Task Force on National Greenhouse Gas Inventories

incc INTERGOVERNMENTAL PANEL ON CLIMATE CHARGE



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LAND REPRESENTATION **USERS' GUIDEBOOK**

IPCC Inventory Software, version 2.91

Compiled by:

Technical Support Unit IPCC Task Force on National Greenhouse Gas Inventories

This Guidebook is prepared by IPCC TFI TSU It has not been a subject to the formal IPCC review process Please use it and submit your feedback to ipcc-software@iges.or.jp

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Introduction

Data Input in the IPCC Inventory Software -hereafter *Software*- to estimate GHG emissions and removals from Land (3.B) categories in a National Greenhouse Gas Inventory (NGHGI)¹ follows these steps:

- Step 1. Enter in the Land Use Manager all land-use subdivisions
- Step 2. Enter in the Land Representation Manager all Regions that compose the territory to which the GHG inventory applies
- **Step 3.** For each Region, enter a land representation² i.e. a **consistent and independent time-series of activity data³** in the <u>Land Representation Manager</u>
- **Step 4.** For each **C** pool, enter **C** stock gains and losses or **C** stocks at different points in time (depending on methods selected) in the relevant calculation worksheets of 3.B land use categories).

In this **Guide** to Land Representation, guidance to implement Steps 1 to 3 is provided by the Technical Support Unit of the IPCC Task Force on National Greenhouse Gas Inventories (IPCC TFI TSU). Guidance on Step 4 are instead provided in the Guidebook for 3.B Land Categories.

Software users must be familiar with the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006 IPCC Guidelines) methods and read the Software manual (downloadable from the Help menu) before going through this guide. This guide does not replace guidance provided in the 2006 IPCC Guidelines.

Throughout this guide, text entered in lilac color represents category information taken from the 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands - (Wetlands Supplement)

Note the Software allows users to apply each of the three⁴ methodological approaches to Land Representation.

¹ Same guidance applies to the use of the *Software* for sub-national entities.

² In a national GHG Inventory, estimates of land-related GHG emissions and removals are based on the consistent representation of land -i.e. land representation- across the inventory time series. Thus, the **Land Representation** deals with: **A. Classification of land** [Land use categories/subcategories/subcategories/subdivisions] according to bio-physical *-climate, soil, vegetation-* and socio-economic *-use, management (e.g. age-class)*-variables, with the aim to delineate units of land more homogenous for C stocks levels and dynamics; **B. Identification and tracking** across the inventory time series **of units of land** [Area data to estimate C stock changes and other GHG emissions] *-i.e. land area with same current and historical classification*. Consistency of A. and B. across the inventory time series is key to ensure unbiasedness of estimates.

³ A consistent **land representation is a time series of annual area estimates of units of land**, as disaggregated according to variables of stratification, where: **A**. The land classification methodology is consistent across the entire time series *-no artifact land conversions caused by changes in the classification method/background-data-*; **B**. The total area of the territory is constant across the entire time series.

For Approaches 2 & 3: In each year Y, all units of land under conversion are reported within the *Land under conversion* relevant categories until the end of the transition period (D); In each year Y, all units of land that did not undergo a conversion in the last Y-D years are reported within the *Land remaining* relevant categories.

⁴ Approach 1: use/management of land is identified, and the area of land use/management categories is quantified; although, land use/management changes are neither identified nor quantified since data are not spatially-explicit.

Approach 2: use/management of land is identified, and the area of land use/management categories is quantified; land use/management changes are identified (data spatially explicit) and the area of changes (between 2 points in time) is quantified, although not tracked over time.

Approach 3: use/management of land is identified, and the area of land use/management categories is quantified; land use/management changes are identified (data spatially explicit) and the area of changes (between 2 points in time) is quantified and tracked over time; so that Approach 3 identifies subsequent changes in areas under conversion, while Approach 2 does not.

Land Use Manager (LUM)

Land Use Manager is a tabbed dialog window.

Users can open it from Administrate main menu, AFOLU sub-menu

IPCC Inventory Software - sandro - [Worksheets]				
💀 Application Database Inventory Year Worksheets	Reports	Tools Export/Import	Administrate Window Help	
2006 IPCC Categories	→ ₽	SOM Mineral (SD) SOM	Users	
	^	Biomass increase (G&L 1/4	Country/Territory	G&L 3/4) Biomass loss (G&L 4/4) Biomass cha
2 - Industrial Processes and Product Use		Worksheet	CO2 Equivalents	
B 3 - Agriculture, Forestry, and Other Land Use		Sector: Agricult	Delete Inventory	
		Category: Forest	-	
E 3.B - Land		Subcategory: 3.B.1.a	Energy	
□ 3.B.1 - Forest land		Sheet: Annual	AFOLU >	Land Use Manager etho
3.B. I.a - Forest land Remaining Forest land		Data	Waste +	Land Representation Manager
- 3.B.1.b.i - Cropland converted to Forest Land		Region GFOI exampl	Guidelines Information Texts	Livestock Manager
- 3.B.1.b.ii - Grassland converted to Forest Land		Land	Use category	

or from the bottom of any worksheets of 3.B categories

SOM Mineral (SD) SOM Organic Biomass increase (G&L 1/4) Biom	Drained SOM Org nass loss (G&L 2/4)	anic Rewetted Biomass loss (G&L 3/4)	Biomass loss (G&L 4/4)	Biomass change (SD)	Biomass change (Abrupt)	DOM (G&L 1/1)	DOM (S	SD 1/1)	SOM	mineral - Forr	mulation A - IPCC Eq 2	25 (Information Item)	SOM Mineral (Appr	caches 2 and 3)
Land Use Manager							- 1	- ×	$\langle \rangle$					1990
Land use shuckne									ii n e y	o of below id biomasso ve-ground biomass d m. (1 sg d m.)	Average annual biomass growth ground (tones c	Equal Carbon fraction of dry matter (tonnes C / tonne d.m.)	on 2.9 Annual increase in biomass carbon stocks due to biomass growth (tonnes C / yr)	
Managed Other Land			No	Item Select	ed				2 4 21 11	(0) or Table / 4.5 WS / nal statistics nternational ta sources	Gtotal = Gw * (1+R)	0.47 / Table 4.3 / 0.451 WS mangroves		
										R	Gtotal	CF	∆CG	
											0		0	
										Land U	lse Manager	and Representation M	anager Un	certainties

On the left-hand side, the Land Use Manager shows the 6 IPCC land use categories

- ➢ Forest land
- ► <u>Cropland</u>
- ▶ <u>Grassland</u>
- ▶ <u>Wetlands</u>
- > <u>Settlements</u>
- ➢ Other land

and 12 subcategories (2 for each Land use category)

Land Use Manager
Land use structure 🛛 👻 👎
Forest Land
Managed Forest Land
Unmanaged Forest Land
🚊 Cropland
Cropland Annual Crops
Cropland Perennial Crops
Grassland
Managed Grassland
Unmanaged Grassland
🖶 Wetlands
Managed Wetlands
Unmanaged Wetlands
Settlements
Settlements (Treed)
Settlements (Other)
⊡ Other Land
Managed Other Land
Unmanaged Other Land

While *Forest land*, *Grassland*, *Wetlands* and *Other land* categories are disaggregated in subcategories depending on whether those are managed⁵ or unmanaged lands, *Cropland* and *Settlements* are disaggregated depending on the presence of perennial⁶ biomass stocks.

To add a land subdivision, select the relevant subcategory and click button Add at the bottom of the window.



Doing so a window mask opens where to enter those data in the relevant fields that the *Software* requires, at minimum, to estimate C stock changes in relevant C pools at selected Tier level. As for instance:

nd una aubdivision name	0	untry/Territory	Wodd
		Castinger	Wadd
il Type		Continent	wond
il Status	No change in hydrology	Climate Region	+
nd use subdivision - Managed Fo	rest Land specific parameters		
Ecological zone	V 🔇 Species Vatural Forest @ Plantation () Abano)	doned managed land
		Land mass	Unspecified V
	Age class (yr)	~ 😣	
	Above-ground biomass	stock (t d.m. / ha)	0.000 ~
	Above-ground net biomass growth (G) (t. d.m. / ha / yr)	0.000 🗸
	Ratio of below-ground biomass to above-ground biomass (R) (t root	d.m./t shoot d.m.)	0.000 ~
	Biomass carbon fr	action (t C / t d.m.)	0.470 ~
	Growing stock level (V) (m3 / ha)	~ 😣	
	Mean annual increment of growing stock	: (lv) (m3 / ha / yr)	
	Biomass conversion and expansion factor for increment (BCEFi) (t d.m. / m3 wood volume)	Specified ~	~
	Biomass conversion and expansion factor for standing stock (BCEFs) (t d.m. / m3 wood volume)	Specified ~	
Bior	nass conversion and expansion factor for wood and fuelwood removal (BCEFr) it d.m. / m3 wood volume)	Specified V	0.000 ~
	Baein wood density (D) it d m	(m3 freeb volume)	
	Biomass expansion factor for conversion of annual pet increment to above ground biomass	increment (BEE1)	
	Biomase expansion factor for conversion of merchantable volume to above ground	ad biomase (BEE2)	
		t maturity & C / ha)	
		e maturity (t e 7 Hd)	

Note: most of the parameters may otherwise be entered in the relevant calculation worksheets with the exception of those marked with a white X in red field ³. Where information is not entered in those parameters marked, the software gives an error message when users attempt to save the subdivision.



⁵ Managed land is land where human interventions and practices have been applied to perform production, ecological or social functions, while unmanaged land is a land not qualified as managed. GHG emissions and removals from unmanaged land are excluded from the NGHGI. ⁶ IPCC methodological approaches to estimate C stock changes from perennial biomass significantly differ from that applied to annual biomass.

The **Land use subdivision** mask is composed of 2 parts:

✓ the Top, which contains parameters common to any subcategory [with labels in **bold**]:

Land use subdivision - common paran	ieters				
Land use subdivision name	I	8	Country/Territory	World	
Soil Type		+ ~ 🔇	Continent	World	
Soil Status	No change in hydrology	~	Climate Region	+ ~	3

✓ the **Bottom**, which contains subcategory specific information:

Land use subdivision - Managed Forest Ecological zone User-defined Mediterranean	and specific parameters Specific parameters Specific parameters	ies Pinus	Natural Forest O Plantation ()	Abandoned managed	land 🗌	
Land use structure				Ane class (w) <20 V	Land mass	Unspecified
Copy of Plantation				Above-ground biomass	stock (t.d.m. / ha)	212.000 ~
Plantation			Abov	- ve-ground biomass growth (G) (t.d.m. /ha /yr)	7.738 🗸
Cropland		Ratio of	below-ground biomass to above	e-ground biomass (R) (t root	d.m./t shoot d.m.)	0.220 🗸
B Wetlands				Biomass carbon fro	action (t C / t d.m.)	0.470 🗸
Settlements Other Land			Growing stock leve	el (V) (m 3 / ha) >80	~	400
			Average net annual	l increment of growing stock	(lv) (m3 / ha / yr)	14.600
		Biomass conversion and expansion	sion factor for increment (BCEFi)	(t d.m. / m3 wood volume)	Specified ~	0.530 🗸
		Biomass conversion and expansion fa	actor for standing stock (BCEFs)	(t d.m. / m3 wood volume)	Specified \sim	0.530 🗸
	Bioma	ss conversion and expansion factor for wood	and fuelwood removal (BCEFr)	(t d.m. / m3 wood volume)	Specified \sim	0.610 🗸
			Bas	sic wood density (D) (t d.m.)	/m3fresh volume)	0.530
		Biomass expansion factor for c	onversion of annual net increme	nt to above-ground biomass	increment (BEF1)	
		Biomass expansion f	actor for conversion of merchant	table volume to above-groun	nd biomass (BEF2)	
			Reference	e soil organic carbon stock	(SOCref) (t C / ha)	45.200 🗸
		Relative 0	stock change factors			
		Land	use (FLU) 1.000	Management (FM	G) 0.75	0 Input (FI) 1.000
Add Copy Delete					s	ave Undo Close

Labels in blue ink are applied to information relevant for the implementation of IPCC Tier 2 methods, Note: <u>BCEFr</u> and <u>Growing stock level</u> in <u>Managed Forest land</u>, although in blue inkz, are needed to estimate biomass C stock losses with Tier 1 Gain&Loss method.

Where the subdivision to add is a variation of a subdivision already entered (e.g. a different age class) a speedy way, which also minimizes potential errors, is to make a copy of the selected subdivision and then change the information according to the new subdivision that is to be entered. This is done by clicking the *Copy* button at the bottom of the *Land use structure* window, as shown below:

anu use manager				- L
Land use subdivision - common par	ameters			
Land use subdivision name	Copy of Plantation		Country/Territory	Italy
Soil Type	High Activity Clay Mineral	+ ~	Continent	Europe
Soil Status	Natural	\sim	Climate Region	Warm Temperate Dry +
Land use subdivision - Managed Fo Ecological zone User-defi Medterran	rest Land specific parameters red v Species Pinus v Natural Forest O Pantation @	Abandone	d managed land	
and use structure			l and mass	Unspecified
Forest Land Managed Forest Land		Ann alaan (ar)		Chapterned
Copy of Plantation		Age class (yr)	520 y	
- Managed Natural Plantation		Above-grou	nd biomass stock (t d.m. / na)	212.000
Unmanaged Forest Land Cropland	800	ve-ground bioma	iss growin (d) (c d.m. / na / yr)	7.738
B- Grassland	Ratio of below-ground biomass to above	re-ground biomas	s (R) (t root d.m./t shoot d.m.)	0.220
- Wetlands - Settlements		Biomas	ss carbon fraction (t C / t d.m.)	0.4/0
Other Land	Growing stock leve	el (V) (m3 / ha)	>80	40
	Average net annua	al increment of gr	owing stock (lv) (m3 / ha / yr)	14.60
	Biomass conversion and expansion factor for increment (BCEFi)	i) (t.d.m. / m3 wo	od volume) Specified ~	0.530 ~
	Biomass conversion and expansion factor for standing stock (BCEFs)	ı) (t.d.m. ∕m3 wo	od volume) Specified ~	0.530 \
	Biomass conversion and expansion factor for wood and fuelwood removal (BCEFr)	r) (t.d.m. / m3 wo	od volume) Specified ~	0.610 🗸
	Ba	asic wood density	(D) (t d.m. / m3 fresh volume)	0.53
	Biomass expansion factor for conversion of annual net increme	ent to above-grou	and biomass increment (BEF1)	
	Biomass expansion factor for conversion of merchan	ntable volume to a	above-ground biomass (BEF2)	
	Reference	ce soil organic ca	arbon stock (SOCref) (t C / ha)	45.200
	Relative C stock change factors			
	Land use (FLU) 1.000	Mana	gement (FMG) 0.75	30 Input (FI) 1.00

Subdivisions are generally used to distinguish different types of vegetation, as well as different management systems and/or age classes; although those are a stratification that can be applied to any other users' need.

Note: You must press the button Save to record in the DataBase (DB) every info entered.

Tip: Once the subdivision is applied to one or more units of land in the Land Representation Manager, the following fields: *Soil type, Soil Status, Climate Region*, cannot be changed anymore.

Land use subdivision name	natural		Country/Territory	World	
Soil Type	High Activity Clay Mineral	+ ~	Continent	World	
Soil Status	No change in hydrology		Climate Region	Tropical Wet	+ ~

Where an error is identified in any of those fields, the Land subdivision (and its data) is to be deleted -to do so users can:

1. first create a copy of the subdivision (to minimize the time to be spent to re-enter data), to do select the subdivision and click on button **Copy** at the bottom of the window:

Forest Land		Constant Manageral assessments		Country (Torollow)	Mada			
Managed Forest Land	Land use subdivision name Copy of Managed secondary Country/ removy Soil Type High Activity Clay Mineral + Continent				Wedd			
Managed secondary					International Contraction			
Unmanaged Forest Land Cropland Grassland Unmanaged Forest Land	Soil Status	No change in hydrology	0	Climate Hegion	Vien respense bry			
Settlements	Land use subdivision - Managed Fo	rest Land specific parameters						
ar Other Land	Ecological zone Subtropic	al dry forest Species Ut lau	ver-defined 🖂	Natural Forest Plantation	Abandoned managed land			
				Land mass	Unspecified			
			Age class (r) Unspecified				
			Above-g	round biomass stock & d.m. / ha)	336 840			
			Above-ground net bio	mass growth (G) (t d.m. / ha / yr)	3.064			
	Ratio of below ground biomass to above ground biomass (R) (t not d m / t shoot d m.) 0.330							
			Bo	mass carbon fraction & C / t d.m.)	0.470 -			
	Growing stock level (V) (n3 / ha) >80							
	Mean annual increment of growing stock. (iv) (m3 / ha / yr) 4500							
		0.840						
		Romass conversion and expansion factor for sta	nding stock (BCEFs) # d.m. / m3	wood volume) Specified ~	0.840			
	Biomass conv	ersion and expansion factor for wood and fuelw	ood removal (BCEFr) # d.m. / m3	wood volume) Specified 🗢	0.950			
	Basic wood densty (D) 8 d m. / m3 fresh volume)							
	Biomass expansion factor for conversion of annual net increment to above ground biomass increment (BEF1)							
		Biomass expansion factor for co	nversion of merchantable volume	to above-ground biomass (BEF2)				
				Litter C stock at maturity (t C / ha)	2			
			Reference soll organic	carbon stock (SOCref) # C / ha)	0.000			
		Relative C stock cha	nge factors					
		Landson (ELD)	1.000 84	in anomatic (EMG) 1.0	00 Input (EI) 1.000			

2. then Delete the original subdivision, to do select the subdivision and click on button **Delete** at the bottom of the window:

Land Use Manager					- 0 X
Land use structure 🗸 🗸	Land use subdivision - common parar	neters			
Forest Land Managed Except Land	Land use subdivision name	Managed secondary		Country/Territory	World
Copy of Managed secondary	Soil Type	High Activity Clay Mineral	• ~	Continent	World
- Managed secondary	Soil Status	No change in hydrology	~	Climate Region	Warm Temperate Dry + V
 B - Cropland B - Grassland B - Wetlands 					
Settlements Other Land	Land use subdivision - Managed Fore	st Land specific parameters			
	Ecological zone Subtropical	dry forest 🗸 Species	User-defined laurisilva	Natural Forest Plantation	Abandoned managed land
				Land mass	Unspecified
			Age cl	ass (yr) Unspecified 🗸	
			Ab	ove-ground biomass stock (t d.m. / ha)	336.840 🗸
			Above-ground r	net biomass growth (G) \$ d.m. / ha / yr)	3.864 🗸
		Ratio of below-	ground biomass to above-groun	d biomass (R) (t root d.m./t shoot d.m.)	0.330 🗸
				Biomass carbon fraction (t C / t d.m.)	0.470 🗸
			Growing stock level (V) (m	3 / ha) >80 🗸	401.000
			Mean annual increm	nent of growing stock (Iv) (m3 / ha / yr)	4.600
		Biomass conversion and expansion fac	tor for increment (BCER) # d.m.	/m3 wood volume) Specified ~	0.840 🗸
	Bio	mass conversion and expansion factor for	standing stock (BCEFs) & d.m.	/m3 wood volume) Specified ~	0.840 🗸
	Biomass conver	sion and expansion factor for wood and fu	elwood removal (BCEFr) & d.m.	/m3 wood volume) Specified ~	0.950 🗸
			Basic woo	d density (D) (t d.m. / m3 fresh volume)	
		Biomass expansion factor for conversion	on of annual net increment to at	oove-ground biomass increment (BEF1)	
		Biomass expansion factor for	conversion of merchantable vo	nume to above-ground biomass (BEF2)	
				Litter C stock at maturity & C / haj	
			Reference soil o	rganic carbon stock (SOCref) & C / ha)	0.000 🗸
		Relative C stock	change factors		
		Land use (FI	LU) 1.000	Management (FMG) 1.0	00 Input (FI) 1.000
Add Copy Delete					Save Undo Close

Note that all units of land that had this original subdivision are also deleted from the Land representation Manager and thus need to be re-entered with the new subdivision.

3. then information to be changed is to be re-entered:

Land Use Manager					_		×
Land use structure 🚽 🦊	Land use subdivision - common pa	rameters					
Forest Land Managed Forest Land	Land use subdivision name	Copy of Managed secondary		Country/Territory	World]
Copy of Managed secondary	Soil Type	Low Activity Clay Mineral	+ ~	Continent	World		j
Managed secondary	Soil Status	No change in hydrology	~	Climate Region	Warm Temperate Dry	+ ~	
B Cropland B Grassland Wetlands							
Settlements Other Land	Land use subdivision - Managed F	prest Land specific parameters					
	Ecological zone Subtropic	al dry forest V Species	User-defined laurisilva	✓ Natural Forest ● Plantation ○	Abandoned managed lar	nd 🗌	
				Land mass	Unspecified	~	
			Age class	(yr) Unspecified 🗸			
			Above	e-ground biomass stock (t d.m. / ha)	336	5.840 🗸	
			Above-ground net b	biomass growth (G) (t d.m. / ha / yr)		8.864 🗸	
		Ratio of below-	ground biomass to above-ground bio	omass (R) (t root d.m./t shoot d.m.)	0	0.330 🗸	
			В	iomass carbon fraction (t C / t d.m.)	0	0.470 🗸	
			Growing stock level (V) (m3 / I	ha) >80 🗸		401.000	
			Mean annual increment	t of growing stock (Iv) (m3 / ha / yr)		4.600	
		Biomass conversion and expansion fac	tor for increment (BCEFi) (t d.m. / m	3 wood volume) Specified ~	0	0.840 ~	
		Biomass conversion and expansion factor for	standing stock (BCEFs) (t d.m. / m	3 wood volume) Specified ~	0	0.840 ~	
	Biomass conv	rension and expansion factor for wood and fu	elwood removal (BCEFr) (t d.m. / m	3 wood volume) Specified ~	0	0.950 🗸	
		Discussion for the formula	Basic wood de	ensity (D) (t d.m. / m3 fresh volume)			
		Biomass expansion factor for conversion	on or annual net increment to above	e-ground biomass increment (BEF1)			
		biomass expansion ractor to	Conversion of merchanicable volum	Litter C stock at maturity & C / ha)			
				Diter e stook at mataniy (i e / na)			
			Reference soil organ	nic carbon stock (SOCref) (t C / ha)	0	.000 ~	
		Relative C stock	change factors	M	10 Invest (ED)	1.000	
		Land use (F	1.000	management (r ma)	npdk (FI)	1.000	
Add Copy Delete				5	Save Undo	Close	e

4. the subdivision name can be modified as needed (in this case the old subdivision name is used again)

Land Use Manager					— 🗆						
Land use structure 🚽 🗸	Land use subdivision - common pa	rameters									
Forest Land Managed Forest Land	Land use subdivision name	Managed secondary		Country/Territory	World						
Managed secondary	Soil Type	Low Activity Clay Mineral	* ~	Continent	World						
Unmanaged Forest Land	Soil Status	No change in hydrology	~	Climate Region	Warm Temperate Dry + ~						
 Grassland Wetlands Settlements 											
Other Land	Land use subdivision - Managed F	prest Land specific parameters									
	Ecological zone Subtropio	al dry forest 🗸 Species	User-defined V	Natural Forest	Abandoned managed land						
			laurisilva	Plantation ()							
				Land mass	Unspecified ~						
			Age class (y	r) Unspecified 🗸							
			Above-g	round biomass stock (t d.m. / ha)	336.840 ~						
			Above-ground net bio	omass growth (G) (t.d.m. / ha / yr)	3.864 ~						
		Ratio of below-g	round biomass to above-ground bion	nass (R) (t root d.m./t shoot d.m.)	0.330 ~						
		Biomass carbon fraction (t C / t d.m.)									
			Growing stock level (V) (m3 / ha	a) >80 🗸	401.000						
			Mean annual increment o	f growing stock (lv) (m3 / ha / yr)	4.600						
		Biomass conversion and expansion fact	or for increment (BCEFi) (t.d.m. / m3)	wood volume) Specified ~	0.840 ~						
		Biomass conversion and expansion factor for	standing stock (BCEFs) (t d.m. / m3	wood volume) Specified ~	0.840 ~						
	Biomass conv	rension and expansion factor for wood and fu	elwood removal (BCEEr) ft d m. / m3	wood volume) Specified ~	0.950 -						
			Basic wood dan	eitu (D) it d.m. (m3 fraeh voluma)							
		Biomass expansion factor for conversio	in of annual net increment to above-	around biomass increment (BEF1)							
		Biomass expansion factor for	conversion of merchantable volume	to above-ground biomass (BEF2)							
				Litter C stock at maturity (t C / ha)							
				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							
			Reference soil organic	c carbon stock (SOCref) (t C / ha)	0.000 ~						
		Relative C stock of	change factors		00 1 1 (51) 1 000						
		Land use (FL	.0) 1.000 Ma	anagement (HMG) 1.0	00 input (FI) 1.000						
Add Copy Delete				1	Save Undo Clos						

Land use subdivision mask, top section

Land use subdivision - common para	ameters		
Land use subdivision name	Organic	Country/Territory	Country X
Soil Type	Inland Organic soil + V	Continent	Europe
Soil Status	Natural	Climate Region	Cool Temperate Moist + ~
Nutrient content	Poor		
It is not possible to change some of	the parameters since subdivision is already being used in Land Representation Mar	nager	

The top section contains up to 7 fields. 5 fields are present in each and every subdivision -<u>Land use subdivision</u> name, <u>Soil Type</u>, **Country/Territory**, **Continent**, <u>Climate Region</u>- while other 2 are provided for some of the subdivisions -<u>Soil Status</u>, **Nutrient content**.

Land use subdivision name

This is a field where unique information is to be entered -i.e. 2 subdivisions cannot have the same alphanumerical combination in the name-. Given that in the land representation manager subdivisions are listed by the name, it is suggested to provide in the name information that can easily recall the characteristics specific of that subdivision.

Soil Type

The *Software* provides in a dropdown menu the complete list of IPCC soil types listed in Chapter 2 of the AFOLU Volume, plus Coastal Wetlands soil (Chapter 4, *Wetlands Supplement*).

FullName	Composition	Remark
High Activity Clay Mineral	Mineral	Sola with high activity day (HAC) mimetia are lightly in noderately wastered pails, which are dominand by 21 illusted day minerate (in the Vatility Reference Base for Sol Resources (VRB) classification these include Leptosola. Vertisals. Kastanczeres, Ohernozena. Resources (VRB) classification interestion. Emitted Schwarz, Sc
Low Activity Clay Mineral	Mineral	Soils with low activity clay (LAC) minerals are highly weathered soils, dominated by 1:1 clay minerals and anorphous iron and aluminium oxides (in VRB classification includes Acrisols, Lixisols, Nitisols, Evralsols, Durisols; in USDA classification includes Ultisols, Oxisols, acidic Affisols).
Volcanic Mineral	Mineral	Soils derived from volcanic seh with allophanic mineralogy (in INRB classification Andosols, in USDA classification Andisols)
Spodic Mineral	Mineral	Soils exhibiting strong podzolization (in VRB classification includes Podzols; in USDA classification Spodosols)
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).
Inland Wetland Mineral	Mineral	Soils with restricted drainage leading to periodic flooding and anaerobic conditions (in IVIRB classification Gleysols; in USDA classification Aquic suborders).
Inland Organic	Organic	Soils classified as histosofis. See glossary of IPCC GPG 2003 for additional details.
Constal Islation de		

Namely:

	Mineral	soils:
--	---------	--------

- ✓ High Activity Clay (HAC)
- ✓ Low Activity Clay (LAC)
- ✓ Volcanic
- ✓ Spodic
- ✓ Sandy
- ✓ Inland Wetland mineral
- > Organic soils:
 - ✓ Inland Organic
- ➤ Mixed soils:
 - ✓ Coastal Wetlands

In addition, by clicking on the symbol $\stackrel{[]}{=}$ users open a dialog tab where user-specific soil types of either *Mineral* or *Organic* composition⁷ can be entered:



Where a **Subdivision** has a *user-specific* soil type, the *Software* does not provide IPCC default values in the dropdown menu of the *SOCref* parameter.8

⁷ Users cannot have user-specific mixed soils.

Soil Status

The Software provides in a dropdown menu 4 options:

- ▶ No change in hydrology -this is the default option applied by the Software-,
- > Drained -it applies to organic and mixed soils as well as to inland wetland mineral soils-,
- Rewetted -it applies to organic and mixed soils as well as to inland wetland mineral soils previously drained-,
- Extracted⁸ -it applies to soils that have been removed to build infrastructures -e.g. port, harbor and marina construction, aquaculture ponds, salt production ponds. An extracted soil has 0 SOC-.

Extraction implies that all C stocks are removed in the year in which excavation occurs. Thus, to estimate C stock losses associated with extraction users will:

- 1. **first** generate a dedicated land use subdivision -e.g. shrimp pond in *Coastal Wetlands* in the Land Use Manager with C stocks set to zero in each C pool,
- 2. **second** report the conversion of the unit of land -e.g. from mangrove to shrimp pond⁹- in the *Land representation table* of the Land Representation Manager, and assign the Stock-Difference method to each C pool,
- 3. calculate C stock losses in Biomass (G&L -Abrupt), in DOM (SD Approaches 2&3) and in SOM (SD Approaches 2&3).

Note: Given *Extraction* determines total loss of C stocks:

- A. the C stock at time t2 in each of the C pools is to be set to 0
- B. the C stock loss shall be counted in the year of conversion only, even if the unit of land may be reported by the software in the calculation worksheets in the following years¹⁰

Recall: Given *Extraction* is a conversion of a land to a new use and/or management it **SHALL NOT** be applied to **Approach 1 Land representation**.

⁸ This status does not apply to peat extraction activities. A soil subject to peat extraction activities has a soil status *Drained*; while a soil that has been subject to peat extraction activities and it is currently abandoned has soil status either *Drained*, if the drainage system is still working, or *Revetted* if it is not anymore working or it has been purposely reverted.

Although it has been introduced by the *Wetlands Supplement* for *Coastal Wetlands*, it is applicable in the *Software* to all soil types to report the complete excavation of SOM from the land (first 30 cm of depth of soils as per IPCC default). The *Software* thus applies the Stock Difference approach to calculate the SOC change by setting to zero (0) the value of SOC at time 2, SOC_{t2}.

⁹ Either as a Settlement (Other) or as a Wetlands Managed (Other Wetlands – Coastal wetlands user-specific shrimp pond)

¹⁰ Units of land with soil status Extracted not undergoing a conversion are reported by the Software in the relevant calculation worksheets. Although, given that an *Extracted* unit of land has 0 C stocks, no further C stock changes shall be estimated, unless a new conversion occur to a land use category with significant C stocks.

Soil status options do not apply evenly to all soil types under all land use sub-categories. Tables 1 to 5 show occurrence of soil types and possible soil statuses of those as available in the Land Use Manager.

Table 1 shows Soil status options available for different Soil Types

Table 2 shows the occurrence of soils of *Organic* composition -with the exception of *Coastal Wetlands* soil- in each land use sub-category as well as which soil statuses those *Soil Types* can have under each land-use subcategory

Table 3 shows the occurrence of soils of *Mineral* composition -with the exception of *Inland Wetland* and *Coastal Wetlands* soil- in each land use sub-category as well as which soil statuses those *Soil Types* can have under each land-use subcategory

Table 4 shows the occurrence of *Inland Wetland* soil in each land use sub-category as well as which soil statuses *Inland Wetland* soils can have under each land-use subcategory:

Table 5 shows the occurrence of *Coastal Wetlands* soils in each land use sub-category as well as which soil statuses *Coastal Wetlands* soils can have under each land-use subcategory:

		Soil composition													
Soil				Mineral ¹¹				Orga	Mixed						
Status		Soil type													
	High Activity Clay	Low Activity Clay	Volcanic	Spodic	Sandy	Inland Wetland	any user- specific	Inland	any user- specific	Coastal Wetlands					
No change in hydrology	NR	NR	NR	NR	NR	Y	NR	Y	Y	Y					
Drained	NA	NA	NA	NA	NA	Х	NA	Y	Y	Y					
Rewetted	NA	NA	NA	NA	NA	Х	NA	Y	Y	Y					
Extracted	1	1	1	1	1	1	1	1	1	Y					

Table 1	Soil Status options of different soil types
1 4010 1	con china options of anterent con types

NR - Although the option is available, it is Not Relevant for all soils of mineral composition, with the exception of Inland Wetland mineral soil.

Y - The option is Applicable.

 ${\bf NA}$ - The option is Not Applicable.

1 - Any soil type can have *Extracted* status which simply means that the entire volume of SOM has been removed; associated SOC total loss is estimated in the relevant calculation worksheet SOM (SD – Approaches 2&3), given the *Software* always applies the Stock-Difference method.

¹¹ All soils with *Mineral* composition have no *soil status* by default, or *Extracted* if selected from dropdown menu

¹² All soils with Organic or Mixed composition have soil status by default Drained, or Extracted if selected from dropdown menu.

		Land use category												
	Fores	t land	Crop	land	Gras	ssland		We	tlands		Settlements		Other land	
	Managed	Unmanaged	Amnal	Perennial	Managed	Unmanaged	Peatlands extraction	Flooded	Managed	Unmanaged	Lreed	Other	Managed	Unmanaged
Occurrence	Υ	Y	Y	Y	Y	Y	Y	Υ	Y	Y	Y	Y	YA	NO
						Soil	Status							
No change in hydrology	Y	Y	NA	NA	Y	Y	NA	Y	Y	Y	NA	NA	NA	
Drained	Y	NA	Y	Y	Y	NA	Y	NA	NA	NA	Y	Y	Y	NO
Rewetted	Y	NA	NA	NA	NA	NA	Y	NA	Y	NA	NA	NA	NA	
Extracted	NA	NA	NA	NA	NA	NA	NA	NA	Y	NA	NA	Y	Y	

Table 2 Occurrence and Soil Status options for Organic soils¹³

A limited to units of land in conversion

Y - Soil type occurring, and Soil status option is Applicable;

NA - Soil type occurring but Soil status option is NOT Applicable

NO - Soil type NOT occurring so NO Soil status

		Land use category												
	Fores	t land	Crop	land	Gra	ssland		W	etlands		Settlements		Other land	
	Managed	Unmanaged	Annal	Perennial	Managed	Unmanaged	Peatlands extraction	Flooded	Managed	Unmanaged	Treed	Other	Managed	Unmanaged
Occurrence	Y	Y	Y	Y	Y	Y	NO	Y	NO	NO	Y	Y	Y	NO
						Soil	Status							
No change in hydrology ^B	NR	NR	NR	NR	NR	NR		NA			NR	NR	NR	
Drained	NA	NA	NA	NA	NA	NA	NO	NA	NO	NO	NA	NA	NA	NO
Rewetted	NA	NA	NA	NA	NA	NA	1.0	NA	1.0	110	NA	NA	NA	
Extracted	NA	NA	NA	NA	NA	NA		Y			NA	Y	Y	

 Table 3 Occurrence and Soil Status options for Mineral soils¹⁴

^B With the exception of *Inland Wetland* soil type, this option is not informative for mineral soils although it is retained by the *Software* as a default option.

NR - Although the option is available, it is Not Relevant for all soils of mineral composition, with the exception of Inland Wetland mineral soil.

Y - Soil type occurring, and Soil status option is Applicable;

NA - Soil type occurring but Soil status option is NOT Applicable

NO - Soil type NOT occurring, so NO Soil status

¹³ excluding *Coastal Wetlands* soils

¹⁴ excluding Inland Wetland & Coastal Wetlands

		Land use category												
	Fores	t land	Crop	land	Gras	ssland		We	etlands		Settlements		Other land	
	Managed	Unmanaged	Amnal	Perennial	Managed	Unmanaged	Peatlands extraction	Flooded	Managed	Unmanaged	Treed	Other	Managed	Unmanaged
Occurrence	Y	Y	Y	Υ	Y	Y	NO	Υ	Y	Y	Y	Y	Y	NO
						Soil	Status							
No change in hydrology ^c	Y	Y	NA	NA	Y	Y		NA	Y	Y	NA	NA	NA	
Drained	Y	Y	Y	Y	Y	NA	NO	NA	NA	NA	Y	Y	Y	NO
Rewetted	Y	Y	Y	NA	NA	NA		NA	Y	NA	NA	NA	NA	
Extracted	NA	NA	NA	NA	NA	NA		Y	Y	NA	NA	Y	Y	

Table 4 Occurrence and Soil Status options for Inland Wetland soil

Y - Soil type occurring, and Soil status option is Applicable;

NA - Soil type occurring but Soil status option is NOT Applicable

NO - Soil type NOT occurring, so NO Soil status

		Land use category												
	Fores	t land	Crop	land	Gra	Grassland Wetlands						ements	Othe	er land
	Managed	Unmanaged	Annal	Perennial	Managed	Unmanaged	Peatlands extraction	Flooded	Managed c	Unmanaged c	Treed	Other	Managed	Unmanaged
Occurrence	Y	Y	Y	Y	Y	NO	NO	NO	Y	Y	Y	Y	Y	NO
						Soil	Status							
No change in hydrology	Y	Y	NA	NA	NA				Y	Y	NA	NA	NA	
Drained	Y	NA	Y	Y	Y	NO	NO	NO	NA	NA	Y	Y	Y	NO
Rewetted	Y	NA	NA	NA	NA	NÜ	110	1.0	Y	NA	NA	NA	NA	
Extracted	NA	NA	NA	NA	NA				Y	NA	NA	Y	Y	1

Table 5 Occurrence and Soil Status for Coal	<i>stal Wetlands</i> soils
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^C Limited to Other Wetlands that are Coastal Wetlands.

Note: IPCC default values for GHG emissions/removals from *Coastal Wetlands* soils, provided for the aggregation of mineral and organic soils, are offered by the *Software* to *Coastal Wetlands* soils of mineral or organic composition.

According to the *soil status*, the *Software* populates units of land of the relevant subdivisions in the calculation worksheets of AFOLU categories for **Drainage** and **Rewetting** and **Extraction**, to calculate the relevant GHG as:

For CO₂:

- ➤ 3.B Land Use Categories:
 - ✓ SOM Organic Drained
 - ✓ SOM Organic Rewetted
 - ✓ SOM (SD Approaches 2&3) → Extraction

For N₂O:

➤ 3.C.4 Managed soils:

- ✓ Drainage of managed organic soils
- ✓ Rewetting of managed organic soils

For CH₄:

- > 3.C.8 Drained Organic Soils
- 3.C.9 Drainage Ditches
- > 3.C.10 Rewetting of Organic Soils
- > 3.C.11 Rewetting of Mangroves and Tidal marshes
- > 3.C.11 Rewetted and Created Wetlands in Inland Wetland Mineral Soils

For more information see Area Data Transfer to Calculation Worksheets.

Climate Region

The *Software* provides in a dropdown menu the list of IPCC Climate Regions listed in Table 4.1 (AFOLU Volume, 2006 IPCC Guidelines. A partial snapshot is shown below:

Domain	Region		
	Tropical Wet		
Tropical	Tropical Moist		
	Tropical Dry		
	Tropical Montane		
Subtropical (Mediterranean)	Warm Temperate Moist		
	Warm Temperate Dry		
Tanan	Cool Temperate Moist		
remperate	Cool Temperate Dry		
Descal	Boreal Moist		
Boreal	Boreal Dry		
Deles	Polar Moist		
Folar	Polar Dry		

The selection of the *Climate Region* determines the IPCC default values that the *Software* populates in the dropdown menus of the parameters.

By clicking on the symbol 💷 users open a dialog tab where user-specific climate regions can be entered:

Warm Temperate Dry	Mean Annual Temperature >10°C and ≤18°C. Mean Annual Precipitation lower than Potential Evano-Transpiration			
Informer Transformers Station				
viami rempérate Moist	Mean Annual Temperature >10°C and ≤18°C: Mean Annual Precipitation higher than Potential Evapo-Transpiration			
Cool Temperate Dry	Mean Annual Temperature >0°C and c10°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 Dry	Mean Annual Temperature c0°C: Each Month Mean Tempearature a10°C: Mean Annual Precipitation lower than Potential Evapo-Transpiration			
Boreal Moist	Mean Annual Temperature c0°C: Each Month Mean Tempearature ±10°C. Mean Annual Precipitation higher than Potential Evapo-Transpiration			
Polar Dry	Mean Annual Temperature s0°C: Each Month Mean Tempearature <10°C: Mean Annual Precipitation lower than Potential Evapo-Transpiration			
Polar Moist	Mean Annual Temperature c0°C: Each Month Mean Tempearature <10°C: Mean Annual Precipitation higher than Potential Evapo-Transpiration			
Western Mediterranean				
	Cool Temperate Day Cool Temperate Moost Bioreal Day Bioreal Moist Polar Day Pedar Moist Western Meditemanani			

In subdivisions with a user-specific climate region the *Software* does not provide IPCC default values in the dropdown menu of relevant parameters.

Land use subdivision mask, bottom section

Hereafter the bottom section of the mask for each land use subcategory is shown with guidance for the data compilation. As a general rule, where applicable, the *Software* provides in a dropdown menu the IPCC default values applicable to the subdivision, while users can always enter their own user-specific values regardless the provision by the *Software* of the IPCC default value.

Parameters populating the mask are limited to those needed to estimate C stock change. Although, not necessarily all parameters needed to estimate C stock changes are populated in the mask, instead data on additional parameters are to be entered directly into the calculation worksheets; this also allow more flexibility to deal with rapidly changing parameters of units of land.

Parameters to estimate non-CO₂ emissions are generally entered directly in the calculation worksheets.

Finally, parameters in black ink are needed for Tier 1, although can be used at higher tiers too, while parameters in blue ink are needed for Tier 2, either in substitution of Tier 1 parameters or additionally to those.

Note that in <u>Managed Forest land</u>, the parameters <u>Growing stock level</u> and <u>BCEFr</u> although in blue ink applies to Tier 1 Gain&Loss method and therefore values shall be always entered.

Common parameter across Land use subcategories:

Given conversion of land use and/or management occurs between land subdivisions with same combination of *Soil Type* and *Climate Region*, and given that the **Reference soil organic carbon stock (SOCref)**, depends on the combination of *Soil Type* and *Climate Region*, **users shall enter in every subdivision of a determined combination** of *Soil Type* and *Climate Region* the same identical value of *SOCref*.

Value to be entered in the **<u>Reference soil organic carbon stock (SOCref)</u>** can be:

- ✓ either selected in the dropdown menu -i.e. IPCC default value- for the combination of mineral *Soil Type* and *Climate Region* selected
- \checkmark or entered in the relevant field.

Notes:

- ✓ In unmanaged land, SOC_{REF} is not further adjusted through stock-change factors since no management occurs/occurred.
- ✓ Given SOC_{REF} is soil-type-specific, the value selected/entered for a land-use type is automatically applied by the *Software* to all other land-use types with the same soil type.
- ✓ This parameter is not provided for subdivisions that have instead soils of Organic composition.

Further Note: Although a data entry for all parameters is not needed to allow the *Software* to compile the relevant Calculation worksheets in category **3.B**, those needed as minimum are presented by the *Software* already precompiled.

<u>Age Class</u> and <u>Growing stock level</u> parameters in <u>Managed Forest land</u> do <u>exception to this rule</u>. Indeed, those are presented blank by the *Software* although require a value, at Tier 1, to allow the *Software* to populate the relevant IPCC default values in the dropdown menu of other parameters; in particular, the selection of:

- ✓ the Age Class value determines the IPCC default values present in the dropdown menu of parameters <u>Aboveground</u> <u>biomass stock</u> and <u>Aboveground biomass growth</u> (see <u>Managed Forest land</u> for further information on Age Class).
- ✓ the <u>Growing stock level</u> value determines the IPCC default values present in the dropdown menu of parameters <u>Biomass expansion factor of annual net increment to above-ground biomass increment</u> and <u>Biomass conversion and expansion factor</u> <u>for standing stock</u> and <u>Biomass conversion and expansion factor for wood and fuelwood removal</u>. (see <u>Managed Forest land</u> for further information on Age Class)

Forest land

Land use subdivision - common par	ameters					
Land use subdivision name		8	Country/Terr	itory Wor	ld	
Soil Type	High Activity Clay Mineral	+ ~	Conti	nent Wor	ld	
Soil Status	No change in hydrology		Climate Re	gion		+ ~ 🔞
				_		
Land use subdivision - Managed Fo	prest Land specific parameters					
Ecological zone	V 🔇 Species	\sim	🛿 Natural Forest 🔘		Abandoned managed I	and
			Plantation ()			
			Land	mass Un	specified	
		Age class (yr)		~ 🔇		
		Above-grou	und biomass stock (t d.m.	/ ha)		0.000 ~
		Above-ground net biom	ass growth (G) (t d.m. / ha	a∕yr)		0.000 🗸
	Ratio of below-groun	d biomass to above-ground biomas	s (R) (t root d.m.∕t shoot	d.m.)		0.000 ~
		Bioma	ss carbon fraction (t C / t	d.m.)		0.470 🗸
		Growing stock level (V) (m3 / ha)		~ 😣		
		Mean annual increment of g	rowing stock (lv) (m3 / ha	n ∕yr)		
	Biomass conversion and expansion factor for	ncrement (BCEFi) (t.d.m. / m3 wo	od volume) Specified	~		~
в	Biomass conversion and expansion factor for stan	ding stock (BCEFs) (t. d.m. / m3 wo	od volume) Specified	~		~
Biomass conve	ersion and expansion factor for wood and fuelwo	nd removal (BCEEr) it d.m. /m3.wo	od volume) Specified	~		0.000 ~
		Projo wood dopait	(D) t d m (m2 freeb vo	luma)		
	Diamage and an inclusion of	basic wood densig	(D) (rum / monesh vo			
	biomass expansion factor for conversion of	annual net increment to above-gro	und biomass increment (i			
	Biomass expansion factor for com	version of merchantable volume to	above-ground biomass (t	SEF2)		
		Lit	er C stock at maturity (t C	/ha)		~
		Reference soil organic c	arbon stock (SOCref) (t C	/ ha)		0.000 ~
	Relative C stock chan	ge factors				
	Land use (FLU)	1.000 Mana	gement (FMG)	1.000	Input (FI)	1.000
				Save	Undo	Close
				Save	Ondo	0,030

Forest land subdivisions have 3 specific parameters to be entered:

Ecological zone, the dropdown menu presents the IPCC default zones, as shown in the 2006 IPCC Guidelines figure 4.1, relevant for the climate region selected. Users can enter a user-specific species by selecting User-defined, see below.



Species, the dropdown menu presents the list of species for which IPCC provides default values for parameters to be entered in the mask. Users can enter a user-specific species by selecting *User-defined*, see below.



This parameter does not necessarily require entering a tree species, it can more likely be used to enter forest types e.g. *Laurisilva*.

Land mass is active only for Asian countries since the 2006 IPCC Guidelines tables 4.7 and 4.9 provides different default values for Asia (Continental) vs Asia (Insular); thus, accordingly to the territory to be inventoried users shall select among *Insular* or *Continental* or *Unspecified*. The selection of *Insular* or *Continental* determines that the *Software* provides associated IPCC default values in the dropdown of parameters <u>Aboveground biomass stock</u> and <u>Aboveground biomass growth</u>. While selecting *Unspecified* both sets of IPCC default values are present in the dropdown menu of those parameters.

Unmanaged Forest land



Since C stock changes in unmanaged land are considered not anthropogenic, parameters to be entered in the bottom portion of the land use subdivision mask defines the biomass C stock that, in case of conversion to other land uses can be lost. In particular:

- Aboveground biomass stock, the dropdown menu provides IPCC default value, if available, although users can enter their own data. It applies to Tier 1 only. In case a value is entered in *Growing stock level* [i.e. entered in the field without the dropdown menu] then this parameter is greyed out, and data enter is not allowed; although the *Software* calculates the *Aboveground biomass stock* as the product of the *Growing stock level* by the *Biomass conversion and expansion factor for standing stock* or by *BEF2*D*.
- <u>Ratio of below-ground biomass to above-ground biomass</u>, the dropdown menu provides IPCC default value, if available, although users can enter their own data. It applies to all tiers.
- Biomass carbon fraction, the dropdown menu provides IPCC default value, although users can enter their own data. It applies to all tiers.
- Growing stock level, the dropdown menu provides IPCC default value, although users can enter their own data in the field next to it. The *Growing stock level* is also used by the *Software* to select the relevant BCEF value to present in the dropdown menu, if available.

This means that it is a needed parameter at Tier 1 too, although presented in blue ink.

