

User Manual

Palm GHG Calculator

Revision no. : 3.0
Date : 12th August 2014

Table of Contents

Important notes	3
Additional notes for users of the pilot version of PalmGHG V 1.2.1	4
Installation	4
Creating a new database	7
Default Values	19

Important notes


1. Three year data is no longer required. The user can use ONE YEAR data instead. However, the calculator has not yet been adjusted to accommodate this change. Therefore the data columns for three years still appear. In the interim, the user is advised to just fill in the data required for the year of assessment. For the remaining years, the user will have to key in N/A.

Short cut: Right click to automatically select "Data is Not Available" (N/A)

The screenshot shows the 'PalmGHG Calculator - Ver 2.0.1' interface. The main window is titled 'Palm Oil Mill Input Form' and has several tabs: 'FFB', 'Extraction', 'PK Crushing', 'PKS', 'POME', and 'EFB'. The 'FFB' tab is active, showing a table for 'Source of fresh fruit bunch (FFB)'. The table has columns for 'No.', 'Source/Plantation', 'Association', and 'R'. It lists 'Own' and 'Outgrower' categories with sub-totals. A 'Total FFB Processed' and 'Planted Area' are also shown. A pop-up window titled 'FFB Supplier Registration Form' is overlaid on the main form. It has radio buttons for 'Own' and 'Group', and 'Outgrower'. It contains fields for 'Name', 'FFB Sales License', 'Company', 'Group', 'Membership No.', 'RSPO Certified' (Yes/No), 'FFB Delivered to this Mill (mt/yr)' for years 2013, 2012, and 2011, 'Location Address', 'Geographic Address', 'Street', 'District', 'State', 'X-Coordinate', 'Y-Coordinate', and 'Contact Details'. A right-click context menu is visible over the 2011 'FFB Delivered' field, with 'Data is Not Available' selected.

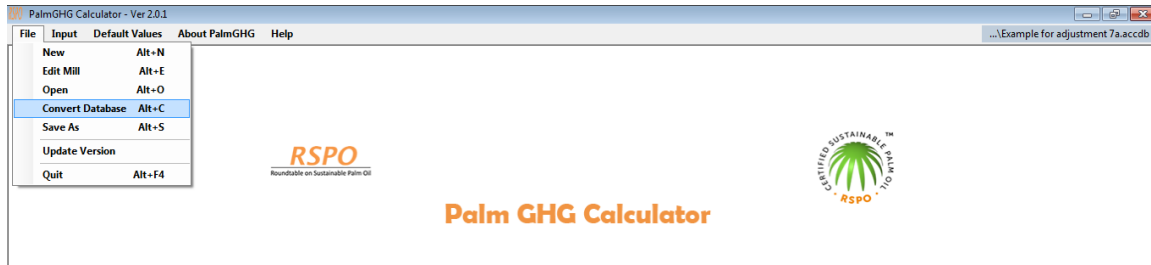
2. During the implementation period (ends 31st December 2016), companies are allowed to exclude land use change emissions from the GHG calculations. This can be achieved by selecting the option **"Exclude LUC emissions from calculations"** in the Mill Input Form. However, from **1st Jan 2017**, calculations must include land use change emissions.

The screenshot shows the 'PalmGHG Calculator - Ver 2.0.1' interface. The main window is titled 'Palm Oil Mill Input Form - (First Time)' and has tabs: 'FFB', 'Extraction', 'PK Crushing', 'PKS', 'POME', 'Electroly', 'Mill Fuel', and 'EFB'. The 'FFB' tab is active, showing fields for 'Name of Mill', 'Company', and 'Group'. Below these are 'Choose PalmGHG Calculation Option' with radio buttons for 'Apply full version of PalmGHG' (selected) and 'Apply November 2011 version of PalmGHG'. A table shows 'Capacity of Mill' with columns for 'Year' and 'Rated Throughput'. The table lists years 2013, 2012, and 2011 with corresponding throughput values. A note at the bottom says: 'Note: Please input N/A when the input data is missing. Right click on the...'. An 'Information' dialog box is open, providing details about the 'Apply full version of PalmGHG' option, including the November 2005 cut-off for LUC and the 'Exclude LUC emissions from calculations' option. The dialog box also explains that users can use a version of PalmGHG that only includes emissions from operations during the three-year implementation period ending 31st December 2016, and that users will see a jump in emissions from 2017 onwards as a result.

3. Take note of the presence of  buttons and click on these buttons for additional guidance.

Additional notes for users of the pilot version of PalmGHG V 1.2.1

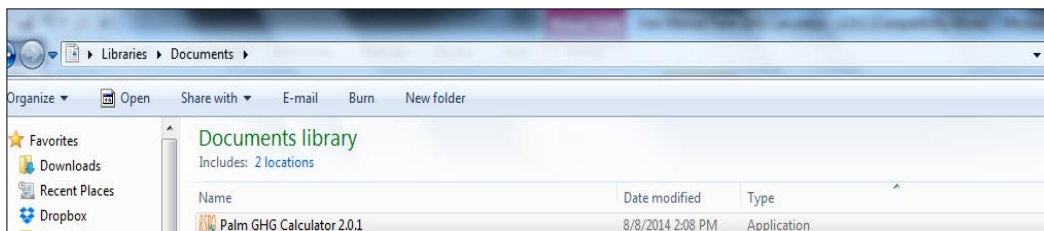
1. Users will need to uninstall PalmGHG V1.2.1 before installing PalmGHG V2.0.1
2. Mill databases (accdb files) created with PalmGHG V1.2.1 can still be used in PalmGHG V2.0.1. Simply use the convert database function under the file menu to convert the V1.2.1 database to the V2.0.1 version before opening.



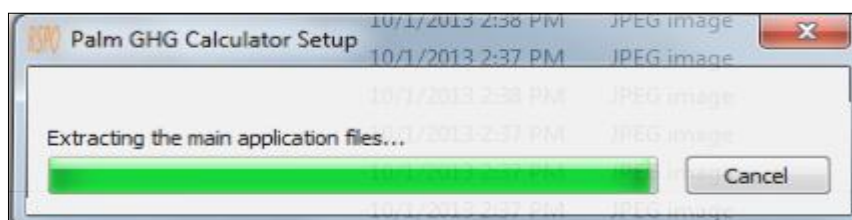
3. Due to some changes in the design of V2.0.1, upon conversion, please check and confirm the data inputs in the POME, Electricity and Compost forms again.

