

Calculation Methodology

All equations from the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories [IPCC, 2019]

IPCC Calculation Reference Numbers			
	Methane	Nitrous Oxide	Carbon Dioxide
Septic Tanks	1	5	N/A
Pit Latrines	2	6	N/A
Composting Toilets	3		N/A
Open Defecation	4	8	N/A

METHANE CALCULATIONS

Equation 6.3 Estimate Organically degradable material TOW in wastewater prior to treatment.
Calculations 1-4 (See above Table)

$$\text{EQUATION 6.3 (UPDATED)} \\ \text{TOTAL ORGANICALLY DEGRADABLE MATERIAL IN DOMESTIC WASTEWATER} \\ \text{TOW} = P \bullet \text{BOD} \bullet 0.001 \bullet 365$$

Variable	Description	Units	Value	Source	Notes
TOW	Total Organics in wastewater in inventory year	kg BOD/yr	Calculated	N/A	N/A
P	Country population in inventory year	person	Calculated	JMP 2017 SSP Scenarios	- See Population Data Calculation
BOD	country-specific per capita BODs in inventory year	g/person/day	From table	Table 6.4 (IPCC Guidelines)	- Match values from table to chosen countries
0.001	Conversion from gBOD to kgBOD	N/A	N/A	N/A	N/A

Equation 6.3a Estimate total organics in domestic wastewater for each wastewater treatment/discharge pathway or system

Calculations 1-4 (See above Table)

$$\text{EQUATION 6.3a (NEW)} \\ \text{TOTAL ORGANICS IN DOMESTIC WASTEWATER BY TREATMENT/DISCHARGE PATHWAY OR SYSTEM} \\ \text{TOW}_i = \sum_j [\text{TOW} \bullet U_i \bullet T_i \bullet f_j]$$

Variable	Description	Units	Value	Source	Notes
TOW(i)	Total organics in wastewater in inventory year for income group (i) and treatment/discharge system/pathway (i)	kg BOD/yr	Calculated	N/A	N/A
TOW	Total Organics in wastewater in inventory year	kg BOD/yr	Calculated	N/A	N/A
U(i)	Fraction of population in income group (i) in inventory year	N/A	From table	Table 6.5 (IPCC Guidelines)	- Match values from table to countries
T(i)	Degree of utilization of treatment /discharge pathway or system for each income group	N/A	From table	Table 6.5 (IPCC Guidelines)	- Match values from table to countries
f(j)	Correction factor for additional industrial BOD discharged into treatment/discharge pathway	N/A	1	N/A	N/A

Equation 6.3d Estimate total organics in treated wastewater effluent discharged

Calculations 1-4 (See above Table)

$$\text{EQUATION 6.3d (NEW)} \\ \text{TOTAL ORGANICS IN TREATED DOMESTIC WASTEWATER EFFLUENT} \\ \text{TOW}_{\text{effluent}} = \sum_j [\text{TOW} \bullet T_j \bullet (1 - \text{TOW}_{\text{rem},j})]$$

Variable	Description	Units	Value	Source	Notes
TOW(effluent)	Total organics in the treated wastewater effluent discharged to aquatic environments in inventory year	kg BOD/yr	Calculated	N/A	N/A
TOW	Total Organics in wastewater in inventory year	kg BOD/yr	Calculated	N/A	N/A
T(j)	Degree of utilization of treatment system in inventory year	N/A	From table	Table 6.5 (IPCC Guidelines)	- Match values from table to chosen countries
j	Each wastewater treatment type used in inventory year	N/A	N/A	N/A	N/A
TOW(REM)	Fraction of total wastewater organics removed during wastewater treatment per treatment type. Pathways for organics removal include loss to sludge and biological decomposition	N/A	From table	Table 6.6b (IPCC Guidelines)	Applicable to Septic Tanks and pit latrines only

NITROUS OXIDE CALCULATIONS

Equation 6.10 Estimate total nitrogen in wastewater
Calculations 5-8 (See above Table)

$$\text{EQUATION 6.10 (NEW)} \\ \text{TOTAL NITROGEN IN DOMESTIC WASTEWATER BY TREATMENT PATHWAY} \\ \text{TN}_{\text{Dom},j} = (P_{\text{Dom},j} \bullet \text{Protein} \bullet F_{\text{pro}} \bullet N_{\text{pro}} \bullet F_{\text{NH}_4\text{-CON}} \bullet F_{\text{FOD-CON}})$$

Variable	Description	Units	Value	Source	Notes
TN(Dom,j)	Total annual amount of nitrogen in domestic wastewater for treatment pathway	kg N/yr	Calculated	N/A	N/A
P(treatment,j)	Human population who are served by the treatment pathway in inventory year	person	Calculated	JMP 2017 SSP Scenarios	- See Population Data Calculation
Protein	Annual per capita protein consumption	kg protein / person / yr	Calculated	IPCC Guidelines	- Food Balance Sheets of FAOSTAT can be used for per capita protein supply quantity if adjusted with IPC fraction of protein consumed - See Protein Data Calculation
F(NPR)	fraction of nitrogen in protein	kg N/kg Protein	0.16	IPCC Guidelines	Default Value
F(ind-Con)	factor for industrial and commercial co-discharged protein into the sewer system	kgN/kgN	1	N/A	Not applicable
N(HH)	Additional nitrogen from household products added to wastewater	N/A	1.1	Table 6.10a (IPCC Guidelines)	Default = 1.1; table has some country data - to be matched with chosen countries.

Equation 6.8 Estimate total nitrogen in wastewater effluent

Calculations c-8 (See above Table)

$$\text{EQUATION 6.8 (UPDATED)} \\ \text{TOTAL NITROGEN IN DOMESTIC WASTEWATER EFFLUENT} \\ \text{N}_{\text{effluent,dom}} = \sum_j [\text{TN}_{\text{Dom}} \bullet T_j] \bullet [1 - \text{N}_{\text{rem},j}]$$

Variable	Description	Units	Value	Source	Notes
N (effluent,dom)	Total nitrogen in the wastewater effluent discharged to aquatic environments in inventory year	kg N/yr	Calculated	N/A	N/A
TN(Dom)	Total annual amount of nitrogen in domestic wastewater for treatment pathway	kg N/yr	Calculated	N/A	N/A
T(j)	Degree of utilization of treatment system in inventory year	N/A	from table	Table 6.5 (IPCC Guidelines)	- Match values from table to chosen countries
j	each wastewater treatment type used in inventory year	N/A	N/A	N/A	N/A
N(REM)	Fraction of total wastewater nitrogen removed during wastewater treatment per treatment type.	N/A	from table	Table 6.10c (IPCC Guidelines)	- Pathways for removal include transfer to sludge and nitrification-denitrification with concomitant N loss to the atmosphere

Equation 6.7 Estimate total nitrogen in wastewater effluent

Calculations 5-8 (See above Table)

$$\text{EQUATION 6.7 (UPDATED)} \\ \text{N}_2\text{O EMISSIONS FROM DOMESTIC WASTEWATER EFFLUENT} \\ \text{N}_2\text{O}_{\text{effluent,dom}} = \text{N}_{\text{effluent,dom}} \bullet \text{EF}_{\text{effluent}} \bullet \frac{44}{28}$$

Variable	Description	Units	Value	Source	Notes
N2O(effluent,dom)	Total nitrogen in the wastewater effluent discharged to aquatic environments in inventory year	kg N/yr	Calculated	N/A	N/A
N(effluent,dom)	Nitrogen in the effluent discharged to aquatic environments	kg N/yr	Calculated	N/A	N/A
EF(effluent)	Emission factor for N2O emissions from wastewater discharged to aquatic environments	kg N2O-N/kgN	From table	Table 6.8a (IPCC Guidelines)	- 44/28 is the conversion of kgN2O-N into kg N2O This is the targeted parameter for improvement with varied with field based emission factors for model comparison.

Equation 6.3c Estimate amount of organic component removed in sludge in septic systems
Calculations 1
 (See above Table)

$$\text{ORGANIC COMPONENT REMOVED AS SLUDGE FROM SEPTIC SYSTEMS}$$

$$S_{\text{septic}} = \text{TOW}_{\text{septic}} * F * 0.5$$

Variable	Description	Units	Value	Source	Notes
S(septic)	Organic component removed from wastewater (in the form of sludge) in septic systems	kg BOD/yr	Calculated	N/A	N/A
TOW(septic)	Total Organics in wastewater in septic systems specifically in inventory year	kg BOD/yr	Calculated	N/A	N/A
F	Fraction of the population managing their septic tank in compliance with the sludge removal instruction of their septic system	N/A	0.5	IPCC Guidelines	Default value is 0.5 (i.e. 50% of the population will managed correctly)
0.5	Fraction of organics in wastewater removed in sludge when septic tank is managed in accordance with sludge removal instructions	N/A	N/A	N/A	N/A

Equation 6.2 Obtain emission factor for each domestic wastewater treatment/discharge pathway/system
Calculations 1-4
 (See above Table)

$$\text{CH}_4 \text{ EMISSION FACTOR FOR EACH DOMESTIC WASTEWATER TREATMENT/DISCHARGE PATHWAY OR SYSTEM}$$

$$EF_j = B_g * MCF_j$$

Variable	Description	Units	Value	Source	Follow-up
EF(j)	Emission Factor	kg CH ₄ /kg BOD	Calculated	N/A	N/A
j	Each wastewater treatment type used in inventory year	N/A	N/A	N/A	N/A
B(g)	Maximum CH ₄ producing capacity	kg CH ₄ /kg BOD	From table	Table 6.2 (IPCC Guidelines)	N/A
MCF(j)	Methane correction factor (fraction)	N/A	From table	Table 6.3 (IPCC Guidelines)	This is the targeted parameter for improvement with varied with field based emission factors for model comparison.

