

## Estimating GHG emissions and removals from SOM in mineral soils applying the IPCC Inventory Software

29 November, 2022 IPCC TFI TSU

**IDCC** 



## **IPCC Inventory Software**

- New version 2.83 released at UNFCCC COP27
- > A single tool:
  - ✓ with full capacity for all IPCC methodological Tiers and Approaches for source/sink GHG estimates
  - ✓ For preparing GHG estimates at national and/or subnational (including tracking of results of specific activities)
  - $\checkmark$  for storing and archiving the entire National GHG Inventory
  - ✓ For providing with verification of country-specific methods through comparison with IPCC methods
- > Interoperability with UNFCCC reporting tool for CRT under implementation





## **Ongoing work**

### Paris Agreement requirements

- ✓ AR5 GWP100
- ✓ Indirect CO₂ emissions
- $\checkmark$  (memo item) Indirect N<sub>2</sub>O emissions
- ✓ Interoperability with UNFCCC reporting tool for CRTs (5/CMA.3)

### > Other

- ✓ Notation Keys
- ✓ Time series export/import
- ✓ Supporting tools





## **The Software**

2006 IPCC Cateoories	Worksheets						
- Energy - 1.A - Fuel Combustion Activities	Fuel Consumption Data Fuel Combus	stion Emissions					
□ 1A1 - Energy Industries □ 1A1 - A la - Main Activity Electricity an □ A1a - A la - Electricity Generation □ 1A1a :: Combined Heat and □ 1A1a :: i - Combined Heat and □ 1A1a :: i - Heat Plants □ 1A1b - Petroleum Refining	Sector: Energy Category: Fuel Combustion Act Subcategory: 1.A.1.a.J - Electricity Sheet: Fuel Consumption D Data	tivities Generation ata	Selecting	g Worksheets			
H-1.A.1.c Manufacture of Solid Fuel - 1.A.1.c.i - Manufacture of Solid	Fuel Type (All fuels)	~	Equation	24			
<ul> <li>I.A.1.c.ii - Other Energy Industr</li> <li>El-1.0.2 - Manufacturing Industries and C</li> </ul>			Equation		1 20	Ň	r
1 A 2.a - Iron and Steel 1 A 2.b - Non-Ferrous Metals	Subdivision	Fuel	Consumption Unit	Consumption (Mass, Volume or Energy Unit)	Conversion Factor (TJ/Unit) (NGV)	Total consumption (TJ)	
1.A.2.c - Chemicais 1.A.2.d - Pulp, Paper and Print	s	F	U	C	CF	TC = C * CF	
-1.A.2.e - Food Processing, Bevera	Region A	Crude Oil	TJ	500 🧭		500	2.211
- 1.A.2.f - Non-Metallic Minerals	Region B	Crude Oil	Gg	50 🧭	42.3	2115	3
1.A.2.g - Transport Equipment	Region C	Lignite Oil Shele (Tax Sanda	Gg	1000	11.9	11900	3
-1.A.2.i - Mining (excluding fuels) an	Region D - Plant X	Vil Snale / Tar Sands Natural Gas (Dn/)	Ga	2000 🥑	6.9	33600	12
- 1.A.2.j - Wood and wood products	Region D - Plant W	Natural Gas + Hydorgen (20%)	Go	3000	55	165000	19
	The second						APR DOCTOR
-1.A.2.k - Construction	*						12
<ul> <li>1.A.2.k - Construction</li> <li>1.A.2.l - Textile and Leather</li> <li>1.A.2.m - Non-specified Industry</li> <li>1.A.3.a Civil Aviation</li> <li>1.A.3.a.i - International Aviation</li> </ul>	Total			<i>d</i>		230915	
<ul> <li>1.A.2k - Construction</li> <li>1.A.2k - Construction</li> <li>1.A.2k - Construction</li> <li>1.A.2k - Non-specified Industry</li> <li>1.A.3 - Transport</li> <li>1.A.3 - Construction</li> <li>1.A.3 - Linternational Aviation</li> </ul>	Total			~	[	230915 Euel Manager	Time Set
<ul> <li>1A2k - Construction</li> <li>1A2l - Textile and Leather</li> <li>1A2a - Non-specified Industry</li> <li>1A3a - Transport</li> <li>1A3a - Civil Aviation         <ul> <li>1A3a - Civil Aviation</li> <li>1A3a - International Aviation</li> <li>1A3b - Cars</li> <li>1A3bi -</li></ul></li></ul>	Vorksheet remarks.		<ul> <li>♥ 1A.1.a.i - Time Series</li> </ul>	~		230915 Fuel Manager	Time Se
1.42k - Construction     1.42k - Construction     1.42i - Textile and Leather     1.42i - Textile and Leather     1.43 - Transport     1.43 - Transpor	V Worksheet remarks		• 9 1A.1.a i - Time Series	CAREON DIOXIC	JE (CO2) Emissions (Bq. CC2 Equi	230915 Fuel Manager	Time Se
<ul> <li>1.4.2.k Construction</li> <li>1.4.2.k Construction</li> <li>1.4.3.a Transport</li> <li>1.4.3.a Civil Aviation</li> <li>1.4.3.a. a International Aviation</li> <li>1.4.3.a. a Domestic Aviation</li> <li>1.4.3.b Read Transportation</li> <li>1.4.3.b Passenger cars</li> <li>1.4.3.b Light-duty trucks</li> <li>1.4.3.b Light-duty trucks</li> <li>1.4.3.b Netorcycles</li> <li>1.4.3.b. v - Evacorative emission</li> <li>2006 IPCC Guidelines</li> </ul>	Worksheet remarks		1A1.a.i - Time Series      10     10     10     0	CARBON DIOXID CARBON DIOXID (2.6.86 6.6.61 1990	DE (CO2) Emissions (6q CO2 Equi DE (CO2) Emissions (6q CO2 Equi 0 000 0 000 0 000 0 000	230915 Fuel Manager valents) 00 01 10 10 10 10 10 10 10 10 10 10 10 1	Time Se



## **Software Functions**



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- ➢ MSAccess (ACE OLEDB 12) for WindowsOS
- Microsoft .NET Framework 4.6.2



## Case Study for Eq 2.25 (SOM in mineral soils)

- Case study area: 1,000 ha
- > 3 land use subdivisions:
  - A. Cropland, annual, intensive
  - B. Cropland, perennial, agroforestry pepper
  - C. Forest land, managed, restoration AB (AC10)

### Time series 1999-2020, 3 land use changes identified:

- ✓ In 1999, A. covers 600 ha and B. 400 ha
- ✓ In 2000, 100 ha of A. are converted to B.
- ✓ In 2010, 100 ha of A. are converted to B.
- $\checkmark\,$  In 2020, 100 ha of B. are converted to C.
- $\checkmark~$  2010 and 2020 changes occur on a land subject to a dedicated activity

### Three different land representations approaches(1, 2, 3)

- ✓ Approach 1 -no land use change identification-
- ✓ Approach 2 -land use change identification-
- ✓ Approach 3 -land use change identification and tracking across time-



## **Case Study for SOM in mineral soils**

### Case study on Eq. 2.25 (SOM in mineral soils)

category	Cro	pland	Crof	oland	Fores	t land
subcategory	anı	nual	pere	nnial	man	aged
subdivision	inte	nsive	agroforest	ry - pepper	restoration	AB (AC10)
	tot area	change area	tot area	change area	tot area	change area
Year	1	ha	h	a	ha	
1999	600		400			
2000	500	-100	500	`+100		
2010	400	-100	500	`+100		
2020	400		400	-100	100	`+100

Two additional areas are included in this presentations to test the application to SOM of the Stock Different methods and to estimate CH4 emissions from created wetlands in inland wetland mineral soils

- + 500 ha of Cropland with created wetlands inland mineral soils (lotus cultivation)
- 500 ha of Cropland in rotation system (2-year annual + 8-year fallow) to which the SD approach is applied

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## **SOC Change estimates**

- Land Use Manager (subdivisions' setting)
- Land Representation Manager (input of activity data)
- Mineral soil SOC change
  - Equation 2.25
    - ✓ (Formulation A)
    - ✓ (Formulation B)
  - [Stock Difference Method]
- Direct N<sub>2</sub>O emissions from managed soils
- Indirect N<sub>2</sub>O emissions from managed soils

[CH<sub>4</sub> emissions from rewetted/created wetlands inland mineral soils]





## Land Use Manager (LUM)

- > First step when preparing a GHG inventory for land-related sources/sinks
- Input subdivisions to the 12 main land subcategories are to be input here [managed Forest land, unmanaged Forest land, annual Cropland, perennial Cropland, managed Grassland, unmanaged Grassland, managed Wetlands, unmanaged Wetlands, Settlements (Treed), Settlements (Other), managed Other land, unmanaged Other land]
- Describe as subdivisions, each and every different use/management of land in the area inventoried, further stratified by climate zone and soil type
- Parameters to be input are category specific and are used by the software to estimate at Tier 1 or 2

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> There are not limits to the number of subdivisions that can be input



## Land Use Manager (LUM) – annual cropland

Eccent I and	Land use subdivision - common par	aneters					
r orest cano		literature and the			6	Des 1	
Cropland	Land use subdivision name	High Activity Clay Mineral		1250	Country/ territory	Later America and	Cathlan
4	Soll Coder	Natural		1.02	Climate Becien	Tropical Moist	
Cropland Perennial Cro Grassland Wetlands	300 36000	Hature		141	Canada Program		
Other Land	Land use subdivision - Annual Crop	e apecific parameters					
	Rice ecosystem						
			Hethaceous biomass 10	Z/ha 🖂	5.000	Chatter # C/14	mi 1000
			Batio of below of	mund biomass to about	e-conund biomass (R) # mot (	/1 short Cl	
					• <b>•</b> • • • • • • • • • • • • • • • • •		
				-			re 000 [22]
				Pleference so	Forganic carbon stock (SOUN Relative C stock cits	ef) (C / ha)	60.000
					Lan	id use (FLU)	0.480 🛶
					т	llage (FMG)	1.000
						Insuit (FI)	0.920



