2006 IPCC Guidelines for National Greenhouse Gas Inventories

Second Authors/Experts Meeting: Agriculture, Forestry and Other Land Use (2 – 4 June 2004, Le Morne, Mauritius)

Meeting Report

Prepared and reviewed by the Technical Support Unit of the IPCC National Greenhouse Gas Inventories Programme

- Supporting material prepared for consideration by the Intergovernmental Panel on Climate Change. This supporting material has not been subject to formal IPCC review and approval process.
- The Preparation of 2006 IPCC National Greenhouse Gas Inventories Guidelines was approved by the IPCC Panel XX but their decision does not imply NGGIP or IPCC endorsement or approval of these proceedings or any recommendations or conclusions contained herein.
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EXECUTIVE SUMMARY

The IPCC launched the project 'Development of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006 IPCC Guidelines)' to assess and collate scientific and technical information relevant to estimating greenhouse gas emissions and removals in the context of the 1996 IPCC Guidelines, the Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (GPG2000), and the Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG-LULUCF). The project is planned to complete in 2006.

The meeting in Mauritius, on 2-4 June 2004, was the second of a series of authors/experts meetings to be conducted in the year 2004 for the preparation of the 2006 IPCC Guidelines. This meeting generally aimed to convene all the authors/experts of Volume 4 (Agriculture, Forestry, and Other Land-use or AFOLU) to discuss the strategy and work plan for the completion of the task.

All authors/experts in the meeting agreed, as a "generic task" to complete the restructuring of the report base on the approved table of contents. They also agreed to do 'gap filling' and ensuring consistency of methods across land use categories; to refine/revise Tier 1 methods; to provide more specific guidance on application of higher tiers; and to improve the user-friendliness of the report.

Drafting by LAs and CLAs will take place between June and 15 October 2004. Consolidation of the drafts will be done by CLAs, in consultation with LAs, between 15 October and 15 November. CLAs will finalise the first-order draft (FOD), including the draft from the harvested wood product, between 15 November and 1 December. The FOD will be submitted to the TSU on 1 December 2004 to prepare for the Consolidation Meeting in January 2005.

BACKGROUND

At its 17th Session, the Subsidiary Body for Scientific and Technological Advice (SBSTA) of the United Nations Framework Convention on Climate Change (UNFCCC) invited the IPCC to revise the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (1996 IPCC Guidelines), taking into consideration the relevant work under the Convention and the Kyoto Protocol, and to aim at completing the work by early 2006. In response to this invitation, the IPCC launched the project 'Development of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006 IPCC Guidelines)' to assess and collate scientific and technical information relevant to estimating greenhouse gas emissions and removals in the context of the 1996 IPCC Guidelines, the Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (GPG2000), and the Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG-LULUCF). A Scoping Meeting was held in September 2003 to develop the terms of reference (TOR), table of contents (TOC), and the work plan to complete the project in 2006.

IPCC XXI, in November 2003, accepted the TOR, TOC and work plan of the project as elaborated by the Task Force Bureau on Inventories (TFB). This was followed by the selection of authors in accordance with the IPCC procedures.

The First Coordinating Lead Authors and Steering Group Meeting (CLA/SG Meeting) and the First Authors/Experts Meeting on Cross-cutting Issues and Reporting Tables were held in parallel in Oslo, Norway, on 4-6 May 2004. These meetings enabled the Coordinating Lead Authors of the 2006 IPCC Guidelines to prepare for the detailed outlines of the sectoral volumes and to draft the detailed workplan towards the completion of the report. This meeting also enabled the authors of Volume 1 (Cross-cutting Issues and Reporting Tables) to provide guidance on cross-cutting issues and how to ensure consistency in drafting the sectoral volumes of the report.

The meeting in Mauritius, on 2-4 June 2004, was the second of a series of authors/experts meetings to be conducted in the year 2004 for the preparation of the 2006 IPCC Guidelines. This meeting generally aimed to convene all the authors/experts of Volume 4 (Agriculture, Forestry, and Other Land-use or AFOLU) to discuss the strategy and work plan for the completion of the task.

OBJECTIVES AND ORGANISATION OF THE MEETING

The meeting convened eighty-two (82) authors/experts whose participation was categorised as Coordinating Lead Authors (CLAs) and Lead Authors (LAs) of the volume on Agriculture, Forestry and Other Land use (AFOLU), a CLA on cross-cutting issues, members of the Task Force Bureau on Inventories, and a representative from the UNFCCC (see Attachment A). The specific objectives of the meeting were to:

- discuss the draft outline for AFOLU sector (Volume 4) of the 2006 IPCC Guidelines, paying special attention to consistency and harmonisation requirements within the sector and also with other sectors;

- discuss specific tasks/issues assigned to breakout groups and prepare the First-Order Draft of Volume 4;

- discuss links between the sectoral volumes;

- consider the guidance from the First CLA meeting on the consistency and links between the sectoral volumes in drafting the 2006 IPCC Guidelines;

- consider the guidance provided by the "Cross-cutting Issue group" for consistency and harmonisation requirements through the whole report; and reporting issues, and

- explore the availability of scientific and other materials for the drafting.

The Government of Mauritius hosted the meeting, through its Meteorological Service Office. The Technical Support Unit of the IPCC National Greenhouse Gas Inventories Programme (IPCC-NGGIP-TSU) did the coordination with support from the local organisers.

