USER'S **MANUAL**

Community-Level GHG Inventory
for Local Government Units (LGUs) in the Philippines

With support from:

USAID
FROM THE AMERICAN PEOPLE

REVISION HISTORY

Date	Particulars
June 1, 2015	Initial adoption (ver01)
August 31, 2015	1st revision to include IPPU and Forestry Sectors

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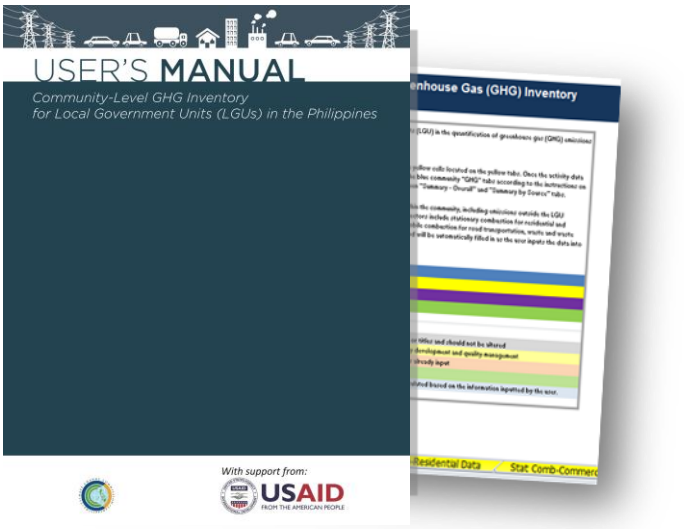
1.Introduction

1.1 Policies / Rationale

The Climate Change Act as amended in 2012 (RA 10174) declares that it is the policy of the Philippine Government to strengthen, integrate, consolidate, and institutionalize government initiatives to achieve coordination in the implementation of plans and programs to address climate change in the context of sustainable development.

Section 14 of this Act specifically recognizes the role that LGUs play in mainstreaming climate change efforts within the government and requires them to formulate and implement local climate change action plans (LCCAP) that is consistent with local and national policies and frameworks.

To complement this Act, Memorandum Circular No. 2014-135 or the Guidelines for the Formulation of the LCCAP was released by the Department of Interior and Local Government. Section 3.3.5 of the Memorandum Circular strongly suggests LGUs to identify mitigation options to help reduce their carbon footprints and contribute to efforts in addressing climate change.



Development of a greenhouse gas (GHG) inventory[1] is an activity that can support better planning for mitigation options that the LGUs can implement. Thus capacity building efforts related to GHG inventories are being supported by the Climate Change Commission, the sole policy-making body of the government that is tasked to coordinate, monitor and evaluate programs and action plans of the government relating to climate change.

[1]A GHG inventory is an accounting of GHGs that are emitted to and/or removed from the atmosphere over a period of time.

This User's Manual is produced by the CCC, with support from the USAID, to enable LGUs to institutionalize the process of developing their community-wide GHG inventories.

1.2 Purpose

This User's Manual provides a step-by-step guide for the LGUs to quantify and manage information and data related to the development of their community-level GHG inventories.

A Community-level inventory is a useful planning tool in developing mitigation actions for the entire community. It includes emissions from activities within the LGU's jurisdiction, including emissions from sources and/or activities in the different sectors within the community, such as energy, transportation, agriculture, industry, and waste.

This User's Manual is accompanied by a **GHG Inventory Quantification Support Spreadsheet**<filename: Spreadsheet for Community-Level GHG Quantification in the Philippines>. The two go hand-in-hand, and complement each other. While the Spreadsheet can be treated as a stand-alone document, the User's Manual explains in simple terms, the information required by the Spreadsheet and provides step-by-step instructions that are especially helpful for first-time users.

Collectively, the Spreadsheet, and the User's Manual aim to facilitate and institutionalize the process of planning, collecting and managing data, quantifying and reporting of an LGU's community -wide GHG emissions.

1.3 Scope and limitations

A number of categories of emission sources within the community level are included in this version of the User's Manual and the Spreadsheet. Other categories are presently not included but may be included in later versions as greater understanding of LGUs' experiences in these categories become available.

The following categories of emission sources are considered in this version:

- Stationary Combustion from commercial and residential buildings
- Purchased Electricity (Commercial buildings, Residential buildings, others (e.g. streetlights, mass rapid transit etc.))
- Mobile Combustion
- Solid Waste in Landfills(including GHG emissions from solid waste produced from within the community but landfilled outside the community geopolitical boundaries)
- Wastewater Treatment and Discharge
- Agriculture (crops and livestock)
- Industrial Processes and Products Use for Selected industries
- Forestry

In order for LGUs to accurately account for these categories, specific data to be collected, and the sources from which it is to be collected, are identified and defined in both the User's Manual and the

Spreadsheet. In most cases, data considered are from the same source that provided it for use in the development of LGUs GHG inventories under USAID's previous capacity building efforts. However, in other cases, more specific data that can lead to a more accurate quantification of GHG emissions for a given source is desirable. Thus, this User's Manual also presents optional or alternate options to address better accuracy needs.

1.4 GHG Accounting Protocols and Principles

Present government policies, particularly the Memorandum Circular No. 2014-135 or the Guidelines for the Formulation of the LCCAP, does not require but rather encourage GHG reduction efforts from LGUs. Thus, rules governing the conduct of GHG inventories are dependent on the choices made by the LGUs but are anchored in internationally recognized standards and protocols on community-level GHG accounting. The main reference document for the conduct of this type of inventory is the IPCC Guidelines for National GHG inventories. In some cases the Global Protocol for Community-Scale GHG Emissions (GPC) is also used. Guidelines from both these documents are used in this Manual as well as the Spreadsheet, when applicable.

The IPCC Guidelines and the GPC have provided good practice approaches in ensuring the quality of the GHG inventory report. The IPCC has identified the principles of transparency, accuracy, completeness, consistency and comparability as indicators of GHG inventory qualities. Meanwhile the GPC has identified the principles of relevance, completeness, consistency, transparency, accuracy and measurability as indicators in the conduct of the inventory. Often, tradeoffs are encountered in applying these principles, so it is necessary for LGUs to decide which among

these will have more weight as they conduct their inventories.

The following principles have governed past LGU GHG inventories and are used as guides in this Manual and Spreadsheet:

Transparency - Activity data, emission sources, emission factors, and accounting methodologies should be adequately documented and disclosed to enable verification. The information should be sufficient to enable individuals outside of the inventory process to use the same source data and derive the same results. All exclusions need to be clearly identified and justified.

Relevance - The reported GHG emissions shall appropriately reflect emissions occurring as a result of activities and consumption from within the city's geopolitical boundary. The inventory shall also serve the decision-making need of the local authority, and take into consideration relevant local and national regulations.

Accuracy - The calculation of GHG emissions should not systematically overstate or understate actual GHG emissions. Accuracy should be sufficient to give decision makers and the public reasonable assurance of the integrity of the reported information. Local authorities should reduce uncertainties in the quantification process to the extent that it is possible and practical.

Completeness - All emissions sources within the inventory boundary shall be accounted for. Any exclusion of emission sources shall be justified and clearly explained.

Consistency - Emissions calculations shall be consistent in approach, boundary, and methodology. Consistent methodologies for calculating GHG emissions will enable meaningful trend analysis over time, documentation of reductions, and comparisons between LGUs.

Comparability - The GHG inventory is reported in a way that allows it to be compared with other inventories from other LGUs. This should be reflected in appropriate choice of emissions or removals categories and in the use of the same reporting guidelines as that of the other LGUs'.

1.5 GHG Inventory Management and Reporting Process

LGUs who wish to conduct their GHG inventories are expected to go through the following process:

- Planning and Design
- Implementation (data collection, calculating emissions, data quality management)
- Reporting
- Improvement
- Finalization

Both the Manual and the Spreadsheet are guided by this process of the GHG inventory but puts special emphasis on data quantification and quality management. Nevertheless, it provides an overall idea of

the inventory process which LGUs need to go through. Each LGU will go through this process at its own pace, depending on factors such as human resources, budget and technical capabilities. Thus, a completely filled out Spreadsheet, which complies with all the steps in the manual, will allow the LGUs to experience going through this whole
cycle.

1.6 GHG Emissions Quantification

In order to understand the data needed to quantify GHG emissions, LGUs need to know the general quantification equation used in computing for GHG emissions:

GHG EMISSIONS = Activity Data X Emission Factor

Activity data (A) is any data that pertains to the magnitude of human activity resulting to GHG emissions. This can be volume of fuel (measured in Liters), weight of fuel (measured in kilogram units), amount of electricity usage (measured in kilowatt-hour) or distances travelled (measured in kilometers) etc.

Emission factor (EF) is the average emission rate of a given GHG for a given source, relative to units of activity. They are always expressed as ratios, for example, 2.68 kg of CO2 per Liter of diesel. The table below dissects this definition and example even more:

Question: What is the EF of diesel?	
Answer: 2.68 kg CO2/L	
Salient points of EF definition	Values/answers based on the question
"given GHG"	CO2
"given source"	Diesel
"Unit of activity"	Liters
"Average emission rate"	2.68 kg co2/L of diesel

Activity data may be within the control of the LGUs or can be gathered from published local or national databases. EFs are taken from published national or international guidance documents. Sometimes, EF values are not readily available for the given activity data, so additional computations are needed, but the Spreadsheet has collected and encoded these formula for all major GHG sources of emissions. Therefore, the LGUs' focus is only on gathering and making sure that the Activity data is complete and accurate. Guidelines on activity data collection are found in chapter 3.

1.7 Quantification of GHG Removals by Sinks

LGUs with forests need to look into the contribution of these forests in their GHG inventories. Forests are unique in the sense that they can be a source of greenhouse gas emissions or they can remove GHG emissions by absorbing them. The net carbon emissions or removal of the forest and land use sector is dependent on two basic biophysical processes:[2]

a) Changes in forest/woody carbon stocks due to the net annual biomass growth of existing forest and non-forest stands, and possible biomass regrowth in abandoned lands;

b) Land use and forest conversion practices which affect the carbon chemistry of the atmosphere via biomass burning, decay and soil carbon release and uptake.

[2] Tracking Greenhouse Gases: An Inventory Manual, page 122

The current version of the Spreadsheet and the Manual only considers process (a), as the methodology for this are simpler and data are available.

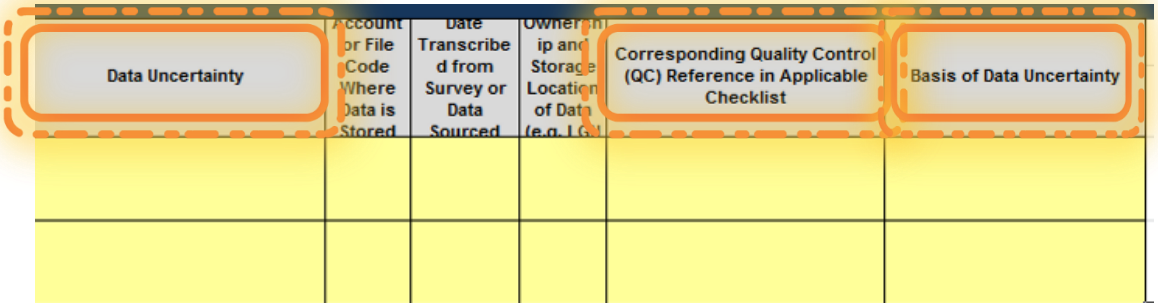
1.8 Data Quality Management

Apart from GHG emissions quantification, special emphasis is made on quality assurance (QA) and quality control (QC)[3]. These data quality management concepts are included in the Spreadsheets as well as this User's Manual to set and/or improve LGU's internal procedures and systems for collecting and managing GHG emissions-related data. It also identifies opportunities for improvement as well as best practices that the LGUs may implement in the future.

It is important to have QA/QC checks to ascertain whether there are data that were incorrectly stated or were omitted that may cause emissions to be misrepresented , thus potentially influencing decisions or actions taken by the users of the GHG inventory report.

Knowing the probabilities of how much of the data collected were misrepresented will provide LGUs a gauge of the accuracy of their data and will aid them in determining how much weight they will put (i.e. how relevant the data is) for that particular data in decision-making.

For starters, LGUs are not expected to have QA/QC procedures in place especially for those generating first-time inventory reports. However, for some LGUs, procedures may be devised to ensure the quality of data. For these LGUs, the Spreadsheet requires answering questions such as "How Much data uncertainty this data has?" or provide for "basis of data uncertainty" as shown below:



Note that these questions or information do not affect the calculation of the GHG emissions in the Spreadsheet, but are essential for QA/QC. Hence, guidelines are provided in the User's Manual when applicable, but LGUs may opt not to answer them for the time being.

[3] *Quality Assurance* is a planned system of review procedures conducted by personnel not involved in the inventory development process. Meanwhile, *Quality Control*is a system of routine technical activities implemented by the inventory development team to measure and control the quality of the inventory as it is prepared (2006 IPCC Guidelines)

1.9 Reporting GHG Emissions and/or Removals by Sinks

The Spreadsheet can be considered as a predefined template which the LGUs can use in reporting their GHG inventories. It can also be a good starting point for LGUs to improve upon as data and emission factors are improved. The advantages of using this template include:

- Concise format allows LGUs to focus on data collection and improving data quality
- Accommodates varying levels of capacities between LGUs by providing essential steps as well as optional steps to cater to more advanced information
- Standardized format allows comparison of results among LGUs
- Once data are properly inputted in the Spreadsheet, an overall GHG Emissions and removals by Sinks Summary for community-wide GHG emissions by sources is automatically calculated. This snapshot provides an easy reference for LGUs of their emissions by sources:

Below is an example of a GHG Emission Summary Table.

GHG Emissions Summary

Emission Source	GHG Emissions (tonnes CO_2e)	Proportion of Total Emissions	Weighted Uncertainty
Scope 1 Emissions (Net of Forestry and Land Use)			
GHG Emissions from Community-Level Residential Stationary Fuel Use	500.00	0.48%	
GHG Emissions from Community-Level Commercial Stationary Fuel Use	600.00	0.58%	
GHG Emissions from Community Mobile Combustion	1100.00	1.06%	
GHG Emissions from Solid Waste Disposal - IPCC FOD Method*	3750.00	3.62%	
GHG Emissions from Other Solid Waste Treatment (ICLEI)*	560.00	0.54%	
GHG Emissions from Solid Waste Open Burning (ICLEI)*	210.00	0.20%	
GHG Emissions from Wastewater Treatment and Discharge	4000.00	3.86%	
GHG Emissions from Community-Level Agriculture (Crops)	500.00	0.48%	
GHG Emissions from Community-Level Agriculture (Livestock)	740.00	0.72%	
GHG Emissions from Solid Waste Disposal - Inside LGU Geopolitical Boundaries (ICLEI)	0.00	0.00%	
GHG Emissions from Wastewater Treatment and Discharge (Other Sources)	0.00	0.00%	
GHG Emissions from Industrial Processes and Product Use	2000.00	1.93%	
Scope 1 Emissions/Removal (Forestry and Land Use)			
GHG Emissions from Forestry and Land Use	19533.36	18.87%	
GHG Removal from Sink		0.00%	
Total Scope 1 Emissions	**33,493**	**32.36%**	**0%**
Scope 2 Emissions			
GHG Emissions from Purchased Electricity at Community-Level Residential Sites	20000.00	19.32%	
GHG Emissions from Purchased Electricity at Community-Level Commercial Sites	50000.00	48.31%	
GHG Emissions from Purchased Electricity at Community-Level for All Other Sources	0.00	0.00%	
Total Scope 2 Emissions	**70,000**	**67.64%**	**0%**
Scope 3 Emissions			
GHG Emissions from Solid Waste Disposal - Outside LGU Geopolitical Boundaries (ICLEI)	0.00	0.00%	
Total Scope 3 Emissions			
Total Emissions and Uncertainty	**103,493**	**100.00%**	**0%**

Instructions | InternalControl | General Info | Summary-Overall | Stat Comb-Residential Data | Stat Comb-Co

Emissions are classified according to SCOPES. Scopes establish the inventory boundaries so that GHG emissions to be accounted for and reported in the inventory are clearly stated. Boundaries define the scale and reach of emissions that will be included by the LGU in its GHG inventory Report. There are 3 scopes used in the inventory reporting[4]:

- Scope 1: All direct emissions from sources within the geopolitical boundary of the community.
- Scope 2: Energy-related indirect emissions that occur outside the community boundary as a consequence of consumption/use of grid-supplied electricity,

[4]World Resources Institute, World Business Council for Sustainable Development, 2001

- Scope 3: All other indirect emissions that occur outside the boundary as a result of activities within the community's geopolitical boundary, including trans-boundary emissions due to exchange/use/consumption of goods and services

It is best practice for LGUs to report all of its Scopes 1 and 2 emissions. Scope 3 emissions are also relevant, especially those on waste, so they are also commonly reported.

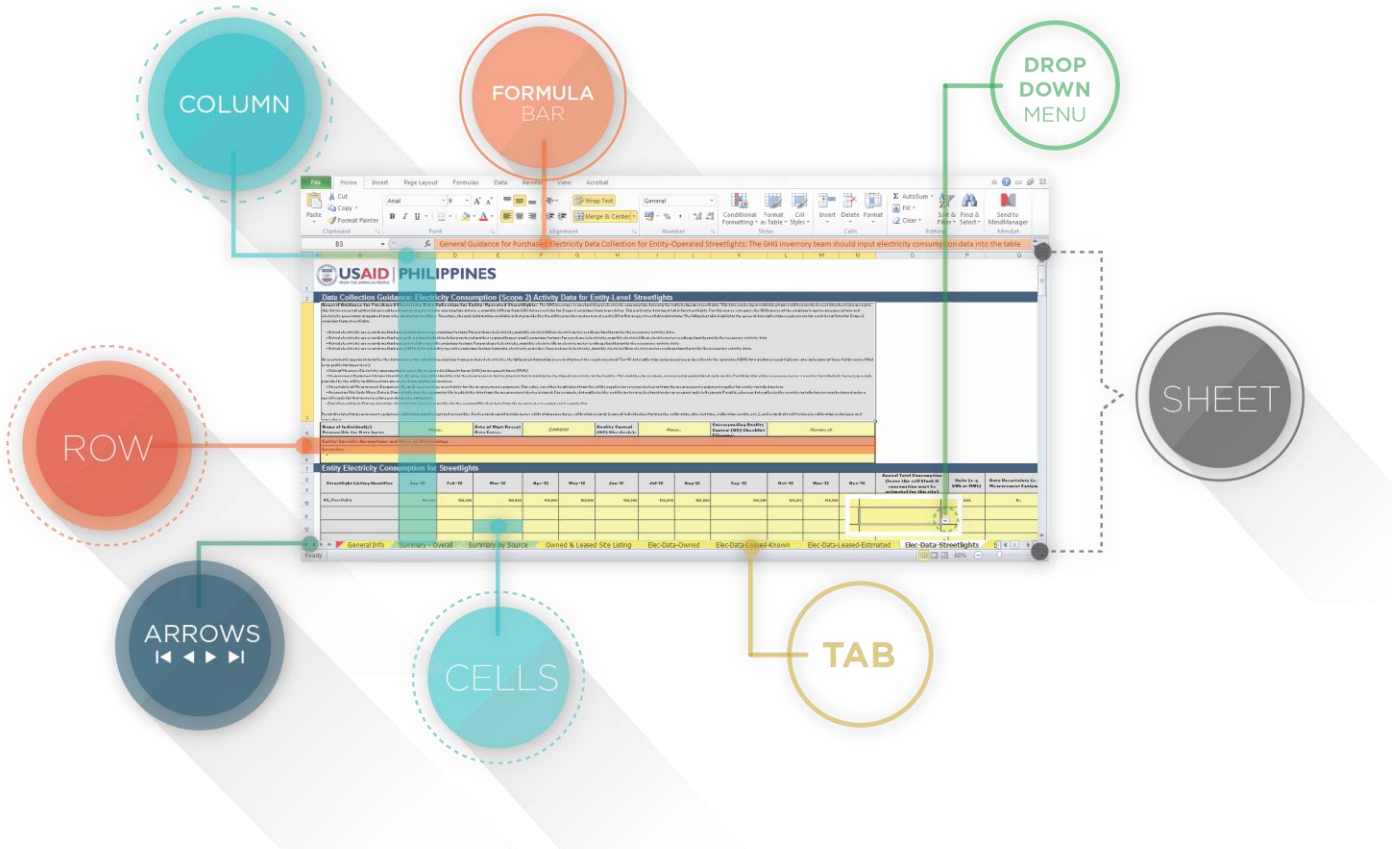
Take note that the Total GHG emission reflected in the summary includes emissions from the forestry sector but excludes removals by sinks. Similarly, the proportion of total emissions considers GHG emissions from forestry and not the removal by sinks. This way of presenting the results will ensure the inclusion of all GHG emission sources necessary for the LGUs to identify and prioritize mitigation actions within their communities.

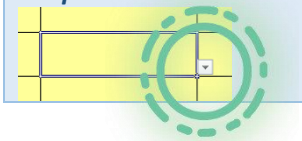
2. The GHG Inventory **Quantification Support** Spreadsheet

This User's Manual complements the GHG Inventory Quantification Support Spreadsheet. Thus, it is important to first understand the basic features of the Spreadsheet before proceeding with the inventory process.

2.1 Basic Parts of the Spreadsheet Screen

The Spreadsheet was made using the Microsoft Excel software. This software should be installed in the LGUs' computers in order to use the Spreadsheet. The following are the basic parts of the Spreadsheet and their specific functions as they appear on the screens:



Column	Vertical grid pattern in an excel worksheet Each column is denoted by a capital letter (e.g. A, B, C….. ZZ…)
Row	Horizontal grid patterns in an excel worksheet. Each row is denoted by a number (e.g. 1, 2, 3…100…1,000…)
Cell	A rectangular box which stores data. It is the intersection formed by a column and a row. Each cell can be uniquely identified by its column and row (e.g. A1, J75….ZZ100…) An *active cell* is a cell outlined by a black/dark blue border. Data can be typed here.
Formula Bar	The space where data or formula used in active cells are displayed
Worksheet	A single page composed of many cells arranged in a grid pattern using columns and rows. Each worksheet contains information, data and formula. They are governed by color-coded "rules" and LGUs are required to follow the step-by-step procedures in order to fill them out.
Data Sheets	For our own purposes, data sheets are worksheets that are used for data collection purposes.
Spreadsheet	Spreadsheet is a collective set of worksheets
Tab	Found at the bottom of the worksheet, it displays the name of a specific worksheet (e.g. summary, elec data –owned etc).
Arrows (I, , ,)	Found at the lower left of the worksheet, clicking these symbols allows the user to view the tabs that are not currently shown.
Drop-down menu 	Sometimes, an arrow ( ) automatically appears on the lower right portion of an active cell. This signifies the presence of a drop-down menu. Click on the arrow to view the menu/list and select applicable data.

2.2 Color-Coding Scheme

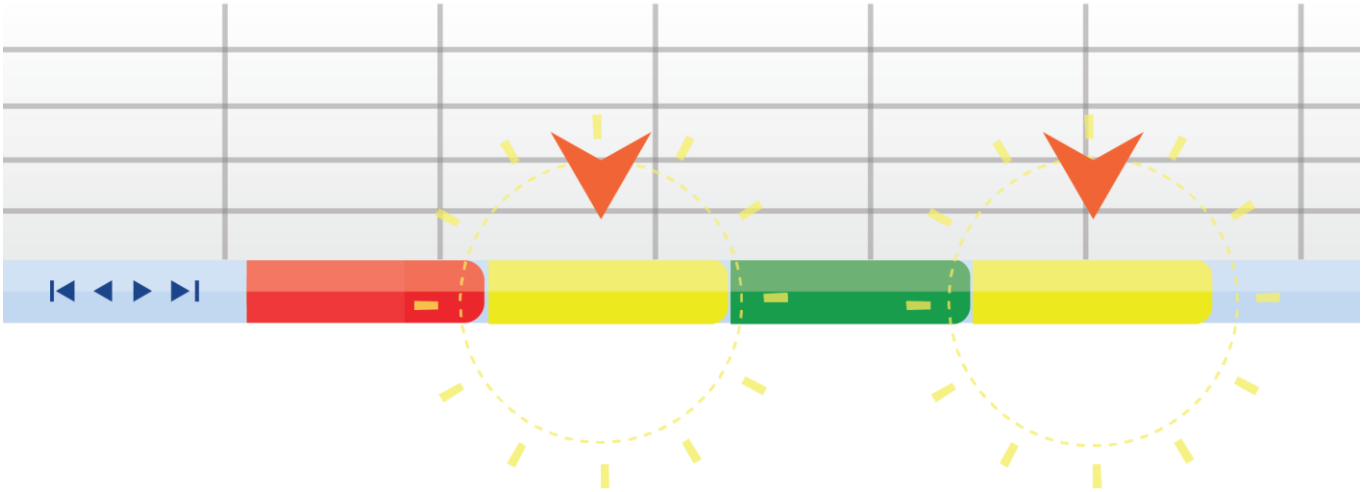
The Spreadsheet uses the following color-coding scheme for easy reference:

As a general rule, yellow tabs and (light) yellow cells indicate data inputs. Users are required to fill this out. For starters, it is highly recommended that LGUs only concern themselves with yellow tabs and cells. Users may go ahead and alter the orange and (light) green only after doing the yellow ones.

Blue and grey cells contain values that are default or were automatically computed or copied from other cells. They are easy to identify not only because of their colours but by the formula that appears in the formula bar when active cells are clicked. Extra caution is needed to prevent accidental deletion of these formulas they may affect the whole Spreadsheet.

2.3 Worksheets

Note that the Spreadsheet contains 45 worksheets (or 45 tabs), 22 of which are colored yellow. These yellow worksheets are data input worksheets and require data from the LGUs. Each of these yellow worksheets corresponds to a particular LGUs' source of emissions. Thus it is good practice to fill out as much of these yellow cells as possible by following the step-by-step guide in Chapter 4 by collecting as much data as possible by following procedures outlined in Chapter 3. The tabs, found at the bottom part of the screen, identify the worksheets.



2.4 Software Version with Macros Enabled

Note that this Spreadsheet has codes or "Macros" in it. Macros is a function in Excel that allows it to create repetitive tasks and standardized formats. Hence it is recommended that LGUs use the most recent version of Microsoft Excel when using this Spreadsheet, to maximize the use of Macros.

3. Activity **Data Collection**

This Chapter presents a Step-By-Step procedure in identifying and gathering the correct data needed for the GHG community-level inventory. Activity data is almost always unique to any LGU, but in this Chapter, datasheet templates are presented so that LGUs can focus on their actual data gathering.

These datasheets were designed to mirror the worksheets found in the Spreadsheet, and were meant to be used to summarize and record the data collected from the surveys conducted/ to be conducted by the LGUs. The purpose of this simplified approach is for the LGU to first gather the correct data, and when complete, input them in the Spreadsheet.

A compilation of the Data Sheets used in this Chapter is found in the **Annex 1: Data Sheets.**

3.1 General Guidelines on Activity Data

Activity data (A) for community-level inventory should be derived from the following:

1. Census or Sampling
2. National or regional consumption data of the Philippines

Census or survey

Activity data can be collected by conducting a survey using a census[5] or sampling[6] method within the geopolitical boundaries of the local government unit (LGU), or in some cases, outside the LGU boundaries. The survey for activity data needed for the community-level inventory may be incorporated with the other surveys being conducted within the LGU[7].

Guidance Notes:

Fuel data consumed by the community are obtained from fuel suppliers operating within the geopolitical boundaries of the LGU and those fuel suppliers **based outside** the LGU **but servicing the households and businesses within**. The activity data collected from these fuel suppliers are often in Peso amount and not in liters sold. The data to be used in the computation of emissions has to be converted to activity data units (i.e. liters, kilograms, cubic meter, kilowatt-hours) using the average price per unit. It is necessary to document the steps taken and assumptions used to convert the Peso amount to activity data units.

[5] Census is a procedure of systematically collecting data from a **whole** population
[6] Sampling is a process of choosing a **representative sample** from a target population
[7] An example of this survey is the local census periodically done by the LGUs

Municipality of Kalayaan, Laguna experience

A census which covers the entire 4,966 households of Kalayaan was conducted for their first inventory. Respondents who own or operate businesses (e.g. restaurants, '*sari-sari*'stores) in Kalayaan were asked to include total consumption in their responses. The census was conducted from May to June 2012 during the summer season in the Philippines. Questions on the monthly consumption of the following were included in the census: LPG, kerosene, fuelwood and charcoal for cooking; Fuel use for generators; and Kerosene for lighting.

Prior to the conduct of this census, the Kalayaan GHG Inventory Team undertook training with the faculty of the University of the Philippines – Los Banos on how to formulate survey questionnaires. This training was supported by the USAID.

A total of 11 surveyors, who were all working full time for the municipality as interns for the summer were tasked to carry out the census in the three barangays. In addition, thirty (30) students doing their on-the-job training in the municipality under the Special Program for the Employment of Students (SPES) were tasked to assist the 11 surveyors. Thus, each surveyor had a team of at least two members when carrying out the task. The Kalayaan GHG Inventory Team oversaw the process of surveying and encoding of the data.

