



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

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IPCC TFI TSU

ipcc

INTERGOVERNMENTAL PANEL ON climate change



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)**
 - ✓ **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
- ✓ (memo item) Indirect N₂O emissions
- ✓ Interoperability with UNFCCC reporting tool for CRTs (5/CMA.3)

➤ Other

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

The Software

Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help → **Selecting Functionalities**

2006 IPCC Categories

- Energy
 - 1.A - Fuel Combustion Activities
 - 1.A.1 - Energy Industries
 - 1.A.1.a - Main Activity Electricity an
 - 1.A.1.a.i - Electricity Generation** → **Selecting categories**
 - 1.A.1.a.i.i - Combined Heat and
 - 1.A.1.a.i.ii - Heat Plants
 - 1.A.1.a.ii - Petroleum Refining
 - 1.A.1.a.iii - Manufacture of Solid Fuel
 - 1.A.1.a.iii.i - Manufacture of Solid
 - 1.A.1.a.iii.ii - Other Energy Industr
 - 1.A.2 - Manufacturing Industries and C
 - 1.A.2.a - Iron and Steel
 - 1.A.2.b - Non-Ferrous Metals
 - 1.A.2.c - Chemicals
 - 1.A.2.d - Pulp, Paper and Print
 - 1.A.2.e - Food Processing, Bevera
 - 1.A.2.f - Non-Metallic Minerals
 - 1.A.2.g - Transport Equipment
 - 1.A.2.h - Machinery
 - 1.A.2.i - Mining (excluding fuels) an
 - 1.A.2.j - Wood and wood products
 - 1.A.2.k - Construction
 - 1.A.2.l - Textile and Leather
 - 1.A.2.m - Non-specified Industry
 - 1.A.3 - Transport
 - 1.A.3.a - Civil Aviation
 - 1.A.3.a.i - International Aviation
 - 1.A.3.a.ii - Domestic Aviation
 - 1.A.3.b - Road Transportation
 - 1.A.3.b.i - Cars
 - 1.A.3.b.i.1 - Passenger cars
 - 1.A.3.b.i.2 - Passenger cars
 - 1.A.3.b.ii - Light-duty trucks
 - 1.A.3.b.ii.1 - Light-duty truc
 - 1.A.3.b.ii.2 - Light-duty truc
 - 1.A.3.b.iii - Heavy-duty trucks a
 - 1.A.3.b.iv - Motorcycles
 - 1.A.3.b.v - Evaporative emissio

Worksheets

Fuel Consumption Data | Fuel Combustion Emissions → **Selecting Worksheets**

Sector: Energy
 Category: Fuel Combustion Activities
 Subcategory: 1.A.1.a.i - Electricity Generation
 Sheet: Fuel Consumption Data

Data
 Fuel Type: (All fuels)

Subdivision	Fuel	Consumption Unit	Consumption (Mass. Volume or Energy Unit)	Conversion Factor (TJ/Unit) (NCV)	Total consumption (TJ)
S	F	U	C	CF	TC = C * CF
Region A	Crude Oil	TJ	500	1	500
Region B	Crude Oil	Gg	50	42.3	2115
Region C	Lignite	Gg	1000	11.9	11900
Region D - Plant X	Oil Shale / Tar Sands	Gg	2000	8.9	17800
Region D - Plant Y	Natural Gas (Dry)	Gg	700	48	33600
Region D - Plant W	Natural Gas + Hydrogen (20%)	Gg	3000	55	165000
Total					230915

2006 IPCC Guidelines

Worksheet remarks

1.A.1.a.i - Time Series

CARBON DIOXIDE (CO2) Emissions (Gg CO2 Equivalents)

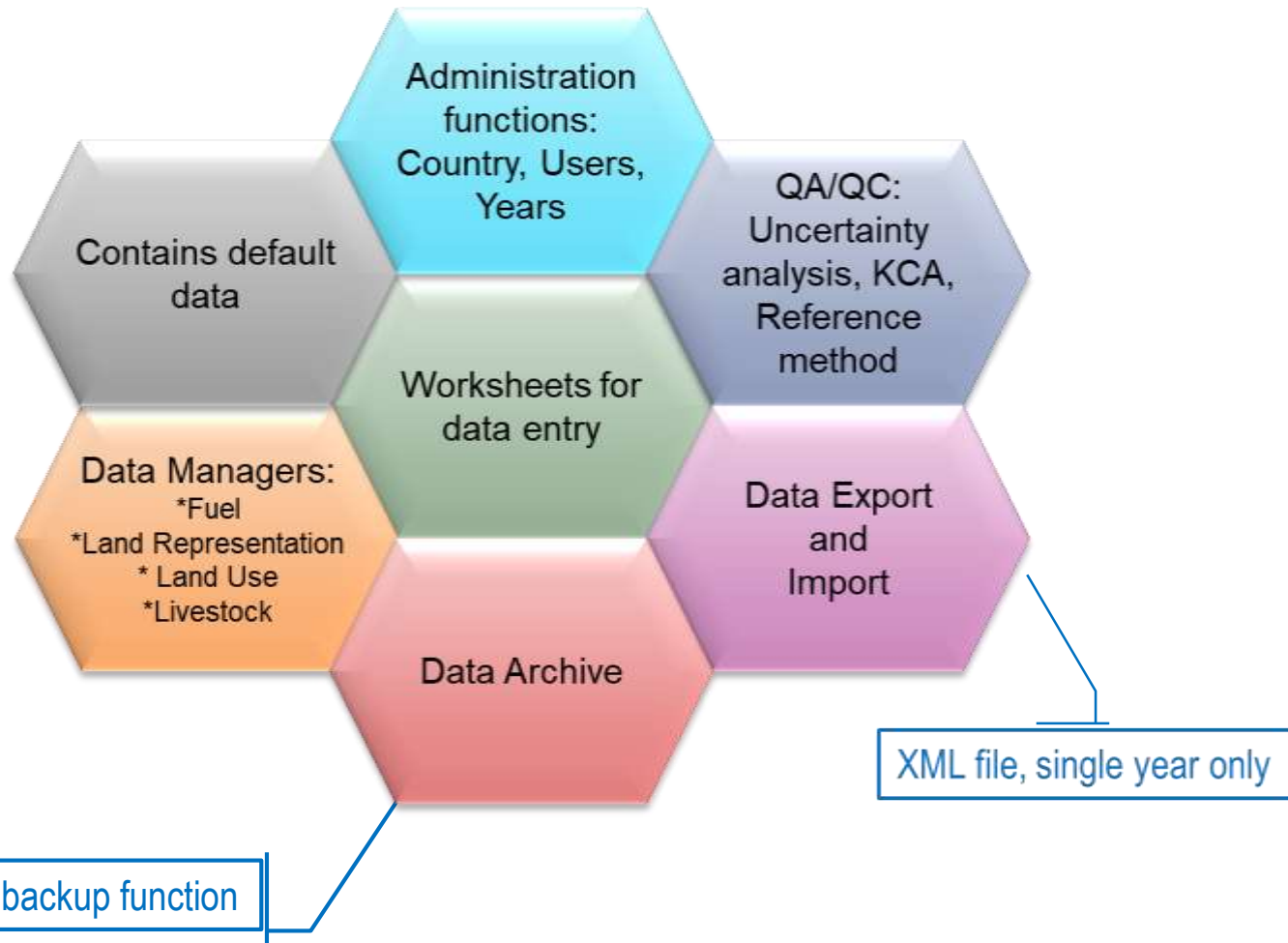
* Base year for assessment of uncertainty in trend: 1990