The three-day meeting started with a plenary session that introduced the background, mandate, some relevant information on the preparation of the 2006 IPCC Guidelines including the issues arising from the reporting of inventory information as compiled by the UNFCCC, and the objectives and expected outputs of the meeting. Five main breakout groups (BOG) were formed namely: BOG1 – Biomass; BOG2 – Soils; BOG3 – Wetlands; BOG4 – Livestock; and BOG5 – Consistent representation of lands/management systems. These BOGs met several times to further discuss the draft detailed outline of AFOLU (the outline that was developed in the Oslo Meeting), and to assign the tasks for the drafting. Meetings of CLAs and BOG Facilitators, with Steering Group and TSU, were held in-between, to assess the progress of the BOG sessions and to develop some guidance (when necessary) on how to proceed. This Second Authors/Experts meeting closed with a plenary session to wrap up the discussions and to report the conclusions from the different BOGs.

At this meeting in Mauritius, the harvested wood product (HWP) BOG did not meet since it has to take into consideration any decision that may arise on this matter from the Conference of the Parties (COP) to the UNFCCC. This group will meet in November 2004 in parallel with the Authors/Expert Meeting of the Waste Sector (Volume 5).

OUTPUTS FROM THE MEETING

The following are some of the major decisions concluded at the different sessions of the breakout groups (BOGs):

BOG1 – Biomass
This group agreed to have a general framework to describe carbon stock changes, disturbance impact and non-CO_2 emissions for consistent treatment of carbon stock and transfers among biomass, dead organic matter (DOM), and soil (see Figures 1 and 2). It also agreed to develop consistent terminology and symbols for pools and fluxes. The group also agreed to develop a general disturbance matrix that will summarise all "fractions" of the five carbon pools.

Figure 1: Framework to describe the consistent treatment of C stock and transfers among biomass, dead organic matter and soils.

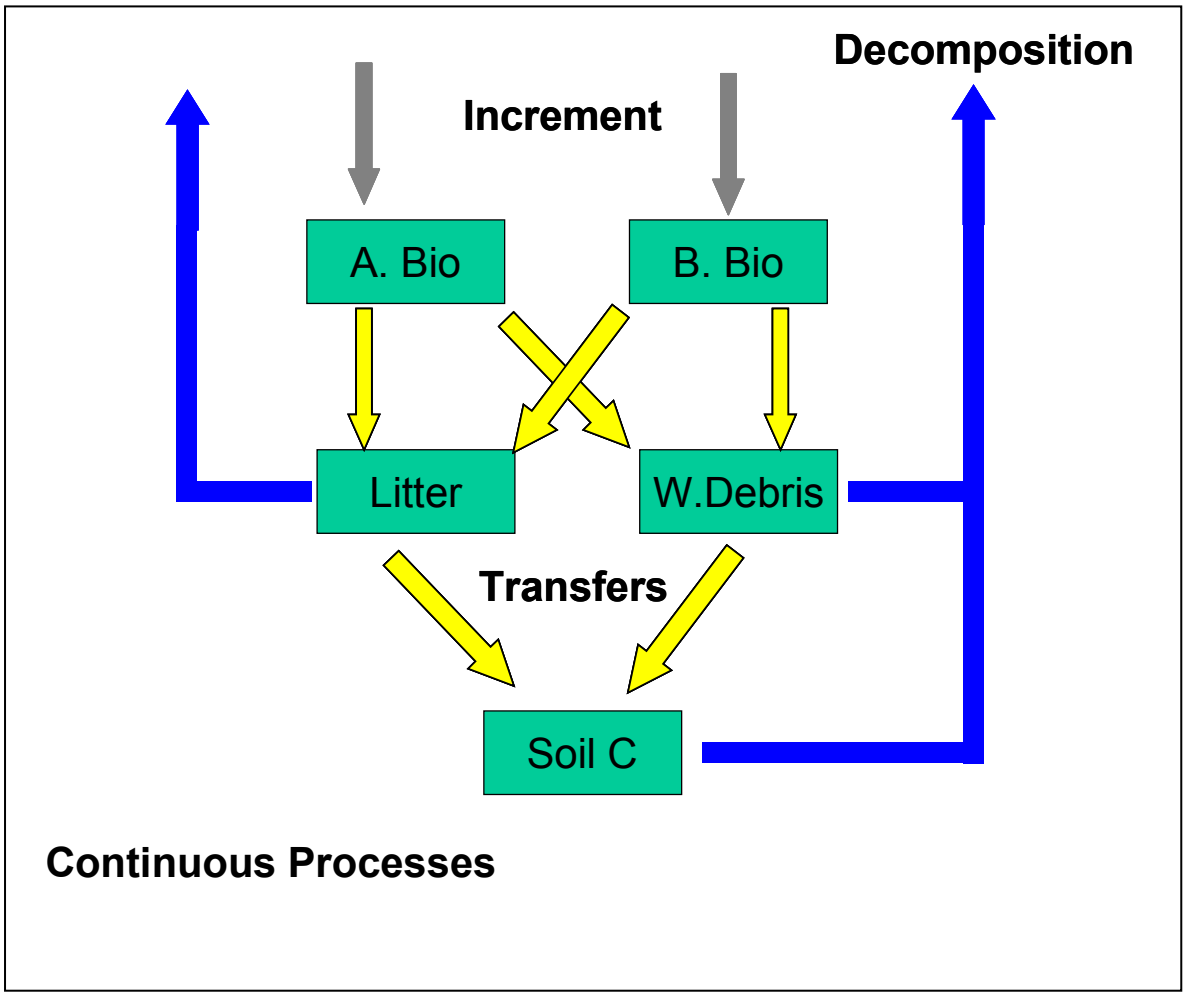
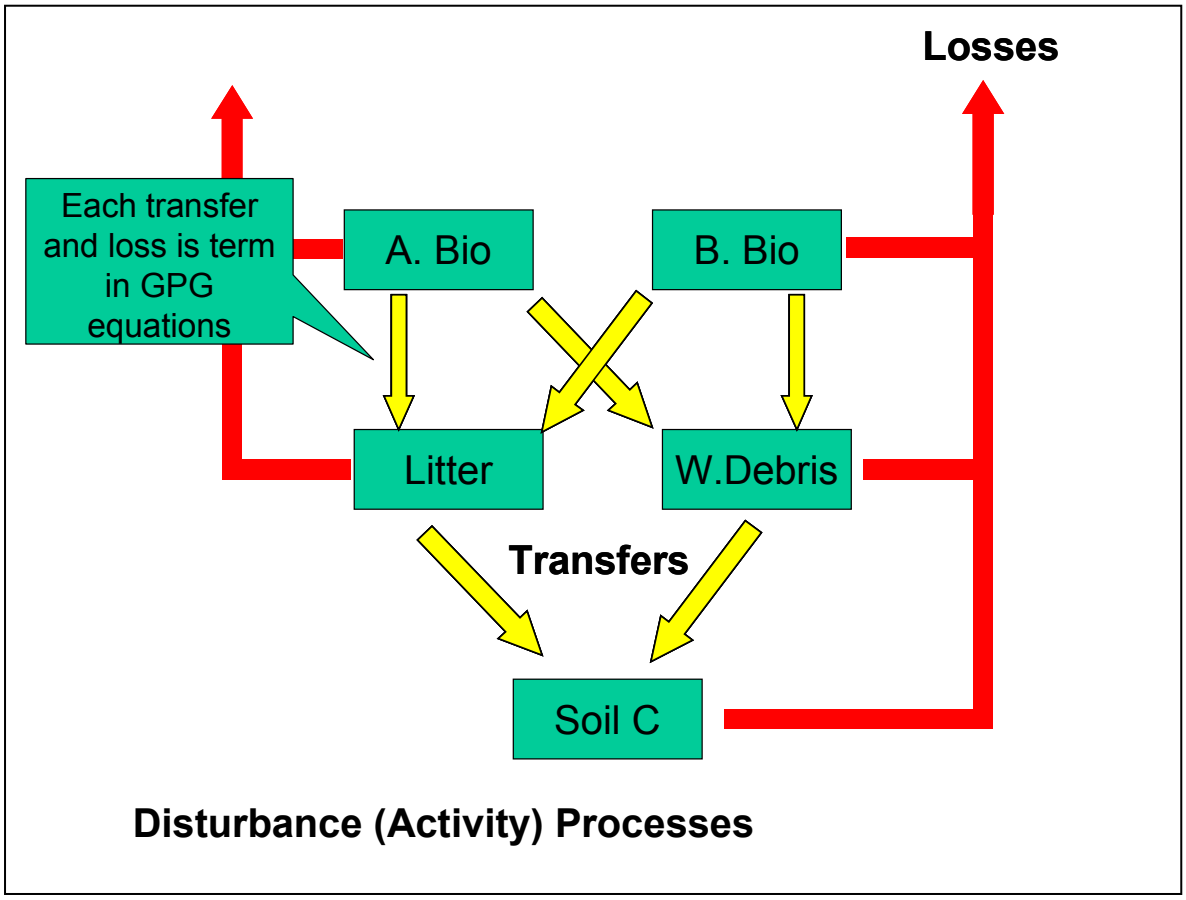