National or regional consumption data of the Philippines

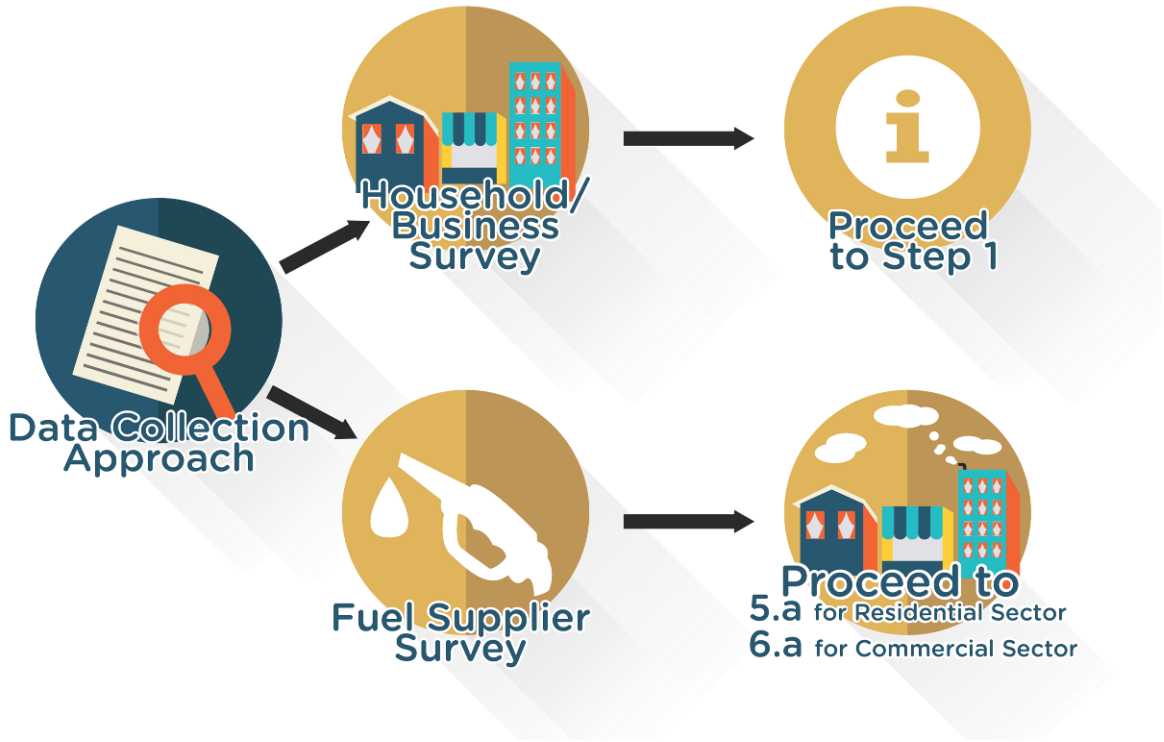
Government agencies such as the Department of Energy (DoE), Environmental Management Bureau of the Department of Environment and Natural Resources (EMB-DENR) or the Land Transportation Office (LTO), and statistical office such the Philippine Statistics Authority (the newly created office which covers the National Statistics Office[8], National Statistical Coordination Board and Bureau of Agricultural Statistics) may be able to provide information needed for the community-level inventory. The Planning Office of the LGU may also have data on household and commercial establishments within the geopolitical boundaries of the LGU.

[8] National Statistics Office conducts the Household Energy Consumption Survey(HECS)

The Spreadsheet has been developed using activity data based on household and vehicle surveys. If the LGU does not have household and/or vehicle survey, the LGU may proceed directly to the emission data sources and will need to skip some of the columns in the Spreadsheet that are not applicable. The decision tree will provide the guide on the steps to follow for computing emissions depending on the data collection approaches adopted.

3.2 Stationary Combustion

Stationary Combustion fuels are those used by residential and commercial sectors for cooking, lighting, heating and cooling within the geopolitical boundaries of the LGU.



Step 1 Request information for the number of residential households (including multi-unit buildings) and registered businesses (for commercial sector) within the LGU boundaries from the concerned Division/Office of the LGU (i.e. Planning Division or Business Licensing Division for commercial establishments), Philippine Statistics Authority, Philippines Business Registry, other government offices or directly from fuel suppliers.

Step 2 Conduct the survey method chosen (census or sampling). The survey method to be adopted will depend on the time and resources available, such as personnel and budget.

Step 3 Prepare the summary of the data collected from the residential sector based on the suggested format of *Datasheet 3.1. List of Households included in the inventory per Districts/Barangays*.

Datasheet 3.1. List of all Households included in the inventory per Districts/Barangays

	Districts/Barangays included in the inventory	Total Population	Total Number of Residential Households	Total number surveyed (enter "NA" if no data)	Source of data
1.					Example: • LGU • Philippine Statistics Authority • Household survey
2.					
3.					
4.					
5.					

Step 4 Prepare the summary of the data collected from the commercial sector based on the suggested format of *Datasheet 4.1. List of Commercial Establishments included in the inventory per District/Barangay*.

Datasheet 4.1. List of all of Commercial Establishments included in the inventory per District/Barangay

	Districts/ Barangays included in the inventory	Total Population	Total Number of Registered Businesses (enter "NA" if no survey is used)	Total number of business surveyed (enter "NA" if no data)	Source of data
1.					Example: • Permit and Licensing Division of the LGU • Commercial establishment survey
2.					
3.					
4.					
5.					
6.					

Step 5 Identify the emission sources of the residential sector. Use Datasheet 5.1 to record the information collected on fuel consumption of the residential sector for stationary combustion.

Step 5.1. Consolidate all activity data according to District/Barangay (Column A) and Application (Column D). Indicate the Data Source Identifier in Column B (title of the source document) and the Type of Data in Column C (i.e. household survey, fuel supplier, national averages). Disaggregate the data according to the type of fuel (blended diesel, gasoline, LPG, fuel wood), annual volume and unit of measurement (i.e. liters, kilograms) and indicate in Columns E, F and G respectively. Ensure that there is no double counting when applying combination of data collection approaches. (Skip Step 5.A and proceed to Step 6)

Datasheet 5.1.Emission sources and fuel consumption of the residential sector – Stationary Combustion (Examples are provided)

A	B	C	D	E	F	G
District/ Barangay/ LGU	Data Source Identifier	Type of Data	Application	Fuel type	Annual Volume	Unit
Longos	Surveyed Residence Longos 1	Individual Household survey	cooking	kerosene	300	liters
San Antonio	Data Fuel Sale data from Fuel supplier San Antonio	Fuel supplier survey	generator	Blended diesel	10,000	liters

Step 5 .A. Identify the emission sources of the residential sector. Use Datasheet 5.1 to record the information collected on the fuel consumption of the residential sector for stationary combustion.

Step 5 .A. 1. Consolidate all activity data according to District/Barangay (Column A) and Application (Column D) *if available*. Indicate the Data Source Identifier (title of the source document) and the Type of Data (i.e. fuel supplier, national averages). If disaggregated activity data per District/Barangay and Application of fuel are not available, put the name of the LGU in Column A, disregard Application in Column D, consolidate and identify the fuel consumed per fuel type, amount and units in Columns E, F, G respectively. Ensure that there is no double counting when applying combination of data collection approaches.

Step 6 Identify the emission sources of the commercial sector. Use Datasheet 6.1 to record the information collected on the fuel consumption of the commercial sector for stationary combustion.

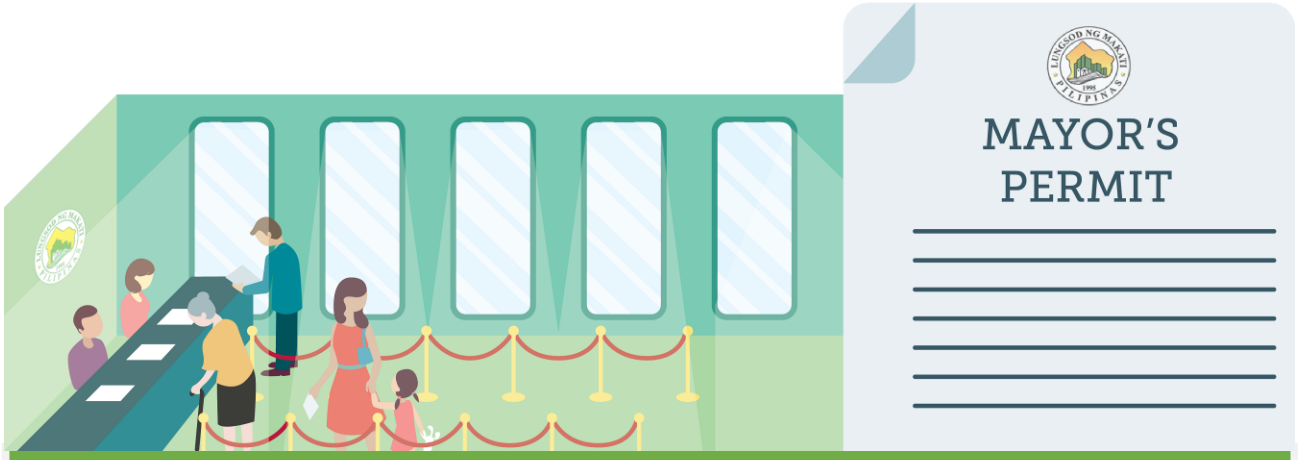
Step 6.1 Consolidate all activity data according to District/Barangay (Column A) and Application (Column D). Indicate the Data Source Identifier in Column B (title of the source document) and the Type of Data (i.e. business survey, fuel supplier, national averages). Disaggregate the data according to the type of fuel (blended diesel, gasoline, LPG, fuel wood), annual volume and unit of measurement (i.e. liters, kilograms) and indicate in Columns E, F, and G respectively. Ensure that there is no double counting when applying combination of data collection approaches. (Skip Step 6.A and proceed to Step 7)

Datasheet 6.1.Emission sources and fuel consumption of the commercial sector – Stationary Combustion (Examples are provided)

A	B	C	D	E	F	G
District/ Barangay/ LGU	Data Source Identifier	Type of Data	Application	Fuel type	Annual Volume	Unit
Longos	Surveyed Businesses Longos 1	Individual Business survey	generator	Blended diesel	3000	liters
San Antonio	Data Fuel Sale data from Fuel supplier San Antonio	Fuel supplier	cooking	LPG	5000	kg

Step 6.A Identify the emission sources of the commercial sector. Use Datasheet 6.1 to record the information collected on the fuel consumed of the commercial sector for stationary combustion.

Step 6.A. 1 Consolidate all activity data according to District/Barangay (Column A) and Application (Column D) *if available*. Indicate the Data Source Identifier (title of the source document) and the Type of Data (i.e. business survey, fuel supplier, national averages). If dis aggregated activity data per District/Barangay and application of fuel are not available, put the name of the LGU in column A, disregard Application in column D, consolidate and identify the fuel consumed per fuel type, amount and units in Columns E, F, G respectively. Ensure that there is no double counting when applying combination of data collection approaches.



Makati City experience

Most LGUs do not collect GHG emissions-related data in their communities, but have processes and procedures in place that can be utilized to collect these data. Examples of these procedures include issuances and/or renewals of permits and performance monitoring for certain sectors.

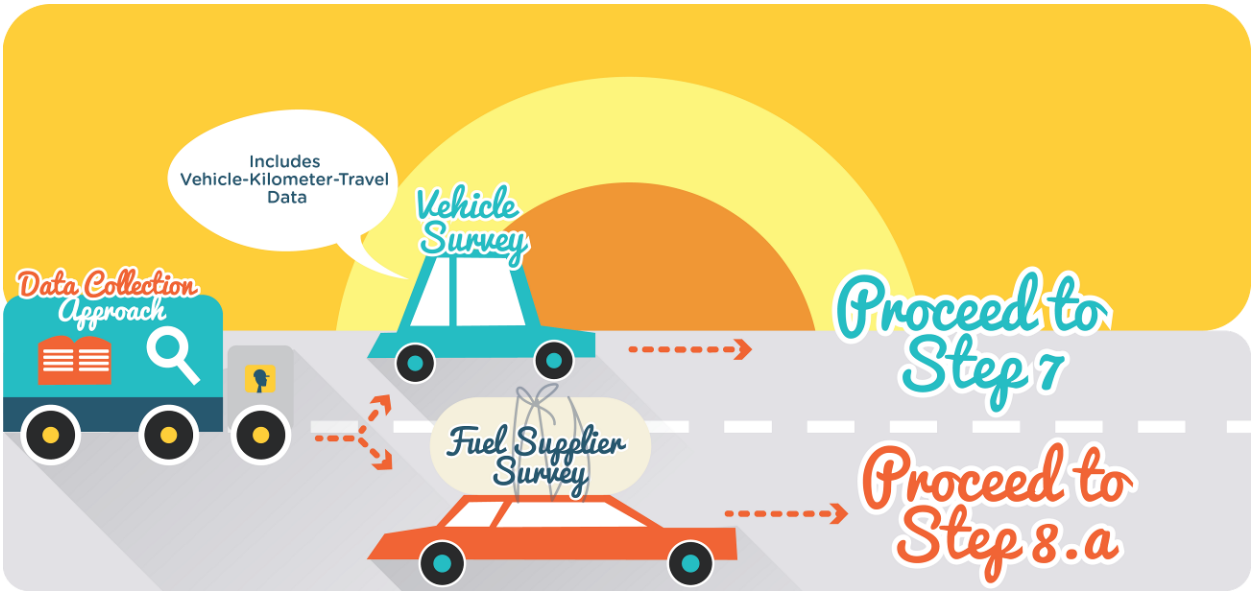
To facilitate easier and more systematic collection of activity data from the business sector, Makati LGU included the submission of relevant activity data (i.e. annual fuel and electricity consumption of the business establishment) for the Community-level Inventory as part of the requirements when securing or renewing business permit.

3.3 Mobile Combustion

Mobile Combustion refers to fuels used for on-road transportation[9] within the geopolitical boundaries of the LGU.

There are two methods to collect activity data for mobile combustion, namely, (1) Distance-based Method or (2) Fuel-based Method. The type of vehicle and year model is needed when using the Distance-based Method. Activity data needs to be segregated according to fuel type (e.g. gasoline, diesel, LPG, others).

Distance-based method	Activity data is sourced using distance travelled by the vehicle, per fuel type (e.g. 100 kilometers)
Fuel based method. This is the preferred method.	Activity data is sourced from the amount of fuel consumed by the vehicle, per fuel type (e.g. 100 liters)



Step 7 Request information for the number of registered vehicles by type within the LGU boundaries from the Philippines Land Transportation Office (Department of Transportation and Communications) or other relevant government agencies including the LGU for the registered tricycles. *Use Datasheet 7.1. List of all Vehicles* included in the inventory per Districts/Barangays to record the data collected.

[9]On-road transportation are vehicles used for transportation

Datasheet 7.1. List of all Vehicles included in the inventory per Districts/Barangays

	Districts/Barangays included in the inventory	Total Population	Total Number of Vehicles registered within the District	Total number surveyed (enter "NA" if no data)	Source of data
1.					Example: • Land Transportation Office (LTO) • LGU for tricycles
2.					
3.					
4.					
5.					

Step 8 Identify emission sources from mobile combustion**.** Use *Datasheet 8.1Fuel consumption – Mobile Combustion* to record the information collected on the type and amount of fuel consumed per emission source for mobile combustion.

Step 8.1 Consolidate the data collected according to District/Barangay (Column A) and Vehicle type (Column D). Indicate the Data Source Identifier in Column B (title of the source document) and the Type of Data (i.e. fuel supplier, national averages). Disaggregate the data according to the type of fuel (i.e. diesel, gasoline, LPG) and indicate in Column E. Use Columns G, H, I for Fuel-based Method **OR** Columns F, H, I for Distance-based Method. Ensure that there is no double counting when applying a combination of data collection approaches. (Skip Step 8.A and proceed to Step 9).

Datasheet 8.1.Fuel consumption – Mobile Combustion (Examples are provided)

A	B	C	D	E	F	G	H	I
District/ Barangay/ LGU	Data Source Identifier	Type of Data	Vehicle Type	Fuel type	Annual Distance Travelled (km)	Annual Fuel Consumption (liters)	Annual Fuel Used for Stationary Combustion (liters)	Annual Fuel Used for Mobile Combustion
Longos	Fuel Supplier	Fuel Supplier		Blended diesel		3000		3000
San Antonio	Transportation Survey	Transportation Data	Tricycle	gasoline	5000			500
San Juan	Fuel Supplier	Fuel Supplier		gasoline		5000		5000

Step 8.A Identify emission sources from mobile combustion. Use *Datasheet 8.1Fuel consumption – Mobile Combustion* to record the information collected on the type and amount of fuel consumed per emission source for mobile combustion.

Step 8.A . 1 Consolidate the data collected according to District/Barangay (Column A) and Vehicle type (Column D). If disaggregated activity data per District/Barangay and vehicle type are not available, put the name of the LGU in Column A, disregard Column D, consolidate fuel consumed per fuel type and indicate in Column E. Use Columns G, H, I for fuel-based approach **OR** Columns F, H, I for distance-based approach. Ensure that there is no double counting when applying a combination of data collection approaches.

3.4 Electricity Consumption

Electricity Consumption refers to electricity consumed within the geopolitical boundaries of the LGU. Data on total community electricity consumption should be secured from the electricity providers (e.g. utility company or electric cooperatives) or from government offices. Wherever possible, this data should be segregated by the electricity provider into the different sectors of the community (e.g. residential, commercial, industrial, public facilities).

LGU Experience

To facilitate the collection of electricity consumption data, the LGUs wrote a letter to their respective electricity provider (e.g. MERALCO office or electric cooperative), requesting for the electricity consumption within their geopolitical boundaries segregated according to sectors (e.g. residential, commercial, industrial, public facilities).

Step 9 Use *Datasheet 9.1 Activity Data –Electricity Consumption-Residential Sector* to collect the activity data on electricity consumption of the residential sector. If activity data is not segregated according to Districts/Barangay, indicate the name of the LGU.

Datasheet 9.1 Activity Data –Electricity Consumption-Residential Sector (Examples are provided)

District / Barangay/ LGU-	Data Source Identifier **(e.g. Household Survey Number or Utility Name and Source Identifier)**	Data Type **- (e.g. Household Surveys, electricity provider)**	Actual Annual Electricity Consumption (kWh)
Longos	Longos-Utility_provider_AAA-household_elec	Electricity Utilities Provider	8,000,000
San Antonio	San_Antonio-Utility_provider_BBB-household elec	Electricity Utilities Provider	10,000,000

Step 10 Use *Datasheet 10.1 Activity Data –Electricity Consumption-Commercial Sector* to collect the activity data on electricity consumption of the commercial sector. If activity data is not segregated according to Districts/Barangay, indicate the name of the LGU.

Datasheet 10.1 Activity Data –Electricity Consumption-Commercial Sector (Examples are provided)

District / Barangay/ LGU	Data Source Identifier **(e.g. Business Survey Number or Utility Name and Source Identifier)**	Data Type **- (e.g. Business Surveys, electricity provider)**	Actual Annual Electricity Consumption (kWh)
Longos	Longos-Utility_provider_AAA-commercial_elec	Electricity Utilities Provider	8,000,000
San Antonio	San_Antonio-Utility_provider_BBB-commercial_elec	Electricity Utilities Provider	10,000,000

Step 11 *Use Datasheet 11.1 Activity Data –Electricity Consumption-Other Sectors* to collect the activity data on electricity consumption of the other sectors. If activity data is not segregated according to Districts/Barangay, indicate the name of the LGU and the sector.

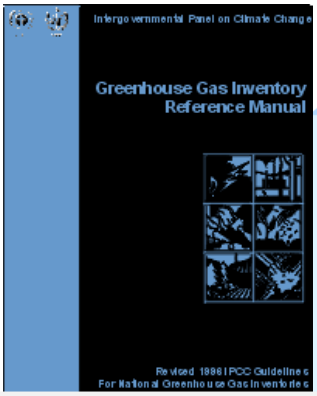
Datasheet 11.1 Activity Data –Electricity Consumption-Other sectors (Examples are provided)

District / Barangay/ LGU	Data Source Identifier **(e.g. Streetlights, MRT line, Utility Name and Source Identifier)**	Data Type **(e.g. Surveys, National Census Averages, Other)**	Actual Annual Electricity Consumption (kWh)
Longos	Longos-Utility_provider_AAA-other_elec	Electricity Utilities Provider	800,000
San Antonio	San_Antonio-Utility_provider_BBB-other_elec	Electricity Utilities Provider	220,000

3.5 Agriculture

Agriculture Emissions are those generated by agricultural activities like crop production (mainly rice production) and raising of livestock. More specifically, these are emission that result from livestock management (i.e. methane (CH_4) and nitrous oxide (N_2O) emissions from manure production and use) and from soil management (i.e. nitrous oxide emissions from crop management practices). GHG emissions resulting from fuel combustion in on-farm equipment [10]and human sewage disposal are not reported under the agriculture category.

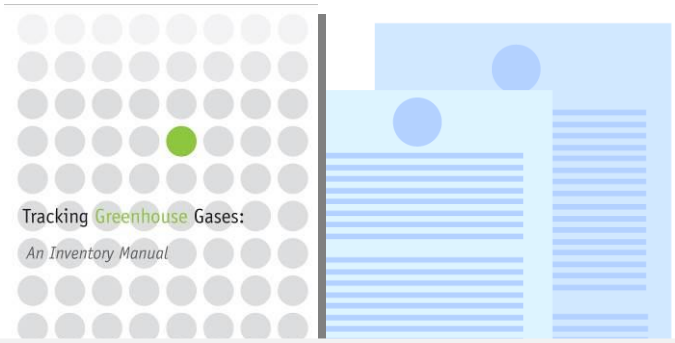
[10]On-farm equipment such as farm tractors, tree cutters, dryers, etc.



Guidance Notes

Livestock-related manure management data collection for LGUs in the Philippines should be based on a default value for farm management of nutrients by livestock type (e.g. cattle, poultry, swine etc.). A complete list of all significant livestock populations that have default emission factor values is provided in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (*IPCC Guidelines*)*Section 4 - Agriculture* (i.e. dairy cows, other cattle, buffalo, sheep, goats, camels, horses, mules and asses, swine, and poultry). More detailed categories should be used if data is available.

For crop production in the Philippines, the general IPCC methodology for calculating CH_4 emissions from rice production should be used based on the annual harvested areas. Rice production in the Philippines should be disaggregated into one of the four following categories: Dry Season/Irrigated, Dry Season/Non-Irrigated, Wet Season/Irrigated, or Wet Season/Non-Irrigated). For other crops, it is recommended that the LGU acquire regional/custom emission factors from reliable sources (e.g. peer-reviewed scientific journals), since GHG emissions from cropping practices are very dependent on local climatic and soil conditions.



LGU Experience

The LGUs that developed the Community-level Inventory under the Climate Change and Clean Energy (CEnergy) Project of the USAID used emission factors derived from the 2000 National Inventory of the Philippines for the computation of the emissions of livestock production and soil management.

Step 12 Request agricultural land use (total hectares under agricultural crop production), crop-type (including growing season and irrigation practices), and livestock headcounts for any farms inside the LGU's geopolitical boundaries from the national, regional or local statistics office (i.e Bureau of Agricultural Statistics, local Agriculture Office). This data should include the land area designated to each crop-type and corresponding irrigation practice and growing season (e.g. rice, dry season, irrigated), and livestock headcounts for the LGU by animal type. Also request the statistics office to provide crop-specific emission factors for the Philippines as well as animal-specific (e.g. manure management) emission factors specific to the Philippines if available. Documentation to support the validity of the data acquired must be included in the report.

Batangas City Experience

The LGU's local agriculture offices (through their Municipal or City Agriculture Officers) can be good sources of primary data. Oftentimes, the report that these offices generate are enough inputs for the GHG inventory report in the agriculture sector. This eliminates the need for LGUs to conduct separate surveys for the sole purpose of GHG inventory.

Batangas City LGU secured the data on hectares used for crop production including rice cultivation and the number of livestock from the Local Agriculture Office. The rice cultivation data is already segregated according to irrigation practice and growing season, while the livestock data is segregated according to the type of livestock.

Step 13 Record the activity data on crop production collected based on the suggested format of *Datasheet 13.1 Agriculture Crop Emission Sources*. If data according to District/Barangay is not available, put the name of the LGU. Indicate the Data Source Identifier in Column B and the Type of Data in Column C. The Application in Column D must specify the growing season (dry or wet) and irrigation practice (irrigated or rainfed). Indicate the total hectares cultivated in Column E.

Datasheet 13.1 Agriculture Crop Emission Sources (Examples are provided)

A	B	C	D	E
District/ Barangay/ LGU	**Data Source Identifier** (e.g. Name of Government Agriculture Agency and Department)	**Type of Data** (e.g. Agricultural Bureau, Census Averages, Other)	**Application** (e.g. crop type and approach)	**Total Hectares Under Production (hectares, ha)**
Longos	Longos-agriculture-bureau-crop-type-area	Data Directly from Government Agricultural Agency	Rice (Dry Season, Irrigated)	200
Longos	Longos-agriculture-bureau-crop-type-area	Data Directly from Government Agricultural Agency	Rice (Dry Season, Rainfed)	500
San Antonio	SanAntonio-crop_residue-area	Data Directly from Government Agricultural Agency	Crop Residues (tonnes of dry weight)	800

Step 14 Record the activity data on livestock production collected based on the suggested format of *Datasheet 14.1 Livestock Emission Sources*. If data according to District/Barangay is not available, put the name of the LGU. Indicate the Data Source Identifier in Column B and the Type of Data in Column C. The Application in Column D must specify the type of livestock (e.g. buffalo, poultry, cattle, etc.). Indicate the number of heads/population in Column E.

Guidance Notes

Headcount (of livestock) refer to **average population** in a given year, not on the total annual population. Care must be taken to determine the average population as GHG emissions may be overestimated if total annual population is used. A good indicator to determine total population is annual sales, while census of animals undertaken by the local DA office usually indicates average annual population.

Datasheet 14.1 Livestock Emission Sources (Examples are provided)

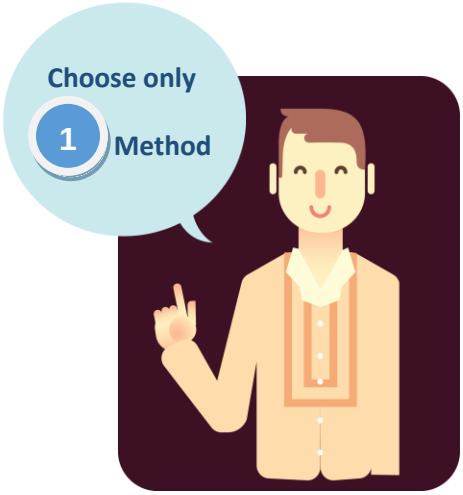
A	B	C	D	E
District/ Barangay/ LGU	**Data Source Identifier** (e.g. Name of Government Agriculture Agency and Department)	**Type of Data** (e.g. Government Agricultural Bureau, National Census Averages, Other)	**Application** (e.g. Livestock Type)	**Total Headcount**
Longos	Longos-agriculture-bureau-livestock	Data Directly from Government Agricultural Agency	Buffalo	200
Longos	Longos-agriculture-bureau-livestock	Data Directly from Government Agricultural Agency	Poultry	1800
San Antonio	SanAntonio-livestock	Data Directly from Government Agricultural Agency	Cattle	100
San Antonio	SanAntonio-livestock	Data Directly from Government Agricultural Agency	Goat	1300

3.6 Solid Waste

Solid Waste refers to municipal solid waste ("MSW") generated within the LGU's geopolitical boundaries that may cause GHG emissions inside the LGU's geopolitical boundaries (e.g. the LGU operates or has substantial control over the solid waste facility) or the solid waste is transported to a disposal site outside the LGU's geopolitical boundaries and causes GHG emissions.

Emissions from waste facilities should be calculated using any of the following in cases where the waste is landfilled:

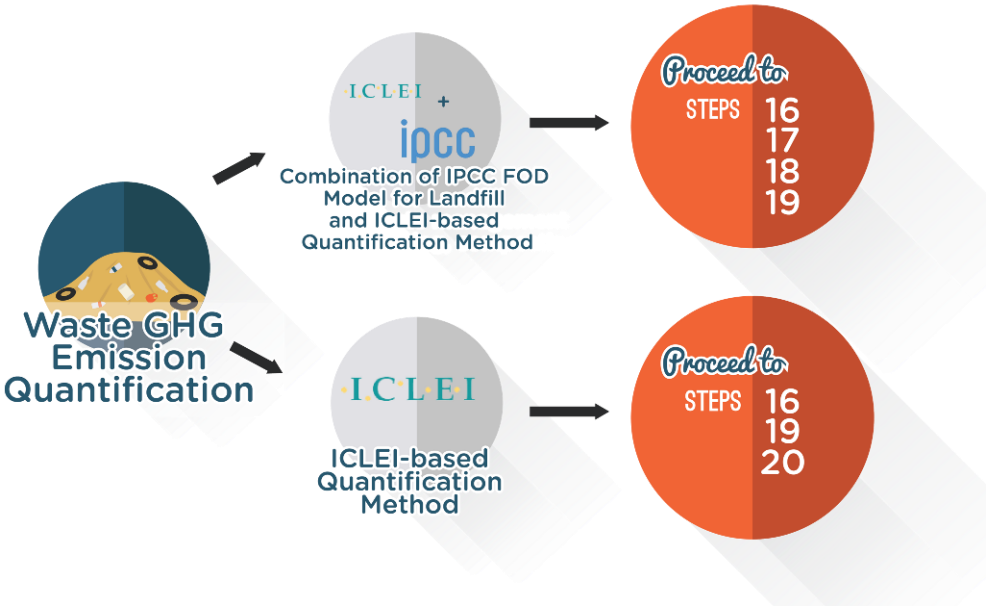
1. First order decay (FOD) model at disposal sites; or
2. ICLEI-based waste quantification methodology (which estimates future emissions of current waste generation);



A combination of the IPCC FOD method may be used for solid waste disposal at managed sites and the ICLEI methods for waste disposal via open burning, composting, anaerobic digestion, or other/uncategorized, which are IPCC compliant.

The user must however **choose only one method** for determining GHG emissions from disposal at solid waste disposal sites (SWDS), like landfill.[11]

Step 15 Choose the methodology to be used in estimating emissions from solid waste and follow the decision tree depending on the chosen methodology.



Step 16 Collect the data needed for the quantification of the waste emissions from the concerned unit/division of the LGU (e.g. Environment and Natural Resources Office). *Use Datasheet 16.1 Solid Waste Disposal Data Entry Parameters (IPCC FOD Method*) to record the data collected. Identify the sources of the data. You may use the IPCC Default Values if no data are available.

