



Working paper No. 3 (2004)

## Workshop on emissions projection

Bonn, Germany, 6–8 September 2004

### Issues in the preparation of GHG projections for agriculture and land use, land-use change and forestry

#### Working paper

#### I. Introduction

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA), at its nineteenth session, requested the secretariat “to organize a workshop in the second half of 2004 on emissions projections of Parties included in Annex I to the Convention (Annex I Parties), as a contribution to the preparation of their fourth national communications. The workshop would cover methods, assumptions, indicators, key parameters of models and sensitivity analysis, and dissemination of methodologies<sup>1</sup>”.
2. This paper was prepared to support discussions at the UNFCCC workshop on greenhouse gas (GHG) projections of Annex I Parties in Bonn, Germany on 6–8 September 2004. Its objective is to outline major issues in the preparation of GHG projections for agriculture and for land use, land-use change and forestry (LULUCF) based on the experience with the preparation of GHG projections presented by Annex I Parties in the latest, usually third, national communications.
3. General and cross-cutting in the preparation of GHG projections and specific issues in the preparation of GHG projections for the energy sector, transport, industry and waste management are dealt with in two other working papers prepared for the workshop.
4. The list of major methodological issues for the preparation of sectoral projections, provided in this paper, is not intended to be exclusive or definitive – participants may identify other issues and/or reformulate the issues presented here, as needed.

#### II. Key methodological issues for agriculture

5. **Definition and projection of activity levels and emission factors:** Most Parties based their projections of GHG emissions from agriculture on estimates of future activity levels (such as expected changes in crops and livestock), combined with assumptions about future emission factors from various agricultural sources.

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<sup>1</sup> FCCC/SBSTA/2003/15, paragraph 14(f).

6. **The workshop may wish to review the approaches used for projecting activity levels and emission factors in agriculture and, if necessary, identify best practices for such estimates.**
7. *Use of specialized agricultural models in projections:* Some Annex I Parties used specialized models in the preparation of GHG projections for agriculture.<sup>2</sup>
8. **The workshop may wish to discuss models that are applied for agriculture and, if necessary, outline the GHG sources in agriculture for which use of specialized models would be desirable.**
9. *Modelling of GHG-related factors particularly relevant to agriculture:* Most GHG-related measures described in national communications were not designed to reduce GHG emissions but rather to address other problems (for example, agro-environmental policies or biological farming); GHG mitigation is in such cases an additional positive effect (or an ancillary benefit). Nevertheless, some Parties provided examples of specific measures designed to mitigate GHG emissions, for example improvements in manure management.
10. **The workshop may wish to review the approaches used for modelling the impact of policies and measures on GHG emissions in agriculture and to identify, if needed, typical methodological problems and their solutions.**
11. *Presentation of main drivers of projected GHG emissions:* The UNFCCC guidelines stipulate that “to provide the reader with an understanding of emission trends in the years 1990 to 2020, Parties shall present relevant information on factors and activities for each sector.” Some national communications provided little or no information on the main drivers behind the projected levels of GHG emissions from agriculture. The lack of such information reduces the transparency and credibility of GHG projections from this sector.
12. **The workshop may wish to discuss what factors and activities could be best used to illustrate and clarify, within a national communication, the projected behaviour of GHG emissions from agriculture.**

### **III. Key methodological issues for land use, land-use change and forestry**

13. *LULUCF-related challenges for reporting GHG projections.* The reporting of projections for the LULUCF sector has been scarce. Table 1 in Working paper No. 1 shows that many Parties did not provide projections for GHG emissions and removals from land-use change and forestry. More exactly, the analysis in document FCCC/SBSTA/2004/INF.7 shows that only 25 Parties reported numerical data for GHG projections.
14. **The workshop may wish to discuss the specific difficulties that modellers face in the preparation of GHG projections for LULUCF and, as possible, recommend solutions based on experience of those Parties that were able to project these emissions (see table 1).**
15. *Drivers of projected GHG emissions.* Some national communications provided little or no information on the main drivers behind projected levels of GHG emissions from LULUCF. The lack of such information reduces the transparency and credibility of GHG projections from this sector.
16. **The workshop may wish to discuss which factors and variables could be used to project GHG emissions in LULUCF and whether any useful recommendations could be provided in this respect. In particular, the workshop may wish to address:**

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<sup>2</sup> Examples of such models are the Austrian Carbon Balance Model and the New Zealand OVERSEE model (for estimating N<sub>2</sub>O emissions from soil).

- (a) **Economic and political factors** that determine the level of activities such as afforestation and reforestation, harvesting, land clearance, forest management practices and others
- (b) **Forestry and other LULUCF-related variables used to estimate GHG emissions and removals.** The use of growth rates, tree density, biomass expansion factors and others, as well as assumptions on such factors as the occurrence of fires and pests, the feedback effects of climate change and the effects of CO<sub>2</sub> fertilization and nitrogen deposition, are used in the estimation of GHG emissions and removals from LULUCF and, thus, could be used for projections
- (c) **How factors and activities could best be used to illustrate and clarify, within a national communication, the projected behaviour of GHG emissions/removals from LULUCF.**

17. **Approaches, methods and sources of information and data.** The methods used by Parties to project GHG emissions/removals vary and are usually not comparable. Furthermore, methods used among Parties diverge from those used in the preparation of the national GHG inventories. The workshop may wish to exchange information on available methods, including models, for projecting GHG emissions into the future.

18. **The workshop may wish to discuss the relevance of extrapolating emissions/removals and provide alternative approaches that could be used when this approach is not the most appropriate. In addition, the workshop may wish to identify sources of information on LULUCF-related projection methods and for the factors referred to in the paragraph above.**

19. **Good practice guidance for LULUCF.** The Intergovernmental Panel on Climate Change (IPCC) finalised its report entitled *Good Practice Guidance for land use, land-use change and forestry* (GPG), which the Conference of the Parties, by its decision 13/CP.9, adopted for reporting emissions/removals from LULUCF under the Convention. The GPG defines six land categories and provides technical guidance for the evaluation of emissions and removals of GHG resulting in each of these categories.

20. **The workshop may wish to discuss the implications of the GPG for the preparation of projections, including the possible use of the technical guidance included in this report.**

**Table 1. Methods used by Parties to develop GHG projections for the LULUCF sector**

<b>Party</b>	<b>Description of method</b>
Australia	Extrapolation of the current trend
Belarus	Model: input national forest inventory (NFI) data, output carbon pools estimates
Belgium	Linear trend
Hungary	Linear model CASMOFOR
Ireland	Constant net removals from 2006 onwards
New Zealand	Same model used for reporting emissions and removals from the LUCF sector
Norway	Extrapolation of national forest inventory data
Poland	Extrapolation of national forest inventory data
Sweden	Scenario analysis
Switzerland	Linear extrapolation of trend 1985-1995
United Kingdom	Spreadsheet model: Assumed continuation of the prevailing pattern of land-use change

*Source:* extracted from table 13 in FCCC/SBSTA/2004/INF.7.

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