



IPCC Inventory Software: Waste Sector

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IPCC TFI TSU

Key functionalities

- Subnational disaggregation
- Implements all methods in Volume 5 of the *2006 IPCC Guidelines* and Chapter 6 of the *Wetlands Supplement*
- Data Manager: Waste Type Manager (new functionality)
 - Waste Type Parameters (Solid Waste Disposal category)
- Interoperability functionality with UNFCCC reporting tool for CRT (new functionality)

Waste Type Manager

- Contains main data/information needed for estimation of greenhouse gas (GHG) emissions from solid waste disposal and treatment.
 - All waste categories, types and associated parameters (e.g., DOC, DOCf, dm, TC, FC)
 - Populated with IPCC defaults but allows to enter user-specific data/information. Needs to be populated before starting the estimation of emissions.
- Data/information entered are transferred to relevant worksheets

The screenshot displays the 'Waste Type Manager' dialog box, which is used to define waste types and their associated parameters. The dialog box is titled 'Waste Type Manager' and has a 'Type of weight of waste' section with radio buttons for 'Wet Weight' (selected) and 'Dry Weight'. There is also a checkbox for 'Show user-defined waste types only'.

Waste Category	Waste Type / Industry Type	Degradable organic carbon		Degradable organic carbon which decomposes in SWDS	Dry Matter Content (Fraction)	Total Carbon in Dry Matter (Fraction)	Fossil Carbon in Total Carbon (Fraction)
		DOC (Fraction of wet weight)	DOCf (Fraction of dry weight)				
Industrial Waste	Bulk waste			0.5		0.5	0.9
	Inert			0.5	1	0.8	1
	Petroleum products, Solvents, Plastics			0.5	1	0.8	1
	Rubber	0.39	0.46	0	0.94	0.67	0.2
	Rapidly degrading waste	0.16	0.36	0.5	0.4	0.30	
Municipal Waste	Slowly degrading waste	0.94	0.94	0.5	1	0.24	0.2
	Construction and demolition						
	Pulp and paper	0.44	0.44	0.5	0.5	0.46	0.01
	Textile	0.24	0.3	0.5	0.8	0.5	0.2
	Wood and wood products	0.43	0.51	0.5	0.95	0.51	
Other waste	Bulk waste	0.19	0.5				
	Inert			0.5	1		
	Glass			0.5	1		
	Metal			0.5	1		
	Plastic			0.5	1	0.75	1
	Rubber and leather	0.39	0.46	0	0.94	0.67	0.2
	Moderately degrading waste	0.24	0.6	0.5	0.4	0.7	0.1
	Disposable nappies	0.2	0.49	0.5	0.4	0.49	0
	Garden and park	0.16	0.36	0.5	0.4	0.30	
	Rapidly degrading waste	0.4	0.44	0.5	0.5	0.46	0.01
Sludge	Slowly degrading waste	0.4	0.44	0.5	0.5	0.46	0.01
	Paper and cardboard						
	Textile	0.24	0.3	0.5	0.8	0.5	0.2
	Wood	0.43	0.5	0.5	0.95	0.5	
	Clinical waste	0.15	0.28	0.5	0.95	0.6	0.4
Other waste	Bulk waste			0.5			
	Hazardous waste			0.5			
	Industrial sewage sludge	0.09	0.35	0.5			
Sludge	Rapidly degrading waste	0.09	0.35	0.5			
	Municipal sewage sludge	0.05	0.5	0.5			

Solid Waste Disposal

- Waste Type Parameters

- Waste categories, types and relevant parameters (e.g., DOC, DOC_f) are transferred from *Waste Type Manager* and transferred to calculation worksheets
- Users can select/indicate the waste categories and types to be used for estimation of CH_4 emissions from solid waste disposal sites (SWDS)

The screenshot displays the 'Waste Type Manager' software interface. On the left, a tree view shows the '2006 IPCC Categories' with '4 - Waste' expanded to '4.A - Solid Waste Disposal'. The main window shows parameters for 'Japan' (Region: Asia - Eastern, Subdivision: Region_1, Climate Zone: Boreal and temperate wet). A 'Waste Type Parameters' dialog box is open, showing a table of waste types and their parameters.

