GHG Inventory Compilation Using the IPCC Software

SOUTH AFRICA EXPERIENCE

forestry, fisheries & the environment
Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

2030 NDP

30 YEARS OF FREEDOM

Presentation outline

- Data collection
- IPCC software
- CRT tables
- Key messages

DATA VALUE CHAIN

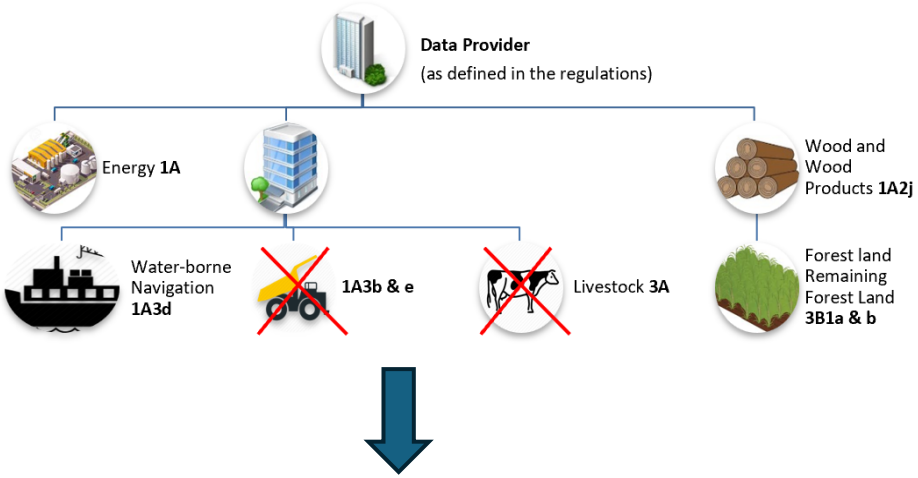
1. DATA COLLECTION

2. INVENTORY COMPILATION
(IPCC SOFTWARE)

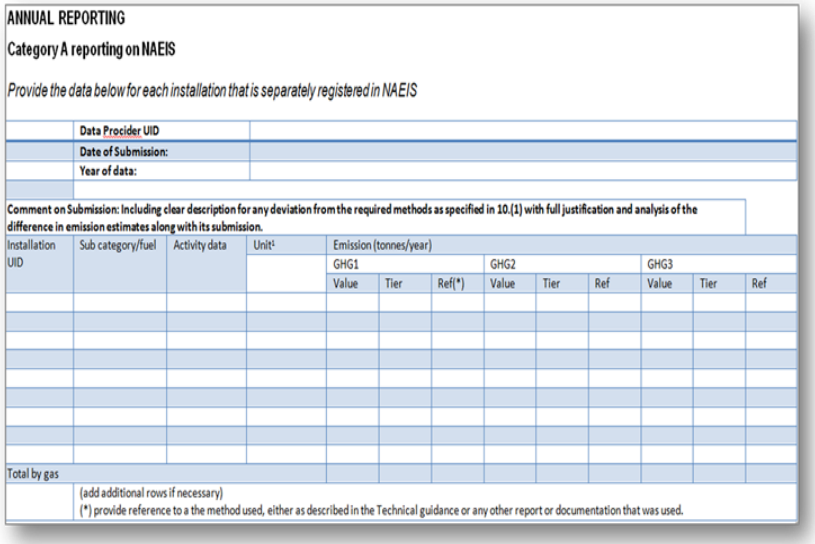
3. CRT TABLES

Data Collection: Reporting Process (GHG Reporting Regulations)

Step 1: Define Operational Boundaries



Step 2: Apply reporting framework



ANNUAL REPORTING

Category A reporting on NAEIS

Provide the data below for each installation that is separately registered in NAEIS

Data Procider UID	
Date of Submission:	
Year of data:	

Comment on Submission: Including clear description for any deviation from the required methods as specified in 10.(1) with full justification and analysis of the difference in emission estimates along with its submission.

Installation UID	Sub category/fuel	Activity data	Unit[1]	Emission (tonnes/year)								
				GHG1			GHG2			GHG3		
				Value	Tier	Ref(*)	Value	Tier	Ref	Value	Tier	Ref
Total by gas												

(add additional rows if necessary)

(*) provide reference to a the method used, either as described in the Technical guidance or any other report or documentation that was used.

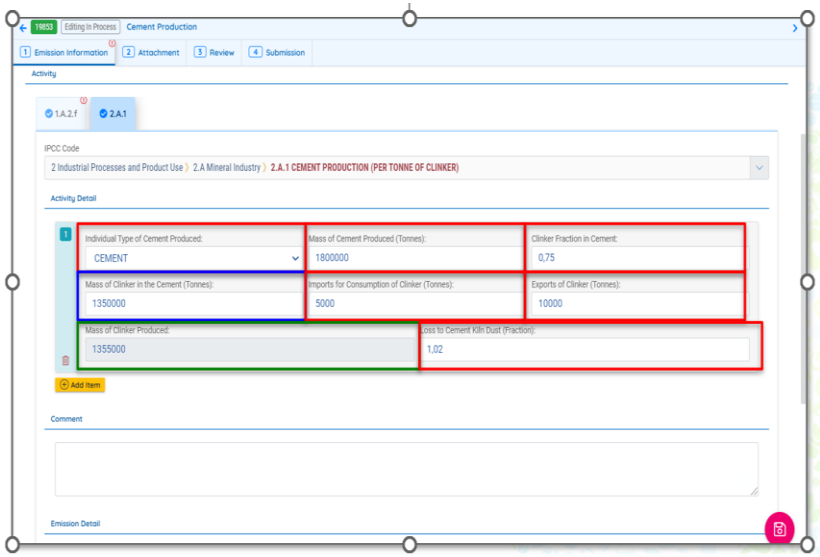
Step 2: Identify applicable IPCC activities & reporting requirements