Equation 6.1 Estimate emissions and adjust for possible sludge removal and/or CH₄ recovery of treatment/discharge pathway/system in inventory year.
Calculations 1-4
 (See above Table)

$$\text{CH}_4 \text{ EMISSIONS FROM DOMESTIC WASTEWATER FOR EACH TREATMENT/DISCHARGE PATHWAY OR SYSTEM, } i$$

$$\text{CH}_4 \text{ Emissions}_i = [(TOW_i - S_i) * EF_i - R_i]$$

Variable	Description	Units	Value	Source	Follow-up
CH ₄ Emissions(i)	CH ₄ emissions from treatment/discharge system in inventory year	kg CH ₄ / year	Calculated	N/A	N/A
TOW(i)	Total organics in wastewater in inventory year for income group (i) and treatment/discharge system/pathway (i)	kg BOD/yr	Calculated	N/A	N/A
S(i)	Organic component removed from wastewater (in the form of sludge) in septic systems	kg BOD/yr	Calculated	N/A	-Applies to Septic Systems only - All others = 0
j	each treatment/discharge pathway/system	N/A	N/A	N/A	N/A
EF(i)	Emission factor for treatment/discharge pathway	kg CH ₄ /kg BOD	Calculated	N/A	N/A
R(i)	Amount of CH ₄ recovered from treatment system in inventory year	kg CH ₄ / year	N/A	IPCC Default	- Default is 0

Population Data

Notes: From SSPOpen Access Database
From the Worldbank population projection estimator OR used 2017 pop from JMP and multiplied by 1.8 (based on world growth rate for 2030 from World bank estimator)
Not reported or reported as zero

		JMP 2017 Data	JMP 2017 Data				JMP Data							
ISO3	Country	Population (2017)	Rate of Open Defecation(2017)	Sewer Usage (2017)	Septic Tank Usage (2017)	Pit Latrine Usage (2017)	Percentage Point Change (% 2000-2017)							
							Open Defecation	Unimproved	Limited	Basic	Safely Managed	Sewer	Septic Tank	Pit Latrines
AFG	Afghanistan	4,526,599	12.7	2.6	9.9	40.8	-13.28	-10.60	3.97	19.90	0.00	0.14	5.25	18.49
AGO	Angola	5,933,231	19.9	12.7	19.9	54.7	-22.95	-8.28	8.91	22.32	0.00	1.64	54.71	-25.12
AIA	Anguilla	81	0.5	1.2	93.9	4.0	-1.68	-4.44	0.15	5.97	0.00	0.00	2.13	3.98
ASM	America	390	0.7	48.7	39.0	11.4	0.00	-0.57	10.29	-10.42	0.00	17.16	-4.08	-13.22
BDI	Burundi	284,809	2.6	0.4	3.6	53.4	-0.14	-5.87	5.41	0.61	0.00	-1.37	2.31	5.07
BEN	Benin	6,016,043	53.8	1.4	40.6	30.6	-13.77	2.11	1.82	7.85	0.00	1.28	0.66	9.73
BFA	Burkina Faso	8,956,660	46.7	0.8	1.7	44.4	-24.73	-2.39	19.01	8.11	0.00	0.14	0.31	26.67
BLZ	Belize	2,938	0.8	8.9	62.3	25.7	-3.68	-2.43	0.70	5.42	0.00	-5.25	28.07	-16.70
BOL	Bolivia	1,469,538	13.3	48.1	12.2	17.6	-19.75	-5.56	0.10	16.28	9.92	16.50	3.74	6.07
BRA	Brazil	235,517	1.1	66.5	14.0	8.1	-7.81	-6.71	-0.91	-7.24	22.67	24.10	-5.95	-3.63
BRB	Barbados	2,368	0.8	3.1	58.3	0.8	0.13	-8.72	0.16	8.43	0.00	1.98	-5.47	12.08
BWA	Botswana	252,851	11.0	1.4	4.9	76.6	-10.68	-12.15	-2.52	25.35	0.00	0.26	0.50	22.07
CIV	Côte d'Ivoire	6,252,794	25.7	6.5	17.6	30.3	-10.38	-3.91	3.16	11.14	0.00	-0.02	9.00	0.00
CMR	Cameroon	1,672,146	7.0	0.4	13.0	44.3	-0.45	0.77	0.65	-0.97	0.00	-0.49	6.06	-5.88
COD	Congo (Kin)	9,803,951	12.1	0.1	5.4	35.2	1.85	1.91	-2.81	-0.95	0.00	-1.50	6.06	-3.29
COG	Congo	460,058	8.7	1.3	14.7	37.9	0.51	-18.65	9.89	8.25	0.00	-4.38	13.33	9.19
COL	Colombia	1,504,531	3.1	77.3	16.1	1.4	-5.89	-4.41	-7.76	0.00	3.51	7.42	2.79	0.09
COM	Comoros	4,815	0.6	5.3	5.4	38.3	-0.07	-19.12	12.54	6.65	0.00	5.28	5.43	8.48
CPV	Cape Verde	110,200	20.2	23.8	55.5	0.4	-30.84	-5.64	-2.66	33.81	0.00	9.63	26.40	0.45
DJI	Djibouti	165,730	17.3	5.1	11.3	53.6	-1.62	-17.67	2.93	5.86	10.51	0.07	0.16	19.06
DOM	Dominica	309,511	2.9	22.3	57.0	15.7	-2.30	-1.78	-2.07	6.14	0.00	-7.06	34.89	-23.76
DZA	Algeria	319,385	0.8	83.7	8.3	4.0	-5.61	1.77	-0.02	4.70	-0.85	14.29	-8.92	-1.54
ECU	Ecuador	348,545	2.1	63.6	27.6	5.8	-12.18	-5.93	-0.21	17.68	0.63	24.12	9.88	-15.89
ETH	Ethiopia	23,458,294	22.4	11.3	23.3	11.3	-56.70	49.25	3.54	3.91	0.50	0.50	1.71	5.25
GAB	Gabon	59,803	3.0	33.6	0.0	41.2	1.24	-6.11	-8.09	12.95	0.00	11.77	0.00	-6.91
GHA	Ghana	5,206,293	18.1	3.3	17.0	48.4	-3.80	-6.81	0.70	9.91	0.00	-1.44	12.33	-0.28
GIN	Guinea	1,825,028	14.4	2.0	11.3	39.7	-13.19	-18.68	13.29	0.00	0.99	11.27	19.61	-1.24
GMB	Gambia	22,620	1.1	2.5	17.9	45.8	-4.65	-26.42	-3.35	-18.42	0.00	-0.19	6.13	-27.70
GNB	Guinea-B	313,945	16.9	3.1	14.2	19.30	-19.30	4.47	5.93	8.89	0.00	-0.56	11.75	3.63
GNQ	Equator	36,181	2.9	10.6	6.2	59.4	-7.83	-5.94	2.24	11.52	0.00	1.26	0.27	12.23
