United Nations
Economic Commission for Africa

ideas for a prosperous Africa

BLUE ECONOMY VALUATION TOOLKIT

USER MANUAL

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SUSTAINABLE DEVELOPMENT GOALS

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Author's Note

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This disclaimer applies unless revoked (by a statement to the contrary).

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Abbreviations and Acronyms

AU	African Union
AU-IBAR	The African Union Inter-African Bureau for Animal Resources
BEA	Blue Economy in Africa
BEVTK	Blue Economy Valuation Toolkit
CBD	Convention on Biological Diversity
CEM	Commission on Ecosystem Management
CICES	Common International Classification of Ecosystem Services
EAC	East African Community
EEZ	Exclusive Economic Zone
EU	European Union
EC	European Community
FAO	Food and Agriculture Organisation of the United Nations
GBP	Great Britain Pound
GDP	Gross Domestic Product
INSD	National Statistics Institute of Djibouti (L'Institut National des Statistiques de Djibouti)
ILO	International Labour Organisation
IOC	Indian Ocean Commission
ISIC	International Standard Industrial Classification
IUCN	International Union for Conservation of Nature
LME	Large Marine Ecosystem
MPI	Multidimensional Poverty Index
NACE	Nomenclature des Activités Économiques dans la Communauté Européenne
NAD	Nomenclature of Activities of Djibouti
NAEMA	Nomenclature d'activités des Etats membres d'Afristat
NAICS	North American Industry Classification System
NCA	National Capital Accounting
NBS	National Bureau of Statistics (Seychelles)
NOPEMA	Nomenclature de produits des Etats membres d'Afristat
OS	Operating System
PDF	Portable Document Format
SDG	Sustainable Development Goal
SFA	Seychelles Fisheries Authority
SNA	System of National Accounting
ToR	Terms of Reference
TRE	Resources and Employment Table (Tableau des ressources et des emplois)
SEEA EEA	System of Environmental- Economic Accounting – Experimental Ecosystem Accounting
SNA	System of National Accounts

UN	United Nations
UNDP	United Nations Development Programme
UNECA	United Nations – Economic Commission for Africa
UNECA SRO-EA	United Nations Economic Commission for Africa, Sub-Regional Office for Eastern Africa
UNEP	United Nations Environment Programme
USD	United States Dollar
VBA	Visual Basic for Application
ZAR	Zuid-Afrikaans Rand (South African Rands)

1 Presentation of the Blue Economy Valuation Toolkit

The overall objective of the project was to provide a tested Blue Economy Valuation toolkit (BEVTK) and associated materials.

The BEVTK has been applied in three pilot countries that are Djibouti, Rwanda and the Seychelles (Figure 1-1). These countries have been identified as representative of the various typologies found in East Africa which were narrowed down to landlocked, insular and coastal countries.

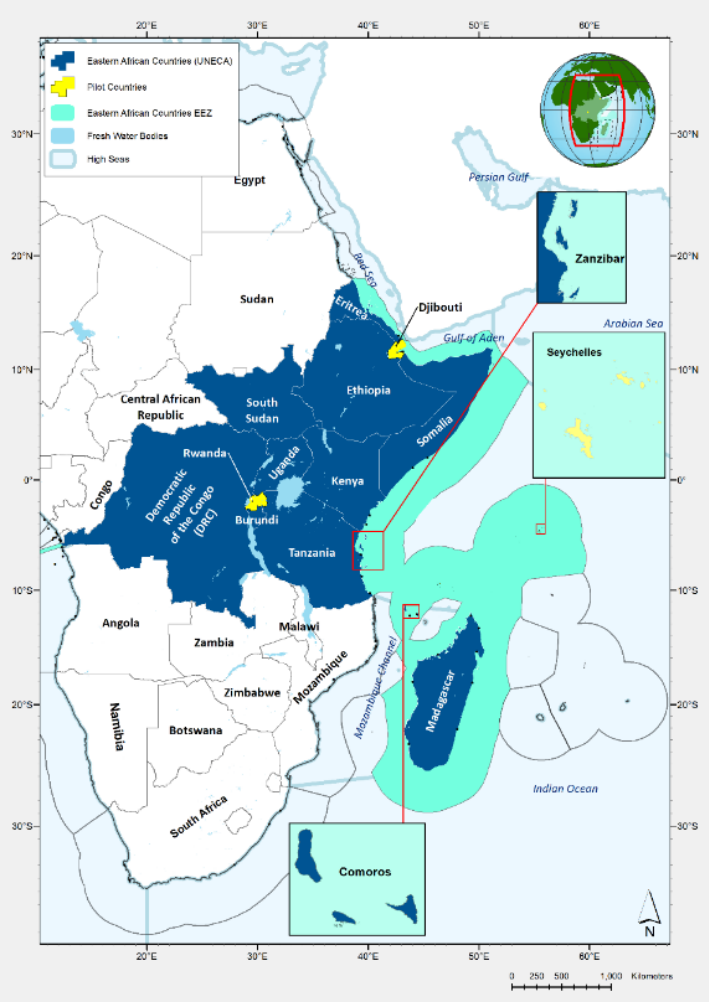


Figure 1-1: East African States and relevant EEZs identifying the 3 pilot countries

The report presents, in Part 1, the Blue Economy Valuation Toolkit and, in Part 2, the user manual. In Part 1, the objective of the toolkit, its structure and capabilities are displayed. It shows how BEVTK integrates three modules which are the economic activities, social dimension and ecosystems' services and their respective contributions to the blue economy. This part concludes with key recommendations for improving the BEVTK. In Part 2, the way to navigate with the tool, to elaborate input tables, pivot charts, summarizing tables and snapshot summarizing the contribution of the selected country to the Blue Economy is presented in detail.

The Blue Economic Valuation Toolkit (BEVTK) version 2 is available for download at the following link: https://www.uneca.org/eastern-africa/blue-economy

1.1 Objective of the BEVTK

The BEVTK was developed as a tool to guide sub-regional and national in-depth socio-economic assessments that will support informed decision-making.

The toolkit complements the multisectoral approach and step-by-step methodology for policy development highlighted in the Blue Economy Policy Handbook for Africa (UNECA, 2016a). As such, BEVTK can be used for socio-economic assessments aimed to provide an accurate snapshot of the potential of the Blue Economy. This version of the toolkit was designed to be used in Eastern Africa but can easily be extended to any other parts of the World. The quality of any country's assessment using BEVTK will depend on the amount of data available and usable and as such it is crucial that such data be collected as completely and timely as possible. The more relevant data are available and can then be inputted into the BEVTK, the better the tool will be able to draw an accurate picture of the country's contribution to the Blue Economy.

With the BEVTK, the intent was to build a tool capable of capturing the various dimensions of human interactions with our "Blue environment" (ocean, lakes, rivers, etc..) and capable of recording the various types of benefits (utilitarian, hedonistic and/ or monetary) people gained from it.

The 3 main dimensions looked at and focused on are therefore:

- Any Economic Activities associated with the Blue Economy,
- Any Social Dimension of human interaction with the Blue Economy and
- Any Ecosystem Services related to the "Blue economy"

The Toolkit is flexible and comprehensive enough to represent any country within UNECA scope (coastal, insular or landlocked). To do so, classifications and nomenclatures systems widely accepted among international experts, compatible with systems used nationally have been used (SNA, NCA, SEEA, etc.). They are easily comprehensible by all stakeholders. The nomenclatures used are presented in section 3.1 of the Appendix.

1.2 Structure of the BEVTK

The BEVTK is organized around 3 modules,

1. **Economics Activities** associated with the blue economy,
2. **Social Dimension** associated with the blue economy and
3. **Ecosystem Services** associated with the blue economy.

The flows of information coming in and coming out of the tool are as follows:

1. **Collection of data** for each module from various sources (e.g. SNA, NCA, LME organisations, UNDP, UNEP, AU-IBAR, World Bank, etc.)
2. **Data entry** in the tool using predefined tabular templates and customized nested list of categories following specific nomenclatures for each module.
3. Automatic production of **summary tables and charts** for each module dynamically linked to the corresponding tabular data.
4. **Consolidation** of the summary tables and charts from the 3 modules into a "**snapshot**" summarizing the country's contribution to the Blue economy with some sensitivity analysis capabilities such as:
    a. Simulating a change in the state of the economy through changes in inflation, exchange rates,
    b. Simulating a change in the country's state of the environment through changes in the quality of the ecosystem and
    c. Simulating a change in the country's social dimension through changes in, for example, unemployment level, level of poverty, gender inequality, fair trades, etc.

In order to facilitate the comparison and the consolidation of the collected data in each of the three modules, the BEVTK includes a utility facility composed of historical exchange rates for each country going back 10 years and a table of deflators by country covering the same period. The facility also stores basic information on each country's physical and geographic characteristics, flags, national currency, GDP, etc.

To control how data are entered into the tool, templates were used incorporating internationally accepted systems of standards used by experts across the globe in each relevant dimension and following a system of nested categories and sub-categories[1]:

- Economic Activity: International Standard Industrial Classification or ISIC Nomenclature (revision 4)
- Social Dimension: Social Indexes from UNDEP (Human Development Indexes such as (Gini, MPI, GII, etc.), World Bank and from other Internationally recognized organizations.

[1] The nested lists used for each classification/ nomenclature can be found in section 3.1 of the Appendix at the end of this report.

- Ecosystem Services: IUCN Habitats Classification Scheme (version 3.1) to describe each relevant Ecosystem and Common International Classification of Ecosystem Services or CICES Nomenclature (version 5.1)

Figure 1-2 below shows the flows and various stages in the BEVTK from the step when the data are collected to the steps when there are transcribed, standardised, calibrated, summarized and finally presented.

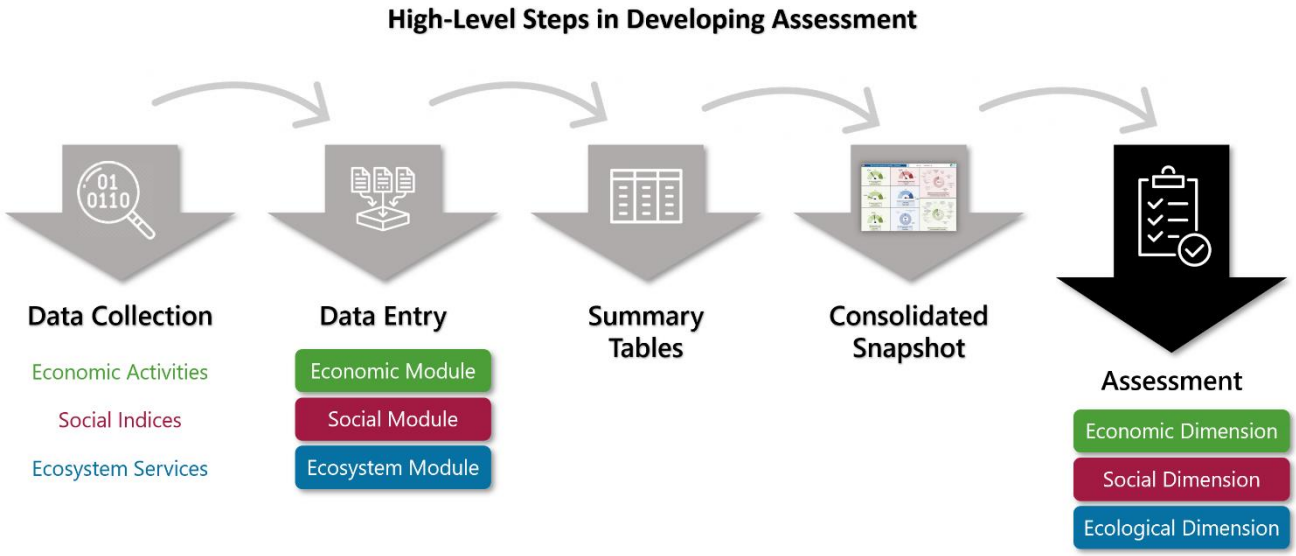


Figure 1-2: BEVTK High-Level Steps Diagram

Figure 1-3 below shows how the BEVTK is connected through MS Excel to the three modules and the utility facility to produce a dynamic Blue Economy Snapshot for the country. Such structure should, in time, enable the user of the tool to conduct sensitivity analysis on the main indicators generated by those three modules and test various scenarios in which one could ask any "*what if?*" question.

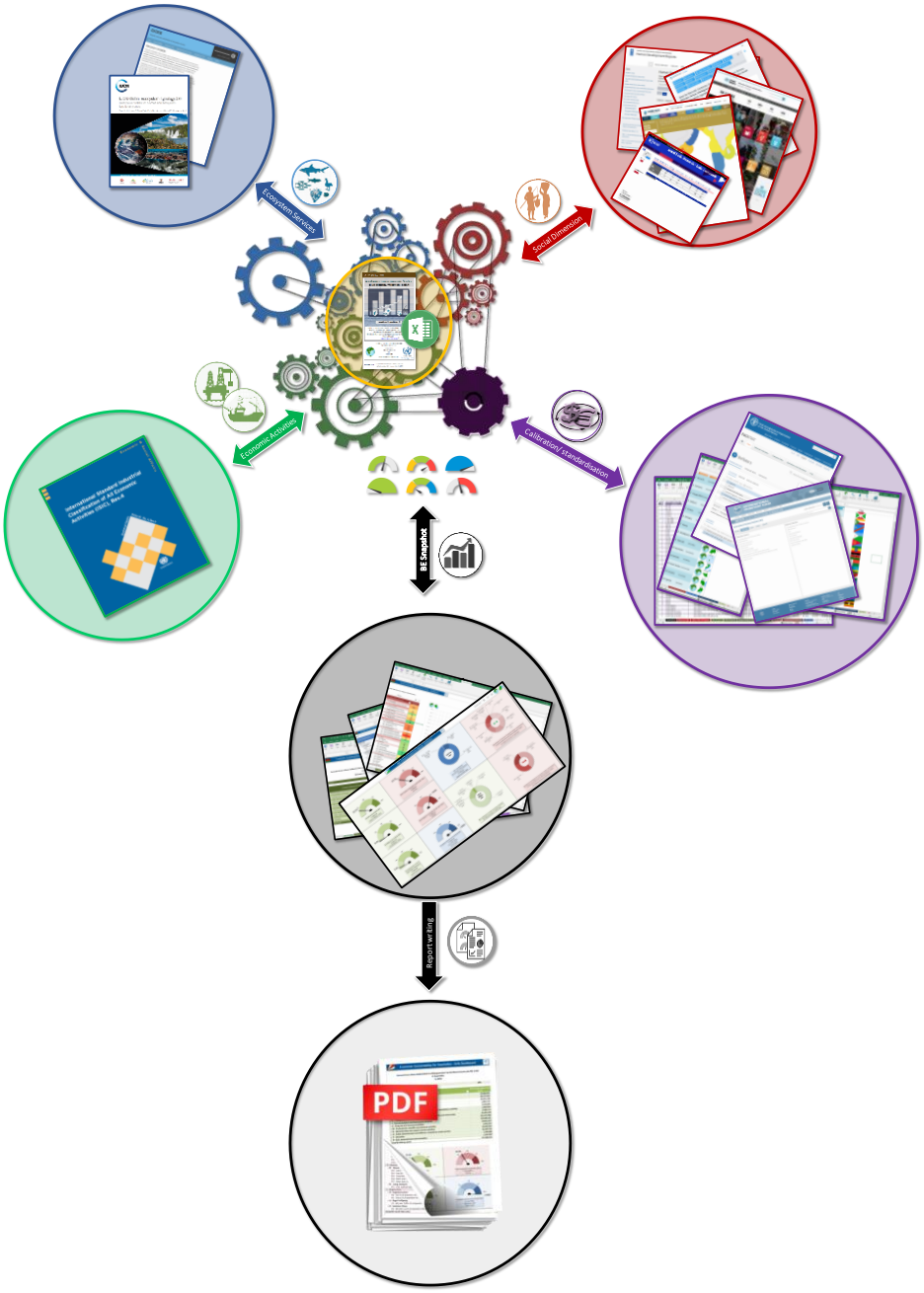


Figure 1-3: The BEVTK Excel toolkit Operations

The BEVTK Excel toolkit, shown in the centre in yellow, in relation to the nomenclatures and classifications used inside the 3 modules (ISIC rev 4 for the Economic Activity in green, various UNDP's, World Bank's and other's indicators for the Social Dimension in red and CICES ver. 5.1 and IUCN HCS ver. 3.1 for the Ecosystem Services in blue), historical exchange rates, deflator and country specific information for the calibration and standardisation facility in purple and the resulting country's Blue Economy snapshot using Excel Pivot tables and charts in black/ grey.

2 Operational Manual of the BEVTK Version 2

2.1 Introduction

BEVTK version 2 was designed in MS Excel® with some of its functionality programmed using Visual Basic for Application[2] (VBA) Macros. Therefore, it is important to enable Macros upon opening the tool. MS Excel® was chosen for its availability, flexibility, and tractability between versions: the toolkit is compatible with MS Excel® version 2010 (tested), version 2019 (used to develop the tool), version Office 365 (tested by the developer and the consultants in the pilot countries), 32-bit and 64-bit versions which were tested as well throughout the development phases. The tool has only been tested on computers running the Microsoft Windows™ operating system but was not tested on Apple's iOS systems due to compatibility issues with VBA macros and Reference Libraries only available on Windows platforms. MS Excel® is highly customizable and thanks to VBA and the data validation capability, most potential data entry errors can be prevented. Indeed, thanks to the numerous error trapping mechanisms built in BEVKT, the potential for misleading information from human error is limited. The BEVTK was designed with the end goal of avoiding the GIGO[3] effect!

BEVTK is based on an open, transparent, programmable, and easily updatable platform which is both readily available and can be widely shared among stakeholders and practitioners.

Finally, BEVTK comes with several customized tasks shortcuts and options accessible from the Microsoft Excel Ribbon[4] at the top of the window under the Tab labelled "**UNECA-SRO-EA**". The customized **ribbon tab's options** let the user seamlessly access the various functionality of the tool. Alternatively, a customized context menu or ***pop-up menu*** with similar functionality is also available, accessible by right clicking on any visible area of the active worksheet and enabled by default.

[2] Visual Basic for Applications (VBA) is an implementation of Microsoft's event-driven programming language Visual Basic 6, which was declared legacy in 2008. Visual Basic for Applications enables building user-defined functions (UDFs), automating processes and accessing Windows API and other low-level functionality through dynamic-link libraries (DLLs). VBA programs can be attached to a menu button, a macro, a keyboard shortcut, or an OLE/COM event, such as the opening of a document in the application. The language provides a user interface in the form of User Forms, which can host ActiveX controls for added functionality.

[3] Garbage In, Garbage Out!

[4] Microsoft Excel ribbon is the row of tabs and icons at the top of the Excel window that allows the user to quickly find, understand and use commands for completing a certain task. It resembles a complex toolbar.

2.2 Getting Started

While loading the **BEVTK (version 2).xlsm** file, the following BEVTK screenshot (Figure 2-1) will appear. Figure 2-1 corresponds to the opening screen indicating the toolkit's version and the due credits (including the developer's email details), disclaimer and copyrights.

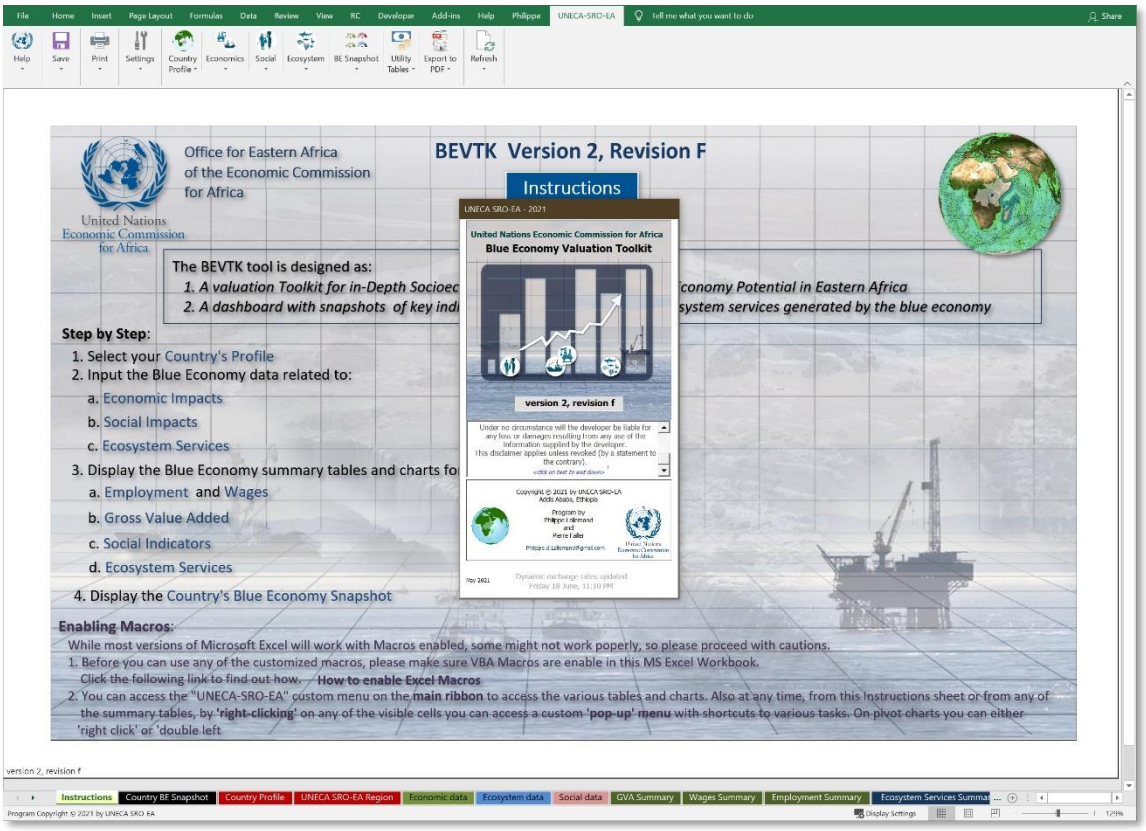


Figure 2-1: BEVTK opening screen and credits

The toolkit opens onto the instruction sheet which gives the user some basic information about the tool (Figure 2-2). The texts in blue are hyperlinks which, when clicked, will take the user directly to the underlying worksheet: for example, from this screen the user can jump directly to the country profile selection (1.), the economic sustainability input module (2.a.), the social sustainability module (2.b.), the ecosystem services module (2.c.) and any of their corresponding summary sheets (3.a through 3.d), etc...

This instruction screen informs the user on the necessary steps to run the tool properly: by first entering the country profile, then by populating the selected country's data tables for the three modules economics, social and ecosystem, in any order. It is possible that the toolkit will come with data already entered to demonstrate what kind of information is needed and what to expect from the summary tables and charts. Those data can be easily over written by resetting each table to blank tables (directions for how to do that later in this manual).

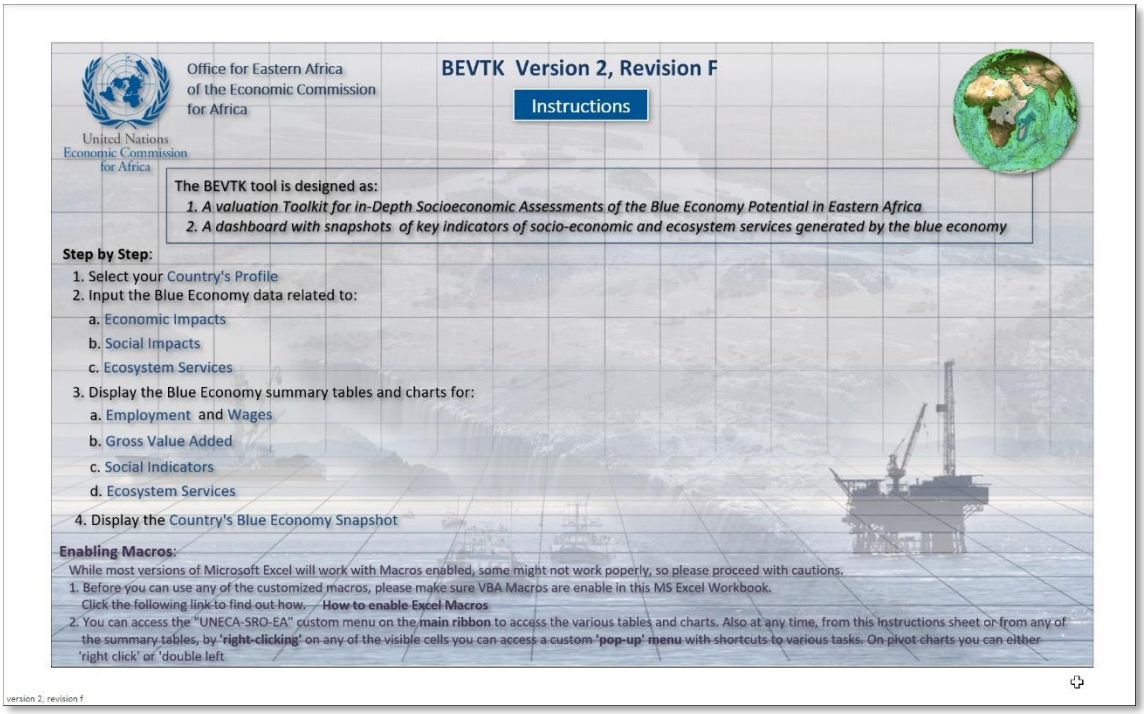


Figure 2-2: BEVTK Instruction Brief Screen

2.3 BEVTK Customized Menus and Navigation

2.3.1 Introduction – the main BEVTK Menu Tab and pop-up menu

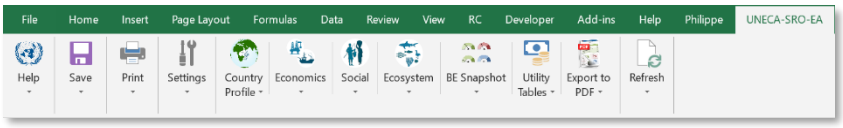
The toolkit comes with a ***customized Ribbon Tab*** labelled "*UNECA-SRO-EA*" on the Microsoft Excel Ribbon[5] that we will refer to as the "**BEVTK Menu Tab**" for now on in this manual. The **BEVTK Menu Tab** was developed to facilitate the navigation inside BEVTK between worksheets and to run specific tasks such as data management (reset, input, delete, row formatting), *printing*, *exporting to PDF*, *refreshing/ updating* the tables, etc.

The screenshots below show the different look and feel of the collapsed[6] **BEVTK Menu Tab** depending on the version of **Microsoft Excel** used.

1. **BEVTK Menu Tab** under **Microsoft Excel 365**:

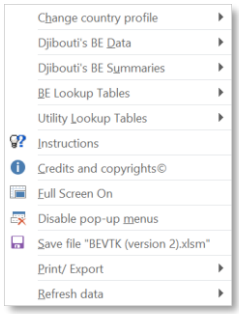
[6] i.e., omitting to show the individual sub-menus

2. **BEVTK Menu Tab** under **Microsoft Excel 2019:**

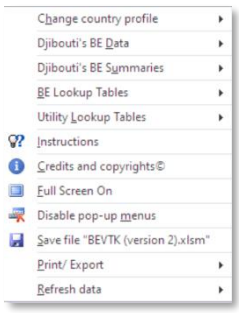


3. **BEVTK Menu Tab** under **Microsoft Excel 2010:**

There is also a customized *pop-up menu*[7], sometime also called a *context menu* that can be accessed by right clicking on any of the visible and enabled[8] area of the active worksheet; we will refer to it as the **BEVTK pop-up menu** for now on in this manual. The screenshot below shows the "collapsed" **BEVTK pop-up menu** under the various version of Microsoft Excel tested.