Table 24.1: IPCC classification of emissions for cement production

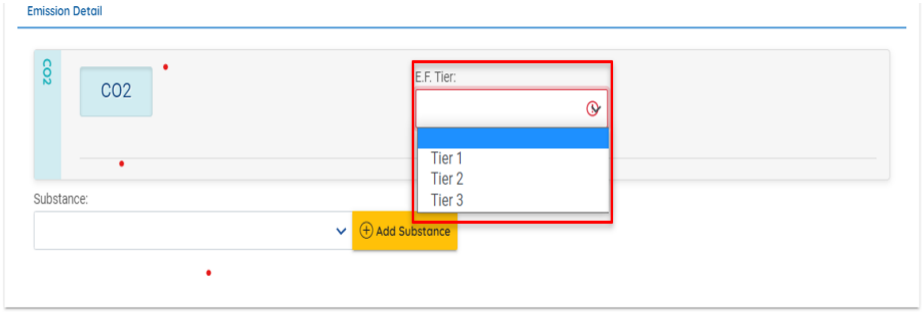
Sector	Relevant IPCC code/s	Definition	Relevant IPCC Gases	Tier	Methodology reference	Transitional arrangements
Cement Production	1A2f	Fuel combustion activities in the non-metallic minerals sector.	CO_2	1, 2 or 3	Section 12	Yes
			CH_4	1, 2 or 3	Section 12	No
			N_2O	1, 2 or 3	Section 12	No
	2A1	Cement production process emissions.	CO_2	2 or 3	Section 24	Yes

Data Collection: South African Greenhouse Gas Emissions Reporting System (SAGERS)

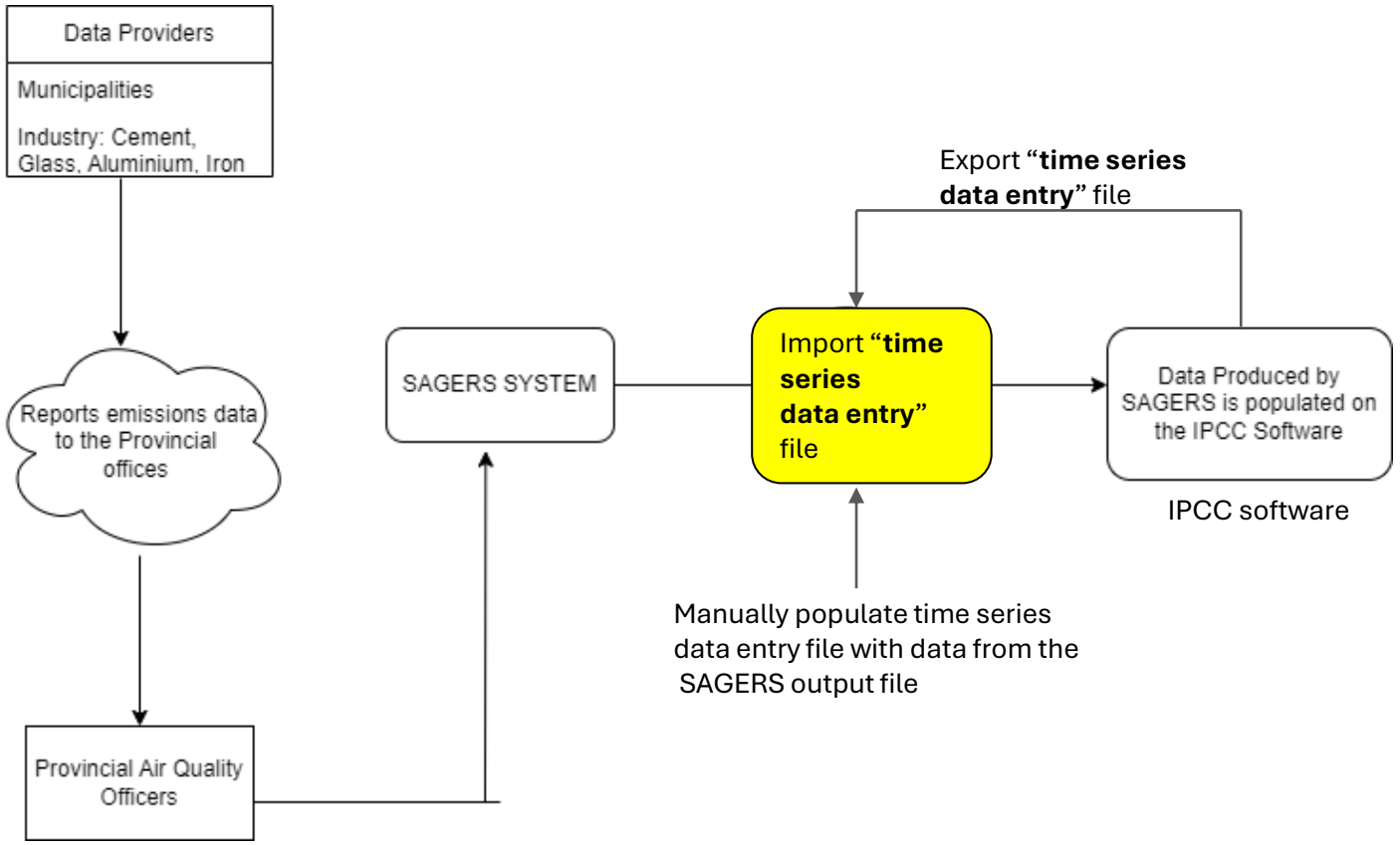
Step 1: Input Activity Data



Step 2: Select estimation Method (T1-T3)



