IPCC Inventory Software

Agriculture, Forestry and Other Land Use Sector

The 18th Workshop on Greenhouse Gas Inventories in Asia (WGIA18)

13 July 2021

IPCC TFI TSU

ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

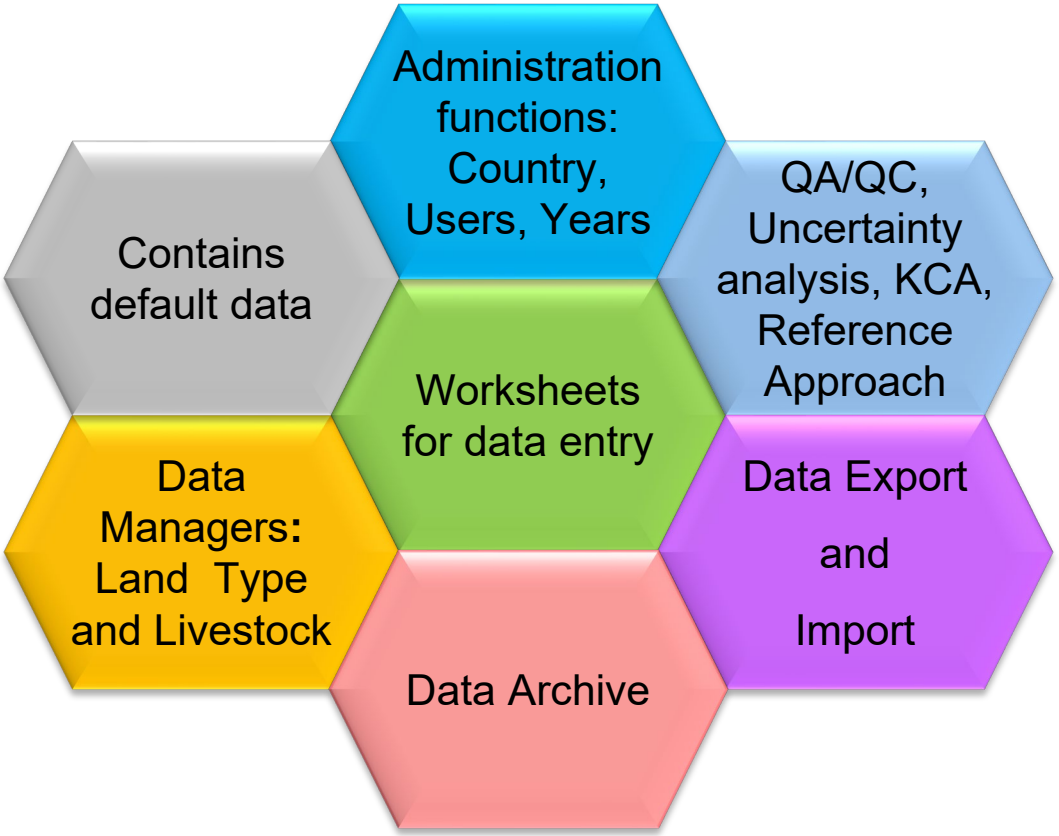
Introduction

- 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

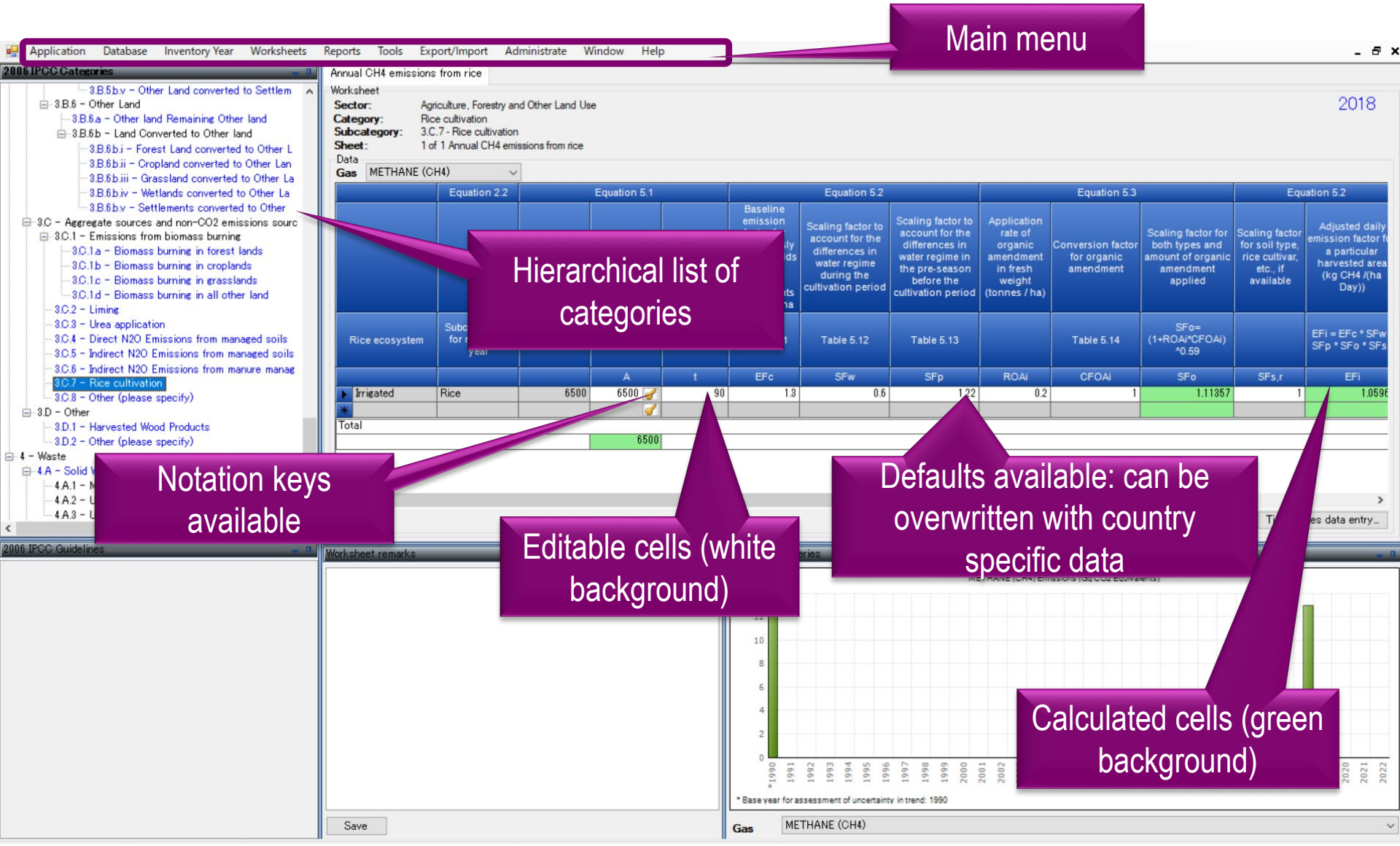
IPCC Inventory Software

- 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

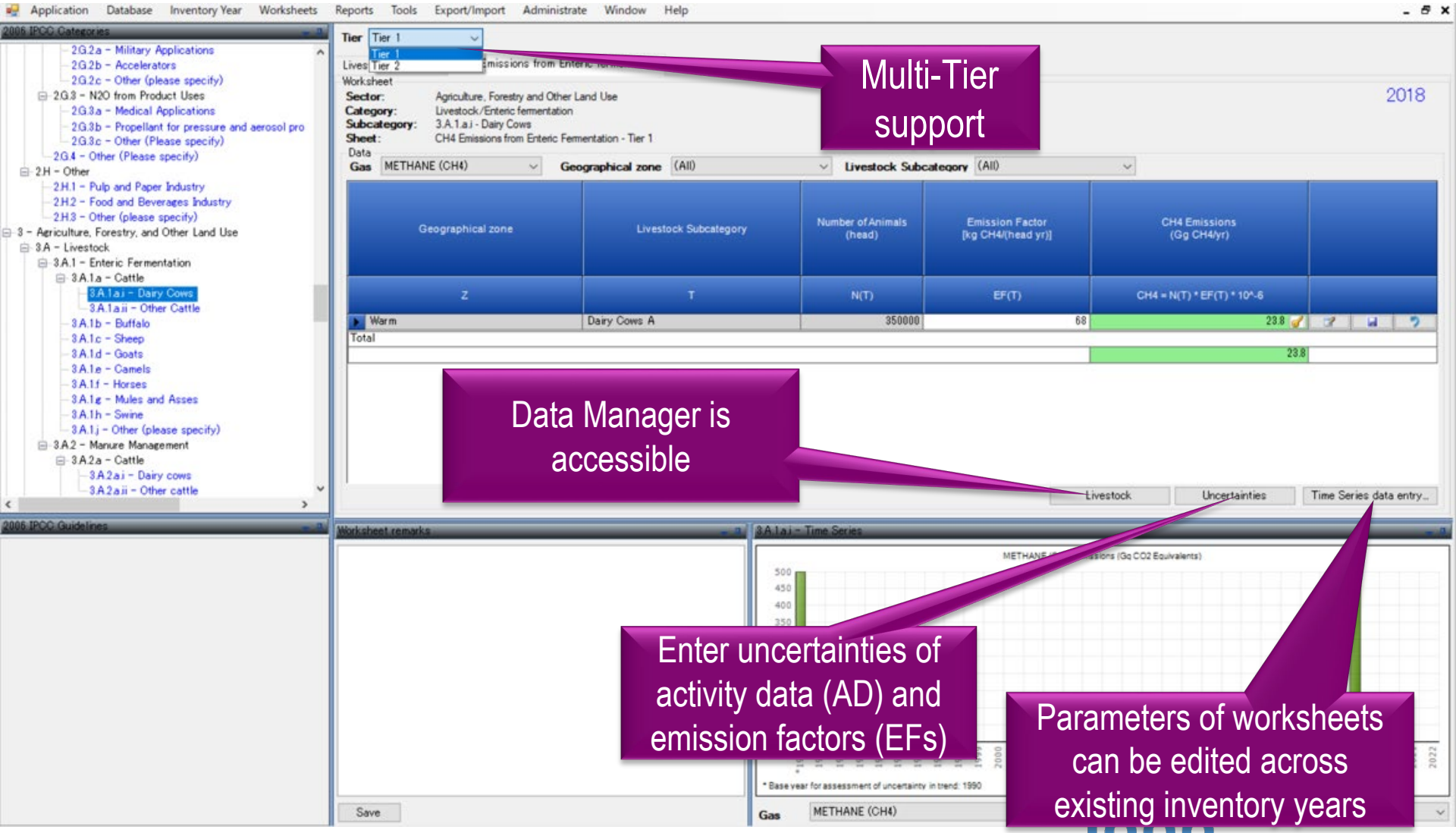
Software Functions



Worksheets


Main menu
Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help
2006 IPCC Categories
3.B.5.b.v - Other Land converted to Settlem
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 L
3.B.6.b.ii - Cropland converted to Other Lan
3.B.6.b.iii - Grassland converted to Other La
3.B.6.b.iv - Wetlands converted to Other La
3.B.6.b.v - Settlements converted to Other
3.C - Aggregate sources and non-CO2 emissions sourc
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 manag
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 W
4.A.1 - M
4.A.2 - L
4.A.3 - L
Hierarchical list of categories
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
2018
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
Table 5.12
Table 5.13
Table 5.14
SFo= (1+ROAi*CFOAi) ^0.59
EFi = EFc * SFw SFp * SFo * SFs
A
t
EFc
SFw
SFp
ROAi
CFOAi
SFo
SFs,r
EFi
Irrigated
Rice
6500
6500
90
1.3
0.6
1.22
0.2
1
1.11357
1
1.0596
Total
6500
Notation keys available
Editable cells (white background)
Defaults available: can be overwritten with country specific data
Calculated cells (green background)
2006 IPCC Guidelines
Worksheet remarks
Save
* Base year for assessment of uncertainty in trend: 1990
Gas METHANE (CH4)