Figure 2: Framework that describes disturbances (or "activities") which include fires, harvest, LUC and other events that redistribute carbon in an ecosystem



BOG2 – Soils

The Soils group agreed to conduct scoping/review of the following issues:

A. On soil carbon issues,

- Estimation of dead organic matter (DOM) pool in collaboration with the DOM Biomass group
- Update of mineral soil C stock change factors (in settlements, uncertainty, erosion scaling factor (for Tier 2), rice management factors, agroforestry, and management categorisation;
- Evaluation of adjustment in time to new equilibrium (e.g. stratification by climate region); and
- Liming on soil organic carbon loss

B. For Mineral Soils, Organic Soils & Liming

- Management effects on soil inorganic carbon (e.g. primary carbonate loss & secondary carbonate gain – method);
- Salt-affected soils e.g. naturally salty soils (Tier 2), anthropogenic salty soils (Tier 2);
- Soil categories/reference C stocks (native reference carbon stocks, sensitivity and further stratification);
- Organic soils (re-examine C loss factors; examine CO_2-CH_4 dynamics - recalculation issues);
- Coupling between C stock change and N_2O losses;

- Cross cutting issues (uncertainties in default EFs – country specific – random effect; decision tree for completeness; issues from mixing tiers; time series consistency & recalculation); and
- General guidance for Tiers 2 and 3 applications (selection of models, source categories, activity data, uncertainty, validation / verification)

C. On rice cultivation

- Basic forms of the GL96 and GPG2000 methodology that can be used in the report
- Readjustment of default emission factors (EFs)
- Readjustment of current scaling factors (SFs)
- Determination of additional SFs
- Provision of guidelines in using additional activity data (water management, organic amendments, climate zone, soil type), and
- Establishment of uncertainties in reported CH_4 inventories based on EFs, SFs, and activity data