- Biomass conversion and expansion factor for standing stock, the dropdown menu provides IPCC default value, if available, although users can enter their own data. It can be either *Specified*, and in such a case the value is entered in the field, or *Calculated* as *BEF2*D* and consequently values of *Basic wood density* and of *Biomass expansion factor of merchantable volume to above-ground biomass* are to be entered.
- Basic wood density, if BEF2*D is selected for Biomass conversion and expansion factor for standing stock, then a value is to be entered by users; otherwise is left blank.
- Biomass expansion factor of merchantable volume to above-ground biomass, if BEF2*D is selected for Biomass conversion and expansion factor for standing stock, then a value is to be entered by users; otherwise is left blank.

Tier 3, depending on data used, is to be accommodated in the above listed variables.

Managed Forest land

Land Use Manager					- 1	- X
Land use structure 🗸 🗸	-Land use subdivision - common para	ameters				
Forest Land	Land use subdivision name	Managed secondary		Country/Territory	World	
Managed Forest Land	Soil Type	Low Activity Clay Mineral	* ~	Continent	World	
Unmanaged Forest Land	Soil Status	No change in hydrology	~	Climate Region	Warm Temperate Dry	+ ~
Grassland Grassland Grassland Settlements						
Other Land	- Land use subdivision - Managed Fo	rest Land specific parameters				
	Ecological zone Subtropica	al dry forest 🗸 Species	User-defined V	Natural Forest 💿	Abandoned managed land	
			laurisilva	Plantation O		
				Land mass	Unspecified	~
			Age class (yr)	Unspecified 🗸		
			Above-gr	ound biomass stock (t.d.m. / ha)	336.8	40 🗸
			Above-ground net bior	mass growth (G) (t d.m. / ha / yr)		64 🗸
		Ratio of below-	ground biomass to above-ground biom	ass (R) (t root d.m.∕t shoot d.m.)	0.3	.30 🗸
			Biom	nass carbon fraction (t C / t d.m.)	0.4	70 🗸
			Growing stock level (V) (m3 / ha)	>80 ~	40	01.000
			Mean annual increment of	growing stock (lv) (m3 / ha / yr)		4.600
		Biomass conversion and expansion fac	tor for increment (BCEFi) (t.d.m. / m3 w	vood volume) Specified ~	0.8	40 🗸
	в	iomass conversion and expansion factor for	standing stock (BCEFs) (t.d.m. / m3 w	vood volume) Specified ~	0.8	40 🗸
	Biomass conve	ersion and expansion factor for wood and fu	elwood removal (BCEFr) (t.d.m. ∕m 3 w	vood volume) Specified ~	0.9	50 🗸
			Basic wood dens	ity (D) (t.d.m. ∕m3 fresh volume)		
		Biomass expansion factor for conversion	on of annual net increment to above-g	round biomass increment (BEF1)		
		Biomass expansion factor fo	r conversion of merchantable volume t	o above-ground biomass (BEF2)		
			L	itter C stock at maturity (t C / ha)		~
			Reference soil ornanic	carbon stock (SOCref) It C / ba)	0.0	00 🗸
		Relative C stock	change factors		0.0	
		Land use (F	LU) 1.000 Mar	nagement (FMG) 1.00	00 Input (FI)	1.000
Add Copy Delete				5	Save Undo	Close

Natural Forest vs Plantation given that the 2006 IPCC Guidelines provide different default values for Plantations for the following parameters: Above-ground biomass, Above-ground net biomass growth, Mean Annual Increment; selecting the forest typology allows the Software to populate the dropdowns of those parameters with relevant IPCC default values.

Abandoned managed land, is relevant for reporting under the UNFCCC with non-Annex I Reporting Tables 1 and 2 (<u>Decision 17/CP.8</u>). Thus, it is to be checked if the subdivision is a formerly managed land and only if users wish to use such reporting tables; otherwise, leave it unchecked.

Note: Do not check this box if you are using the *Software* to generate a JSON file to upload data into the UNFCCC ETF reporting tool.

Additionally to parameters described for <u>Unmanaged Forest land</u>, <u>Managed Forest land</u> requires the following parameters:

Age class, the dropdown menu provides IPCC default age classification in *older than 20-year* and *from 0 to 20 years*, which selection determines the IPCC default values that the *Software* populates in the dropdown menus of the biomass stand and biomass growth parameters.

Age class (yr)	Remark
≤20 y	
>20 y	
Unspecified	
User-defined range	

Otherwise, users can select Unspecified or User-defined range. For the latter, users enter, in the next field the user-defined range, e.g.:

	Hear-defined range		61-90 year	Ī
Age class (yr)	User-defined range	\sim	61-80 year	

The selection of a non-IPCC age class -i.e. Unspecified or User-defined- prevents IPCC default values from being present in the dropdown menu of parameters <u>Aboveground biomass stock</u> and <u>Aboveground biomass growth</u>.

Age Class applies to all tiers.

Aboveground biomass growth, the dropdown menu provides IPCC default value, if available, although users can enter their own data. It applies to Tier 1 only, thus in case a value is entered in *Mean Annual Increment* then this parameter is greyed out, and no data enter is allowed; although the *Software* calculates the *Aboveground biomass growth* as the product of the *Mean Annual Increment* by the *Biomass conversion and expansion factor for increment* or by BEF1*D.

- Mean Annual Increment, the value to enter is the increment¹⁵, either the current increment, the average current increment, or the mean increment, where all correspond to the gross increment minus the natural background mortality¹⁶.
- Biomass conversion and expansion factor for increment, the dropdown menu provides IPCC default value, if available, although users can enter their own data. It can be either *Specified*, and in such a case users enter the value in the field next to it, or *Calculated* as *BEF1*D* and consequently users enter values of *Basic wood density* and of *Biomass expansion factor of annual net increment to above-ground biomass increment*.
- Biomass expansion factor of annual net increment to above-ground biomass increment, if BEF1*D is selected for Biomass conversion and expansion factor for standing stock, then users enter the value otherwise is left blank.
- Biomass conversion and expansion factor for wood and fuelwood removal, the dropdown menu provides IPCC default value, if available, although users can enter their own data. It can be either *Specified*, and in such a case the value is entered in the field next to it, or *Calculated* as *BEF2*D* and consequently values of *Basic wood density* and of *Biomass expansion factor of merchantable volume to above-ground biomass* are to be entered. This means that it is a needed parameter at Tier 1 too (*Gainer Loss* method), although presented in blue ink. Note that users can instead enter data for *BEF2* and *D*.
- \blacktriangleright <u>Relative C stock change factors</u>, at Tier 1 are by IPCC default all equal to 1, given that forest SOC is considered to be the reference for all other land use categories. Users can enter a user-specific value according to data collected. **Note:** In Forest land the F_{LU} stock-change factor is used to adjust SOC by the natural disturbance regime¹⁷ i.e. F_D .

Tier 3, depending on data used, is to be accommodated in the above listed variables.

¹⁵ The type of increment likely depends on the breadth of age class

¹⁶ This does not include mortality/losses caused by disturbances

¹⁷ See page Tier 2 for SOC mineral at page 4.24, Volume 4 of 2006 IPCC Guidelines

Cropland

Cropland methods provided by IPCC significantly differ depending on the type of biomass present in the land. Thus, Cropland is subdivided into 2 subcategories, one dealing with that land with annual biomass only the other one dealing with land with perennial biomass, although the latter subcategory may also include an annual biomass component.

Annual Cropland

Land use subdivision - common para	neters						
Land use subdivision name			😮 Coun	try/Territory	Italy		1
Soil Type	High Activity Clay Mineral	+ \		Continent	Europe]
Soil Status	Natural		Clin	nate Region		+ ~	8
Land use subdivision - Annual Crops	specific parameters						
Rice ecosystem							
					C fraction & C	(t.d.m.) 1000	1
		Herbaceous biomass	•	×	C fraction (i.C.	/ t d.m.)	
		Ratio of below-ground bioma	ss to above-ground biom	iass (R) (t root (C/t shoot C)		
		Ret	erence soil organic carbo	on stock (SOCr	ef) (t C / ha)	0.000 🗸	
			Relat	ive C stock cha	ange factors		
				Lan	d use (FLU)	1.000 🗸	
				т	illage (FMG)	1.000 🗸	
					Input (FI)	1.000 🗸	

Rice ecosystem is to be checked in order to instruct the *Software* to report units of land with the rice ecosystem subdivision in relevant worksheets for 3.C.7 (*Rice Cultivation*).

Herbaceous biomass can be entered either in *tonne of C* per hectare, and in such a case the IPCC default value can be selected from the drop-down menu -although a user-specific value can either be entered-, or in *tonne of dry matter* per hectare.

Herbaceous biomass	tC∕ha ∾	·	~	C fraction (t C	/t d.m.)	1.000
Ratio of below	tC/ha td.m./ha	abov	e-ground biomass (R) (t i	root C/t shoot C)		

In the latter case, there is not an IPCC default value and the C fraction of dry matter is to be enter, see below:

Herbaceous biomass t d.m. / ha V Cfraction & C / t d.m.)

For all other parametes see <u>Managed Forest land</u>.

Tier 3, depending on data used, is to be accommodated in the above listed variables.

Perennial Cropland

Land use subdivision - common parar	neters					
Land use subdivision name		8	Country/Territory	Italy		
Soil Type	High Activity Clay Mineral	+ ~	Continent	Europe		
Soil Status	Natural	\sim	Climate Region		+ ~	8
	* .					
Land use subdivision - Perennial Crop	s specific parameters					
Cropland type	<u>~</u> 😒					
	Woody biomass	tC∕ha ∽	0.000	C fraction (t C	:/t d.m.) 1.000	
		Age class (yr)) Unspecified 🗸	Value		
	P	erennial biomass ca	arbon accumulation rate (G) (tonnes	C / ha / yr)	~	
	Ratio of below-ground wood	y biomass to above	-ground woody biomass (R) (t root C	C/t shoot C)		
			Harvest / Matur	ity cycle (yr)	0.000 🗸	
		10 (h-				
	Agrororestry Herbaceous biomass	ru / na 🗸 🗸		C fraction (t C	. / t d.m.) 1.000	
	Ratio of below-ground herbaceous bior	nass to above-groun	nd herbaceous biomass (R) (t root (C/t shoot C)		
		Reference	ce soil organic carbon stock (SOCr	ef) (t C / ha)	0.000 🗸	
			Relative C stock cha	ange factors		
			Lan	d use (FLU)	1.000	
			Т	illage (FMG)	1.000	
				Input (FI)	1.000	

Cropland type provides IPCC default types of perennial crop systems. Users can enter a user-specific species by selecting *User-defined*, see below.

Land use subdivision - Per	ennial Crops specific parameters		
Cropland type	User-defined	~	olive trees

Woody biomass can be entered either in *tonne of C* per hectare or in *tonne of dry matter* per hectare.

Woody biomass	tC∕ha ∨		0.000	C fraction (t C / t d.m.) 1.000
	t C / ha t d.m. / ha	Unspecified	\sim	Value

In the latter case, the C fraction of dry matter is to be entered as well, see below:

Woody biomass t d.m. / ha v 0.000 C fraction (t C / t d.m.)

The value to be entered as *Woody biomass* is the total biomass at maturity (i.e. before the final harvest). If a value is entered in *Woody biomass*, then no values shall be entered in: *Age class*.

Alternatively, instead of entering the value of *Woody biomass*, users enter values for *Age class*, and for the parameters *Perennial biomass carbon accumulation rate* and the *Harvest/Maturity cycle* following parameters:

- Age class, users first select "User defined", then enter a single value in the field.
- Harvest/Maturity cycle, the dropdown menu provides IPCC default value, if available, although users can enter their own value.

Note: if a value is entered for the *Age class*, then the *Software* grays out the field of *Woody biomass*, although it calculates its value, which is shown in grey in the field, as the *Perennial biomass carbon accumulation rate* multiplied by the *Age class*.

Agroforestry is to be checked if an annual biomass component is to be added to the estimates. For parameters of annual biomass component see <u>Annual Cropland</u>.

For all other parametes see <u>Managed Forest land</u>.

Tier 3, depending on data used, is to be accommodated in the above listed variables.

Grassland

Different types of vegetation can be classified under Grassland, ranging from land covered by grass only and managed, e.g. pastures, to land with significant woody vegetation that, although does not meet the forest thresholds, largely determines the C dynamic of the land.

Unmanaged Grassland

Land use subdivision name	Country/Territory	Italy	1	
Soil Type	High Activity Clay Mineral Continent	Europe		È.
Soil Status	Natural Climate Region	jion +		0
Land use subdivision - Unmanaged Vegetation type	Grassland specific parameters	d.m. / ha)	0.000 🗸	
	Ratio of below-ground herbaceous biomass to above-ground herbaceous biomass (R) (t root d.m./t sl	hoot d.m.)		
	Carbon fraction of herbaceous biomass dry matter (C / t d.m.)	0.470	
	Woody biomass t	d.m. / ha)	0.000	
	Natio of below-ground woody biomass to apove-ground woody biomass (h) (; foot a m / t si Carbon fraction of woody biomass dry matter (; i	C /t d.m.)	0.470 🗸	
	Performance and annuals applies share share. (200-and	AC (ba)	0.000	

Vegetation type is to be selected from a dropdown menu containing IPCC default types corresponding to the climate region selected.

Vegetation type	~	3		
	Vegetation type	Ratio BGB to AGB (R) (t d.m. BGB / t d.m. AGB)		Error
	Woodland	0.500	19.000	±80%
	Savannah	0.500	19.000	±80%
	Shrubland	2.800	9.000	±144%

The selection of the vegetation type determines the value of the *root-to-shoot ratio* the *Software* shows in the relevant fields (either for *annual biomass* or for *perennial biomass*), although users can overwrite that default value with their own data.

For all other parametes for annual biomass see <u>Annual Cropland</u>, while for those of woody biomass see <u>Perennial Cropland</u>. Tier 3, depending on data used, is to be accommodated in the above listed variables.

Note: As with <u>Unmanaged Forest land</u>, the Reference soil organic carbon stock (SOC_{REF}) is not further adjusted through stockchange factors since no management occurs.

Managed Grassland

Land use subdivision nam	e Country/Territory taly
Soil Type	High Activity Clay Mineral + V Continent Europe
Soil Status	Natural Climate Region
Land use subdivision - Manage	d Grassland specific parameters
Vegetation type	V S Improved grassland Abandoned managed land
	Herbaceous biomass (t d.m. / ha) 0.000 🗸
	Ratio of below-ground herbaceous biomass to above ground herbaceous biomass (R) (t root d.m./t shoot d.m.)
	Carbon fraction of herbaceous biomass dry matter (t C / t d m.) 0.470
	Woody biomass (t d.m. / ha) 0.000
	Age class (yr) Unspecified Value
	Woody biomass accumulation rate (g) (t d.m. / ha / yr)
	Ratio of below-ground woody biomass to above-ground woody biomass (R) (t root d.m./ t shoot d.m.)
	Carbon fraction of woody biomass dry matter (t C / t d m.) 0470 🗸
	Reference soil organic carbon stock (SOCref) tt C / ha) 0.000 🗸
	Relative C stock channe factors
	Land use (FLU) 1.000 🗸

Improved grassland is to be checked if the subdivision is subject to additional input of organic matter, e.g. manure and/or sludge application. Otherwise, FI is greyed out and any data entry from users is not allowed.

Abandoned managed land, is relevant for reporting under the UNFCCC with non-Annex I Reporting Tables 1 and 2 (<u>Decision 17/CP.8</u>). Thus, it is to be checked if the subdivision is a formerly managed land and only if users wish to use such reporting tables; otherwise, leave it unchecked.

Note: Do not check this box if you are using the *Software* to generate a JSON file to upload data into the UNFCCC ETF reporting tool.

Differently¹⁸ than in <u>Unmanaged Grassland</u>, in <u>Managed Grassland</u> users can enter data for the parameters Age class and Woody biomass accumulation rate instead of for Woody biomass. While if Woody biomass is entered the Age class and Woody biomass accumulation rate fields will remain greyed.



- Age class, users first select "User defined", then enter a single value in the next field;
- Woody biomass accumulation rate, is the average net accumulation¹⁹ of carbon during the time period determined by the Age class value entered. Accordingly, if a value is entered for Age class then the Software grays out the field of Woody biomass, although it calculates a value, which is shown in grey in the field, as the Woody biomass accumulation rate multiplied by the Age class.

Note: Given that unlimited accumulation of biomass is not possible, this parameter is an active parameter only if the *Age-class* is entered. Further, if a *Woody biomass accumulation rate* is entered then biomass losses shall also be estimated in the relevant calculation worksheet **Biomass change (G&L)**.

For all other parametes for annual biomass and SOC see <u>Annual Cropland</u>, while for those of perennial biomass see <u>Perennial Cropland</u>.

Tier 3, depending on data used, is to be accommodated in the above listed variables.

¹⁸ This corresponds to a Tier 2 IPCC methodological approach

¹⁹ Gross increment minus mortality

Wetlands

IPCC disaggregates Wetlands in four types:

- Peatlands under peat extraction
- Peatlands abandoned (former extraction)
- Flooded land
- Other Wetlands, including Coastal Wetlands

For *Costal Wetlands* types, users first check **Other Wetlands** box and then check **Coastal Wetlands** box, and select the vegetation type. For <u>Managed Wetlands</u> only users can enter a user-specific vegetation type:



While *Peatlands under peat extraction*, *Peatlands abandoned (former extraction)*, *Flooded land* are always managed systems, *Other Wetlands* may include unmanaged and managed land.

Soil types can be applied to subdivisions of *Wetlands* as shown in Tables 6 and 7 below.

Table 6 possible soil types and soil statuses under managed Wetlands subdivisions

Soil Status		Soil composition								
		Mineral		Org	Mixed					
		Soil type								
		Inland Wetland ²⁰	any user-specific	Inland any user-specific		Coastal Wetlands				
		Soil Status								
Peatlands under peat e	s under peat extraction NA NA Drained			ined	NA					
Peatlands abandoned ((former extraction)	NA	NA	Drained or Rewetted		NA				
Flooded land		NA or ^{Extra}	cted20,21	NA or E	NA or Extracted ²¹					
Other Western day	Other Wetlands		NA	No change in hydrology Rewetted Extracted	No change in hydrology Rewetted Extracted	NA				
Other Wetlands:	Coastal Wetlands	NA	NA	NA	NA	No change in hydrology Rewetted Extracted				

 Table 7 possible soil types and soil statuses under unmanaged Wetlands subdivisions

	Soil composition							
	Miner	ral	Org	Mixed				
Soil Status	Soil type							
	Inland Wetland	any user-specific	Inland	any user-specific	Coastal Wetlands			
			Soil Status					
Other Wetlands	No change in hydrology	NA	No change in hydrology	No change in hydrology	NA			
Coastal Wetlands	NA	NA	NA	NA	No change in hydrology			

²⁰ For *Flooded land* any mineral soil type can be applied

²¹ Where the land is converted to flooded land, SOM may first be removed

Unmanaged Wetlands

Unmanaged Wetlands can occur under only one of the land subdivision types: **Other Wetlands**, although *soil composition* can be *mineral*, *organic* or *mixed*. Parameters differ according to the soil composition:

✓ Mineral composition, for which *SOCref* is needed:

Land use subdivision - common para	ameters					
Land use subdivision name		•	Country/Territory	World]
Soil Type	Inland Wetland Mineral	+ ~	Continent	World]
Soil Status	No change in hydrology	\checkmark	Climate Region		+ ~	8
Land use subdivision - Unmanaged	Wetlands specific parameters					
- Type						
Other Wetlands						
			Above-ground biomass sto	ck (t d.m. / ha)		
		Ratio of below-ground biomass to	above-ground biomass (R) (t root d.m	n./t shoot d.m.)		
			Carbon fraction of biomass dry mat	ter (t C / t d.m.)	~	
		Ref	ference soil organic carbon stock (SC)Cref) (t C / ha)	0.000 🗸	

✓ Organic composition, for which *SOCref* is not needed:

Land use subdivision name			8	Country/Territory	World	
Soil Type	Inland Organic	+	\sim	Continent	World	
Soil Status	No change in hydrology		\sim	Climate Region		+ ~
Nutrient content	Unspecified		\sim			
Land use subdivision - Unmanaged Type	Wetlands specific parameters					
Land use subdivision - Unmanaged Type Other Wetlands	l Wetlands specific parameters					
Land use subdivision - Unmanaged Type Other Wetlands	Wetlands specific parameters					
.and use subdivision - Unmanaged Type	I Wetlands specific parameters			Above-ground biomass sto	ock (t.d.m. / ha)	
Land use subdivision - Unmanaged Type	I Wetlands specific parameters	Ratio of below-ground biom	ass to above	Above-ground biomass sto ground biomass (R) & root d.n	bck (t.d.m. / ha) [n./t shoot d.m.)	

For parametes for biomass see Unmanaged Forest land.

Depending on the soil type selected the mask shows a different parameter.

For Inland Organic soils no Reference SOC is needed.

For *Wetland Mineral* soils the *Reference SOC* that, likewise <u>Unmanaged Forest land</u>, is not further adjusted through stockchange factors since no management occurs.

Type is not to be selected since there is only one *Wetlands* type in <u>Unmanaged Wetlands</u>.

Tier 3, depending on data used, is to be accommodated in the above listed variables.

Managed Wetlands

Depending on the Wetlands type selected the mask shows a different set of parameters.

Type is to be selected from the dropdown menu among 4 IPCC types. Type selection determines what type of activities is reported and thus what relevant parameter

s are provided in the mask.

> <u>Peatlands under extraction</u> where the 2 parameters are mutually exclusive (users have to compile one of the two):

Land use subdivision - common para	meters						
Land use subdivision name			8	Country/Territory	Japan		
Soil Type	Inland Organic soil	+	~	Continent	Asia		
Soil Status	Drained	•	~	Climate Region		+	~ 🔇
Nutrient content		•	~ 😢				
Land use subdivision - Managed We	tlands specific parameters						
Туре							
Peatlands under extraction							
 Peatlands abandoned (former et 	extraction)						
Flooded land							
O Other Wetlands							
			Carbo	n fraction of air-dry peat by weig	ght (tC∕t peat)		- 😣
			Carbon fr	action of air-dry peat by volume	(t C / m3 peat)		~ 😣
							_

- ✓ <u>Carbon fraction of air-dry peat by weight</u>, the dropdown menu provides IPCC default values, if available, although users can enter their own data.
- ✓ <u>Carbon fraction of air-dry peat by volume</u>, the dropdown menu provides IPCC default values, if available, although users can enter their own data.
- Peatlands abandoned (former extraction) where 5 relevant parameters are provided to be compiled only if users wish to estimate vegetation re-installment after abandonment:

Land use subdivision - common para	meters								
Land use subdivision name					8	Country/Territory	Italy		
Soil Type	Inland Organic soil			+ ~		Continent	Europe		
Soil Status	Drained			\sim		Climate Region		+	~ 🔇
Nutrient content				\sim	8				
Land use subdivision - Managed We	tlands specific parameters								
Туре									
 Peatlands under extraction 									
Peatlands abandoned (former e	extraction)								
Flooded land									
Other Wetlands									
					Abo	ove-ground biomass sto	ock (t.d.m. / ha)	0.0	00
					Age class (yr)		Value		8
				A	bove-ground b	iomass accumulation r	ate (t.d.m. / ha)		
		F	Ratio of below-ground I	biomass to	above-ground	l biomass (R) (t root d.r	n./t shoot d.m.)		
					Carbon frac	tion of biomass dry ma	tter (t C / t d.m.)		~

The first three: Above-ground biomass stock, Age class and Woody biomass accumulation rate are correlated to each other. Indeed, users can either enter the Above-ground biomass stock or the Age class and Above-ground biomass accumulation rate.

If Above-ground biomass stock is entered the Age class and Above-ground biomass accumulation rate field s will remain greyed.

Abo	d.m. / ha)	45.000				
Age class (yr)	Unspecified	\sim	Value			
Above-ground bi	Above-ground biomass accumulation rate (t d.m. / ha)					

Otherwise,

✓ <u>Age class</u>, users first select "User defined", then enter a single value in the next field;

✓ <u>Above-ground biomass accumulation rate</u>, is the average net accumulation²² of carbon during the time period determined by the *Age class* value entered. Accordingly, if a value is entered for *Age class* then the *Software* grays out the field of *Above-ground biomass stock*, although it calculates a value, which is shown in grey in the field, as the *Above-ground biomass accumulation rate* multiplied by the *Age class*.



Note: Given that unlimited accumulation of biomass is not possible, this parameter is an active parameter only if the *Age-class value* is entered. Further, if an *Above-ground biomass accumulation rate* is entered then biomass losses shall also be estimated in the relevant calculation worksheet **Biomass change (G&L)**.

The final two parameters are the Ratio of below-ground biomass to above-ground biomass, to be entered directly by users, and the carbon fraction of biomass dry matter, where users may select from the dropdown or enter user-specific information.

Note: units of land that are <u>Peatlands abandoned</u> are mapped:

- a. to *Peat extraction remaining Peat extraction* or to *Land converted to Peat extraction* (if the land is still undergoing a conversion), if the *Soil status* is *Drained*
- b. to Other Wetlands remaining Other Wetlands or to Land converted to Other Wetlands (if the land is still undergoing a conversion), if the Soil status is Rewetted
- Flooded land does not entail calculation of C stock changes, so no parameters are needed:

					_
Land use subdivision - common paran	neters				
Land use subdivision name		8	Country/Territory	World	
Soil Type	+ ~	8	Continent	World	
Soil Status	~	8	Climate Region	+~	8
Land use subdivision - Managed Wet	lands specific parameters				
Туре					
 Peatlands under extraction 					
O Peatlands abandoned (former ex	xtraction)				
Flooded land					
O Other Wetlands					

\triangleright	Other	Wet	lands:
------------------	-------	-----	--------

Land use subdivision - common par	ameters				
Land use subdivision name		8	Country/Territory	World	
Soil Type	Inland Wetland Mineral	+ ~	Continent	World	
Soil Status	No change in hydrology	~	Climate Region		+ ~ (
Land use subdivision - Managed W	etlands specific parameters				
Туре					
O Peatlands under extraction					
Peatlands abandoned (former	extraction)				
Flooded land					
Other Wetlands Coas	stal Wetlands				
		Above-ground biomass stock (t.d.m. / ha)		0.000	
		Age class (y	r)	🗸 🔕 Value	•
		Above-ground	biomass accumulation r	ate (t.d.m. /ha)	
		Ratio of below-ground biomass to above-grou	nd biomass (R) (t root d.n	n./t shoot d.m.)	
		Carbon fra	action of biomass dry mat	ter(tC∕td.m.)	×
		Reference soil	organic carbon stock (SC	DCref) (t C ∕ ha)	0.000 🗸
			Relative C stock	change factors	
			1	Land use (FLU)	1.000
			Man	agement (FMG)	1.000

²² Gross increment minus mortality

If *Inland Wetland mineral* soil is selected, the SOC stock change factors have to be entered. IPCC does not provide default values for SOC stock change factors in <u>Managed Wetlands</u>, although guidance for land under conversions is provided in Chapter 5 of the <u>Wetlands</u> Supplement.

Note: Chapter 5 of the *Wetlands Supplement* provides refined SOC_{REF} values for *Inland Wetland mineral* soil as well as revised values for Carbon-Stock-Change factors dedicated to *Inland Wetland mineral* soil.

Land use subdivision - common par	ameters					
Land use subdivision name	3		Country/Territory	World		
Soil Type	Coastal Wetlands	+~	Continent	World		
Soil Status	No change in hydrology	~	Climate Region		+~	8
Land use subdivision - Managed W	etlands specific parameters					
Type						
 Peatlands under extraction 						
 Peatlands abandoned (former 	extraction)					
Flooded land						
Other Wetlands Coas	tal Wetlands					
			Above-ground biomass sto	ck (td.m./ha)	0.000	
		Age cl	lass (yr)	Value		8
		Above-g	ground biomass accumulation ra	ate (t.d.m. / ha)		
		Ratio of below-ground biomass to above	e-ground biomass (R) (t root d.m	./t shoot d.m.)		
		Car	bon fraction of biomass dry mat	ter (t C / t d.m.)	~	

If *Coastal Wetlands* soil is selected, no values for SOC parameters have to be entered.

Note: Table 4.11 of the *Wetlands Supplement* provides SOC values for Coastal Wetlands according to the vegetation type.

For biomass parametes see *Peatlands abandoned (former extraction)*.
<u>Settlements</u>

IPCC provides methodological guidance to estimate biomass C stock changes at Tier 2 only (Equations 8.2 and 8.3). While SOC change estimates, at Tier 1 and 2, depend on the proportion of land that is:

- ▶ paved
- covered by turfgrass
- ➤ cultivated
- ➤ treed

Thus, the Software has 2 subcategories for Settlements:

- Settlements (Treed)
- Settlements (Other)

<u>Settlements (Treed)</u> encompasses the portion covered by trees only²³, while <u>Settlements (Other)</u> encompasses the other 3 land cover types.

Thus, users shall share the total area of settlement between the 2 subcategories and for the subcategory <u>Settlements</u> (<u>Other</u>) users shall further estimate the proportion of area covered by each of the non-tree cover types.

 $^{^{\}rm 23}$ It does not include other land cover types mixed within trees.

Settlements (Treed)

							_
Land use subdivision - common par	ameters						
Land use subdivision name			3	Country/Territory	World]
Soil Type	High Activity Clay Mineral 🛛 + 🗸			Continent	World]
Soil Status	No change in hydrology		\sim	Climate Region		+ ~	6
Land use subdivision - Treed Settle	ments specific parameters						
					_		
				Above-ground biomass stoc	k (t.d.m. ∕ha)		
		Ratio of below-ground I	biomass to above-gr	ound biomass (R) (t root d.m.	/t shoot d.m.)		
			Carbon	fraction of biomass dry matte	er (t.C.∕t.d.m.)		
				Active growing pe	riod (AGP) (yr)	~	
		Nu	umber of crown cove	r classes or individual woody	plant classes	1	
			Reference s	nil organic carbon stock (SO	Cnef) (t C / ha)	0.000 ~	
				Polativo Catack o	hanne factor		
				heiduve c slock c	and use (FLU)	1.000	
				Mara		1 000	
				Mana	gement (FIMG)	1.000	
					Input (FI)	1.000	

Parameters specific for this subdivision are:

➤ Age class intends to distinguish those treed land where trees are still in an active growing period (AGP), parameter for which IPCC assumes a 20-years default, and those that are not. For those that are in an active growing period -i.e. Age class ≤ AGP- the net growth is to be estimated in the relevant worksheet, for those that are not -i.e. Age class > AGP- no biomass changes are to be estimated.



Where Unspecified is selected, the Software allows an unlimited carbon accumulation in the biomass C pool for the Gain&Loss method, thus Unspecified is to be selected only if the Stock-Difference method is applied to the biomass C pool to the unit of land under this land subdivision.

- Active growing period, users can select the IPCC default value -i.e. 20 years- from dropdown or enter their userspecific value.
- Number of crown cover or individual woody plant classes both IPCC equations -8.2 and 8.3) calculate biomass C stock changes as the sum of stock changes occurring on a subset of the tree population i.e. the class. The use of classes deals with variability in growth rates among different sub-population (e.g. different age for same tree species) or differences in the tree species or group of species.

Users have three variables: *land subdivision, age class, number of crown cover or individual woody plant classes* to deal with variability in the net accumulation rate, although the *Gain&Loss* method allows to estimate net C gain only and only until the vegetation achieve its long-term biomass C stock. Thus, where losses are to be estimated the *Stock-Difference* method is to be applied between C stock estimates at time 1 and a time 2, where C stock at time 2 is to be calculated by users -the *Software* does not implement such calculation of C stock at time 2- as C stock at time 1 plus C stock gains between time 1 and 2 minus C stock losses between time 1 and 2.

For <u>Settlements (Treed)</u> the Tier 1 value for all Relative SOC change factors provided in the Software is equal to 1 for F_{LU} and F_{MG} while for F_{I} the value of , users can enter any alternative value.

For all other parametes for biomass see Managed Wetlands.

Tier 3, depending on data used, is to be accommodated in the above listed variables.

Settlements (Other)

Land use subdivision - common para	ameters				
Land use subdivision name				Country/Territory	World
Soil Type	High Activity Clay Mineral		+ ~	Continent	World
Soil Status	No change in hydrology		\sim	Climate Region	+ 🗸 🔇
Land use subdivision - Other Settlen	nents specific parameters				
				Above-ground biomass sto	ck (t.d.m. / ha)
		Ratio of below	ground biomass to	above-ground biomass (R) (t root d.m	./ t shoot d.m.)
				Carbon fraction of biomass dry matt	er (t C / t d.m.)
			Re	ference soil organic carbon stock (SC	Cref) (t C / ha) 0.000 ~
Cultivated					
				Proportion of the area that is	cultivated (%)
	R	elative C stock change fa	actors		
		Land use (FLU)	1.000 🗸	Management (FMG) 1.000	V Input (FI) 1.000
Turfgrass					
	_			Proportion of the area covered	by turfgrass (%)
	R	elative C stock change fa	actors		L (7)
		Land use (FLU)	1.000 🗸	Management (FMG) 1.000	✓ Input (FI) 1.000 ✓
Paved					
		alativa Catachi alta di		Proportion of the a	rea paved (%)
	н	elative C stock change fa	o ano	Management (FMC)	200 last (E) 0.000
		Land use (FLU)	0.600	Management (FMG) 0.3	0.800 Input (FI)

Parameters specific for this subdivision are:

Proportion of the area that is cultivated, Proportion of the area covered by turfgrass, Proportion of the area paved data entered shall sum up to 100%.

Users can instead apportion the area of non-treed settlements among three subdivisions²⁴ each of one dealing with a single land cover, and thus assign 100% to the proportion of the relevant land cover.

- ▶ For <u>Settlements (Other)</u> the IPCC Tier 1 values of the Relative SOC change factors are:
 - ✓ For *Cultivated*, are those for *Cropland*²⁵, with no-till F_{MG} values and F_{I} equal to 1
 - \checkmark For *Turfgrass*, are those for *Improved Grassland*,²⁶ with no-till F_{MG} values and F_I equal to 1
 - ✓ For Paved, the product of F_{LU}, F_{MG} and F_I is 0.8 times the corresponding product for the previous land use and/or management (i.e., 20% of SOC of previous land use and/or management will be lost as a result of disturbance, removal or relocation of soil).

The current version of the *Software* does not have the capacity to compile the Relative SOC change factors as 0.8 of those of the previous land subdivision. To deal with this, the only option currently available is to create *land-conversion-specific* subdivisions for *Paved* areas in <u>Settlements (Other</u>), in such a way the F_{LU} , F_{MG} and F_{I} can be entered as 80% of the value of the previous subdivision. For example, a subdivision named *forest land converted to paved land* has the value of 0.8 for each of the 3 *Relative SOC change factors*.

For all other parametes for biomass see Managed Wetlands.

Tier 3, depending on data used, is to be accommodated in the above listed variables.

 25 AFOLU Table 5.5 – F_{LU} value according to climate regions: Temperate/Boreal Dry = 0.80; Temperate/Boreal Moist = 0.69 Tropical Dry = 0.58; Tropical Moist/Wet = 0.48; Tropical montane = 0.64; F_{MG} = value according to climate regions: Temperate/Boreal Dry = 1.10; Temperate/Boreal Moist = 1.15; Tropical Dry = 1.17; Tropical Moist/Wet = 1.22; Tropical montane = 1.16

²⁴ E.g. "paved", "turfgrass", "cultivated"

 $^{^{26}}$ AFOLU Table 6.2 - F_{LU} = 1; F_{MG} = value according to climate regions: Temperate/Boreal = 1.14; Tropical = 1.17; Tropical montane = 1.16

Other land

It includes all land without significant C stocks. This means that *Other land remaining Other land* has no significant C stock changes and thus the *Software* does not provide any calculation worksheets for category 3.B.6.a.; furthermore, every conversion to *Other land* results in the complete loss of C stocks resident in the land according to its previous use and/or management. Note that for organic soils, such a complete loss can be modelled through *Drained* soils status (by selecting in *Land Unit Parameter* the *IPCC default* method for *SOM organic*) or more efficiently through a stock-difference loss of the entire SOC (by selecting in *Land Unit Parameter* the *Stock difference* method for *SOM organic*).

Note: Coastal Wetlands soils under Other land are always extracted (no alternative soil status available)

Unmanaged Other land

Managed Other land

Given that Other land has not significant resident C stocks, no C stock parameters are present in the Unmanaged Other land mask as well as in the Managed Other land mask.

Land use subdivision - common paran	neters					
Land use subdivision name			8	Country/Territory	World]
Soil Type		+ ~	8	Continent	World]
Soil Status	No change in hydrology	\checkmark		Climate Region	+ ~	8
Land use subdivision - Unmanaged O	ther Land specific parameters					
_						_

C		Fores	t land	Crop	oland	Grassland		Wetl	ands	Settlements		Other land	
U	роог	R	С	R	С	R	С	R	С	R	С	R	С
Biomass	Aboveground	Х	Х	\mathbf{X}^2	Х	Х	Х		Х	Х	Х		Х
biomass -	Belowground	X1	Х	X2	Х	Х	Х		Х	Х	Х		Х
DOM	Dead Wood	Х	X ³	X	X ³	X	X ³		X ³	X	X ³		X ³
	Litter	Х	Х	Х	X^4	Х	X^4		X^4	Х	X^4		X^4
Soil Organic	mineral	Х	Х	Х	Х	Х	Х			X	Х		Х
Matter	organic ^{5,6}	Х	Х	Х	Х	Х	Х	\mathbf{X}^7	X7,8	Х	Х		Х
Harvested Wood Product		X											

Reporting requirement for C pools at Tier 1 and Tier 2

Table 8 Ma	ndatory C po	ools as per '	Tier 1 or '	Tier 2 of the	2006 IPCC (Guidelines
------------	--------------	---------------	-------------	---------------	-------------	------------

A **black X** indicates that according to Tier 1 C stock changes in the relevant C pool are to be estimated, and a **blue X** indicates those C stock changes to be additionally estimated according to Tier 2. Tier 3 applied to any C pool in any land use category requires users to estimate annual C stock changes in that C pool (either as net change between times or as a sum of all gains and losses).

R indicates subcategories where land is not undergoing a change in use, while **C** indicates those where land is undergoing a change.

Notes: 1. although IPCC provides default values of **R** (root:to:shoot ratio) and so users may estimate changes in belowground biomass at Tier 1 too; 2. limited to perennial biomass; 3. Given that the 2006 IPCC Guidelines do not provide default values for Dead Wood users estimate changes in Dead Wood at Tier 2 or 3 only; 4. Limited to conversion from forest land; 5. where organic soils are drained, IPCC default method applies; 6. the Wetlands Supplement extends IPCC default methodology to rewetted soils; 7. including due to peat extraction; 8. the Wetlands Supplement extends to those soils in Coastal Wetlands that are a mix of mineral and organic origin

Note: Failing in reporting C stock changes for those C pools for which 2006 IPCC Guidelines provides a Tier 1 method impairs completeness of reporting and is to be noted as "NE" (Not Estimated) in the reporting tables.

Land Representation Manager (LRM)

Land Use Representation Manager is a tabbed dialog window containing 3 tabs:

- ✓ <u>Regions</u>,
- ✓ Land Representation table,
- ✓ <u>Annual land representation matrix</u> (limited²⁷ to Approaches 2 & 3 for land representation).

Users can open it from Administrate main menu, AFOLU sub-menu

DPCC Inventory Software - sandro - [Worksheets]									
🖳 Application Database Inventory Year Worksheets	Reports	Tools Export/Import	Administrate Window Help						
2006 IPCC Categories	→ ậ	SOM Mineral (SD) SOM	Users						
3.B.1.a - Forest land Remaining Forest land	^	Biomass increase (G&L 1/4	Country/Territory	G&L 3/4) Biomass loss (G&L 4/4) Biomass					
B. 3.B.1.b - Land Converted to Forest land		Worksheet	CO2 Equivalents						
3.B.1.b.i - Cropland converted to Forest Land		Sector: Agricult	Delete Inventory						
3.B.1.b.ii - Grassland converted to Forest Land		Category: Forest	r .						
3.B.1.b.iii - Wetlands converted to Forest Land		Subcategory: 3.B.1.a	Energy						
3.B.1.b.iv - Settlements converted to Forest Land 2.B.1 b.v. Other Land converted to Forest Land		Sheet: 1 of 4 /	AFOLU >	Land Use Manager					
B-3.B.2 - Cropland		Data	Waste 🕨	Land Representation Manager					
- 3.B.2.a - Cropland Remaining Cropland		Region GFOI exampl	Guidelines Information Texts	Livestock Manager					

or from the bottom of any worksheets of 3.B categories



All information shown in the 3 tabs is relative to currently chosen inventory year.

²⁷ Given Approach 1 for Land Representation does not identify land use changes the matrix cannot be built.

Regions Tab

This tab allows subnational representation of land by stratifying the national territory in subnational units, here defined as **Regions**. It requires entering the total area of the country, although apportioned among Regions, as well as selecting for each Region the approach for the land representation.

Land Representation Manager			- 0	×
Regions Land representation table Annual land rep	presentation matrix (Approach 2 & 3)			
Whole country area (ha) 6,00	00.000			
Region name	Area	Approach	Remark	
Region 1	(114)	Approach 1		
Region 2	2,000	Approach 2		
Region 3	3,000	Approach 3		×
*				
Total	6000.000			
Define single region in case you wish to report for the whole	le country			
			Save Undo	Close

users can either enter a single Region that covers the entire territory, for which the GHG inventory is prepared, or a number of Regions. In the latter case, for each Region an independent and consistent time series of activity data is to be entered by users in the Tab <u>Land representation table</u>.

Whole country area: Users must enter total area of the territory for which the GHG inventory is prepared.

The area value entered is saved automatically (no need to press **Save**) and can be changed through a new data entry. The field has a background color that indicates:

- Green sum of areas across defined regions matches whole country area.
- Orange sum of areas across defined regions is less than whole country area.
- Red sum of areas across defined regions is greater than whole country area.

Note: the area value cannot have more than three decimals, given that area values entered in the <u>Land representation table</u> can only have three decimals.

Tip: In case of Orange/Red color, placing mouse pointer over the field shows tooltip with a warning and the area difference between the total and the sum of areas entered in the Regions fields.

<u>**Table**</u>: Users can define one or more regions with the following attributes:

- ✓ **Region name** to be entered.
- \checkmark Area area of the region in ha to be entered.
- ✓ Approach -1, 2, 3 for land representation to be selected.
- Remark users can enter here notes relevant for the row of data (information is neither transferred to reporting tables nor can be printed)

Note: the area value cannot have more than three decimals, given that area values entered in the <u>Land representation table</u> can only have three decimals.

Tip: to record info entered in the DataBase (DB) press the button Save. Once saved the information cannot be changed anymore. Where an error is identified in information entered, the Region (and its data) is to be deleted. To do so click the red x on the right hand of the table- and enter again information.

Land representation table Tab

Allows defining units of land for the selected Region according to Region's defined Approach for land representation.



The Land representation table requires users to enter a consistent land representation. Where a consistent land representation is a time series of annual area estimates of units of land, as disaggregated according to stratification, that:

- \checkmark reports the total area of the territory constant across the entire time series
- classifies land using a consistent methodology across the entire time-series (no artifact land conversions caused by changes in the classification method/background-data)
- ✓ in each year **Y**, all units of land under conversion are reported within the *Land converted to* relevant category until the end of the transition period (**D**)
- ✓ in each year **Y**, all units of land that did not undergo a conversion in the last **Y-D** years are reported within the *Land remaining* relevant category.

Being **A** the first year of a time series and **T** the last one, a Time series of activity data consists of annual area (ha), for each of the units of land, for each year of the inventory time period (**A** to **T**, composed by a number of years equal to **T-A**) plus for a number of years, prior to year **A**, equivalent to the transition period (**D**) applied to conversions of land use and/or management i.e. **A-D**; which means that the complete time series of data needed for the land representation is equal to **T-D**. For example, **A** is the year 2005, **T** is the year 2024 and **D** is a 20-year period, then the time series of activity data needed is from the year **A-D** (2005-20=1985) to **T** (2024), which means T-D=2024-1985=39 years.



Region – dropdown menu for choosing one of the defined regions to work with. By choosing region, region's area is filled in automatically together with information on the Approach defined for that region in the tab *Regions*. Multi-level table below is automatically filled with data on IPCC land use categories and associated area (as the sum of areas entered for the units of land belonging to the category/sub-category).

Region can be any level of stratification of the territory users wish to apply, e.g. administrative regions, ecological zones, parks, land subject to specific project activities, as well as a mix of those. *Nevertheless, it is suggested to use the stratification in "Regions" to aggregate all land that has the same soil type and climate region while subject to different land use and/or management.* Other levels of disaggregation -e.g. administrative, ownership, management systems- can be managed through the use of land-use subdivisions as well as of units of land²⁸. For each Region the *Software* requires an independent²⁹ and consistent Land Representation.

Region area – background color meaning:

• Green – sum of areas across land use subcategories equals region's total area.

²⁸ A unit of land is an area homogenous per climatic and pedologic characteristic as well as per current and past use/management.

²⁹ No land transfer allowed among different Regions

- Orange sum of areas across land use subcategories is less than region's total area.
- Red sum of areas across land use subcategories is greater than region's total area.

Discrepancy – In case of Orange/Red color, shows the area difference between Region's total area and area entered in the *Land representation table* for that Region. Negative value means that the area entered in the *Land representation table* is larger than the area entered for the Region in the *Regions tab*; a positive value vice versa indicates that the area entered in the *Land representation table* is smaller than the area entered for the Region in the *Regions tab*; a positive value vice versa indicates that the area entered in the *Land representation table* is smaller than the area entered for the Region in the *Regions tab*. Otherwise, the zero value means no discrepancy.

Current inventory year is indicated on the right-hand side.

Table levels

The Multi-level table contains all 6 IPCC land use categories as well as all 12 land use subcategories, where users can enter 4 levels of information for each unit of land:

- \blacktriangleright <u>1st level</u>, where to select the current land use category of the unit of land
- ▶ <u>2nd level</u>, where to select the current land use subcategory of the unit of land
- \blacktriangleright <u>3rd level</u>, where to select the current land use subdivision of the unit of land
- ➤ <u>4th level</u>, where to enter all information that qualifies the unit of land conversion status, the area and the methods applied to estimate C stock changes in each C pool.
- \blacktriangleright <u>5th level</u>, information on historical conversions of the land is stored.

NOTE: Units of land SHALL be entered from the first year of the inventory time series onwards

Guide to Land Representation

<u>1st level</u>

Contains the 6 IPCC land use categories:

Land	l Repre	isentation Manager				×	
Reg	pions	Land representation table Annual land representation matrix (Approach 2 & 3					
Reg	gion	Region III V Region area (ha) 1.	Discrepancy (ha) OK	Approach 3	1999		
			Area (1999) (ha)	Remark			
Ð	Fo	vrest Land	0				
	Cr	opland	1,000				
	G	rassland	0				
÷.	W	etlands	0				
	Se	ettlements	0				
	O	her Land	0				
	Gi Gi W Se Ot	lean Land assland etlands titements her Land	0 0 0 0 0 0 0 0 0				

In **Remark**, users can enter notes relevant for the entire category *(information is neither transferred to reporting tables nor can be printed)*

Clicking on the element , on the right-hand side of the TAB, the lower level of the relevant category opens. So, to enter a unit of land click on the of its current use.

Tip: in case of Approach 3, in the first inventory year of the inventory time series i.e. year **A**, the land use category to be selected for a unit of land may not be the actual land use and/or management in the first inventory year; it could instead be the land use and/or management in the time period **A-D** to **A** if any use and/or management change occurred in that time period [section on 5th level].

