



# IPCC Inventory Software

## Agriculture, Forestry and Other Land Use Sector

The 18<sup>th</sup> Workshop on Greenhouse Gas Inventories in Asia (WGIA18)

13 July 2021

IPCC TFI TSU

**ipcc**

INTERGOVERNMENTAL PANEL ON climate change



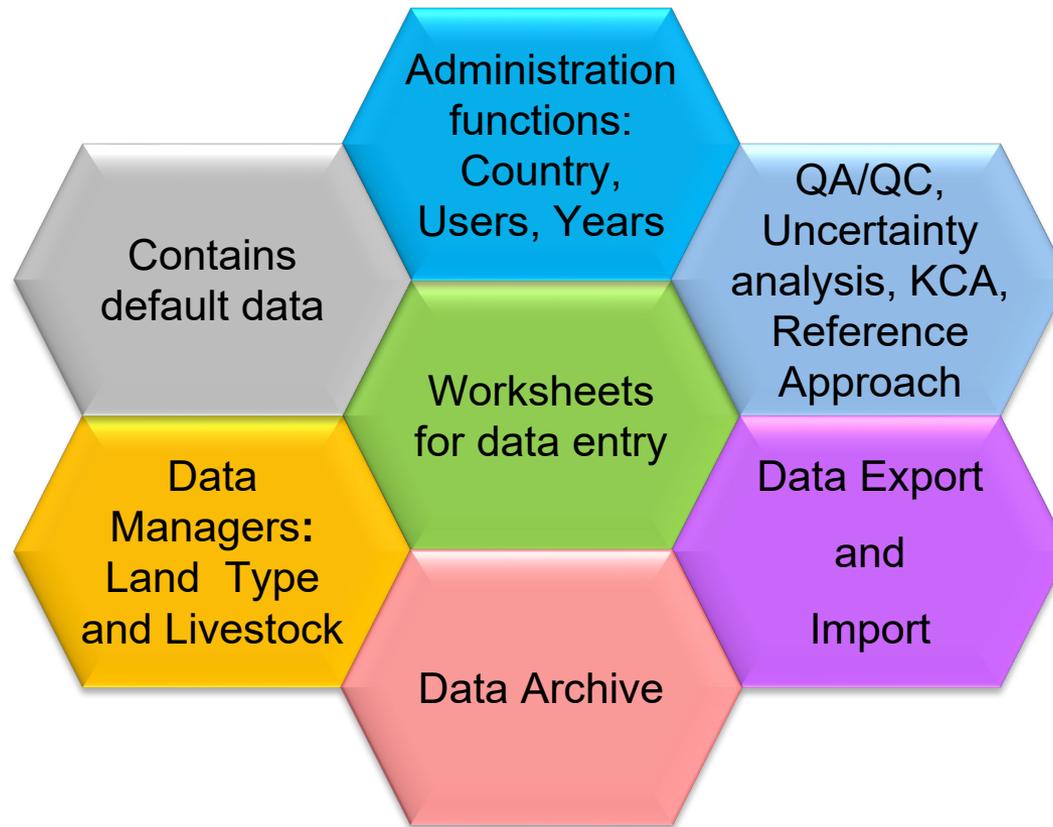
# Introduction

- IPCC launched the Inventory Software in 2012
  - implements the *2006 IPCC Guidelines*
- The latest version 2.691 released in January 2020 and available at <https://www.ipcc-nggip.iges.or.jp/software/index.html>
  - implements Tier 2 methods for most categories of Energy, Industrial Processes and Product Use (IPPU) and Waste sectors as well as Agriculture categories of Agriculture, Forestry and Other Land Use (AFOLU) sector

# IPCC Inventory Software

- Database based and stand-alone software
- Does not require internet access or expensive hardware
- Can be used for the whole inventory or just individual categories
- Allows different parts of inventory to be developed simultaneously
- Contains default data from the *2006 IPCC Guidelines* but gives users the flexibility to use their own country-specific information
- Includes Uncertainty Analysis and Key Category Analysis
- Can be used for reporting under the *2006 IPCC Guidelines or Revised 1996 IPCC Guidelines* (consistent with Tables 1 and 2 in Annex to Decision 17/CP.8 )
- Aids Quality Assurance/Quality Control (QA/QC)
- FREE