D. On soils N_2O emissions

- Review of additional literature on EFs for mineral N; organic N; excreta during grazing; crop residue N (including cover crops); biological-fixed N; forests, pasture renewal and rotational systems
- Review of information on freeze-thaw environments
- Revision of indirect emissions of N_2O from N deposition, EF for leached N (EF_5), and for ammonia losses;
- Provide QA/QC methodology to ensure completeness of reported emission related to N sources
- Evaluate if inclusion in methodology is appropriate for tillage practice, land use change, mid-season aeration of rice paddies, EF for fertiliser applied to flooded land and wetlands
- Advice on activity data for inclusion of emissions of NO_x from Energy and IPPU
- Uncertainties and QA/QC, and
- Worksheets and Reporting Tables

BOG3 – Wetlands

The Wetlands BOG, which covered the greenhouse gas emissions and removals from peatland and flooded land, agreed to address the following tasks:

- Definitions & Terminology
- Scoping papers
- Linkages and cross-cutting issues with other land-uses
- Methodologies
- International Contacts

This group will look into the issue of definitions and terminologies in order to develop decision tree that will distinguish different sub-categories of managed peatland; unchanged, converted from agroforestry/forestry; or converted from unmanaged peatland. The group agreed to prepare scoping papers for the following topics to support the drafting of the wetlands chapter:

1. Forest conversion to peatlands
2. Restoration or abandonment of post extraction/agriculture/forestry
3. Cranberry production

4. Water purification
5. Riparian areas managed for flood control
6. Managed coastal wetlands
7. Dissolved organic carbon (DOC) and dissolved inorganic carbon (DIC)

The BOG agreed to establish strong linkages with the groups working on soils (on drained wetland soils), biomass burning (on peatland burning), and rice cultivation. It will also try to elaborate on the distinction between nutrient-rich and nutrient-poor peatland and the implications of their use.

For flooded lands, the group agreed to improve the default EFs to reflect new data and other refinements. Scoping paper on carbon coming into flooded lands from other land categories will be developed and the linkage to indirect N_2O calculations will be established. Guidance on the use of the carbon stock change equation for lands converted to flooded lands will be refined to avoid overestimation.

BOG4 – Livestock

For livestock population and feed characterization, the Livestock BOG agreed to do consistency check across the following sources:

- enteric fermentation
- CH_4 and N_2O emissions from manure management; and
- N_2O from soils.

Improvement will be needed to:

- Expand information in relation to swine and poultry (representative categories, feed characteristics and formulas)
- Consider the influence of management system (intensive / extensive systems) broken down by region
- Add paragraph on relevance of expression of emissions on basis of per unit production / discussion of system approach.
- Annual Population (three year average to annual average considering influence of raising period and season change)

For Enteric Fermentation, the group agreed to:

- Modify the decision tree in GPG2000;
- Update the Default Values and EF for Tier 1;
- Update the formula for Net Energy calculation for Tier 2;
- Update the Methane Conversion Rate based on new science and technical knowledge available; and
- Propose for Tier3 that countries explore specific methods including process-based model or direct measurement approach

For Manure Management, the group decided to:

- Update default Tier 1 emission factor
- Update background table
- Revise inputs to Tier 2 (i.e. MCF, VS, N, new management systems; new lagoon MCF defaults);
- Define main parameters and management systems
- Consolidate text across GPGs, Guidelines, and Workbook
- Develop uncertainty values for Tier 1 methane factors

- Revise decision trees to reflect all available options

For Nitrogen Losses in Manure Systems, the group will look into the proper accounting for applied nitrogen to soils from manure management systems taking into account the following:

- Step to subtract for volatilization to ammonia and nitrogen oxides in livestock system
- Research needed to collect default parameters for calculation
- Maintain consistency with world-wide ammonia inventory studies

BOG5 – Consistent Representation of lands/management systems

This group agreed to enhance the consistency in representation of land areas by: 1) using a common set of classifications of land into areas that match default factors and where possible available global data (particularly for Tiers 1 and 2 methodologies); and 2) developing (initially) around existing classifications in GPG and Guidelines, and varied direction from AFOLU authors as methodologies are further developed. The task is viewed to be accomplished by the following steps (elements of work):

1. Describe the major Land Use/Management categories (Chapters 2 and 3 of GPG 2003)
2. Synthesize a common set of biophysical classifications (see Table 1)
3. Provide technical guidance on how to estimate land areas:
    - How to use spatial and/or statistical data to estimate land areas
    - Provide guidance on matching area estimates to default factors in the methodological guidance
    - Encourage transparent reporting through (or to) classification systems, relevant at Tiers 2 and 3

Table 1: Example of Biophysical Classifications

Climate (Mostly done)	Soils (Mostly done)	Vegetation (Variable)
Boreal Cold temperate, dry Cold temperate, moist Warm temperate, dry Warm temperate, moist Tropical, dry Tropical, moist Tropical, wet	High activity clay (HAC) Low activity clay (LAC) Sandy Spodic Volcanic Wetland	1996 Guidelines adopt FAO 1993 (but provide defaults and report on alternative schemes)

CONCLUSIONS

All authors/experts agreed, as generic tasks, to complete the restructuring of the report base on the approved TOC; to do 'gap filling' and ensuring consistency of methods across land use categories; to refine/revise Tier 1 methods (default) through data collection, analysis, and synthesis of data for re-estimating emissions and stock change factors (where appropriate); to provide more specific guidance on application of higher Tiers; and to improve the user-friendliness of the report (e.g. decision trees, step-by-step 'cookbook', examples).