2nd level

Contains **12 land use subcategories**, a pair for each IPCC land use category. While for Land-Cover-based categories -i.e. Forest land, Grassland, Wetlands and Other land- the variable determining the split in the pairs is the presence of human activity -i.e., Managed vs Unmanaged land- for those categories that are purely Land-Use-based the variable determining the split in the pairs is on the presence of woody biomass -i.e. for Cropland, annual vs perennial crops; Settlements, treed vs other-:

Image of the substrate of the subs	gions La	nd representation table Annual land representation matrix (An	pproach 2 & 3)	
Land use category Area (1999) Remark • Forest Land 0 Remark • Managod Forest Land 0 Remark • Managod Forest Land 0 Remark • Managod Forest Land 0 Remark • Ummanged Forest Land 0 Remark • Ummanged Forest Land 0 Remark • Ummanged Forest Land 0 Remark • Croplend 1,000 Remark • Croplend Armal Crops 0 Remark • Croplend Armal Crops 600 0 • Land use subcategory (1990) (199) Remark • Ummanged Grassland 0 0 • Ummanged Grassland 0 0 • Ummanged Wetards 0 0 • Land use subcategory (1990) (199) Remark • Ummanged Wetards 0 0 • Ummanged Wetards 0 • Ummanged Wetards 0 </th <th>aion R</th> <th>ecion III Y Becion area (ba)</th> <th>1 000 000 Discrepancy (ha)</th> <th>Approach 3 199</th>	aion R	ecion III Y Becion area (ba)	1 000 000 Discrepancy (ha)	Approach 3 199
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Area (1999) (ha) Area (1999) (ha) Remark ■ Managed Grassland 0 ■ Umanaged Grassland 0 ■ Umanaged Grassland 0 ■ Land use category Area (1999) (ha) Remark ■ Vetlands 0 ■ Managed Wetlands 0 ■ Managed Wetlands 0 ■ Unmanaged Wetlands 0 ■ Unmanaged Wetlands 0 ■ Unmanaged Wetlands 0 ■ Unmanaged Wetlands 0 ■ Land use subcategory Area (1999) (ha) Remark ■ Land use category Area (ha) Remark ■ Settlements 0 Remark ■ Settlements (Treec) 4rea (1999) (ha) Remark ■ Settlements (Treec) 4rea (1999) (ha) Remark ■ Settlements (Cther) 0 0 ■ Land use category Area (1999) (ha) Remark ■ Settlements (Cther) 0 0 ■ Land use category Area (1999) (ha) Remark	Grass	sland	0	
Managed Grassland 0 Ummanaged Grassland 0 Land use category Area (1999) (ha) Remark Vetlands 0 Managed Vetlands 0 Managed Vetlands 0 Ummanaged Vetlands 0 Ummanaged Vetlands 0 Land use category Area (1999) (ha) Remark Managed Vetlands 0 Ummanaged Vetlands 0 Land use category Area (1999) (ha) Remark Settlements 0 Remark Land use subcategory Area (1999) (ha) Remark Settlements (Treed) 0 0 Ettand use category Area (1999) (ha) Remark Other Land Cher Land 0 Land use subcategory Area (1999) (ha) Remark		Land use subcategory	Area (1999) (ha)	Remark
Immanaged Grassland O Land use category Area (1999) (na) Remark Vetlands 0 Land use subcategory Area (1999) (na) Remark Managed Wetlands 0 Unmanaged Wetlands 0 Unmanaged Wetlands 0 Land use category Area (1999) (na) Remark Unmanaged Wetlands 0 Settlements 0 Settlements (Treed) 0 Settlements (Treed) 0 Settlements (Treed) 0 Land use category Area (1999) (ha) Remark Differ Land Area (1999) (ha) Remark Other Land 0 0	• M	anaged Grassland	0	
Land use category Area (1999) (ha) Remark Vetlands 0 Imaged Vetlands (1999) (ha) Remark Imaged Vetlands 0 Imaged Vetlands	⊕ U	nmanaged Grassland	0	
Wetlands 0 Land use subcategory Area (1999) (ha) Remark Managed Wetlands 0 Ummanaged Wetlands 0 Land use category Area (ha99) (ha) Remark Land use category Area (ha99) (ha) Remark Settements 0 Settements (Treed) Area (h99) (ha) Remark Settements (Cher) 0 Settements (Cher) Remark Land use category Area (1999) (ha) Remark Other Land Area (H99) (ha) Remark Dither Land Area (H99) (ha) Remark		Land use category	Area (1999) (ha)	
Area (1999) (ha) Remark Immanged Wetlands 0	Wetla	nds	0	
B Managed Wetlands 0 Ummanaged Wetlands 0 Land use category Area (1999) (ha) Remark Settlements 0 Settlements (Treed) Area (1999) (ha) Remark Settlements (Treed) 0 Settlements (Other) Area (1999) (ha) Remark Land use category Area (1999) (ha) Remark Umanaged Wetlands 0 Settlements (Treed) 0 Settlements (Other) Area (1999) (ha) Remark Umanaged Wetlands 0 Land use category Area (1999) (ha) Remark Uther Land 0 Land use subcategory Area (1999) (ha) Remark		Land use subcategory	Area (1999) (ha)	Remark
Immanaged Wetlands O Land use category Area (1999) (ha) Remark Settlements - - Land use subcategory Area (1999) (ha) Remark Land use subcategory Area (1999) (ha) Remark Extlements (Treed) - 0 Settlements (Treed) - 0 Settlements (Other) 0 - Settlements (Other) 0 - Understand use category Area (1999) (ha) Remark Other Land - - Land use subcategory Area (1999) (ha) Remark	M	anaged Wetlands	0	
Land use category Area (1999) (ha) Remark Settlements	⊕- Ui	nmanaged Wetlands	0	
Settlements O Land use subcategory Area (1999) (ha) Remark B Settlements (Treed) 0 Settlements (Other) 0 Land use category Area (1999) (ha) Remark Land use category Area (1999) (ha) Remark Other Land 0 Remark		Land use category	Area (1999) (ha)	Remark
Area (1999) (ha) Remark B Settlements (Treed) 0 Control 0	Settle	ments	0	
Draw Settlements (Treed) 0 Settlements (Other) 0 Land use category Area (1999) (ha) Remark Other Land - Land use subcategory Area (1999) (ha) Remark		Land use subcategory	Area (1999) (ha)	
Image: Settlements (Uther) U Land use category Area (1999) (ha) Remark Other Land 0 Land use subcategory Area (1999) (ha) Remark	⊕ Se	ettlements (Treed)	0	
Land use category Area (1999) (ha) Remark Other Land 0 0 Land use subcategory Area (1999) (ha) Remark	•	ettlements (Other)	0	
Dther Land 0 Cher Land use subcategory Cher		Land use category	Area (1999) (ha)	
Land use subcategory (1999) Remark (ha)	Other	r Land	0	
		Land use subcategory	Area (1999) (ha)	

Area – specified area of the subcategory for a chosen inventory year.

In **Remark**, users can enter notes relevant for the entire subcategory *(information is neither transferred to reporting tables nor can be printed)*

Clicking on 🕒 the lower level of the relevant subcategory opens. So, to enter a unit of land click on the 🕒 of its current use.

3rd level

Contains all land use subdivisions entered by users in the Land Use Manager (LUM) for the relevant subcategory:

		Land use category			Remark	
]- 🕨	For	est Land	remark upd			
		Land use subcategory	Area (ha)		Remark	
Þ		Managed Forest land		300 000	rupd	
		Current Land use subdivision			Remark	
		Plantation 1				X
		Plantation 2				×
		Plantation 3				×
		Forest drained				×
		Natural forest				X
		Organic plantation				×
		new forest custom type				×
		*				

In **Remark**, users can enter notes relevant for the entire subdivision *(information is neither transferred to reporting tables nor can be printed)*

Clicking on 1 the lower level of table opens where information on previous use and/or management of the unit of land as well as its area is to be entered. So, to enter a unit of land click on the 1 of its current type.

Tip: placing mouse pointer over any subdivision shows tooltip with information on that subdivision as entered in the Land Use Manager.

4th level

Allows entering Units of land, according to the Approach for the Land Representation selected for the Region. The set of guidance to enter information on units of land is subdivided in 2 subsets:

- ✓ Data input guidance to create a new unit of land. Note that some steps do not apply to all Approaches, as indicated
- ✓ Data input guidance to add/modify information of a unit of land

Note: although all possible combinations of subdivisions³⁰ are available in dropdown menu of relevant land use subcategories, users need to add information (areas) for those actually occurring only.

³⁰ as entered by users in the Land Use Manager

Data input guidance to create a new unit of land

For each unit of land, when first entered in the representation, the following step-by-step procedure applies:

- First step selecting, from dropdown menu, previous land use subcategory. It does not apply to Approach 1
- second step selecting, from dropdown menu, previous land use subdivision. It does not apply to Approach 1
- third step adding user-defined land unit code³¹
- ▶ fourth step adding Transition period. It does not apply to Approach 1
- Fifth step adding Year of conversion. It does not apply to Approach 1
- Sixth step adding Area. For Apporach 1 only, the area of the unit of land 20-year before is to be added too
- seventh step selecting, from Land Unit Parameters table under column "P", method to be applied to estimate C stock changes in each C pool
- eighth step adding any notes in Remark field
- > ninth step save unit of land by clicking button Save

³¹ Users can insert an alphanumerical code to track, and so recognize, the unit of land across the entire inventory time series.

First step, select, from the dropdown menu, the land use subcategory the unit of land had in the previous inventory year:



Note: In a consistent land representation, the time-series of land activity data needed begins **D** years before the first inventory year, where **D** is the transition period applied to land use and/or management conversions. Nevertheless, units of land are entered in the *Software* from the first inventory year onwards only. Consequently, given the first year of an inventory time series **A**, where users are adding a unit of land:

- When Approach 2 is applied: the information to be entered as previous subcategory is the subcategory to which the unit of land belonged in the year A-D. Where the previous land use subcategory or previous land use subdivision is different than the current one, a conversion occurred and thus users are required to enter the length of the Transition period D [Fourt step] as well as the year of conversion [Fifth step]
- When Approach 3 is applied: the unit of land may have undergone multiple land use and/or management chanages in the period from year A-D to year A, and consequently multiple changes need to be entered for the same unit of land. In such a case, moving from the year A-D onwards, users shall select as current land use category/subcategory and subdivision the category/subcategory and subdivision the land had after the conversion, even if the land in the first inventory year has a different current land use; same applies for subsequent land use and/or management changes that occurred before the first inventory year. Where the previous land use subcategory or previous land use subdivision is different than the current one, a conversion occurred and thus users are required to enter the length of the Transition period D [Fourt step] as well as the year of conversion [Fifth step]. For example:

For an inventory time series from year A to year A+20, a times series of activity data for the period A-D to A+20 is needed. The activity data time series of unit of land X shows a first conversion *-managed forest land to annual cropland*in the year A-(D/2) and a second conversion *-annual cropland to managed grassland*- in the year A-(D/4); no conversion in inventory year A and in any following inventory years occurred.



Given that:

- ✓ data input shall start from the first inventory year -i.e. year A- onwards, and
- ✓ data input of land use and/or management changes occurring before the first inventory year shall also be made be made from the first year of that period -i.e. year A-D- onwards, data input in the inventory year A in the land representation manager follows the following steps:
 - 1. <u>first</u>, enter the conversion from <u>managed forest land</u> to <u>annual cropland</u> occurred in the year **A-(D/2)**, where <u>annual cropland</u> is the current land use subcategory and <u>managed forest land</u> is the previous land use subcategory:



2. <u>second</u>, enter the conversion from <u>annual cropland</u> to <u>managed grassland</u> occurred in the year A-(D/4), where <u>managed grassland</u> is the current land use subcategory and <u>annual cropland</u> is the previous land use subcategory. This is

done by using the functionality for "further conversion" "¹" that is available when Approach 3 for land representation is applied [section on "Data input guidance limited to units of land under Approach 3 for land representation"]

New Land Unit Conver	sion	×
Current conversion stat	tus	
From	Managed Forest Land / FL Custom 1	
То	Cropland Annual Crops / Tes 1	
Transition Period (D)	20 Year of conversion 1980	
New conversion to		
Land use subcategory	Managed Grassland v	
Land use subdivision	Test GL 🗸	
Transition Period (D)	20	
Year of conversion	1985 ~	
Remark		
	Save Cancel	

Thus, in the first inventory year **A** the unit of land is shown in the land representation manager as:



which means that the unit of land was first classified under cropland and finally classified under grassland; although information on first conversion remains associated with the unit of land, but shown in gray to indicate that such dynamic isn't anymore ongoing in the year A.

NOTE: data entry for conversions of a unit of land is to be done from the first year of the inventory time series forward; trying to enter data in the reverse order -i.e. from the latest inventory year backward- does not work.

In case of **Approach 1** for land representation, this **first step** does not apply since land use and/or management changes are neither identified nor tracked.

Second step, select, from the dropdown menu, the land use subdivision the unit of land had in the previous inventory year:



Note: see **Note** at **first step**. Same applies here.

In case of **Approach 1** for land representation, this **second step** does not apply since land use and/or management changes are neither identified nor tracked.

Tip: Within each region, conversions from one subdivision to another subdivision is restricted by the following rules:

- cannot convert any subdivisions of managed subcategories -<u>Managed Forest land</u> [MFL], <u>Cropland</u> (both subcategories) [CL], <u>Managed Grassland</u> [MGL], <u>Managed Wetlands</u> [MWL], <u>Settlements</u> (both subcategories) [SL], <u>Managed Other land</u> [MOL]- to any subdivisions of unmanaged subcategories -<u>Unmanaged Forest land</u> [UFL], <u>Unmanaged Grassland</u> [UGL], <u>Unmanaged Wetlands</u> [UWL], <u>Unmanaged Other land</u> [UOL]-
- ✓ soil type in previous and current land subdivision shall be the same [Land Use Manager]
- ✓ climate region in previous and current land subdivision shall be the same [Land Use Manager]
- ✓ for Forest land only, ecological zone in previous and current land subdivision shall be the same [Land Use Manager]

Third step, enter the **user-defined land unit code**, while the *Software* compiles the **automatic land unit code** [section on "Automatic unit of land codes"].

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 (1990) (ha)	Remark	Р	см	
*	example 1	Cropland Annual Crops 🗸	Tes 1 🗸	20	1990	Ө ↔		2		x

Although this is not a mandatory information to enter, it is recommended to do so in order to facilitate users in data entry in the calculation Worksheets for C stock changes and associated GHG emissions and removals. Indeed, in those worksheets a number of units of land are visualized together and the **land unit code** allows to distinguish among those.

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Automatic unit of land codes

In any given point of time, the automatic code is generated from Current land use subdivision under which the unit of land is classified. In case there is an ongoing transition, automatic code also contains a code of the subdivision from which the unit of land is being converted together with indication of the age of conversion (using "Cx" suffix, which means x^{tb} year in conversion (relative to current inventory year, see picture below):

	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	Ρ	с	м	
Đ	PCL-AP-UD-10	3	Cropland Perennial Crops	agroforestry - pepper	NA	NA	400 <>		2			x
Đ	PCL-AP-UD-15<-ACL-SI-C0	2	Cropland Annual Crops	soybean intensive	20	2010	100 ()		3			x
•	PCL-AP-UD-18<-ACL-SI-C_	0	Cropland Annual Crops	soybean intensive	20	2000	100 ↔		3	U		x

Coding elements according to land use categories are shown hereafter:

Forest land

[M,U]FL-NAMEabbr-[PL,NF]-FTabbr-LUID

[M,U] = either Managed or Unmanaged

NAMEabbr = Subdivision name abbreviation (automatically generated from Subdivision name)

[PL,NF] = either Plantation or Natural forest

FTabbr = Forest type name abbreviation (automatically generated from Forest type name)

LUID = unit of land database ID

<u>Example</u>:

MFL-OP-PF-TG-48 = Managed Forest land - Organic plantation - planted forest - Tectona grandis - 48 DB ID

Cropland

[P,A]CL-NAMEabbr-[CTp,RE]-LUID

[P,A] = either Perennial or Annual

NAMEabbr = Subdivision name abbreviation (automatically generated from Subdivision name)

[CTp,RE] = CTp – either crop type abbreviation (for perennial) or RE in case of rice ecosystem (for annual)

LUID = unit of land database ID

<u>Example:</u>

PCL-BF-OP-62 = Perennial cropland – Belvedere Farm - Oil palm - 62 DB ID

Grassland

[M,U]GL-NAMEabbr-VegType-[IMP]-LUID

[M,U] = either Managed or Unmanaged

NAMEabbr = Subdivision name abbreviation (automatically generated from Subdivision name)

VegType = vegetation type

IMP - only in case of improved grassland

```
LUID = land unit database ID
```

<u>Example:</u>

MGL-TG-ST-IMP-67 = Managed GL - Test grassland - Steppe - improved - 67 DB ID

Wetlands

[M,U]WL-NAMEabbr-[P,F,O]-LUID

[M,U] = either Managed or Unmanaged

NAMEabbr = Subdivision name abbreviation (automatically generated from Subdivision name)

[P,F,O] = either Peatlands (P) or Flooded land (F) or Other land (O)

LUID = unit of land database ID

<u>Example:</u>

MWL-P2-P-82 = Managed WL - Peatlands 2 - Peatlands - 82 DB ID

Settlements

[T,O]SL-NAMEabbr-LUID [T,O] – either Treed or Other NAMEabbr = Subdivision name abbreviation (automatically generated from Subdivision name) LUID = land unit database ID

<u>Example:</u>

TSL-S1-59 = Treed SL - Settlements 1 - 59 DB ID

Other land

[M,U]OL-NAMEabbr-LUID

[M,U] = either Managed or Unmanaged

NAMEabbr = Subdivision name abbreviation (automatically generated from Subdivision name)

LUID = unit of land database ID

<u>Example:</u>

MOL-OL1-67 = Managed OL - Other land 1 – 67 DB ID

Additional Suffix (Approach 2 and 3 only)

Relative to current inventory year: Cx (where x indicates the xth year in which the land is under conversion. **Note**: the xth year in which the conversion occurs has number 1

Fourth step, enter the Transition period, in years. By default the value of 20-year is used by the Software.

	Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	(D) (D) (years)	Year of conversion	Area (1990) (ha)			м	
÷	*	example 1	Cropland Annual Crops 🗸	Tes 1 🗸	20	1990	1,000 💮		2		x
						·					

The **Transition period** (**D**) is the time period according to which the *Software* tracks the previous land use subcategory/subdivision of a unit of land undergoing a land use subcategory/subdivision conversion.

In case of **Approach 1** for land representation, this **fourth step** does not apply since land use and/or management changes are neither identified nor tracked.

Fifth step, select the **Year of conversion** from a dropdown menu populated by the *Software* with all years of the time period **Y-D**:

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 (1990) (ha)		Р	с	м	
*	example 1	Cropland Annual Crops	~	Tes 1	\sim	20	1990	1,000 💮		2			>
								/					

The **Year of conversion** precompiled by the *Sofwtare* is the current inventory year **Y**.

In case of **Approach 1** for land representation, this **fifth step** does not apply since land use and/or management changes are neither identified nor tracked.

Sixth step, enter the **Area**, in hectares (ha), of the unit of land in the relevant inventory year.

	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 (1990) (ha)	Remark		м
٠	*	example 1	Cropland Annual Crops 🗸	Tes 1 🗸	20	1990	1,000 💮		2	×
						1				

Note: the area value cannot have more than three decimals.

Once the **area** is entered, users select to which time period of the inventory time series the area value entered applies. To do so, users open a dialog window by clicking on element \bigcirc next to the Area column, and then select the desired option:

Area update mode	×
Current inventory year only	
Ourrent inventory year and all subset	equent inventory years
O Current inventory year and all previo	ous inventory years
O All inventory years	
	Update Cancel

The Dialog Window contains 4 options. By default the option **Current inventory year and all subsequent inventory years** applies, which means that if this is the option users wish to apply, no action will be needed.

Approach 1 specific rule

In case of **Approach 1** for land representation, this **sixth step** requires to add the area for a year equal to **Y-20**, where **Y** is the inventory year for which information is being entered. For example data entry for a unit of land in the year 1990 for an Approach 1 Land representation requires to enter the area that that same unit had in 1970:

Land unit code (Automatic)	Land unit code (User defined)	Area (1990) (ha)	Area (1970) (ha)	Remark P
MFL-O-PL-TG5	example 2	1,000 🛶	900	X

This information is critical to allow the *Software* to implement Formulation A of Equation 2.25 for the calculation of SOC changes

Note: even if the area of the unit of land area in a given year Y is 0 (zero) the area of 20 years before must be entered

Seventh step, select the methodology to be applied to each C pool to calculate the C stock changes. IPCC provides 2 methodological approaches to estimate C stock changes in C pools (*Section 2.2.1 - Overview of carbon stock change estimation*): the Gain & Loss method and the Stock-Difference method.

To do so, users open a dialog window by clicking on element window by clicking on element a symbol under letter (Pools):

Land Unit Parameters		×
C pools / Methods		
Biomass change	Gain & Loss	\sim
DOM - Deadwood	Gain & Loss	\sim
DOM - Litter	Gain & Loss	\sim
SOM - Mineral	Default	\sim
	Default Stock difference	
	Save	Cancel

The Dialog Window contains 4 Carbon pools: **Biomass, Dead Organic Matter – Deadwood, Dead Organic Matter – Litter, Soil Organic Matter – Mineral**. For each C Pool the methodology is to be selected between the IPCC default methodology³², which is the **Gain & Loss**, and the IPCC alternative methodology, which is the **Stock-Difference**. For each C pool, by default the option **Gain & Loss** applies, which means that if this is the option users wish to apply, no action will be needed.

³² To calculate SOC changes in mineral soils, IPCC default method applies equation 2.25, in Formulation A or B according to the Approach applied to the Land representation

Eighth step, enter any information on the unit of land users wish to recall or just to show to future users:



In **Remark**, users can enter notes relevant for the entire subdivision *(information is neither transferred to reporting tables nor can be printed)*

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Ninth step, save the information entered by clicking on the **Save** button (bottom of the window). When saving, the *Software* record all information on the unit of land in the database and assign an **automatic land unit code**.

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 (1990) (ha)	Remark	Р	с	м
MFL-FC1-PL-P-6<-MGL-T	example 4	Managed Grassland	Test GL	20	1990	1.000 💮	abandoned land	2		×

Once saved, information cannot be changed anymore with the exception of the following fields:

- ✓ user-defined land unit code
- ✓ area
- ✓ remark

In case an error is spotted in any of the other fields, to correct it the entire row of information needs to be deleted -to do so click on the symbol "X" at the right hand side-, then all information on the unit of land is to be entered again.

Data input guidance to add/modify information of a unit of land

Two additional functionalities are available to modify information entered for a unit of land:

- \blacktriangleright button <u>M</u>, to merge it with another unit of land. This does not apply to Approach 1
- button <u>C</u>, to add a new conversion to a unit of land that is still undergoing a conversion. This applies to Approach 3 only

As noted: information entered in the following fields:

- ✓ user-defined land unit code
- ✓ area

✓ remark

can be changed at any time. However, note that a new information entered in the field **user-defined land unit code** or in the field **remark** in any of the inventory years is automatically propagated by the *Software* to the entire time series, while for the area users shall select the time period within the inventory time series to which the new value applies; where no selection is made by default the option **Current inventory year and all subsequent inventory years** will apply.

In case an error is spotted in any of the other fields, to correct it the entire row of information needs to be deleted -to do so click on the element X at the right-hand side-, then all information on the unit of land is to be entered again.

Button "**M**" is to be clicked in case users wish to merge the unit of land with another unit of land -this makes the *Software* stop tracking the unit of land any further. This functionality applies only to units of land that have undergone completely the transition period of a conversion from one land use category/subdivision to another one, and are therefore shown in blue ink by the *Software*.

In the example below, the unit of land *MFL-PP-PL-P-25* has completed its conversion to *Managed Forest land – Pine plantation*. Accordingly, the *Software* has changed the associated **Transition period** and **Year of conversion** as NO.

					Area (1991) (ha)						
Þ	Ma	anaged Forest Land				120					
			Current Land use subdi	ivision			Rer	nark			
	e -	Pine plantation									×
		Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	e Previous Land use subdivision	Transition perio [T] (years)	d Year of conversion	Area (1991) (ha)	Remark	PN	4
	Ð	MFL-PP-PL-P-23	1	Managed Forest Land	Pine plantation	NA	NA	100 ↔		2	×
		MFL-PP-PL-P-24<-MGL-P-P	1	Managed Grassland	Pasture	20	1990	10 💮			×
	Ð	MFL-PP-PL-P-25	1	Managed Forest Land	Pine plantation	NO	NO	10 ↔		0	×
										_	

Thus, given that same values for parameters and emission factors apply to unit of land *MFL-PP-PL-P-25* and unit of land *MFL-PP-PL-P-23* users may decide to merge the 2 units. In such a case, by clicking button "M" in the row of the unit of land *MFL-PP-PL-P-25* the following dialog window opens

Source Land Unit		
Land use subcategory	Managed Forest Land	
Land use subdivision	Pine plantation	
Land unit	MFL-PP-PL-P-25	
Area [ha]	10	
Land Unit	Managed Forest Land	
Land use subdivision	Pine plantation	`
Land unit		``````````````````````````````````````
Area [ha]	+10 [ha]	

Then, users select the unit of land to which the unit of land is to be merged (in this example, unit of land *MFL-PP-PL-P-23*)

Merge Land Unit		×
Source Land Unit	Managed Enget Land	
Land use subdivision	Pine plantation	
Land unit	MFL-PP-PL-P-25	
Area [ha]	10	
Target Land Unit		
Land use subcategory	Managed Forest Land	\sim
Land use subdivision	Pine plantation	~
Land unit	MFL-PP-PL-P-23	\sim
Area [ha]	100 +10 [ha]	
	Merg	e Cancel

Once merged, the unit of land *MFL-PP-PL-P-25* disappears and its area is added by the *Software* to the area of the unit of land *MFL-PP-PL-P-23* from the year in which the merging is made onward.

Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	Transition period [T] (years)	Year of conversion	Area (1991) (ha)	Р	м	
MFL-PP-PL-P-23		Managed Forest Land	Pine plantation	NA	NA	110 (->	3		×
MFL-PP-PL-P-24<-MGL-P-P_		Managed Grassland	Pasture	20	1990	10 (-)	3		x
6			~			<->	2		

That means that the merging does not occur backward. The following picture is taken from the land representation of the previous year:

Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	Transition period [T] (years)	Year of conversion	Area (1990) (ha)		
MFL-PP-PL-P-23		Managed Forest Land	Pine plantation	NA	NA	100 ↔	2	x
MFL-PP-PL-P-24<-MGL-P-P_		Managed Grassland	Pasture	20	1990	10 ()	3	x
MFL-PP-PL-P-25<-MGL-P-P_		Managed Grassland	Pasture	30	1961	10 💮	3	×

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In any case, merging is just an option; users may wish to keep reporting the two units of land separated beyond the conversion period (e.g. since belonging to two different administrations). In such a case the previous subcategory/subdivision can still be examined after expanding the next level (conversion history), and it is shown in grey, as in the example below:

	MFL-TGN-NF-TG-89	Managed Forest	Tectona grandis NF NO	NO	15 0	00
	Previous Land use subcategory	Previous Land use subdivision	Transition period [T] (years)	Year of conversion	י ד	Remark
	Settlements (Treed)	Settlement 1 (T)	20	1971		

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Button "C" is to be clicked in case users wish to enter a new conversion for a land that is still under conversion, and thus it applies under Approach 3 for land representation only.

	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)	Р	с	м	
	PCL-AP-UD-10	3	Cropland Perennial Crops	agroforestry - pepper	NA	NA	400 (>				×
Ð	PCL-AP-UD-15<-ACL-SI-C0	2	Cropland Annual Crops	soybean intensive	20	2010	100 (>	Z			×
Ð	PCL-AP-UD-18<-ACL-SI-C_	0	Cropland Annual Crops	soybean intensive	20	2000	100 💮	Z	Ű		×

NOTE: data entry for conversions of a unit of land is to be done from the first year of the inventory time series forward; trying to enter data in the reverse order -i.e. from the latest inventory year backward- does not work.

By pressing the button **C** a new dialog window opens:

From	Oropland Annual Crops / soybean intensive Oropland Perennial Crops / agroforestry - pepper				
То					
Transition Period (D)	20 Year of conversion 2010				
New conversion to					
Land use subcategory	Managed Forest Land	v			
Land use subdivision	Restoration AB (AC 10)	v			
Transition Period (D)	20				
Year of conversion	2020 ~				
Remark					

The dialog window is composed of 2 sections:

- > The upper section with information, on the *Current conversion status* of the unit of land, as compiled by the *Software*.
 - ✓ Previous land subdivision,
 - ✓ Current land use subdivision
 - ✓ Transition Period
 - ✓ Year of conversion
- > The lower section with information, on the *New conversion to* of the unit of land, to be entered by users:
 - ✓ New Land subcategory,
 - ✓ New Land subdivision,
 - ✓ Transition Period
 - ✓ Year of conversion³³
 - ✓ Remark (if any)

After pressing Save, the unit of land is automatically relocated under the subdivision entered in the *New Conversion to* section and the previous subdivision assigned to the unit by the *Software* is the one that was in the *Current conversion* status. The *Software* navigates to the relocated unit of land automatically.

In this example a land under conversion to cropland is further converted to forest land; consequently, the *Software* relocate the subdivision under forest land:



The previous land conversion is shown at a lower lever (5th) in grey.

³³ Year of conversion dropdown contains the list of years from: 'the year of conversion reported under the *Current conversion status* + 1 year' up to the *current inventory year*. In this example, being 2020 the inventory year, the dropdown menu includes the years 2011-2020

5th level

It shows the complete history of transitions of the unit of land relative to the current inventory year, ordered by year of transition descending and shown in grey (picture below).



Indeed, the Land unit conversion in a given point of time -i.e. the chosen inventory year- is automatically presented considering current status of land unit together with its history of transitions. For example, a unit of land experiences multiple conversions within the time period analyzed for inventory purposes. Note that although the inventory period is 1990-2022, the inventory compiler has analyzed a time series of data starting in 1971 -i.e. 1971-2022- because of the transition period applied is of 20 years. Then,

in 1975, the unit of land transition from MGL/prairie organic rewetted inland to ACL/maize organic drained



Note: this conversion occurred before the initial year of the inventory time series -i.e. 1990-2020; thus it is entered in the year 1990

in 1983, the unit of land transition from ACL/maize organic drained to MFL/Tectona grandis Planted Forest



Note: this conversion occurred before the initial year of the inventory time series -i.e. 1990-2020; thus it is entered in the year 1990

in 2002, the unit of land transition from MFL/Tectona grandis Planted Forest to TSL/urban



Note: this is the latest conversion of this unit of land and occurred in the inventory year visualized -i.e. Year of conversion = Inventory year = 2002-, thus the button "C" for intervening new conversion is NOT available.

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in **2022**, the land unit has gone through the entire transition period (i.e. 20-year) since the last conversion; thus it has been reclassified by the *Software* as a remaining land -i.e. *NO* is applied by the *Software* for the *Transition period* [D] and for the *Year of Conversion*³⁴- and colored in blue. History layer shows all the previous conversions:



Because in 2022 the unit of land is in a remaining category, it cannot intervene in any further conversion.

Note: Data entered are recorded in the DB when pressing the **Save** button. Thus, the *Undo* button can be used to discard all changes made since the last save, it does not cancel information that was entered before saving. In case of a data entry saved that is to be corrected, the only way to achieve it is to delete the wrong data entry (by clicking the red X on the extreme right end of the row) and to re-enter the correct one.

 $^{^{34}}$ Note that for a unit of land that did not intervene any conversion across the entire time series of the inventory the notation key NA is used by the *Software*.

Annual land representation matrix Tab

For land representation approaches 2 and 3, a land matrix Tab provides for the total area of the land representation to be classified either as a land that has not undergone a change between the initial (rows) and final (columns) year of the land-use conversion matrix or as a land that has undergone a change between 2 different subcategories.

Note: that such classification does not correspond to the IPCC categorization in *land remaining under one use/management* and *land under conversion from one use and/or management to another one*. Although a land reported in a matrix as converted from the initial year to the final year is part of the IPCC *land under conversion* categories, such categories include also land that have undergone a change in use and/or management in years before the initial year of the land-use conversion matrix.

For instance,



in the year 2015, 80 ha are reported as converted -from the initial year to 2015- from <u>managed grassland</u> to managed forest land. In the year 2015, those 80 hectares are reported, in the national GHG inventory, under Grassland converted to Forest land. However, in the same year additional land is reported under Grassland converted to Forest land -i.e. in any inventory year Y, any category with conversion lands (*Land converted to Land use X*) sums up all lands converted in the period Y to Y-(D-1)³⁵ to that category (X)-, for instance the 40 ha reported in the land-use conversion matrix of the year 2010.

³⁵ Where D is the Transition Period entered by users in the Land Representation Manager for the relevant *land conversion* category

Area Data Transfer to Calculation Worksheets

The compilation of data in the Land Representation Manager allows the *Software* to populate area data in the relevant calculation worksheets in each of the relevant inventory categories of the AFOLU sector. This also means that area data cannot directly be entered in those calculation worksheets.

The transfer of area data to the relevant worksheets is ruled by the:

- Characterization of the land type, as entered in the Land Use Manager
- Land Representation Approach, as selected in the Land Representation Manager
- Method to calculate C stock changes in each C pool, as selected in the Land Representation Manager

Tables in the section <u>calculation Worksheets for C stock changes in, and CO₂-C fluxes from/to, C pools</u> below show how for each C pool in each land use category the *Software* maps Area Data entered in the Land Representation Manager to the relevant calculation worksheets.

Tables in the section <u>calculation Worksheets for CH_4 and N_2O emissions from land</u> below show how the *Software* maps Area Data entered in the Land Representation Manager to the relevant calculation worksheets for N_2O and CH_4 emissions estimates.

Calculation Worksheets for C stock changes in, and CO₂-C fluxes from/to, C pools

The calculation worksheet to which the *Software* maps units of land, as well as the time period over which a unit of land is mapped to a specific calculation worksheet, depends on:

- > Approach for land representation:
 - \checkmark Approach 1, the transition period (D) is fixed to 20 years;

No conversions are reported, thus units of land are all populated for the entire³⁶ inventory time series (regardless of its length) in the Land Remaining categories only, -i.e. 3.B.1.a, 3.B.2.a, 3.B.3.a, 3.B.4.a, 3.B.5.a, 3.B.6.a-.

- ✓ Approaches 2 and 3, users assign the transition period (D) to each unit of land where a use and/or management change occurred (i.e. the current subdivision is different from the previous subdivision). By default the *Software* assigns a 20-year value, and accordingly each unit of land is reported in the relevant calculation worksheets for the entire transition period in a conversion status:
 - either within the relevant Land Conversion category, in case of a land use change (once the conversion period is ended the unit of land is mapped to the relevant Land Remaining category)
 - or within the Land Remaining categories -in case of a management change within the same land use-.

Although, in case of Land Representation Approach 3 only, in case of a subsequent conversion the unit of land is transferred to the new land category/subcategory/subdivision even if the transition period has not achieved its end.

- The method (see Table 9) selected -in the Land Representation Table- for each C pool to estimate associated C stock changes or CO₂-C fluxes:
 - ✓ SOM mineral soils IPCC Default method: formulation A of IPCC Equation 2.25 is applied to units of land reported under Approach 1 for Land Representation, accordingly those units of land are populated in the calculation worksheet "SOM mineral Eq. 2.25 Formulation A" (each unit in the category relevant to its subdivision) for the entire³⁷ inventory time series regardless of its length;
 - ✓ SOM mineral soils IPCC Default method: formulation B of IPCC Equation 2.25 is applied to units of land reported under Approaches 2 or 3 for Land Representation, accordingly those units of land are populated in the relevant calculation worksheet "SOM mineral Eq. 2.25 Formulation B" (each unit in the category relevant to its subdivision and conversion status) for the length of the transition period only, or in case of Approach 3 for a shorter period if a new conversion occurs before the transition period is completed;
 - ✓ Biomass/DOM Gain and Loss method: the units of land are mapped to the relevant calculation worksheets³⁸ for the entire inventory time series regardless of its length;
 - ✓ SOM/Biomass/DOM Stock-Difference method: the units of land are mapped to the relevant calculation worksheets³⁹ for the entire inventory time series regardless of its length;
- The process (see Table 3) for each C pool causing C stock changes/CO₂-C fluxes:
 - ✓ SOM organic/SOM mixed soils: where the soil status is "Drained" or "Rewetted" the units of land are reported in the relevant calculation worksheet "SOM Organic Drained" or "SOM Organic Rewetted" for the entire⁴⁰ inventory time series regardless of its length, unless a conversion to the new activity occur⁴¹ (in such a case the unit of land is transferred to the calculation worksheet corresponding to the new activity);
 - ✓ SOM mineral/organic/mixed soils, status is *Extracted* the units of land are reported in the relevant calculation worksheet SOM (SD Approach 1) -for the entire period for which an area is associated to the unit of land, although users SHALL calculate C stock losses in the year of the first occurrence only- and SOM (SD Approaches 2003), although the Software keep mapping the unit of land in the relevant calculation worksheet in the year of

⁴⁰ From the onset of the activity onward

³⁶ From the first appearance of the unit of land in the inventory

³⁷ From the first appearance of the unit of land in the inventory

³⁸ For each C pool a pair of calculation worksheets is provided to report with stock-difference, one worksheet applies to units of land reported with Approach 1 for Land Representation and the other one to units of land reported with Approaches 2 or 3

³⁹ For each C pool a pair of calculation worksheets is provided to report with stock-difference, one worksheet applies to units of land reported with Approach 1 for Land Representation and the other one to units of land reported with Approaches 2 or 3

⁴¹ e.g. a drained land subsequently rewetted

conversion only (given that thereafter the SOC of extracted soils is 0 and so no emissions/removals will thereafter occur from SOM).

- The combination of process (see Table 3) and method selected. Where the method selected is the IPCC Default and the C pool is
 - ✓ Biomass; in case of conversion, any conversions, that causes an abrupt loss of biomass, the unit of land is mapped to the calculation worksheet "Biomass change (Abrupt)" in the year of conversion only.
 - ✓ DOM; limited to land of *Peatland under extraction*, the unit of land is mapped to the calculation worksheet "DOM (G&L Abrupt)" in the year of site-clearing only -i.e. the year of the inventory time series in which the unit of land is first reported-.
| 140 | he > 11 00 Delaul | t methods to estimate | e stoek enanges/ 662-6 nuxes in e pools |
|---------------------|-------------------|------------------------|---|
| | C Pool | | IPCC default methodology |
| Biomass | Above-Ground | | Equation 2.4. Cain and Loss |
| Diomass | Below-Ground | | Equation 2.4 - Gain and Loss |
| Dood Organia Matter | Dead Wood | | Equation 2.4. Cain and Loss |
| Dead Organic Matter | Litter | | Equation 2.4 - Gain and Loss |
| | | No change in hydrology | |
| | Mineral soils | Drained | Equation 2.25 |
| | | Rewetted | |
| Soil Organia Mattar | | Extracted | Equation 4.6 |
| Son Organic Matter | | No change in hydrology | NA |
| | Organic soils/ | Drained | Equation 2.26 / Equation 2.3 |
| | Mixed soils | Rewetted | Equations 3.4/3.5 |
| | | Extracted | Equation 4.6 |

Table 9 IPCC Default methods to estimate C stock changes/CO2-C fluxes in C pools

Table 10 Processes causing CSCs in, and CO₂-C fluxes from/to, C pools

					(C pools		
	Pro	ocess	Bio	mass	Dead Orga (DC	anic Matter DM)	Soil Organic Matter (SOM)	
			above gro	below ⁴² ound	Dead Wood	Litter	Mineral so	Organic ⁴³ oils
	Biomass growth⁴⁴ gross growth minus the losses due to natural mortality			X				
C inputs	DOM inputs ⁴⁵			2	X			
	SOM CO ₂ -C net influx ⁴⁶							X
	SOC net input/or	SOC net input /output					x	
	p							
	Biomaga lagana	Harvest/Fuelwood collection	Х	Х				
C outputs	biomass losses	Disturbances ⁴⁷	X	X				
Julpuis	DOM outputs ⁴⁸				2	X		
	SOM CO ₂ -C net o	outflux ⁴⁹						X

X indicates that the 2006 IPCC Guidelines and its Wetlands Supplement provides guidance to estimate C stock changes or CO₂-C fluxes from the relevant C pool impacted by the relevant process

Tables 11-19 below illustrate the mapping of AD (i.e. areas of land) sourced from the <u>Land Representation Manager</u> to the applicable calculation worksheets, depending on the C pool, its characteristics (e.g. soil status), the method applied to calculate C stock changes and CO₂-C fluxes and the land representation approach.

Each table is composed by 2 parts for each land use category present in the table:

⁴² At Tier 1 inventory compilers may exclude belowground biomass gains/losses

⁴³ this includes mixed -i.e. mineral and organic- soils in Coastal Wetlands

⁴⁴ this is the gross growth minus the losses due to natural mortality. In other words the net increment

⁴⁵ caused by harvest and other disturbances in biomass pool

⁴⁶ Due to rewetting

⁴⁷ fires, pests, landslides, floodings, etc.

⁴⁸ due to decay, fuelwood collection, fires

⁴⁹ due to drainage

Part 1 "units of land not converted to and with no management change", with mapping for every unit of land that has not changed its category/subcategory/subdivision in the last D years, where D is the length, in years, of the transition period.

Note: for Approach 1 Land Representation all units of land in the NGHGI are reported for the entire time series as *units of land not converted to and with no management change*.

Part 2 "Units of land converted to, or with only a management change", with mapping for every unit of land that has changed its category/subcategory/subcategory/subdivision in the last D years, where D is the length, in years, of the transition period, although some of the C stock losses are estimated in the year of category/subcategory/subcategory/subdivision change only;

A **X** indicates that the unit of land with the relevant combination of C pool, Method⁵⁰, Approach and current and historical land category/subcategory/subcivision is mapped to the calculation worksheet in the table's column.

<u>Tables 11 - 12</u> map units of land to the calculation worksheets for the Biomass C pools;

Table 13 maps units of land to the calculation worksheets for the DOM C pools;

Tables 14 - 15 map units of land to the calculation worksheets for the SOM mineral soil C pool

Tables 16 - 17 map units of land to the calculation worksheets for the SOM organic and mixed soils C pool

Tables 18 - 19 map units of land to the calculation worksheets for the SOM organic and mixed soils C pool

This means that the corresponding activity data -i.e. area- will only appear in the relevant calculation worksheet if all relevant criteria exist (e.g. soil type/soil status/C pool/Method/Approach). Activity data are all sourced from the Land Representation Manager, with the exception of the calculation worksheets to implement the Stock-Difference method with Approach 1 Land Representation (given that the area of the unit of land is not needed there to perform the calculation of the net C stock change).

⁵⁰ method applied to calculate C stock changes and CO₂-C fluxes

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Table 11 Mapping units of land to calculation TABs for Biomass C	pools in Forest Land, Cropland, Grassland
	1 , 1 ,

Land Representat	ion Manager		5		Calculation TABs	- BIOMASS C POC	DLS				
Method ⁵¹	Approach ⁵²	Biomass Gains (G&L 1/4)	Biomass Loss (G&L 2/4)	Biomass Loss (G&L 3/4)	Biomass Loss (G&L 4/4)	Biomass Change (G&L)	Biomass Change (Abrupt) ⁵³	Biomass SD - Approach 1	Biomass <i>SD - Approaches 2&3</i>		
	<u>.</u>	Units of land	not converted to	and with no mana	gement change []	Forest land remainin	g Forest land]				
	1	V	v	V	V						
IPCC Default	2 or 3	А	Λ	Λ	Λ						
Stock Difference	1							X			
Stock-Difference	2 or 3								X		
Units of land converted to [Land converted to Forest land], or with only a management change [Forest land remaining Forest land]											
IPCC Default	2 or 3	X	X	X	X		X				
Stock-Difference	2 or 3								X		
	Units of land not converted to and with no management change [Cropland remaining Cropland]										
	1					N 54					
IPCC Default	2 or 3					Λ^{37}					
Stock Difference	1							X			
Stock-Difference	2 or 3								X		
	Units	of land converted to	• [Land converted	to Cropland], or	with only a manag	ement change [Cro	pland remaining Cro	opland]	-		
IPCC Default	2 or 3					X ⁵⁵	X				
Stock-Difference	2 or 3								X		
	<u>.</u>	Units of lan	d not converted to	o and with no man	agement change	[Grassland remainir	g Grassland]		<u>.</u>		
	1					Y					
IPCC Default	2 or 3					X					
Starl Differen	1							X			
Stock-Difference	2 or 3								X		
	Units	of land converted to	[Land converted	to Grassland], or v	vith only a manag	ement change [Gras	sland remaining Gr	assland]			
IPCC Default	2 or 3					X	X				
Stock-Difference	2 or 3								X		

 ⁵¹ Methodological approach applied to estimate annual net C stock change in SOM C pool
 ⁵² Approach applied to Land Representation
 ⁵³ In the year of conversion only

⁵⁴ Limited to Perennial crops

⁵⁵ Including annual crops, although in the year of conversion only

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Table 12 Mapping units of land to calculation TABs for Biomass C pools in Wetlands, Settlements, Other land

Land Represen	tation Manager		Calculation TABs -	BIOMASS C POOLS						
Method ⁵⁶	Approach ⁵⁷	Biomass Change (G&L)	Biomass Change (Abrupt) ⁵⁸	Biomass (SD - Approach 1)	Biomass (SD – Approaches 2&3)					
	Units	of land not converted to and with	no management change [Wetland	ls remaining Wetlands] ⁵⁹						
IPCC Default	1	x								
	2 or 3	<u>A</u>								
Stock-Difference	1			X						
Stock Difference	2 or 3				X					
	Units of land conve	erted to [Land converted to Wetlan	ds], or with only a management cl	hange [Wetlands remaining Wetlan	ds]					
IPCC Default	2 or 3	\mathbf{X}^{60}	Х							
Stock-Difference	2 or 3				X					
Units of land not converted to and with no management change [Settlements remaining Settlements]										
IPCC Default	1	V 61								
II CC Delaut	2 or 3	<u></u>								
Stock-Difference	1			X						
Stock-Difference	2 or 3				X					
	Units of land convertee	d to [Land converted to Settlement	ts], or with only a management ch	ange [Settlements remaining Settler	ments]					
IPCC Default	2 or 3	Х	Х							
Stock-Difference	2 or 3				X					
		Other 1	and remaining Other land							
IPCC Default	1									
	2 or 3									
Stock-Difference	1									
Stock-Difference	2 or 3									
		Units of la	and converted to Other Land							
IPCC Default	2 or 3		X							
Stock-Difference	2 or 3		X62							

⁵⁶ Methodological approach applied to estimate annual net C stock change in SOM C pool

⁵⁷ Approach applied to Land Representation

⁵⁸ In the year of conversion only

⁵⁹ Limited to Other Wetlands

⁶⁰ Limited to Other Wetlands

⁶¹ Treed Settlements only

⁶² Even if the Stock-Difference is selected, the units of land will be mapped in the "Biomass Change (Abrupt)" calculation worksheet; and the Stock after conversion is to be set to zero (0).

Table 13 Mapping units of land to calculation TABs for DOM C pools in all land categories

Land Represe	ntation Manager		Calculation TABs - DOM C POOLS							
Method ⁶³	Approach ⁶⁴	DOM (G&L) ⁶⁵	DOM (SD - A 1) ⁶⁶	DOM (SD - A 2) ⁶⁷						
[Forest land 1	remaining Forest land; Cro	Units of land not converted to and opland remaining Cropland; Grassland remaining	with no management change ng Grassland; Wetlands remaining Wetlands ⁶⁸ ; S	Settlements remaining Settlements]						
IPCC Default	1 2 or 3	Х								
Stock-Difference	1		X							
	2 or 3			X						
[Lan [Forest land	Units of land converted to [Land converted to Forest land; Land converted to Cropland; Land converted to Grassland; Land converted to Wetlands; Land converted to Settlements] Units of land with only a management change [Forest land remaining Forest land; Cropland remaining Cropland; Grassland remaining Grassland; Wetlands remaining Wetlands; Settlements remaining Settlements									
IPCC Default	2 or 3	X								
Stock-Difference	2 or 3			Х						
		Other land remain	ing Other land							
IDCC Default	1									
IFCC Default	2 or 3									
Stock-Difference	1									
	2 or 3									
		Units of land convert	ed to Other Land							
IPCC Default	2 or 3			\mathbf{X}^{69}						
Stock-Difference	2 or 3			Х						

Note: In the Managed Wetlands subcategory, the land use type *Petland under extraction*, both as Land remaining or Land converted, contains 2 additional calculation worksheets to estimate C stock changes associated with the extraction of peat -i.e. *Extraction: on-site CO₂-C emissions-* and its use in horticulture -i.e. *Extraction: off-site CO₂-C* emissions-. Any unit of land in Managed Wetlands subcategory that is part of the subdivision type "Peatland extraction" is mapped to both calculation worksheets in each inventory year from the onset of the activity to its end (if any).

