



**BIOENERGY AND FOOD SECURITY
RAPID APPRAISAL (BEFS RA)**

User Manual

COUNTRY STATUS MODULE



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BEFS Rapid Appraisal

Country Status Module

User Manual

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3 The National Biofuels Board is chaired by the Secretary of Department of Energy and includes the following members: Department of Trade and Industry, Department of Science and Technology, Department of Agriculture, Department of Finance, Department of Labor and Employment, Philippine Coconut Authority, Sugar Regulatory Administration.

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1 Overview of the Country Status Module

Considering that bioenergy supply chains bridge across a number of disciplines and sectors, a minimum understanding of the most relevant sectors should be the starting point when assessing bioenergy options. The main areas to consider are agriculture and food (including crop production, livestock and forestry), energy, natural resources and some indication on general economic performance.

In the BEFS Rapid Appraisal (BEFS RA), this general overview by sector is given in the *Country Status* module, which depicts the current economic, agriculture, food and energy status in the country. Special attention is given to food security, by allowing the user to determine which are the key food crops and the net trade position of the country with respect to these crops. These indicators will ensure that from the onset, the user is very aware of the foodstuffs that have to be dealt with caution throughout the analysis. The other agriculture indicators presented are the contribution of agriculture to GDP (thus showing how important the agricultural sector is for the country concerned) and the identification of the main key commodities. With respect to energy, the current energy production supply and use, as well as the current energy consumption at transport and household level are presented. This will allow the user to understand how bioenergy is being used, for which purpose and what the potential energy gaps might be in the country, all while considering what role bioenergy could play in increasing energy access.

The following figure shows the overall structure of the *Country Status* module (Figure 1). The module is broken down into four sections, each corresponding to an Excel sheet: Country Overview, Net Trade Position for Key Food Crops, Energy Balance and Energy Demand. Each sheet is explained in detail in the subsequent sections of the manual.

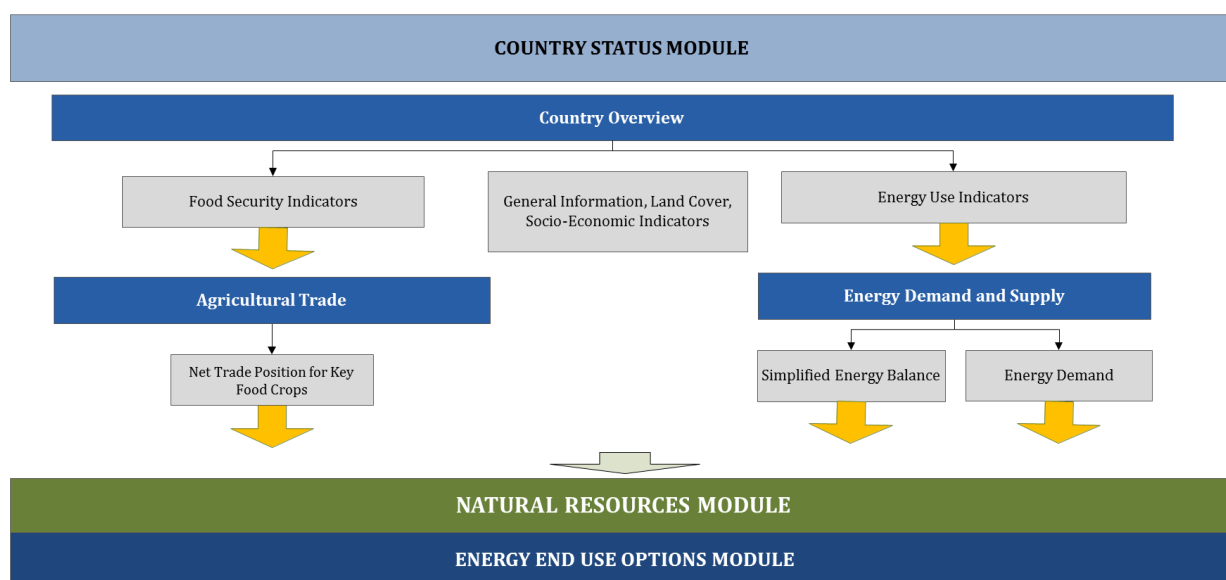


Figure 1: Structure of the Country Status Module

2 Terms and Definitions in the Country Status Module

This section includes definitions of specific terms used in the *Country Status* module. They primarily refer to the indicators and information used for representation of the current socio-economic, food security and

energy demand and supply in the country. The tool uses data extracted from FAOSTAT and SOFI⁴ databases, (FAO, 2013), and the World Development Indicators (WDI) (World Bank, 2013). The list of terms and definitions follows.

2.1 Population, Land cover/Land use

- **Total population:** refers to the present-in-area (de facto) population which includes all persons physically present within the present geographical boundaries of countries at the mid-point of the reference period.
- **Rural population:** residual population after subtracting urban population from total population (FAO, 2013).
- **Urban population:** refers to the population residing in urban areas. Usually the urban areas and hence the urban population are defined according to national census definitions (FAO, 2013).
- **Country area:** area of the country including area under inland water bodies, but excluding offshore territorial waters. Possible variations in the data may be due to updating and revisions of the country data and not necessarily to any change of area (FAO, 2013).
- **Land area:** the total area of the country excluding areas under inland water bodies. Possible variations in the data may be due to updating and revisions of the country data and not necessarily to any change of area (FAO, 2013).
- **Agricultural area:** the sum of areas under arable land, permanent crops and permanent meadows and pastures (FAO, 2013).
- **Arable land:** the land under temporary agricultural crops (multiple-cropped areas are counted only once), temporary meadows for mowing or pasture, land under market and kitchen gardens and land temporarily fallow (less than five years). The abandoned land resulting from shifting cultivation is not included in this category. Data for “Arable land” are not meant to indicate the amount of land that is potentially cultivable (FAO, 2013).
- **Permanent crops:** are sown or planted once, and then occupy the land for some years and need not be replanted after each annual harvest, such as cocoa, coffee and rubber. This category includes flowering shrubs, fruit trees, nut trees and vines, but excludes trees grown for wood or timber (FAO, 2013).
- **Forest area:** the land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. Forest is determined both by the presence of trees and the absence of other predominant land uses. The trees should be able to reach a minimum height of 5 meters (m) *in situ*⁵ (FAO, 2013).

⁴ The State of Food Insecurity in the World

⁵ A full definition is given in the user manual for the Natural Resources module, Section 3: Woodfuel and Wood Residues.

2.2 Socio-economic, food security and energy use indicators

- **GDP per capita:** gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources (The World Bank, 2013).
- **Agriculture⁶, value added:** value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3 (The World Bank, 2013).
- **Prevalence of undernourished population:** population below minimum level of dietary energy consumption (also referred to as prevalence of undernourishment) shows the percentage of the population whose food intake is insufficient to meet dietary energy requirements continuously. Data showing as 2.5 signifies a prevalence of undernourishment below 2.5% (The World Bank, 2013).
- **Poverty headcount at national poverty line:** National poverty rate is the percentage of the population living below the national poverty line. National estimates are based on population-weighted subgroup estimates from household surveys (The World Bank, 2013).
- **Food security:** Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (World Food Summit, 1996).
- **Energy security:** Energy security refers to the uninterrupted availability of energy sources at an affordable price (IEA, 2013).
- **Energy use:** refers to use of primary energy before transformation to other end-use fuels, which is equal to indigenous production plus imports and stock changes, minus exports and fuels supplied to ships and aircraft engaged in international transport (The World Bank, 2013).
- **Electricity production:** the production of power plants and combined heat and power plants less transmission, distribution, and transformation losses and own use by heat and power plants (The World Bank, 2013).
- **Net trade position:** The net trade position defines the share by which a country is a net exporter or a net importer of a specific good and it is expressed in percentage terms. If the amount exported of a specific good is larger than the amount imported with respect to domestic production, the country is a net exporter. On the other hand, if the amount imported of a specific good is larger than the amount exported with respect to domestic consumption, the country is a net importer of that good. The net trade position for net exporters is calculated as $(\text{export} - \text{imports}) / \text{production}$ while for net importers it is calculated as $(\text{imports} - \text{exports}) / \text{domestic supply (consumption)}$.
- **Total primary energy supply (TPES):** Indigenous production plus imports minus the sum of exports, international marine bunkers, international aviation bunkers, -/+ stock changes. Thereby, the production is the production of primary energy, i.e. hard coal, lignite, peat, crude oil, NGL, natural gas, combustible renewables and waste, nuclear, hydro, geothermal, solar and heat from heat pumps that is extracted from the ambient environment⁷ (IEA, 2013).

⁶ Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing, as well as the cultivation of crops and livestock production.

⁷ A full definition can be found on IEA web site <http://www.iea.org/stats/defs/Tpes.asp>.