Data Transfer (SAGERS – IPCC software)



Data collection – IPPU Example (sub-national level)

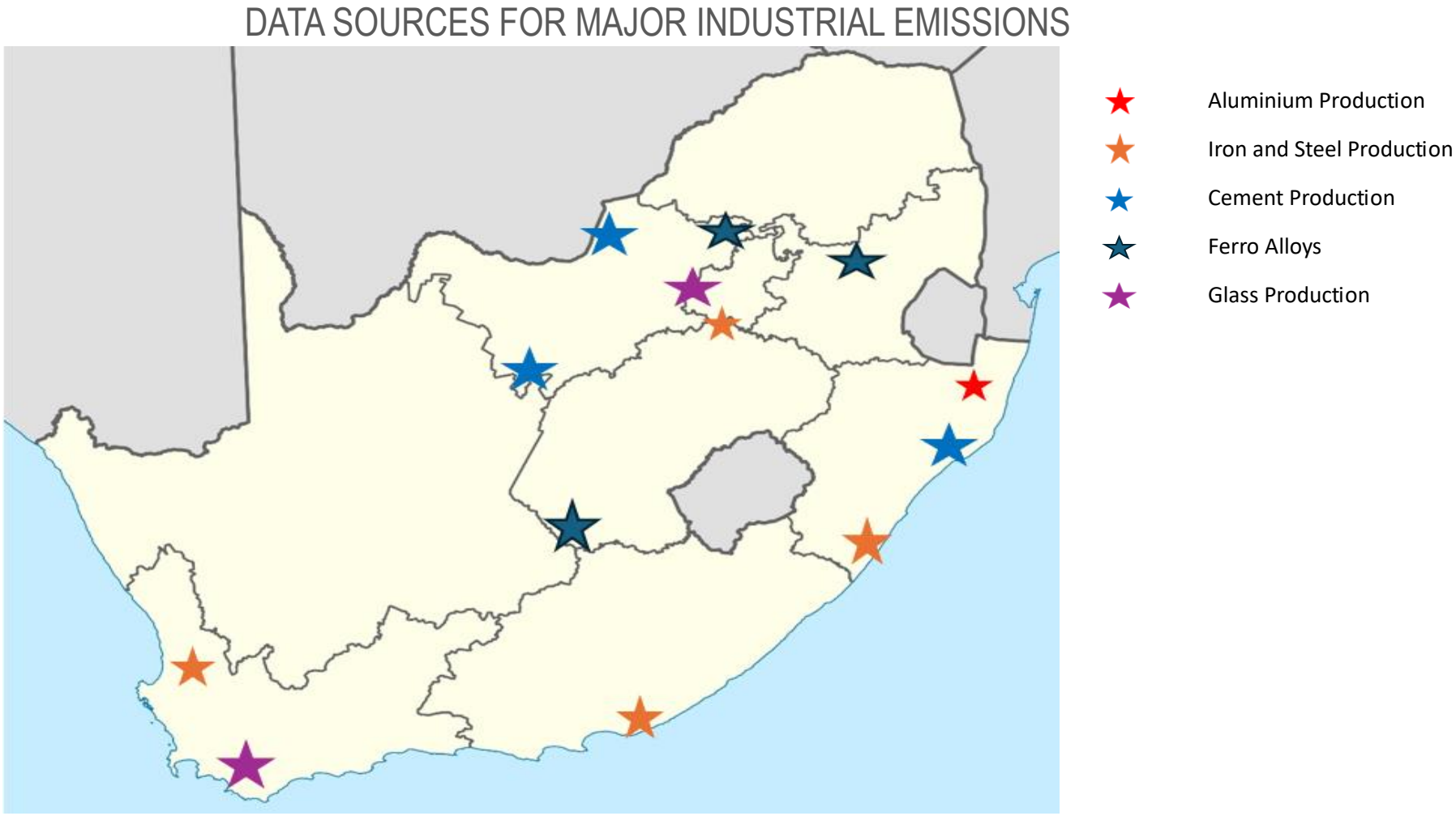
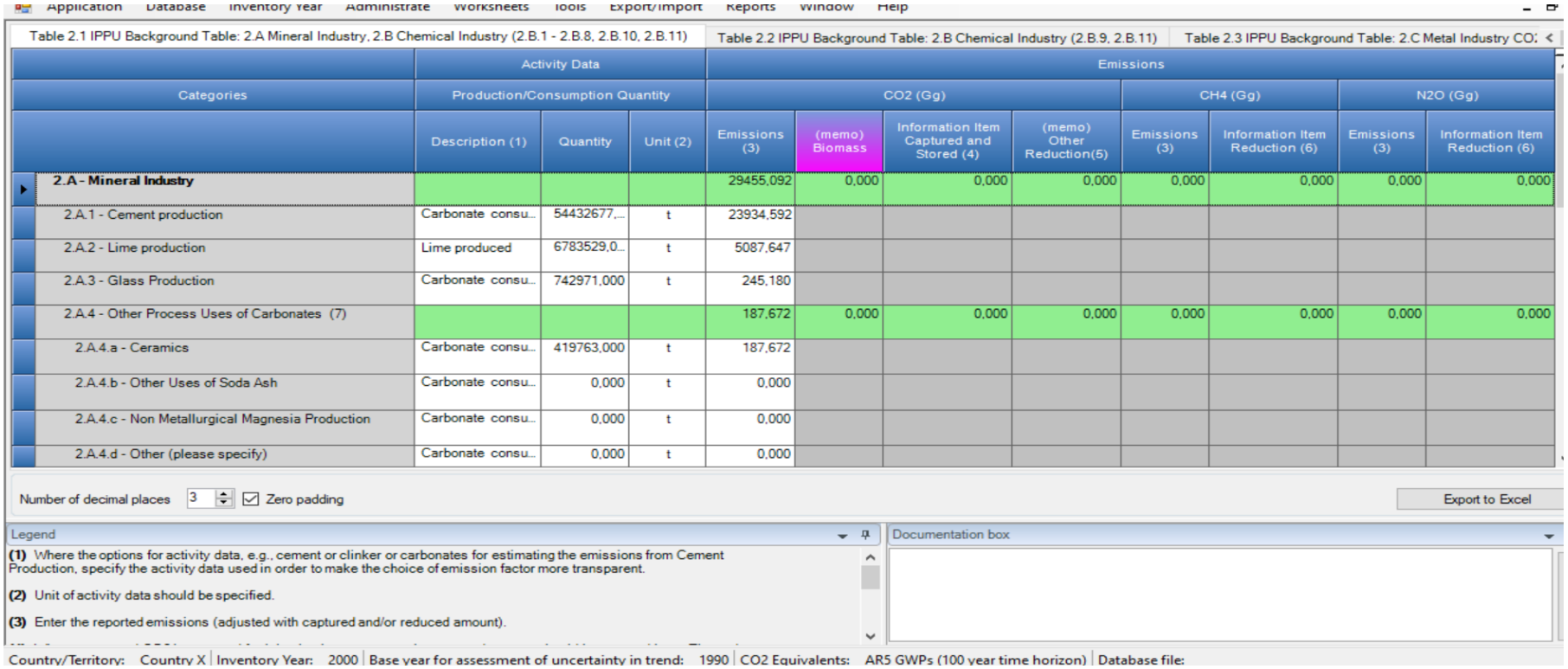