⁶³ Methodological approach applied to estimate annual net C stock change in SOM C pool

⁶⁴ Approach applied to Land Representation

⁶⁵ In *Peatland under extraction*, the TAB name is DOM (G&L – Abrupt). Unit of land is mapped to this TAB in the year of site-clearing only -i.e. the year of the inventory time series in which the unit of land is first reported-.

⁶⁶ DOM (SD - Approach 1)

⁶⁷ DOM (SD - Approaches 2&3)

⁶⁸ Limited to "Other Wetlands"

⁶⁹ Even if the IPCC method is selected, the units of land will be mapped in the "DOM (SD - Approaches 2&3)" calculation worksheet; and the Stock at time t₂ is to be set to zero (0).

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Table 14 Mapping units of land to calculation TABs for SOM mineral soils C pool in *Forest land, Cropland, Grassland, Wetlands, Settlements*

Land	Use Manager	Land Represent	ation Manager		Calculation TABs - SOM C POOL 72 Eq. 2.25 - B ⁷³ SD - A 1 ⁷⁴ SD - A 2&3 ⁷⁵ Drained ⁷⁶ Rewetted ⁷ no management change rassland; Wetlands remaining Wetlands ⁷⁸ ; Settlements remaining Settlements]				
	Soil	Method ⁷⁰	Approach ⁷¹				s - 50m c 1 001		
Composition	Status	Method	пррилен	Eq. 2.25 - A ⁷²	Eq. 2.25 - B ⁷³	SD - A 174	SD - A 2&375	Drained ⁷⁶	Rewetted ⁷⁷
		Unit	s of land not convert	ted to and with no	management cha	ange	-		-
[Forest	land remaining Forest land	; Cropland remaining	Cropland; Grassland	l remaining Grass	land; Wetlands re	maining Wetlan	ds ⁷⁸ ; Settlements	remaining Settle	ements]
	No change in hydrology	IPCC Default	1	X					
			2 or 3	V					
	Drained ⁷⁹	IPCC Default	2 or 3	Δ					
	- 170		1	X					
	Rewetted ⁷⁹	IPCC Default	2 or 3						
Mineral Soil	No change in hydrology	Stock-Difference	1			X			
Winiciai Son	rvo enange in nydrology	Stock-Difference	2 or 3				X		
	Drained ⁷⁹	Stock-Difference	1			X	v		
	Rewetted ⁷⁹		2 OF 3			x	Λ		
		Stock-Difference	2 or 3				X		
	Extracted	NA ⁸⁰	1			81			
			2 or 3				X		
		-	Units	of land converted	to				-
	[Land converted to Forest]	and; Land converted t	to Cropland; Land co	onverted to Grass	and; Land conver	rted to Wetlands	; Land converted	to Settlements]	
TT	1	C 1 1 · · ·	Units of land wi	ith only a manage	ment change	• • • • • • • • • • • • • • • • • • • •	1.79 0.441		
[Forest	land remaining Forest land	; Cropland remaining	Cropiand; Grassiand	remaining Grass	land; wetlands re	maining wettar	ds ⁷⁰ ; Settlements	remaining Settle	ements
	No change in hydrology	IPCC Default	2 or 3		X				
	Drained ⁷⁹	IPCC Default	2 or 3		X				
	Rewetted ⁷⁹	IPCC Default	2 or 3		X				
Mineral Soil	No change in hydrology	Stock-Difference	2 or 3				X		
	Drained ⁷⁹	Stock-Difference	2 or 3				X		
	Rewetted ⁷⁹	Stock-Difference	2 or 3				X		
	Extracted	NA^{80}	2 or 3			81	X		

⁷⁰ Methodological approach applied to estimate annual net C stock change in SOM C pool

⁷¹ Approach applied to Land Representation

⁷² SOM mineral - Eq. 2.25 Formulation A

⁷³ SOM mineral - Eq. 2.25 Formulation B

⁷⁴ SOM (SD - Approach 1)

⁷⁵ SOM (SD - Approaches 2&3)

⁷⁶ SOM Organic Drained

⁷⁷ SOM Organic Rewetted

⁷⁸ Limited to "Other Wetlands"

⁷⁹ Wetland mineral soils only

⁸⁰ Units of land with soil status *Extracted* are mapped to the relevant "SOM (SD - Approach 1)" or "SOM (SD - Approaches 2&3)" TABs regardless of the methodological approach selected in the Land **Representation Table. NOTE** that for each unit of land with soil status *Extracted*, users **SHALL** calculate C stock losses in the year of the first occurrence only, although in the relevant calculation worksheet *land remaining under same land use* for the entire period for which an area is associated to the unit of land.

⁸¹ Soil Status *Extracted* SHALL NOT be applied to Approach 1 Land representation.

IPCC Inventory Software

Table 15 Mapping units of land to calculation TABs for SOM mineral soils C pool in Other land

Land Use	Manager	Land Representa	tion Manager			Calculation TAR	SOM C BOOL			
Soi	1	Mothod82	Approach83			Calculation TAD	S - SOM C FOOL			
Composition	Status	Method	Approach	Eq. 2.25 - A ⁸⁴	Eq. 2.25 - B ⁸⁵	SD - A 1 ⁸⁶	SD - A 2&387	Drained ⁸⁸	Rewetted ⁸⁹	
			-	Other land	remaining Other la	nd	-			
			1							
NA		IPCC Default	2 or 3							
Mineral Soil	INA	Stock-Difference	1	No C stock changes are estimated in Other land remaining Other land given C pools do not contain significant C stocks						
			2 or 3							
	Extracted	NT 4.00	1							
	Extracted	INAS	2 or 3							
				Units of land	converted to Other I	and ⁹¹				
	NTA	IPCC Default	2 or 3		X					
Mineral Soil	INA	Stock-Difference	2 or 3				X			
	Extracted	NA90	2 or 3			92	X			

⁹² Soil Status *Extracted* SHALL NOT be applied to Approach 1 Land representation.

⁸² Methodological approach applied to estimate annual net C stock change in SOM C pool

⁸³ Approach applied to Land Representation

⁸⁴ SOM mineral - Eq. 2.25 Formulation A

⁸⁵ SOM mineral - Eq. 2.25 Formulation B

⁸⁶ SOM (SD - Approach 1)

⁸⁷ SOM (SD - Approaches 2&3)

⁸⁸ SOM Organic Drained

⁸⁹ SOM Organic Rewetted

⁹⁰ Units of land with soil status *Extracted* are mapped to the relevant "SOM (SD - Approach 1)" or "SOM (SD - Approaches 2&3)" TABs regardless of the methodological approach selected in the Land **Representation Table. NOTE** that for each unit of land with soil status *Extracted*, users **SHALL** calculate C stock losses in the year of the first occurrence only, although in the relevant calculation worksheet *land remaining under same land use* for the entire period for which an area is associated to the unit of land.

⁹¹ Although "Other land" soils do not have a status, units of land in mineral soils are either mapped to "SOM mineral - Eq. 2.25 Formulation B" calculation worksheet, in case the IPCC default method is selected, or to "SOM (SD - Approaches 2&3)" calculation worksheet, in case the Stock-Difference method is selected.

IPCC Inventory Software

Table 16 Mapping units of land to calculation TABs for SOM organic soils C pool in Forest Land, Cropland, Grassland, Wetlands, Settlements

Land	l Use Manager	Land Represent	ation Manager		(Coloulation TA	Pa SOM C DOC)I	
	Soil	Mothed 93	A p p p p p p p k b k k k k k k k k k k		, c				
Composition	Status	Methodys	Approach	Eq. 2.25 - A ⁹⁵	Eq. 2.25 - B%	SD - A 197	SD - A 2&398	Drained ^{99,100}	Rewetted ¹⁰¹
	-	Unit	s of land not convert	ted to and with no	management cha	ange	-		
[Forest	land remaining Forest land	l; Cropland remaining	Cropland; Grasslan	d remaining Grass	sland; Wetlands r	emaining Wet	lands; Settlement	s remaining Settle	ments]
	No shares in herdusteers	IDCC Defeelt	1						
	No change in hydrology	IPCC Default	2 or 3						
	Drained	IPCC Default	1					х	
	Rewetted		2 or 3						
	Rewetted	IPCC Default	$\frac{1}{2 \text{ or } 3}$						Х
			1			x			
Organic Soil	No change in hydrology	Stock-Difference	2 or 3				X		
	Drained	Stock Difference	1			Х			
		Stock-Difference	2 or 3				X		
	Rewetted	Stock-Difference	1			X			
			2 or 3			102	X		
	Extracted	NA ¹⁰²	1			105	v		
			2 of 5				Λ		
	II and converted to Forest 1	and. I and converted t	Cropland: Land or	or land converted	and: Land conver	ted to Wetland	de Land converte	ed to Settlements]	
	[Land converted to Polest]	land, Land Converted	Units of land wi	th only a manage	ment change	ited to wettail	us, Land converte	u to settiementsj	
[Forest	land remaining Forest land	l; Cropland remaining	Cropland; Grasslan	d remaining Grass	sland; Wetlands r	emaining Wet	lands; Settlement	s remaining Settler	ments]
	No change in hydrology	IPCC Default	2 or 3						
	Drained	IPCC Default	2 or 3					Х	
	Rewetted	IPCC Default	2 or 3						X
Organic Soil	No change in hydrology	Stock-Difference	2 or 3				Х		
	Drained	Stock-Difference	2 or 3				Х		
	Rewetted	Stock-Difference	2 or 3				X		
	Extracted	NA ¹⁰²	2 or 3			103	X		

⁹³ Methodological approach applied to estimate annual net C stock change in SOM C pool

⁹⁴ Approach applied to Land Representation

⁹⁵ SOM mineral - Eq. 2.25 Formulation A

⁹⁶ SOM mineral - Eq. 2.25 Formulation B

⁹⁷ SOM (SD - Approach 1)

⁹⁸ SOM (SD - Approaches 2&3)

⁹⁹ SOM Organic Drained

¹⁰⁰ For Wetlands, this is limited to peat extraction sites, either active or abandoned for which the drainage system is still active.

¹⁰¹ SOM Organic Rewetted

¹⁰² Units of land with soil status *Extracted* are mapped to the relevant *SOM (SD - Approach 1)* or *SOM (SD - Approaches 2003)* TABs regardless of the methodological approach selected in the Land Representation **Table**. **NOTE** that for each unit of land with soil status *Extracted*, users **SHALL** calculate C stock losses in the year of the first occurrence only, although in the relevant calculation worksheet *land remaining under same land use* for the entire period for which an area is associated to the unit of land.

¹⁰³ Soil Status *Extracted* SHALL NOT be applied to Approach 1 Land representation.

IPCC Inventory Software

Table 1	Mapping units o	of land to calculation	on TABs for SOM	organic soils ¹⁰⁴ C	pool in Other land
	FF				F

Land	Use Manager	Land Representa	tion Manager		C	algorithm TAP						
	Soil	Mathed 105	A contract b 106		Ca	alculation TAD	s - SOM C POOL	•				
Composition	Status	Methodios	Approachio	Eq. 2.25 - A ¹⁰⁷	Eq. 2.25 - B ¹⁰⁸	SD - A 1 ¹⁰⁹	SD - A 2&3 ¹¹⁰	Drained ¹¹¹	Rewetted ¹¹²			
	-	-	Other	land remaining Oth	ner land	-	-					
		IPCC Default	1									
	Drained	II CC Delaut	2 or 3		No C stock changes are estimated in							
Organic Soil		Stock-Difference	1		Other land remaining Other land							
		Stock Difference	2 or 3	given C pools do not contain significant C stocks								
	Extracted	NA ¹¹³	1	given e pools do not contain significant e stocks								
			2 or 3									
			Units of la	nd converted to Ot	her Land ¹¹⁴							
	Drained	IPCC Default	2 or 3					X				
Organic Soil	Diamed	Stock-Difference	2 or 3				X					
	Extracted	NA ¹¹³	2 or 3			115	X					

¹⁰⁸ SOM mineral - Eq. 2.25 Formulation B

¹¹⁴ Although "Other land" soils do not have a status, units of land in organic or mixed soils are either mapped to "SOM organic Drained" calculation worksheet, in case the IPCC default method is selected, or to "SOM (SD - Approaches 2&3)" calculation worksheet, in case the Stock-Difference method is selected

¹¹⁵ Soil Status *Extracted* SHALL NOT be applied to Approach 1 Land representation.

¹⁰⁴ Excluding *Coastal Wetlands* soils

¹⁰⁵ Methodological approach applied to estimate annual net C stock change in SOM C pool

¹⁰⁶ Approach applied to Land Representation

¹⁰⁷ SOM mineral - Eq. 2.25 Formulation A

¹⁰⁹ SOM (SD - Approach 1)

¹¹⁰ SOM (SD - Approaches 2&3)

¹¹¹ SOM Organic Drained

¹¹² SOM Organic Rewetted

¹¹³ Units of land with soil status *Extracted* are mapped to the relevant *SOM* (*SD - Approach 1*) or *SOM* (*SD - Approach 2003*) TABs regardless of the methodological approach selected in the Land Representation **Table**. **NOTE** that for each unit of land with soil status *Extracted*, users **SHALL** calculate C stock losses in the year of the first occurrence only, although in the relevant calculation worksheet *land remaining under same land use* for the entire period for which an area is associated to the unit of land.

IPCC Inventory Software

Table 18 Mapping units of land to calculation TABs for SOM C pool of *Coastal Wetlands* soils¹¹⁶ in *Forest Land, Cropland, Grassland, Wetlands, Settlements*

Land	Use Manager	Land Representa	tion Manager			Calculation TA	Be - SOM C POO	T	
	Soil	Method ¹¹⁷	Approach118						
Туре	Status	Method	Appioaen	Eq. 2.25 - A ¹¹⁹	Eq. 2.25 - B ¹²⁰	SD - A 1 ¹²¹	SD - A 2&3 ¹²²	Drained ^{123,124}	Rewetted ¹²⁵
		Unit	s of land not conv	erted to and with	no management c	hange	_	-	
[Forest	land remaining Forest land	l; Cropland remaining	Cropland; Grassl	and remaining Gr	assland; Wetlands	remaining Wo	etlands; Settlement	s remaining Settle	ments]
	No change in hydrology	IPCC Default	1						
	0, 0,		2 or 3						
	Drained	IPCC Default	$\frac{1}{2 \text{ or } 3}$					X	
Rewetted		1							
	Rewetted	IPCC Default	2 or 3						Х
Coastal	No ahanga in hudualaan	Stoply Difference	1			X			
Wetlands Soil	no change in nydrology	Stock-Difference	2 or 3				Х		
	Drained	Stock-Difference	1			X			
			2 or 3			v	X		
	Rewetted	Stock-Difference	1 2 or 2			X	v		
			2 01 3			127	Λ		
	Extracted	NA ¹²⁶	2 or 3				X		
			Un	its of land convert	ed to	<u></u>			
	[Land converted to Forest]	land; Land converted	to Cropland; Land	l converted to Gra	ssland; Land conv	verted to Wetla	nds; Land converte	ed to Settlements]	
			Units of land	with only a mana	gement change			1	
[Forest	land remaining Forest land	l; Cropland remaining	cropland; Grassl	and remaining Gr	assland; Wetlands	remaining Wo	etlands; Settlement	s remaining Settler	ments]
	No change in hydrology	IPCC Default	2 or 3						
	Drained	IPCC Default	2 or 3					Х	
	Rewetted	IPCC Default	2 or 3						Х
Coastal	No change in hydrology	Stock-Difference	2 or 3				Х		
Wetlands Soil	Drained	Stock-Difference	2 or 3				Х		
	Rewetted	Stock-Difference	2 or 3				Х		
	Extracted	NA126	2 or 3			127	X		

¹¹⁶ This applies to *Coastal Wetlands* soils.

¹¹⁷ Methodological approach applied to estimate annual net C stock change in SOM C pool

¹¹⁸ Approach applied to Land Representation

- ¹¹⁹ SOM mineral Eq. 2.25 Formulation A
- ¹²⁰ SOM mineral Eq. 2.25 Formulation B
- ¹²¹ SOM (SD Approach 1)

123 SOM Organic Drained

¹²⁴ For Wetlands, this is limited to peat extraction sites, either active or abandoned for which the drainage system is still active.

125 SOM Organic Rewetted

¹²⁶ Units of land with soil status *Extracted* are mapped to the relevant *SOM (SD - Approach 1)* or *SOM (SD - Approaches 2003)* TABs regardless of the methodological approach selected in the Land Representation **Table**. **NOTE** that for each unit of land with soil status *Extracted*, users **SHALL** calculate C stock losses in the year of the first occurrence only, although in the relevant calculation worksheet *land remaining under same land use* for the entire period for which an area is associated to the unit of land.

¹²⁷ Soil Status *Extracted* SHALL NOT be applied to Approach 1 Land representation.

¹²² SOM (SD - Approaches 2&3)

IPCC Inventory Software

Table 2 Mapping units of land to calculation TABs for SOM C pool of Coastal Wetlands soils¹²⁸ in Other land

Land	Use Manager	Land Represent	ation Manager	Calculation TABs - SOM C POOL						
	Soil	Mothod 129	Approx ab 130		Cal		- SOM C FOOL			
Туре	Status	Method	Approachise	Eq. 2.25 - A ¹³¹	Eq. 2.25 - B ¹³²	SD - A 1 ¹³³	SD - A 2&3 ¹³⁴	Drained ¹³⁵	Rewetted ¹³⁶	
Other land remaining Other land										
		IPCC Default	1	1						
Coastal	Drained		2 or 3		No	Stock change	es are estimated in	,		
	Diamed	Stock-Difference	1		Other land res	ther land rama	ranges are estimated in			
Wetlands Soil		Stock-Difference	2 or 3	Other land remaining Other land						
	Extracted	NIA 137	1		given C po	ols do not con	itain significant C	STOCKS		
-	Extracted	1111	2 or 3							
			Units of land	converted to Other	Land ¹³⁸					
	Drained	IPCC Default	2 or 3					Х		
Coastal Wetlands Soil	Diamed	Stock-Difference	2 or 3				X			
	Extracted	NA ¹³⁷	2 or 3				X			

¹³⁸ Although "Other land" soils do not have a status, units of land in organic or mixed soils are either mapped to "SOM organic Drained" calculation worksheet, in case the IPCC default method is selected, or to "SOM (SD - Approaches 2&3)" calculation worksheet, in case the Stock-Difference method is selected

¹²⁸ This applies to *Coastal Wetlands* soils of any soil composition i.e. mineral, organic, mixed.

¹²⁹ Methodological approach applied to estimate annual net C stock change in SOM C pool

¹³⁰ Approach applied to Land Representation

¹³¹ SOM mineral - Eq. 2.25 Formulation A

¹³² SOM mineral - Eq. 2.25 Formulation B

¹³³ SOM (SD - Approach 1)

¹³⁴ SOM (SD - Approaches 2&3)

¹³⁵ SOM Organic Drained

¹³⁶ SOM Organic Rewetted

¹³⁷ Units of land with soil status *Extracted* are mapped to the relevant *SOM* (*SD - Approach 1*) or *SOM* (*SD - Approach 2003*) TABs regardless of the methodological approach selected in the Land Representation **Table**. **NOTE** that for each unit of land with soil status *Extracted*, users **SHALL** calculate C stock losses in the year of the first occurrence only, although in the relevant calculation worksheet *land remaining under same land use* for the entire period for which an area is associated to the unit of land.

Calculation Worksheets for other emissions from land

The calculation worksheet to which the *Software* maps units of land, as well as the time period over which a unit of land is mapped to a specific calculation worksheet, depends on:

- ▶ land use category; given 3.C. categories can be land-use-specific;
- > activity whose emissions are to be estimated; given 3.C. categories are activity-specific.

The time period over which a unit of land is mapped to a specific calculation worksheet, depends on the activity; given that some activities emits in the year those occur only, while others are assumed to emit from their onset across the entire inventory time series regardless of its length, unless a conversion occur¹³⁹ (in such a case the unit of land is transferred to the category corresponding to the new activity).

Tables 11 and 12 map units of land to the calculation worksheets. The corresponding activity data -e.g. area- will only appear in the relevant calculation worksheet if all relevant criteria exist (e.g. soil type/soil status/activity/). Activity data are sourced from the Land Representation Manager unless otherwise specified.

¹³⁹ This only occurs in case of Approach 3 Land representation

IPCC Inventory Software (TSU IPCC TFI)

Table 20 Mapping units of land to the calculation TABs for other emissions [categories 3.C.1 – 3.C.5]

I	PCC Category	GHG	Calculation Worksheet	Time period	Units of land mapped from		
	. En mot la n d		Emissions from burning $(1/2)$		Forest land Remaining Forest land		
	a. Porest land		Emissions from burning (2/2)		Land converted to Forest land		
	b Granland		Emissions from burning $(1/2)$		Cropland Remaining Cropland		
2 C 1140	b. Cropiand	CO ₂ ¹⁴¹	Emissions from burning $(2/2)$	Inventory Year only	Land converted to Cropland		
5.C.1.10	c Crassland	N ₂ O	Emissions from burning (1/2)	Inventory rear only	Grassland Remaining Grassland		
	C. Grassiand		Emissions from burning $(2/2)$		Land converted to Grassland		
	d All other land was		Emissions from burning $(1/2)$		All other land uses Remaining		
	d. All other faild uses		Emissions from burning $(2/2)$		Land converted to All other land uses		
3.C.2	Liming	60	CO ₂ emissions from liming	Inventory Year only	The <i>Software</i> does not map units of land to this category; although users can select the land use category in which the activity occurs		
3.C.3	Urea application	CO_2	CO ₂ emissions from urea	Inventory Year only	The <i>Software</i> does not map units of land to this category; although users can select the land use category in which the activity occurs		
			Synthetic N applied to managed soils				
			Organic N applied to managed soils	Lawanto ay Vasa o alv	The Software does not map units of land to this category;		
			N in crop residues	Inventory rear only	although users can select the land use category in which the activity occurs		
			Urine and Dung input in grazed soils				
3.C.4	from soils	N ₂ O	N in SOM mineralized	Inventory Year only ¹⁴²	The <i>Software</i> maps units of land for which a negative SOC change has been estimated in the inventory year in the relevant 3.B worksheets		
		2	Drainage of organic soils	Entire inventory time	The Software maps here units of land with organic soil composition and Coastal Wetlands type and soil status Drained		
			Rewetting of organic soils	series from activity's onset	The Software maps here units of land with organic soil composition and Coastal Wetlands type and soil status Rewetted		
2 C 5	Indirect N ₂ O emissions		Emissions from N volatilized	Lawonto av Voon or 1	The Software maps activity data from 3.C.4, although the user can select the land category		
5.0.5	3.C.5 from soils		Emissions from N leached/runoff	inventory rear only	and subdivision to which to apply it		

¹⁴⁰ Units of land where burning occurred in the inventory year are however selected by users from a drop-down menu containing all units of land of the relevant land use category

¹⁴¹ CO₂ emissions can be estimated here and then reported within 3.B estimates for the relevant C pool, or directly estimated in the relevant worksheets of 3.B categories

¹⁴² Although the actual period depends on the methods applied to estimate SOC changes in mineral soils and the land representation approach i.e. a single year for Approach 1 and for the Stock-Difference, the transition period for Equation 2.25

IPCC Inventory Software (TSU IPCC TFI)

	•			Table 3	
	IPCC Category	GHG	Calculation Worksheet	Time period	Units of land mapped from
3.C.7	Rice Cultivation		CH ₄ Emissions from Rice	Inventory Year only	The <i>Software</i> does not map units of land for this category; although users can select the land subdivision in which the activity occurs
3.C.8	Drainage of organic soils		CH4 Emissions from drainage of organic soils		The Software maps here units of land with organic soil composition ¹⁴³ and soil status Drained
3.C.9	Ditches in drained organic soils	CH4	CH ₄ Emissions from ditches in drained organic soils	Entire inventory time	The Software maps here units of land with organic soil composition ¹⁴³ and soil status Drained
3.C.10	Rewetting of drained inland organic soils		CH ₄ Emissions from rewetted inland organic soils	series from activity's onset	The Software maps here units of land with organic soil composition ¹⁴³ and soil status Rewetted
3.C.11	Rewetting of drained Mangrove or Tidal marsh		CH4 Emissions from rewetted Mangrove or Tidal marsh		The Software maps here units of land in <u>Other Wetlands</u> land subdivisions with vegetation either "Mangrove" or "Tidal Marsh"
3.C.13	Rewetting of drained inland mineral soils	CH4	CH ₄ Emissions from rewetted inland mineral soils	Entire inventory time series from activity's onset	The Software maps here units of land that have Inland Wetland Mineral soil and have soil status Rewetted
3.D.2	Other	CO ₂ CH ₄ N ₂ O		Inventory Year only	The <i>Software</i> does not map units of land for this category; although users can select the land subdivision in which the activity occurs

Examples

Three examples will be provided, one for each IPCC Approach on land representation. In this version of the Guide only two examples are provided:

✓ Example 1, Region 1, Approach 1

✓ Example 2, Region 2, Approach 2

All examples are based on a simplified case of a country X that collects land use data every 5 years -namely for the following years: 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025-.

All country land is managed, with a single¹⁴⁴ soil type (mineral) and climate zone (subtropical). The country has the following land-use categories:

- ✓ Forest land, with the *managed* subcategory only, and 4 forest subdivisions (broadleaves natural, conifers natural, broadleaves planted, conifers planted),
- ✓ Cropland, with 2 subcategories (annual *vs* perennial) and 3 subdivisions (annual crops, rice, perennial crops),
- ✓ Grassland, with the *managed* subcategory only, and one single subdivision,
- ✓ Settlements, with the *other* subcategory only, and one single subdivision,
- ✓ Other land, with the *managed* subcategory only, and one single subdivision.

Note: IPCC *good practice* requires that a land representation time series is not affected by trends not associated with changes in activities. This brings the need, having the year **S** as the first year of your inventory, to have a land representation time series from the year **S**-**D**¹⁴⁵, where **D** is the transition period¹⁴⁶. This means that with data available in this example the first year of the NGHGI is to be 2015; we nevertheless compile data for the entire time period before the year 2015 for which we have data, i.e. from 1990 to 2015.

<u>Recall</u>: Given that a unit of land cannot change its soil type and climate zone across the time series, it is advisable when using the *Software* to set a Region in the Land Representation Manager (LRM) for each combination of soil type and climate zone. This largely facilitate the data handling and data input.

Data for Examples are accessible by clicking the ATTACH icon (paper-clip) in the Navigation Panel

The Navigation Panel is usually shown on the left-hand side of the screen; where you have it not displayed, you can access it from the View menu, as shown below:



From the same <u>ATTACH icon</u> you can download a database compiled with data for Examples. Login: Land representation; **Password**: Guidebook

¹⁴⁵ Which means to have annual land-use conversion matrices from the year S-(D-1); e.g. being 1990 the first year of an NGHGI, the first annual land-use conversion matrix is to be 1970/1971.

¹⁴⁴ These are very simplified examples given that countries have many more land use types under a number of combinations of soil types and climate zones.

¹⁴⁶ Where D is equal to 20 years (IPCC default)

Step 1

The first step is common to all examples, and it requires to enter land use types in the Land Use Manager (LUM)

. We minimize data entry in this example, so compiling only those mandatory fields (those with an \bigotimes in the right-hand side) and just with a 0-value, although to calculate C stock changes values shall be entered.

Forest land -					
	Land use subdivision - common para	ameters			
	Land use subdivision name	Broadleaves Natural		Country/Territory	World
	Soil Type	Land representation exercise	+ ~	Continent	World
	Soil Status	No change in hydrology	~	Climate Region	Land Representation exercis + ~
				-	
	Land use subdivision - Managed Fo	rest Land specific parameters			
	Ecological zone User-defin Land repres	ed V Species sentation exercise	User-defined Land representation exercise	Natural Forest O At Plantation ()	bandoned managed land
				Land mass	Unspecified 🗸
			Ane da	es (m) Unspecified	
			Age da		0.000
			Abo	ve-ground biomass stock (t d.m. / ha)	0.000 🗸
			Above-ground ne	et biomass growth (G) (t d.m. / ha / yr)	0.000 🗸
		Ratio	of below-ground biomass to above-ground	biomass (R) (t root d.m./t shoot d.m.)	0.000 🗸
				Biomass carbon fraction (t C / t d.m.)	0.470 ~
			Growing stock level 0/0 (m2	(ba) Unspecified	
			Cirowing stock level (v) (ind		
			Mean annual increme	ent of growing stock (Iv) (m3 / ha / yr)	
		Biomass conversion and expa	ansion factor for increment (BCEFi) (t d.m. /	m3 wood volume) Specified ~	~
		Biomass conversion and expansion	factor for standing stock (BCEFs) (t d.m. /	m3 wood volume) Specified ~	×
	Biomas	s conversion and expansion factor for wo	od and fuelwood removal (BCEFr) it d.m. /	m3 wood volume) Specified ~	0.000 ~
			Decision		
			Basic wood	density (D) (t d.m. / m3 tresh volume)	
		Biomass expansion factor fo	conversion of annual net increment to abo	ove-ground biomass increment (BEF1)	
		Biomass expansion	factor for conversion of merchantable vol	ume to above-ground biomass (BEF2)	
				Litter C stock at maturity (t C / ha)	~
			Reference soil org	ganic carbon stock (SOCref) (t C / ha)	0.000 ~
		Relativ	e C stock change factors		
	Land use subdivision - common par	ameters			
	Land use subdivision - common par Land use subdivision name Soil Type Soil Status	ameters Broadleaves Plantation Land representation exercise No change in hydrology	t) v	Country/Territory Continent Climate Region	World World Land Representation exercis + V
	Land use subdivision - common par Land use subdivision name Soil Type Soil Status	ameters Broadleaves Plantation Land representation exercise No change in hydrology	• •	Country/Territory Continent Climate Region	World World Land Representation exercis + v
	Land use subdivision - common par Land use subdivision name Soil Type Soil Status	ameters Broadleaves Plantation Land representation exercise No change in hydrology rest Land specific parameters	(*) ×	Country/Territory Continent Climate Region	World World Land Representation exercis + V
	Land use subdivision - common par Land use subdivision name Soil Type Soil Status Land use subdivision - Managed Fo Ecological zone User-defin Land repre	ameters Proadleaves Plantation Land representation exercise No change in hydrology rest Land specific parameters red sentation exercise	User-defined v Land representation exercise	Country/Territory Continent Climate Region Natural Forest O A Plantation •	World World Land Representation exercis + v
	Land use subdivision - common par Land use subdivision name Soil Type Soil Status Land use subdivision - Managed Fo Ecological zone User-defi Land repre	ameters Broadleaves Plantation Land representation exercise No change in hydrology rest Land specific parameters ned sentation exercise Specie	User-defined v Land representation exercise	Country/Territory Continent Climate Region Natural Forest O A Plantation O Land mass	World World Land Representation exercis + v bendoned managed land Unspecified v
	Land use subdivision - common par Land use subdivision name Soil Type Soil Status Land use subdivision - Managed Fo Ecological zone User-defin Land repre	ameters Broadleaves Plantation Land representation exercise No change in hydrology rest Land specific parameters med sentation exercise Specie	User-defined User-defined Land representation exercise Ane da	Country/Territory Continent Climate Region Natural Forest O A Plantation O Land mass es (yr) Unspecified V	World World Land Representation exercis • v bandoned managed land Unspecified v
	Land use subdivision - common par Land use subdivision name Soil Type Soil Status Land use subdivision - Managed Fo Ecological zone User-defin Land repre	ameters Broadleaves Plantation Land representation exercise No change in hydrology rest Land specific parameters red sentation exercise Specie	User-defined Land representation exercise Age da	Country/Territory Continent Climate Region Natural Forest O A Plantation O A Land mass ss (r) Unspecified V	World World Land Representation exercis + v bendoned managed land
	Land use subdivision - common par Land use subdivision name Soil Type Soil Status Land use subdivision - Managed Fo Ecological zone User-defin Land repre	ameters Broadleaves Plantation Land representation exercise No change in hydrology rest Land specific parameters ned sentation exercise Specie	User-defined Land representation exercise Age cla Abc	Country/Territory Continent Climate Region Natural Forest O Plantation O Land mass sss (yr) Unspecified v ve-ground biomass stock (t d.m. /ha)	World World Land Representation exercis + ✓ bendoned managed land Unspecified 0.000
	Land use subdivision - common par Land use subdivision name Soil Type Soil Status	ameters Broadleaves Plantation Land representation exercise No change in hydrology rest Land specific parameters red sentation exercise	User-defined Land representation exercise Age cla Above-ground n	Country/Territory Continent Climate Region Natural Forest O Plantation O Land mass ass (yr) Unspecified v ve-ground biomass stock (t d.m. / ha) et biomass growth (G) (t d.m. / ha / yr)	World World Land Representation exercis + v bandoned managed land Unspecified v 0.000 v 0.000 v
	Land use subdivision - common par Land use subdivision name Soil Type Soil Status	ameters	User-defined User-defined Land representation exercise Age cla Above-ground n Above-ground n of below-ground biomass to above-ground	Country/Territory Continent Climate Region Natural Forest O Plantation O Land mass as (yr) Unspecified V ver-ground biomass stock (t d.m. / ha) et biomass growth (G) (t d.m. / ha / yr) Libiomass (R) (t root d.m./t shoot d.m.)	World World Land Representation exercis + ✓ bendoned managed land Unspecified ✓ 0.000 ✓ 0.000 ✓ 0.000 ✓
	Land use subdivision - common par Land use subdivision name Soil Type Soil Status	ameters	User-defined User-defined Land representation exercise Age cla Above-ground n of below-ground biomass to above-ground	Country/Territory Continent Climate Region Natural Forest O Plantation O Land mass as (yr) Unspecified V Land mass (yr) (yr) (yr) (yr) (yr) (yr) (yr) (yr)	World World Land Representation exercis + ✓ bandoned managed land Unspecified ✓ 0.000 ✓ 0.000 ✓ 0.000 ✓ 0.000 ✓
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			Potio of	bolow around his	mane to above em	und hiom	non (P) it mot dim	(tobact.d.m.)	0.000
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					Basic w	vood dens	sity (D) (t. d.m. / m3	fresh volume)	
		Biomass expansion	factor for c	onversion of annu	ial net increment to	o above-g	ground biomass incr	ement (BEF1)	
		Biomass	expansion f	actor for conversion	on of merchantable	e volume t	to above-ground bi	omass (BEF2)	
						L	Litter C stock at ma	unity (t C / ha)	
					Peference es	ul organio	anthan stack (SO)	mf) A C (ha)	0.000
			Relative (Cetock change fa	indom	on organic	Calbort Stock (SOA	ster) (r.c. / na)	0.000
			Land	tuse (FLU)	1 000	Ma	inagement (EMG)	1.00	0 Input (El) 1.00
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	ommon para						. .	<i>(</i> T) ,	
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Land use subdivision - N Ecological zone	Managed Fore User-define Land represe Biomass	Biomass conversion and conversion and expansion failed as a second	Species Ratio of and expan expansion f ctor for woo	User-defined Land representai f below-ground bio Grow sion factor for incr actor for standing d and fuelwood re conversion of annu- actor for conversio	Age Above-grour mass to above-gro ving stock level (V) Mean annual inc ement (BCEF)) ¢ d stock (BCEFs) ¢ d Basic w ual net increment to on of merchantable	e class (yr Above-gr nd net bio Bion Bion Bion Bion Bion Bion Bion Bi	Natural Forest Plantation Plantation Plantation Plantation Plantation Plantation Plantation Plantation Plantation () Unspecified f growing stock (Iv) wood volume) Sp wood volume) Sp wood volume) Sp sty (D) t d.m. / m3 ground biomass incritication to above-ground biomass incritication to above-ground biomass incritication Plantation Pl	Ab Land mass Land mass k (t dm. / ha) dm. / ha / yr) /t shoot dm.) h (t C / t dm.) (m3 / ha / yr) ecfied ~ ecfied ~ ecfied ~ fresh volume) ement (BEF1) mass (BEF2) unty (t C / ha)	Land Representation exercis (+) (and oned managed land Unspecified Unspecified 0.000 (> 0.0
Land use subdivision - M Ecological zone	Aanaged Fore User-define Land represe Biomass	Biomass conversion Biomass conversion Biomass expansion fa Biomass expansion fa Biomass expansion Biomass expansion Biomass	Species Ratio of and expan expansion f ctor for woo a factor for c expansion f	User-defined Land representai f below-ground bio Grow sion factor for inor actor for standing d and fuelwood re conversion of annu factor for conversio	Age Above-grour mass to above-gro ving stock level (V) Mean annual inc ement (BCEF) (t d stock (BCEFs) (t d moval (BCEFr) (t d Basic w ial net increment to on of merchantable	e class (yr Above-gr Bion Bion Dion J (m3 / ha m. / m3 v vood dent L	Natural Forest Plantation P	Ab Land mass Land mass k (t dm. / ha) dm. / ha / yr) / t shoot dm.) m (t C / t dm.) (m3 / ha / yr) ecfied ~ ecfied ~ ecfied ~ ment (BEF1) omass (BEF2) unty (t C / ha)	Land Representation exercis (+) (andoned managed land) Unspecified 0.000 (0.000 (0.000 (0.000 (0.470 (0.000 (0.470 (0.000 (0.470 (0.000 (0.470 (0.000 (0.470 (0.000 (0.470 (0.470 (0.000 (0.470 (0.000 (0.470 (0.470 (0.000 (0.470 (
Land use subdivision - N Ecological zone	Aanaged Fore User-define Land represe Biomass	Biomass conversion Biomass conversion Biomass conversion and conversion and expansion fa Biomass expansion Biomass expansion Biomass	Species Ratio of and expan expansion f ctor for woo a factor for c	User-defined Land representai f below-ground blo Grow sion factor for incr actor for standing d and fuelwood re conversion of annu cactor for conversio	Age Above-grour mass to above-gro ving stock level (V) Mean annual inc ement (BCEFI) (t) atock (BCEF2) (t) Basic w al net increment to on of merchantable Reference so	c class (yr Above-gr nd net bio Bion Bion Bion biox Bion biox Bion biox	Natural Forest Plantation Plantation Plantation Plantation Plantation Plantation Plantation () Unspecified f growing stock (Iv) wood volume) Sp wood volume) wood volume)	Ab Land mass Land mass k t dm. / ha) dm. / ha / yr) /t shoot dm.) m t C / t dm.) (m3 / ha / yr) ecfied ~ ecfied ~ resh volume) ment (BEF1) pmass (BEF2) unty t C / ha) Creft t C / ha)	Land Representation exercis (+) (and oned managed land) Unspecified 0.000 (0.000 (0.000 (0.470 (0.470 (0.000 (0.470 (0.470 (0.000 (0.470 (0.000 (0.470 (0.470 (0.000 (0.470 (0.470 (0.000 (0.470 (0.470 (0.000 (0.470 (0.470 (0.000 (0.470 (
Land use subdivision - N Ecological zone	Aanaged Fore User-define Land represe Biomass	Biomass conversion Biomass conversion Biomass expansion fa Biomass expansion Biomass expansion Biomass expansion	Species Ratio of and expan expansion f ctor for woo a factor for c expansion f	User-defined Land representai f below-ground bio Grow sion factor for incr actor for standing d and fuelwood re conversion of annu cactor for conversio C stock change fa	Age Above-grour mass to above-gro ving stock level (V) Mean annual inc ement (BCEFI) (t d stock (BCEF3) (t d moval (BCEF7) (t d Basic w all net increment to on of merchantable Reference so ictors	c class (yr Above-gr nd net bio Bion Bion Bion Bion biox Bion Bion biox Bion Bion biox	Natural Forest Plantation P	Ab Land mass Land mass k (t dm. / ha) dm. / ha / yr) / t shoot dm.) m (t C / t dm.) (m3 / ha / yr) ecfied ~ ecfied ~ ment (BEF1) omass (BEF2) unty (t C / ha) Creft (t C / ha)	Land Representation exercis (+) (and oned managed land Unspecified 0.000 (

Cropland - Annual.

bil Type			Country/Lemtony	World		
oil Type	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Country/Terntory	vvona		
4.0	Land representation exercise	+ ~	Continent	World		
il Status	No change in hydrology	\checkmark	Climate Region	Land Rep	resentation exer	cis + 🗸
d use subdivision - Annual Crops	s specific parameters					
e ecosystem 🗌						
		Herbaceous biomass t C / ha v	\sim	C fraction (t	t C / t d.m.)	1.000
		Ratio of below-ground biomass to abov	ve-ground biomass (R) (t root C	C/t shoot C)		
		Reference so	il organic carbon stock (SOCre	ef) (t C / ha)		57.000 🗸
			Relative C stock cha	ange factors		
			Lan	d use (FLU)		0.800 ~
				liage (FMG)		0.950
				input (i i)		0.330 🔍
			2	Save	Undo	Close
d use subdivision - common para	uneters			Save	Undo	Close
d use subdivision - common para xd use subdivision name	ameters Rice		Country/Territory	Save	Undo	Close
d use subdivision - common para d use subdivision name Type	meters Rice Land representation exercise	•	Country/Territory Continent	Save World World	Undo	Close
d use subdivision - common para Id use subdivision name I Type I Status	Rice Land representation exercise No change in hydrology	•v	Country/Territory Continent Climate Region	Save World World Land Repu	Undo	Close cis + v
d use subdivision - common para ad use subdivision name I Type I Status	Rice Rice Land representation exercise No change in hydrology	•v v	Country/Territory Continent Climate Region	World World Land Repu	Undo resentation exer	Close cis • v
d use subdivision - common para d use subdivision name I Type Status d use subdivision - Annual Crops	Rice Land representation exercise No change in hydrology specific parameters		Country/Territory Continent Climate Region	World World Land Repr	Undo resentation exer	Close rcis + v
f use subdivision - common para d use subdivision name Type Status d use subdivision - Annual Crops e ecceystem	meters Rice Land representation exercise No change in hydrology	+v V	Country/Territory Continent Climate Region	World World Land Repr	Undo resentation exer	Close cis • v
I use subdivision - common para d use subdivision name Type Status I use subdivision - Annual Crops e ecceystem	Rice Land representation exercise No change in hydrology specific parameters	+ v + v Herbaceous biomass (C / ha v Ratio of below-ground biomass to abov	Country/Territory Continent Climate Region	World World Land Reput	Undo resentation exer : C / t d m)	Close cis + ~ 1.000
d use subdivision - common para d use subdivision name Type Status d use subdivision - Annual Crops e ecceystem	Ameters Pice Land representation exercise No change in hydrology specific parameters	Herbaceous biomass I C / ha V Ratio of below-ground biomass to abov	Country/Territory Continent Climate Region	World World Land Repr C fraction (C/t shoot C)	Undo resentation exer (C / t d.m.)	Close
d use subdivision - common para d use subdivision name Type Status d use subdivision - Annual Crops e ecceystem	Intelets Floce Land representation exercise No change in hydrology specific parameters	Herbaceous biomass t C / ha v Ratio of below-ground biomass to abov	Country/Territory Continent Climate Region	Save World World Land Reputer C fraction (C	Undo resentation exer .C / t d.m.)	Close
d use subdivision - common para d use subdivision name Type Status d use subdivision - Annual Crops e ecosystem 💽	Interes Fice Land representation exercise No change in hydrology specific parameters	Herbaceous biomass IC / ha v Ratio of below-ground biomass to abov	Country/Territory Continent Climate Region Climate Region	World World Land Repu C fraction (C fractio	Undo Undo resentation exert C / t d m.) [[Close
d use subdivision - common para d use subdivision name I Type I Status d use subdivision - Annual Crops e ecosystem	Rece Land representation exercise No change in hydrology specific parameters	Herbaceous biomass IC / ha v Ratio of below-ground biomass to abov	Country/Territory Continent Climate Region Climate Region re-ground biomass (R) & root C il organic carbon stock (SOCre Relative C stock cha Lan	World World Land Repr C fraction (C/t shoot C) af) (t C / ha) inge factors d use (FLU) illage (FMG)	Undo Undo resentation exer .C / t d m.)	Close

Cropland - Perennial:

oil Type	r erenniai crops	Country/Territory	WORD	
	Land representation exercise + ~	Continent	World	
pil Status	No change in hydrology 🗸	Climate Region	Land Representation exercis + v	
nd use subdivision - Perennial C	ops specific parameters			
iropland type All pe	annials 🗸			
	Woody biomass t C / ha	~ 0.000	C fraction (t C / t d.m.) 1.000	
	Age class	s (yr) Unspecified 🗸	Value	
	Perennial biomas	s carbon accumulation rate (G) (tonnes	C / ha / yr) 🗸 🗸	
	Ratio of below-ground woody biomass to abo	ove-ground woody biomass (R) (t root 0	C/t shoot C)	
		Harvest / Matur	ity cycle (yr) 0.000 ~	
	Agroforestry Aerobaceous biomass t C / ha	×	C fraction (t C / t d.m.) 1.000	
	Ratio of below-ground herbaceous biomass to above-g	ground herbaceous biomass (R) (t root (C/t shoot C)	
	Refe	erence soil organic carbon stock (SOCr	ef) (t C / ha) 67.000 ~	
		Relative C stock cha	ange factors	
		Lan	d use (FLU) 1.000	
		Т	illage (FMG) 1.000	
			Input (FI) 1.000	

Grassland - Managed:

	vvorid	Country/Territory	Grassland			sion name	Land use subdivision name Grassian	
Int World Land Representation exercis		Continer	nd representation exercise + ~				oil Type	
		Climate Region	No change in hydrology		No change in hydrol		ioil Status	
				ters	arassland specific parame	n - Managed Gr	and use subdivision	
		d land	Abandoned managed	Improved grassland	sfined 🗸	User-det	egetation type	
					resentation exercise	Land repr		
0.000 🗸	ss (t.d.m. / ha)	Herbaceous biomass (
	./t shoot d.m.)	nerbaceous biomass (R) (t root d.m./t	biomass to above-ground h	Ratio of below-ground herbaceous				
0.470	er(tC∕td.m.)	on of herbaceous biomass dry matter (Carbon fractio					
0.000	m.∕ha ∨	Woody biomass t d.m. /						
	Value	s (yr) Unspecified 🗸	Age class					
	d.m. / ha / yr)	nass accumulation rate (G) (tonnes d.n	Woody biom					
	./t shoot d.m.)	und woody biomass (R) (t root d.m./t	oody biomass to above-grou	Ratio of below-ground w				
1.000 🗸	er(tC∕td.m.)	fraction of woody biomass dry matter (Carbon fr					
67.000 🗸	ICref) (t C / ha)	ence soil organic carbon stock (SOCre	Referen					
	change factors	Relative C stock char						
1.000 🗸	and use (FLU)	Land						
1.000 🗸	igement (FMG)	Manager						
1 000 🗸	Input (FI)							

Settlements - *(Other)*:

	Jettienierits		Country/Territory	VVorld
Soil Type	Land representation exercise	+~	Continent	World
Soil Status	No change in hydrology	~	Climate Region	Land Representation exercis + ~
and use subdivision - Other Settler	ments specific parameters			
			Above-ground biomass stoc	k (t.d.m. / ha)
		Ratio of below-ground biomass to	above-ground biomass (R) (t root d.m.	/t shoot d.m.)
		Ret	ference soil organic carbon stock (SO	Cref) (t C / ha) 67.000 🗸
Cultivated				
		Relative C stock change factors	Proportion of the area that is	cultivated (%) 10.000
		Land use (FLU) 1.000 v	Management (FMG) 1.000	 Input (FI) 1.000
Turfgrass				
		Relative C stock change factors	Proportion of the area covered b	y turfgrass (%) 20.000
		Land use (FLU) 1.000 🗸	Management (FMG) 1.000	✓ Input (FI) 1.000 ✓
Paved			D	1.000
		Relative C stock change factors	Proportion of the a	ea paved (%) /0.000
		Land use (FLU) 0.800	Management (FMG) 0.8	00 Input (FI) 0.800
			2	Save Undo Clos
anaged.			5	Save Undo Clos
anaged: and use subdivision - common pa	ameters			iave Undo Clos
anaged: and use subdivision - common pa and use subdivision name	rameters Other land		Country/Territory	Vorld
anaged: and use subdivision - common par and use subdivision name iciol Type	rameters Other land Land representation exercise		Country/Territory Cortinent Climate Benino.	World World
and use subdivision - common par and use subdivision name ioil Type ioil Status	rameters Other land Land representation exercise Not applicable	•v	Country/Territory Continent Climate Region	World Land Representation exercis + V
anaged: and use subdivision - common par and use subdivision name ioii Type ioii Status and use subdivision - Managed O	rameters Other land Land representation exercise Not applicable ther Land specific parameters	• v	Country/Territory Continent Climate Region	World World Land Representation exercis + ~
anaged: and use subdivision - common par and use subdivision name foil Type foil Status and use subdivision - Managed O	ameters Other land Land representation exercise Not applicable ther Land specific parameters		Country/Territory Continent Climate Region	World Undo Close
anaged. and use subdivision - common pa and use subdivision name ioil Type ioil Status and use subdivision - Managed O	rameters Other land Land representation exercise Not applicable ther Land specific parameters		Country/Territory Continent Climate Region	World World Land Representation exercis + V
and use subdivision - common par and use subdivision name ioil Type ioil Status and use subdivision - Managed O	rameters Other land Land representation exercise Not applicable ther Land specific parameters	v	Country/Territory Continent Climate Region	World World Land Representation exercis + V

Other land - Managed:

Soil Type				
	Land representation exercise	+~	Continent	World
oil Status	Not applicable	~	Climate Region	Land Representation exercis +
and use subdivision - Managed Oth	er Land specific parameters			

Example 1 – Approach 1 for Land Representation

Let's do then a Step-by-Step example on preparing with Approach 1 a time series of units of land for a Land representation.

