



IPCC Inventory Software

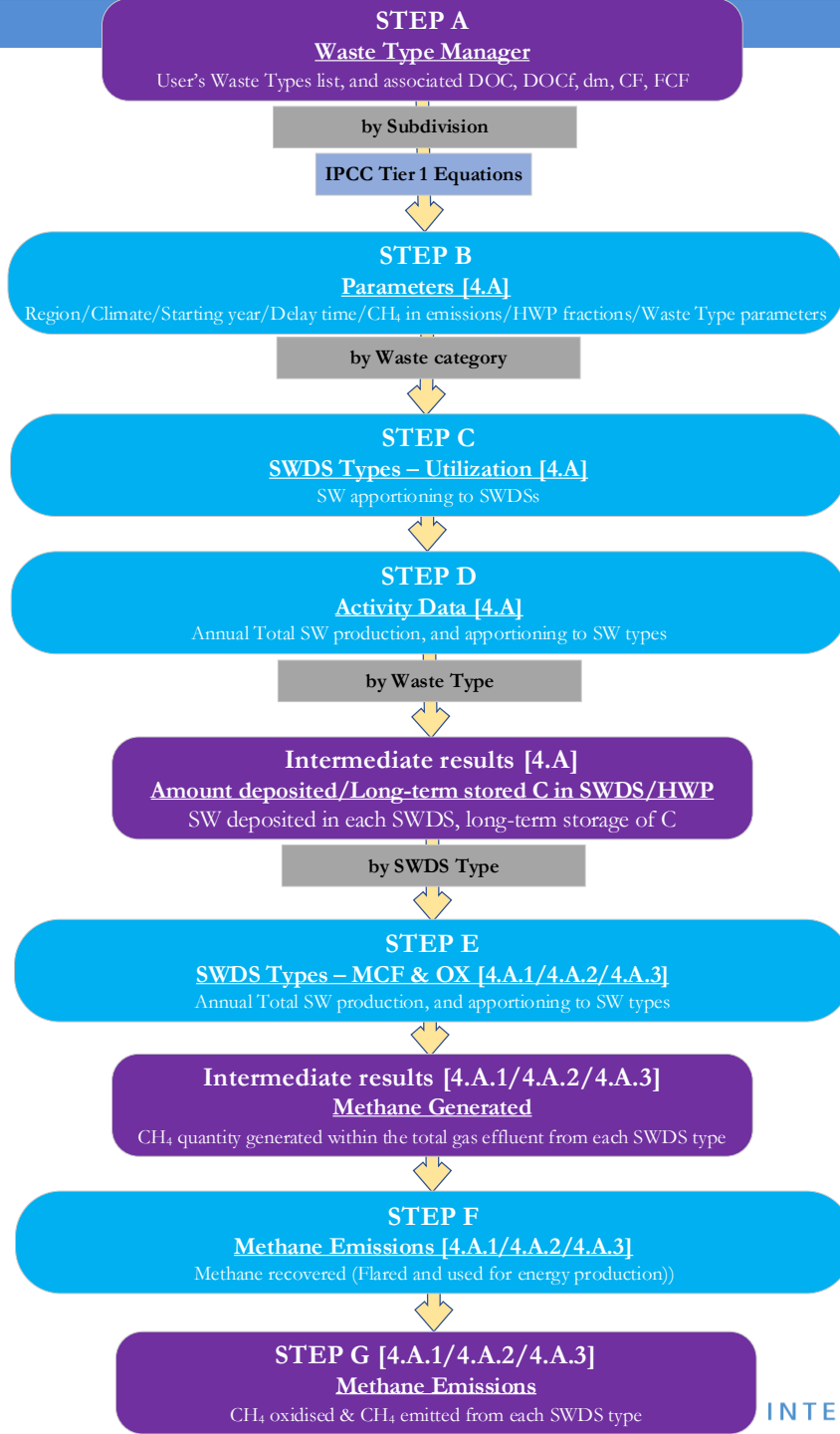
**Training of GHG Inventory National Experts to
prepare first Biennial Transparency Report under ETF
of the Paris Agreement:**