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## Land Use Manager (LUM) – perennial cropland

Forest Land				10.000		
Cropland	Land use subdivision name	agroforentry - pepper		Country/Territory	Brazi	
Cropland Annual Crops     Intensive production	Soil Type	High Activity Clay Mineral	+ *	Continent	Latin America and Car	bbean
Gropland Perennial Cro	Soil Status	Netural	3	Climate Region	Tropical Moist	• •
Settlementa	Land use subdivision - Perennial Cr	ops specific parameters				
Other Land	Cropland type User-d	efined 🔛	Acacia + pepper	]		
			Woody biomass t C / ha	150.000	Children EC/Film)	1.000
			Age class (	yr) Unspecified	Value	
			Perennial biomass of	carbon accumulation rate (G) ¢onnes	C /ha /yr)	7.500 ~
			Ratio of below-ground woody biomass to above	e-ground woody biomass (FI) # root C	//tahootC)	0.400
				Harvest / Matur	ty cycle (yr)	20 000 🛩
		Agroforestry 🗹	Herbaceous biomass t C / ha	5.000	Charles (C/tilm)	1.000
		Ratio of b	elow-ground herbaceous biomass to above-grou	und herbaceous biomass (R) & root C	/1 ahoot C)	
			Refere	nce soll organic carbon stock (SOC)	e) (t C / ha)	65.000 🐱
				Relative C stock cha	inge factors	
				Lan	d use (FLU)	1.010
				т	Rage (FMG)	1.100
					Input (FI)	1.110
>						



## Land Use Manager (LUM) – forest land

	Land use subdivision - common par	aneters			
Forest Land Managed Forest Land	Land use subdivision name	Restoration AB (AC 10)	1	Country/Territory	Brazil
1	Soil Type	High Activity Clay Mineral	* v	Continent	Latin America and Caribbean
Unmanaged Forest Lan ropland rassland letlands	Soil Status	Natural		Climate Region	Tropical Moist 🔹 🗸
Other Land	Land use subdivision - Managed Fo	orest Land specific parameters			
	Ecological zone User-defi Atlantic bio	ned Species User-defined indigenous species	Natural For mix Partati	nt⊛ Abar n:⊖	idoned managed land
				Land mass	Unspecified
			Age class (ir) £20	/	
			Above-ground bio	mass stock (t d.m. / ha)	110 000 🔍
			Above-ground biomass gro	wth (G) t d.m. / ha / yr)	11 200 80
		Ratio of below-ground b	omass to above-ground biomass (R)	(m.b toorle t \.m.b toor	0.200 😔
			Bomass car	on fraction (t C / t d.m.)	0.470
		Ger	wing stock level (V) (m3 / ha) 61-8	0 4	
		Aur	rage net annual increment of growing	stock (iv) (n3 / ha / yr)	8.000
		Bomass conversion and expansion factor for in	penent (BCEFi) (t.d.m. / m3 wood vo	une) Specified 🤟	1.400 😡
		Bomass conversion and expansion factor for standing	stock (BCEFs) t d.m. / m3 wood vo	ume) Specified 🗠	1.600
	Bo	mass conversion and expansion factor for wood and fuelwood r	emoval (BCEFr) t d.m. / m3 wood vol	une) Specified ~	0.000
			Basic wood density (D) (	d.m. / m3 fresh volume)	
		Biomasa expansion factor for conversion of an	ual net increment to above ground bi	omass increment (BEF1)	
		Bomass expansion factor for conven	ion of merchantable volume to above	ground biomass (BEF2)	
			Reference soil organic carbon	flock (SOGel) & C / ha)	65.000
		Relative C stock change I	actors		
3		Land use (FLU)	1.000 Manageme	e (FMG) 1.0	00 Input (Fi) 1.000
CONTRACT INCOME					Save Unda Clos



## LUM – Soil Type Manager

### Soil Type Manager

1000	200
	×
120	300

	Soil Type Name 🛛 🛆	Composition 🗸	Remark	
	Coastal Wetlands soil	Mixed	Table 4.11 WS	
	High Activity Clay Mineral	Mineral	Soils with high activity clay (HAC) minerals are lightly to moderately weathered soils. which are dominated by 2:1 silicate clay minerals (in the World Reference Base for Soil Resources (WRB) classification these include Leptosols, Vertisols, Kastanozems, Chernozems, Phaeozems, Luvisols, Alisols, Albeluvisols, Solonetz, Calcisols, Gypsisols Umbrisols, Cambisols, Regosols; in USDA classification includes Mollisols, Vertisols, high-base status Alfisols, Aridisols, Inceptisols).	
	Inland Organic soil	Organic	Soils classified as histosols. See glossary of IPCC GPG 2003 for additional details.	
	Low Activity Clay Mineral	Mineral	Soils with low activity clay (LAC) minerals are highly weathered soils, dominated by 1:1 clay minerals and amorphous iron and aluminium oxides (in WRB classification includes Acrisols, Lixisols, Nitisols, Ferralsols, Durisols; in USDA classification includes Ultisols, Oxisols, acidic Alfisols).	
	Sandy Mineral	Mineral	Includes all soils (regardless of taxonomic classification) having > 70% sand and < 8% clay, based on standard textural analyses (in WRB classification includes Arenosols; in USDA classification includes Psamments).	
	Spodic Mineral	Mineral	Soils exhibiting strong podzolization (in WRB classification includes Podzols; in USDA classification Spodosols)	
	Volcanic Mineral	Mineral	Soils derived from volcanic ash with allophanic mineralogy (in WRB classification Andosols; in USDA classification Andisols)	
	Wetland Mineral	Mineral	Soils with restricted drainage leading to periodic flooding and anaerobic conditions (in WRB classification Gleysols; in USDA classification Aquic suborders).	
*	Terra preta	Mineral 🗸	average black carbon cotnent 33 Mg ha-1 m-1	x
*				X

Default soil types as well as soil types already used in any Land Use Subdivision cannot be changed nor deleted.

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## LUM – Climate Region Manager

#### Climate Region Manager

 $\Box$   $\times$ 

	Climate domain ∆ ▽	Climate Region 🛛 🛆	Remark	
	Tropical	Tropical Dry	Mean Annual Temperature >18°C and ≤7 days of frost/year; Elevation <1,000m; Mean Annual Precipitation ≤1,000mm	
		Tropical Moist	Mean Annual Temperature >18°C and ≤7 days of frost/year; Elevation <1,000m; Mean Annual Precipitation ≤2,000mm	
		Tropical Montane Dry	Mean Annual Temperature >18°C and ≤7 days of frost/year; Elevation ≥1,000m; Mean Annual Precipitation ≤1,000mm	
		Tropical Montane Moist	Mean Annual Temperature >18°C and ≤7 days of frost/year; Elevation ≥1,000m; Mean Annual Precipitation >1,000mm	
		Tropical Wet	Mean Annual Temperature >18°C and ≤7 days of frost/year; Elevation <1,000m; Mean Annual Precipitation >2,000mm	
	Subtropical (Mediterranean)	Warm Temperate Dry	Mean Annual Temperature >10°C and ≤18°C; Mean Annual Precipitation lower than Potential Evapo-Transpiration	
		Warm Temperate Moist	Mean Annual Temperature >10°C and ≤18°C; Mean Annual Precipitation higher than Potential Evapo-Transpiration	
	Temperate	Cool Temperate Dry	Mean Annual Temperature >0°C and ≤10°C; Mean Annual Precipitation lower than Potential Evapo-Transpiration	
		Cool Temperate Moist	Mean Annual Temperature >0°C and ≤10°C: Mean Annual Precipitation higher than Potential Evapo-Transpiration	
	Boreal	Boreal Dry	Mean Annual Temperature ≤0°C; Each Month Mean Tempearature ≥10°C; Mean Annual Precipitation lower than Potential Evapo-Transpiration	
		Boreal Moist	Mean Annual Temperature ≤0°C; Each Month Mean Tempearature ≥10°C; Mean Annual Precipitation higher than Potential Evapo-Transpiration	
	Polar	Polar Dry	Mean Annual Temperature <0°C; Each Month Mean Tempearature <10°C; Mean Annual Precipitation lower than Potential Evapo-Transpiration	
		Polar Moist	Mean Annual Temperature <0°C; Each Month Mean Tempearature <10°C; Mean Annual Precipitation higher than Potential Evapo-Transpiration	
*	Tropical	eastern amazonia climate	mean annual precipiattion > 2,500 mm; mean annual temperature 31 C	×
*				×

Default climate regions as well as climate regions already used in any Land Use Subdivision cannot be changed nor deleted.

