



Overview of Activities on 2006 Guidelines

I&NDC Network 2021 Introductions and Research Collaboration Meeting
2-3 June 2021, Virtual

IPCC TFI TSU

Outline



IPCC Inventory Software development



IPCC Emission Factor Database (EFDB) population

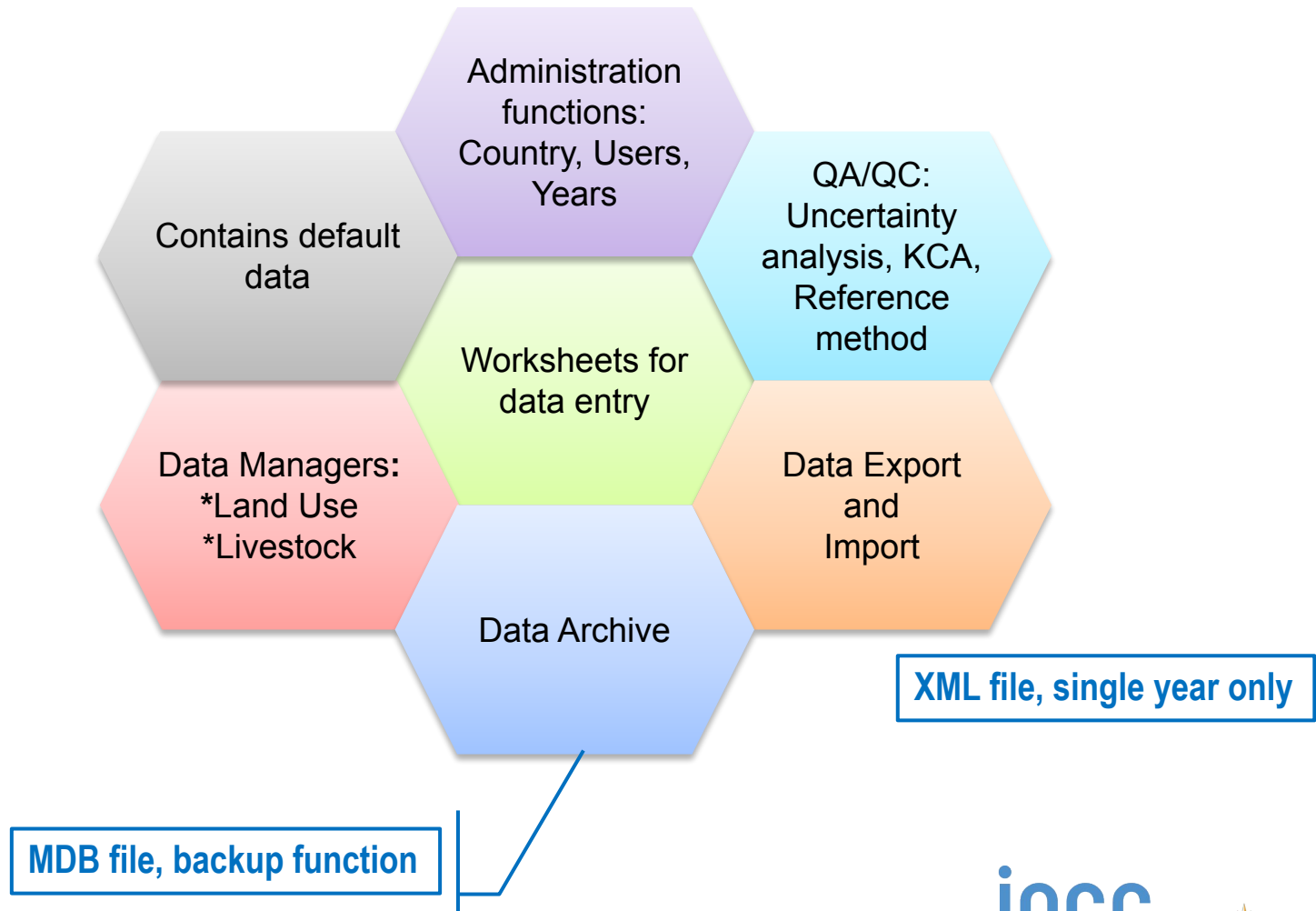


IPCC 2019 Refinement

IPCC Inventory Software - Background

- produced, since 2012, by the IPCC Task Force on National Greenhouse Gas Inventories (IPCC TFI) to assist inventory compilers in using the 2006 IPCC Guidelines
- based on MS-Access for WindowsOS
Windows Emulator needed for any other operating system (e.g. MacOS, AndroidOS)
- FREE to use
(download at <https://www.ipcc-nggip.iges.or.jp/software/index.html>)
- Free Support to users provided by IPCC TFI TSU
- Plan for updating to full methods/tiers/approaches within the 2006 IPCC Guidelines funded

IPCC Inventory Software - Functions



IPCC Inventory Software - Updates

General:

- Subnational disaggregation
- Approaches 1 and 2 for UA and KCA (level and trend)
- Time series export/import
- Translations

AFOLU:

- Land representation (national/sub-national):
 - ❖ All approaches (1, 2, 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 Supplements methods and defaults
- User-defined soil and climate/vegetation zoning

ipcc

INTERGOVERNMENTAL PANEL ON climate change



Land Representation – Approach 3

IPCC Inventory Software - valentyina - [Worksheets]

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

Land Representation Manager

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

Region Region 3 Region area (12,000,000) Discrepancy (h) +500 Approach 3 2009

Land use category		Remark								
Forest Land										
Land use subcategory	Area (2009) (ha)	Area discrepancy (2009) (ha)	Remark							
Managed Forest Land	7000	OK								
Current Land use subdivision		Remark								
Planted Mineral Cool										
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 (2009) (ha)	Remark	P	C	M