- **Final energy consumption:** is the total energy consumed by end users, such as households, industry and agriculture. It is the energy which reaches the final consumer's door and excludes that which is used by the energy sector itself. Final energy consumption excludes energy used by the energy sector, including for deliveries, and transformation. It also excludes fuel transformed in the electrical power stations of industrial auto-producers and coke transformed into blast-furnace gas where this is not part of overall industrial consumption but of the transformation sector. Final energy consumption in "households, services, etc." covers quantities consumed by private households, commerce, public administration, services, agriculture and fisheries (EC, 2013⁸).

3 Scope and Objective of the Country Status Module

The aim of the module is to provide an overview of the state of affairs of the country for sectors relevant to developing bioenergy policy, i.e. socio-economic status, agricultural production and trade, key foodstuffs and energy supply and demand. In line with the objectives of BEFS RA, key indicators were selected in each area to describe the country status.

Some key socio-economic and natural resources indicators have been selected to give an overview of the context and natural resources status in the country. The socio-economic indicators included are population (total, urban and rural), GDP/capita and the contribution of agriculture to GDP. An overview of the current land use is given by presentation of the area of different land-use classes. Detailed information on natural resources use and status is provided in the *Natural Resources* module.

In this module, more facts are provided in the areas of food security, agriculture and energy. In order to describe to which extent the country is food and energy secure, information on the prevalence of undernourished population, energy and electricity use per capita as well as the access to electricity are assessed.

The first step in the food and agriculture sections is to define the most important commodities for the country, both in terms of food supply and agricultural exports. The most important foodstuffs are identified by ranking them based on the contribution to the total per capita per day calorie supply. The key export commodities are ranked according to their contribution to total exports value, expressed in US\$. It is important to consider this information when analysing feedstock potentially suitable for bioenergy production, so the potential overlap with current food production, domestic consumption and exports can be clear. Note though, that the BEFS RA tool is not designed to assess whether there will be any effect or if such an effect will have positive or negative consequences on income, prices, welfare and markets in general.⁹ The aim of BEFS RA is only to make the user aware of potential consequences for food security and agriculture by highlighting possible trade-offs and competition for resources.

⁸ http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:Final_energy_consumption

⁹ In order to assess the impacts of bioenergy production on food and agriculture (prices, production, income, etc.), it would be necessary to conduct a detailed economy wide analysis, such as a Computable General Equilibrium (CGE) modelling analysis, household level analysis, etc. This is beyond the scope of the BEFS Rapid Appraisal.

Once the main foodstuffs are identified, the user can compute the net trade position for up to five of the highest-ranked crops (those with the highest kcal/capita/day). The net trade position identifies whether the country is a net importer or net exporter of the selected crop. It also allows for a better understanding of the viability of using these crops for bioenergy production. If a country is a net importer of a crop, using this crop as bioenergy feedstock would either require increasing imports or the increased supply would have to occur through production increases in the country. In the case when a country is a net exporter, using part of the production for domestic bioenergy production can have impacts on exports and the external trade position. This level of analysis does not allow the user to draw conclusions, but does raise awareness in terms of potential conflicts, constraints, and implications. The net trade position is computed for the last 10 years. The user should mainly focus on the most recent year and use this to define the net trade position of the crop considered. Nonetheless, it is useful to consider trends over recent years as they can show that in some cases the net trade position can fluctuate between net import and net export. This can be tied to production changes due to weather conditions, agricultural practices, etc.

The aim of BEFS RA is to understand how much bioenergy feedstock can be produced sustainably (which ties into sustainable agriculture production and the overlap with food security and food production) on the one hand, and to understand what type of bioenergy the country might need and which energy gap bioenergy might fill, on the other. For this purpose, it is necessary to understand current energy supply sources (domestic production, import and consumption) and the profile of some of the consumers. An overview of the current situation in energy supply and consumption in the country is given through the aggregated energy balance. The energy balance illustrates the amount and type of energy supplied and from which primary energy sources this occurs, how much of the energy consumed is being produced domestically, and how much is imported and exported. The energy consumption is broken down by energy sources and sectors, specifically households, transport and industry. The energy balance shows if and to which extent the country is self-sufficient in energy supply, identifies the main primary energy sources, the way consumption is distributed among sectors, what is the relation between specific sectors and energy sources, etc.

On the energy demand side, a specific focus is drawn to household level energy use and the transport sector. In the case of households, the aim is to get an indication of current household level energy consumption patterns, both for rural and urban households. Bioenergy options selected throughout the tool should then be screened against the current household consumption patterns. The indicators also give the user information on the level of access, i.e. the number of households in urban and rural areas that do have access to energy. In the case of transport fuels, production and trade balance of gasoline, diesel and liquid biofuels are considered, while for households, prices and daily consumption of fuels used for heating and cooking, as well as electricity consumption are noted. This information assists the user to understand diesel and gasoline consumption levels, current/target biofuel mandates and the production levels required to meet these targets.

4 Running the Country Status Module

To complete the *Country Status* module, the user has to provide the information previously outlined. The module consists of four Excel sheets: Country Overview, Net Trade Position for Key Food Crops, Energy Balance and Energy Demand. Most of the data presented in the Country Overview sheet are archived in the databases, which are incorporated in the tool and display automatically upon selecting the country of interest. Nevertheless, if national and/or more recent data are available, the user should input those numbers. In the other sheets, the user should obtain data from other sources. A list of suggested data sources is given in the Annex.

The flow of analysis is defined by the tool and the user is navigated step by step through the sheets and asked to enter the necessary data. The navigation buttons are placed on the top and bottom of each sheet, indicating the next step with the button “NEXT>>” and allowing the user to return to the previous section with the “<<BACK” button.

4.1 Step 1: Selecting the country

The *Country Status* module file starts with an overview sheet of the module. The user must first select the language of preference in order to view the tool in that language (Figure 2, label 1). The language choices are: English (EN), French (FR) and Spanish (ES). The next step is to select the country of interest from a dropdown list. The level of analysis can be at the country, sub-national, local, and other levels. For cases in which the analysis conducted is not at the national level, the user is asked to enter the name/title of the area in the blank, white cell (Figure 2, labels 2 and 3).

The screenshot displays the BEFS Country Status Module interface. At the top left is the FAO logo, and at the top right is the BEFS logo. The main header is a blue bar with 'EN' in a dropdown menu (marked with a red '1') and 'COUNTRY STATUS' in white text. Below this is a grey bar with a 'Country:' dropdown menu set to 'Malawi' (marked with a red '2') and a 'NEXT >> Country Overview' button. A second grey bar contains 'BEFS Rapid Appraisal for' followed by a dropdown menu set to 'the country' (marked with a red '3') and a 'Clear data' button. The central content area is a blue rounded rectangle titled 'The Country Status Module' containing descriptive text. Below this is a large flowchart titled 'COUNTRY STATUS MODULE' showing the hierarchy: 'Country Overview' leads to 'Food Security Indicators', 'General Information, Land Cover, Socio-Economic Indicators', and 'Energy Use Indicators'. 'Food Security Indicators' leads to 'Agricultural Trade', which leads to 'Net Trade Position for key food crops'. 'Energy Use Indicators' leads to 'Energy Demand and Supply', which branches into 'Simplified Energy Balance' and 'Energy Demand'. Below the flowchart are two stacked bars: 'NATURAL RESOURCES MODULE' (green) and 'ENERGY END USE OPTIONS MODULE' (blue). At the bottom is a 'NEXT >> Country Overview' button.

Figure 2: Layout of the Country Status Module Introductory Sheet

Once the country is selected, the information about its population, land cover, socio-economic indicators, food security and energy use indicators are derived from the incorporated databases and shown in the Country Overview sheet (Figure 3). However, the user should review the data and if he/she has access to more reliable data, then that should be used instead. When the analysis is at a sub-national level, the population and land cover/land-use data for the area evaluated should be provided (Figure 3, labels 1 and 3).