Thus, after having completed Step 1 we proceed as follows.

Recall:

- ✓ Approach 1 does not identify changes in the use/management land, which means that:
 - > all units of land are Remaining¹⁴⁷ in the relevant¹⁴⁸ land use subdivision:
 - a land conversion matrix cannot be built, and so the software does not compile data in the Land representation table Tab
- ✓ to correctly operationalize formulation A¹⁴⁹ of IPCC Equation 2.25¹⁵⁰ (SOC changes in mineral soils)¹⁵¹, in each inventory year Y the Land Representation for Approach 1 requires also the area data of each unit of land in the year Y-D. The Software applies the IPCC default value -i.e. 20 years- of the transition period D.

¹⁴⁷ This indicates a unit of land of a land category that did not have any conversion in the last **D** years (where **D** is the transition period applied to land use conversions, by default 20 years) e.g. Managed forest land, Broadleaves natural *Remaining* Managed forest land, Broadleaves natural. ¹⁴⁸ i.e. the land use subdivision from which the unit of land has been converted.

¹⁴⁹ Formulation A is to be applied when Approach 1 for Land representation is applied.

¹⁵⁰ See pages 2.36 to 2.38 (boxes 2.1 and 2.2) of Chapter 2 (Generic Methodologies Applicable to Multiple Land-Use Categories) Volume 4 of the 2019 Refinement (https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/4_Volume4/19R_V4_Ch02_Generic%20Methods.pdf)

¹⁵¹ For guidance on preparing estimates of SOC changes refer to the Land Categories 3.B Users' Guidebook.

Step 2

We compile raw data available in the country in the following land-use tables below. Each table covers a five-year period given the land use survey is conducted every 5 years. An inventory compiler can derive¹⁵² a set of 5 annual land-use table from each of the tables below (data are all in hectares).

1990			Area (ha)		1995			Area (ha)	
Subcategory	Subdivision	Subdivision	Subcategory	Category	Subcategory	Subdivision	Subdivision	Subcategory	Category
	Broadleaves Natural	91,285				Broadleaves Natural	90,005		
	Conifers Natural	30,260				Conifers Natural	30,000		
Managed Forest Land	Broadleaves Plantation	3.030	133,575	133,575	Managed Forest Land	Broadleaves Plantation	3.000	132,655	132,655
	Conifers Plantation	9,000				Conifers Plantation	9.650		
	Annual combe	80.065				Annual combe	80.320		
Annual Cropland	Pannkas crops	800	80,865		Annual Cropland	Pannaa crops	850	81,170	00.400
	NJCe D. s. l.	800	0.000	. 88,885	D	N/CP	850	0.010	90,780
Perennial Cropland	Perennial crops	8,020	8,020		Perennial Cropland	Perennial crops	9,010	9,010	
Managed Grassland	Grassland	70,525	70,525	70,525	Managed Grassland	Grassland	70,040	70,040	70,040
Settlements (Other land)	Settlements	6,000	6,000	6,000	Settlements (Other land)	Settlements	6,125	6,125	6,125
Managed Other Land	Other land	1,015	1,015	1,015	Managed Other Land	Other land	1,000	1,000	1,000
	Subdivision	300,000				Subdivision	300,000		
Total final	Subcategory		300,000		Total final	Subcategory		300,000	
	Category			300,000		Category			300,000
2000			Area (ha)		2005			Area (ha)	
Subcategory	Subdivision	Subdivision	Subcategory	Category	Subcategory	Subdivision	Subdivision	Subcategory	Category
	Broadleaves Natural	89,767				Broadleaves Natural	89,732		
	Conifers Natural	29,928				Conifers Natural	29,898		
Managed Forest Land	Broadleaves Plantation	2,880	132,455	132,455	Managed Forest Land	Broadleaves Plantation	2,900	132,405	132,405
	Conifers Plantation	9.880				Conifers Plantation	9.875		
	Annual comps	80.310				Annual comps	80.305		
Annual Cropland	Rice	870	81,180	90.290	Annual Cropland	Rice	875	81,180	90 310
Peronnial Cropland	Devenuial contr	0,110	9 1 1 0		Recognial Cropland	Paraunial contr	9 130	9 130	20,270
Menaged Casesland	Current Crops	70.029	70.039	70.035	Mensoral Cosseland	Curveland	70.028	70.028	70.000
Managed Grassland	Grassiana	/0,038	/0,038	70,038	Managed Grassland	Grassiana	70,028	/0,028	70,028
Settlements (Other land)	Settlements	6,197	6,197	0,197	Settlements (Other land)	Settlements	6,237	0,237	0,237
Managed Other Land	Other land	1,020	1,020	1,020	Managed Other Land	Other land	1,020	1,020	1,020
	Subdivision	300,000				Subdivision	300,000		
Total final	Subcategory		300,000		Total final	Subcategory		300,000	
	Category			300,000		Category			300,000
Cincgory									
2010			Area (ha)		2015			Area (ha)	
2010	Subdivision	Subdivision	Area (ha)	Catagory	2015 Subastagou	Subdivision	Subdivision	Area (ha)	Catagory
2010 Subcategory	Subdivision	Subdivision \$	Area (ha) Subcategory	Category	2015 Subcategory	Subdivision	Subdivision	Area (ha) Subcategory	Category
2010 Subcategory	Subdivision Broadleaves Natural	Subdivision \$ 89,742	Area (ha) Subcategory	Category	2015 Subcategory	Subdivision Bradleaves Natural	Subdivision 89,742	Area (ha) Subcategory	Category
2010 Subcategory Managed Forest Land	Subdivision Broadleaves Natural Conifers Natural	Subdivision \$ 89,742 29,898	Area (ha) Subcategory 132,415	Category 132,415	2015 Subcategory Managed Forest Land	Subdivision Broadleaves Natural Conifers Natural	Subdivision 89,742 29,798	Area (ha) Subcategory 132,385	Category 132,385
2010 Subcategory Managed Forest Land	Subdivision Broadleaves Natural Conifers Natural Broadleaves Plantation	Subdivision 5 89,742 29,898 2,910	Area (ha) Subcategory 132,415	Category 132,415	2015 Subcategory Managed Forest Land	Subdivision Broadleaves Natural Conjfers Natural Broadleaves Plantation	Subdivision 89,742 29,798 2,970	Area (ha) Subcategory 132,385	Category 132,385
2010 Subcategory Managed Forest Land	Subdivision Broadleaves Natural Conifers Natural Broadleaves Plantation Conifers Plantation	Subdivision 9 89,742 29,898 2,910 9,865	Area (ha) Subcategory 132,415	Category 132,415	2015 Subcategory Managed Forest Land	Subdivision Broadleaves Natural Conifers Natural Broadleaves Plantation Conifers Plantation	Subdivision 89,742 29,798 2,970 9,875	Area (ha) Subcategory 132,385	Category 132,385
2010 Subcategory Managed Forest Land Annual Cropland	Subdivision Broadleaves Natural Confers Natural Broadleaves Plantation Confers Plantation Annual crops	Subdivision S 89,742 29,898 2,910 9,865 80,345	Area (ha) Subcategory 132,415 81.220	Category 132,415	2015 Subcategory Managed Forest Land Annual Cropland	Subdivision Broadleases Natural Conifers Natural Broadleases Plantation Conifers Plantation Annual crops	Subdivision 89,742 29,798 2,970 9,875 80,285	Area (ha) Subcategory 132,385 	Category 132,385
2010 Subcategory Managed Forest Land Annual Cropland	Subdivision Broadhaves Natural Conffers Natural Broadheaves Plantation Conffers Plantation Annual crops Rice	Subdivision S 89,742 29,898 2,910 9,865 80,345 875	Area (ha) Subcategory 132,415 81,220	Category 132,415 90,365	2015 Subcategory Managed Forest Land Annual Cropland	Subdivision Breadleases Natural Conffers Natural Breadleases Plantation Conffers Plantation Annual crops Rice	Subdivision 89,742 29,798 2,970 9,875 80,285 835	Area (ha) Subcategory 132,385 81,120	Category 132,385 90,275
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland	Subdivision Broadleaves Natural Confers Natural Broadleaves Plantation Confers Plantation Annual crops Rice Perennial crops	Subdivision S 89,742 29,898 2,910 9,865 80,345 875 9,145	Area (ha) Subcategory 132,415 81,220 9,145	Category 132,415 90,365	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland	Subdivision Broadleaves Natural Confers Natural Broadleaves Plantation Conffers Plantation Annual crops Rice Perennial crops	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155	Area (ha) Subcategory 132,385 81,120 9,155	Category 132,385 90,275
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland	Subdivision Broadleaves Natural Conffers Natural Broadleaves Plantation Conffers Plantation Annual crops Rice Peremial crops Grassland	Subdivision S 89,742 29,898 2,910 9,865 80,345 875 9,145 70,008	Area (ha) Subcategory 132,415 81,220 9,145 70,008	Category 132,415 90,365 70,008	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland	Subdivision Broadleases Natural Conifers Natural Broadleases Plantation Conifers Plantation Annual crops Rice Perennial crops Grassland	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058	Area (ha) Subcategory 132,385 81,120 9,155 70,058	Category 132,385 90,275 70,058
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land)	Subdivision Broadleaves Natural Conifers Natural Broadleaves Plantation Confers Plantation Annual crops Rice Perennial crops Grassland Settlements	Subdivision S 89,742 29,898 2,910 9,865 80,345 875 9,145 70,008 6,192	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192	Category 132,415 90,365 70,005 6,192	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land)	Subdivision Broadleaves Natural Conifers Natural Broadleaves Plantation Conifers Plantation Annual crops Rice Perennial crops Grassland Settlements	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262	Area (ha) Subcategory 132,385 81,120 9,155 70,058 6,262	Category 132,385 90,275 70,058 6,262
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land	Subdivision Broadhaves Natural Conffers Natural Broadheaves Plantation Conffers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land	Subdivision S 89,742 29,898 29,910 9,865 9,865 80,345 875 9,145 70,008 6,192 1,020 1,020	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020	Category 132,415 90,365 70,008 6,192 1,020	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land	Subdivision Breadisaves Natural Confers Natural Breadisaves Plantation Canfers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020	Area (ha) Subcategory 132,385 81,120 9,155 70,058 6,262 1,020	Category 132,385 90,275 70,058 6,262 1,020
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land	Subdivision Broadleaves Natural Cauffers Natural Broadleaves Plantation Cauffers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision	Subdivision S 89,742 29,898 29,898 2,910 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020	Category 132,415 90,365 70,008 6,192 1,020	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land	Subdivision Broadleaves Natural Conffers Natural Broadleaves Plantation Conffers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000	Area (ha) Subcategory 132,385 81,120 9,155 70,058 6,262 1,020	Category 132,385 90,275 70,058 6,262 1,020
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final	Subdivision Broadleaves Natural Confers Natural Broadleaves Plantation Confers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcate sory	Subdivision S 89,742 29,898 2,910 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000 300,000	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000	Category 132,415 90,365 70,008 6,192 1,020	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other Land Managed Other Land	Subdivision Broadleaves Natural Confers Natural Broadleaves Plantation Confers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subdivision	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000	Area (ha) Subcategory 132,385 81,120 9,155 70,058 6,262 1,020 300,000	Category 132,385 90,275 70,058 6,262 1,020
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final	Subdivision Broadleaves Natural Conffers Natural Broadleaves Plantation Conffers Plantation Annual crops Rice Perennial crops Grassland Sentements Other land Subdivision Subcategory Category	Subdivision S 89,742 29,898 2,910 9,865 80,545 875 9,145 70,008 6,192 1,020 300,000 80,000	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000	Categosy 132,415 90,365 70,008 6,192 1,020 300,000	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final	Subdivision Broadleases Natural Conifers Natural Broadleases Plantation Conifers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000	Area (ha) Subcategory 132,385 81,120 9,155 70,058 6,262 1,020 300,000	Category 132,385 90,275 70,058 6,202 1,020 300,000
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final	Subdivision Broadhaves Natural Conffers Natural Broadheaves Plantation Conffers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category	Subdivision S 89,742 29,898 29,898 2,910 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000	Category 132,415 90,365 70,008 6,192 1,020 300,000	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final	Subdivision Breadieases Natural Confers Natural Breadleases Plantation Canfers Plantation Annual crops Rice Perennial crops Grassland Setthements Other land Subdivision Subcategory Category	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000	Area (ha) Subcategory 132,385 81,120 9,155 70,058 6,262 1,020 300,000	Category 132,385 90,275 70,058 0,202 1,020 300,000
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2020	Subdivision Broadhaves Natural Conffers Natural Broadheaves Plannation Conffers Plannation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category	Subdivision S 89,742 29,898 29,998 2,910 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha)	Category 132,415 90,305 70,008 0,192 1,020 300,000	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2025	Subdivision Breadleases Natural Conffers Natural Breadleases Plantation Conffers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000	Area (ha) Subcategory 132,385 81,120 9,155 70,058 6,262 1,020 300,000 Area (ha)	Category 132,385 90,275 70,058 6,262 1,020 300,000
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2020 Subcategory	Subdivision Broadleaves Natural Conffers Natural Broadleaves Plantation Conffers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Subdivision	Subdivision S 89,742 29,898 29,898 2,910 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000 Subdivision 8	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha) Subcategory	Category 132,415 90,365 70,008 6,192 1,020 300,000 Category	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2025 Subcategory	Subdivision Breaditaves Natural Confers Natural Breaditeaves Plantation Confers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000	Area (ha) Subcategory 132,385 \$1,120 9,155 70,058 6,262 1,020 300,000 Area (ha) Subcategory	Category 132,385 90,275 70,058 6,262 1,020 300,000 Category
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2020 Subcategory	Subdivision Broadleaves Natural Confers Natural Broadleaves Plantation Confers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subdategory Category Subdivision Broadleaves Natural	Subdivision S 89,742 29,898 2,910 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000 300,000 Subdivision 8 89,742 89,742	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha) Subcategory	Category 132,415 90,365 70,008 6,192 1,020 300,000 Category	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2025 Subcategory	Subdivision Broadleaves Natural Confers Natural Broadleaves Plantation Confers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subdategory Category Subdivision Broadleaves Natural	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000 Subdivision 89,782	Area (ha) Subcategory 132,385 81,120 9,155 70,058 6,262 1,020 300,000 Area (ha) Subcategory	Category 132,355 90,275 0,252 1,020 300,000 Category
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2020 Subcategory	Subdivision Broadleaves Natural Confers Natural Broadleaves Plantation Confers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Broadleaves Natural Confers Natural	Subdivision S 89,742 29,898 2,910 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000 5 Subdivision 5 Subdivision 5 9,742 29,788	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha) Subcategory	Category 132,415 90,365 70,008 6,192 1,020 300,000 Category	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2025 Subcategory	Subdivision Broadleaves Natural Confers Natural Broadleaves Plantation Confers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Subdivision Broadleaves Natural Confers Natural	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000 Subdivision 89,782 29,788	Area (ha) Subcategory 132,385 81,120 9,155 70,058 6,262 1,020 300,000 Area (ha) Subcategory	Category 132,385 90,275 70,058 0,262 1,020 300,000 Category
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2020 Subcategory Managed Forest Land	Subdivision Broadhaves Natural Conffers Natural Broadhaves Plantation Conffers Plantation Annual crops Kice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Broadhaves Natural Conffers Natural Conffers Natural	Subdivision S 89,742 29,898 29,910 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000 300,000 Subdivision 89,742 2,9788 2,980	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha) Subcategory 132,295	Category 132,415 90,365 70,008 6,192 1,020 300,000 Category 132,295	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2025 Subcategory Managed Forest Land	Subdivision Breadleases Natural Conffers Natural Breadleases Plantation Conffers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Subdivision Breadleases Natural Conffers Natural Envadleases Plantation	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000 Subdivision 89,782 29,788 2,970	Area (ha) Subcategory 132,385 81,120 9,155 70,058 6,262 1,020 300,000 Area (ha) Subcategory 132,285	Category 132,385 90,275 0,282 1,020 300,000 Category 132,285
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2020 Subcategory Managed Forest Land	Subdivision Broadhaves Natural Conffers Natural Broadhaves Plantarion Conffers Plantarion Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Subdivision Broadhaves Natural Conffers Natural Broadhaves Plantarion	Subdivision S 89,742 29,898 29,910 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000 300,000 Subdivision 5 99,742 29,788 2,980 9,785	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha) Subcategory 132,295	Category 132,415 90,305 70,005 0,792 1,020 300,000 Category 132,295	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2025 Subcategory Managed Forest Land	Subdivision Breadleaves Natural Conffers Natural Breadleaves Plantation Conffers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Subdivision Breadleaves Natural Conffers Natural Conffers Plantation	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000 Subdivision 89,782 29,788 2,970 9,745	Area (ha) Subcategory 132,385 81,120 9,155 70,058 6,262 1,020 300,000 Area (ha) Subcategory 132,285	Category 132,385 90,275 0,058 0,202 1,020 300,000 Category 132,285
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2020 Subcategory Managed Forest Land	Subdivision Broadleaves Natural Conffers Natural Broadleaves Plantation Conffers Plantation Ammal crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Subdivision Broadleaves Natural Broadleaves Plantation Conffers Plantation	Subdivision S 89,742 29,898 2,910 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000 300,000 Subdivision 89,742 29,788 2,980 9,785 80,755	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha) Subcategory 132,295	Category 132,415 90,365 70,008 0,192 1,020 300,000 Category 132,295	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2025 Subcategory Managed Forest Land	Subdivision Breadleaves Natural Confers Natural Breadleaves Plantation Confers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Subdivision Breadleaves Natural Breadleaves Plantation Confers Plantation	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000 89,782 29,788 2,970 9,745 80,115	Area (ha) Subcategory - 132,385 	Category 132,385 90,275 6,262 1,020 300,000 Category 132,285
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2020 Subcategory Managed Forest Land Annual Cropland	Subdivision Broadleaves Natural Confers Natural Broadleaves Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Subdivision Broadleaves Natural Broadleaves Plantation Confers Plantation Annual Confers Plantation Confers Plantation Annual Confers Plantation Broadleaves Plantation	Subdivision S 89,742 29,898 2,910 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000 300,000 Subdivision 8 9,785 89,742 29,788 2,980 9,785 80,255	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha) Subcategory 132,295 81,080	Category 132,415 90,365 70,008 6,192 1,020 300,000 Category 132,295 90,165	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2025 Subcategory Managed Forest Land Annual Cropland	Subdivision Broadleaves Natural Confers Natural Broadleaves Plantation Confers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subdivision Subdivision Broadleaves Natural Confers Natural Broadleaves Plantation Confers Plantation Annual crops Rice	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000 89,782 29,788 2,970 9,745 80,115 87	Area (ha) Subcategory 132,385 81,120 9,155 70,058 6,262 1,020 300,000 Area (ha) Subcategory 132,285 80,940	Category 132,355 90,275 0,262 1,020 300,000 Category 132,285
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2020 Subcategory Managed Forest Land Annual Cropland Brannich Cropland	Subdivision Broadhaves Natural Conffers Natural Broadhaves Plantation Conffers Plantation Annual crops Rice Perennial crops Grassland Sentements Other land Subdivision Subcategory Category Subdivision Broadleaves Natural Conffers Natural Conffers Plantation Conffers Plantation Annual crops Rice Demociment	Subdivision Subdivision	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha) Subcategory 132,295 81,080 9,285	Category 132,415 90,365 70,008 6,192 1,020 300,000 Category 132,295 90,365	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2025 Subcategory Managed Forest Land Annual Cropland	Subdivision Breadleases Natural Conffers Natural Tradleases Plantation Conffers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategosy Categosy Subdivision Breadleases Natural Conffers Natural Conffers Plantation Conffers Plantation Annual crops Rice Perencis	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000 89,782 29,788 2,970 9,745 80,115 825	Area (ha) Subcategory - 132,385 - 132,385 - 81,120 9,155 70,058 6,262 1,020 300,000 Area (ha) Subcategory - 132,285 - 80,940 0,225	Category 132,385 90,275 0,282 1,020 300,000 Category 132,285 90,275
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2020 Subcategory Managed Forest Land Annual Cropland Annual Cropland Perennial Cropland Mencal Cropland	Subdivision Broadhaves Natural Conffers Natural Broadhaves Planation Conffers Planation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Category Subdivision Broadhaves Natural Conffers Planation Annual crops Rice Perennial crops Rice Rice Rice Rice Rice Rice Rice Rice	Subdivision 2 89,742 29,898 2,910 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000 Subdivision 2 89,742 29,788 89,742 29,788 9,785 80,255 825 9,285 9,285 9,000	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha) Subcategory 132,295 81,080 9,285 70,002	Category 132,415 90,305 70,005 0,192 1,020 300,000 Category 132,295 90,305 20,000	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2025 Subcategory Managed Forest Land Annual Cropland Annual Cropland Perennial Cropland Menced Forest Land	Subdivision Breadleaves Natural Conffers Natural Breadleaves Plantation Conffers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Subdivision Breadleaves Natural Conffers Natural Breadleaves Plantation Annual crops Rice Perennial crops	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000 Subdivision 89,782 29,788 2,970 9,745 80,115 825 9,335 6,025	Area (ha) Subcategory - 132,385 - 132,385 - 81,120 9,155 70,058 6,262 1,020 - 300,000 Area (ha) Subcategory - 132,285 - 80,940 9,335 - 60,575	Category 132,385 90,275 70,058 6,262 1,020 300,000 Category 132,285 90,275 90,275
2010 Subcategory Managed Forest Land Annual Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2020 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland	Subdivision Evaadleaves Natural Cauffers Natural Cauffers Natural Cauffers Plantation Cauffers Plantation Annual crops Rice Perennial crops Grassland Settlements Orber land Subdivision Subcategory Category Category Category Evadleaves Plantation Cauffers Natural Broadleaves Plantation Cauffers Cau	Subdivision Subdivision	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha) Subcategory 132,295 81,080 9,285 70,028 (202)	Category 132,415 90,365 70,008 6,192 1,020 300,000 Category 132,295 90,365 70,028	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2025 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland	Subdivision Broadleaves Natural Conffers Natural Broadleaves Plantation Conffers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Subdivision Broadleaves Plantation Conffers Natural Broadleaves Plantation Conffers Plantation	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000 Subdivision 89,782 29,788 2,970 9,745 80,115 825 9,335 69,978 6,978	Area (ha) Subcategory - 132,385 - 132,385 - 132,385 - 70,058 - 6,262 - 1,020 - 300,000 Area (ha) Subcategory - 132,285 	Category 132,385 90,273 70,058 6,262 1,020 300,000 Category 132,285 90,273 90,273
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2020 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Settlements (Other land)	Subdivision Broadleaves Natural Confers Natural Broadleaves Plantation Confers Plantation Ammal crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Category Subdivision Broadleaves Plantation Confers Natural Broadleaves Plantation Confers Plantation Confers Natural Broadleaves Plantation Confers Plantation Confer	Subdivision S 89,742 29,898 2,910 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000 300,000 Subdivision 8 89,742 29,788 2,980 9,785 80,255 825 9,285 70,028 6,302 4,57	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha) Subcategory 132,295 81,080 9,285 70,028 6,302 4,017	Category 132,415 90,365 70,008 0,192 1,020 300,000 Category 132,295 90,365 70,028 0,302	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2025 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Settlements (Other land)	Subdivision Broadleaves Natural Conifers Natural Broadleaves Plantation Conifers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Broadleaves Natural Broadleaves Natural Broadleaves Plantation Conifers Natural Broadleaves Plantation Conifers Pla	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000 Subdivision 89,782 29,788 2,970 9,745 80,115 825 9,335 69,978 6,452	Area (ha) Subcategory - 132,385 - 132,385 - 132,385 - 0,058 - 6,262 - 1,020 - 300,000 - 300,000 - 4 rea (ha) Subcategory - 132,285 - 132,285 - 132,285 - 132,385 - 132,585 - 132,585	Category 132,355 90,275 0,262 1,020 300,000 Category 132,285 90,275 09,978 0,452
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Settlements (Other land) Managed Other Land Total final 2020 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Settlements (Other land) Managed Other Land	Subdivision Broadhaves Natural Conffers Natural Droadhaves Natural Droadhaves Plantation Annual crops Rice Perennial crops Grassland Subdivision Subcate gory Category Subdivision Broadheaves Natural Conffers Plantation Conffers Plantation Conffers Plantation Annual crops Rice Perennial crops Rice Perennial crops Grassland Settlements Other land	Subdivision Subdivision	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha) Subcategory 132,295 81,080 9,285 70,028 6,302 1,010	Category 132,415 90,365 70,008 6,192 1,020 300,000 Category 132,295 70,028 6,302 1,010	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other Land) Managed Other Land Total final 2025 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other Land) Managed Other Land	Subdivision Breadicases Natural Conffers Natural Conffers Plantation Annual crops Rice Perennial crops Grassland Subdivision Subcategory Category Subdivision Breadleaves Natural Conffers Plantation Conffers	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000 89,782 29,788 2,970 9,745 80,115 825 9,335 6,452 1,010	Area (ha) Subcategory - 132,385 - 132,385 - 132,385 - 0,058 - 6,262 - 1,020 - 300,000 Area (ha) Subcategory - 132,285 	Category 132,353 90,273 70,038 0,202 1,020 300,000 Category 132,285 90,275 0,975 0,452 1,010
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other Land Total final 2020 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other Land	Subdivision Broadhaves Natural Conffers Natural Broadhaves Plantation Conffers Plantation Annual crops Kice Perennial crops Grassland Settlements Other land Subdivision Broadhaves Natural Conffers Plantation Froadhaves Plantation Conffers Plantat	Subdivision S 89,742 29,898 29,910 9,865 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000 300,000 89,742 29,788 2,980 9,785 80,255 825 9,285 70,028 6,302 1,010 300,000	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha) Subcategory 132,295 81,080 9,285 70,028 6,302 1,010	Category 132,415 90,305 70,008 0,192 1,020 300,000 Category 132,295 90,305 90,305 70,028 0,302 1,010	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other Land) Managed Other Land 2025 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Settlements (Other Land)	Subdivision Breadleases Natural Conffers Natural Breadleases Planation Conffers Planation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Subcategory Category Breadleases Natural Conffers Natural Breadleases Planation Annual crops Rice Perennial crops Rice Perennial crops Grassland Settlements Other land	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000 89,782 29,788 2,975 80,115 825 9,335 6,452 1,010 300,000	Area (ha) Subcategory - 132,385 - 132,385 - 132,385 - 0,058 - 6,262 - 1,020 - 300,000 Area (ha) Subcategory - 132,285 	Category 132,385 90,275 70,058 0,262 1,020 300,000 Category 132,285 90,275 90,275 69,978 0,452 1,010
2010 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2020 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final	Subdivision Evaadhaaes Natural Cauifers Natural Cauifers Natural Cauifers Natural Cauifers Plantation Cauifers Plantation Annual crops Rice Perennial crops Grassland Settlements Other land Subdivision Broadhaves Natural Cauifers Natural Cauifers Natural Broadheaves Plantation Cauifers Natural Broadheaves Plantation Cauifers Plantation Cauifers Plantation Cauifers Plantation Cauifers Plantation Cauifers Instand Stubdivision Broadheaves Comments Other land Settlements Other land Subdivision Subcategory	Subdivision S 89,742 29,898 2,910 9,865 80,345 875 9,145 70,008 6,192 1,020 300,000 300,000 Subdivision 2 29,788 2,980 9,785 80,255 825 9,285 70,028 6,302 1,010 300,000	Area (ha) Subcategory 132,415 81,220 9,145 70,008 6,192 1,020 300,000 Area (ha) Subcategory 132,295 81,080 9,285 70,028 6,302 1,010 300,000	Category 132,415 90,365 70,008 6,192 1,020 300,000 Category 132,295 90,365 70,028 6,302 1,010	2015 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Other Land Total final 2025 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other land) Managed Grassland Settlements (Other land) Managed Other Land Total final	Subdivision Broadleaves Natural Conffers Natural Conffers Natural Conffers Plantation Conffers Plantation Annual crops Rice Perennial crops Grassland Subdivision Subcategory Category Category Subdivision Broadleaves Plantation Conffers Natural Droadleaves Plantation Conffers Plantation Subcategory	Subdivision 89,742 29,798 2,970 9,875 80,285 835 9,155 70,058 6,262 1,020 300,000 Subdivision 89,782 29,788 2,970 9,745 80,115 825 9,335 69,978 1,010 300,000	Area (ha) Subcategory - 132,385 - 132,385 - 132,385 - 70,058 - 6,262 - 1,020 - 300,000 Area (ha) Subcategory - 132,285 	Category 132,385 90,275 70,058 6,262 1,020 300,000 Category 132,285 90,275 69,978 6,452 1,010

¹⁵² E.g. by assigning to each annual land-use conversion matrix 1/5th of the changes reported in each 5-year land-use conversion matrix, or by randomizing in annual changes each change reported in the 5-year land-use conversion matrix, or better by using ancillary data to derive those annual values.

Step 3

Data from the land-use tables above are compiled in a time series of units of land to be entered in the Land Representation Manager (LRM).

The time series is assembled in a table which relevant parameters are: *Current Subdivision*, *Previous Subdivision*, *Area (ha)*, *Method applied for each C pool*.

Note:

- ✓ In this exercise, information on *Method applied for each C pool* is not compiled given C stock change estimates are not¹⁵³ part of this Guide;
- ✓ The identification code assigned is just an example, users may find a better way to coding units of land to help them to attribute the appropriate EFs/parameters in the relevant calculation worksheets (see <u>Automatic unit of land codes</u>).

¹⁵³ Guidebook on Land Categories 3.B deals with C stock change estimation in C pools.

Step 3a

<u>First</u>: we start from the oldest land-use table and **we generate a unit of land for each subdivision in the table**, as reported in the table below:

ID		Previous			Current		Area (ha)
	Category	Subcategory	Subdivision	Category	Subcategory	Subdivision	1990
FL-FL_1			Broadleaves Natural			Broadleaves Natural	91,285
FL-FL_2	Forest land Managed Forest lan	Managed Forest land	Conifers Natural	Ferret land	Managed Forest land	Conifers Natural	30,260
FL-FL_3		Managed Polest land	Broadleaves Plantation	1.01est land		Broadleaves Plantation	3,030
FL-FL_4			Conifers Plantation			Conifers Plantation	9,000
CL-CL_1		Annual Consideral	Annual crops		Annual Cropland	Annual crops	80,065
CL-CL_2	Cropland	Annual Cropiand	Rice	Cropland		Rice	800
CL-CL_3		Perennial Cropland	Perennial crops		Perennial Cropland	Perennial crops	8,020
GL-GL_1	Grassland	Managed Grassland	Grassland	Grassland	Managed Grassland	Grassland	70,525
SL-SL_1	Settlements	Settlements (Other)	Settlements	Settlements	Settlements (Other)	Settlements	6,000
OL-OL_1	Other land	Managed Other land	Other land	Other land	Managed Other land	Other land	1,015

Step 3b

<u>Second</u>: from the other land-use tables we compile for each unit of land the area it has in each year of the time series:

ID		Previous		Current				Area (ha)							
ID.	Category	Subcategory	Subdivision	Category	Subcategory	Subdivision	1990	1995	2000	2005	2010	2015	2020	2025	
FL-FL_1			Broadleaves Natural			Broadleaves Natural	91,285	90,005	89,767	89,732	89,742	89,742	89,742	89,782	
FL-FL_2	Forest land	Managed Forget land	Conifers Natural	Forest land	Managed Forget land	Conifers Natural	30,260	30,000	29,928	29,898	29,898	29,798	29,788	29,788	
FL-FL_3	1'orest land	Managed Forest land	Broadleaves Plantation	1 ofest land	Managed Forest land	Broadleaves Plantation	3,030	3,000	2,880	2,900	2,910	2,970	2,980	2,970	
FL-FL_4			Conifers Plantation			Conifers Plantation	9,000	9,650	9,880	9,875	9,865	9,875	9 ,785	9,745	
CL-CL_1		Annual Creatend	Annual crops		Annual Coopland	Annual crops	80,065	80,320	80,310	80,305	80,345	80,285	80,255	80,115	
CL-CL_2	Cropland	Annual Cropiand	Rice	Cropland	Annual Cropiand	Rice	800	850	870	875	875	835	825	825	
CL-CL_3		Perennial Cropland	Perennial crops		Perennial Cropland	Perennial crops	8,020	9,010	9,110	9,130	9,145	9,155	9,285	9,335	
GL-GL_1	Grassland	Managed Grassland	Grassland	Grassland	Managed Grassland	Grassland	70,525	70,040	70,038	70,028	70,008	70,058	70,028	69,978	
SL-SL_1	Settlements	Settlements (Other)	Settlements	Settlements	Settlements (Other)	Settlements	6,000	6,125	6,197	6,237	6,192	6,262	6,302	6,452	
OL-OL_1	Other land	Managed Other land	Other land	Other land	Managed Other land	Other land	1,015	1,000	1,020	1,020	1,020	1,020	1,010	1,010	

Step 3b

<u>Third</u>: recalling that to correctly operationalize formulation A of IPCC Equation 2.25 (SOC changes in mineral soils), the area of the unit of land in the year **Y-D** is needed, and assuming no area changes occurred before 1990¹⁵⁴, the area data for years **Y-D** are compiled as:

					Year Y-D										
ID		Previous		Current				Area (ha)							
ID ID	Category	Subcategory	Subdivision	Category	Subcategory	Subdivision	1970	1975	1980	1985	1990	1995	2000	2005	
FL-FL_1			Broadleaves Natural			Broadleaves Natural	91,285	91,285	91,285	91,285	91,285	90,00 5	89,767	89,732	
FL-FL_2	Ecret land	Managed Forest land	Conifers Natural	Forest land	Managed Forest land	Conifers Natural	30,260	30,260	30,260	30,260	30,260	30,000	29,928	29,898	
FL-FL_3	1-OTest Mild	Managed Porest land	Broadleaves Plantation	1 Olest Mile	Managed Polest land	Broadleaves Plantation	3,030	3,030	3,030	3,030	3,030	3,000	2,880	2,900	
FL-FL_4			Conifers Plantation			Conifers Plantation	9,000	9,000	9,000	9,000	9,000	9,650	9,880	9,875	
CL-CL_1		Annual Cropland	Annual crops		Annual Cropland	Annual crops	80,065	80,065	80,065	80,065	80,065	80,320	80,310	80,305	
CL-CL_2	Cropland	minual cropiand	Rice	Cropland	2 militar Cropiand	Rice	800	800	800	800	800	850	870	875	
CL-CL_3		Perennial Cropland	Perennial crops		Perennial Cropland	Perennial crops	8,020	8,020	8,020	8,020	8,020	9,010	9,110	9,130	
GL-GL_1	Grassland	Managed Grassland	Grassland	Grassland	Managed Grassland	Grassland	70,525	70,525	70,525	70,525	70,525	70,040	70,038	70,028	
SL-SL_1	Settlements	Settlements (Other)	Settlements	Settlements	Settlements (Other)	Settlements	6,000	6,000	6,000	6,000	6,000	6,125	6,197	6,237	
OL-OL_1	Other land	Managed Other land	Other land	Other land	Managed Other land	Other land	1,015	1,015	1,015	1,015	1,015	1,000	1,020	1,020	

¹⁵⁴ Such an assumption is consistent with good practice if the first inventory year reported is 2015, otherwise the inventory compiler shall collect data needed for all years from year S -*first year of the NGHGI time series*- to year S-D.

Step 4

We enter data in the *Software*.

Recall: enter units of land in the *Software* from the first year -i.e. 1990- of the time series¹⁵⁵ till the last year -i.e. 2025. This is a MUST requirement to correctly enter a Land Representation in the *Software*.

¹⁵⁵ Recall, this first requires setting the time series in the Inventory Year TAB of the Application Menu (accessible from the main bar of the Sofivtare).

Step 4a

In the **Regions** TAB, we enter:

- 1. total area of the country, in ha
- 2. Regions' name and associated area; for this example Region's name is *Example 1* and the area is 300,000 ha:

nd Representation Manager – D X													
Regions Land representation table Land-use conversion mate	ix (Approach 2 & 3) Total Land-use conversion	natrix (All Regions and Approaches)											
hole country area (ha) 900.000.000													
Region name	Area (ha)												
Example 1	300,000	Approach 1											
Example 2	300,000	Approach 2											
Example 3	300.000	Approach 3		×									
*													
Total													
	900000.000												

Note the Land Representation in the figure covers all three examples of this Guide -i.e. 3 Regions for the 3 Examples on Land Representation, each Region contains one example for the corresponding IPCC Approach.

Step 4b

In the Land representation table TAB, we enter data from Forest land category to Other land category. Thus:

- 1. we click on the symbol + on the left-hand side of the screen next to *Forest land* category to open submenu of subcategories
- 2. we click on the symbol * on the left-hand side of the screen next to *Managed Forest land* subcategory to open submenu where to enter information on units of land according to the relevant subdivisions:
- 3. to select the *Current land use subdivision* we click on the symbol in the right-hand side of the field, so opening a dropdown menu from which selecting the relevant subdivision: <u>Note that</u> the dropdown menu contains the subdivisions entered in the Land Use Manager



4. Once the *Current land use subdivision* is selected, we move to the following level by clicking on the symbol + on the left-hand side of the screen, and we:

	Land use category	Area (1990) (ha)		Area (1970) (ha)					
e.	Forest Land	0			0				
	Land use subcategory	Area (1990) (ha)		Area (1970) (ha)		Remark			
	Managed Forest Land		0		0				
	Current Land	l use subdivision			Remark				
	📄 🙀 Broadleaves Natural			~				×	
	Land unit code (Automatic)	Land unit code (User defined)		Area (1990) (ha)	Area (1970) (ha)	Remark	Ρ		
	*			(-)			2		

5. enter the Land unit code (user-defined),

NOTE: Given in Approach 1 all units of land are classified as *Remaining* in the land use subdivision-, information on *Previous land use subcategory* and *Previous land use subdivision* is not relevant and so those 2 fields are not shown in the data mask.

6. enter the Area (ha) of the unit of land in the current inventory year -i.e. 1990,



7. enter the Area (ha) of the unit of land in the inventory year Y-D¹⁵⁶ -i.e. 1970.



8. click on *SAVE*, on the bottom right-hand corner of the window, before moving to enter the next unit of land. <u>Note that</u> once saved the Software assign an automatic code to the unit of land

¹⁵⁶ Note that if the year Y-D is part of the inventory time series the *Software* automatically compile the value of the area of the year Y-D.

Once entered the area, we leave the *Area update mode* (accessible by clicking on the symbol woon the right-hand side of the field *Area*) in its default option *Current inventory year and subsequent inventory years*.



Repeating steps 1 to 15 for all units of land we complete the land representation data entry for the year 1990:

Re	gions	Land representation table	Land-use of	conversion matrix (App	roach 2 & 3) Total Land-	use conversion matrix	x (All Regions and Approaches)			
R	egion	Example 1	~	Region area (ha)	300,000.000	Discrepancy (ha)	1990: OK; 1970: OK		Approach 1	1990
					Area (1990) (ha)		Area (1970) (ha)			
æ	- F	orest Land				133,575		133,575		
ŧ	C	ropland				88,885		88,885		
÷.	G	rassland				70,525		70,525		
ė	. N	/etlands				0		0		
ŧ	S	ettlements				6,000		6,000		
ŧ	0	ther Land				1,015		1,015		

Step 4c

Once all units of land for the year 1990 have been entered we create the years 1991, 1992, 1993, 1994 and 1995. To do so, we use the *Inventory Year* Menu (accessible from the main bar of the *Software*) and select the *Create new*... functionality.

🏟 IPCC Inventory Software - Lar	nd Representation - [Work	sheets]					
🖳 Application Database	Inventory Year Admin	istrate Worksheets	Tools E	Export/Import	Reports	Window	Help
2006 IPCC Categories	Choose	Total Net CO2 Emission	n/Removal				
	Create new	Worksheet					

We can either create new inventory years as a copy of the previous inventory year -e.g. 1991 as a copy of 1990- or as an empty inventory year.

			×
Create	e new Inv	entory Year	
New Inventory Year	1991	~	
 Create empty inventory y Copy data from inventory 	year y year	1990	~
Create		Car	icel

In both cases the Land representation table of the new inventory year contains the units of land already entered in the previous year(s), although in the second case -i.e. empty inventory- no area data are prefilled by the *Software*. However, given we have no new data to enter for the years 1991, 1992, 1993 and 1994, we choose to create those as a copy of the previous inventory year; while for the year 1995, given we have new data, we choose to create it as an empty inventory.

		×									
Create new Inventory Year											
New Inventory Year 1995	~										
 Create empty inventory year Copy data from inventory year 	1990	~									
Create		Cancel									

We then enter the data for units of land in the year 1995, by repeating all steps described at Step 4b:

Regions	Land representation table	Land-use of	conversion matrix (App	proach 2 & 3) Total Land	use conversion matrix	(All Regions and Approaches)			
Region	Example 1	~	Region area (ha)	300,000.000	Discrepancy (ha)	1995: OK; 1975: OK		Approach 1	1995
				Area (1995) (ha)		Area (1975) (ha)			
⊕ ▶	Forest Land				132,655		133,575		
÷	Cropland				90,180		88,885		
<u>ن</u>	Grassland				70,040		70,525		
÷ 1	Wetlands				0		0		
<u>ن</u>	Settlements				6,125		6,000		
· ·	Other Land				1.000		1.015		

Step 4d

We repeat operations described in <u>Step 4c</u> to create the years 1996, 1997, 1998, 1999, 2000 and we enter data in year 2000 as described in <u>Step 4b</u>. And we do it for all other years; till we have created, repeating operations described in <u>Step 4c</u>, all years to 2025 and we have entered data in years 2005, 2010, 2015, 2020, 2025, repeating operations described in <u>Step 4c</u>.