MFL-PMC-PL-P-47	unit 2	Managed Forest Land	Planted Mineral Cool	NA	NA	1000				
MFL-PMC-PL-P-54	unit 8	Managed Forest Land	Planted Mineral Cool	NA	NA	1000				
MFL-PMC-PL-P-58<MFL...	unit 7.1	Managed Forest Land	Planted Mineral intensive	20	1990	1000				
MFL-PMC-PL-P-59	unit 77	Managed Forest Land	Planted Mineral Cool	NA	NA	1000				
Current Land use subdivision		Remark								
Planted Organic Drained										
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 (2009) (ha)	Remark	P	C	M
MFL-POD-PL-P-48	unit3	Managed Forest Land	Planted Organic Drained	NO	NO	1000				
Current Land use subdivision		Remark								
Mangroves Natural										
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 (2009) (ha)	Remark	P	C	M
Current Land use subdivision		Remark								
Mangroves intensive										
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 (2009) (ha)	Remark	P	C	M
MFL-MI-NF-M-53<MFL-M...	unit 6	Managed Forest Land	Mangroves Natural	20	2005	2000				

Save Undo Close

Gas NITROUS OXIDE (N2O)

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:

2015 2016 2017 2018 2019 2020 2021 2022

Time Series data entry...

11:20 AM 5/26/2021

Stock Difference – Forest land

IPCC Inventory Software - valentina - [Worksheets]

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

2006 IPCC Categories

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 1 - Information item) SOM Mineral (Approach 2.3) SOM Mineral (SD) SOM Organic Drained SOM Organic Rewetted

Worksheet

Sector: Agriculture, Forestry and Other Land Use

Category: Forest Land

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

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

Data

Region: Region 3 - Approach 3

Equation 2.8

Land use category

Area (ha)

Biomass conversion and expansion factor for standing stock

Biomass expansion factor for conversion of merchantable volume to above-ground

Basic wood density (t d.m. / m³ fresh volume)