Installation

1. Download the Palm GHG Calculator installer from the RSPO website (www.rspo.org) and save it in your local folder.



2. Double click on the installer to initiate installation (see below).

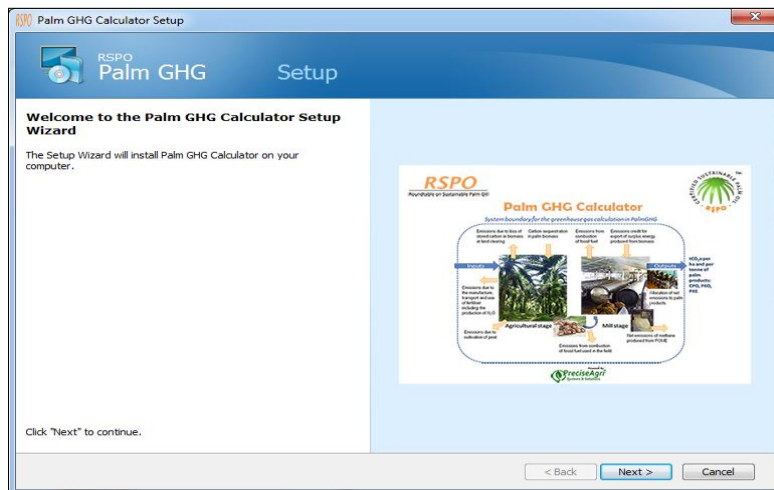


Note

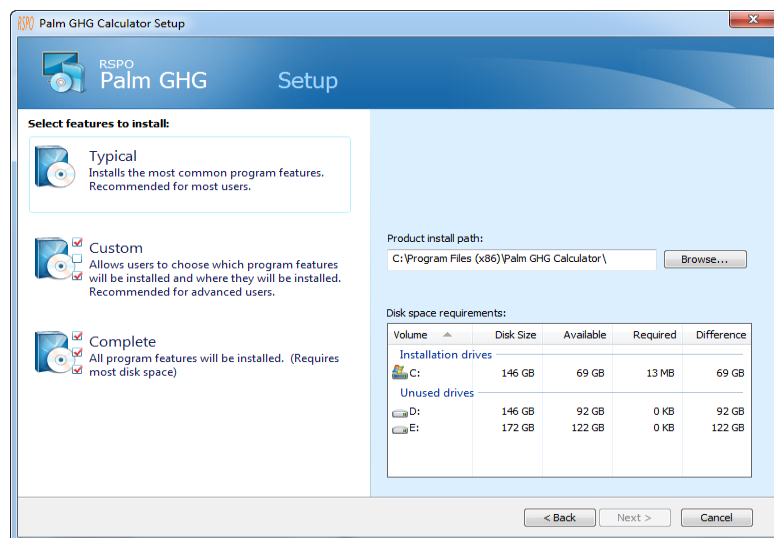
Requirements for installation:

- i. .Net Framework 4: The PalmGHG calculator installer will check whether .Net Framework 4 is present in the user's computer; if absent, then the user will be directed to a site for download. The .Net Framework 4 is a software development framework from Microsoft which provides a controlled programming environment where the software can be developed, installed and executed on Windows-based operating systems. **The user will have to install .Net Framework 4 before continuing PalmGHG installation.**
- ii. Access Database Engine: This is automatically installed during the installation of PalmGHG.
- iii. **Best resolution to view Palm GHG application is 1366 x 768.**

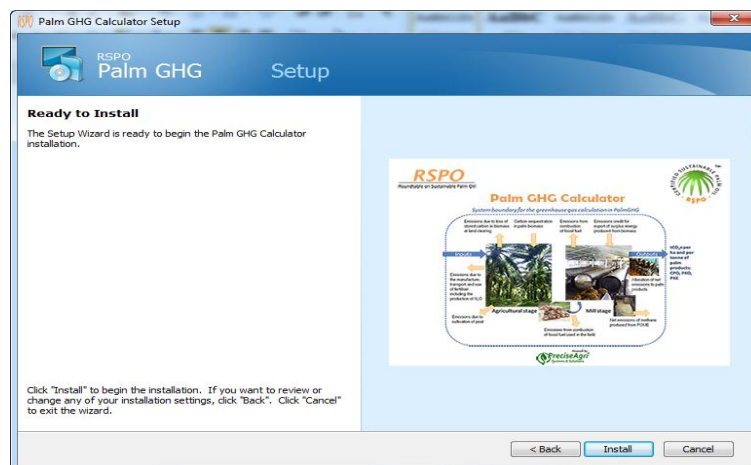
- When the Setup Wizard window appears, click "Next" to continue.



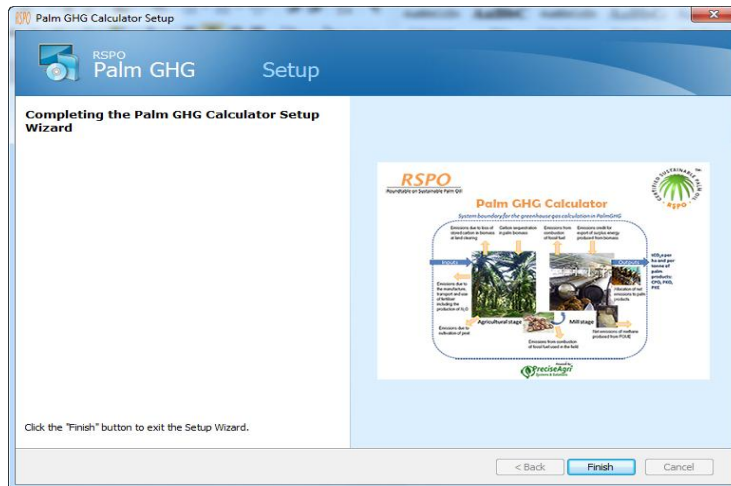
- Select Typical installation and click "Next" to continue.