SWDS

ipcc

INTERGOVERNMENTAL PANEL ON climate change





Step A: Set-up Waste Manager

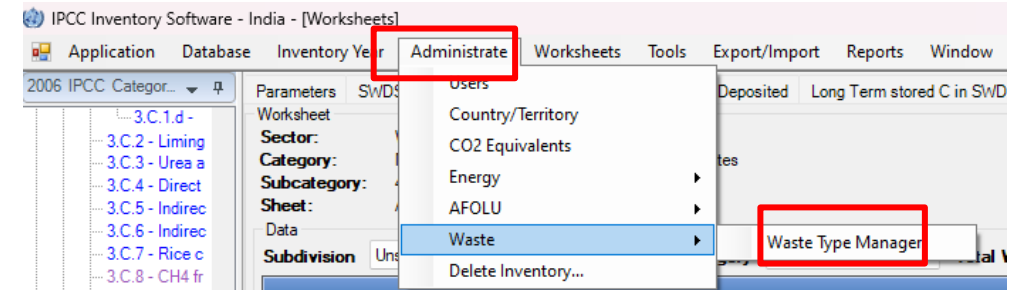
Applies to all Inventory categories of Waste sector that have solid waste



To Report to UNFCCC solid waste data shall be in

WET WEIGHT

Users can enter new waste types as well as revise IPCC default values of parameters (*those in the red box apply to SWDS*)



Waste Type Manager

Type of weight of waste: Wet Weight Dry Weight Show user-defined waste types only

Waste Category	Waste Type / Industry Type		Degradable organic carbon			Dry Matter Content (Fraction)	Total Carbon in Dry Matter (Fraction)	Fossil Carbon in Total Carbon (Fraction)
			DOC (Fraction of wet weight)	DOC (Fraction of dry weight)	DOCF (Fraction)			
Industrial Waste	Bulk waste	Bulk Industrial Waste	0.15		0.15		0.5	0.9
	Highly decomposable waste	Food, beverages and tobacco	0.15	0.38	0.15	0.4	0.38	
	Inert	Petroleum products, Solvents, Plastics				1	0.8	1
		Rubber	0.39	0.46	0.39	0.84	0.67	0.2
	Less decomposable waste	Construction and demolition	0.04	0.04	0.04	1	0.24	0.2
		Wood and wood products	0.43	0.51	0.43	0.85	0.51	
Municipal Waste		Pulp and paper	0.4	0.44	0.4	0.9	0.46	0.01
		Textile	0.24	0.3	0.24	0.8	0.5	0.2
	Bulk waste	Bulk Municipal Waste	0.18		0.18			
	Highly decomposable waste	Food waste	0.15	0.38	0.15	0.4	0.38	
		Garden and park	0.2	0.49	0.2	0.4	0.49	0
	Inert	Glass				1		
		Metal				1		
		Plastic				1	0.75	1
		Rubber and leather	0.39	0.46	0.39	0.84	0.67	0.2
	Less decomposable waste	Wood	0.43	0.5	0.43	0.85	0.5	
Moderately decomposable wa.	Disposable nappies	0.24	0.6	0.24	0.4	0.7	0.1	
	Paper and cardboard	0.4	0.44	0.4	0.9	0.46	0.01	
	Textile	0.24	0.3	0.24	0.8	0.5	0.2	
Other waste	Bulk waste	Clinical waste	0.15	0.23	0.15	0.65	0.6	0.4
		Hazardous waste						
Sludge	Highly decomposable waste	Industrial sewage sludge	0.09	0.35	0.09			
		Municipal sewage sludge	0.05	0.5	0.05			
*								

Category, Class and Name of default waste types cannot be changed and default waste types cannot be deleted.
Selected Type of Weight of Waste is automatically applied in all the relevant worksheets across all the Inventory Years.

Save Undo Close

Step B: Set-up Parameters

Region impacts the selection of IPCC default factors for Allocation of waste to SWDS types

Climate zone impacts the selection of IPCC default factors for k (and thus half-life)

Useful to stratify in subdivisions for different climate zones

F set as per IPCC default

Delay time?

The screenshot shows the 'Parameters' tab in the ioccc software. The settings are for India, Asia - South-Central region, Unspecified subdivision, and Tropical wet climate zone. The interface is divided into several sections:

- Country/Territory:** India
- Region:** Asia - South-Central
- Subdivision:** Unspecified
- Climate Zone:** Tropical wet
- Main parameters and Waste Types for selected Subdivision:**
 - Starting year: 1951
 - Delay Time (months): 6
 - Fraction of methane (F) in developed gas: 0.500
 - Conversion Factor, C to CH4: 1.333333
- Parameters for HWP (Bulk MSW):**
 - % garden in municipal waste: 0.00 %
 - % paper in municipal waste: 0.00 %
 - % wood in municipal waste: 0.00 %
- Parameters for HWP (Bulk Industrial Waste):**
 - % paper in industrial waste: 0.00 %
 - % wood in industrial waste: 0.00 %

Buttons at the bottom include 'Save', 'Uncertainties', and 'Waste Type Manager'.