Finally, the meeting agreed to a work plan for the first order draft (FOD). Drafting by LAs and CLAs will take place between June and 15 October 2004. CLAs will consolidate the drafts, in consultation with LAs, between 15 October and 15 November. CLAs will finalise the FOD, including the draft from the harvested wood product, between 15 November and 1 December. The FOD will be submitted to the TSU on 1 December 2004 for technical editing and formatting and in preparation for the Consolidation Meeting to be held in January 2005.

Attachment A – Participant list

List of Participants

IPCC National Greenhouse Gas Inventories Programme

Preparation of 2006 IPCC National Greenhouse Gas Inventories Guidelines
Second Authors/Experts Meeting : Agriculture, Forestry and Other Land Use
2 – 4 June 2004
Le Morne, Mauritius

*** Absentees**
**** Task Force Bureau Members**

Lead Authors for Agriculture, Forestry and Other Land Use

Argentina
Hector Ginzo
Ministerio de Relaciones Exteriores,
Comercio Internacional y Culto
Esmeralda 1212, Piso 14
C1007 ABR
Tel : (54 11) 4819 7414
Fax : (54 11) 4819 7413
hdginzo@arnet.com.ar

Australia
Robert John Raison
CSIRO - Forestry and Forest Products
PO Box E4008
Kingston, ACT 2604
Tel : (61 26) 281 8280
Fax : (61 26) 281 8312
John.Raison@csiro.au

Gary P Richards
Australian Greenhouse Office
GPO Box 621
Canberra, ACT 2601
Tel : (61) 262741926
Fax : (61) 262741493
gary.richards@deh.gov.au

Brazil
Carlos Frederico Silveira Menezes
Enviromental Departament of Centrais Elétricas Brasileiras S.A. - ELETROBRÁS
Rua Djalma Ulrich, 326 Apto.701, Copacabana
22071-020, Rio de Janeiro, RJ
Tel : (55 21) 21 2247 3654
Fax : (55 21) 21 2247 3654
frederico@eletrobras.com/frederico.menezes@mme.gov.br

Niro Higuchi
National Institute for Research in the Amazon - INPA/CPST
Caixa Postal 478
69.011-970 Manaus - AM
Tel : (55 92) 643 1843 / 643 1900
Fax : (55 92) 643 1836
niro@inpa.gov.br

Thelma Krug **
Inter-American Institute for Global Change Research
Avenida dos Astronautas 1758, Jardim da Granja
12297-010 Sao Jose dos Campos, SP
Tel : (55 12) 3945 6895
Fax : (55 12) 3941 4410
thelma@dir.iai.int

Magda Lima
Empresa Brasileira de Pesquisa Agropecuária - Embrapa
Rodovia SP-340 km 127.5
Jaguariúna, SP 13820-000
Tel : (55 19) 3867 8745
Fax : (55 19) 3867 8740
magda@cnpma.embrapa.br

Ricardo Rodrigues
Ministry of Science and Technology
Praia do Flamengo 200
Sala 2401 Rio de Janeiro – RJ 22210-901
Tel : (55 21) 2555 0307
Fax : (55 21) 2555 0306
RVIANNA@FINEP.GOV.BR

Canada
Dominique Blain
Environment Canada
PVM 19th floor, 351 boul. St-Joseph Gatineau
Québec K1A 0H3
Tel : (1 819) 953 6079
Fax : (1 819) 953 3006
dominique.blain@ec.gc.ca

Eric Duchemin
DREXenvironnement
2667 rue Knox
Montreal, QC H3K 1R3
Tel : (1 514) 937 5619
Fax :
drexenv@sympatico.ca

Werner Kurz
Natural Resources Canada, Canadian Forest Service
506 West Burnside Road
Victoria, BC, V8Z 1M5
Tel : (1 250) 363 6031
Fax : (1 250) 363 0775
wkurz@nrcan.gc.ca

Tim McAllister
Agriculture and Agri-Food Canada
P. O. Box 3000 Lethbridge
Alberta T1J 4B1
Tel : (1 403) 317 2240
Fax : (1 403) 317 2182
mcallister@agr.gc.ca

Brian McConkey
Agriculture and Agri-Food Canada
P.O. Box 1030, Swift Current
SK, S9H 3X2
Tel : (1 306) 778 7281
Fax : (1 306) 773 9123
mcconkeyb@agr.gc.ca

Philippe Rochette
Agriculture and Agri-Food Canada
2560, Hochelaga Blvd
Sainte-Foy, QC, G1V 2J3
Tel : (418) 657 7985 (x267)
Fax : (418) 648 2402
rochettep@agr.gc.ca

Alain Tremblay
Hydro-Québec
75 Boulevard Rene-Levesque, 10 floor
Montreal, Quebec, H2Z 1A4
Tel : (1 514) 289 2211 (ext: 4416)
Fax : (1 514) 289 5038
tremblay.alain@hydro.qc.ca

Chile
Sergio Gonzalez **
INIA
Casilla 439 Correo 3
Santiago de Chile
Tel : (56 2) 7575115
Fax : (56 2) 7575120
sgonzale@platina.inia.cl / sgonzal@ctcreuna.cl

Rafael Novoa
INIA (retired)
Brown Norte 1661. Providencia
Santiago
Tel : (56 2) 274 3735
Fax :
rnovoasa@hotmail.com