		Land-use c	onversion matrix (Approa	ach 2 & 3) Total Land-i	use conversion matrix	(rannegione and represence)				
Region Exam	mple 1	~	Region area (ha)	300,000.000	Discrepancy (ha)	2000: OK; 1980: OK		Approach 1		200
	Land use ca	ategory		Area (2000)		Area (1980)			Remark	
				(ha)		(ha)				
Forest L	Land				132,455		133,575			
Grassla	od .				90,290		88,885 70,525			
V/etlands	inu le				70,035		70,525			
Settleme	ents				6,197		6,000			
Other La	and				1,020		1,015			
Regions Land r	representation table L	and-use co	Begion area (ba)	ch 2 & 3) Total Land-u	Discrepancy (ba)	(All Regions and Approaches) 2005: OK: 1985: OK		Approach 1		200
				Area	Discrepancy (na)	Area		Aproach 1		200
	Land use ca	tegory		(2005) (ha)	100.405	(1985) (ha)	100 575		Remark	
Forest La	and				132,405		133,575			
Grasslan	J ad				70.029		70,525			
Wetlands	1u				70,028		70,525			
B Settlemen	nts				6.237		6 000			
Other Lar	nd				1.020		1.015			
Regions Land r	representation table L	and-use c	Region area (ha)	ch 2 & 3) Total Land-u 300,000.000	Discrepancy (ha)	(All Regions and Approaches) 2010: OK; 1990: OK		Approach 1		201
				Area		Area				
	Land use ca	ategory		(2010) (ha)		(1990) (ha)				
Forest La	and				132,415		133,575			
Cropland	ł				90,365		88,885			
🕀 🖌 Grasslan	nd				70,008		70,525	i		
Wetlands	5				0		0			
Settlemer	ents				6,192		6,000			
Other Lar	ind				1,020		1,015			
Regions Land r	representation table	.and-use c	onversion matrix (Approa	ich 2 & 3) Total Land-u	use conversion matrix	(All Regions and Approaches)				
Region Exam	nple 1	~	Region area (ha)	300,000.000	Discrepancy (ha)	2015: OK; 1995: OK		Approach 1		201
	Land use ca	ategory		Area (2015)		Area (1995)				
				(114)	132 385	(114)	132 655			
- Forest La	and									
Forest La Cropland	and				90,275		90,180			
	and d nd				90,275 70,058		90,180 70,040			
Forest La Grasslan Wetlands	and d nd s				90,275 70,058 0		90,180 70,040 0			
 Forest La Cropland Grasslar Wetlands Settlement 	and d nd s ents				90,275 70,058 0 6,262		90,180 70,040 0 6,125			
Forest La Cropland Grasslar Wetlands Settleme Other La	and d nd s ents and				90,275 70,058 0 6,262 1,020		90,180 70,040 0 6,125 1,000			
Forest Lz Cropland Grasslan Wetlands Settleme Other La	and d nd s and ation Manager d representation table	Land-use o	conversion matrix (Approx	ach 2 & 3) Total Land-	90.275 70.058 0 6.262 1.020 use conversion matrix	(All Regions and Approaches)	90,180 70,040 0 6,125 1,000			
Forest Lz Cropland Grasslan Wetlands Settleme Other Lan Land Representa Regions Land Regon Example	and d nd s ents ation Manager d representation table mple 1	Land-use o	conversion matrix (Approc Region area (ha)	ach 2 & 3) Total Land- 300,000 -	90,275 70,058 0 6,262 1,020 use conversion matrix Discrepancy (ha)	(All Regions and Approaches) 2020: OK: 2000: OK	90,180 70,040 0 6,125 1,000	Approach 1		202
Forest Lz Cropland Grasslan Wetlands Grasslan Wetlands Other Las Land Representa Regions Land Region Examples	and d d s s ants ants ation Manager d representation table mple 1 Land use c	Land-use o	conversion matrix (Appro Region area (ha)	ach 2 & 3) Total Land- 300,000,000 (2020) (na)	90,275 70,058 0 6,262 1,020 use conversion matrix Discrepancy (ha)	(All Regions and Approaches) 2020: OK: 2000: OK (2000) (na)	90,180 70,040 0 6,125 1,000	Approach 1	Remark	202
Forest La Forest La Cropland Grasslan Wetlands Settleme Other La Land Representa Regions Land Region Evan B- Forest L Forest L	and d d nd s s ation Manager d representation table f representation table f mple 1 Land use c Land	Land-use o	conversion matrix (Approx Region area (ha)	ach 2 & 3) Tetal Land- 300.000.000 (rea (2000) (ha)	90,275 70,058 0 6,262 1,020 use conversion matrix Discrepancy (ha) 132,295	(All Regions and Approaches) 2020: OK: 2000: OK Area (2000) (ha)	90,180 70,040 0 6,125 1,000	Approach 1	Remark	202
Forest L Forest L Cropland Grasslan Wetlands Other Lai	and d d d d d d d d d d d d d d d d d d d	Land-use o	conversion matrix (Approx Region area (ha)	ach 2 & 3) Total Land- 300,000,000 (103) (104)	90,275 70,058 0 6,262 1,020 use conversion matrix Discrepancy (ha) 132,295 90,355	(All Regions and Approaches) 2020: OK: 2000: OK Arss (2009) ((ha)	90,180 70,040 0 6,125 1,000 1,000	Approach 1	Remark	202
Forest L Forest L Forest L Forest L Croplan Croplan Grassla Settleme Other Lai Land Representa Region Exam Forest L Forest L Croplan Grassla	and d d d d d d d d d d d d d d d d d d d	Land-use c	conversion matrix (Approc Region area (ho)	ach 2 & 3) Total Land- 300,000 000 (2000) (ha)	90,275 70,058 0 6,262 1,020 Use conversion matrix Discrepancy (ha) 132,295 90,365 70,028	(All Regions and Approaches) 2020: OK. 2000: OK (2009) ((ha)	90,180 70,040 0 0 6,125 1,000 132,455 90,290 70,038	Approach 1	Remark	202
Forest L Forest L Grassla	and d d s s s ation Manager d representation table f representation table f umple 1 Land use c Land d d s	Land-use c	conversion matrix (Approx	ach 2 & 3) Total Land- 300.000.000 Area (Cos) (ha)	90,275 70,058 0 6,262 10,200 use conversion matrix Discrepancy (ha) 1132,295 90,365 70,028 0 0	(All Regions and Approaches) 2020: OK: 2000: OK Area (tha)	90.180 70.040 0 6.125 1.000 132.455 90.290 70.033 0 0	Approach 1	Remark	202
Porest L Grasslan Copland Grasslan Grasslan Vetland Settleme Other La Porest L Region Exam Grassla Grasslan	and d d d d s s nnts ation Manager d to persentation table d representation table t Land use c Land d d d s s	Land-use o	conversion matrix (Approx Region area (ha)	ach 2 & 3) Total Land- 300,000,000 (2001) (fus)	90,275 70,088 0 6,262 1,020 use conversion matrix Discrepancy (ha) 132,295 90,365 70,028 0 6,302	(All Regions and Approaches) 2020: OK: 2000: OK (2000) (Ina)	90,180 70,040 0 6,125 1,000 132,455 90,290 70,038 0 0 6,197	Approach 1	 Remark	202
B Forest L4 Cooland Cooland B Grassland B Settleme B Settleme B Forest L4 Region Land Representz Region Exar B Forest L4 B Cropland B Cropland B Settleme	and d d d d d d d d d d d d d d d d d d	Land-use o	conversion matrix (Approc Region area (ha)	ach 2 & 3) Tetal Land- 300.000 000 /Area (2000) (ha)	90,275 70,058 0 6,262 1,020 Uuse conversion matrix Discrepancy (ha) 132,295 90,365 70,028 0 0 6,302 1,010	(All Regions and Approaches) 2020: OK: 2000: OK (Ra) (ha)	90,180 70,040 0 6,125 1,000 132,455 90,290 70,033 0 0 6,197 1,020	Approach 1	Remark	202
Porest L Grasslan Copland Grasslan Copland Grasslan Vetland Settleme Other La Porest L Region Land Porest L Settleme Other La Region Land Region Land Region Land Region Land Region Land Region Land	and d d d d d d d d d d d d d d d d d d	Land-use o	conversion matrix (Approx Region area (ha)	ach 2 & 3) Total Land- 300.000 000 (114) (114) ch 2 & 3) Total Land- 300.000 000	90.275 70.058 0 6.262 1.020 Use conversion matrix Discrepancy (ha) 132.295 90.365 70.028 0 0 6.302 1.010 use conversion matrix Discrepancy (ha)	(All Regions and Approaches) 2020: OK. 2000: OK (2000) (na) (All Regions and Approaches) 2025: OK. 2005: OK	90,180 70,040 0 6,125 1,000 132,455 90,290 70,038 0 0 6,197 1,020	Approach 1	Remark	202
Porest La Copland Copland Copland Copland Vetada	and d d d d d d d d d d d d d d d d d d	Land-use c	conversion matrix (Approx Region area (ha)	ach 2 & 3) Total Land- 300.000 000 (2000) (ha) cch 2 & 3) Total Land- 300.000 000	90,275 70,058 0 6,262 1,020 1,020 0 0 90,365 70,028 0 0 6,302 1,010 0 0 6,302 1,010	(All Regions and Approaches) 2020: OK: 2000: OK (na) (ha) (All Regions and Approaches) 2025: OK: 2005: OK	90.180 70.040 0 6.125 1.000 132.455 90.290 70.038 0 6.197 1.020	Approach 1	Remark	202
Forest L Cropland Grassiar	and d d d d d d d d d d d d d d d d d d	Land-use or ategory ategory ategory	conversion matrix (Approx Region area (ha) onversion matrix (Approa Region area (ha)	ach 2 & 3) Total Land- 300.000 000 (114) ach 2 & 3) Total Land- 300.000 000 Area (2025) (125)	90,275 70,058 0 6,262 1,020 Use conversion matrix Discrepancy (ha) 132,295 90,365 70,028 0 6,302 1,010 use conversion matrix Discrepancy (ha)	(All Regions and Approaches) 2020: OK: 2000: OK (2000) (Ina) (All Regions and Approaches) 2025: OK: 2005: OK (2006) (Ina)	90.180 70.040 0 6.125 1.000 1.000 1.000 1.000 1.000 0.290 70.033 0 0 6.197 1.020	Approach 1	Remark	202
Porest La Cropland Grassian Welland Settleme Other La Settleme Other La Settleme Other La Settleme Other La Settleme Other La Settleme	and d d d d d d d d d d d d d d d d d d d	Land-use c	conversion matrix (Approx Region area (ha)	ach 2 & 3) Total Land- 300.000 000 (2020) (ha) ach 2 & 3) Total Land- 300.000 000 Area 2000 (ha)	90,275 70,058 0 6,262 10,20 0 0 0 102 0 0 102 0 0 0 0 0 0 0 0 0 0	(All Regions and Approaches) 2020: OK: 2000: OK (2000) (11a) (All Regions and Approaches) 2025: OK: 2005: OK (2005) (11a) (2005) (11a) (2005) (11a) (2005) (11a) (2005) (11a) (2005) (11a) (2005) (11a) (2005) (11a) (2005) (11a) (2005) (11a) (11	90.180 70.040 0 6.125 1.000 132.455 90.290 70.039 0 6.197 1.020	Approach 1 Approach 1 Approach 1	Remark	202
B Forest L Cooland Cooland B Grasslar B Welland B Settleme B Other La B Settleme B Cropland B Settleme B Cropland B Settleme B Cropland B Settleme B Grassla B Settleme B Other La B Settleme B Settleme B Settleme B Settleme B Settleme	and d d d d d d d d d d d d d d d d d d	Land-use or Land-use or ategory ategory	conversion matrix (Approx Region area (ha)	ach 2 & 3) Tetal Land- 300.000 000 (Pas (Pas) (Pas) teh 2 & 3) Tetal Land- 300.000 000 Area (2025) (Pas)	90.275 70.088 0 6.262 1.020 Use conversion matrix Discrepancy (ha) 132.295 90.365 70.028 0 6.302 1.010 Use conversion matrix Discrepancy (ha)	(All Regions and Approaches) 2020: OK: 2000: OK Area (2000) (hs) (hs) (All Regions and Approaches) 2025: OK: 2005: OK (hs) (hs) (hs)	90.180 70.040 0 6.125 1.000 132.455 90.290 70.033 0 6.197 1.020	Aproach 1	Remark	202
B) Forest L B) Cropland B) Grasslar B) Veldands B) Settleme B) Other Law B) Settleme B) Grasslar B) Settleme B) Forest L B) Forest L B) Grasslar B) Grasslar B) Grasslar B) Settleme B) Grasslar B) Settleme B) Grasslar B) Forest L B) Grasslar B) Cropland B) Grasslar B) Cropland	and d d d d d d d d d d d d d d d d d d	Land-use c	conversion matrix (Approx Region area (ha) anversion matrix (Approx Region area (ha)	ach 2.8.3) Total Land- 300.000 000 (res (res) (rha) ch 2.8.3) Total Land- 300.000 000 Area (2025) (rha)	90.275 70.058 0 0 6.262 1.020 Uuse conversion matrix Discrepancy (ha) 132.295 70.028 0 0 6.302 1.010 Uuse conversion matrix Discrepancy (ha) 132.285 9.0.255 9.0.225 9.0.275 6.9.978 6.9.975	(All Regions and Approaches) 2020: OK: 2000: OK (2000) (111) (All Regions and Approaches) 2025: OK: 2005: OK (2005) (113)	90.180 70.040 0 6.125 1.000 1.000 1.000 1.020 1.020 1.020 1.020	Approach 1	Remark	202
Forest L Cropland Grasslar Grasslar Grasslar Velland Grasslar Velland Grasslar Grasslar Velland Grasslar Velland Grasslar Gras	and d d d d d d d d d d d d d d d d d d	Land-use c	conversion matrix (Approx Region area (ha)	ach 2 & 3) Total Land- 300.000 000 (cool) (c	90,275 70,058 0 6,262 1,020 Uuse conversion matrix Discrepancy (ha) 132,295 90,365 70,028 0 6,302 1,010 Uuse conversion matrix Discrepancy (ha) 132,285 90,275 69,978 0 0 0 0 0 0 0 0 0 0 0 0 0	(All Regions and Approaches) 2020: OK: 2000: OK (2000) (11a) (All Regions and Approaches) 2025: OK: 2005: OK (2005) (11a)	90,180 70,040 0 6,125 1,000 132,455 90,280 70,089 70,089 70,089 70,089 1,020 1	Approach 1 Approach 1 Approach 1	Remark	202
Porest La Copland Copland Copland Velland	and d d d d d d d d d d d d d d d d d d d	Land-use c	conversion matrix (Approx Region area (ha)	ach 2 & 3) Total Land- 300.000 000 (7000) (ha) cch 2 & 3) Total Land- 300.000 000 Area (ha)	90.275 70.058 0 0 6.262 1.020 Discrepancy (ha) 132.295 90.365 70.028 0 0 6.302 1.010 Use conversion matrix Discrepancy (ha) Discrepancy (ha) 0 0 0.65 0 0 0.65 0 0 0 0 0 0 0 0 0 0 0 0 0	(All Regions and Approaches) 2020: OK: 2000: OK (na) (na) (All Regions and Approaches) 2025: OK: 2005: OK (na) (na)	90.180 70.040 0 6.125 90.290 70.030 0 90.290 70.033 0 0 6.137 1.020	Approach 1	Remark	202
B Forest L B Cropland B Grassian B Welfand B Settleme B Other La B Forest L B Other La B Forest L B Other L B Other L B Other L B Other L B Forest L B Forest L B Grasslan B Welland B Setterne B Grasslan B Setterne B Grasslan B Setterne B Setterne B Setterne B Setterne	and d d d d d d d d d d d d d d d d d d	Land-use c	conversion matrix (Approc Region area (ha) onversion matrix (Approa Region area (ha)	ach 2.8.3) Total Land- 300.000 000 (Cross)	90,275 70,058 0 0 6,262 1,020 Uuse conversion matrix Discrepancy (ha) 132,285 90,385 70,028 0 0 6,302 1,010 Uuse conversion matrix Discrepancy (ha) 132,285 90,275 90,2	(All Regions and Approaches) 2020: OK: 2000: OK (2000) (ma) (All Regions and Approaches) 2025: OK: 2005: OK (2005) (ma)	90.180 70.040 0 6.125 1.000 132.455 90.290 70.033 0 0 6.197 1.020 132.405 90.310 70.028 0 0 6.197 1.020 0 6.297 1.020	Approach 1 Approach 1 Approach 1	Remark	202

Example 2 – Approach 2 for Land Representation

Let's do then a Step-by-Step example on preparing with **Approach 2** a time series of units of land for a Land representation. This is a very simplified example given that countries have many more land use types under a number of combinations of soil types and climate zones.

Thus, after having completed **Step 1** we proceed as follows.

Note:

✓ In a real country with more than a single soil type and climate zone as well as with more land-use subdivisions the units of land of a complete land representation can grow to several hundred as well as several thousand.

Recall:

✓ Approach 2 does not track subsequent changes in the use/management of a unit of land, which means that each new land-use conversion generates a new unit of land which area is to be subtracted from the units of land that are *Remaining* in the relevant¹⁵⁷ land use subdivision.

¹⁵⁷ i.e. the land use subdivision from which the unit of land has been converted.

Step 2

We compile raw data available in the country in the following land-use conversion matrices below. Each matrix covers a five-year period given the land use survey is conducted every 5 years. An inventory compiler can derive¹⁵⁸ a set of 5 annual land-use conversion matrices from each of the tables below (data are all in hectares), although we do not do it in this example.

1990/19	95		Managed	l Forest Land		Annual Cro	Subca pland	regory Perennial Cropland	Managed Grassland	Settlements (Other)	Managed Other Land		т	otal Initial	
Subcategory	Subdivision	Broadleaves Natural	Conifers Natural	Broadleaves Plantation	Conifers Plantation	Annual crops	Subdi Rice	vision Perennial crops	Grassland	Settlements	Other land		Subdivision	Subcategory	Category
	Broadleaves Natural	90,000	20.000		300			940	35	10			91,285		
Managed Forest Land	Conifers Natural Broadleaves Plantation Conifers Plantation		30,000	3,000	250					10 30			30,260	133,575	133,575
Annual Cropland	Annual crops Rice				2,000	80,000	50 800	10	5				80,065 800	80,865	\$22.22
Perennial Cropland	Perennial crops							8,000		20			8,020	8,020	
Managed Grassland	Grassland	5			100	320		60	70,000	40			70,525	70,525	70,525
Settlements (Other land)	Settlements Other land									6,000	1.000		6,000	6,000	<i>6,000</i>
Managed Other Land	Subdivision	90,005	30,000	3,000	9,650	80,320	850	9,010	70,040	6,125	1,000		1,010		
Total final	Subcategory		1	32,655		81,170		9,010	70,040	6,125	1,000	300,000		300,000	
	Calegory		1;	2,000				7,750	70,040	0,120	1,000				
1996\20	00		Managed	l Forest Land		Annual Cro	Subca pland	tegory Perennial Cropland	Managed Grassland	Settlements (Other)	Managed Other Land		т	otal Initial	
Subcategory	Subdivision	Broadleaves Natural	Conifers Natural	Broadleaves Plantation	Conifers Plantation	Annual crops	Subdi Rice	vision Perennial crops	Grassland	Settlements	Other land	-	Subdivision	Subcategory	Category
	Broadleaves Natural Canifers Natural	89,737	29.928					100	168	72			90,005		
Managed Forest Land	Broadleaves Plantation			2,830	170								3,000	132,655	132,655
	Conifers Plantation	30		10	9,610	80.310							9,650		
Annual Cropland	Rice			10		30,310	850						850	81,170	90.150
Perennial Cropland	Perennial crops							9,010					9,010	9,010	
Managed Grassland	Grassland			30	100		20		69,870		20		70,040	70,040	70,040
Settlements (Other land)	Settlements									6,125			6,125	6,125	6,125
Managed Other Land	Other land										1,000		1,000		
	Subdivision	89,767	29,928	2,880	9,880	80,310	870	9,110	70,038	6,197	1,020				
Total final	Subcategory		1:	32,455		81,180)	9,110	70,038	6,197	1,020	300,000		300,000	
	Category		13	32,435			91	0,290	70,038	6,197	1,020				
		1					Subca	tegory							
2001\20	05		Managed	l Forest Land		Annual Cro	pland	Perennial Cropland	Managed Grassland	Settlements (Other)	Managed Other Land		Т	otal Initial	
Subcategory	Subdivision	Broadleaves Natural	Conifers Natural	Broadleaves Plantation	Conifers Plantation	Annual crops	Subdi Rice	Perennial crops	Grassland	Settlements	Other land		Subdivision	Subcategory	Category
	Broadleaves Natural	89,697	00.000					50	20				89,767		
Managed Forest Land	Confers Natural Broadleaves Plantation		29,898	2.880						30			29,928	132,455	132,455
	Conifers Plantation	20		5	9,855								9,880		
Annual Cropland	Annual crops			5		80,305	070						80,310	81,180	
Personal Comband	Kace Barranial and a						8/0	0.090	20	10			870	0.110	90,290
Managed Grassland	Gratiand	15		10	20		5	9,000	69.988	10			70.038	70.038	70.045
	6						-			6.197				6.107	
Settlements (Other land)	Settlements										1		6,197	0,197	0,197
Managed Other Land	Settlements Other land									,	1,020		6,197	6,197	0,197
Managed Other Land	Other land Subdivision	89,732	29,898	2,900	9,875	80,305	875	9,130	70,028	6,237	1,020 1,020		6,197 1,020	0,197	0,197
Managed Other Land Total final	Other land Subdivision Subcategory	89,732	29,898	2,900 32,405	9,875	80,305 81,180	875	9,130 9,130	70,028 70,028	6,237 6,237	1,020 1,020 1,020	300,000	6,197	300,000	0,197
Managed Other Land Total final	Other land Subdivision Subcategory Category	89,732	29,898 1: 12	2,900 32,405 32,405	9,875	80,305 81,180	875 9	9,130 9,130 0,370	70,028 70,028 70,028	6,237 6,237 <i>0,237</i>	1,020 1,020 1,020 7,020	300,000	6,197 1,020	300,000	0,19/
Settlements (Other Land) Managed Other Land Total final	Semements Other land Subdivision Subcategosy Categosy	89,732	29,898 1: 1.	2,900 32,405 <i>32,405</i>	9,875	80,305 81,180	875 90 Subca	9,130 9,130 0,310	70,028 70,028 70,028	6,237 6,237 6,237 6,237	1,020 1,020 1,020 7,020	300,000	6,197	300,000	0,19/
Settlements (other land) Managed Other Land Total final	Semements Other land Subdivision Subcategory Category	89,732	29,898 1: 72 Managed	2,900 32,405 <i>32,403</i> I Forest Land	9,875	80,305 81,180 Annual Cro	875 9 Subcar pland	9,130 9,130 9,370 regory Perennial Cropland	70,028 70,028 70,025 Managed Grassland	6,237 6,237 6,237 6,237 5ettlements (Other)	1,020 1,020 1,020 1,020 1,020 Managed Other Land	300,000	6,197 1,020	0,197 300,000	0,197
Settlements (other land) Managed Other Land Total final 2006\20 Subastanay	Semement Other land Subdivision Subcategory Category	89,732	29,898 11 12 Managed	2,900 32,405 32,403 I Forest Land	9,875	80,305 81,180 Annual Cro	875 9 Subca pland Subdi Birr	9,130 9,130 9,130 9,130 9,130 Perennial Cropland Perennial Cropland	70,028 70,028 70,028 Managed Grassland	6,237 6,237 <i>0,237</i> Settlements (Other)	1,020 1,020 1,020 7,020 Managed Other Land	300,000	6,197 1,020 T	0,197 300,000 otal Initial	0,197
Settements (other iand) Managed Other Land Total final 2006\20 Subcategory	Semement Other land Subdivision Subcategory Category 10 Subdivision Broadlases Natural	89,732 Bradieases Natural 89,732	29,898 1: 7: Managed	2,900 32,405 12,405 I Forest Land Breadlenver Plantation	9,875	80,305 81,180 Annual Crops	875 9 Subca pland Subdi Rice	9,130 9,130 2,210 regory Perennial Cropland Perennial crops	70,028 70,028 70,028 70,028 Managed Grassland Grassland	6,237 6,237 0,237 Settlements (Other)	1,020 1,020 1,020 7,020 Managed Other Land Other land	300,000	6,197 1,020 T <i>Subdivision</i> 89,732	0,197 300,000 otal Initial Subcategory	0,197 Categosy
Settlements (Uner Land) Managed Other Land Total final 2006 \20 Subcategory Managed Forest Land	Semement Other land Subdivision Subcategory Category 10 Subdivision Breadlease Natural Confeet Natural	89,732 Breadlaser Natural 89,732	29,898 1: 7: Managed Couffre Natural 29,895	2,900 52,405 12,405 1 Forest Land Braadleaver Plantation	9,875	80,305 81,180 Annual Crop	90 Subca pland Subdi Rice	9,130 9,130 2,210 regoty Perennial Cropland vision Perennial crops	70,028 T0.028 70,028 Managed Grassland Graziland	6,237 6,237 8,237 8,237 Settlements (Other)	1,020 1,020 1,020 7,020 Managed Other Land Other land	300,000	6,197 1,020 T <i>Subdivision</i> 89,732 29,898	0,197 300,000 otal Initial Subcategory 132,405	0,197 Category 132,405
Settlements (Uner Land) Managed Other Land Total final 2006\20 Subcategory Managed Forest Land	Simonia Otier land Subdivision Subdivision Category 10 Subdivision Bradiener Namal Confers Natural Disediener Planates Confers Natural	89,732 Breakleaver Natural 89,732 5	29,898 1: 7: Managed Conffree Natural 29,898	2,900 32,405 12,403 1Forest Land Breaklasser Plastation 2,000	9,875	80,305 81,180 Annual Cro	875 90 Subca pland Subdi Rice	9,130 9,130 9,270 Perennial Cropland rision Perennial crops	70,028 70,028 70,028 70,028 Managed Grassland Grassland	6,237 6,237 6,237 5 Settlements (Other) 5	1,020 1,020 1,020 1,020 7,020 Managed Other Land Other land	300,000	6,197 1,020 T <u>Subdivision</u> 89,732 29,898 2,900 9,875	0,197 300,000 fotal Initial Subcategory 132,405	0,197 Category 132,405
Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cressland	Simulation Other Lad Subdivision Subcategory Category 10 Subdivision Bradieser Namal Confer Nama Confer Nama Confer Planates Annal Org	89,732 Breadleaver Natural 89,732 5	29,898 1: 7: Managed Confers Natural 29,898	2,900 32,405 12,405 1 Forest Land Brasilinever Pleastier 2,900	9,875	80,305 81,180 Annual Crop Annual crops 80,305	875 Subcar pland Subdi Rice	9,130 9,130 2,310 tegoty Perential Cropland trision Perential crops	70,028 70,028 70,028 70,028 Managed Grassland Grazzland	6,237 6,237 6,237 6,237 Settlements (Other) Settlements	1,020 1,020 1,020 7,020 Managed Other Land Other land	300,000	6,197 1,020 T Subdivision 89,732 29,898 2,900 9,875 80,305	0,197 300,000 otal Initial Subcategory 132,405 81,180	6,197 Category 132,405
Settlements (Uner Land) Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland	Similaria Orier ind Subdrivision Subdrivision Category Category 10 Subdrivision Breadlesers Namel Category Breadleser Jeantes Category Leantes Category Breadleser Jeantes Category	59,732 Breadleaver Natural 59,732 5	29,898 1: 1: Managed Confers Natural 29,898	2,900 32,405 12,403 1Forest Land Breaklower Pleasance 2,000	9,875	S0,305 S1,150 Annual Crops S0,305	875 Subca pland Subdi Rice 875	9,130 9,130 9,130 9,310 Perennial Cropland Perennial crops	70,028 70,025 70,025 Managed Grassland Grazzland	6,237 6,237 0,297 Settlements (Other) Stritements	1,020 1,020 1,020 7,029 Managed Other Land Other land	300,000	6,197 1,020 T Subdivision 89,732 29,898 2,900 9,875 80,305 875 2,000	6,19 300,000 otal Initial Subcategory 132,405 81,180 0.07	6,197 Category 132,405 90,310
Settlements (Unier Land) Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland Perennial Cropland	Similari Otri ind Subdivision Subcategory Category Category 10 Subdivision Bradiener Nama Dendlener Nama Dendlener Plantnee Catfor Plantnee Categor Plantnee Categor Plantnee Categor Plantnee Categor Plantnee Categor Plantnee Categor Plantnee Categor Plantnee Categor Plantnee	89,732 Breakleaver Netternal 89,732 5 5	29,898	2,900 32,405 12,405 Herest Land Breakleaver Plantator	9,875	80,305 81,180 Annual Crops 80,305 40	Subca pland Subdi Rice 875	9,130 9,130 9,170 Perenial Cropland vision Perenial crops 9,065	70,028 70,025 70,025 Managed Grassland Grazzland	6,237 6,237 6,237 8,237 8ettlements (Other) 5	1,020 1,020 1,020 7,020 Managed Other Land Other land	300,000	6,197 1,020 Subdivision 89,732 2,998 2,500 9,875 80,305 875 9,130	0,197 300,000 otal Initial Subcategory 132,405 81,180 9,130	6,197 Category 132,405 90,310
Settlements (Uner Land) Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grasaland	3 minimum Other land Stubdiversion Stubdiversion Stubdiversion Broadbarer, Namal Broadbarer, Namal Canfer, Namal Annal oppi Canfer, Namal Annal oppi Elice Perennal oppi State	59,732 Breakleaver Natural 59,732 5	29,998 11 72 Managed Confer Natural 29,898	2,900 32,405 1 Forest Land Breadleaver Planninge 2,500	9,875	80,305 81,180 Annual Crop 80,305 40	975 99 Subca Pland Subdi Rice 875	9,130 9,130 3,310 Perensial Cropland Pressial Crops 9,085	70,028 70,028 70,028 Managed Grassland <i>Grassland</i> 70,008	6,237 6,237 6,237 6,237 5 5 5 5 5 5 10 6,177	1,020 1,020 1,020 1,020 Managed Other Land Other land	300,000	6,197 1,020 T Subdivision Y 9,732 2,900 9,875 9,130 875 9,130 70,028 6,2 ²⁸	6,19 300,000 oral Initial Subcategory 132,405 81,180 9,130 70,028 6,227	Category 132,403 90,310 70,028
Settlements (Unier Land) Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland Petermial Cropland Managed Grassland Settlements (Other Land) Managed Managed Grassland	Similari Other ind Subdivision Subcategory Category Category 10 Subdivision Breakness Namel Catefor Name Catefor Namel Catefor Namel Scientific Namel Catefor Namel Catefor Namel	89,732 Breatleaver Network 89,732 5 5	29,998 1: 72 Confere Natural 29,898	2,900 32,405 12,407 1Forest Land Breallancer Planation 2,000 10	9,875	80,305 81,180 Annual Crops 	975 90 Subca pland Subdi Rice 875	9,130 9,130 9,130 Perennial Cropland resort Perensial crops 9,085 60	70,025 70,025 70,025 Managed Grassland Grassland 70,008	6,237 6,237 6,237 6,237 Settlements (Other) Settlements 5 10 6,177	1,020 1,020 1,020 7,020 Managed Other Land Other land	300,000	6,197 1,020 T Subditrision 9,732 29,995 2,900 9,875 9,875 9,875 9,875 9,875 9,875 9,875 9,875 9,875 9,875 9,150 70,022	6,19 300,000 oral Initial Subcategory 132,405 81,180 9,130 70,028 6,237	6,197 Category 132,403 50,310 70,028 6,237
Settlements (Uner Land) Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland Managed Grassland Settlements (Other Land) Managed Other Land	Similaria Orier ind Subdivision Subdivision Subdivision Backberry Namel Conferences Name Conferences Name Name Conferences Name Conferences Name Conferences Name Conferences Name Conferences Name Conferences Name Conferences Name Conferences Name Conferences Name Name Conferences Name Name Conferences Name Name Name Name Name Name Name Name	89,732 Breadlener Natural 89,732 5 5 5 5 5 5 5 5 5 5 5 5 5	29,898 1: 7: Managed Confre Natural 29,695 29,695 29,695	2,900 22,405 12,405 1Forest Land Prediencer Pleasance 2,000 10 10	9,875	80,305 81,180 Annual crops 80,305 40 80,345	875 90 Subcar pland <i>Subdi</i> <i>Rice</i> 875 875	9,130 9,130 2,310 Perential Cropland Perential crops 9,085 60 9,145	70,028 70,025 70,025 Managed Grassland Grazzland 70,005 70,005	6,237 6,237 6,237 5.237 Settlements (Other) 5. 10 6,177 6,192	1,020 1,020 1,020 7,020 Managed Other Land Other land	300,000	6,197 1,020 T Subdivision 89,732 29,593 29,900 9,875 9,875 9,875 9,130 70,028 6,237 1,020	6,19 300,000 otal Initial Subcategory 132,405 81,180 9,130 70,028 6,237	6,197 Category 132,403 50,310 70,028 6,237
Settlements (Unier Land) Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other Land) Managed Other Land	3 Aministri Orter ind Subdivision Subdivision Subdivision Davidsers Namel Confer Natural Confer Natural Amal orge Confer Statutes Confer Statutes Confer Statutes Confer Statutes Amal orge Rice Perential orge Graziand Subdivision Subdivision	\$9,732 Breadinary National \$9,732 5 5 5 89,742	29,898 1: 7: Managed Cenfor Name/ 29,695 29,698 1:	2,900 22,405 12,403 1Forest Land Breadleaver Plantaise 2,900 10 10	9,875	80,305 81,150 Annual Crop -Annual Crop 80,305 40 80,345 81,220	Subca pland Subci Rice 875 875	9,130 9,130 9,170 Perential Cropland vision Perential crops 9,065 60 9,145	70,028 70,025 70,025 70,025 Managed Grassland Grazzland 70,008 70,008 70,008	6,237 6,237 6,237 Settlements (Other) Strilement 5 10 6,177 6,192 6,192	1,020 1,020 1,020 7,020 Managed Other Land Other land 1,020	300,000	6,197 1,020 T Subdivision 59,732 29,999 2,999 9,875 9,130 70,025 875 9,130 6,237 1,020	6,19 300,000 otal Initial Subcategory 132,405 81,180 9,130 70,028 6,237 300,000	6,197 Category 132,403 50,310 70,028 6,237
Managed Other Land Total final 2006, 20 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Settlements (Other Land Managed Grassland Total final	3 similariti Other ind Stubdivision Stubdivision Stubdivision Braditary Nama Cangfer Nama Cangfer Nama Cangfer Nama Cangfer Nama Cangfer Nama Cangfer Nama Mender Pictures Reic Perensial engi Grazian Stubcategory Category Category	89,732 Breatleaver Natural 89,732 5 5 89,742	29,898 11 7. Managed Confers Natural 29,595 29,595 1: 29,595	2,900 22,405 170rest Land Breadleaver Plantator 2,900 10 10 2,910 32,415	9,875 Cenffre Plantance 9,865 9,865	80,305 81,150 Annual Cro -Annual Crop 80,305 40 80,345 81,220	Subcat pland Subdi Rice 875 875	9,130 9,130 9,170 Perential Cropland rision Pressial ergs 9,085 60 9,145 9,145 9,145	70,028 70,028 70,028 Managed Grassland Grassland Grassland 70,008 70,008 70,008 70,008 70,008	6,237 6,237 6,237 Settlements (Other) 5 5 10 6,177 6,192 6,192 6,192	1,020 1,020 1,020 7,029 Managed Other Land Other land 1,020 1,020 1,020 1,020	300,000	6,197 1,020 T Subdivision 89,752 2,999 2,990 9,875 9,130 70,025 875 9,130 6,237 1,020	6,19 300,000 oral Initial Subcategory 132,405 81,180 9,130 70,028 6,237 300,000	6,197 Categosy 132,403 50,310 70,028 0,237
Settlements (Uner Land) Managed Other Land Total final 2006, 22 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Nanaged Grasaland Settlements (Other Land) Managed Other Land	3 similariti Orker ind Subdivision Subdivision Category Category 10 Subdivision Bradiener, Namal Bradiener, Namal Canfer Namal Sentener, Namal Gener, Subdivision Armal orgs Reve Perennal orgs Gravitad Subdivision Subdivision Subdivision Subdivision	89,732 Brasilearer Natural 89,732 5 5 5 89,742	29,898 11 72 Managed Ceeffrr Natural 29,598 11 29,598 11 72	2,900 22,405 187493 18 Forest Land Brazilianser Planatine 2,900 10 2,910 22,415	9,875 Cenfer Planame 9,565 9,865	80,305 81,150 Annual crop: 	875 91 Subcar pland Rice 875 875 875	9,130 9,130 9,370 Perennial Cropland Perensial engr 9,085 60 9,145 9,145 9,145	70,028 70,028 70,028 Managed Grassland Grassland 70,008 70,008 70,008 70,008	6,237 6,237 6,237 6,237 5 5 5 5 5 10 6,177 6,192 6,192 6,192	1,020 1,020 1,020 1,020 Managed Other Land Other land 1,020 1,020 1,020 1,020	300,000	6,197 1,020 7 500 507,52 2,909 2,900 9,875 2,900 9,875 9,130 70,028 6,237 1,020	6,19 300,000 oral Initial Subcategory 132,405 81,180 9,130 70,028 6,237 300,000	6,197 Category 132,403 90,310 70,028 0,237
Settlements (Uner Land) Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other Land) Managed Other Land Total final 2011\20	Similaria Orier ind Subdivision Subdivision Subdivision Databaser, Nama Carefer, Nama Subdivision Subdivision Subdivision Subdivision Subdivision	89,732 Breatleaver Natural 89,732 5 5 89,742	29,898 11 7. Managed Confers Natural 29,898 1 29,898 1 7. Managed	2,900 32,405 12,405 1Forest Land Brasiliancer Planative 2,900 10 10 10 10 12,415 12,415 1Forest Land	9,875 Canfbr Planation 9,865 9,865	80,305 81,180 Annual Cro 	Subcar pland Subdi Rice 875 875 90 90 90 90 90 90 90	9,130 9,130 9,130 Perennial Cropland <i>ision</i> Perenaial crops 9,085 60 9,145 9,145 9,145 9,145 9,145 9,145	70,025 70,025 70,025 Managed Grassland Graziland 70,005 70,005 70,005 70,005 70,005 70,005 70,005	6,237 6,237 6,237 6,237 5 5 5 5 10 6,177 6,192 6,192 6,192 6,192 6,192 6,192 5 5	1,020 1,	300,000	6,197 1,020 T Subdivision 1 89,732 29,598 2,900 9,575 9,575 9,575 9,575 9,575 1,020 T 1,020 T	6,19 300,000 otal Initial Subcategory 132,405 81,180 9,130 70,028 6,237 300,000 otal Initial	6,197 Category 132,405 50,310 70,028 6,237
Managed Other Land Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland Petermial Cropland Managed Grassland Settlements (Other Land) Managed Other Land Total final	3 similariti Oriter ind Subdivision Subdivision Subdivision Benalitaris Namel Confers Stanta Benalitaris Namel Confers Stanta Confers Stanta Annal age Confers Stanta Confers Stanta Subdivision Subdivision Subdivision Subdivision Subdivision Subdivision Subdivision	89,732 Breadleners Natural 89,732 5 5 5 5 5 5 5 5 5 5 5 5 5	29,898 1: 72 Managed Capter Natural 29,898 29,898 1: 72 Managed	2,900 32,405 32,407 IForest Land Breathever Pleasancer 2,000 10 10 10 2,910 32,415 12,415 IForest Land	9,875	80,305 81,180 Annual Crop .4mmal crops .4mmal crops .40 80,305 .40 80,345 .81,220 Annual Crops .40	Subca Subca 875 Subca 875 875 90 90 90 90 90 90 90 90 90 90 90 90 90	9,130 9,130 9,130 9,130 9,130 9,000 9,000 9,000 9,000 9,145 9,145 9,145 9,145 9,145 9,145 9,145	70,028 70,028 70,028 70,028 70,028 Managed Grassland 70,008 70,008 70,008 70,008 70,008	6,237 6,237 6,237 Settlements (Other) Striitment 5 10 6,177 6,192 6,192 6,192 6,192	1,020 1,020 1,020 7,020 Managed Other Land Other Land 1,020 1,020 1,020 1,020 1,020	300,000	6,197 1,020 T Subdivision 89,732 29,999 29,997 9,975 9,975 9,975 9,975 9,975 9,975 9,975 1,020 T T	6,197 300,000 oral Initial Subcategory 132,405 81,180 9,130 70,028 6,237 300,000 oral Initial	6,197 Category 132,405 50,310 70,025 6,237
Settlements (Unier Land) Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Unber Land) Total final 2011\20	3 similariti Oriter ind Subdivision Subdivision Subdivision Bradiener Xenery Confer Natural Development Conference Annal orget Rice Personial orget Graziland Sutherision Subdivision Subdivision Buddivision		29,898 1 7 Managed Confere Naturel 29,698 1 29,698 1 1 29,698 1 29,898 1 29,898 1 29,898	2,900 32,405 I Porest Land Breadleaver Plantaise 2,900 10 10 10 2,910 32,415 I Porest Land I Porest Land	9,875 Cenffre Plantation 9,865 9,865	50,305 51,150 Annual Crop -4emal crop 40 50,305 40 80,345 51,220 Annual Crop -4emal crop	Subcar pland Rice 875 875 875 90 Subcar 90 90 Subcar 90 Subca 90 Subca 90 Subca 90 Subca 90 Subca 90 Subco	9,130 9,130 9,170 Perenial Cropland trition Perenial crops 9,065 60 9,145 9,145 9,145 9,145 9,145 9,145 9,145	70,028 70,025 70,025 Managed Grassland Graziland 70,008 70,008 70,008 70,008 70,008 70,008	6,237 6,237 6,237 Settlements (Other) 5 10 6,177 6,192 6,192 6,192 6,192 5 5trilements (Other)	1,020 1,020 1,020 7,020 Managed Other Land Other land 1,020 1,020 1,020 1,020 7,029 Managed Other Land Other land	300,000	6,197 1,020 <i>Subdivision</i> 89,732 29,695 29,695 9,875 9,136 76,623 6,237 1,020 T <i>Subdivision</i> T <i>Subdivision</i> T	6,19 300,000 oral Initial Subcategory 132,405 81,180 9,130 70,028 6,237 300,000 oral Initial Subcategory	6,157 Category 132,405 50,310 70,025 0,237 Category
Settlements (Uner Land) Managed Other Land Total final 2006, 22 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other Land) Managed Other Land Total final 2011, 20 Subcategory Managed Forest Land	3 similariti Orker ind Subdivision Subdivision Subdivision Brooleary Namal Cargery Namal Cargery Namal Cargery Namal Cargery Planates Cargery Planates Cargery Planates Carger Planates Carger States Peressal oppi Grazilan Subdivision Subdivision Subdivision Subdivision Brooleary Namal	89,732 89,732 89,732 5 5 5 89,742 89,742 89,742	29,898 11 72 Managed Ceeffer Name 29,598 1 29,598 1 29,598 1 1 20,598 1 1 1 20,598 1 1 1 20,598 1 1 1 20,598 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2,900 22,405 11 Porest Land 12,900 10 10 10 10 10 12,910 12,415 11 Porest Land 12,910 12,415 11 Porest Land 12,910 10 11 10 12,910 12,415 11 10 11 10 12,910 10 10 10 10 10 10 10 10 10 10 10 10 1	9,875 Cenffer Planame 9,565 9,565 Cenffer Planame	50,305 51,150 Annual Cro -4emal crop 50,305 40 50,345 51,220 Annual Cro -4emal crop	Subcar pland Rice 875 875 875 90 Subcar 875 90 Subcar 90 Subca 90 Subca 90 80 Subca 90 Subca 90 Subca 90 Subca 90 Subca 90 Sub	9,130 9,130 9,310 Perensial Cropland rision Presental crops 9,065 60 9,145 9,1	70,028 70,028 70,028 Managed Grassland Graziland 70,008	6,237 6,237 6,237 6,237 5 5 5 10 6,177 6,192 6,192 6,192 6,192 8 5 7 192 6,192 5 7 192 6,192	1,020 1,020 1,020 1,027 Managed Other Land Other land 1,020 1,020 1,020 1,020 1,020 1,020 1,020 1,020	300,000	6,197 1,020 T Subdivision 9,973 2,9,998 2,900 9,975 9,913 9,913 9,913 1,020 T 5,028 6,237 1,020 T Subdivision 1,020 T Subdivision 1,020 T Subdivision 2,9,998 2,900 9,875 2,900 9,875 2,900 9,875 2,900 9,875 2,900 9,875 2,900 9,875 2,900 9,875 2,900 9,875 2,900 9,875 2,900 9,875 2,900 9,875 2,900 9,875 2,900 1,100 1,100 1,100 1,100 1,100 1,100 1,000 1,100 1,000 1,100 1,000 1	6,19 300,000 oral Initial Subcategory 132,405 \$1,180 9,130 70,028 6,237 300,000 oral Initial Subcategory 132,415	Caregory 132,405 0,310 70,025 0,237
Settements (Uner Land) Managed Other Land Total final 2006, 22 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Other Land) Managed Other Land Total final 2011, 20 Subcategory Managed Forest Land	3 similaria Orker ind Subdivision Subdivision Subdivision Data Subdivision Confert Natural Confert Natural Confert Natural Confert Natural Confert Natural Confert Natural Confert Natural Confert Subdivision Subdivision Subdivision Subdivision Subdivision Subdivision Subdivision Data Subdivision Subdivision Subdivision Subdivision Subdivision Subdivision Subdivision Natural Confert Natural	89,732 Breatleaver Natural 5 5 5 89,742 Breatleaver Natural 89,742	29,898 11 7 Managed Confer Name 29,598 29,898 1 29,898 1 1 7 Managed Confer Name 1 29,598 1 1 29,598 1 1 29,598 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2,900 22,405 12,405 12,405 1Forest Land 2,900 10 10 2,910 22,415 12,415 1Forest Land 10 10 10 10 10 10 10 10 10 10 10 10 10	9,875	80,305 81,190 Annual Cro 2.4mmal crop 80,345 81,220 Annual Cro 2.4mmal crop	875 Subcar pland Subdi Rice 875 90 Subcar pland 875 90 Subcar pland	9,130 9,130 2,310 egory Perenial Cropland vision 9,055 60 9,055 60 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145	70,025 70,025 70,025 70,025 Managed Grassland Graziland 70,005 70,005 70,008 70	6,237 6,237 6,237 6,237 5 5 5 10 6,177 6,192 6,192 6,192 6,192 6,192 6,192	1,020 1,020 1,020 1,020 1,020 Managed Other Land Other land 1,020	300,000	6,197 1,020 T Subdivision 1 89,732 29,732 29,732 29,753 9,753 9,753 9,753 9,753 1,020 T Subdivision 1 59,752 1,020 T T Subdivision 1 59,752 2,959 2,950 2,955 2,	6,19 300,000 oral Initial Subcategory 132,405 81,180 9,130 70,025 6,237 300,000 oral Initial Subcategory 132,415	0,197 Category 132,403 0,310 70,025 0,237 Category 132,415
Managed Other Land Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland Petermial Cropland Managed Grassland Settlements (Other Land) Managed Other Land Total final 2011\20 Subcategory Managed Forest Land	3 similaria Orter ind Subdivision Subdivision Subdivision Benalisers Namel Confer Stanta Benalisers Namel Confer Stanta Benalisers Stanta Annal opt Carlyer Planta Subdivision	89,732	29,998 11 72 Managed Confern Named 29,598 29,898 11 72 Managed Confern Named 29,798	2,900 22,405 22,405 22,405 17 Orest Land 2,000 2,000 10 2,910 22,415 22,415 1Forest Land 2,910 22,415 100 2,810 2,	9,875 Confre Plantation 9,865 9,865 Confrer Plantation 40 9,335	80,305 51,160 Annual Crop 80,305 40 80,345 81,220 Annual Cro 40 80,345 81,220	875 Subcar Pland Subdi Rice 875 9 9 Subcar Pland Subdi Rice	9,130 9,130 9,130 Perenial Cropland vision 9,065 60 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145	70,028 70,028 70,028 70,028 70,028 70,028 70,008 70,008 70,008 70,008 70,008 70,008 70,008 70,008 70,008	6,237 6,237 6,237 8,237 Settlements (Other) 5 10 6,177 6,192 6,192 6,192 6,192 6,192 8,193 8,193	1,020 1,020 1,020 7,020 Managed Other Land 0ther land 1,020 1,020 1,020 1,020 1,020 1,020 1,020	300,000	6,197 1,020 T Subdivision 89,732 29,593 29,90 9,975 9,375	6,197 300,000 oral Initial Subcategory 132,405 81,180 9,130 70,028 6,237 300,000 oral Initial Subcategory 132,415 01,020	0,117 Canegory 132,403 70,025 0,237 Canegory 132,413
Settlements (Unier Land) Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grassland Settlements (Unit Land) Total final 2011\20 Subcategory Managed Forest Land Annual Cropland	3 stabilities and a stability of the set of		29,898 1 1 7 1 1 1 29,898 1 29,595 29,595 1 29,595 1 1 29,595 1 29,795 1 29,795 1 1 29,795 1 1 1 29,795 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2,900 22,405 170rest Land 2,900 2,405 10 10 2,900 10 10 10 10 10 10 10 10 10 10 10 10 1	9,875 Cenffer Plantation 9,865 9,865 0,865 0,865 0,865	50,305 51,180 Annual Crop -4muel crop 40 50,305 40 50,305 51,200 Annual Crop -4muel crop -4muel crop -4muel crop	Subcat pland Subdi Rice 875 875 875 90 90 90 90 90 90 90 90 90 90 90 90 90	9,130 9,130 9,130 9,130 9,130 9,145 9,065 60 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,150	70,028 70,028 70,025 Managed Grassland Grazilani 70,008 70,008 70,008 70,008 70,008 70,008 70,008 70,008 70,008 70,008 70,008 70,008	6,237 6,237 6,237 Settlements (Other) 5 10 6,177 6,192 6,192 6,192 6,192 5 5 settlements (Other) 5 Settlements (Other) 10	1,020 1,020	300,000	6,197 1,020 <i>Subdivision</i> 89,752 29,595 2,900 9,875 9,136 76,028 6,237 1,020 T <i>Subdivision</i> 87,5 9,136 76,028 6,237 1,020 T <i>Subdivision</i> 87,5 9,255 9,265 9,275 1,020	6,19 300,000 oral Initial Subcategory 132,405 81,180 9,130 70,028 6,237 300,000 oral Initial Subcategory 132,415 81,220	0,117 Category 132,403 0,217 0,228 0,227 Category 132,415 0,365
Settlements (Unier Land) Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Other Land Total final 2011\20 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Perennial Cropland	3 similaria Other ind Subdivision Subdivision Subdivision Broadisers Namal Confer Namal Confer Namal Confer Namal Confer Namal Confer Namal Confer Subdivision Manal orgi Subdivision Subd	S9,732 S9,732 S9,732 S9,732 S S9,732 S S9,742 S9,742 S9,742	29,898 11 7 29,898 1 1 29,598 1 29,598 1 29,598 1 29,598 1 20,598	2,900 22,405 170rest Land 180rest Land 10 10 10 10 12,910 22,415 170rest Land 180rest Land 10 10 10 10 10 10 10 10 10 10 10 10 10	9,875 Cenffer Planation 9,865 9,865 Cenffer Planation 40 9,835	50,305 51,150 Annual Cro -4mmel cropr 50,305 40 50,345 51,220 Annual Cro -4mmel cropr -50,285	Subcat pland Subdi Rice 875 875 90 Subcat Subcat Rice 835 835	9,130 9,130 9,130 9,130 9,130 9,130 9,130 9,065 60 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,150	70,028 70,028 70,028 Managed Grassland Graziland 70,008	6,237 6,237 6,237 Settlements (Other) 5 5 10 6,177 6,192 6,192 6,192 6,192 6,192 5,trilements (Other) 5 Settlements (Other) 10 10 20	1,020 1,020 1,020 1,020 1,020 Managed Other Land Other land 1,020	300,000	6,197 1,020 <i>Subdivision</i> 59,532 29,598 29,90 9,875 9,0130 70,025 6,237 1,020 T <i>Subdivision</i> 59,742 29,595 9,742 29,595 9,9145	6,19 300,000 iotal Initial Subcategory 132,405 81,180 9,130 70,028 6,237 300,000 iotal Initial Subcategory 132,415 81,220 9,145	0,197 Category 132,405 0,310 70,028 0,337 Category 132,413 0,345
Settements (Uner Land) Managed Other Land Total final 2006,120 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Grasaland Settlements (Other Land) Managed Other Land Total final 2011,20 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Perennial Cropland	Similaria Orke ind Subdivision Subcategory Category III Subdivision Bradiener, Namei Canfer Namei Canfer Namei Canfer Subcategory Canfer Subcategory Canfer Subcategory Category Perenal cap: Subdivision Subcategory Category Category Subcategory Category Subcategory Category Category Category Category Subcategory Categ	89,732 Breakleaver Natural 59,732 5 5 5 89,742 Breakleaver Natural 89,742	29,898 11 7 Managed 29,898 1 29,598 29,898 1 29,898 1 29,898 1 29,998 1 29,998 1 29,998 1 20,198 20,198 1 20,19	2,900 32,405 12,405 12,405 1Forest Land 1Presst Land 2,900 10 2,910 32,415 12,415 1Forest Land 100 2,970 100 100 2,970 100 100 100 100 100 100 100 100 100 1	9,875 Ceoffer Planamee 9,865 9,865 Ceoffer Planamee 40 9,333	\$0,305 \$1,180 Annual Crop	subca subca	9,130 9,130 9,130 9,130 9,130 9,051 9,055 60 9,055 60 9,145 9,125 9,125 9,125 9,125	70,028 70,028 70,028 Managed Grassland <i>Creational</i> 70,008 70,008 70,008 70,008 70,008 8 70,008	6,237 6,237 6,237 6,237 5 5 5 10 6,197 6,192 6,197	1,020 1,020 1,020 1,020 1,020 Managed Other Land 0ther land 1,020	300,000	6,197 1,020 T Subdivision 3 9,573 2,500 9,575 9,130 70,023 6,237 1,020 T Subdivision 3 9,575 9,130 70,023 6,237 1,020 T Subdivision 3 9,575 9,130 70,023 6,237 1,020 T Subdivision 3 9,575 9,130 70,023 6,237 1,020 70,023 6,237 1,020 70,023 6,237 1,020 70,023 6,237 1,020 70,023 6,237 1,020 70,023 6,237 1,020 70,023 6,237 1,020 70,023 6,237 1,020 70,023 70,025	6,19 300,000 oral Initial Subcategory 132,405 81,180 9,130 70,028 6,237 300,000 oral Initial Subcategory 132,415 81,220 9,145 70,005	0,177 Category 132,405 0,310 70,025 0,217 Category 132,415 103,415 103,415 103,415
Settlements (Unier Land) Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland Peremial Cropland Managed Grassland Settlements (Other Land) Managed Other Land Total final 2011\20 Subcategory Managed Forest Land Annual Cropland Peremial Cropland Managed Grassland Settlements (Other Land)	3 Ministria Orber Ind Subdivision Subdivision Subdivision Bendlener Namel Confer Namel Annal opp Category Categ	S9,732 S9,732 Breadleaver National S9,732 S	29,898 1 7 Managed Confere Named 29,698 29,698 1 29,698 1 7 Managed Confere Named	2,900 22,405 I Forest Land Decess Land Dec	9,875 Confire Planation 9,865 9,865 9,865 40 9,535	S0,305 S1,150 Annual Cro Annual Cro B0,305 40 80,345 61,220 Annual Cro S0,265 S0,265	875 Subca Rice 875 875 875 875 875 875 875 875 875 875	9,130 9,130 9,130 Perenaial Cropland vision 9,065 60 9,145	70,028 70,028 70,028 70,028 70,028 70,028 70,008	6,237 6,237 6,237 8,237 Settlements (Other) 5 10 6,177 6,192 6,192 6,192 6,192 8,192 8,192 9,192 Settlements (Other) 5 Settlements (Other) 10 10 6,192	1,020 1,020 1,020 7,020 Managed Other Land 0ther land 1,020 1,020 1,020 1,020 1,020 1,020 1,020 1,020 1,020	300,000	6,197 1,020 <i>Subdivision</i> 89,732 29,999 2,900 9,875 9,130 70,028 6,237 1,020 T <i>Subdivision</i> 75,028 6,237 1,020 T <i>Subdivision</i> 75,028 6,237 1,020 T <i>Subdivision</i> 75,998 2,910 89,742 2,910 89,742 2,910 89,752 1,020 T <i>Subdivision</i> 75,028 6,237 1,020 T <i>Subdivision</i> 75,028 6,237 1,020	6,197 300,000 oral Initial Subcategory 132,405 81,180 9,130 70,028 6,237 300,000 oral Initial Subcategory 132,415 81,220 9,145 70,008 6,192	Category 132.403 70,022 6,237 132.415 10,025 132.415 10,005 0,192
Settlements (Other Land) Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland Petennial Cropland Ranged Grassland Cother Land Total final 2011\20 Subcategory Managed Forest Land Annual Cropland Petennial Copland Ranged Forest Land Annual Cropland Petennial Copland Ranged Grassland Settlements (Other Land) Managed Other Land	3 struktur Other land Subdivision Subdivision Subdivision Bradiener Namel Confer Natural Confer Natural Confer Natural Media Confer Natural Confer Natural Confer Natural Subdivision Subd	89,732 89,732 89,732 5 5 5 89,742 99,742	29,898 1 1 7 2 Managed 29,696 20,596	2,900 32,405 170rest Land 180rest Land 10 10 10 10 10 10 10 10 10 10 10 10 10	9,875 Confer Plantation 9,865 9,865 Confer Plantation 9,865 0,00 9,835 0,00 9,835 0,00 9,835 0,00 9,835 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	50,305 51,180 Annual Crop -4emal crop 40 50,305 40 50,305 51,200 50,305 40 -40 50,305 51,200 50,305 51,180 50,205 51,180 50,205 51,180 50,205 51,180 50,205 51,200 50,205 51,200 50,205 51,200 50,205 51,200 50,205 51,200 50,205 51,200 50,205 51,200 50,205 51,200 50,205 51,200 50,205 51,200 50,205 51,200 50,205 51,200 50,205 51,200 50,205 51,200 50,205 51,200 51,200 50,205 51,200 51,200 50,205 51,200 51,200 50,205 51,200 51,	Subca Subca Rice 875 875 875 875 875 875 90 90 80 80 80 80 80 80 80 80 80 80 80 80 80	9,130 9,130 9,130 9,130 9,130 9,130 9,145 9,085 60 9,145 9,125 9,125 9,125	70,028 70,028 70,025 70,025 Managed Grassland 70,008 70,008 70,008 70,008 70,008 70,008 70,008 60 60 60	6,237 6,237 6,237 Settlements (Other) 5 10 6,177 6,192 6,192 6,192 6,192 8 5 Settlements (Other) 5 Settlements (Other) 10 6,192 6,192 6,192 6,192 10 10 20 10 10 6,192	1,020 1,020 1,020 1,020 1,020 1,020 Managed Other Land Other land 1,020 1,020 1,020 Managed Other Land Other land Other land 1,020 1	300,000	6,197 1,020 <i>Subdivision</i> 89,732 29,593 2,900 9,875 9,875 9,130 76,628 6,237 1,020 T <i>Subdivision</i> 89,742 1,020 T <i>Subdivision</i> 89,742 9,875 9,145 70,028 575 9,145 70,028 5,595 9,145 70,029 5,595 9,145 70,020 1,020	6,19 300,000 oral Initial Subcategory 132,405 81,180 9,130 70,028 6,237 300,000 oral Initial Subcategory 132,415 81,220 9,145 70,008 6,127 132,415	0,197 Carregory 132,405 00,110 0,237 Carregory 132,415 0,2415 70,005 6,192
Settements (Unier Land) Managed Other Land Total final 2006\20 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Managed Other Land Total final 2011\20 Subcategory Managed Forest Land Annual Cropland Perennial Cropland Perennial Cropland Perennial Cropland Perennial Cropland Perennial Cropland Managed Forest Land	3 similariti Other ind Subdivision Subdivision Subdivision Bradiener, Namal Canfer, Namal Canfer, Namal Canfer, Namal Canfer, Namal Canfer, Namal Canfer, Namal Canfer, Namal Canfer, Subdivision Subdivision Subdivision Subdivision Subdivision Bradiener, Plentine Canfer, State Subdivision Subdivision Bradiener, Plentine Canfer, State Subdivision Bradiener, Plentine Canfer, State Subdivision Subdivision Subdivision Subdivision Canfer, Subdivision Bradiener, Plentine Canfer, State State Settierer, State Subdivision Bradiener, Plentine Canfer, Subdivision Subdivision Subdivision Subdivision Subdivision Subdivision Subdivision Subdivision	\$9,732 Brasiliares Natural \$9,732 5 5 5 5 5 5 5 5 5 5 5 5 5	29,898 11 7 29,898 11 7 29,598 29,598 1 29,598 1 29,598 1 29,598 1 29,598 1 29,598 1 29,598 1 20,798 1 29,798 1 29,798 1 29,798 1 29,798 1 29,798 1 29,798 1 20,798 1	2,900 22,405 11 Forest Land 12,900 10 10 10 10 10 12,910 22,415 14 15 10 10 10 10 10 10 10 10 10 10 10 10 10	9,875 Cenffer Planates 9,865 9,865 Cenffer Planates 40 9,835 	\$0,305 \$1,150 Annual Cro -4mmel cropr -50,305 40 \$0,345 \$1,220 Annual Cro -4mmel cropr -50,305 \$0,305 \$1,220 \$0,345 \$1,220 \$0,345 \$1,220 \$0,345 \$1,220 \$0,345 \$1,220 \$0,345 \$1,220 \$0,345 \$1,220 \$0,345 \$1,220 \$0,345 \$1,220 \$0,345 \$1,220 \$0,345 \$1,220 \$0,345 \$1,220 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$1,200 \$0,285 \$0,285 \$1,200 \$1,200 \$1,2	875 Subcar pland 875 97 875 97 97 97 97 97 97 97 97 97 97	9,130 9,130 9,130 9,130 9,130 9,130 9,130 9,085 60 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,145 9,155 9,155	70,028 70,028 70,028 Managed Grassland Gratiland 70,008	6,237 6,237 6,237 Settlements (Other) 5 5 10 6,177 6,192 6,192 6,192 6,192 5 5 5 5 10 6,192 6,192 6,192 6,192 6,192 6,192 6,192 6,192 5 5 10 6,192 6,192 6,192 6,192 6,192	1,020 1,020 1,020 1,020 1,020 1,020 Managed Other Land Other land 1,020	300,000	6,197 1,020 <i>Subdivision</i> 89,732 29,898 29,909 9,875 9,975 9,0430 70,028 6,237 1,020 T <i>Subdivision</i> 89,742 29,898 29,909 9,875 9,145 70,008 875 9,145 70,008 1,020	6,19 300,000 iotal Initial Subcategory 132,405 81,180 9,130 70,028 6,237 300,000 iotal Initial Subcategory 132,415 81,220 9,145 70,008 6,192 300,000	0,117 Caregory 132,405 . 90,310 70,028 0,237 Caregory 132,415 . 90,365 . 90,065 . 90,0