Fig. 1. Locations of some major Industrial Plants in South Africa.

Gauteng Province (sub-national) IPPU Emissions Inventory Compilation



Application Database Inventory Year Administrate Worksheets Tools Export/Import Reports Window Help

Table 2.1 IPPU Background Table: 2.A Mineral Industry, 2.B Chemical Industry (2.B.1 - 2.B.8, 2.B.10, 2.B.11) | Table 2.2 IPPU Background Table: 2.B Chemical Industry (2.B.9, 2.B.11) | Table 2.3 IPPU Background Table: 2.C Metal Industry CO2

Categories	Activity Data			Emissions							
	Production/Consumption Quantity			CO2 (Gg)				CH4 (Gg)		N2O (Gg)	
	Description (1)	Quantity	Unit (2)	Emissions (3)	(memo) Biomass	Information Item Captured and Stored (4)	(memo) Other Reduction(5)	Emissions (3)	Information Item Reduction (6)	Emissions (3)	Information Item Reduction (6)
2.A - Mineral Industry				29455,092	0,000	0,000	0,000	0,000	0,000	0,000	0,000
2.A.1 - Cement production	Carbonate consu...	54432677,...	t	23934,592							
2.A.2 - Lime production	Lime produced	6783529,0...	t	5087,647							
2.A.3 - Glass Production	Carbonate consu...	742971,000	t	245,180							
2.A.4 - Other Process Uses of Carbonates (7)				187,672	0,000	0,000	0,000	0,000	0,000	0,000	0,000
2.A.4.a - Ceramics	Carbonate consu...	419763,000	t	187,672							
2.A.4.b - Other Uses of Soda Ash	Carbonate consu...	0,000	t	0,000							
2.A.4.c - Non Metallurgical Magnesia Production	Carbonate consu...	0,000	t	0,000							
2.A.4.d - Other (please specify)	Carbonate consu...	0,000	t	0,000							

Number of decimal places 3 Zero padding Export to Excel

Legend

(1) Where the options for activity data, e.g., cement or clinker or carbonates for estimating the emissions from Cement Production, specify the activity data used in order to make the choice of emission factor more transparent.

(2) Unit of activity data should be specified.

(3) Enter the reported emissions (adjusted with captured and/or reduced amount).