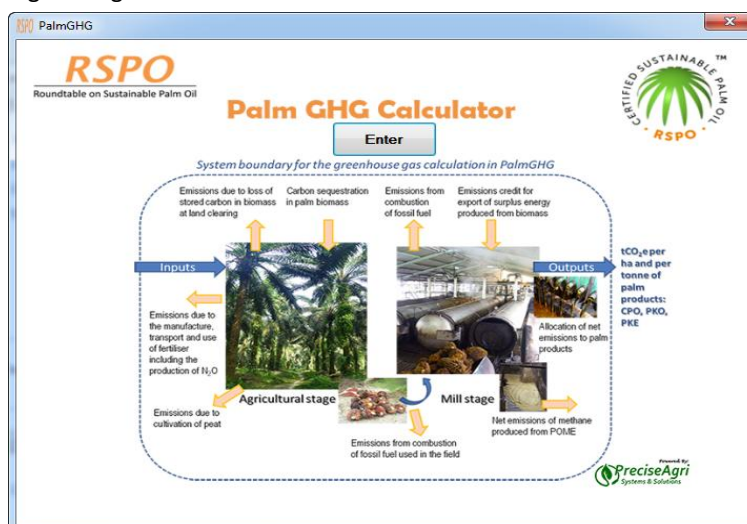
- Click "Install" to initialize the installation.



- Once installation is complete click "Finish" and proceed to run PalmGHG.

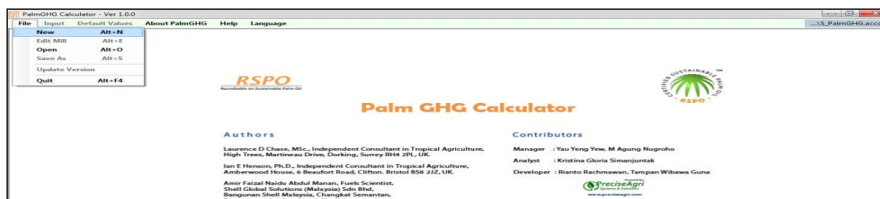


- Click "Enter" to begin using PalmGHG.




Creating a new database

1. Select New on the File drop-down menu, when creating a Mill database in PalmGHG for the first time.



2. The Mill Registration Form will appear in a pop-up window. Fill in the necessary information. Click "OK" to finish. Registration will be successful if all the required information is keyed in.

3. The Palm Oil Mill Input form will then appear. The Palm Oil Mill Input form consists of ten input sheets and a results summary sheet. Begin by selecting how you want to use PalmGHG, click on  for more information. After filling in the form, click "Save" and move on to the next sheet by clicking on the FFB (fresh fruit bunch) tab.

Note

- Missing or Unavailable Data

All mandatory input fields required for calculations in PalmGHG must be filled in. If the volume is nil, please key in "0". However, if data is missing or unavailable please key in "N/A". If any mandatory input field is left blank, the user will be unable to proceed.

- Using only 1 year data

Users no longer need to use 3 years data for assessment. In the interim (until the next update), please fill in "N/A" for previous years inputs.

- Select Edit Mill to edit Mill's details.

RSPO Edit Mill Registration

Edit Mill Registration

Name: ABC

Company: Company

Group: *(if same owner owns more than one mill)*

Membership No.:

RSPO Certified: Yes No

Location Address: Street, Discript, State, Country, Post Code

Geographic Address: Y-Coordinate, X-Coordinate

Contact Details: Telephone, Fax, Contact Person Name, Email

Note: *if the Assessment Year changed all data in this database will be deleted*

Assessment Year (yyyy)*: 2013

Update Cancel

- The purpose of the FFB sheet is to capture all the information on the FFB supplied to the Mill during the assessment year. Begin data entry by clicking "Add".

Palm Oil Mill Input Form - (First Time)

Info | FFB | Extraction | PK Crushing | PKS | POME | Electricity | Mill Fuel | EFB | Compost | Summary

Source of fresh fruit bunch (FFB)


No.	Source/Plantation	Association	RSPO Cert	Unit	2013	2012	2011	
Own				Subtotal	m ³ yr	-	-	-
Group				Subtotal	m ³ yr	-	-	-
Outgrower				Subtotal	m ³ yr	-	-	-
Total FFB Processed				m³yr	-	-	-	

Planted Area

No.	Association	Unit	2013	2012	2011
1	Own Planted Area	ha.	0	0	0
2	Group Plantation Planted Area	ha.	0	0	0
3	Outgrower	ha.	0	0	0
Total planted area			ha.	0	0

- The FFB Supplier Registration Form will appear in a pop-up window. Select the supplier's association, whether it is the Mill's Own Estate, Group Estate or Outgrowers. Key in the necessary information and click "OK" to complete.

- You will come to the FFB Supplier Input Form which consists of several input sheets and a summary sheet.

- FFB Sheet – Enter name of estate and the FFB production volume. If the estate only supplies FFB to the Mill being assessed, click "Save" to proceed. However, if the estate also supplies FFB to another Mill or FFB Collection Center, click  and indicate the volumes of FFB that is supplied elsewhere. Only emissions resulting from the cultivation of FFB processed in the assessed mill will be considered in the final result.

9. Outgrower Supplier Sheet – Click “yes” if the complete data set of the outgrower supplier is available. If unavailable, click “No” and proceed to provide an estimate for tCO₂e/FFB and state the reference/data source.

The screenshot shows the 'FFB Supplier Input Form - Smallholder 1 (First Time)' window. The 'Outgrower Supplier' tab is active. It contains a 'Save' button and a question: 'Do you have a complete dataset for the outgrower supplier?' with radio buttons for 'Yes' and 'No'. Below this, it asks for assumed emission values if the dataset is unavailable. The form shows 'Total tCO₂e/ha' as 'N/A', 'Total tCO₂e/FFB' as '1.2', and a text box for 'Reference/Data source' containing 'emissions from Smallholder 1 is assumed to be similar to emissions from own estates'. A note at the bottom states: 'If the complete dataset is available, please proceed to the next tab.'


10. Planting Data Sheet – Users can choose to key the information directly into PalmGHG or to key the information into an Excel spreadsheet and then upload it into PalmGHG. Crop cycle years is shown as 25 years by default. Users can also add Previous Land Use categories to the existing default list provided in PalmGHG by clicking “Previous LUC” button as shown below.