Step B: Set-up Parameters

MSW	IPCC default	User value
DOC	0.18	0.11
DOCf	0.5	0.4 (or 0.5?)
k	0.17	0.17

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)	DOCf (Fraction)	k	
Industrial Waste	Bulk waste	Bulk Industrial Waste	<input checked="" type="checkbox"/>	0.15	0.5	0.17	
	Highly decomposable waste	Food, beverages and tobacco	<input type="checkbox"/>				
	Less decomposable waste	Construction and demolition		<input type="checkbox"/>			
		Wood and wood products		<input type="checkbox"/>			
	Moderately decomposable w.	Pulp and paper		<input type="checkbox"/>			
Municipal Waste	Bulk waste	Bulk Municipal Waste	<input checked="" type="checkbox"/>	0.11	0.4	0.17	
	Highly decomposable waste	Food waste	<input type="checkbox"/>				
	Less decomposable waste	Garden and park		<input type="checkbox"/>			
		Wood		<input type="checkbox"/>			
	Moderately decomposable w.	Disposable nappies		<input type="checkbox"/>			
		Paper and cardboard		<input type="checkbox"/>			
		Textile		<input type="checkbox"/>			
Other waste	Bulk waste	Clinical waste	<input type="checkbox"/>				
		Hazardous waste	<input type="checkbox"/>				
Sludge	Highly decomposable waste	Industrial sewage sludge	<input type="checkbox"/>				
		Municipal sewage sludge	<input type="checkbox"/>				

Step C: SWDS utilization

Parameters: SWDS Types - Utilization | Activity Data | Amount Deposited | Long Term stored C in SWDS | Harvested Wood Products

Worksheet: 2005

Sector: Waste
 Category: Methane emissions from Solid Waste Disposal Sites
 Subcategory: 4.A - Solid Waste Disposal
 Sheet: SWDS Types - Utilization

Data

Subdivision: Unspecified | Waste Category: Municipal Waste

Year	Unmanaged		Managed				Uncategorised	Distribution Check	
	Unmanaged – shallow (%)	Unmanaged – deep (%)	Managed – anaerobic (%)	Managed poorly – semi-aerobic (%)	Managed well – semi-aerobic (%)	Managed poorly – active aeration (%)	Managed well – active aeration (%)	Uncategorised SWDS (%)	Total (%)
1951	25	30	25	5				15	100

Magenta columns contain SWDS types from *2019 Refinement* (required for interoperability with UNFCCC CRTs)

Does India apply 1 single SWDS only?