BEVTK pop-up menu as seen under MS Excel 2019 and MS Excel 365



BEVTK pop-up menu as seen under MS Excel 2010

The options offered in this **pop-up menu** mimic the options offered in the **BEVTK Menu Tab**. The **BEVTK pop-up menu** adds some functionality to the tool since it facilitates accessing several functions such as refreshing the pivot tables and charts or

[7] By default, this customized *pop-up menu* should be enabled although in some situation, MS Excel will revert to the default Excel context menu or floaties, in which case the customized *pop-up menu* can be re-enabled through the Settings sub-menu of the **BEVTK Menu Tab** (more explanations later in this manual)

[8] i.e., not greyed out

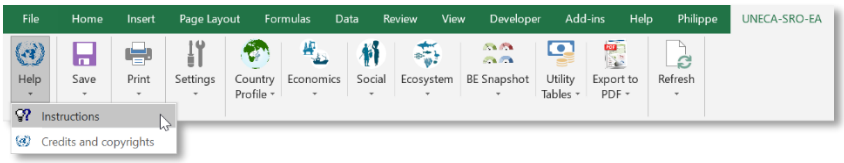
allowing for quick navigation between data input tables, summaries, etc., and that, directly from the working area.

The following sections describe the Individual sub-menus available through the **BEVTK Menu Tab** and **BEVTK pop-up menu**.

2.3.2 Help sub-menu

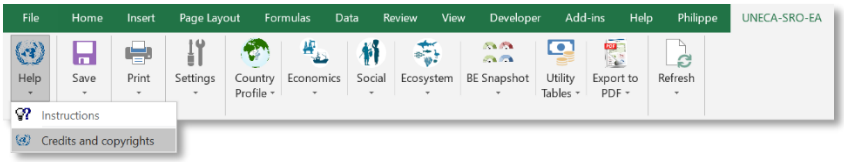
"Instructions" Option

The first sub-menu on the main menu is the **Help** sub-menu. Under this sub-menu, the first option is for the user to access the "Instructions" sheet (see Figure 2-2 above).



"Credits and copyrights" Option

The screenshot below shows how to access the "Credits and copyrights" option through the **BEVTK Menu Tab**.



Through a *pop-up form*, this option will display the tool version, disclaimers, copyrighted and credits information as shown below:

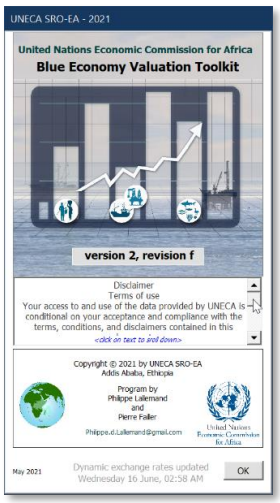
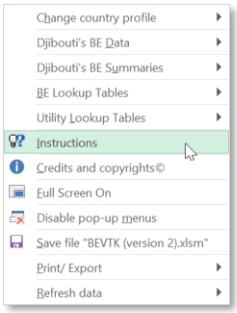


Figure 2-3: Disclaimers, Credit and Copyrights' Form accessible through the Help sub-menu.

Accessing the Help option through the BEVTK pop-up menu

The Instructions sheet can also be accessed through the **BEVTK pop-up menu** by right clicking on any visible cell if this option is enabled[9]. The Screenshot below shows the **BEVTK pop-up menu** once made visible by right-clicking on the visible area of the active worksheet with the option "Instructions" selected.



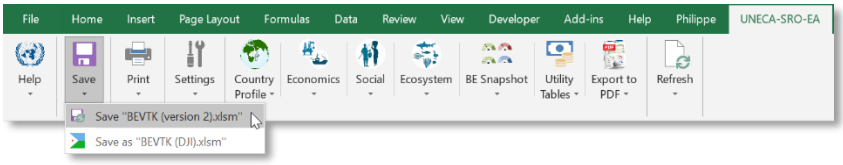
The screenshot below shows how to access the "Credits and copyrights" option through the **BEVTK pop-up menu**.

2.3.3 Save sub-menu

The BEVTK save options are meant as quick shortcuts to save the file with pre-defined names. If the user wishes to save the toolkit in a different path and/or under a different name, the **File** > **Save as** option under the Excel default Menu Tab is an alternative.

Save under current name

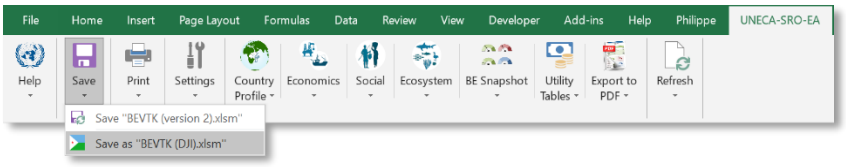
The user can decide to save the toolkit with the default or current saved name, by default it is "***BEVTK (version 2).xlsm***" as shown in the screenshot of the **BEVTK Menu Tab** below.



Save as predefined filename

The file can also be saved as a filename combining the word "BEVTK" followed by the active country code in parenthesis at the end of the filename, the example below shows "***BEVTK (DJI).xlsm***" with "(DJI)" at the end of the filename indicating the current data are being processed for the country of "*Djibouti*".

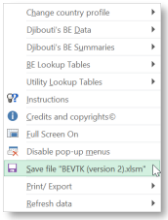
[9] See the **Settings** sub-menu in the **BEVTK Menu Tab** to enable/ disable the **BEVTK pop-up menu**.



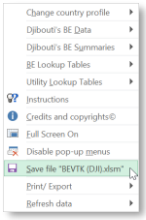
Save as through the BEVTK pop-up menu

The user can also access a shortcut option to save the Excel workbook under the current filename. In the examples below, the selected option shows a. in the first quadrant Save file "BEVTK (2012).xlsm" indicating that the workbook will be saved under the current name which happens to be default name "*BEVTK (2012).xlsm*", *b.* in the second quadrant, Save file "BEVTK (DJI).xlsm" indicating that the workbook was already saved with the filename under the second option of the BEVTK Save Sub-menu combining the word "*BEVTK*" with the country code in parenthesis or "*BEVTK (DJI).xlsm*"

Selecting the BEVTK save option will overwrite the previous version of the file under that name without warning i.e, the current and opened version of the toolkit.

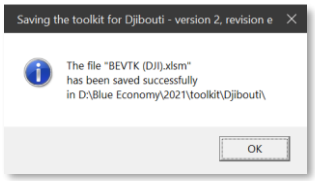


Save the toolkit under the default name "*BEVTK (2012).xlsm*



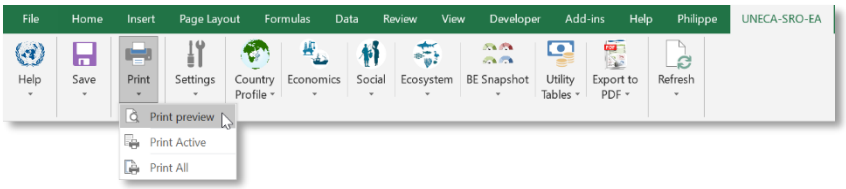
Save the toolkit combining the word "*BEVTK*" with the active country code in parenthesis that is in this case "BEVTK (DJI).xlsm"

Once the file has been processed and regardless of the method used, a dialog box will appear indicating whether the file was successfully saved or not and if so, where was it saved i.e., the active folder's path, as shown in the example below.



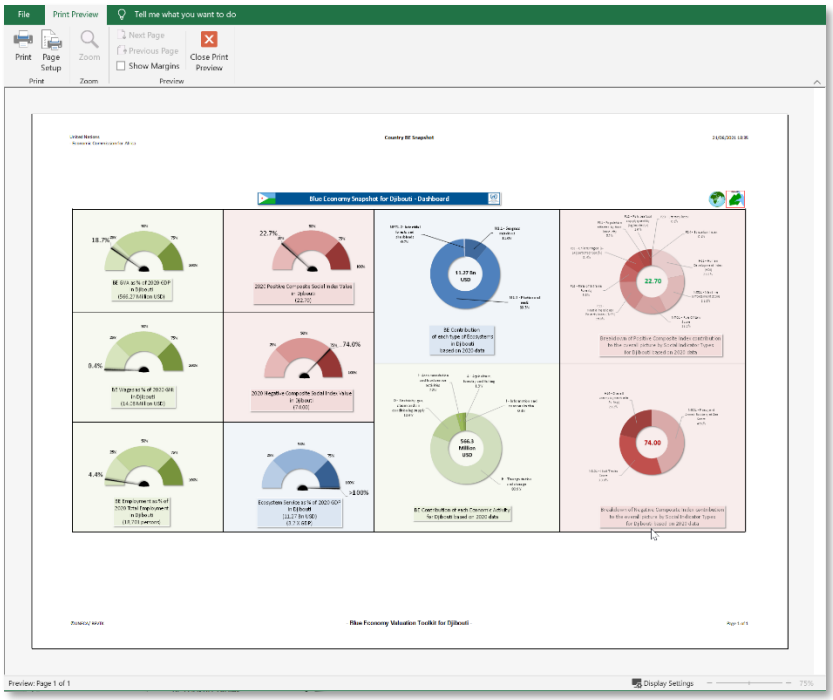
2.3.4 Print sub-menu

The toolkit comes with a short cut and customized **Print** sub-menu with 3 options, a. to print a preview of the active worksheet, b. to print the active worksheet or c. to print all the worksheets in the active workbook.



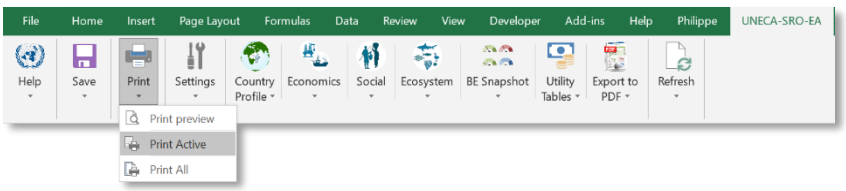
Print preview option

The print preview option shows what the current worksheet will look like when printed as show in the example below. Below, the user selected to preview what the Country BE Snapshot would look like once printed (including headers, footers, number of pages and position of the table on the page).



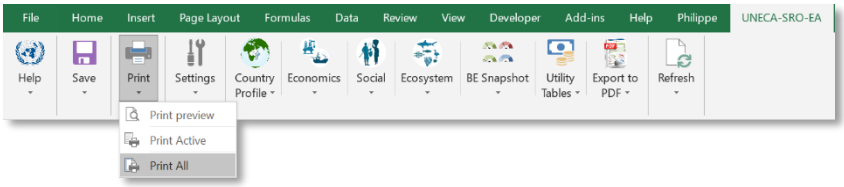
Print active option

This will print i.e., send to the printer, the active worksheet. Using the example above, the Country BE Snapshot will be printed. This option can be found in the Print-sub-menu of the **BEVTK Menu Tab** as shown below.

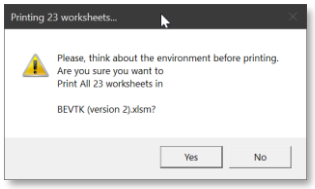


Print all option

This option should be used sparsely as it will send a rather large number of pages corresponding to about 23 worksheets (some with up to 4 pages) to the printer. This option can be found in the Print-sub-menu of the **BEVTK Menu Tab** as shown below

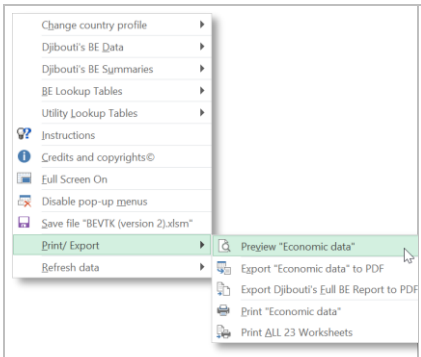


A confirmation dialog box will be displayed to warn the user of the potential environmental impact of printing so many pages as shown below:

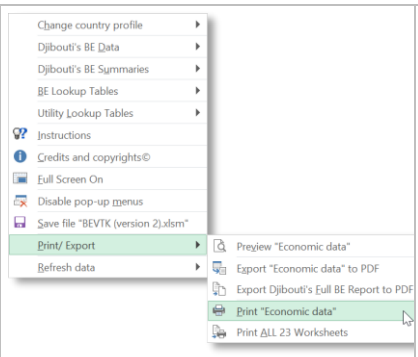


Printing through the BEVTK pop-up menu

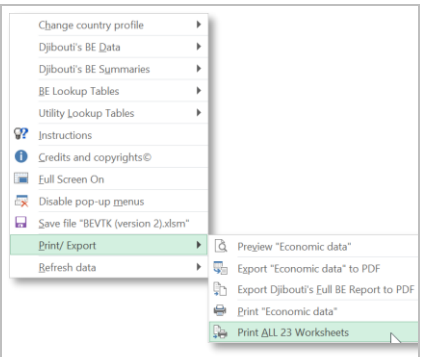
The **BETK pop-up menu** combines both printing and exporting under the same sub-menu labelled "Print/ Export". In the example below, the 3 quadrants represent the 3 print options as defined above.



To Print preview the active worksheet (e.g. "Economic data" Worksheet)



To send to the printer the active worksheet (e.g. "Economic data" Worksheet)



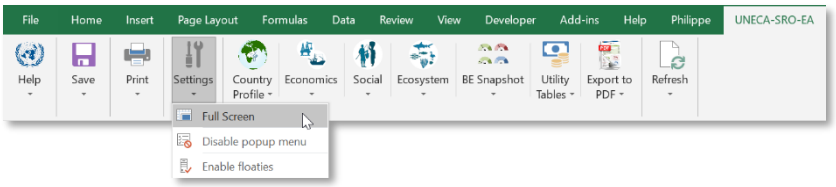
To sent to the printer the content of every woksheets in the toolkit

2.3.5 Settings sub-menu

There are three options under the **Settings** menu, "Full Screen", "Enable (disable) popup menu" and "Disable (enable) floaties".

Full screen option

This option is self-explanatory.



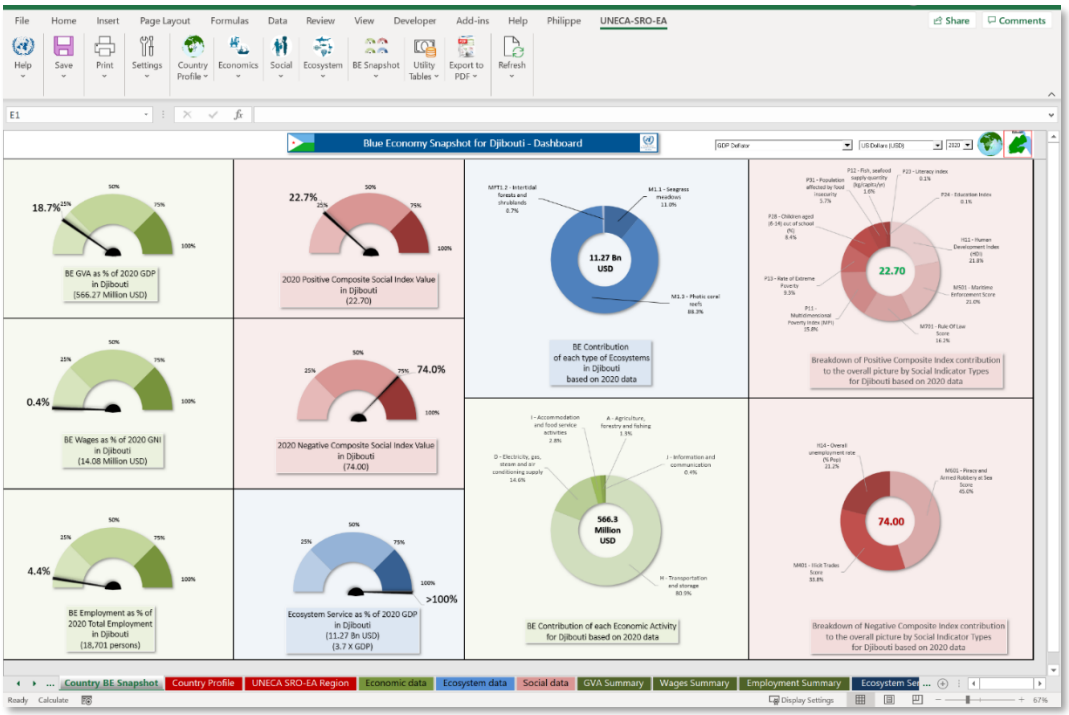


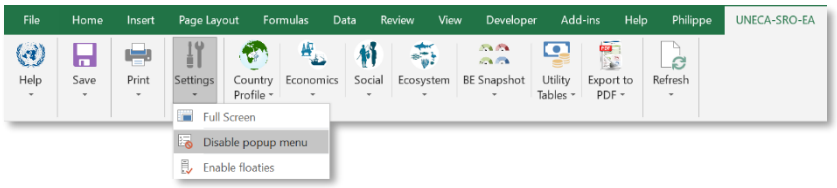
Figure 2-4: Full screen view of the BE Snapshot's graphs

View excludes the toolbar/ ribbon at the top (press the ***|ESC|*** *key to restore the application to a windowed screen, alternatively, select the Full Screen off option from the* ***pop-up menu*** *when enabled)*

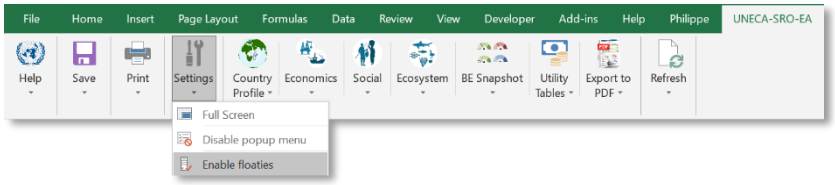
Disabling/enabling the pop-up menu

The other two settings' options are used to enable/ disable the customized context **BEVTK *pop-up menu*** while disabling/ enabling the default Excel context menu or ***floaties***. Note that both context menus are mutually exclusive.

By default, the ***pop-up menu*** is enabled. Selecting the option to disable the pop-up menu is equivalent to selecting the option to enable the floaties and vice-versa, enabling the pop-up menu will disable the default Excel floaties.

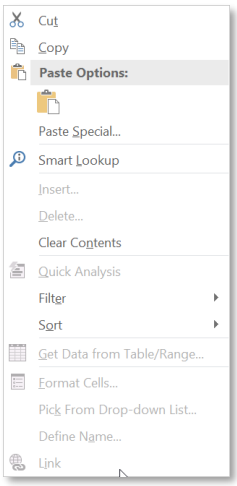


is equivalent to

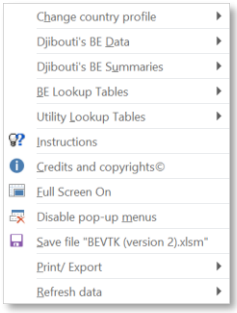


When the pop-up menu is enabled, by invoking it (right clicking on any visible area of the worksheet), it is possible to disable it (i.e. enable the floaties) by selecting the Disable pop-up menus option

Note that the Excel context menu or ***floaties*** won't be available until it is re-enabled. When enabled, the default Excel ***floaties*** will be displayed when right clicking on any visible area of the worksheet.

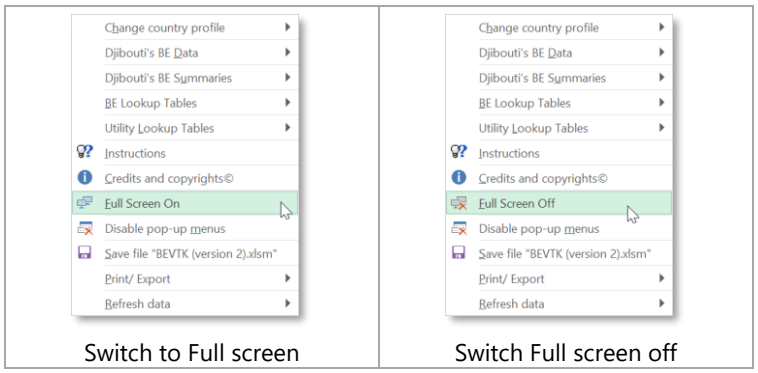


When the customized **BEVTK pop-up menu** is enabled, by right clicking on any visible and enabled area on the active worksheet, the following pop-up menu will appear.



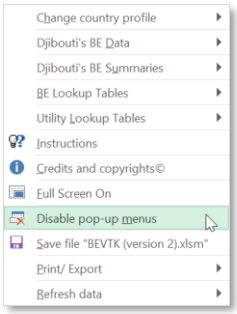
Using the BEVTK pop-up menu to adjust some of the settings

The **BEVTK pop-up menu** can be used to switch to full screen and back to normal screen as shown in the quadrants below.



Switch to Full screen | Switch Full screen off

The user can disable the **BEVTK pop-up menu** by selecting the option as shown below.



2.3.6 *Country Profile sub-menu*

The sub-menu **Country Profile** is where the user may choose the country to run the analysis over and/ or adjust the selected country's profile. As soon as a country is selected, the corresponding country's flag will appear on certain of the menus' options to indicate the active country selection.

Change the Active Country Profile option

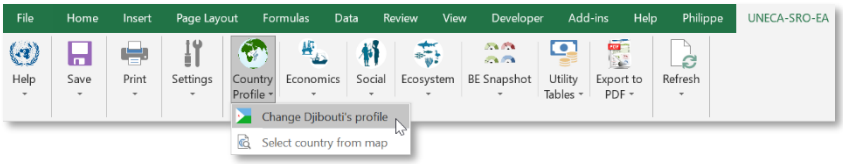


Figure 2-5 shows a snapshot of the country profile's window where the user can customize several parameters for the selected country.

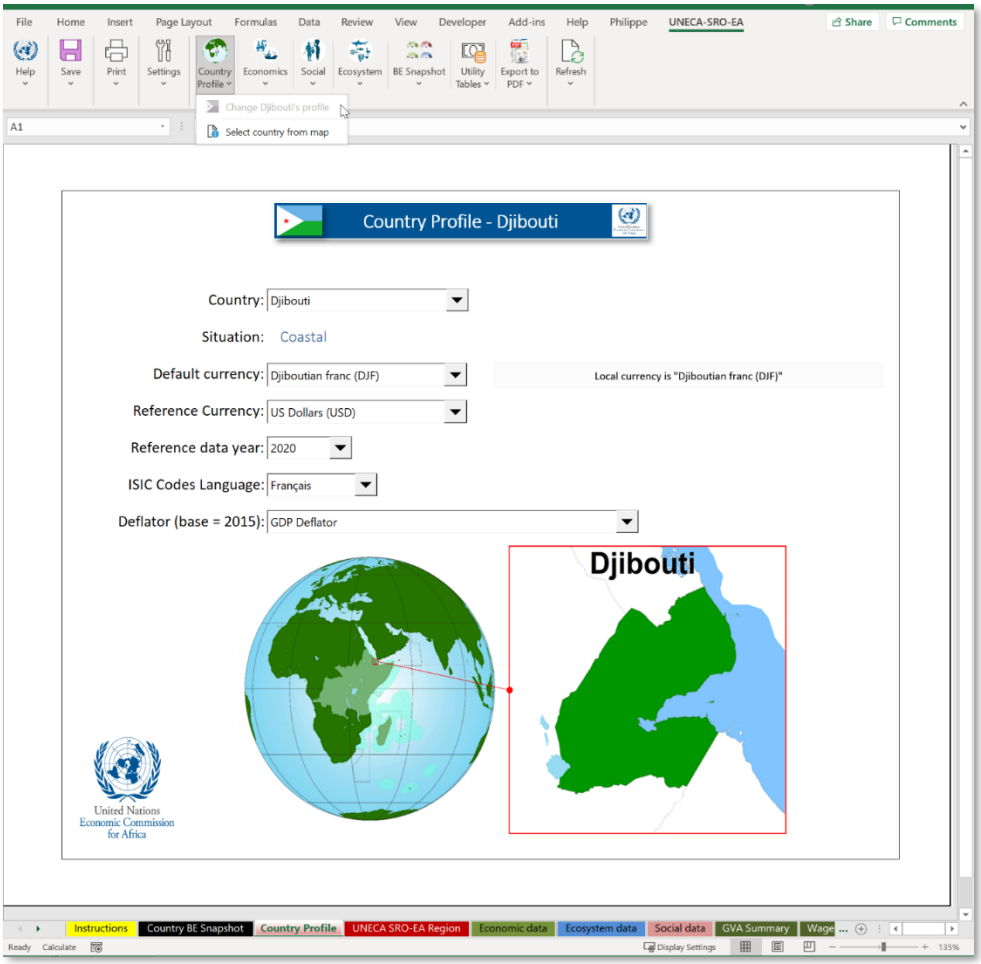


Figure 2-5: Country Profile's Selection Sheet

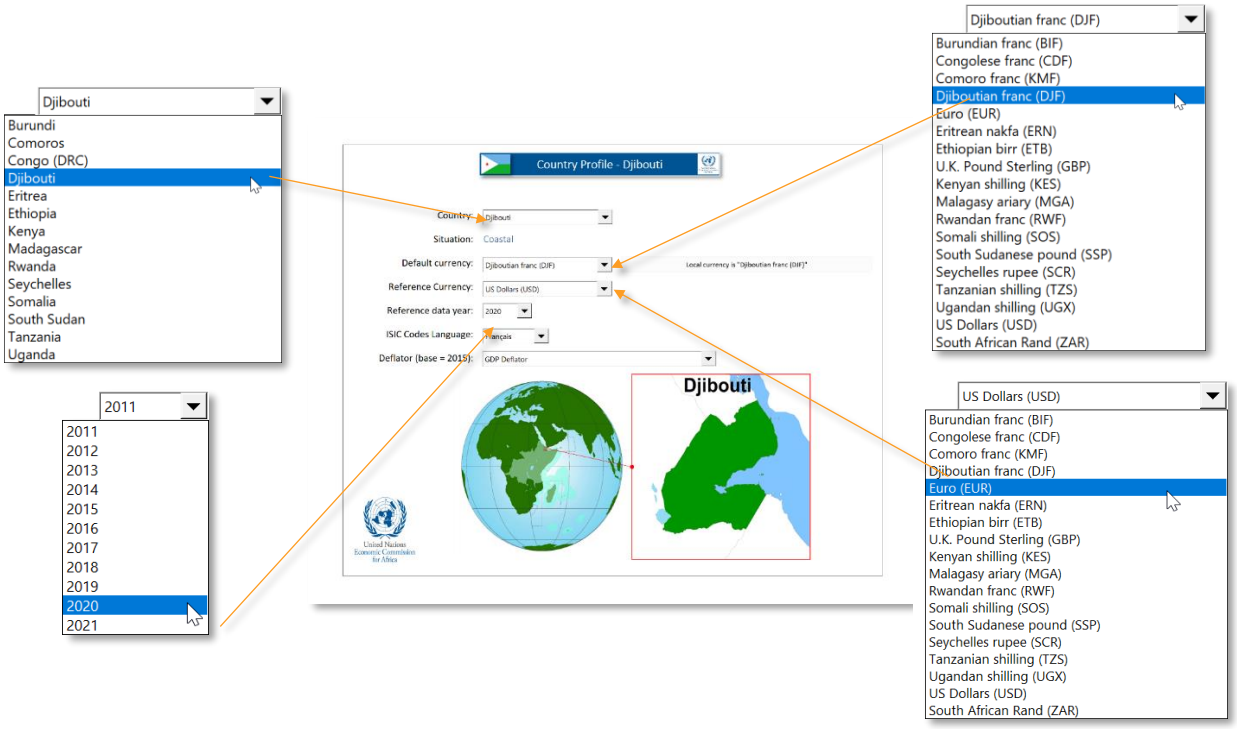
The following parameters can be changed:

1. **Country name**: The user can select among the 14 East African countries under UNECA SRO-EA jurisdiction (see Table 3-22 in Section 3.3)
2. **Default currency**: Once a country is selected, the country's national currency is pre-selected by default but can be overwritten by the user if needed. The list includes currencies from the 14 SRO-EA countries plus Euro (EUR), British pounds (GDP), US dollars (USD) and South African Rands (ZAR) (see Table 3-15 in Section 3.2.1).
3. **Reference currency**: this list is composed of the same items as the Default currency list. Here the default is US dollars (USD). Once selected, this currency will be used to standardise the monetary values across the datasets to a single common currency to facilitate aggregation and potential data comparison. This means that the data can first be entered in any currency which will all be converted and expressed in a

single reference automatically; this is done by converting the value in the selected currency into the reference one cross checking the relevant exchange rate in a lookup table (see Table 3-15 in Section 3.2).

