2019 Refinement to the 2006 IPCC Guidelines: Refinements in Volume 5 (Waste)

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Outline

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- Summary

Overview

- Refinements are made in the following chapters:
  - Chapter 2: Waste generation, composition and management data
  - Chapter 3: Solid waste disposal
  - Chapter 5: Incineration and open burning of waste
  - Chapter 6: Wastewater treatment and discharge
- Volume 5 contains annexes:
  - Annex 1 (Mapping tables)
  - Annex 2 (Worksheets)
- IPCC Waste Model for estimation of methane (CH_4) emissions from solid waste disposal site (SWDS) has been updated reflecting the refinements made in relevant chapters.
- The refinements are made to include new and updated default data as well as new and up-to-date information and guidance, among others.

Chapter 2: Waste generation, composition and management data

- **Updated and new default data** on waste generation and treatment e.g., new data on municipal solid waste (MSW) open dumped (updated Table 2.1 and updated Annex 2A.1)
- **Updated and new default data** on MSW composition e.g., new data on garden waste and nappies (updated Table 2.3 and new Annex 2A.2)
- **New default data** on carbon (C) and nitrogen (N) content in domestic and industrial sludge (new Table 2.4a)
- **New and updated default data** on degradable organic carbon (DOC) content in domestic and industrial sludge (new Table 2.4a)
- **Updated/elaborated guidance** on sludge e.g., definition of sludge; DOC of sludge (Section 2.3.2)

Chapter 3: Solid waste disposal

- New types of managed SWDS and respective default methane correction factors (MCF) (updated Table 3.1)
  - Managed poorly–semi-aerobic
  - Managed well–active aeration
  - Managed poorly–active aeration

Chapter 3: Solid waste disposal

- New default data on fraction of degradable organic carbon which decomposes (DOC_f) by type of waste (new Table 3.0):
  - Less decomposable (e.g., wood, tree branches)
  - Moderately decomposable (e.g., paper, textile, nappies)
  - Highly decomposable (e.g., food waste, grasses)
- Appendices provide information as basis for future methodological development:
  - Information on nitrous oxide (N_2O) emissions from SWDS (Appendix 3A.1)
  - Information on estimation of CH_4 emissions from SWDS managed by active aeration using locally available measured data (Appendix 3A.2)

Chapter 5: Incineration and open burning of waste

- **New technologies** of thermal treatment of waste: pyrolysis, gasification and plasma (Section 5.1)
- **New default emission factors** for CH_4 and N_2O emissions from combined systems of pyrolysis-melting and gasification-melting (new Tables 5.3a and 5.4a)
- **Updated default oxidation factor** for opening burning of MSW (updated Table 5.2)

Chapter 6: Wastewater treatment and discharge

The chapter has been substantially refined:

- Updated and elaborated guidance
  - Introduction (Section 6.1)
  - CH_4 emissions from wastewater (Section 6.2)
  - N_2O emissions from domestic wastewater (Section 6.3)
- New guidance
  - N_2O emissions from industrial wastewater (Section 6.4)
- New and updated default data
- Annexes (Annex 6A.1- 6A.7) provide additional details related to new or updated default data
- Information on non-biogenic CO_2 emissions from wastewater treatment as basis for future methodological development (Appendix 6A.1)

Chapter 6: Wastewater treatment and discharge

Introduction (Section 6.1)

- Figure 6.1 has been updated and simplified to show different pathways for wastewater treatment and discharge
- New subsections have been added to discuss
  - Centralized treatment systems (Section 6.1.1)
  - Decentralized treatment systems of domestic wastewater (onsite sanitation) (Section 6.1.2)
  - Emissions from receiving waters (Section 6.1.3)

Chapter 6: Wastewater treatment and discharge

CH_4 emissions from wastewater (Section 6.2)

- Certain MCFs for domestic and industrial wastewater treatment and discharge have been updated (e.g., septic systems; centralized wastewater treatment plants; discharge to aquatic environments)
  - There are no longer separate MCFs for "well managed" and "not well managed" centralized aerobic treatment systems
- New Tier 2 MCFs/emission factors for wastewater discharged to aquatic environments (discharge to reservoirs, lakes and estuaries; discharge to aquatic environments other than reservoirs, lakes and estuaries)
- New guidance on the calculation of organic component removed as sludge

Chapter 6: Wastewater treatment and discharge

N_2O emissions from domestic wastewater (Section 6.3)

- Updated guidance on estimation of N_2O emissions from wastewater treatment plants
- Updated and new emission factors for discharges to aquatic environments
- Updated emission factor for wastewater treatment plants
- New emission factor for septic systems

Chapter 6: Wastewater treatment and discharge

N_2O emissions from industrial wastewater (new Section 6.4)

- New guidance (no methodology in the *2006 IPCC Guidelines*)
  - Emissions from industrial wastewater treatment plants
  - Emissions from industrial wastewater effluent discharged to aquatic environments

Summary

Volume 5 of the 2019 Refinement provides:

- Updated and elaborated guidance (e.g., new types of managed solid waste disposal sites; CH_4 and N_2O emissions from gasification and pyrolysis of waste; CH_4 and N_2O emissions from wastewater)
  - Better understanding of emissions/sources and more clearer guidance (e.g., clarification to the existing guidance)
- New guidance (e.g., N_2O emissions from industrial wastewater)
  - Improved completeness
- New and updated default data (e.g., waste generation and composition; parameters of domestic and industrial sludge; CH_4 and N_2O emissions from domestic and industrial wastewater treatment and discharge)
  - Improved accuracy

Thank you

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