The Land Representation in the IPCC Inventory Software
A Guide

IPCC TFI Side Event, UNFCCC SB 58

6 June 2023, Bonn, Germany

Sandro Federici, IPCC TFI TSU

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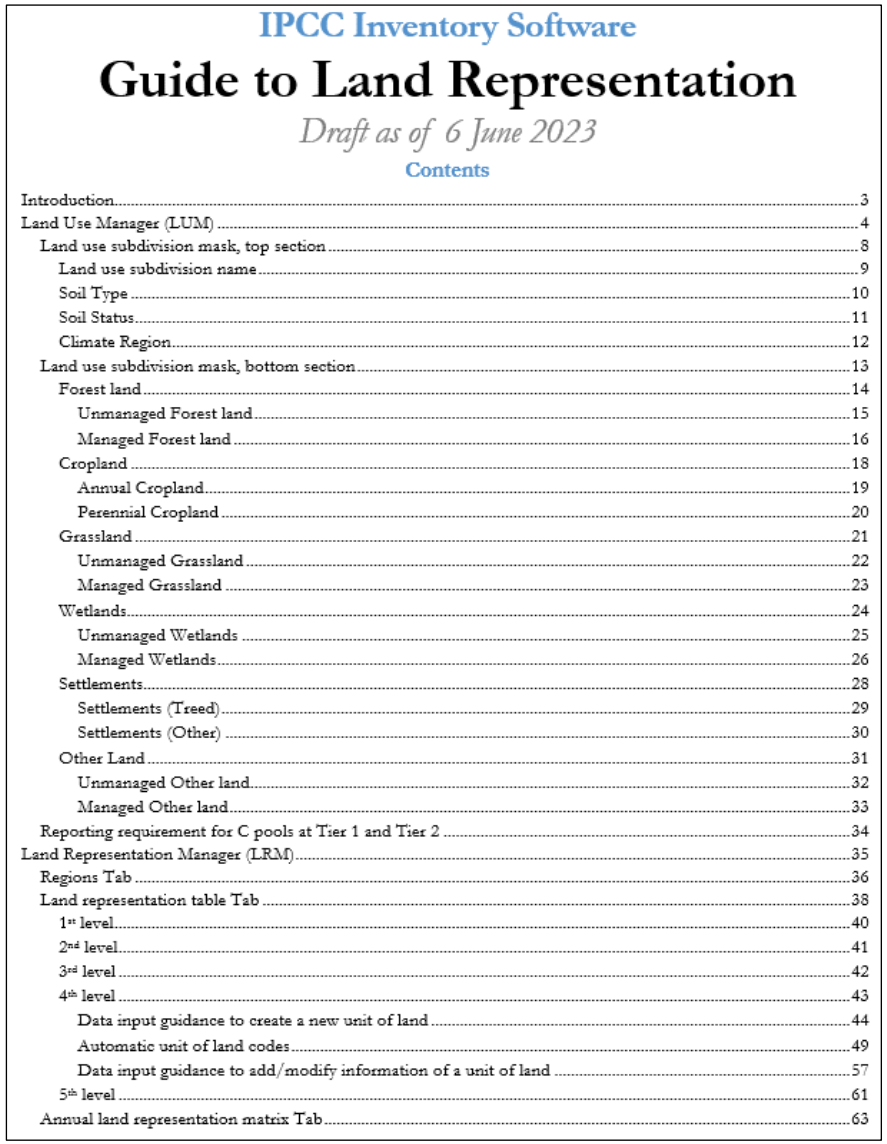
IPCC Inventory Software Guide to Land Representation

- First Iteration



IPCC Inventory Software

Guide to Land Representation

Draft as of 6 June 2023

Contents

- Description of functionalities to be used to input a land representation in the IPCC Inventory Software

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The Land Representation

- In a national GHG Inventory, **estimates of land-related GHG emissions and removals are based on the consistent representation of land across the inventory time series**

- **Land Representation** deals with:

  I. **Classification of land according to bio-physical** *-climate, soil, vegetation-* **and socio-economic** *-use, management (e.g. age-class)-* **variables** aimed at identifying units of land more homogenous for C stocks levels and dynamics → [Land use categories/subcategories/subdivisions]

  II. **Identification and tracking across the inventory time series of units of land** *–i.e. land area with same current and historical classification–* → [Area data to estimate C stock changes and other GHG emissions]