Reference year: In conjunction with the reference currency, the reference year is used as the reference point in time to calibrate and standardise any monetary value entered in the tool , this need to be related to a deflator which takes into account any inflation/ deflation between the year of reference and the data year (see

4. Table 3-27 in Section 3.23.3).
5. **ISIC codes language**: the nomenclature used to identify the economic activities using the series of nested lists form ISIC has been translated in French; this option let the user choose between and English or a French ISIC nomenclature.
6. Choice of **deflator**: the deflator used to standardise and calibrate any monetary values entered in the tool; this works in conjunction with the currency of reference and the data reference year.



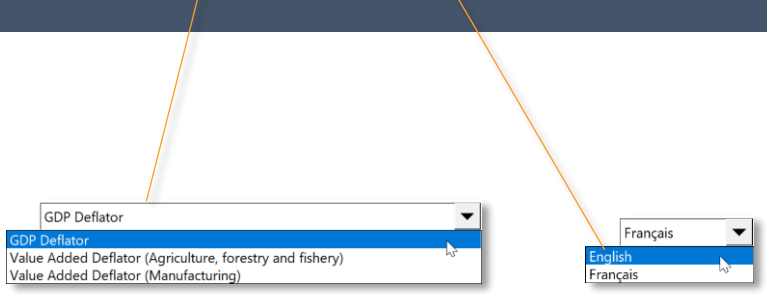
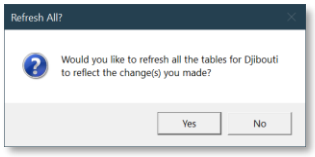
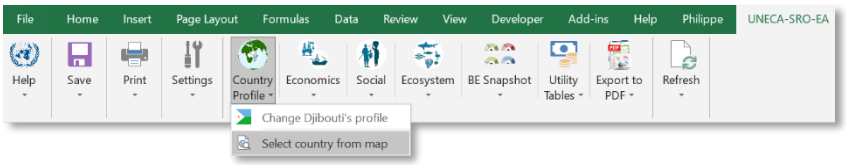


Figure 2-6: Country Profile's selection lists

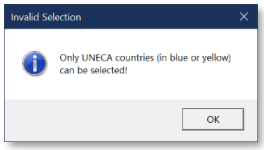
When a change is made on some of the parameters in the Country Profile sheet, a dialog box will ask whether the user wants to Refresh all tables or not; this can be done after each change or once all the desired parameters have been changed to avoid repetitive and unnecessary wait while the tables are being refreshed.



Selecting the Country from a Map option



Alternatively, the country can be selected by clicking on the country directly from the map. Note that if the user clicks outside of the relevant countries, a warning message will appear indicating that the selection is invalid.



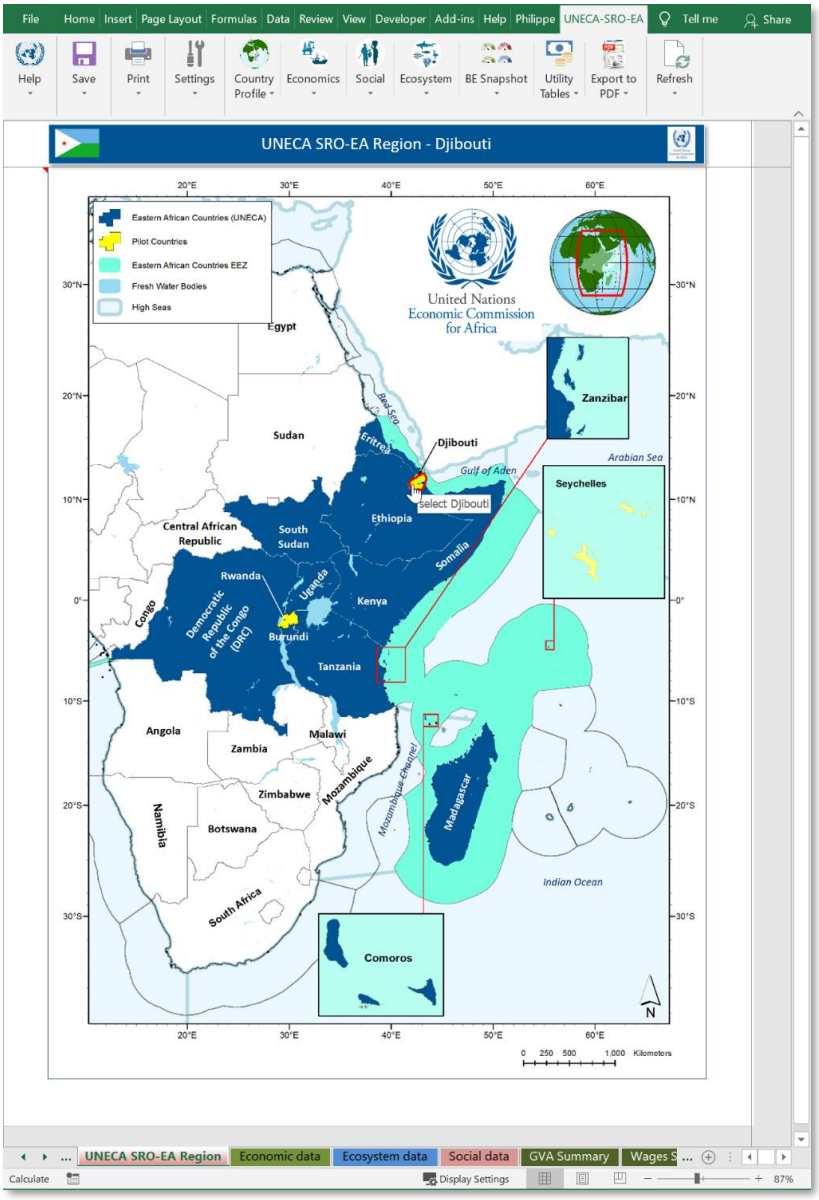


Figure 2-7: Country selection using the interactive map of the UNECA SRO-EA region.

Below are quadrants explaining the procedure to select a country and then wait for the initialisation process to be finished to proceed to the next step (usually update the country profile sheet).

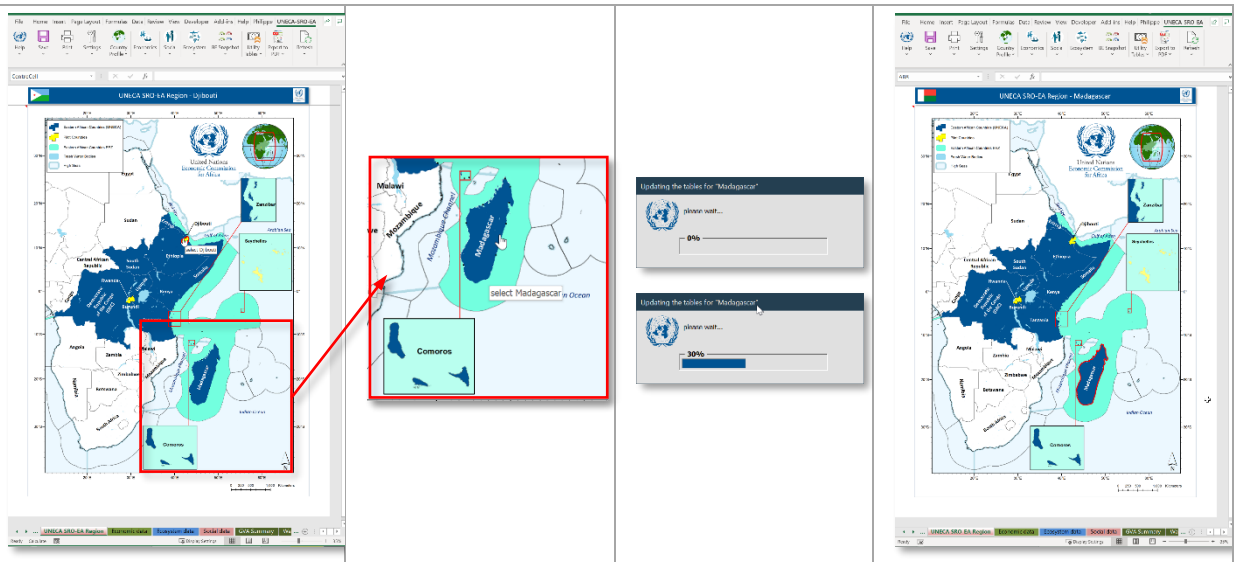
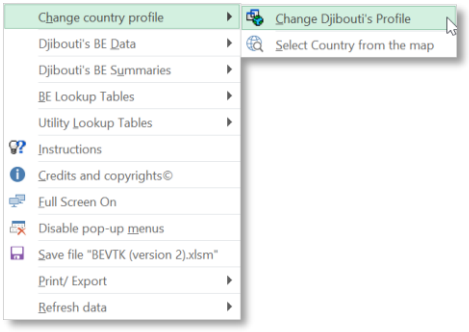


Figure 2-8: Steps to Country Selection using Map

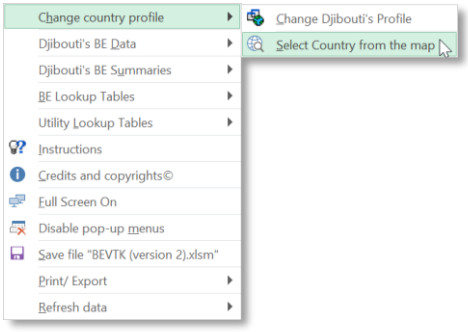
For example, after selecting and clicking on Madagascar directly on the map, a progress bar appears indicating that the tables are being updated to reflect this new selection. Once done, a new map extent will be displayed with the selected country outlined in red and the country profile sheet will be populated with the default value for Madagascar.

Using the BEVTK pop-up menu to select/modify country profile

Though the **BEVTK pop-up menu**, the user may also access the same option as found in the **BEVTK Menu Tab** to select or modify the country profile as shown below.



Modifying the current country's profile using the BEVTK pop-up menu



Selecting a new country from the map using the BEVTK pop-up menu

2.3.7 *Economics sub-menu*

There are 3 main groups under the **Economics** sub-menu as follow:

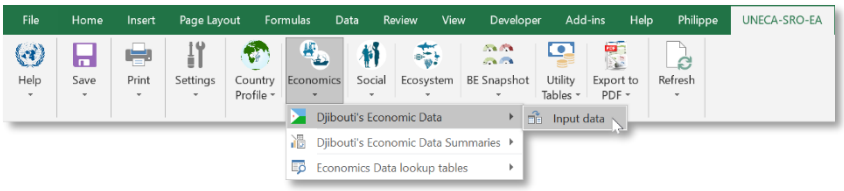
1. The Active Country's Economic Data group
2. The Active Country's Economic Data Summaries group
3. The Economics Data lookup tables group

The three summary options within the "*Active Country's Economic Data Summaries*" group give the user access to summary sheets where pivot tables and charts are linked dynamically to the data entered by the user and therefore are automatically generated. When changes are made in the underlying data table, the options under the Refresh Menu (see section 2.3.13) must be used to update the summaries.

Active Country's Economic Data sub-menu

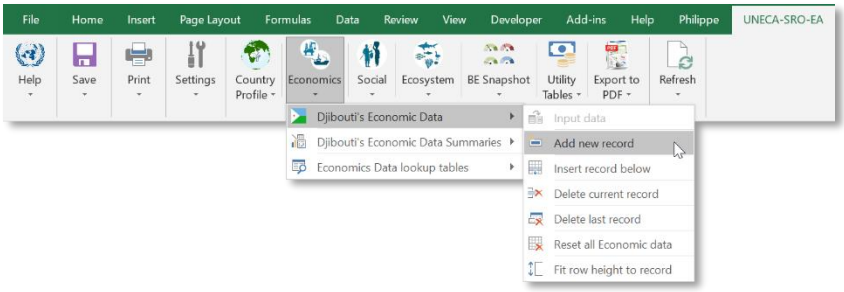
The first option "*input data*" is to access the active country's economic data worksheet.

If the Economic Data worksheet is not yet active, only the *input data* option will be available under the "Active Country's Economic data" group as shown in the Screenshot below. This option lets the user access the user defined data table.

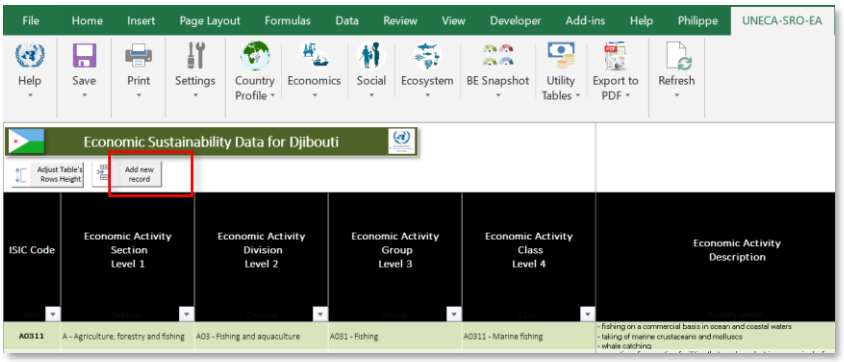


Once the "*input data*" option has been selected and the Economic Data worksheet is active, the "*input data*" option is greyed out and additional options are available which are intended for the user to manipulate the records. i.e., insert, add, delete, data reset or to fit the row height to the text displayed in a specific record (i.e., table row) as shown in the various menu screenshots below. In order to use any of the options to manipulate the table records or rows, the cursor must be positioned anywhere on the table otherwise clicking any of the options will have no effect whatsoever.

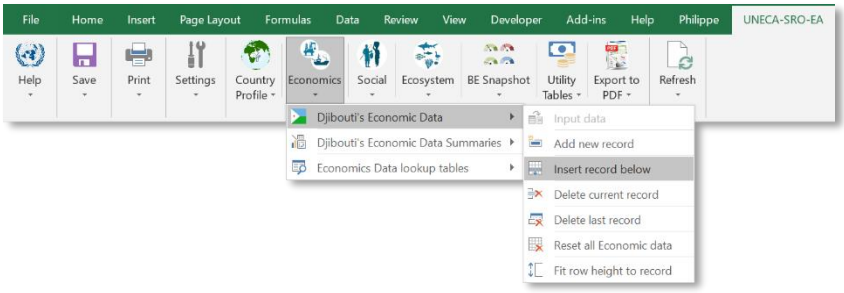
The "*Add new record*" option will add a row below the last record of the table so that the user can enter data in a new record, i.e., table row. If the table is empty this option will add a second empty row to the table.



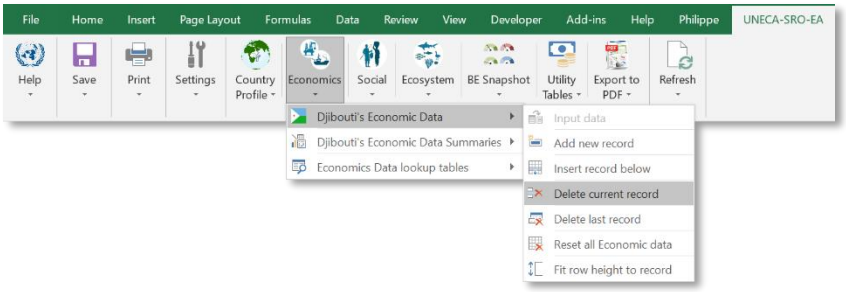
Alternatively, to add a record, the user can click on the button above the table to the left and labelled "*Add new record*" as shown on the screenshot below (inside the red outline).



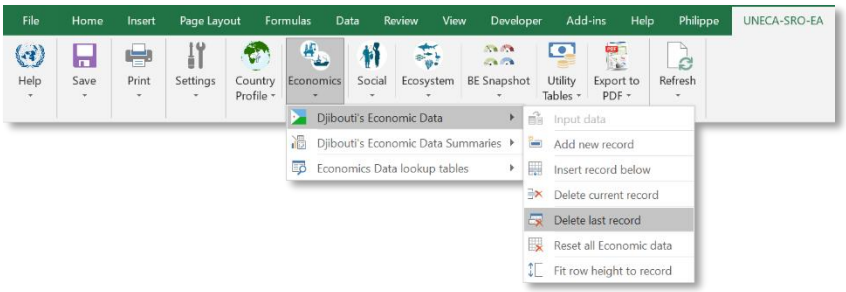
Once the Economic data table is being populated, the user might want to insert a record somewhere between 2 existing records (or rows) in which case the "*insert record below*" option will do just that. To do so, the user must click anywhere along the table row just above the position where the new record is to be inserted. When the table has only 1 record (empty or not), inserting or adding a record has the same effect.



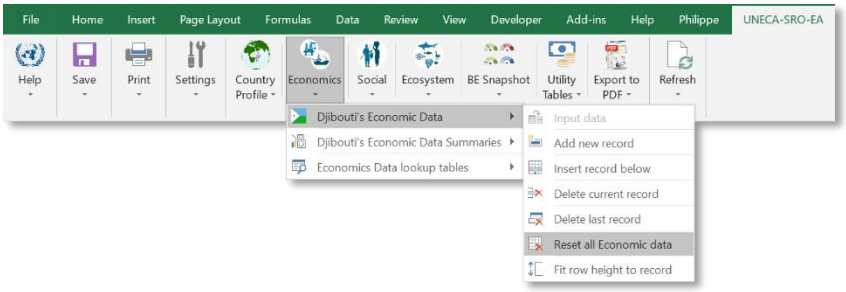
If a record has been entered by mistake, duplicated, etc…the user may want to delete that record (i.e., table row) by clicking anywhere on that record (i.e., along that table's row) then click on the option "*Delete current record*".



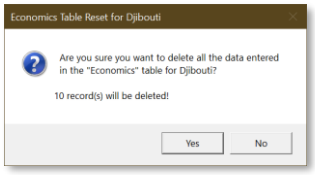
There is an option to "*Delete the last record*" in case, for example, the user inadvertently added a last row to the table using the add or insert record option. In this case the active cell does not need to be on the last table row but anywhere on the table itself.



Sometime, the table might come populated with data which need to be removed, in which case the user can use the "*Reset all Economic data*". This will delete all the row and keep only on empty row at the beginning of the table.

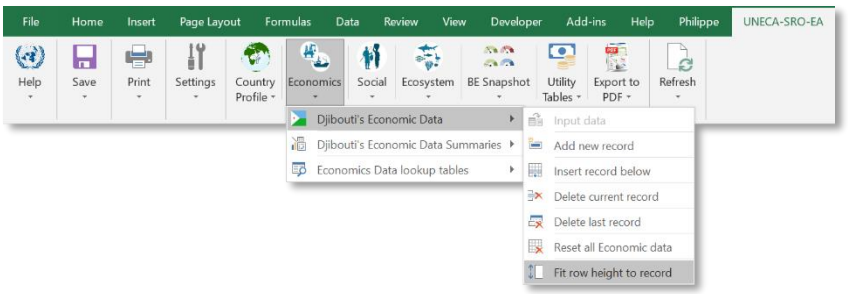


A warning dialog box will pop up to ask the user for confirmation before deleting the records in the entire table as show below.



Finally, with the last option "*Fit row height to record*", the user can fit the height of <u>All</u> the table rows to fit the content with the longest text within each record in the table

(i.e., along each table's row). This operation will work even if no records are selected in the table.



There is a button to the left side above the table to adjust the current record row height to match the content as well as shown below (inside the red outline).

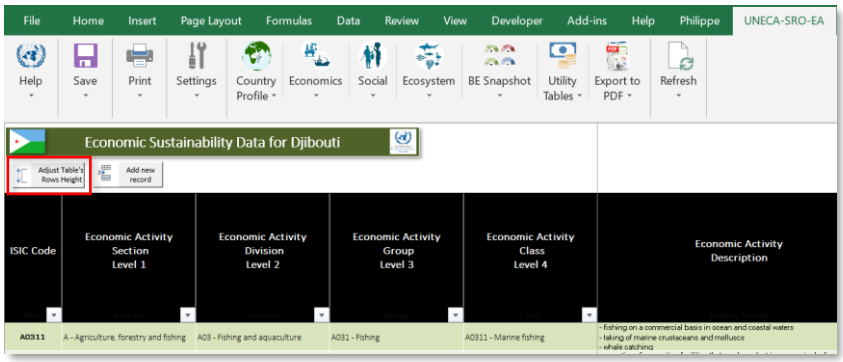


Figure 2-9 below summarises the step-by-step procedure to follow when entering an economic activity in the Economic table following the ISIC classification.

Following each level of the classification, from 1 (Section) to 4 (Class) in that order, the user select the item from the relevant level's data validation drop-down list which is accessible once the cell corresponding to the level is selected i.e., the record's cell under level 1 will show the data validation drop-down list corresponding to the Level 1 of the nested nomenclature, the record's cell under level 4 will show the data validation drop-down list corresponding to the Level 4 of the nested nomenclature conditional of the items selected in Levels 1, 2 and 3. As a consequence, the data corresponding to each level can only be entered sequentially since the content of each level's data validation drop-down list depends on the previous level following the stream for that branch starting with level 1. In other words, each level's data validation drop-down list is conditional on the item(s) selected from the previous level(s)' data validation drop-down list to preserve the logical levels' stream following the ISIC nomenclature. If all classification's levels have been populated with items from their corresponding data validation drop-down list, only the current item will be available in the drop-down list,

except for the data validation drop-down list of level 4 which will show all available items in that list conditional of items selected at the Levels 1, 2 and 3.

Note that, for any of the 4 classification's levels, the user may at any time override the data validation rules by typing/ entering own data instead of selecting any item from the drop-down list. In that case, the nested logic of the pre-defined levels stream will be broken which means that any subsequent level's entry will have to be typed manually as well since the toolkit won't be able to generate any meaningful item in the data validation drop-down list that is conditional to the user's defined values in the previous level(s). This can be particularly handy when there is no data available in the active country which follows the pre-defined international nomenclature such as ISIC but the official statistics follow a different classification scheme specific to the country and/ or recorded at different levels of aggregation/ details.

Most table's cell requiring an input from the user shows a "screentip" when hoovered over to indicate the kind of data expected and whether the value can be selected from a drop-down list or not. Even if a drop-down list is available, the user can overwrite the default or pre-fetched values with his/ her own. For example, Figure 2-9 below shows the screentips (in light yellow) appearing when the user hoovers over any of the level, Section, Division, Group or Class and examples of the corresponding data validation drop-down lists are shown just below.

Except for the last level of the nested classification (here level 4 or Class), if the user wishes to select a different item from the data validation drop-down list, it can only be done if the value(s) or drop-down's list item(s) of the subsequent levels are first cleared in ordered to release the conditionality imposed by those lower levels' items. In other words, if the user wants to change the item selected from the data-validation drop-down list of level 2 and have access to all the available items conditional of the previous level, any item selected/ entered in level 3 and 4 must first be cleared.

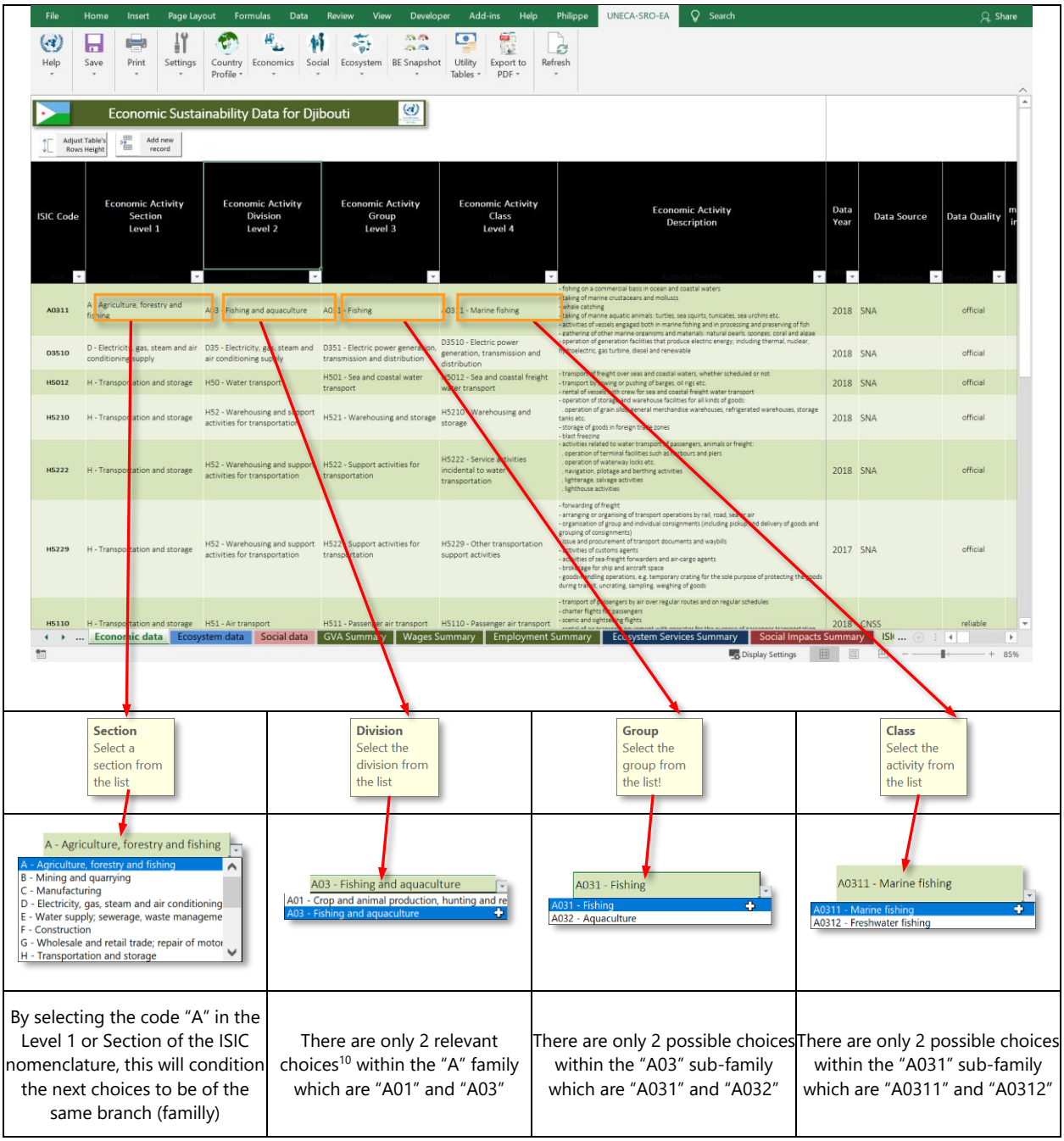


Figure 2-9: Economic activity's possible levels of details

Details from level 1 (section) to level 4 (class) following ISIC rev. 4 nomenclature

Note that because each drop-down list is conditionally generated once the previous item has been selected from their own list, depending on the machine, this process may

[10] The A02 code is not listed in that drop-down list because it is flagged as non-BE relevant in the nomenclature lookup table and therefore was not considered

slow down the navigation between cells where the cells' data-validation is linked to a conditional drop-down list.