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			Approach I - 1,00	)0 ha	
Unit	Vear		Land us	se	Area
Umt	Tear	category	subcategory	subdivision	ha
	1999				600 ha
1	2000 - 2009	Cropland	Annual	Soybean intensive	500 ha
	2010-2020				400 ha
	1999				400 ha
	2000 - 2009	~ · ·	<b>D</b>		500 ha
2	2010 - 2019	Cropland	Perenmal	Agroforestry - pepper	600 ha
	2020				500 ha
	1999 - 2019				
3	2020	Forest land	Managed	Restoration AB (AC10)	100 ha
			Approach II - 1,0	00 ha	
			Land us	se	Area
Unit	Year	category	subcategory	subdivision	ha
	1999				600 ha
1	2000-2009	Cropland	Annual	Sovbean intensive	500 ha
-	2010-2020	oropiano			400 ha
2.1	1999-2019				400 114
[2 2]	2020	Cropland	Perennial	Agroforestry - pepper	400 ha
2.2	2000-2019				100 ha
[2 1]	2020	Cropland	Perennial	Agroforestry - pepper	100 114
23	2010-2019	Cropland	Perennial	Agroforestry - pepper	
3	2010-2017	Ecrest land	Managed	Restoration AB (AC10)	100 ha
5	2020	1.01est land	Managett	Restoration 71D (71C10)	
			Approach III - 10	00 ha	
			Land up	20 110	Area
Unit	Year	antogom	aubeatagory	aubdivision	ha
	1000	category	subcategory	Subdivision	па
0	2000 2010	Cropland	Personal	Aproforestry papage	100.1-
[2]	2000-2019	Cropiand	reienmai	Agrotorestry - pepper	100 ha
[2]	2020				
1	1999	Createrit	A	8 <b>1</b>	500 ha
1	2020-2009	Cropland	Annual	Soybean intensive	500 ha
	2010-2020				400 ha
	1999-2009	Cropland	Annual	Soybean intensive	
2	2010-2019	Cropland	Perennial	Agroforestry - pepper	100 ha
	2020	Forest land	Managed	Restoration AB (AC10)	
3	1999 - 2019	Cropland	Perennial	Agroforestry - pepper	400 ha
/07	2020	Cropiand	I CICIIIIAI	rigioloresity - pepper	500 ha

### Units of *Land remaining* in blue

>

>

Units of *Land under conversion* in orange



WMO

## Land Representation Manager (LRM)

### > Allows to use any of the three IPCC approaches:

- ✓ Approach 1 -no land use change identification-
- ✓ Approach 2 -land use change identification-
- ✓ Approach 3 -land use change identification and tracking across time-
- Ensures consistency of land representation -including through fully spatially explicit tracking of units of land-

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### Unit of land, an area homogenous per

- ✓ physical conditions -climate/vegetation zone and soil type- and
- ✓ current and historical socio-economic functions -land use & management type-



## LRM – Regions Tab

Region 1         1000         Approach 1           Region 2         1000         Approach 2           Region 3         1000         Approach 3	Region name	- Arts Dist	Approach	Remark	
Begion 2         1000         Approach 2           Region 3         1000         Approach 3            Image: State St	Region 1	1000	Approach 1		
Region 3 1000 Approach 3 v	Region 2	1000	Approach 2		
4 3000.000	Region 3	1000	Approach 3		
3000.000					
	£	-			
		-20000 5040			

 A country can be represented in a single set of National data or in a number of Regions

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 $\checkmark\,$  For each Region the land representation approach is to be selected



## LRM – Land Representation Tab [1999] [Appr. 1]

X Land Representation Manager Regions Land representation table Annual land representation matrix (Approach 2 & 3) 1999 1999: OK: 1979: OK 1.000.000 Region Region I Region area (ha) Discrepancy (ha) Approach 1 Area (1979) Area (1999) Land use category (88) (ha) Forest Land Ð X Land Unit Parameters Cropland Land use subcategory C pools / Methods Cropland Annual Crops **Biomass change** Gain & Loss V soybean intensive × DOM - Deadwood Gain & Loss Land unit code V (Automatic) ACL-SI-1 DOM - Litter Gain & Loss V Current Lano SOM - Mineral Default V Land use subcategory Cropland Perennial Crops Save Ð Cancel Current Land × agroforestry - pepper Land unit code Land unit code (1979)(Automatic) (User defined) (ma) (ha) PCL-AP-UD-2 2 400 (-> 400 2 X 2 6.3 Save



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## LRM – Land Representation Tab [2000] [Appr. 1]

nd Repr	esentation Manager									)
egions	Land representation table Region I	Annual land representation matrix (Ap     Region area (ha)	proach 2 & 3)	Discrepancy (ha)	2000: OK: 1980: OK		Approach 1		20	00
	Land use	category	Area (2000)		Area (1960)			Remark		
E	ovestiland	- 22 - 52	(ha)	0	(ha)	0	6			
C	ropland			1000		1000				-
Ar	ea update moo	le			×	a 0) )	500	Remark		
C	Current invent	ory year only				_	Remark			×
0	Current invent	ory year and all subsequ	uent inventory	years		768 200) 1a)	Area (1980) (ha)	Remark	P	
C	Current invent	ory year and all previous	s inventory ye	ars		500 «-»	600		1	×
C	) All inventory ye	ears					Remark			
			Upo	late	Cancel	a 0) )	400	Remark		
4	agroforestry - pepper	7		_	34		Remark			×
		Land unit code (Automatic)		Land unit code (User defined)		Area 2000) (ha)	Area (1960) (hs)	Remark	P	
	PCL-AP-UD-2		2			500	400		2	×
							Sav	ve Undo	Cio	se
N.									JU	
10	UNEP				INTERGOV	ERNMENT	AL PANEL ON	limate	cha	n

## LRM – Land Representation Tab [2010] [Appr. 1]

ions	Land representation table Annual land representation r Region I  Region area	(ha) 1.000.000	Discrepancy (ha)	2010: OK: 1990: OK		Approach 1		20
	Land use category	Area (2010) (ba)		Area (1990)			Remark	
Fo	prest Land	(14)	0	(00)	0	2		
C	ropland		1000		1000			
	Land use subcategory		Area (2010) (ha)	c	krea 1990) (ha)		Remark	
1	Cropland Annual Crops		40	0	1	600		
	Curren	Land use subdivision				Remark		
e	soybean intensive							5
	Land unit code (Automatic)		Land unit code (User defined)		Area (2010) (ha)	Area (1990) (ha)	Remark	P
	ACL-SI-1	1			400 €⇒	600		1
					6-5			2
	Curren	Land use subdivision				Remark		
	M.			~				
	Land use subcategory		Area (2010) (ha)		Area 1990) (ha)		Remark	
1	Cropland Perennial Crops		60	0		400		
	Curren	Land use subdivision				Remark		
8	agrotorestry - pepper							
	Land unit code (Automatic)		Land unit code (User defined)	j	Area. (2010) (ha)	Area (1990) (ha)	Remark	P
	PCL-AP-UD-2	2			600 6-9	400		1
	·				(-)			1



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## LRM – Land Representation Tab [1999] [Appr. 2]

ion	Region II	Region area (ha)	1.000.000	Discrepancy (ha)	ОК		Approach 2	1		199
	Land	use category		Area (1999) (ha)				Remark		
Fo	vrest Land opland		Land Unit Para	imeters		6		>	<	
	Cropland Annual Crops	Land use subcategory	C pools / Me	thods					-	
8	soybean intensive	Current Li	Biomass cha	nge	Gain & Los	35		$\sim$		X
	Land unit code (Automatic)	Land unit co (User define	DOM - Dead	wood	Gain & Los	88		~	mark	P M
	ACL-SI-5	1	DOM - Litter		Gain & Los	35		~		3
1		Current L	SOM - Miner	al	Default			~		
		Land use subcategory								
	Cropland Perennial Crops	Current Li				Save	Ca	ncel		
	Land unit code	Land unit code	Previous La	nd use Previo	us Land use	Transition Period	Year of	Area (1000)	(and the second s	2 M
	(Automatic)	(User defined)	subcateg	ory su	bdivision	(years)	conversion	(ha)	A STATISTICS	
	FUL-AF-UD-0	2.1	Cropiana rerenni	ar crops agroiorest	A - bebbes 0	10	TRPS.	400 (-9		3



INTERGOVERNMENTAL PANEL ON Climate change

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## LRM – Land Representation Tab [2000] [Appr. 2]

× Land Representation Manager Land representation table Annual land representation matrix (Approach 2 & 3) Regions 2000 Region II Region area (ha) 1,000.000 Discrepancy (ha) OK Approach 2 Region 1 Land use category Remark (ha) Forest Land ٠ Cropland Area update mode Remark Current inventory year only Croplan Current inventory year and all subsequent inventory years  $\odot$ soyt X Current inventory year and all previous inventory years rear of P M 500 3 X (-) All inventory years 2 Cancel Update Remark Cropland Perennial Crops 500 Current Land use subdivision agroforestry - pepper x Transition Period Land unit code Land unit code Previous Land use Previous Land use Year of PM (Automatic) (User defined) subcategory subdivision PCL-AP-UD-6 Cropland Perennial Crops NA 400 (-) 2.1 agroforestry - pepper NA 2 X × PCL-AP-UD-17<-ACL-SI-CO 2.2 Cropland Annual Crops 20 2000 100 (-) 2 soybean intensive 3 6-> 4 Save Undo Close

WMO

## LRM – Land Representation Tab [2010] [Appr. 2]

Land Representation Manager

Reg	jon II 🗸 🗸 🗸	Region area (ha)	1,000.000	Discrepancy	y (ha) OK		Approach	2			20
	Land use cat	egory			Area (2010) (ha)			Remark			
orest l roplar	Land nd					0 1000					
	Land us	e subcategory			Area (2010) (ha)			Remark			
Cro	pland Annual Crops					400					-
	en herr interaine	Current Land use	subdivision				Ren	tark			4
	soybean intensive					Design the second second second				1 1	
	Land unit code (Automatic)	Land unit code (User defined)	Previous La subcateg	nd use jory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Area (2010) (ha)	Remark	P	M
	ACL-SI-5	Cropland Annual	Crops soy	ybean intensive	NA	NA	400 💨		3		
4	*			~	Y			<b>(-)</b>		3	
		Current Land use	subdivision				Ren	tark			
*					3	*					
	Land us	e subcategory			Area (2010) (ha)			Remark			
Cro	pland Perennial Crops					600					
1		Current Land use	subdivision				Ren	nark			
	agroforestry - pepper										
	Land unit code (Automatic)	Land unit code (User defined)	Previous La subcateg	nd use jory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Aren (2010) (ha)	Remark	P	м
	PCL-AP-UD-6	21	Cropland Perenni	ial Crops agr	roforestry - pepper	NA	NA	400 ↔		3	
	PCL-AP-UD-7<-ACL-SI-CO	2.3	Cropland Annual	Crops soj	ybean intensive	20	2010	100 💮		2	
9	PCL-AP-UD-17<-ACL-SI-C10	2.2	Cropland Annual	Crops soy	ybean intensive	20	2000	100 ->		2	
1	*			~	Y			(-)		3	



Close

×



I – Land Representation Tab [2020] [Appr. 2]