# Software Functions



# Worksheets

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

2006 IPCC Categories

- 3.B.5.b.v - Other Land converted to Settlements
- 3.B.6 - Other Land
  - 3.B.6.a - Other land Remaining Other land
  - 3.B.6.b - Land Converted to Other Land
    - 3.B.6.b.i - Forest Land converted to Other Land
    - 3.B.6.b.ii - Cropland converted to Other Land
    - 3.B.6.b.iii - Grassland converted to Other Land
    - 3.B.6.b.iv - Wetlands converted to Other Land
    - 3.B.6.b.v - Settlements converted to Other Land
- 3.C - Aggregate sources and non-CO2 emissions sources
  - 3.C.1 - Emissions from biomass burning
    - 3.C.1.a - Biomass burning in forest lands
    - 3.C.1.b - Biomass burning in croplands
    - 3.C.1.c - Biomass burning in grasslands
    - 3.C.1.d - Biomass burning in all other land
  - 3.C.2 - Liming
  - 3.C.3 - Urea application
  - 3.C.4 - Direct N2O Emissions from managed soils
  - 3.C.5 - Indirect N2O Emissions from managed soils
  - 3.C.6 - Indirect N2O Emissions from manure management
  - 3.C.7 - Rice cultivation
  - 3.C.8 - Other (please specify)
- 3.D - Other
  - 3.D.1 - Harvested Wood Products
  - 3.D.2 - Other (please specify)
- 4 - Waste
  - 4.A - Solid Wastes
    - 4.A.1 - Municipal Solid Wastes
    - 4.A.2 - Industrial Solid Wastes
    - 4.A.3 - Other Solid Wastes

Annual CH4 emissions from rice

Worksheet

Sector: Agriculture, Forestry and Other Land Use  
 Category: Rice cultivation  
 Subcategory: 3.C.7 - Rice cultivation  
 Sheet: 1 of 1 Annual CH4 emissions from rice

Data

Gas: METHANE (CH4)

	Equation 2.2	Equation 5.1	Equation 5.2	Equation 5.3	Equation 5.2							
	Baseline emission	Scaling factor to account for the differences in water regime during the cultivation period	Scaling factor to account for the differences in water regime in the pre-season before the cultivation period	Application rate of organic amendment in fresh weight (tonnes / ha)	Conversion factor for organic amendment	Scaling factor for both types and amount of organic amendment applied	Scaling factor for soil type, rice cultivar, etc., if available	Adjusted daily emission factor for a particular harvested area (kg CH4 / (ha Day))				
	Rice ecosystem	Subcategory	Table 5.12	Table 5.13	Table 5.14	$SF_o = (1 + ROAI * CFOAI) * 0.59$	$SF_{s,r}$	$EFI = Efc * SFw * SFp * SFo * SFs$				
	Irrigated	Rice	A	t	EFc	SFw	SFp	ROAI	CFOAI	SFo	SFs,r	EFI
	6500	6500	90	1.3	0.6	1.22	0.2	1	1.11857	1	1.0596	
Total		6500										

2018

Worksheet remarks

Save

Gas: METHANE (CH4)

Calculated cells (green background)

Editable cells (white background)

Notation keys available

Hierarchical list of categories

Defaults available: can be overwritten with country specific data

Bar chart showing Methane (CH4) emissions from 1990 to 2022. The y-axis ranges from 0 to 12. The x-axis shows years from 1990 to 2022. A single bar is visible for 1990 with a value of approximately 6.5. The chart is titled 'METHANE (CH4) Emissions (by CO2 Equivalent)'. A note at the bottom states: '\* Base year for assessment of uncertainty in trend: 1990'.

# Worksheets

**Multi-Tier support**

**Data Manager is accessible**

**Enter uncertainties of activity data (AD) and emission factors (EFs)**

**Parameters of worksheets can be edited across existing inventory years**

Geographical zone	Livestock Subcategory	Number of Animals (head)	Emission Factor [kg CH4/(head yr)]	CH4 Emissions (Gg CH4/yr)
Z	T	N(T)	EF(T)	$CH4 = N(T) * EF(T) * 10^{-6}$
Warm	Dairy Cows A	350000	68	23.8
Total				23.8

Worksheet: 2018

Gas: METHANE (CH4) | Geographical zone: (All) | Livestock Subcategory: (All)

Worksheet remarks: 3.A.1.a.i - Time Series

METHANE Emissions (Gg CO2 Equivalents)

\* Base year for assessment of uncertainty in trend: 1990

Gas: METHANE (CH4)

# AFOLU Data Managers

- Two types of data managers for AFOLU
  - Land Type Manager
  - Livestock Manager
- Parameters defined in the data managers are used in relevant worksheets of AFOLU sector.
- Accessible from relevant worksheets