Worksheets


Application
Database
Inventory Year
Worksheets
Reports
Tools
Export/Import
Administrate
Window
Help
2006 IPCC Categories
2G.2a - Military Applications
2G.2b - Accelerators
2G.2c - Other (please specify)
2G.3 - N2O from Product Uses
2G.3a - Medical Applications
2G.3b - Propellant for pressure and aerosol pro
2G.3c - Other (Please specify)
2G.4 - Other (Please specify)
2.H - Other
2H.1 - Pulp and Paper Industry
2H.2 - Food and Beverages Industry
2H.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
Tier
Tier 1
Tier 1
Tier 2
Worksheet
Sector: Agriculture, Forestry and Other Land Use
Category: Livestock/Enteric fermentation
Subcategory: 3.A.1.a.i - Dairy Cows
Sheet: CH4 Emissions from Enteric Fermentation - Tier 1
2018
Data
Gas METHANE (CH4)
Geographical zone (All)
Livestock Subcategory (All)
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
Livestock
Uncertainties
Time Series data entry...
2006 IPCC Guidelines
Worksheet remarks
Save
3.A.1.a.i - Time Series
Gas
METHANE (CH4)
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

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

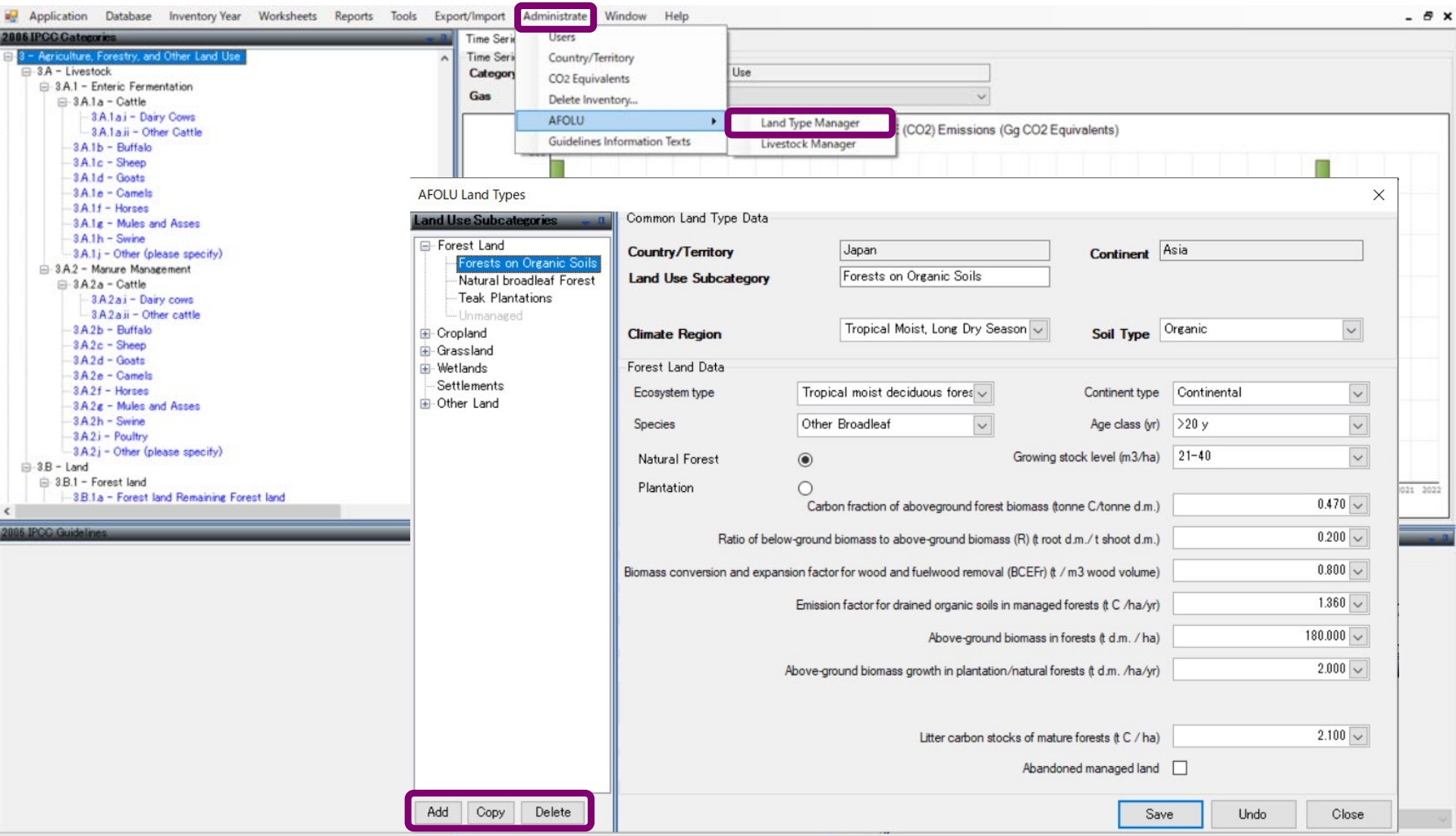
Main Menu

→ *Administrate*

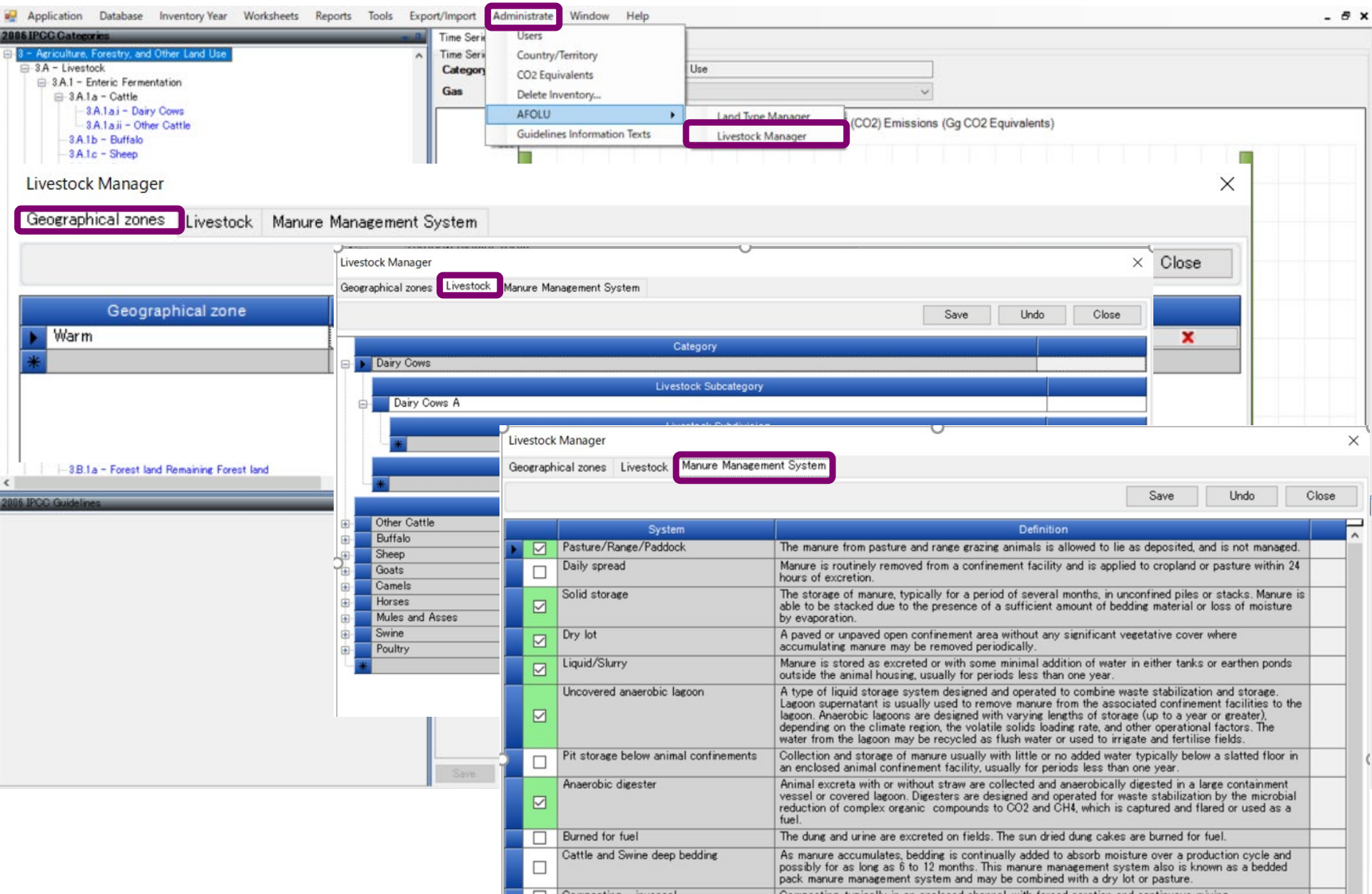
→ *AFOLU*

→ *Land Type Manager or Livestock Manager*

Land Type Manager