Useful to stratify in SWDS types

Step D: Activity Data 1951-2020

Data

Subdivision Waste Category Total Waste Waste Type Amounts

						Composition of waste going to solid waste disposal sites.		
Year	Population (Capita)	Waste per capita (kg/cap/yr)	Total Waste (Gg)	% to SWDS (%)	Total to SWDS (Gg)	Bulk Municipal Waste	Inert	Total
	A	B	C = A * B * 10 ⁻⁶	D	E = C * (D/100)	% of E	% of E	%
1983	170,400,000	200.75	34,207.8	70	23,945.46	100	0	100
1984	176,100,000	200.75	35,352.075	70	24,746.4525	100	0	100
1985	181,800,000	200.75	36,496.35	70	25,547.445	100	0	100
1986	187,500,000	200.75	37,640.625	70	26,348.4375	100	0	100
1987	193,200,000	200.75	38,784.9	70	27,149.43	100	0	100
1988	198,900,000	200.75	39,929.175	70	27,950.4225	100	0	100
1989	204,600,000	200.75	41,073.45	70	28,751.415	100	0	100
1990	210,300,000	200.75	42,217.725	70	29,552.4075	100	0	100
1991	216,000,000	200.75	43,362	70	30,353.4	100	0	100
1992	223,000,000	200.75	44,767.25	70	31,337.075	100	0	100
1993	230,000,000	200.75	46,172.5	70	32,320.75	100	0	100
1994	237,000,000	200.75	47,577.75	70	33,304.425	100	0	100
1995	244,000,000	200.75	48,983	70	34,288.1	100	0	100
1996	251,000,000	200.75	50,388.25	55	27,713.5375	100	0	100
1997	258,000,000	200.75	51,793.5	70	36,255.45	100	0	100
1998	265,000,000	200.75	53,198.75	70	37,239.125	100	0	100
1999	272,000,000	200.75	54,604	70	38,222.8	100	0	100
2000	279,000,000	200.75	56,009.25	70	39,206.475	100	0	100
2001	286,000,000	200.75	57,414.5	70	40,190.15	100	0	100
2002	295,100,000	200.75	59,241.325	70	41,468.9275	100	0	100
2003	304,200,000	200.75	61,068.15	70	42,747.705	100	0	100
2004	313,300,000	200.75	62,894.975	70	44,026.4825	100	0	100
2005	322,400,000	200.75	64,721.8	70	45,305.26	100	0	100
2006	331,500,000	200.75	66,548.625	70	46,584.0375	100	0	100
2007	340,600,000	200.75	68,375.45	70	47,862.815	100	0	100
2008	349,700,000	200.75	70,202.275	70	49,141.5925	100	0	100
2009	358,800,000	200.75	72,029.1	70	50,420.37	100	0	100
2010	367,900,000	200.75	73,855.925	70	51,699.1475	100	0	100
2011	377,000,000	200.75	75,682.75	70	52,977.925	100	0	100
2012	386,100,000	200.75	77,509.575	70	54,256.7025	100	0	100
2013	395,200,000	200.75	79,336.4	70	55,535.48	100	0	100
2014	404,300,000	200.75	81,163.225	70	56,814.2575	100	0	100
2015	413,400,000	200.75	82,990.05	70	58,093.035	100	0	100
2016	422,500,000	200.75	84,816.875	70	59,371.8125	100	0	100
2017	432,648,000	164.25	71,062.434	80	56,849.9472	100	0	100
2018	441,726,000	164.25	72,553.4955	80	58,042.7964	100	0	100
2019	450,877,000	164.25	74,056.54725	80	59,245.2378	100	0	100
2020	460,086,000	164.25	75,569.1255	80	60,455.3004	100	0	100

Step E: MCF & OX

SWDS	parameter	IPCC default	User value
Managed anaerobic	MCF	1	0.5 (or 0.4?)
	OX	0	0
Managed well Semi-aerobic	MCF	0.5	0.5 (or 0.4?)
	OX	0	0
Unmanaged shallow	MCF	0.4	0.5 (or 0.4?)
	OX	0	0
Unmanaged deep	MCF	0.8	0.5 (or 0.4?)
	OX	0	0
Uncategorised	MCF	0.6	0.5 (or 0.4?)
	OX	0	0

Steps F/G

Categories	CO2	CH4	N2O
4 - Waste	0.000	816.858	0.000
4.A - Solid Waste Disposal		816.858	
4.A.1 - Managed Waste Disposal Sites		0.000	
4.A.2 - Unmanaged Waste Disposal Sites		0.000	
4.A.3 - Uncategorised Waste Disposal Sites		816.858	

Categories	CO2	CH4	N2O
4 - Waste	0.000	1,061.915	0.000
4.A - Solid Waste Disposal		1,061.915	
4.A.1 - Managed Waste Disposal Sites		245.057	
4.A.2 - Unmanaged Waste Disposal Sites		694.329	
4.A.3 - Uncategorised Waste Disposal Sites		122.529	

From third NC3:

2019, 59,245 Gg of MSW reached landfills in India, resulting in 791 Gg of Methane