Gas: CARBON DIOXIDE (CO2)

Country/Territory: Japan | Inventory Year: 1990 | Base year for assessment of uncertainty in trend: 1990 | CO2 Equivalents: SAR GWPs (100 year time horizon) | Database file: (G:\Shared drives\IPCC-TSU\inventory_software\ipcc2006.acddb)

- Free to use
- Comes in 2 separate packages for installation, 64-bit vs 32-bit

Software Functions



- 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.
 - ✓ In 2020, 100 ha of B. are converted to C.
 - ✓ 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)

<i>category</i>	Cropland		Cropland		Forest land	
<i>subcategory</i>	annual		perennial		managed	
<i>subdivision</i>	intensive		agroforestry - pepper		restoration AB (AC10)	
Year	<i>tot area</i>	<i>change area</i>	<i>tot area</i>	<i>change area</i>	<i>tot area</i>	<i>change area</i>
	<i>ha</i>		<i>ha</i>		<i>ha</i>	
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

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 N₂O emissions from managed soils
- Indirect N₂O emissions from managed soils
- *[CH₄ 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**
- **There are not limits to the number of subdivisions that can be input**

Land Use Manager (LUM) – *annual cropland*

Land Use Manager

Land use structure

- Forest Land
- Cropland
 - Cropland Annual Crops
 - Cropland Perennial Cro
- Grassland
- Wetlands
- Settlements
- Other Land

Land use subdivision - common parameters

Land use subdivision name: intensive production

Soil Type: High Activity Clay Mineral

Soil Status: Natural

Country/Territory: Brazil

Continent: Latin America and Caribbean

Climate Region: Tropical Moist

Land use subdivision - Annual Crops specific parameters

Rice ecosystem

Herbaceous biomass: 1 C/ha (unit) | 5,000 (value) | C fraction (C/1 d.m.) | 1,000 (value)

Ratio of below-ground biomass to above-ground biomass (R) (root C/1 shoot C) []

Reference soil organic carbon stock (SOCref) (t C/ha) | 65,000 (value)

Relative C stock change factors

Land use (FLU) | 0.480 (value)

Tillage (FMG) | 1,000 (value)

Input (FI) | 0.920 (value)

Add Copy Delete Save Undo Close

Land Use Manager (LUM) – *perennial cropland*

Land Use Manager

Land use structure

- Forest Land
- Cropland
 - Cropland Annual Crops
 - intensive production
 - Cropland Perennial Cro
- Grassland
- Wetlands
- Settlements
- Other Land

Land use subdivision - common parameters

Land use subdivision name: agroforestry - pepper

Soil Type: High Activity Clay Mineral

Soil Status: Natural

Country/Territory: Brazil

Continent: Latin America and Caribbean

Climate Region: Tropical Moist

Land use subdivision - Perennial Crops specific parameters

Cropland type: User-defined | Acacia + pepper

Woody biomass: tC / ha | 150 000 | C fraction % C / t d.m.: 1.000

Age class (yr): Unspecified | Value: |

Perennial biomass carbon accumulation rate (G) (tonnes C / ha / yr): 7.500

Ratio of below-ground woody biomass to above-ground woody biomass (R) (root C / t shoot C): 0.400

Harvest / Maturity cycle (yr): 20 000

Agroforestry Herbageous biomass: tC / ha | 5.000 | C fraction % C / t d.m.: 1.000

Ratio of below-ground herbageous biomass to above-ground herbageous biomass (R) (root C / t shoot C): |

Reference soil organic carbon stock (SOCref) (t C / ha): 65.000

Relative C stock change factors

Land use (FLU): 1.010

Tillage (FMG): 1.100

Input (F): 1.110

Add Copy Delete Save Undo Close

Land Use Manager (LUM) – forest land

Land Use Manager

Land use structure

- Forest Land
 - Managed Forest Land
 - Unmanaged Forest Land
- Cropland
- Grassland
- Wetlands
- Settlements
- Other Land

Land use subdivision - common parameters

Land use subdivision name: Restoration AB (AC 10)

Soil Type: High Activity Clay Mineral

Soil Status: Natural

Country/Territory: Brazil

Continent: Latin America and Caribbean

Climate Region: Tropical Moist

Land use subdivision - Managed Forest Land specific parameters

Ecological zone: User-defined
Atlantic bioma

Species: User-defined
indigenous species mix

Natural Forest: Plantation:

Abandoned managed land:

Land mass: Unspecified

Age class (yr): ≤20 y

Above-ground biomass stock (t d.m. / ha): 110 000

Above-ground biomass growth (G) (t d.m. / ha / yr): 11 200

Ratio of below-ground biomass to above-ground biomass (R) (t root d.m. / t shoot d.m.): 0.200

Biomass carbon fraction (t C / t d.m.): 0.470

Growing stock level (V) (m³ / ha): 61-80

Average net annual increment of growing stock (Iv) (m³ / ha / yr): 8.000

Biomass conversion and expansion factor for increment (BCEFi) (t d.m. / m³ wood volume): Specified 1.400

Biomass conversion and expansion factor for standing stock (BCEFs) (t d.m. / m³ wood volume): Specified 1.600

Biomass conversion and expansion factor for wood and fuelwood removal (BCEFr) (t d.m. / m³ wood volume): Specified 0.000

Basic wood density (D) (t d.m. / m³ fresh volume):

Biomass expansion factor for conversion of annual net increment to above-ground biomass increment (BEF1):

Biomass expansion factor for conversion of merchantable volume to above-ground biomass (BEF2):

Reference soil organic carbon stock (SOCref) (t C / ha): 65.000

Relative C stock change factors

Land use (FLU): 1.000 Management (FMG): 1.000 Input (FI): 1.000

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LUM – Soil Type Manager

Soil Type Manager



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 content 33 Mg ha ⁻¹ m ⁻¹	✘
*			✘

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

Save

Undo

Close

LUM – Climate Region Manager

Climate Region Manager



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 Temperature ≥10°C; Mean Annual Precipitation lower than Potential Evapo-Transpiration	
	Boreal Moist	Mean Annual Temperature ≤0°C; Each Month Mean Temperature ≥10°C; Mean Annual Precipitation higher than Potential Evapo-Transpiration	
Polar	Polar Dry	Mean Annual Temperature ≤0°C; Each Month Mean Temperature <10°C; Mean Annual Precipitation lower than Potential Evapo-Transpiration	
	Polar Moist	Mean Annual Temperature ≤0°C; Each Month Mean Temperature <10°C; Mean Annual Precipitation higher than Potential Evapo-Transpiration	
* Tropical	eastern amazonia climate	mean annual precipitation > 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.