Datasheet 16.1 Landfill Solid Waste Disposal Data Entry Parameters (IPCC FOD Method) (Sample LGU-specific values are provided using the IPCC default values)

	IPCC default value		User-defined
Starting year	1950		1950
DOC (Degradable organic carbon)			
(weight fraction, wet basis)	**Range**	**Default**	**User-defined**
Disposable nappies	0.18-0.32	0.24	0.24
Food waste	0.08-0.20	0.15	0.15
Garden	0.18-0.22	0.2	0.2
Paper	0.36-0.45	0.4	0.4
Sewage sludge	0.04-0.05	0.05	0.05
Textiles	0.20-0.40	0.24	0.24
Wood and straw	0.39-0.46	0.43	0.43
DOCf (fraction of DOC dissimilated)		0.5	0.5
Methane generation rate constant (k)			
(years^{-1})	**Range**	**Default**	**User-defined**

Disposable nappies	0.15–0.2	0.17	0.17
Food waste	0.17–0.7	0.4	0.4
Garden	0.15–0.2	0.17	0.17
Paper	0.06–0.085	0.07	0.07
Sewage sludge	0.17–0.7	0.4	0.4
Textiles	0.06–0.085	0.07	0.07
Wood and straw	0.03–0.05	0.035	0.035
Industrial waste	0.15–0.2	0.17	0.17
Delay time (months)		6	6
Fraction of methane (F) in developed gas		0.5	0.5
Conversion factor, C to CH_4		1.33	1.33
Oxidation factor (OX)		0	0
Parameters for carbon storage			
% paper in industrial waste		0%	0%
% wood in industrial waste		0%	0%

Step 17 Identify the distribution of waste by waste management type using the *Datasheet 17.1 Solid Waste Disposal Data Entry for Methane Correction Factor (MCF) Calculation* (IPCC FOD Method)

Guidance Notes:

LGUs are familiar with RA 9003 classification but may not be familiar with the IPCC classification, which provides the default MCF values for specific types of solid waste management. This table provides LGUs with conversion guides in order to apply appropriate IPCC default values.

R.A. 9003	IPCC 2006/WORKSHEET
Controlled disposal facilities	Unmanaged, deep type
Sanitary Landfills	Anaerobic, managed
Open dumpsites	Unmanaged, deep type

Datasheet 17.1 Solid Waste Disposal Data Entry for Methane Correction Factor (MCF) Calculation (Sample values are provided)

	Unmanaged, shallow	Unmanaged, deep	Managed	Managed, semi-aerobic	Uncategorized	Total (100%)
	MCF	MCF	MCF	MCF	MCF	
IPCC default	0.4	0.8	1	0.5	0.6	

User-defined value	0.4	0.8	1	0.5	0.6	
Distribution of Waste by Waste Management Type - Annex A1.1						
User-defined value (Philippines)	44%	0%	0%	28%	28%	
Year	%	%	%	%	%	
1950	44%	0%	0%	28%	28%	100%
1951	44%	0%	0%	28%	28%	100%
1952	44%	0%	0%	28%	28%	100%
1953	44%	0%	0%	28%	28%	100%
1954	44%	0%	0%	28%	28%	100%
2006	**44%**	**0%**	**0%**	**28%**	**28%**	**100%**
2007	44%	0%	0%	28%	28%	100%
2008	44%	0%	0%	28%	28%	100%
2009	44%	0%	0%	28%	28%	100%
2010	44%	0%	0%	28%	28%	100%
2011	44%	0%	0%	28%	28%	100%
2012	44%	0%	0%	28%	28%	100%
2013	44%	0%	0%	28%	28%	100%
2014	44%	0%	0%	28%	28%	100%

Guidance Notes

If 50-year data on waste distribution per management type is not available, use the most recent waste characterization data. It is good practice to fill out the most recent years, depending on availability of data, as newer wastes generate more emissions than older wastes.

Step 18 Identify and record waste diversion and composition rates using the Datasheet *18.1 Waste Diversion Rates and Datasheet 18.2 Waste Composition Rates*

Datasheet 18.1 Waste Diversion Rates

Year	Population	Waste per capita (tonnes/capita/yr)	% to Solid Waste Disposal Site (SWDS)	% MSW Composted	% MSW Sent to Anaerobic Digestion	% MSW Open Burned	% Total MSW Other/Unspeci-fied
IPCC defaultl		0.19					
1950							

1951							
1952							
1953							

2011							
2012							
2013							
2014							

Datasheet 18.2 Waste Compositions (% tonnes)

Year	Food (%)	Garden (%)	Paper (%)	Wood (%)	Textile (%)	Nappies(%)	Sludge (%)	Plastics and other Inert (%)
1950								
1951								
1952								
1953								

2011								
2012								
2013								
2014								

Step 19 Collect the data needed for the quantification of the waste emissions from the concerned unit/division of the LGU (e.g. Environment and Natural Resources Office). *Use Datasheet 19.1 General Solid Waste Composting Activity Data* to record the data collected for composting activity and *Datasheet 19.2 General Solid Waste Open Burning Activity Data* for open burning.

Datasheet 19.1 General Solid Waste Composting Activity Data

Data Source Identifier	Population	Total Solid Waste (Actual) for District/Barangay	Fraction of Total Solid Waste Sent for Anaerobic Digestion Facilities	Fraction of Total Solid Waste Sent for Composting
	inhabitants	tonnes	%	%
LGU				

Datasheet 19.2 General Solid Waste Open Burning Activity Data

Data Source Identifier	Population	Total Solid Waste (Actual) for District/Barangay	Amount of Total Solid Waste Open Burned
	inhabitants	tonnes	tonnes
LGU			

Step 20 **(For ICELI method)** Collect the data needed for the quantification of the waste emissions from the concerned unit/division of the LGU (e.g. Environment and Natural Resources Office). Use *Datasheet 20.1 Landfill Solid Waste Disposal Data Entry (ICLEI method) by Landfill type* to record the data collected.

Datasheet 20.1 Landfill Solid Waste Disposal Data Entry (ICLEI method) by Landfill type

District/ Barangay	Population	Total solid waste	Fraction of solid waste sent to specific disposal site	Specific Landfill Site	Location of Landfill site (outside or inside LGU)
	inhabitants	tonnes	(%)		
LGU				**Unmanaged - shallow**	
				Managed – semi-aerobic	
				Uncategorized	

3.7 Wastewater

Waste water emissions included are those associated with Methane (CH_4) and Nitrous Oxide (N_2O) emissions from waste water and sewage. LGUs should account for CH_4 and N_2O emissions from any wastewater systems and disposal activities coming from the following sources:

1. Waste water **generated inside** the LGU's geopolitical boundaries (Scope 1).
2. Wastewater **generated/received from outside t**he geopolitical boundaries of the LGU, **but treated within** the boundaries of the LGU (Scope 1).
3. Wastewater **generated by the LGU** but is **treated outside** the geopolitical boundaries of the LGU (Scope 3)

LGU Experience

Wastewater **generated/received from outside t**he geopolitical boundaries of the LGU, **but treated within** the boundaries of the LGU and Wastewater **generated by the LGU** but is **treated outside** the geopolitical boundaries of the LGU are real cases but are not properly documented. LGUs are encouraged to check their boundaries to determine if there are these cases, and report as appropriate.

Emissions from wastewater treatment should be calculated by using the first order decay (FOD) model utilized by the IPCC.

The type of data required to quantify emissions from wastewater generally consists of determining the types of wastewater systems inside the LGU's geopolitical boundaries and the number of residents and entities using each type of wastewater management system. Default methane correction factors (IPCC, 2006) for each treatment system and a default maximum methane producing capacity factor (IPCC, 2006) are generally used to determine emissions from wastewater treatment and discharge. Default emission factor values to determine N_2O emissions for human sewage (e.g. g N_2O/person/year) are also generally used, although country-specific or test sample-specific data may also be used.[12]

Guidance Notes

For example, N_2O emissions specific to the LGU can be calculated by determining the annual per capita protein consumption, the fraction of nitrogen in protein, factor of non-consumed protein added to wastewater, nitrogen removed with sludge etc. Furthermore, LGU-specific CH_4 emission factors can be used by sourcing the maximum CH_4 producing capacity (B_o) for domestic wastewater. However, since sewage systems and sludge treatment are rare in the Philippines, the majority of wastewater treatment systems will be of "uncollected" forms (e.g. uncollected septic tanks) LGU-specific CH_4 emission factors or N_2O emissions may be difficult to determine.

[12]Guidance Document, page 41

Step 21 Collect the data needed for the quantification of the wastewater emissions from the concerned government agencies (e.g. Department of Environment and Natural Resources (DENR) National Water Resources Board (NWRB), or unit/division of the LGU (e.g. local or barangay sanitation unit). Use *Datasheet 21.1 Wastewater Management System*, to record the data collected. Prepare separate tables for wastewater generated by the LGU and wastewater received from outside the geopolitical boundaries of the LGU.

Datasheet 21.1 Wastewater Management System (IPCC default values are provided for items 2 -9)

Data Needed			Examples	Is it used in the LGU (Yes or No)	% of population using the system
1	Wastewater systems or types in LGU	Open-pits/ Latrines	dry climate, ground water table lower than latrine, small family (2-5 people)		
			dry climate, ground water table lower than latrine, communal		
			wet climate/flush water use, ground water table than latrine		
			regular sediment removal for fertilizer		
		River Discharge	Stagnant oxygen deficient rivers and lakes		
			Rivers, lakes and estuaries		
		Untreated	River Discharge		
			Sewers (closed and underground)		
			Open sewers		
		Treated	Aerobic –centralized and well managed		
			Aerobic – not well managed		
			Sludge anaerobic treatment		
			Aerobic shallow ponds		
			Anaerobic lagoons – shallow, (less than 2 meters)		
			Anaerobic lagoons – shallow, (more than 2 meters)		
			Anaerobic reactors		

Data needed		Default Values (IPCC)		LGU Specific
		Uncollected	Collected	
2	Per Capita BOD generation (per day) for the LGU (maybe national value or default IPCC value)	**40**	**40**	
3	LGU or region specific correction factor for industrial BOD discharges in sewers (national or IPCC default value)	**1.00**	**1.25**	
4	Maximum Methane production capacity factor used in the calculation in reference to the BOD from LGU or region specific data (if available)	**.60** $kgCH_4/kgBOD$		
5	LGU, regional, national maximum methane production capacity factor used in the computation in reference to the COD	**.25** $kgCH_4/kgCOD$		

6	Annual per capita protein consumption (as localized as possible)	**.59** g/person/DAY	
7	Fraction of nitrogen in protein (as localized as possible)	**.16** kg N/kg protein	
8	Factor for non-consumed protein added to wastewater	**1.1**	
9	Nitrogen removed in sludge (value of 0 unless sludge removal is implemented by LGU of specific waste treatment facility	**0**	
10	LGU, regional, national methane correction factor (reference as appropriate)		

3.8 Forest and Land Use change

Most of the greenhouse gas emissions from forest and land use change are attributed to timber/wood harvesting and conversion of forest into other land uses such as agriculture, settlements, etc. Forest can be a source of greenhouse gas emissions or removal. The net carbon emissions or removal of the forest and land use sector is dependent on two basic biophysical processes:[13]

c) Changes in forest/woody carbon stocks due to the net annual biomass growth of existing forest and non-forest stands, and possible biomass regrowth in abandoned lands;

d) Land use and forest conversion practices which affect the carbon chemistry of the atmosphere via biomass burning, decay and soil carbon release and uptake.

The accompanying spreadsheet covers only the GHG emissions/removals of forest and other land-use due to changes in carbon stocks and not the GHG emissions due to biomass burning and decay.

Step 22 Collect the data needed for the quantification of the GHG emissions from forest and other land use change. Use *Datasheet 22.1 Forestry and Other Land-Use Change Data for GHG emissions* to record the data collected.

Datasheet 22.1 Forestry and Other Land-Use Change Data for GHG emissions (Examples are provided)

District or Barangay	Data Source Identifier	Emission Type	Emission Source	*Annual* Total
Name of LGU		Wood Products Harvesting	Charcoal (cu.m.)	
Name of LGU		Wood Products Harvesting	Construction (cu.m.)	
Name of LGU		Changes in the use of forest lands	Forest converted to Agriculture (ha)	
Name of LGU		Changes in the use of forest lands	Forest converted to settlement (ha)	

[13] Tracking Greenhouse Gases: An Inventory Manual, page 122

Step 23 Collect other data parameters needed for the quantification of the GHG emissions and or removals from forest and other land use change. Use *Datasheet 23.1 1 Parameters for Forest and other Land-use Change* to record the data collected. Identify the sources of the data.

Guidance Notes:

Default values are provided for **biomass growth rate** and **carbon content** of the biomass and forestland types. However, it is highly recommended to use local/regional/provincial values if available.

Datasheet 23.1 Parameters for Forest and other Land-use Change

Data requirements	Default Values		User-Defined		Source of Data
	Biomass Growth rate	Carbon Content	Biomass Growth rate	Carbon Content	
1. Wood and wood products harvesting					
a. Fuel wood (cu.m.)		.49			
b. Charcoal (tons)		.49			
c. Construction (cu.m.)		.49			
d. Novelties (tons)		.49			
2. Changes in use of the forestlands					
a. Used for Agriculture (ha)	7.81	.49			
b. Used as Grasslands (ha)	7.81	.49			
c. Left as Barren Areas (ha)	7.81	.49			
3. Forestland remaining					
a. *General Forestland type*[14] *(ha)*	7.81	.49			
b. Primary Forest - Visayas (ha)	2.10*	0.45*			
c. Secondary Forest- Luzon (ha)	6.50*	0.44*			
d. Brushland –for wood- Visayas (ha)	9.40*	0.45*			
e. Grassland – Visayas (ha)	0.00*	0.45*			
f. Tree plantations – (*e.g.* S. *macrophylla*- Luzon (ha)	7.50*	0.43*			
4. Lands converted to forestland					
a. Barren to Forestland (ha)	7.81	.49			
b. Grassland to Forestland (ha)	7.81	.49			
c. Wetlands to Forestland (ha)	7.81	.49			

[14] General forestland type is used if no disaggregated data on forestland type is available

d. Settlement to Forestland (ha)	7.81	.49			
e. Cropland to Forestland (ha)	7.81	.49			

*Tracking Greenhouse Gases: An Inventory Manual, Table 64. page 129

Data Requirement	Default Value (tons/ha)	User-defined (tons/ha)	Source of Data
Carbon stock in existing Forest	262		

Step 24 Collect the data needed for the quantification of the GHG removals from forest and other land use change. Use *Datasheet 24.1 Forestry and Other Land-Use Change Data for GHG removals* to record the data collected.

Datasheet 24.1 Forestry and Other Land-Use Change Data for GHG removals. (Examples are provided)

District or Barangay	Data Source Identifier	Removal Type	Removal Source	*Annual* Total (ha)
Name of LGU		Remaining Forestland	Carbon stock in inventory year	
Name of LGU		Change in Forestland	Grassland to Forest	
Name of LGU		Change in Forestland	Barren to Forest land	

3.9 Industrial processes and products use (IPPU)

The greenhouse gases from the industry sector are mainly coming from the industrial production processes that chemically or physically transform raw materials. During these industrial processes, different greenhouse gases are produced such as carbon dioxide (CO_2), methane, (CH_4) and nitrous oxide (N_2O). Other greenhouse gases such as hydroflourocarbons (HFCs) are used in products such as refrigeration and aerosol cans. Sulphur hexafluoride (SF6) are used in electrical equipment. The IPCC categorized the industrial process according to the following:

- Mineral Industry
- Chemical Industry
- Metal Industry
- Non-Energy Products from Fuels and Solvent used
- Electronics Industry
- Products Used as Substitute for Ozone Depleting Substances
- Other Product and Manufacture Use
- Others such as Pulp and Paper and Food Industry

Not all of these types of industries may be present in your community, or the GHG emissions of the industries easily attributable to the community. Annex 3 provides the industry categories that may be included in the GHG inventory if present in the community.

An important step in computing for the GHG emissions from the industrial sector is the identification of GHG intensive industries present in the community using the recommended list as guide. The data requirements may include the volume of inputs (in metric tons) and/or the aggregated production (in metric tons) of each industry identified.

Step 25 Identify the GHG intensive industries present in the community using the recommended list (e.g mineral industry, chemical industry, etc) in Annex 3. Get the names and relevant information of the specific industries and use *Datasheet 25.1 List of Industrial Processes in the Community* to record the data collected.

Datasheet 25.1 List of Industrial Processes in the Community

IPCC Category	Name of Industries	Contact Details	Potential Source of Data
Mineral	Company Name		Business Permit Division of the LGU; Industry Association; Local Chapter of Chamber of Commerce
	Company Name		
Chemical	Company Name		
	Company Name		

Step 26 Collect the activity data needed for each industry identified using the datasheet as shown in the example below. Please refer to the Annex 1 for the specific datasheets applicable to your sub-sector.

Datasheet 26.1 Mineral Industry- Activity Data

Sub-sector		Activity Data	Units	Source of Data
Cement Production	Name of Company	Type of cement produced		
		Mass of cement produced per type	tonnes	
Limestone Production	Name of Company	Mass of lime produced per type	tonnes	
Glass Production	Name of Company	Total glass production per type	tonnes	

Guidance Notes:

The spreadsheet provides GHG emission computation **for selected industrial process and products use only**. Please refer to the IPCC Volume 3 for the complete list of industries and emission factors. It is highly recommended to use local/national industry emission factors if available.

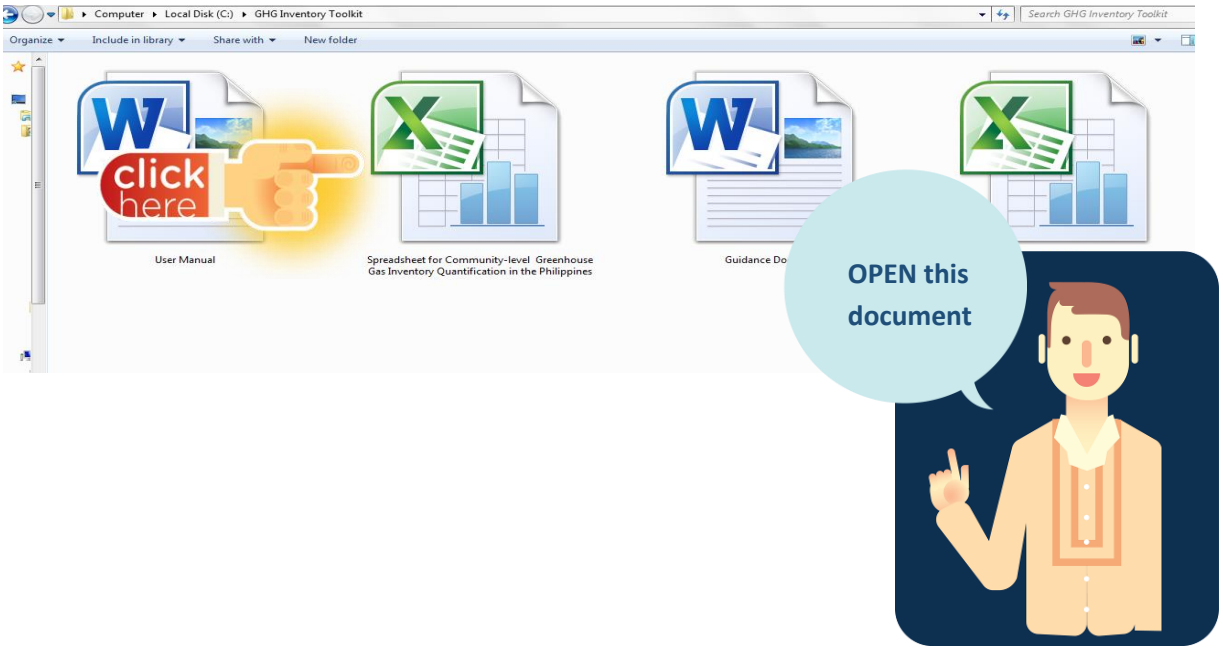
4. Steps to **Input Data** in the Spreadsheet

This Chapter presents Step -By-step procedures in encoding the data gathered in Chapter 3 in an orderly and correct manner in the Spreadsheet. This chapter is designed to let the user go through the Spreadsheet in a chronological order (i.e. 1st tab, 2nd tab, etc). The datasheets prepared in the previous chapter will serve as the source documents for the data input in this chapter. The data encoders are advised to take the necessary steps to ensure that correct data are captured in the spreadsheets.

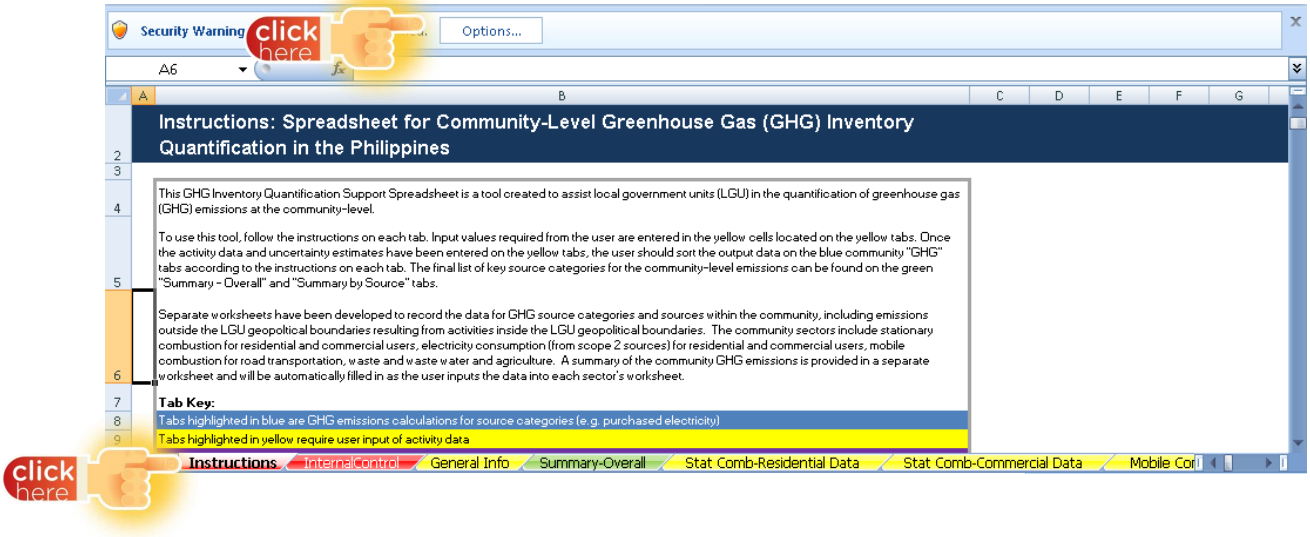
Remember that the focus of this Chapter is to fill out the yellow tabs and (light) yellow cells only. Blue and grey cells contain values that are default or were automatically computed or copied from other cells. LGUs are asked to Not Delete the contents of these cells, as they may affect the whole Spreadsheet.

4.1 General Overview Worksheets

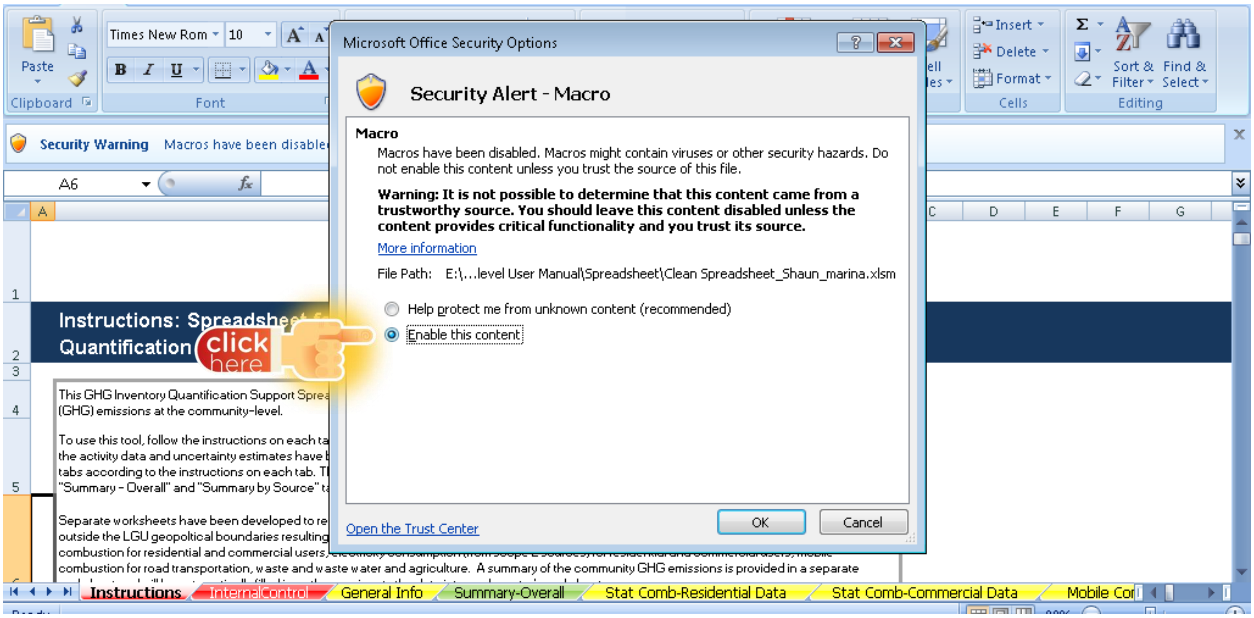
Step 1 Open the spreadsheet titled “Spreadsheet for CEnergy_ Community-GHG_Inventory_Quantification



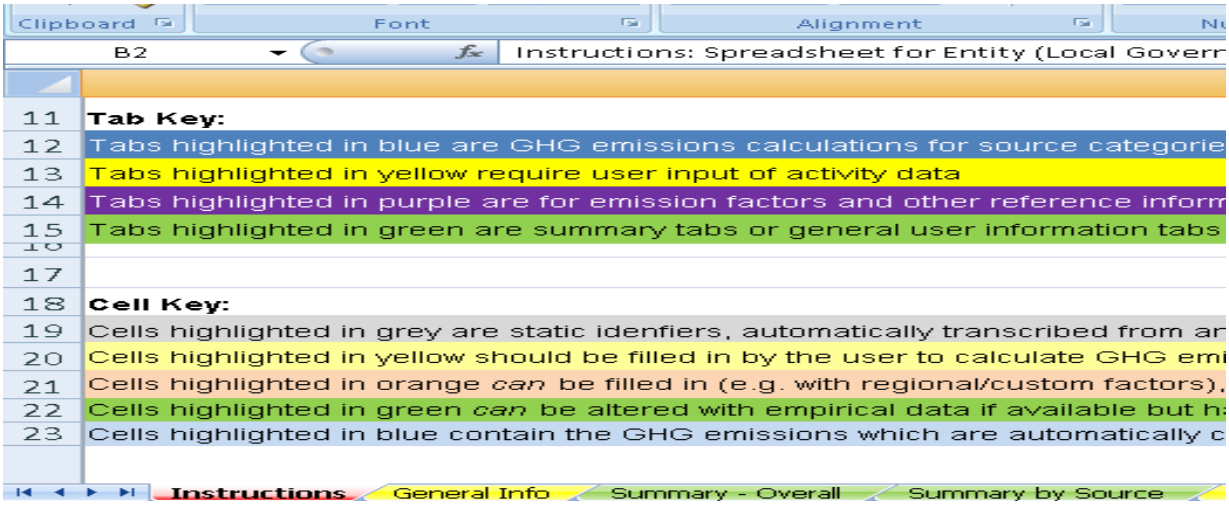
Step 2 Click the **Instruction** tab. Enable the macros by clicking the "**Options**".



Step 2.1 Choose "Enable the content" and click "ok".

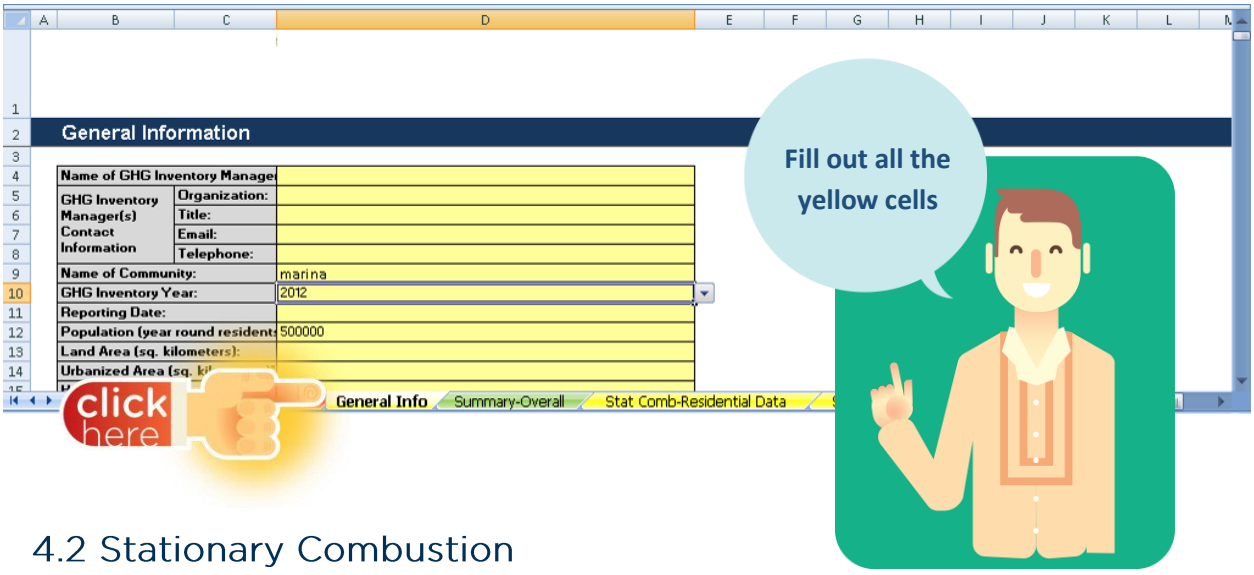


The Instructions tab helps user to familiarize themselves with the general language of the Spreadsheet.