GRD	Grenada	3,818	3.5	6.8	58.7	28.2	1.67	2.75	-6.18	1.76	0.00	3.45	9.90	-17.77
GTM	Guatem	792,755	4.7	42.9	22.8	17.9	-9.37	-0.38	1.99	5.39	0.00	7.26	2.99	-7.96
GUY	Guyana	4,762	0.6	2.1	66.4	27.5	-0.70	-8.52	2.26	6.95	0.00	-2.44	33.68	-22.03
HND	Honduras	556,738	6.0	40.1	25.7	24.4	-13.85	-7.39	2.63	18.61	0.00	12.95	7.25	1.04
HTI	Haiti	2,182,803	19.9	0.7	14.2	47.2	-17.19	-11.56	10.80	17.95	0.00	-0.33	11.79	17.30
IDN	Indonesia	25,542,676	9.7	11.3	70.8	3.2	-22.83	-8.60	-32.04	0.00	-0.51	33.18	-1.24	-1.24
IND	India	344,585,706	25.7	10.6	33.0	28.5	-46.90	-3.63	7.35	43.17	0.00	3.44	21.25	25.84
JAM	Jamaica	15,171	0.5	22.7	24.8	51.5	-0.37	-1.86	-3.09	5.33	0.00	5.27	-15.92	12.89
KEN	Kenya	5,141,424	10.3	5.4	3.9	41.9	-7.07	7.56	4.05	-4.54	0.00	-2.28	1.93	-0.04
KHM	Cambod	5,081,581	31.7	14.3	51.4	0.0	-52.84	-1.07	4.65	49.26	0.00	6.85	47.33	-0.26
KIR	Kiribati	31,114	28.4	11.8	20.4	28.4	-20.33	-12.26	8.48	24.12	0.00	-0.68	12.90	20.37
LAO	Lao PDR	1,418,547	20.7	1.1	18.9	57.2	-40.88	-6.96	1.68	0.00	36.24	0.30	11.94	35.60
LBR	Liberia	1,874,414	39.6	0.5	0.7	21.4	-15.37	-23.65	3.70	3.46	0.00	-3.88	15.58	0.46
LCA	Saint Lu	1,425	0.8	5.0	81.6	12.5	-10.03	-1.13	6.32	6.84	0.00	-1.34	54.35	-39.85
LKA	Sri Lank	6,116,800	0.6	4.2	20.0	92.7	0.00	-11.43	-0.27	11.14	0.00	2.40	-4.39	12.86
LSO	Lesotho	609,254	27.3	1.2	1.2	59.9	-19.00	-30.42	15.56	33.86	0.00	0.12	0.61	48.69
MDG	Madagas	7,259,475	7.3	55.4	26.6	10.3	-17.00	-0.17	-5.62	16.26	6.54	9.52	16.63	-8.97
MDQ	Madag	11,398,414	44.6	1.3	5.8	19.0	6.80	-21.41	8.65	5.96	0.00	0.84	3.89	9.88
MEX	Mexico	1,143,129	0.9	79.6	14.9	3.3	-9.42	-5.58	-0.98	-16.70	32.68	15.26	1.64	-1.89
MHL	Marshall	5,342	10.1	39.5	47.4	2.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MKD	Macedon	14,259	0.7	73.7	12.2	13.4	0.61	-7.63	-6.89	10.93	2.98	16.72	-21.29	11.60
MLI	Mali	1,334,167	7.2	1.2	4.4	48.6	-13.89	-8.13	-1.12	11.77	11.18	-3.04	3.07	21.99
MMR	Myanmar	5,028,471	9.4	0.0	8.9	64.8	0.07	7.40	-0.92	-6.55	0.00	-2.35	-0.37	-4.75
MNG	Mongol	317,330	10.3	21.1	0.2	65.2	-6.60	-4.53	0.61	10.52	0.00	-1.52	-0.13	12.79
MOZ	Mozambi	8,131,054	27.4	0.9	7.3	25.8	-31.80	10.27	2.62	18.90	0.00	-0.48	5.89	16.12
MRT	Maurita	1,411,431	31.9	2.6	14.1	39.2	-23.20	-7.50	-0.29	31.00	0.00	1.12	2.97	26.62
MWI	Malawi	1,063,976	5.7	2.1	34.4	1.1	-9.73	1.93	2.37	5.43	0.00	0.39	1.08	6.33
NAM	Namibia	1,234,276	48.7	35.7	1.3	10.0	-7.35	-0.73	3.48	6.39	0.00	7.08	-0.45	3.24
NER	Niger	14,572,182	67.8	0.7	3.1	19.5	-15.87	0.70	6.68	2.05	6.44	-0.32	2.50	12.99
NGA	Nigeria	37,803,731	19.8	10.0	18.6	31.0	-6.59	0.43	-3.50	7.59	2.06	5.93	15.40	-15.17
NIC	Nicarag	404,328	6.5	24.4	10.4	45.3	-9.28	-0.82	1.23	16.07	0.00	8.20	6.27	2.83
NPL	Nepal	6,297,777	21.5	5.1	48.9	21.7	-45.39	-4.46	46.93	2.92	0.03	36.65	12.27	12.27
NRU	Nauru	294	2.6	23.1	29.2	44.1	1.69	-1.53	-0.05	-0.11	0.00	0.00	0.00	-0.16
PAK	Pakistan	20,547,511	10.4	25.2	33.1	11.7	-29.76	-4.83	6.09	28.50	0.00	5.37	17.59	11.63
PAN	Panama	1,811,666	4.4	37.1	37.0	15.0	-3.38	-16.67	-2.19	22.24	0.00	8.88	16.32	-5.15
PER	Peru	2,100,227	6.5	70.8	6.4	6.0	-11.82	-2.25	3.93	21.35	31.49	14.79	-5.11	4.40
PHL	Philipp	5,336,198	5.1	4.3	75.2	11.9	-5.87	-3.74	-4.79	4.27	10.13	0.28	5.21	4.11
PNG	Papua N	1,193,855	14.5	3.9	4.5	6.8	1.22	8.32	-1.61	-7.93	0.00	-0.02	-0.02	-9.49
PRY	Paraguy	45,077	0.7	8.8	42.5	41.8	-0.22	-20.04	0.82	4.60	14.85	-4.38	10.40	14.24
RWA	Rwanda	267,379	2.2	1.1	79.4	2.2	-2.13	-26.44	7.44	21.13	0.00	0.65	-0.47	28.39
SDN	Sudan	9,854,716	24.3	1.0	6.1	37.8	-36.62	7.76	15.88	4.76	0.00	0.65	4.75	13.45
SEN	Senegal	2,180,155	13.8	8.3	32.7	27.4	-10.24	-8.90	6.55	5.49	7.10	-0.38	11.61	7.92
SLB	Soloma	328,229	53.7	6.9	12.8	19.5	-3.54	-11.91	2.36	13.09	0.00	1.57	0.93	12.95
SLE	Sierra L	1,331,757	17.6	0.5	44.2	10.0	-8.64	-7.06	10.23	0.86	4.61	-1.18	2.41	13.47
SVK	El Salva	64,140	1.0	40.6	17.3	40.4	-9.16	-5.65	4.23	0.00	4.72	10.03	-4.87	-4.87
SOM	Somalia	4,058,198	27.5	11.0	4.0	38.3	-31.22	11.11	1.45	18.67	0.00	4.22	3.95	11.95
SSD	South S	7,899,544	62.8	0.1	4.0	15.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STP	Sao Tom	96,920	47.4	14.8	3.0	31.2	-23.19	-1.55	2.15	22.59	0.00	10.71	-12.11	26.13
SVK	Surinam	15,836	89.5	2.8	1.7	8.2	-5.62	-12.61	0.96	5.17	0.00	0.72		