China
Hongmin Dong
Agrometeorology Institute
Chinese Academy of Agricultural Sciences
12 Zhongguancun South Street
Beijing 100081
Tel : (86 10) 6891 9979
Fax : (86 10) 6891 9979
Donghm@ns.ami.ac.cn / Donghm@mail.caas.net.cn

Yue Li
Institute of Agricultural Environment and Sustainable Development
Chinese Academy of Agricultural Sciences
12 Zhongguancun South Street
Beijing 100081
Tel : (86 10) 6211 9681
Fax : (86 10) 6211 9681
yueli@ns.ami.ac.cn / lujinghong@yahoo.com

Xiaoquan Zhang
Chinese Academy of Forestry
Wan Shou Shan
Beijing 100091
Tel : (86 10) 6288 9512
Fax : (86 10) 6288 8840
xiaoquan@forestry.ac.cn

FAO
Dieter Schoene
Food and Agriculture Organization
Viale Terme di Caracalla
00100 Rome
Italy
Tel : (39) 06 570 55077
Fax : (39) 06 570 55137
dieter.schoene@fao.org

Finland
Jukka Alm
Finnish Forest Research Institute
Joensuu Research Centre
PO Box 68 (Yliopistokatu 7)
FIN-80101
Tel : (358 50) 391 3107
Fax : (358 10) 211 3001
jukka.alm@metla.fi

Jari Huttunen
University of Kuopio
Department of environmental Sciences
Bioteknia 2, University of Kuopio
P.O. Box 1627, FIN-70211
FIN-70211
Tel : (358 17) 163 582
Fax : (358 17) 163 750
Jari.Huttunen@uku.fi

Carl Kim Pingoud *
Finnish Forest Research Institute
Unioninkatu 40 A
00170 Helsinki
Tel : (358 10) 211 2063
Fax : (358 10) 211 2104
kim.pingoud@metla.fi

France

Robert Delmas
Laboratoire d'Aérologie
14, avenue Edouard Belin
31400 Toulouse
Tel : (33 5) 61 33 27 10
Fax :
delr@aero.obs-mip.fr

Germany

Michael Köhl *
University of Hamburg
Feeral Research Centre for Forestry and Forest Products
Leuschnerstr. 91
D-21031 Hamburg
Tel : 49(0) 40 73962-100
Fax : 49(0) 40 42891-2665
m.koehl@holz.uni-hamburg.de

Reiner Wassmann
Institute for Meteorology and Climate Research (IMK/IFU) Forschungszentrum Karlsruhe
Kreuzeckbahnstr. 19
82467 Garmisch-Partenkirchen
Tel : (49 8821) 183139
Fax : (49 8821) 183296
Reiner.Wassmann@imk.fzk.de

Hungary

Zoltan Somogyi
Forest Research Institute, Hungary
Frankel L. u. 42-44.
Budapest H-1023
Tel : (36 30) 465 2684
Fax : (36 1) 326 1639
somogyiz@erti.hu / som9013@helka.iif.hu

India

Sumana Bhattacharya *
Winrock International India
NATCOM Project
1, Navjeevan Vihar
New Delhi 110017
Tel : (91 11) 2669 3876
Fax : (91 11) 2669 3876
sumana@winrockindia.org
sumana_bhattacharya@yahoo.com

N.H. Ravindranath
Indian Institute of Science
Centre for Ecological Sciences
Indian Institute of Science
Bangalore 560 012
Tel : (91 80) 2334 1838
Fax : (91 80) 2360 1428
ravi@ces.iisc.ernet.in

Ireland

Kenneth Byrne
Department of Civil and Environmental Engineering
University College Cork
Cork
Tel : (353 21) 490 3025
Fax : (353 21) 427 6648
k.byrne@ucc.ie

Japan

Mariko Handa *
Organization for Landscape and Urban Greenery Technology Development
Shuwa Dai-san Toranomon Building
1-21-8 Toranomon, Minato-ku
Tokyo 105-0001
Tel : (81 3) 3593 9351
Fax : (81 3) 3593 9356
handa@greentech.or.jp

Mitsuo Matsumoto
Forestry and Forest Products Research Institute
Matsunosato 1, Tsukuba-city
Ibaraki-pref., 305-8687
Tel : (81 29) 873 3211
Fax : (81 29) 874 3720
machan@ffpri.affrc.go.jp

Mario Tonosaki *
Forestry and Forest Products Research Institute
Matsunosato 1, Tsukuba-city
Ibaraki-pref., 305-8687
Tel : (81 29) 873 3211(ext 576)
Fax : (81 29) 874 3720
tonosaki@ffpri.affrc.go.jp

Atsushi Tsunekawa
The University of Tokyo
Yayoi 1-1-1, Bunkyo-ku
Tokyo 113-8657
Tel : (81 3) 5841 5049
Fax : (81 3) 5841 5072
atsushi@mail.ecc.u-tokyo.ac.jp

Kazuyuki Yagi
National Institute for Agro-Environmental Science
3-1-3 Kannondai
Tsukuba 305-8604
Tel : (81 29) 838 8234
Fax : (81 29) 838 8199
kyagi@affrc.go.jp

Malawi
Samuel Kainja
Forestry Department
Box 30048, Lilongwe
Tel : (265 1) 771 000
Fax : (265 1) 774 268
skainja@malawi.net

Malaysia
Faizal Parish *
Global Environment Center
2nd Floor, Wisma Hing, 78, Jalan SS2/72
47300 Petaling Jaya, Selangor
Tel : (60 3) 7957 2007
Fax : (60 3) 7957 7003
fparish@genet.po.my / fparish@pd.jaring.my