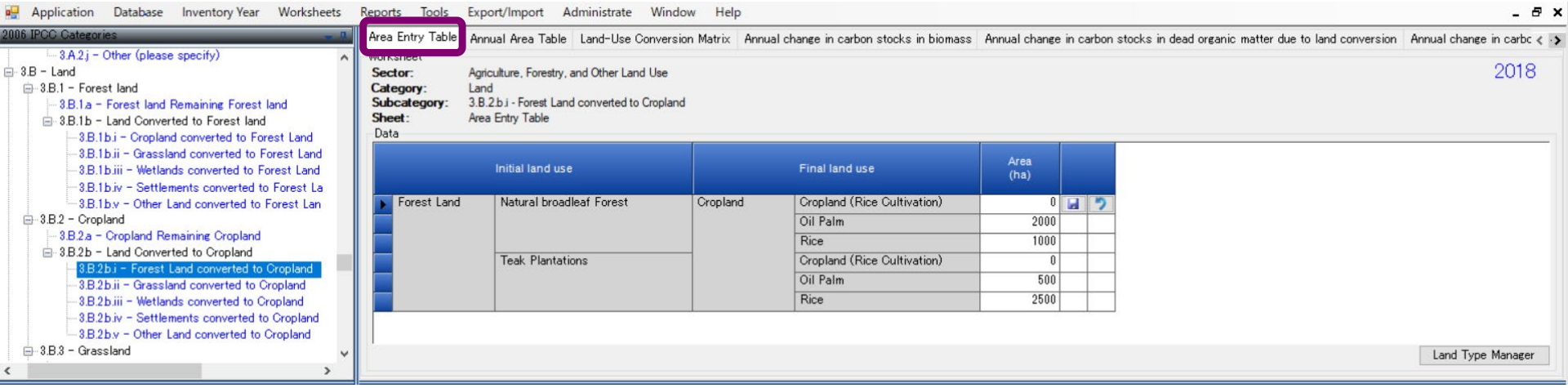


Livestock Manager



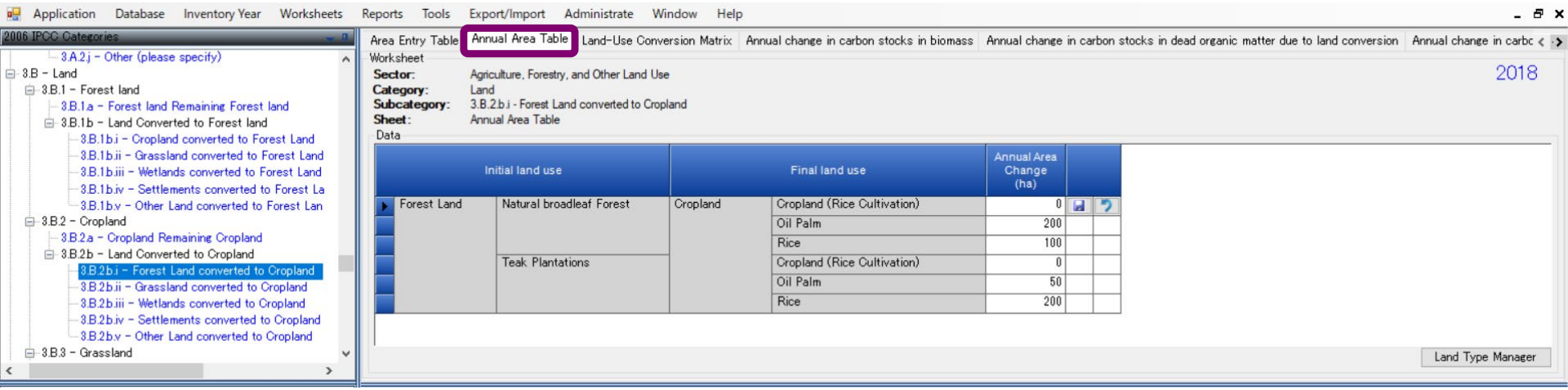
AFOLU Area Entry Table

- 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.



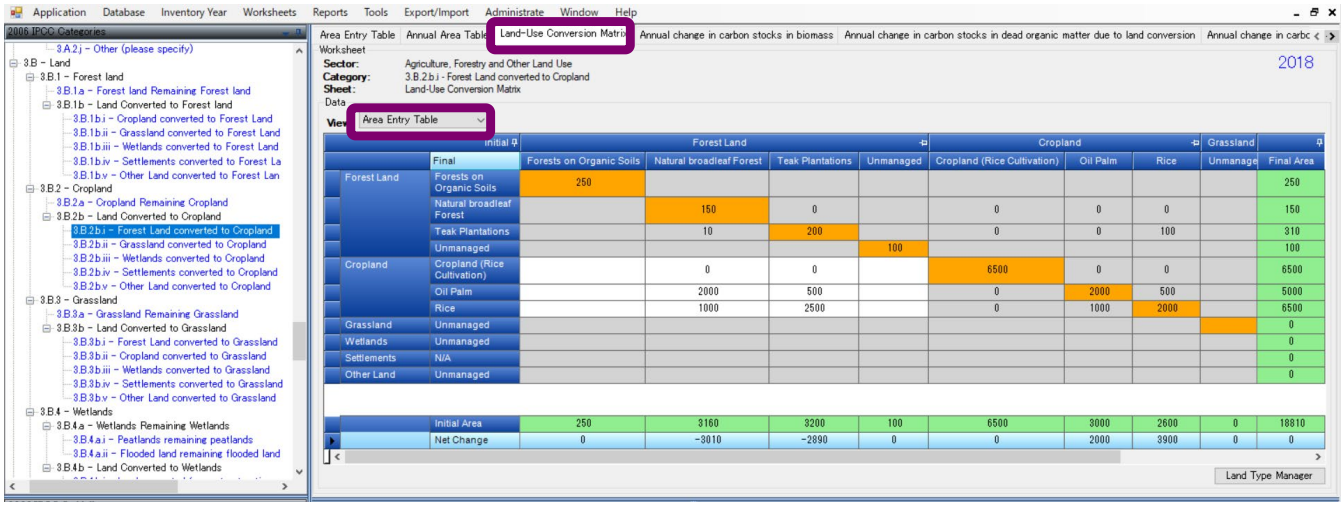
AFOLU Annual Area Table

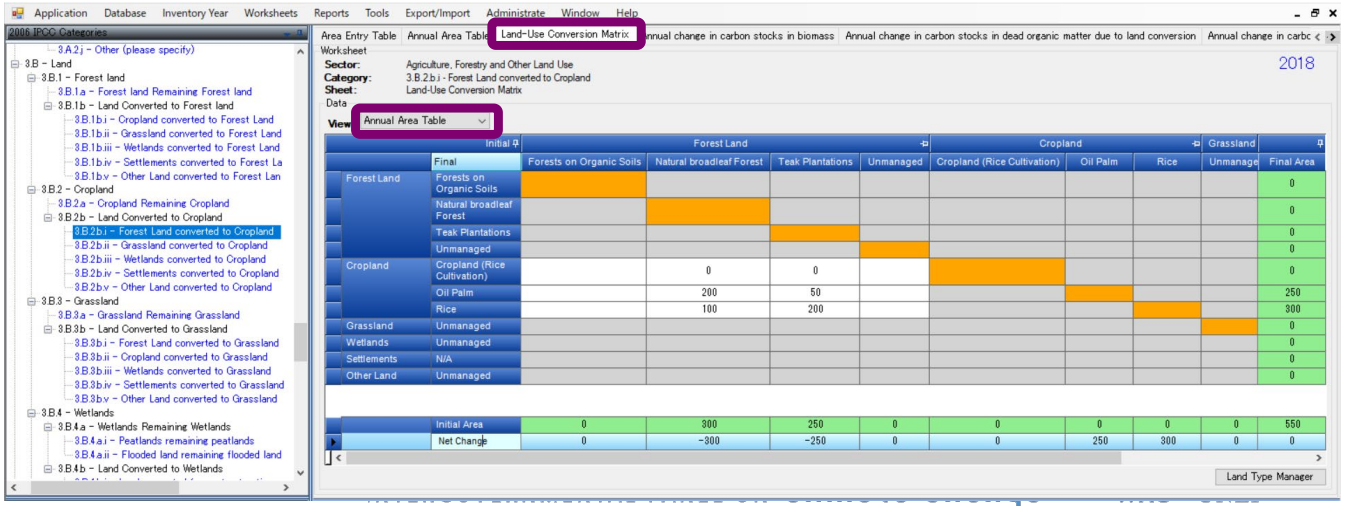
- This worksheet is available in 3.B Land categories which contain worksheets based on “annual area change”. It is used for defining annual land area changes between land use subcategories defined in Land Type Manager.
- This data can then be used by the software to complete the Land Use Matrix and fill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