SSP1		SSP2		SSP3		SSP1					SSP2					SSP3				
Population		Population		Population		Sanitation Technology Usage Rates [%]					Sanitation Technology Usage Rates [%]					Sanitation Technology Usage Rates [%]				
Total Population [in Millions]	Population Openly Defecating (No. of People)	Total Population [in Millions]	Population Openly Defecating (No. of People)	Total Population [in Millions]	Population Openly Defecating (No. of People)	Sewer	Septic Tank	Pit Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Sewer	Septic Tank	Pit Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Sewer	Septic Tank	Pit Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine
48	6,073,783	52	6,585,321	56	7,171,408	2.7	28.2	69.1	0	0	2.7	13.9	54.9	25.9	2.6	0	0	0	0	100
30	5,946,589	32	6,345,782	33	6,644,978	1.0	97.8	0	0	0	1.0	96.5	0.0	0.1	2.4	0	0	0	0	100
145	788,351	145	788,351	145	788,351	0.0	93.0	7.0	0	0	0.0	92.9	7.0	0.0	0.0	0	0	0	0	100
0	385	0	385	0	385	61.8	36.4	1.8	0	0	61.8	35.9	1.2	0.4	0.7	0	0	0	0	100
13	332,483	13	343,048	13	338,952	0.0	24.0	76.0	0	0	0.0	5.3	57.3	34.9	2.5	0	0	0	0	100
14	7,678,746	14	7,678,746	15	7,698,502	2.4	32.1	65.6	0	0	2.4	4.5	38.0	0.0	11.8	43.3	0	0	0	100
25	11,751,493	27	12,735,394	30	13,806,110	0.9	18.1	81.0	0	0	0.9	1.9	64.8	4.6	27.8	0	0	0	0	100
0	2,980	0	3,162	0	3,458	3.3	83.8	13.0	0	0	3.3	83.7	12.9	0.0	0.0	0	0	0	0	100
12	1,573,772	13	1,675,819	14	1,861,366	60.7	16.0	23.2	0	0	60.7	15.1	22.3	1.9	0.0	0	0	0	0	100
216	2,430,283	223	2,508,869	230	2,594,816	84.9	9.6	5.5	0	0	84.9	9.4	5.3	0.4	0.0	0	0	0	0	100
1	2,291	0	2,327	0	2,346	0.0	0.5	100.0	0	0	0.0	0.0	99.5	0.0	0.5	0	0	0	0	100
2	262,208	2	267,911	2	253,937	0.0	4.9	95.1	0	0	0.0	3.3	93.4	0.4	2.9	0	0	0	0	100
25	6,344,841	26	6,737,865	29	7,550,726	6.5	43.9	49.7	0	0	6.5	24.5	30.3	20.9	17.8	0	0	0	0	100
26	1,819,582	27	1,898,894	29	2,005,496	0.0	38.9	61.1	0	0	0.0	17.6	39.8	35.9	6.6	0	0	0	0	100
102	12,558,032	107	12,998,599	113	13,665,757	0.0	38.7	61.3	0	0	0.0	10.1	32.7	43.7	13.5	0	0	0	0	100
6	509,149	6	531,705	6	549,825	0.0	40.0	60.0	0	0	0.0	24.9	44.9	21.0	9.1	0	0	0	0	100
55	1,690,274	57	1,757,879	60	1,841,396	80.4	18.2	1.4	0	0	80.4	18.2	1.4	0.0	0.0	0	0	0	0	100
1	5,616	1	6,201	1	7,011	9.3	27.7	62.9	0	0	9.3	9.6	44.8	35.8	0.5	0	0	0	0	100
1	107,669	1	112,711	1	125,292	23.2	75.9	0.9	0	0	23.2	75.7	0.8	0.3	0.0	0	0	0	0	100
1	199,013	1	204,654	1	208,881	4.2	19.6	76.3	0	0	4.2	11.5	68.2	0.1	16.1	0	0	0	0	100
11	330,571	12	345,119	13	369,894	14.9	84.4	0.7	0	0	14.9	83.7	0.0	0.3	1.1	0	0	0	0	100
43	331,706	45	344,124	47	361,979	94.6	2.0	3.4	0	0	94.6	1.5	2.8	1.1	0.0	0	0	0	0	100
17	376,234	19	385,254	19	405,354	65.1	35.1	0.0	0.0	0.0	65.1	35.1	0.0	0.0	0.0	0	0	0	0	100
117	26,177,420	124	27,707,960	131	29,276,604	1.5	43.4	55.1	0	0	1.5	3.6	15.3	79.6	0.0	0	0	0	0	100
2	58,878	2	58,525	2	60,658	42.6	10.7	46.7	0	0	42.6	0.0	35.9	17.5	3.9	0	0	0	0	100
34	6,058,732	36	6,847,890	38	6,884,498	2.2	38.0	59.8	0	0	2.2	26.4	48.2	8.1	15.1	0	0	0	0	100
13	1,805,707	13	1,805,707	15	2,134,629	2.8	31.2	66.0	0	0	2.8	19.9	54.7	34.4	0.0	0	0	0	0	100
2	26,206	3	28,013	3	30,120	2.4	47.8	49.8	0	0	2.4	22.6	44.8	24.6	5.0	0	0	0	0	100
2	332,564	2	349,902	2	369,447	2.7	49.4	47.9	0	0	2.7	23.2	21.7	50.3	2.1	0	0	0	0	100
1	29,937	1	31,316	1	31,535	11.6	13.0	75.4	0	0	11.6	6.4	68.8	13.3	0.0	0	0	0	0	100
0	3,639	0	3,992	0	4,257	9.4	71.1	19.4	0	0	9.4	66.1	14.6	4.9	4.8	0	0	0	0	100
19	877,686	20	956,237	23	1,074,097	46.0	25.5	28.5	0	0	46.0	17.6	20.6	15.8	0.0	0	0	0	0	100
1	4,584	1	4,789	1	5,386	0.0	89.3	10.7	0	0	0.0	89.2	10.7	0.0	0.1	0	0	0	0	100
9	568,266	10	604,590	11	665,006	44.0	31.2	25.2	0	0	44.0	31.2	25.2	0.0	0.0	0	0	0	0	100
12	2,398,046	12	2,395,580	13	2,554,019	0.4	31.2	68.4	0	0	0.4	23.2	60.5	9.2	6.7	0	0	0	0	100
270	26,169,143	277	26,936,539	285	27,583,539	2.0	96.2	2.2	0	0	2.0	96.2	2.2	0.0	0.0	0	0	0	0	100
1459	375,398,299	1529	391,324,267	1604	412,651,931	2.2	49.4	48.4	0	0	2.2	49.3	48.2	0.3	0.0	0	0	0	0	100
3	14,474	3	15,116	3	16,659	25.7	12.8	61.5	0	0	25.7	12.6	61.4	0.1	0.2	0	0	0	0	100
58	5,997,405	61	6,268,345	66	6,848,900	3.6	30.0	66.5	0	0	3.6	5.4	41.9	44.3	4.9	0	0	0	0	100
16	5,058,056	17	5,289,414	18	5,684,896	12.6	87.6	0.0	0.0	0.0	12.6	87.6	0.0	0.0	0.0	0	0	0	0	100
0	39,544	0	39,544	0	39,544	11.3	45.8	42.9	0	0	11.3	38.8	35.9	12.9	1.1	0	0	0	0	100
7	1,535,267	8	1,613,799	8	1,723,949	0.0	16.0	84.5	0	0	0.0	16.0	84.5	0.0	0.0	0	0	0	0	100
7	2,814,118	8	3,004,723	7	2,961,695	0.0	45.4	54.6	0	0	0.0	12.6	21.7	37.8	27.9	0	0	0	0	100
0	1,557	0	1,611	0	1,585	0.0	100.0	0.0	0	0	0.0	100.0	0.0	0.0	0.0	0	0	0	0	100
22	125,698	23	131,116	24	135,710	0.0	0.8	99.7	0	0	0.0	0.0	99.4	0.6	0.6	0	0	0	0	100
2	672,865	3	687,768	3	697,782	0.0	6.4	93.6	0	0	0.0	0.0	87.3	0.0	12.8	0	0	0	0	100
35	2,537,247	36	2,640,306	40	2,871,098	57.7	39.3	3.4	0	0	57.7	39.3	3.4	0.0	0.0	0	0	0	0	100
31	13,659,549	33	14,830,303	35	15,786,621	1.9	40.2	57.9	0	0	1.9	8.8	26.5	13.0	49.8	0	0	0	0	100
121	1,159,249	126	1,210,249	146	1,287,871	82.3	16.1	1.9	0	0	82.3	16.1	1.9	0.0	0.0	0	0	0	0	100
0	6,536	0	6,536	0	6,536	39.5	52.8	7.7	0	0	39.5	47.4	2.2	0.9	10.1	0	0	0	0	100
2	14,831	2	14,931	2	14,931	76.6	0.6	22.8	0	0	76.6	0.0	22.3	0.0	1.2	0	0	0	0	100
49	1,708,228	26	1,855,029	28	1,989,014	0.0	20.6	79.4	0	0	0.0	6.7	65.4	27.8	0.0	0	0	0	0	100
46	4,843,371	51	5,043,191	54	5,043,191	0.0	23.7	76.3	0	0	0.0	8.6	61.2	30.8	9.5	0	0	0	0	100
3	338,557	3	351,885	4	369,638	19.9	2.7	77.6	0	0	19.9	0.1	75.0	0.0	5.3	0	0	0	0	100
32	8,761,484	34	9,263,653	35	9,646,616	0.5	36.6	62.9	0	0	0.5	11.8	38.1	46.4	3.1	0	0	0	0	100
5	1,513,748	5	1,604,995	5	1,685,023	3.5	26.7	69.8	0	0	3.5	16.4	59.6	6.3	14.2	0	0	0	0	100
24	1,387,724	26	1,498,522	28	1,584,871	2.4	31.1	66.5	0	0	2.4	3.9	39.3	54.4	0.0	0	0	0	0	100
3	1,402,267	3	1,435,250	3	1,471,168	41.1	23.7	35.2	0	0	41.1	0.9	12.5	2.4	43.1	0	0	0	0	100
27	18,146,839	30	20,230,025	33	22,103,243	0.4	37.6	62.0	0	0	0.4	5.0	29.4	9.4	55.7	0	0	0	0	100
241	47,682,225	253	50,050,295	268	53,130,174	14.5	48.2	37.2	0	0	14.5	30.4	19.4	20.8	14.8	0	0	0	0	100
6	416,188	7	439,215	8	469,390	30.7	18.5	50.8	0	0	30.7	15.2	47.5	6.7	0.0	0	0	0	0	100
39	8,894,612	41	8,894,612	45	9,594,962	0.0	69.0	31.1	0	0	0.0	69.0	31.1	0.0	0.0	0	0	0	0	100
0	337	0	337	0	337	23.1	31.1	45.9	0	0	23.1	29.2	43.9	0.0	3.9	0	0	0	0	100
225	23,489,604	240	24,997,545	257	26,762,399	29.3	48.3	22.4	0	0	29.3	46.5	20.6	3.5	0.0	0	0	0	0	100
4	190,427	4	197,881	5	205,149	37.9	50.4	12.0	0	0	37.9	49.5	11.0	0.0	1.8	0	0	0	0	100
32	2,072,466	33	2,157,430	36	2,346,041	82.1	4.5	13.4	0	0	82.1	2.5	11.4	4.0	0.0	0	0	0	0	100</

