# IPCC Inventory Software

IPCC Side-event- IPCC-TFI tools for National GHGs Inventories

UN Climate Change Conference

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# IPCC Inventory Software- Presentation Outline

- **Part 1:-**
  - ✓ Overview/Introduction
  - ✓ Structure of Software
  - ✓ Key functions/features software
- **Part 2:-**
  - ✓ How to get started when using IPCC Inventory Software

# Part 1: IPCC Inventory Software – Key Functions/Features

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# Introduction

- IPCC launched the Inventory Software in 2012
- The software implements the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
  - can assist countries in using the IPCC Guidelines
  - presentations explaining the *2006 IPCC Guidelines* and other supporting materials are available at IPCC TFI website

    https://www.ipcc-nggip.iges.or.jp/support/support.html
- The latest version of the software (version 2.54) implements Tier 2 methods in the *2006 IPCC Guidelines* for Energy, Industrial Processes & Product Use and Waste sectors. Available at http://www.ipcc-nggip.iges.or.jp/software/index.html

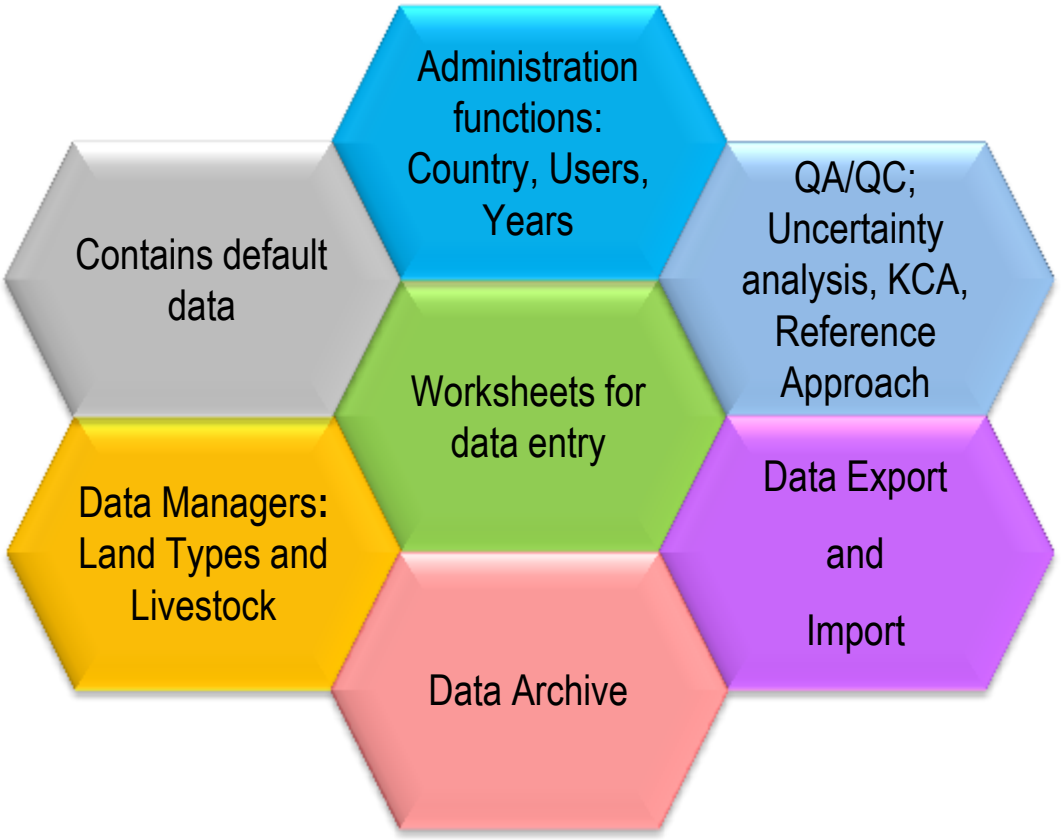
# Introduction

- Development to implement Tier 2 methods for the AFOLU sector is underway and includes Wetland Supplement (at Tier 1)
- Agriculture sector - Tier 2 implementation for livestock categories was completed in 2018, new version of software with Tier 2 for livestock categories is expected first quarter of 2019.
- Work on implementation of Tier 2 for LULUCF categories is due to start ( December –January)
- Implementation of Wetlands Supplement, is an extension to 2006 IPCC Guidelines dealing with new methodologies for calculating and reporting emissions for inland/coastal, drained/rewetted lands under Land Use sector (at Tier 1)