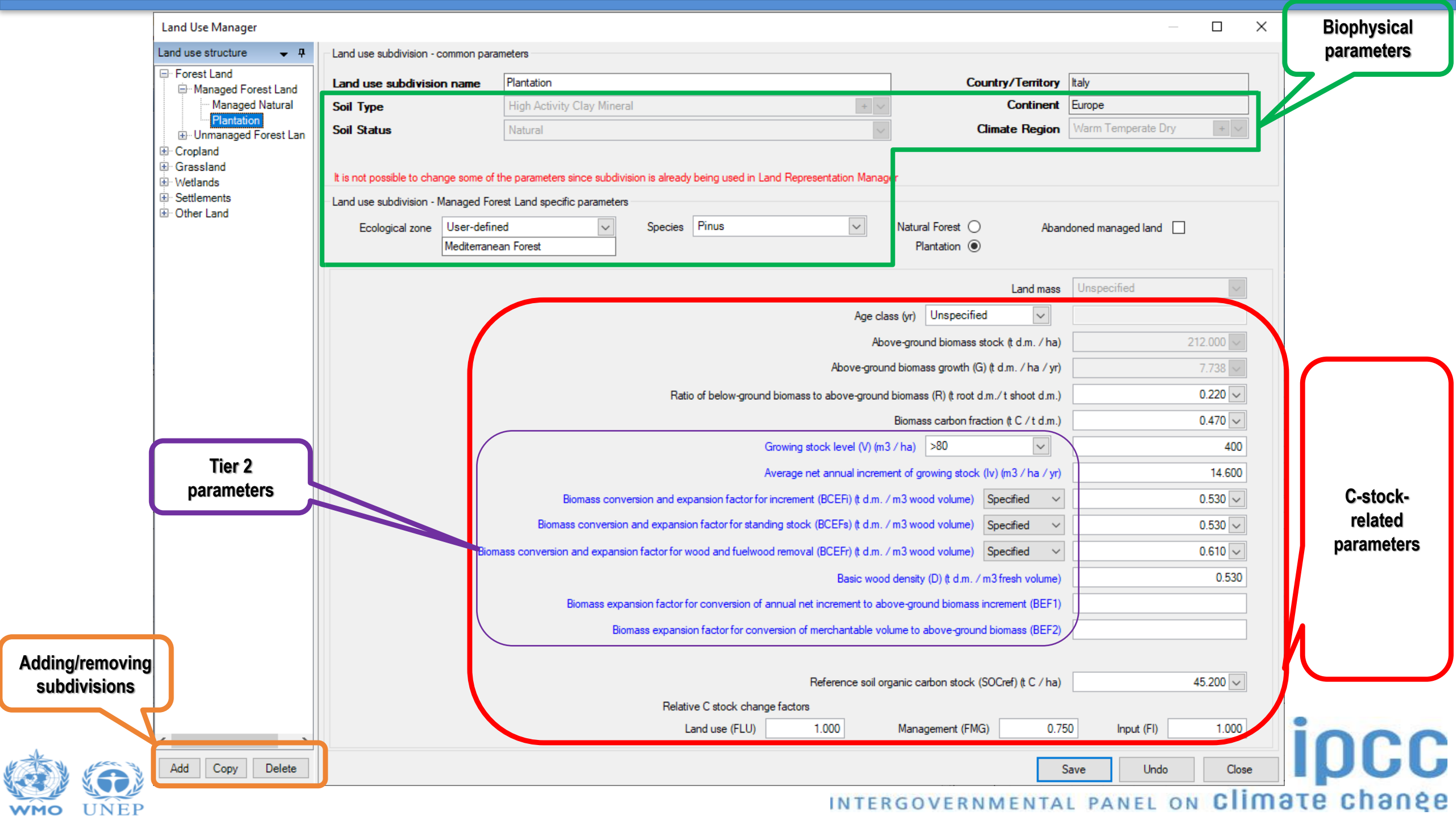
- **Consistency of I and II across the inventory time series is key to ensure unbiasedness of estimates**

The Land Representation

- **A consistent land representation is a time series of annual area estimates of units of land, as disaggregated according to variables of stratification, that reports:**
  - **The land classification methodology is consistent across the entire time series** *-no artifact land conversions caused by changes in the classification method/background-data-*
  - **The total area of the territory is reported and it 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**