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.





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*

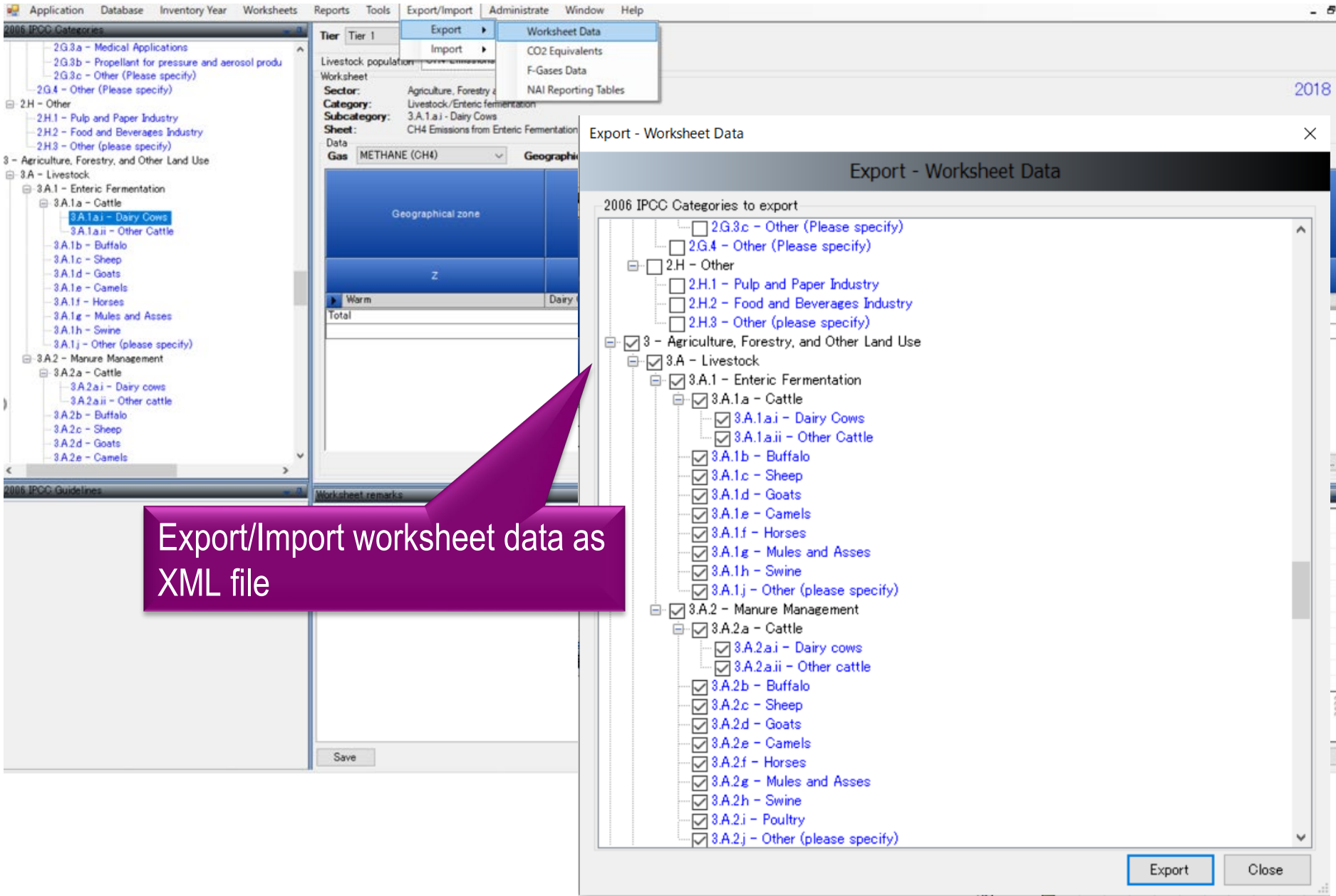
→ *Uncertainty Analysis or Key Category Analysis*