Netherlands
André Van Amstel
Wageningen University
Ritzema Bosweg 32a
P.O. Box 47
6700 AA Wageningen
Tel : (31 317) 484812
Fax : (31 317) 484839
andre.vanamstel@wur.nl

New Zealand
Cecile de Klein
AgResearch, Invermay Agricultural Centre
Private Bag 50034, Mosgiel
Tel : (64 3) 489 9047
Fax : (64 3) 489 3739
cecile.deklein@agresearch.co.nz

Keith Lassey
National Institute of Water and Atmospheric Research
Private Bag 14-901 Kilbirnie
Wellington
Tel : (64 4) 386 0583
Fax : (64 4) 386 2153
k.lassey@niwa.co.nz

Norway
Harald Aalde
Norwegian Institute of Land Inventory
P.O.box 115
N-1430 Ås
Tel : (47 64) 94 97 76
Fax : (47 64) 94 97 86
harald.aalde@nijos.no

Kristin Rypdal
CICERO – Center for International Climate and Environmental Research
P.O. Box 1129 Blindern
N-0318 Oslo
Tel : (47) 22 85 87 80
Fax : (47) 22 85 87 51
kristin.rypdal@cicero.uio.no

Philippines
Rodel Lasco
World Agroforestry Centre (ICRAF)
2F CFNR Admi Bldg
University of the Philippines
College, 4031 Laguna
Tel : (63 49) 536 2925
Fax : (63 49) 536 4521
rlasco@cgiar.org

Russia
Michael Gytarsky
Institute of Global Climate and Ecology
20-B, Glebovskaya str.
Moscow 107258
Tel : (7 095) 169 2198
Fax : (7 095) 160 0831
Mike.Gytarsky@ru.net

Anna Romanovskaya
Institute of Global Climate and Ecology
20-B, Glebovskaya str.
Moscow 107258
Tel : (7 095) 169 2198
Fax : (7 095) 160 0831
Aromanovskaya@comail.ru / an_roman@mail.ru

Spain
Maria Jose Sanz Sanchez
Fundación CEAM
Parque Tecnológico, c/ Charles Darwin
14. Paterna (Valencia) 46980
Tel : (34 96) 131 8227
Fax : (34 96) 131 8190
mjose@ceam.es

Sudan
Nagmeldin Goutbi Elhassan
Higher Council for Environment and Natural Resources (HCENR)
P.O. Box 10488 Gama Street
Khartoum
Tel : (249 183) 784 279
Fax : (249 183) 787 617
goutbi@yahoo.com

UK
Keith Smith
University of Edinburgh
School of GeoSciences
Darwin Building, Mayfield Road
Edinburgh EH9 3JU
Tel : (44 131) 650 7721
Fax : (44 131) 662 0478
keith.smith@ed.ac.uk

Pete Smith
University of Aberdeen
School of Biological Sciences
Cruikshank Building, St Machar Drive
Aberdeen, AB24 3UU
Tel : (44 1224) 272702
Fax : (44 1224) 272703
Pete.smith@abdn.ac.uk

Uruguay

Daniel Martino
Carbosur
Constituyente 1467/1202
Montevideo, 11.100
Tel : (598) 2 401 6279
Fax : (598) 2 400 3533
carbosur@adinet.com.uy

US

Kathryn Bickel
US Department of Agriculture
1400 Independence Ave, SW
J.L. Whitten Building Room 112-A
Washington, DC, 20250
Tel : (1 202) 720 9978
Fax : (1 202) 401 1176
kbickel@oce.usda.gov

John Brenner
US Department of Agriculture
Colorado State University, NESB, NREL
A217, Fort Collins
CO 80523-1499
Tel : (1 970) 491 5799
Fax : (1 970) 491 1965
jbrenner@nrel.colostate.edu

Patrick Gonzalez
The Nature Conservancy
Climate Change Initiative
4245 North Fairfax Dr., Arlington
VA 22203-1606
Tel : (1 703) 841 2038
Fax : (1 703) 276 3241
pgonzalez@tnc.org / pgonzalez@cal.berkeley.edu

Jerry Hatfield *
US Department of Agriculture
Agricultural Research Service
National Soil Tilth Laboratory
2150 Pammel Drive, Ames
Iowa 50011
Tel : (1 515) 294 5723
Fax : (1 515) 294 8125
hatfield@nstl.gov

Linda Heath
US Department of Agriculture Forest Service
PO Box 640 (Courier mail: 271 Mast Road)
Durham, NH 03824
Tel : (1 603) 868 7612
Fax : (1 603) 868 7604
Lheath@fs.fed.us

Bill Irving
US Environmental Protection Agency
1200 Pennsylvania Avenue NW
Washington DC 20460 (6204J)
Tel : (1 202) 343 9065
Fax : (1 202) 343 2357
irving.bill@epa.gov

Jennifer Jenkins
University of Vermont
Gund Institute for Ecological Economics
590 Main St.
Burlington, VT 05405
Tel : (1 802) 656 2953
Fax : (1 802) 656 2995
jennifer.c.jenkins@uvm.edu

Donald Johnson
Colorado State University
209 Animal Sciences Bldg, Colorado State Univ.
Ft. Collins, CO 80523
Tel : (1 970) 491 7833
Fax : (1 970) 491 5326
don.johnson@colostate.edu