## Main Menu

→ *Administrate*

→ *AFOLU*

→ *Land Type Manager or Livestock Manager*

# Land Type Manager

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

2006 IPCC Categories

- 3 - Agriculture, Forestry, and Other Land Use
  - 3A - Livestock
    - 3A.1 - Enteric Fermentation
      - 3A.1a - Cattle
        - 3A.1ai - Dairy Cows
        - 3A.1aj - Other Cattle
      - 3A.1b - Buffalo
      - 3A.1c - Sheep
      - 3A.1d - Goats
      - 3A.1e - Camels
      - 3A.1f - Horses
      - 3A.1g - Mules and Asses
      - 3A.1h - Swine
      - 3A.1j - Other (please specify)
    - 3A.2 - Manure Management
      - 3A.2a - Cattle
        - 3A.2ai - Dairy cows
        - 3A.2aj - Other cattle
      - 3A.2b - Buffalo
      - 3A.2c - Sheep
      - 3A.2d - Goats
      - 3A.2e - Camels
      - 3A.2f - Horses
      - 3A.2g - Mules and Asses
      - 3A.2h - Swine
      - 3A.2i - Poultry
      - 3A.2j - Other (please specify)
  - 3B - Land
    - 3B.1 - Forest land
      - 3B.1a - Forest land Remaining Forest land

2006 IPCC Guidelines

AFOLU Land Types

Land Use Subcategories

- Forest Land
  - Forests on Organic Soils
  - Natural broadleaf Forest
  - Teak Plantations
  - Unmanaged
- Cropland
- Grassland
- Wetlands
- Settlements
- Other Land

Common Land Type Data

Country/Territory: Japan Continent: Asia

Land Use Subcategory: Forests on Organic Soils

Climate Region: Tropical Moist, Long Dry Season Soil Type: Organic

Forest Land Data

Ecosystem type: Tropical moist deciduous forest Continent type: Continental

Species: Other Broadleaf Age class (yr): >20 y

Natural Forest:  Growing stock level (m3/ha): 21-40

Plantation:  Carbon fraction of aboveground forest biomass (tonne C/tonne d.m.): 0.470

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

Biomass conversion and expansion factor for wood and fuelwood removal (BCEFr) (t / m3 wood volume): 0.800

Emission factor for drained organic soils in managed forests (t C /ha/yr): 1.360

Above-ground biomass in forests (t d.m. / ha): 180.000

Above-ground biomass growth in plantation/natural forests (t d.m. /ha/yr): 2.000

Litter carbon stocks of mature forests (t C / ha): 2.100

Abandoned managed land:

Add Copy Delete Save Undo Close

# Livestock Manager

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

2006 IPCC Categories

- 3 - Agriculture, Forestry, and Other Land Use
  - 3A - Livestock
    - 3A.1 - Enteric Fermentation
      - 3A.1a - Cattle
        - 3A.1a.i - Dairy Cows
        - 3A.1a.ii - Other Cattle
      - 3A.1b - Buffalo
      - 3A.1c - Sheep

Time Series  
Time Series  
Category  
Gas

Use  
Land Type Manager  
Livestock Manager (CO2) Emissions (Gg CO2 Equivalents)

**Livestock Manager**

Geographical zones Livestock Manure Management System

Geographical zone

- Warm

Category

- Dairy Cows
  - Livestock Subcategory
    - Dairy Cows A

Livestock Manager

Geographical zones Livestock Manure Management System

System Definition

System	Definition
<input checked="" type="checkbox"/> Pasture/Range/Paddock	The manure from pasture and range grazing animals is allowed to lie as deposited, and is not managed.
<input type="checkbox"/> Daily spread	Manure is routinely removed from a confinement facility and is applied to cropland or pasture within 24 hours of excretion.
<input checked="" type="checkbox"/> Solid storage	The storage of manure, typically for a period of several months, in unconfined piles or stacks. Manure is able to be stacked due to the presence of a sufficient amount of bedding material or loss of moisture by evaporation.
<input checked="" type="checkbox"/> Dry lot	A paved or unpaved open confinement area without any significant vegetative cover where accumulating manure may be removed periodically.
<input checked="" type="checkbox"/> Liquid/Slurry	Manure is stored as excreted or with some minimal addition of water in either tanks or earthen ponds outside the animal housing, usually for periods less than one year.
<input checked="" type="checkbox"/> Uncovered anaerobic lagoon	A type of liquid storage system designed and operated to combine waste stabilization and storage. Lagoon supernatant is usually used to remove manure from the associated confinement facilities to the lagoon. Anaerobic lagoons are designed with varying lengths of storage (up to a year or greater), depending on the climate region, the volatile solids loading rate, and other operational factors. The water from the lagoon may be recycled as flush water or used to irrigate and fertilise fields.
<input type="checkbox"/> Pit storage below animal confinements	Collection and storage of manure usually with little or no added water typically below a slatted floor in an enclosed animal confinement facility, usually for periods less than one year.
<input checked="" type="checkbox"/> Anaerobic digester	Animal excreta with or without straw are collected and anaerobically digested in a large containment vessel or covered lagoon. Digesters are designed and operated for waste stabilization by the microbial reduction of complex organic compounds to CO2 and CH4, which is captured and flared or used as a fuel.
<input type="checkbox"/> Burned for fuel	The dung and urine are excreted on fields. The sun dried dung cakes are burned for fuel.
<input type="checkbox"/> Cattle and Swine deep bedding	As manure accumulates, bedding is continually added to absorb moisture over a production cycle and possibly for as long as 6 to 12 months. This manure management system also is known as a bedded pack manure management system and may be combined with a dry lot or pasture.
<input type="checkbox"/> Composting (in-vessel)	Composting units are in an enclosed chamber with forced aeration and continuous mixing.