Save Undo Close

Land Representation approaches

Approach I - 1,000 ha

Unit	Year	Land use			Area
		category	subcategory	subdivision	ha
1	1999	Cropland	Annual	Soybean intensive	600 ha
	2000 - 2009				500 ha
	2010-2020				400 ha
2	1999	Cropland	Perennial	Agroforestry - pepper	400 ha
	2000 - 2009				500 ha
	2010 - 2019				600 ha
	2020				500 ha
---	1999 - 2019	Forest land	Managed	Restoration AB (AC10)	---
3	2020				100 ha

Approach II - 1,000 ha

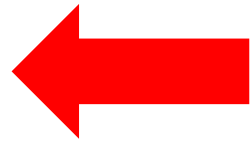
Unit	Year	Land use			Area
		category	subcategory	subdivision	ha
1	1999	Cropland	Annual	Soybean intensive	600 ha
	2000-2009				500 ha
	2010-2020				400 ha
2.1	1999-2019	Cropland	Perennial	Agroforestry - pepper	400 ha
[2.2]	2020				---
2.2	2000-2019	Cropland	Perennial	Agroforestry - pepper	100 ha
[2.1]	2020				---
2.3	2010-2019	Cropland	Perennial	Agroforestry - pepper	100 ha
3	2020	Forest land	Managed	Restoration AB (AC10)	100 ha

Approach III - 1,000 ha

Unit	Year	Land use			Area
		category	subcategory	subdivision	ha
---	1999	Cropland	Perennial	Agroforestry - pepper	---
0	2000-2019				100 ha
[3]	2020				---
1	1999	Cropland	Annual	Soybean intensive	600 ha
	2020-2009				500 ha
	2010-2020				400 ha
2	1999-2009	Cropland	Annual	Soybean intensive	---
	2010-2019	Cropland	Perennial	Agroforestry - pepper	100 ha
	2020	Forest land	Managed	Restoration AB (AC10)	---
3	1999 - 2019	Cropland	Perennial	Agroforestry - pepper	400 ha
[7]	2020				500 ha

➤ Units of *Land remaining* in blue

➤ Units of *Land under conversion* in orange



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-*

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

Land Representation Manager

Regions | Land representation table | Annual land representation matrix (Approach 2 & 3)

Whole country area (ha) 3,000,000

Region name	Area (ha)	Approach	Remark
Region 1	1000	Approach 1	
Region 2	1000	Approach 2	
Region 3	1000	Approach 3	
Total	3000,000		

- ✓ A country can be represented in a single set of National data or in a number of Regions
- ✓ For each Region the land representation approach is to be selected

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

Land Representation Manager

Regions Land representation table Annual land representation matrix (Approach 2 & 3)

Region: Region I Region area (ha): 1,000,000 Discrepancy (ha): 1999: OK; 1979: OK Approach: 1 1999

Land use category	Area (1999) (ha)	Area (1979) (ha)	Remark
Forest Land			
Cropland			
Land use subcategory			
Cropland Annual Crops			
Current Land			
soybean intensive			
Land unit code (Automatic)			
ACL-SI-1			
Current Land			
Land use subcategory			
Cropland Perennial Crops			
Current Land			
agroforestry - pepper			
Land unit code (Automatic)			
PCL-AP-UD-2	2	400 ↔ 400	
Land unit code (User defined)			

Land Unit Parameters

C pools / Methods

Biomass change: Gain & Loss

DOM - Deadwood: Gain & Loss

DOM - Litter: Gain & Loss

SOM - Mineral: Default

Save Cancel

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

Land Representation Manager

Regions | Land representation table | Annual land representation matrix (Approach 2 & 3)

Region: Region I | Region area (ha): 1,000,000 | Discrepancy (ha): 2000: OK; 1980: OK | Approach 1 | 2000

Land use category	Area (2000) (ha)	Area (1980) (ha)	Remark
Forest Land	0	0	
Cropland	1000	1000	
agroforestry - pepper			
PCL-AP-UD-2	2		

Area update mode

- Current inventory year only
- Current inventory year and all subsequent inventory years
- Current inventory year and all previous inventory years
- All inventory years

Update Cancel

Land unit code (Automatic)	Land unit code (User defined)	Area (2000) (ha)	Area (1980) (ha)	Remark	P
PCL-AP-UD-2	2	500	400		X

Save Undo Close

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

Land Representation Manager

Regions Land representation table Annual land representation matrix (Approach 2 & 3)

Region Region area (ha) Discrepancy (ha) Approach 1 2010

Land use category	Area (2010) (ha)	Area (1990) (ha)	Remark
Forest Land	0	0	
Cropland	1000	1000	

Land use subcategory	Area (2010) (ha)	Area (1990) (ha)	Remark		
Cropland Annual Crops	400	600			
Current Land use subdivision					
soybean intensive					
Current Land use subdivision					
Land unit code (Automatic)	Land unit code (User defined)	Area (2010) (ha)	Area (1990) (ha)	Remark	P
ACL-SI-1	1	400 ↔	600		✗
Current Land use subdivision				Remark	
Land use subcategory	Area (2010) (ha)	Area (1990) (ha)	Remark		
Cropland Perennial Crops	600	400			
Current Land use subdivision					
agroforestry - pepper					
Current Land use subdivision					
Land unit code (Automatic)	Land unit code (User defined)	Area (2010) (ha)	Area (1990) (ha)	Remark	P
PCL-AP-UD-2	2	600 ↔	400		✗

Save Undo Close



LRM – Land Representation Tab [2020] [Appr. 1]

Land Representation Manager

Region: Region I Region area (ha): 1,000,000 Discrepancy (ha): 2020: OK, 2000: OK Approach: 1 2020

Land use category	Area (2020) (ha)	Area (2000) (ha)	Remark
Forest Land	100	0	
Land use subcategory			
Managed Forest Land	100	0	
Current Land use subdivision			
Restoration AB (AC 10)			
Land unit code (Automatic)			
MFL-RAA1-NF-UD-4	3	100 ↔	0
Current Land use subdivision			
Land use subcategory			
Unmanaged Forest Land	0	0	
Land use category			
Cropland	900	1000	
Land use subcategory			
Cropland Annual Crops	400	500	
Current Land use subdivision			
soybean intensive			
Land unit code (Automatic)			
ACL-SI-1	1	400 ↔	500
Current Land use subdivision			
Land use subcategory			
Cropland Perennial Crops	500	500	
Current Land use subdivision			
agroforestry :pepper			
Land unit code (Automatic)			
PCL-AP-UD-2	2	500 ↔	500

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

Land Representation Manager

Regions: Land representation table | Annual land representation matrix (Approach 2 & 3)

Region: Region II | Region area (ha): 1,000,000 | Discrepancy (ha): OK | Approach 2 | 1999

Land use category	Area (1999) (ha)	Remark							
Forest Land									
Cropland									
Land use subcategory									
Cropland Annual Crops									
Current Land use									
soybean intensive									
Land unit code (Automatic) Land unit code (User defined)									
ACL-SI-5	1								
Current Land use									
Land use subcategory									
Cropland Perennial Crops									
Current Land use									
agroforestry - pepper									
Land unit code (Automatic) Land unit code (User defined) Previous Land use subcategory Previous Land use subdivision Transition Period (D) (years) Year of conversion Area (1999) (ha) Remark P M									
PCL-AP-UD-6	2.1	Cropland Perennial Crops	agroforestry - pepper	NA	NA	400 ↔			

Land Unit Parameters

C pools / Methods

- Biomass change: Gain & Loss
- DOM - Deadwood: Gain & Loss
- DOM - Litter: Gain & Loss
- SOM - Mineral: Default

Save Cancel

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

Land Representation Manager

Regions | Land representation table | Annual land representation matrix (Approach 2 & 3)

Region: Region II | Region area (ha): 1,000,000 | Discrepancy (ha): OK | Approach 2 | 2000

Land use category	Area (2000) (ha)	Remark							
Forest Land									
Cropland									
Cropland									
soybean									
Cropland Perennial Crops	500								
Current Land use subdivision									
agroforestry - pepper									
Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Area (2000) (ha)	Remark	P	M
PCL-AP-UD-6	2.1	Cropland Perennial Crops	agroforestry - pepper	NA	NA	400			
PCL-AP-UD-17<-ACL-SI-C0	2.2	Cropland Annual Crops	soybean intensive	20	2000	100			