Protein Data

Source:

[FAOSTAT](#)

Select Countries of Interest

Select Protein supply quantity (g/capita/day)

Select most recent year (2017)

Area	Unit	Total value	[kg protein / person / year]
	g/capita/day	54.09	19.7
Afghanistan	g/capita/day	92.85	33.9
Algeria	g/capita/day	54.09	19.7
Angola	g/capita/day	88.74	32.4
Barbados	g/capita/day	67.11	24.5
Belize	g/capita/day	64.45	23.5
Benin	g/capita/day	68.4	25.0
Bolivia (Plurinational State of)	g/capita/day	65.09	23.8
Botswana	g/capita/day	90.87	33.2
Brazil	g/capita/day	76.08	27.8
Burkina Faso	g/capita/day	65.38	23.9
Cambodia	g/capita/day	69.49	25.4
Cameroon	g/capita/day	70.51	25.7
Chad	g/capita/day	72.31	26.4
Colombia	g/capita/day	55.63	20.3
Congo	g/capita/day	59.11	21.6
Côte d'Ivoire	g/capita/day	66.43	24.2
Djibouti	g/capita/day	66.86	24.4
Dominican Republic	g/capita/day	65.77	24.0
Ecuador	g/capita/day	74.7	27.3
El Salvador	g/capita/day	65.64	24.0
Ethiopia	g/capita/day	79.31	28.9
Gabon	g/capita/day	63.48	23.2
Gambia	g/capita/day	62.95	23.0
Ghana	g/capita/day	70.57	25.8
Grenada	g/capita/day	69.83	25.5
Guatemala	g/capita/day	61.78	22.5
Guinea	g/capita/day	44.13	16.1
Guinea-Bissau	g/capita/day	87.58	32.0
Guyana	g/capita/day	49.91	18.2
Haiti	g/capita/day	64.04	23.4
Honduras	g/capita/day	65.7	24.0
India	g/capita/day	68.63	25.0
Indonesia	g/capita/day	72.83	26.6
Jamaica	g/capita/day	60.87	22.2
Kenya	g/capita/day	83.19	30.4
Lao People's Democratic Republic	g/capita/day	63.95	23.3
Lesotho	g/capita/day	39.91	14.6
Liberia	g/capita/day	42.94	15.7
Madagascar	g/capita/day	67.98	24.8
Malawi	g/capita/day	84.74	30.9
Mali	g/capita/day	79.82	29.1
Mauritania	g/capita/day	93.3	34.1
Mexico	g/capita/day	82.35	30.1
Mongolia	g/capita/day	98.03	35.8
Morocco	g/capita/day	51.18	18.7
Mozambique	g/capita/day	93.35	34.1
Myanmar	g/capita/day	62	22.6
Namibia	g/capita/day	73.58	26.9
Nepal	g/capita/day	66	24.1
Nicaragua	g/capita/day	81.86	29.9
Niger	g/capita/day	55.9	20.4
Nigeria	g/capita/day	66.25	24.2
Pakistan	g/capita/day	79.42	29.0
Panama	g/capita/day	71.85	26.2
Paraguay	g/capita/day	78.38	28.6
Peru	g/capita/day	62.66	22.9
Philippines	g/capita/day	59.2	21.6
Rwanda	g/capita/day	89.17	32.5
Saint Vincent and the Grenadines	g/capita/day	85.7	31.3
Samoa	g/capita/day	52	19.0
Sao Tome and Principe	g/capita/day	60.47	22.1
Senegal	g/capita/day	55.66	20.3
Sierra Leone	g/capita/day	53.64	19.6
Solomon Islands	g/capita/day	83.36	30.4
South Africa	g/capita/day	64.27	23.5
Sri Lanka	g/capita/day	67.88	24.8
Sudan	g/capita/day	60.15	22.0
Suriname	g/capita/day	57.69	21.1
Timor-Leste	g/capita/day	57.31	20.9
Togo	g/capita/day	52.32	19.1
Uganda	g/capita/day	59.75	21.8
United Republic of Tanzania	g/capita/day	63.72	23.3
Vanuatu	g/capita/day	56.3	20.5
Venezuela (Bolivarian Republic of)	g/capita/day	53.24	19.4
Yemen	g/capita/day	59.06	21.6
Zambia	g/capita/day	51.2	18.7
Zimbabwe		Average	24.6

[illegible]

Model & Analysis

No.	Country	SSPs						Activity Data												Fraction of total wastewater organics removed during wastewater treatment per treatment type. Pathway for organics removal include loss to sludge and biological decomposition	Fraction of the population managing their septic tank in compliance with the sludge removal instructions of their septic system					
		SSP1	SSP2	SSP3	SSP4	SSP5	SSP6	Degree of utilization of treatment /discharge pathway or system for each income group																		
		Population (2030)						[No. of People]																		
		[No. of People]						[No. of People]																		
Units							Septic Tank	Pt Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Open Latrine	Septic Tank	Pt Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Open Latrine	Septic Tank	Pt Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Open Latrine	Septic Tank			Pt Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Open Latrine		
Variable																										
1	Algeria	47,834,208	51,689,360	56,289,664	6,073,783	1,581,521	7,121,408	37	0.28	0.69	0.00	0.00	0.14	0.55	0.36	0.03	0	0	1	0.625		0.43	0.3	0	0.5	
2	Angola	28,075,280	31,855,137	33,136,827	8,946,589	5,846,782	6,644,236	37	0.38	0.01	0.00	0.00	0.97	0.00	0.00	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
3	Anguilla	14,454,204	14,454,204	14,454,204	14,454,204	14,454,204	14,454,204	37	0.38	0.68	0.00	0.00	0.88	0.13	0.78	0.01	0	0	1	0.625		0.43	0.3	0	0.5	
4	Antigua and Barbuda	55,000	55,000	55,000	55,000	55,000	55,000	37	0.36	0.02	0.00	0.00	0.36	0.01	0.00	0.01	0	0	1	0.625		0.43	0.3	0	0.5	
5	Aruba	12,629,639	13,086,424	13,229,648	343,660	133,822	133,822	37	0.31	0.47	0.00	0.00	0.68	0.00	0.00	0.00	0	0	1	0.625		0.43	0.3	0	0.5	
6	Bahamas	335,526,933	34,253,563	34,672,639	7,261,746	7,637,207	7,688,502	37	0.32	0.66	0.00	0.00	0.05	0.38	0.12	0.43	0	0	1	0.625		0.43	0.3	0	0.5	
7	Bahrain	255,142,277	27,260,895	29,958,302	31,151,493	32,735,394	33,680,120	37	0.18	0.81	0.00	0.00	0.02	0.85	0.05	0.28	0	0	1	0.625		0.43	0.3	0	0.5	
8	Belize	389,012	403,236	403,236	403,236	403,236	403,236	37	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	1	0.625		0.43	0.3	0	0.5	
9	Bolivia, Plurinational State of	11,835,482	12,620,925	13,396,331	1,373,772	1,675,819	1,861,366	37	0.16	0.23	0.00	0.00	0.15	0.22	0.02	0.00	0	0	1	0.625		0.43	0.3	0	0.5	
10	Bosnia and Herzegovina	215,839,075	222,819,089	230,452,257	2,480,283	2,568,868	2,594,836	50	0.10	0.06	0.00	0.00	0.09	0.05	0.00	0.00	0	0	1	0.625		0.43	0.3	0	0.5	
11	Brazil	275,426	2,805,747	2,933,038	2,091	3,237	3,446	2,091	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.01	0	0	1	0.625		0.43	0.3	0	0.5	
12	Burkina Faso	2,376,462	2,418,148	2,301,505	262,208	307,913	253,937	37	0.05	0.95	0.00	0.00	0.03	0.93	0.00	0.03	0	0	1	0.625		0.43	0.3	0	0.5	
13	Burundi	24,633,031	23,179,458	23,179,458	23,179,458	23,179,458	23,179,458	37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	1	0.625		0.43	0.3	0	0.5	
14	Cameroon	26,174,500	27,315,490	28,848,948	1,819,582	1,888,894	2,006,476	37	0.39	0.61	0.00	0.00	0.18	0.40	0.36	0.07	0	0	1	0.625		0.43	0.3	0	0.5	
15	Canada	101,703,689	107,350,361	113,883,521	12,258,023	12,934,598	13,665,717	37	0.39	0.61	0.00	0.00	0.10	0.33	0.44	0.13	0	0	1	0.625		0.43	0.3	0	0.5	
16	Central African Republic	5,822,114	6,080,041	6,287,236	509,149	531,705	549,825	37	0.40	0.60	0.00	0.00	0.25	0.45	0.21	0.09	0	0	1	0.625		0.43	0.3	0	0.5	
17	Chad	15,123,047	15,727,769	16,051,406	1,400,274	1,752,879	1,941,396	37	0.18	0.81	0.01	0.00	0.00	0.00	0.00	0.00	0	0	1	0.625		0.43	0.3	0	0.5	
18	Chile	19,404,285	2,048,136	2,188,181	5,636	6,261	7,051	37	0.38	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0	0	1	0.625		0.43	0.3	0	0.5	
19	Colombia	530,864	558,839	621,216	107,609	113,713	125,292	37	0.76	0.01	0.00	0.00	0.76	0.01	0.00	0.00	0	0	1	0.625		0.43	0.3	0	0.5	
20	Costa Rica	5,149,172	5,183,745	5,206,137	399,033	404,654	208,881	37	0.20	0.76	0.00	0.00	0.00	0.11	0.68	0.00	0.16	0	0	1		0.625	0.43	0.3	0	0.5
21	Cote d'Ivoire	12,005,098	12,867,532	13,600,971	364,139	369,894	374,119	37	0.84	0.01	0.00	0.00	0.84	0.00	0.00	0.01	0	0	1	0.625		0.43	0.3	0	0.5	
22	Croatia	4,618,615	4,618,615	4,618,615	331,706	361,629	361,629	37	0.31	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0	0	1	0.625		0.43	0.3	0	0.5	
23	Cuba	17,726,951	17,973,799	19,844,075	36,121	376,826	405,554	37	0.35	0.00	0.00	0.00	0.35	0.00	0.00	0.00	0	0	1	0.625		0.43	0.3	0	0.5	
24	Cyprus	1,077,389	1,237,978	1,306,894	267,220	27,707,965	29,176,804	37	0.43	0.55	0.00	0.00	0.04	0.15	0.80	0.00	0	0	1	0.625		0.43	0.3	0	0.5	
25	Czechia	1,088,841	1,088,841	1,088,841	68,678	68,678	68,678	37	0.11	0.47	0.00	0.00	0.00	0.36	0.36	0.18	0.04	0	0	1		0.625	0.43	0.3	0	0.5
26	Dominican Republic	335,540	35,931,404	38,717,910	6,068,732	6,487,890	6,884,498	37	0.38	0.60	0.00	0.00	0.26	0.48	0.08	0.15	0	0	1	0.625		0.43	0.3	0	0.5	
27	Dominica	12,025,621	12,025,621	12,025,621	1,025,621	1,025,621	1,025,621	37	0.31	0.66	0.00	0.00	0.00	0.20	0.55	0.18	0.04	0	0	1		0.625	0.43	0.3	0	0.5
28	Dominican Republic	2,448,281	2,601,389	2,797,034	26,306	28,013	30,120	37	0.48	0.50	0.00	0.00	0.33	0.25	0.50	0.00	0.00	0	0	1		0.625	0.43	0.3	0	0.5
29	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
30	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
31	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
32	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
33	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
34	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
35	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
36	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
37	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
38	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
39	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
40	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
41	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
42	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
43	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
44	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
45	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
46	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
47	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
48	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
49	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369,447	37	0.30	0.62	0.00	0.00	0.33	0.22	0.50	0.02	0	0	1	0.625		0.43	0.3	0	0.5	
50	Dominican Republic	1,977,467	2,074,458	2,190,335	332,564	349,952	369																			