Waste Category	Waste Type / Industry Type			Degradable organic carbon	Degradable organic carbon which decomposes in SWDS	Methane generation rate constant (k)
	Class of decomposability	Type	Use in calculations	DOC (Fraction of wet weight)	DOC _f (Fraction)	k
Industrial Waste	Bulk waste	Bulk Industrial Waste	<input checked="" type="checkbox"/>	0.15	0.15	0.09
	Rapidly degrading waste	Food, beverages and tobacco	<input checked="" type="checkbox"/>	0.15	0.15	
	Slowly degrading waste	Construction and demolition	<input checked="" type="checkbox"/>	0.04	0.5	
		Pulp and paper	<input checked="" type="checkbox"/>	0.4	0.4	
		Textile	<input checked="" type="checkbox"/>	0.24	0.24	
		Wood and wood products	<input checked="" type="checkbox"/>	0.43	0.43	
Municipal Waste	Bulk waste	Bulk Municipal Waste	<input checked="" type="checkbox"/>	0.18	0.18	0.09

Wastewater Treatment and Discharge

- Implements the method for estimation of N₂O emissions from industrial wastewater treatment (2019 Refinement)
 - No method in the 2006 IPCC Guidelines

The screenshot displays the IPCC Emission Inventory Software (EIS) interface. On the left, the '2006 IPCC Categories' tree is shown, with '4.D.2 - Industrial Wastewater Treatment and Discharge' highlighted in pink. The main window shows two worksheets for 'N2O Emissions from Effluent wastewater' for the year 1990.

Worksheet 1: Direct N2O Emissions from Treatment Plants

Equation 6.11 (NEW), 6.13 (NEW)

Subdivision	Industry sector	Total N in wastewater from industry (kg N/yr)	N2O Emissions (kg N2O)	N2O Emissions (Gg N2O)
Region_1	Meat & Poultry	2470000	11644.28571	0.01164

Worksheet 2: N2O Emissions from Effluent wastewater

Equation 6.12(NEW), 6.13 (NEW), 6.14 (NEW)

Type of treatment and discharge pathway or system	Degree of utilization (Fraction)	Fraction of total wastewater N removed during wastewater treatment (Fraction)	Total annual amount of N in the industrial wastewater effluent (kg N/yr)	Emission Factor (kg N2O-N/kg N)	N2O Emissions (kg N2O)	N2O Emissions (Gg N2O)
j	T _{ij}	N _{rem(i)}	N _{eff(j)} = TN _{ind(i)} * T _{ij} * (1-N _{rem(j)})	EF _j	E _{ij} = N _{eff(j)} * EF _j * 44/28	E _{ij} / 10 ⁶
Anaerobic lagoons	1	0.4	1482000	0.005	11644.28571	0.01164
Total					11644.28571	0.01164

Interoperability with UNFCCC reporting tool for CRT

The screenshot shows the 'Export/Import' menu with 'UNFCCC CRT' selected. The 'CRT Data Set Manager' window displays the following data:

CRT Data Set name	Date created
1990-1991	07.06.2023 17:43:28
4B_1990	28.08.2023 09:41:54

The 'New CRT Data Set' dialog box shows the 'Sector' dropdown set to 'Waste' and the 'Year' dropdown set to '1990'. The 'Table' dropdown is set to 'Table5.B'. Callouts indicate 'Select sector' and 'Select category/table'.

TABLE 5.B. SECTORAL BACKGROUND DATA FOR WASTE
Biological Treatment of Solid Waste (Sheet 1 of 1)

Greenhouse gas source and sink categories	ACTIVITY DATA AND OTHER RELATED INFORMATION	IMPLIED EMISSION FACTOR		EMISSIONS		RECOVERY (1)		Information to Summary 3 CRT			
		Annual waste amount treated (kt dm)	CH4 (2) (g/kg waste)	N2O (g/kg waste)	CH4 (3) (kt)	N2O (kt)	CH4		N2O		
							Amount of CH4 flared (kt)	Amount of CH4 for energy recovery (4) (kt)	Method	EF	Method
5.B.1. Composting	24			0.2	0.0144						
5.B.1.a. Municipal solid waste	24			0.2	0.0144						
5.B.1.b. Other (please specify) (5)	NO			NO	NO						
Industrial waste [IPCC Software 4.B]	NO			NO	NO						
Sludge [IPCC Software 4.B]	NO			NO	NO						
Other waste [IPCC Software 4.B]	NO			NO	NO						
5.B.2. Anaerobic digestion at biogas faci...	12			0.024	NE, NO	NE, NO	NE, NO				
5.B.2.a. Municipal solid waste	12			0.024	NE	NE	NE				
5.B.2.b. Other (please specify) (5)	NO			NO	NO	NO	NO				
Industrial waste [IPCC Software 4.B]	NO			NO	NO	NO	NO				
Sludge [IPCC Software 4.B]	NO			NO	NO	NO	NO				
Other waste [IPCC Software 4.B]	NO			NO	NO	NO	NO				

Summary

- Waste Type Manager helps ensure consistency of data and information used in estimation of GHG emissions from solid waste disposal and treatment categories
- Allows estimation of CH₄ emissions by type of SWDSs
- Provides interoperability with UNFCCC reporting tool for CRT
- Guidebook for Waste sector is under development

Thank you

<https://www.ipcc-nggip.iges.or.jp/index.html>

<https://www.ipcc-nggip.iges.or.jp/software/index.html>