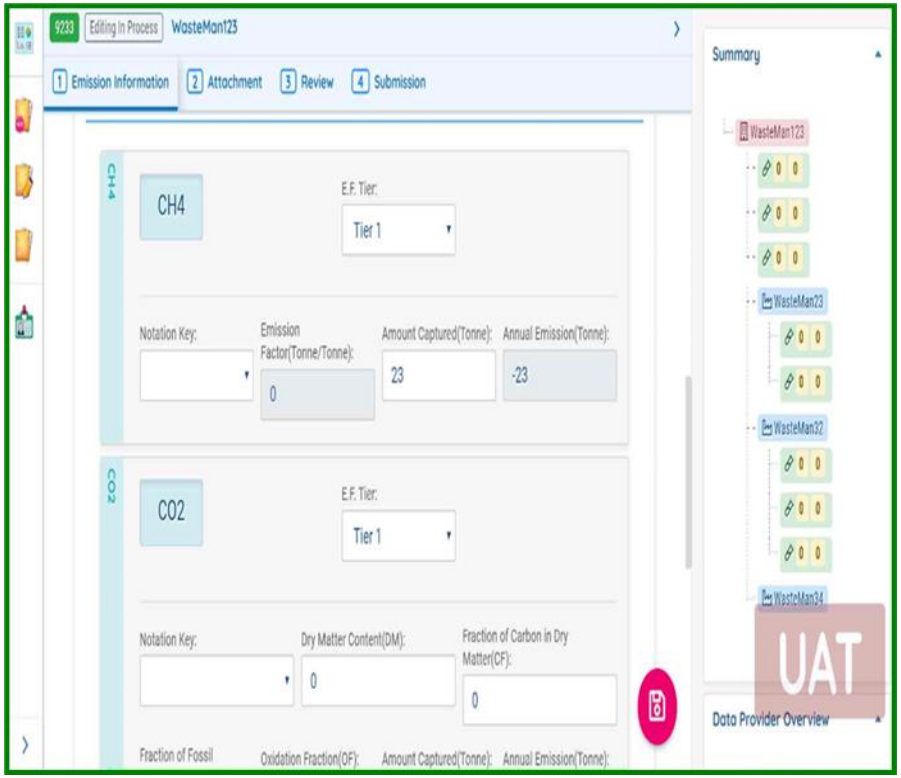
Documentation box

Country/Territory: Country X | Inventory Year: 2000 | Base year for assessment of uncertainty in trend: 1990 | CO2 Equivalents: AR5 GWPs (100 year time horizon) | Database file:

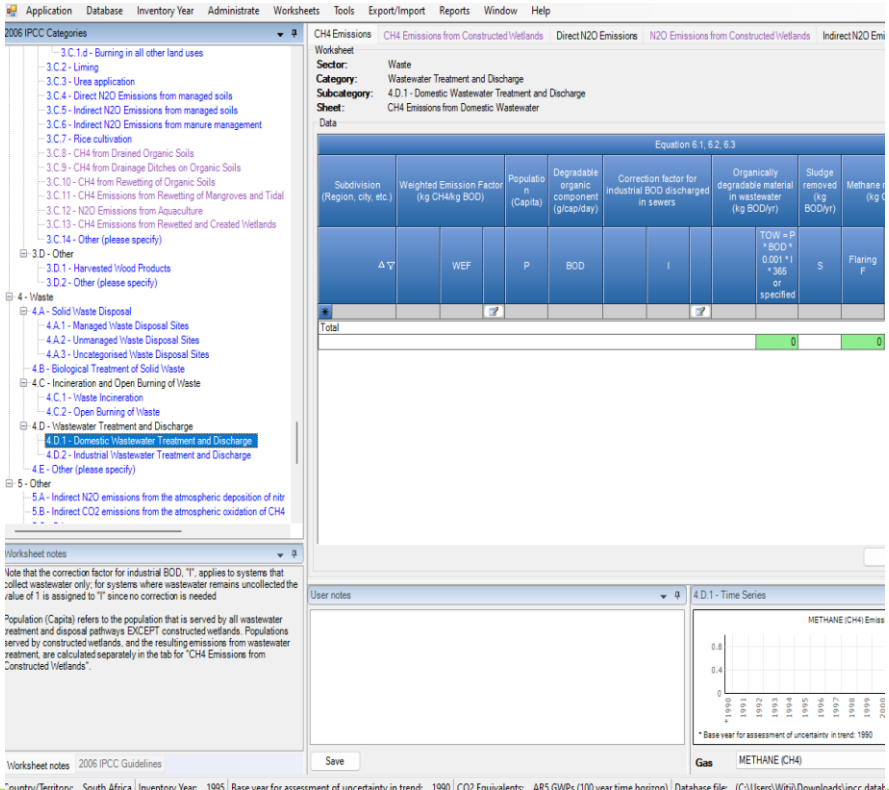
"Sub-division column in the worksheets allows for sub-national disaggregation of data"

Data Collection: Waste sector

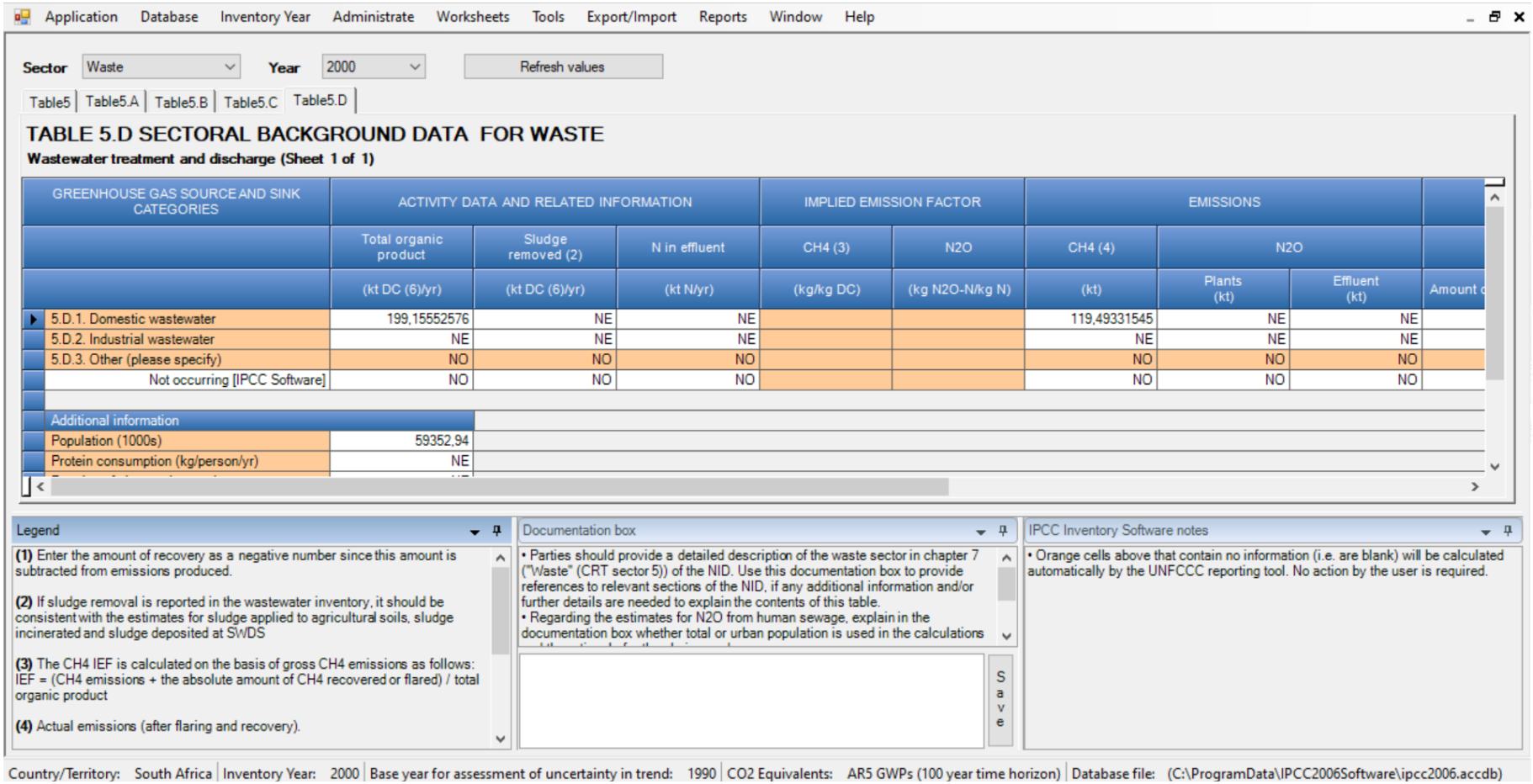
SAGERS (National & Provincial data)



