



Overview of the IPCC Inventory Software for National Greenhouse Gas Inventories and its interoperability with UNFCCC CRT

UNFCCC Side Event, UNFCCC COP28

IPCC TFI TSU

ipcc

INTERGOVERNMENTAL PANEL ON climate change



IPCC Inventory Software

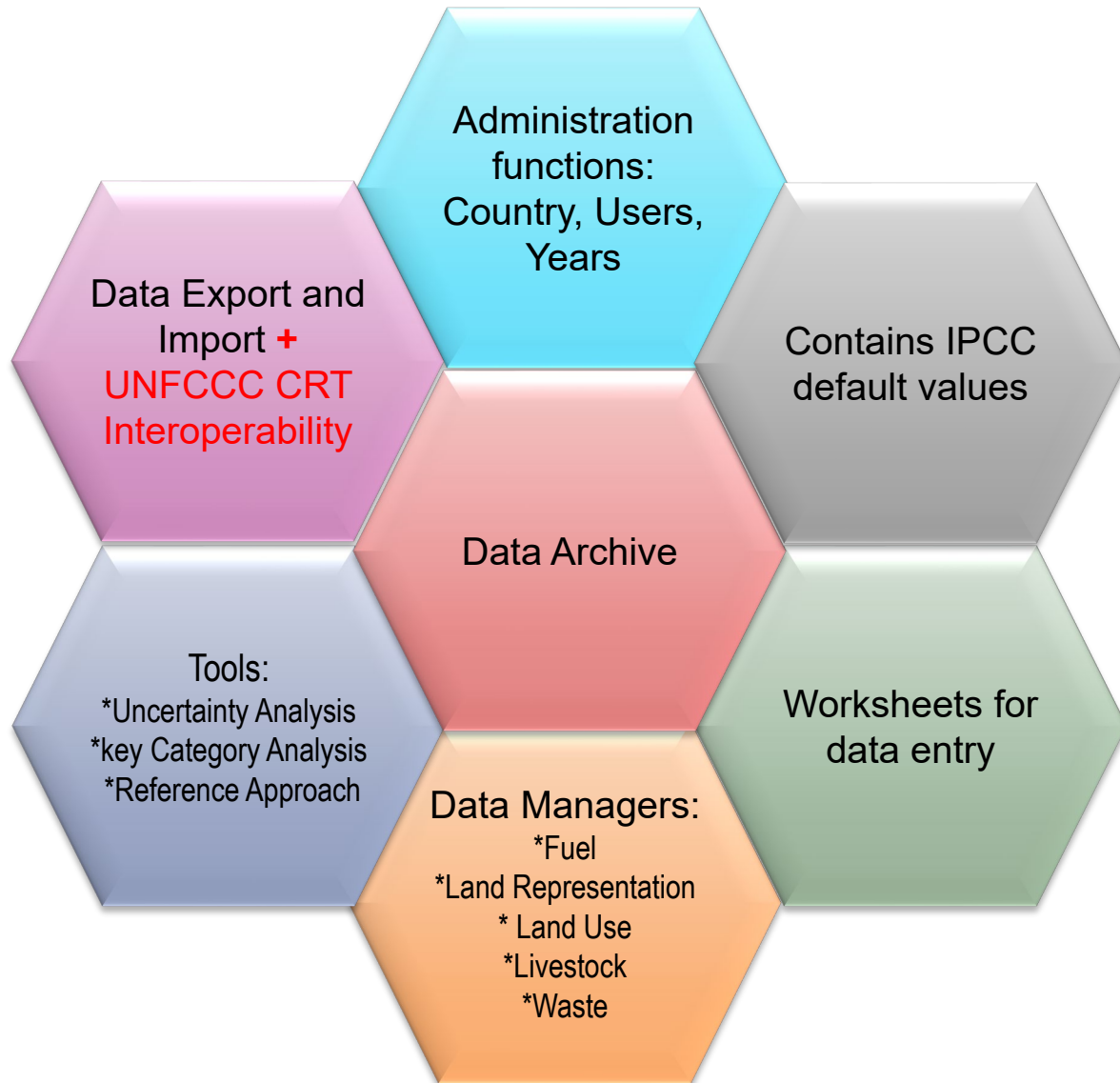
- IPCC Inventory Software was first released in 2012. Initially, it was designed to be a simple tool implementing only Tier 1 methods according to the *2006 IPCC Guidelines*
- Latest version, 2.89, has been released on November 28, 2023, for UNFCCC COP28
- Version 2.89 implements the following:
 - all Methodological Tiers & Approaches according to the *2006 IPCC Guidelines*, and its
 - ✓ *Wetlands Supplement* (in lilac colour)
 - ✓ in addition, some elements of the *2019 Refinement* (in magenta colour) to facilitate Interoperability with the UNFCCC CRT Reporting tool
 - Calculation of Indirect CO₂ and N₂O emissions according to the *2006 IPCC Guidelines and its 2019 Refinement*
 - Interoperability functionality with the UNFCCC CRT Reporting tool (Energy Sector, Waste sector, Agriculture categories)