# AFOLU Area Entry Table

- This worksheet is available in 3.B Land categories and designated for defining 20-year land area transitions between land use subcategories defined in Land Type Manager.
- This data can then be used by the software to complete the Land Use Matrix and fill in the “20 year” land areas in all the relevant worksheets.

The screenshot displays the Land Type Manager software interface. The left sidebar shows a tree view of IPCC categories, with 3.B.2b.i - Forest Land converted to Cropland selected. The main window shows the 'Area Entry Table' worksheet for the year 2018. The worksheet title bar includes 'Area Entry Table', 'Annual Area Table', 'Land-Use Conversion Matrix', and other options. The main content area contains a table with the following data:

Initial land use		Final land use		Area (ha)		
Forest Land	Natural broadleaf Forest	Cropland	Cropland (Rice Cultivation)	0		
			Oil Palm	2000		
			Rice	1000		
			Cropland (Rice Cultivation)	0		
	Teak Plantations		Oil Palm	500		
			Rice	2500		

# AFOLU Annual Area Table

- This worksheet is available in 3.B Land categories which contain worksheets based on “annual area change”. It is used for defining annual land area changes between land use subcategories defined in Land Type Manager.
- This data can then be used by the software to complete the Land Use Matrix and fill in the “annual” land areas in all the relevant worksheets.

The screenshot displays the IPCC Land Type Manager software interface. The left sidebar shows a tree view of IPCC categories, with '3.B.2b.i - Forest Land converted to Cropland' selected. The main window shows the 'Annual Area Table' worksheet for the year 2018. The worksheet details are as follows:

- Area Entry Table:** Annual Area Table
- Worksheet:** Agriculture, Forestry, and Other Land Use
- Sector:** Agriculture, Forestry, and Other Land Use
- Category:** Land
- Subcategory:** 3.B.2b.i - Forest Land converted to Cropland
- Sheet:** Annual Area Table

The data table is structured as follows:

Initial land use		Final land use		Annual Area Change (ha)	
Forest Land	Natural broadleaf Forest	Cropland	Cropland (Rice Cultivation)	0	
			Oil Palm	200	
	Teak Plantations	Rice	100		
		Cropland (Rice Cultivation)	0		
		Oil Palm	50		
		Rice	200		

# AFOLU Land Use Matrix

- This worksheet is available in 3.B Land categories. It is a complete view of land use subcategory transitions constructed from Area Entry Table or Annual Area Table.

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

2018 IPCC Categories

3.A.2) - Other (please specify)

3.B - Land

3.B.1 - Forest land

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

3.B.1.b - Land Converted to Forest land

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

3.B.1.b.ii - Grassland converted to Forest Land

3.B.1.b.iii - Wetlands converted to Forest Land

3.B.1.b.iv - Settlements converted to Forest Land

3.B.1.b.v - Other Land converted to Forest Land

3.B.2 - Cropland

3.B.2.a - Cropland Remaining Cropland

3.B.2.b - Land Converted to Cropland

3.B.2.b.i - Forest Land converted to Cropland

3.B.2.b.ii - Grassland converted to Cropland

3.B.2.b.iii - Wetlands converted to Cropland

3.B.2.b.iv - Settlements converted to Cropland

3.B.2.b.v - Other Land converted to Cropland

3.B.3 - Grassland

3.B.3.a - Grassland Remaining Grassland

3.B.3.b - Land Converted to Grassland

3.B.3.b.i - Forest Land converted to Grassland

3.B.3.b.ii - Cropland converted to Grassland

3.B.3.b.iii - Wetlands converted to Grassland

3.B.3.b.iv - Settlements converted to Grassland

3.B.3.b.v - Other Land converted to Grassland

3.B.4 - Wetlands

3.B.4.a - Wetlands Remaining Wetlands

3.B.4.a.i - Peatlands remaining peatlands

3.B.4.a.ii - Flooded land remaining flooded land

3.B.4.b - Land Converted to Wetlands

Area Entry Table Annual Area Table Land-Use Conversion Matrix Annual change in carbon stocks in biomass Annual change in carbon stocks in dead organic matter due to land conversion Annual change in carb...