There are other data validation schemes not necessarily depending on selecting an item from a drop-down list. There are few errors trapping checks on cells requiring input from the user. For example, if the user enters a value outside the scope of what is expected, a warning dialog window will pop up indicating the invalid entry as shown in the screenshot below.

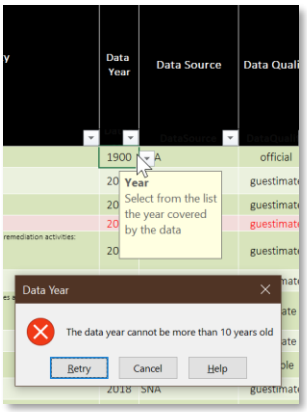


Figure 2-10: Message appearing during error trapping

This message appears after the user overruled the data-validation drop-down list and entered manually a year outside of the predefined scope which only takes into account the last 10 years plus the current year.

Note that any other cells (labels, headers, description, formulae) are protected by default from being inadvertently changed by the user[11].

Table 2-1 to Table 2-4 below shows the progression of selecting an economic activity starting by the Section then Division, Group and Class following the arborescent of the nested list from the ISIC rev. 4 nomenclature.

[11] Although at any time, the user may unprotect any worksheet without a password this is not recommended and should only be done in specific cases and only if the user is very comfortable working with MS Excel.

Table 2-1: Selecting an item from the “Section” level or level 1 of the Economic Activity

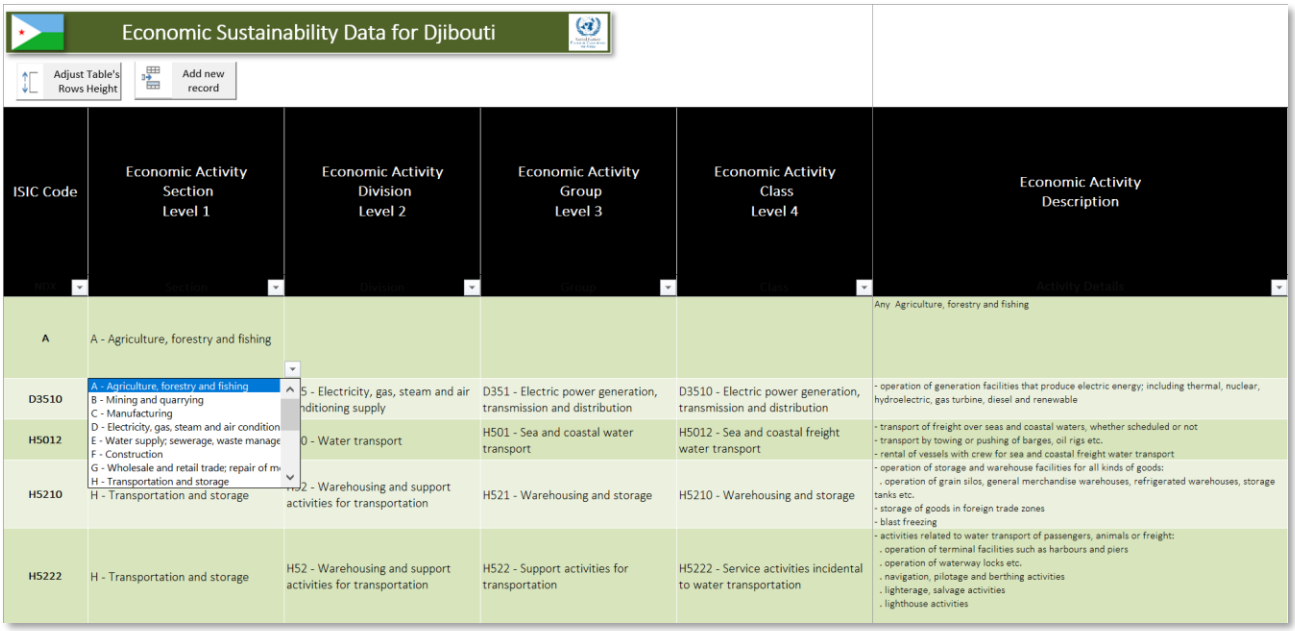


Table 2-2: Selecting an item from the “Division” level or level 2 of the Economic Activity

The available choices are conditional of the item selected in the previous level (i.e. the Section level or level 1 in this case).

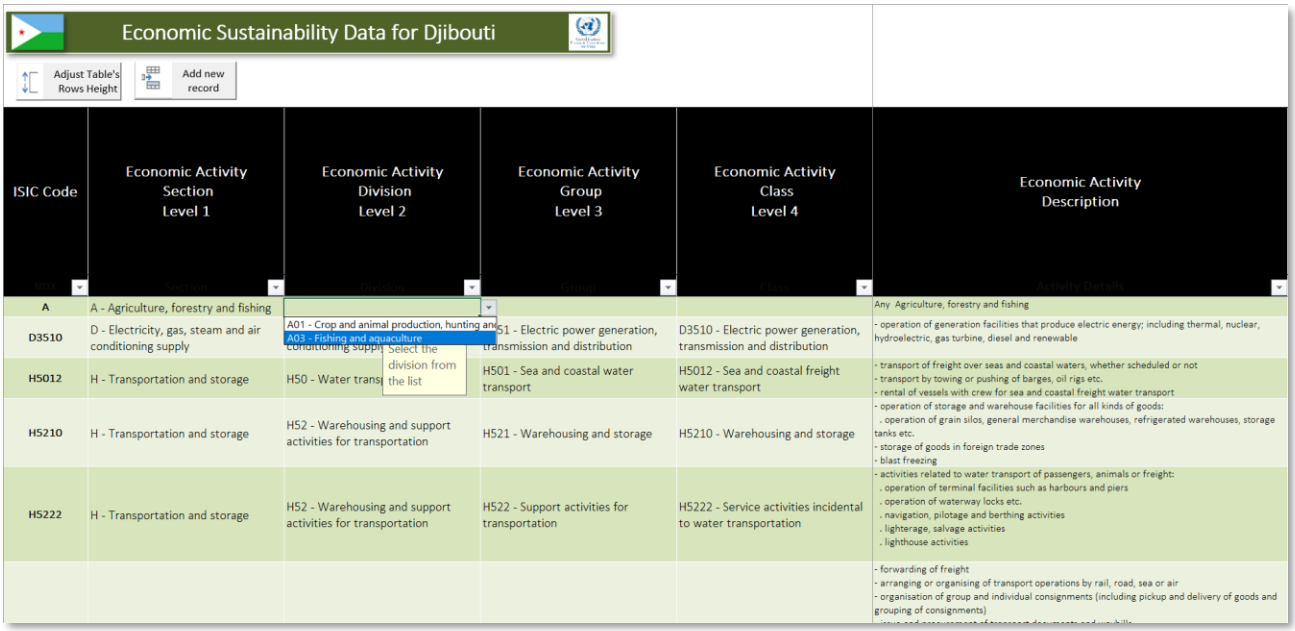


Table 2-3: Selecting an item from the "Group" level or level 3 of the Economic Activity

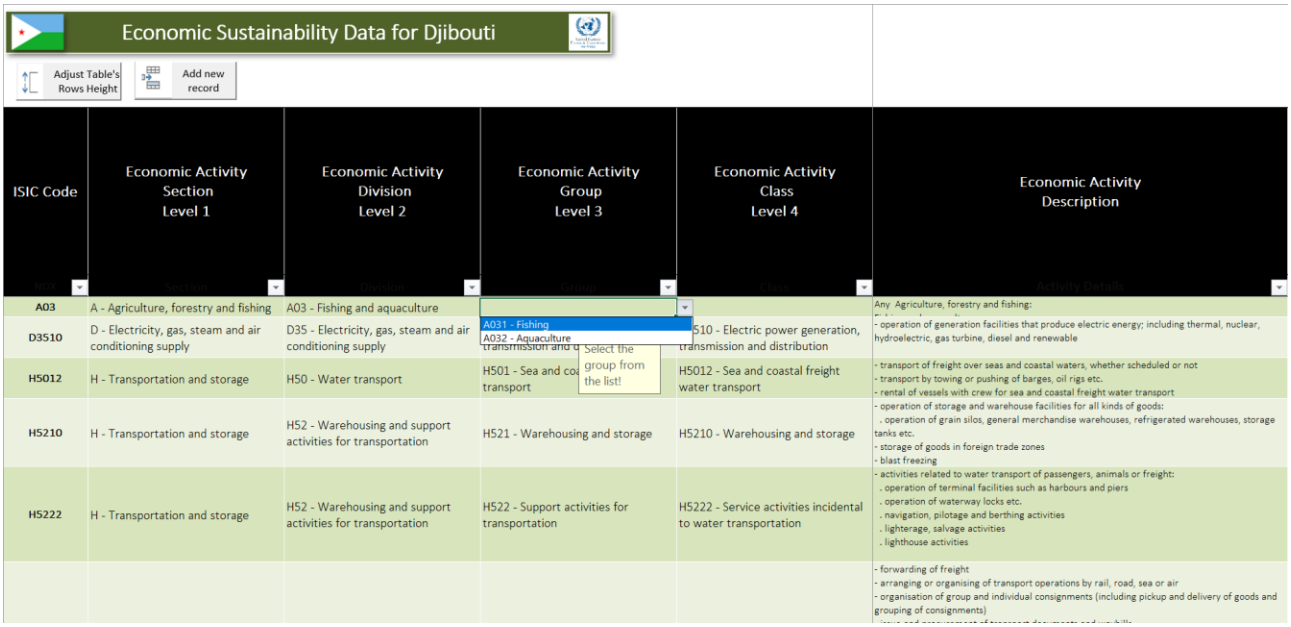
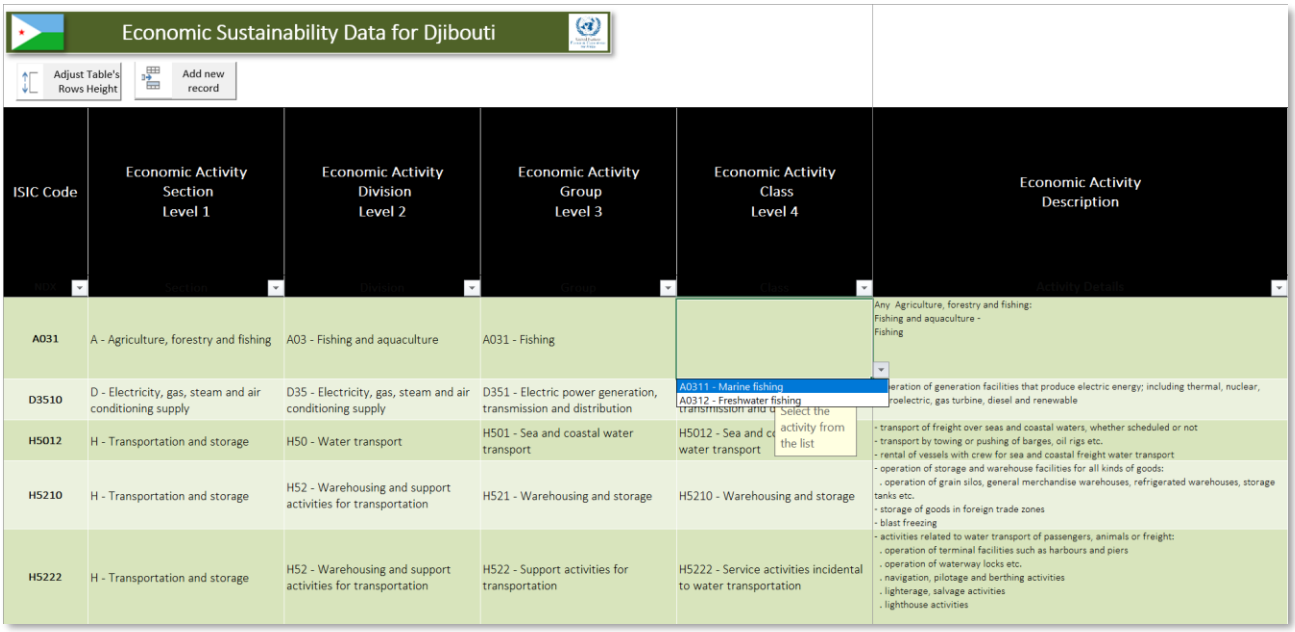


Table 2-4: Selecting an item from the "Class" level or level 4 of the Economic Activity

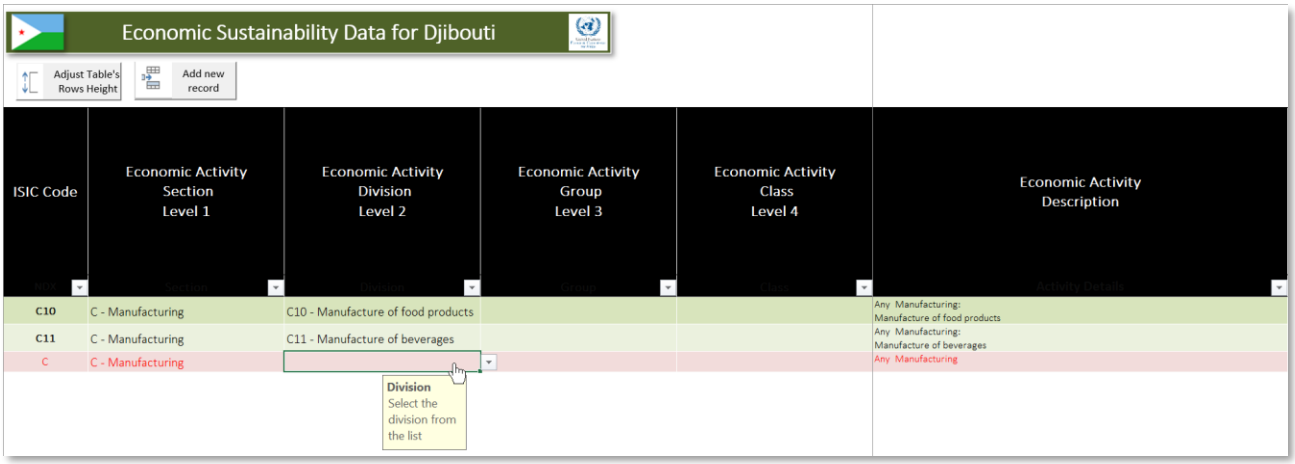


Although in this case, the classification allows for recording any economic activity at up to the 4th level, the user may enter the activity at one, two, three or four levels of details (i.e. level 1 only, levels 1 and 2 only, levels 1, 2 and 3 only or levels 1, 2, 3 and 4). As soon as an activity (record) has been entered in the table, it is check against the other records in that table to ensure that no overlapping classification stream has been

already entered. If an activity has been duplicated in the table or if for example, an activity has already been entered up to level 3 (i.e., with details in the levels 1, 2 and 3) and with the code "A031" and a new record is entered at up to level 2 (i.e., with details in the levels 1 and 2 only) and with the code "A03" which includes in the aggregation under the level 3 classification the codes "A031", this might be a typical case of double counting which will be in any case automatically flagged by highlighting the corresponding row with a pink background and red text until if necessary, it is corrected or deleted (see example below). (see example in Table 2-5).

Table 2-5: Screen's clue warning for possible duplication

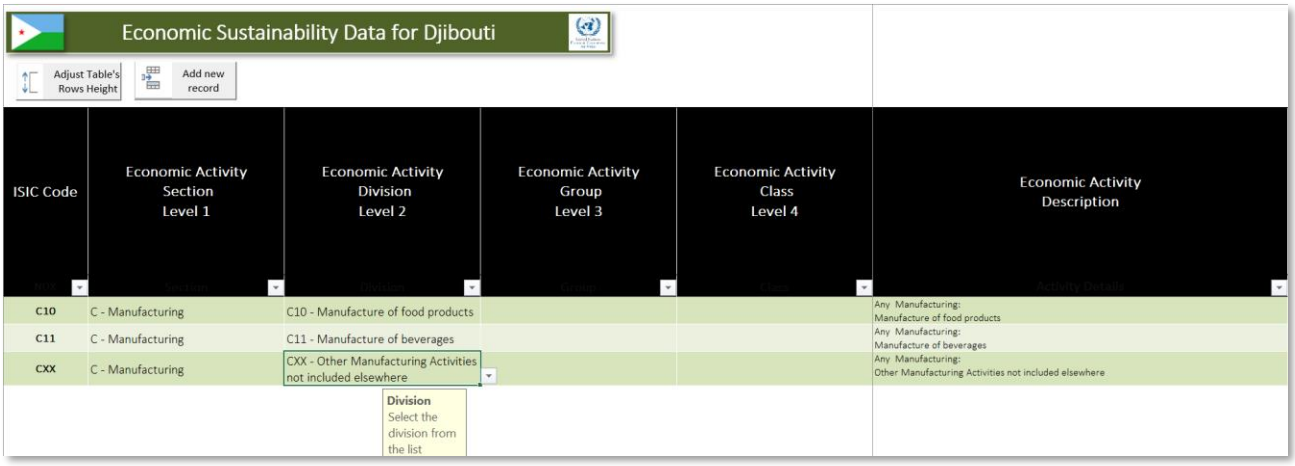
The pink highlight indicates for the user that a data row might have been duplicated or an economic activity indirectly double counted. In this case only the activity with the ISIC code "C" (i.e. level 1) is highlighted because two more activities from the same section (i.e. level 1) have already been recorded at a highest level of details (up to Level 2).



In Table 2-5 above, the flagging issue could also well be a false positive because under ISIC code "C", the user only associated 20% of the Manufacturing activity to BE, another portion being accounted for under ISIC codes C10 and C11 which is more specific (i.e., higher level of details), everything else left under the code "C" is what was unaccounted for under "C10" and "C11" but yet relevant to the BE economic contribution. Rather than inputting a %age to a higher classification level (here "C"), the user may create own level 2 classification item to record items not included in "C10" and "C11".: for example, enter manually the user-defined Level 2 classification "CXX – Other Manufacturing Activities not included elsewhere" as shown in Table 2-6.

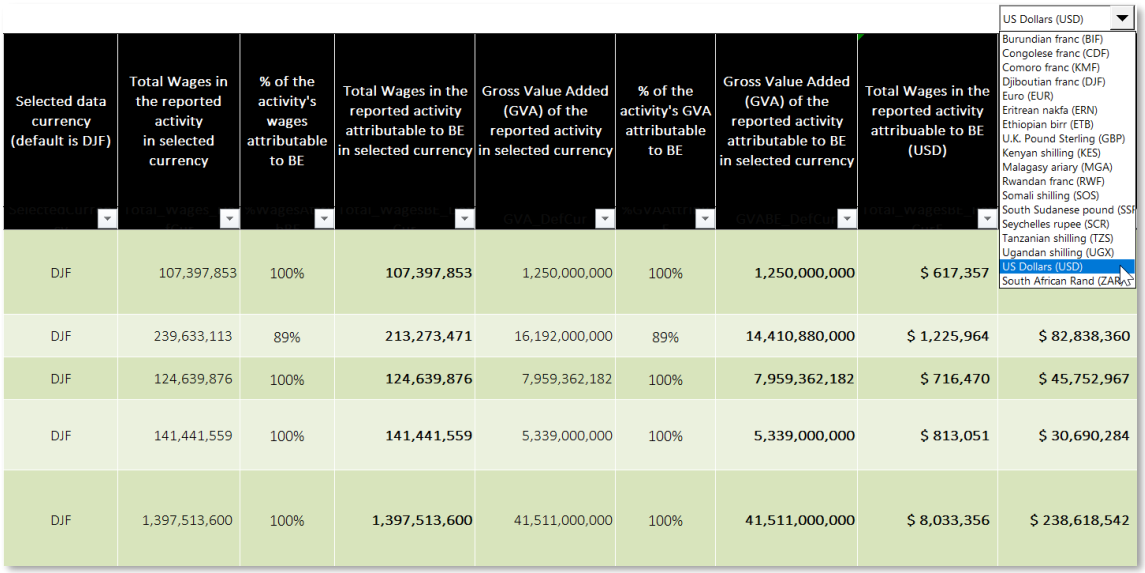
Table 2-6: Example of user-defined entry overriding the rule of selecting from drop-down list.

User-defined entry overrides the rule of selecting an item from the data validation drop-down list. Despite the screen tip indicating otherwise, the economic activity can be entered manually bypassing the data validation rule, although it is not recommended when a proper ISIC code exists for the activity in question.



Once the economic activity has been entered/ defined, the user enters the **data year**, **data source**, **data quality** and **% of the activity attributable to the Blue Economy**. Then if the data is available, the users enters the **number of males and females employed** in the reported activity, and/ or the **total employment** in the reported activity (if the number of males and females are known and have been entered, the user can press the button labelled "*calculate*" to populate automatically the total number employed. ; the number of males, females and the total employment in the reported activity attributable to BE are calculated based on the % of the activity attributable to the Blue Economy.

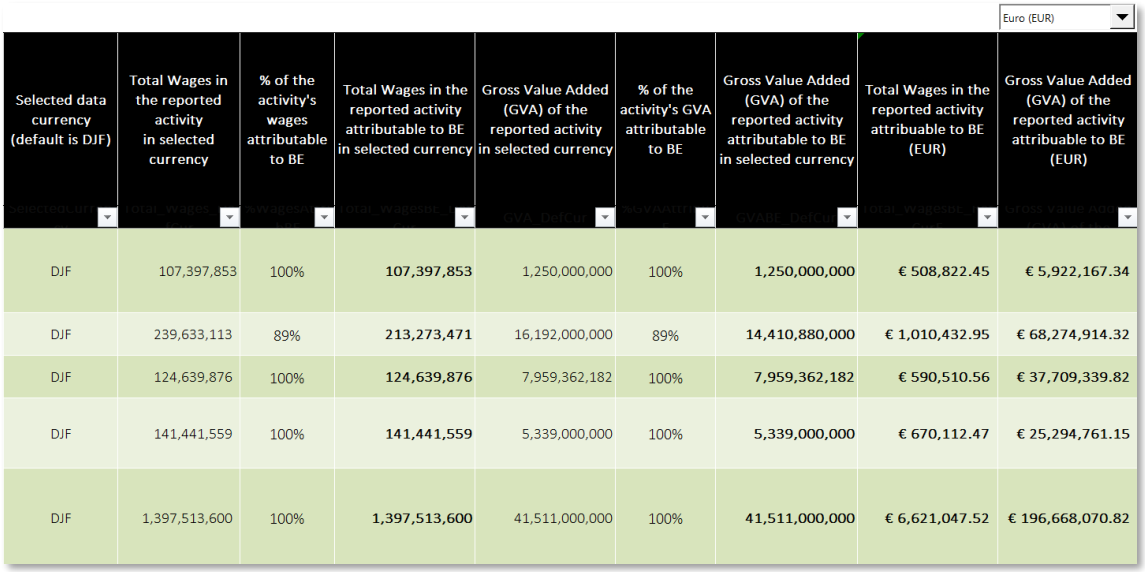
The monetary values entered by the user will be expressed in the "*selected currency*" which will be automatically converted and expressed as well in the "*reference currency*" based on the user selection in the "country profile" worksheet. The user may also "on the fly" override the existing "*reference currency*" by replacing it with a new one from the drop-down list situated at the top right end of the Economic data table (Figure 2-11). Once selected, the new "*reference currency*" will be stored in the "Country Profile" Worksheet.



Selected data currency (default is DJF)	Total Wages in the reported activity in selected currency	% of the activity's wages attributable to BE	Total Wages in the reported activity attributable to BE in selected currency	Gross Value Added (GVA) of the reported activity in selected currency	% of the activity's GVA attributable to BE	Gross Value Added (GVA) of the reported activity attributable to BE in selected currency	Total Wages in the reported activity attribuable to BE (USD)	US Dollars (USD)
DJF	107,397,853	100%	107,397,853	1,250,000,000	100%	1,250,000,000	$ 617,357	$ 82,838,360
DJF	239,633,113	89%	213,273,471	16,192,000,000	89%	14,410,880,000	$ 1,225,964	$ 45,752,967
DJF	124,639,876	100%	124,639,876	7,959,362,182	100%	7,959,362,182	$ 716,470	$ 30,690,284
DJF	141,441,559	100%	141,441,559	5,339,000,000	100%	5,339,000,000	$ 813,051	$ 238,618,542
DJF	1,397,513,600	100%	1,397,513,600	41,511,000,000	100%	41,511,000,000	$ 8,033,356	

Burundian franc (BIF)
Congolese franc (CDF)
Comoro franc (KMF)
Djiboutian franc (DJF)
Euro (EUR)
Eritrean nakfa (ERN)
Ethiopian birr (ETB)
U.K. Pound Sterling (GBP)
Kenyan shilling (KES)
Malagasy ariary (MGA)
Rwandan franc (RWF)
Somali shilling (SOS)
South Sudanese pound (SSP)
Seychelles rupee (SCR)
Tanzanian shilling (TZS)
Ugandan shilling (UGX)
US Dollars (USD)
South African Rand (ZAR)

Figure 2-11: "On the fly" selection of reference currency at end of the Economic Data Table



Selected data currency (default is DJF)	Total Wages in the reported activity in selected currency	% of the activity's wages attributable to BE	Total Wages in the reported activity attributable to BE in selected currency	Gross Value Added (GVA) of the reported activity in selected currency	% of the activity's GVA attributable to BE	Gross Value Added (GVA) of the reported activity attributable to BE in selected currency	Total Wages in the reported activity attribuable to BE (EUR)	Gross Value Added (GVA) of the reported activity attribuable to BE (EUR)	Euro (EUR)
DJF	107,397,853	100%	107,397,853	1,250,000,000	100%	1,250,000,000	€ 508,822.45	€ 5,922,167.34	
DJF	239,633,113	89%	213,273,471	16,192,000,000	89%	14,410,880,000	€ 1,010,432.95	€ 68,274,914.32	
DJF	124,639,876	100%	124,639,876	7,959,362,182	100%	7,959,362,182	€ 590,510.56	€ 37,709,339.82	
DJF	141,441,559	100%	141,441,559	5,339,000,000	100%	5,339,000,000	€ 670,112.47	€ 25,294,761.15	
DJF	1,397,513,600	100%	1,397,513,600	41,511,000,000	100%	41,511,000,000	€ 6,621,047.52	€ 196,668,070.82	

Figure 2-12: New calculation after "on the fly" selection of euro as the reference currency

The user enters the total Wages in the reported activity and the gross value added (GVA) of the reported activity expressed in the selected currency (the country national currency by default).