Version 2.89

○ More features

- allows **subnational level of reporting** (*e.g., tracking specific activities or regions*)
- allows for each source/sink to use either a **single methodological Tier or a mix of Tiers**
- allows, in each equation, to **input user-specific values for EFs and parameters**
- allows different categories/sectors to be developed simultaneously
- implements **AR5 GWP₁₀₀** values (*and allows any other user-specific metric to be applied*)
- stores the entire set of information of NGHGI within a single database

Architecture



- MSAccess (ACE OLEDB 12) for WindowsOS
- ACCDB file, *backup function*
- Microsoft .NET Framework 4.6.2
- Password protected
NEVER FORGET PASSWORD!

Categories

Worksheets

Sub-divisions

Default or User-defined process/technology

Default or User-defined EF & parameters

Inventory Software - Pavel - [Worksheets]

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

2006 IPCC Categories

- 2.A.3 - Glass Production
- 2.A.4 - Other Process Uses of Carbonates
 - 2.A.4.a - Ceramics
 - 2.A.4.b - Other Uses of Soda Ash
 - 2.A.4.c - Non Metallurgical Magnesia Pro
 - 2.A.4.d - Other (please specify)
- 2.A.5 - Other (please specify)
- 2.B - Chemical Industry
 - 2.B.1 - Ammonia Production
 - 2.B.2 - Nitric Acid Production
 - 2.B.3 - Adipic Acid Production
 - 2.B.4 - Caprolactam, Glyoxal and Glyoxylic A
 - 2.B.5 - Carbide Production
 - 2.B.6 - Titanium Dioxide Production
 - 2.B.7 - Soda Ash Production
 - 2.B.8 - Petrochemical and Carbon Black Pro
 - 2.B.8.a - Methanol
 - 2.B.8.b - Ethylene
 - 2.B.8.c - Ethylene Dichloride and Vinyl C
 - 2.B.8.d - Ethylene Oxide
 - 2.B.8.e - Acrylonitrile
 - 2.B.8.f - Carbon Black
 - 2.B.9 - Fluorochemical Production
 - 2.B.9.a - By-product emissions
 - 2.B.9.b - Fugitive Emissions
 - 2.B.10 - Other (Please specify)
- 2.C - Metal Industry
 - 2.C.1 - Iron and Steel Production
 - 2.C.2 - Ferroalloys Production
 - 2.C.3 - Aluminium production
 - 2.C.4 - Magnesium production
 - 2.C.5 - Lead Production
 - 2.C.6 - Zinc Production
 - 2.C.7 - Other (please specify)
- 2.D - Non-Energy Products from Fuels and Solv
 - 2.D.1 - Lubricant Use
 - 2.D.2 - Paraffin Wax Use
 - 2.D.3 - Solvent Use

Nitric Acid Production - Tier 1 | Nitric Acid Production - Tier 2 | Capture and storage or other reduction

Worksheet: Nitric Acid Production - Tier 2

Sector: Industrial Processes and Product Use

Category: Chemical Industry

Subcategory: 2.B.2 - Nitric Acid Production

Sheet: N2O Emissions from Nitric Acid Production - Tier 2

Data

Equation 3.6

Subdivision	Production process / technology	Nitric acid production from technology i (tonnes)	N2O emission factor for technology type i (g N2O/tonne nitric acid produced)	Destruction factor for abatement technology type j (Fraction)	Abatement system utilisation factor for abatement technology type j (Fraction)	N2O Emissions (kg)	N2O Emissions (Gg)
	Ij	NAPi	EFi	DFj	ASUFj	E=NAPi*EFi*(1-DFj)*ASUFj	E/1000000
Facility #2	Medium pressure combustion plants	1,250	7	0.99	0.9	953.75	0.00095
Kanagawa	High pressure plants	10,000	9	0.5	1	45,000	0.045
	Plants with NSCRa (all processes)	1,000	2	0.5	1	1,000	0.001
Tokyo	Combined technology	5,000	2	0.5	1	5,000	0.005
	Plants with NSCRa (all processes)	1,000	2	0.6	1	800	0.0008
Total		18,250				52,753.75	0.05275