The general instructions are provided in this spreadsheet. This is what it looks like.

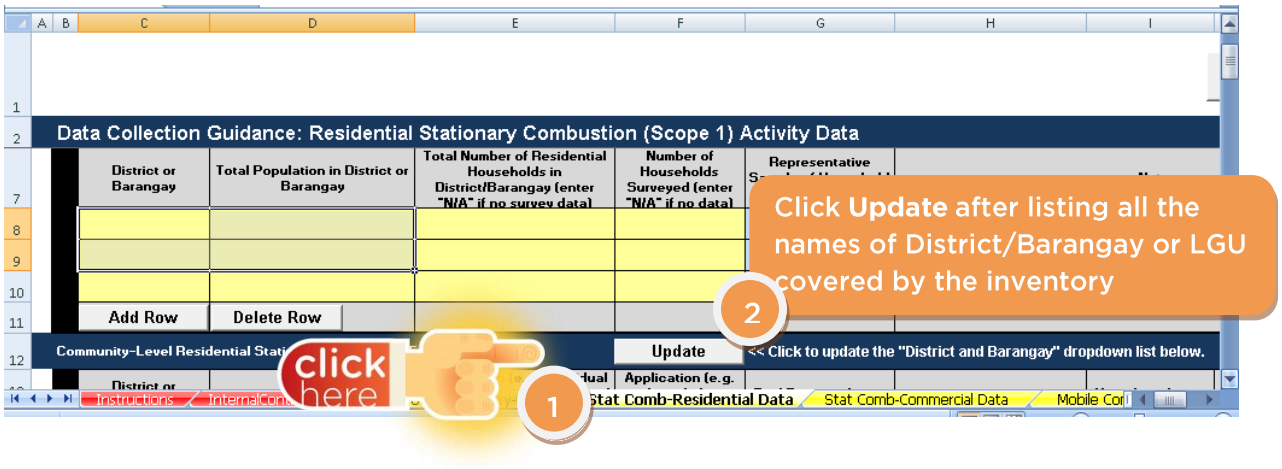
Step 3 Click the **General Info** tab. Input the name of your LGU/community in Row 9 and provide all available data required. Use the drop-down menu in Row 10 to indicate the GHG Inventory Year.



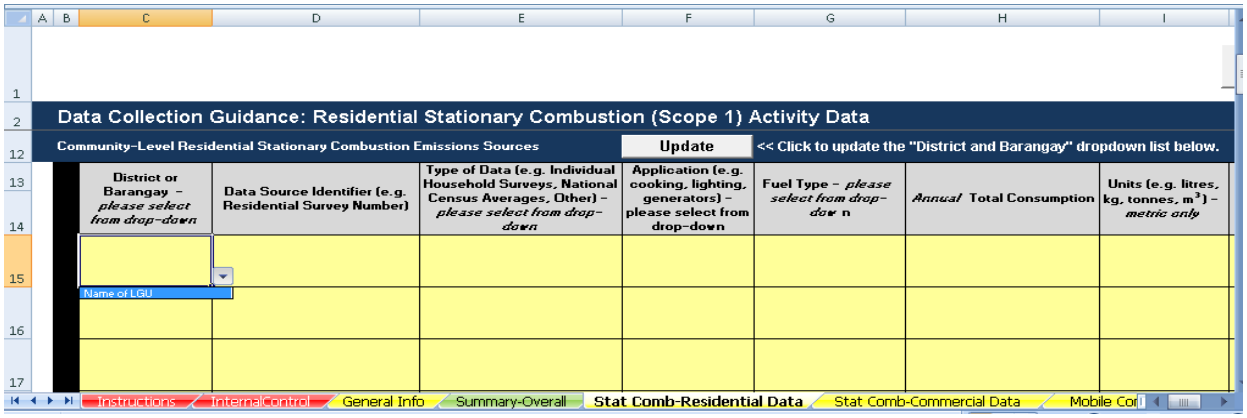
4.2 Stationary Combustion

Stationary Combustion – fuels used by residential and commercial sectors for cooking, lighting, heating and cooling within the geopolitical boundaries of the LGU.

Step 4 Click the **Stat-Comb-Residential Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List in Row 6, the assumptions used as shown in the example. Refer to *Datasheet 3.1. List of all Households included in the inventory per Districts/Barangays* to fill-out the yellow cells starting in Row 8, Colum C. If disaggregated data per Districts/Barangay are not available, input the name of the LGU and provide the other data requirement if available. Click the "*Add Row*" and "*Delete Row*" as applicable**.** Click the "*Update*" button when finished with the encoding of the name/s of the LGU/District/Barangay.



Step 4.1. Choose the name of your LGU or District/Barangay from the drop-down menu in Row 15, Column C. Refer to *Datasheet 5.1 Emission sources and fuel consumption of the residential sector – Stationary Combustion* to fill-out the yellow cells starting in Row 15.



Step 4.2 Indicate the Data Source Identifier in Column D.

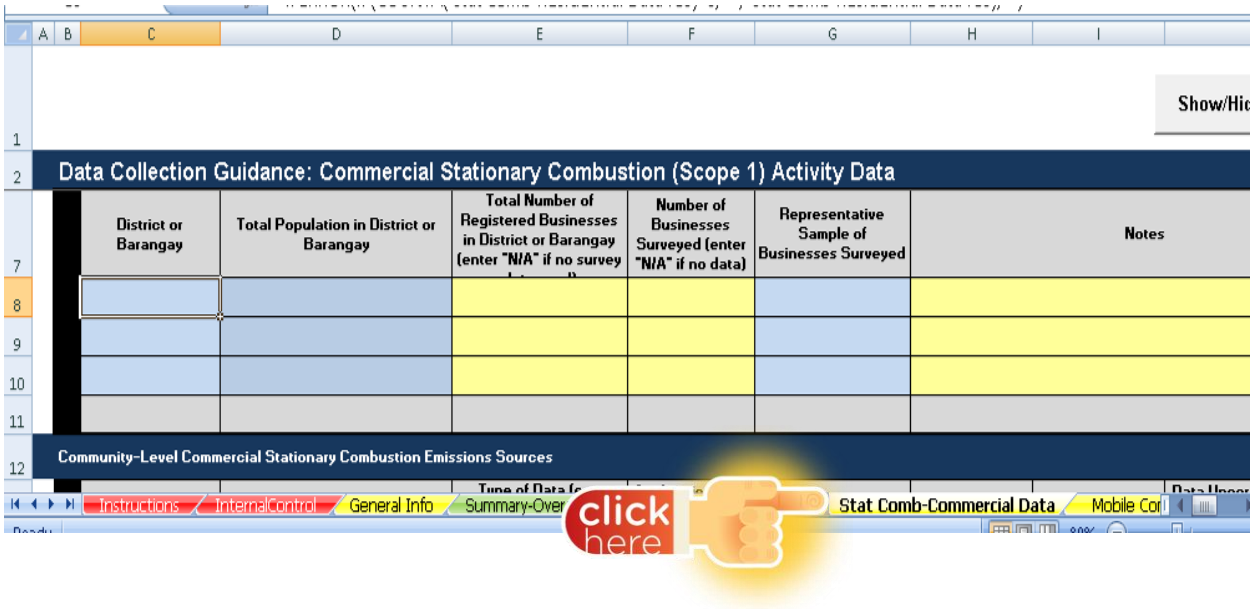
Step 4. 3 Use the drop-down menu in Column E to choose the Type of data;

Step 4.4 Use the drop-down menu in Column F to choose the Application. Use 'Other" if specific use of fuel is not listed or unknown.

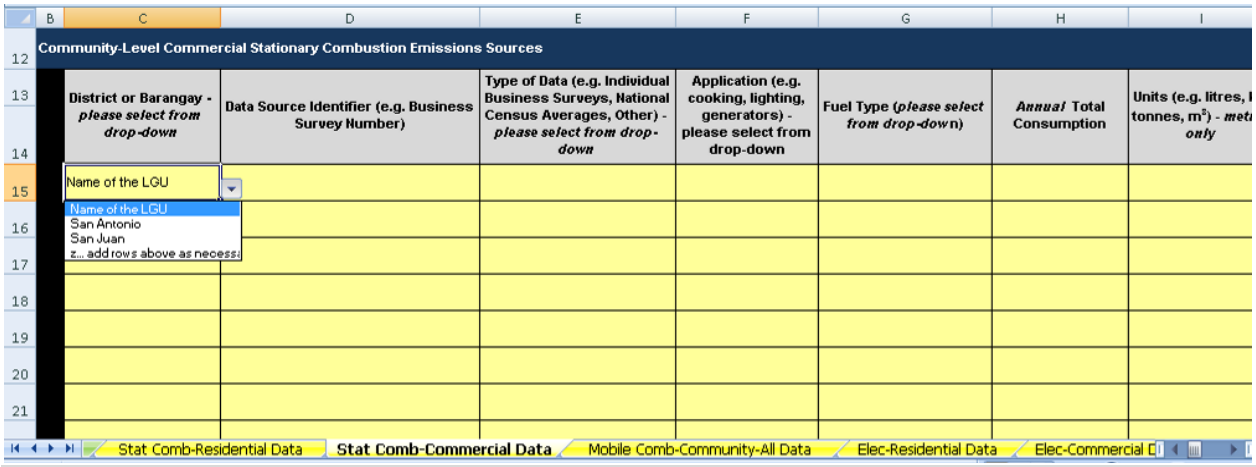
Step 4. 5 Use the drop-down menu in Column G to choose the Fuel type. Choose the 'Blended Diesel Residential/Commercial' for diesel used in the Philippines;

Step 4. 6 Input the Annual total Consumption in Column H and identify the units in Column I.

Step 5 Click the **Stat-Comb-Commercial Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and to get better view of the spreadsheet. List in Row 6, all the assumptions used as shown in the example. Refer to *Datasheet 4.1.List of all of Commercial Establishments included in the inventory per District/Barangay* to fill-out the yellow cells starting in Row 8, Colum E if available.



Step 5.1 Choose the name of your LGU or District/Barangay from the drop-down menu in Row 15, Column C. Refer to *Datasheet 6.1 Emission sources and fuel consumption of the commercial sector – Stationary Combustion* to fill-out the yellow cells starting in Row 15.



Step 5.2 Indicate the Data Source Identifier in Column D.

Step 5.3 Use the drop-down menu in Column E to choose the type of data;

Step 5.4 Use the drop-down menu in Column F to choose the Application. Use 'Other" if specific use of fuel is not listed or unknown.

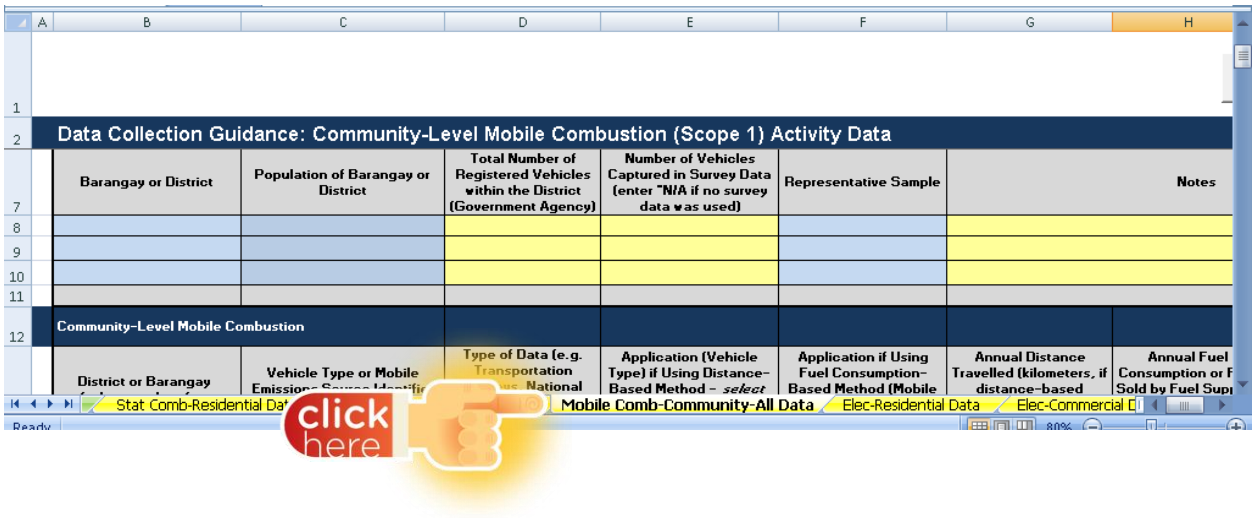
Step 5.5 Use the drop-down menu in Column G to choose the Fuel type. Choose the 'Blended Diesel Residential/Commercial' for diesel used in the Philippines;

Step 5.6 Input the Annual total Consumption in Column H and identify the units in Column I.

4.3 Mobile Combustion

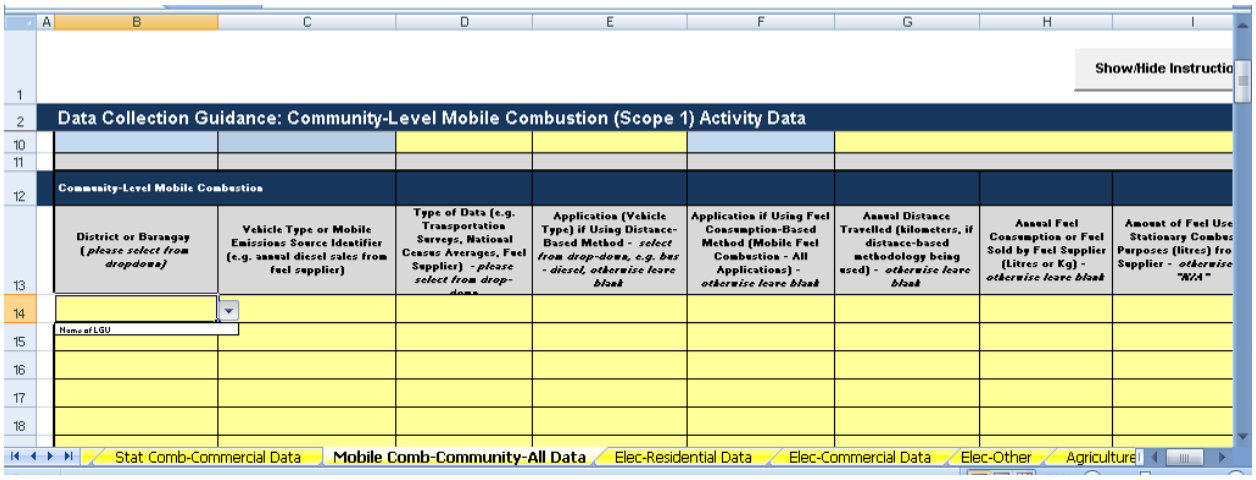
Mobile Combustion– fuels used for transportation[15] within the geopolitical boundaries of the LGU.

Step 6 Click the **Mobile-Comb-Community- All Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions used in Row 6 as shown in the example. Refer to *Datasheet 7.1.List of all Vehicles included in the inventory per Districts/Barangays* to fill-out the yellow cells starting in Row 8, Colum D if available.



[15]Transportation excludes off-road vehicles and other machineries used in farm lands and forests.

Step 6.1 Choose the name of your LGU or Districts/Barangays from the drop-down menu in Row 14, Column C. Refer to *Datasheet 8.1 .Fuel consumption – Mobile Combustion* to fill-out the yellow cells starting in Row 14 Column CI.

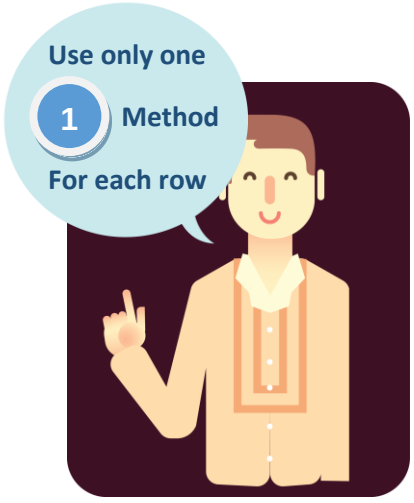


Step 6.2 Indicate the Vehicle type or Mobile Emissions Source Identifier in Column C.

Step 6. 3 Use the drop-down menu in Column D to choose the Type of data.

Step 6.4 Use the drop-down menu in Column E to choose the Application (if using the Distance-based method).

Step 6.5 Use the drop-down menu in Column F to choose the Application (if using the Fuel Consumption-based method). Choose 'On-Road Diesel Fuel' for Diesel used in the Philippines.

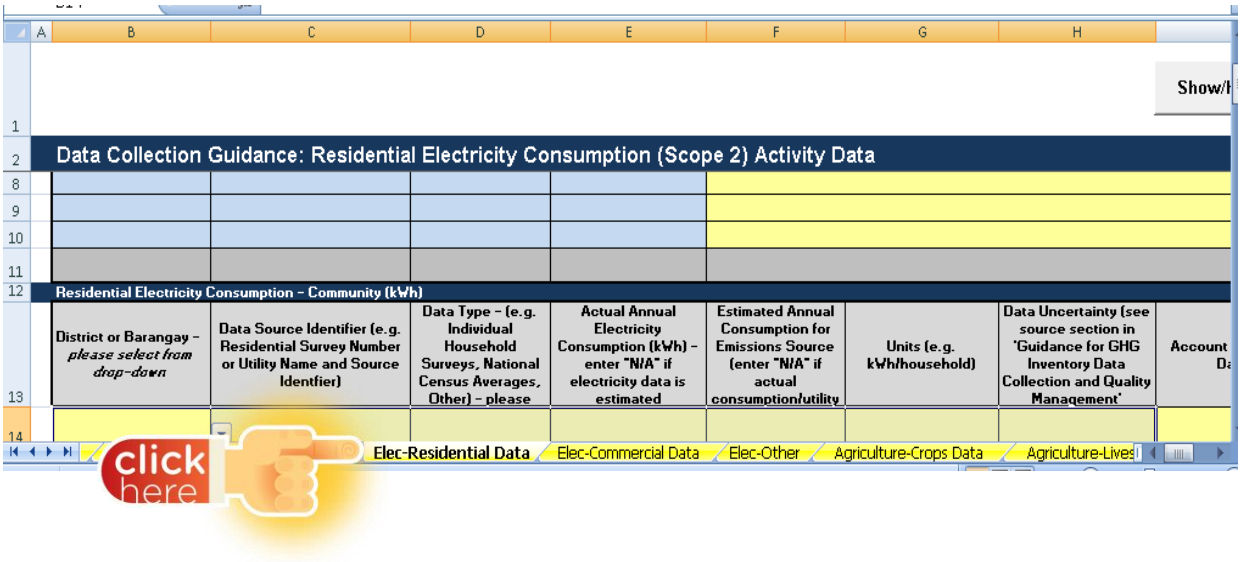


Step 6.6 Use Column G to input Annual Distance Travelled and Column H for Annual Fuel Consumption.

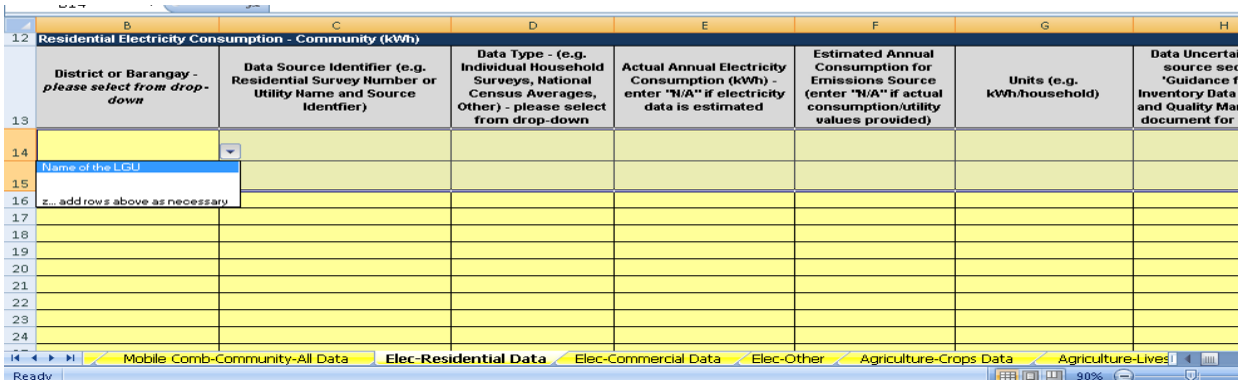
Step 6.7 If the amount for Fuel used in Stationary Combustion is known, input the amount in Column I. Column J will automatically reflect the difference between Column H and Column I which represents the Annual Amount of Fuel Consumed for Mobile Combustion. However, if the amount of Fuel used in Stationary Combustion is unknown, **leave the cell blank**.

4.4 Electricity Consumption

Step 7 Click the **Elec-Residential Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions used in Row 6.



Step 7.1 Choose the name of your LGU or Districts/Barangays from the drop-down menu in Row 14, Column B. Refer to *Datasheet9.1.Activity Data –Electricity Consumption-Residential Sector per District/Barangay* to fill-out the yellow cells.



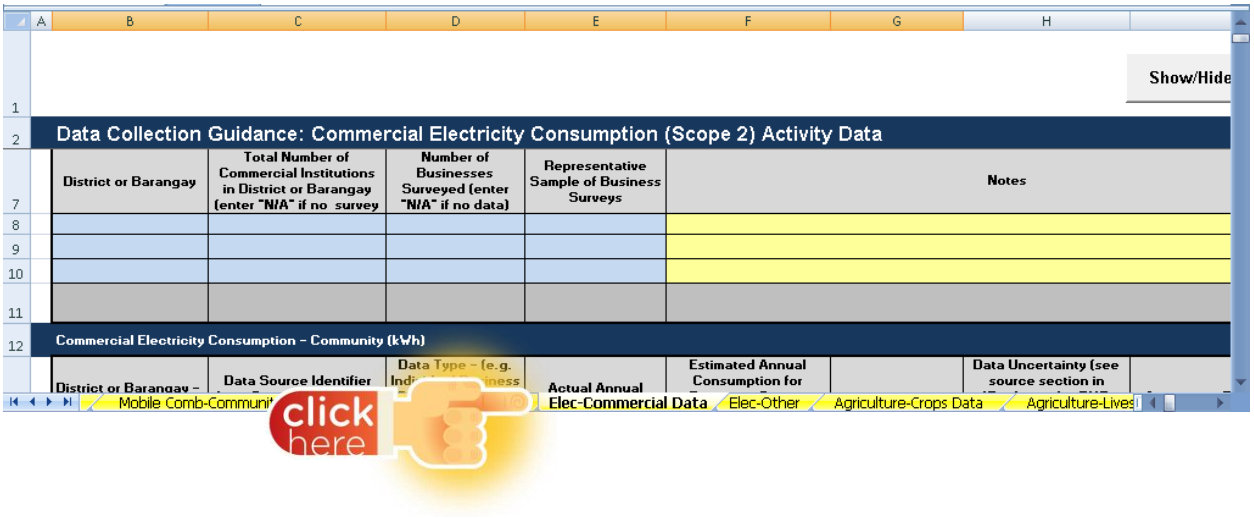
Step 7.2 Indicate the Data Source Identifier in Column C.

Step 7.3 Use the drop-down menu in Column D to choose the Type of data.

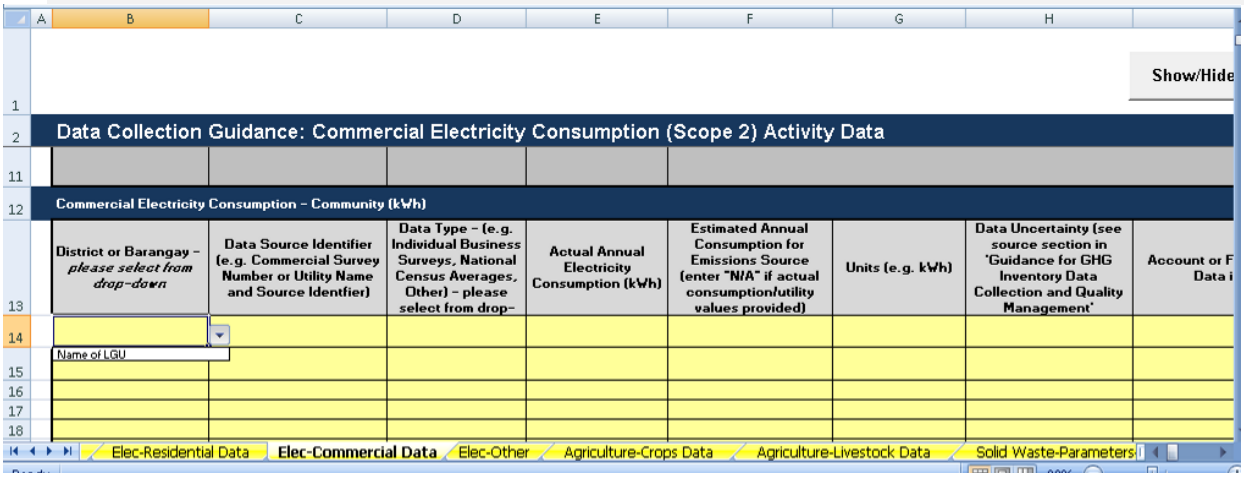
Step 7.4 Use Column E if Annual Electricity Consumption in known and Column F if Annual Electricity Consumption is estimated.

Step 7.5 Indicate the unit in Column G.

Step 8 Click the **Elec-Commercial Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions used in Row 6.



Step 8.1 Choose the name of your LGU or Districts/Barangays from the drop-down menu in Row 14, Column B Refer to *Datasheet 10.1.Activity Data –Electricity Consumption-Commercial Sector per District/Barangay* o fill-out the yellow cells..



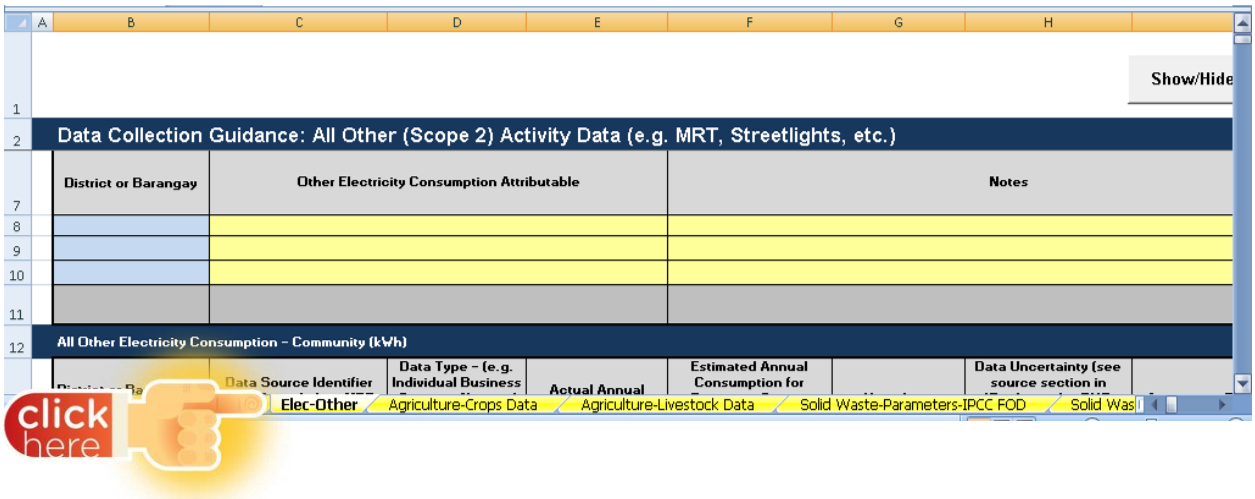
Step 8.2 Indicate the Data Source Identifier in Column C.

Step 8.3 Use the drop-down menu in Column D to choose the Type of data.

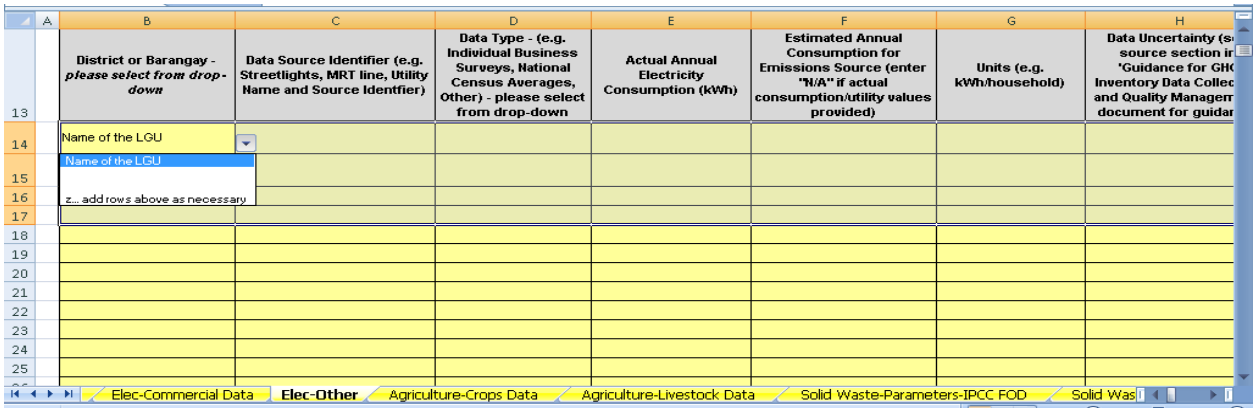
Step 8.4 Use Column E if Annual Electricity Consumption in known and Column F if Annual Electricity Consumption is estimated.