Area update mode

Current inventory year only
 Current inventory year and all subsequent inventory years
 Current inventory year and all previous inventory years
 All inventory years

Update Cancel

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

Land Representation Manager

Regions Land representation table | Annual land representation matrix (Approach 2 & 3)

Region **Region II** Region area (ha) **1,000,000** Discrepancy (ha) **OK** Approach 2 **2010**

Land use category		Area (2010) (ha)		Remark						
<input type="checkbox"/>	Forest Land	0								
<input type="checkbox"/>	Cropland	1000								
Land use subcategory		Area (2010) (ha)		Remark						
<input type="checkbox"/>	Cropland Annual Crops	400								
Current Land use subdivision		Area (2010) (ha)		Remark						
<input type="checkbox"/>	soybean intensive									
Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Area (2010) (ha)	Remark	P	M	
<input type="checkbox"/>	ACL-SI-5	1	Cropland Annual Crops	soybean intensive	NA	NA	400 ↔		<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>							↔		<input type="checkbox"/>	<input type="checkbox"/>
Current Land use subdivision		Area (2010) (ha)		Remark						
<input type="checkbox"/>										
Land use subcategory		Area (2010) (ha)		Remark						
<input type="checkbox"/>	Cropland Perennial Crops	600								
Current Land use subdivision		Area (2010) (ha)		Remark						
<input type="checkbox"/>	agroforestry - pepper									
Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Area (2010) (ha)	Remark	P	M	
<input type="checkbox"/>	PCL-AP-UD-6	2.1	Cropland Perennial Crops	agroforestry - pepper	NA	NA	400 ↔		<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	PCL-AP-UD-7<-ACL-SI-C0	2.3	Cropland Annual Crops	soybean intensive	20	2010	100 ↔		<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	PCL-AP-UD-17<-ACL-SI-C10	2.2	Cropland Annual Crops	soybean intensive	20	2000	100 ↔		<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>							↔		<input type="checkbox"/>	<input type="checkbox"/>

Save Undo Close



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

Land Representation Manager

Regions | Land representation table | Annual land representation matrix (Approach 2 & 3)

Region: Region II | Region area (ha): 1,000,000 | Discrepancy (ha): OK | Approach 2 | 2020

Land use category		Area (2020) (ha)		Remark					
Forest Land		100							
Land use subcategory		Area (2020) (ha)		Remark					
Managed Forest Land		100							
Unmanaged Forest Land		0							
Land use category		Area (2020) (ha)		Remark					
Cropland		900							
Land use subcategory		Area (2020) (ha)		Remark					
Cropland Annual Crops		400							
Current Land use subdivision		Remark							
soybean intensive				✘					
Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Area (2020) (ha)	Remark	P	M
ACL-SI-5	1	Cropland Annual Crops	soybean intensive	NA	NA	400 (↔)			✘
Current Land use subdivision		Remark							
*									
Land use subcategory		Area (2020) (ha)		Remark					
Cropland Perennial Crops		500							
Current Land use subdivision		Remark							
agroforestry - pepper				✘					
Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Area (2020) (ha)	Remark	P	M
PCL-AP-UD-6	2.1	Cropland Perennial Crops	agroforestry - pepper	NA	NA	400 (↔)			✘
PCL-AP-UD-7<-ACL-SI-C10	2.3	Cropland Annual Crops	soybean intensive	20	2010	100 (↔)			✘

Save | Undo | Close



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

Land Representation Manager

Regions Land representation table Annual land representation matrix (Approach 2 & 3)

Region: Region III Region area (ha): 1,000,000 Discrepancy (ha): OK Approach 3 1999

Land use category		Area (1999) (ha)	Remark
Forest Land		0	
Cropland		1000	

Land use subcategory		Area (1999) (ha)	Remark
Cropland Annual Crops		600	

Current Land use subdivision		Remark
soybean intensive		

Land unit code (Automatic)	Land unit code	Previous Land use	Previous Land use	Transition Period	Year of transition	Area (1999) (ha)	Remark	P	C	M
ACL-SI-8						500 ↔				
ACL-SI-14						100 ↔				
						↔				

Land unit code (Automatic)	Land unit code	Previous Land use	Previous Land use	Transition Period	Year of transition	Area (1999) (ha)	Remark	P	C	M
PCL-AP-UD-10						400 ↔				
						↔				

Land Unit Parameters

- C pools / Methods
- Biomass change: Gain & Loss
- DOM - Deadwood: Gain & Loss
- DOM - Litter: Gain & Loss
- SOM - Mineral: Default

Save Cancel

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

Land Representation Manager

Regions Land representation table Annual land representation matrix (Approach 2 & 3)

Region Region III Region area (ha) 1,000,000 Discrepancy (ha) OK Approach 3 2000

Land use category	Area (2000) (ha)	Remark
Forest Land	0	
Cropland	1000	

Area update mode

Current inventory year only

Current inventory year and all subsequent inventory years

Current inventory year and all previous inventory years

All inventory years

Area	Remark
400 ↔	↔
100 ↔	↔

Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Area (2000) (ha)	Remark	P	C	M
PCL-AP-UD-10	3	Cropland Perennial Crops	agroforestry - pepper	NA	NA	400 ↔				
PCL-AP-UD-18<ACL-SI-C0	0	Cropland Annual Crops	soybean intensive	20	2000	100 ↔				



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

Land Representation Manager

Regions Land representation table | Annual land representation matrix (Approach 2 & 3)

Region **Region III** Region area (ha) **1,000,000** Discrepancy (ha) **OK** Approach **3** **2010**

Land use category		Area (2010) (ha)	Remark							
Forest Land		0								
Cropland		1000								
Land use subcategory		Area (2010) (ha)	Remark							
Cropland Annual Crops		400								
Current Land use subdivision		Remark								
soybean intensive										
Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Area (2010) (ha)	Remark	P	C	M
ACL-SI-8	1	Cropland Annual Crops	soybean intensive	NA	NA	400 ↔				✗
ACL-SI-14	2 (till 2009)	Cropland Annual Crops	soybean intensive	NA	NA	0 ↔				✗
Current Land use subdivision		Remark								
Land use subcategory		Area (2010) (ha)	Remark							
Cropland Perennial Crops		600								
Current Land use subdivision		Remark								
agroforestry - pepper										
Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Area (2010) (ha)	Remark	P	C	M
PCL-AP-UD-10	3	Cropland Perennial Crops	agroforestry - pepper	NA	NA	400 ↔				✗
PCL-AP-UD-15<<ACL-SI-C0	2	Cropland Annual Crops	soybean intensive	20	2010	100 ↔				✗
PCL-AP-UD-18<<ACL-SI-C	0	Cropland Annual Crops	soybean intensive	20	2000	100 ↔				✗



Save Undo Close



LRM - Land Representation Tab [2020] [Appr. 3]