Activity Data

2006 IPCC Guidelines

Worksheet notes

User notes

2.B.2 - Time Series

NITROUS OXIDE (N2O) Emissions (Gg CO2 Equivalents)

Country/Territory: Country X | Inventory Year: 1990 | Base year for assessment of uncertainty in trend: 1990 | CO2 Equivalents: AR4 GWPs (100 year time horizon) | Database file: (C:\Users\shermanau\Desktop\pavel\SOFT\IPPU SPEC\7 TESTING 282\Database_backup_282_IPPU_September.accd)

Example of a worksheet

Reporting

Main Menu

→ Report

IPCC Report	Level	Contents
Short summary (IPCC)	1.A	Emissions/Removals
Summary (IPCC)	1.A.1	Emissions/Removals
Sectoral (IPCC)	1.A.1.a.ii (most disaggregated level)	Emissions/Removals
Background (IPCC)	1.A.1.a.ii (most disaggregated level)	AD, Emissions/Removals

Main Menu

→ Export

UNFCCC Report	Level	Contents
NAI 1 & 2 (UNFCCC 17/CP.8)	1.A.1	Emissions/Removals

Note: All reports can be exported as MS Excel file

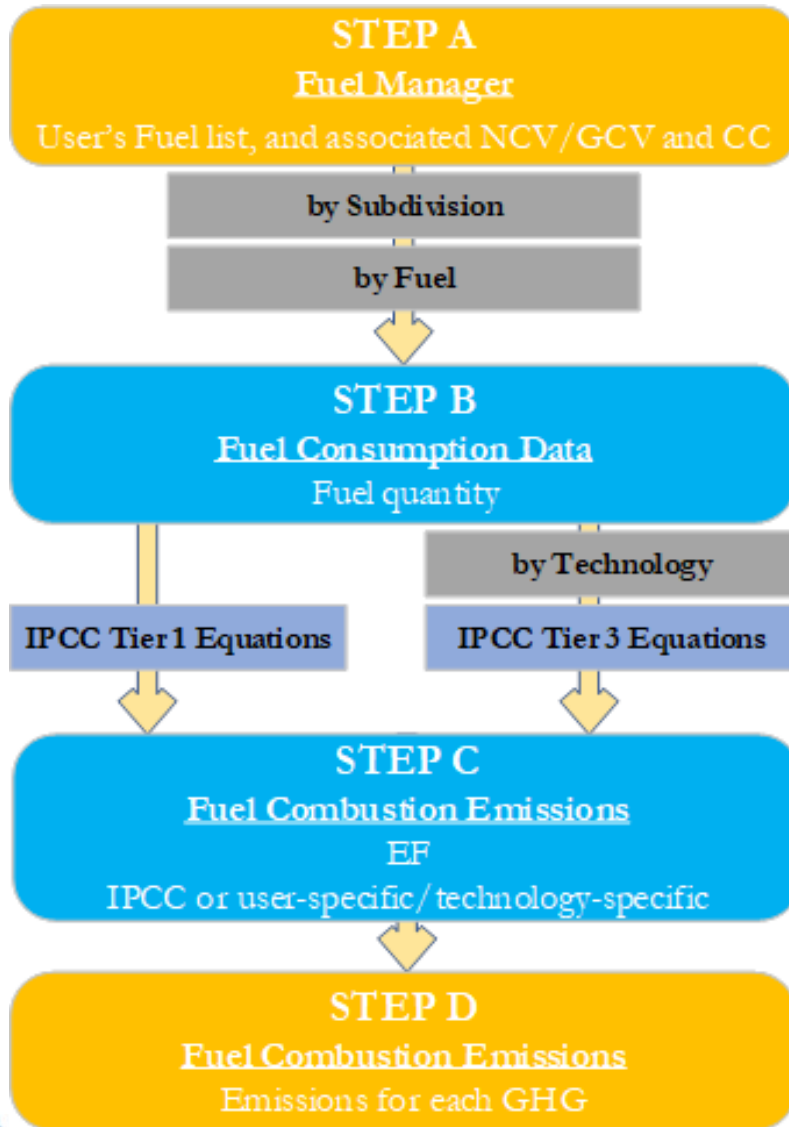
Ongoing work

- **Paris Agreement requirements**
 - Interoperability with UNFCCC reporting tool for Common Reporting Tables (*Decision 5/CMA.3*), land categories and IPPU sector
- **Other**
 - Notation Keys
 - Time series export/import
 - Uncertainty Analysis
 - Guidebooks