Worksheet

Sector: Agriculture, Forestry and Other Land Use

Category: 3.B.2.b) - Forest Land converted to Cropland

Sheet: Land-Use Conversion Matrix

Data

View: Area Entry Table

	Initial 0	Forest Land					Cropland			Grassland	Final Area
Forest Land	Final	Forests on Organic Soils	Natural broadleaf Forest	Teak Plantations	Unmanaged	Cropland (Rice Cultivation)	Oil Palm	Rice	Unmanage	Final Area	
Forests on Organic Soils		250								250	
Natural broadleaf Forest			150	0		0	0	0		150	
Teak Plantations			10	200		0	0	100		310	
Unmanaged					100					100	
Cropland			0	0		6500	0	0		6500	
Oil Palm			2000	500		0	2000	500		5000	
Rice			1000	2500		0	1000	2000		6500	
Grassland										0	
Wetlands										0	
Settlements										0	
Other Land										0	
Initial Area		250	3160	3200	100	6500	3000	2600	0	18810	
Net Change		0	-3010	-2890	0	0	2000	3900	0	0	

Land Type Manager

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

2018 IPCC Categories

3.A.2) - Other (please specify)

3.B - Land

3.B.1 - Forest land

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

3.B.1.b - Land Converted to Forest land

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

3.B.1.b.ii - Grassland converted to Forest Land

3.B.1.b.iii - Wetlands converted to Forest Land

3.B.1.b.iv - Settlements converted to Forest Land

3.B.1.b.v - Other Land converted to Forest Land

3.B.2 - Cropland

3.B.2.a - Cropland Remaining Cropland

3.B.2.b - Land Converted to Cropland

3.B.2.b.i - Forest Land converted to Cropland

3.B.2.b.ii - Grassland converted to Cropland

3.B.2.b.iii - Wetlands converted to Cropland

3.B.2.b.iv - Settlements converted to Cropland

3.B.2.b.v - Other Land converted to Cropland

3.B.3 - Grassland

3.B.3.a - Grassland Remaining Grassland

3.B.3.b - Land Converted to Grassland

3.B.3.b.i - Forest Land converted to Grassland

3.B.3.b.ii - Cropland converted to Grassland

3.B.3.b.iii - Wetlands converted to Grassland

3.B.3.b.iv - Settlements converted to Grassland

3.B.3.b.v - Other Land converted to Grassland

3.B.4 - Wetlands

3.B.4.a - Wetlands Remaining Wetlands

3.B.4.a.i - Peatlands remaining peatlands

3.B.4.a.ii - Flooded land remaining flooded land

3.B.4.b - Land Converted to Wetlands

Area Entry Table Annual Area Table Land-Use Conversion Matrix Annual change in carbon stocks in biomass Annual change in carbon stocks in dead organic matter due to land conversion Annual change in carb...

Worksheet

Sector: Agriculture, Forestry and Other Land Use

Category: 3.B.2.b) - Forest Land converted to Cropland

Sheet: Land-Use Conversion Matrix

Data

View: Annual Area Table

	Initial 0	Forest Land					Cropland			Grassland	Final Area
Forest Land	Final	Forests on Organic Soils	Natural broadleaf Forest	Teak Plantations	Unmanaged	Cropland (Rice Cultivation)	Oil Palm	Rice	Unmanage	Final Area	
Forests on Organic Soils										0	
Natural broadleaf Forest										0	
Teak Plantations										0	
Unmanaged										0	
Cropland			0	0						0	
Oil Palm			200	50						250	
Rice			100	200						300	
Grassland										0	
Wetlands										0	
Settlements										0	
Other Land										0	
Initial Area		0	300	250	0	0	0	0	0	550	
Net Change		0	-300	-250	0	0	250	300	0	0	

Land Type Manager

# Time Series Data Entry

- Majority of worksheets supports time series data entry
  - Parameters of worksheets can be edited across existing inventory years
  - Time series data entry worksheet can be activated by clicking Time Series Data Entry button
- Export and Import
  - Export the selected parameter data into MS Excel file
  - Data for that parameter can be edited/modified and imported back into the software

# Uncertainty Analysis and Key Category Analysis

## Main Menu

→ *Tools*

→ *Uncertainty Analysis or Key Category Analysis*

- Uncertainties in AD and EF are entered in the worksheets
- Click Refresh Data button to perform the Uncertainty Analysis and Key Category Analysis
- Results can be exported to MS Excel file

# Reports

- Reporting tables can be produced and exported to MS Excel file
  - Summary table (emissions data up to category level 3 e.g., 1.A.1 Energy Industries)
  - Short Summary table (emissions data up to category level 2 e.g., 3.B Land)
  - Sectoral table for each sector (emissions data at most disaggregated level e.g., 3.B.1.b.i Cropland converted to Forest Land)
  - Background table for each sector (AD and emissions at most disaggregated level e.g., 3.A.1.a.i Dairy Cows)

# Data Export and Import

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

Export Import Worksheet Data  
CO2 Equivalents  
F-Gases Data  
NAI Reporting Tables