- 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



Support to Users

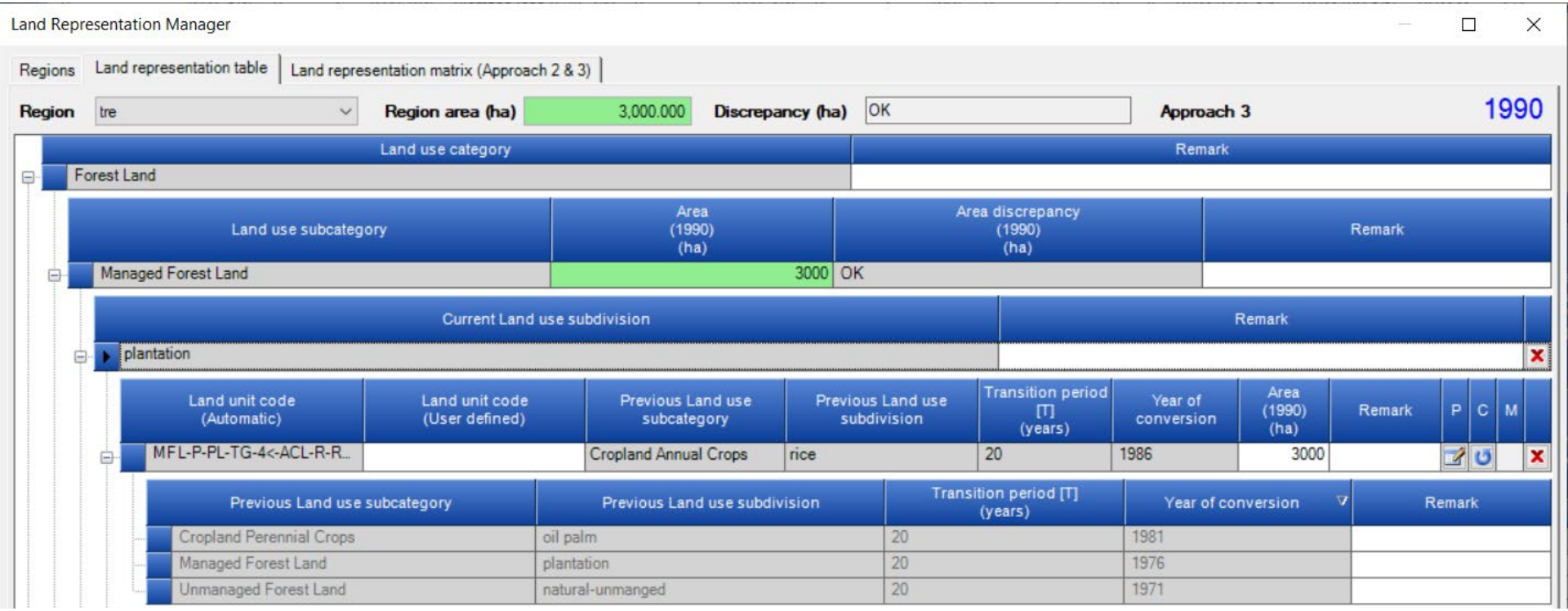
- Organizing expert meetings annually
- Help Desk ipcc-software@iges.or.jp
- Non-English User Manual is available in addition to the official English version:
  - French version (provided by Government of Belgium)
  - Arabic version (provided by Sidati Ould Dah Ould EIDA, CCPNCC, Mauritania)
- Frequently Asked Questions

  https://www.ipcc-nggip.iges.or.jp/software/index.html
- Collaboration with other organizations (e.g., UNFCCC regional workshops)