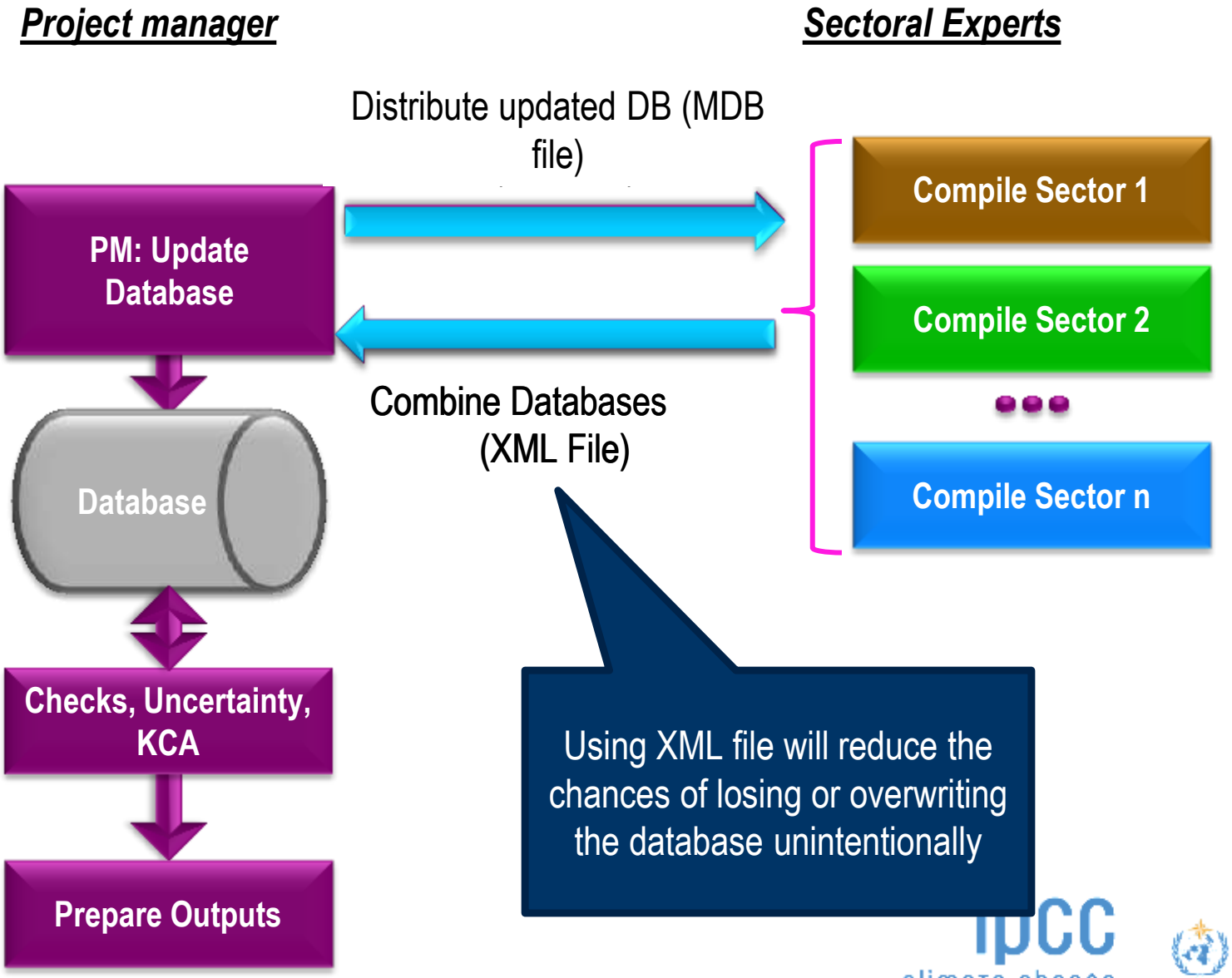
# IPCC Inventory Software

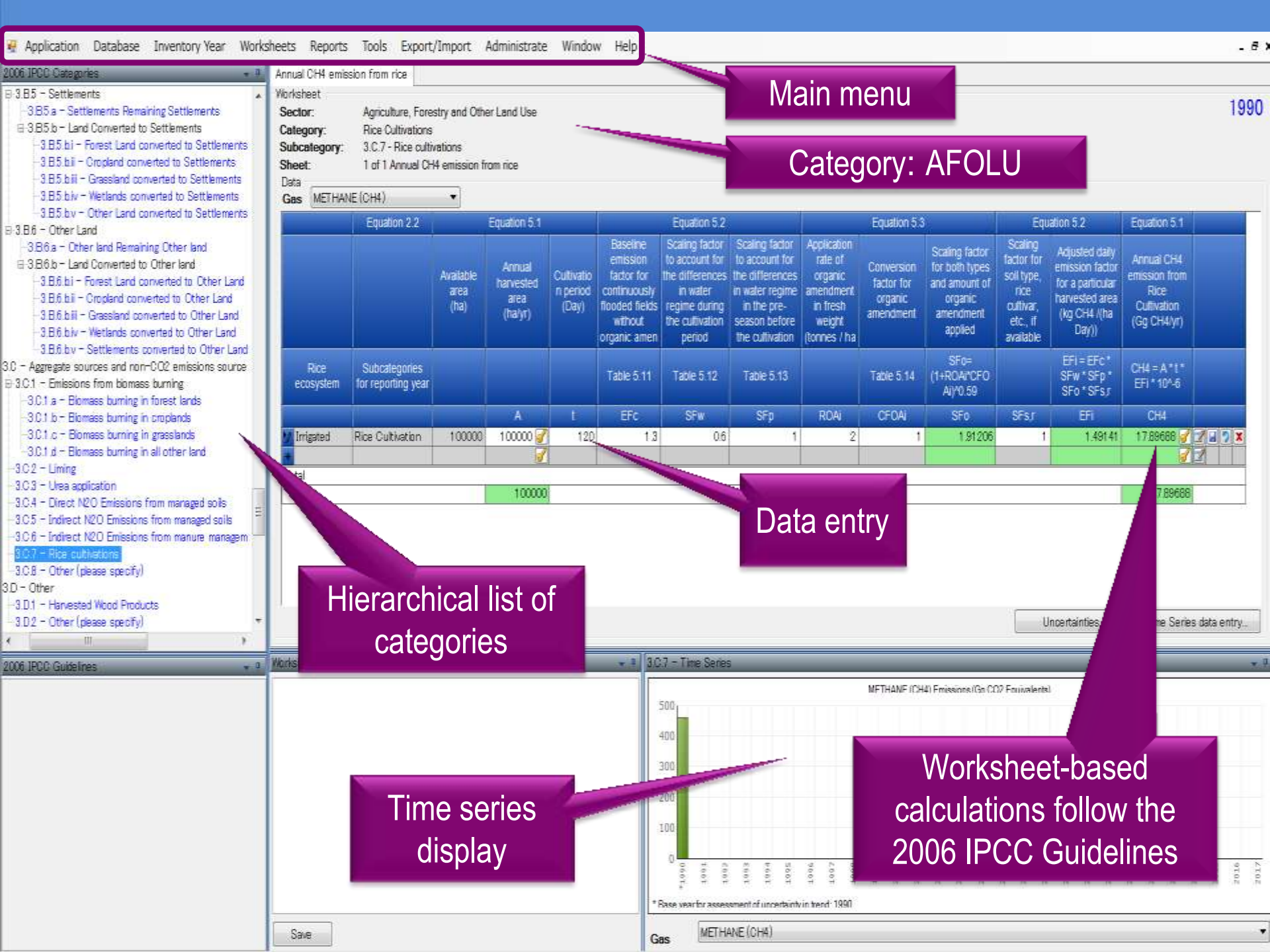
- Database based and stand alone software
- Does not require internet access or expensive hardware
- Can be used for the whole inventory or just individual categories
- Allows different parts of inventory to be developed simultaneously
- Can be used for reporting under the *Revised 1996 Guidelines* or *2006 IPCC Guidelines*
- *A*ids QA/QC
- FREE