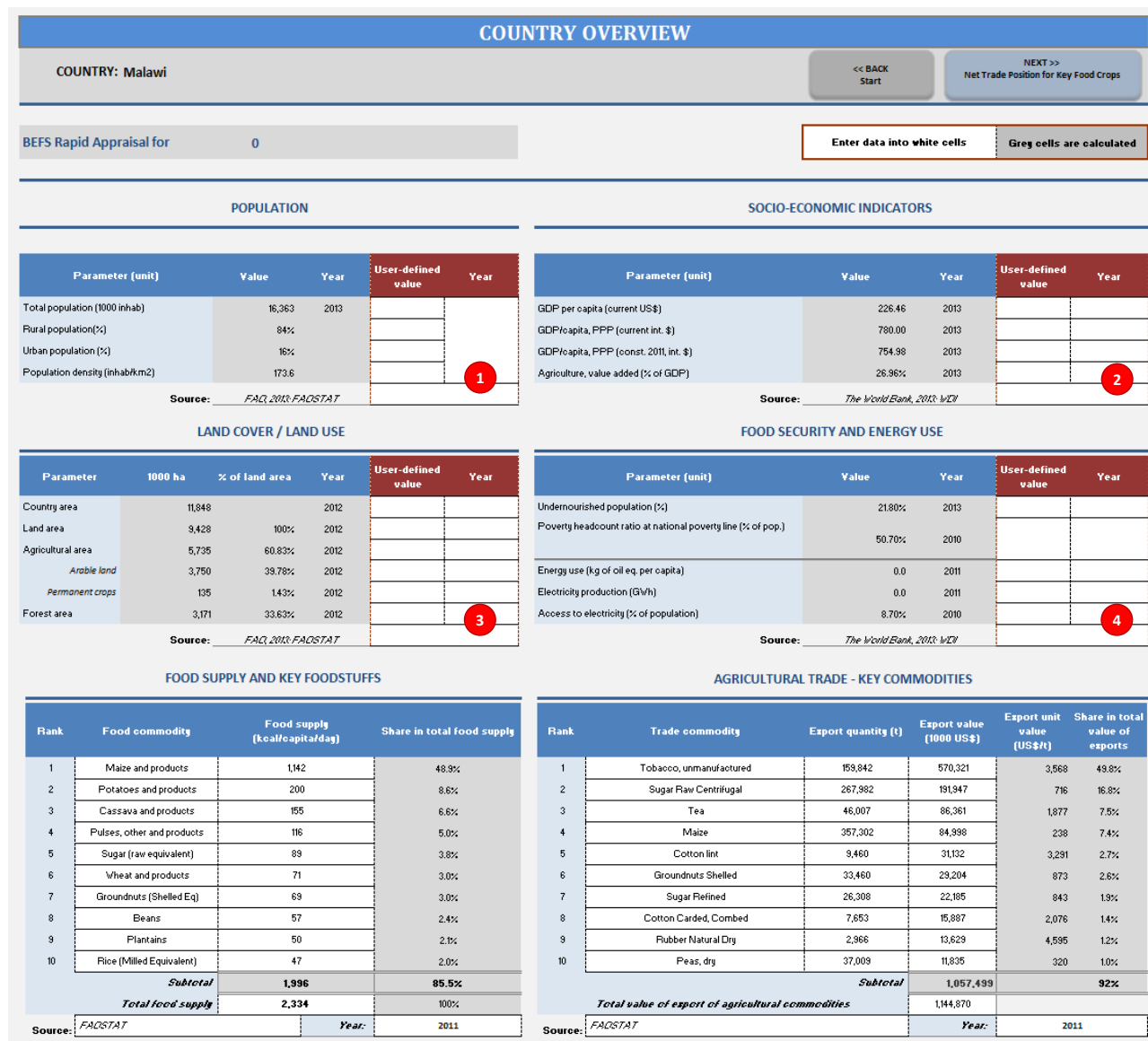


Figure 3: Layout of the Country Overview Sheet

4.2 Step 2: Ranking the key foodstuffs

The key foodstuffs in the country should be selected based on the per capita per day calorie contribution. This is calculated for the most recent year for which data is available. The name of the foodstuffs and their contributions to the daily food supply (expressed in Kcal/capita/day) are entered in their respective cells. It is important to indicate the source of information and the year to which the data apply.

If this data cannot be found in the national statistics, they can be extracted from the Food Balance Sheets available in FAOSTAT. The Food Balance Sheets can be downloaded from FAOSTAT in .xls format. The procedure is explained below and depicted from Figure 4 to Figure 7.

The user must:

1. Go to <http://www.fao.org/faostat/en/#data> and select *Food Balance Sheets* from the sub-section *Food Balance* (Figure 4, label 1).
2. Select:
 - *Countries/Regions/Special Groups* of interest,
 - *Elements: Food supply (Kcal/capita/day)* (Figure 4, label 2),
 - *Items: Select all*,
 - *Years: The last year available*.
3. Select the *Output type: Pivot, Thousand separator; in "Show Data": None; and in Output Formatting Options: Flags*. Then press the "Show Data" button (Figure 5, labels 1 to 3). A preview of the values will be shown (Figure 5, label 5).
4. Press Download Data.
5. Open the .csv file (unmerge all cells if needed) and set a filter to the first row.
6. Select the column *Food supply (Kcal/capita/day)* and sort *Largest to Smallest* (Figure 6, label 1).
7. Identify the 10 most important foodstuffs and enter the foodstuffs name and data on *Food Supply and Key Foodstuffs* in the Country Status tool (Figure 7, label 1). Under the *Total food supply*, use the sum of *all foodstuffs* from the imported Excel sheet (Figure 7, label 2).

Figure 4: Procedure for Obtaining Data on the Key Foodstuffs from FAOSTAT – Part 1

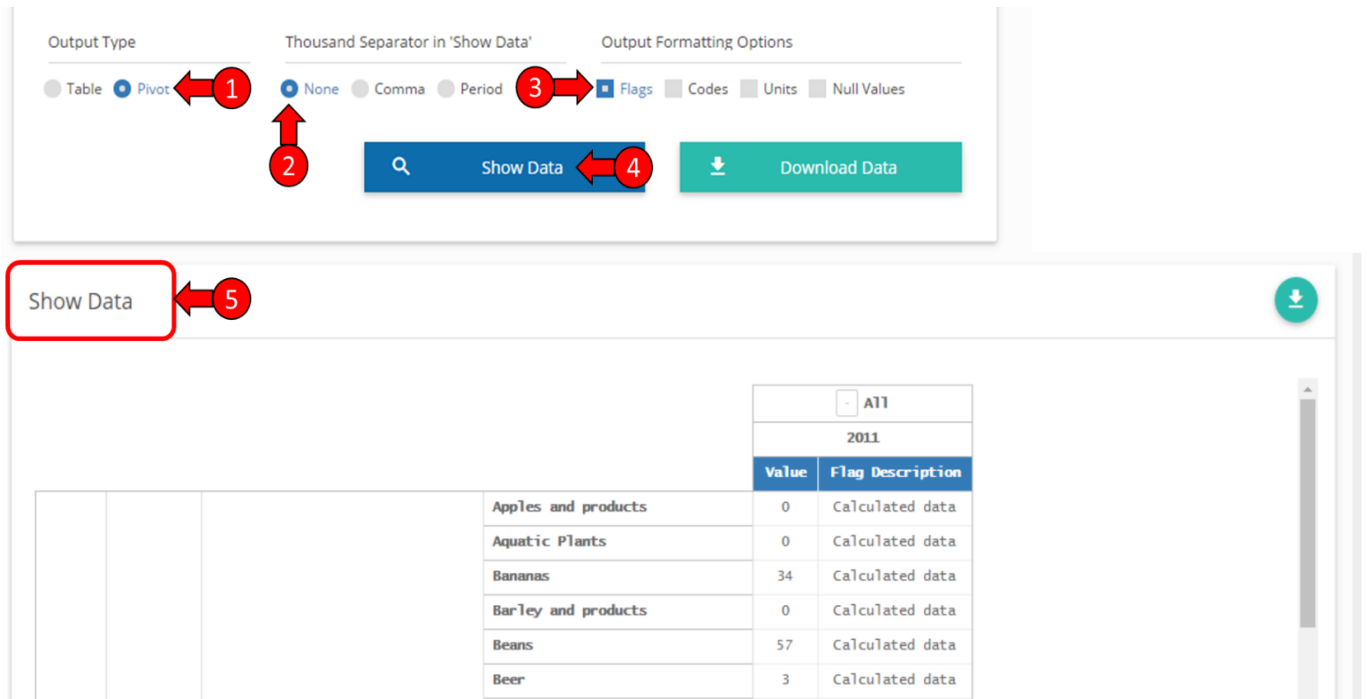


Figure 5: Procedure for Obtaining Data on the Key Foodstuffs from FAOSTAT – Part 2