Step 8.5 Indicate the unit in Column G.

Step 9 Click the **Elec-Other Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions used in Row 6.



Step 9.1 Choose the name of your LGU or Districts/Barangays from the drop-down menu in Row 14, Column B. Refer to *Datasheet11.1.Activity Data –Electricity Consumption-Other Sector per District/Barangay* to fill-out the yellow cells.



Step 9.2 Indicate the Data Source Identifier in Column C.

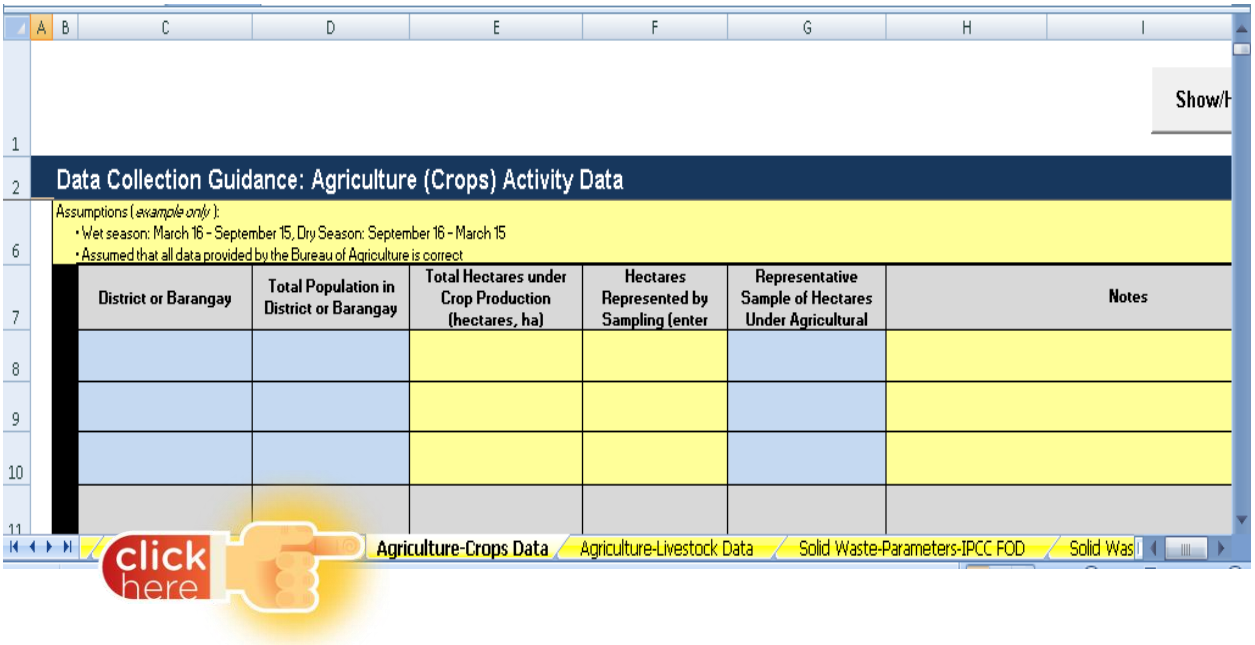
Step 9.3 Use the drop-down menu in Column D to choose the Type of data.

Step 9.4 Use Column E if Annual Electricity Consumption in known and Column F if Annual Electricity Consumption is estimated.

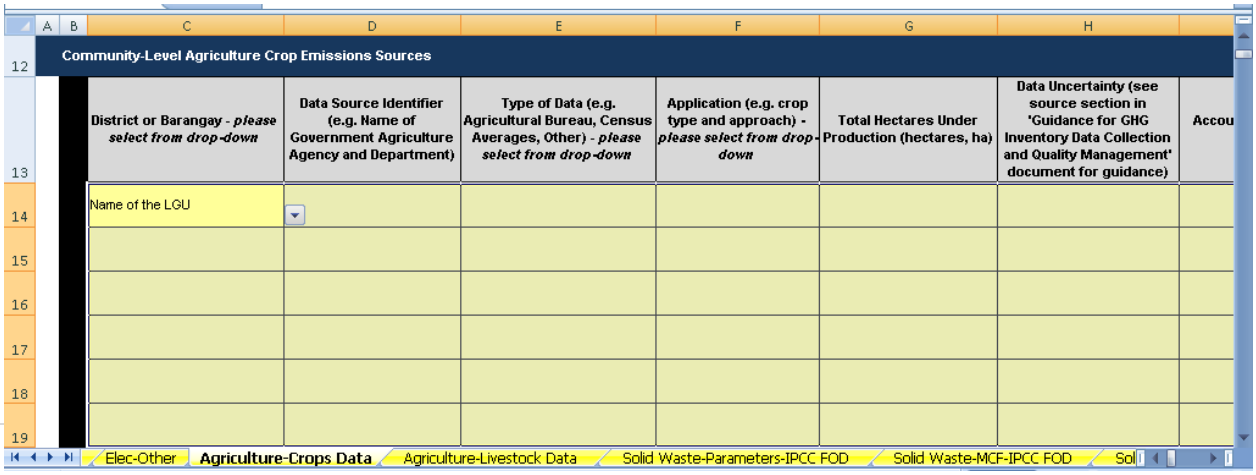
Step 9.5 Indicate the unit in Column G.

4.5 Agriculture

Step 10. Click the **Agriculture-Crops Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions used in Row 6 as shown in the example.



Step10.1 Choose the name of your LGU from the drop-down menu in Row 14, Column C and accomplish all the other columns based on *Datasheet 13.1 Agriculture Crop Emission Sources* to fill-out the yellow cells if available.

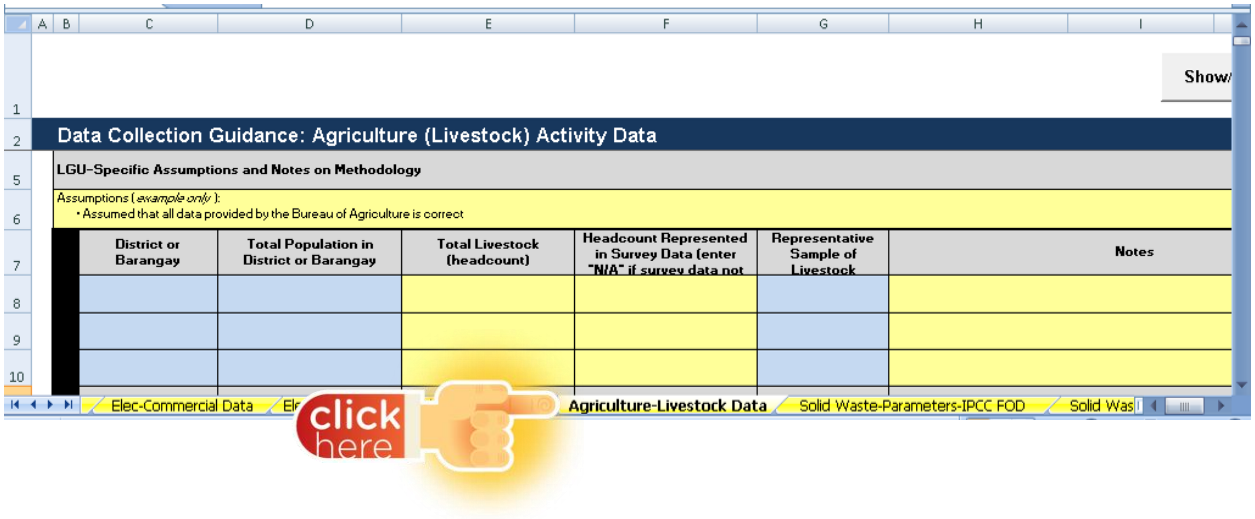


Step 10.3 Use the drop-down menu in Column E to choose the Type of data.

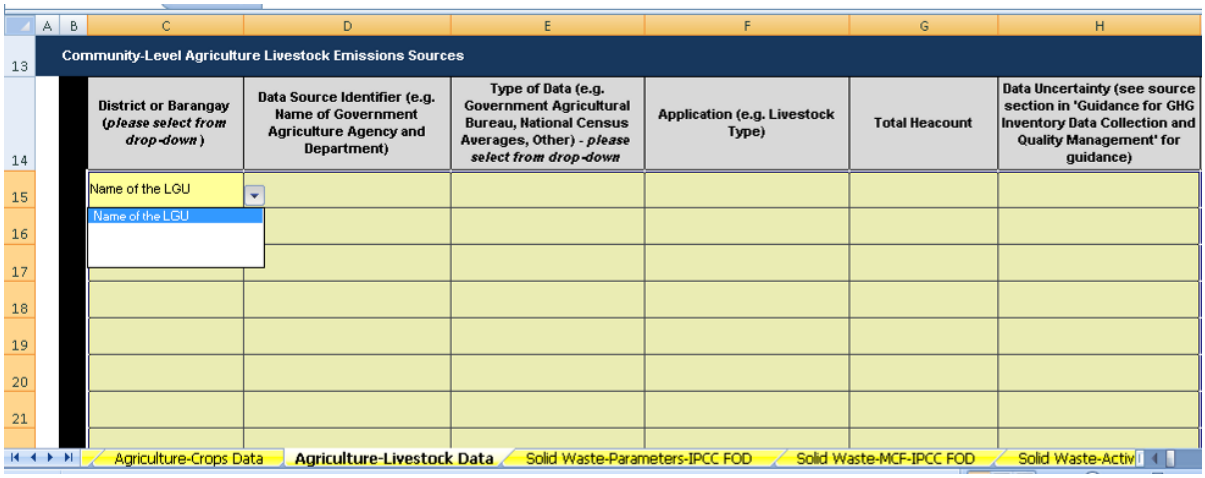
Step 10.4 Use the drop-down menu in Column F to choose the Application.

Step 10.5 Input total hectares in Column G.

Step 11. Click the **Agriculture-Livestock Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions used in Row 6G.



Step 11.1 Choose the name of your LGU from the drop-down menu in Row 15, Column C and accomplish all the other columns based *Datasheet 14.1 Livestock Emission Sources* to fill-out the yellow cells if available.



Step 11.2 Indicate the Data Source Identifier in Column D.

Step 11.3 Use the drop-down menu in Column E to choose the Type of Data.

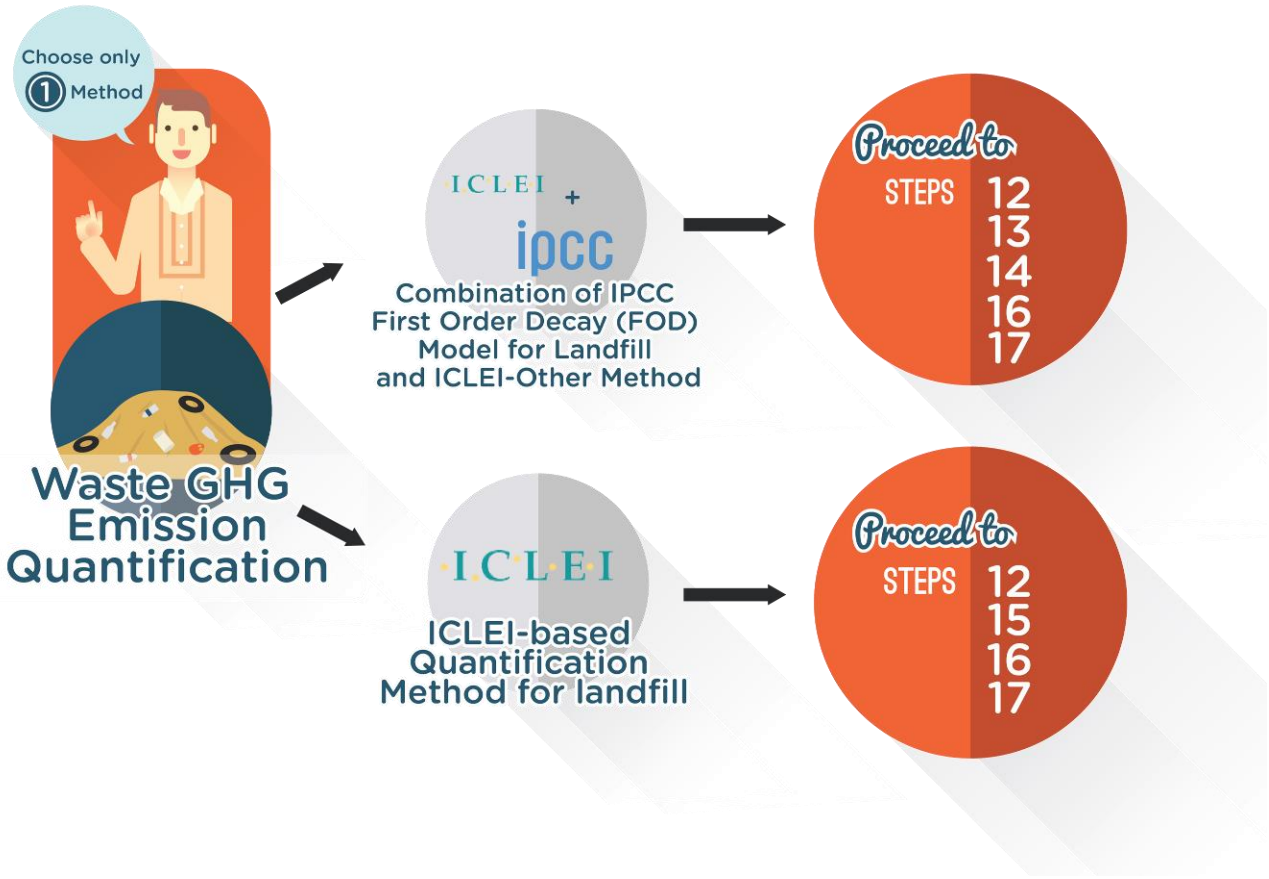
Step 11.4 Use the drop-down menu in Column F to choose the Application.

Step 11.5 Input the Total Headcount in Column G.

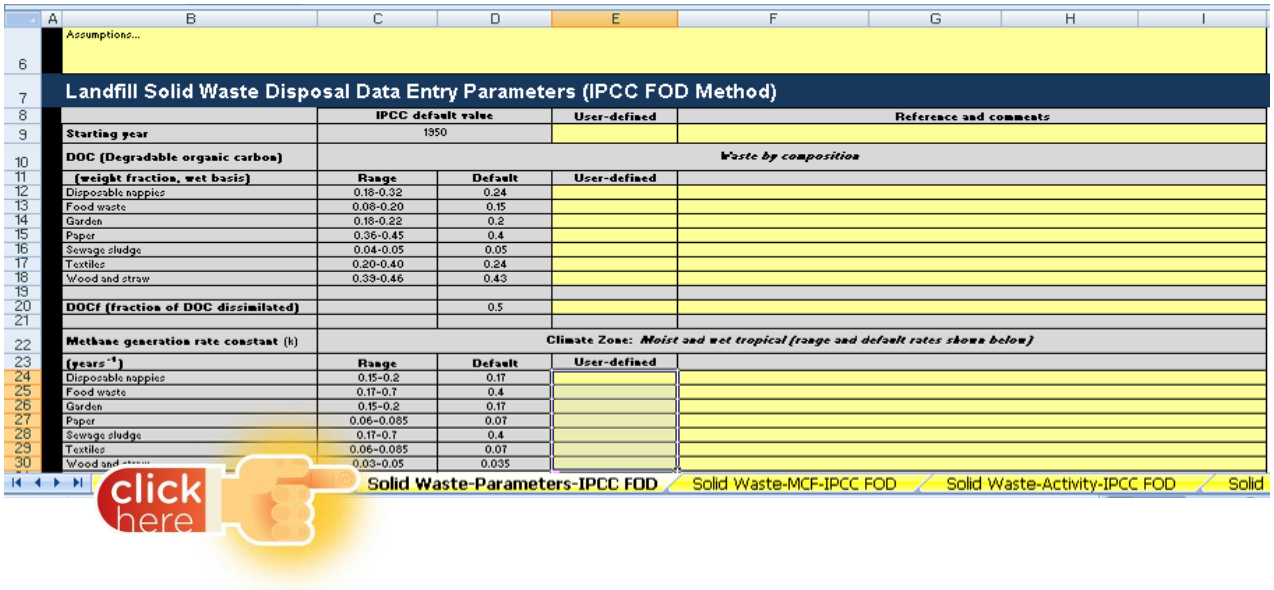
4.6 Solid Waste

Solid Waste - Solid waste refers to municipal solid waste ("MSW") generated within the LGU's geopolitical boundaries that may cause GHG emissions inside the LGU's geopolitical boundaries (e.g. the LGU operates or has substantial control over the solid waste facility) or the solid waste is transported to a disposal site outside the LGU's geopolitical boundaries and causes GHG emissions.

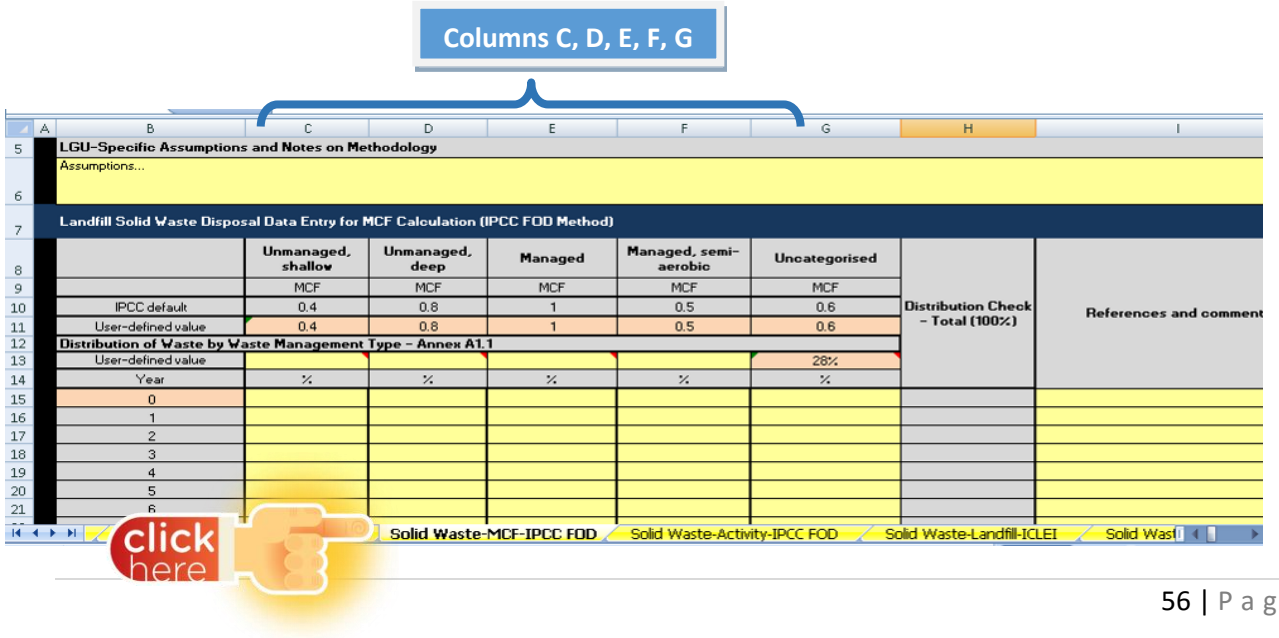
Follow the decision tree depending on the methodology chosen for estimating GHG emissions from solid waste in disposal site.



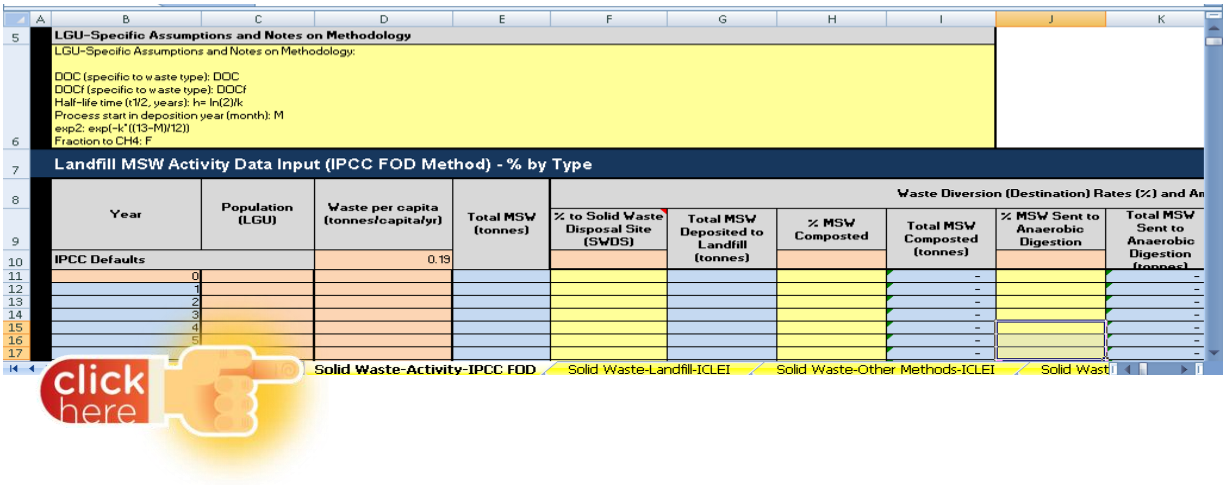
Step 12. Click the **Solid Waste-Parameters IPCC FOC** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all assumptions in Row 6 and enter in Column E User-defined data based *on Datasheet 16.1 Landfill Solid Waste Disposal Data Entry Parameters (IPCC FOD Method)*. Note that Column E values can be equal to default values as found in column D. However, use LGU specific or nationally determined values for these parameters in Column E if available.



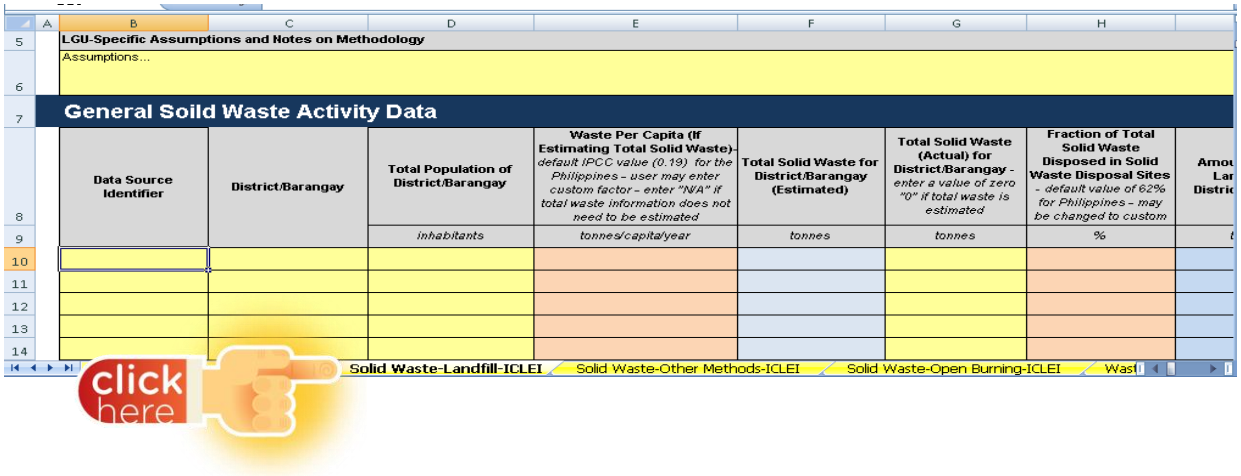
Step 13 Click **Solid Waste-MCF-IPCC-FOD** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Fill-out all the yellow cells starting with Row 13, Columns C, D, E, F and G using *Datasheet 17.1 Solid Waste Disposal Data Entry for Methane Correction Factor (MCF) Calculation* as reference.



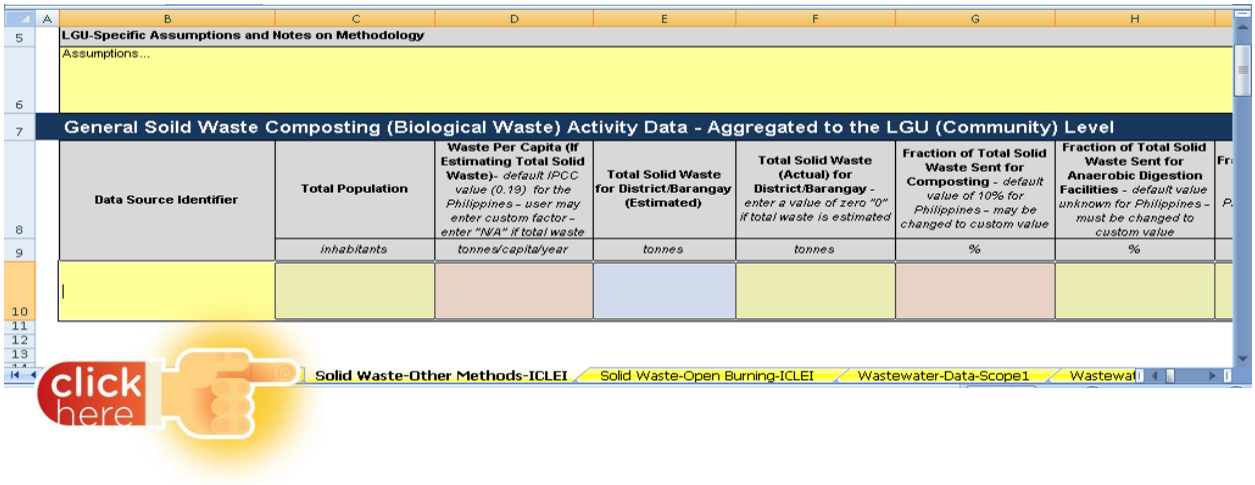
Step 14. Click **Solid Waste-Activity-IPCC-FOD** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out all the yellow cells starting with Row 11, Columns F,H, J, L, N, P, R, T, V, X, Z, AB, AD, using the Datasheet 18.1 as reference.



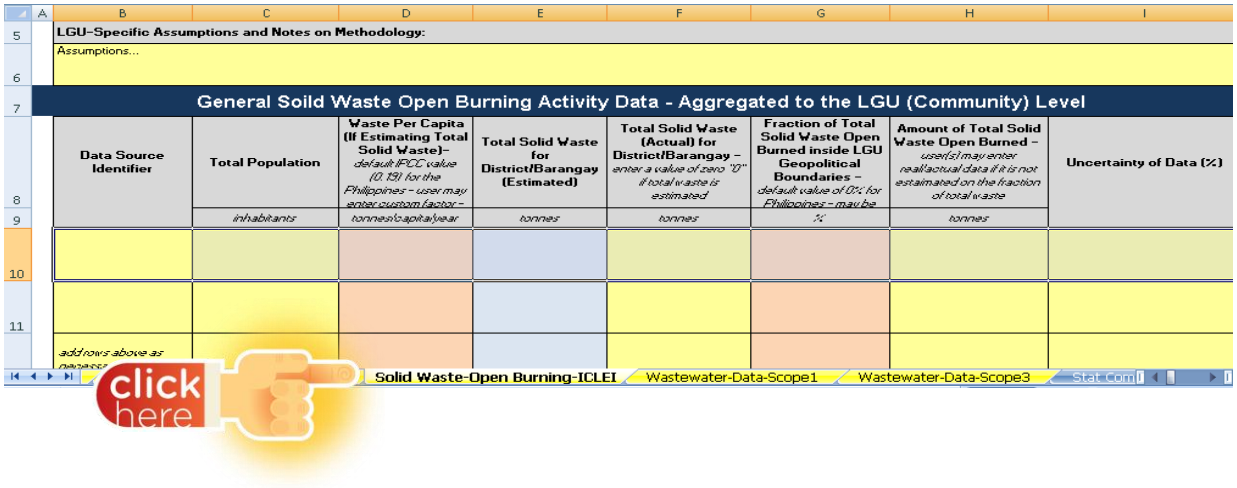
Step 15. Click **Solid Waste-Landfill- ICLEI** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out all the yellow cells starting with Row 10, Columns B, C, D, G, J, K and L *Datasheet 20.1 Landfill Solid Waste Disposal Data Entry (ICLEI method) by Landfill type* as reference.



Step 16. Click **Solid Waste-Other Methods- ECLEI** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out all the yellow cells starting with Row 10, Columns B, C, F, H and I using *Datasheet 19.1 General Solid Waste Composting Activity Data*.



Step 17. Click **Solid Waste-Landfill- Open Burning- ECLEI** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out all the yellow cells starting with Row 10, Columns B, C, F and H using *Datasheet 19.2 General Solid Waste Open Burning Activity Data* as reference.