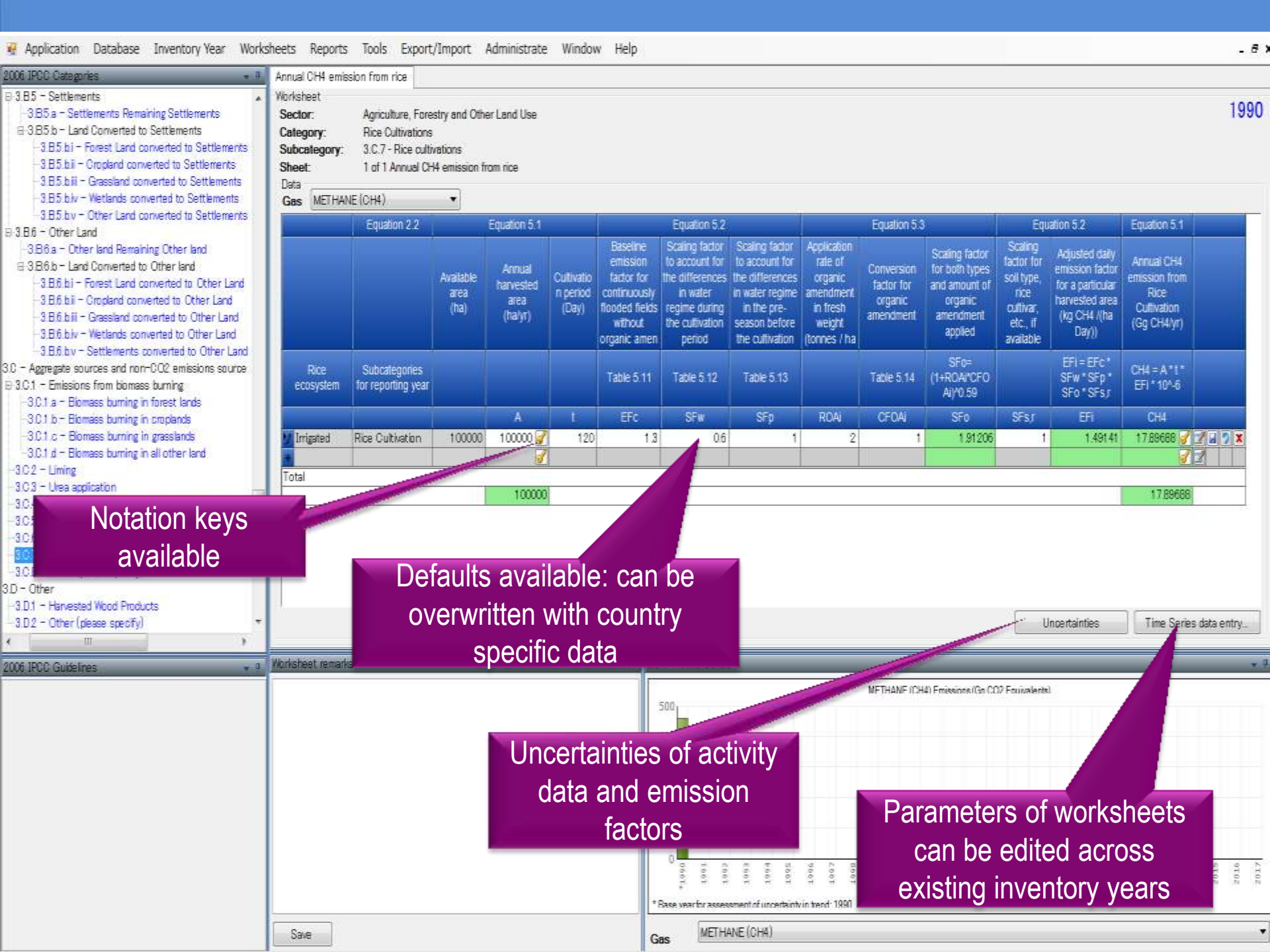
# Software Functions



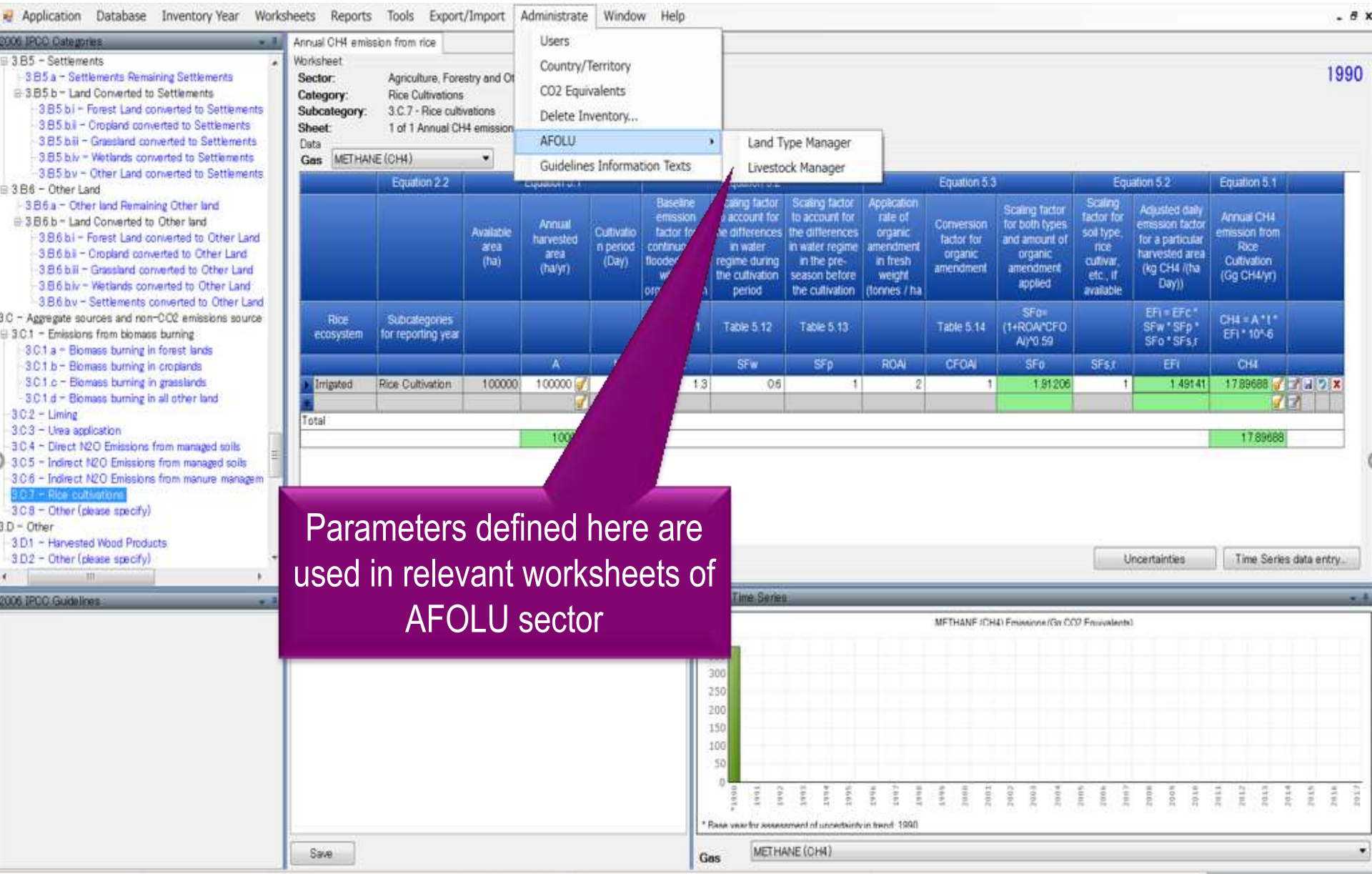
# Multiple Users

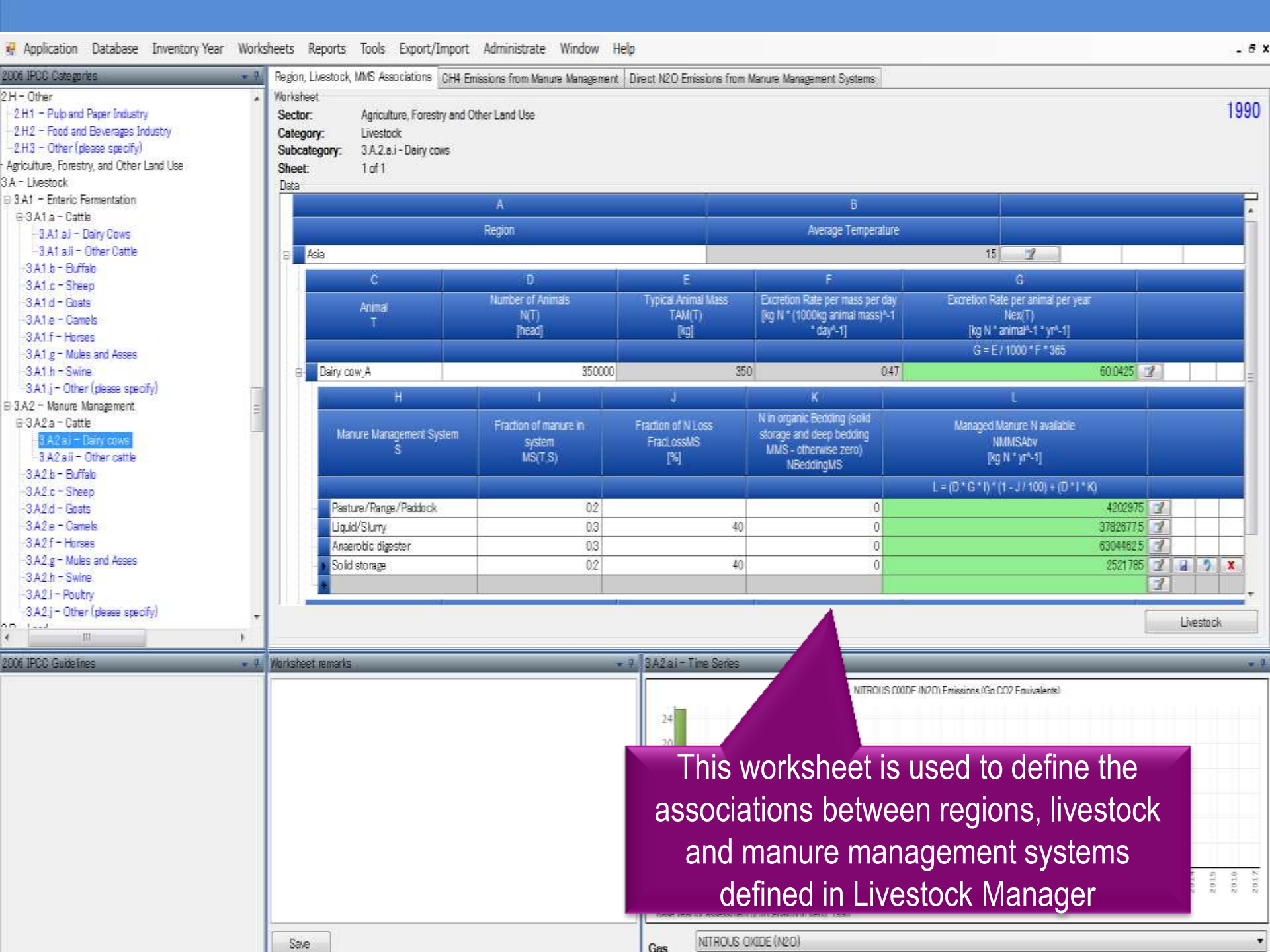



Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help
Main menu
Category: AFOLU
1990
Hierarchical list of categories
Data entry
Time series display
Worksheet-based calculations follow the 2006 IPCC Guidelines