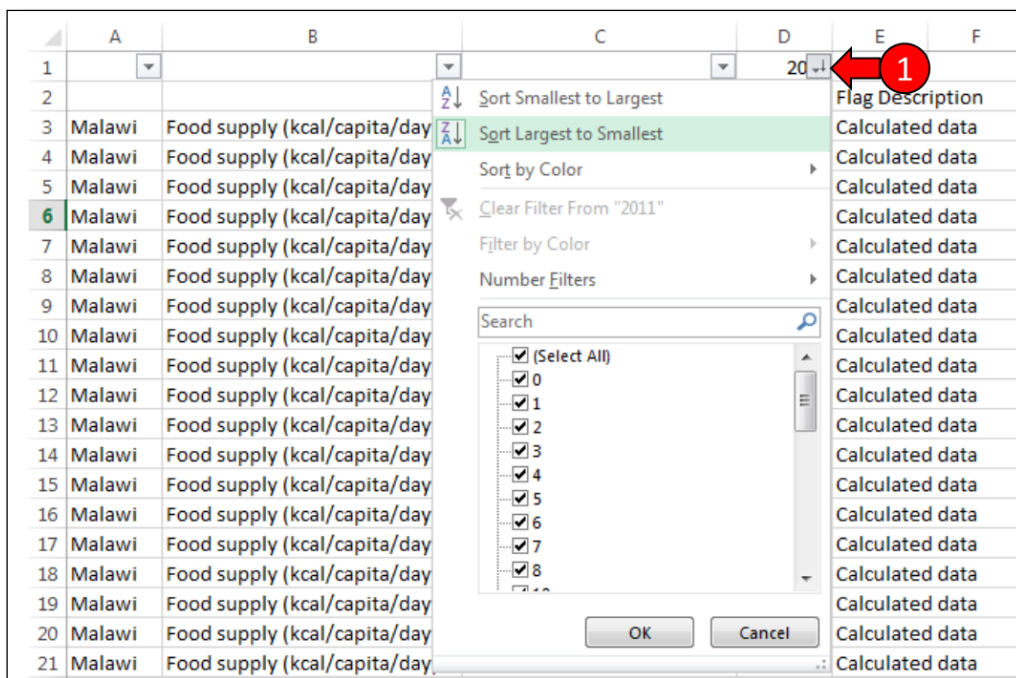


Figure 6: Procedure for Ranking the Key Foodstuffs in the Food Balance Sheet

FOOD SUPPLY AND KEY FOODSTUFFS			
Rank	Food commodity	Food supply (kcal/capita/day)	Share in total food supply
1	Maize and products	1,142	48.9%
2	Potatoes and products	200	8.6%
3	Cassava and products	155	6.6%
4	Pulses, other and products	116	5.0%
5	Sugar (raw equivalent)	89	3.8%
6	Wheat and products	71	3.0%
7	Groundnuts (Shelled Eq)	69	3.0%
8	Beans	57	2.4%
9	Plantains	50	2.1%
10	Rice (Milled Equivalent)	47	2.0%
	Subtotal	1,996	85.5%
	Total food supply	2,334	100%
Source:	FAOSTAT	Year:	2011

Figure 7: Food Supply and Key Foodstuffs Table for Malawi

4.3 Step 3: Ranking the key export commodities

The key export commodities in the country are ranked according to their contribution to the total value of exported commodities in the most recent year (for which data is available). The commodities and information on the amount and value of exports are entered by the user.

If this data cannot be found in the national statistics, they can be extracted from the trade statistics available in FAOSTAT. The procedure on how to download the data and fill out the table is explained and depicted with figures below.

The user must:

- Go to <http://www.fao.org/faostat/en/#data> and select *Crops and livestock products* from the *sub-section Trade* (Figure 8, labels 1).
- Select:
 - Countries/Regions/Special Groups* of interest (Figure 8, label 2a),
 - Elements: Export Quantity* and *Export Value* (Figure 8, label 2b),
 - Items*: Click on *Items Aggregated* and select: *"Agricult.Products,Total + (Total)"* and *"Agricult.Products,Total > (List)"* (Figure 8, label 2c),
 - Years*: The last available year (Figure 8, label 2d).
- Select the *Output type: Pivot, Thousand separator* in *"Show Data": None*; and in *Output Formatting Options: Flags*. Then press the *"Show Data"* button (Figure 9, label 1 to 4). A preview of the values will be shown (Figure 9, label 5).
- Rearrange the table by dragging and dropping columns as follows: Select the column for *Items* shown in *Figure 9, label 6a* and drag it in the location shown in *Figure 9, label 6b*. Columns and rows should match *Figure 9, label 7*. Then, press *Download Data* (Figure 9, label 8)

5. Open the .csv file (unmerge all cells if needed) and set a filter to the first row.
6. Select the column *Export Value* and sort *Largest to Smallest* (Figure 10, label 1).
7. Identify the 10 most important export commodities and enter the key commodity name and data on *Agricultural Trade – Key Commodities* in the Country Status tool. Under the *Total value of export of agricultural commodities*, use the total for agricultural products from the imported Excel sheet (Figure 10).

The screenshot displays the FAOSTAT website interface. On the left, the 'Trade' domain is selected, with 'Crops and livestock products' highlighted. The main content area shows the following filters:

- COUNTRIES:** Filter results include Libya, Lithuania, Luxembourg, Madagascar, Malawi (selected), and Malavisa. A red circle labeled '2a' is next to Malawi.
- ELEMENTS:** Filter results include Import Quantity, Import Value, Export Quantity, and Export Value. 'Export Value' is selected. A red circle labeled '2b' is next to it.
- ITEMS:** Filter results include Agriculture, Products, Total + (Total), Agriculture, Products, Total > (List) (selected), Animal fats + (Total), Animal fats > (List), Animal Oil+Fat+Grns + (Total), and Animal Oil+Fat+Grns > (List). A red circle labeled '2c' is next to the selected item. A red arrow points to the 'ITEMS' filter.
- YEARS:** Filter results include 2011 (selected), 2010, 2009, 2008, 2007, and 2006. A red circle labeled '2d' is next to 2011.

The right sidebar shows 'Bulk Downloads' for various data sets and 'Related Documents' including 'Trade'.

Figure 8: Procedure for Obtaining Data on the Key Commodities from FAOSTAT – Part 1

Output Type: Table Pivot

Thousand Separator in 'Show Data': None Comma Period

Output Formatting Options: Flags Codes Units Null Values

Show Data Download Data

Show Data

	Value	Flag Description
Almonds shelled	0	FAO estimate
Anise, badian, fennel, coriander	24	Official data
Bambara beans		Data not available
Barley	0	FAO estimate
Beans, dry	15855	Official data
Beans, green	52	Official data
Beer of barley	1	Official data

Show Data

	Export Quantity		Export Value	
	2011		2011	
	Value	Flag Description	Value	Flag Description
Almonds shelled	0	FAO estimate	0	FAO estimate
Anise, badian, fennel, coriander	24	Official data	22	Official data
Bambara beans		Data not available		Data not available
Barley	0	FAO estimate	0	FAO estimate
Beans, dry	15855	Official data	7902	Official data
Beans, green	52	Official data	58	Official data
Beer of barley	1	Official data	0	Official data

Figure 9: Procedure for Obtaining Data on the Key Commodities from FAOSTAT – Part 2

Rank	Trade commodity	Export quantity (t)	Export value (1000 US\$)	Export unit value (US\$/t)	Share in total value of exports
1	Tobacco, unmanufactured	159,842	570,321	3,568	49.8%
2	Sugar Raw Centrifugal	267,982	191,947	716	16.8%
3	Tea	46,007	86,361	1,877	7.5%
4	Maize	357,302	84,998	238	7.4%
5	Cotton lint	9,460	31,132	3,291	2.7%
6	Groundnuts Shelled	33,460	29,204	873	2.6%
7	Sugar Refined	26,308	22,185	843	1.9%
8	Cotton Carded, Combed	7,653	15,887	2,076	1.4%
9	Rubber Natural Dry	2,966	13,629	4,595	1.2%
10	Peas, dry	37,009	11,835	320	1.0%
Subtotal			1,057,499		92%
Total value of export of agricultural commodities			1,144,870		
Source: FAOSTAT		Year: 2011			

Figure 10: Agricultural Trade – Key Commodities Table for Malawi

4.4 Step 4: The net trade position for the key food crops

The user can now compute the net trade position for up to five key crops. The user can determine the crops that will be analysed by selecting the highest-ranked crops, those with the highest kcal/capita/day, generated in the *Food Supply and Key Foodstuffs* table (Figure 7). As explained previously, the net trade position for the most recent year is computed, but an overview of the position for the last ten years is added to illustrate how it may fluctuate over time. The net trade position is reported on an annual basis and expressed in percentage terms.

If the data needed cannot be found in the national statistics, they can be they can be extracted from FAOSTAT. The procedure on how to download the data and fill out the table is explained and depicted with figures below.

The user must:

1. Type in the name of each of the crops analysed next to the cell “Food crop” in the Net Trade Position for Key Food Crops sheet (Figure 14, label 1).
2. Go to <http://www.fao.org/faostat/en/#data> and select *Commodity Balances – Crops Primary Equivalent* from the sub-section *Food Balances* Figure 11, labels 1 and 2.