¹⁵⁸ E.g. by assigning to each annual land-use conversion matrix 1/5th of the changes reported in each 5-year land-use conversion matrix, or by randomizing in annual changes each change reported in the 5-year land-use conversion matrix, or better by using ancillary data to derive those annual values.

IPCC Inventory Software (TSU IPCC TFI)

	Subcategory														
2016\20	20		Managed	Forest Land		Annual Cro	pland	Perennial Cropland	Managed Grassland	Settlements (Other)	Managed Other Land		7	fotal Initial	
							Subdi	vision	sion						
Subcategory	Subdivision	Broadleaves Natural	Conifers Natural	Broadleaves Plantation	Conifers Plantation	Annual crops	Rice	Perennial crops	Grassland	Settlements	Other land		Subdivision	Subcategory	Category
	Broadleaves Natural	89,742											89,742		
Managad Faract Land	Conifers Natural		29,788							10			29,798	132 385	112 100
Managed Forest Land	Broadleaves Plantation			2,920				50					2,970	102,000	152,505
	Conifers Plantation				9,775			100					9,875		
Annual Complement	Annual crops			30		80,255							80,285	81.120	
Annual Crophand	Rice			10			825						835	01,120	90,275
Perennial Cropland	Perennial crops			20				9,135					9,155	9,155	
Managed Grassland	Grassland								70,028	30			70,058	70,058	70,055
Settlements (Other land)	Settlements									6,262			6,262	6,262	6,262
Managed Other Land	Other land				10						1,010		1,020		
	Subdivision	89,742	29,788	2,980	9,785	80,255	825	9,285	70,028	6,302	1,010				
Total final	Subcategory		13	2,295		81,080		9,285	70,028	6,302	1,010	300,000		300,000	
	Category		13	2,295			90	0,365	70,028	6,302	1,010				

2021\2025		Subcategory													
		Managed Forest Land				Annual Cropland Perennial Cropland Managed Grassland Settlements (Other) Managed Other Land						Total Initial			
		Subdivision													
Subcategory	Subdivision	Broadleaves Natural	Conifers Natural	Broadleaves Plantation	Conifers Plantation	Annual crops	Rice	Perennial crops	Grassland	Settlements	Other land		Subdivision	Subcategory	Category
Managed Forest Land	Broadleaves Natural	89,742					1						89,742	132,295	132,295
	Conifers Natural		29,788										29,788 2,980		
	Broadleaves Plantation			2,970						10					
	Conifers Plantation				9,745					40			9,785		
Annual Cropland	Annual crops	40				80,085		70		60		80,25 825	80,255		81,080 90,365
	Rice						825						825	81,080	
Perennial Cropland	Perennial crops							9,265		20			9,285	9,285	
Managed Grassland	Grassland					30			69,978	20			70,028	70,028	70,028
Settlements (Other land)	Settlements									6,302			6,302	6,302	6,302
Managed Other Land	Other land										1,010		1,010		
Total final	Subdivision	89,782	29,788	2,970	9,745	80,115	825	9,335	69,978	6,452	1,010				
	Subcategory	132,285				80,940		9,335	69,978	6,452	1,010	300,000		300,000	
	Category	132,285					9	0,275	69,978	6,452	1,010				

Step 3

Data from the land-use conversion matrices above are compiled in a time series of units of land to be entered in the Land Representation Manager (LRM).

The time series is assembled in a table which relevant parameters are: *Current Subdivision*, *Previous Subdivision*, *Area (ha)*, *Method applied for each C pool.*

Note the following:

- \checkmark A 20-year transition period (**D**) is applied to this exercise for every land-use change;
- For every conversion, the land is assumed to be in a non-conversion status just before the conversion occurs [this is because Approach 2 is not capable to track¹⁵⁹ multiple conversions of an area across time].

This means that:

- \blacktriangleright the area of units of land in conversion is kept constant across the entire transition period **D**;
- in each inventory year, the area of new units of land under conversion is subtracted from the area that units of land $Remaining^{160}$ in the land-use subdivision had in the previous inventory year. Thus, in each inventory year **Y**, the area of a unit of land Φ Remaining in a land use subdivision Ψ decreases of a quantity equivalent to the area converted in that year **Y** to other land use subdivisions and may¹⁶¹ increase of a quantity equivalent to the area that was converted to that land use subdivision Ψ in the year **Y**-**D**.
- ✓ Recalling that the *Software* allows¹⁶² users to merge units of land that concluded the conversion period with the unit of land *Remaining¹⁶³* in the same subdivision, the area of every unit of land *Remaining* in a subdivision is to be entered before any merging available is made;
- ✓ In this exercise, information on *Method applied for each C pool* is not compiled given C stock change estimates are not¹⁶⁴ part of this Guidebook;
- ✓ The identification code assigned is just an example, users may find a better way to coding units of land to help them to attribute the appropriate EFs/parameters in the relevant calculation worksheets (see <u>Automatic unit of land codes</u>).

¹⁵⁹ While instead Approach 3 tracks multiple conversions of an area across the time series.

¹⁶⁰ This indicates a unit of land of a land category that did not have any conversion in the last **D** years (where **D** is the transition period applied to land use conversions, by default 20 years) e.g. Managed forest land, Broadleaves natural *Remaining* Managed forest land, Broadleaves natural. ¹⁶¹ The *Software* allows to track multiple units of land of the same subdivision -e.g. multiple units of the land use subdivision Managed forest land, Broadleaves natural- in a non-conversion status i.e. *Remaining*; this means that the user may or may not decide to add areas that have completely undergone the conversion to the current land use subdivision. In this example, we do merge areas of the same subdivision that are not under conversion or not under conversion anymore.

¹⁶² Merging units of land reduces the overall number of units of land and thus facilitates the data handling.

¹⁶³ E.g. with a transition period **D** set to 20 years, a unit of land has been converted from Managed Grassland, Grassland *to* Managed forest land, Broadleaves natural in the year 2000, thus in the year 2020 the unit of land has concluded its transition period, and the Software allows the user to merge it with any unit of land that is Managed forest land, Broadleaves natural *Remaining* Managed forest land, Broadleaves natural.

¹⁶⁴ Guidebook on Land Categories 3.B deals with C stock change estimation in C pools.
Step 3a

<u>First</u>: we start from the oldest land-use conversion matrix, and we generate a unit of land for each value in the matrix, including values in the diagonal cells¹⁶⁵ (i.e. areas that did not change use within the time frame of the land-use conversion matrix), as reported in the table below:

TD		Previous			Current		Area (ha)							
ID	Category	Subcategory	Subdivision	Category	Subcategory	Subdivision	1990	1995	2000	2005	2010	2015	2020	2025
FL-FL_1			Broadleaves Natural			Broadleaves Natural	91,285	90,000						
FL-FL_2	B	Manad Frankland	Conifers Natural		Managed Research and	Conifers Natural	30,260	30,000						
FL-FL_3	Porest land	Managed Potest land	Broadleaves Plantation	Polest land	Managed Potest land	Broadleaves Plantation	3,030	3,000						
FL-FL_4			Conifers Plantation			Conifers Plantation	9,000	9,000						
FL-FL_1995-1	Forest land	Managed Forget land	Broadleaves Natural	Forest land	Managed Forest land	Conifers Plantation	-	300	300	300	300	-	-	-
FL-FL_1995-2	1-OTest Inita	Managed Potest land	Conifers Natural	1-01est Infia	Managed Porest land	Conifers Plantation	-	250	250	250	250	-	-	-
GL-FL_1995-1	Grauland	Managed Grassland	Granland	Forest land	Managed Forest land	Broadleaves Natural	-	5	5	5	5	-	-	-
GL-FL_1995-2	Classiand	Managed Ofassiand	Grassiana	1.01est land	Managed Folest land	Conifers Plantation	-	100	100	100	100	-	-	-
CL-CL_1		Annual Cropland	Annual crops		Annual Cropland	Annual crops	80,065	80,000						
CL-CL_2	Cropland		Rice	Cropland		Rice	800	800						
CL-CL_3		Perennial Cropland	Perennial crops		Perennial Cropland	Perennial crops	8,020	8,000						
CL-CL_1995-1	Cropland	Annual Cropland	Annual crops	Cropland	Annual Cropland	Rice	-	50	50	50	50	-	-	-
CL-CL_1995-2	Ciopiana	rinnan cropiana	2 1mman trops	Ciopiana	Perennial Cropland	Perennial crops	-	10	10	10	10	-	-	-
FL-CL_1995-1	Forest land	Managed Forest land	Broadleaves Natural	Cropland	Perennial Cropland	Perennial crops	-	940	940	940	940	-	-	-
GL-CL_1995-1	Granland	Managed Grassland	Grauland	Cropland	Annual Cropland	Annual crops	-	320	320	320	320	-	-	-
GL-CL_1995-2	Olassiand	Managet Orasiant	Gradiana	Cropiana	Perennial Cropland	Perennial crops	-	60	60	60	60	-	-	-
GL-GL_1	Grassland	Managed Grassland	Grassland	Grassland	Managed Grassland	Grassland	70,525	70,000						
FL-GL_1995-1	Forest land	Managed Forest land	Broadleaves Natural	Grauland	Managed Grassland	Grauland	-	35	35	35	35	-	-	-
CL-GL_1995-1	Cropland	Annual Cropland	Annual crops	Ombaland	Managet Orasiante	Crimental I	-	5	5	5	5	-	-	-
SL-SL_1	Settlements	Settlements (Other)	Settlements	Settlements	Settlements (Other)	Settlements	6,000	6,000						
FL-SL_1995-1			Broadleaves Natural				-	10	10	10	10	-	-	-
FL-SL_1995-2	Forest land	Managed Forest land	Conifers Natural	Settlements	Settlements (Other)	Settlements	-	10	10	10	10	-	-	-
FL-SL_1995-3			Broadleaves Plantation				-	30	30	30	30	-	-	-
CL-SL_1995-1	Cropland	Perennial Cropland	Perennial crops	Settlements	Settlements (Other)	Settlements	-	20	20	20	20			-
GL-SL_1995-1	Grassland	Managed Grassland	Grassland	Settlements	Settlements (Other)	Settlements	-	40	40	40	40	-	-	-
OL-SL_1995-1	Other land	Managed Other land	Other land	Settlements	Settlements (Other)	Settlements	-	15	15	15	15	-	-	-
OL-OL_1	Other land	Managed Other land	Other land	Other land	Managed Other land	Other land	1,015	1,000						

 OL-SL_1
 Other land
 Interview
 Other land
 Interview
 In

the relevant land use subdivision¹⁶⁶ is the area reported in the column *Total Initial* of the relevant land use subdivision¹⁶⁷.

Are i.e. that did not und Y is the la D	Area (ha) of land category <i>Remaining</i> i.e. that did not undergo any conversion in the last V-D years, where: Y is the last year of the land-use conversion matrix D is the transition period (20 years)									
	Broadleaves Natural	90,000								
Managad Foract Land	Conifers Natural	30,000								
Managed Forest Land	Broadleaves Plantation	3,000								
	Conifers Plantation	9,000								
America Constant	Annual crops	\$0,000								
Annual Cropiand	Rice	800								
Perennial Cropland	Perennial crops	8,000								
Managed Grassland	Grassland	70,000								
Settlements (Other land)	Settlements	ó,000								
Managed Other Land	Other land	1,000								
5 Subcategory	Subcategory Subdivision									

166 Those labelled: FL-FL..., CL-CL..., GL-GL..., WL-WL..., SL-SL..., OL-OL...

	Are i.e. that did not un Y is the la D	Area (ha) of land category <i>Remaining</i> i.e. that did not undergo any conversion in the last Y-D years, where: Y is the last year of the land-use conversion matrix D is the transition period (20 years)									
	Broadleaves Natural 91,285										
	Managed Forest Land	Conifers Natural	30,260								
	Managed Porest Land	Broadleaves Plantation	3,030								
		Conifers Plantation	9,000								
	Annual Cranland	Annual crops.	80,065								
	Annuar Crophand	Rice	\$00								
	Perennial Cropland	Perennial crops	8,020								
	Managed Grassland	Grassland	70,525								
	Settlements (Other land)	ő,000									
	Managed Other Land	Other land	1,015								
167	Subcategory	Area (1990									

Note: units of land in conversion have an associated area:

- ✓ for the transition period only -i.e. D years-. Before the year of conversion the units of land have no area -i.e. 0 ha-, after the transition period D expired, we decided to merge those with the corresponding unit of land *Remaining* in the relevant land use subdivision -e.g. unit of land FL-FL_1995-1 is merged in the inventory year 2015 with unit of land FL-FL_1-; consequently, the unit of land has not an area value anymore.
- ✓ Constant across the entire time series, given Approach 2 does not identify and track subsequent changes in units of land. This means

Step 3b

<u>Second</u>: We generate units of land from all other land-use conversion matrices, although limited¹⁶⁸ to areas under conversion -i.e. one unit of land for each area in conversion:

1000	10000
1996,	/2000

ID		Previous		Current			Area (ha)							
ID	Category	Subcategory	Subdivision	Category	Subcategory	Subdivision	1990	1995	2000	2005	2010	2015	2020	2025
FL-FL_2000-1			Coniform Directorium			Broadleaves Natural	-	-	30	30	30	30	-	-
FL-FL_2000-2	Forest land	Managed Forest land	Congers Fiantation	Forest land	Managed Forest land	Broadleaves Plantation	-	-	10	10	10	10	-	-
FL-FL_2000-3			Broadleaves Plantation			Conifers Plantation	-	-	170	170	170	170	-	-
CL-FL_2000-1	Cropland	Annual Cropland	Annual crops	Forest land	Managed Forest land	Broadleaves Plantation	-	-	10	10	10	10	-	-
GL-FL_2000-1	Curriera	Manual Cambral	Currentered	V	M	Broadleaves Plantation	-	-	30	30	30	30	-	-
GL-FL_2000-2	Grassiand	Managed Grassiand	Grassiana	1-Orest Iand	Managed Porest land	Conifers Plantation	-	-	100	100	100	100	-	-
FL-CL_2000-1	Forest land	Managed Forest land	Broadleaves Natural	Cropland	Perennial Cropland	Perennial crops	-	-	100	100	100	100	-	-
GL-CL_2000-1	Grassland	Managed Grassland	Grassland	Cropland	Annual Cropland	Rice	-	-	20	20	20	20	-	-
FL-GL_2000-1	Forest land	Managed Forest land	Broadleaves Natural	Grassland	Managed Grassland	Grassland	-	-	168	168	168	168	-	-
FL-SL_2000-1	Forest land	Managed Forest land	Conifers Natural	Settlements	Settlements (Other)	Settlements	-	-	72	72	72	72	-	-
GL-OL_2000-1	Grassland	Managed Grassland	Grassland	Other land	Managed Other land	Other land	-	-	20	20	20	20	-	-

2001/2005

ID	Previous				Current			Area (ha)							
ID	Category	Subcategory	Subdivision	Category	Subcategory	Subdivision	1990	1995	2000	2005	2010	2015	2020	2025	
FL-FL_2005-1	Frankland	Managed Report land	Broadleaves Natural	Frank land	Managed Report land	Conifor Directoria	-	-	-	20	20	20	20	-	
FL-FL_2005-2	1-orest fand	Managed Porest land	Broadleaves Plantation	1-orest land	Managed Polest land	Comjers Plantation	-	-	-	5	5	5	5	-	
CL-FL_2005-1	Cropland	Annual Cropland	Annual crops	Forest land	Managed Forest land	Broadleaves Plantation	-	-	-	5	5	5	5	-	
GL-FL_2005-1						Broadleaves Natural	-	-	-	15	15	15	15	-	
GL-FL_2005-2	Grassland	Managed Grassland	Grassland	Forest land	Managed Forest land	Broadleaves Plantation	-	-	-	10	10	10	10	-	
GL-FL_2005-3						Conifers Plantation	-	-	-	20	20	20	20	-	
FL-CL_2005-1	Forest land	Managed Forest land	Broadleaves Natural	Cropland	Perennial Cropland	Perennial crops				50	50	50	50		
GL-CL_2005-1	Grassland	Managed Grassland	Grassland	Cropland	Annual Cropland	Rice	-	-	-	5	5	5	5		
FL-GL_2005-1	Forest land	Managed Forest land	Broadleaves Natural	Graviand	Managed Grassland	Granland	-	-	-	20	20	20	20	-	
CL-GL_2005-1	Cropland	Perennial Cropland	Perennial crops	Orassiand	Managee Orasiane	Grassiana	-	-	-	20	20	20	20		
FL-SL_2005-1	Forest land	Managed Forest land	Conifers Natural	c	Sullar (Other)	Carthour	-	-	-	30	30	30	30	-	
CL-SL 2005-1	Cropland	Perennial Cropland	Perennial crote	Setuements	Setuements (Other)	Servements	-	-	-	10	10	10	10	-	

2006/2010

ID	Previous			Current			Area (ha)							
ID	Category	Subcategory	Subdivision	Category	Subcategory	Subdivision	1990	1995	2000	2005	2010	2015	2020	2025
FL-FL_2010-1	Forest land	Managed Forest land	Conifers Plantation	Forest land	Managed Forest land	Broadleaves Natural	-	-	-	-	5	5	5	5
CL-FL_2010-1	Cropland	Perennial Cropland	Perennial crops	Forest land	Managed Forest land	Broadleaves Natural	-	-	-	-	5	5	5	5
GL-FL_2010-1	Grassland	Managed Grassland	Grassland	Forest land	Managed Forest land	Broadleaves Plantation	-	-	-	-	10	10	10	10
CL-CL_2010-1	Cropland	Perennial Cropland	Perennial crops	Cropland	Annual Cropland	Annual crops	-	-	-	-	40	40	40	40
CL-CL_2010-1	Settlements	Settlements (Other)	Settlements	Cropland	Perennial Cropland	Perennial crops	-	-	-	-	60	60	60	60
FL-SL_2010-1	Forest land	Managed Forest land	Conifers Plantation	C	Seulerente (Other)	Cutt	-	-	-	-	5	5	5	5
CL-SL_2010-1	Grassland	Managed Grassland	Grassland	Settlements	Settlements (Other)	Settlements	-	-	-	-	10	10	10	10

2011/2015 Previous Current Area (ha) ID Categor Subdivis 1990 1995 2000 2005 2010 2015 2020 2025 Subd egor FL-FL_2015-1 Conifers Natural Broadleaves Plantation 100 100 100 Forest land Managed Forest land Forest land Managed Forest land FL-FL_2015-2 Broadleaves Plantatio Conifers Plantation 40 40 40 CL-CL_2015-1 Cropland Annual Cropland Annual crops Cropland Perennial Cropland Perennial crops 30 30 30 CL-GL_2015-1 FL-SL_2015-1 Cropland Annual Cropland Annual crops Grassland Managed Grassland Grassland 60 60 60 Conifers Plantation Forest land Managed Forest land 30 30 30 CL-SL_2015-1 CL-SL_2015-2 Annual Cropland Rice 10 20 10 10 Cropland Settlement Settlements (Other) Settlements Perennial Cropland Perennial crops 20 20 GL-SL_2015-1 Grassland Managed Grassland Grassland 10 10 10

2016/2020

ID	Previous			Current			Area (ha)								
ID ID	Category	Subcategory	Subdivision	Category	Subcategory	Subdivision	1990	1995	2000	2005	2010	2015	2020	2025	
CL-FL_2020-1		Annual Canaland	Annual crops				-	-	-	-	-	-	30	30	
CL-FL_2020-2	Cropland	Annua Cropiana	Rice	Forest land	d Managed Forest land		Broadleaves Plantation	-	-	-	-	-	-	10	10
CL-FL_2020-3		Perennial Cropland	Perennial crops	1.01est land			-	-	-	-	-	-	20	20	
OL-FL_2020-1	Other land	Managed Other land	Other land			Conifers Plantation	-	-	-	-	-	-	10	10	
FL-CL_2020-1	Forest land	Managed Forest land	Broadleaves Plantation	Crooked	Paranaial Crophad	Permunial contro	-	-	-	-	-	-	50	50	
FL-CL_2020-2	Forest land	Managed Forest land	Conifers Plantation	Ciopiana	r erennar cropiana	1 erenniai crops	-	-	-	-	-	-	100	100	
FL-SL_2020-1	Forest land	Managed Forest land	Conifers Plantation	C	Settlements (Other)	Cattlenate	-	-	-	-	-	-	10	10	
GL-SL_2020-1	Grassland	Managed Grassland	Grassland	Secuements	Settlements (Other)	Sectionments	-	-	-	-	-	-	30	30	

2021	12025
2021	1 2023

ID	Previous			Current			Area (ha)							
ID	Category	Subcategory	Subdivision	Category	Subcategory	Subdivision	1990	1995	2000	2005	2010	2015	2020	2025
CL-FL_2025-1	Cropland	Annual Cropland	Annual crops	Forest land	Managed Forest land	Broadleaves Natural	-	-	-	-	-	-	-	40
CL-CL_2025-1	Cropland	Annual Cropland	Annual crops	Cropland	Perennial Cropland	Perennial crops	-	-	-	-	-	-	-	70
GL-CL_2025-1	Grassland	Managed Grassland	Grassland	Cropland	Annual Cropland	Annual crops	-	-	-	-	-	-	-	30
FL-SL_2025-1	Forest land	Managed Forest land	Broadleaves Plantation				-	-	-	-	-	-	-	10
FL-SL_2025-2	1-OTest IAlia	Managed Porest land	Conifers Plantation				-	-	-	-	-	-	-	40
CL-SL_2015-1	Cropland	Annual Cropland	Annual crops	Settlements	Settlements (Other)	Settlements	-	-	-	-	-	-	-	60
CL-SL_2015-2	Ciopiana	Perennial Cropland	Perennial crops				-	-	-	-	-	-	-	20
GL-SL_2015-1	Grassland	Managed Grassland	Grassland				-	-	-	-	-	-	-	20

¹⁶⁸ Areas in diagonal grey cells have already generated units of land Remaining in the land-use subdivision at step 3a.

Guide to Land Representation

Step 3c

Third: from the land-use conversion matrices we calculate for each unit of land *Remaining* in a subdivision the area it has in each year of the time series:

- 1. taking the area the unit of land had in the previous inventory year Y;
- 2. subtracting all areas reported in the relevant land-use conversion matrix as converted in the inventory year Y from the subdivision of that unit of land to another subdivision (*i.e. all areas in the land-use conversion matrix reported in the row corresponding to the subdivision, excluding the area in the grey cell*);
- 3. adding all areas reported in the year $Y-(D+1)^{169}$ as converted to the subdivision of that unit of land.

Area (ha) to be entered i.e. that did not unde Y is the la D	Area (ha) to be en i.e. that did not Y is t								
	89,732								
Managad Farast Land	29,928	Managed Forest Law							
Managed Polest Land	2,830	Managed Porest Lan							
	Conifers Plantation	8,960							
Annual Cranland	Annual crops	79,990	Annual Cropland						
Annual Cropiand	Rice	800	Annual Cropiand						
Perennial Cropland	Perennial crops	8,000	Perennial Cropland						
Managed Grassland	Grassland	69,830	Managed Grassland						
Settlements (Other land)	ō,000	Settlements (Other la							
Managed Other Land	1,000	Managed Other Lan							
Subcategory	Subdivision	Area (2000)	Subcategory						
No merging in 2005	No merging in 2005 given the time series of changes starts in 1995 No merging in 2								

Area (na) to be entered for units of and <i>Remaining</i> in a fand-use subdivision i.e. that did not undergo any conversion in the last Y-(D+1) years, where: Y is the last year of the land-use conversion matrix D is the transition period (20 years)								
	Broadleaves Natural	89,662						
Managed Frank Land	Conifers Natural	29,898						
Managed Forest Land	Broadleaves Plantation	2,830						
	Conifers Plantation	8,935						
Annual Complement	Annual crops	79,985						
Annual Cropiano	Rice	800						
Perennial Cropland	Perennial crops	7,970						
Managed Grassland	Grassland	69,780						
Settlements (Other land)	Settlements	б,000						
Managed Other Land Other land 1,000								
Subcategory	Subdivision	Area (2005)						
No merging in 2005 given the time series of changes starts in 1005								

Area (ha) to be entered for units of land <i>Remaining</i> in a land-use subdivision i.e. that did not undergo any conversion in the last Y-(D+1) years, where: Y is the last year of the land-use conversion matrix D is the transition period (20 years)									
	Broadleaves Natural	89,662							
Managed Freedow Land	Conifers Natural	29,898							
Managed Forest Land	Broadleaves Plantation	2,830							
	Conifers Plantation	8,925							
Annual Constant	Annual crops	79,985							
Annual Cropland	Rice	800							
Perennial Cropland	Perennial crops	7,925							
Managed Grassland	Grassland	69,760							
Settlements (Other land)	Settlements	5,940							
Managed Other Land	Other land	1,000							
Subcategory	Subdivision	Area (2010)							
No marging in 2005 given the time series of changes starts in 1995									

D	D is the transition period (20 years)								
	Broadleaves Natural	89,662							
Managed Frank Land	Conifers Natural	29,798							
Managed Forest Land	Broadleaves Plantation	2,790							
	Conifers Plantation	8,895							
Annual Complement	Annual crops	79,925							
Annual Cropland	Rice	760							
Perennial Cropland	Perennial crops	7,905							
Managed Grassland	Grassland	69,750							
Settlements (Other land)	Settlements	5,940							
Managed Other Land	Other land	1,000							
Subcategory	Subdivision	Area (2015)							

Area (ha) to be entered for units of land *Remaining* in a land-use subdivisior i.e. that did not undergo any conversion in the last Y-(D+1) years, where: Y is the last year of the land-use conversion matrix

Although in the year 2015 units of land that were converted in the year 1995 are merged with the corresponding unit of land *Remaining* in the relevant subdivision *(given those have concluded the transition period)*, such merging occurs after the area for the relevant *Remaining* land-use subdivision has been entered by the user

Area (ha) to be entered for units of land <i>Remaining</i> in a land-use subdivision i.e. that did not undergo any conversion in the last Y-(D+1) years, where: Y is the last year of the land-use conversion matrix D is the transition period (20 years)								
	Broadleaves Natural	89,667						
Managed Forest Land	Conifers Natural	29,788						
Managed Forest Land	Broadleaves Plantation	2,740						
	Conifers Plantation	9,445						
Annual Cropland	Annual crops.	80,215						
Annual Crophand	Rice	800						
Perennial Cropland	8,895							
Managed Grassland	Grassland	69,720						
Settlements (Other land)	Settlements	5,940						
Managed Other Land	Other land	990						
Subcategory	Subdivision	Area (2020)						
Although in the year 2 1995 are merged with t relevant subdivision <i>(g</i>	015 units of land that wer he corresponding unit of <i>iven those have conclude</i> d	e converted in the year land <i>Remaining</i> in the d the transition period),						
such merging occurs after the area for the relevant <i>Remaining</i> land-use subdivision has been entered by the user								

Area (ha) to be entered i.e. that did not unde Y is the la D	for units of land <i>Remaining</i> in rgo any conversion in the last ist year of the land-use convers is the transition period (20 year	n a land-use subdivision Y-(D+1) years, where: ion matrix ırs)		
	Broadleaves Natural	89,697		
Managed Frank Land	Conifers Natural	29,788		
Managed Forest Land	Broadleaves Plantation	2,780		
	Conifers Plantation	9,675		
Annual Complement	Annual crops	80,045		
Annual Cropiand	Rice	820		
Perennial Cropland	Perennial crops	8,975		

Managed Grassland

 Settlements (Other land)
 Statisments
 0,012

 Managed Other Land
 Other land
 1,010

 Subcategory
 Subdivision
 Area (2025)

 Although in the year 2015 units of land that were converted in the year
 1995 are merged with the corresponding unit of land Remaining in the relevant subdivision (given those have concluded the transition period), such merging occurs after the area for the relevant Remaining land-use subdivision has been entered by the user

Grassland

69.838

¹⁶⁹ This is to avoid to double count areas converted in the year Y-D to the subdivision of that unit of land, given those are manually merged in the inventory year Y after we have entered the area of that unit of land.

Step 3d

Fourth: we compile all the time series of areas of units of land on a single table to be used for data entry in the *Software*.

ID		Previous			Current					Area	(ha)			
	Category	Subcategory	Subdivision	Category	Subcategory	Subdivision	1990	1995	2000	2005	2010	2015	2020	2025
FL-FL_1			Broadleaves Natural			Broadleaves Natural	91,285	90,000	89,732	89,662	89,662	89,662	89,667	89,697
FI_FI 2			Conifore Motural			Confere Notural	30.260	30,000	29.922	20,802	29,898	29 798	29.788	29.788
TL-TL_2	Forest land	Managed Forest land	Compers I Valural	Forest land	Managed Forest land	Comjers I vanirai	30,200	30,000	29,920	29,090	29,090	29,790	29,700	29,700
FL-FL_3		-	Broadleaves Plantation		-	Broadleaves Plantation	3,030	3,000	2,830	2,830	2,830	2,790	2,740	2,780
FL-FL_4			Conifers Plantation			Conifers Plantation	9,000	9,000	8,960	8,935	8,925	8,895	9,445	9,675
FL-FL_1995-1			Broadleaves Natural	F . 1 1		6 1 BL	-	300	300	300	300	merge	i - I	-
FL-FL 1995-2	Forest land	Managed Forest land	Conifers Natural	Forest land	Managed Forest land	Confers Plantation	-	250	250	250	250	moros		-
CL EL 1005 1			Congere 2 vannan			Provellance NTertowell		5	5	5	5	intrg.		
GL-FL_1995-1	Grassland	Managed Grassland	Grassland	Forest land	Managed Forest land	Droaaleaves INatiirai		2		2		merge	i	-
GL-FL_1995-2					5	Conifers Plantation	-	100	100	100	100	merge		-
CL-CL_1		Annual Constant	Annual crops		A sum Caraland	_Annual crops	80,065	80,000	79,990	79,985	79,985	79,925	80,215	80,045
CL-CL 2	Cropland	Annual Cropiand	Rice	Cropland	Annual Cropiand	Rice	800	800	800	800	800	760	800	820
CL-CL 3	· ·	Perennial Cropland	Demunial contra	-	Perennial Cropland	Paraunial center	8.020	8,000	8,000	7 970	7 925	7 905	8 895	8 975
CL-CL_0		Telemina Ciopiana	1 erennur trops		1 elemmar Cropiand	1 erennur trops	0,020	0,000	0,000	1,210	1,725	1,200	0,075	0,213
CL-CL_1995-1	Cropland	Annual Cropland	Annual crops	Cropland	Annual Cropland	Kıa	-	00	00	50	<u> </u>	merge		-
CL-CL_1995-2	-	•	-	-	Perennial Cropland	Perennial crops	-	10	10	10	10	merge		-
FL-CL_1995-1	Forest land	Managed Forest land	Broadleaves Natural	Cropland	Perennial Cropland	Perennial crops	-	940	940	940	940	merge	i - I	-
GL-CL 1995-1				•••••	Annual Cropland	Annual crops	-	320	320	320	320	meroe	_	-
CL CL 1005 2	Grassland	Managed Grassland	Grassland	Cropland	Description of the second	Dominial anto		60	60	60	60		/ł	
GL-CL_1993-2					Perennial Cropiand	Ferenmai crops	-	00	00	00	00	merge	-	-
GL-GL_1	Grassland	Managed Grassland	Grassland	Grassland	Managed Grassland	Grassland	70,525	/0,000	69,830	69,/80	69,760	69,750	69,760	69,878
FL-GL_1995-1	Forest land	Managed Forest land	Broadleaves Natural	Constant	Managed Grandend	Considered	-	35	35	35	35	merge	-	-
CL-GL 1995-1	Cropland	Annual Cropland	Annual crops	Glassiand	Managed Grassland	Grassiana	-	5	5	5	5	merge	- 1	-
SL-SL 1	Settlements	Settlements (Other)	Settlemente	Settlements	Settlements (Other)	Sottlements	6.000	6.000	6.000	6.000	5 940	5 940	6.065	6137
FI SI 1005 1	Cettaennennes	(out)	Provallance NT at real	octuennento	octacimente (o anci)	Striking	0,000	10	10	10	10	5,510	0,005	0,207
FL-3L_1995-1			Droaaleaves INatural			6		10	10	10	10	merge	i	-
FL-SL_1995-2	Forest land	Managed Forest land	Conifers Natural	Settlements	Settlements (Other)	Settlements	-	10	10	10	10	merge	·	-
FL-SL_1995-3			Broadleaves Plantation				-	30	30	30	30	merge	i - I	-
CL-SL 1995-1	Cropland	Perennial Cropland	Perennial crops	Settlements	Settlements (Other)	Settlements	-	20	20	20	20	merge	-	-
GL-SL 1995-1	Grassland	Managed Grassland	Granland	Settlement	Settlemente (Other)	Settlemente	-	40	40	40	40	marca		-
OL SL 1005 1	Otherla	Manager Offissiald	Orlassiana	C.ul.	Seulements (Ottler)	Server is		15	15	15	15		·	
OL-SL_1995-1	Other land	Managed Other land	Other land	Settlements	Settlements (Other)	S ettlements	-	10	10	15	15	merge	-	-
OL-OL_1	Other land	Managed Other land	Other land	Other land	Managed Other land	Other land	1,015	1,000	1,000	1,000	1,000	1,000	990	1,010
FL-FL_2000-1						Broadhaves Natural	-	-	30	30	30	30	merge	-
EL_EL_2000-2	Forest land	Managed Forest land	Conifers Plantation	Forest land	Managed Forest land	Broadhaves Plantation	-	-	10	10	10	10		-
FL-FL_2000-2	I OICST MILL	Managed I ofest land	D II DI C	I OICST MIN	Managed I ofest hard	Droualeaves 1 hamanon			170	170	170	170	inter ge	
FL-FL_2000-5			Broadleaves Plantation			Confers Plantation	-	-	1/0	1/0	1/0	1/0	merge	-
CL-FL_2000-1	Cropland	Annual Cropland	Annual crops	Forest land	Managed Forest land	Broadleaves Plantation	-	-	10	10	10	10	merge	-
GL-FL 2000-1						Broadleaves Plantation	-	-	30	30	30	30	merge	-
GL-EL 2000-2	Grassland	Managed Grassland	Grassland	Forest land	Managed Forest land	Conifere Plantation		_	100	100	100	100		-
TL CL 2000 1	F (1 1	M 1E (1.1	D 11 N7 (1	C 1 1	D 10 1 1	D 1 1			100	100	100	100	mig	
FL-CL_2000-1	Forest land	Managed Forest land	Broadleaves INatural	Cropland	Perennial Cropland	Perenmal crops	-	-	100	100	100	100	merge	-
GL-CL_2000-1	Grassland	Managed Grassland	Grassland	Cropland	Annual Cropland	Rice	-		20	20	20	20	merge	-
FL-GL_2000-1	Forest land	Managed Forest land	Broadleaves Natural	Grassland	Managed Grassland	Grassland	-	-	168	168	168	168	merge	-
FL-SL 2000-1	Forest land	Managed Forest land	Conifers Natural	Settlements	Settlements (Other)	Settlements	-	-	72	72	72	72	merpe	-
GL OL 2000 1	Grandand	Managad Granland	Crawland	Other land	Managed Other land	Othur land			20	20	20	20		
GL-OL_2000-1	Grassiand	Managed Grassland	Grassiana	Other Iana	Managed Other Iand	Other land	-		20	20	20	20	merge	-
FL-FL_2005-1	Forest land	Managed Forest land	Broadleaves Natural	Forest land	Managed Forest land	Conifers Plantation	-	-	-	20	20	20	20	merge
FL-FL_2005-2		- set of the set of th	Broadleaves Plantation		Sec 1 often line	conjure i annune	-	-	-	5	5	5	5	merge
CL-FL 2005-1	Cropland	Annual Cropland	Annual crops	Forest land	Managed Forest land	Broadleaves Plantation	-	-	-	5	5	5	5	merge
GL-EL 2005-1	*	*				Broadhaune Matural		-	-	15	15	15	15	
GL-TL_2005-1			<i></i>	F	1 I I I I	Drodukants I vanirai				1.0				merge
GL-FL_2005-2	Grassland	Managed Grassland	Grassland	Forest land	Managed Forest land	Broadleaves Plantation	-	-	-	10	10	10	10	merge
GL-FL_2005-3						Conifers Plantation	-	-	-	20	20	20	20	merge
FL-CL 2005-1	Forest land	Managed Forest land	Broadleaves Natural	Cropland	Perennial Cropland	Perennial crops				50	50	50	50	merge
CL CL 2005 1	Carlad	March Carles	Constant	Caraland	A second second second	P :								
GL-CL_2005-1	Grassland	Managed Grassland	Grassland	Cropland	Annual Cropland	KACE	-	-	-	2	2	2	2	merge
FL-GL_2005-1	Forest land	Managed Forest land	Broadleaves Natural	Grassland	Managed Grassland	Graviland	-	-	-	20	20	20	20	merge
CL-GL_2005-1	Cropland	Perennial Cropland	Perennial crops	Chinesen	iningen Orioninin	07.000	-	-	-	20	20	20	20	merge
FL-SL 2005-1	Forest land	Managed Forest land	Conifers Natural				-	-	-	30	30	30	30	merge
CL_SL_2005-1	Cropland	Received Crowland	Demunial contra	Settlements	Settlements (Other)	Settlements				10	10	10	10	
CL-3L_2005-1	Ciopialia		1 erenniai trops				-		-	10		10	- 10	merge
FL-FL_2010-1	Forest land	Managed Forest land	Confers Plantation	Forest land	Managed Forest land	Broadleaves Natural	-	-	-	-	2)	2	2
CL-FL_2010-1	Cropland	Perennial Cropland	Perennial crops	Forest land	Managed Forest land	Broadleaves Natural	-	-	-	-	5	5	5	5
GL-FL_2010-1	Grassland	Managed Grassland	Grassland	Forest land	Managed Forest land	Broadleaves Plantation	-	-	-	-	10	10	10	10
CL-CL 2010-1	Cropland	Perennial Cropland	Perennial crops	Cropland	Annual Cropland	Annual contre	-	_	-	-	40	40	40	40
SL CL 2010-1	Sattlaner	Sattlamarte (Oile)	Cattlements	Crochard	Paramial C1-	Damani-1					60	60	60	60
SL-CL_2010-1	Setuements	Setuements (Other)	Serviements	Cropiand	r erenniai Cropiand	r erenniai crops	-	-	-	-				- 00
FL-SL_2010-1	Forest land	Managed Forest land	Conifers Plantation	Settlemente	Settlements (Other)	Settlemente	-	-	-	-	5	5	5	5
CL-SL_2010-1	Grassland	Managed Grassland	Grassland	- etachients	- statimente (Ouler)	o constante me	-	-	-	-	10	10	10	10
FL-FL 2015-1	_		Conifers Natural			Broadleaves Plantation	-	-	-	-	1	100	100	100
FL-FL 2015.2	Forest land	Managed Forest land	Broadleauer Dlautation	Forest land	Managed Forest land	Conifere Plantation	-	-	-	-		40	40	40
OL OL 2015-2		1 10 1 1	A A A A A A A A A A A A A A A A A A A	0.1.1	D 110 1 1	D	-						-10	
CL-CL_2015-1	Cropland	Annual Cropland	Annual crops	Cropland	Perennial Cropland	Perennial crops	-	-	-	-	-	30	30	30
CL-GL_2015-1	Cropland	Annual Cropland	Annual crops	Grassland	Managed Grassland	Grassland	-	-	-	-	<u> </u>	60	60	60
FL-SL 2015-1	Forest land	Managed Forest land	Conifers Plantation				-	-	-	-	- 1	30	30	30
CL-SL 2015-1		Annual Cooland	Rice				-	-	-	-	+	10	10	10
CL SL 2015-1	Cropland	Description 1	D	Settlements	Settlements (Other)	Settlements		-	-	-	+l	20	20	20
CL-SL_2015-2		Perennial Cropland	Perennial crops		× /			-	-	-	ļ	20	20	20
GL-SL_2015-1	Grassland	Managed Grassland	Grassland				-	-	-	-	-	10	10	10
CL-FL_2020-1		1 10 1	Annual crops				-	-	-	-		-	30	30
CL-FL 2020-2	Cropland	Annual Cropland	Rica			Broadleaves Plantation	-	-	_	-			10	10
OL-11L_2020-2	oropiand		17/16	Forest land	Managed Forest land	2. vountores 1 familation						·	10	10
CL-FL_2020-3		Perennial Cropland	Perennal crops		-			-	-	-	ļ	·	20	20
OL-FL_2020-1	Other land	Managed Other land	Other land			Conifers Plantation	-	-	-	-			10	10
FL-CL 2020-1	Forest land	Managed Forest land	Broadleaves Plantation				-	-	-	-	-	-	50	50
EL-CL 2020 2	Egrest 1-1	Managed Forest 1-1	Confere Dlandation	Cropland	Perennial Cropland	Perennial crops							100	100
TL-CL_2020-2	T orest land	Lanaged Porest land	Congers Fiantation				-	-	-	-			100	100
FL-SL_2020-1	Porest land	Managed Forest land	Comfers Plantation	Settlements	Settlements (Other)	Settlements	-	-	-	-	ļ		10	10
GL-SL_2020-1	Grassland	Managed Grassland	Grassland		- statistics (O uler)		-	-	-	-	-	-	30	30
CL-FL_2025-1	Cropland	Annual Cropland	Annual crops	Forest land	Managed Forest land	Broadleaves Natural	-	-	-	-	- 1	- 1	1	40
CL-CL 2025-1	Cropland	Annual Cropland	Annual crope	Cropland	Perennial Cropland	Perennial crote	-	-	-	-	- 1		- I	70
CL CL 2025-1	Crula	Manual C. 1	Care 1 1	Creal		1 erennus crops						<u> </u>	┝────┤	20
GL-CL_2025-1	Grassland	Istanaged Grassland	Grassland	Cropland	Annual Cropland	Annual crops	-	-	-	-				50
FL-SL_2025-1	Eorest land	Managed Forest land	Broadleaves Plantation				-	-	-	-	-	-	-	10
FL-SL_2025-2	1 Orest Inita	Terrainaged Lorest tand	Conifers Plantation				-	-	-	-	- 1	- 1	i - 1	40
CL-SL 2015-1		Annual Cropland	Annual crope	Settlemente	Settlements (Other)	Settlemente	-	-	-	-	- 1		I	60
CL SL 2015-2	Cropland	Personal Cl-	Demonial crops	, contents	(Ouler)						+	·+	·	20
CL-SL_2015-2		rerennial Cropland	Perennial crops				-	-	-	-	ļ		l	20
GL-SL_2015-1	Grassland	Managed Grassland	Grassland				-	-	-	-	<u> </u>	-	-	20

Step 4

We enter data in the Software.