Land Representation Manager

UNEP

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Land Representation Manager



Undo Save

Close

## LRM – Land Representation Tab [1999] [Appr. 3]

Region III	V Region area (ha)	1,000.000	Discrepancy (ha) OK		Approach 3		19
	Land use category		Area (1999) (ha)		Re	mark	
Forest Land Cropland				0 1000			
	Land use subcategory		Area (1999) (ha)			Remark	
Cropland Annual C	rops			600			
	Current Land use sub	divisian			Remark		
B soybean intensi	ve		1			r.	
ACL-SI-14	Land Unit Parameters	Previous Land us	se Previous Land use		× 500	I) Remark ↔ ↔	PCM 2
*	Biomass change	Gain	& Loss	~	, section is		
Cropland Perennial	DOM - Deadwood	Gain	8 Loss	~		Remark	
e agroforestry - p	DOM - Litter	Gain	1 & Loss	~	Remark		
Land t (Aut	som - Mineral	Defa	ault	~	an (199 (ha	a 9) Remark )	PCM
PCL-AP-UD	-10				400	$\leftrightarrow$	



INTERGOVERNMENTAL PANEL ON Climate change

## LRM – Land Representation Tab [2000] [Appr. 3]

Land Representation Manager

		Linear and Linear ci	pancy (ha) OK	Appro	ach 3	200
	Land use category		Area (2000) (ha)		Remark	
Forest Land				0		
Cropiano		1	1	000		
Cropland Annual C	Area update mode		Area	×	Remark	
Soybean intens	<ul> <li>Current inventory year</li> <li>Current inventory year</li> <li>Current inventory years</li> <li>All inventory years</li> </ul>	ar only ar and all subseque ar and all previous ir	nt inventory years nventory years		Remark (2000) (ha) 400 (~) 100 (~) 100 (~) Remark	PCM X X X X
Constant Descent			Update	Cancel	Remark	
Cropland Perennia	Current Land in	se subdivision	Update	Cancel	Remark Remark	
Cropland Perennia	Current Land Lin	se subdivision	Update	Cancel	Remark Remark	×
Cropland Perennia	Current Land u pper nit code Land unit code matic) (User defined)	se subdivision Previous Land use subcategory	Update Previous Land use subdivision	sition Period (D) (years)	Remark Remark Area (2000) Remark (ha)	P C M
Cropland Perennia agroforestry - per Land ur (Auto PCL-AP-UD	Current Land Land oper nit code (User defined) 10 3	Previous Land use subcategory Cropland Perennial Crops	Update Previous Land use subdivision agroforestry - pepper NA	sition Period (D) (years) NA	Remark Remark Area (2000) (ha) 400 (->	P C M



INTERGOVERNMENTAL PANEL ON Climate change

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## LRM – Land Representation Tab [2010] [Appr. 3]

n	Region III	Y	Region area (ha)	1,000.000	Discre	pancy (ha)	OK		Арргоа	ch 3			20
		and use cate	gory			Area (2010) (ha)				Remark			
For	rest Land					<u> </u>		1000		1-11-11-00 m 7-1			1.5
	ganna -	Land use	subcategory				Area 2010) (ha)	1000		Remar	N		
	Cropland Annual Crops							400					
	And the second se			Remark.									
8	soybean intensive												
	Land unit co (Automatic	de )	Land unit code (User defined)	Previous Lanc subcatego	d use ty	Previous Subdiv	Land use vision	Transition Period (D) (years)	Year of conversion	Area (2010) (ha)	Remark	PC	м
	ACL-SI-8		1	Cropland Annual C	rops	soybean inter	sive	NA	NA	400 ↔		3	
	ACL-SI-14		2 (68 2009)	Cropland Annual C	rops	soybean inter	sive	NA	NA	0 «->		3	
	*				~		~			<b>(·)</b>		3	
			Current Land us	esubdivision						Remark			
4	*							~					
		Land use	subcategory			-	Area (2010) (ha)			Remar	8		
	Cropland Perennial Crops							600					
	the second second second		Current Land use	e subdivision						Remark			
8	agroforestry - pepper												
	Land unit co (Automatic	de:	Land unit code (User defined)	Previous Lanc subcatego	d use ry	Previous subdiv	Land use dision	Transition Period (D) (years)	Year of conversion	Area (2010) (ha)	Remark	PC	M
	PCL-AP-UD-10		3	Cropland Perennia	Crops	agroforestry -	pepper	NA.	NA	400		3	
	PCL-AP-UD-15<-	CL-SI-CO	2	Cropland Annual C	rops	soybean inter	sive	20	2010	100 ↔		1	
	PCL-AP-UD-18	ACL-SI-C_	0	Cropland Annual C	rops	soybean inter	sive	20	2000	100 ()		30	
					~	-		1		(-)		3	





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## Annual land representation matrix – 2010 [Appr. 2&3]

and Re	presentation	Manager														$\Box$ $\times$
Region	s   Land repr	esentation table Ar	nual land re	epresentation n	natrix (Approa	ch 2 & 3)										
Region	Region II		~	Region area	(ha)	1,0	00.000	oproach 2								2000
		Initial	Fore	st Land	Cro	pland	Gras	sland	Wet	lands	Settle	nents	Other	Land		
	Final		Managed Forest Land	Unmanaged Forest Land	Cropland Annual Crops	Cropland Perennial Crops	Managed Grassland	Unmanage d Grassland	Managed Wetlands	Unmanage d Wetlands	Settleme nts (Treed)	Settleme nts (Other)	Managed Other Land	Unmanage d Other Land	Final Area (ha)	Net change (ha)
Fo	rest Land	Managed Forest Land													0	0
		Unmanaged Forest Land	1												0	0
Cri	pland	Cropland Annual Crops			500										500	-100
		Gropland Perennial Crops			100	400									500	100
	assland	Managed Grassiand													0	0
		Unmanaged Grassland													0	0
Vin	diands	Managed Wetlands													0	0
		Unmanaged Wetlands													0	0
	tièmentsi	Settlements (Treed)													0	0
		Settlements (Other)													0	0
00	ter Land	Managed Other Land													0	0
		Unmanaged Other Land													0	0
*		Initial Area (ha)	0	0	600	400	0	0	0	0	0	0	0	0	1000	0

No data Input - for verification only (not exportable yet)



## Annual land representation matrix – 2010 [Appr. 2&3]

and	d Representation	Manager														
Rej	gions   Land repr	esentation table A	nnual land re	epresentation m	natrix (Approa	ch 2 & 3)										
Re	gion Region II		×	Region area	(ha)	1,0	00 000	Approach 2								2010
		Initial	Fore	stLand	Gro	pland	Gras	stand	Wet	lands	Settler	ments	Othe	Land		
	Final		Managed Forest Land	Unmanaged Forest Land	Cropland Annual Crops	Cropland Perennial Crops	Managed Grassland	Unmanage d Grassland	Managed Wetlands	Unmanage d Wetlands	Settleme nts (Treed)	Settleme nts (Other)	Managed Other Land	Unmanage d Other Land	Final Area (ha)	Net change (ha)
	Forest Land	Managed Forest Land													0	0
		Unmanaged Forest Land													0	0
	Cropland	Cropland Annual Crops			400										400	-100
		Cropland Perennial Crops			100	500			1						600	100
	Grassland	Managed Grassland						L j							0	0
		Unmanaged Grassland													0	0
		Managed Wetlands													0	0
		Unmanaged Wetlands													0	0
	Settlements	Settlements (Treed)													0	0
		Settlements (Other)													0	0
	Other Land	Managed Other Land													0	0
		Unmanaged Other Land													0	0
		Initial Area (ha)	0	0	500	500	0	0	0	0	0	0	0	0	1000	0

No data Input - for verification only (not exportable yet)



**IDCC** 

## Annual land representation matrix – 2020 [Appr. 2/3]

and Repr	esentation	Manager														
Regions	Land repre	sentation table Ar	nnual land re	epresentation n	natrix (Approa	ch 2 & 3)										
Region	Region III		~	Region area	(ha)	1,0	00.000	oproach 3								2020
<u></u>		Initial	Fores	st Land	Crop	pland	Gras	sland	Wet	lands	Settle	ments	Othe	rland		-
F	inal		Managed Forest Land	Unmanaged Forest Land	Cropland Annual Crops	Cropland Perennial Crops	Managed Grassland	Unmanage d Grassiand	Managed Wetlands	Urimanage d Wetlands	Settleme nts (Treed)	Settleme nts (Other)	Managed Other Land	Unmanage d Other Land	Final Area (ha)	Net change (ha)
Fores	it Land	Managed Forest Land				100									100	100
		Unmanaged Forest Land													0	0
Crop		Cropland Annual Crops			400										400	0
		Cropland Perennial Crops				500									500	-100
		Managed Grassland													0	0
		Unmanaged Grassland													0	0
Wetta		Managed Wetlands													0	0
		Unmanaged Wetlands													0	0
Settle		Settlements (Treed)													0	0
		Settlements (Other)													0	0
Other	Land	Managed Other Land													0	0
		Unmariaged Other Land													0	0
•		Initial Area (ha)	0	0	400	600	0	0	0	0	0	0	0	0	1000	0

No data Input - for verification only (not exportable yet)



INTERGOVERNMENTAL PANEL ON Climate change

**IDCC** 

## Mineral soil SOC change – Equation 2.25



Where:

p = a parcel of land representing an individual unit of area over which the inventory calculations are performed.