3. Select:
 - *Countries/Regions/Special Groups* of interest (Figure 11, label 2a),
 - *Elements: Production Quantity, Import Quantity, Stock Variation, Export Quantity and Domestic Supply Quantity* (Figure 11, label 2b),
 - *Items*: Select the key food crops (Figure 11, label 2c),
 - *Years*: Select the past 10 years (e.g. 2002-2011) (Figure 11, label 2d).
4. Select the *Output type: Pivot, Thousand separator in "Show Data": None*; and in *Output Formatting Options: Flags*. Then press the "Show Data" button (Figure 12, label 1 to 4). A preview of the values will be shown (Figure 12, label 5).
5. Rearrange the table by dragging and dropping columns as follows: Select the column for *Elements* shown in Figure 12, *label 6a* and drag it to the rows section following the arrow (Figure 12, *label 6a*). Next, select the row for *Years* shown in Figure 12, *label 6b* and drag it to the columns section following the arrow (Figure 12, *label 6b*)
6. Columns and rows should match Figure 12, *label 7*. Then, press *Download Data* (Figure 12, label 8)
7. Open the exported .csv file and rearrange the columns to the order shown in Figure 13 (production, import, stock variation, export, and domestic supply). Select the values for one crop and *Copy*.
8. *Paste Values* into the appropriate table for the crop in the net trade position sheet of the tool (Figure 14, label 2). Repeat points 7 and 8 for each crop analysed.

The screenshot displays the FAOSTAT website interface for 'Commodity Balances - Crops Primary Equivalent'. The left sidebar shows the 'Food Balance' section with 'Commodity Balances - Crops Primary Equivalent' highlighted by a red circle and the number 1. The main content area has several filter sections: 'COUNTRIES' with 'Malawi' selected (labeled 2a), 'ELEMENTS' with 'Production Quantity', 'Import Quantity', 'Stock Variation', 'Export Quantity', and 'Domestic supply quantity' selected (labeled 2b), 'ITEMS' with 'Tea (including mate)' selected (labeled 2c), and 'YEARS' with years 2002 through 2011 selected (labeled 2d). The right sidebar shows 'Bulk Downloads' and 'Definitions and stand...' options.

Figure 11: Procedure for Obtaining Data on the Net Trade Position from FAOSTAT – Part 1

The screenshot shows the FAO STAT interface with the following data table for 'Tea (including mate)' in Malawi:

		2002	2003	2004	2005	2006
		Value	Flag Description	Value	Flag Description	Value
Domestic supply quantity	Tea (including mate)	77	Standardized data	750	Standardized data	1423
Export Quantity	Tea (including mate)	42596	Standardized data	36924	Standardized data	46200
Import Quantity	Tea (including mate)	373	Standardized data	481	Standardized data	33
Production	Tea (including mate)	39200	Standardized data	41693	Standardized data	50090
Stock Variation	Tea (including mate)	3100	Standardized data	-4500	Standardized data	-2500

The second screenshot shows the data in a pivot table format:

	Domestic supply quantity	Export Quantity	Import Quantity	Production	Stock Variation
	Value	Value	Value	Value	Value
2002	0		0		
2003	0		0		
2004	0		0		
2005	0		0		
2006	0		0		
2007	0		0		
2008	0		0		
2009	2		2		
2010	1		1		
2011	3		3		
2002	77	42596	373	39200	3100
2003	750	36924	481	41693	-4500
2004	1423	46200	33	50090	-2500
2005	434	44600	34	38000	7000
2006	7603	27503	97	45009	-10000
2007	4089	54398	347	48140	10000

Figure 12: Procedure for Obtaining Data on the Net Trade Position from FAOSTAT – Part 2

	A	B	C	D	E	F	G	H
1				Production	Import Quantity	Stock Variation	Export Quantity	Domestic supply quantity
2				Value	Value	Value	Value	Value
3	Malawi	Tea (including mate)	2002	39200	373	3100	42596	77
4	Malawi	Tea (including mate)	2003	41693	481	4500	36924	750
5	Malawi	Tea (including mate)	2004	50090	33	2500	46200	1423
6	Malawi	Tea (including mate)	2005	38000	34	7000	44600	434
7	Malawi	Tea (including mate)	2006	45009	97	10000	27503	7603
8	Malawi	Tea (including mate)	2007	48140	347	10000	54398	4089
9	Malawi	Tea (including mate)	2008	41637	312	0	30435	11514
10	Malawi	Tea (including mate)	2009	52555	235	0	47356	5434
11	Malawi	Tea (including mate)	2010	51589	92	0	49999	1682
12	Malawi	Tea (including mate)	2011	47006	129	0	46008	1127

Figure 13: Procedure for Selecting the Data in the Net Trade Position excel file

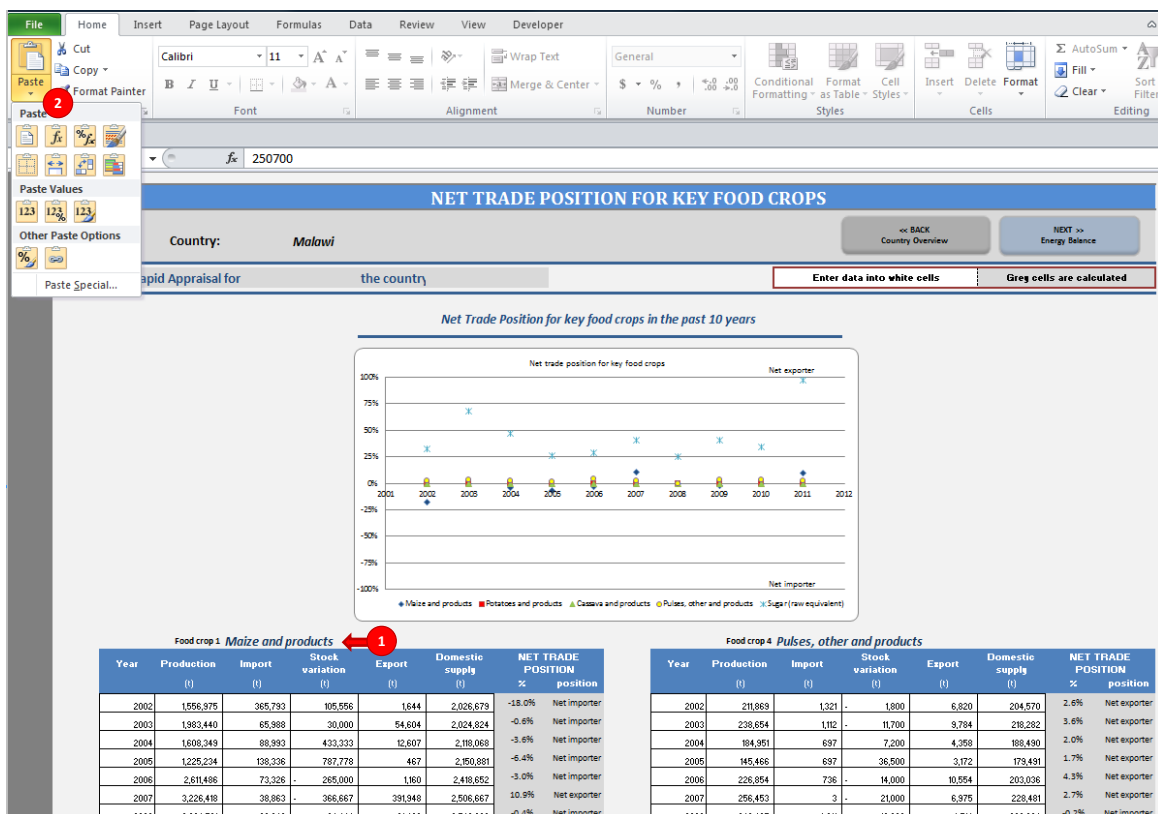


Figure 14: Procedure for Entering Crop Name and Pasting the Data into the Net Trade Position Sheet

After inserting the data required for all of the key food crops, the net trade position for each year is calculated and the results are presented graphically. Figure 15 shows the net trade position of Malawi for the country’s most important key food crops, in terms of the share in the total food supply: maize, potatoes, cassava, pulses and sugar (raw equivalent).