Table 2-7: Economic data populated with employment, wages and GVA data for activities

Economic Sustainability Data for Djibouti

Adjust Table's Rows Height | Add new record

US Dollars (USD)

ISIC Code	Economic Activity Section Level 1	Economic Activity Division Level 2	Economic Activity Group Level 3	Economic Activity Class Level 4	% of the activity's employment attributable to BE	Total employment in the reported activity attributable to BL	Selected data currency (default is DJF)	Total Wages in the reported activity in selected currency	% of the activity's wages attributable to BE	Total Wages in the reported activity attributable to BE in selected currency	Gross Value Added (GVA) of the reported activity in selected currency	% of the activity's GVA attributable to BL	Gross Value Added (GVA) of the reported activity attributable to BL in selected currency	Total Wages in the reported activity attributable to BE (USD)	Gross Value Added (GVA) of the reported activity attributable to BE (USD)
H5012	H - Transportation and storage	H50 - Water transport	H501 - Sea and coastal water transport	H5012 - Sea and coastal freight water transport	100%	335	DJF	124,639,876	100%	124,639,876	7,959,362,182	100%	7,959,362,182	$ 716,470	$ 45,752,967
H5210	H - Transportation and storage	H52 - Warehousing and support activities for transportation	H521 - Warehousing and storage	H5210 - Warehousing and storage	100%	716	DJF	141,441,559	100%	141,441,559	5,339,000,000	100%	5,339,000,000	$ 813,051	$ 30,690,284
H5222	H - Transportation and storage	H52 - Warehousing and support activities for transportation	H522 - Support activities for transportation	H5222 - Service activities incidental to water transportation	100%	6,528	DJF	1,397,513,600	100%	1,397,513,600	41,511,000,000	100%	41,511,000,000	$ 8,033,356	$ 238,618,542
H5229	H - Transportation and storage	H52 - Warehousing and support activities for transportation	H522 - Support activities for transportation	H5229 - Other transportation support activities	100%	4,193	DJF				24,707,767,158	100%	24,707,767,158		$ 143,033,446
H5110	H - Transportation and storage	H51 - Air transport	H511 - Passenger air transport	H5110 - Passenger air transport	47%	487	DJF	228,968,461	47%	107,615,177				$ 618,607	
I5510	I - Accommodation and food service activities	I55 Accommodation	I551 - Short term accommodation activities	I5510 - Short term accommodation activities	100%	2,522	DJF	340,463,738	100%	340,463,738	2,723,400,000	100%	2,723,400,000	$ 1,957,095	$ 15,654,977

The monetary data in the last two columns of the Economic data table are the data entered by the user converted and expressed in the currency of reference (default is USD).

Note that any value expressed in monetary terms is also corrected by a user-selected deflator[12] adjusted by the difference between the data year and a user-selected reference year; the deflator and reference year are selected by the user in the "country profile" worksheet.

Active Country's Economic Data Summary sub-menu

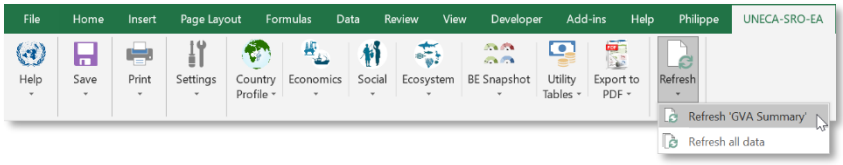
The tool currently provides three types of summaries associated with BE:

1. A GVA data summary
2. A wages data summary
3. An employment data summary

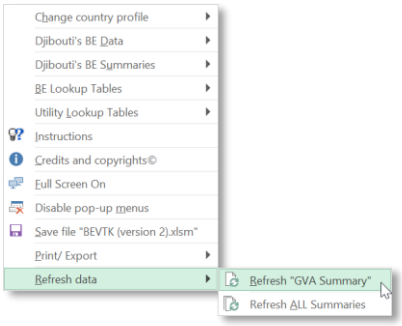
These summaries are accessible through the **Economics** sub-menu of the **BEVTK menu Tab**.

[12] See Table 3-23 in section 3.3 for the countries deflator's lookup table.

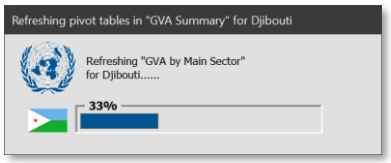
The summaries are built on pivot tables and pivot charts linked to the Economic data worksheet and although it is automatically and dynamically generated, it is important to refresh the summaries each time new records have been entered or modified in the data worksheet, either by refreshing the active summary (when active) or refreshing all the data in the toolkit using the **Refresh** Sub-menu options from the **BEVTK Menu Tab** (see below)



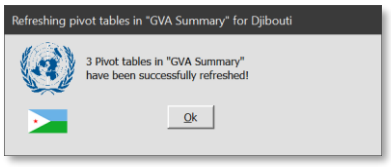
or alternatively, the user may choose to run the equivalent refresh options from the **BEVTK pop-up menu** with two options similarly to the refresh sub-menu's options from the **BEVTK Menu Tab** (see below).



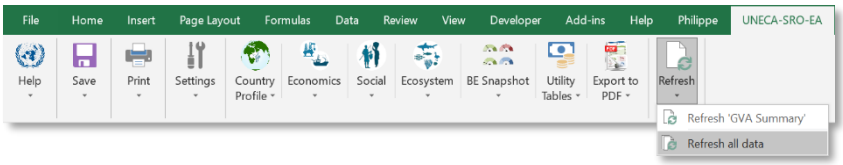
Soon after selecting to refresh the active worksheet, the refresh process starts with a progress bar similar to the one shown below



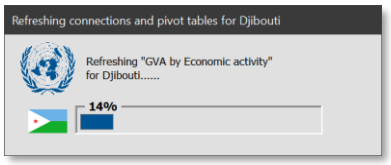
and once the relevant pivot tables and charts have been updated, ends with the message similar to the one shown below.



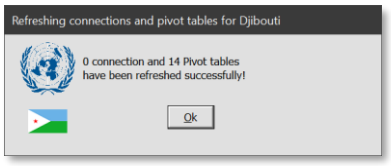
Alternatively, the user may choose to refresh all summaries pivot tables and graphs at once by selecting the option "*Refresh all data*" (see below).



The refresh process will start with a progress bar similar to the one shown below



and once the tables and charts have been updated, ends with the message similar to the one shown below.



The following is a non-exhaustive list of actions a user can do while accessing any of the economic summaries:

- browse through the pivot tables and pivot charts
- convert the summary data in any currency from the pre-defined list of reference currencies
- Select specific data years to be displayed
- Filter the data
- Manipulate the tables and graphs' formatting and layout[13]

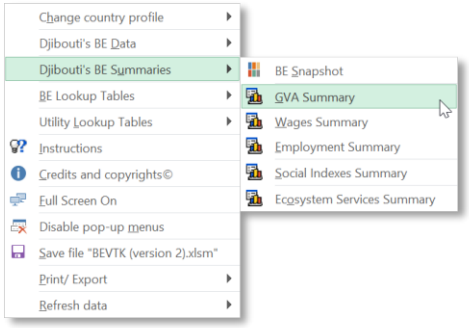
The next three sections present the summary pivot tables and charts automatically generated by **BEVTK** once the data have been entered in the Economic data table and the summaries have been properly refreshed.

[13] Only once the sheet has been unprotected

(i) GVA Summary

The "*GVA Summary*" option can be accessed through the **Economics** Sub-Menu on the **BEVTK Menu Tab** (see below)

or by selecting the *GVA Summary* option from the **BEVTK pop-up menu** as shown below.



The *GVA Summary* is composed of 2 Pivot tables and 2 pivot charts. To navigate or to filter data inside pivot tables or charts the user should follow the standard Excel protocol regarding these features.

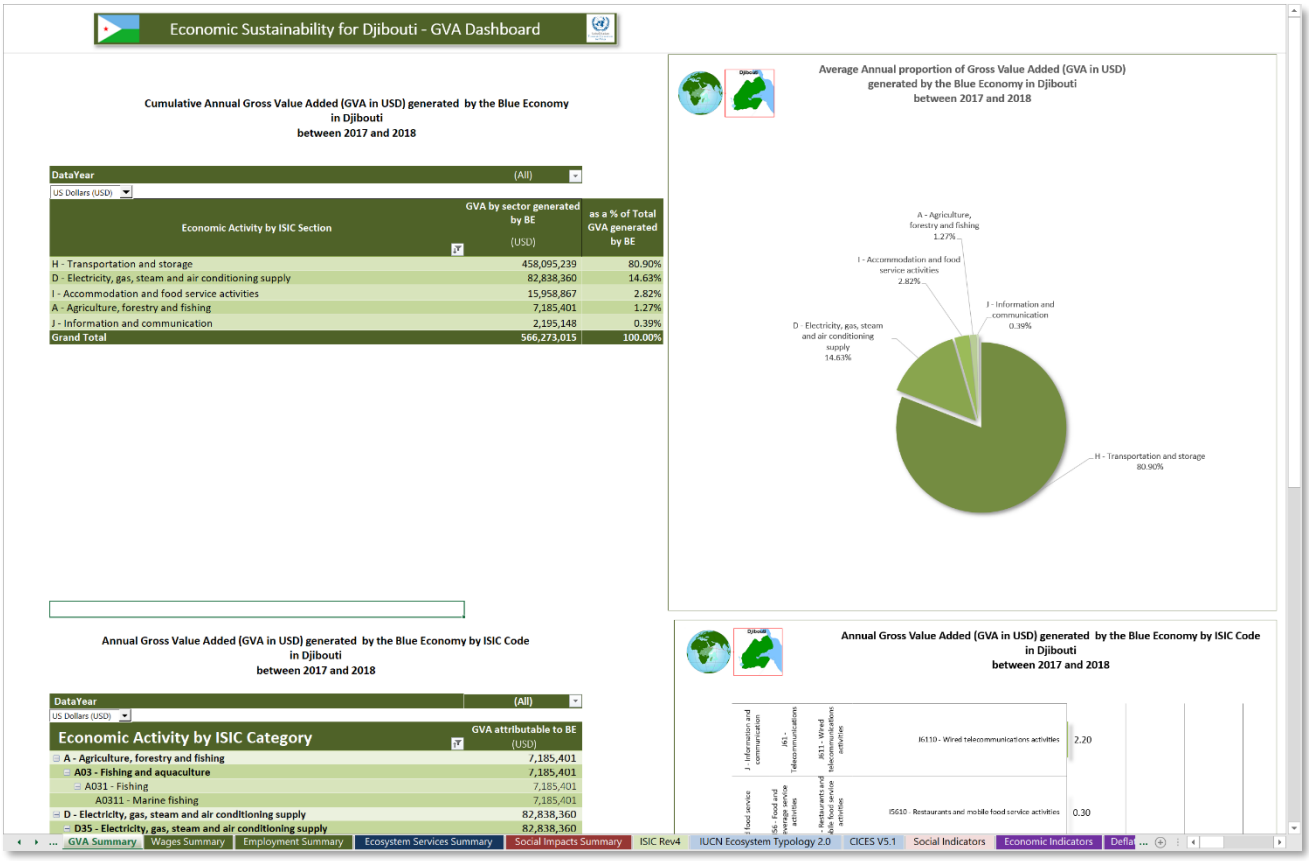
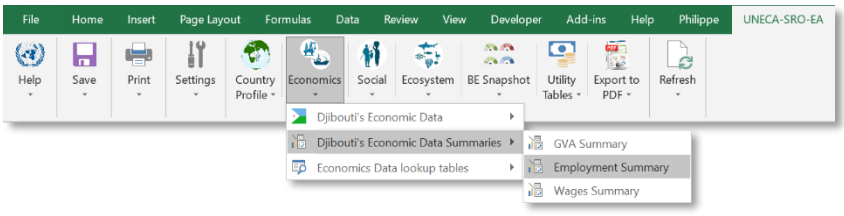


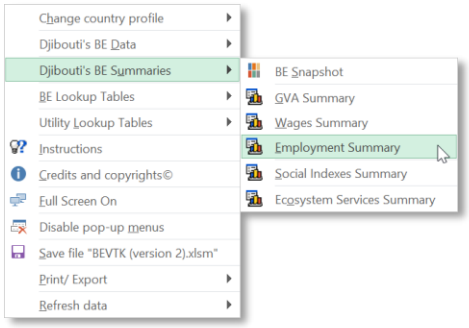
Figure 2-13: Screenshot of BEVTK's Summary sheet showing GVA associated with BE

(ii) Employment Summary

The "*Employment Summary*" option can be accessed through the **Economics** Sub-Menu on the **BEVTK Menu Tab** (see below)



or by selecting the *Employment Summary* option from the **BEVTK pop-up menu** as shown below.



The *Employment Summary* is composed of 2 Pivot tables and 2 pivot charts. To navigate or to filter data inside pivot tables or Pivot charts the user should follow the standard Excel protocol regarding these features.

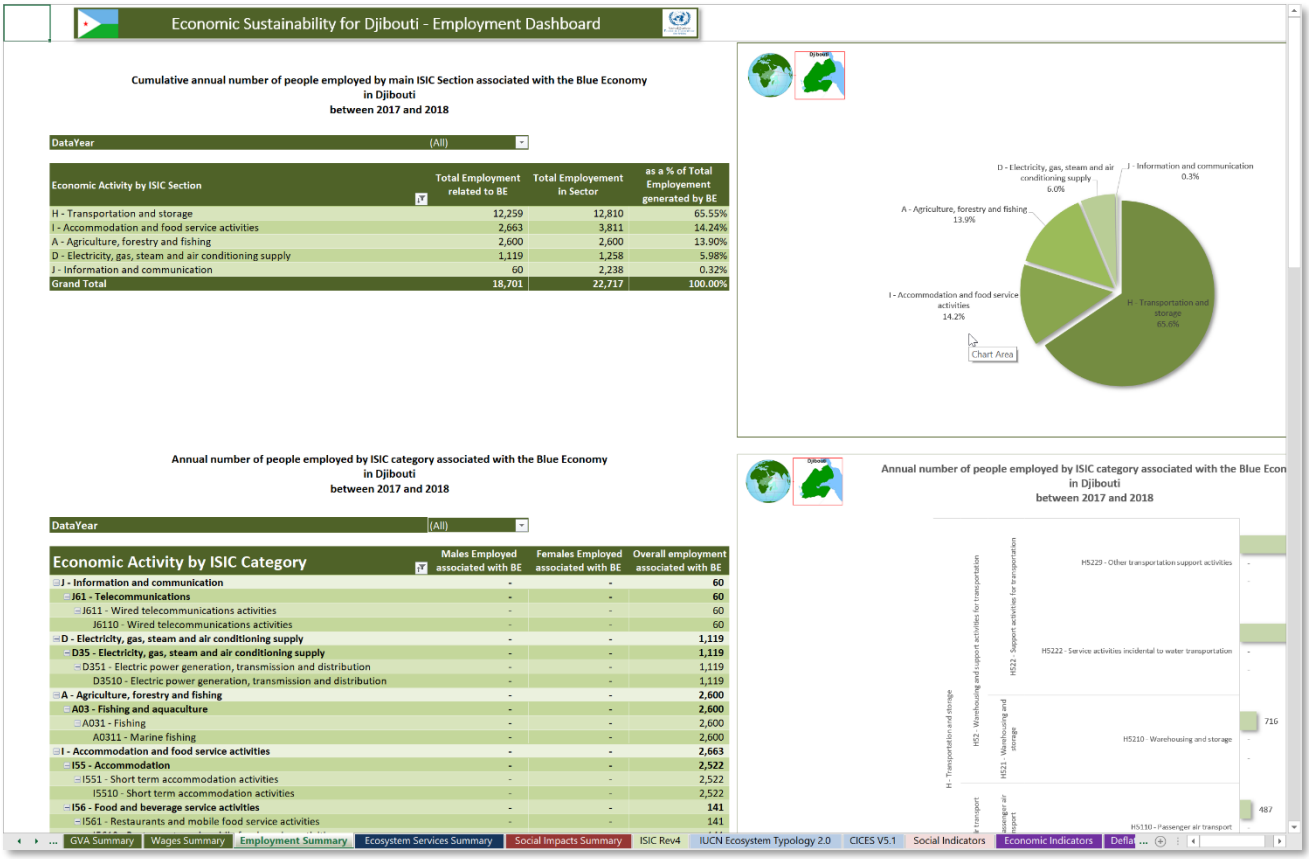
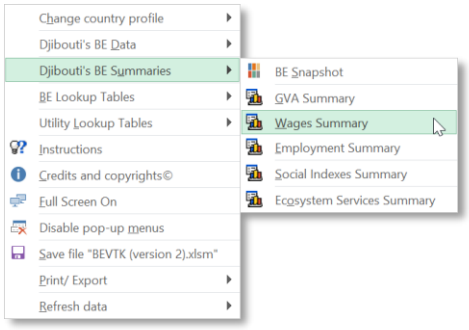


Figure 2-14: Screenshot of BEVTK's Summary sheet showing employment associated with BE.

(iii) Wages Summary

The "*Wages Summary*" option can be accessed through the **Economics** Sub-Menu on the **BEVTK Menu Tab** (see below)

or by selecting the *Wages Summary* option from the **BEVTK pop-up menu** as shown below.



The *Wages Summary* is composed of 2 Pivot tables and 2 pivot charts. To navigate or the filter data inside pivot tables or Pivot charts the user should follow the standard Excel protocol regarding these features.

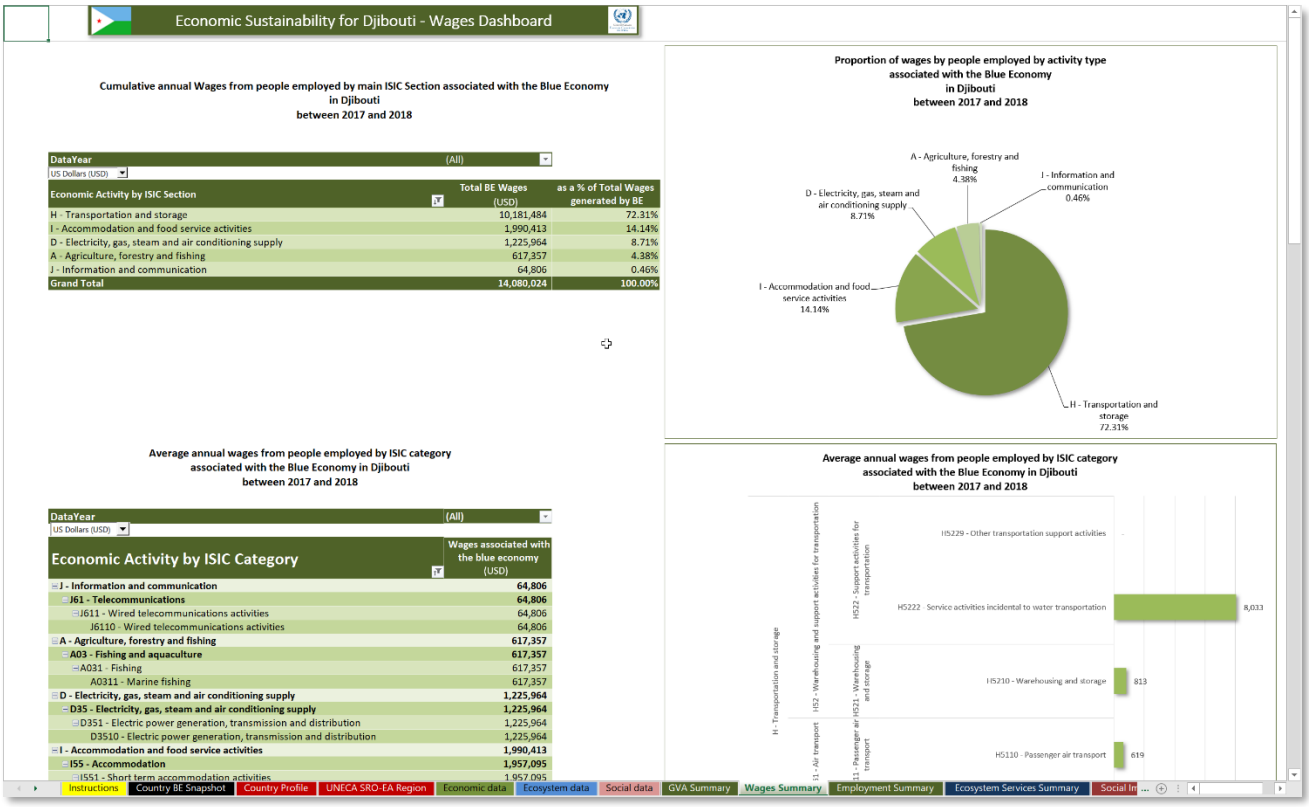
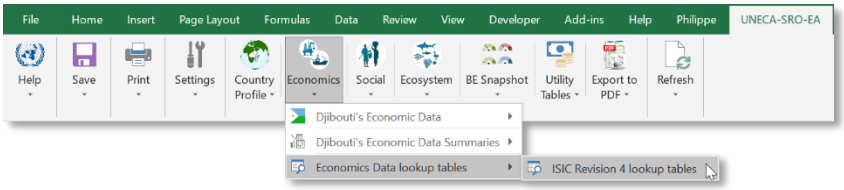


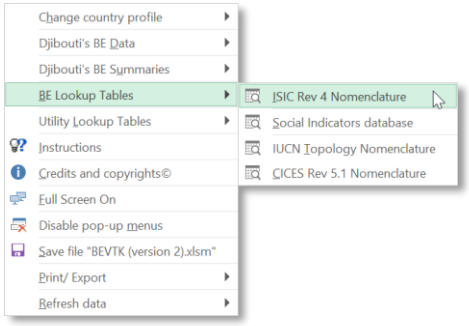
Figure 2-15: Screenshot of BEVTK's Summary sheet showing wages associated with BE.

Economic Data Lookup Tables sub-menu

The toolkit comes with the ISIC Rev. 4 nomenclature which can be accessed through the "*Economics data lookup table*" option from the **Economics** Submenu of the **BEVTK Menu Tab** (see below)



or by selecting the "*ISIC Rev 4 Nomenclature*" option from the **BEVTK pop-up menu** as shown below.



Once the ISIC Rev 4 worksheet is the activate sheet, the user may, for example, modify the Booleans indicating whether or not, a specific classification of any level should be included in the data validation drop-down list based on the country situation (i.e., coastal, island or landlocked).

In the example below, the user can change whether or not to include "Marine aquaculture" as part of the list of items available to landlocked countries in the data validation drop-down list, the default being "No".

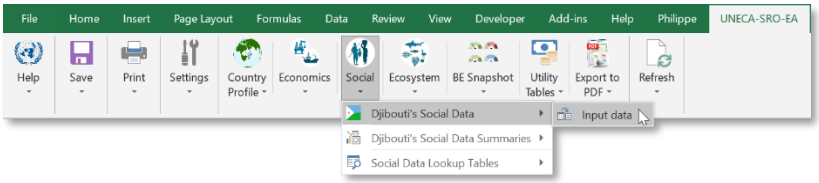
ClassCode	Class	ClassFr	Coastal	Island	Landlocked
A0321	A0321 - Marine aquaculture	A0321 - Aquaculture en mer	Yes	Yes	No
A0322	A0322 - Freshwater aquaculture	A0322 - Aquaculture en eau douce	Yes	Yes	Yes
B0510	B0510 - Mining of hard coal	B0510 - Extraction de houille	No	No	No
B0520	B0520 - Mining of lignite	B0520 - Extraction de lignite	No	No	No
B0610	B0610 - Extraction of crude petroleum	B0610 - Extraction de pétrole brut	No	No	No

2.3.8 *Social sub-menu*

Active Country's Social Data sub-menu

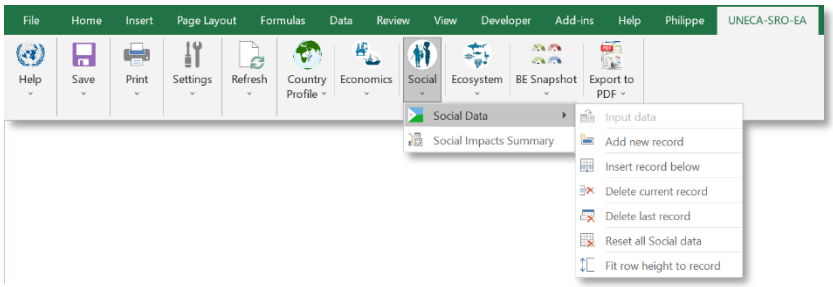
Similar to the economic data entry, this section summarises the step-by-step process to follow when entering data in the Social data worksheet. The error trapping, messages appearing, and menu options used to add, delete and insert records in the table are similar to what was discussed in the Economic Sub-menu section.

If the Social Data worksheet is not yet active, only the *input data* option will be available under the "Active Country's Social data" group as shown in the Screenshot below. This option lets the user access the user defined data table.

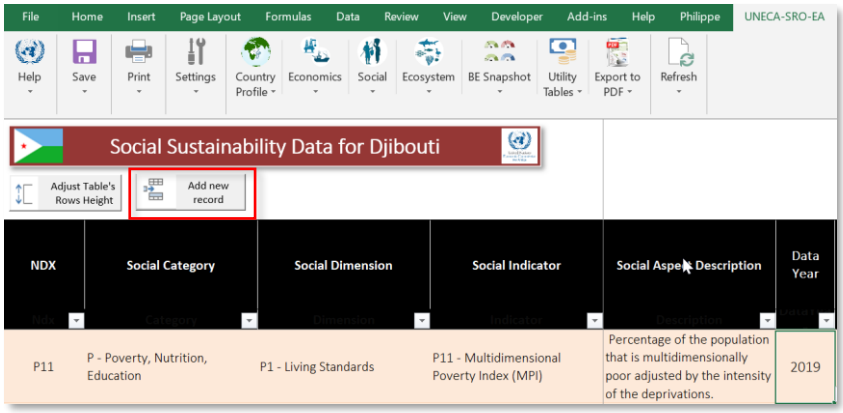


Once the "*input data*" option has been selected and the Social Data worksheet is active, the "*input data*" option is greyed out and additional options are available which are intended for the user to manipulate the records. i.e., insert, add, delete, data reset or to fit the row height to the text displayed in a specific record (i.e., table row) as shown in the various menu screenshots below. In order to use any of the options to manipulate the table records or rows, the cursor must be positioned anywhere on the table otherwise clicking any of the options will have no effect whatsoever.

The "*Add new record*" option will add a row below the last record of the table so that the user can enter data in a new record, i.e., table row. If the table is empty this option will add a second empty row to the table.