Land use categories/subcategories/subdivisions → The Land Use Manager

- It is the **First step when preparing a GHG inventory for land-related sources/sinks**
- It deals with **Input of subdivisions to the 12 main land subcategories**
  - managed Forest land - unmanaged Forest land
  - annual Cropland - perennial Cropland
  - managed Grassland - unmanaged Grassland
  - managed Wetlands - unmanaged Wetlands
  - Settlements (Treed) - Settlements (Other)
  - managed Other land - unmanaged Other land
- **There is not a limit to the number of subdivisions that can be input**
- It applies the **IPCC Climate and the IPCC Soil classifications, although user-specific classifications can be input and applied instead**
- It ensures **consistency in the land categories/subcategories/subdivisions across the inventories time series** *(although it does not deal with the methodology for land classification)*



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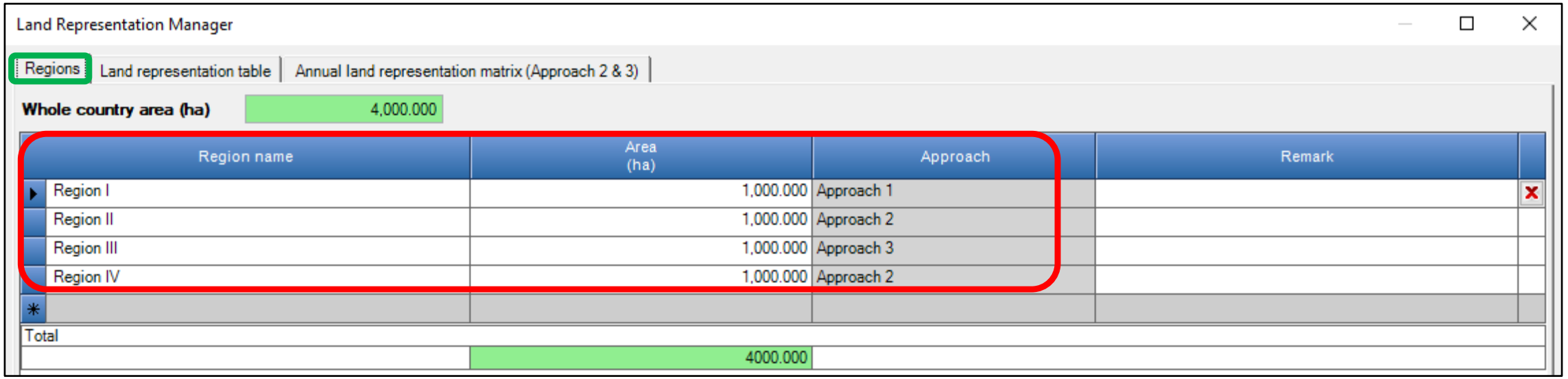
Area data to estimate land's sources/sinks → The Land Representation Manager

- **Allows to use any of the three IPCC approaches**:
  - Approach 1 *-no land use change identification-*
  - Approach 2 *-land use change identification-*
  - Approach 3 *-land use change identification and tracking across time-*
- **Ensures consistency of land representation**
  - Discrepancy-checking in area data input
  - Tracking of unit of lands across the time series - *spatially explicit tracking under Approach 3-*
- **Identifies each unit of land through the identification code**
- **It is composed by 3 Tabs:**
  - Regions
  - Land Representation table
  - Annual land representation table