Sector: Agriculture, Forestry & Other Land Use  
Category: Livestock/Enteric fermentation  
Subcategory: 3.A.1.a.i - Dairy Cows  
Sheet: CH4 Emissions from Enteric Fermentation

Gas METHANE (CH4) Geographical zone

Geographical zone

Z

Warm Dairy

Total

2006 IPCC Categories to export

- 2G.3.c - Other (Please specify)
- 2G.4 - Other (Please specify)
- 2.H - Other
  - 2.H.1 - Pulp and Paper Industry
  - 2.H.2 - Food and Beverages Industry
  - 2.H.3 - Other (please specify)
- 3 - Agriculture, Forestry, and Other Land Use
  - 3.A - Livestock
    - 3.A.1 - Enteric Fermentation
      - 3.A.1.a - Cattle
        - 3.A.1.a.i - Dairy Cows
        - 3.A.1.a.ii - Other Cattle
      - 3.A.1.b - Buffalo
      - 3.A.1.c - Sheep
      - 3.A.1.d - Goats
      - 3.A.1.e - Camels
      - 3.A.1.f - Horses
      - 3.A.1.g - Mules and Asses
      - 3.A.1.h - Swine
      - 3.A.1.j - Other (please specify)
    - 3.A.2 - Manure Management
      - 3.A.2.a - Cattle
        - 3.A.2.a.i - Dairy cows
        - 3.A.2.a.ii - Other cattle
      - 3.A.2.b - Buffalo
      - 3.A.2.c - Sheep
      - 3.A.2.d - Goats
      - 3.A.2.e - Camels
      - 3.A.2.f - Horses
      - 3.A.2.g - Mules and Asses
      - 3.A.2.h - Swine
      - 3.A.2.i - Poultry
      - 3.A.2.j - Other (please specify)

2006 IPCC Guidelines

Worksheet remarks

Save

Export Close

Export/Import worksheet data as XML file

# Support to Users

- Organizing expert meetings annually
- Help Desk [ipcc-software@iges.or.jp](mailto:ipcc-software@iges.or.jp)
- Non-English User Manual is available in addition to the official English version:
  - French version (provided by Government of Belgium)
  - Arabic version (provided by Sidati Ould Dah Ould EIDA, CCPNCC, Mauritania)
- Frequently Asked Questions  
<https://www.ipcc-nggip.iges.or.jp/software/index.html>
- Collaboration with other organizations (e.g., UNFCCC regional workshops)

# Inventory Software: Updates

- Several ongoing and planned updates (some are under testing)
- General
  - Subnational disaggregation
  - Approaches 1 and 2 for Uncertainty Analysis and Key Category Analysis (level and trend)
  - Time series export/import
  - Translations
- AFOLU
  - Land representation (national/sub-national)
    - All approaches (1, 2 and 3 i.e., tracking of units of land across the inventory time series)
    - Annual land transition matrices
  - Stock-Difference approach
  - All tier 2 methods included
  - *Wetlands Supplement* methods and defaults
  - User-defined soil and climate/vegetation zoning

# Land Representation: Approach 3

Land Representation Manager

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

Region: tre | Region area (ha): 3,000,000 | Discrepancy (ha): OK | Approach 3 | 1990

Land use category		Remark								
Forest Land										
Land use subcategory	Area (1990) (ha)	Area discrepancy (1990) (ha)	Remark							
Managed Forest Land	3000	OK								
Current Land use subdivision		Remark								
plantation										
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)	Remark	P	C	M
MFL-P-PL-TG-4<-ACL-R-R...		Cropland Annual Crops	rice	20	1986	3000				
Previous Land use subcategory		Previous Land use subdivision		Transition period [T] (years)	Year of conversion	Remark				
Cropland Perennial Crops		oil palm		20	1981					
Managed Forest Land		plantation		20	1976					
Unmanaged Forest Land		natural-unmanged		20	1971					

# Stock Difference: Forest Land

2006 IPCC Categories

- 3.A.2.f - Horses
- 3.A.2.g - Mules and Asses
- 3.A.2.h - Swine
- 3.A.2.i - Poultry
- 3.A.2.j - Other (please specify)
- Land
  - 3.B.1 - Forest land
    - 3.B.1.a - Forest land Remaining Forest land
    - 3.B.1.b - Land Converted to Forest land
      - 3.B.1.b.i - Cropland converted to Forest Land
      - 3.B.1.b.ii - Grassland converted to Forest Land
      - 3.B.1.b.iii - Wetlands converted to Forest Land
      - 3.B.1.b.iv - Settlements converted to Forest Land
      - 3.B.1.b.v - Other Land converted to Forest Land
  - 3.B.2 - Cropland
    - 3.B.2.a - Cropland Remaining Cropland
    - 3.B.2.b - Land Converted to Cropland
      - 3.B.2.b.i - Forest Land converted to Cropland
      - 3.B.2.b.ii - Grassland converted to Cropland
      - 3.B.2.b.iii - Wetlands converted to Cropland
      - 3.B.2.b.iv - Settlements converted to Cropland
      - 3.B.2.b.v - Other Land converted to Cropland
  - 3.B.3 - Grassland
    - 3.B.3.a - Grassland Remaining Grassland
    - 3.B.3.b - Land Converted to Grassland
      - 3.B.3.b.i - Forest Land converted to Grassland