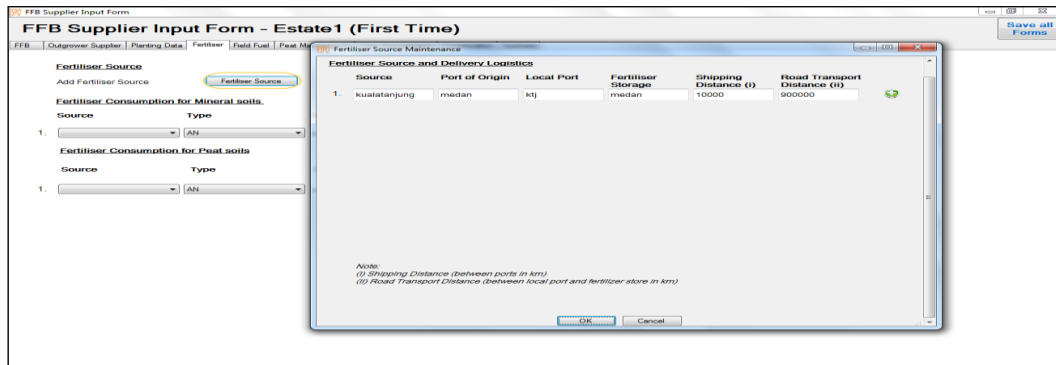
The screenshot shows the 'FFB Supplier Input Form - Estate1 (First Time)' window. The 'Planting Data' tab is active. It includes a 'Save' button, a 'Crop cycle years' field set to '25', and buttons for 'Upload', 'Download Template', and 'Previous LUC'. Below is a table with columns: No, Field ID, Gross Ha, Conservation area (ha), Conservation Type, Other Land Use, Planted area (ha), Previous Land Use, Year Planted, %Peat, and %Mineral. A 'User Comment' field is present with a note: 'Please indicate if any customised values have been used in the previous land use category'. Below the table is an 'Area Statement Summary' table.

Description	Unit	2013
1. Gross Ha	ha	
2. Planted Ha	ha	
3. Conservation Ha	ha	
4. Others	ha	

The screenshot shows the 'Previous Land Use Category' window. It contains a table with columns: No, Type, tC/ha, tCO₂/ha, Custom tC/ha, and Custom tCO₂/ha. The table lists six categories: Undisturbed forest, Disturbed forest, Shrubland, Grassland, Tree crops, and Food crops/Annual crops. There are 'Add' and 'Edit' buttons at the bottom.

No.	Type	tC/ha	tCO ₂ /ha	Custom tC/ha	Custom tCO ₂ /ha
1	Undisturbed forest	268	982.67	<input type="checkbox"/>	
2	Disturbed forest	128	469.33	<input type="checkbox"/>	
3	Shrubland	46	168.67	<input type="checkbox"/>	
4	Grassland	5	18.33	<input type="checkbox"/>	
5	Tree crops	75	275	<input type="checkbox"/>	
6	Food crops/Annual crops	8.5	31.17	<input type="checkbox"/>	

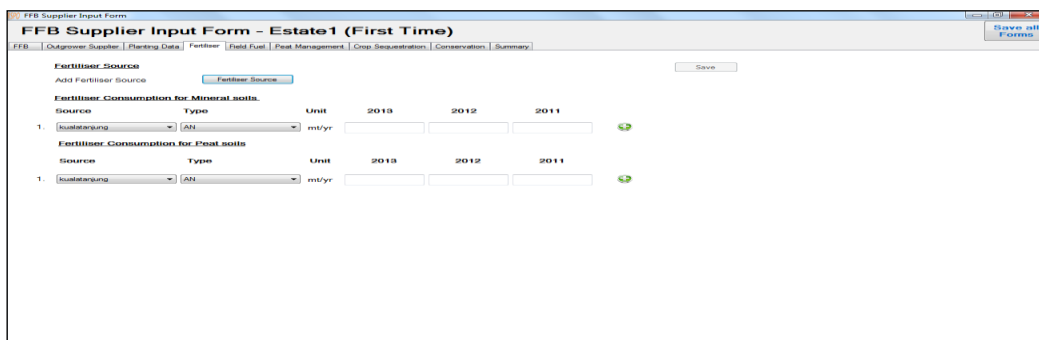
14. Fertiliser Sheet - To begin, click “Fertiliser Source”. A pop-up window will appear. Key in the required information on the fertiliser source. If the fertiliser is purchased from more than one source, click  to key in the additional data. Click “OK” to finish.




Note:

- ✓ Specify the city of port origin as the source. The source differentiates distance between port of origin.
- ✓ Distance is recorded in kilometers (km).
- ✓ Repeat step to record the source of each fertiliser type used.

15. Fertiliser sheet - Upon completing the above step, the fertiliser types and places of origin will appear in the drop-down lists. Proceed to complete the rest of the form. Click “Save”.



16. Fuel Sheet - Select fuel type from the drop-down list and key in the volume used. If more than one fuel type is used, click . Save and proceed to the Peat Management sheet.



17. Peat Management Sheet – The application will show the plantings on peat on this sheet based on the input data in the planting data sheet. Users are encouraged to key in actual values based on measurements of water levels in the field. Otherwise, default values are available depending on water management practices. Click “Save”.

Peat Management

Field ID	% Peat	Ha in Peat	Water Management	cm	CO ₂ Emission from peat (tCO ₂ /ha.yr)	Total CO ₂
ABC001	80	80.0	Yes_Good (Default)		0	0

Summary

Total Ha in Peat : 80.0

CO₂ Emission from peat tCO₂/ha.yr : 0

Total CO₂ : 0

Average CO₂ per Planted ha : 0

18. Crop Sequestration Sheet – Please select Vigorous Growth for estate and Average Growth for outgrowers (smallholders). Click “Save”. If the user chooses to use a different growth model other than the default provided in PalmGHG, select Custom Profile.

Crop Sequestration Calculations

Sequestration Profile : Vigorous Growth

Age	Year Planted	ha	Crop Sequestration Profile tCO ₂ e/ha	Total tCO ₂ e/ha
14	2000	100	8.73	872.85
Total		100		872.85

Average Crop Sequestration per ha per year : 8.73

19. Conservation Sheet – The oil palm concession that serves the Mill may have areas that are suitable for oil palm, but have been specifically protected from clearing as Conservation Areas. These areas could be used as a source of carbon sequestration in the palm oil GHG budget. The RSPO is still working on a practical methodology for growers to estimate the mean annual carbon sequestration from the conservation areas.