Between the 2 formulations, the software applies that associated with the approach for land representation selected for the Region to which the unit of land belongs



## Equation 2.25 – Stock-Change Factors







## Equation 2.25 – Formulation A

$$\Delta C_{Mineral} = \frac{\left(SOC_{0\_GHGI} - SOC_{(0-T)\_GHGI}\right)}{D}$$

$$=\frac{\left[\sum_{c,s,i,}\left(SOC_{REF_{c,s}} \cdot F_{LU_{c,i}} \cdot F_{MG_{c,i}} \cdot F_{I_{c,i}} \cdot A_{c,s,i}\right)\right]_{0} - \left[\sum_{c,s,i,}\left(SOC_{REF_{c,s}} \cdot F_{LU_{c,i}} \cdot F_{MG_{c,i}} \cdot F_{I_{c,i}} \cdot A_{c,s,i}\right)\right]_{(0-D)}}{D}$$

Where, "D" is the transition period (IPCC default is 20 years), and "c" (climate), "s" (soil), "i" (management system) correspond to the variables, in each land use category/subcategory, according to which the estimate is stratified/disaggregated

According to such variables, **SOC at equilibrium**, in any inventory year, for each stratum (unit of land) *c,s,i*, is calculated as:

•  $(SOC_{REF_{c,s}} \bullet F_{LU_{c,i}} \bullet F_{MG_{c,i}} \bullet F_{I_{c,i}} \bullet A_{c,s,i})_0$ 

i.e. the combination of current land uses and management systems of practices in the current inventory year "0" (t C)

• 
$$(SOC_{REF_{c,s}} \bullet F_{LU_{c,i}} \bullet F_{MG_{c,i}} \bullet F_{I_{c,i}} \bullet A_{c,s,i})_{(0-D)}$$

i.e. the combination of land uses and management systems of practices of D years before the current inventory year (t C)

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



## Equation 2.25 – Formulation A (2000)

Year		1999			2000			2010			2020	
Category	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp
Land unit						Area	(ha)					
1	0	600	0	0	500	0	0	400	0	0	400	0
2	0	0	400	0	0	500	0	0	600	0	0	500
3	0	0	0	0	0	0	0	0	0	100	0	0
SOC <sub>0</sub> tC	0	17,222	32,063	0	14,352	40,079	0	11,482	48,095	6,500	11,482	40,079
SOC <sub>0-T</sub> tC	0	17,222	32,063	0	17,222	32,063	0	17,222	32,063	0	14,352	40,079
$\Delta C tC yr^{-1}$	0.000	0.000	0.000	0.000	-143.520	400.793	0.000	-287.040	801.587	325.000	-143.520	0.000

Biomass of Worksheet Sector: Category Subcateg Sheet: Data	hange(G&L) E Agricult Cropian pary: 3.8.2.a SOC Ch	Bomass change (SD) ure. Forestry and Other d - Cropland Remaining C sanges in mineral sols -	Bomass change (Abru Land Use Impland Approach 1 (Information 8	en) DOM (G&L 1/1) DOM (SD 1/1) [	SOM Mineral (Approach 1 - Information item)	SOM Mineral (Approaches 2 and 3) SOM Mineral (SD)	SOM Organic Drained SOM Organic Resetted	2000
Region	Regard I	~	- Approach 1					
	-	Land use calegory			M	Equation 2.25 - A		
Lan		Land use durin	ng teportong yeier	Self organic tarbon stock in ninneral polis in year 2000 (torvies C / Na)	Soll organic carboli stock in mineral solls in year 1900 (tonnes C / ha)	Annual change in cartion sto (tornes C/)	ba in nimeral bolla. 17	
		45	4.2	500(2000)	500(1180)	2Cmineral = ((300)2000) -	EOC(1980)) / 20	
. 3		Croplant Annual C.	soybean intensive	14352	17222.4		-143.5	7 4 7
2		Cropland Perennial.	aproforentry - pepper	40079.325	32063.46		400.7932	3
Total				54431.325	48285.86		257 2732	



## Equation 2.25 – Formulation A (2010)

Year		1999			2000			2010			2020	
Category	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp
Land unit						Area	(ha)					
1	0	600	0	0	500	0	0	400	0	0	400	0
2	0	0	400	0	0	500	0	0	600	0	0	500
3	0	0	0	0	0	0	0	0	0	100	0	0
SOC <sub>0</sub> tC	0	17,222	32,063	0	14,352	40,079	0	11,482	48,095	6,500	11,482	40,079
SOC <sub>0-T</sub> tC	0	17,222	32,063	0	17,222	32,063	0	17,222	32,063	0	14,352	40,079
$\Delta C t C yr^{-1}$	0.000	0.000	0.000	0.000	-143.520	400.793	0.000	-287.040	801.587	325.000	-143.520	0.000

Biomass chang Worksheet Sector: Category: Subcategory Sheet: Data	ge (G&L) Agric Crop r: 3.8.2 SOC	Biomass change (SD) outure, Forestry and Other Idand 2 a - Cropland Remaining C Changes in mineral solis -	Biomass change (Abru Land Use ropland Approach 1 (Information it	upt) DOM (G&L 1/1) DOM (SD 1/1)	SOM Mineral (Approach 1 - Information	item) SOM Mineral (Approaches 2 and 3) SOM Mineral (SD) SOM Organic Drained SOM Organic Rewetted			2010
Region	Region I	~	- Approach 1						
		Land use category				Equation 2.26 - A			
Land un	tit code	Land use durin	ng reporting year	Solf organic carbon stock in mineral solis in year 2010 (tonnes C / ha)	Soil organic carbon stock in mineral soils in year 1990 (tonnes C / ha)	Annual change in carbon stocks in mineral soils (tonnes C / yr)			
		V 47	7 AV	SOC(2010)	SOC(1990)	ΔCmineral = ((SOC(2010) - SOC(1990)) / 20			
1 2		Cropland Annual C. Cropland Perennial	soybean intensive agroforestry - pepper	11481.6 48095.19	17222.4 32063.46	-287.0 801.586	14 17 15 17	ы	2
Total				59576.79	49285 86	514,545	5		
						Land Use Manager Land Representation Manager	r	Uncert	tainties





## Equation 2.25 – Formulation A (2020)

Year		1999			2000			2010			2020	
Category	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp
Land unit						Area	(ha)					
1	0	600	0	0	500	0	0	400	0	0	400	0
2	0	0	400	0	0	500	0	0	600	0	0	500
3	0	0	0	0	0	0	0	0	0	100	0	0
SOC <sub>0</sub> tC	0	17,222	32,063	0	14,352	40,079	0	11,482	48,095	6,500	11,482	40,079
SOC <sub>0-T</sub> tC	0	17,222	32,063	0	17,222	32,063	0	17,222	32,063	0	14,352	40,079
$\Delta C tC yr^{-1}$	0.000	0.000	0.000	0.000	-143.520	400.793	0.000	-287.040	801.587	325.000	-143.520	0.000





## Equation 2.25 – Formulation B – Approach 2

$$\Delta C_{Mineral} = \frac{\left(SOC_{0\_GHGI} - SOC_{(0-T)\_GHGI}\right)}{T}$$

$$\sum_{c,s,i,p} \left\{ \left[ \left(SOC_{REF_{c,s,p}} \bullet F_{LU_{c,i,p}} \bullet F_{MG_{c,i,p}} \bullet F_{I_{c,i,p}}\right)_{0} - \left(SOC_{REF_{c,s,p}} \bullet F_{LU_{c,i,p}} \bullet F_{MG_{c,i,p}} \bullet F_{I_{c,i,p}}\right)_{T} \right] \bullet A_{c,s,i,p} \right\}$$

$$D$$

Where, "D" is the transition period (IPCC default is 20 years), and "c" (climate), "s" (soil), "i" (management system) correspond to the variables, in each land use category/subcategory, according to which the estimate is stratified/disaggregated

According to such variables, **SOC at equilibrium**, in any inventory year, for each stratum (unit of land) *c,s,i*, is calculated as:

•  $(SOC_{REF_{c,s}} \bullet F_{LU_{c,i}} \bullet F_{MG_{c,i}} \bullet F_{I_{c,i}} \bullet A_{c,s,i})_0$ 

i.e. the combination of current land uses and management systems of practices in the current inventory year "0" (t C)

•  $(SOC_{REF_{c,s}} \cdot F_{LU_{c,i}} \cdot F_{MG_{c,i}} \cdot F_{I_{c,i}} \cdot A_{c,s,i})_{(0-D)}$ 

i.e. the combination of land uses and management systems of practices of in the latest year "T" before the conversion (t C)

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



## Equation 2.25 – Formulation B - A2 (2000)

Year	1999				2000	_		2010			2020	_
Category	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp
Land unit						Area	(ha)					
1	0	600	0	0	500	0	0	400	0	0	400	0
2.1	0	0	400	0	0	400	0	0	400	0	0	400
2.2	0	0	0	0	0	100	0	0	100	0	0	0
2.3	0	0	0	0	0	0	0	0	100	0	0	100
3	0	0	0	0	0	0	0	0	0	100	0	0
SOC <sub>0</sub> tC						8,016			16,032	6,500		8,016
SOC <sub>0-T</sub> tC						2,870			5,741	8,016		2,870
$\Delta C t C yr^{-1}$	0.000	0.000	0.000	0.000	0.000	257.273	0.000	0.000	514.547	-75.793	0.000	257.273

Biomass change (G&L) Biomass change (SD) Biomass change (Abrupt) DOM (G&L 1/1) DOM (SD 1/1) SOM Mineral (Approach 1 - Information item) SOM Mineral (Approaches 2 and 3) SOM Mineral (SD) SOM Organic Drained SOM Organic Revetted

Worksheet

Sector: Agriculture, Forestry and Other Land Use

Category: Cropland Subcategory: 3.B.2.a - Cropland Remaining Cropland

Sheet: Annual net C stock change in soil organic matter of mineral soils - Approach 2 and Approach 3 (Default method)

Data

Region II - Approach 2 Region Equation 2.26 - B Stock change factor for management regime for the Stock change factor for land-use system for the Stock change factor for management Stock change factor for C input for the subdivision in the oil organic carbo stock in mineral Reference carbor stock for the Stock change sctor for land-use Stock change actor for C input at took in miner soils for the Annual change in carbon stocks in stock in minera soils at equilibriu factors (D) o subdivision at conversion mineral solis (tonnes C / yr) subdivision in the current inventory combination ΔCmineral = ((SOC (0) - SOC(c)) \*A ) / D Land unit or international data sources or internation data sources ternational data sources or internation data sources 47  $\Delta \nabla$ > 2.2 Cropland\_\_\_soybean\_\_ Cropland\_\_ agrofores. 100 65 1.01 80.15865 0.48 0.92 28.704 257.27325 3 9 20 Total 100 257.27325



## Equation 2.25 – Formulation B - A2 (2010)

Year		1999 E CLa CLa			2000	_		2010			2020	_
Category	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp
Land unit						Area	(ha)					
1	0	600	0	0	500	0	0	400	0	0	400	0
2.1	0	0	400	0	0	400	0	0	400	0	0	400
2.2	0	0	0	0	0	100	0	0	100	0	0	0
2.3	0	0	0	0	0	0	0	0	100	0	0	100
3	0	0	0	0	0	0	0	0	0	100	0	0
SOC <sub>0</sub> tC						8,016			16,032	6,500		8,016
SOC <sub>0-T</sub> tC						2,870			5,741	8,016		2,870
$\Delta C t C yr^{-1}$	0.000	0.000	0.000	0.000	0.000	257.273	0.000	0.000	514.547	-75.793	0.000	257.273

Biomass charge (G&L) Biomass charge (SD) Biomass charge (Abrupt) DOM (SBL 11) DOM (SD 17) SOM Mineral (Approach 1 - Information dem) SOM Mineral (Approaches 2 and 3) SOM Mineral (SD) SOM Organic Drained SCM Organic

Worksheet Agriculture. Forestry and Other Land Use Sector.