Joe Mangino
US Environmental Protection Agency
1200 Pennsylvania Ave., N.W. (6202J)
Washington, DC 20460
Tel : (1 202) 343 9481
Fax : (1 202) 343 2208
mangino.joseph@epa.gov

Arvin Mosier *
US Department of Agriculture
Agricultural Research Service
2150 Centre Avenue
Building D, Suite 100
Fort Collins, CO 80526
Tel : (1 970) 492 7250
Fax : (1 970) 492 7213
arvin.mosier@ars.usda.gov
amosier@lamar.colostate.edu

Stephen Ogle
Colorado State University
NREL, Colorado State University
Fort Collins
CO 80523
Tel : (1 970) 491 7662
Fax : (1 970) 491 1965
ogle@nrel.colostate.edu

Keith Paustian
Colorado State University
NESB Rm B207, Colorado State University
Ft. Collins, CO, 80523
Tel : (1 970) 491 1547
Fax : (1 970) 491 1547
keithp@nrel.colostate.edu

Clark Row
Row Associates (thru ICF Consulting)
PO Box 1037, Edgewood
MD, 21040
Tel : (1 410) 538 3111
Fax : (1 410) 676 7980
clarkrow@aol.com / crow21040@aol.com

Kenneth Skog *
US Department of Agriculture Forest Service
Forest Products Laboratory
One Gifford Pinchot Drive 53711
Tel : (1 608) 231 9360
Fax : (1 608) 231 9360
kskog@fs.fed.us

Stanley Tyler
University of California, Irvine
Earth System Science Department
Irvine, California
CA 92697-3100
Tel : (1 949) 824 8794
Fax : (1 949) 824 3256
styler@uci.edu

Thomas Wirth
US Environmental Protection Agency
1200 Pennsylvania Ave., NW (6202J)
Washington DC 20460
Tel : (1 202) 343 9108
Fax : (1 202) 343 2208
wirth.tom@epa.gov

Zambia
Julius Daka *
Environmental Council of Zambia
P.O. Box 35131
Tel : (260) 1 254023/59
Fax : (269) 1 254164
jdaka@necz.org.zm / ecz@necz.org.zm

Zimbabwe
Washington Zhakata
Climate Change Office
Ministry of Environment and Tourism
P. Bag 7753, Causeway
Harare
Tel : (263 4) 757876/702758
Fax : (263 4) 757876
climate@ecoweb.co.zw
washingtonzhakata@hotmail.com

Invited Experts

UK
Jim Penman
Global Atmosphere Division
Department for the Environment, Food and Rural Affairs
Ashdown House, 123 Victoria St
London SW1E 6DE
Tel : (44 20) 7082 8152
Fax : (44 20) 7082 8151
jim.penman@defra.gsi.gov.uk

Participants from Mauritius

P. Ramgolam
Ministry of Environment
Ken Lee Tower
Barracks Street
Port Louis
Tel : (230) 212 4385
Fax :
envcpi@intnet.mu

Pouran Hanoomanjee
Agricultural Research and Extension Unit
Newry Complex
88 St Jean Road
Quatre Bornes
Tel : (230) 466 3885
Fax : (230) 466 4809
areu@intnet.mu

R. Nayamuth
Mauritius Sugar Industry Research Institute
Reduit
Tel : (230) 454 1061
Fax : (230) 454 1971
rnayamut@msiri.intnet.mu

Prem Goolaup
Meteorological Services
St. Paul Road
Vacoas
Tel : (230) 686 1031/32
Fax : (230) 686 1033
meteo@intnet.mu

UNFCCC

Rocio Lichte
P.O.Box 260124
53153 Bonn
Germany
Tel : (49 228) 815 1619
Fax : (49 228) 815 1999
Rlichte@unfccc.int

Task Force Bureau Member

Taka Hiraishi
c/o Institute for Global Environmental Strategies
2108-11 Kamiyamaguchi, Hayama
Kanagawa 240-0115
Japan
Tel : (81 46) 855 3750
Fax : (81 46) 855 3808
hiraishi@iges.or.jp

S.N. Sok Appadu
Meteorological Services
St. Paul Road, Vacoas
Mauritius
Tel : (230) 686 1031/32
Fax : (230) 686 1033
meteo@intnet.mu

IPCC NGGIP TSU

Simon Eggleston
c/o Institute for Global Environmental Strategies
2108-11 Kamiyamaguchi, Hayama
Kanagawa 240-0115
Japan
Tel : (81 46) 855 3750
Fax : (81 46) 855 3808
eggleston@iges.or.jp

Kyoko Miwa
c/o Institute for Global Environmental Strategies
2108-11 Kamiyamaguchi, Hayama
Kanagawa 240-0115
Japan
Tel : (81 46) 855 3750
Fax : (81 46) 855 3808
miwa@iges.or.jp

Todd Ngara
c/o Institute for Global Environmental Strategies
2108-11 Kamiyamaguchi, Hayama
Kanagawa 240-0115
Japan
Tel : (81 46) 855 3750
Fax : (81 46) 855 3808
ngara@iges.or.jp

Ayako Hongo
c/o Institute for Global Environmental Strategies
2108-11 Kamiyamaguchi, Hayama
Kanagawa 240-0115
Japan
Tel : (81 46) 855 3750
Fax : (81 46) 855 3808
hongo@iges.or.jp

Leandro Buendia
c/o Institute for Global Environmental Strategies
2108-11 Kamiyamaguchi, Hayama
Kanagawa 240-0115
Japan
Tel : (81 46) 855 3750
Fax : (81 46) 855 3808
lbuendia@iges.or.jp