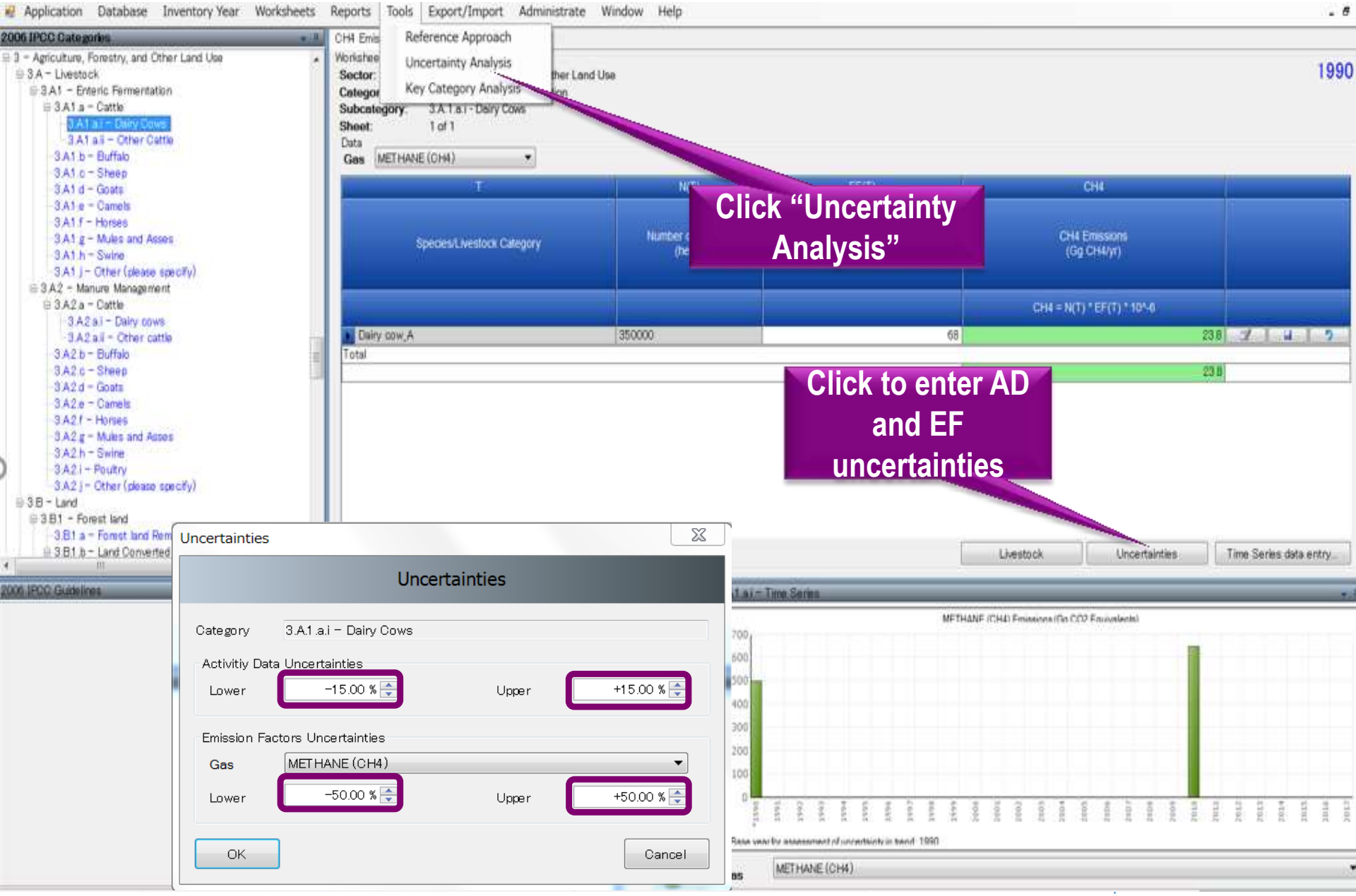

Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help
2006 IPCC Categories
3.B.5 - Settlements
3.B.5.a - Settlements Remaining Settlements
3.B.5.b - Land Converted to Settlements
3.B.5.b.i - Forest Land converted to Settlements
3.B.5.b.ii - Cropland converted to Settlements
3.B.5.b.iii - Grassland converted to Settlements
3.B.5.b.iv - Wetlands converted to Settlements
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 source
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.D - Other
3.D.1 - Harvested Wood Products
3.D.2 - Other (please specify)
2006 IPCC Guidelines
Annual CH4 emission from rice
Worksheet
Sector: Agriculture, Forestry and Other Land Use
Category: Rice Cultivations
Subcategory: 3.C.7 - Rice cultivations
Sheet: 1 of 1 Annual CH4 emission from rice
1990
Data
Gas METHANE (CH4)
Equation 2.2
Equation 5.1
Equation 5.2
Equation 5.3
Equation 5.2
Equation 5.1
Available area (ha)
Annual harvested area (ha/yr)
Cultivation period (Day)
Baseline emission factor for continuously flooded fields without organic amen
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
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))
Annual CH4 emission from Rice Cultivation (Gg CH4/yr)
Rice ecosystem
Subcategories for reporting year
Table 5.11
Table 5.12
Table 5.13
Table 5.14
SFo= (1+ROAi^CFOAi)^0.59
EFi = EFc * SFw * SFp * SFo * SFs,r
CH4 = A * t * EFi * 10^-6
A
t
EFc
SFw
SFp
ROAi
CFOAi
SFo
SFs,r
EFi
CH4
Irrigated
Rice Cultivation
100000
100000
120
1.3
0.6
1
2
1
1.91206
1
1.49141
17.89688
Total
100000
17.89688
Uncertainties
Time Series data entry...
Worksheet remarks
Save
METHANE (CH4) Emissions (Gg CO2 Equivalents)
500
0
* Base year for assessment of uncertainty in trend: 1990
Gas
METHANE (CH4)
Notation keys available
Defaults available: can be overwritten with country specific data
Uncertainties of activity data and emission factors
Parameters of worksheets can be edited across existing inventory years

# AFOLU Data Managers: Land Type and Livestock

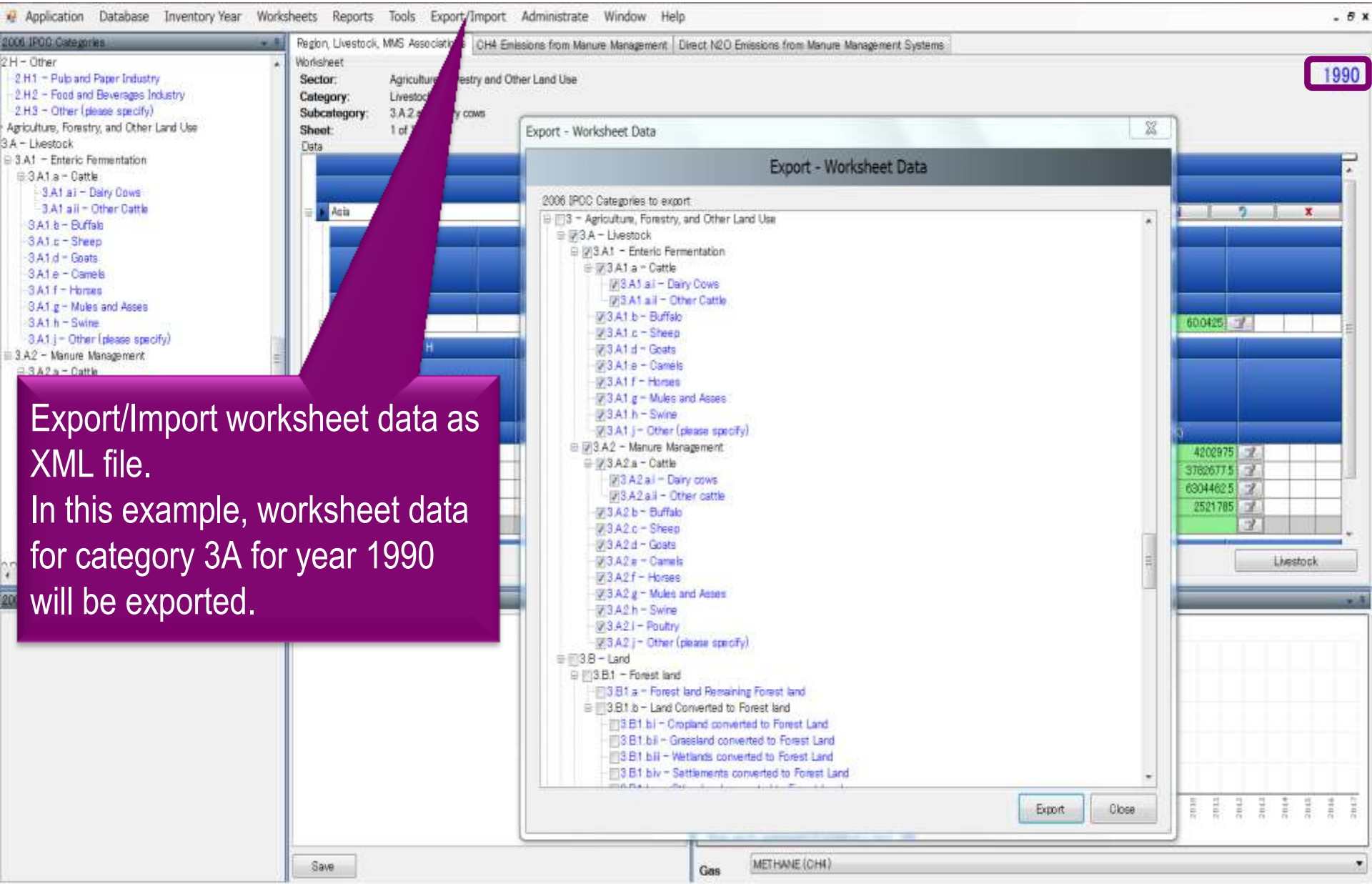



Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help
2006 IPCC Categories
2.H - Other
2.H.1 - Pulp and Paper Industry
2.H.2 - Food and Beverages Industry
2.H.3 - Other (please specify)
Agriculture, Forestry, and Other Land Use
3.A - Livestock
3.A.1 - Enteric 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)
Region, Livestock, MMS Associations
CH4 Emissions from Manure Management
Direct N2O Emissions from Manure Management Systems
Worksheet
Sector: Agriculture, Forestry and Other Land Use
Category: Livestock
Subcategory: 3.A.2.a.i - Dairy cows
Sheet: 1 of 1
1990
Data
A Region
B Average Temperature
Asia 15
C Animal T
D Number of Animals N(T) [head]
E Typical Animal Mass TAM(T) [kg]
F Excretion Rate per mass per day [kg N * (1000kg animal mass)^-1 * day^-1]
G Excretion Rate per animal per year Nex(T) [kg N * animal^-1 * yr^-1]
G = E / 1000 * F * 365
Dairy cow_A 350000 350 0.47 60.0425
H Manure Management System S
I Fraction of manure in system MS(T,S)
J Fraction of N Loss FracLossMS [%]
K N in organic Bedding (solid storage and deep bedding MMS - otherwise zero) NBeddingMS
L Managed Manure N available NMMSAbv [kg N * yr^-1]
L = (D * G * I) * (1 - J / 100) + (D * I * K)
Pasture/Range/Paddock 0.2 0 420.2975
Liquid/Slurry 0.3 40 0 3782.6775
Anaerobic digester 0.3 0 630.44625
Solid storage 0.2 40 0 252.1785
Livestock
2006 IPCC Guidelines
Worksheet remarks
Save
3.A.2.a.i - Time Series
NITROUS OXIDE (N2O) Emissions (Gg CO2 Equivalents)
Gas NITROUS OXIDE (N2O)
This worksheet is used to define the associations between regions, livestock and manure management systems defined in Livestock Manager