Land Representation Manager

Region III Region area (ha) 1,000,000 Discrepancy (ha) OK Approach 3 2020

Land use category		Area (2020) (ha)		Remark						
Forest Land		100								
Land use subcategory		Area (2020) (ha)		Remark						
Managed Forest Land		100								
Current Land use subdivision		Remark								
Restoration AB (AC 10)										
Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Area (2020) (ha)	Remark	P	C	M
MFL-RAA1-NF-UD-19c-PCL	2	Cropland Perennial Crops	agroforestry - pepper	20	2020	100 (↔)				X
Current Land use subdivision		Remark								
Unmanaged Forest Land		0								
Land use category		Area (2020) (ha)		Remark						
Cropland		900								
Land use subcategory		Area (2020) (ha)		Remark						
Cropland Annual Crops		400								
Current Land use subdivision		Remark								
soybean intensive										
Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Area (2020) (ha)	Remark	P	C	M
ACL-SI-8	1	Cropland Annual Crops	soybean intensive	NA	NA	400 (↔)				X
ACL-SI-14	2 (till 2009)	Cropland Annual Crops	soybean intensive	NA	NA	0 (↔)				X
Current Land use subdivision		Remark								
Cropland Perennial Crops		500								
Current Land use subdivision		Remark								
agroforestry - pepper										
Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Area (2020) (ha)	Remark	P	C	M
PCL-AP-UD-10	3	Cropland Perennial Crops	agroforestry - pepper	NA	NA	500 (↔)				X

2020

Cancel

P C M

U

Close

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

Land Representation Manager

Regions | Land representation table | Annual land representation matrix (Approach 2 & 3)

Region: Region II | Region area (ha): 1,000,000 | Approach 2 | 2000

Initial		Forest Land		Cropland		Grassland		Wetlands		Settlements		Other Land		Final Area (ha)	Net change (ha)
Final		Managed Forest Land	Unmanaged Forest Land	Cropland Annual Crops	Cropland Perennial Crops	Managed Grassland	Unmanaged Grassland	Managed Wetlands	Unmanaged Wetlands	Settlements (Treed)	Settlements (Other)	Managed Other Land	Unmanaged Other Land		
Forest Land	Managed Forest Land													0	0
	Unmanaged Forest Land													0	0
Cropland	Cropland Annual Crops			500										500	-100
	Cropland Perennial Crops			100	400									500	100
Grassland	Managed Grassland													0	0
	Unmanaged Grassland													0	0
Wetlands	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	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]

Land Representation Manager

Regions | Land representation table | Annual land representation matrix (Approach 2 & 3)

Region: Region II | Region area (ha): 1,000,000 | Approach 2 | 2010

Initial		Forest Land		Cropland		Grassland		Wetlands		Settlements		Other Land		Final Area (ha)	Net change (ha)
Final		Managed Forest Land	Unmanaged Forest Land	Cropland Annual Crops	Cropland Perennial Crops	Managed Grassland	Unmanaged Grassland	Managed Wetlands	Unmanaged Wetlands	Settlements (Treed)	Settlements (Other)	Managed Other Land	Unmanaged Other Land		
Forest Land	Managed Forest Land													0	0
	Unmanaged Forest Land													0	0
Cropland	Cropland Annual Crops			400										400	-100
	Cropland Perennial Crops			100	500									600	100
Grassland	Managed Grassland													0	0
	Unmanaged Grassland													0	0
Wetlands	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)

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

Land Representation Manager

Regions | Land representation table | Annual land representation matrix (Approach 2 & 3)

Region: Region III | Region area (ha): 1,000,000 | Approach 3 | 2020

Initial		Forest Land		Cropland		Grassland		Wetlands		Settlements		Other Land		Final Area (ha)	Net change (ha)
Final		Managed Forest Land	Unmanaged Forest Land	Cropland Annual Crops	Cropland Perennial Crops	Managed Grassland	Unmanaged Grassland	Managed Wetlands	Unmanaged Wetlands	Settlements (Treed)	Settlements (Other)	Managed Other Land	Unmanaged Other Land		
Forest Land	Managed Forest Land				100									100	100
	Unmanaged Forest Land													0	0
Cropland	Cropland Annual Crops			400										400	0
	Cropland Perennial Crops				500									500	-100
Grassland	Managed Grassland													0	0
	Unmanaged Grassland													0	0
Wetlands	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	400	600	0	0	0	0	0	0	0	0	1000	0

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

Mineral soil SOC change – Equation 2.25

BOX 2.1 (UPDATED)

ALTERNATIVE FORMULATIONS OF EQUATION 2.25 FOR APPROACH 1 ACTIVITY DATA VERSUS APPROACH 2 OR 3 ACTIVITY DATA WITH TRANSITION MATRICES

Two alternative formulations are possible for Equation 2.25 depending on the Approach used to collect activity data, including

Formulation A (Approach 1 for Activity Data Collection)

$$\Delta C_{Mineral} = \frac{\left[\sum_{c,s,i} \left(SOC_{REF_{c,s,i}} \cdot F_{LU_{c,s,i}} \cdot F_{MG_{c,s,i}} \cdot F_{I_{c,s,i}} \cdot A_{c,s,i} \right) \right]_0 - \left[\sum_{c,s,i} \left(SOC_{REF_{c,s,i}} \cdot F_{LU_{c,s,i}} \cdot F_{MG_{c,s,i}} \cdot F_{I_{c,s,i}} \cdot A_{c,s,i} \right) \right]_{(0-T)}}{D}$$

Formulation B (Approaches 2 and 3 for Activity Data Collection)

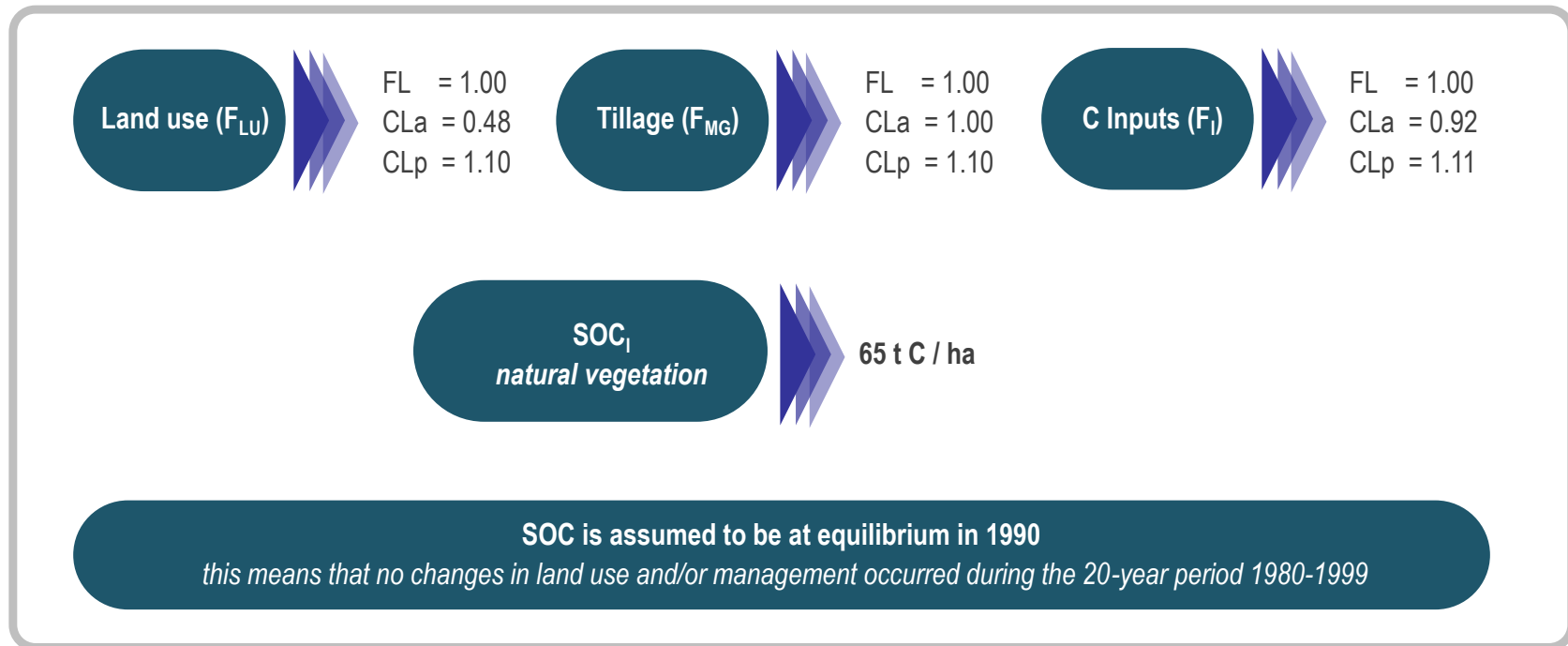
$$\Delta C_{Mineral} = \frac{\sum_{c,s,p} \left[\left\{ \left(SOC_{REF_{c,s,p}} \cdot F_{LU_{c,s,p}} \cdot F_{MG_{c,s,p}} \cdot F_{I_{c,s,p}} \right)_0 - \left(SOC_{REF_{c,s,p}} \cdot F_{LU_{c,s,p}} \cdot F_{MG_{c,s,p}} \cdot F_{I_{c,s,p}} \right)_{(0-T)} \right\} \cdot A_{c,s,p} \right]}{D}$$