The Land Representation Manager

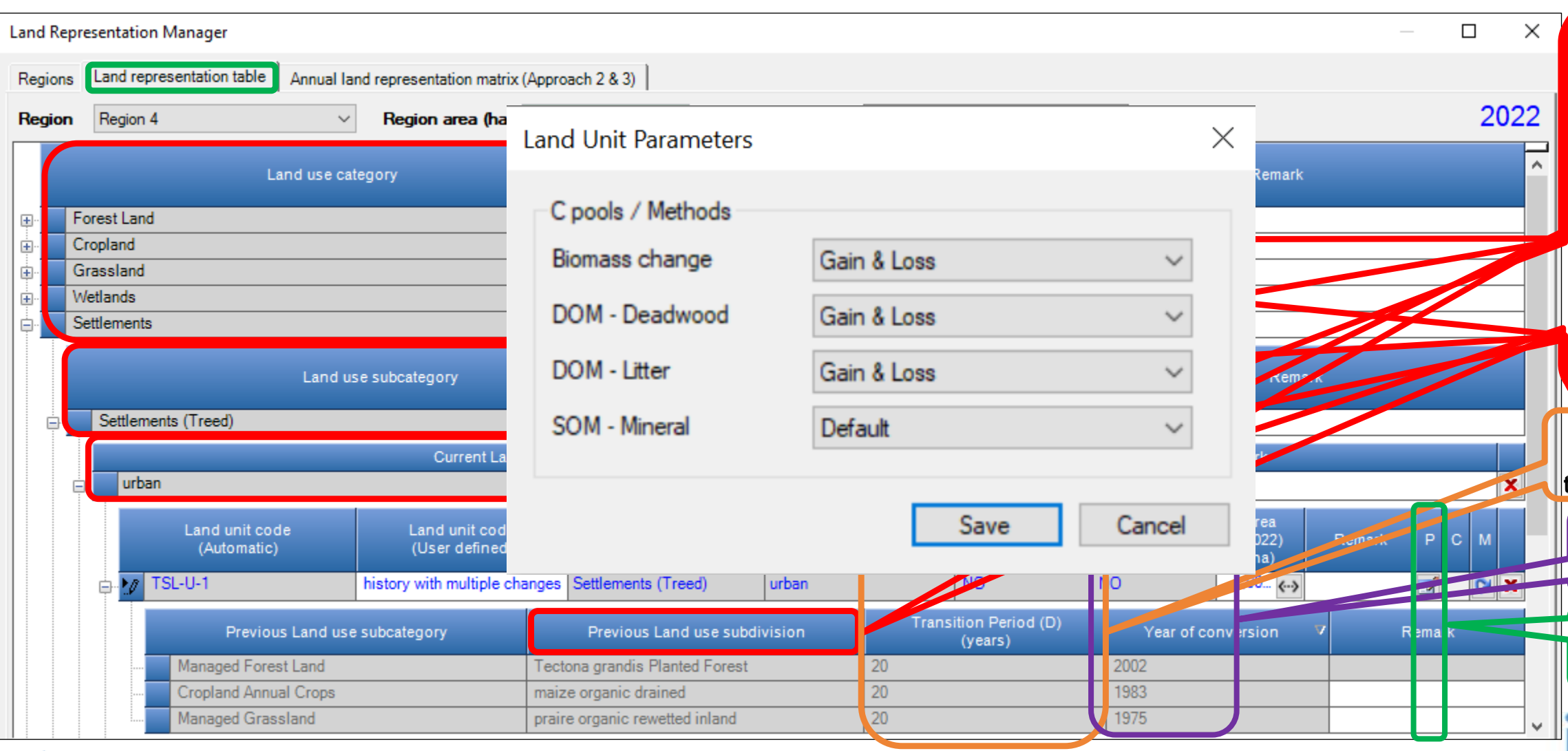
Regions Tab



- The territory inventoried can be reported under 1 Region only or under a number of Regions
- For each Region to be input:
  - **Name**
  - **Area** *–it cannot change across the inventory time series–*
  - **Approach** for Land Representation *–to be selected among the 3 IPCC Approaches–*
- Thus, **the IPCC Inventory Software builds a consistent land representation for each of the Regions of an inventoried territory**

The Land Representation Manager

Land representation table Tab



All land use categories/ subcategories/ subdivisions

Including the historical

Input Transition period to each conversion

Tier 2 parameters

Select methodology for each C pool

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Land Representation Manager

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

Region GFOI example **Region area (ha)** 4,000.000 **Discrepancy (ha)** OK **Approach 2** 2035

Land use category	Area (2035) (ha)	Remark
Forest Land	2,270.000	

Land use subcategory	Area (2035) (ha)	Remark
Managed Forest Land	1,540.000	

Current Land use subdivision	Remark
Managed Natural	

Land unit code	Land unit code	Previous Land use	Previous Land use	Transition Period	Year of	Area

epresentation Manager

ksheets where GHG emissions/removals

Biomass increase (G&L 1/4) | Biomass loss (G&L 2/4) | Biomass loss (G&L 3/4) | Biomass loss (G&L 4/4) | Biomass change (SD) | Biomass change (Abrupt) | DOM (G&L 1/1) | DOM (SD 1/1) | SOM mineral - Formulation A - IPCC Eq 2.25 (Information Item) | SOM Mineral (Approaches 2 and 3) | SOM Mineral (SD) | SOM Organic Drained | SOM Organic Rewetted

Worksheet

Sector: Agriculture, Forestry and Other Land Use

Category:

Subcategory: 3.B.1.a - Forest land Remaining Forest land

Sheet: For 4 Annual increase in carbon stocks in biomass (includes above-ground and below-ground biomass)

2035

Data

Region GFOI example **- Approach 2**

Land use category				Equation 2.9	Equation 2.10							Equation 2.9		
Land unit code	Initial land use	Land use during reporting year		Area (ha)	Average net annual increment of growing stock (m3 / ha / yr)	Biomass expansion factor for conversion of annual net increment to above-ground biomass increment	Basic wood density (t d.m. / m3 fresh volume)	Biomass conversion and expansion factor for increment (t d.m. / m3 wood volume)	Average annual above-ground biomass growth (tonnes d.m. / (ha * yr))	Ratio of below-ground biomass to above-ground biomass (t bg d.m. / t ag d.m.)	Average annual biomass growth above- and below-ground (tonnes d.m. / (ha * yr))	Carbon fraction of dry matter (tonnes C / tonne d.m.)	Annual increase in biomass carbon stocks due to biomass growth (tonnes C / yr)	
				National statistics or international data sources	National statistics or international data sources	Table 3.A.1.10 / National statistics or international data sources	Tables 4.13 / 4.14 / 4.6 WS / National statistics or international data sources	BCEFi = BEF1 * D / Specified	Gw = Iv * BCEFi / Specified	Zero (0) or Table 4.4 / 4.5 WS / National statistics or international data sources	Gtotal = Gw * (1+R)	0.47 / Table 4.3 / 0.451 WS mangroves	ΔCG = A * Gtotal * CF	
				A	Iv	BEF1	D	BCEFi	Gw	R	Gtotal	CF	ΔCG	
U2	Managed For...	Managed Nat...	Managed For...	Managed Nat...	705.000	4.600			0.840	3.864	0.330	5.139	0.470	1,702.847
U3.13		Managed Nat...		Plantation	45.000	14.600			0.530	7.738	0.220	9.440	0.470	199.664
U3.14		Managed Nat...		Plantation	45.000	14.600			0.530	7.738	0.220	9.440	0.470	199.664
U3.15		Managed Nat...		Plantation	45.000	14.600			0.530	7.738	0.220	9.440	0.470	199.664
U3.16		Managed Nat...		Plantation	45.000	14.600			0.530	7.738	0.220	9.440	0.470	199.664
U2.23		Plantation		Managed Nat...	7.000	4.600			0.840	3.864	0.330	5.139	0.470	16.908
U2.24		Plantation		Managed Nat...	8.000	4.600			0.840	3.864	0.330	5.139	0.470	19.323
U2.25		Plantation		Managed Nat...	7.000	4.600			0.840	3.864	0.330	5.139	0.470	16.908
U2.26		Plantation		Managed Nat...	8.000	4.600			0.840	3.864	0.330	5.139	0.470	19.323
U3		Plantation		Plantation	265.000	14.600			0.530	7.738	0.220	9.440	0.470	1,175.797
U2.13	Unmanaged...	Unamanged...		Managed Nat...	30.000	4.600			0.840	3.864	0.330	5.139	0.470	72.462
U2.14		Unamanged...		Managed Nat...	30.000	4.600			0.840	3.864	0.330	5.139	0.470	72.462
U2.15		Unamanged...		Managed Nat...	30.000	4.600			0.840	3.864	0.330	5.139	0.470	72.462
U2.16		Unamanged...		Managed Nat...	30.000	4.600			0.840	3.864	0.330	5.139	0.470	72.462
Total					1,300.000							93.454		4,039.607

Current Land use subdivision	Remark
Unamanged Natural	

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 (2035) (ha)	Remark	P	M
UFL-UN-NF-UD-1	U1	Unmanaged Forest Land	Unamanged Natural	NA	NA	730.0...			