Merchantable growing stock volume at the beginning of the inventory period (t1) (m³ / ha)

Merchantable growing stock volume at the end of the inventory period (t2) (m³ / ha)

Total initial above-ground biomass (t d.m. / ha)

Total final above-ground biomass (t d.m. / ha)

Land unit code

Initial land use

Forest type: Plantation (Pinus)

Ecological zone: Temperate oceanic forest

Age class: 0 - 20

National statistics or international data sources

BCEFs=BEF 2"D or specified

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

National statistics or international data sources

AB(t1)=V(t1)*BCEFs or specified

National statistics or international data sources

AB(t2)=V(t2)*BCEFs or specified

unit 2

Managed For...

Planted Mineral Cool

Managed Fores...

Planted Mineral C...

1000

1

21

Calculated

21

40

Calculated

Total

IPCC Inventory Software - valentina - [Worksheets]

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2006 IPCC Categories

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 1 - Information item)

Worksheet

Sector: Agriculture, Forestry and Other Land Use

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

Data

Region: Region 3 - 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

21

40

Calculated

40

0.4

0.51

14 994

28 56

19

714

14 994

28 56

714

Wetlands Supplement – Rewetted peatlands

IPCC Inventory Software - valentina - [Worksheets]

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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.7 - Rice cultivation
 - 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 Wetland
 - 3.C.14 - Other (please specify)

2006 IPCC Guidelines

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								
Land unit code	Initial land use	Land use during reporting year	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)		
			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

CARBON DIOXIDE (CO2) Emissions (Gn 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:

IPCC Emission Factor Database

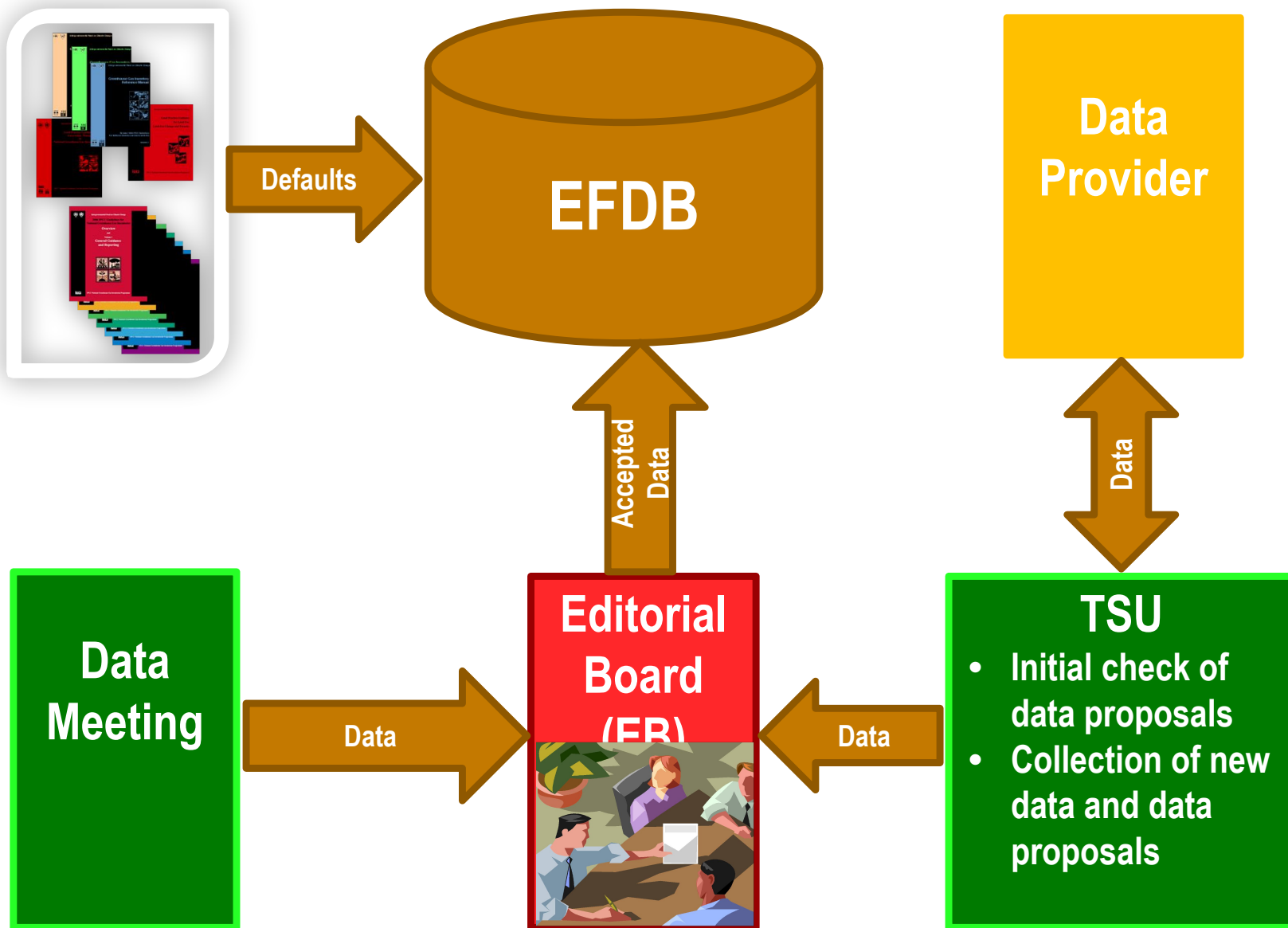
- Library of emission factors and other parameters (with background documentation and technical references) that can be used for estimation of GHG emissions and removals in Inventories
- Data collected:
 - ❖ Default values from IPCC Guidelines
 - ❖ Data from peer-reviewed papers
 - ❖ Data from other publications (e.g., national reports)
- Two types of applications:
 - ❖ Web application
 - ❖ Offline application (OS: Windows, Mac Linus) freely available to download
(download at <https://www.ipcc-nggip.iges.or.jp/EFDB/main.php>)