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

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

$$= \frac{[\sum_{c,s,i} (SOC_{REF_{c,s}} \cdot F_{LU_{c,i}} \cdot F_{MG_{c,i}} \cdot F_{I_{c,i}} \cdot A_{c,s,i})]_0 - [\sum_{c,s,i} (SOC_{REF_{c,s}} \cdot F_{LU_{c,i}} \cdot F_{MG_{c,i}} \cdot F_{I_{c,i}} \cdot A_{c,s,i})]_{(0-D)}}{D}$$

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)

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

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

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 ₀ tC	0	17,222	32,063	0	14,352	40,079	0	11,482	48,095	6,500	11,482	40,079
SOC _{0-T} tC	0	17,222	32,063	0	17,222	32,063	0	17,222	32,063	0	14,352	40,079
ΔC 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 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 Rewetted

Worksheet

Sector: Agriculture, Forestry and Other Land Use 2000

Category: Cropland

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

Sheet: SOC Changes in mineral soils - Approach 1 (Information Item)

Date:

Region: Region 1 - Approach 1

Land use category	Equation 2.25 - A			
Land unit code	Land use during reporting year	Soil organic carbon stock in mineral soils in year 2000 (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)
	Δ	SOC(2000)	SOC(1990)	Δ _{mineral} = ((SOC(2000) - SOC(1990)) / 10)
1	Cropland Annual C. soybean intensive	14352	17222.4	-143.52
2	Cropland Perennial agroforestry - pepper	40079.325	32063.46	400.79325
Total		54431.325	49285.86	257.27325

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 ₀ tC	0	17,222	32,063	0	14,352	40,079	0	11,482	48,095	6,500	11,482	40,079
SOC _{0-T} tC	0	17,222	32,063	0	17,222	32,063	0	17,222	32,063	0	14,352	40,079
ΔC 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 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 Rewetted

Worksheet: Agriculture, Forestry and Other Land Use 2010

Category: Cropland

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

Sheet: SOC Changes in mineral soils - Approach 1 (Information item)

Data

Region: Region I - Approach 1

Land use category	Equation 2.25 - A			
Land unit code	Land use during reporting year	Soil organic carbon stock in mineral soils 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)
		SOC(2010)	SOC(1990)	ΔC _{mineral} = ((SOC(2010) - SOC(1990)) / 20)
1	Cropland Annual C... soybean intensive	11481.6	17222.4	-287.04
2	Cropland Perennial... agroforestry - pepper	48095.19	32063.46	801.5865
Total		59576.79	49285.86	514.5465

Land Use Manager | Land Representation Manager | Uncertainties

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 ₀ tC	0	17,222	32,063	0	14,352	40,079	0	11,482	48,095	6,500	11,482	40,079
SOC _{0-T} tC	0	17,222	32,063	0	17,222	32,063	0	17,222	32,063	0	14,352	40,079
ΔC 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 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 Rewetted

Worksheet

Sector: Agriculture, Forestry and Other Land Use

Category: Cropland

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

Sheet: SOC Changes in mineral soils - Approach 1 (Information item)

Data

Region: Region 1 - Approach 1

Equation 2.25 - A

Land use category	Land use during reporting year	Soil organic carbon stock in mineral soils in year 2020 (tonnes C / ha)	Soil organic carbon stock in mineral soils in year 2000 (tonnes C / ha)	Annual change in carbon stocks in mineral soils (tonnes C / yr)
Land unit code		SOC(2020)	SOC(2000)	ΔC _{mineral} = ((SOC(2020) - SOC(2000)) / 20)
1	Cropland Annual C... soybean intensive	11481.6	14352	-143.52
2	Cropland Perennial... agroforestry - pepper	40079.325	40079.325	0
Total		51560.925	54431.325	-143.52

Equation 2.25 – Formulation B – Approach 2

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

$$= \frac{\sum_{c,s,i,p} \left\{ \left[(SOC_{REF_{c,s,p}} \cdot F_{LU_{c,i,p}} \cdot F_{MG_{c,i,p}} \cdot F_{I_{c,i,p}})_0 - (SOC_{REF_{c,s,p}} \cdot F_{LU_{c,i,p}} \cdot F_{MG_{c,i,p}} \cdot F_{I_{c,i,p}})_T \right] \cdot A_{c,s,i,p} \right\}}{D}$$

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)

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

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

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 ₀ tC						8,016			16,032	6,500		8,016
SOC _{0-T} tC						2,870			5,741	8,016		2,870
ΔC 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 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 Rewetted

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

2000

Region: Region II - Approach 2

Land use category				Equation 2.25 - B										
Land unit code	Initial land use	Land use during reporting year	Area (ha)	Reference carbon stock for the climate and soil combination (tonnes C / ha)	Time dependence of stock change factors (D) or number of years over a single inventory time	Stock change factor for land-use system for the subdivision in the current inventory year (-)	Stock 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 inventory year (-)	Soil organic carbon stock in mineral soils at equilibrium for the current subdivision (tonnes C / ha)	Stock change factor for land-use system at conversion (-)	Stock change factor for management regime at conversion (-)	Stock change factor for C input at conversion (-)	Soil organic carbon stock in mineral soils for the subdivision at conversion (tonnes C / ha)	Annual change in carbon stocks in mineral soils (tonnes C / yr)
			A	SOCref	D	Flu(0)	Fmg(0)	Fi(0)	SOC(0) = SOCref * Flu(0) * Fmg(0) * Fi(0)	Flu(c)	Fmg(c)	Fi(c)	SOC(c)	ΔC _{mineral} = ((SOC(0) - SOC(c)) * A) / D
2.2	Cropland.. soybean..	Cropland.. agrofores..	100	65	20	1.01	1.1	1.11	80.15865	0.48	1	0.92	28.704	257.27325
Total			100											257.27325



Equation 2.25 – Formulation B - A2 (2010)