Biomass increase (GAL 1/4) | Biomass loss (GAL 2/4) | Biomass loss (GAL 3/4) | Biomass loss (GAL 4/4) | Biomass change (SD) | Biomass change (Abrupt) | DOM (GAL 1/1) | DOM (SD 1/1) | SOM Mineral (Approach 2.3) | SOM <

Worksheet

**Sector:** Agriculture, Forestry and Other Land Use

**Category:** Forest Land

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

**Sheet:** Annual net C stock change in biomass - Stock difference method

1990

Data

**Region:** tre - Approach 3

Land use category				Area (ha)	Biomass conversion and expansion factor for standing stock (t d.m. / m3 volume)	Biomass expansion factor for conversion of merchantable volume to above-ground biomass (t d.m. / m3 fr)	Basic wood density (t d.m. / m3 fresh volume)	Merchantable growing stock volume at the beginning of the inventory period (t1) (m3 / ha)	Total initial above-ground biomass (t d.m. / ha)	
Land unit code	Initial land use	Land use during reporting year	National statistics or international data sources							
			A	BCEFs	BEF2	D	V(t1)	AB(t1)		
MFL-P-PL-TG-4...	Cropland An...	rice	Managed Fore...	plantation	3000	0.95		0	Calculated	0
<b>Total</b>										

2006 IPCC Categories

- 3.A.2.f - Horses
- 3.A.2.g - Mules and Asses
- 3.A.2.h - Swine
- 3.A.2.i - Poultry
- 3.A.2.j - Other (please specify)
- Land
  - 3.B.1 - Forest land
    - 3.B.1.a - Forest land Remaining Forest land
    - 3.B.1.b - Land Converted to Forest land
      - 3.B.1.b.i - Cropland converted to Forest Land
      - 3.B.1.b.ii - Grassland converted to Forest Land
      - 3.B.1.b.iii - Wetlands converted to Forest Land
      - 3.B.1.b.iv - Settlements converted to Forest Land
      - 3.B.1.b.v - Other Land converted to Forest Land
  - 3.B.2 - Cropland
    - 3.B.2.a - Cropland Remaining Cropland
    - 3.B.2.b - Land Converted to Cropland
      - 3.B.2.b.i - Forest Land converted to Cropland
      - 3.B.2.b.ii - Grassland converted to Cropland
      - 3.B.2.b.iii - Wetlands converted to Cropland
      - 3.B.2.b.iv - Settlements converted to Cropland
      - 3.B.2.b.v - Other Land converted to Cropland
  - 3.B.3 - Grassland
    - 3.B.3.a - Grassland Remaining Grassland
    - 3.B.3.b - Land Converted to Grassland
      - 3.B.3.b.i - Forest Land converted to Grassland

Biomass increase (GAL 1/4) | Biomass loss (GAL 2/4) | Biomass loss (GAL 3/4) | Biomass loss (GAL 4/4) | Biomass change (SD) | Biomass change (Abrupt) | DOM (GAL 1/1) | DOM (SD 1/1) | SOM Mineral (Approach 2.3) | SOM <

Worksheet

**Sector:** Agriculture, Forestry and Other Land Use

**Category:** Forest Land

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

**Sheet:** Annual net C stock change in biomass - Stock difference method

1990

Data

**Region:** tre - Approach 3

Equation 2.8

Initial above-ground biomass (t d.m. / ha)	Merchantable growing stock volume at the end of the inventory period (t2) (m3 / ha)	Total final above-ground biomass (t d.m. / ha)	Ratio of below-ground biomass to above-ground biomass (R) (t bg d.m. / t ag d.m.)	Biomass carbon fraction (tonnes C / tonne d.m.)	Total initial biomass C stock (tonne C / ha)	Total final biomass C stock (tonne C / ha)	Time period between two inventories (Year)	Annual change in carbon stocks in biomass (tonnes C / yr)
AB(t1)=V(t1)*BCEFs or specified	National statistics or international data sources	AB(t2)=V(t2)*BCEFs or specified	Zero (0) or Table 4.4 / 4.5 WS / National statistics or international data sources	0.47 / Table 4.3 / 0.451 WS mangroves	CB(t1) = AB(t1) * (1+R) * CF	CB(t2) = AB(t2) * (1+R) * CF	T = t2 - t1	ΔCB = (CB(t2) - CB(t1)) / T * A
AB(t1)	V(t2)	AB(t2)	R	CF	CB(t1)	CB(t2)	T	ΔCB
0	Specified	60	0.37	0.47	0	38.634	5	23180.4
					0	38.634		23180.4