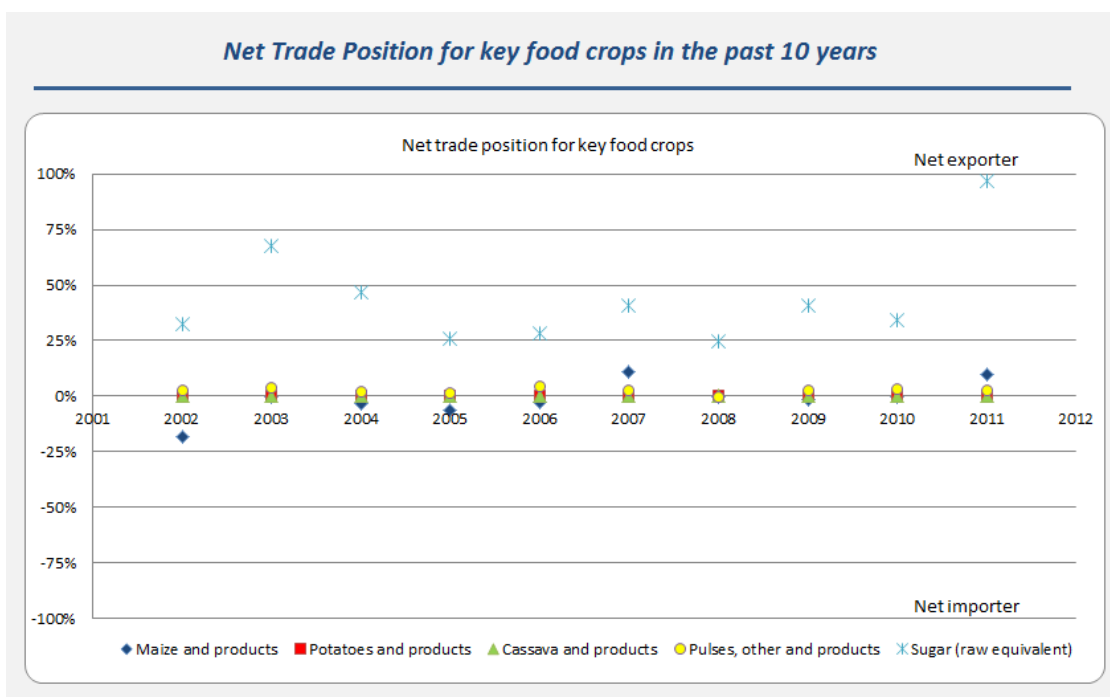


Figure 15: Malawi’s Net Trade Position for Key Food Crops (2002 – 2011)

It is important for the user to consider the information presented in the Country Overview and the Net Trade Position sheets throughout the BEFS RA. For example, in the *Natural Resources* module, the information from the Country Status tool is relevant when selecting the potential bioenergy crops suitable for the production of liquid biofuels. Namely, apart from indicating the amount of crop residues being produced, it reveals if fluctuations occur over time. This is important when thinking about the security of feedstock supply to the processing facility.

Box 1: Interpreting Information Used for Defining the Net Trade Position

In the case of Malawi, in 2011 according to the SOFI (2013), 23.1% of the population was undernourished and the poverty headcount ratio was 50% (WDI, 2013). The data in the Country Overview and Net Trade Position sheets show that more than 80% of the population lives in rural areas and that agriculture is one of the most important sectors for the national economy, contributing around 27% to the GDP in 2013 (Figure 3). In 2011, maize was by far the most important food crop, contributing almost 50% of the total per capita daily calorie intake of 2,334 Kcal. Potato and cassava followed, but with considerably smaller contributions of 8.6% and 6.6%, respectively. The net trade position for maize over the past 10 years illustrates that generally Malawi is self-sufficient in maize production, but that there can be years in which it may become a slight net importer or exporter of maize (Figure 16).

Net Trade Position for key food crops in the past 10 years

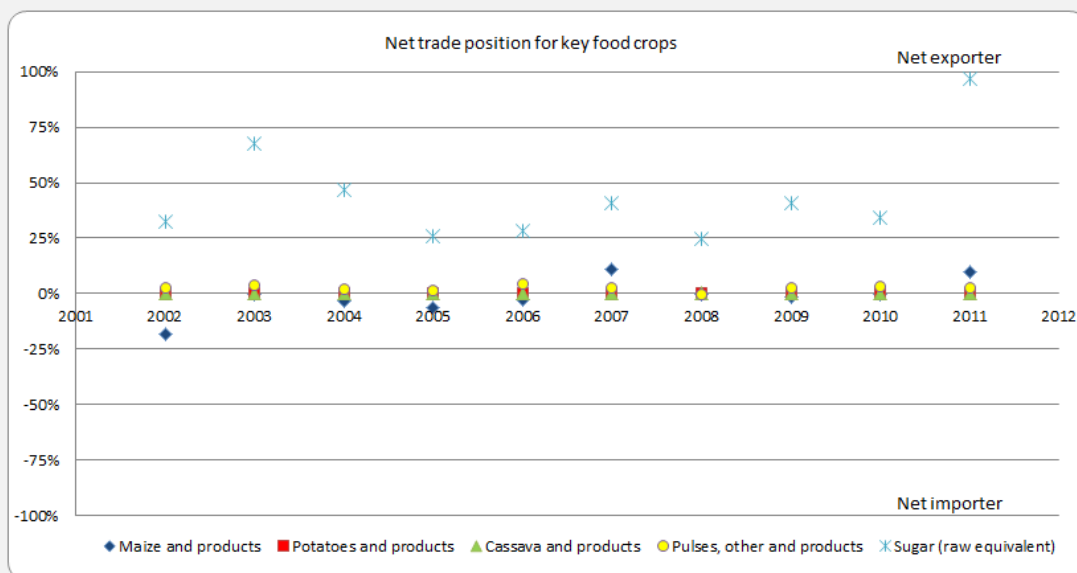


Figure 16: Malawi’s Net Trade Position for Maize (2002 – 2011)

As Malawi’s economy heavily relies on agriculture and bioenergy is closely tied to the agricultural sector, bioenergy development options should be carefully screened in this case.

4.5 Step 5: Populating the aggregated energy balance table

In the Energy Balance sheet, the user needs to provide data on the primary energy supply and final consumption, as indicated in the Simplified Aggregated Energy Balance table (Figure 19). The data required should be derived from national energy statistics (energy balances).

In case the national energy balance or energy statistics data are not available, the information provided by the International Energy Agency (IEA) can be used. Based on the data provided by countries, the IEA produces energy balance flows for almost all the countries in the world. They are publically available and can be accessed on the IEA web site <http://www.iea.org/statistics/> > Energy balance flows.

Malawi is one of the few countries which are not included in the IEA databases. Therefore, the example of Zambia is used in this manual.

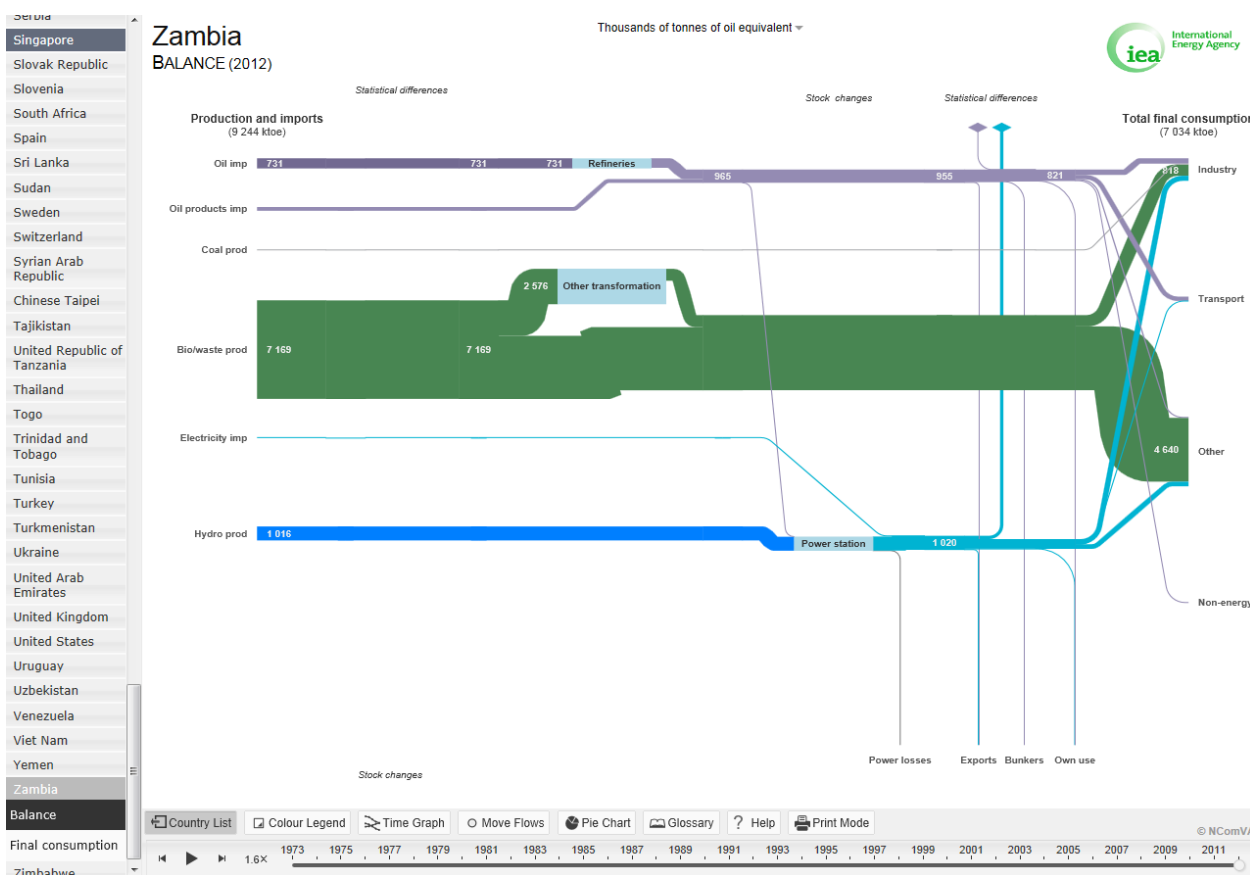


Figure 17: Energy Balance for Zambia from IEA website

The energy balance flows for each country include a graph with numerical values of both the Energy Balance and the Energy Final Consumption (Figure 17 and 18). Additional information can be retrieved by double-clicking on a specific “flow” or category title.