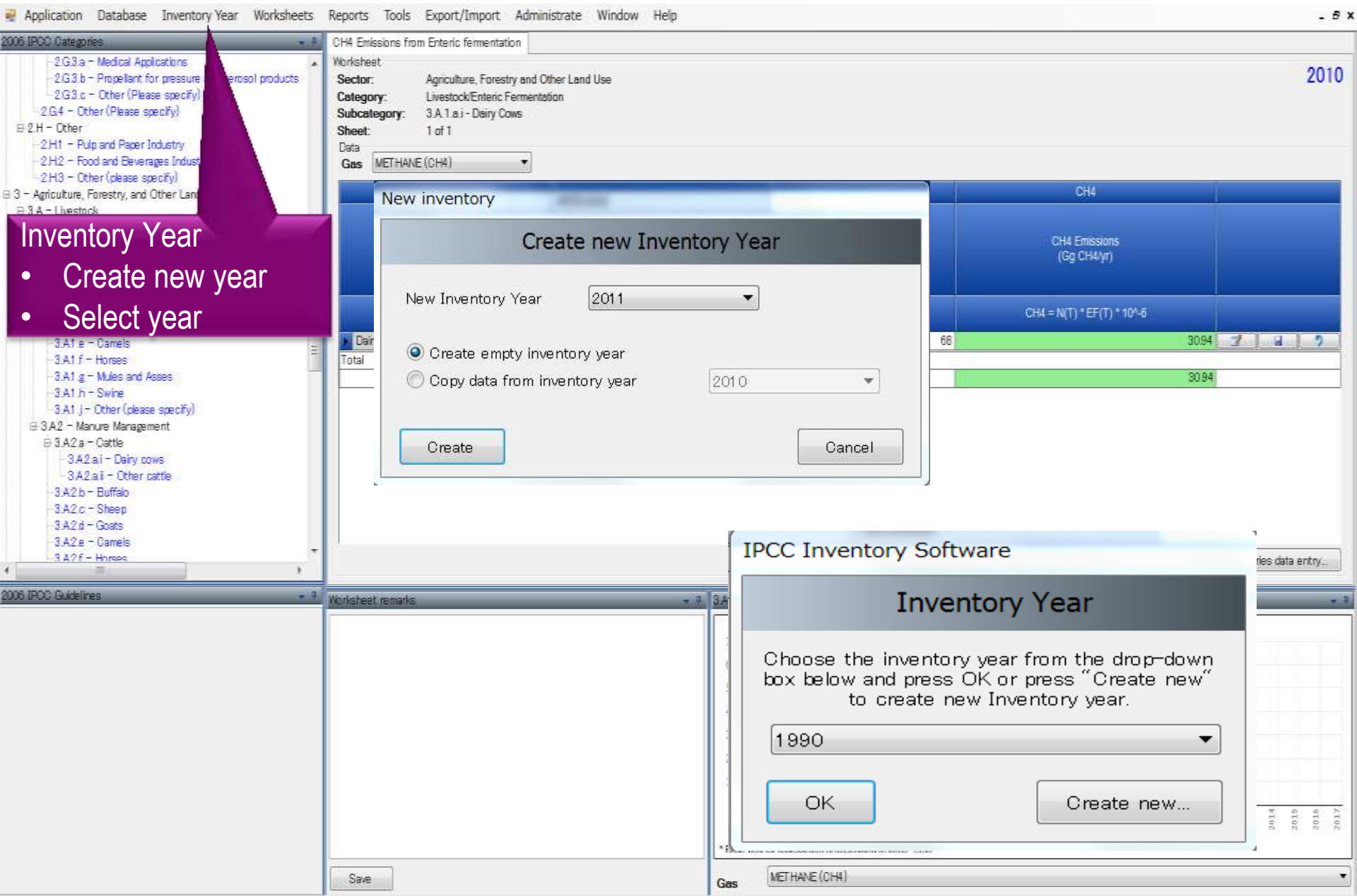
# Tools


Application
Database
Inventory Year
Worksheets
Reports
Tools
Export/Import
Administrate
Window
Help
Reference Approach
Uncertainty Analysis
Key Category Analysis
Click “Uncertainty Analysis”
Click to enter AD and EF uncertainties
Livestock
Uncertainties
Time Series data entry
Uncertainties
Category
3.A.1.a.i – Dairy Cows
Activitiy Data Uncertainties
Lower
-15.00 %
Upper
+15.00 %
Emission Factors Uncertainties
Gas
METHANE (CH4)
Lower
-50.00 %
Upper
+50.00 %
OK
Cancel

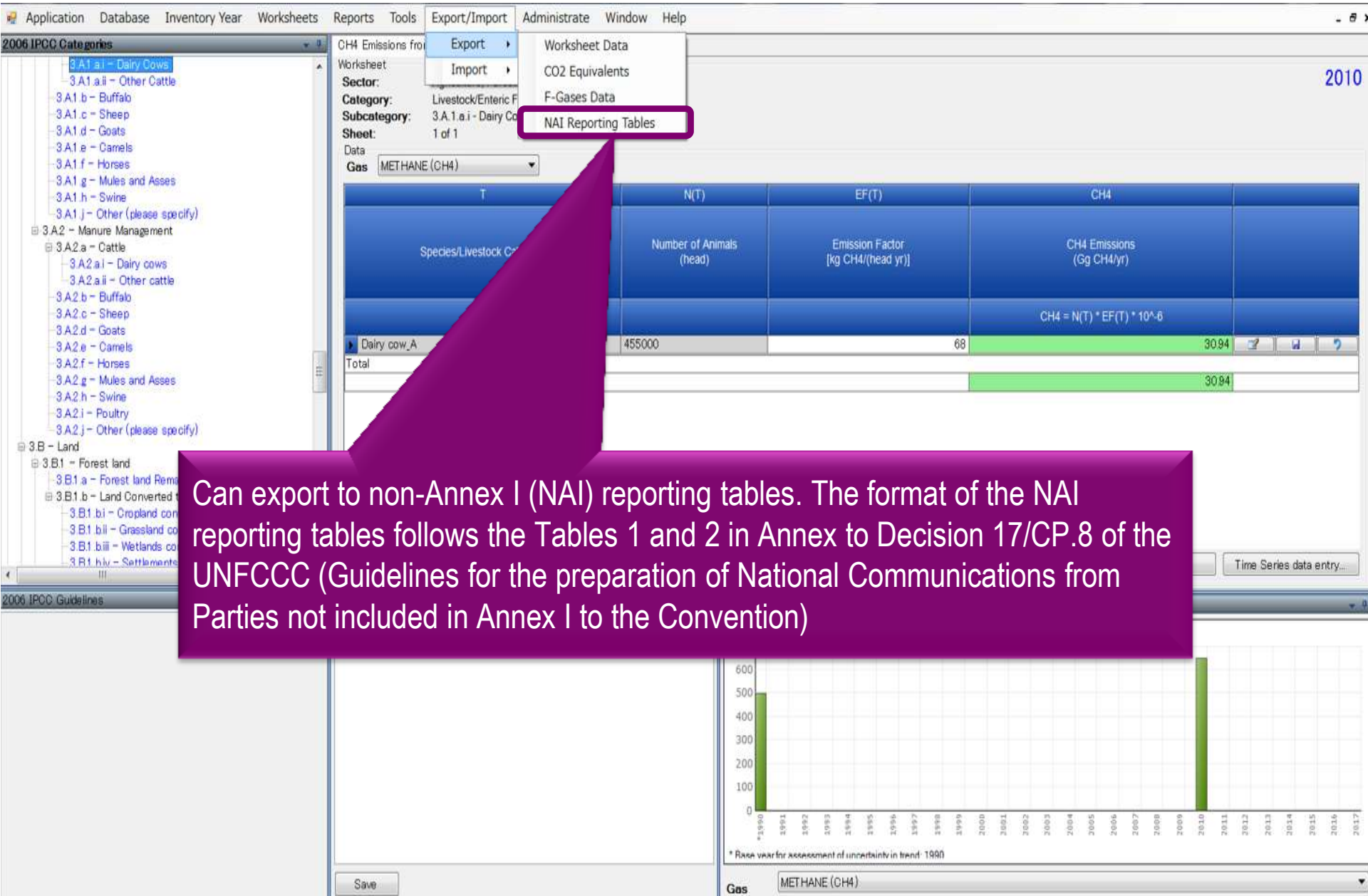
# Data Export and Import



# Inventory Years



# Reports




Can export to non-Annex I (NAI) reporting tables. The format of the NAI reporting tables follows the Tables 1 and 2 in Annex to Decision 17/CP.8 of the UNFCCC (Guidelines for the preparation of National Communications from Parties not included in Annex I to the Convention)

# Ongoing Activities

- Organizing expert meetings annually
- Continuing support to users
  - Help Desk: ipcc-software@iges.or.jp
  - Web Forum: https://discussions.zoho.com/ipccinventorysoftware/
- Work to incorporate Tier 2 methods for AFOLU sector is underway