Category:

Data

Cropland Subcategory: 3.8.2.a - Oropland Remaining Oropland

Sect Annual net C stock change in soli organic matter of mineral solis - Approach 2 and Approach 3 (Default method)

#### Approach 2 Region Region II

	Land	d use catego								Equa	tun 2.25 c fl							
					a a	Reference sarbon track for the strade and som contendion (brines C 1 he)	Ties dependence of Alocit class (D) or function of years over a single inventory line	Packs change lactor for here are vertice for the solution of the carent encedary year (1)	These strange basis for management regime for the addocration on the current incentory year 1-1	Dock change latter for G opus for the subdetuision in the content numbery year (-)	Soil organic carbon albect at mineral satis et equilibrium for the current satisfyrorism (brones Cirtha)	Slock change factor for land one system at conversion (1)	Stock change Rober fol Hangement Conversion H-J	Disit therap Subtrifier C imput at conversion ()	Soli organic carbon stock in mineral scols for the scolar for the conversion (intrines C / ha)	Annual change in sarbun slocks in mineral sols (lunnes C / yr)		
Lind uns code		NC 114	Land of	se Butting Ing year	National metaliana or international data sources	Tables 2.3 + 8.2 WS	Orfset setse is 20	National statutes or international data severees	Notional statistics for international data sources	National statistics ar international state shares	500(0) + 500(41) Pa(0) + Frag(0) + Fr (0)	PCC deletes or country specific	PCC defails or courty specific	Incol defeats an country specific	SOCIEL - SOCHEL* Fluids * Fregisti * Fr (c)	40-10-20 (k) + 4 (7 (b) + 50 (k) + 4 (7 (b)		
-		47	A	47		500.4	D	Pagell	r isgitt)	Fx01	5000	r alti	Piligini	Pilei	SOCIEI	ACTIVE II	-	
2.3	Cropland	soytest.	Croplent.	agronores.	100	杨	20	1.01	1.1	7.11	80.15845	0.48	the second second	0.32	28.754	257.37325	7.4	2
2,2		acybear_		aproforms .	100	65	20	1,01	11	1.11	80.15365	0.48	1	0.92	29,704	267.27325	3	
Total					200											514.5465		Ξ



ipcc INTERGOVERNMENTAL PANEL ON Climate change

## Equation 2.25 – Formulation B - A2 (2020)

Year	Year 1999				2000	_		2010			2020	_
Category	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp
Land unit						Area	(ha)					
1	0	600	0	0	500	0	0	400	0	0	400	0
2.1	0	0	400	0	0	400	0	0	400	0	0	400
2.2	0	0	0	0	0	100	0	0	100	0	0	0
2.3	0	0	0	0	0	0	0	0	100	0	0	100
3	0	0	0	0	0	0	0	0	0	100	0	0
SOC <sub>0</sub> tC						8,016			16,032	6,500		8,016
SOC <sub>0-T</sub> tC						2,870			5,741	8,016		2,870
$\Delta C tC yr^{-1}$	0.000	0.000	0.000	0.000	0.000	257.273	0.000	0.000	514.547	-75.793	0.000	257.273

Biomass increase (G&L 1/4) Biomass loss (G&L 2/4) Biomass loss (G&L 2/4) Biomass loss (G&L 2/4) Biomass change (SD) Biomass change (Abrupt) DOM (G&L 1/1) DOM (SD 1/1) SOM Mineral (Approaches 2 and 3) SOM Mineral (SD) SOM Organic Drained SOM Organic Reweited

Worksheet Sector: Agriculture. Forestry and Other Land Use

Category:

Forest Land Subcategory: 3.B.1.b.i - Cropland converted to Forest Land

Sheet Annual net C stock change in soil organic matter of mineral soils - Approach 2 and Approach 3 (Default method)

Data

Region	Region II	Approach 2
Hegion	megion ii	<ul> <li>Approach</li> </ul>

	Land use catego	a.						Еция	lian 2.25 - 8						
			Area (Ina)	Reference carbon stock for the climate and soil combination (tonnes C / ha)	dependence of stock change factors (D) or number of years over a single inventory time period (T) (V)	Black change factor far land-use system for the subdivision in the current inventory year (-)	Slock change factor for management regime for the subdivision in the current inventory year (-)	Stock, change factor for C input for the subdivision in the current line entory year (-)	Soll organic carbon stock in mineral solly at equilibrium for the current subdivision (tonnes C / fra)	Slock change factor for land-use system at conversion (-)	Stock change factor for management regime at conversion	Stock change factor for C input at conversion (-)	Soli organic carbon stock in mineral solis for the subdivision at conversion (tornes C / ha)	Annual change in cation sticks in mineral soils (tennes C / yr)	
Land unit code		Land use during reporting year	National statistics or international data sources	Tables 2.3 / 6.2 WS	Default value is 20	IPCC defaults or country-specific	IPCC defaults or country specific	IPCC defaults or country specific	50C(0) = 50Cref * Plu(0) * Fing(0) * Pl (0)	PCC defaults or country-specific	IPCC defaults or country-specific	IPCC detauts ar country specific	SOC(c) = SOCref* Plu(c) * Pmg(c) * Pi (c)	∆Cmineral = ((SOC (0) - SOC(c)) *A) / D	
ange X	AV AV		A	SOCref	D	Flu(0)	Fmg(0)	Fi(0)	500(0)	Flu(c)	Fmg(c)	FI(Q)	50C(c) 🗸	4Cmineral	na socia docia
<b>3</b>	Cropland_ agrofores_	Manage_ Restorati_	100	65	5 20	1	1	1	65	1.01	1.1	1.11	80,15865	-75,79325	1 1 2
+ otal			100											-75.79325	
			(file)	combination (tonnes C / ha)	number of years over a single inventory time	surrent inventory year (-)	subdivision in the carrent inventory year (-)	ourrent inventory year (-)	tor the current subdivision (tonnes C / ha)	conversion (-)	regime at conversion (-)	conversion (-)	Subdivision at conversion (formes C-/ ha)	mineral soils (tonnes C / yr)	
Land unit code		Land use during reporting year	National statistics or international data sources	Tables 23/52 WS	Default value is 20	National statistics or international data sources	National statistica or international data sources	National statistics or international data sources	SOC(0) = SOCref* Flu(0) * Fing(0) * Fi (0)	PCC defaults or country-specific	IPCC defaults or country-specific	IPCC defaults or country-specific	SOC(c) = SOCr#* Flu(c) *Fmg(c) *Fi (c)	50minetel = (1500 (0) - 500(c)) *A) / D	
7	AT AV	47 A7		SOCHE	D	Fite(\$)	Frigi0)	F1(2)	50C(0)	Fluit	Fmg(c)	Fac	500(c)	<b>AGmineral</b>	
23	Cropland soybean	Cropland . agrolores .	100	65	20	1.創	1.1	1.11	80.15865	0.48	1	0.92	26.704	257 27325	1 1 2
Total															

## Equation 2.25 – Formulation B – Approach 3

$$\Delta C_{Mineral} = \frac{\left(SOC_{0\_GHGI} - SOC_{(0-T)\_GHGI}\right)}{T}$$
$$= \frac{\sum_{c,s,i,p} \left\{ \left[ \left(SOC_{REF_{c,s,p}} \bullet F_{LU_{c,i,p}} \bullet F_{MG_{c,i,p}} \bullet F_{I_{c,i,p}}\right)_{0} - SOC_{@conversion_{c,s,i,p}} \right] \bullet A_{c,s,i,p} \right\}}{D}$$

Where, "D" is the transition period (IPCC default is 20 years), and "c" (climate), "s" (soil), "i" (management system) correspond to the variables, in each land use category/subcategory, according to which the estimate is stratified/disaggregated

According to such variables, **SOC at equilibrium**, in any inventory year, for each stratum (unit of land) *c,s,i*, is calculated as: •  $(SOC_{REF_{c,s}} \cdot F_{LU_{c,i}} \cdot F_{MG_{c,i}} \cdot F_{I_{c,i}} \cdot A_{c,s,i})_{0}$ 

i.e. the combination of current land uses and management systems of practices in the current inventory year "0" (t C)

While the SOC just before the conversion ( $SOC_{@conversion}$ ) of the unit land is not calculated as SOC at equilibrium of the combination of land uses and management systems of practices of in the latest year "T" before the conversion (t C).  $SOC_{@conversion}$  is the actual SOC of the unit of land in the latest year "T" before the conversion (t C)