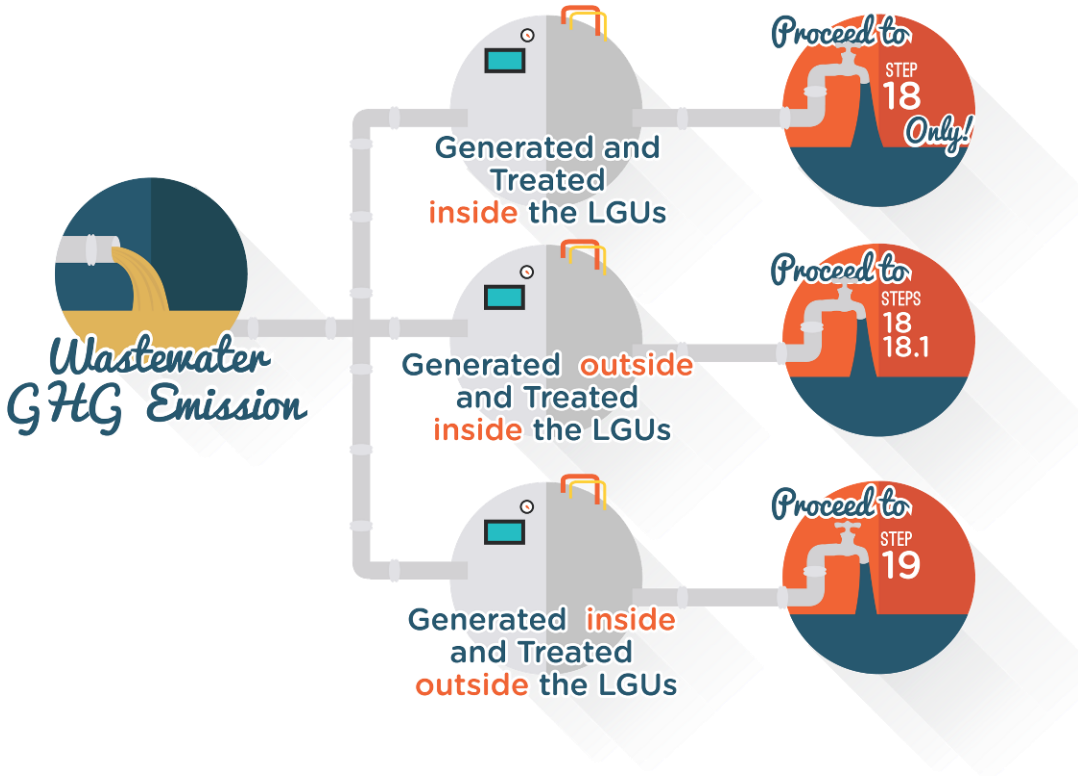
4.7 Wastewater

Wastewater - Waste water emissions included are those associated with Methane (CH_4) and Nitrous Oxide (N_2O) emissions from waste water and sewage. LGUs should account for CH_4 and N_2O emissions from any wastewater systems and disposal activities coming from the following sources:

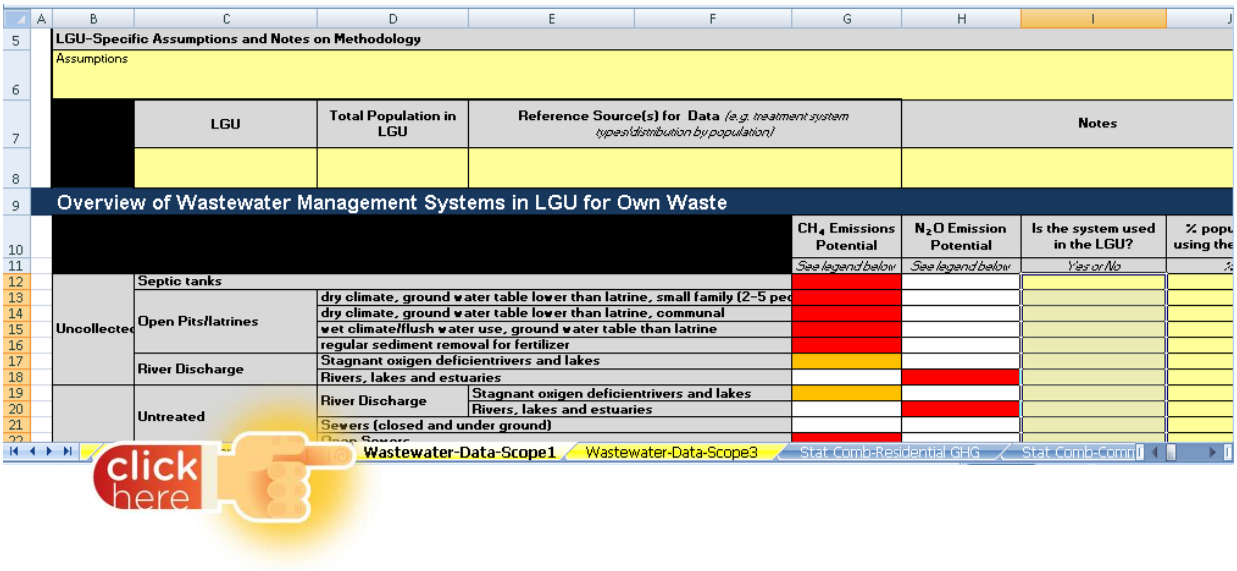
1. Waste water **generated and treated inside** the LGU's geopolitical boundaries (Scope 1).
2. Wastewater **generated/received from outside t**he geopolitical boundaries of the LGU, **but treated within** the boundaries of the LGU (Scope 1).
3. Wastewater **generated by the LGU** but is **treated outside** the geopolitical boundaries of the LGU (Scope 3)

Note that wastewater **generated/received from outside t**he geopolitical boundaries of the LGU, **but treated within** the boundaries of the LGU and Wastewater **generated by the LGU** but is **treated outside** the geopolitical boundaries of the LGU are real cases but are not properly documented. LGUs are encouraged to check their boundaries to determine if there are these cases, and report as appropriate.

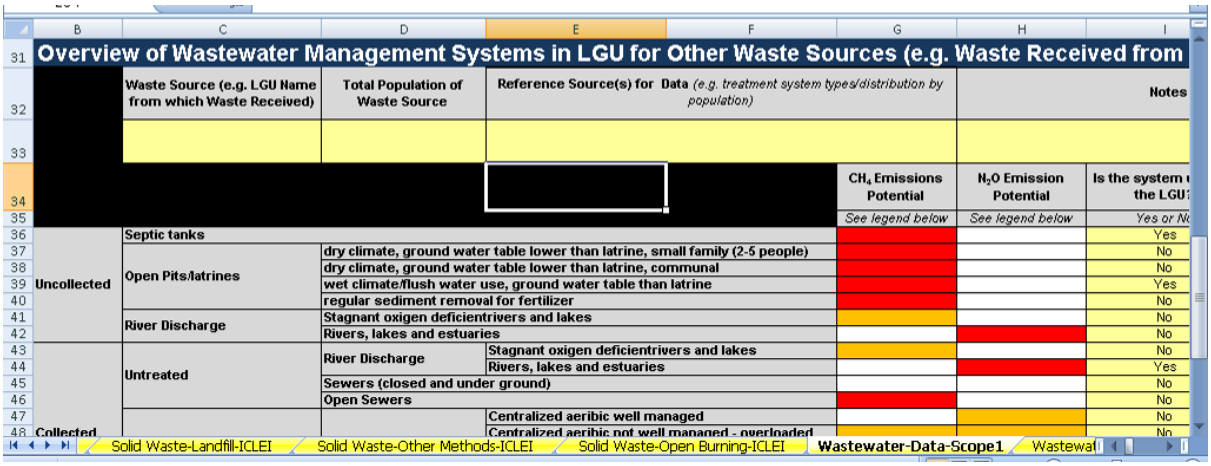
Follow the decision tree below for the steps in computing for the emissions of your wastewater.



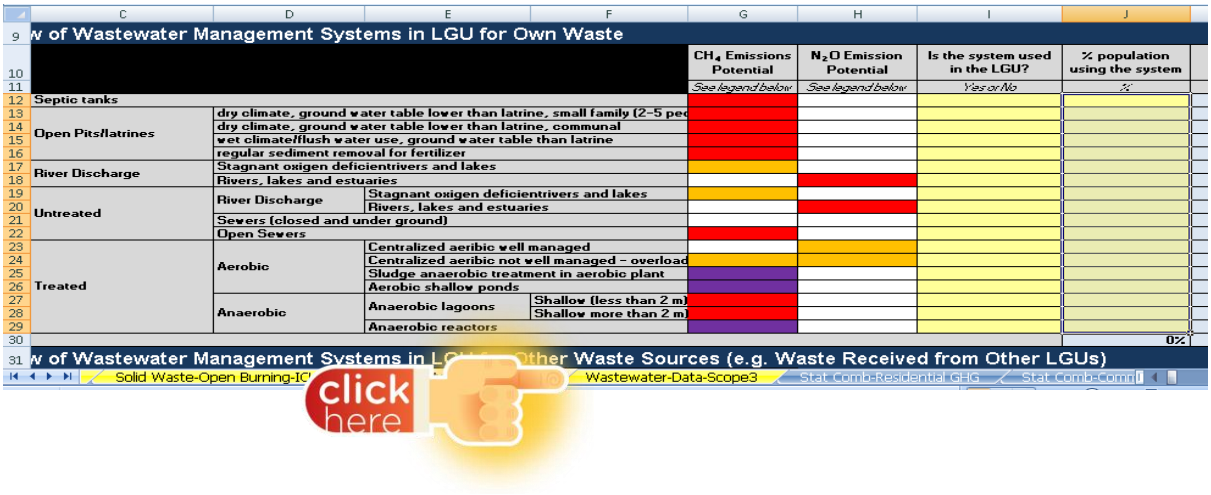
Step 18. Click **Wastewater-Data-Scope 1** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out all the yellow cells in Row 8 starting with Column C, D and Reference Sources of Data. Fill-out Columns I and J starting in Row 12 using *Datasheet 21.1 Wastewater Management System* as reference.



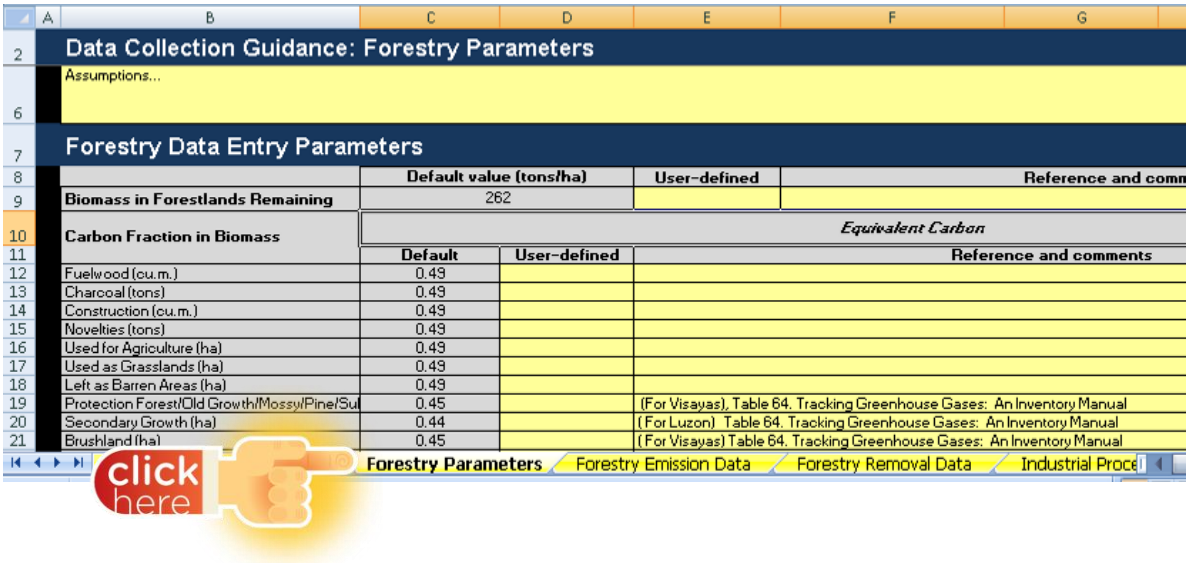
Step 18.1. Proceed to Row 31, Wastewater Management in LGU for Other Waste Sources if your LGU/community is receiving wastewater from other sources. Provide data required in Row 33 and answer the questions in column I starting from Row 36 to Row 53.



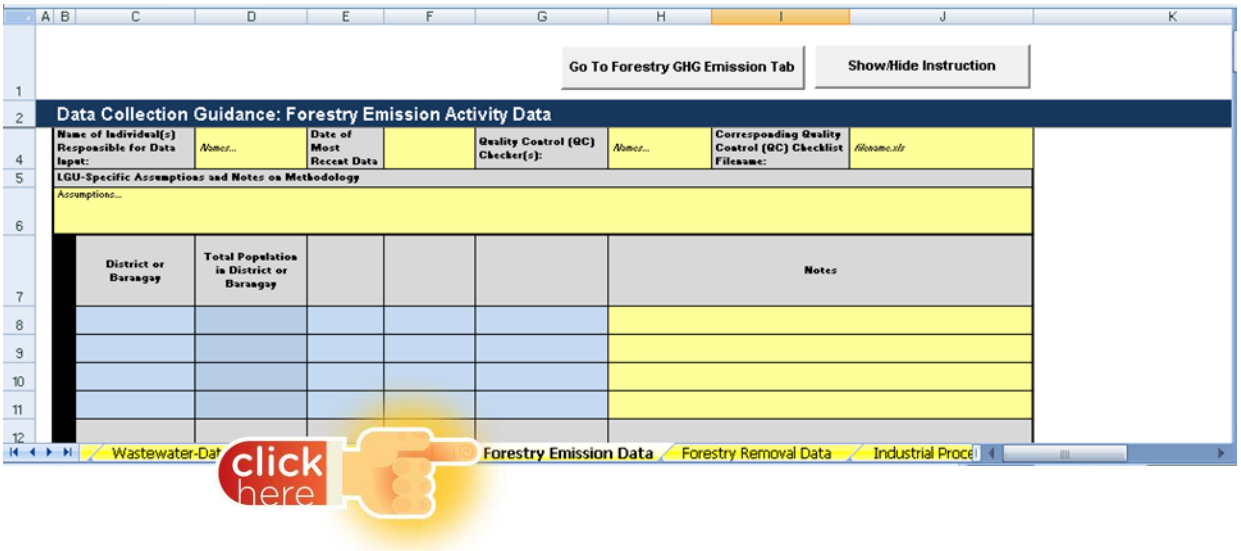
Step 19. Click **Wastewater-Data-Scope 3** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out all the yellow cells in Row 8 starting with Column C, D and Reference Sources of Data. Fill-out Columns I and J using *Datasheet 21.1 Wastewater Management System* as reference.



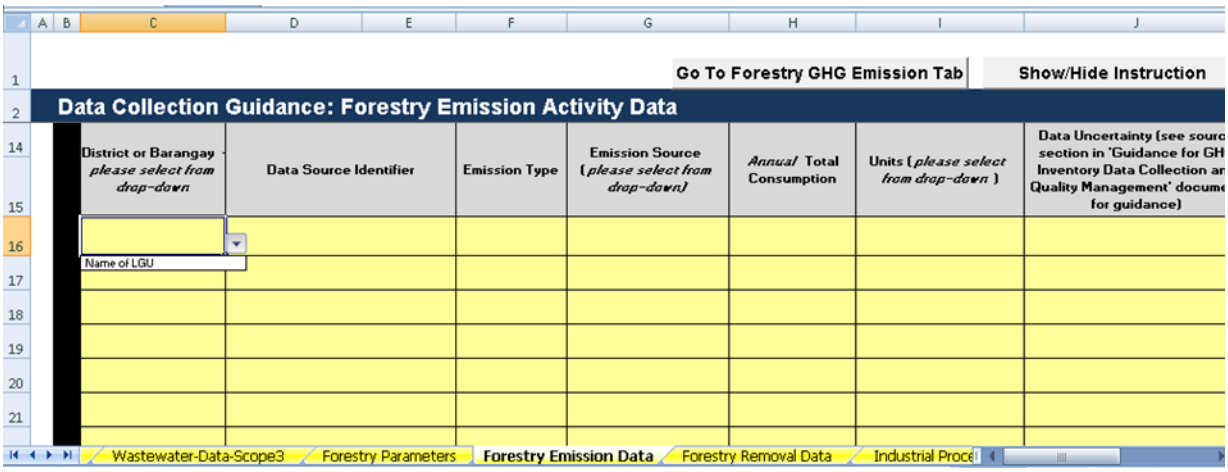
Step 20 Click **Forestry Parameters** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out Column D (User –Defined Values) starting in Row 9. Indicate the References and comments. Default values may be used if User-Defined Values are not available. (*Note: Spreadsheet will automatically use the Default values if User-Defined Values are not entered*)



Step 21 Click **Forestry Emission Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. The name of your LGU or districts/barangays previously identified should be reflected starting in Row 8 Column C and the total population in Column D. Put additional notes if any in Column I.



Step 21.1 Choose the name of your LGU from the drop-down menu in Row 15, Column C and accomplish all the other columns based *Datasheet 22.1 Forestry and Other Land-Use Change Data for GHG emissions* to fill-out the yellow cells.



Step 21.2 Indicate the Data Source Identifier in Column D.

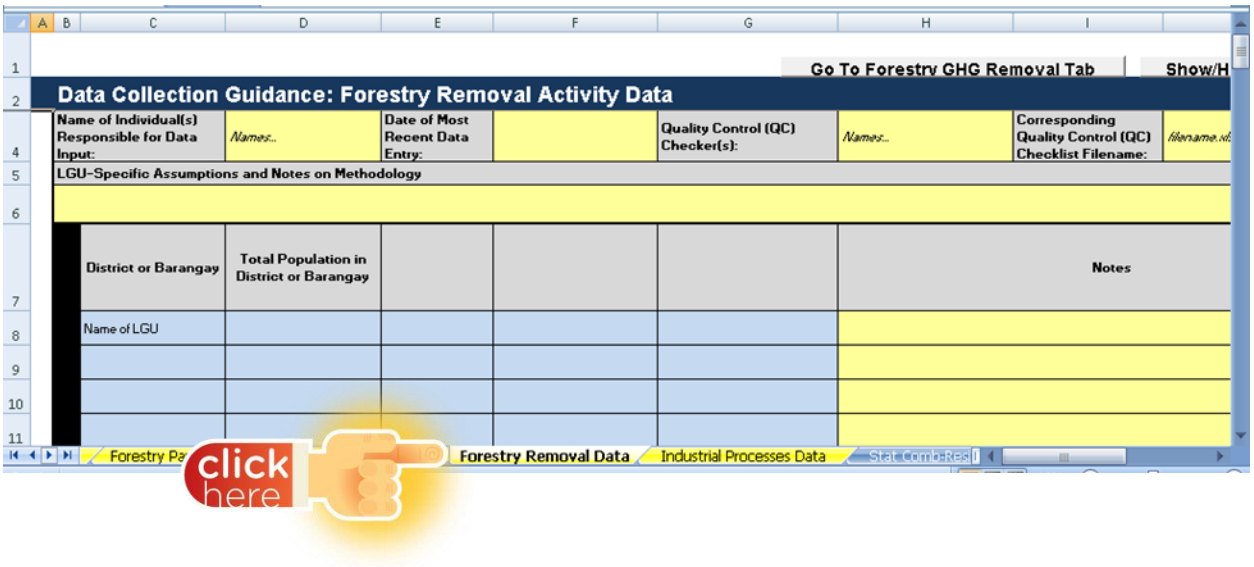
Step 21.3 Use the drop-down menu in Column F to choose the Emission Type

Step 21.4 Use the drop-down menu in Column G to choose the Emission Source.

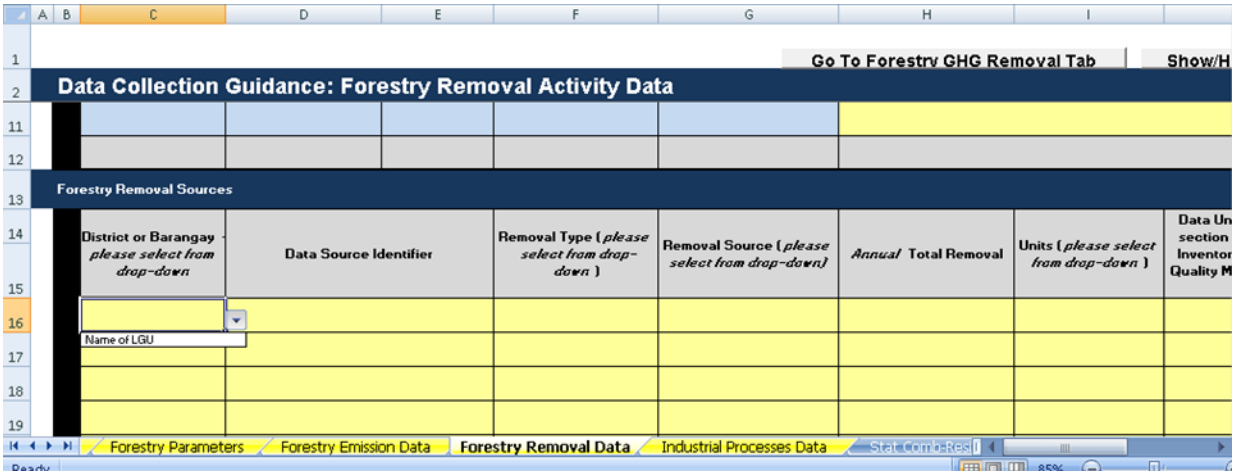
Step 21.5 Input the Annual total (in ha) in Column H.

Step 21.6 Use the drop-down menu in Column I to choose the appropriate unit.

Step 22 Click **Forestry Removal Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. The name of your LGU or districts/barangays previously identified should be reflected starting in Row 8 Column C and the total population in Column D. Put additional notes if any in Column I.



Step 22.1 Choose the name of your LGU from the drop-down menu in Row 15, Column C and accomplish all the other columns *Datasheet 24.1 Forestry and Other Land-Use Change Data for GHG Removal* to fill-out the yellow cells.



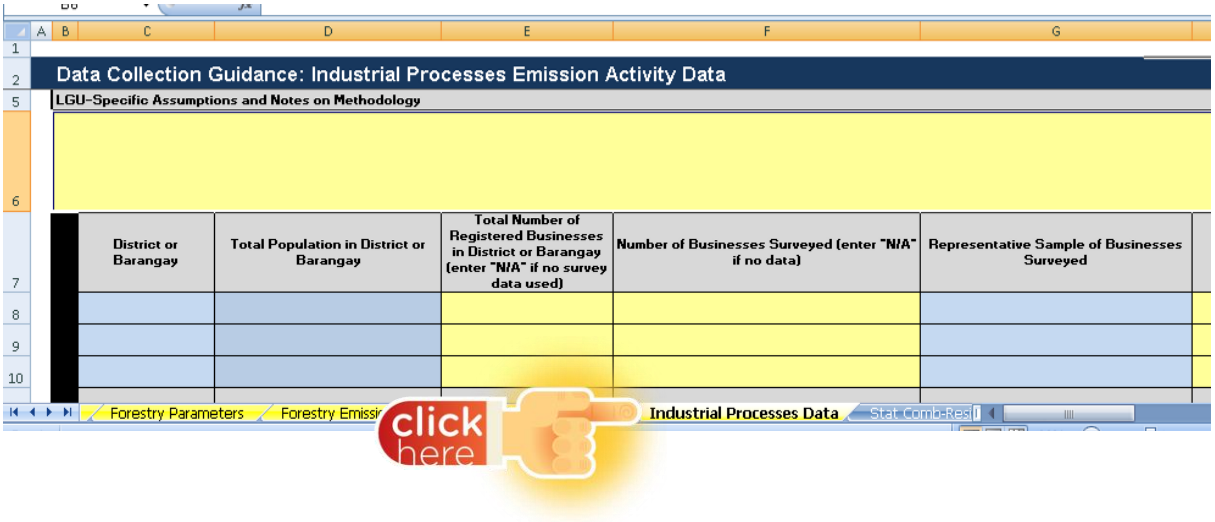
Step 22.3 Use the drop-down menu in Column F to choose the Emission Type.

Step 22.4 Use the drop-down menu in Column G to choose the Emission Source

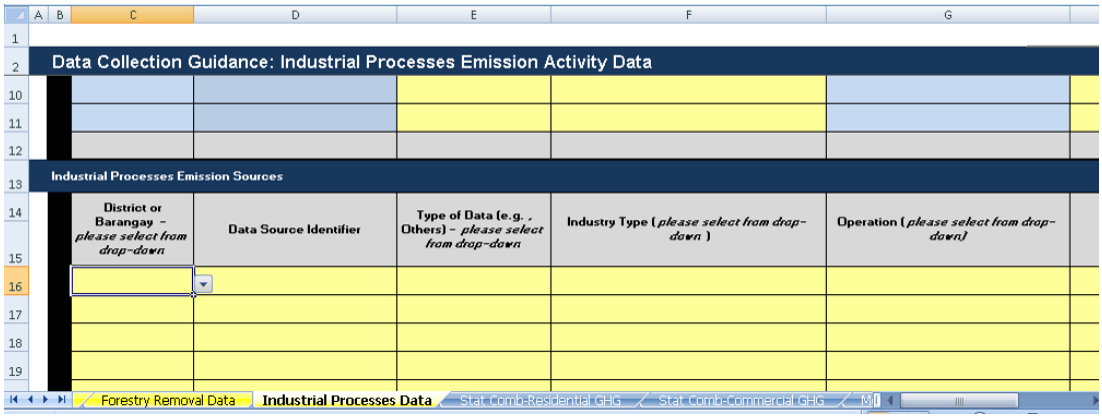
Step 22.5 Input the Annual Total (in ha) in Column H.

Step 22.6 Use the drop-down menu in Column I to choose the appropriate unit.

Step 23 Click **IPPU Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out all the yellow cells particularly those in Column C, D and Reference Sources of Data.



Step 23.1 Choose the name of your LGU from the drop-down menu in Row 15, Column C and accomplish all the other columns based on the **applicable datasheet**s (i.e. *Datasheet 26.1 Mineral Industry, Datasheet 26.2 Chemical Industry, etc.).* Select "Others" for paper and food industries. Choose from the drop-down menu in Column G the specific operation of the selected industry. Input the annual production and units in Columns H and I respectively.
(*Note: The spreadsheet provides quantification of GHG emissions of selected industries only.)*



Step 23.2 Indicate the Data Source Identifier in Column D.

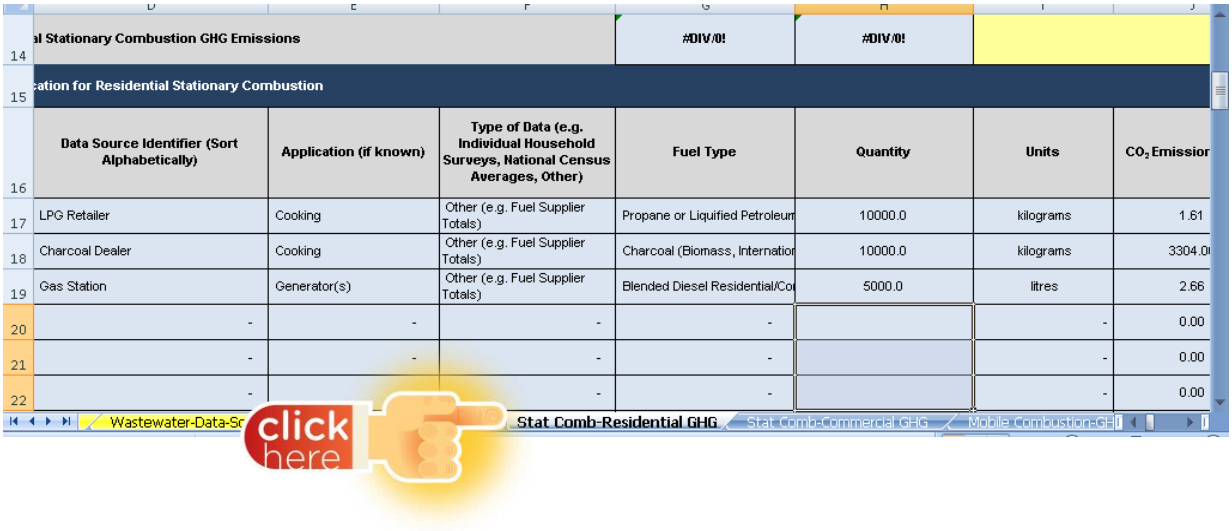
Step 23.3 Use the drop-down menu in Column E to choose the Type of Data.

Step 23.4 Use the drop-down menu in Column F to choose the Industry Type.

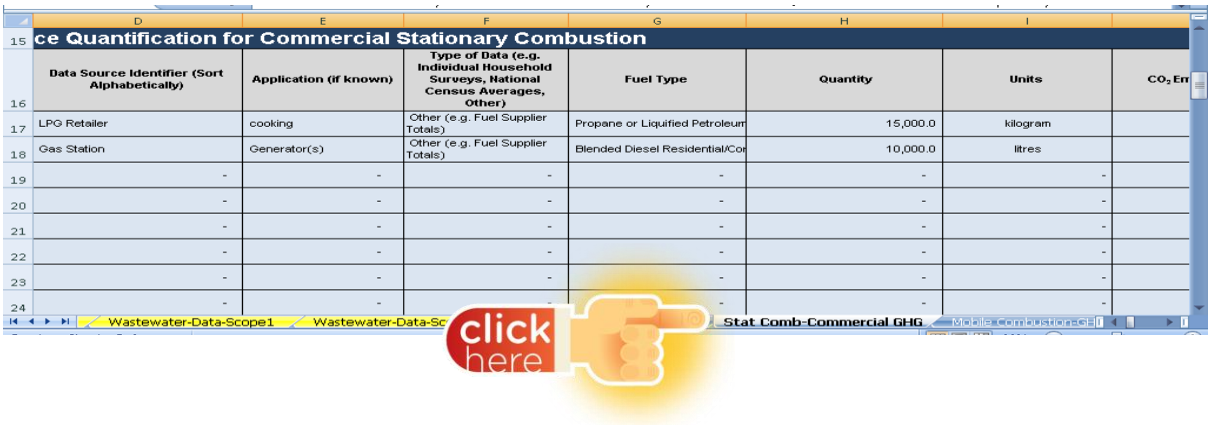
Step 23.5 Use the drop-down menu in Column G to choose the Operation

Step 23.6 Input the Annual Total Production in Column H.