Alternatively, to add a record, the user can click on the button above the table to the left and labelled "*Add new record*" as shown on the screenshot below (inside the red outline)



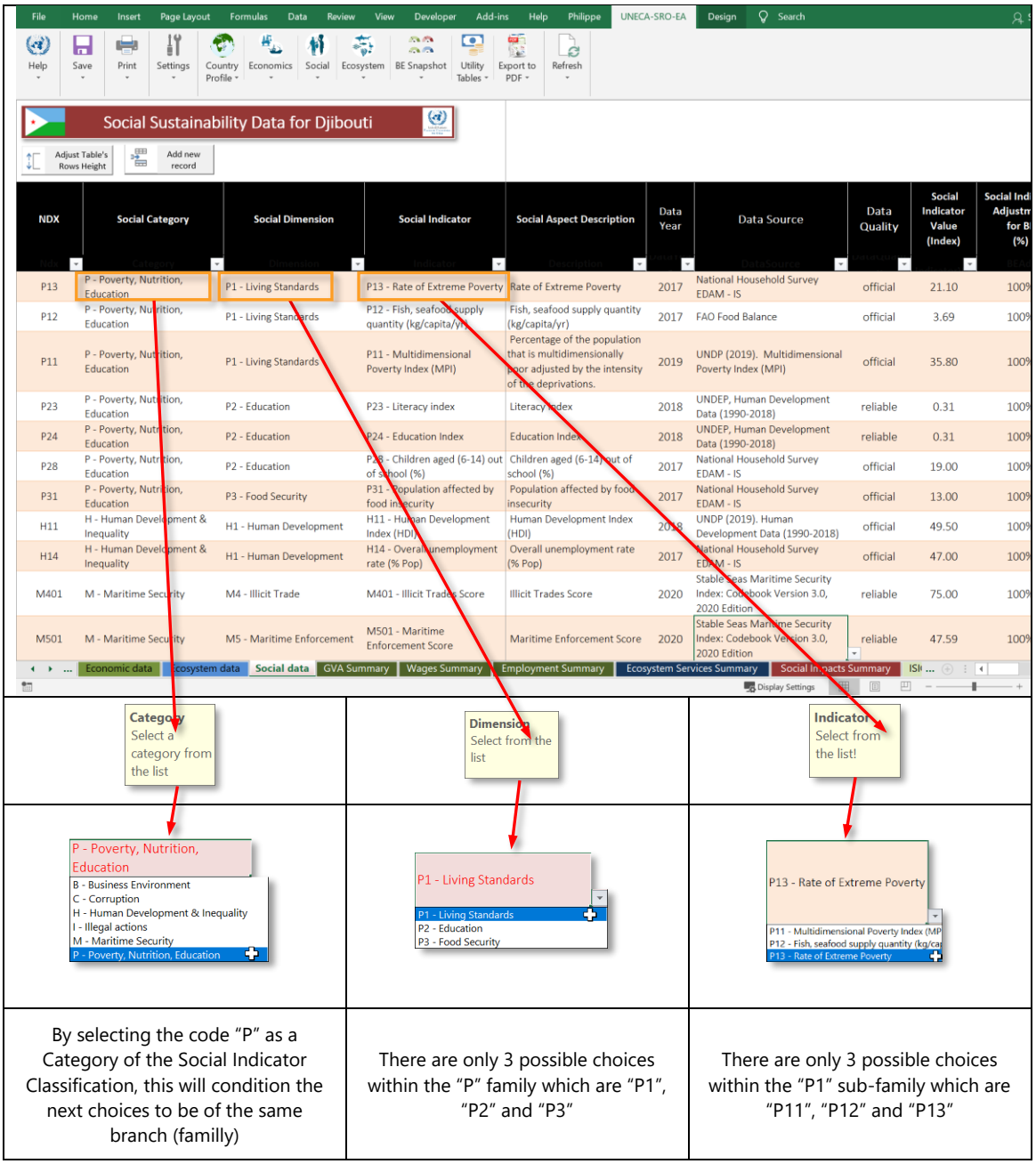
The other options, to insert a record, delete a record, reset all records, fit row height have been covered in the Economic Sub-menu section.

Table 2-8: Social data input table showing the classification system

The classification system used from social category, social dimension to social indicator used and the level of details used to record the social impact of BE.

NDX	Social Category	Social Dimension	Social Indicator	Social Aspect Description	Data Year	Data Source	Data Quality	Social Indicator Value (Index)	Social Indicator Adjustment for BE (%)	Social indicator Gauge for BE	Comments/ Notes
P13	P - Poverty, Nutrition, Education	P1 - Living Standards	P13 - Rate of Extreme Poverty	Rate of Extreme Poverty	2017	National Household Survey EDAM - IS	official	21.10	100%	21.10	
P12	P - Poverty, Nutrition, Education	P1 - Living Standards	P12 - Fish, seafood supply quantity (kg/capita/yr)	Fish, seafood supply quantity (kg/capita/yr)	2017	FAO Food Balance	official	3.69	100%	3.69	
P11	P - Poverty, Nutrition, Education	P1 - Living Standards	P11 - Multidimensional Poverty Index (MPI)	Percentage of the population that is multidimensionally poor adjusted by the intensity of the deprivations.	2019	UNDP (2019). Multidimensional Poverty Index (MPI)	official	35.80	100%	35.80	
P23	P - Poverty, Nutrition, Education	P2 - Education	P23 - Literacy index	Literacy index	2018	UNDEP, Human Development Data (1990-2018)	reliable	0.31	100%	0.31	
P24	P - Poverty, Nutrition, Education	P2 - Education	P24 - Education Index	Education Index	2018	UNDEP, Human Development Data (1990-2018)	reliable	0.31	100%	0.31	
P28	P - Poverty, Nutrition, Education	P2 - Education	P28 - Children aged (6-14) out of school (%)	Children aged (6-14) out of school (%)	2017	National Household Survey EDAM - IS	official	19.00	100%	19.00	
P31	P - Poverty, Nutrition, Education	P3 - Food Security	P31 - Population affected by food insecurity	Population affected by food insecurity	2017	National Household Survey EDAM - IS	official	13.00	100%	13.00	
H11	H - Human Development & Inequality	H1 - Human Development	H11 - Human Development Index (HDI)	Human Development Index (HDI)	2018	UNDP (2019). Human Development Data (1990-2018)	official	49.50	100%	49.50	

The nested dropdown lists used in the Social dimension are based on existing indicators from UNDP (UN, 2019), the World Bank (The World Bank, 2019a), Stable Seas (Stableseas, 2020) and Transparency International (Transparency Internationale, 2020) to name but a few. This nested structure can be amended by the user to add additional indicators they consider relevant for their country. Once new indicators have been added to the existing list following the structure already in place, these new choices will appear in the proposed items in the relevant dropdown-lists. Section 3.1.4 in the Appendix presents the structure used with the nested lists for the social data entry. Because the value of most social indicators is already available for the countries within the scope of this study, some of the data were prefetched and made available to the user as items in a dropdown list appearing when entering the data; the users may choose to accept the indicator's "prefetched" value of enter their own.

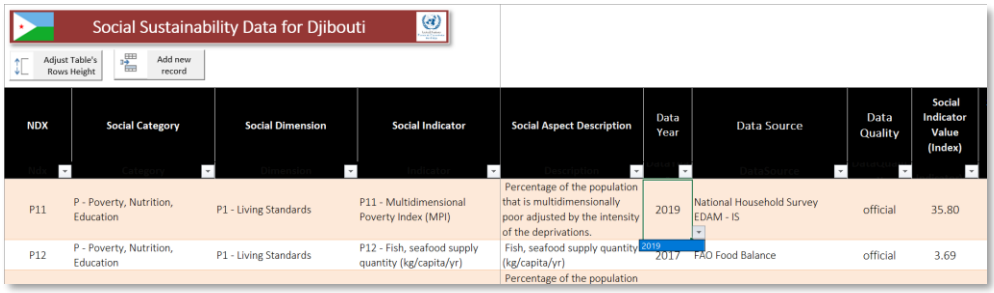


By selecting the code "P" as a Category of the Social Indicator Classification, this will condition the next choices to be of the same branch (familly)	There are only 3 possible choices within the "P" family which are "P1", "P2" and "P3"	There are only 3 possible choices within the "P1" sub-family which are "P11", "P12" and "P13"

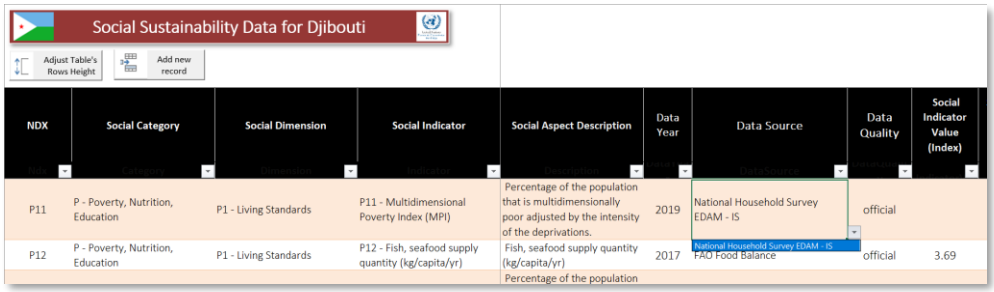
Figure 2-16: Social Indicators' classification with Categories, Dimensions and Indicators

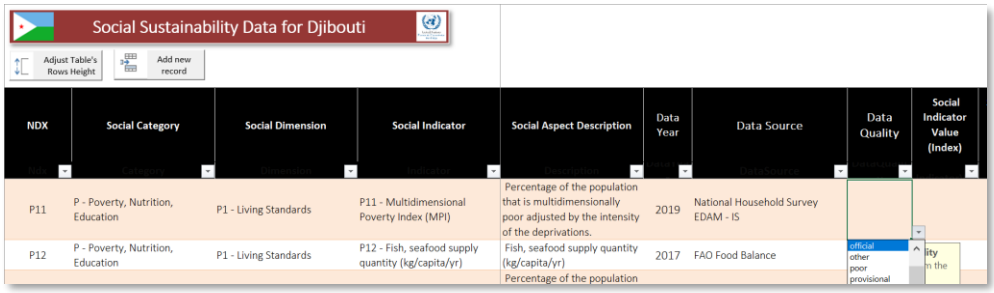
This follows the various existing international social indicators classification.

Once the social indicator has been selected, if available, the data year, data source and indicator value's prefetched values can be selected from the lists or overwritten by the user if required.



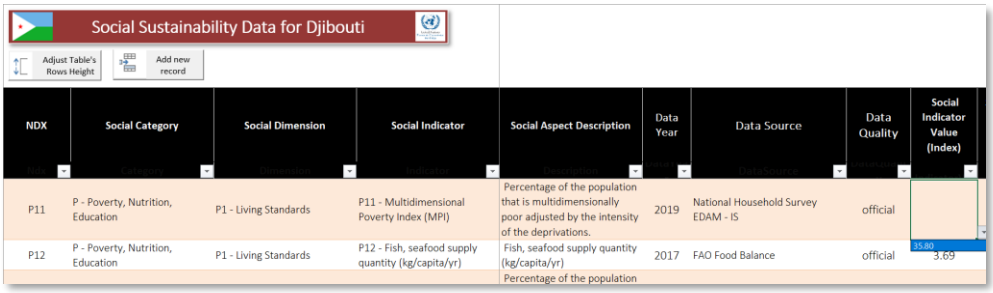
Although the toolkit proposed the data source when data were prefetched for the active country, the user may override the value with their own.





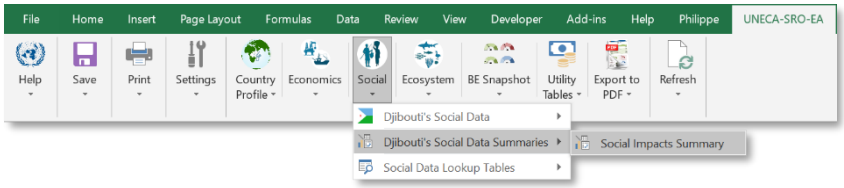
If no value is available for a particular indicator for the country, the items labelled "user defined value" and "no prefetched data" will be listed instead meaning that no data were reported for the country on that indicator so that the user can choose to ignore this fact and enters manually their own value or they may decide not to include that record in the analysis by deleting it altogether.

In this example below, a value of 35.80 was prefetched for the indicator on that row, the user may keep it or overwrite it with his/ her own value.

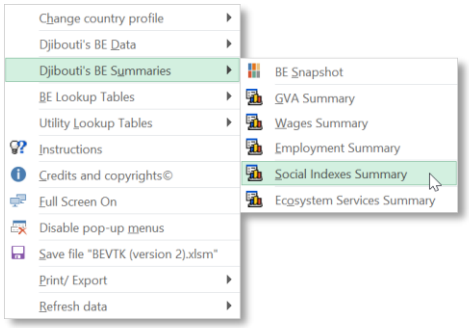


Active Country's Social Data Summary sub-menu

The ***Social Data summary*** option can be access through the **Social** Sub-menu from the **BEVTK Menu Tab** as shown below



or by selecting the *Social indexes Summary* option from the **BEVTK pop-up menu** as shown below.



The summary is built on pivot tables and pivot charts linked to the Social data worksheet and although it is automatically and dynamically generated, it is important to refresh the summaries each time new records have been entered or modified in the data worksheet, either by refreshing the active summary (when enabled) or refreshing all the data in the toolkit.

The following tables and charts are examples of summaries BEVTK produces regarding the Social impact of BE.

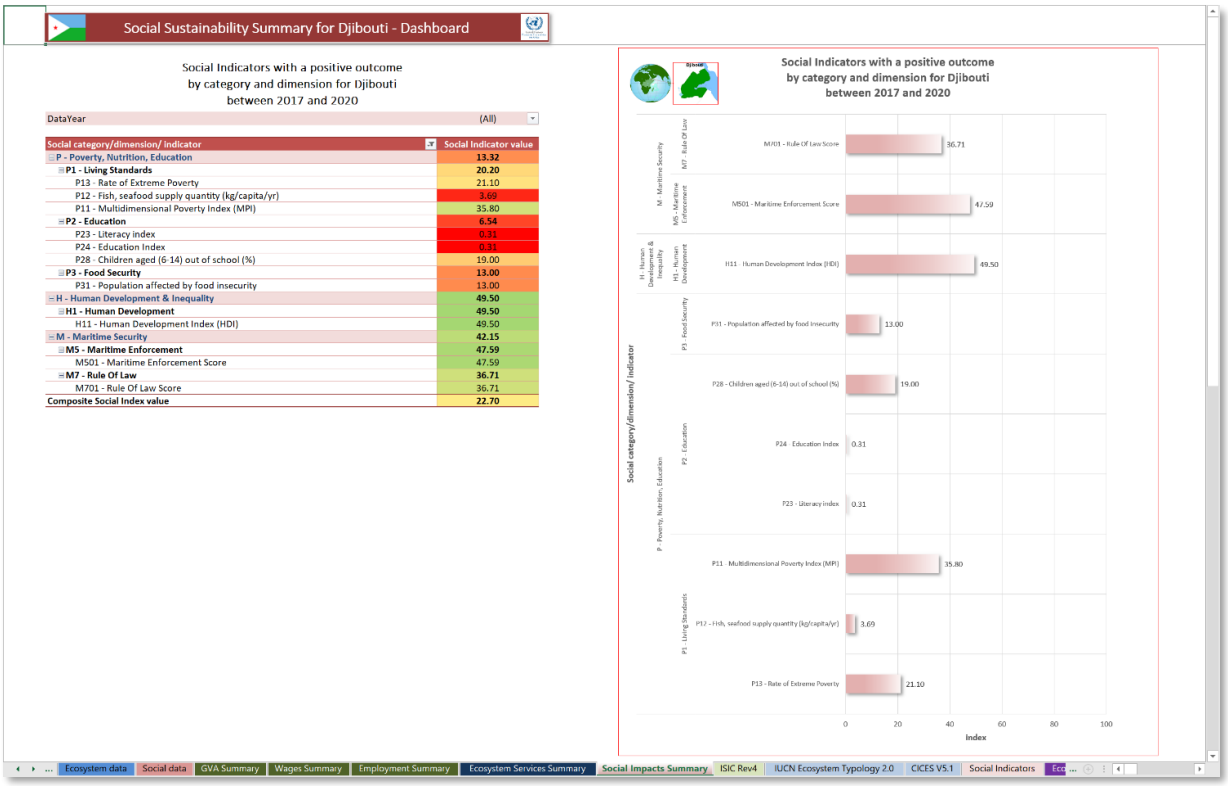


Figure 2-17: Social impacts Summary sheet linked to the social data table

Among others, the user can filter the data year in each pivot table and chart to show only relevant data summary.

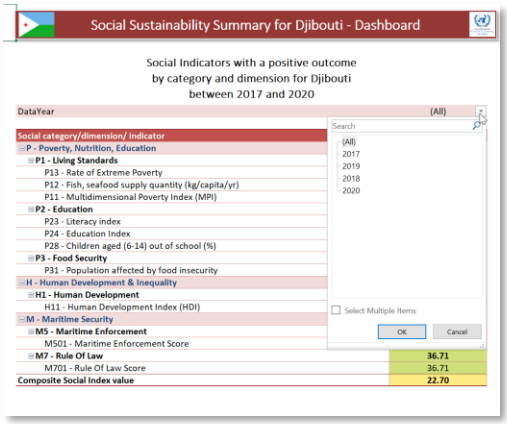


Figure 2-18: Data year selection in the social impact summary table (the default is (ALL))

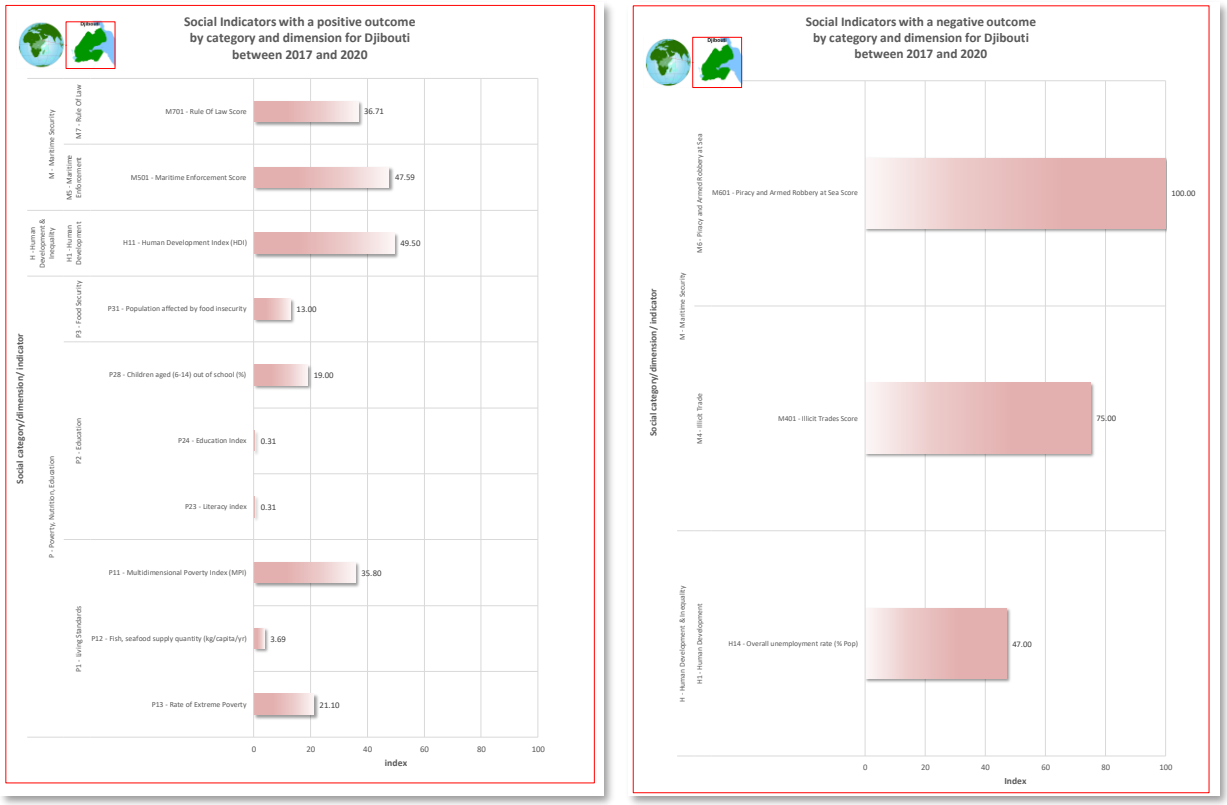
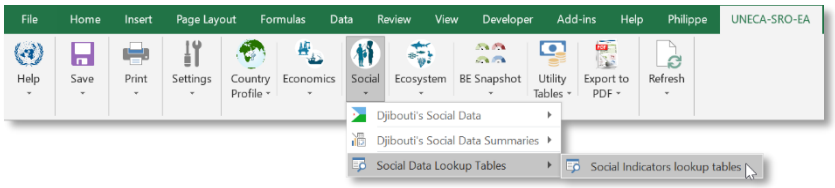


Figure 2-19: Summary of the Active Country's social indicators

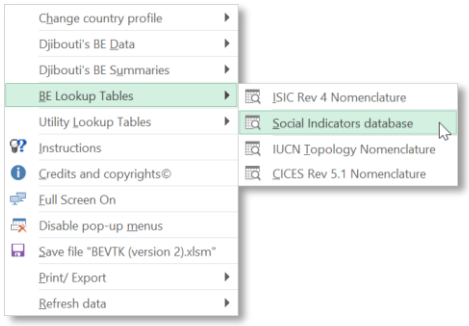
Organised by categories, dimensions and outcomes

Social Data Lookup Tables sub-menu

The toolkit comes with the several Social Indicators which can be accessed through the "*Social Indicators lookup table*" option from the **Social** Submenu of the **BEVTK Menu Tab** (see below)



or by selecting the "*Social Indicators database*" option from the **BEVTK pop-up menu** as shown below.



Once the Social Indicators worksheet has been activated, the user may, for example, modify the Booleans indicating whether or not, specific categories of indicators should be included in the data validation drop-down list based on the country situation (i.e., coastal, island or landlocked) as shown below.

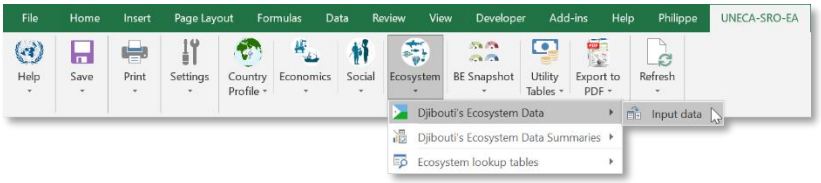
CategoryCode	Category	description	Coastal	Island	Landlocked
B	B - Business Environment	Business Environment	Yes	Yes	Yes
C	C - Corruption	Corruption	Yes	Yes	Yes
H	H - Human Development & Inequality	Human Development & Inequality	Yes	Yes	Yes
I	I - Illegal actions	Illegal actions	Yes	Yes	Yes
M	M - Maritime Security	Maritime Security	Yes	Yes	No
P	P - Poverty, Nutrition, Education	Poverty, Nutrition	Yes	Yes	Yes
S	S - Sustainable Ressources	Sustainable Ressources	No	No	No

2.3.9 *Ecosystem sub-menu*

Active Country's Ecosystem Data sub-menu

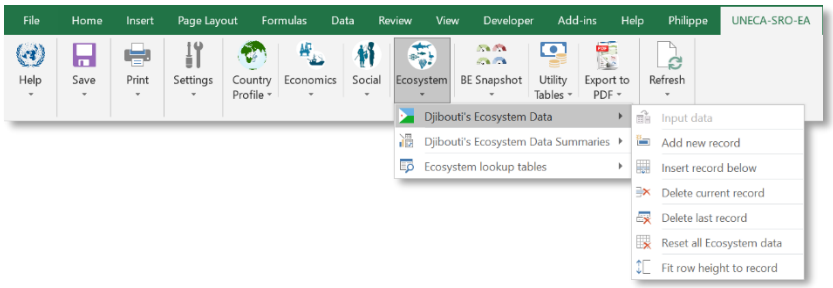
As for the previous two sections on data entry, this section summarises the step-by-step process to follow when entering data in the Ecosystem data worksheet. The error trapping, messages appearing, and menu options used to add, delete and insert records in the table are similar to what was discussed in previous sections.

If the Ecosystem Data worksheet is not yet active, only the *input data* option will be available under the "Active Country's Social data" group as shown in the Screenshot below. This option lets the user access the user defined data table.

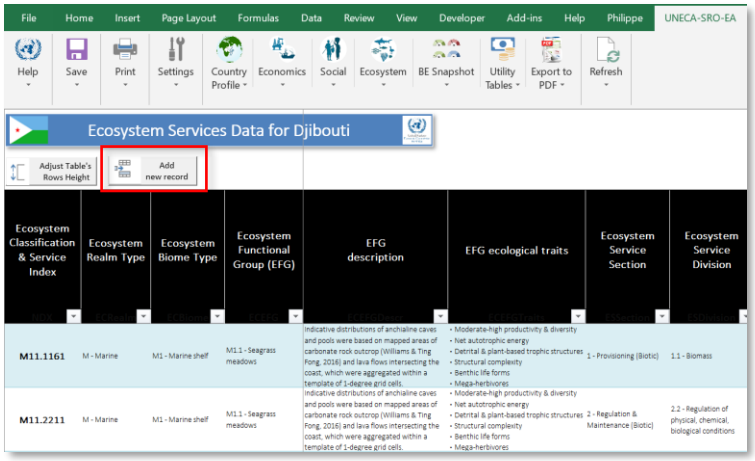


Once the "*input data*" option has been selected and the Ecosystem Data worksheet is active, the "*input data*" option is greyed out and additional options are available which are intended for the user to manipulate the records. i.e., insert, add, delete, data reset or to fit the row height to the text displayed in a specific record (i.e., table row) as shown in the various menu screenshots below. In order to use any of the options to manipulate the table records or rows, the cursor must be positioned anywhere on the table otherwise clicking any of the options will have no effect whatsoever.

The "*Add new record*" option will add a row below the last record of the table so that the user can enter data in a new record, i.e., table row. If the table is empty this option will add a second empty row to the table.



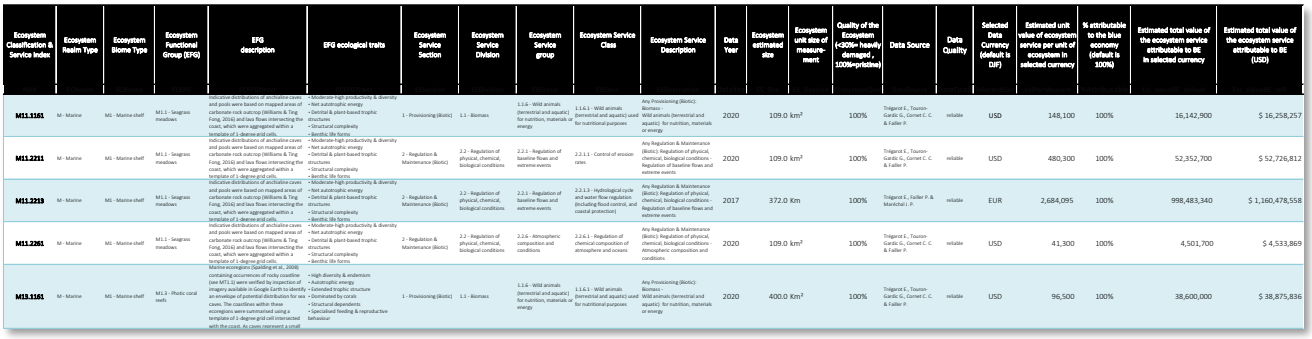
Alternatively, to add a record, the user can click on the button above the table to the left and labelled "*Add new record*" as shown on the screenshot below (inside the red outline).



The other options, to insert a record, delete a record, reset all records, fit row height have been covered in previous sections.

Table 2-9: Ecosystem data input table

The table shows the classification system used to describe the typology and the corresponding ecosystem services and the level of details available to record the Ecosystem contribution to BE.



The ecosystem services data entry table is organised around three main sections:

1. Ecosystem typology data entry section
2. Ecosystem service data entry section
3. Data entry on the estimate corresponding to the ecosystem's monetary contribution to BE.

The following figure show the sequence to enter the data in the input table.