IPCC Software (National & sub-national data)



Gauteng Province Waste Emissions Inventory Compilation



Application Database Inventory Year Administrate Worksheets Tools Export/Import Reports Window Help

Sector: Waste Year: 2000 Refresh values

Table5 | Table5.A | Table5.B | Table5.C | Table5.D

TABLE 5.D SECTORAL BACKGROUND DATA FOR WASTE

Wastewater treatment and discharge (Sheet 1 of 1)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND RELATED INFORMATION			IMPLIED EMISSION FACTOR		EMISSIONS			
	Total organic product	Sludge removed (2)	N in effluent	CH4 (3)	N2O	CH4 (4)	N2O		
	(kt DC (6)/yr)	(kt DC (6)/yr)	(kt N/yr)	(kg/kg DC)	(kg N2O-N/kg N)	(kt)	Plants (kt)	Effluent (kt)	Amount
5.D.1. Domestic wastewater	199,15552576	NE	NE			119,49331545	NE	NE	
5.D.2. Industrial wastewater	NE	NE	NE			NE	NE	NE	
5.D.3. Other (please specify)	NO	NO	NO			NO	NO	NO	
Not occurring [IPCC Software]	NO	NO	NO			NO	NO	NO	

Additional information	
Population (1000s)	59352,94
Protein consumption (kg/person/yr)	NE

Legend

(1) Enter the amount of recovery as a negative number since this amount is subtracted from emissions produced.

(2) If sludge removal is reported in the wastewater inventory, it should be consistent with the estimates for sludge applied to agricultural soils, sludge incinerated and sludge deposited at SWDS

(3) The CH4 IEF is calculated on the basis of gross CH4 emissions as follows: IEF = (CH4 emissions + the absolute amount of CH4 recovered or flared) / total organic product

(4) Actual emissions (after flaring and recovery).

Documentation box

• Parties should provide a detailed description of the waste sector in chapter 7 ("Waste" (CRT sector 5)) of the NID. Use this documentation box to provide references to relevant sections of the NID, if any additional information and/or further details are needed to explain the contents of this table.
• Regarding the estimates for N2O from human sewage, explain in the documentation box whether total or urban population is used in the calculations

Save

IPCC Inventory Software notes

• Orange cells above that contain no information (i.e. are blank) will be calculated automatically by the UNFCCC reporting tool. No action by the user is required.

Country/Territory: South Africa | Inventory Year: 2000 | Base year for assessment of uncertainty in trend: 1990 | CO2 Equivalents: AR5 GWPs (100 year time horizon) | Database file: (C:\ProgramData\IPCC2006Software\ipcc2006.accdb)

CRT TABLES

IPPU Sector (Gauteng Province Emissions)