Conservation Credit

- Calculation (ha)
- Mean Cseq in Conservation Blocks tCO₂e/ha.yr
- Total Cseq in Conservation Blocks tCO₂e/yr
- Average Cseq in Conservation Blocks Over Planted Area tCO₂e/ha.yr

Total ha in Conserved : 0 ha Total Field : 0 Field

Field No.	Gross ha	Planted ha	Conservation ha	Other
-----------	----------	------------	-----------------	-------

20. Click on the Summary tab to view the FFB Supplier Summary. Click “Save all Forms” to ensure the data in all the sheets are saved and a summary will be generated.

Field Emissions Allocation :
 Planted Ha : 3310 ha
 FFB Produced : 65320 mt
 19.73 mt/ha

Buttons: Calculation Sheet, DRAFT

No.	Description	ICO _{2e}	ICO _{2e} /ha	ICO _{2e} /mt FFB	ICO _{2e}
1	Land Conversion	51783.11	15.64	0.79	51783.11
2	Crop Sequestration	-4242.39	-1.28	-0.06	-4242.39
3	Fertiliser (mineral) manufacture transport	1103.23	0.33	0.02	1103.23
4	N ₂ O from fertiliser (mineral) application (i)	2144.74	0.65	0.03	2144.74
5	Fuel Consumption	1329.49	0.40	0.02	1329.49
6	Peat Oxidation	2320.50	0.70	0.04	2320.50
7	Sequestration in conservation areas	-21389.04	-6.46	-0.33	-21389.04
Total		33049.64	9.98	0.51	33049.64

(i) The N₂O emissions from organic fertiliser is not displayed here.
 The total N₂O emission from fertiliser application can only be displayed in the final summary report.

21. Users can see details of the input data by clicking “Calculation Sheet” or save the FFB Supplier’s Summary to local folder by clicking “Draft” button.

Emission Calculation Sheet

Buttons: Calculation Sheet, DRAFT

Field No	Age	Year Planted	Planted area (ha)	Mineral Ha	Peat Ha	Previous Land Use	Expected crop cycle (years)	ICO _{2e} /ha	Total ICO _{2e} /ha	ICO _{2e} /ha Per Year
1	2010	467	467	0	0	Oil Palm	25	210.64	98,368.41	3,854.74
2	2009	160	150	10	0	Oil Palm	25	210.64	33,702.24	1,348.09
3	2008	165	149,995	15,015	0	Oil Palm	25	210.64	34,795.44	1,390.22
4	2007	170	170	0	0	Oil Palm	25	210.64	35,808.63	1,432.35
5	2006	120	120	0	0	Oil Palm	25	210.64	25,276.68	1,011.07
6	2005	160	160	0	0	Oil Palm	25	210.64	33,702.24	1,348.09
7	2004	140	140	0	0	Oil Palm	25	210.64	29,489.46	1,179.58
8	2002	200	200	0	0	Oil Palm	25	210.64	42,127.80	1,685.11
9	2001	135	135	0	0	Oil Palm	25	210.64	28,436.27	1,137.45
10	2000	140	140	0	0	Oil Palm	25	210.64	29,489.46	1,179.58
11	2000	15	0	15	0	Logged Forest	25	319.00	4,785.00	191.40
12	1999	120	120	0	0	Oil Palm	25	210.64	25,276.68	1,011.07

Save As

Libraries > Documents > New folder

Documents library

File name: Draft Report (Feedstock)-PalmGHGCalculator-Ver1.0.0-1172013

Save as type: PDF File (*.pdf)

Buttons: Save, Cancel

22. After saving the Draft, close the window and repeat steps 5 to 19 for each FFB supplier to the Mill.

23. After all the information on FFB supply has been recorded, proceed to the Oil Extraction sheet. Key in the annual CPO Production and Palm Kernel Production for the Mill. The %oer and %ker will be automatically calculated.


The screenshot shows the 'Milling Production' and 'Milling Extraction Rate' sections of the Palm Oil Mill Input Form. The 'Milling Production' section has a table with columns for Description, Unit, 2013, 2012, and 2011. The 'Milling Extraction Rate' section has a similar table. A yellow box highlights the 'Oil Extraction Rate, OER' and 'Kernel Extraction Rate, KER' rows.

Description	Unit	2013	2012	2011
CPO Production	mt	49083.88	53579.22	53070.03
PK Production	mt	11680.07	14247.01	13292.31
Oil Extraction Rate, OER	%	75.14	82.03	81.25
Kernel Extraction Rate, KER	%	17.88	21.81	20.35

24. Select "Yes" if the Mill operates a kernel crusher on site. Otherwise, select "No". Complete both the PK Crushing sheet and the Kernel Shell sheet.

The screenshot shows the 'Palm Kernel Crushing' section of the Palm Oil Mill Input Form. It includes a question 'Do you operate a kernel crusher?' with radio buttons for 'Yes' and 'No'. Below is a table for inputting data for 2013, 2012, and 2011.

Description	Unit	2013	2012	2011
Total PK Produced	mt/yr			
Own PK Crushed	mt/yr			
% of own PK Crushed	%			
PK from other sources	mt/yr			
Embedded emissions of PK from other sources (weighted average)	tCO ₂ e/t PK			
Total PK Crushed	mt/yr			
PKO Produced	mt/yr			
PKO Extraction Rate	%			
PKE Produced	mt/yr			
PKE Extraction Rate	%			

25. POME sheet – Please click  to view the POME treatment assumptions in PalmGHG. Select "Yes" if data is available for the volume of POME generated and the COD removed during digestion. If unavailable, select "No" and default values will be used to estimate the volume of POME and the methane generated during digestion.

The screenshot shows the 'POME Treatment' section of the Palm Oil Mill Input Form. A pop-up window titled 'Flow of POME assumed in PalmGHG' is overlaid on the form. The flow diagram shows the process from 'MILL' to 'COOLING POND', then to 'ANAEROBIC PONDS' and 'AEROBIC PONDS'. From 'ANAEROBIC PONDS', POME can go to 'COMPOST' or 'AEROBIC PONDS'. From 'AEROBIC PONDS', POME can go to 'FIELD APPLICATION' or 'RIVER DISCHARGE'. 'METHANE CAPTURE' is shown as a process that can receive input from 'ELECTRICITY' and 'FLARE', and output to 'AEROBIC PONDS'.