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The Land Representation Manager

Annual land representation matrix Tab

Land Representation Manager

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

Region GFOI example **Region area (ha)** 4,000.000 **Approach 2** 2035

Final		Initial: Forest Land – Managed Forest Land	Forest Land – Unmanaged Forest Land	Cropland – Cropland Annual Crops	Cropland – Cropland Perennial Crops	Grassland – Managed Grassland	Grassland – Unmanaged Grassland	Wetlands – Managed Wetlands	Wetlands – Unmanaged Wetlands	Settlements – Settlements (Treed)	Settlements – Settlements (Other)	Other Land – Managed Other Land	Other Land – Unmanaged Other Land	Final Area (ha)	Net change (ha)
Forest Land	Managed Forest Land	1,450.000	30.000			60.000								1,540.000	90.000
	Unmanaged Forest Land		730.000											730.000	-45.000
Cropland	Cropland Annual Crops		15.000	1,075.000										1,090.000	15.000
	Cropland Perennial Crops													0.000	0.000
Grassland	Managed Grassland					640.000								640.000	-60.000
	Unmanaged Grassland													0.000	0.000
Wetlands	Managed Wetlands													0.000	0.000
	Unmanaged Wetlands													0.000	0.000
Settlements	Settlements (Treed)													0.000	0.000
	Settlements (Other)													0.000	0.000
Other Land	Managed Other Land													0.000	0.000
	Unmanaged Other Land													0.000	0.000
	Initial Area (ha)	1,450.000	775.000	1,075.000	0.000	700.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4,000.000	0.000

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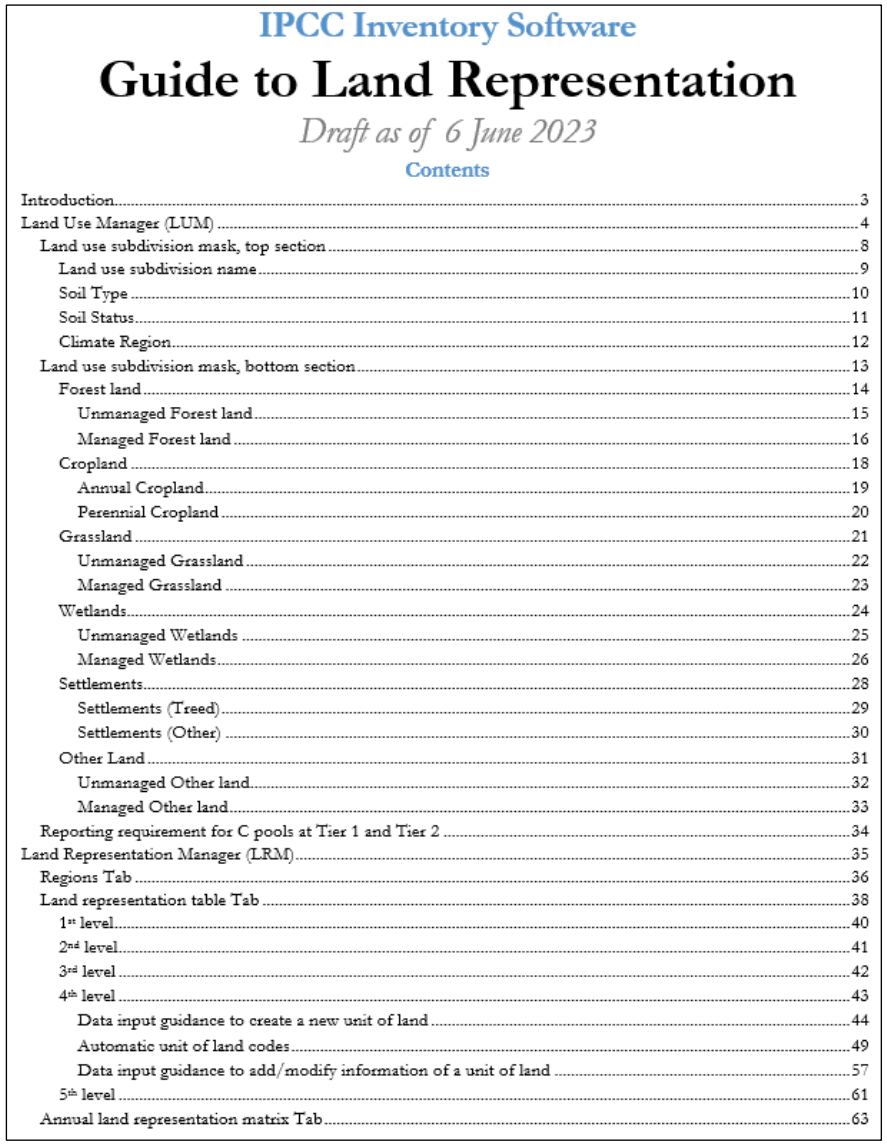
- Download it at

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



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- Next iteration, a step-by-step description of a land representation input to be added

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Thank you

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