# Part 2: IPCC Inventory Software - Getting Started

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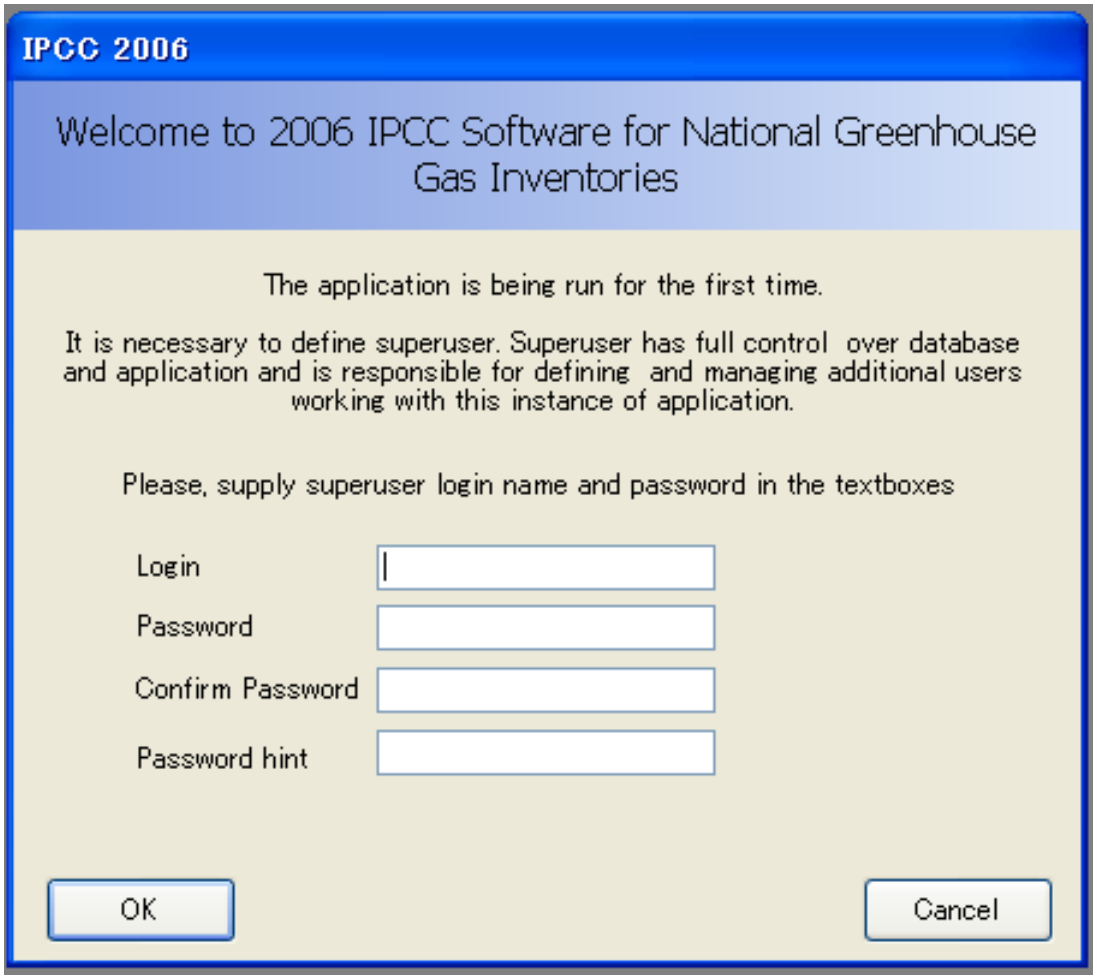
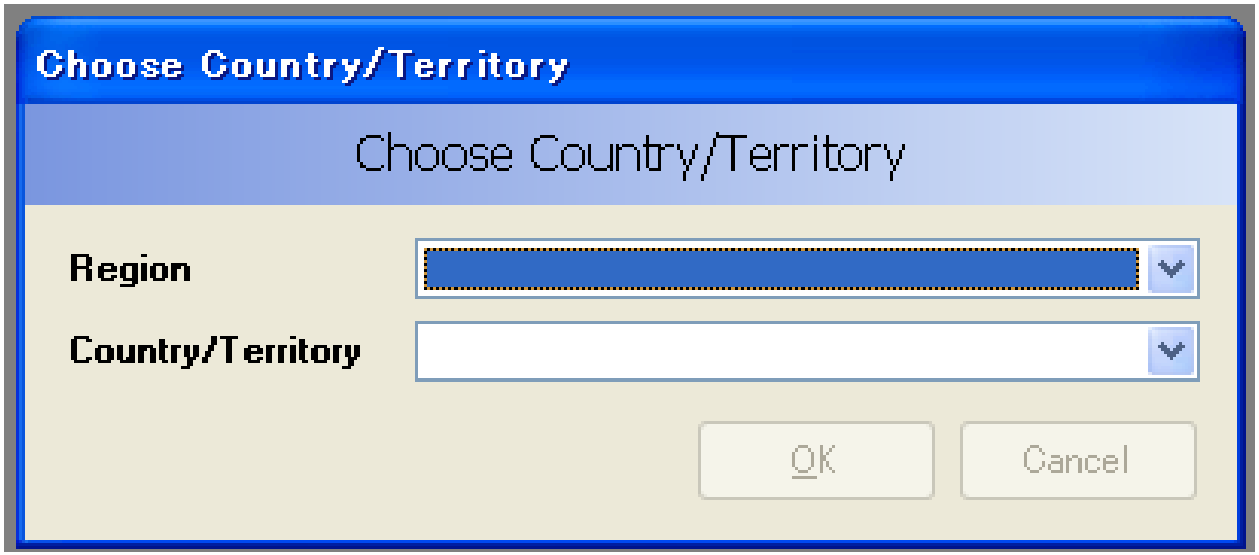
# Let's get started. – Define ID&PW


You will find this icon on the desk top screen.
Click on it, then you will be requested to define super-user.



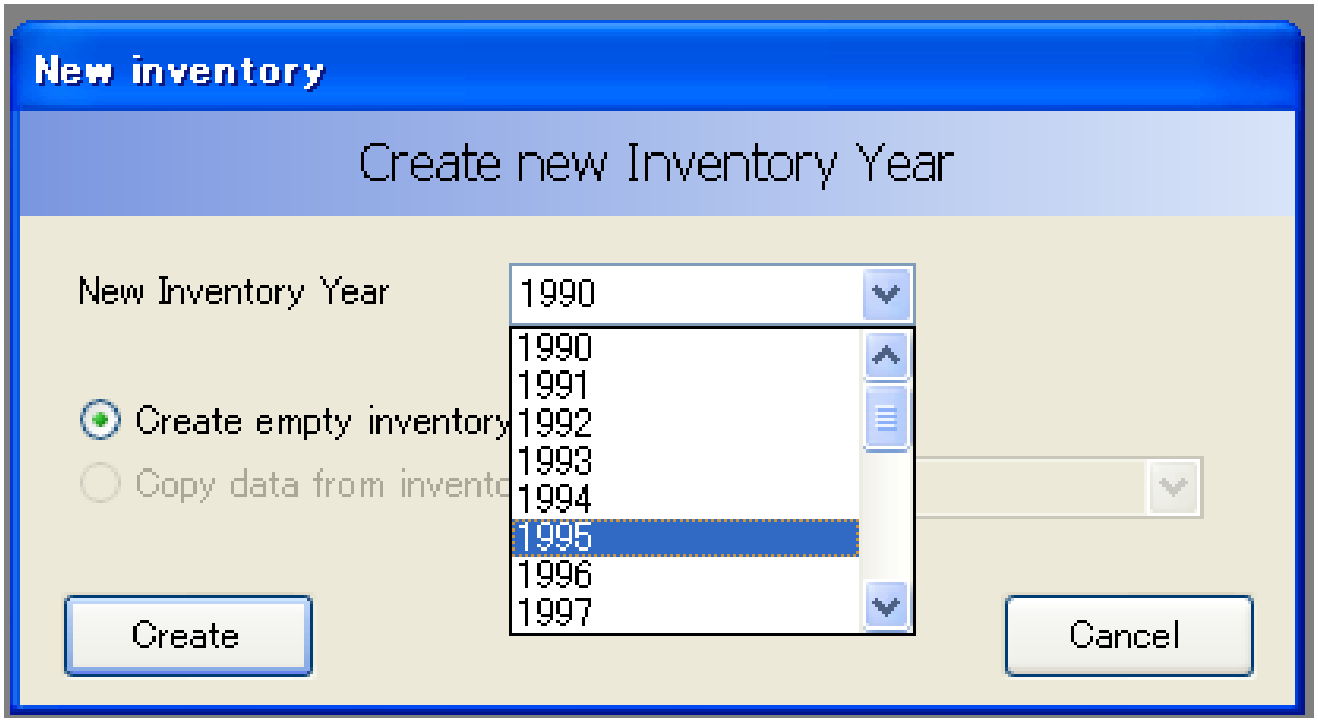

➢ **Do not forget your login name & password!!!**

# Select Region & Country

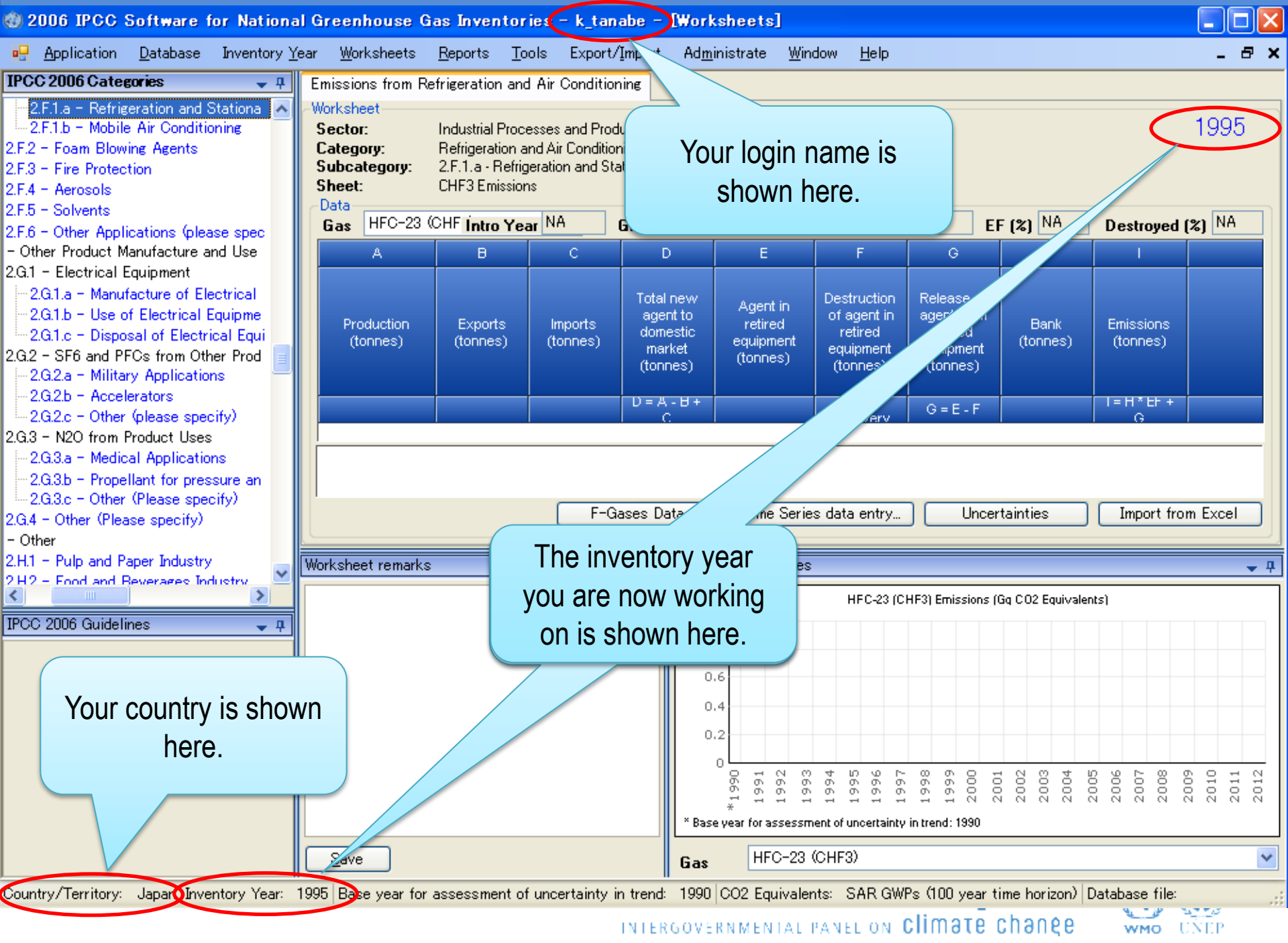



- Select your region & country from the dropdown list.