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



## Equation 2.25 – Formulation B – A3 (2000)

Year	ar 1999 rory F Cla Cla				2000	-		2010			2020	_
Category	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp
Land unit						Area	(ha)					
0	0	0	0	0	0	100	0	0	100	0	0	0
1	0	600	0	0	500	0	0	400	0	0	400	0
2	0	100	0	0	100	0	0	0	100	100	0	0
3	0	0	400	0	0	400	0	0	400	0	0	500
SOC <sub>0</sub> tC						8,016			16,032	6,500		0
SOC <sub>0-T</sub> tC						2,870			5,741	5,443		0
$\Delta C t C yr^{-1}$	0.000	0.000	0.000	0.000	0.000	257.273	0.000	0.000	514.547	52.843	0.000	0.000

Biomass change (S8L) Biomass change (S0) Biomass change (Abrupt) DOM (S8L 1/1) DOM (S0 1/1) SOM Mineral (Approach 1 - Information item) SOM Mineral (Approaches 2 and 3) SOM Organic Drained SOM Organic Revealed

Worksheet

Sector: Agriculture, Forestry and Other Land Use

Category: Cropland Subcategory: 3.8.2.a -

Subcategory: 3.8.2.a · Cropland Remaining Cropland Sheet: Annual net C stock change in soil organic matter of mineral sols - Approach 2 and Approach 3 (Default method)

Data

Region III Approach 3 Region Equation 2.25 - 8 Time Inperidence o stock change factors (D) or Stack change factor fo management regime fo the subdivision in the current inventory year Soil organic carbon took in mineral soils equilibrium for the current subdivision over a single (tonnes C / ha) tonnes C / yr) period (T) Vational statistics of international data sources National statistics or international data sources National statistics or international data sources Land use during reporting Default value in 20 CIC(0) = SCIC(of \* Fil) (0) \* Fing(0) \* Fil(0) SOC(c)) \*A) /D 50C(c) Cropland An. soybean int. Cropland Pe. agroforestry. 1.11 100 65 1.01 80,15865 7 4 7 . 0 20 Total 257.27325 **IDCC** 



INTERGOVERNMENTAL PANEL ON Climate change

## Equation 2.25 – Formulation B – A3 (2010)

Year		1999 F CLa CLa			2000			2010			2020	
Category	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp
Land unit						Area	(ha)					
0	0	0	0	0	0	100	0	0	100	0	0	0
1	0	600	0	0	500	0	0	400	0	0	400	0
2	0	100	0	0	100	0	0	0	100	100	0	0
3	0	0	400	0	0	400	0	0	400	0	0	500
SOC <sub>0</sub> tC						8,016			16,032	6,500		0
SOC <sub>0-T</sub> tC						2,870			5,741	5,443		0
$\Delta C t C yr^{-1}$	0.000	0.000	0.000	0.000	0.000	257.273	0.000	0.000	514.547	52.843	0.000	0.000

Biomass change (G&L) Biomass change (SD) Biomass change (Abrupt) DOM (G&L 1/1) DOM (SD 1/1) SOM Mineral (Approach 1 - Information item) SOM Mineral (Approaches 2 and 3) SOM Mineral (SD) SOM Organic Drained SOM Organic Revetted

Worksheet Sector: Agriculture, Forestry and Other Land Use

Category: Cropland

Subcategory: 3.B.2.a - Cropland Remaining Cropland

Sheet : Annual net C stock change in soil organic matter of mineral soils - Approach 2 and Approach 3 (Default method)

Data

Approach 3 Region Region III Land use category Equation 2.25 - B Stock change factor for management regime for the subdivision in the current inventory year stock change factors (D) or Stock change factor for land-use system for the equilibrium for the current subdivision subdivision in the current inventory year the subdivision at conversion period (T) Default value is 20 SOC(0) = SOCref \* Flu (0) \* Fmg(0) \* Fi(0) △Cmineral = ((SOC(0) SOC(c))\*A)/D  $\Delta \overline{v}$ SOC(0)  $\Delta \nabla$ SDCref **∆Cmineral** Cropland Pe\_ 100 Cropland An\_ soybean int. agroforestry\_ 65 20 1.01 80.15865 257.27325 🕜 🖬 🤊 100 65 20 1.01 1 11 80.15865 28 704 2 soybean int. agroforestry. 257 27325 Total 514.5465 200



INTERGOVERNMENTAL PANEL ON Climate change

2010

C

## Equation 2.25 – Formulation B – A3 (2020)

Year		1999 F CLa CLa			2000	_		2010			2020	
Category	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp	F	CLa	CLp
Land unit						Area	(ha)					
0	0	0	0	0	0	100	0	0	100	0	0	0
1	0	600	0	0	500	0	0	400	0	0	400	0
2	0	100	0	0	100	0	0	0	100	100	0	0
3	0	0	400	0	0	400	0	0	400	0	0	500
SOC <sub>0</sub> tC						8,016			16,032	6,500		0
SOC <sub>0-T</sub> tC						2,870			5,741	5,443		0
$\Delta C t C yr^{-1}$	0.000	0.000	0.000	0.000	0.000	257.273	0.000	0.000	514.547	52.843	0.000	0.000

Bomass Increase (G8, 14) Bomas Ioss (G8, 24) Bomas Workshaut

Sector: Agriculture, Forestry and Other Land Use Forest Land

Category

Subcategory: 3.8.1b.) - Cropland converted to Forest Land Avrual net C stock charge in soll organic matter of meneral suits - Approach 2 and Approach 3 (Default method)

Sheet Deta

Region III Region Approach 3

-	Lant size category	ř I					Equition 2.25 - 6					_
			22	Halmanca sa tan alosa for the schedule and add saadwaton (tormes C / trai	Time Becondence of stoce change factors ID (see number of years see a single inventory time period (T) (pt)	Shock change factor for land use system for the subdivision in the carrent lowerfory year of	Shoot change laster for the system regime for the subdivision in the current eventory year (-)	Disch schange fachter fan E trigue fan tria aubdrogenen in the carrent insentiery year i-i	Soil arganic centum Abok in mineral solts at elavitarian far the carrent sabak-sont formes C / he)	Self organic servici stack in minimal sole to the subfraction in the year of conversion Upprivation ( ) (w)	Annual change m sation yilicts in winned satis (termes C / yr)	
	Initial land use	Land use during reporting	National chalosies or Historical chalo Historical chalo Historical	Tables 2.3 / 6.2 WS	Default value is 20	PCC beloads or country expetition	IPCC defaults or country specific	PSC defaults or country specific	SOCIO - SOCIET * Pu (b) * Peg(b) * Pi(b)		SCRIMENT = (USOCIO) - SOCIETI *A1/D	
	47 47	47 47	A)	30 Cref	0	Pluidy	Freq(0)	Fx(0)	SOCIÓ	\$0C(t) ¥	ACmineral	
Total	Cropsana re.   agrotorestry	Managed H_ (Hestoration_)	130	65	20		0		85	54.43133	5/3611	3 8 3
			100								52.84337	
(* 1) e											Ip	CC



INTERGOVERNMENTAL PANEL ON Climate change

## **Stock-Difference Method**





## **Stock-Difference Method**

Can b	be selecte	ed in the	Land Rep	oresentation	on Manag	ger for and Unit Parameters	each C	pool ×
(bioind						C pools / Methods Biomass change DOM - Deadwood DOM - Litter SOM - Mineral	Gain & Loss Gain & Loss Gain & Loss Stock difference	* * *
SOM Organic Rewebed Biomass change (G&L) E Worksheet Sector: Agricult Category: Cropian Subcategory: 3.8.2.a Sheet: Annual	iomass change (SD) Biom ure, Forestry and Other Land U d - Cropland Remaining Croplanc net C stock change in soil orga	ass change (Abrupt) DOM (G&L se i nic matter of mineral sols (Stock, diff	1/1) DOM (SD 1/1) SOM (	Mineral (Approach 1 - Informati	on item) SOM Mineral (Appr	caches 2 and 3) SO	Save	Cancel
Data Region Region IV	- Appr	oach 2						
	Land use category		6		Equation 2.5	y v		
			Area (ha)	Soil organic carbon stock ir mineral soils at time 0 (tonnes C / ha)	n Soil organic carbon stock in mineral soils at time 0-T (tonnes C / ha)	Number of years over a single inventory time period (Year)	Annual change in carbon stocks in mineral solls (tonnes C / yr)	
Land unit code	Initial land use	Land use during reporting yea	National statistics or international data sources	National statistics or international data sources	National statistics or international data sources		0Cmineral = ((SOC(0) - SOC(0-T)) / T	
7	44	A7 A7	7 ×	SCC(0)	SOC(0-T)	T	۵Cmineral	
Total				2			0	





## **Direct N<sub>2</sub>O emissions from managed soils**

Urine and dung inputs to grazed soils (1 of 2) Urine and dung inputs to grazed soils (2 of 2) Drainage of managed organic soils Rewetting of managed organic soils Summary of Direct N2O Emissions from managed soils											
Managed mar	nure N ava	ilable for application to man	ged soils.	feed, fuel or construction use	es Synthetic N ap	oplied to managed soils	Organic Napplied to man	aged soils Nin crop n	esidues Nin mineral soils th	hat is mineralised	
Worksheet         Sector:       Agriculture, Forestry and Other Land Use         Category:       Aggregate Sources and Non-CO2 Emissions Sources on Land         Subcategory:       3 C.4 - Direct N2O Emissions from managed sols         Sheet:       N in mineral sols that is mineralised, in association with loss of soil C from soil organic matter as a result of changes to land use or management.         Data         Data											2020
i agent i						Equation 1	18				
Land unit code	d unit d unit ode  Initial land use Land use during reporting year Average loss of soil carbon (lonnes C/yr) Crit ratio of the soil organic matter The net amount of N mineralised in mineral soils as a result of loss of soil carbon through change in land use or management (kg N/2C-N / kg N) Table 11.1								N2O Emissions (kg N2O / yr)		
	- 47	7	47	A7	aGmineral,LU	R	Fsom = (ACmineral,LU * (1/R) * 1000 (	eti	N2O-N = Fsom * EF1	N20 + N20-N * 44/28	
3	Cropia.	agroforestry - pepper	Manag	Restoration AB (AC 10)	-75.79325	15	5052.88333	0.01	50 52883	79.40245 🧹	2 1 2
I otal							5052.88333		50.52883	79.40245	