PalmGHG Calculator - Ver 2.0.1

File Input Default Values About PalmGHG Help

Palm Oil Mill Input Form - (First Time)

Info FFB Extraction PKCrushing PKS POME Electricity Mill Fuel EFB Compost Summary

POME Treatment ⓘ

Are data available for production of POME and COD removed during digestion? Yes No Save

if you choose "Yes", complete the information below :

Description	Unit	2013	2012	2011
POME Produced	t/yr	112146	N/A	N/A
POME diverted to anaerobic pond	%	100	N/A	N/A
POME diverted to methane capture (flaring)	%	0	N/A	N/A
POME diverted to methane capture (electricity generation)	%	0	N/A	N/A
COD removed during digestion	tCOD/tPOME	0.1	N/A	N/A

POME Calculation Result

POME	t/yr	112146	N/A	N/A
CH4 (Total)	t/yr	1996.20	N/A	N/A

26. Electricity sheet – Key in the required data. Click “Save” to continue.

PalmGHG Calculator - Ver 2.0.1

File Input Default Values About PalmGHG Help

Palm Oil Mill Input Form - (First Time)

Info FFB Extraction PKCrushing PKS POME Electricity Mill Fuel EFB Compost Summary

Electricity generation and consumption ⓘ Save

Description	Unit	2013	2012	2011
Grid Electricity Utilisation	kWh/yr	5772.683	N/A	N/A
Excess electricity exported to worker's housing and/or national grid	kWh/yr	122540.1	N/A	N/A
Grid electricity	tCO ₂ e/yr	3.68	N/A	N/A
Electricity credit	tCO ₂ e/yr	78.08	N/A	N/A

27. Fuel sheet - Select the relevant fuel type from the drop-down list provided. Key in the required data as per the Mill's usage.

PalmGHG Calculator - Ver 2.0.1

File Input Default Values About PalmGHG Help

Palm Oil Mill Input Form - (First Time)

Info FFB Extraction PKCrushing PKS POME Electricity Mill Fuel EFB Compost Summary

Fossil Fuel Consumption ⓘ Save

Description	Type	Unit	2013	2012	2011
FFB Milling	Diesel	l/yr	220300	N/A	N/A
PKCrushing	Diesel	l/yr	0	N/A	N/A

28. EFB sheet – Fill in all required fields on EFB sheet and click “Save”.

Description	Unit	2013	2012	2011
EFB	t/yr	14370.40	N/A	N/A
Sale of EFB for electricity generation	%	0	N/A	N/A
EFB Transported for field application	%	100	N/A	N/A
EFB Converted to compost	%	0	N/A	N/A
Other uses of FFB	%	0	N/A	N/A
Energy production	MJ/tEFB	1576.75		
Gross credit for electricity	kgCO ₂ e/tEFB	279.08		
Net credit	tCO ₂ e/tEFB	0.28	0.28	0.28
EFB credit for electricity generation	tCO ₂ e	0	N/A	N/A

29. Compost Sheet – Fill in all field on Compost Sheet and click “Save”.

Description	Unit	2013	2012	2011
Compost applied	t/yr	1000	N/A	N/A
N Content of compost	%	1.1	N/A	N/A

30. After completing all the required data, click “Save all Forms”. Then click on the Summary tab for a summary of the calculation results.

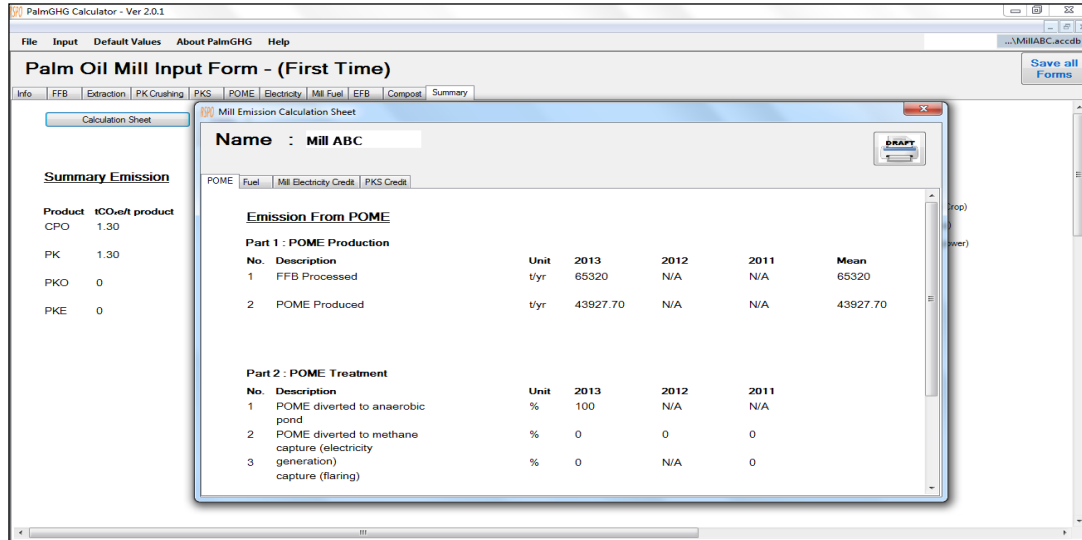
Summary Emission

Product	tCO ₂ e/t product
CPO	1.30
PK	1.30
PKO	0
PKE	0

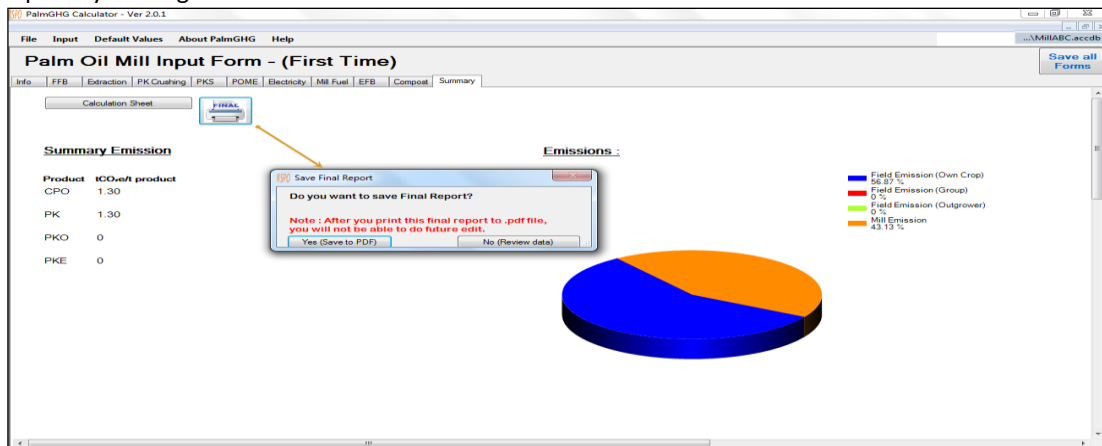
Emissions :

- Field Emission (Own Crop) 56.87%
- Field Emission (Group) 0%
- Field Emission (Outgrower) 0%
- Mill Emission 43.13%

31. To view the details of the input data used for the calculations, click on “Calculation Sheet”.



32. The user can check and review the draft report for possible errors. If required, corrections can still be made by the user. Once all the information is confirmed to be correct, the Mill can then generate the final report by clicking “Final Print”.