# Determine Initial Inventory Year




- Determine the year for which you are going to produce your national GHG inventory.
  - ✓Determine the initial inventory year first.
  - ✓The other years can be created later.


2006 IPCC Software for National Greenhouse Gas Inventories - k_tanabe - [Worksheets]
Application
Database
Inventory Year
Worksheets
Reports
Tools
Export/Import
Administrate
Window
Help
IPCC 2006 Categories
2.F.1.a - Refrigeration and Stationa
2.F.1.b - Mobile Air Conditioning
2.F.2 - Foam Blowing Agents
2.F.3 - Fire Protection
2.F.4 - Aerosols
2.F.5 - Solvents
2.F.6 - Other Applications (please spec
- Other Product Manufacture and Use
2.G.1 - Electrical Equipment
2.G.1.a - Manufacture of Electrical
2.G.1.b - Use of Electrical Equipme
2.G.1.c - Disposal of Electrical Equi
2.G.2 - SF6 and PFCs from Other Prod
2.G.2.a - Military Applications
2.G.2.b - Accelerators
2.G.2.c - Other (please specify)
2.G.3 - N2O from Product Uses
2.G.3.a - Medical Applications
2.G.3.b - Propellant for pressure an
2.G.3.c - Other (Please specify)
2.G.4 - Other (Please specify)
- Other
2.H.1 - Pulp and Paper Industry
IPCC 2006 Guidelines
Emissions from Refrigeration and Air Conditioning
Worksheet
Sector: Industrial Processes and Produ
Category: Refrigeration and Air Condition
Subcategory: 2.F.1.a - Refrigeration and Stat
Sheet: CHF3 Emissions
1995
Data
Gas HFC-23 (CHF
Intro Year NA
EF (%) NA
Destroyed (%) NA
A
B
C
D
E
F
G
I
Production (tonnes)
Exports (tonnes)
Imports (tonnes)
Total new agent to domestic market (tonnes)
Agent in retired equipment (tonnes)
Destruction of agent in retired equipment (tonnes)
Release
(tonnes)
Bank (tonnes)
Emissions (tonnes)
D = A - B + C
G = E - F
I = H * EF + G
F-Gases Data
Time Series data entry...
Uncertainties
Import from Excel
Worksheet remarks
Save
HFC-23 (CHF3) Emissions (Gg CO2 Equivalents)
0.6
0.4
0.2
0
*1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
* Base year for assessment of uncertainty in trend: 1990
Gas HFC-23 (CHF3)
Country/Territory: Japan
Inventory Year: 1995
Base year for assessment of uncertainty in trend: 1990
CO2 Equivalents: SAR GWPs (100 year time horizon)
Database file:
Your login name is shown here.
The inventory year you are now working on is shown here.
Your country is shown here.
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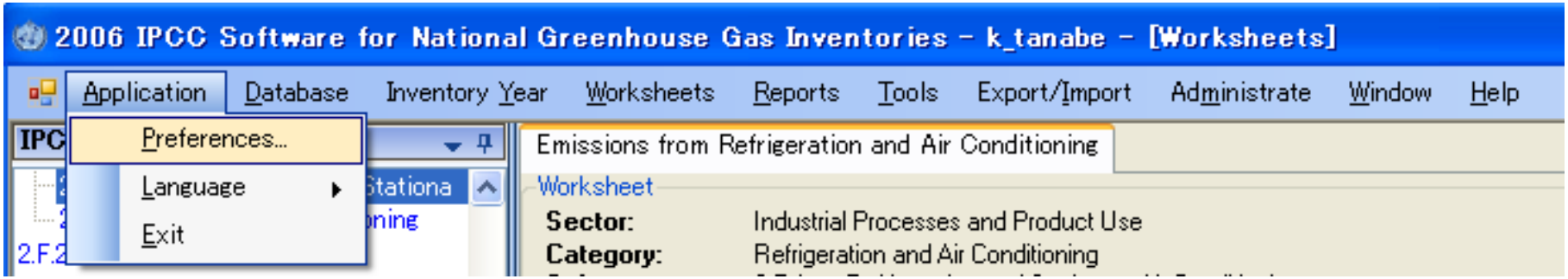
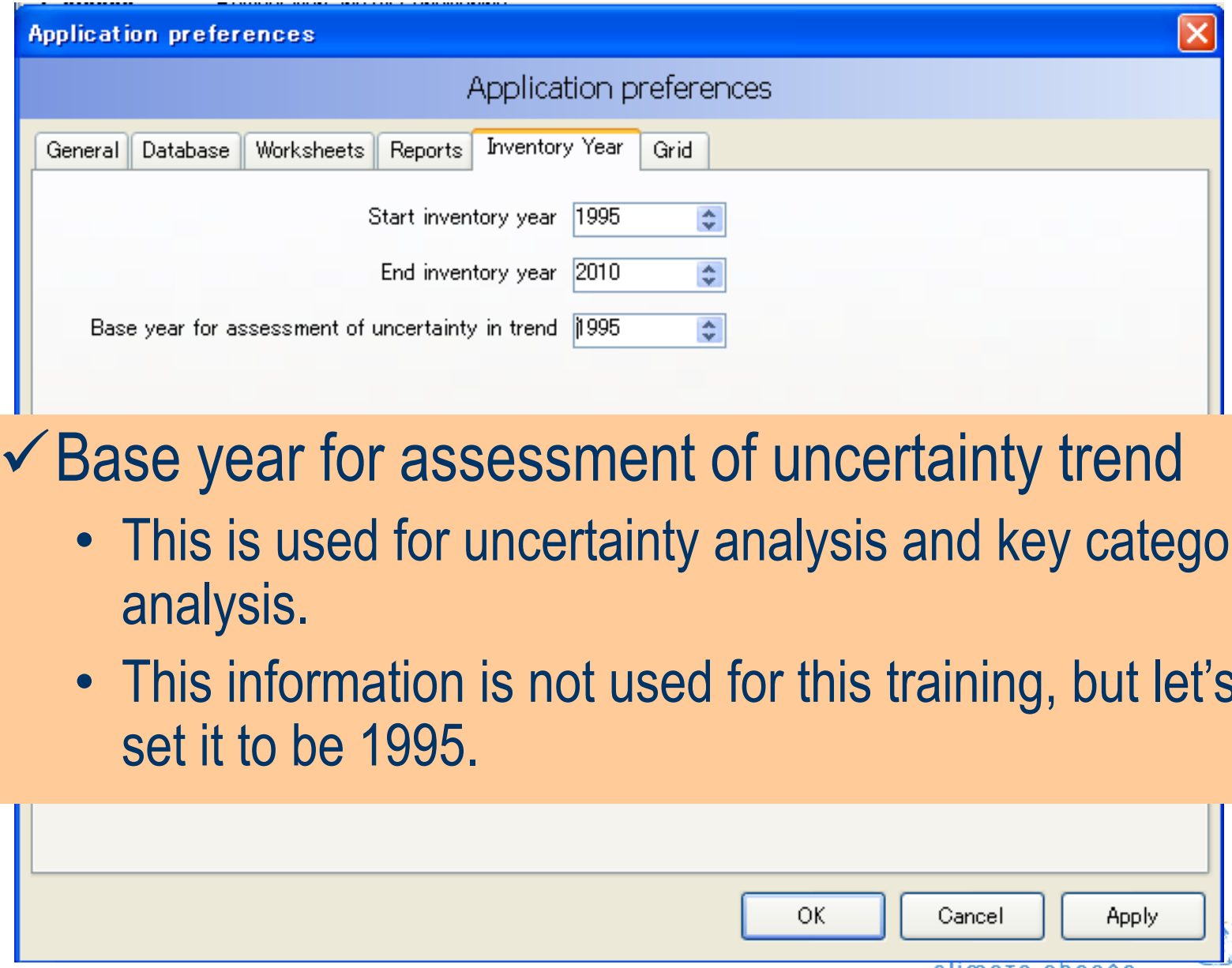
# Adjust Configuration As You Like




- You can adjust configuration as you like using the menu "Application" – "Preferences", e.g.:
  - ✓Appearance of windows
  - ✓Database management
  - ✓Default number of decimal places in worksheets and reporting tables
  - ✓Inventory years (from what year to what year)