## Indirect N<sub>2</sub>O emissions from managed soils leaching/runoff

N2O from Atmosph Vorkaheet Sector: Category: Subcategory: Sheet: Data	heric Deposition Agriculture, Fore Aggregate Sourc 3.C.5 - Indirect N N2O from N lead	of N Volatilised from Managed S stry and Other Land Use res and Non-CO2 Emissions Sour I20 Emissions from managed solis hing/hunoff from Managed Solis	oils N2O from	Is N2O from N leaching/runoff from Managed Soils									
Region Regio	on II	<i></i>											
						E	puetion 11.10						
			Arimual amount of synthetic fertilizer N applied to soils (kg N / yr)	Achount of animal manure, compost, sewage sludge and other organic N additions applied to soits (kg N / yr)	Amount of utine and dung N deposited by grazing enimals (kg N / yr)	crop residues (above and below-gravind). Including N- foung crops, and from formgeopasture renewal, returned to 5005 (2000).	emotion of m mineralised in mineral solls associated with loss of soil C from SOM as a result of changes to land use or management (for 2/14)	mineralised in organic solls associated with loss of soil C from soil organic matter as a result of changes to land use or management (be NL (m)	Fraction of all N added to/mineralised in managed soits that is lost through leaching and runoff (kg N / (kg of N additions))	Emission factor for N2O emissions from N leaching and runoff (kg N2O-W(kg N leaching/hunoff)]	Amount of N2O-N produced from leaching and runoff of N additions to managed soils (kg N2O-N/yr)	N2O Emissions (kg N2O/yr)	
Landuse	category	Land use subdivision							Table 11.3	Table 113	N2O Not Sen + Fon + Forp + For + Fsom + (N from Fos))* FracLEACH- (H) * EF5	N2O = N2O N *(44/26)	
CHILDREN COLUMN THE	27	۵7	Fsn	Fan	Eprp	For	Fsom	N from Fos	FracLEACH-(H)	EF5	N20-N	N2O	
Forest Land		Restoration AB (AC 10)	ń		1		5052.88333	0	0.3	0.0075	11,36899 🖌	17.86555	3 7 3
1 0131			0	0	0	0	5052.88333	0			11.36899	17.86555	





# CH<sub>4</sub> emissions from rewetted/created wetlands in inland mineral soils

And long   Copy   Determined   Soil Type   Soil Type   Soil Type   Soil Statue     Permined     Copy Determined     Copy Determined     Copy Determined     Soil Type     Soil Type   Soil Type   Soil Statue     Permined     Copy Determined     Soil Type	e strocture + 4 La	nd use subdivision - common par	ameters				
Safe Type     Fight Activity Clay Meaned     Image Activity Clay Meaned     Image Activity Clay Meaned     Image Activity Clay Meaned       Safe Type     Fight Activity Clay Meaned     Image Activity Clay Meaned     Image Activity Clay Meaned     Image Activity Clay Meaned       Safe Type     Fight Activity Clay Meaned     Image Activity Clay Meaned     Image Activity Clay Meaned     Image Activity Clay Meaned       Safe Type     Fight Activity Clay Meaned     Image Activity Clay Meaned     Image Activity Clay Meaned     Image Activity Clay Meaned       Safe Type     Fight Activity Clay Meaned     Image Activity Clay Meaned     Image Activity Clay Meaned     Image Activity Clay Meaned       Safe Type     Fight Activity Clay Meaned     Image Activity Clay Meaned     Image Activity Clay Meaned     Image Activity Clay Meaned       Image Activity Clay Meaned     Fight Activity Clay Meaned     Image Activity Clay Meaned     Image Activity Clay Meaned     Image Activity Clay Meaned       Image Activity Clay Activity Clay Meaned     Fight Activity Clay Meaned     Image Activity Clay Activity Clay Meaned     Image Activity Clay Activity C	est Land La	and use subdivision name	lotus flower		Country/Territory	Brazil	1
Code Code         Said Salue         Restand         Common Region         Trappoid Massi With an and the parameters are a subdivious is sheady being used in Land Representation Manager           Lond use hiddwares - Annual Cross specific parameters         In ear parallel to druge some of the parameters are a subdivious is sheady being used in Land Representation Manager         Lond use hiddware - Annual Cross specific parameters           Lond use hiddwares - Annual Cross specific parameters         Herbaceous biomass (Cr/Ma )         5000 )         Checken (Cristical)         1000 )           Ratio of below ground biomass to above ground biomass (b strong (Cristical))         1000 )         Reference sol organic cabon stock (SOCH) (Cristical)         1000 )           Ratio of below ground biomass to above ground biomass (b chrong Factors         Lond use (FLU) )         1100 )         1000 )           Ratio of below ground biomass to above ground biomass (b chrong Factors         Lond use (FLU) )         1100 )         1200 )	Cropland Annual Crops Sc	oil Type	High Activity Clay Meeral	100 (01)	Continent	Latin America and Carl	bbean
Subject       It in the possible to change score do the parameters since subdivision is sheady being used in Land Representation Manager         Substant Wetands       The net possible to change score do the parameters since subdivision is sheady being used in Land Representation Manager         Substant Wetands       The net possible to change score do the parameters since subdivision is sheady being used in Land Representation Manager         Substant Wetands       The net possible to change score do the parameters since subdivision is sheady being used in Land Representation Manager         Substant Wetands       The net possible to change score do the parameters since subdivision is sheady being used in Land Representation Manager         Deter Land       The net possible to change score do the parameters since subdivision is sheady being used in Land Representation Manager         Reference sol segaritic cation stock (SOCH) # C / talue)       1000         Reference sol segaritic cation stock (SOCH) # C / talue)       1100 @         Bit of below ground biomast to above ground biomast (B) # not C / talue)       1100 @         Bit of below ground biomast (B) # not C / talue)       1100 @         Bit of below ground biomast (B) # not C / talue)       1100 @         Bit of below ground biomast (B) # not C / talue)       1100 @         Bit of below ground biomast (B) # not C / talue)       1100 @         Bit of below ground biomast (B) # not C / talue)       1100 @         Bit of below ground biomast	latus flower	oil Status	Renated		Climate Region	Tropical Maist	12152
Copy Detet  Copy Detet Copy Detet  Copy Detet  Copy Detet  Copy Detet  Copy Detet  Copy Detet  Copy Detet  Copy Detet  Copy Detet  Copy Detet  Copy Detet  Copy D	soybean intensive						
Source diamond	Cropland Perennial Cro	is not possible to change some of	the parameters since subdivision is a	already being used in Land Representation Manager			
telements her Lad  Resexception  Resexcepti	etiands La	nd use subdivision - Annual Crop	a specific parameters				
1 Copy Deter	ettlements ther I and Pi	ke exception					
Hetachou bonass (L/Na v 5.000 v)       Chacker (L/La v 1.000 v)         Ratio of below-ground biomass to above ground biomass (B) (E rot C/L about C)       0.300 v)         Reference sol organic cabon stock (SOCed) (E C /ha)       65.000 v)         Reference sol organic cabon stock (SOCed) (E C /ha)       1100 v)         Trage (FMG)       1.220 v)         hpad (F)       1.440 v)         Vertex       1.440 v)         Copy       Delete					r ma livi		i umi
Ratio of below ground biomass to above ground biomass (b) # rod C/ t about C)     0.000       Reference sol organic carbon stock (SOCed) # C / has     65.000 w       Reference sol organic carbon stock (SOCed) # C / has     1.100 w       Land user (FLU)     1.100 w       Talage (FMG)     1.220 w       hpot (FI)     1.440 w       1     1.440 w				Herbaceous biomass	5.000	Chacton (C/Lid.M.)	1000
Beference sol organic cachon stock: (SOCref) £ C / ha)         65.000 w           Relative C stock, change factors         Land use (FLU)         1.100 w           Talage (FMG)         1.222 w         Input (FI)         1.440 w				Ratio of below-ground biomass to ab	ove-ground biomass (R) & root C	C/t shoot C)	0.300
Belefer       Save       Undor       Copy							
Add: Copy Delete				Reference	soil organic carbon stock (SOCre	ef) & C / ha)	65.000 🛩
Add: Copy Delete					Relative C stock cha	ange factors	
Add Copy Delete					Lan	id use (FLU)	1.100 😪
hput (Fi) 140 v Add Copy Delete					Ti	illage (FMG)	1.220 🛩
dd Copy Delete Undo Oos						Input (FI)	1.440 🛩
>         Save         Under         Copy							
Add Copy Delete Save Undo Close							
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# CH<sub>4</sub> emissions from rewetted/created wetlands in inland mineral soils

CH4 Emissions f Worksheet Sector: Category: Subcategory:	Agriculture, Fo Aggregate Soc 3.C.13 - CH4 I	nd Created Wetlands on Inland V restry and Other Land Use urces and Non-CO2 Emissions So Emissions from Rewetted and Cre	Wetland Mine Surces on Lar ated Wetland	eral Soils nd ds on Inland	d Wetland Mineral Soils					2020
Sheet: Data	CH4 Emissions	s from Rewetted and Created We	tlands on inia	and Wetlan	d Mineral Soils					
Region (AI)		~				_				
						Equ	ation 5.1 WS			
Land unit code		Initial land use		Land	l use during reporting year		Land area of rewetted infand mineral soli (ha)	Emission factor for CH4 emissions from rewelled and created Wetlands on inland Wetland mineral solts (kg CH4, fna / yr) WS Table 5.4	CH4 Emissions (Gg CH4 / yr)	
5	۵v		A.V	ΔV	1	<u>۵</u> .4	Arewetted	8	CH4 = (Arewetted * EF) * 10%6	
ACL-LF-23	Cropland A.	lotus flower	Cro	pland A.	lotus flower		500	900	0.45	2 4 2
Total										
									0.	15

All elements sourced from the 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands are clearly identifiable because of the liliac color used.

INTERGOVERNMENTAL PANEL ON CLIMATE CHANES





# Thank you

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