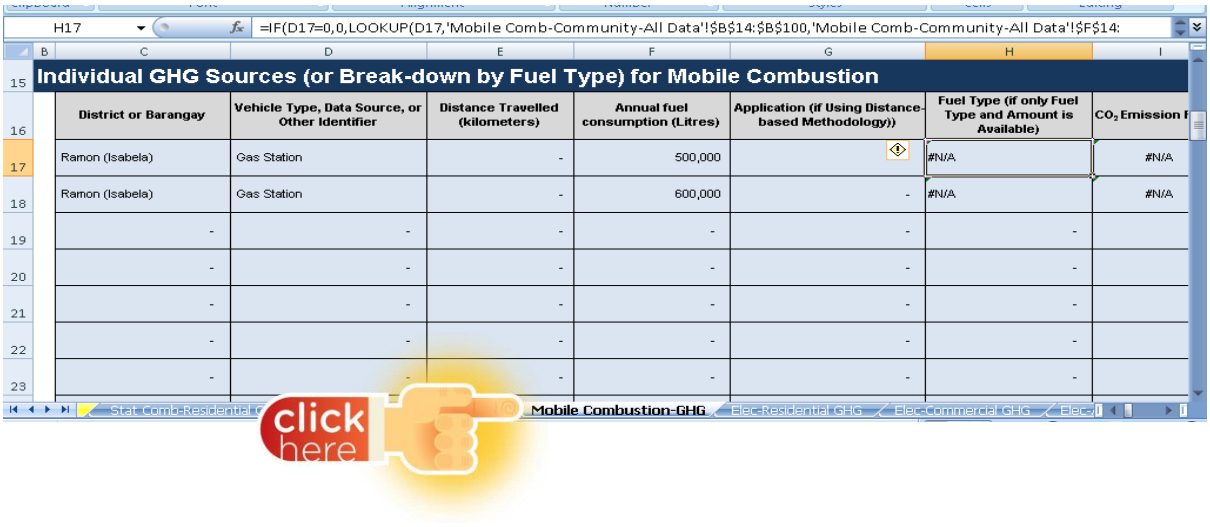
Step 24 Click the **Stat Comb-Residential GHG** tab**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Input data requirements in Row 7. Compare data input starting from Row 17 with your *Datasheet 5.1 Emission sources and fuel consumption of the residential sector – Stationary Combustion*. If there are incorrect data input, go back to the Stat Comb-Residential Data tab and correct data input using the "Go to" button.



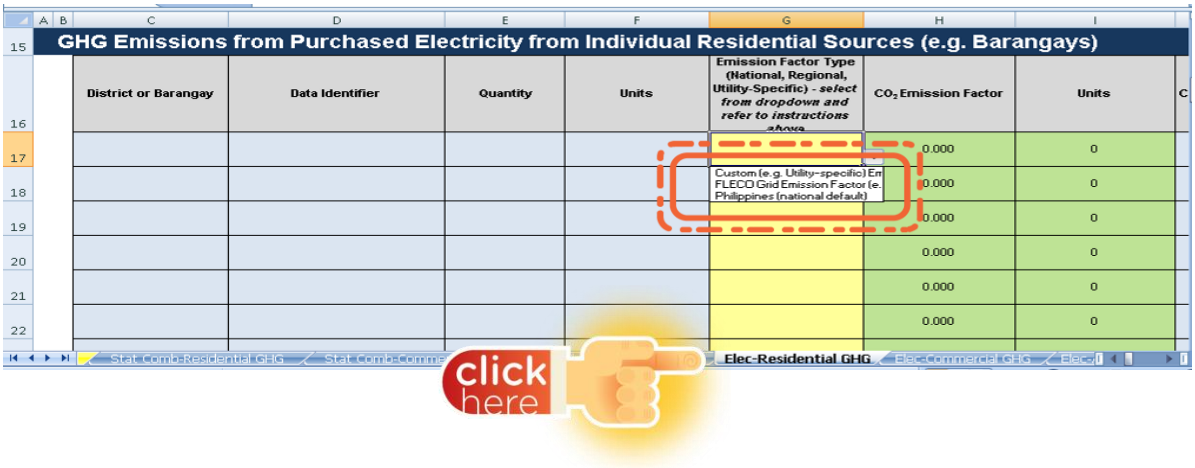
Step 25 Click the **Stat Comb-Commercial GHG** tab**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Input data requirements in Row 7. Check data input starting from Row 17 with your *Datasheet 4.1.List of all of Commercial Establishments included in the inventory per District/Barangay*. If there are incorrect data, go back to the Stat Comb-Commercial Data tab and correct data input using the "Go to" button.



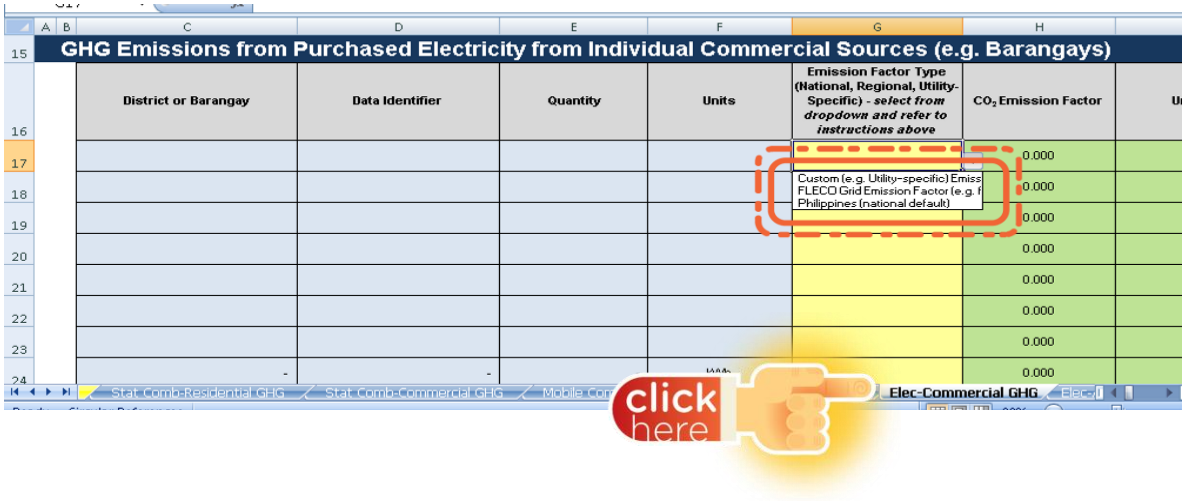
Step 26 Click the **Mobile combustion-GHG** tab**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Input data requirements in Row 7. Check data input starting from Row 17 with your *Datasheet7.1.List of all Vehicles included in the inventory per Districts/Barangays*. If there are incorrect data, go back to the Mobile Combustion Data tab and correct data input using the "Go to" button.



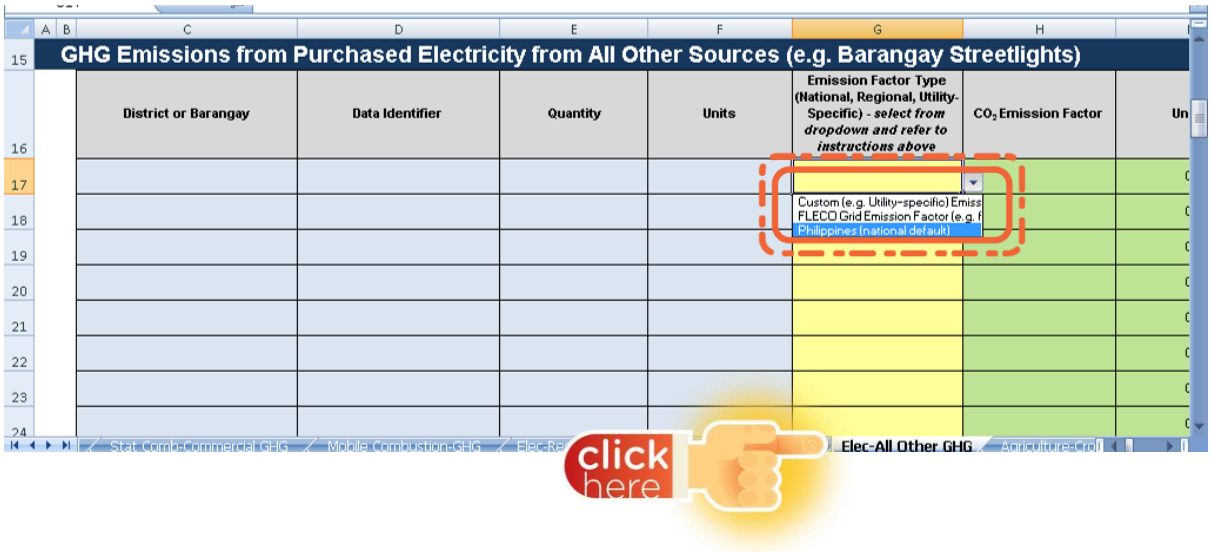
Step 27 Click the **Elec-Residential GHG** tab**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your *Datasheet9.1.Activity Data –Electricity Consumption-Residential Sector per District/Barangay*. If there are incorrect data, go back to the Elec-Residential Data tab and correct data input using the "Go to" button. Use the drop-down menu in Column G for the emission factor type. Choose "Philippines" as the emission factor type if regional or grid specific emission factor is not available.



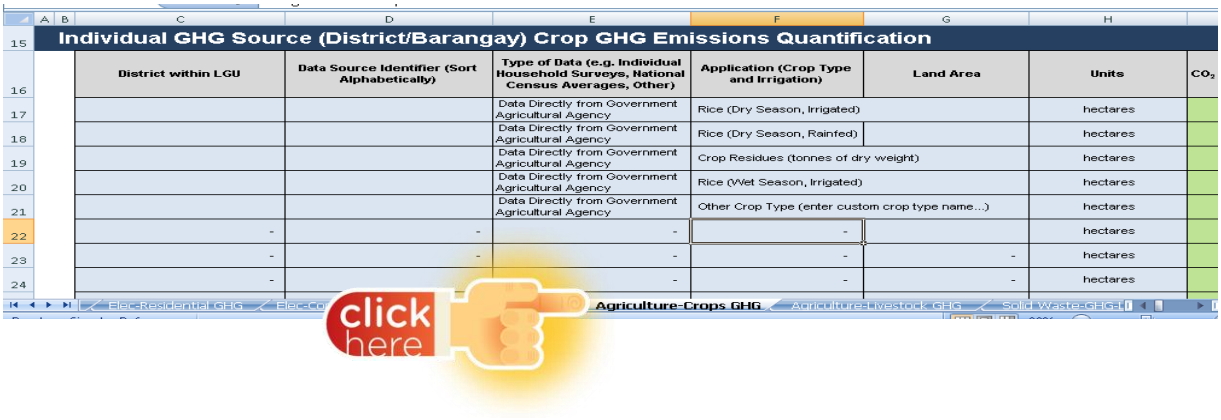
Step 28 Click the **Elec-Commercial GHG** tab**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your *Datasheet10.1.Activity Data –Electricity Consumption-Commercial Sector per District/Barangay*. If there are incorrect data, go back to the Elec-Commercial Data tab and correct data input using the "Go to" button. Use the drop-down menu in Column G for the emission factor type. Choose "Philippines" as the emission factor type if regional or grid specific emission factor is not available.



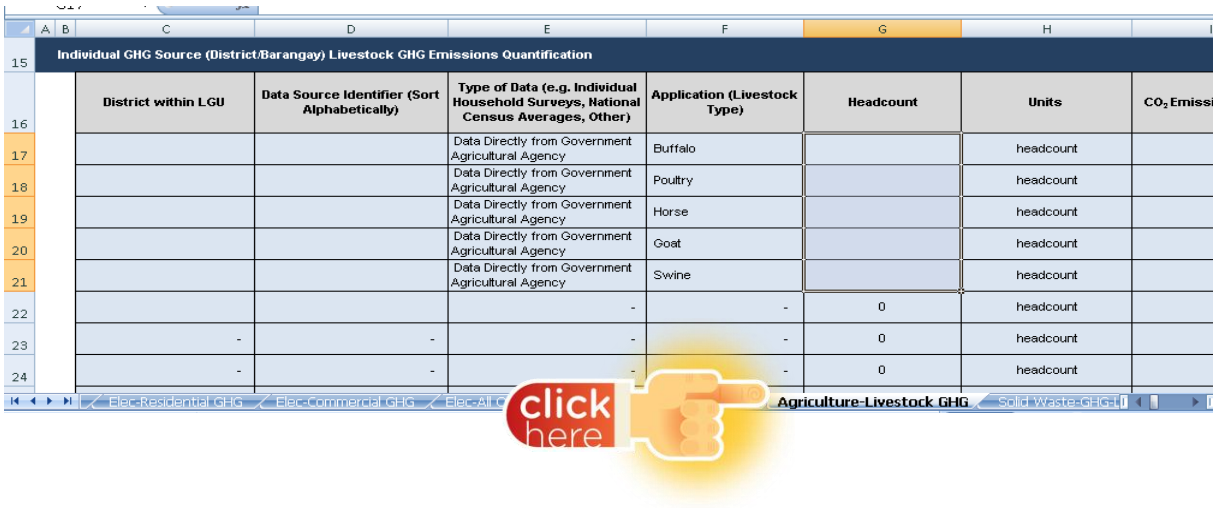
Step 29 Click the **Elec-All Other GHG** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your *Datasheet11.1.Activity Data –Electricity Consumption-Other Sector per District/Barangay*. If there are incorrect data, go back to the Elec-All Other Data tab and correct data input using the "Go to" button. Use the drop-down menu in Column G for the emission factor type. Choose "Philippines" as the emission factor type if regional or grid specific emission factor is not available.



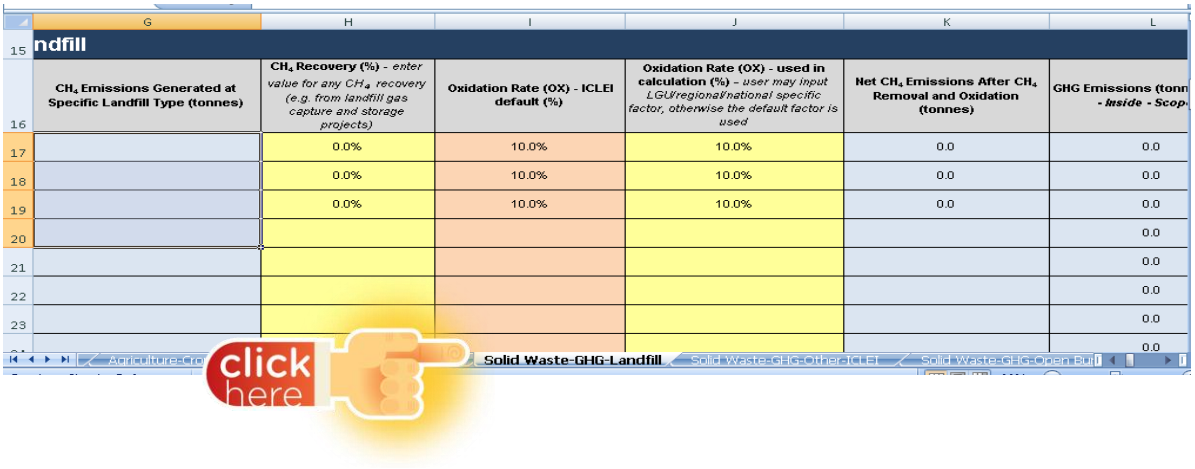
Step 30 Click the **Agriculture-Crops GHG** tab**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your *Datasheet 13.1 Agriculture Crop Emission Sources*. If there are incorrect data, go back to the Agriculture-Crops Data tab and correct data input using the "Go to" button.



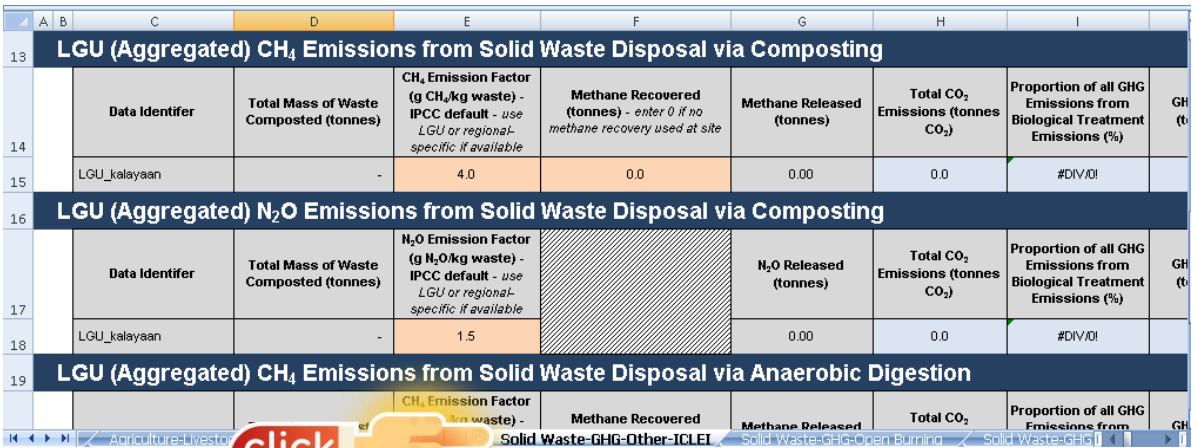
Step 31 Click the **Agriculture-Livestock GHG** tab**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your *Datasheet 14.1 Agriculture Livestock Emission Sources*. If there are incorrect data, go back to the Agriculture-Livestock Data tab and correct data input using the "Go to" button.



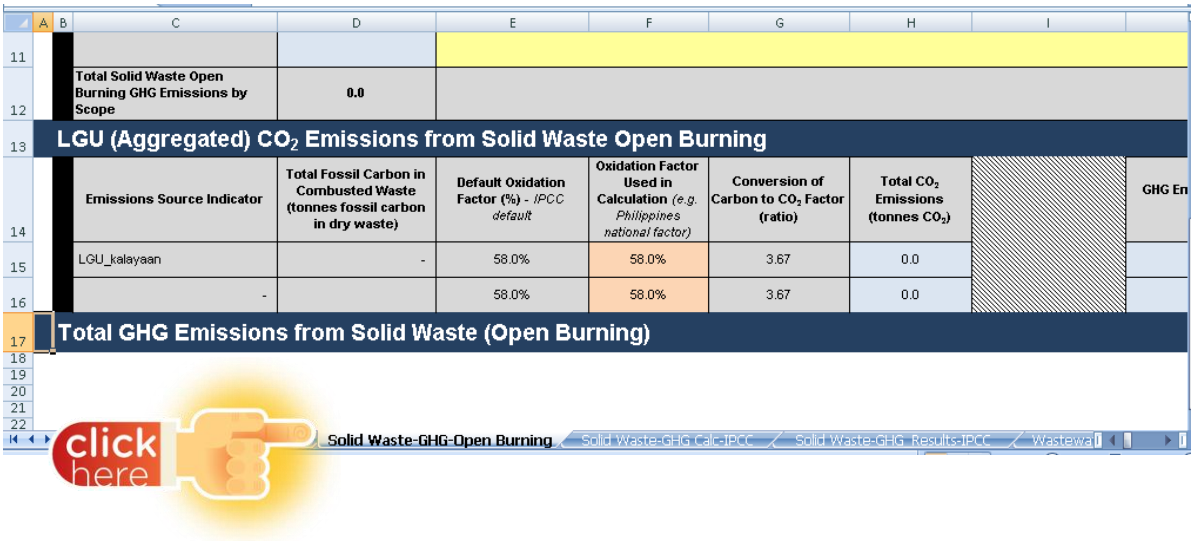
Step 32 Click the **Solid waste-GHG-Landfill** tab**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17. If there are incorrect data, go back to the Solid waste Landfill ICLEI Data tab and correct data input using the "Go to" button. Enter value for any methane (CH_4) recovery and capture project in Row 17, Column H if available. Otherwise, enter zero (0) If there is no methane recovery and capture project. Enter oxidation rate used in the computation in Row 17, Column J if available. Otherwise, use the default value of 10%.



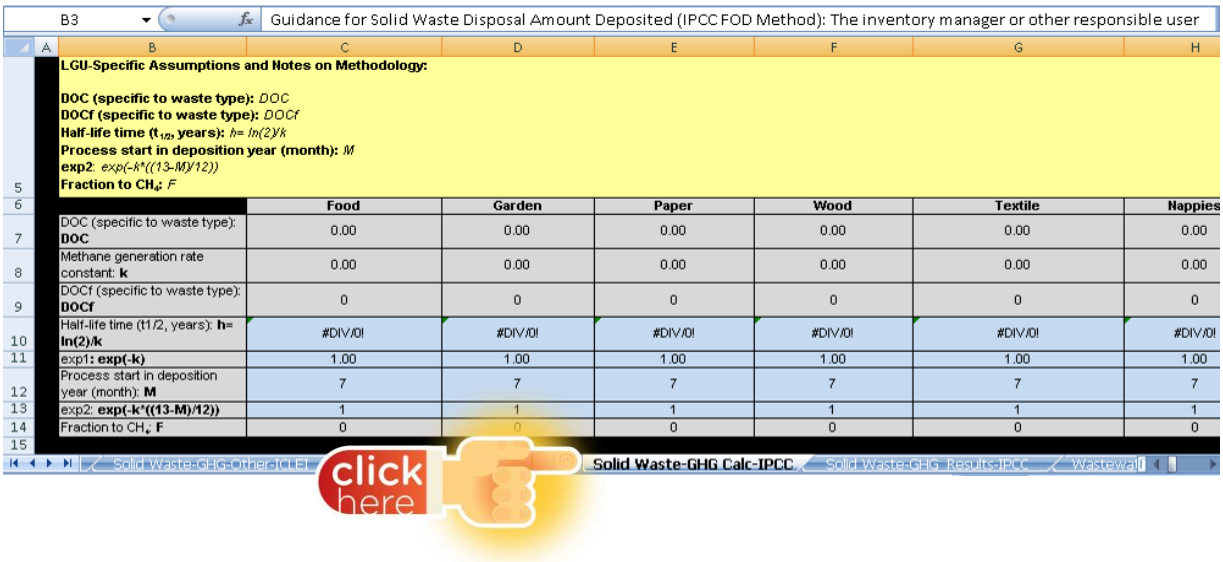
Step 33 Click the **Solid waste-GHG-Other -ICLEI** tab if applicable**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input. If there are incorrect data, go back to the Solid waste Other ICLEI Data tab and correct data input using the "Go to" button.



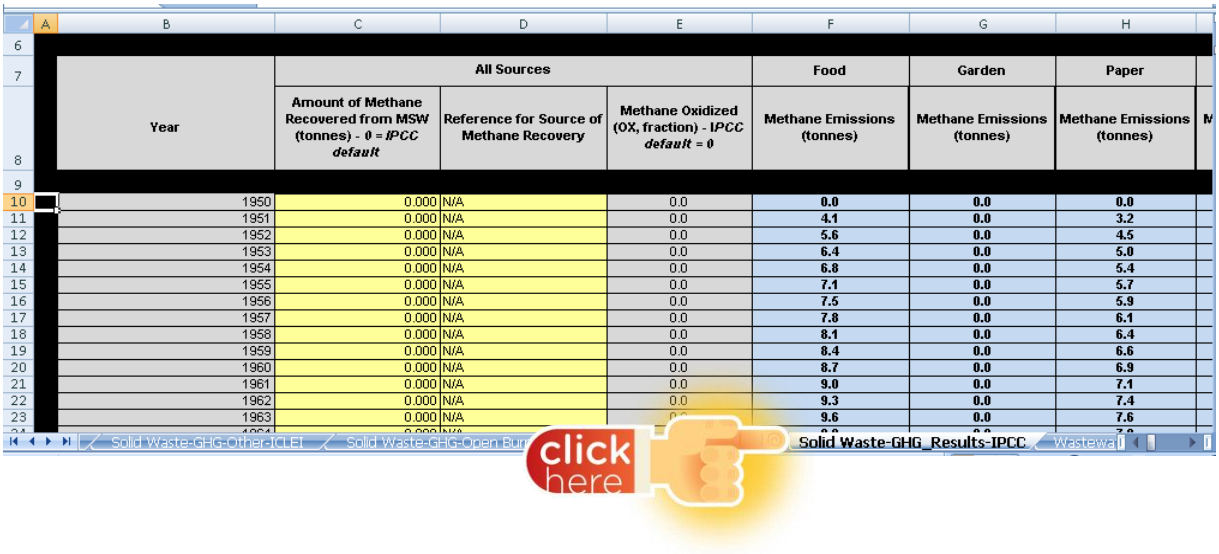
Step 34 Click the **Solid waste-GHG-Open Burning** tab if applicable**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input. If there are incorrect data, go back to the Solid waste –Open Burning ICLEI Data tab and correct data input using the "Go to" button.



Step 35 Click the **Solid waste-GHG_Calc- IPCC** tab**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Review and check data input. Put assumptions in Row 5 as shown in the example.

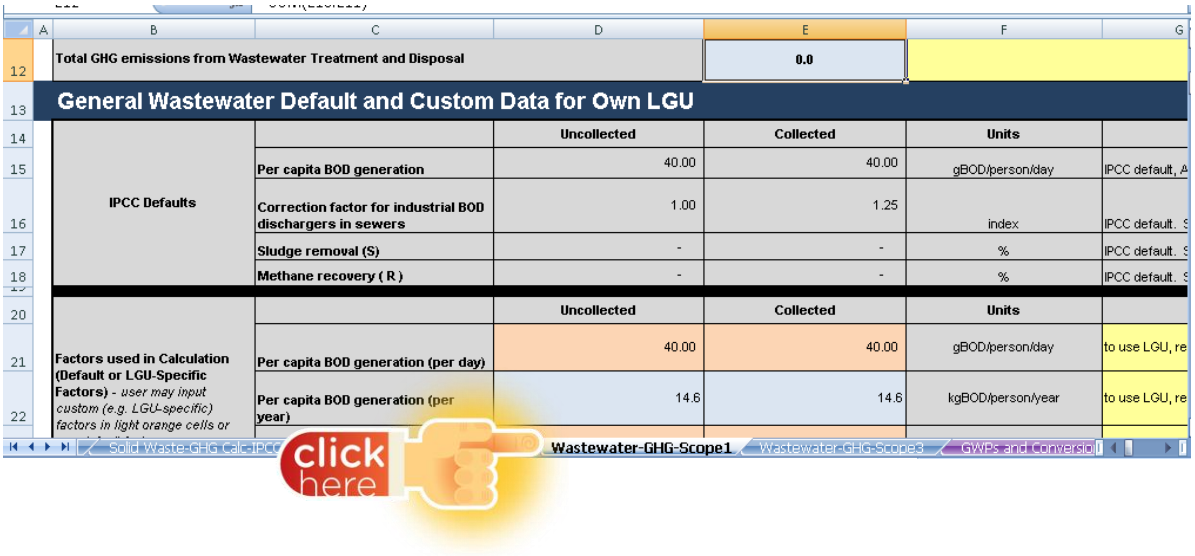


Step 36 Click the **Solid waste-GHG_Results- IPCC** tab**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Enter the known value for the methane (CH_4) recovered from the Municipal Solid Waste Disposal site (MSW) and the Reference for the Source of Methane Recovery in Columns C and D respectively.



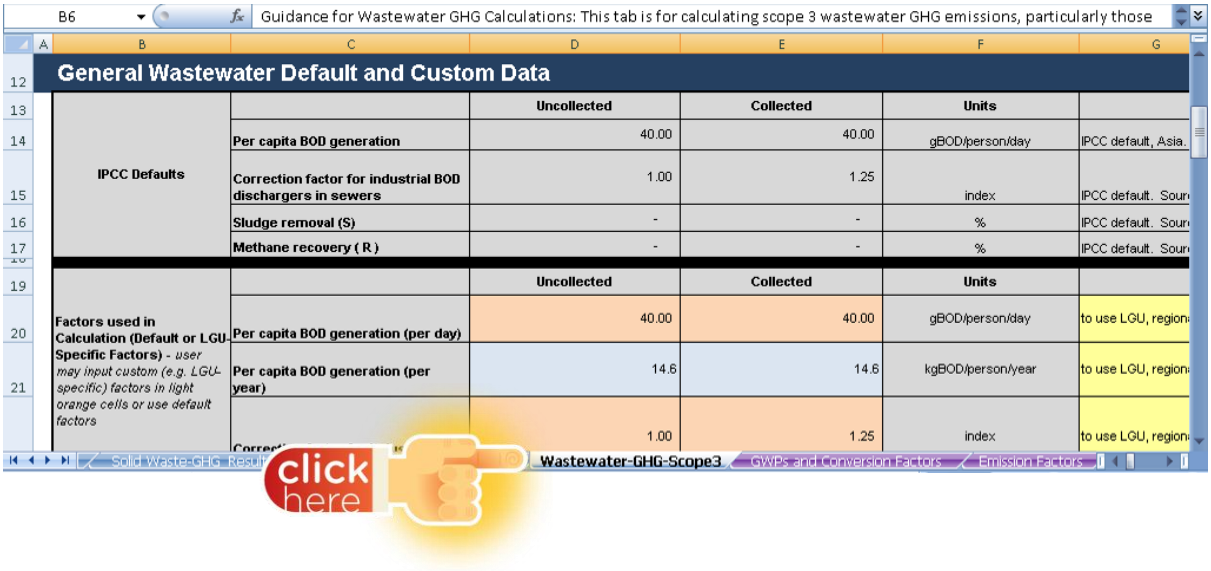
Year	All Sources			Food	Garden	Paper	
	Amount of Methane Recovered from MSW (tonnes) - 0 = *IPCC default*	Reference for Source of Methane Recovery	Methane Oxidized (OX, fraction) - *IPCC default* = 0	Methane Emissions (tonnes)	Methane Emissions (tonnes)	Methane Emissions (tonnes)	M
1950	0.000	N/A	0.0	0.0	0.0	0.0	
1951	0.000	N/A	0.0	4.1	0.0	3.2	
1952	0.000	N/A	0.0	5.6	0.0	4.5	
1953	0.000	N/A	0.0	6.4	0.0	5.0	
1954	0.000	N/A	0.0	6.8	0.0	5.4	
1955	0.000	N/A	0.0	7.1	0.0	5.7	
1956	0.000	N/A	0.0	7.5	0.0	5.9	
1957	0.000	N/A	0.0	7.8	0.0	6.1	
1958	0.000	N/A	0.0	8.1	0.0	6.4	
1959	0.000	N/A	0.0	8.4	0.0	6.6	
1960	0.000	N/A	0.0	8.7	0.0	6.9	
1961	0.000	N/A	0.0	9.0	0.0	7.1	
1962	0.000	N/A	0.0	9.3	0.0	7.4	
1963	0.000	N/A	0.0	9.6	0.0	7.6	

Step 33 Click the **Wastewater-GHG-Scope 1** tab**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Review and check data input/results.