The EFDB is not intended for authorization of use of specific EFs and it has not been subject to formal IPCC review processes

It serves as a library where inventory compilers can find EFs suitable to their inventories by their own judgement.

IPCC Emission Factor Database

- It evolves across time through a continuous process of data population and platform management
- Data proposals submitted to the Editorial Board (e.g., from researchers, inventory experts) and data collection efforts (e.g., expert meetings to collect data, literature search by TSU, others)
- **Open to any data proposals**
 - ❖ Data proposals are considered by EFDB Editorial Board for inclusion into the EFDB
 - ❖ Criteria for inclusion of new data: robustness, applicability and documentation
 - ❖ Contact IPCC TFI Technical Support Unit (TSU) at ipcc-efdb@iges.or.jp



Web application

The screenshot displays the EFDB website interface, which is used for searching and viewing emission factor data. The interface includes a header with the EFDB logo and navigation links. The main content area is divided into sections for search options, status of search, and search results.

Search options (e.g. Basic search): The 'Basic search' tab is selected. Below it, the 'Select Gases' dropdown is highlighted, showing a list of gases including Methane, Nitrous oxide, and Carbon dioxide. The 'Select Fuels' dropdown is also highlighted, showing a list of fuels including Coal, Gas, and Oil. The 'Select Type of Parameter' dropdown is highlighted, showing a list of parameters including Emission factor, Global warming potential, and Carbon equivalent.

Status of search: The 'Status' section shows the search criteria: 'IPCC 2006 Source/Sink Category: Waste (4)', 'Gases: (All)', 'Fuels: (All + NA)', and 'Type of parameter: (All)'. The 'Displayed records: 1 - 20 / 1718' is shown, along with a table of results.