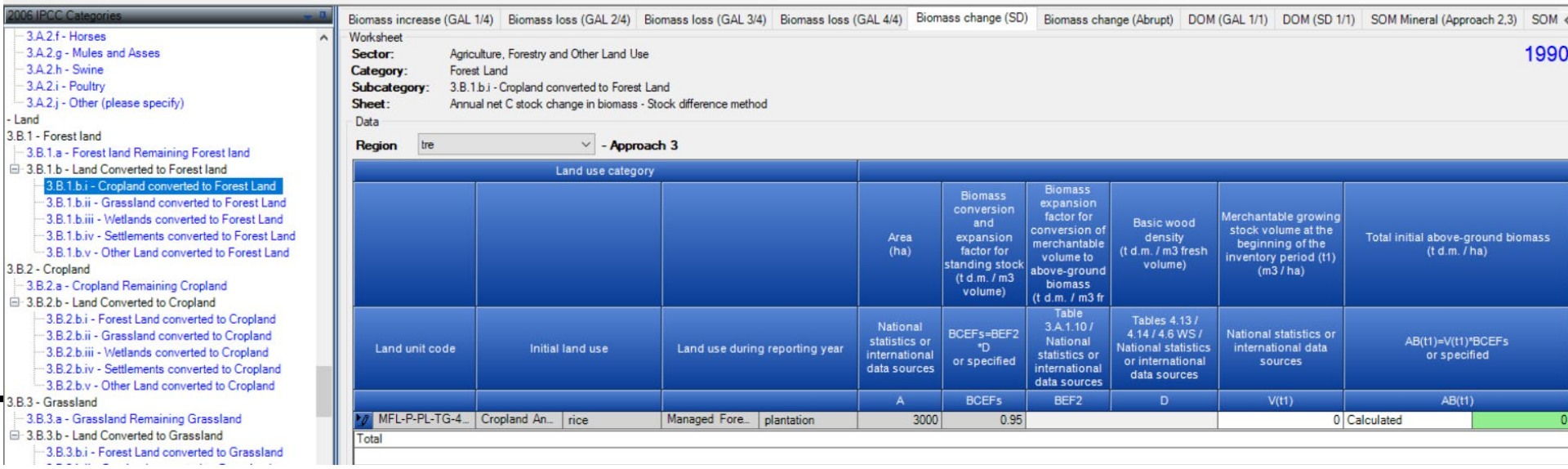
Inventory Software: Updates

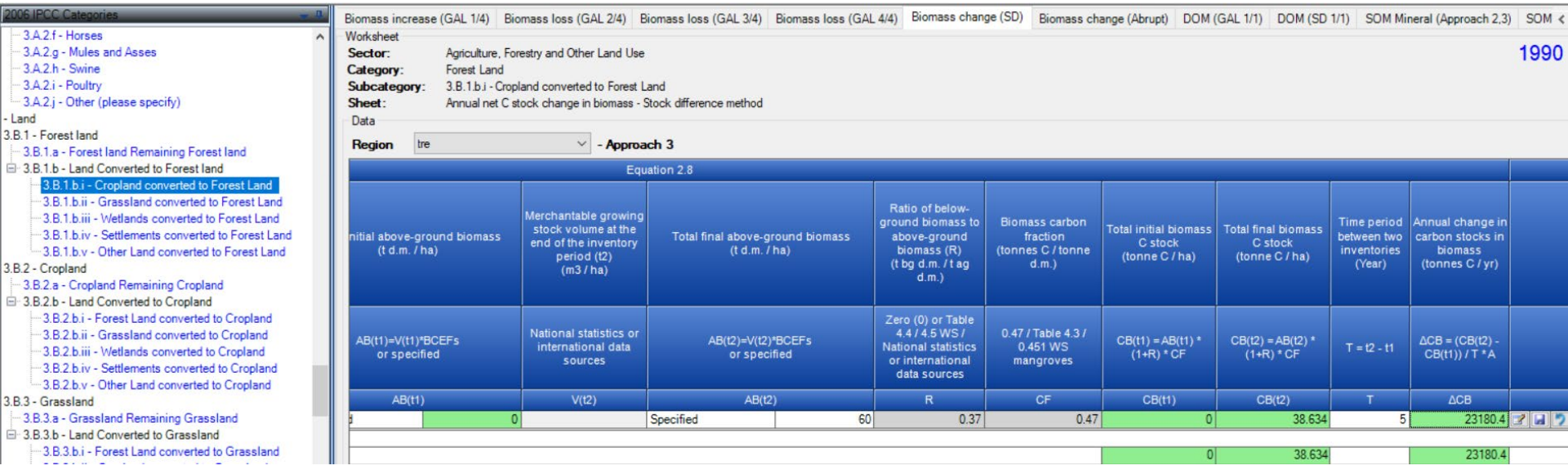
- Several ongoing and planned updates (some are under testing)
- General
  - Subnational disaggregation
  - Approaches 1 and 2 for Uncertainty Analysis and Key Category Analysis (level and trend)
  - Time series export/import
  - Translations
- AFOLU
  - Land representation (national/sub-national)
    - 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

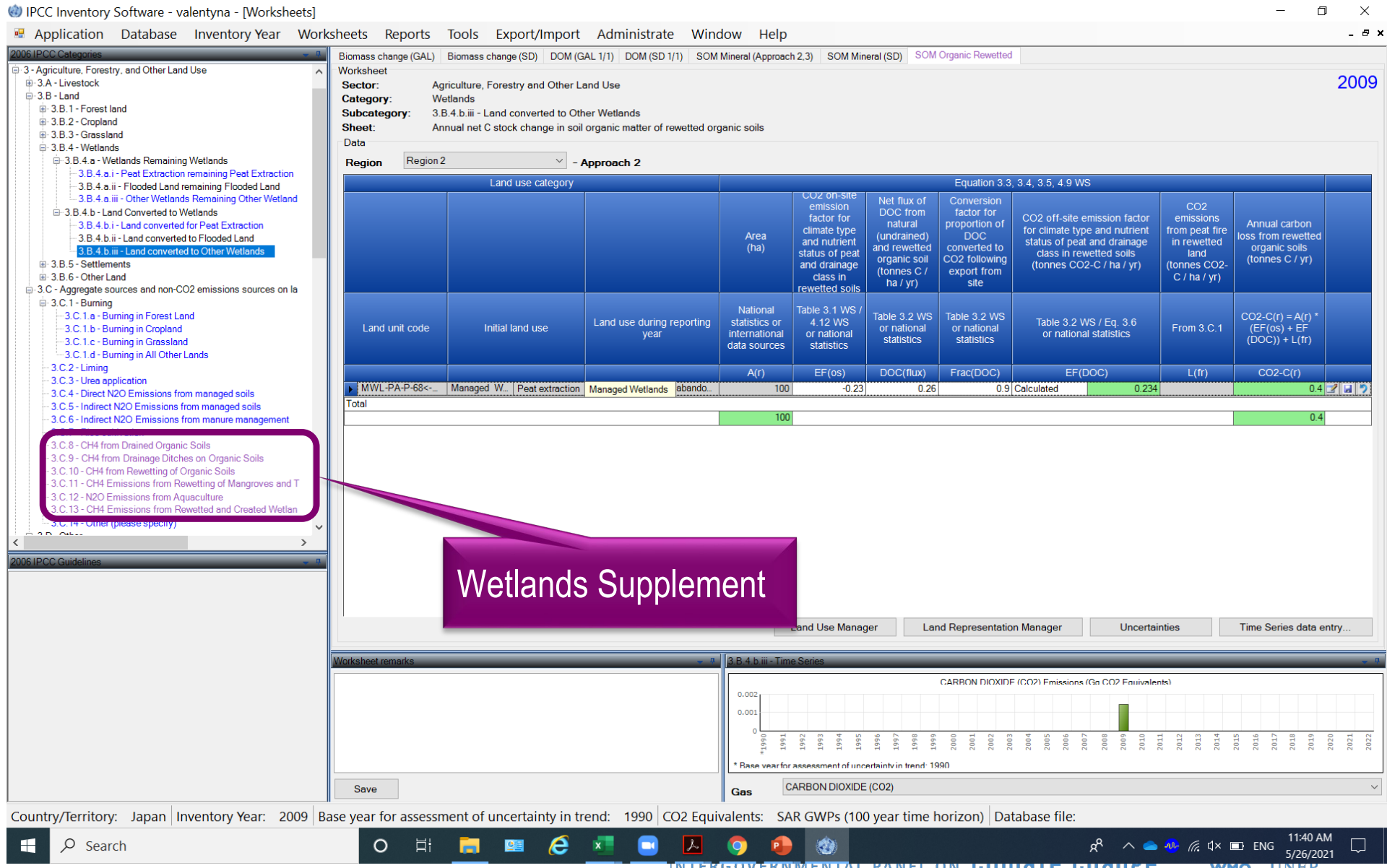


Stock Difference: Forest Land





Wetlands Supplement: Rewetted Peatlands



Thank you

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

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