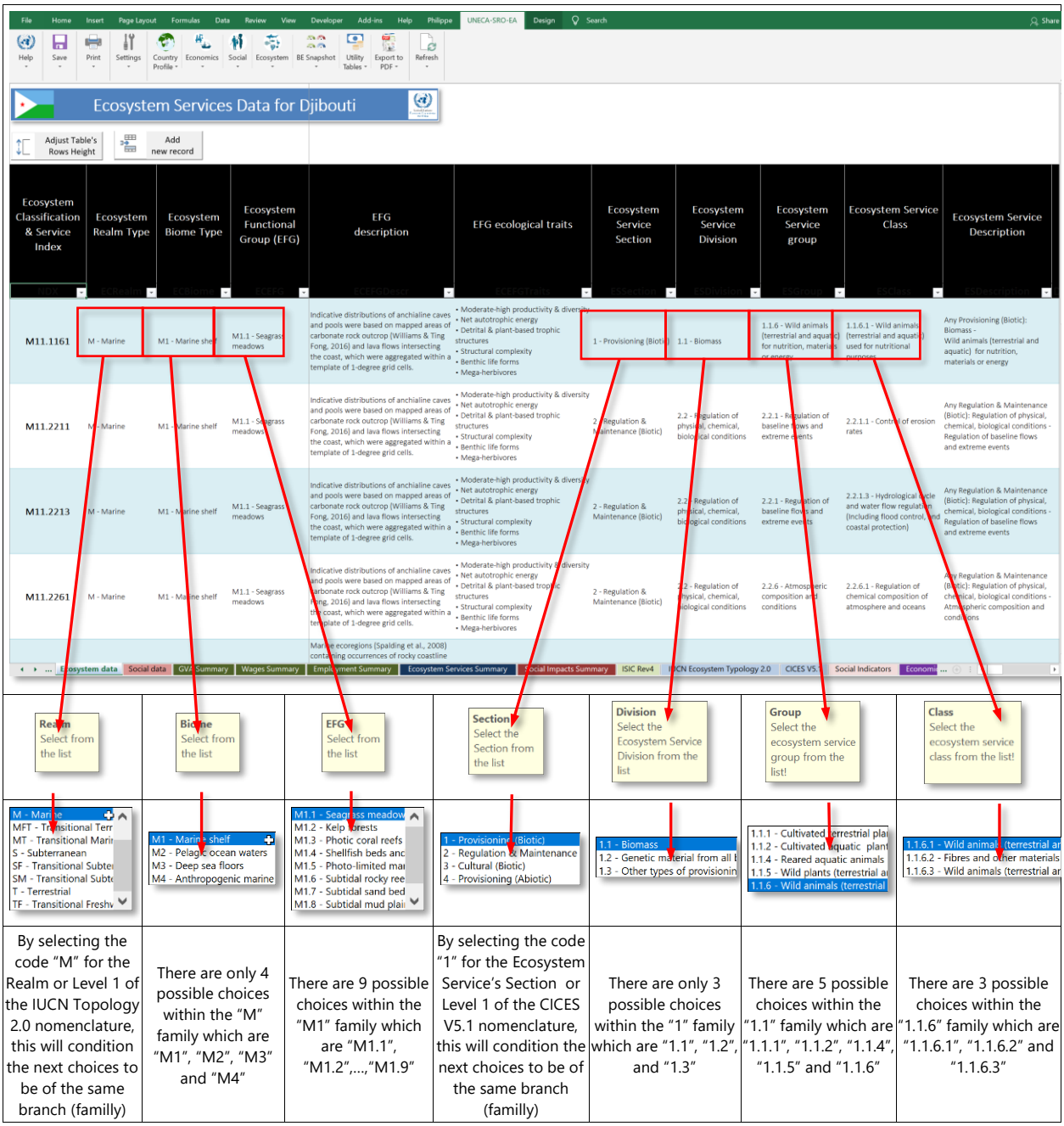


Figure 2-20: Ecosystem services possible levels of details for ecosystem typology and services

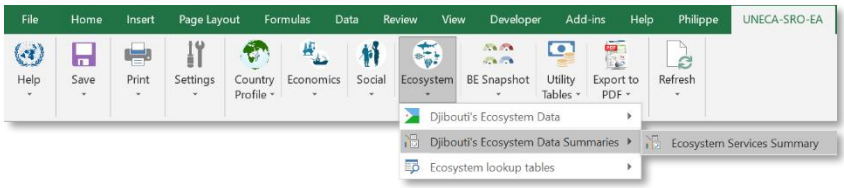
This follows IUCN Topology 2.9 and CICES V5.1 nomenclature respectively.

Note that because each drop-down list is conditionally generated once the previous item has been selected from their own list, depending on the machine, this process may slow down the navigation between cells where the cells' data-validation is linked to a conditional drop-down list.

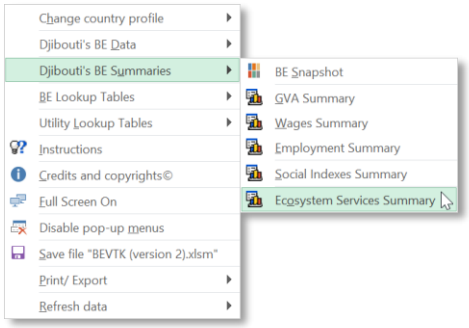
There are other data validation schemes not necessarily depending on selecting an item from a drop-down list. There are few errors trapping checks on cells requiring input from the user. For example, if the user enters a value outside the scope of what is expected, a warning dialog window will pop up indicating the invalid entry. As in all the data input tables, the user may change the reference currency at any time (the drop-down menu is accessible at the end of the table (top-right).

Active Country's Ecosystem Data Summary sub-menu

The ***Ecosystem Services Summary*** option can be access through the **Ecosystem** Sub-menu from the **BEVTK Menu Tab** as shown below.



Or by selecting the *Ecosystem Services Summary* option from the **BEVTK pop-up menu** as shown below.



The summary is built on pivot tables and pivot charts linked to the Ecosystem data worksheet and although it is automatically and dynamically generated, it is important to refresh the summaries each time new records have been entered or modified in the data worksheet, either by refreshing the active summary (when enabled) or refreshing all the data in the toolkit.

The following tables and charts are examples of summaries BEVTK produces for the Ecosystem Services contribution to BE.

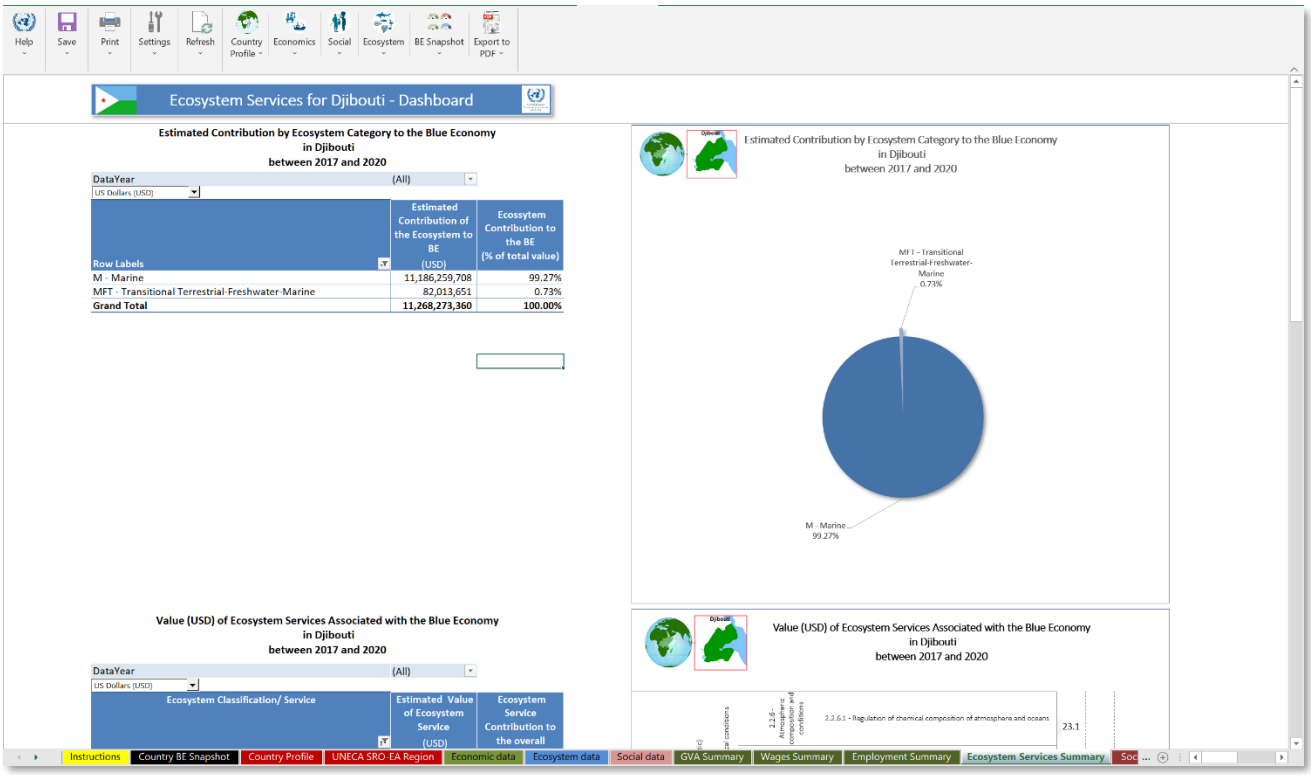


Figure 2-21: Ecosystem Services' Summary sheet linked to the ecosystem data table

Table 2-10: BEVTK output example (a) for the Ecosystem Services contribution to the BE

Results are organised by main categories of habitats and their relative share expressed in percentage.

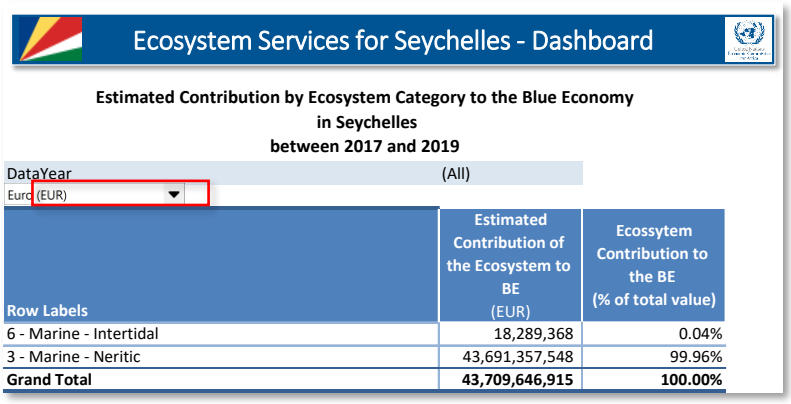


Table 2-11: BEVTK output example (b) for the Ecosystem Services contribution to the BE

Results are organised by main categories of habitats, classes and sub-classes.

Value (EUR) of Ecosystem Services Associated with the Blue Economy in Seychelles between 2017 and 2019

DataYear (All)

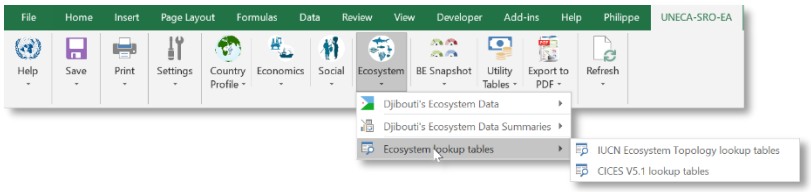
Euro (EUR)

Ecosystem Classification/ Service	Estimated Value of Ecosystem Service (EUR)	Ecosystem Service Contribution to the overall
3 - Marine - Neritic	43,691,357,548	100.0%
3.08 - Coral reef	735,773,431	1.7%
3.08.1 - Outer Reef Channel		
1 - Provisioning (Biotic)	444,168,552	1.0%
2 - Regulation & Maintenance (Biotic)	291,604,880	0.7%
3.09 - Seagrass	42,955,584,116	98.3%
(blank)		
1 - Provisioning (Biotic)	57,793,051	0.1%
2 - Regulation & Maintenance (Biotic)	42,897,791,065	98.1%
6 - Marine - Intertidal	18,289,368	0.0%
6.07 - Mangrove Submerged Roots	18,289,368	0.0%
(blank)		
1 - Provisioning (Biotic)	1,294,421	0.0%
2 - Regulation & Maintenance (Biotic)	16,994,947	0.0%
Grand Total	43,709,646,915	100.0%

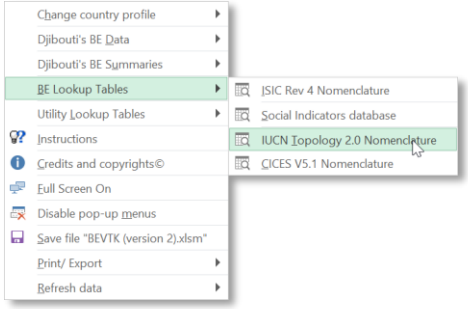
As it was the case for the Social Impact and economic summary results, the user may change the reference currency and change which data year to include in the calculation (see red outline from the screenshots above in Table 2-10 and Table 2-11).

Ecosystem Lookup Tables sub-menu

The toolkit comes with the IUCN Topology 2.0 and CICES V5.1 nomenclature which can be accessed through the "*Ecosystem lookup table*" option from the **Ecosystem** Submenu of the **BEVTK Menu Tab** (see below)

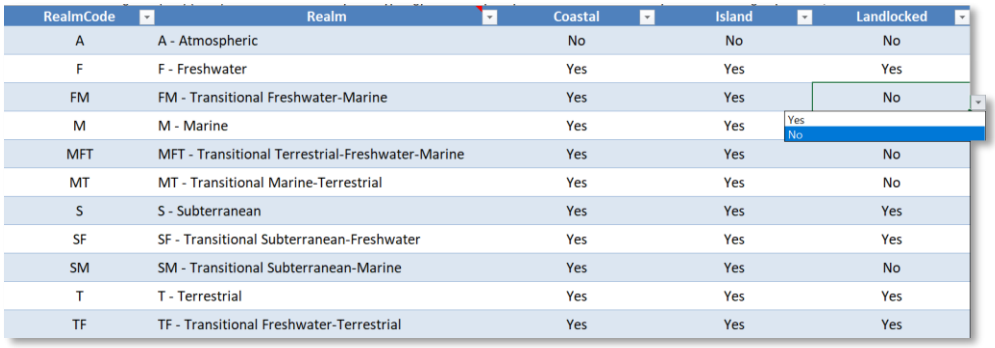


or by selecting either the "IUCN Topology *2.0 Nomenclature"* option or the "CICES V5.1 *Nomenclature"* option from the **BEVTK pop-up menu** as shown below.



Once the any of the two lookup table worksheets is the activate sheet, the user may, for example, modify the Booleans indicating whether or not, a specific classification of any level should be included in the data validation drop-down list based on the country situation (i.e., coastal, island or landlocked).

In the example below, the user can change whether or not to include the Realm "FM - Transitional Freshwater-Marine" as part of the list of items available to landlocked countries in the data validation drop-down list, the default being "No".

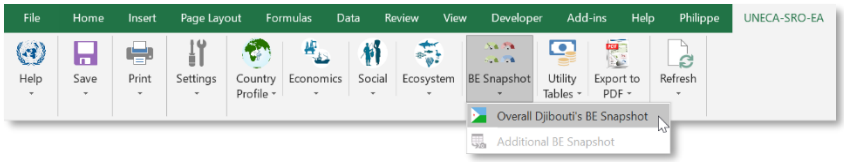


RealmCode	Realm	Coastal	Island	Landlocked
A	A - Atmospheric	No	No	No
F	F - Freshwater	Yes	Yes	Yes
FM	FM - Transitional Freshwater-Marine	Yes	Yes	No
M	M - Marine	Yes	Yes	Yes / No
MFT	MFT - Transitional Terrestrial-Freshwater-Marine	Yes	Yes	No
MT	MT - Transitional Marine-Terrestrial	Yes	Yes	No
S	S - Subterranean	Yes	Yes	Yes
SF	SF - Transitional Subterranean-Freshwater	Yes	Yes	Yes
SM	SM - Transitional Subterranean-Marine	Yes	Yes	No
T	T - Terrestrial	Yes	Yes	Yes
TF	TF - Transitional Freshwater-Terrestrial	Yes	Yes	Yes

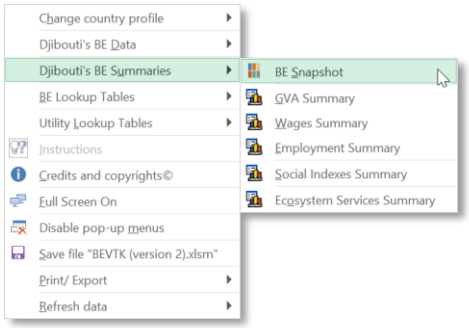
2.3.10 BE Snapshot sub-menu

Overall Active Country's BE Snapshot

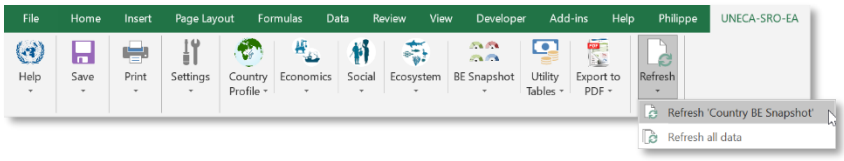
The *Overall Active Country BE Snapshot* option can be access through the **BE Snapshot** Sub-menu from the **BEVTK Menu Tab** as shown below



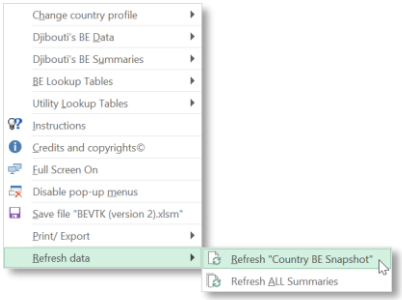
or by selecting the *BE Snapshot* option from the **BEVTK pop-up menu** as shown below.



The *BE Snapshot* is built on pivot tables and pivot charts linked to all five summary worksheets, GVA Summary, Wages Summary, Employment Summary, Ecosystem Services Summary and Social Impacts Summary and although it is automatically and dynamically generated, it is important to refresh all summaries each time new records have been entered or modified in any of the 3 data worksheet, either by refreshing the *Country BE Snapshot worksheet* if active or refreshing all the data in the toolkit.



Alternatively, the user may choose to run the equivalent refresh options from the **BEVTK pop-up menu** with two options similarly to the refresh sub-menu's options from the **BEVTK Menu Tab** (see below)



The following tables and charts are examples of summaries **BEVTK** produces regarding the Social impact of BE.

The **BEVTK** provides a Summary and BE snapshot for the country as shown below.

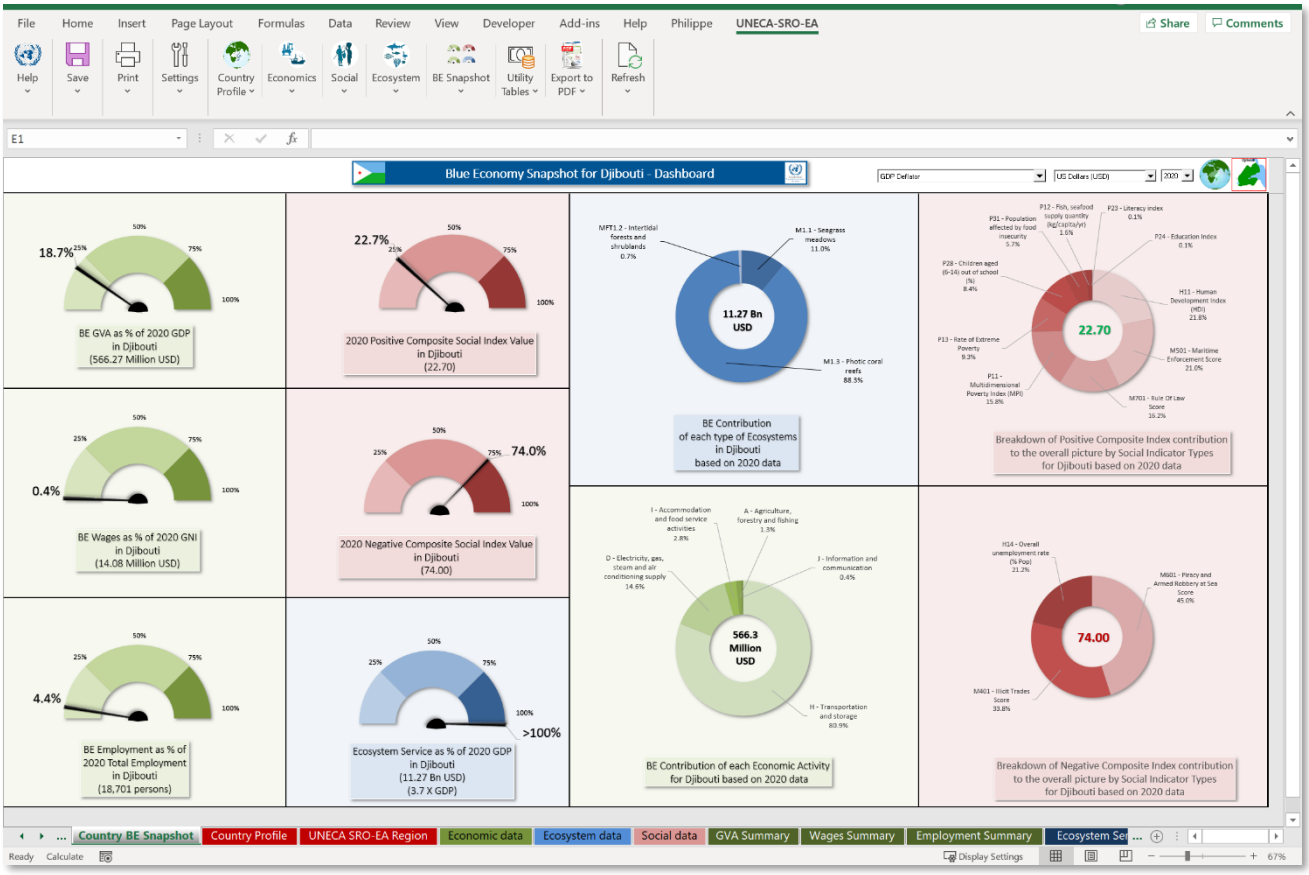


Figure 2-22: Country's BE Snapshot of the three modules with gauges and pie charts

Visuals are linked to all five Summary Worksheets and three data worksheets covering the economic, social and ecosystem aspects of BE.

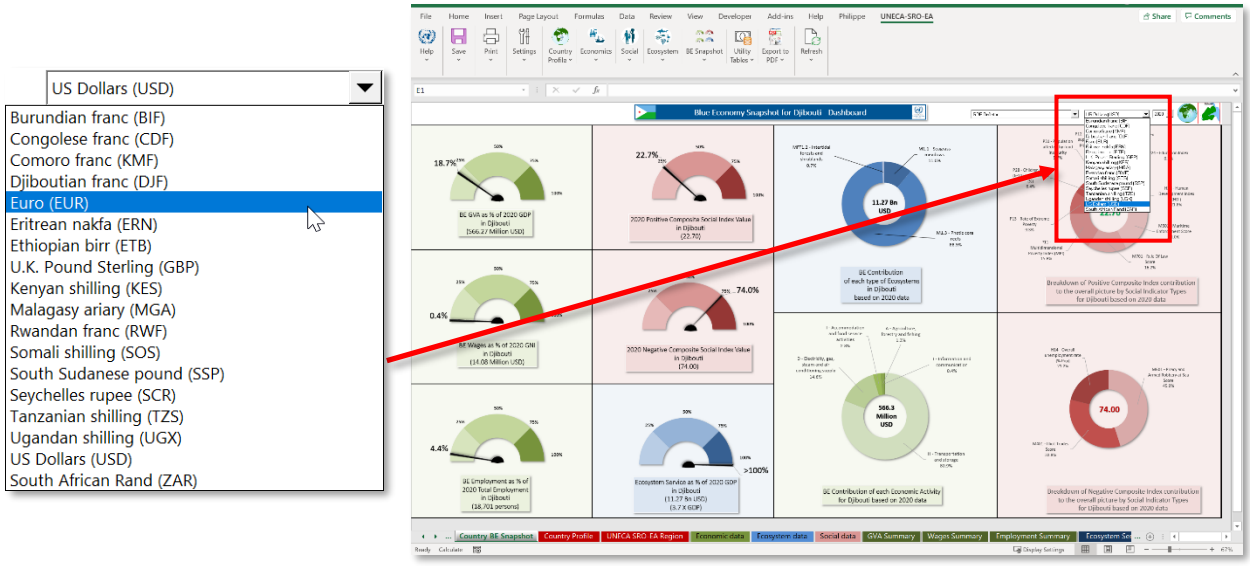


Figure 2-23: Changing the deflator

The user may change the deflator used to calibrate the data by selecting an alternative in the pull-down list.

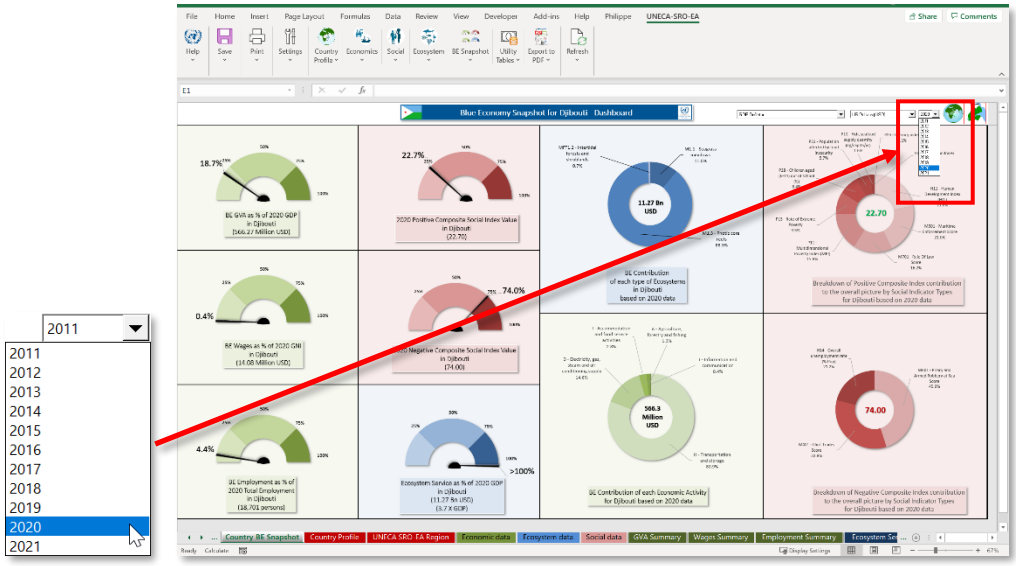


Figure 2-24: Changing the reference year

The user may change the data reference year by selecting an alternative in the year pull-down list.

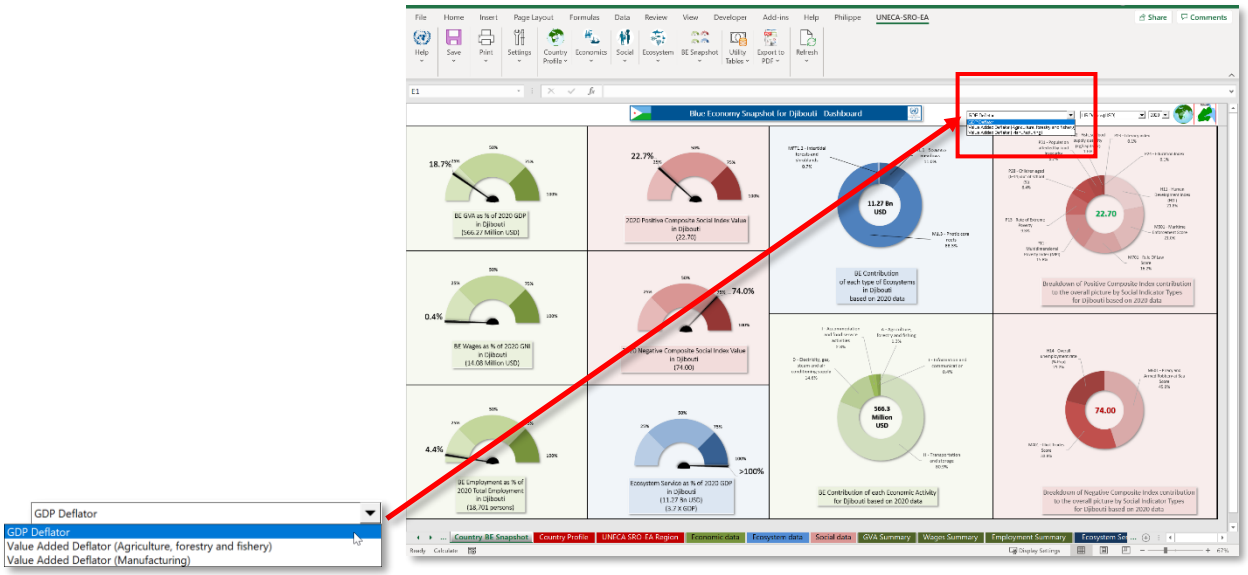


Figure 2-25: Changing the reference currency

The user may change the reference currency to express the monetary data in a different currency by selecting it from the pull-down list.