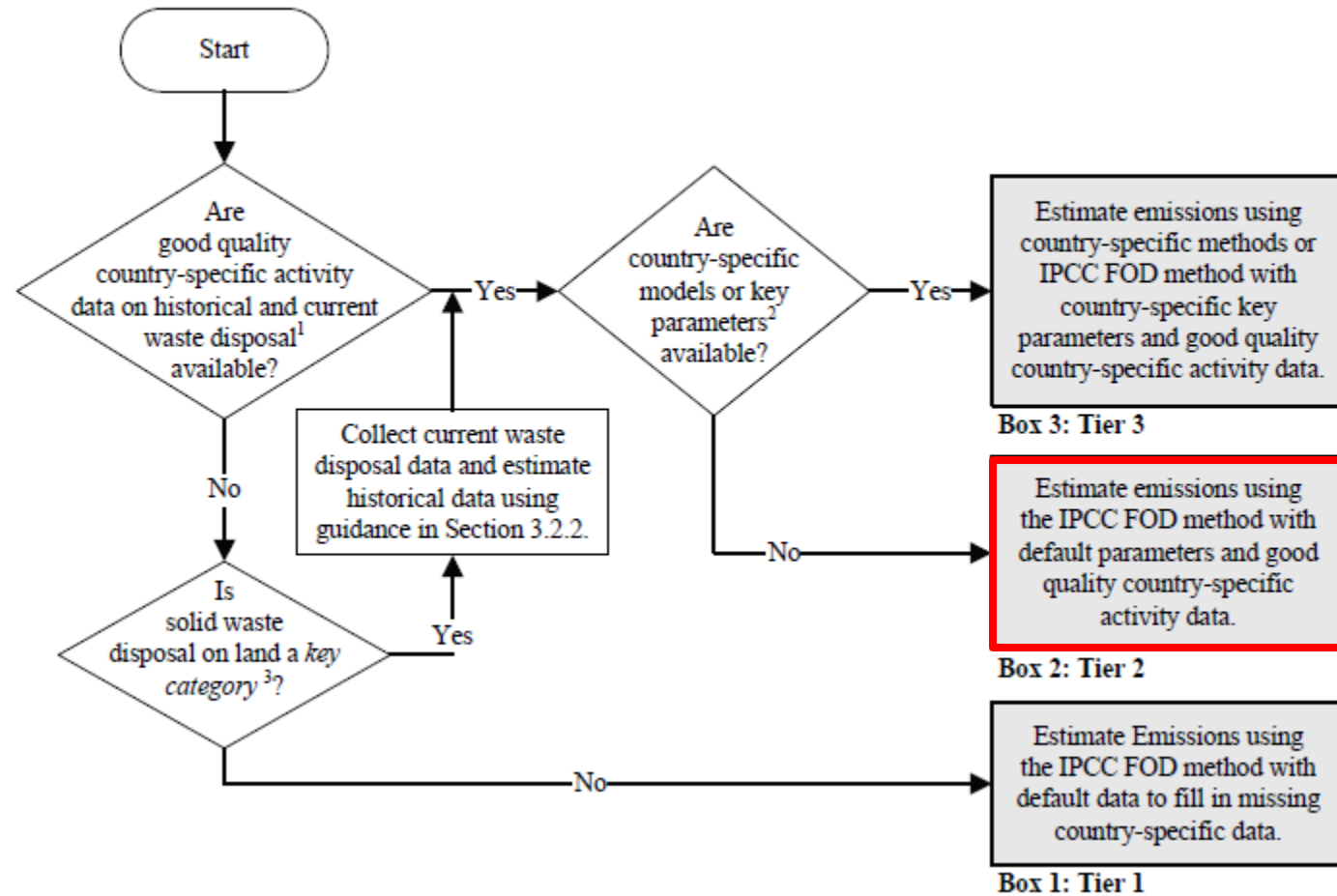
Type of emission factor and level of methodological tier employed for GHG estimation						
Gas	CO ₂		CH ₄		N ₂ O	
Sector/ Category	Method used	Emission Factor	Method used	Emission Factor	Method used	Emission Factor
E. Production of halocarbons	NO		NO		NO	
3. Agriculture						
A. Enteric fermentation	NO		T1, T2	D, CS	NO	
B. Manure management	NO		T1	D	T1	D
C. Rice cultivation	NO		T2	CS		
D. Agricultural soils	NO		NO		T2	CS
F. Field burning of agricultural residues	NO		T1	D	T1	D
4. Land Use, Land Use Change and Forestry (LULUCF)						
A. Forest land	T2	CS	T2	D, CS	T2	D, CS
B. Cropland	T2	CS	NO		NO	
C. Grassland	T2	CS	NO		NO	
D. Settlements	T2	CS	NO		NO	
E. Wetlands	NE		NE		NE	
F. Other Land	NA		NA		NA	
5. Waste						
A. Solid waste disposal on land	NO		T2	D, CS	NO	
B. Waste-water handling	NO		T1, T2	D, CS	T1, T2	D, CS
Memo item (not accounted in total emissions)						
International bunkers	T1, T2	D	T1, T2	D	T1, T2	D
CO ₂ from biomass	T1	D	NO		NO	

T1- Tier 1; T2- Tier 2; T3- Tier 3; CS- Country Specific; D- IPCC Default, NO-Not Occurring, NA-Not Applicable, NE-Not Estimated

Key Category & Tier

Key Category & Tier

Figure 3.1 Decision Tree for CH₄ emissions from Solid Waste Disposal Sites





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