Year	1999			2000			2010			2020		
	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
SOC₀ tC						8,016			16,032	6,500		8,016
SOC_{0-T} tC						2,870			5,741	8,016		2,870
ΔC 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 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 Rewetted

Worksheet: Agriculture, Forestry and Other Land Use | Sector: Cropland | Category: 3.B.2.a - Cropland Remaining Cropland | Subcategory: | 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 | 2010

Land use category				Equation 2.25 - B												
Land use code	Initial land use	Land use during reporting year	National statistics or international data sources	Area (ha)	Reference carbon stock for the climate and soil combination (tonnes C / ha)	Time dependence of stock change factors (D) or number of years since a single inventory time	Stock change factor for land-use system for the subdivision in the current inventory year (F)	Stock change factor for management regions for the subdivision in the current inventory year (F _{mg})	Stock change factor for C input for the subdivision in the current inventory year (F _C)	Soil organic carbon stock at equilibrium for the current subdivision (tonnes C / ha)	Stock change factor for land-use system at conversion (F _{conv})	Stock change factor for management regions at conversion (F _{mg,conv})	Stock change factor for C input at conversion (F _{C,conv})	Soil organic carbon stock at mineral soils for the subdivision at conversion (tonnes C / ha)	Annual change in carbon stocks in mineral soils (tonnes C / yr)	
					Table 2.3: E2 WS	Default value is 20	National statistics or international data sources	National statistics or international data sources	National statistics or international data sources	SOC(0) + SOC _{ref} * F _{mg(0)} * F _{C(0)} (0)	IPCC default or country-specific	IPCC default or country-specific	IPCC default or country-specific	SOC(c) + SOC _{ref} * F _{mg(c)} * F _{C(c)} (c)	ΔC _{mineral} = (SOC (0) - SOC(c)) * A / D	
					SOC _{ref}	D	F _{mg(0)}	F _{mg(c)}	F _{C(0)}	SOC(0)	F _{conv}	F _{mg,conv}	F _{C,conv}	SOC(c)	ΔC _{mineral}	
2.3	Cropland	soybean	Cropland	agroforests	100	85	20	1.01	1.1	1.11	80.15885	0.48	1	0.92	28.704	257.27325
2.2	Cropland	soybean	agroforests	100	85	20	1.01	1.1	1.11	80.15885	0.48	1	0.92	28.704	257.27325	
Total				200											514.5465	



Equation 2.25 – Formulation B – Approach 3

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

$$= \frac{\sum_{c,s,i,p} \left\{ \left[(SOC_{REF_{c,s,p}} \cdot F_{LU_{c,i,p}} \cdot F_{MG_{c,i,p}} \cdot F_{I_{c,i,p}})_0 - SOC_{@conversion_{c,s,i,p}} \right] \cdot A_{c,s,i,p} \right\}}{D}$$

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:

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

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)

Equation 2.25 – Formulation B – A3 (2000)

Year	1999			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 ₀ tC						8,016			16,032	6,500		0
SOC _{0-T} tC						2,870			5,741	5,443		0
ΔC tC 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 Rewetted

Worksheet: Agriculture, Forestry and Other Land Use | Sector: Cropland | Category: 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) | 2000

Region: Region III - Approach 3

Land use category			Equation 2.25 - B									
Land unit code	Initial land use	Land use during reporting year	Area (ha)	Reference carbon stock for the climate and soil combination (tonnes C / ha)	Time dependence of stock change factors (D) or number of years over a single inventory time period (T) (yr)	Stock change factor for land-use system for the subdivision in the current inventory year (-)	Stock 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 inventory year (-)	Soil organic carbon stock in mineral soils at equilibrium for the subdivision (tonnes C / ha)	Soil organic carbon stock in mineral soils for the subdivision at conversion (tonnes C / ha)	Annual change in carbon stocks in mineral soils (tonnes C / yr)	
	ΔT	ΔT	A	SOCref	D	F _{lu} (0)	F _{mg} (0)	F _{li} (0)	SOC(0)	SOC(c)	ΔC _{mineral}	
0	Cropland An.	soybean int.	100	65	20	1.01	1.1	1.11	80,15865	28,704	257.27325	
Total			100								257.27325	

Equation 2.25 – Formulation B – A3 (2010)

Year	1999			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 ₀ tC						8,016			16,032	6,500		0
SOC _{0-T} tC						2,870			5,741	5,443		0
ΔC tC 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 Rewetted

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

2010

Region: Region III - Approach 3

Land use category					Equation 2.25 - B							
Land unit code	Initial land use	Land use during reporting year	National statistics or international data sources	Area (ha)	Reference carbon stock for the climate and soil combination (tonnes C / ha)	Time dependence of stock change factors (D) or number of years over a single inventory time period (T) (yr)	Stock change factor for land-use system for the subdivision in the current inventory year (-)	Stock 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 inventory year (-)	Soil organic carbon stock in mineral soils at equilibrium for the current subdivision (tonnes C / ha)	Soil organic carbon stock in mineral soils for the subdivision at conversion (tonnes C / ha)	Annual change in carbon stocks in mineral soils (tonnes C / yr)
				A	SOCref	D	F _{lu} (0)	F _{mg} (0)	F _i (0)	SOC(0)	SOC(c)	ΔC _{mineral} = ((SOC(0) - SOC(c)) * A) / D
0	Cropland An...	soybean int...	Cropland Pe...	100	65	20	1.01		1.11	80.15865	28.704	257.27325
2		soybean int...	agroforestry...	100	65	20	1.01	1.1	1.11	80.15865	28.704	257.27325
Total				200								514.5465

Equation 2.25 – Formulation B – A3 (2020)

Year	1999			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 ₀ tC						8,016			16,032	6,500		0
SOC _{0-T} tC						2,870			5,741	5,443		0
ΔC tC 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 increase (G&L 1/4) | Biomass loss (G&L 2/4) | Biomass loss (G&L 3/4) | Biomass loss (G&L 4/4) | 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 Revealed

Worksheet: Agriculture, Forestry and Other Land Use | Sector: Forest Land | Category: 3.B.1b) - Cropland converted to Forest Land | Subcategory: Annual net C stock change in soil organic matter of mineral soils - Approach 2 and Approach 3 (Default method) | Sheet: Data | 2020

Region: Region III - Approach 3

Land unit code	Initial land use	Land use during reporting year	National statistics or international data sources	Reference carbon stock for the cropland and soil combination (tonnes C / ha)	Time dependence of stock change factors (D) or number of years over a single inventory time period (T) (yr)	Stock change factor for land-use system for the subdivision in the current inventory year (-)	Stock 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 inventory year (-)	Soil organic carbon stock in mineral soils at equilibrium for the subdivision in the year of conversion (tonnes C / ha)	Soil organic carbon stock in mineral soils for the subdivision in the year of conversion (tonnes C / ha)	Annual change in carbon stocks in mineral soils (tonnes C / yr)	
				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	SOC(0) + SOCref * F _u (B) * F _{mg} (B)	SOC(0)	ΔC _{mineral} = (SOC(0) - SOC ₀) * A / D	
				SOCref	D	F _u (B)	F _{mg} (B)	F _v (B)	SOC(B)	SOC(0)	ΔC _{mineral}	
2	Cropland Pa. agroforestry	Managed F. Restoration		100	65	20	1	1	1	65	54 43133	52 84337
Total				100							52 84337	

Stock-Difference Method

Can be selected in the **Land Representation Manager** for each C pool (biomass/DOM/SOM) of each unit of land