IPCC Equation 8.8f				IPCC Equation 6.3c				IPCC Equation 6.2				SSPL				IPCC Equation 6.1			
SSPL				SSPL				SSPL				SSPL				SSPL			
Total organics in the treated wastewater effluent discharged to aquatic environments in inventory year								Organic component removed from wastewater (in the form of sludge) in sludge systems											
Emission Factor (IPCC Default)								Emission Factor (Improved)								1A (IPCC)			
Septic Tank								Septic Tank								1B (Improved)			
Septic Tank								Septic Tank								2A (IPCC)			
Septic Tank								Septic Tank								2B (Improved)			
[g BOD ₅ /yr]								[g BOD ₅ /yr]								CH ₄ Emissions [g CH ₄ /yr]			
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SWPS										Parameters												
3A (PCC)				3B (ImproveD)				Annual per Capita protein consumption	Additional nitrogen from household products added to wastewater	Fraction of total wastewater nitrogen removed during wastewater treatment per treatment type.				Emission Factor (PCC Default)				Emission Factor (ImproveD)				
Septic Tank	PI Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PI Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	[kg protein / person / year]	-	Septic Tank	PI Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PI Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PI Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	
Protein										g(NH4)	g(N2O)				[g N2O /capita /day] EF (Effluent)							
0	0	0	8,229,621	0	0	0	2,851,728	19.7	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	7,625,451	0	0	0	2,833,879	19.7	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	904,680	0	0	0	311,291	24.6	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	152	0	0	0	152	24.6	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	388,368	0	0	0	133,840	24.6	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	9,004,005	0	0	0	3,118,851	25.5	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	15,843,339	0	0	0	5,453,530	27.8	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	3,968	0	0	0	1,366	24.5	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	2,136,029	0	0	0	734,986	25.0	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	2,977,707	0	0	0	1,024,598	33.2	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	2,692	0	0	0	926	32.4	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	291,408	0	0	0	100,271	23.8	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	8,664,912	0	0	0	2,981,507	21.6	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	2,301,426	0	0	0	791,897	25.4	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	15,682,276	0	0	0	5,396,109	20.3	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	630,957	0	0	0	217,106	20.3	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	2,113,112	0	0	0	727,180	26.4	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	8,045	0	0	0	2,788	24.6	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	143,780	0	0	0	49,473	24.6	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	239,204	0	0	0	82,480	24.2	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	424,475	0	0	0	146,058	24.4	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	451,393	0	0	0	142,832	33.9	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	465,398	0	0	0	160,138	24.0	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	31,596,659	0	0	0	11,560,264	24.0	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	49,608	0	0	0	23,952	28.9	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	7,900,375	0	0	0	2,718,418	23.0	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	2,448,615	0	0	0	843,887	22.5	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	34,565	0	0	0	11,893	23.2	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	423,962	0	0	0	140,481	16.1	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	31,189	0	0	0	12,492	22.5	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	4,886	0	0	0	1,481	25.8	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	1,233,591	0	0	0	424,122	25.5	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	6,180	0	0	0	2,127	32.0	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	763,135	0	0	0	262,387	23.4	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	2,030,890	0	0	0	3,008,489	18.2	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	31,653,469	0	0	0	10,891,633	25.0	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	473,542,850	0	0	0	162,941,215	24.0	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	19,117	0	0	0	6,578	26.6	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	7,859,234	0	0	0	2,734,381	22.2	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	6,520,908	0	0	0	2,236,861	23.9	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	45,379	0	0	0	15,634	24.6	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	1,978,335	0	0	0	680,725	30.4	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	3,398,723	0	0	0	1,169,465	14.6	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	1,933	0	0	0	665	24.6	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	155,739	0	0	0	53,887	23.5	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	800,746	0	0	0	275,529	23.3	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	1,294,757	0	0	0	1,133,602	35.8	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	18,116,009	0	0	0	6,233,861	15.7	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	1,477,009	0	0	0	508,533	34.1	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	7,500	0	0	0	2,181	24.6	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	17,134	0	0	0	5,896	24.6	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	2,282,513	0	0	0	781,389	30.9	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	5,788,345	0	0	0	1,991,638	34.1	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	424,182	0	0	0	145,957	30.1	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	11,079,071	0	0	0	3,809,097	18.7	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	1,933,666	0	0	0	605,394	29.1	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	1,813,273	0	0	0	629,050	24.8	1.1	0.42	0.12	0	0	0.01	0	0.0004	0.00001	0.12	0.03	0.00002	0.00001	
0	0	0	1,648,253	0	0	0	580,911	22.6	1.1	0.42	0.12	0	0	0								