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GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs [1]	PFCs [1]	Unspecified mix of HFCs and PFCs [1]	SF_6	NF_3	NO_x	CO	NMVOC	SO_X	Total GHG emissions [2]
	(kt)			CO_2 equivalent (kt) [3]					(kt)				C
2.A.3. Glass production	191,44												191,44
2.A.4. Other process uses of carbonates	147,26	NE	NE										147,26
2.B. Chemical industry	1 265,99	4,23	1,37	NO	NO	NE,NO			0,00	NE	NE	NE	1 748,70
2.B.1. Ammonia production	209,44	4,06	NE						NE	NE	NE	NE	323,12
2.B.2. Nitric acid production			1,37						NE				364,30
2.B.3. Adipic acid production													
2.B.4. Caprolactam, glyoxal and glyoxylic acid production													
2.B.5. Carbide production	37,38	0,17							NE	NE	NE	NE	42,00
2.B.6. Titanium dioxide production	813,78												813,78
2.B.7. Soda ash production	6,39												6,39
2.B.8. Petrochemical and carbon black production	100,57	0,00							NE	NE	NE	NE	100,63
2.B.9. Fluorochemical production				NO	NO	NO							NO
2.B.10. Other	98,43	0,00	NE			NE,NO			0,00	NE			98,48
2.C. Metal industry	15 528,54	0,00		NO	125,86	NO			NE	NE	NE	NE	15 654,45
2.C.1. Iron and steel production	6 307,24	NE							NE	NE	NE	NE	6 307,24
2.C.2. Ferroalloys production	8 080,65	0,00							NE	NE	NE	NE	8 080,70
2.C.3. Aluminium production	1 133,48				125,86				NE	NE	NE	NE	1 259,34
2.C.4. Magnesium production				NO	NO	NO							NO
2.C.5. Lead production	7,16								NE	NE	NE	NE	7,16
2.C.6. Zinc production									NE	NE	NE	NE	
2.C.7. Other				NO	NO	NO							NO
2.D. Non-energy products from fuels and solvent use [4]	1 124,79	NE	NE						NE	NE	NE	NE	1 124,79
2.D.1. Lubricant use	515,69	NE	NE						NE	NE	NE	NE	515,69
2.D.2. Paraffin wax use	609,10	NE	NE						NE	NE	NE	NE	609,10
2.D.3. Other													
2.E. Electronics industry				NO	NO	NO							NO

Table2(I) | Table2(I).A-H | Table2(II) | Table2(II).B-Hs1 | Table2(II).B-Hs2

CRT Tables

Waste Sector (Gauteng Province Emissions)

TABLE 5 SECTORAL REPORT FOR WAFTE
(Sheet 1 of 1)

2022
ZAF-CRT-2024-V0.1
South Africa

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GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	NO_x	CO	NMVOC	SO_x	Total GHG emissions (1)
	(kt)							CO_2 equivalents (kt) (2)
5. Total waste	28,91	625,05	5,93	NE	NE	NE	NE	22 468,00
5.A. Solid waste disposal		307,00		NE	NE	NE		8 596,00
5.A.1. Managed waste disposal sites		250,00		NE	NE	NE		8 596,00
5.A.2. Unmanaged waste disposal sites		NE		NE	NE	NE		NE
5.A.3. Uncategorized waste disposal sites		NE		NE	NE	NE		NE
5.B. Biological treatment of solid waste		61,99	3,00	NE	NE	NE		2 530,38
5.B.1. Composting		49,98	3,00	NE	NE	NE		2 194,05
5.B.2. Anaerobic digestion at biogas facilities		12,01	NE	NE	NE	NE		336,32
5.C. Incineration and open burning of waste	28,91	8,69	0,20	NE	NE	NE	NE	325,37
5.C.1. Waste incineration								
5.C.2. Open burning of waste	28,91	8,69	0,20	NE	NE	NE	NE	325,37
5.D. Wastewater treatment and discharge		304,37	2,73	NE	NE	NE		10 567,00
5.D.1. Domestic wastewater		125,25	2,73	NE	NE	NE		5 470,00
5.D.2. Industrial wastewater		179,13	NE	NE	NE	NE		5 015,54
5.D.3. Other								
5.E. Other *(please specify)*								
Memo item: (3)								
5.F.1. Long-term storage of C in waste disposal sites	NE							NE
5.F.2. Annual change in total long-term C storage	NE							NE
5.F.3. Annual change in total long-term C storage in HWP waste (4)	NE							NE

(1) "Total GHG emissions" does not include NO_x, CO, NMVOC and SO_x.

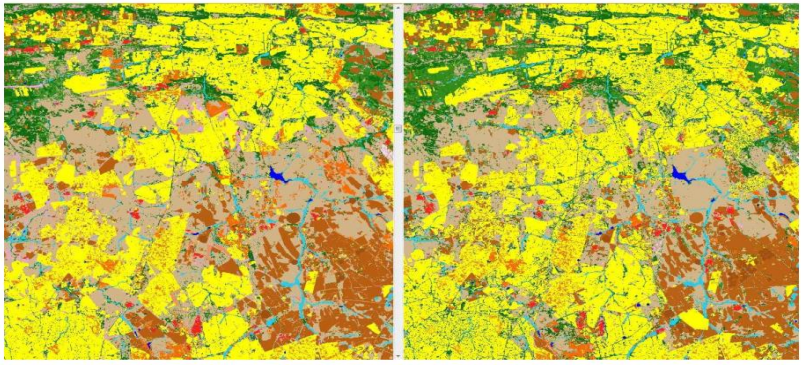
Table5 | Table5.A | Table5.B | Table5.C | Table5.D