Guidebook - Scope

- Guide to estimate anthropogenic GHG emissions and removals from each inventory category by implementing all methodological Tiers & Approaches according to the 2006 IPCC Guidelines and its *Wetlands Supplement* with elements of the *2019 Refinement*.
- Software users **SHALL** be familiar with the IPCC methodologies and read the *Software Manual* (downloadable from the “Help” menu) before going through the Guidebook.
- ✓ ***The Guidebook does not replace guidance provided in the IPCC Methodology Reports***

Guidebook - Structure



- Category by category, the Guidebook shows the workflow of data input and calculation in each worksheet when implementing any of the available IPCC methodological Tiers and Approaches to estimate anthropogenic GHG emissions/removals
- Guidebook Appendices describe the use of multi-category components (e.g., Fuel manager)

Land Representation

○ 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 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 homogeneous for variables of interest, including current and historical classification–* [Area data to estimate C stock changes and other GHG emissions]

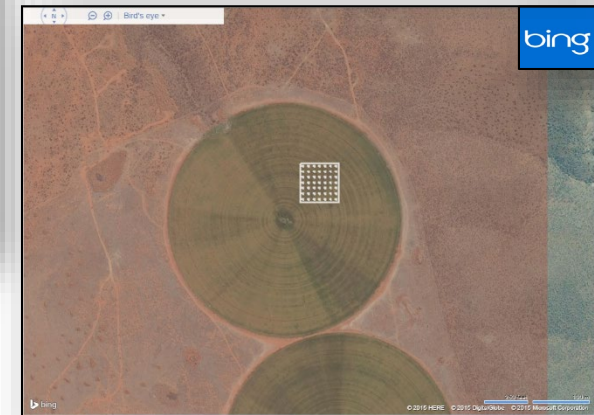
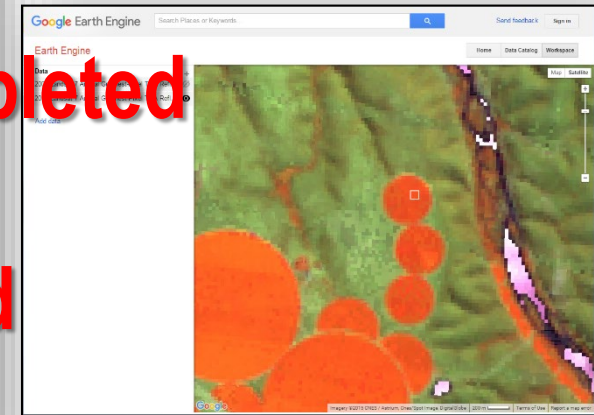
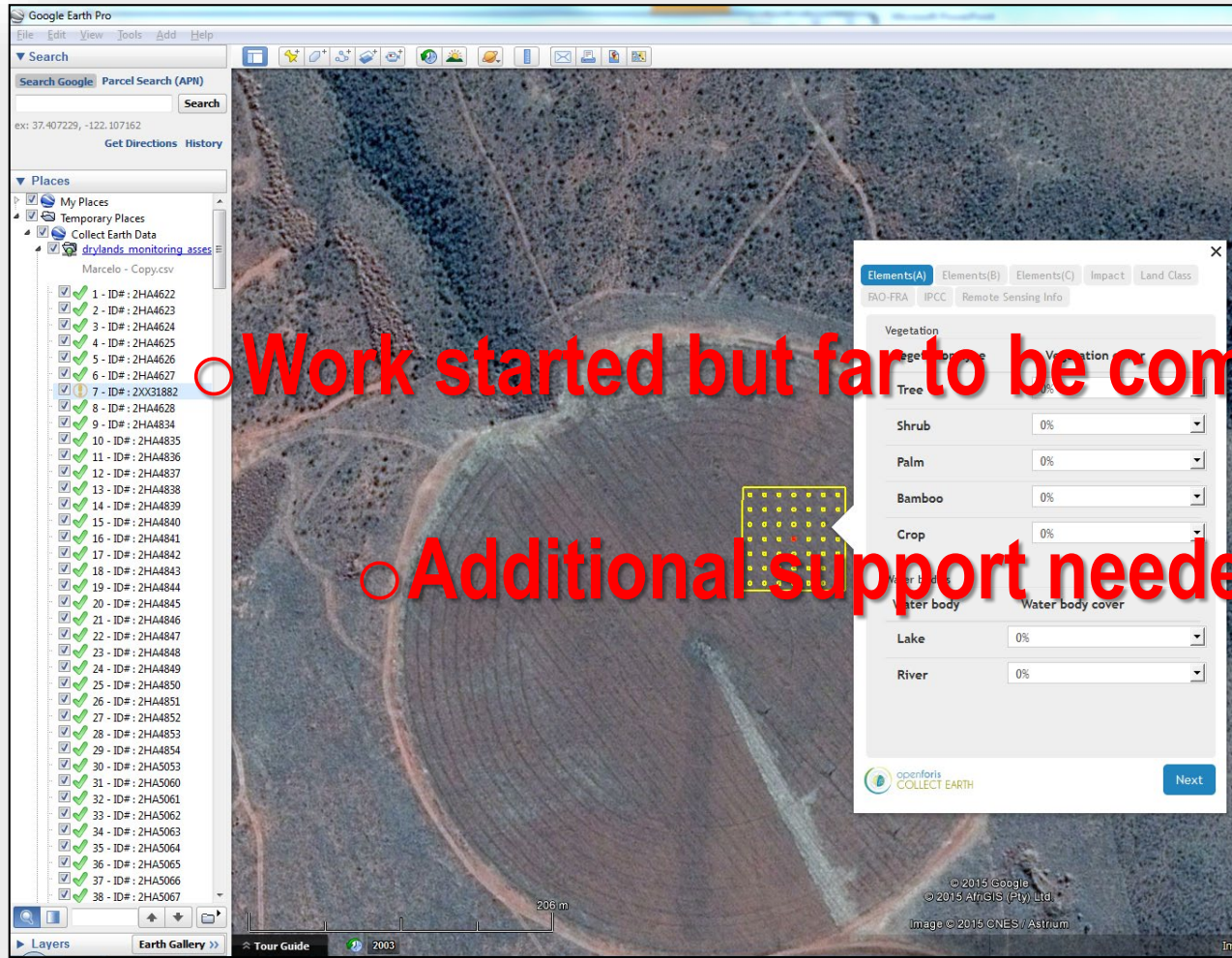
○ It is the most data intensive and thus labour requiring dataset in an NGHGI