# Determine Inventory Years

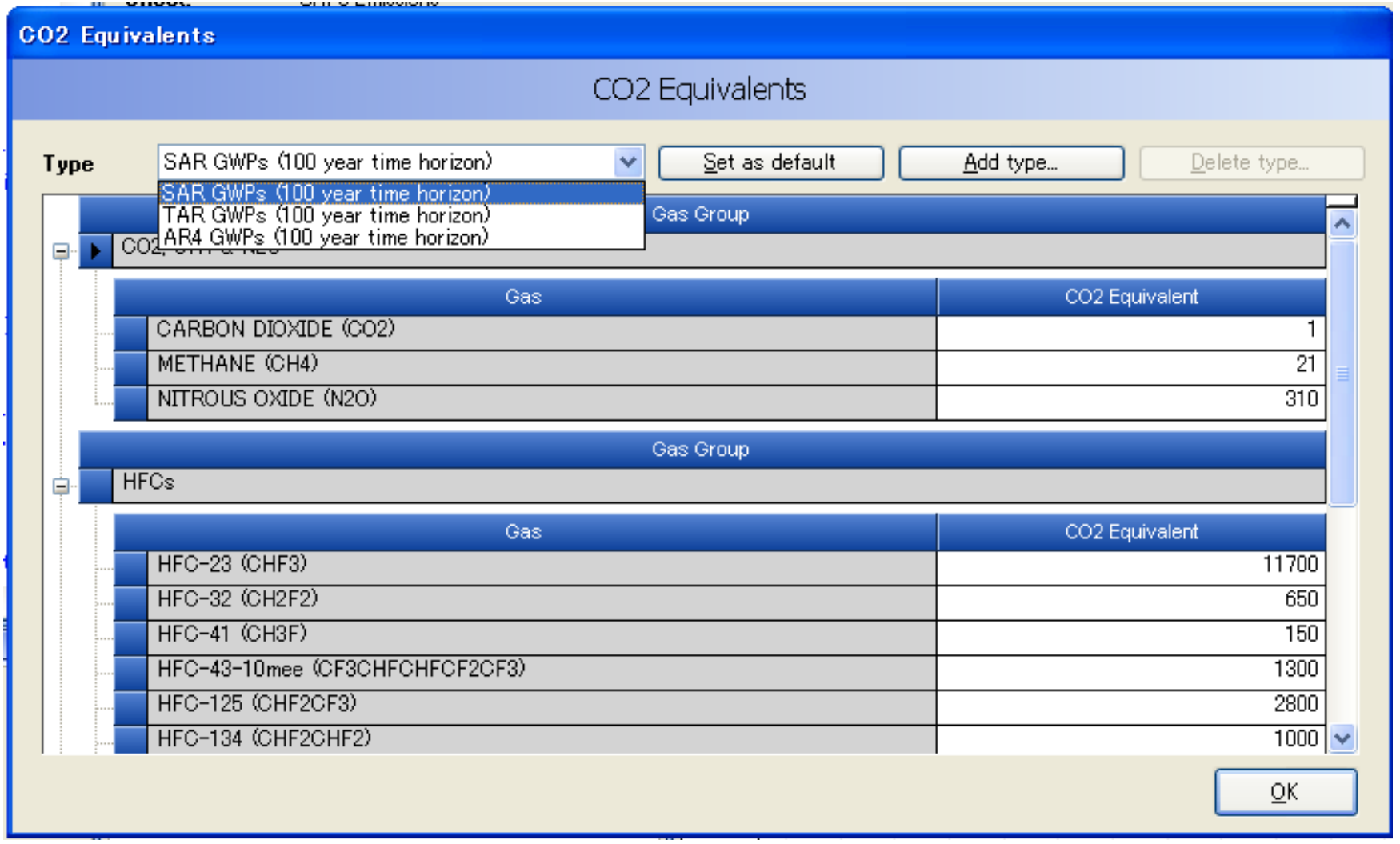



- ✓ Base year for assessment of uncertainty trend
  - This is used for uncertainty analysis and key category analysis.
  - This information is not used for this training, but let's set it to be 1995.

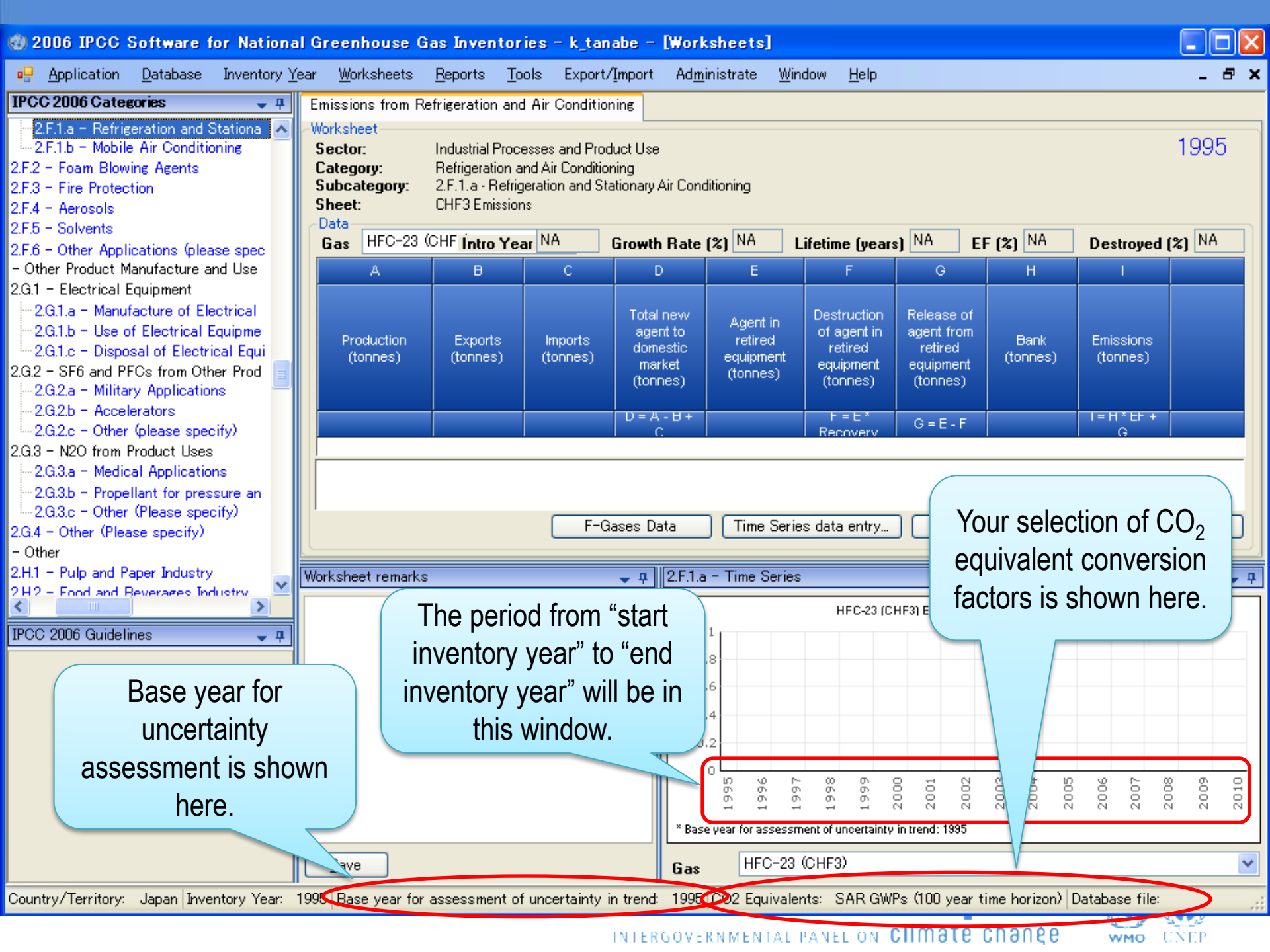
# Determine $CO_2$-eq conversion factors


- You can select, or even newly define, the $CO_2$ equivalent conversion factors using "Administrate" – "CO2 Equivalents" menu.
  - ✓ According to the current NAI-NC Guidelines (Dec17/CP.8), "20. Non-Annex I Parties wishing to report on aggregated GHG emissions and removals expressed in CO2 equivalents should use the **global warming potentials (GWP)** provided by the IPCC in its **Second Assessment Report** ("1995 IPCC GWP Values") based on the effects of GHGs over a **100-year time horizon**."

# Determine $CO_2$-eq conversion factors




- Let's select "SAR GWPs (100 year time horizon)" as an example.


2006 IPCC Software for National Greenhouse Gas Inventories - k_tanabe - [Worksheets]
Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help
IPCC 2006 Categories
2.F.1.a - Refrigeration and Stationa
2.F.1.b - Mobile Air Conditioning
2.F.2 - Foam Blowing Agents
2.F.3 - Fire Protection
2.F.4 - Aerosols
2.F.5 - Solvents
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2.G.3.b - Propellant for pressure an
2.G.3.c - Other (Please specify)
2.G.4 - Other (Please specify)
- Other
2.H.1 - Pulp and Paper Industry
IPCC 2006 Guidelines
Emissions from Refrigeration and Air Conditioning
Worksheet
Sector: Industrial Processes and Product Use
Category: Refrigeration and Air Conditioning
Subcategory: 2.F.1.a - Refrigeration and Stationary Air Conditioning
Sheet: CHF3 Emissions
1995
Data
Gas HFC-23 (CHF Intro Year NA Growth Rate (%) NA Lifetime (years) NA EF (%) NA Destroyed (%) NA
A Production (tonnes)
B Exports (tonnes)
C Imports (tonnes)
D Total new agent to domestic market (tonnes)
D = A - B + C
E Agent in retired equipment (tonnes)
F Destruction of agent in retired equipment (tonnes)
F = E * Recovery
G Release of agent from retired equipment (tonnes)
G = E - F
H Bank (tonnes)
I Emissions (tonnes)
I = H * EF + G
F-Gases Data
Time Series data entry...
Worksheet remarks
2.F.1.a - Time Series
HFC-23 (CHF3) E
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
* Base year for assessment of uncertainty in trend: 1995
Gas HFC-23 (CHF3)
Base year for uncertainty assessment is shown here.
The period from "start inventory year" to "end inventory year" will be in this window.
Your selection of $CO_2$ equivalent conversion factors is shown here.
Country/Territory: Japan
Inventory Year: 1995
Base year for assessment of uncertainty in trend: 1995
CO2 Equivalents: SAR GWPs (100 year time horizon)
Database file:
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# Thank you

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