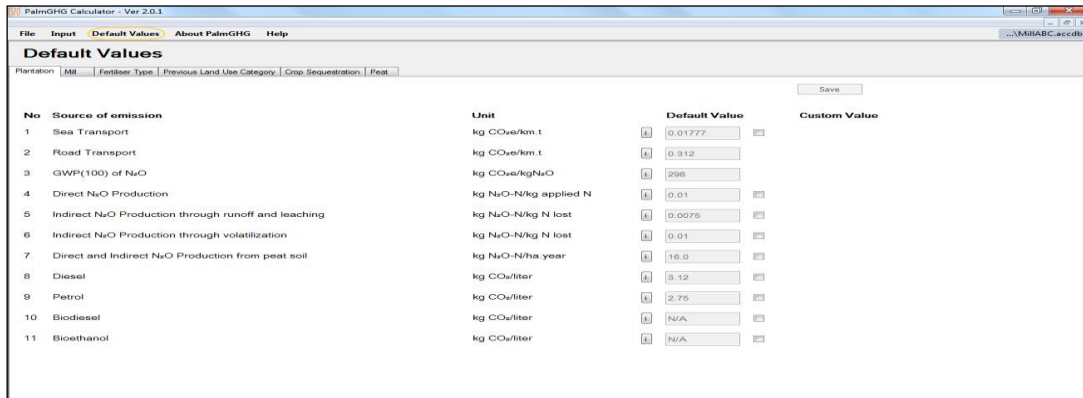



Important Note:

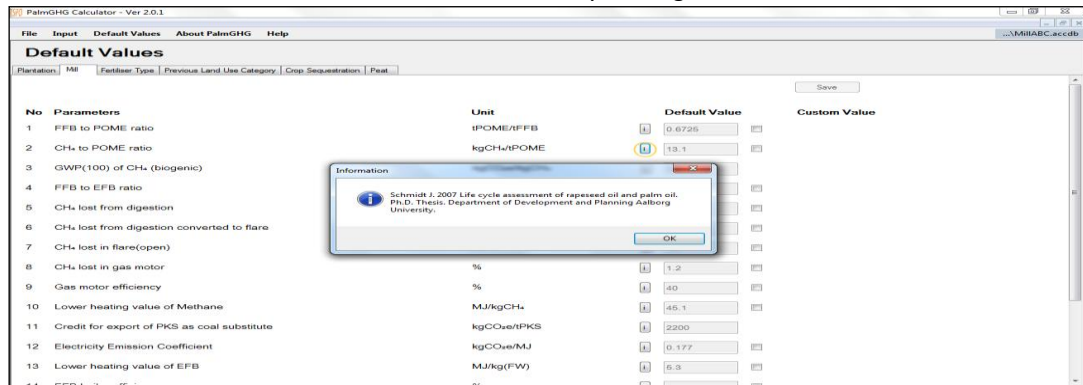
Please confirm that all the information provided in the report is correct before generating it as the Final Report. Once the Final Report is generated, further edits will no longer be allowed.


Default Values

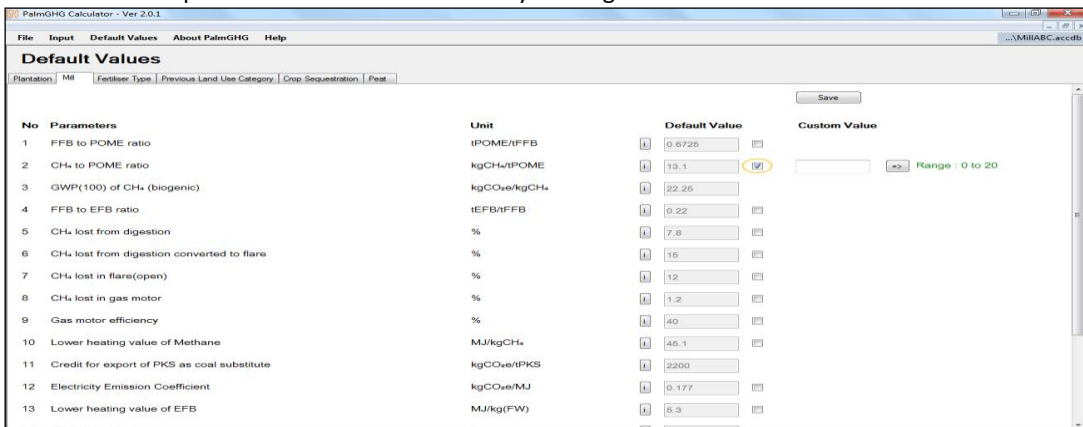
User can view the list of Default Values which are used for calculation by clicking Default Values menu.



