

A Summary of the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories

Background

This report summarises additions and revisions to the *1995 IPCC Guidelines for National Greenhouse Gas Inventories (1995 IPCC Guidelines)*. It also describes efforts made by the IPCC to harmonise methods with others. The additions and revisions were accepted by the IPCC at its Twelfth Session held in Mexico City (11-13 September 1996) after acceptance by Working Group I at its Sixth Session held in Mexico City (10 September 1996) in accordance with IPCC procedures. They are called the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. Within this report, a revision of an existing methodology or default data is referred to as a 'revision', 'revised method' or 'revised data'. Additional methods and default data are defined as 'new' methods or 'new data'.

Agriculture Chapter

1. Three sections of this Chapter have been *revised*, that are, (1) methane emissions from rice cultivation, (2) nitrous oxide emissions from agricultural soils and (3) manure management. For the estimation of N₂O emissions, the default methods and data are *new*.

2. **Methane Emissions from Rice Cultivation.** In the *1995 IPCC Guidelines*, the estimation of CH₄ emissions from wetland rice cultivation is a function of the CH₄ emission factor, area of rice cultivated and the season length. One critical default parameter is the CH₄ emission factor, which is based upon temperature. It was determined that the relationship between CH₄ emissions and soil temperature as assumed in the *1995 IPCC Guidelines* was no longer appropriate because new data suggest that the seasonally integrated CH₄ flux depends much more on the input of organic carbon, water regime, time and duration of drainage and soil type than on local temperature. The *revised* methodology is a function of the emission factor integrated over a cropping season for particular rice water regime, for a given organic amendment, and of the annual harvested area cultivated under these conditions. The latter is given by the cultivated area times the number of cropping seasons per year.

3. The *revisions* to the method use internationally-agreed definitions for rice eco-systems classified according to the water regime and a range of CH₄ emission scaling factors relative to continuously flooded rice eco-systems and for soils without organic amendment. A default seasonally integrated emission factor is also provided for the continuously-flooded regime, without-organic amendment.

4. **Nitrous Oxide Emissions from Agricultural Soils and Manure Management.** A *new* default method for calculating national emissions of N₂O from agriculture is provided. The *new* N₂O method is a revision of the method in the *1995 IPCC Guidelines*. It includes more sources of N₂O from agricultural activities and makes explicit recommendations on N₂O emission factors. The *new* method accounts for the application of N-fertilisers to the soil and N uptake in crops and subsequently tracks the flow of N as it moves through the (anthropogenic) animal and human food chain. Three categories of N₂O sources are distinguished in the *new* methodology, (1) direct emissions from agricultural soils, (2) emissions from animal production, and (3) N₂O emissions indirectly induced by agricultural

activities¹. Because a larger number of sources and pathways are considered, the *new* N₂O methodology affects several source sectors. Emissions are reported in several sections of the 1995 *IPCC Guidelines*, namely, Manure Management (Section 4.2, 1995 *IPCC Guidelines*), Agricultural Soils (Section 4.5, 1995 *IPCC Guidelines*), and Waste (Section 6.3, 1995 *IPCC Guidelines*). The input data required can be obtained from FAO databases.

5. The *new* method provides a comprehensive description of N₂O emissions from agriculturally-related activities by accounting for previously omitted N₂O sources. Using this method, global N₂O emission estimates imply that atmospheric N₂O input from agricultural production as a whole has apparently been previously underestimated by at least 70%. Nitrous oxide emissions resulting from atmospheric deposition are assigned to the NO_x or NH₃ emitting country².

References

Australian Methodology for the Estimation of Greenhouse Gas Emissions and Sinks (1996).

Joint EMEP/CORINAIR Atmospheric Emission Inventory Guidebook (1996), 1st Edition, European Environmental Agency.

1995 IPCC Guidelines for National Greenhouse Gas Inventories, Reporting Instructions (Volume 1); Workbook (Volume 2); Reference Manual (Volume 3).

LIST OF ABBREVIATIONS

| | |
|------------------|--|
| CO ₂ | Carbon dioxide |
| CH ₄ | Methane |
| N ₂ O | Nitrous oxide |
| SO ₂ | Sulphur dioxide |
| NO _x | Sum of nitrogen oxide and nitrogen dioxide |
| CO | Carbon monoxide |
| NH ₃ | Ammonia |
| NM VOC | Non-methane volatile organic compounds |

¹It is however recognised that there are other sources of anthropogenic atmospheric inputs of N-compounds to soils e.g., NO_x from fuel combustion. Only compounds directly applied to agricultural soils are considered.

²In some countries and regions, other conventions related to long range transboundary air pollution are addressing the issue of atmospheric transport and deposition in greater detail.

For further information, please contact:

Ms. Bo Lim
IPCC Support Unit for Emission Inventories
OECD, Environment Directorate
2, rue André Pascal
75775 Paris Cedex 16
France

Tel: (+33 1) 45 24 78 94
Fax: (+33 1) 45 24 78 76
Email: Bo.Lim@oecd.org