Accessibility: Good to go

Next step (LULUCF) – subnational inventory

Step 1: Land Use Change assessment

Midrand, Gauteng

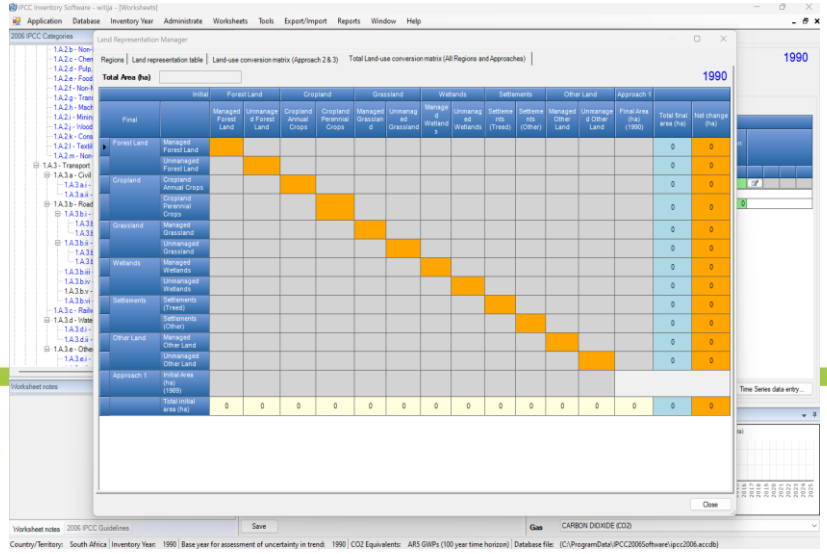


Note significant expansion of settlements (yellow) in 2013/14 compared to 1990. Note that the settlement class includes smallholdings, so in this area the expansion of settlements has gone into other land-cover classes as well, such as natural grasslands.

Step 2: sub-national Land Use Change matrix

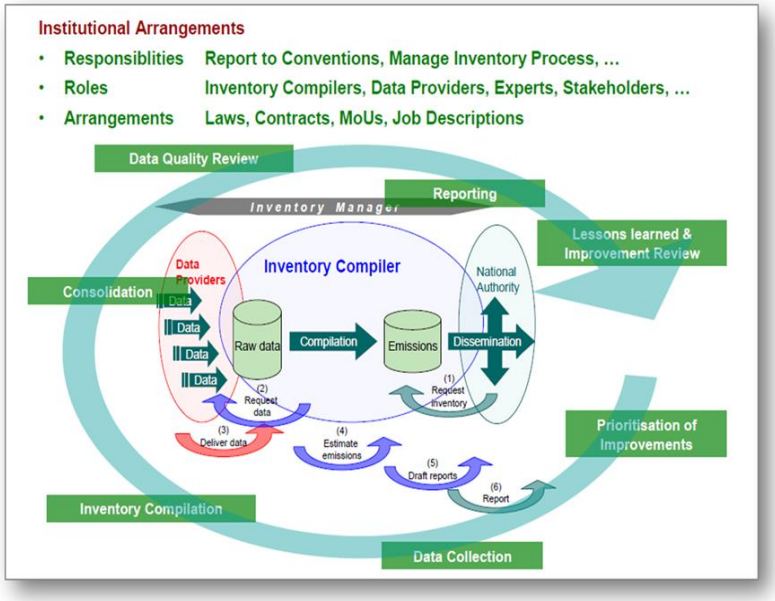
Gauteng Province change based on the 30m pixels			(change based on standardised areas)					
	1990 Land Cover		2014 Land Cover		Change from 1990 to 2014			Class mapping accuracy (2013)
	Pixels	Hectares	Pixels	Hectares	Pixels	Hectares	%	
Indigenous Forest	2	0.18	29	2.61	27	2.43	1350.00	72.6 / 94.64
Thicket /Dense bush	1064404	95796.36	1171881	105469.29	107477	9672.93	10.10	53.74 / 83.64
Woodland/Open bush	1811216	163009.44	2159919	194392.71	348703	31383.27	19.25	60.84 / 54.13
Low shrubland	232843	20955.87	88873	7998.57	-143970	-12957.30	-61.83	70.59 / 61.82
Plantations / Woodlots	472403	42516.27	296695	26702.55	-175708	-15813.72	-37.19	89.3 / 94.35
Cultivated commercial annual crops non-pivot	3897750	350797.50	3697032	332732.88	-200718	-18064.62	-5.15	91.91 / 99.54
Cultivated commercial annual crops pivot	68352	6151.68	223211	20088.99	154859	13937.31	226.56	95.38 / 92.42
Cultivated commercial permanent orchards	11483	1033.47	18527	1667.43	7044	633.96	61.34	92.18 / 95.29
Cultivated commercial permanent vines	0	0.00	0	0.00	0	0.00	0.00	91.61 / 97.26
Cultivated subsistence crops	30416	2737.44	13285	1195.65	-17131	-1541.79	-56.32	89.00 / 94.00
Settlements (incl smallholdings)	3473234	312591.06	3840546	345649.14	367312	33058.08	10.58	93.90 / 98.68
Wetlands	651038	58593.42	572043	51483.87	-78995	-7109.55	-12.13	88.07 / 91.18
Grasslands	6227097	560438.73	5946964	535226.76	-280133	-25211.97	-4.50	84.56 / 69.82
Mines	231305	20817.45	195821	17623.89	-35484	-3193.56	-15.34	92.82 / 98.10
Waterbodies	105313	9478.17	105983	9538.47	670	60.30	0.64	79.64 / 93.31
Bare Ground	12854	1156.86	22768	2049.12	9914	892.26	77.13	98.77 / 97.58
Degraded	106337	9570.33	42466	3821.94	-63871	-5748.39	-60.06	78.69 / 85.95
totals	*18396047*	*1655644*	*18396043*	*1655644*				*User / Producer class accuracies*

Step 3: AD for the IPPC software



Consideration for the IPCC Software

IDEAL ECOSYSTEM WITH IPCC SOFTWARE AT THE CENTRE



Key messages

1. Create a data collection module within the IPCC software (structure already in place);
2. This can be achieved by enabling wide access of the database with a web application, allowing multiple stakeholders to enter the data through the web and then using the software to make GHG estimates and compile the CRTs;
3. Good that the software allows for sub-division of data input (helpful for sub-national disaggregation of data).
4. Creation of reports at sub-division level;
5. Allow a QA/QC of the CTR tables on the software

THANK YOU!

GHG INVENTORY AND SYSTEMS

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