The reference source of each default value can be viewed by clicking 



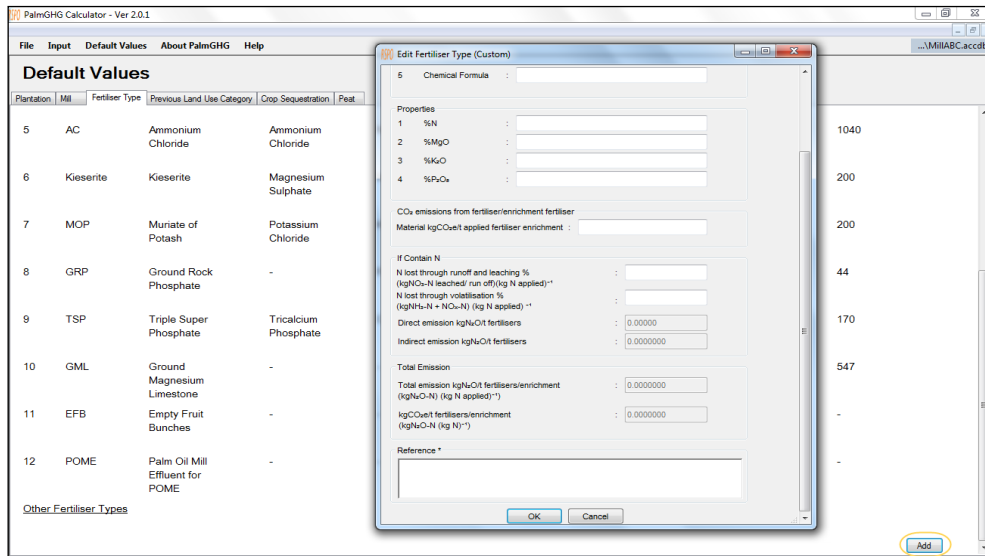
In order to use a custom value for the calculation, tick the checkbox provided. An input field will appear. Key in the custom value and provide the reference source by clicking 



Note:

Not all parameters can be customized. RSPO will define the parameters that can be customized by the user.

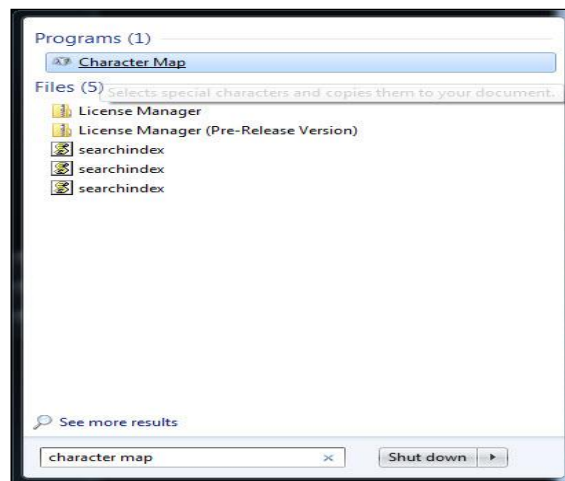
Currently, PalmGHG only provides for several types of fertilizers. In order to add new types of fertilizers, go to the Fertilizer form and click “Add”. A pop-up window will appear.



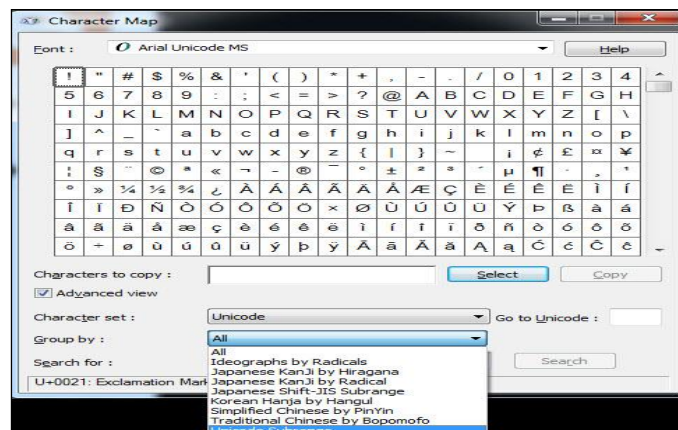
Note for Chemical Formula

Use Character Map to key in Chemical Formula value.

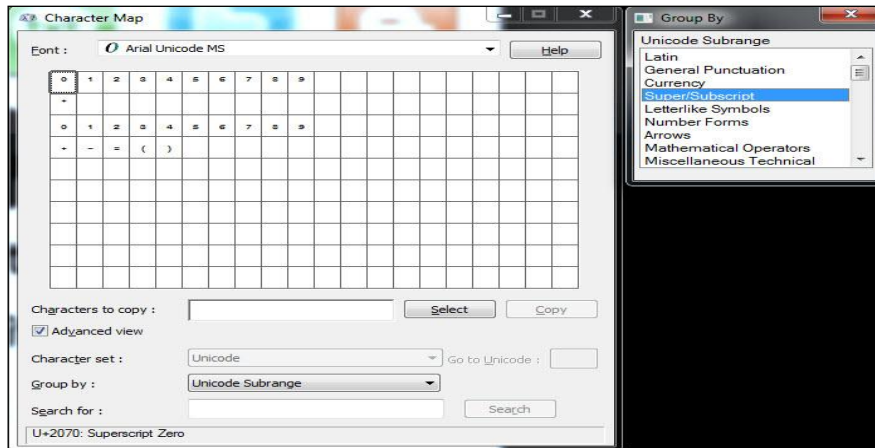
- i. From start program search “Character Map”, then click it.



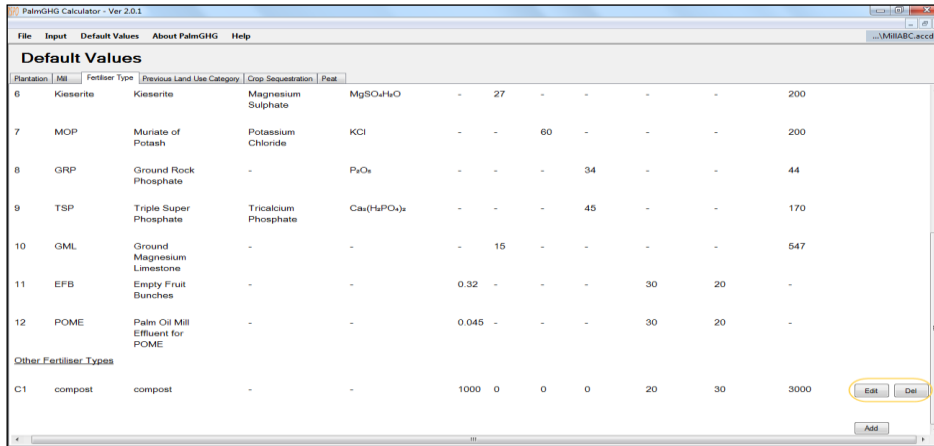
- ii. Select the font type and group by “Unicode Subrange”.



- iii. Select super/subscript for the group by type. Then select the character you need to use and copy paste to “Chemical Formula” field.



User can edit and delete their additional fertilizer type by clicking “Edit” or “Delete”, as shown below.



In the same way, user can also add other land use types to those currently provided.