# Wetlands Supplement: Rewetted Peatlands

IPCC Inventory Software - valentina - [Worksheets]

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

2006 IPCC Categories

- 3 - Agriculture, Forestry, and Other Land Use
  - 3.A - Livestock
  - 3.B - Land
    - 3.B.1 - Forest land
    - 3.B.2 - Cropland
    - 3.B.3 - Grassland
    - 3.B.4 - Wetlands
      - 3.B.4.a - Wetlands Remaining Wetlands
        - 3.B.4.a.i - Peat Extraction remaining Peat Extraction
        - 3.B.4.a.ii - Flooded Land remaining Flooded Land
        - 3.B.4.a.iii - Other Wetlands Remaining Other Wetland
      - 3.B.4.b - Land Converted to Wetlands
        - 3.B.4.b.i - Land converted for Peat Extraction
        - 3.B.4.b.ii - Land converted to Flooded Land
        - 3.B.4.b.iii - Land converted to Other Wetlands
    - 3.B.5 - Settlements
    - 3.B.6 - Other Land
  - 3.C - Aggregate sources and non-CO2 emissions sources on la
    - 3.C.1 - Burning
      - 3.C.1.a - Burning in Forest Land
      - 3.C.1.b - Burning in Cropland
      - 3.C.1.c - Burning in Grassland
      - 3.C.1.d - Burning in All Other Lands
    - 3.C.2 - Liming
    - 3.C.3 - Urea application
    - 3.C.4 - Direct N2O Emissions from managed soils
    - 3.C.5 - Indirect N2O Emissions from managed soils
    - 3.C.6 - Indirect N2O Emissions from manure management
    - 3.C.8 - CH4 from Drained Organic Soils
    - 3.C.9 - CH4 from Drainage Ditches on Organic Soils
    - 3.C.10 - CH4 from Rewetting of Organic Soils
    - 3.C.11 - CH4 Emissions from Rewetting of Mangroves and T
    - 3.C.12 - N2O Emissions from Aquaculture
    - 3.C.13 - CH4 Emissions from Rewetted and Created Wetlan
    - 3.C.14 - Other (please specify)

2006 IPCC Guidelines

Biomass change (GAL) Biomass change (SD) DOM (GAL 1/1) DOM (SD 1/1) SOM Mineral (Approach 2.3) SOM Mineral (SD) SOM Organic Rewetted

Worksheet

Sector: Agriculture, Forestry and Other Land Use

Category: Wetlands

Subcategory: 3.B.4.b.iii - Land converted to Other Wetlands

Sheet: Annual net C stock change in soil organic matter of rewetted organic soils

Data

Region: Region 2 - Approach 2

Land use category	Equation 3.3, 3.4, 3.5, 4.9 WS										
	Area (ha)	CO2 on-site emission factor for climate type and nutrient status of peat and drainage class in rewetted soils	Net flux of DOC from natural (undrained) and rewetted organic soil (tonnes C / ha / yr)	Conversion factor for proportion of DOC converted to CO2 following export from site	CO2 off-site emission factor for climate type and nutrient status of peat and drainage class in rewetted soils (tonnes CO2-C / ha / yr)	CO2 emissions from peat fire in rewetted land (tonnes CO2-C / ha / yr)	Annual carbon loss from rewetted organic soils (tonnes C / yr)				
Land unit code	Initial land use	Land use during reporting year	National statistics or international data sources	Table 3.1 WS / 4.12 WS or national statistics	Table 3.2 WS or national statistics	Table 3.2 WS or national statistics	Table 3.2 WS / Eq. 3.6 or national statistics	From 3.C.1	CO2-C(r) = A(r) * (EF(os) + EF(DOC)) + L(fr)		
			A(r)	EF(os)	DOC(flux)	Frac(DOC)	EF(DOC)	L(fr)	CO2-C(r)		
MWL-PA-P-68<-	Managed W...	Peat extraction	Managed Wetlands	abando...	100	-0.23	0.26	0.9	Calculated	0.234	0.4
Total					100					0.4	

Land Use Manager Land Representation Manager Uncertainties Time Series data entry...

Worksheet remarks

3.B.4.b.iii - Time Series

CARRON DIOXIDE (CO2) Emissions (In CO2 Equivalents)

\* Base year for assessment of uncertainty in trend: 1990

Gas CARBON DIOXIDE (CO2)

Country/Territory: Japan Inventory Year: 2009 Base year for assessment of uncertainty in trend: 1990 CO2 Equivalents: SAR GWPs (100 year time horizon) Database file:

Save

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INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE WMO UNEP

Wetlands Supplement

# Thank you

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