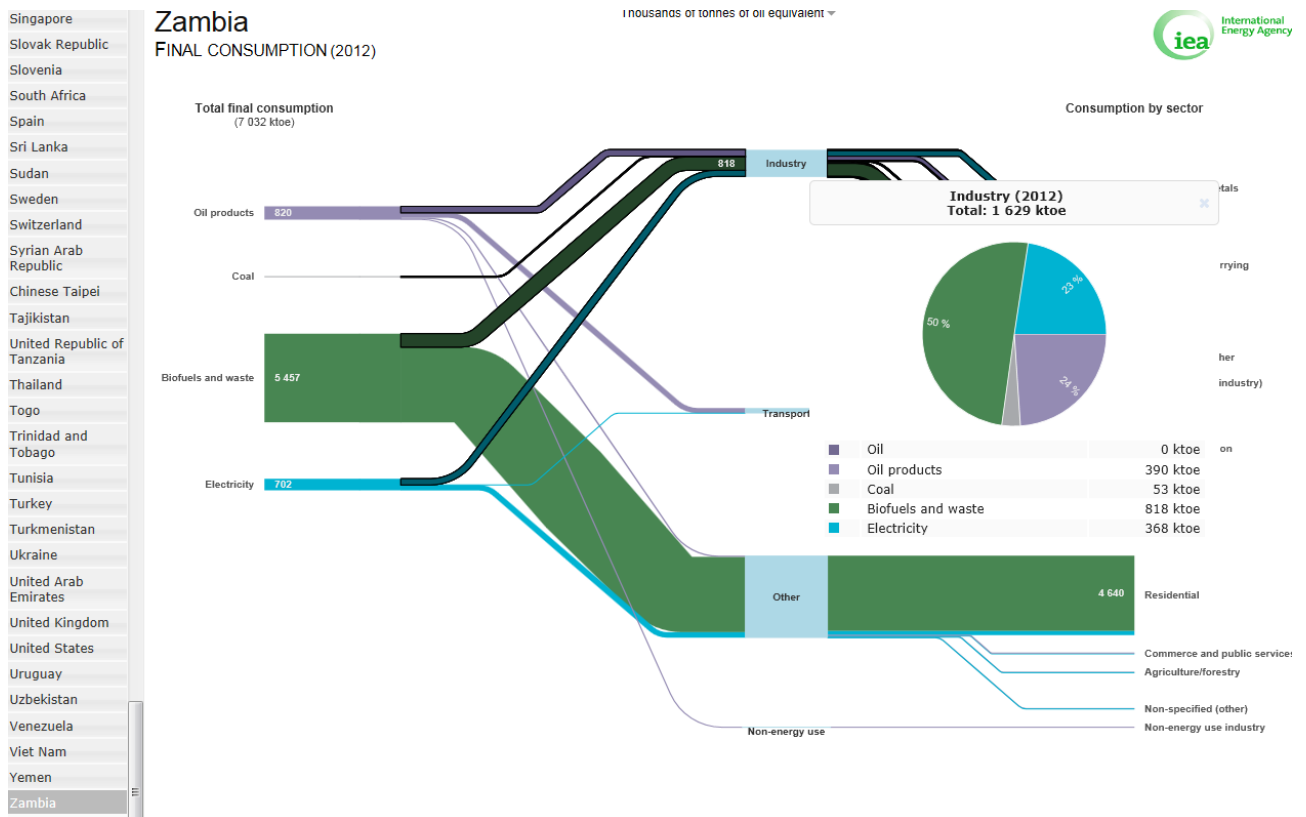


Figure 18: Energy Final Consumption for Zambia from IEA website

The numerical data from the charts should be used to populate the Simplified Aggregated Energy Balance table. In the “unit” cell, the user should enter either ktoe (thousands of tonnes of oil equivalent) or mtoe (millions of tonnes of oil equivalent) as the unit (Figure 19). Based on the table, a graphical presentation of the balance is generated in the Energy Balance sheet of the tool (Figure 20).

Simplified aggregated energy balance

Unit:	ktoe	Coal and peat	Crude oil	Oil products	Natural gas	Nuclear	Hydro	Geothermal, solar, etc.	Biofuels and waste	Electricity	Heat	Total
Total primary energy supply		53	731	211	0	0	1,016	0	7,169	-51	0	9,129
Production		53					1,016		7,169			8238
Import			731	274						1		1006
Export				63						52		115
Final consumption		53	0	821	0	0	0	0	5458	702	0	7034
Industry		53		390					818	368		1629
Transport				309						2		311
Residential									4,640	250		4890
Commercial and public services				27						52		79
Agriculture / forestry				29						17		46
Fishing												0
Non-specified				18						13		31
Non-energy use				48								48
Source:		IEA		Year:	2012							

Figure 19: Simplified Aggregated Energy Balance Table for Zambia

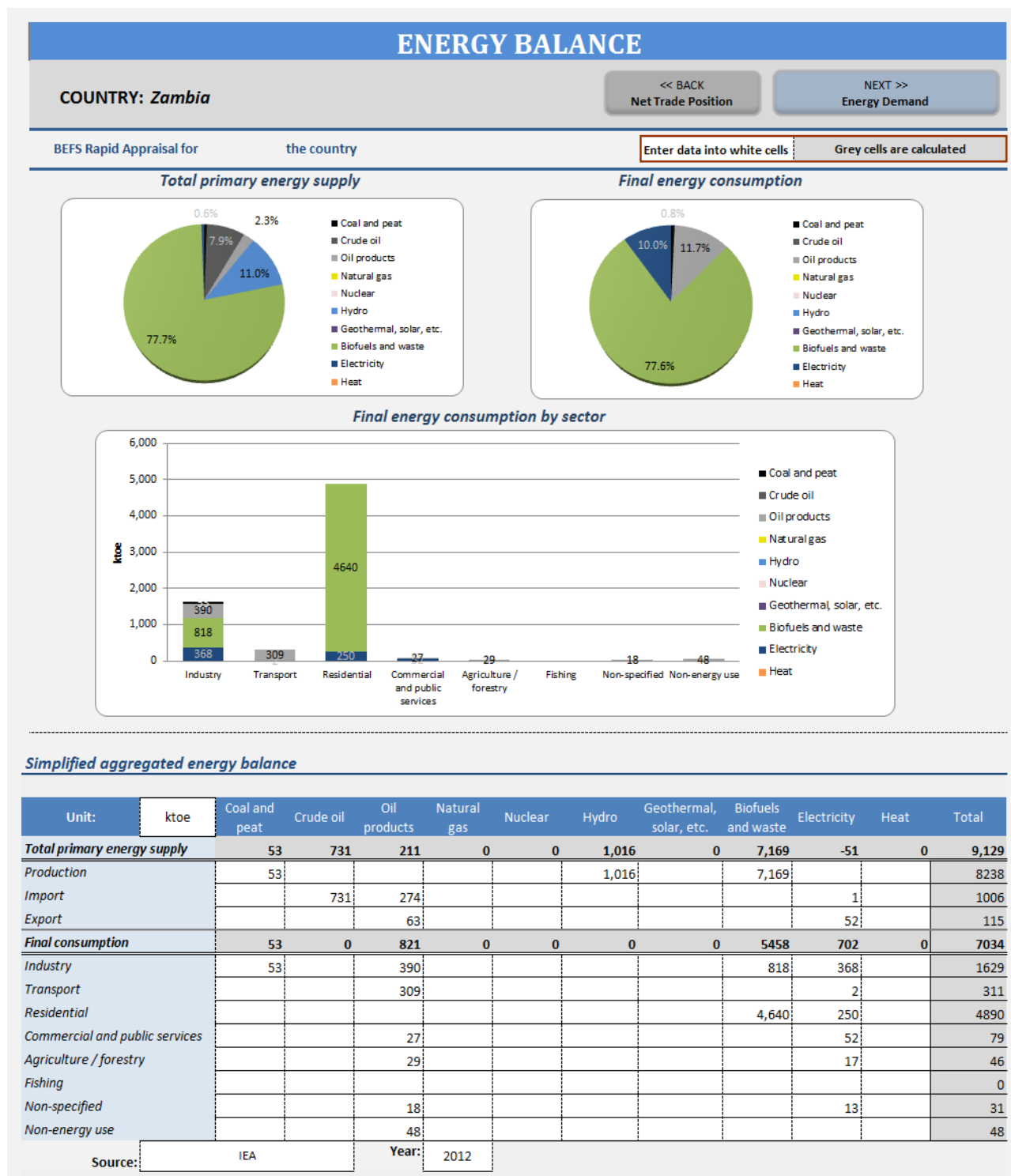


Figure 20: Energy Balance Sheet for Zambia

4.6 Step 6: Data input on energy demand in transport sector and households

The final step in running the *Country Status* module is to provide more detailed data about the current energy demand by sectors.