Land Representation Tool

Thus, working on an add-on will provide the following functions:

- I. Customization of mask for data collection;
- II. Collection of sampling data on land cover/use through multi-spectral and multi-temporal analysis of remotely sensed images;
- III. Analysing data collected by producing annual matrices of land use and land-use change (Approach 2) or a dataset of units of land (Approach 3);
- IV. Assessing bias and correcting for it, then calculating standard error of adjusted area data;
- V. Gap-filling the time series of adjusted annual matrices to ensure a complete land representation;
- VI. For each year of the time series, producing the land representation, as activity data for each and every land category, with associated uncertainties;
- VII. Exporting the land representation in a file readily uploadable in the IPCC Inventory software.

Land Representation Tool



<https://openforis.org/tools/collect-earth/>

<http://www.mdpi.com/2072-4292/8/10/807>

Download

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

Task Force on National Greenhouse Gas Inventories

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WMO UNEP

IPCC web sites

Inventory Software

New Version 2.890 – IPCC Inventory Software

This is the new version 2.890 of the IPCC Inventory Software released on November 27, 2023.

Please note that version 2.890 comes in 2 different files for installation. Thus, before downloading the file you shall check which one you actually need by using [this decision tree](#).

- Ver. 2.890 IPCC Inventory Software - 64bit
- Ver. 2.890 IPCC Inventory Software - 32bit

If you find any issues in the use of the IPCC Inventory Software, come back to us at ipcc-software@iges.or.jp.

Thank you very much for your support.

Important!

When setting YOUR Password always set YOUR Password Hint too.
It is highly recommended that you take note of your password and store it in a safe place. In case you lose or forget your password, the IPCC Inventory Software does not have a mechanism to restore your password, this means that you can no longer access your database.

Please note that the IPCC Inventory Software cannot be used with iOS (Apple Computers).

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- Version 2.89 of the IPCC Inventory Software comes with two alternative installation packages: 32 bit vs. 64bit.
- Please support by using it and reporting any findings to: ipcc-software@iges.or.jp

Support

- IPCC TFI TSU is supporting the IPCC Inventory Software:
 - User Manual
 - Help Desk: ipcc-software@iges.or.jp
 - Pool of voluntary testers, *to support software development and use*
 - Cooperation with the UNFCCC at training workshops on the use of the IPCC Inventory Software
 - Annual IPCC meetings on feedback from software users, *including issues where support is needed, or software improvements are envisaged*



Thank you

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

ipcc-software@iges.or.jp

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