Land Unit Parameters ✕

C pools / Methods

Biomass change	Gain & Loss
DOM - Deadwood	Gain & Loss
DOM - Litter	Gain & Loss
SOM - Mineral	Stock difference

SOM Organic Rewetted

Worksheet: 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

Sector: Agriculture, Forestry and Other Land Use 2020

Category: Cropland

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

Sheet: Annual net C stock change in soil organic matter of mineral soils (Stock difference method)

Data

Region: Region IV - Approach 2

Land use category			Equation 2.5				
Land unit code	Initial land use	Land use during reporting year	Area (ha)	Soil organic carbon stock in mineral soils at time 0 (tonnes C / ha)	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 soils (tonnes C / yr)
			National statistics or international data sources	National statistics or international data sources	National statistics or international data sources		$\Delta C_{\text{mineral}} = ((SOC(0) - SOC(0-T)) / T)$
			A	SOC(0)	SOC(0-T)	T	$\Delta C_{\text{mineral}}$
Total			0				0

Stock-Difference Method

Can be selected in the **Land Representation Manager** for each C pool (biomass/DOM/SOM) of each unit of land

Land Unit Parameters ✕

C pools / Methods

Biomass change	Gain & Loss
DOM - Deadwood	Gain & Loss
DOM - Litter	Gain & Loss
SOM - Mineral	Stock difference

SOM Organic Rewetted

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

Worksheet

Sector: Agriculture, Forestry and Other Land Use 2020

Category: Cropland

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

Sheet: Annual net C stock change in soil organic matter of mineral soils (Stock difference method)

Data

Region: Region IV - Approach 2

Land use category			Equation 2.5				
Land unit code	Initial land use	Land use during reporting year	Area (ha)	Soil organic carbon stock in mineral soils at time 0 (tonnes C / ha)	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 soils (tonnes C / yr)
			National statistics or international data sources	National statistics or international data sources	National statistics or international data sources		$\Delta C_{\text{mineral}} = ((SOC(0) - SOC(0-T)) / T)$
			A	SOC(0)	SOC(0-T)	T	$\Delta C_{\text{mineral}}$
Total			0				0

Direct N₂O emissions from managed soils

2020

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 manure N available for application to managed soils, feed, fuel or construction uses | Synthetic N applied to managed soils | Organic N applied to managed soils | N in crop residues | N in mineral soils that 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 soils
Sheet: N in mineral soils 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
Region: Region II

Equation 11.8

Land unit code	Initial land use	Land use during reporting year	Average loss of soil carbon (tonnes C / yr)	C/N 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 / yr)	Emission Factor for N mineralised (kg N ₂ O-N / kg N) Table 11.1	N ₂ O-N Emissions (kg N ₂ O-N / yr)	N ₂ O Emissions (kg N ₂ O / yr)		
	Δ	Δ	Δ	R	$F_{\text{Soil}} = \Delta C_{\text{mineral,LU}} \cdot (1/R) \cdot 1000$	EF1	$N_{2O-N} = F_{\text{Soil}} \cdot EF1$	$N_{2O} = N_{2O-N} \cdot 44/28$		
3	Cropla..	agroforestry - pepper	Manag..	Restoration AB (AC 10)	-75.79325	15	5052.88333	0.01	50.52883	79.40245
Total								5052.88333	50.52883	79.40245

Indirect N₂O emissions from managed soils leaching/runoff

N2O from Atmospheric Deposition of N Volatilised from Managed Soils N2O from N leaching/runoff from Managed Soils

Worksheet

Sector: Agriculture, Forestry and Other Land Use
Category: Aggregate Sources and Non-CO2 Emissions Sources on Land
Subcategory: 3.C.5 - Indirect N2O Emissions from managed soils
Sheet: N2O from N leaching/runoff from Managed Soils

2020

Data

Region Region II

Equation 11.10												
Land use category	Land use subdivision	Annual amount of synthetic fertilizer N applied to soils (kg N / yr)	Amount of animal manure, compost, sewage sludge and other organic N additions applied to soils (kg N / yr)	Amount of urine and dung N deposited by grazing animals (kg N / yr)	Amount of N from crop residues (above- and below-ground), including N-fixing crops, and from forage/pasture renewal, returned to soils (kn N / yr)	Amount of N mineralised in mineral soils associated with loss of soil C from SOM as a result of changes to land use or management (kn N / yr)	Amount of N mineralised in organic soils associated with loss of soil C from soil organic matter as a result of changes to land use or management (kn N / yr)	Fraction of all N added to/mineralised in managed soils 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-N/(kg N leaching/runoff)]	Amount of N2O-N produced from leaching and runoff of N additions to managed soils (kg N2O-N/yr)	N2O Emissions (kg N2O/yr)	
		Fsn	Fon	Fprp	Fcr	Fsom	N from Fos	FracLEACH-(H)	EF5	N2O-N	N2O	
Forest Land	Restoration AB (AC 10)					5052.88333	0	0.3	0.0075	11.36899	17.86555	
Total		0	0	0	0	5052.88333	0			11.36899	17.86555	

CH₄ emissions from rewetted/created wetlands in inland mineral soils

Land Use Manager

Land use structure

- Forest Land
- Cropland
 - Cropland Annual Crops
 - lotus flower
 - rotation A
 - soybean intensive
 - Cropland Perennial Cro
- Grassland
- Wetlands
- Settlements
- Other Land

Land use subdivision - common parameters

Land use subdivision name: lotus flower

Soil Type: High Activity Clay Mineral

Soil Status: Rewetted

Country/Territory: Brazil

Continent: Latin America and Caribbean

Climate Region: Tropical Moist

It is not possible to change some of the parameters since subdivision is already being used in Land Representation Manager

Land use subdivision - Annual Crops specific parameters

Rice ecosystem:

Herbaceous biomass (t C / ha): 5.000

C factor (t C / t d.m.): 1.000

Ratio of below-ground biomass to above-ground biomass (R) (t root C / t shoot C): 0.300

Reference soil organic carbon stock (SOCref) (t C / ha): 65.000

Relative C stock change factors

Land use (FLU): 1.100

Tillage (FMG): 1.220

Input (FI): 1.440

Add Copy Delete Save Undo Close

CH₄ emissions from rewetted/created wetlands in inland mineral soils

Worksheet: CH₄ Emissions from Rewetted and Created Wetlands on Inland Wetland Mineral Soils

Sector: Agriculture, Forestry and Other Land Use 2020

Category: Aggregate Sources and Non-CO₂ Emissions Sources on Land

Subcategory: 3.C.13 - CH₄ Emissions from Rewetted and Created Wetlands on Inland Wetland Mineral Soils

Sheet: CH₄ Emissions from Rewetted and Created Wetlands on Inland Wetland Mineral Soils

Data Region: (All)

Equation 5.1 WS						
Land unit code	Initial land use	Land use during reporting year	Land area of rewetted inland mineral soil (ha)	Emission factor for CH ₄ emissions from rewetted and created Wetlands on inland Wetland mineral soils (kg CH ₄ / ha / yr) WS Table 5.4	CH ₄ Emissions (Gg CH ₄ / yr)	
			Arewetted	EF	CH ₄ = (Arewetted * EF) * 10 ⁻⁶	
ACL-LF-23	Cropland A. lotus flower	Cropland A. lotus flower	500	900	0.45	
Total					0.45	

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



Thank you

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

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INTERGOVERNMENTAL PANEL ON climate change