The Current Energy Demand sheet is divided into three sections: Population, Fuel consumption in transport sector and Energy consumption in households. The user should input the data into the white cells. The data should be obtained from national statistics, market studies, reports, surveys, etc. (Figure 21).

The information presented in this sheet is also used in the techno-economic analysis of BEFS RA. It evaluates to which extent additionally produced bioenergy can contribute to the energy supply in the country. Additionally, it compares the costs of production with the current energy prices in the country.

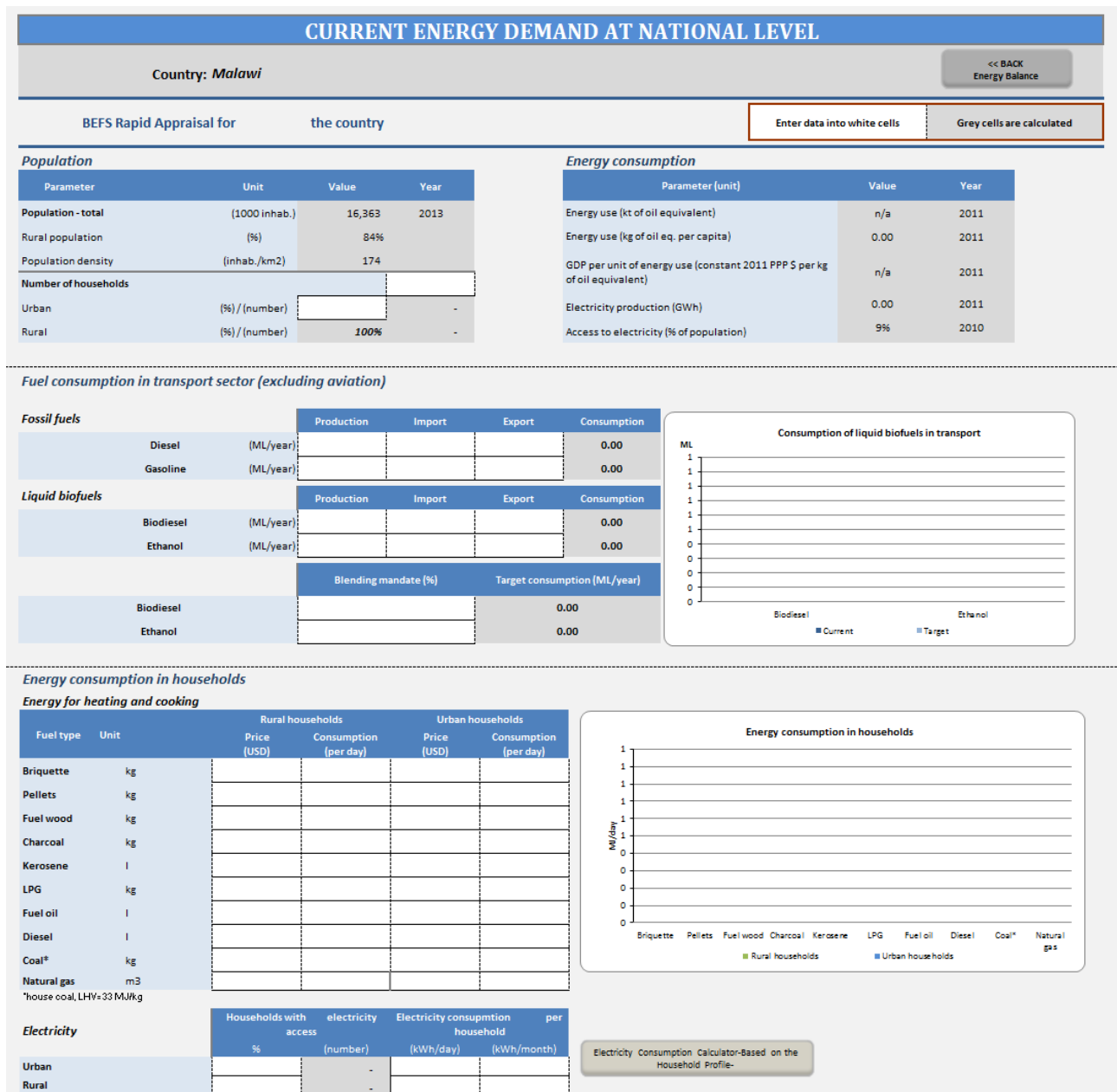


Figure 21: Current Energy Demand Sheet

5 Assumptions and Limitations of the Tool

The information included in the *Country Status* module represents only the most important indicators and can provide an overall review of the state of affairs in the country. The data included in the databases of the tool refer to the country as a whole. Therefore, the data do not reveal sub-national differences, which in some countries may be considerable. In addition, the annual data in the global databases are often published with a delay (e.g. data for 2011 are published in 2013). Thus, whenever data are available in the national statistics, preference should be given to that data.

6 Annex

6.1 Databases

Databases named “Country” and “FAOSTAT_Land” are incorporated in the tool.

The “Country” database includes country-specific data derived from FAOSTAT (FAO, 2013) and WDI (The World Bank, 2013):

- FAOSTAT 2013: Total population (1000 inhabitants), Rural population (%), Urban population (%), Population density (inhabitants/km²)
- WDI, 2013: GDP/capita (current US\$), GDP/capita, PPP (current int. \$), GDP/capita (const. 2011, int. \$), Agriculture, value added (% of GDP), Undernourished population (% of total), Poverty headcount ratio at national poverty line (% of population), Energy use (kg of oil eq. per capita), Electricity production (GWh), Electricity access (% of population), GDP per unit of energy use (const. 2011 PPP \$ per koe)

The “FAOSTAT_Land” database includes data on the land use/land cover in 1990, 2000, 2005, 2011 and 2012 for agricultural area, arable land, country area, forest area, land area, other land, permanent crops, permanent meadows and pastures, total area equipped for irrigation.

6.2 Data requirements for running the tool

The table below includes data requirements for running the *Country Status* module. A suggested data source is provided.

Table 1: Data Requirements for Running the Analysis

Data	Data Source
Country Status Sheet	
- Population (rural population, total population, urban population)	Statistics, census (national, subnational), FAOSTAT. Information provided by the tool.
- Land use/land cover (country area, land area, agricultural land, arable land, permanent crops, forest area)	Land use statistics, land cover maps (national, subnational), FAOSTAT. Information provided by the tool.
- Socio-economic indicators (GDP, agriculture value added)	Statistics (national, subnational), World Development Indicators. Information provided by the tool.
- Energy use (energy use per capita, electricity production, access to electricity)	Statistics (national, subnational), World Development Indicators. Information provided by the tool.
- Key foodstuffs, Key commodities	Agricultural statistics, statistics (national, subnational), FAOSTAT (Food Balance Sheets, Trade, Commodity Balances).
Net Trade Position Sheet	
- Domestic supply, Export, Import, Production, Stock Variation for key food crops	Agricultural statistics, statistics (national, subnational), FAOSTAT (Production).
Energy Balance Sheet	
- Primary energy supply (production, import and export for each energy source) and Final energy consumption in industry, transport, residential sector, commercial and public services, agriculture/forestry, fishing, by energy source	Energy balances/statistics (national, subnational), IEA (Statistics>Energy balance flows).
Energy Demand Sheet	
- Number of households in the country, Number of urban households	Statistics, census (national, subnational).
- Production, Import and Export for diesel, Gasoline, Biodiesel, Ethanol	Energy balances/statistics (national, subnational).
- Prices for fuels used in households: Briquettes, Pellets, Woodfuel, Charcoal, Kerosene, LPG, Fuel oil, Diesel, Coal, Natural gas	National (energy) statistics, market studies, market (national, subnational).
- Consumption of fuels used in households: Urban and rural households: Briquettes, Pellets, Woodfuel, Charcoal, Kerosene, LPG, Fuel oil, Diesel, Coal, Natural gas	National (energy) statistics, market studies, market (national, subnational).
- Electricity consumption per day and per month in an average urban and rural household.	National (energy) statistics, energy studies (national, subnational).

7 References

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