To narrow down search results: The 'Export to XLS' button is highlighted, indicating that the search results can be exported to an Excel file.

Details of data: The table of results is shown, with columns for 'EF ID', 'IPCC 1996', 'IPCC 2006', 'Gas', 'Fuel', 'Type of parameter', 'Description', 'Country', 'Value', 'Unit', and 'Action'. The first two rows of data are visible, showing emission factors for 'Municipal Solid Waste (MSW) Generation Rate' for 'USA' and 'Canada'.

Results can be exported in Excel: The 'Export to XLS' button is highlighted, indicating that the search results can be exported to an Excel file.

<https://www.ipcc-nggip.iges.or.jp/EFDB/main.php>

2019 Refinement - Volume 4

Agriculture, Forestry and Other Land Use (AFOLU)

- Refinements are made in all chapters except chapter 9 (Other land)
- Contains annexes
 - Annex 1: Mapping tables
 - Annex 2: Worksheets
- The refinements include new and updated default data as well as new and up-to-date information and guidance.

<https://www.ipcc-nggip.iges.or.jp/home/2019refinement.html>

General Guidance I

- Updated and new guidance on land representation:
 - Approaches, where approach 3 is for tracking unit of lands across time
 - Methods for estimating areas of land use and land-use change (*sample-based, survey-based and wall-to-wall*);
 - Combining multiple data sources
 - Derivation of IPCC land-use categories from land cover information
- New guidance on the use of allometric models and biomass density maps for estimation of biomass
- Elaborated guidance on application of Tier 3 methods (model-based and measurement-based)

General Guidance II

- New guidance on inter-annual variability
 - Optional/voluntary approach for disaggregation of total emissions and removals for the managed land proxy (MLP) into those that are associated with human effects and those due to natural disturbances
- Elaborated/updated guidance on developing consistent time series through extrapolation based on functional relationships (*forest example with functional relationship between age/stock and associated annual increment*)
 - It is *good practice* that the model used for extrapolation utilizes information on the methodological elements that is consistent with those used in the rest of the time series.

Agricultural land

- Tier 2 steady state method for SOC changes in cropland
- Updated stock change factors (F_{LU} , F_{MG} , F_I) for Tier 1
Tier 2 steady state method can be used to estimate country-specific stock change factors
- New guidance (Tiers 2) for estimation of SOC change in mineral soils associated with biochar amendments

Flooded land

- *Flooded land Remaining Flooded land*
 - New guidance for estimation of CH₄ emissions
- *Land Converted to Flooded land*
 - Updated guidance for estimation of CO₂ emissions (based on CO₂ fluxes instead of C stock changes)
 - New guidance for estimation of CH₄ emissions
 - An optional approach to develop indicative estimates of the anthropogenic component of total CO₂ and non-CO₂ emissions from flooded lands

Livestock

- Tier 2 gross energy calculation extended to goat
- CH₄ EF for enteric fermentation derived from DMI
- new CH₄ EFs for enteric fermentation for llamas and ostrich:
- Manure Management, new advanced Tier 1a method for consideration of differing productivity systems (high and low productivity systems)
 - Definitions of high and low productivity systems are provided
 - Distinction between developed and developing countries removed
 - default parameters and EFs recalculated by climate zone or by regions and productivity systems
- 50% of equations updated, 10 new equations added, 27 new equations Annexed

Harvested Wood Products

- Maintains the existing approaches in the *2006 IPCC Guidelines*
- Elaborated and updated guidance:
 - Detailed guidance on wood product in use *including good practice in the choice of method*;
 - Delineation of the boundaries of different approaches *and clarifying essential differences among those*;
 - Clarifications on estimating for emissions associated with HWP use for energy purpose;
 - Disaggregation of semi-finished HWP commodity classes into 3 instead of 2
 - Updated and new parameters (e.g., default conversion factors and half-lives for HWP commodity classes)

Thank you

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