										SPP1		PPCC Equation 8.10		SPP3				
Emission Factor (PPCC Default)				Emission Factor (Improved)				Total annual amount of nitrogen in domestic wastewater for treatment pathway										
Septic Tank	PI Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PI Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	[kg N/yr.]										
[kg N2O / kg Nf / kg Nf (pHunit)]								TOW (Septic Tanks)	TOW (PI Latrines)	TOW (Composting Toilets / Bucket Latrines)	TOW (Open Defecation / Hanging Latrines)	TOW (Septic Tanks)	TOW (PI Latrines)	TOW (Composting Toilets / Bucket Latrines)	TOW (Open Defecation / Hanging Latrines)			
2.88E+00	0.00E+00	9.59E-12	2.08E-11	2.61E-09	6.11E-10	4.80E-11	2.00E-11	5,942,514	14,592,287	-	0	3,182,208	12,560,210	5,980,002	391,575	0	0	24,118,790
2.83E+00	0.00E+00	9.59E-12	2.00E-11	2.61E-09	4.80E-11	2.00E-11	2.00E-11	20,206,854	259,293	-	0	21,287,704	-	27,805	0	0	0	21,080,400
2.27E+00	0.00E+00	7.69E-12	1.60E-11	2.10E-09	4.90E-11	3.84E-11	1.60E-11	3,176,611	240,810	-	0	3,175,830	240,029	1,563	0	0	0	3,174,211
2.27E+00	0.00E+00	7.69E-12	1.60E-11	2.10E-09	4.90E-11	3.84E-11	1.60E-11	0	0	-	0	0	0	12	0	0	0	1,671
2.27E+00	0.00E+00	7.69E-12	1.60E-11	2.10E-09	4.90E-11	3.84E-11	1.60E-11	346,239	1,095,041	-	0	79,150	851,745	518,734	37,410	0	0	1,469,324
2.37E+00	0.00E+00	8.05E-12	1.80E-11	2.10E-09	5.10E-11	4.00E-11	1.60E-11	16,665,807	10,749,258	-	0	1,454,724	12,080,924	3,194,539	13,750,083	0	0	31,761,953
2.65E+00	0.00E+00	8.85E-12	1.45E-11	1.86E-09	4.34E-11	3.41E-11	1.45E-11	10,450,212	46,511,901	-	0	1,179,812	40,326,376	2,881,073	17,275,413	0	0	47,255,884
2.28E+00	0.00E+00	7.73E-12	1.61E-11	2.11E-09	3.87E-11	1.61E-11	1.61E-11	10,762	1,865	-	0	11,415	1,765	4	0	0	0	14,909
2.23E+00	0.00E+00	7.59E-12	1.58E-11	2.07E-09	4.83E-11	3.79E-11	1.58E-11	1,109,275	1,605,686	-	0	1,112,509	1,641,108	137,389	0	0	0	8,178,871
1.68E+00	0.00E+00	5.71E-12	1.19E-11	1.56E-09	3.64E-11	2.85E-11	1.19E-11	1,362,419	781,297	-	0	1,380,290	780,376	52,370	0	0	0	15,147,210
1.72E+00	0.00E+00	5.85E-12	1.22E-11	1.59E-09	3.72E-11	2.92E-11	1.22E-11	40	13,057	-	0	-	13,200	123	0	0	0	13,174
2.36E+00	0.00E+00	7.97E-12	1.64E-11	2.12E-09	5.00E-11	3.90E-11	1.64E-11	53,808	1,043,493	-	0	36,713	1,046,809	4,613	0	0	0	1,064,809
2.58E+00	0.00E+00	8.78E-12	1.81E-11	2.30E-09	5.59E-11	4.39E-11	1.81E-11	10,566,524	11,963,777	-	0	6,273,998	7,757,802	3,340,693	4,553,424	0	0	28,671,818
2.28E+00	0.00E+00	7.47E-12	1.54E-11	2.03E-09	4.75E-11	3.71E-11	1.54E-11	3,157,639	4,962,568	-	0	1,494,167	3,177,769	1,042,174	595,841	0	0	8,912,608
2.71E+00	0.00E+00	9.31E-12	1.94E-11	2.54E-09	5.94E-11	4.66E-11	1.94E-11	16,943,249	28,862,369	-	0	4,658,147	15,128,740	20,225,049	6,226,163	0	0	48,836,921
2.71E+00	0.00E+00	9.31E-12	1.94E-11	2.54E-09	5.94E-11	4.66E-11	1.94E-11	727,330	1,092,202	-	0	472,900	854,026	395,573	171,555	0	0	1,964,892
2.11E+00	0.00E+00	7.17E-12	1.49E-11	1.94E-09	4.57E-11	3.59E-11	1.49E-11	1,428,202	117,501	-	0	1,484,579	116,255	1,492	0	0	0	8,514,544
2.27E+00	0.00E+00	7.69E-12	1.60E-11	2.10E-09	4.90E-11	3.84E-11	1.60E-11	6,751	33,125	-	0	7,153	32,043	9,612	144	0	0	30,392
2.27E+00	0.00E+00	7.69E-12	1.60E-11	2.10E-09	4.90E-11	3.84E-11	1.60E-11	352,109	4,298	-	0	369,880	3,841	1,366	0	0	0	543,129
2.36E+00	0.00E+00	7.81E-12	1.61E-11	2.10E-09	4.97E-11	3.91E-11	1.61E-11	1,616,146	647,811	-	0	1,616,146	595,500	549	140,425	0	0	894,393
2.29E+00	0.00E+00	7.76E-12	1.62E-11	2.11E-09	4.94E-11	3.88E-11	1.62E-11	1,198,611	9,940	-	0	1,240,983	-	4,159	16,596	0	0	1,588,726
1.63E+00	0.00E+00	5.59E-12	1.14E-11	1.52E-09	3.54E-11	2.79E-11	1.14E-11	40,416	66,307	-	0	30,556	57,395	22,789	0	0	0	2,159,002
2.32E+00	0.00E+00	7.89E-12	1.64E-11	2.15E-09	5.02E-11	3.94E-11	1.64E-11	536,420	-	-	0	559,410	-	-	0	0	0	1,715,492
2.18E+00	0.00E+00	7.96E-12	1.65E-11	2.15E-09	5.09E-11	3.99E-11	1.65E-11	47,884,430	60,821,112	-	0	4,175,298	17,886,246	93,021,528	123,451,053	0	0	225,451,053
1.89E+00	0.00E+00	6.54E-12	1.37E-11	1.80E-09	4.17E-11	3.27E-11	1.37E-11	31,078	139,209	-	0	31,078	137,146	53,324	11,631	0	0	309,044
2.49E+00	0.00E+00	8.24E-12	1.72E-11	2.29E-09	5.25E-11	4.12E-11	1.72E-11	9,310,130	24,658,160	-	0	6,925,510	12,652,929	2,312,411	3,874,614	0	0	27,940,778
2.49E+00	0.00E+00	8.24E-12	1.72E-11	2.29E-09	5.25E-11	4.12E-11	1.72E-11	2,237,321	4,731,414	-	0	1,512,113	4,160,032	1,395,713	1,340,403	0	0	8,471,803
2.41E+00	0.00E+00	8.17E-12	1.70E-11	2.21E-09	5.21E-11	4.09E-11	1.70E-11	51,288	131,288	-	0	25,829	28,109	57,572	122,828	0	0	132,828
1.44E+00	0.00E+00	5.11E-11	2.49E-11	3.20E-09	7.49E-11	5.80E-11	2.49E-11	465,110	452,010	-	0	229,744	215,360	499,083	20,947	0	0	1,047,149
2.47E+00	0.00E+00	8.49E-12	1.75E-11	2.25E-09	5.35E-11	4.20E-11	1.75E-11	15,484	49,801	-	0	7,813	49,801	16,506	16,506	0	0	138,116
2.17E+00	0.00E+00	7.33E-12	1.53E-11	2.06E-09	4.68E-11	3.68E-11	1.53E-11	11,737	2,208	-	0	12,000	2,445	208	872	0	0	19,301
2.19E+00	0.00E+00	7.55E-12	1.55E-11	2.07E-09	4.72E-11	3.71E-11	1.55E-11	1,001,296	1,326,168	-	0	754,508	1,011,818	678,070	0	0	0	4,816,269
1.76E+00	0.00E+00	5.92E-12	1.21E-11	1.61E-09	3.77E-11	2.96E-11	1.21E-11	21,023	2,766	-	0	24,037	2,874	10	22	0	0	1,188,743
2.38E+00	0.00E+00	8.10E-12	1.69E-11	2.21E-09	5.14E-11	4.05E-11	1.69E-11	730,293	585,682	-	0	776,974	626,310	0	0	0	0	2,775,798
3.09E+00	0.00E+00	1.09E-11	2.17E-11	2.81E-09	6.69E-11	5.20E-11	2.17E-11	3,259,486	5,084,761	-	0	1,258,411	4,386,281	698,707	510,640	0	0	10,380,343
2.29E+00	0.00E+00	7.58E-12	1.57E-11	2.06E-09	4.81E-11	3.78E-11	1.57E-11	113,013,842	2,639,118	-	0	113,013,842	2,639,118	0	0	0	0	121,688,933
2.31E+00	0.00E+00	7.65E-12	1.58E-11	2.07E-09	4.85E-11	3.80E-11	1.58E-11	786,768,617	800,751,648	-	0	786,768,617	800,751,648	0	0	0	0	1,241,625,336
2.14E+00	0.00E+00	7.12E-12	1.49E-11	1.94E-09	4.54E-11	3.54E-11	1.49E-11	8,441	41,677	-	0	8,441	41,677	0	0	0	0	86
2.51E+00	0.00E+00	8.51E-12	1.78E-11	2.32E-09	5.43E-11	4.26E-11	1.78E-11	7,023,788	35,591,894	-	0	1,311,456	10,266,974	10,848,012	1,210,456	0	0	27,911,791
2.34E+00	0.00E+00	7.98E-12	1.64E-11	2.14E-09	5.06E-11	3.97E-11	1.64E-11	1,642,493	19,453,486	-	0	1,910,453	18,806	0	0	0	0	23,762,627
2.27E+00	0.00E+00	7.69E-12	1.60E-11	2.10E-09	4.90E-11	3.84E-11	1.60E-11	78,502	73,596	-	0	66,525	61,620	1,840	22,113	0	0	171,419
1.84E+00	0.00E+00	6.24E-12	1.30E-11	1.70E-09	3.97E-11	3.12E-11	1.30E-11	1,313,521	6,930,556	-	0	1,380,710	7,285,066	-	0	0	0	9,512,999
3.83E+00	0.00E+00	1.30E-11	2.71E-11	3.54E-09	8.28E-11	6.50E-11	2.71E-11	3,278,579	3,936,389	-	0	971,462	1,673,940	2,912,044	2,145,919	0	0	7,093,248
2.27E+00	0.00E+00	7.69E-12	1.60E-11	2.10E-09	4.90E-11	3.84E-11	1.60E-11	6,748	5	-	0	6,983	-	0	0	0	0	7,303
2.36E+00	0.00E+00	7.89E-12	1.64E-11	2.15E-09	5.04E-11	3.94E-11	1.64E-11	517,407	517,407	-	0	538,267	52	529	3,029	0	0	560,305
2.38E+00	0.00E+00	8.11E-12	1.69E-11	2.21E-09	5.17E-11	4.06E-11	1.69E-11	176,242	2,588,501	-	0	-	2,465,223	-	360,223	0	0	660,360
1.56E+00	0.00E+00	5.29E-12	1.16E-11	1.54E-09	3.37E-11	2.61E-11	1.16E-11	6,279,557	944,923	-	0	6,514,624	567,507	0	0	0	0	18,060,147
1.56E+00	0.00E+00	5.29E-12	1.16E-11	1.54E-09	3.37E-11	2.61E-11	1.16E-11	2,121,271	21,813,098	-	0	3,587,555	10,844,250	5,318,953	15,144,811	0	0	43,546,851
1.44E+00	0.00E+00	5.11E-11	2.49E-11	3.20E-09	7.49E-11	5.80E-11	2.49E-11	465,110	452,010	-	0	229,744	215,360	499,083	20,947	0	0	7,718,9