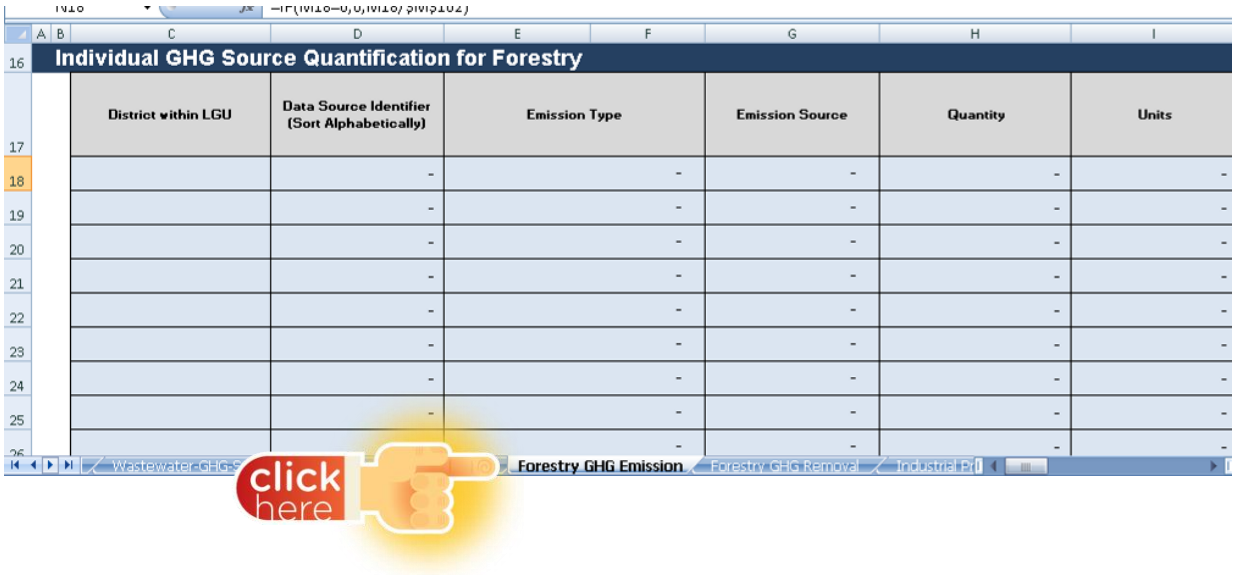


Total GHG emissions from Wastewater Treatment and Disposal			0.0		
General Wastewater Default and Custom Data for Own LGU					
		Uncollected	Collected	Units	
IPCC Defaults	Per capita BOD generation	40.00	40.00	gBOD/person/day	IPCC default, A
	Correction factor for industrial BOD dischargers in sewers	1.00	1.25	index	IPCC default. S
	Sludge removal (S)	-	-	%	IPCC default. S
	Methane recovery (R)	-	-	%	IPCC default. S
		Uncollected	Collected	Units	
Factors used in Calculation (Default or LGU-Specific Factors) - *user may input custom (e.g. LGU-specific) factors in light orange cells or*	Per capita BOD generation (per day)	40.00	40.00	gBOD/person/day	to use LGU, re
	Per capita BOD generation (per year)	14.6	14.6	kgBOD/person/year	to use LGU, re

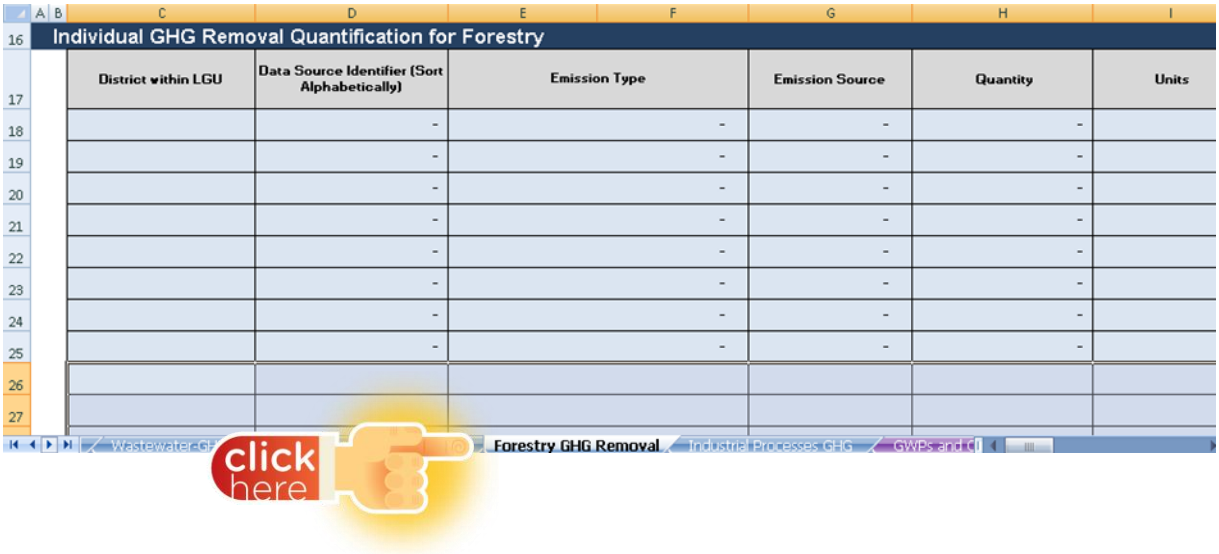
Step 37 Click the **Wastewater-GHG-Scope 3** tab if applicable**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Review and check data input/results.



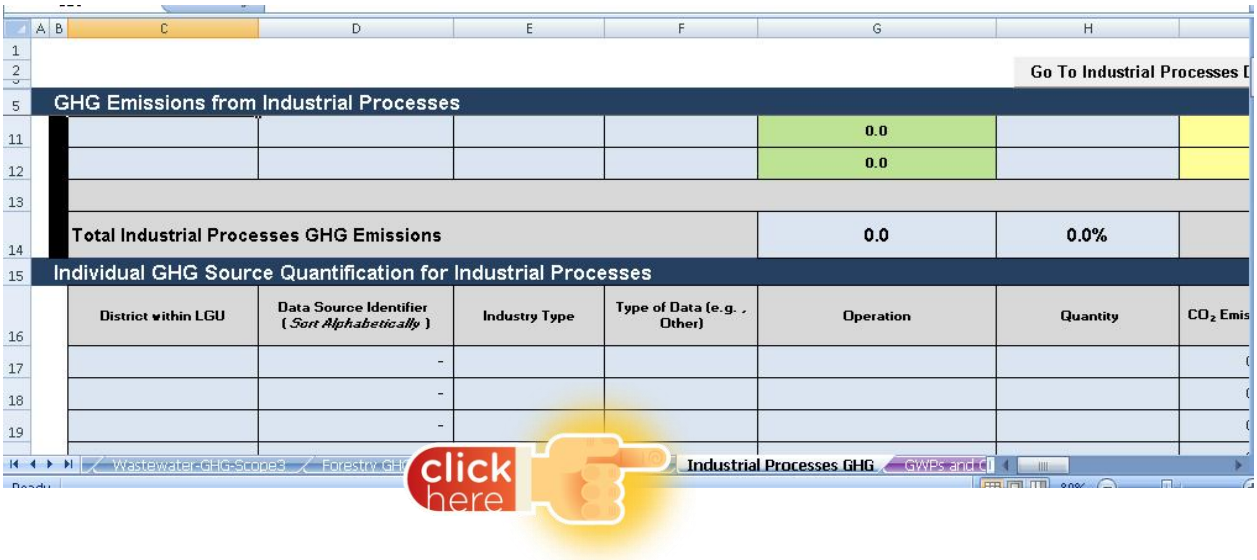
Step 38 Click the **Forestry Emission** tab**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your *Datasheet 22.1 Forestry and Other Land-Use Change Data for GHG emissions*. If there are incorrect data, go back to the Forestry Emission Data tab and correct data input using the "Go to" button.



Step 39 Click the **Forestry Removal** tab**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your *Datasheet 24.1 Forestry and Other Land-Use Change Data for GHG removals*. If there are incorrect data, go back to the Forestry Removal Data tab and correct data input using the "Go to" button.

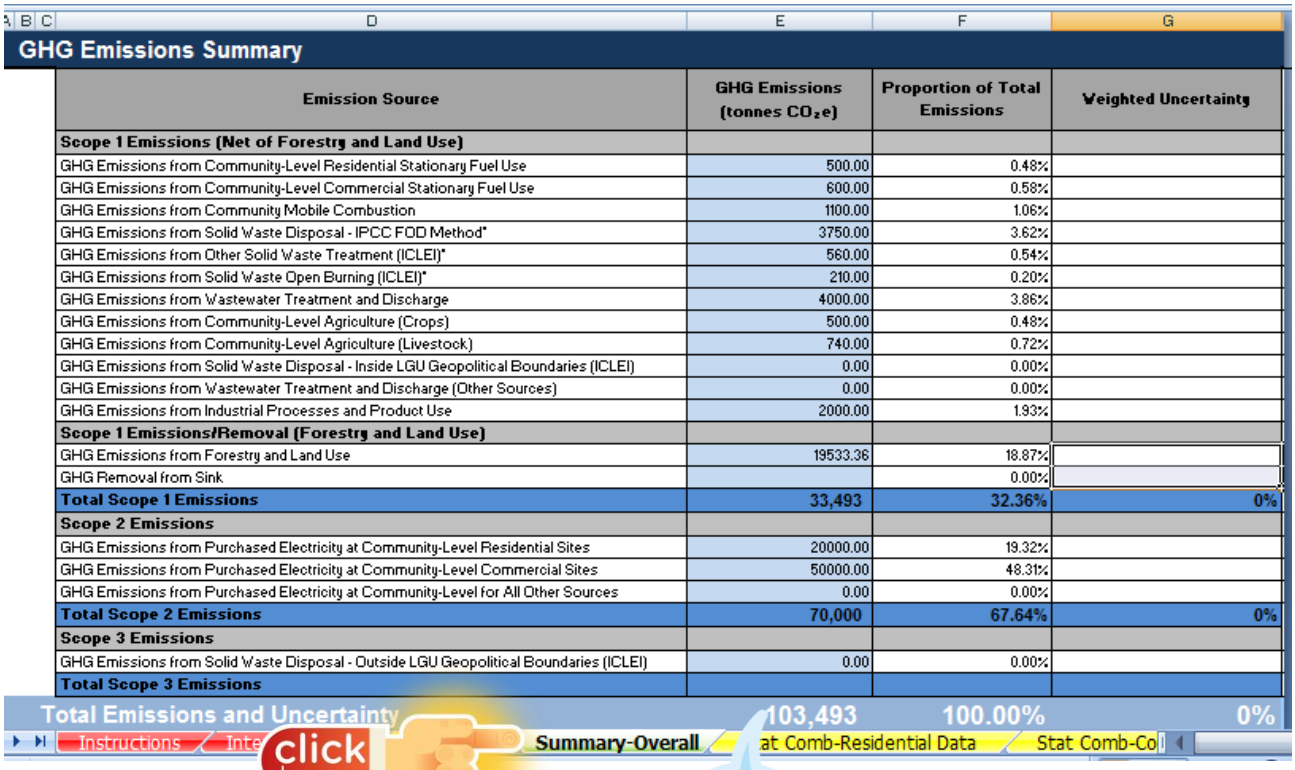


Step 40 Click the **Industrial Processes GHG** tab**.** Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your applicable datasheets on industrial processes. If there are incorrect data, go back to the Industrial Processes Data tab and correct data input using the "Go to" button.



4.8 Emissions Summary, by Source

Step 41 Click the **Summary-Overall** to view the summary of the GHG emissions categorized according to scopes.



GHG Emissions Summary

Emission Source	GHG Emissions (tonnes CO_2e)	Proportion of Total Emissions	Weighted Uncertainty
Scope 1 Emissions (Net of Forestry and Land Use)			
GHG Emissions from Community-Level Residential Stationary Fuel Use	500.00	0.48%	
GHG Emissions from Community-Level Commercial Stationary Fuel Use	600.00	0.58%	
GHG Emissions from Community Mobile Combustion	1100.00	1.06%	
GHG Emissions from Solid Waste Disposal - IPCC FOD Method*	3750.00	3.62%	
GHG Emissions from Other Solid Waste Treatment (ICLEI)*	560.00	0.54%	
GHG Emissions from Solid Waste Open Burning (ICLEI)*	210.00	0.20%	
GHG Emissions from Wastewater Treatment and Discharge	4000.00	3.86%	
GHG Emissions from Community-Level Agriculture (Crops)	500.00	0.48%	
GHG Emissions from Community-Level Agriculture (Livestock)	740.00	0.72%	
GHG Emissions from Solid Waste Disposal - Inside LGU Geopolitical Boundaries (ICLEI)	0.00	0.00%	
GHG Emissions from Wastewater Treatment and Discharge (Other Sources)	0.00	0.00%	
GHG Emissions from Industrial Processes and Product Use	2000.00	1.93%	
Scope 1 Emissions/Removal (Forestry and Land Use)			
GHG Emissions from Forestry and Land Use	19533.36	18.87%	
GHG Removal from Sink		0.00%	
Total Scope 1 Emissions	**33,493**	**32.36%**	**0%**
Scope 2 Emissions			
GHG Emissions from Purchased Electricity at Community-Level Residential Sites	20000.00	19.32%	
GHG Emissions from Purchased Electricity at Community-Level Commercial Sites	50000.00	48.31%	
GHG Emissions from Purchased Electricity at Community-Level for All Other Sources	0.00	0.00%	
Total Scope 2 Emissions	**70,000**	**67.64%**	**0%**
Scope 3 Emissions			
GHG Emissions from Solid Waste Disposal - Outside LGU Geopolitical Boundaries (ICLEI)	0.00	0.00%	
Total Scope 3 Emissions			
Total Emissions and Uncertainty	**103,493**	**100.00%**	**0%**

Annex 1: **Data** Sheets

Data Sheets for Community-Level Inventory

Datasheet 3.1. List of Households included in the inventory per Districts/Barangays

	Districts/Barangays/ LGU included in the inventory	Total Population	Total Number of Residential Households	Total number surveyed (enter "NA" if no data)	Source of data
1.					Example: • LGU • Philippine Statistics Authority • Household survey
2.					
3.					
4.					
5.					

Datasheet 4.1. List of all of Commercial Establishments included in the inventory per District/Barangay

	Districts/ Barangays/ LGU included in the inventory	Total Population	Total Number of Registered Businesses (enter "NA" if no survey is used)	Total number of business surveyed (enter "NA" if no data)	Source of data
1.					Example: • Permit and Licensing Division of the LGU • Commercial establishment survey
2.					
3.					
4.					
5.					
6.					

Datasheet 5.1.Emission sources and fuel consumption of the residential sector – Stationary Combustion

A	B	C	D	E	F	G
District/ Barangay/ LGU	Data Source Identifier	Type of Data	Application	Fuel type	Annual Volume	Unit

Datasheet 6.1.Emission sources and fuel consumption of the commercial sector – Stationary Combustion

A	B	C	D	E	F	G
District/ Barangay/ LGU	Data Source Identifier	Type of Data	Application	Fuel type	Annual Volume	Unit

Datasheet 7.1. List of all Vehicles included in the inventory per Districts/Barangays

	Districts/Barangays/ LGU included in the inventory	**Total Population**	**Total Number of Vehicles registered within the District**	**Total number surveyed (enter "NA" if no data)**	**Source of data**
1.					Example: • Land Transportation Office (LTO) • LGU for tricycles
2.					
3.					
4.					
5.					

Datasheet 8.1.Fuel consumption – Mobile Combustion (Example is provided)

A	B	C	D	E	F	G	H	I
District/ Barangay / LGU	Data Source Identifier	Type of Data	Vehicle Type	Fuel type	Annual Distance Travelled (km)	Annual Fuel Consumption (liters)	Annual Fuel Used for Stationary Combustion (liters)	Annual Fuel Used for Mobile Combustion

Datasheet 9.1 Activity Data –Electricity Consumption-Residential Sector

District or Barangay -	Data Source Identifier **(e.g. Household Survey Number or Utility Name and Source Identifier)**	Data Type **- (e.g. Household Surveys, electricity provider)**	Actual Annual Electricity Consumption (kWh)

Datasheet 10.1 Activity Data –Electricity Consumption-Commercial Sector

District or Barangay -	Data Source Identifier **(e.g. Business Survey Number or Utility Name and Source Identifier)**	Data Type **- (e.g. Business Surveys, electricity provider)**	Actual Annual Electricity Consumption (kWh)

Datasheet 11.1 Activity Data –Electricity Consumption-Other sectors

District or Barangay	Data Source Identifier **(e.g. Streetlights, MRT line, Utility Name and Source Identifier)**	Data Type **(e.g. Surveys, National Census Averages, Other)**	Actual Annual Electricity Consumption (kWh)

Datasheet 13.1 Agriculture Crop Emission Sources

A	B	C	D	E
District or Barangay	**Data Source Identifier** (e.g. Name of Government Agriculture Agency and Department)	**Type of Data** (e.g. Agricultural Bureau, Census Averages, Other)	**Application** (e.g. crop type and approach)	**Total Hectares Under Production (hectares, ha)**

Datasheet 14.1 Livestock Emission Sources

A	B	C	D	E
District or Barangay	**Data Source Identifier** (e.g. Name of Government Agriculture Agency and Department)	**Type of Data** (e.g. Government Agricultural Bureau, National Census Averages, Other)	**Application** (e.g. Livestock Type)	**Total Headcount**

Datasheet 16.1 Landfill Solid Waste Disposal Data Entry Parameters (IPCC FOD Method)

	IPCC default value		User-defined
Starting year	1950		
DOC (Degradable organic carbon)			
(weight fraction, wet basis)	**Range**	**Default**	**User-defined**
Disposable nappies	0.18-0.32	0.24	
Food waste	0.08-0.20	0.15	
Garden	0.18-0.22	0.2	
Paper	0.36-0.45	0.4	
Sewage sludge	0.04-0.05	0.05	
Textiles	0.20-0.40	0.24	
Wood and straw	0.39-0.46	0.43	
DOCf (fraction of DOC dissimilated)		0.5	
Methane generation rate constant (k)			
(years^{-1})	**Range**	**Default**	**User-defined**
Disposable nappies	0.15–0.2	0.17	
Food waste	0.17–0.7	0.4	
Garden	0.15–0.2	0.17	
Paper	0.06–0.085	0.07	
Sewage sludge	0.17–0.7	0.4	
Textiles	0.06–0.085	0.07	
Wood and straw	0.03–0.05	0.035	
Industrial waste	0.15–0.2	0.17	
Delay time (months)		6	
Fraction of methane **(F) in developed gas**		0.5	

Conversion factor, **C to CH_4**		1.33	
Oxidation factor **(OX)**		0	
Parameters for carbon storage			
% paper in industrial waste		0%	
% wood in industrial waste		0%	

Datasheet 17.1 Solid Waste Disposal Data Entry for Methane Correction Factor (MCF) Calculation

	Unmanaged, shallow	Unmanaged, deep	Managed	Managed, semi-aerobic	Uncategorized	Total (100%)
	MCF	MCF	MCF	MCF	MCF	
IPCC default	0.4	0.8	1	0.5	0.6	
User-defined value	0.4	0.8	1	0.5	0.6	
Distribution of Waste by Waste Management Type - Annex A1.1						
User-defined value (Philippines)					28%	
Year	%	%	%	%	%	
1950						100%
1951						100%
1952						100%
1953						100%
1954						100%

2006						**100%**
2007						100%
2008						100%
2009						100%
2010						100%
2011						100%
2012						100%
2013						100%
2014						100%

Datasheet 18.1 Waste Diversion Rates

Year	Population	Waste per capita (tonnes/capita/yr)	% to Solid Waste Disposal Site (SWDS)	% MSW Composted	% MSW Sent to Anaerobic Digestion	% MSW Open Burned	% Total MSW Other/Unspecifieded
IPCC default l		0.19					
1950							
1951							
1952							
1953							
2011							
2012							
2013							
2014							

Datasheet 18.2 Waste Compositions (% tonnes)

Year	Food (%)	Garden (%)	Paper (%)	Wood (%)	Textile (%)	Nappies(%)	Sludge (%)	Plastics and other Inert (%)
1950								
1951								
1952								
1953								
2011								
2012								
2013								
2014								

Datasheet 19.1 General Solid Waste Composting Activity Data

Data Source Identifier	Population	Total Solid Waste (Actual) for District/Barangay	Fraction of Total Solid Waste Sent for Anaerobic Digestion Facilities	Fraction of Total Solid Waste sent for Composting
	inhabitants	tonnes	%	%
LGU				

Datasheet 19.2 General Solid Waste Open Burning Activity Data

Data Source Identifier	Population	Total Solid Waste (Actual) for District/Barangay	Amount of Total Solid Waste Open Burned
	inhabitants	tonnes	tonnes
LGU			

Datasheet 20.1 Landfill Solid Waste Disposal Data Entry (ICLEI method) by Landfill type

District/ Barangay	Population	Total solid waste	Fraction of solid waste sent to specific disposal site	Specific Landfill Site	Location of Landfill site (outside or inside LGU)
	inhabitants	**tonnes**	**(%)**		
LGU				**Unmanaged - shallow**	
				Managed – semi-aerobic	
				Uncategorized	

Datasheet 21.1 Wastewater Management System

Data Needed		Examples		Is it used in the LGU (Yes or No)	% of population using the system
1	Wastewater systems or types in LGU	Open-pits/ Latrines	dry climate, ground water table lower than latrine, small family (2-5 people)		
			dry climate, ground water table lower than latrine, communal		
			wet climate/flush water use, ground water table than latrine		
			regular sediment removal for fertilizer		
		River	Stagnant oxygen deficient rivers and lakes		

		Discharge	Rivers, lakes and estuaries		
		Untreated	River Discharge		
			Sewers (closed and underground)		
			Open sewers		
		Treated	Aerobic –centralized and well managed		
			Aerobic – not well managed		
			Sludge anaerobic treatment		
			Aerobic shallow ponds		
			Anaerobic lagoons – shallow, (less than 2 meters)		
			Anaerobic lagoons – shallow, (more than 2 meters)		
			Anaerobic reactors		

	Data needed	Default Values (IPCC)		LGU Specific
		Uncollected	Collected	
2	Per Capita BOD generation (per day) for the LGU (maybe national value or default IPCC value)	**40**	**40**	
3	LGU or region specific correction factor for industrial BOD discharges in sewers (national or IPCC default value)	**1.00**	**1.25**	
4	Maximum Methane production capacity factor used in the calculation in reference to the BOD from LGU or region specific data (if available)	**.60** $kgCH_4/kgBOD$		
5	LGU, regional, national maximum methane production capacity factor used in the computation in reference to the COD	**.25** $kgCH_4/kgCOD$		
6	Annual per capita protein consumption (as localized as possible)	**.59** g/person/DAY		
7	Fraction of nitrogen in protein (as localized as possible)	**.16** kg N/kg protein		
8	Factor for non-consumed protein added to wastewater	**1.1**		
9	Nitrogen removed in sludge (value of 0 unless sludge removal is implemented by LGU of specific waste treatment facility	**0**		
10	LGU, regional, national methane correction factor (reference as appropriate)			

Datasheet 22.1 Forestry and Other Land-Use Change Data for GHG emissions (Examples are provided)

District or Barangay	Data Source Identifier	Emission Type	Emission Source	*Annual* Total
Name of LGU		Wood Products Harvesting	Charcoal (cu.m.)	
Name of LGU		Wood Products Harvesting	Construction (cu.m.)	
Name of LGU		Changes in the use of forest lands	Converted to Agriculture (ha)	
Name of LGU		Changes in the use of forest lands	Converted to settlement (ha)	

Datasheet 23.1 Parameters for Forest and other Land-use Change

Data requirements	Default Values		User-Defined		Source of Data
	Biomass Growth rate	Carbon Content	Biomass Growth rate	Carbon Content	
5. Wood and wood products harvesting					
a. Fuel wood (tons)		.49			
b. Charcoal (tons)		.49			
c. Construction (tons)		.49			
d. Novelties (tons)		.49			
6. Changes in use of the forestlands					
a. Used for Agriculture (ha)	7.81	.49			
b. Used as Grasslands (ha)	7.81	.49			
c. Left as Barren Areas (ha)	7.81	.49			
7. Forestland remaining					
g. ***General Forestland type***[16] ***(ha)***	7.81	.49			
h. **Primary Forest - Visayas (ha)**	2.10*	0.45*			
i. **Secondary Forest- Luzon (ha)**	6.50*	0.44*			
j. **Brushland –for wood- Visayas (ha)**	9.40*	0.45*			
k. **Grassland – Visayas (ha)**	0.00*	0.45*			
l. **Tree plantations – S. *macrophylla*- Luzon (ha)**	7.50*	0.43*			

[16] General forestland type is used if no disaggregated data on forestland type is available

8. Lands converted to forestland					
a. Barren to Forestland (ha)	7.81	.49			
b. Grassland to Forestland (ha)	7.81	.49			
c. Wetlands to Forestland (ha)	7.81	.49			
d. Settlement to Forestland (ha)	7.81	.49			
e. Cropland to Forestland (ha)	7.81	.49			

*Tracking Greenhouse Gases: An Inventory Manual, Table 64. page 129

Data Requirement	Default Value (tons/ha)	User-defined (tons/ha)	Source of Data
Carbon stock in existing Forest	262		

Datasheet 24.1 Forestry and Other Land-Use Change Data for GHG removals. (Examples are provided)

District or Barangay	Data Source Identifier	Removal Type	Removal Source	*Annual* Total (ha)
Name of LGU		Remaining Forestland	Carbon stock in inventory year	
Name of LGU		Change in Forestland	Grassland to Forest	
Name of LGU		Change in Forestland	Barren to Forest land	

Datasheet 26.1 Mineral Industry- Activity Data

Sub-sector	Name of Company	Activity Data	Units	Source of Data
Cement Production		Type of cement produced		
		Mass of cement produced per type	tonnes	
Limestone Production		Mass of lime produced per type	tonnes	
Glass Production		Total glass production per type	tonnes	

Datasheet 26.2 Chemical Industry- Activity Data

Sub-sector	Name of Company	Activity Data	Units	Source of Data
Ammonia Production		Volume of NH_3 produced		
Soda Ash		Volume of soda ash		

Production		Production capacity		
Petrochemical and Carbon Black Production		Methanol produced	tons	
		Ethylene produced	tons	
		Ethyl		

Datasheet 26.3 Metal Industry- Activity Data

Sub-sector	Name of Company	Activity Data	Units	Source of Data
Iron and Steel Production from integrated facilities		Amount of steel produced by process type		
Iron and Steel Production from non integrated facilities				

Datasheet 26.4 Electronic Industry- Activity Data

Sub-sector	Name of Company	Activity Data	Units	Source of Data
Integrated Circuit or Semiconductor		Plant production		
TFT Flat Panel Display		Plant production		
Photovoltaic		Plant production		
Heat Transfer Fluid		Plant production		
Other		Plant production		

Datasheet 26.5 Other Industry- Activity Data

Sub-sector	Name of Company	Activity Data	Units	Source of Data
Ex. Pulp and Paper		Production output		
Ex. Food Industries				
Others				

Annex 2: Potential **Data Sources**

Data Requirement	Potential Data Sources
List of Household	LGU, Philippine Statistics Authority; Household Survey
List of Commercial Establishments	Permit and Licensing Division of the LGU; Commercial Establishment Survey
Fuel consumption	Department of Energy; Gasoline Station; LPG Retailers/Distributors; Charcoal and Fuelwood Retailers/Distributors
List of Vehicles	Land Transportation Office; LGU for tricycles
Electricity Consumption	Energy provider; electric cooperatives
Agricultural Crops	Agriculture Office based on the LGU; Philippine Statistics Office
Agricultural Livestock	Agriculture Office based on the LGU; Philippine Statistics Office
Amount of Solid Waste	LGU
Waste Characterization Study (WACS)	LGU; National Solid Waste Management Commission
Population	LGU; Philippine Statistics Office
List of Industry	Permit and Licensing Division of the LGU; National Inventory Report of the country
Forest Data	LGU; Forest Management Bureau; NAMRIA; National GHG Inventory Report of the country

Annex 3: List of **Existing IPPU Categories** in the Philippines

List of Existing Industrial Processes and Product Use (IPPU) Categories
In the Philippines, As of year 2010 that can be attributed directly to the LGUs

Source: EMB-DENR

Categories	Are these Industries Present within my LGU? Y= Yes; N=No
2A Mineral Industry	
2A1: Cement Production	
2A2: Lime Production	
2A3: Glass Production	
2B Chemical Industry	
2B1: Ammonia Production	
2B7: Soda Ash Production	
2B8: Petrochemical and Carbon Black Production	
2B8a: Methanol	
2B8b: Ethylene	
2B8c: Ethylene Dichloride and Vinyl Chloride Monomer	
2B8d: Ethylene Oxide	
2B8e: Acrylonitrile	
2B8f: Carbon Black	
2C Metal Industry	
2C1: Iron and Steel Production	
2C1a: Iron and Steel Production from integrated facilities	
2C1a: Iron and Steel Production from non integrated facilities	
2E Electronics Industry	
2E1: Integrated Circuit or Semiconductor	
2E2: TFT Flat Panel Display	
2E3: Photovoltaics	
2E4: Heat Transfer Fluid	
2E5: Other	
2F Other Industries	
2F1: Pulp and Paper	
2F2: Food Industries	
2F3: Others	

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