Recall: enter units of land in the *Software* from the first year -i.e. 1990- of the time series¹⁷⁰ till the last year -i.e. 2025. This is a MUST requirement to correctly enter a Land Representation in the *Software*.

¹⁷⁰ Recall, this first requires setting the time series in the Inventory Year TAB of the Application Menu (accessible from the main bar of the Sofivtare).

Step 4a

In the **Regions** TAB, we enter:

- 3. total area of the country, in ha
- 4. Regions' name and associated area; for this example Region's name is *Example 2* and the area is 300,000 ha:

and Representation Manager – 🗆 X												
Regions Land representation table Land-use conversion matrix (Approach 2 & 3) Total Land-use conversion matrix (All Regions and Approaches)												
Whole country area (ha) 900,000.000												
Region name	Area (ha)											
Example 1	300,000	Approach 1										
Example 2	300,000	Approach 2										
Example 3	300,000	Approach 3		×								
*												
Total												
	900000.000											

Note the Land Representation in the figure covers all three examples of this Guide -i.e. 3 Regions for the 3 Examples on Land Representation, each Region contains one example for the corresponding IPCC Approach.

Guide to Land Representation

Step 4b

In the Land representation table TAB, we enter data from Forest land category to Other land category. Thus:

- 9. we click on the symbol + on the left-hand side of the screen next to *Forest land* category to open submenu of subcategories
- 10. we click on the symbol + on the left-hand side of the screen next to *Managed Forest land* subcategory to open submenu where to enter information on units of land according to the relevant subdivisions:
- 11. to select the *Current land use subdivision* we click on the symbol in the right-hand side of the field, so opening a dropdown menu from which selecting the relevant subdivision:



12. Once the *Current land use subdivision* is selected, we move to the following level by clicking on the symbol * on the left-hand side of the screen, and we:



13. enter the Land unit code (user-defined),

14. select the *Previous land use subcategory* and then the *Previous land use subdivision*, by clicking in both cases on symbol in the right-hand side of the field,

Note that the selection of the land use subcategory determines the land use subdivision available in the dropdown menu



NOTE: Given **FL-FL_1** is not undergoing a conversion -i.e. *Remaining* in the land use subdivision-, the information in the fields *Previous land use subcategory* and *Previous land use subdivision* and in the fields *Land use subcategory* and *Current land use subdivision* is identical. Thus, the *Software* automatically¹⁷¹ compiles the notation key *NA* -i.e. *Not Applicable*- in the fields *Transition period* and *Year of conversion*.

15. enter the Area (ha),



¹⁷¹ The *Software* does it given the fields Previous land use subdivision and Current land use subdivision contain same information.

Note: Once entered the area, we leave the *Area update mode* (accessible by clicking on the symbol **1** on the right-hand side of the field *Area*) in its default option *Current inventory year and subsequent inventory years*.



16. click on *SAVE*, on the bottom right-hand corner of the window, before moving to enter the next unit of land. <u>Note that</u> once saved the Software assign an automatic code to the unit of land

Repeating steps 1 to 15 for all units of land we complete the land representation data entry for the year 1990:

Regi	ons Land representation table	Land-use conversion matrix (Approach	2 & 3) Total Land-use conver	sion matrix (All Regions and Approaches)		
Regi	on Example 2	 Region area (ha) 	300.000.000 Discrep	ancy (ha) OK	Approach 2	1990
				Area (1990) (ha)		Remark
œ٠	Forest Land					
œ٠	Cropland				88,885	
œ٠	Grassland					
÷۹	Wetlands			0		
÷	Settlements				6.000	
œ۰	Other Land				1,015	

Step 4c

Once all units of land for the year 1990 have been entered we create the years 1991, 1992, 1993, 1994 and 1995.

To do so, we use the *Inventory Year* Menu (accessible from the main bar of the *Software*) and select the *Create new...* functionality.

٢	(i) IPCC Inventory Software - Land Representation - [Worksheets]										
	Application	Database	Inventory Year	Admin	istrate	Worksheets	Tools	Export/Import	Reports	Window	Help
2006 IPCC Categories		Choose		Total N	et CO2 Emissior	n/Remov	al				
			Create new		Worksh	eet					

We can either create new inventory years as a copy of the previous inventory year -e.g. 1991 as a copy of 1990- or as an empty inventory year.

	×								
Create new Inventory Year									
New Inventory Year 199	91 🗸								
Create empty inventory year									
Copy data from inventory yea	r 1990 🗸								
Create	Cancel								

In both cases the Land representation table of the new inventory year contains the units of land already entered in the previous year(s), although in the second case -i.e. empty inventory- no area data are prefilled by the *Software*. However, given we have no new data to enter for the years 1991, 1992, 1993 and 1994, we choose to create those as a copy of the previous inventory year; while for the year 1995, given we have new data, we choose to create it as an empty inventory.

		×								
Create new Inventory Year										
New Inventory Year 1995	~									
 Create empty inventory year Copy data from inventory year 	1990	~								
Create		Cancel								

We then enter the data for units of land in the year 1995, by repeating all steps described at Step 4b:

F	Regions	Land representation table	Land-use co	nversion matrix (Approa	All Regions and Approaches)						
F	Region	Example 2	×	Region area (ha)	300,000	000 Discrepancy (ha)	ок	Approach 2	1995		
	Land use category					Area (1995 (ha)					
0	🗉 🕨 F	orest Land					132,655				
1		Cropland					90,180				
(Grassland						70,040				
Wetlands						0					
1	9	ettlements					6,125				
1		Other Land					1.000				

Note: when a unit of land under conversion is entered the *Software* automatically set the transition period to 20 years and the current inventory year as the *Year of conversion*.

			Land use cate	gory		Area (1955) Remark (1ha)						
P	Fo	rest L	and			13	2.300					
			Land us	e subcategory		Area (1995) (ha)			Remark			
		Man	aged Forest Land				132,300					
				Current Land use subd	ivision		Remark					
	æ	E	roadleaves Natural				×					
	۲	C	onifers Natural				2				×	
	۲	E	roadleaves Plantation				×				×	
	e	C	onifers Plantation									×
			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 (1995) (ha)	Remark	Р	м
		÷.	MFL-CP-PL-UD-4	FL-FL_4	Managed Forest Land	Conifers Plantation	NA	NA	9,000 ↔		2	×
		÷.	MFL-CP-PL-UD-11<-MFL-BN	FL-FL_1995-1	Managed Forest Land	Broadleaves Natural	20	1995	300 ↔		2	×

Step 4d

We repeat operations described in <u>Step 4c</u> to create the years 1996, 1997, 1998, 1999, 2000 and we enter data in year 2000 as described in <u>Step 4b</u>. And we do it for all other years; till we have created, repeating operations described in <u>Step 4c</u>, all years to 2025 and we have entered data in years 2005, 2010, 2015, 2020, 2025, repeating operations described in <u>Step 4c</u>.

	Land Representation M	anager			- 0 X
	Pasiana Landrenree	entation table			
	Regions Eurorepress	Parles and the Parles are the	200 000 000 Discourses (the) OK	A h 2	2000
	Region Example 2	V Region area (ha)	300,000 Discrepancy (ha)	Approach 2	2000
		Land use category	Alea (2000)		
	Forest Land		(na) 132,455		
	Cropland		90,290		
	Grassland		70.038		
	Settlements		6,197		
2000:	Other Land		1,020		
	Land Research time M				
	Land Representation iv	lanager			- 0 ^
	Regions Land repres	entation table Land-use conversion matrix (Approach	2 & 3) Total Land-use conversion matrix (All Regions and Approaches)		
	Region Example 2	 Region area (ha) 	300,000.000 Discrepancy (ha) OK	Approach 2	2005
		Land use category	Area (2005)	Remark	
	. England		(ha) 100 405		
	Cropland		90,310		
	Grassland		70.028		
	Wetlands		0]
2005.	Other Land		1,020		
2005.					
	Land Representation N	lanager			– 🗆 X
	Regions Land repres	entation table Land-use conversion matrix (Approach	2 & 3) Total Land-use conversion matrix (All Regions and Approaches)		
	Region Example 2	· Region area (ha)	300,000.000 Discrepancy (ha) OK	Approach 2	2010
			Area		
			(2010) (ha)		
	Forest Land		132,415		
	Cropland		90,365		
	Wetlands		0		
	Settlements		6,192		
2010:	Cale Land		1,020		
	I and Penrecentation M	lanager			
	Land Representation M	lanager			- 0 X
	Land Representation M Regions Land repres	lanager entation table Land-use conversion matrix (Approach	2 & 3) Total Land-use conversion matrix (All Regions and Approaches)		- 0 X
	Land Representation M Regions Land representation Region Example 2	lanager entation table Land-use conversion matrix (Approach V Region area (ha)	2 & 3) Total Land-use conversion matrix (All Regions and Approaches) 300,000 000 Discrepancy (ha) OK	Approach 2	- □ × 2015
	Land Representation M Regions Land representation Region Example 2	lanager entation table Land-use conversion matrix (Approach Region area (ha)	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000 Discrepancy (ha) OK.	Approach 2 Remark	× 2015
	Land Representation M Regions Land representation Region Example 2	lanager entation table Land-use conversion matrix (Approach Region area (ha) Land use category	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000 Discrepancy (ha) OK	Approach 2 Remark	- □ × 2015
	Land Representation M Regions Land represe Region Example 2 Forest Land Cropland	lanager entation table Land-use conversion matrix (Approach Region area (ha)	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000 Discrepancy (ha) OK	Approach 2 Remark	× 2015
	Land Representation M Regions Land represe Region Example 2	lanager entation table Land-use conversion matrix (Approach	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000 Discrepancy (ha) OK	Approach 2 Remark	× 2015
	Land Representation M Regions Land represe Region Example 2 For Forest Land Cropland Grassland Wetlands Settlements	lanager entation table Land-use conversion matrix (Approach	2 & 3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.000 Discrepancy (ha) 0K (2015) (ha) 132,385 00,275 00,058 0 0 6,222 0 0 0 0 0 0 0 0 0	Approach 2 Remark	× 2015
2015:	Land Representation M Regions Land represe Regions Example 2 Forest Land Cropland Cropland Wetlands Settlements Coher Land	anager entation table Land-use conversion matrix (Approach	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.000 Discrepancy (ha) 0K Cares C	Approach 2 Remark	× 2015
2015:	Land Representation M Regions Land repres- Region Example 2 Forest Land Cropland Cropland Vietlands Settlements Other Land	Ianager entation table Land-use conversion matrix (Approach v Region area (ha)	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.000 Discrepancy (he) OK 4/res (cris) (rhs) 0K 90.275 90.275 70.058 0 6.262 1.020	Approach 2 Remark	× 2015
2015:	Land Representation M Regions Land represent Region Example 2 Forest Land Cropland Cropland Settlements Other Land Land Representation M	Ianager entation table Land-use conversion matrix (Approach	2 & 3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.000 Discrepancy (ha) DK drass 0K 132.385 90.275 70.058 0 6 6.262 1.020 1.020	Approach 2 Remark	×
2015:	Land Representation M Regions Land represe Region Example 2 Forest Land Cropland Cropland Settlements Other Land Land Representation M Regions Land representation	Ianager entation table Land-use conversion matrix (Approach Land use Category Land use Category Ianager entation table Land-use conversion matrix (Approach	2 & 3) Total Land-use conversion matrix (All Regions and Approaches) 300,000 00 Discrepancy (ha) 0 K (2015) 0 132,385 90,275 0,058 90,275 0 6,262 1,020 1,020 1,020 1,020	Approach 2 Remark	- • × 2015
2015:	Land Representation M Regions Land repress Region Example 2 P Forest Land Cropland Grassland Wetlands Settlements Other Land Regions Land repress Region Example 2	Ianager entation table Land-use conversion matrix (Approach Land use Category Land use Category Ianager entation table Land-use conversion matrix (Approach Region area (ha)	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000 00 Discrepancy (ha) OK (2015) (ha) 132.385 90.275 90.275 70.068 0 6.262 1.020 1.020 1.020	Approach 2 Remark	- • × 2015
2015:	Land Representation M Regions Land represe Region Example 2	Ianager entation table Land-use conversion matrix (Approach Cand use category Land use category Ianager entation table Land-use conversion matrix (Approach Sector area (ha)	28.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) OK (2015) (C015) (Pa) 132.385 90.275 90.275 0 6.262 1.020 1.020	Approach 2 Remark	- • × 2015 - • × 2020
2015:	Land Representation M Region Land represent Region Example 2 P Forest Land Grassland Grassland Wellands Grassland	lanager entation table Land-use conversion matrix (Approach Cand use category Land use category lanager entation table Land-use conversion matrix (Approach Region area (ha) Land use category Land use category Land use category	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) 0K (2015) (h) 132,385 0.0.275 00,275 00,275 0.0.0058 0 6,262 0.0.0058 0 6,262 1.020 1.020 1.020	Approach 2 Remark Approach 2 Remark	- • × 2015 - • × 2020
2015:	Land Representation M Regions Land represent Region Example 2 P Forest Land Cropland Cropland Cropland Cropland Land Representation M Regions Land represent Region Example 2 P Forest Land Cropland	anager entation table Land-use conversion matrix (Approach	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) 0K 4 cess (10) 4 cess (10) 132,385 90.275 90,275 90.0058 0 6,262 1,020 1,020 1,020 28.3) Total Land-use conversion matrix (All Regions and Approaches) 300,000,000 Discrepancy (ha) 0K 4 cess (2007) (ha) 132,285 122,295 9,192 19,192	Approach 2 Remark	- • × 2015 - • × 2020
2015:	Land Representation M Regions Land represent Regions Example 2 Protect Land Cropland Cropland Wellands Wellands Other Land Regions Land representation M Regions Land representation M Regions Example 2 Protect Land Cropland Cropland Cropland Cropland Cropland Cropland Cropland	anager entation table Land-use conversion matrix (Approach Cand use category Land use category entation table Land-use conversion matrix (Approach Persion matrix (Approach Cand use category Land use category Land use category	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) 0K 4 Area (cris) (hs) 132.385 90.275 90.275 90.005 0 6.262 1.020 1.020 1.020 300.00000 Discrepancy (ha) 0K 28.3) Total Land-use conversion matrix (All Regions and Approaches) 300.00000 1.020 Discrepancy (ha) 0K 28.3) Total Land-use conversion matrix (All Regions and Approaches) 1.020 1.020 Discrepancy (ha) 0K 1.020 Discrepancy (ha) 0K	Approach 2 Remark	- • × 2015
2015:	Land Representation M Regions Land represent Regions Example 2 Forest Land Grassland Wetlands Corpland Wetlands Corpland Forest Land Forest Land Forest Land Wetlands Corpland Corplan	anager entation table Land-use conversion matrix (Approach Cand use category Land use category anager entation table Land-use conversion matrix (Approach Cand use category Land use category Land use category	2 & 3.) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) 0K (215) (hi) (12,385) 90.275 90.275 70.058 0 6.262 1.020 1.020	Approach 2 Remark	-
2015:	Land Representation M Regions Land represent Regions Example 2 P Forest Land Cropland Cropland Cropland Settlements Other Land Regions Land representation M Regions Land representation M Regions Example 2 P Forest Land Cropland Cropland Settlements Settlements Settlements Settlements Settlements Settlements Cropland Settlements Settlements Cropland Settlements Cropland Cropland Cropland Settlements Settlements Cropland Settlements Settlements Cropland Settlements Cropland	Ianager entation table Land-use conversion matrix (Approach Cand use category Land use category Ianager entation table Land-use conversion matrix (Approach Region area (ha) Land use category Land use category Land use category	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) 0K 4res (2015) (hs) 0K 90.275 90.275 90.058 0 0 6.262 10.020 1.020 28.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.000 Discrepancy (ha) 0K Ares (his) 10.229 0.4 28.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.000 Discrepancy (ha) 0K 28.3) Total Land-use conversion matrix (All Regions and Approaches) 132.295 00.000.000 Discrepancy (ha) 0K 01.000 Discrepancy (ha) 0K	Approach 2 Remark Approach 2 Remark	× 2015
2015: 2020:	Land Representation M Region Land repres- Region Example 2 P Forest Land Cropland Grassland Cropland Grassland Cother Land Land Representation M Region Example 2 Forest Land Grassland Cropland Grassland Cother Land Settlements Cropland Grassland Cropland Grassland Cropland Grassland Cropland Grassland Cropland Grassland Cropland Grassland Cropland Grassland Cropland Grassland Cropland	anager entation table Land-use conversion matrix (Approach Land use category Land use category lanager entation table Land-use conversion matrix (Approach Region area (ha) Land-use conversion matrix (Approach Region area (ha) Land-use conversion matrix (Approach Land-us	28.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.000 Discrepancy (ha) DK (2015) (his) 132.385 90.275	Approach 2 Remark Approach 2 Remark	- • × 2015 - • × 2020
2015: 2020:	Land Representation M Region Land representation M Performance of the second	Ianager entation table Land-use conversion matrix (Approach Land use category Land use category Ianager entation table Land-use conversion matrix (Approach Cand use category Land use category Land use category Ianager	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) 0K (2015) (ha) 132,385 0.0.275 0.0275 0.0.0058 0.0276 0.0.0058 0.0275 0.0.0058 0.0275 0.0.0058 0.0205 0.0.000 Discrepancy (ha) 0K 28.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000 Discrepancy (ha) 0K 28.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000 Discrepancy (ha) 0K 28.3) Total Land-use conversion matrix (All Regions and Approaches) 132,295 132,295 0 0.025 0.025 0.025 0 0.025 0.026 0.020	Approach 2 Remark Approach 2 Remark	- • × 2015
2015: 2020:	Land Representation M Region Land representation M Performance Provide A Strand Cropland Cropland Cropland Cropland Region Land representation M Region Example 2 Performance Provide A Strand Cropl	lanager entation table Land-use conversion matrix (Approach Land use category	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) 0K (10) (12) 132,285 0 90,275 90,275 0 0 6,262 0 6,262 1,020 2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 1 300.000.000 Discrepancy (ha) 0K 2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 1 300.000.000 Discrepancy (ha) 0K (2000) (132,295 93,036 0 6,302 0 10.028 0 6,302 10.010 1,010 1,010	Approach 2 Remark Approach 2 Remark	- • × 2015
2015: 2020:	Land Representation M Regions Land represent Regions Example 2 P Forest Land Corpland Grassland Corpland Grassland Settlements Corpland Regions Land represent Regions Example 2 P Forest Land Cropland Grassl	anager entation table Land-use conversion matrix (Approach Cand use category Land use category Cand use category Land use category Cand us	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) 0K (10) (10) 132.385 0.0.000.00 Discrepancy (ha) 0K 90.275 0.0 0.0 0.0.000.00 Discrepancy (ha) 0K 122.385 0.000 0.000 1.0.000 Discrepancy (ha) 0K 28.3) Total Land-use conversion matrix (All Regions and Approaches) 132.295 0 0.0000 0.0000 122.295 0.0000 0.0000 122.295 0.00000 0.00000 122.295 0.00000 0.00000 122.295 0.00000 0.00000 122.295 0.00000 0.00000 10.010 0.000000 0.000000	Approach 2 Remark Approach 2 Remark	- • × 2015
2015: 2020:	Land Representation M Regions Land represent Regions Example 2 Forest Land Cropland Cropland Cropland Cropland Cropland Cropland Forest Land Regions Land represent Region Example 2 Forest Land Cropland	anager entation table Land-use conversion matrix (Approach Cand use category Land use category Region area (ha) Canders Conversion matrix (Approach Canders	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) 0K 4rea 4rea 90.275 0 132.385 90.275 90.005 0 100.000.00 Discrepancy (ha) 90.275 0 100.005 0 100.005 0 100.005 0 100.0000 Discrepancy (ha) 100.0000 Discrepancy (ha) 100.0000 Discrepancy (ha) 122.295 0.0365 100.0000 Discrepancy (ha) 122.295 0.0365 100.0000 Discrepancy (ha) 122.295 0.0365 100.0000 0 28.3) Total Land-use conversion matrix (All Regions and Approaches) 100.000000 Discrepancy (ha) 28.3) Total Land-use conversion matrix (All Regions and Approaches) 100.000000 Discrepancy (ha)	Approach 2 Remark Approach 2 Remark	- • × 2015
2015: 2020:	Land Representation M Regions Land represent Regions Example 2 Forest Land Cropland Cropland Cropland Conter Land Regions Land representation M Regions Land representation M Regions Example 2 Forest Land Cropland Cropland Settlements Cother Land Cother Land Cropland C	anager entation table Land-use conversion matrix (Approach Cand use category Land use category	28.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) 0K (28.3) Colors 0 (13.2) 00.275 0 (14.1) 132.385 0 (15.1) 0.275 0 (16.1) 132.385 0 (16.1) 0.275 0 (16.1) 0.275 0 (16.2) 0.275 0 (16.2) 0.275 0 (10.20) 0.275 0 (10.20) 0.275 0 (10.20) 0.275 0 (10.20) 0.275 0 (10.20) 0.275 0 (10.20) 0.275 0 (28.3) Total Land-use conversion matrix (All Regions and Approaches) 0 (10.10) 0.225 0 0 (28.3) Total Land-use conversion matrix (All Regions and Approaches) 0 (28.3) Total Land-use conversion matrix (All Regions and Approaches) 0 <tr< td=""><td>Approach 2 Remark Approach 2 Remark Approach 2 Remark Remark Remark Remark Remark</td><td>-</td></tr<>	Approach 2 Remark Approach 2 Remark Approach 2 Remark Remark Remark Remark Remark	-
2015: 2020:	Land Representation M Region Land repres- Region Example 2 P Forest Land Cropland	anager entation table Land-use conversion matrix (Approach Land use category	28.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) 0K 4768 (2015) (11) 132.385 90.275 70.056 0 6.762 10.000 Discrepancy (ha) 90.275 70.056 0 6.762 10.000 Discrepancy (ha) 28.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) 6 6.762 10.020 Discrepancy (ha) 90.305 70.028 0 6.302 10.100 0.0 10.101 0.0 10.102 0.0 10.103 Discrepancy (ha) 10.104 Conversion matrix (All Regions and Approaches) 10.105 0.0 10.100 Discrepancy (ha) 10.100 Discrepancy (ha) 10.100 Discrepancy (ha) 10.122.285 0.0	Approach 2 Remark Approach 2 Remark Approach 2 Remark Remark Remark Remark	- • × 2015 - • × 2020 - • × 2020
2015: 2020:	Land Representation M Region Land representation M Performance of the second	anager entation table Land-use conversion matrix (Approach Land use category	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) 0K (2015) (hb) 132,385 0,0276 0.000.000 Discrepancy (ha) 0K 0.000.000 Discrepancy (ha) 0K 28.3) Total Land-use conversion matrix (All Regions and Approaches) 1.020 28.3) Total Land-use conversion matrix (All Regions and Approaches) 0 300.000.000 Discrepancy (ha) 0K 4 400.000 Discrepancy (ha) 0K 4 6.302 0 0 5 0.300.000 Discrepancy (ha) 0K 4 4.302 0 0 5 0.302 0 0 10.2295 0 0 0 10.300 Discrepancy (ha) 0K 0 12.235 0 0 0 12.2285 0 0 0 12.2285 0 0 0 12.2285 0 0 0<	Approach 2 Remark Approach 2 Remark Approach 2 Remark Remark Remark Remark Remark	- • × 2015 - • × 2020 - • × 2020 - • × 2025
2015: 2020:	Land Representation M Region Land representation M Region Example 2 P Forest Land Cropland Cropland Regions Land representation M Regions Land representation M Regions Example 2 P Forest Land Cropland Crop	anager entation table Land-use conversion matrix (Approach Land use category	2.8.3) Total Land-use conversion matrix (All Regions and Approaches) 300.000.00 Discrepancy (ha) 0K (28.3) (19.2) 132.285 0 90.275 90.275 0 0 6.262 0 6.262 1.020 28.3) Total Land-use conversion matrix (All Regions and Approaches) 1 300.000.00 Discrepancy (ha) 0K 28.3) Total Land-use conversion matrix (All Regions and Approaches) 1 300.000.00 Discrepancy (ha) 0K (2000) (132.295 9.0365 0 0.5.032 0.1.010 122.33) Total Land-use conversion matrix (All Regions and Approaches) 1.010 122.33 Total Land-use conversion matrix (All Regions and Approaches) 1.010 122.31 Total Land-use conversion matrix (All Regions and Approaches) 1.010 122.32 0 0.0275 0.0275 0 0.0275 0.0275 0.0275	Approach 2 Approach 2 Approach 2 Remark Approach 2 Remark Remark Remark	-

2025: Other Land

NOTE: In the year 2015, areas converted in the year 1995 have completed the transition period D and thus are identified by the *Software* with blue ink.

Land Re	presenta	ation Manager								_			×
Region	s Land	representation table Land-use	conversion matrix (Approach 2	2 & 3) Total Land	-use conver	sion matrix (All Regions and	Approaches)						
Region	n Exar	nple 2 v	Region area (ha)	300,000.000	Discrep	ancy (ha) OK		Approach	2			20)15
						Area (2015) (ha)							
₽►	Forest L	and .					132,415						
		Land us	e subcategory			Area (2015) (ha)			Remark				
	Man	aged Forest Land					132,415						
			Current Land use :	subdivision				Re	mark				
	÷ -	Broadleaves Natural											×
		Land unit code (Automatic)	Land unit code (User defined)	Previous L subcate	and use gory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Area (2015) (ha)	Remark	P	м	
	٠	MFL-BN-NF-UD-1	FL-FL_1	Managed Forest	t Land	Broadleaves Natural	NA	NA	89,662 ↔		2		x
	Ð	MFL-BN-NF-UD-13	GL-FL_1995-1	Managed Forest	t Land	Broadleaves Natural	NO	NO	5 ↔		2	(م	×
	٠	MFL-BN-NF-UD-28<-MFL-C	FL-FL_2000-1	Managed Forest	t Land	Conifers Plantation	20	2000	30 ↔		2		X
		MFL-BN-NF-UD-42<-MGL	GL-FL_2005-1	Managed Grass	land	Grassland	20	2005	15 ↔		2		x
		MFL-BN-NF-UD-51<-MFL-C	FL-FL_2010-1	Managed Forest	t Land	Conifers Plantation	20	2010	5 ↔		2		×
	۲	MFL-BN-NF-UD-52<-PCL-P	CL-FL_2010-1	Cropland Peren	nial Crops	Perennial crops	20	2010	5 ↔		2		x

By clicking on the symbol \bigcirc a dialog box opens where we have to select¹⁷², in the *Land unit* field, the unit of land to which merging the unit of land that has completed its conversion period. In this case unit *GL-FL_1995_1* of an area of 5 *ha* has undergone its transition period D and can thus be merged with the relevant unit of land *Remaining* in the relevant land use subdivision -i.e. *Broadleaves natural* -, which is *FL-FL_1*.

		Current Land use si	ubdivision			Remark		1
	Broadleaves Natural						×	
	Land unit code (Automatic)	Land unit code (User defined)	Previous Land use subcategory	Previous Land use subdivision	Merge Land Unit			×
	MFL-BN-NF-UD-1	FL-FL_1	Managed Forest Land	Broadleaves Natural	Jand use subsets and	Managed French Land		
÷	MFL-BN-NF-UD-13	GL-FL_1995-1	Managed Forest Land	Broadleaves Natural	Land use subcategory	Managed Forest Land		
	MFL-BN-NF-UD-28<-MFL-C	FL-FL_2000-1	Managed Forest Land	Conifers Plantation	Land use subdivision	Broadleaves Natural		
÷.	MFL-BN-NF-UD-42<-MGL	GL-FL_2005-1	Managed Grassland	Grassland	Land unit	GL-FL_1995-1		
	MFL-BN-NF-UD-51<-MFL-C	FL-FL_2010-1	Managed Forest Land	Conifers Plantation	Area [ba]	5		
÷.	MFL-BN-NF-UD-52<-PCL-P	CL-FL_2010-1	Cropland Perennial Crops	Perennial crops	, too play	<u> </u>		
	*			~ ~	Target Land Unit			
		Current Land use si	ubdivision		Land use subcategory	Managed Forest Land		
	Conifers Natural				I and una a dedicion	Provide source Mark and		
	Broadleaves Plantation				Land use subdivision	broadleaves Natural		
	Conifers Plantation				Land unit	FL-FL_1		~
*				~	Area [ha]	89662 +5 [ha]		
	Land us	e subcategory		Area (2015) (ha)			Merge	Cancel

Once merged, the area of unit of land FL-FL_1 is increased of an area equivalent to the area of unit of land GL-FL_1995_1 -i.e. from 89,622 to 89,667 ha-and unit of land GL-FL_1995_1 is not anymore tracked in the NGHGI.

Land Repr	esentati	ion Manager								_		×
Regions	Land re	epresentation table Land	use conversion matrix (Appro	oach 2 & 3) Tot	tal Land-use conve	sion matrix (All Regions and	Approaches)					
Region	Examp	ole 2	✓ Region area (ha)	300,00	00.000 Discrep	ancy (ha) OK		Approach	2			2015
						Area (2015) (ha)						
F	orest La	nd					132,415					
						Area (2015) (ha)						
e	Manaş	ged Forest Land					132,415					
			Current Land	l use subdivision				Re	mark			
	Bre	oadleaves Natural										×
		Land unit code (Automatic)	Land unit code (User defined)	Pre	vious Land use subcategory	Previous Land use subdivision	Transition Period (D) (years)	Year of conversion	Area (2015) (ha)	Remark	P	м
	>	MFL-BN-NF-UD-1	FL-FL_1	Manageo	d Forest Land	Broadleaves Natural	NA	NA	89,667 ↔		2	×
		MFL-BN-NF-UD-28<-MFI	-C FL-FL_2000-1	Manageo	d Forest Land	Conifers Plantation	20	2000	30 ↔		2	×
	÷	MFL-BN-NF-UD-42<-MG	GL-FL_2005-1	Manageo	d Grassland	Grassland	20	2005	15 💮		2	×
	÷.	MFL-BN-NF-UD-51<-MFI	-C FL-FL_2010-1	Manageo	d Forest Land	Conifers Plantation	20	2010	5 ↔		2	×
		MFL-BN-NF-UD-52<-PCL	-P., CL-EL 2010-1	Cropland	Perennial Crons	Perennial crops	20	2010	5 6.0		1	Y

Merging of units of land occurs also in the inventory years 2020 and 2025.

¹⁷² The dialog box contains in a dropdown menu all units of land of the relevant subdivision that are not in a conversion status. In our case only 1 unit of land corresponds to such description.

V

Conclusion

In conclusion of this example, in the Land representation table Tab you will see your land representation as expected to be reported in an NGHGI:

and N	presentation		and use con	version matrix ((Approach 24	2)]			(4)10		-t 2					
Region	Example 2	sentation table	and-use com	Region area	(Approach 2 c	300.00	nd-use conv	ersion matrix	(All Region	s and Approa	ches)					1990
logio	Enampie 2	Initial	Fore	stland	Cro	pland	Gras	sland	Wet	lands	Settle	ments	Othe	rland		1000
	Final		Managed Forest	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	Unmanage d Other	Final Area (ha)	Net chang (ha)
Fo	orest Land	Managed Forest	133,575												133,575	0
		Unmanaged													0	0
Cr	opland	Cropland			80.865										80.865	0
		Cropland				8 020									8 020	0
G	assland	Perennial Crops Managed				0.010	70.525								70.525	0
		Grassland Unmanaged					10,525								0	0
w	etiands	Grassland Managed													0	0
		Wetlands Unmanaged													0	0
Se	ttlements	Wetlands Settlements													0	
		(Treed) Settlements													0	0
0	bar Land	(Other) Managed Other										6,000			6,000	0
		Land											1,015		1,015	0
		Other Land	100 575	-	00.005	0.000	70 505	-	-	-	0	0.000	1.015	-	0	0
		Initial Area (ha)	133,575	0	80,865	8,020	/0,525	0	0	0	0	6,000	1,015	0	300,000	0
nd Re	epresentation	Manager													-	
egior	ns Land repre	sentation table L	and-use con	version matrix	(Approach 2	& 3) Total La	and-use conv	version matrix	(All Region	is and Approa	ches)					
legio	n Example 2		~	Region area	(ha)	300,0	00.000	Approach 2								199
		Initial	Fore	st Land	Cro	pland	Gras	ssland	Wet	tlands	Settle	ments	Oth	er Land		
			Managed Forest	Unmanaged Forest Land	Cropland Annual	Cropland Perennial	Managed Grassland	Unmanage d	Managed Wetlands	Unmanage d	Settleme nts	Settleme nts	Managed Other	Unmanage d Other	Final Area (ha)	Net chan
Fo	orest Land	Managed Forest	Land		Crops	Crops	105	Grassland		Wetlands	(Treed)	(Other)	Land	Land	122.655	-920
		Land Unmanaged	132,330				105								0	-520
Cr	opland	Forest Land Cropland			00.050		000								01.470	0
		Annual Crops Cropland			80,850		320								81,170	305
0	arsland	Perennial Crops	940		10	8,000	60								9,010	990
		Grassland	35		5		70,000								70,040	-485
		Grassland													0	0
		Wetlands													0	0
		Wetlands													0	0
Se		Settlements (Treed)													0	0
		Settlements (Other)	50			20	40					6.000	15		6,125	125
		Managed Other Land											1,000		1,000	-15
		Unmanaged Other Land													0	0
		Initial Area (ha)	133,575	0	80,865	8,020	70,525	0	0	0	0	6,000	1,015	0	300,000	0
nd Re	presentation	Manager													-	
Region	as Land repre	sentation table	and-use com	version matrix	(Approach 28	3 3) Total La	ind-use conv	ersion matrix	(All Region	s and Approa	ches)					
Regio	n Example 2		~	Region area	(ha)	300.0	00.000	Approach 2								200
		Initial	Fore	st Land	Cro	pland	Gras	sland	Wet	lands	Settle	ments	Othe	r Land		
_			Managed	Unmanaged	Cropland	Cropland	Managed	Unmanage	Managed	Unmanage	Settleme	Settleme	Managed	Unmanage	Final Area	Net chang
	Final		Land	Forest Land	Annual Crops	Crops	Grassland	d Grassland	Wetlands	d Wetlands	nts (Treed)	nts (Other)	Uther Land	d Other Land	(ha)	(ha)
Fo		Managed Forest Land	132,315		10		130								132,455	-200
		Unmanaged Forest Land													0	0
		Cropland Annual Crops			81,160		20								81,180	10
		Cropland Perennial Crops	100			9,010									9,110	100
G	assland	Managed Grassland	168				69,870								70,038	-2
		Unmanaged Grassland													0	0
w	etlands	Managed Wetlands													0	0
		Unmanaged Wetlands													0	0
Se	ttlements	Settlements (Treed)													0	0
		Settlements	72									6,125			6,197	72
0	her Land	Managed Other					20						1.000		1,020	20
		Land Unmanaged					20						.,		0	0
		Other Land	100.055	0		0.010	70.040	0	0	0	0	0.105	1.000	-	200,000	0

d Representation	Manager														U
egions Land repr	esentation table	and-use con	version matrix	(Approach 28	& 3) Total Li	and-use con	version matrix	(All Region	s and Approa	iches)					
egion Example	2	~	Region area	(ha)	300,0	00.000	Approach 2								200
	Initial	Fore	st Land	Cro	pland	Gra	ssland	Wet	lands	Settle	ments	Othe	r Land		
		Managed Forest	Unmanaged Forest Land	Cropland Annual	Cropland Perennial	Managed	Unmanage d	Managed	Unmanage d	Settleme nts	Settleme nts	Managed Other	Unmanage d Other	Final Area	Net chan
ForestLand	Managed Forest	Land	T Orest Land	Crops	Crops	Grassiano	Grassland	wenanus	Wetlands	(Treed)	(Other)	Land	Land	(na)	(114)
	Land	132,355		5		45								132,405	-50
	Forest Land													0	0
	Cropland Annual Crops			81,175		5								81,180	0
	Cropland Perennial Crops	50			9,080									9,130	20
Grassland	Managed	20			20	69,988								70,028	-10
	Unmanaged													0	0
Wetlands	Grassland Managed													-	-
	Wetlands													U	0
0-10-1-1-	Wetlands													0	0
	(Treed)													0	0
	Settlements (Other)	30			10						6,197			6,237	40
Other Land	Managed Other Land											1,020		1.020	0
	Unmanaged Other Land													0	0
	Initial Area (ha)	132,455	0	81,180	9,110	70,038	0	0	0	0	6,197	1,020	0	300,000	0
															_
o Representation	manager														
gions Land repr	esentation table	and-use con	version matrix	(Approach 28	3) Total Li	and-use conv	version matrix	(All Region	s and Approa	ches)					
egion Example	2	~	Region area	(ha)	300,0	00.000	Approach 2								20
	Initial	Fore	st Land	Cro	pland	Gra	sland	Wet	lands	Settie	ments	Othe	r Land		
		Managed Forest	Unmanaged Forest Land	Cropland Annual	Cropland Perennial	Managed	Unmanage d	Managed Wetlands	Unmanage d	Settleme nts	Settleme nts	Managed Other	Unmanage d Other	Final Area (ba)	Net cha
Forest Land	Managed Forest	Land		Crops	Crops		Grassland		Wetlands	(Treed)	(Other)	Land	Land	(
	Land	132,400			5	10								132,415	10
	Forest Land													0	0
	Cropland Annual Crops			81,180	40									81,220	40
	Cropland Perennial Crops				9,085						60			9,145	15
Grassland	Managed					70,008								70,008	-20
	Unmanaged													0	0
Wetlands	Grassland Managed													0	-
	Wetlands Unmanaged													0	0
Collinson	Wetlands													0	0
	(Treed)													0	0
	Settlements (Other)	5				10					6,177			6,192	-4
	Managed Other Land											1,020		1,020	0
	Unmanaged Other Land													0	0
	Initial Area (ha)	132,405	0	81,180	9,130	70,028	0	0	0	0	6,237	1,020	0	300,000	0
l Democratetico	Manager														_
, Nepresentation	manager														U
gions Land repr	esentation table	and-use con	version matrix	(Approach 2)	& 3) Total L	and-use con	version matri:	x (All Region	is and Approa	iches)					
gion Example	2	~	Region area	(ha)	300,0	00.000	Approach 2								20
	Initia	Fore	st Land	Cro	pland	Gra	ssland	We	lands	Settle	ments	Othe	er Land		
		Managed Forest	Unmanaged Forest Land	Cropland Annual	Cropland Perennial	Managed Grassland	Unmanage d	Managed Wetlands	Unmanage d	Settleme	Settleme	Managed Other	Unmanage d Other	Final Area (ha)	Net ch
Forest Land	Managed Forest	Land		Crops	Crops		Grassland		Wetlands	(Treed)	(Other)	Land	Land	122.005	
	Land	132,385												132,385	-3
0	Forest Land													0	(
	Annual Crops			81,120										81,120	-1
	Cropland Perennial Crops			30	9,125									9,155	1
Grassland	Managed Grassland			60		69,998								70,058	5
	Unmanaged													0	(
Wetlands	Managed													0	
	Wetlands Unmanaged													0	
0	Wetlands													0	0
	(Treed)													0	(
	Settlements (Other)	30		10	20	10					6,192			6,262	7
Other Land	Managed Other											1,020		1.020	C
	Unmanaged													0	0
	Other Land Initial Area (ha)	132 415	0	81 220	9.145	70.008	0	0	0	0	6.192	1.020	0	300.000	0
	(IIII)			0.,	0,110	10,000					0,.01			000,000	

Guide to Land Representation

ions Land rep	resentation table	and-use con	version matrix	(Approach 28	k 3) Total Li	and-use conv	ersion matrix	TAIL REGION	s and Abbroa	cies) i					
gion Example	2	~	Region area	(ha)	300,0	00.000	Approach 2								20
	Initial	Fore	st Land	Cro	pland	Gras	sland	Wet	lands	Settle	ments	Othe	r Land		
		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 ch (h
Forest Land	Managed Forest	132,225		40	30									132,295	-
	Unmanaged Ecrest Land													0	
Cropland	Cropland Annual Crops			81,080										81,080	
	Cropland Decembial Crops	150			9,135									9,285	
Grassland	Managed					70,028								70,028	
	Unmanaged													0	
Wetlands	Managed													0	
	Unmanaged													0	
Settlements	Settlements													0	
	Settlements	10				30					6,262			6,302	
Other Land	Managed Other											1.010		1,010	
	Unmanaged														
														0	
Representation	Initial Area (ha) n Manager resentation table	132,385 and-use con	0 version matrix	81.120 (Approach 2.8	9,165	70,058	0 rersion matrix	0 : (All Region	0 s and Approa	0 ches)	6,262	1,010	0	0 300,000 —	
Representatior ons Land rep ion Example	Initial Area (ha) n Manager resentation table	132,385 and-use con	0 version matrix Region area	81,120 (Approach 2.8 (ha)	9,165	70,058 and-use conv 00.000	0 version matrix Approach 2	0 : (All Region	0 s and Approa	0 ches)	6,262	1,010	0		2
Representation ons Land rep ion Example	Initial Area (ha) n Manager resentation table 2 Initial	132,385 and-use con	0 version matrix Region area st Land	81.120 (Approach 2.8 (ha)	9, 165 k 3) Total Li 300,0 pland	70,058 and-use conv 00.000	0 rersion matrix Approach 2 Island	0 : (All Region Wet	0 s and Approa	0 ches)	6,262 ments	1,010 Othe	0 Ir Land	0 300,000	2
Representation ons Land repr ion Example Final	Initial Area (ha) In Manager resentation table	132,385 and-use con V Fore Managed Forest Land	0 version matrix Region area st Land Unmanaged Forest Land	81,120 (Approach 2.8 (ha) Cro Cropland Annual Crops	9,165 300,0 9,165 300,0 9 9 0,0 0,0 0,0 0,0 0,0 0,0	and-use conv 00.000 Gras Managed Grassland	0 erision matrix Approach 2 island Unmanage d Grassland	0 : (All Region Wet Managed Wetlands	0 s and Approa lands Unmanage d Wetlands	0 ches) Settleme nts (Treed)	6,262 ments Settleme nts (Other)	0the Managed Other Land	0 rr Land Unmanage d Other Land	U 300,000 Final Area (ha)	D 2
Representation ons Land rep ion Example Final Forest Land	Initial Area (ha) Initial Area (ha) Initial In	132.385 and-use con v Fore Managed Forest Land 132.245	0 version matrix Region area st Land Unmanaged Forest Land	81,120 (Approach 2.8 (ha) Cro Cropland Annual Crops 40	9,165 300,0 pland Cropland Perennial Crops	70.058 and-use conv 00.000 Gras Managed Grassland	0 Approach 2 Island Unmanage d Grassland	(All Region Wet Managed Wetlands	0 s and Approa lands Unmanage d Wetlands	ches) Settle Settleme nts (Treed)	6,262 ments Settleme nts (Other)	1,010 Othe Managed Other Land	0 Ir Land Unmanage d Other Land	0 300,000 	D 2
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Glossary

Category/Subcategory/Subdivision: in the *Software*, <u>category</u> refers to the 6 IPCC land use categories, <u>subcategory</u> refers to the pairs under which subdivisions aggregate in the <u>Land Use Manager</u>, <u>subdivision</u> refers to the land use types entered by users in the <u>Land Use Manager</u>.

- ✓ **Category**: The 6 IPCC land use categories are broadly defined in <u>Chapter 3</u> (Volume 4, 2006 IPCC Guidelines), and it is recognized that these categories are a mixture of land cover (e.g., Forest, Grassland, Wetlands) and land use (e.g., Cropland, Settlements) classes. Within a GHG Inventory, each land use category is composed of 2 reporting sets: Land remaining in the land category and Land converted to the land category.
- ✓ **Subcategory**: The Software disaggregates the 6 IPCC land use categories in pairs of subcategories -i.e. 12-, depending on the presence of human activity i.e. Forest land, Grassland, Wetlands and Other land, as Managed vs Unmanaged land, or for those categories that are manmade depending on the presence of woody biomass i.e. Cropland, annual vs perennial crops, and Settlements, treed vs other.
- ✓ **Subdivisions**: are those land use types entered by users in the <u>Land Use Manager</u> under any of the 12 subcategories. There is not a limit to the number of subdivisions users can enter.

Region: Any stratification of the national territory in subnational units, as defined by users (e.g., administrative regions, ecological zones, parks, land subject to specific project activities, as well as a mix of those). Users can enter any number of user-specific regions. If users wish to report for the entire country, only one region is to be defined.

Unit of land: is an area homogeneous for all relevant variables that qualify a land use subcategory. Under approach 1, homogeneity is limited to the current status of the land; under Approaches 2 and 3 it depends on historical records too. Units of land are entered in the <u>Land Representation Manager</u> and then transferred by the *Software* to the relevant calculation worksheets.

<u>Units of land</u> can be in a:

- *Remaining* status, which means that the area did not undergo a conversion to another land use subdivision within the last D years; where D is the transition period.
- ✓ Conversion status, which means that the area did undergo a conversion to another land use subdivision within the last D years; where D is the transition period.