IPCC Equation 6.8															
SPP1				SPP2				SPP3				SPP4			
Total nitrogen in the wastewater effluent discharged to aquatic environments in inventory year															
[g N/m ³ / N (effluent, Don)]															
1A (IPCC)				1B (Improved)				Septic Tank				Septic Tank			
Septic Tank	PI Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PI Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PI Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PI Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine
3,476,371	12,841,081	-	-	1,861,592	11,092,985	5,930,002	599,575	0	0	0	0	24,918,798	9,821.04	0.00E+00	0.00E+00
11,821,010	227,258	-	0	12,453,907	27,805	523,458	0	0	0	0	0	23,089,400	3,346.03	0.00E+00	0.00E+00
1,838,118	211,913	-	0	1,857,840	211,225	1,563	0	0	0	0	0	3,417,421	4,211.04	0.00E+00	0.00E+00
356	35	-	0	351	181	6	12	0	0	0	0	1,471	8,072.08	0.00E+00	0.00E+00
202,550	963,636	-	0	46,302	749,536	518,774	37,410	0	0	0	0	1,469,324	4,598.05	0.00E+00	0.00E+00
5,634,407	17,296,947	-	0	809,124	10,634,204	3,745,259	11,750,083	0	0	0	0	52,101,252	1,346.03	0.00E+00	0.00E+00
6,087,049	40,926,473	-	0	700,147	55,407,387	2,883,673	12,275,453	0	0	0	0	47,475,694	1,222.03	0.00E+00	0.00E+00
6,296	6,678	-	0	1,553	4	4	0	0	0	0	0	14,909	1,432.06	0.00E+00	0.00E+00
648,926	1,413,004	-	0	650,818	1,444,175	137,389	-	0	0	0	0	8,178,871	1,454.04	0.00E+00	0.00E+00
797,015	687,541	-	0	807,469	686,731	52,370	-	0	0	0	0	15,147,210	1,346.04	0.00E+00	0.00E+00
35	11,490	-	0	11,616	-	-	123	0	0	0	0	13,374	6,006.09	0.00E+00	0.00E+00
31,510	917,294	-	0	21,477	911,193	4,613	0	0	0	0	0	1,061,809	7,412.06	0.00E+00	0.00E+00
6,181,417	10,528,124	-	0	3,670,289	6,826,866	5,340,693	4,551,424	0	0	0	0	28,671,818	1,606.03	0.00E+00	0.00E+00
1,847,219	4,167,000	-	0	874,008	2,977,437	3,042,374	559,841	0	0	0	0	8,952,408	4,064.04	0.00E+00	0.00E+00
9,911,801	23,619,348	-	0	2,725,131	13,131,291	20,225,049	6,226,163	0	0	0	0	48,836,921	2,726.03	0.00E+00	0.00E+00
426,488	961,138	-	0	276,699	751,543	399,573	173,551	0	0	0	0	1,064,892	1,176.04	0.00E+00	0.00E+00
835,498	99,021	-	0	868,479	102,304	1,492	-	0	0	0	0	8,513,641	1,771.04	0.00E+00	0.00E+00
31,510	31,486	-	0	1,507	30,158	9,412	144	0	0	0	0	1,061,809	7,412.06	0.00E+00	0.00E+00
205,984	3,782	-	0	216,438	3,380	1,366	-	0	0	0	0	543,129	4,672.05	0.00E+00	0.00E+00
97,192	509,912	-	0	58,356	523,864	349	140,421	0	0	0	0	891,393	2,246.05	0.00E+00	0.00E+00
201,180	8,747	-	0	725,975	4,139	-	16,396	0	0	0	0	1,584,718	1,606.04	0.00E+00	0.00E+00
21,655	58,350	-	0	17,875	50,502	22,239	-	0	0	0	0	2,159,092	3,896.06	0.00E+00	0.00E+00
313,806	327,372	-	0	327,372	-	-	0	0	0	0	0	1,713,482	7,296.05	0.00E+00	0.00E+00
28,013,562	53,622,578	-	0	2,442,149	55,722,297	93,021,628	-	0	0	0	0	123,451,053	6,521.03	0.00E+00	0.00E+00
18,180	18,180	-	0	18,180	18,180	52,324	11,631	0	0	0	0	209,000	3,306.06	0.00E+00	0.00E+00
5,446,660	12,899,181	-	0	4,052,008	11,134,577	2,112,413	3,974,614	0	0	0	0	27,840,278	1,321.03	0.00E+00	0.00E+00
1,308,813	4,316,813	-	0	884,817	1,460,817	1,199,123	320,402	0	0	0	0	4,171,401	3,246.04	0.00E+00	0.00E+00
30,001	15,110	-	0	24,736	57,572	-	-	0	0	0	0	122,828	7,231.06	0.00E+00	0.00E+00
272,323	397,769	-	0	114,412	189,693	499,081	20,947	0	0	0	0	1,047,349	9,445.05	0.00E+00	0.00E+00
9,040	78,860	-	0	4,629	79,221	16,506	-	0	0	0	0	125,156	2,246.06	0.00E+00	0.00E+00
6,866	2,823	-	0	7,020	2,327	872	872	0	0	0	0	19,101	1,498.06	0.00E+00	0.00E+00
587,221	986,098	-	0	441,440	776,000	578,070	-	0	0	0	0	4,611,001	1,296.04	0.00E+00	0.00E+00
13,469	2,434	-	0	14,062	2,520	10	22	0	0	0	0	30,100	2,314.06	0.00E+00	0.00E+00
427,222	518,040	-	0	454,130	51,133	-	-	0	0	0	0	2,735,789	1,624.04	0.00E+00	0.00E+00
1,142,876	4,417,630	-	0	1,028,105	4,070,209	698,707	510,640	0	0	0	0	8,188,731	4,311.04	0.00E+00	0.00E+00
64,943,097	2,364,667	-	0	66,593,551	2,322,423	-	-	0	0	0	0	121,068,923	1,451.02	0.00E+00	0.00E+00
458,010,212	616,750,212	-	0	478,341,907	704,641,450	5,263,074	-	0	0	0	0	1,745,000,003	1,075.01	0.00E+00	0.00E+00
5,055	36,676	-	0	5,211	38,201	62	171	0	0	0	0	77,941	1,064.06	0.00E+00	0.00E+00
4,108,916	13,724,814	-	0	767,436	9,930,937	10,848,012	1,210,466	0	0	0	0	26,781,178	1,031.03	0.00E+00	0.00E+00
10,882,496	11,380,172	-	0	11,380,172	54,226	1,840	-	0	0	0	0	23,792,627	2,546.03	0.00E+00	0.00E+00
45,923	64,765	-	0	38,917	54,226	1,840	22,113	0	0	0	0	171,419	1,046.05	0.00E+00	0.00E+00
768,410	6,098,890	-	0	807,715	6,410,858	-	-	0	0	0	0	9,212,999	1,414.04	0.00E+00	0.00E+00
1,917,369	3,463,951	-	0	568,422	1,473,067	2,912,044	2,145,919	0	0	0	0	7,593,248	7,356.04	0.00E+00	0.00E+00
3,948	1	-	0	4,085	-	1	-	0	0	0	0	7,303	8,846.07	0.00E+00	0.00E+00
864	459,293	-	0	473,667	-	52	3,029	0	0	0	0	562,805	7,066.07	0.00E+00	0.00E+00
103,102	2,277,881	-	0	-	2,169,396	-	360,223	0	0	0	0	2,866,590	2,466.05	0.00E+00	0.00E+00
8,851,793	479,512	-	0	3,021,755	499,010	-	-	0	0	0	0	18,060,587	5,731.04	0.00E+00	0.00E+00
145,705	91,977,287	-	0	2,008,720	9,542,240	5,318,563	20,362,658	0	0	0	0	43,164,811	3,151.03	0.00E+00	0.00E+00
114,155	114,155	-	0	114,155	114,155	-	-	0	0	0	0	7,718,874	1,071.04	0.00E+00	0.00E+00
8,753	1,907	-	0	7,850	547	243	3,849	0	0	0	0	23,792,627	1,986.06	0.00E+00	0.00E+00
216	12,924	-	0	-	12,769	-	750	0	0	0	0	64,723	4,902.08	0.00E+00	0.00E+00
1,122,630	6,494,443	-	0	397,031	5,815,938	2,810,513	-	0	0	0	0	10,827,593	2,018.04	0.00E+00	0.00E+00
8,692,196	18,050,266	-	0	1,461,130	15,534,839	5,997,357	2,738,210	0	0	0	0	30,147,633	6,136.04	0.00E+00	0.00E+00
20,597	1,221,247	-	0	1,228,209	1,228,209	-	86,168	0	0	0	0	1,955,447	5,311.05	0.00E+00	0.00E+00
6,165,898	15,941,633	-	0	2,111,014	10,224,968	14,129,613	941,452	0	0	0	0	31,761,176	1,841.03	0.00E+00	0.00E+00
4,120,786	4,710,583	-	0	760,154	4,131,761	1,519,603	1,147,014	0	0	0	0	8,640,188	2,321.04	0.00E+00	0.00E+00
1,103,394	3,546,240	-	0	149,737	2,262,620	3,160,812	-	0	0	0	0	6,919,440	2,481.04	0.00E+00	0.00E+00
774,364	1,721,065	-	0	31,401	626,996	138,440	2,481,151	0	0	0	0	5,859,440	1,912.04	0.00E+00	0.00E+00
20,987,481	52,684,389	-	0	3,141,102	27,554,192	9,980,394	56,267,074	0	0	0	0	116,134,022	3,921.03	0.00E+00	0.00E+00
48,112,189	56,081,074	-	0	31,990,102	30,706,489	37,420,274	26,533,976	0	0	0	0	190,791,304	1,327.02	0.00E+00	0.00E+00
159,072	709,441	-	0	145,131	774,496	124,447	-	0	0	0	0	2,094,183	4,431.05	0.00E+00	0.00E+00
15,990,054	10,830,720	-	0	16,951,016	11,452,235	-	-	0	0	0	0	45,933,267	3,321.03	0.00E+00	0.00E+00
265	589	-	0	589	546	-	57	0	0	0	0	1,459	6,011.08	0.00E+00	0.00E+00
19,697,159	28,955,972	-	0	18,325,938	3,717,500	-	18,566	0	0	0	0	113,688,096	6,511.03	0.00E+00	0.00E+00
286,161	103,134	-	0	292,150	98,170	-	-	0	0	0	0	1,046,618	5,521.05	0.00E+00	0.00E+00
275,364	1,211,988	-	0	118,976	1,090,498	438,637	57	0	0	0	0	11,812,623	3,381.05	0.00E+00	0.00E+00
11,421,451	3,171,892	-	0	11,891,922	3,3										

IPC Equation 6.7										Parameters										DOF										R2O										CO2																																																																																																																																																																																																																																																																																																																																																
SP2										SP3										SP4										SP5										SP6										SP7																																																																																																																																																																																																																																																																																																																																						
2A (PCCE)										2B (improved)										3A (PCCE)										3B (improved)										21										310										1																																																																																																																																																																																																																																																																																																																												
Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open 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/ Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank	PE Latrines	Composting Toilet / Bucket Latrine	Open Defecation / Hanging Latrine	Septic Tank

[illegible]