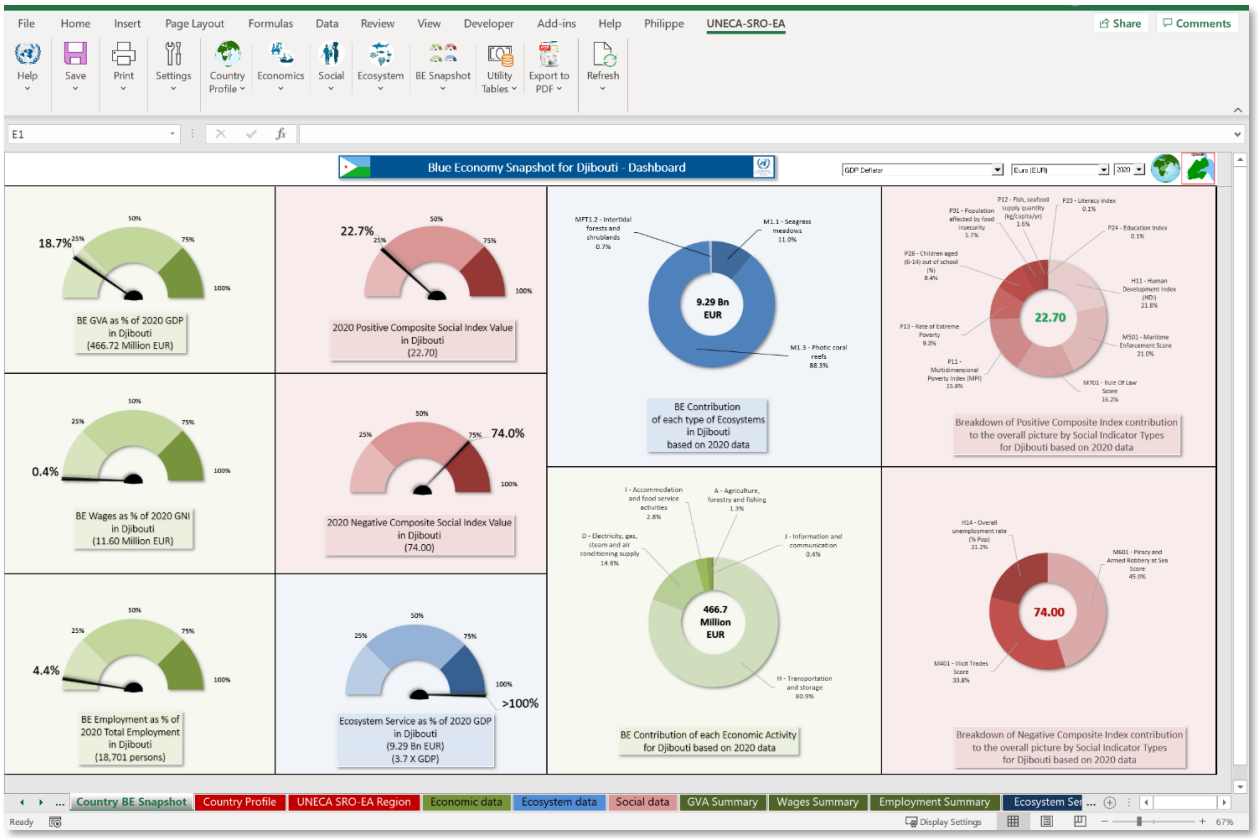


Figure 2-26: Simulation of the BE Snapshot adjusting reference currency (from USD to EUR)

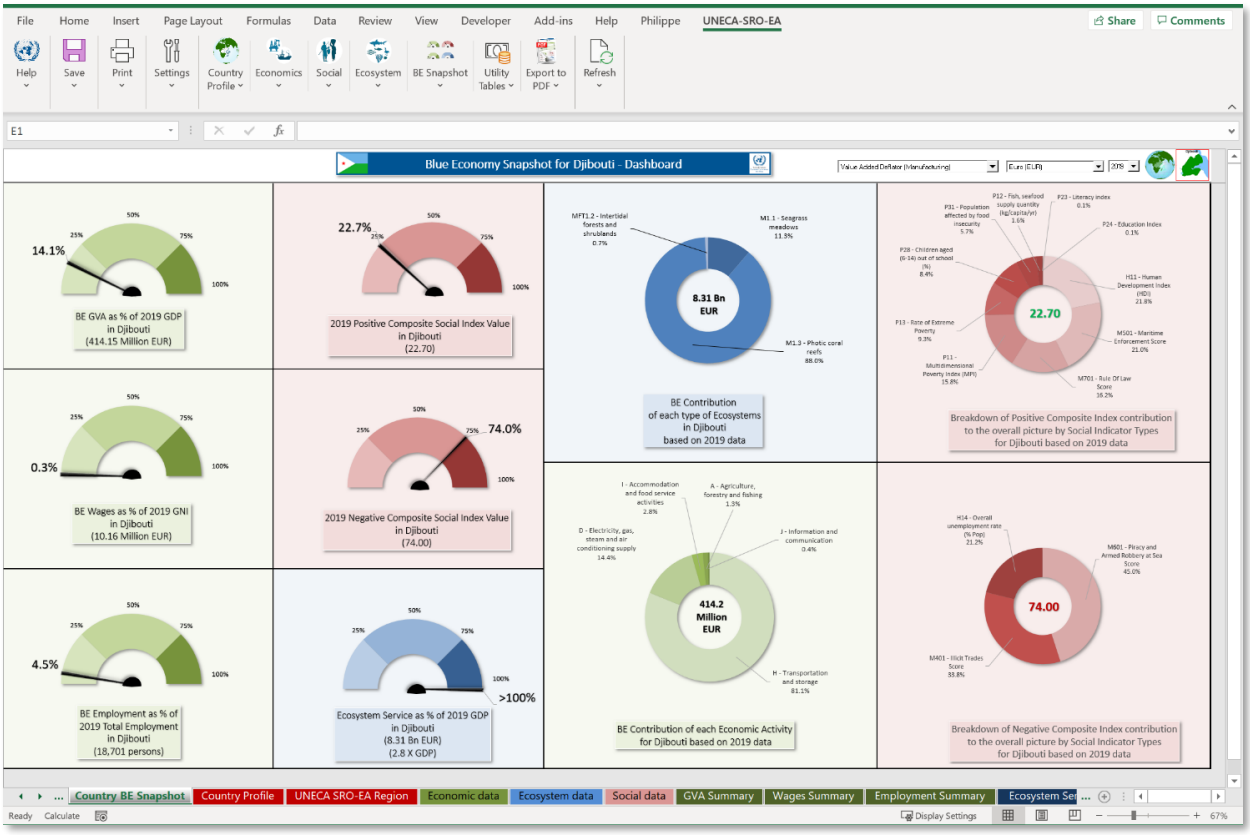


Figure 2-27: Simulation of the BE Snapshot adjusting reference currency, year, and deflator

Simulation changing the currency of reference (from USD to EUR), a change in deflator (from GDP deflator to a value-added deflator (Manufacturing)) and a change in the reference year (from 2020 2019).

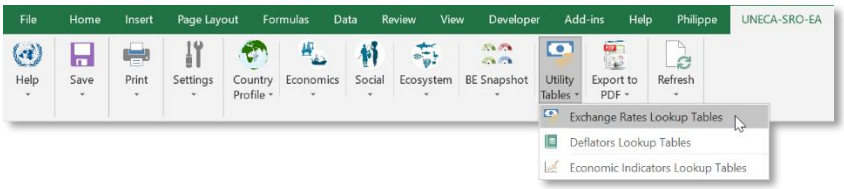
2.3.11 Utility tables sub-menu

Other than the lookup tables specifically related to BE, the toolkit comes with 3 types of utility lookup tables used to calibrate and standardise all timely monetary values:

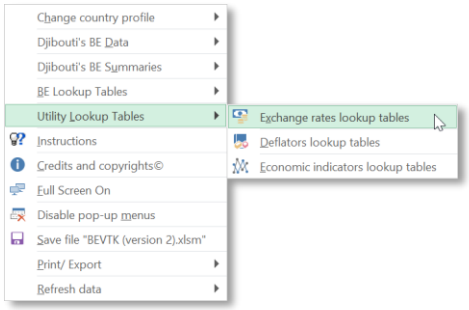
1. Exchange Rates Lookup Tables
2. Deflators Lookup Tables
3. Economic Indicators Lookup Tables

Exchange Rates Lookup Tables

The Exchange Rates Lookup Tables can be accessed through the "*Exchange Rates Lookup Tables*" option from the **Utility Tables** Submenu of the **BEVTK Menu Tab.**



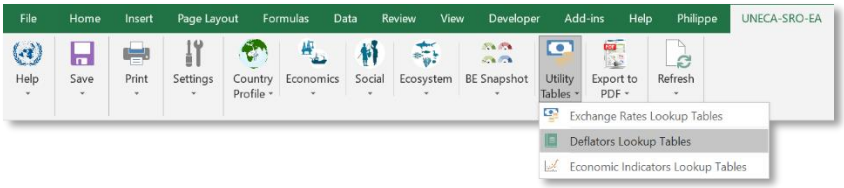
Or by selecting the "*Exchange rates lookup tables*" option as shown below.



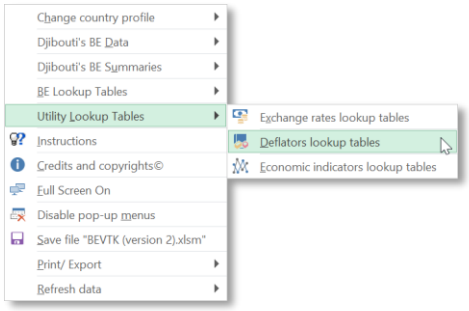
A complete description of the tables is in the appendix (section 3.2.1).

Deflators Lookup Tables

The Deflators Lookup Tables can be accessed through the "*Deflators Lookup Tables*" option from the **Utility Tables** Submenu of the **BEVTK Menu Tab** (see below)



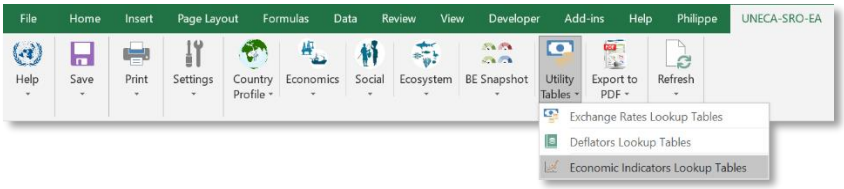
or by selecting the "*Deflators lookup tables*" option from the **BEVTK pop-up menu**.



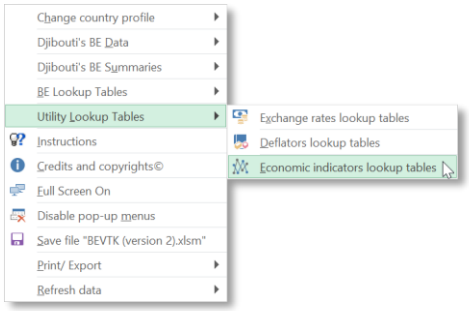
A complete description of the tables can be found in the appendix (section 3.2.2 below)

Economic Indicators Lookup Tables

The Economic Indicators Lookup Tables can be accessed through the "Economic Indicators *Lookup Tables*" option from the **Utility Tables** Submenu of the **BEVTK Menu Tab** (see below)



or by selecting the "*Economic Indicators lookup tables*" option from the **BEVTK pop-up menu** as shown below.



A complete description of the tables can be found in the appendix (section 3.2.3 below).

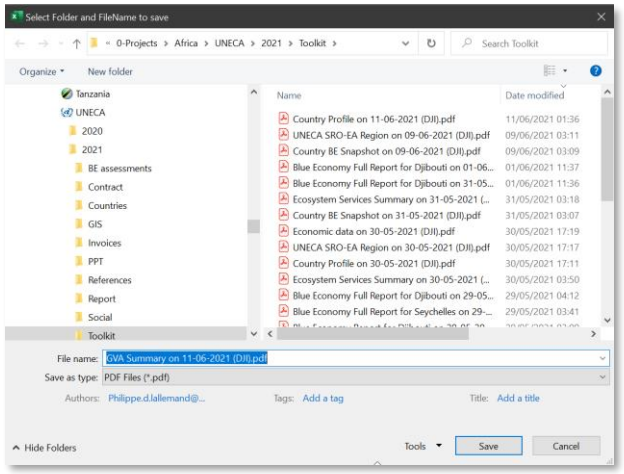
2.3.12 Export to PDF sub-menu

The toolkit comes with 2 options to export the worksheets to a portable document format (PDF) file:

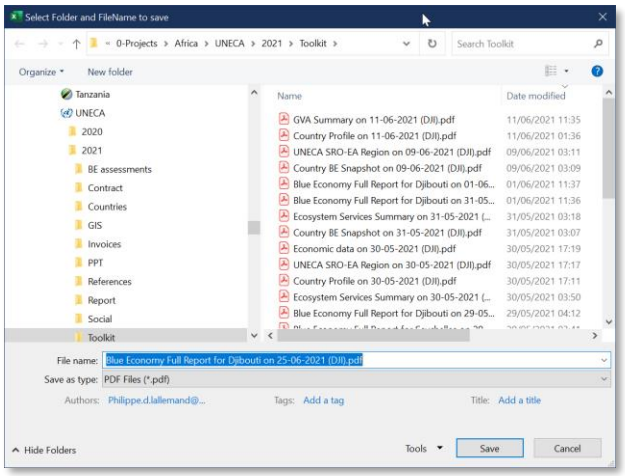
1. Export Active Worksheet to PDF
2. Export Active Country's Full BE Report to PDF

When exporting to a PDF document, a dialog window will appear to confirm the name and location to save the PDF file to and under what name; by default the location is the current workbook path and the name of the PDF file is the worksheet name for the *Export active* option and "Blue Economy Full Report" follow by the Active Country's name for the *Export Full BE Report* option, both options followed by the current date and the active country's 3 alphanumeric characters code in parenthesis added at the end of the name (see below). The proposed name and/ or path can always be overwritten by the user.

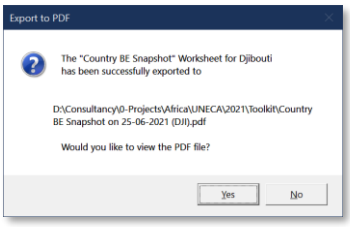
Dialog windows showing the default "save as type's file name" when exporting to PDF the active worksheet:



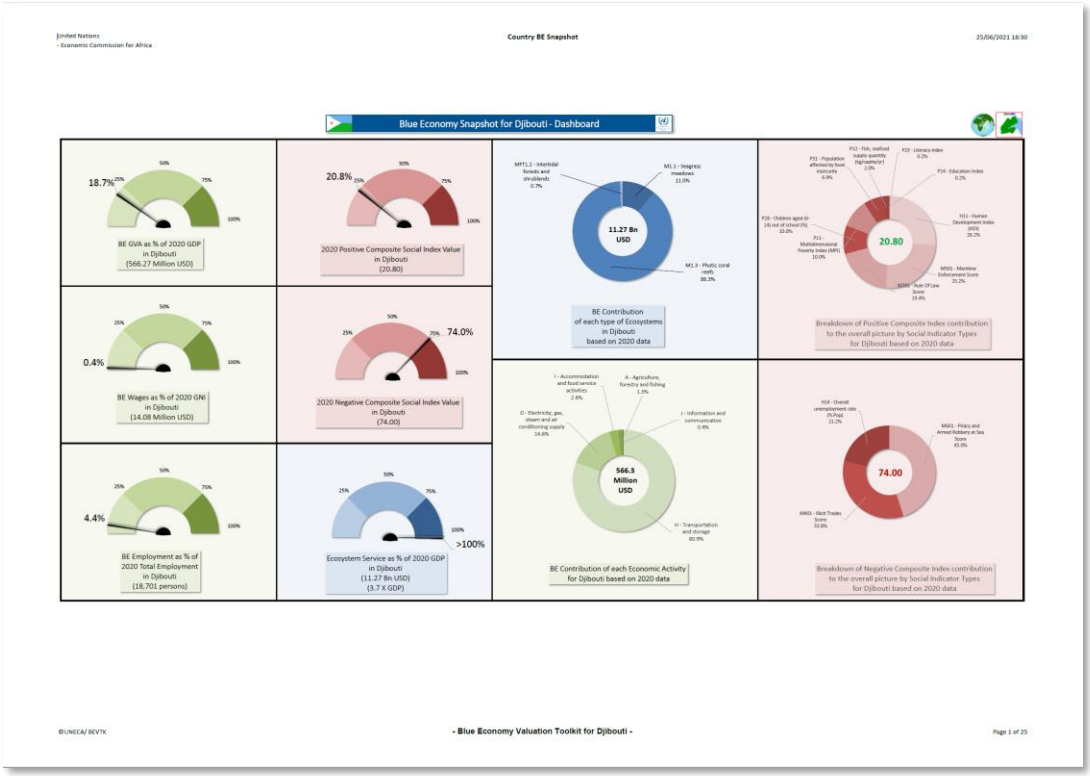
Dialog windows showing the default "save as type's file name" when exporting to PDF the Full BE report for the active country:



Once the file has been successfully exported to PDF, a dialog box will ask whether to open the generated PDF file (assuming a PDF reader is installed on the system).

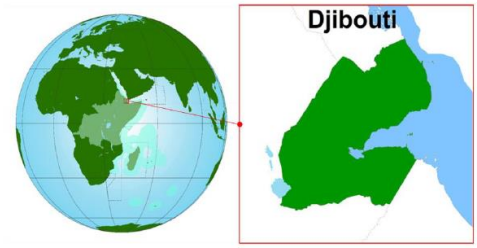


The following screenshots are pages 1, 2 and 3 of the 25 pages Full report's PDF document.

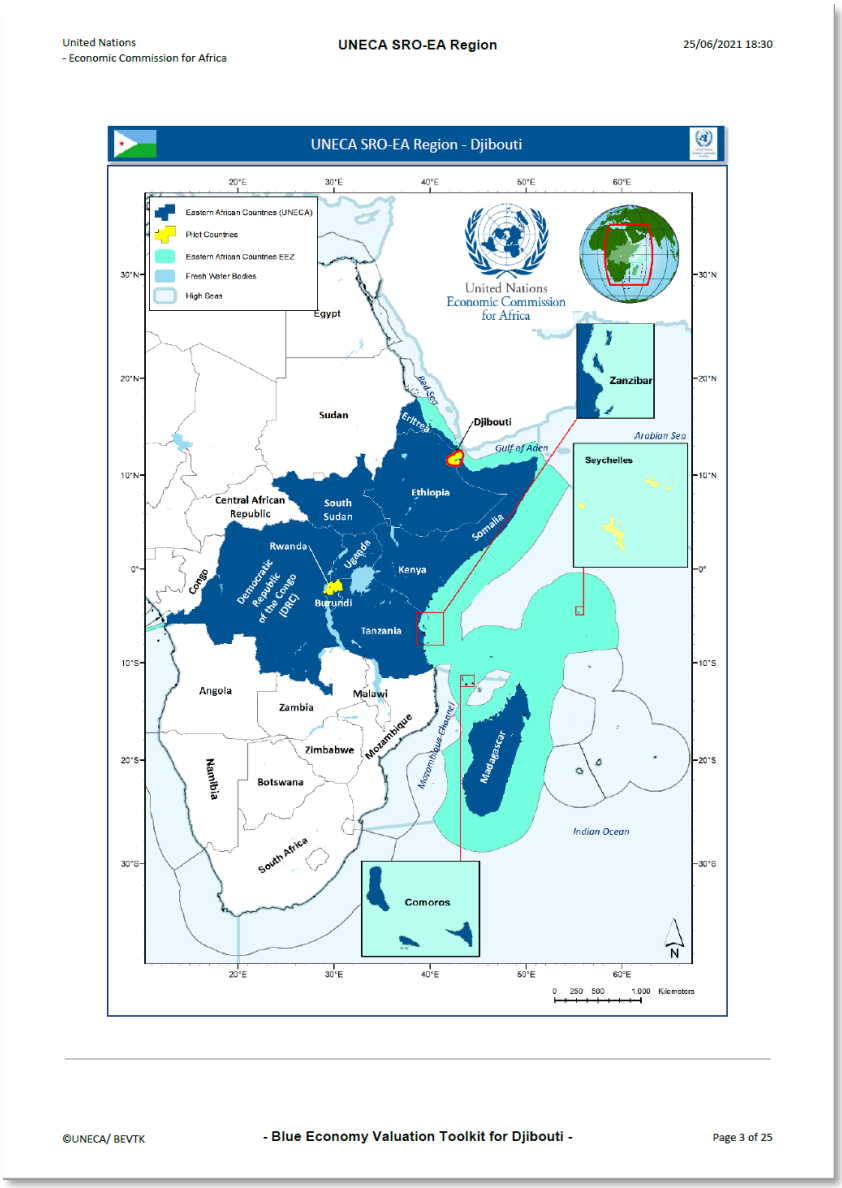


Country Profile - Djibouti

Country:	Djibouti
Situation:	Coastal
Default currency:	Djiboutian franc (DJF)
Reference Currency:	US Dollars (USD)
Reference data year:	2020
ISIC Codes Language:	English
Deflator (base = 2015):	GDP Deflator

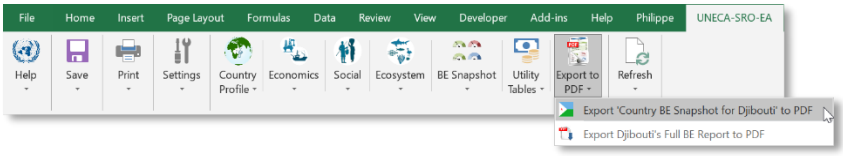


United Nations
Economic Commission
for Africa

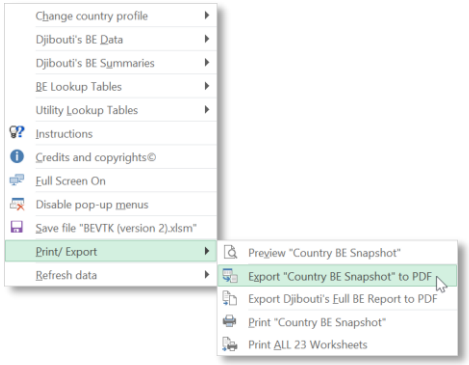


Export Active Worksheet to PDF

To Export the active worksheet to a PDF document, select the "*Export 'Active worksheet for Active Country' to PDF*" option from the **Export to PDF** Submenu of the **BEVTK Menu Tab** as shown below (e.g. *Export 'County BE Snapshot for Djibouti' to PDF*)

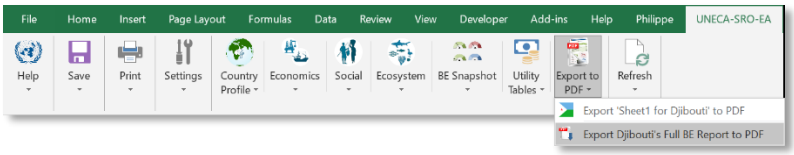


or by selecting the "*Export 'active worksheet' to PDF*" option from the **BEVTK pop-up menu** as shown below (e.g. Export "*Country BE Snapshot" to PDF*).

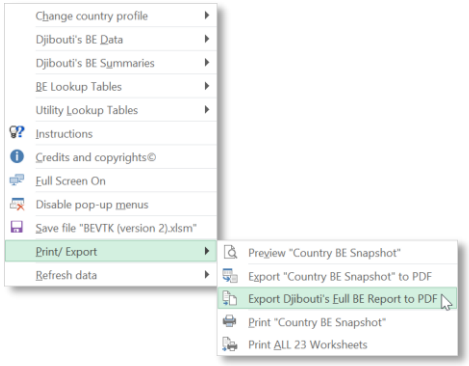


Export Active Country's Full BE Report to PDF

To Export the whole BE Report for the active country to a PDF document, select the "*Export Active Country's Full BE Report to PDF*" option from the **Export to PDF** Submenu of the **BEVTK Menu Tab** as shown below



or by selecting the "*Export 'active worksheet' to PDF*" option from the **BEVTK pop-up menu** as shown below (e.g. *Export Djibouti's Full BE Report to PDF*).

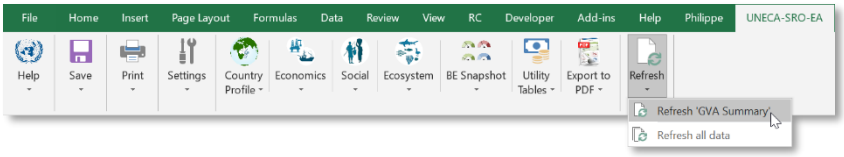


2.3.13 Refresh sub-menu

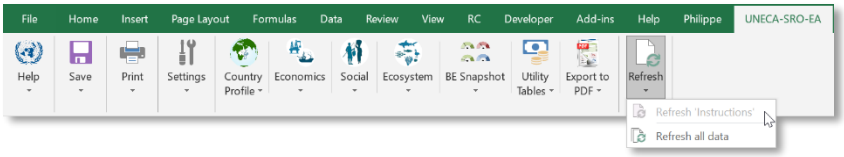
The Refresh sub-menu can have 1 or 2 options depending on the active worksheet. When available, the first option is to refresh the active worksheet and will only be enable if it is a Summary or the BE snapshot, the second option is to Refresh all Pivot tables and charts regardless of the active worksheet.

Refresh Active Worksheet

The user may Refresh the active worksheet if it is a summary table or the Country BE Snapshot, the option will be greyed-out otherwise. For example, if the active sheet is the "GVA summary", the *"Refresh 'GVA summary'"* will be the option available to refresh the active sheet as display below.

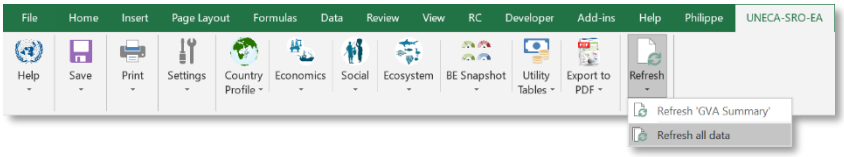


For example, if the active worksheet is the "*Instructions*" sheet, the option will be greyed out as shown below.



Refresh all data

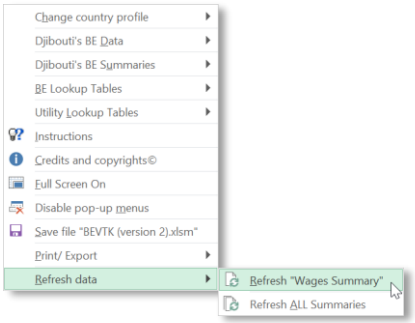
At any point and regardless the active worksheet, the user may choose the "*Refresh All data*" which will refresh all the summary pivot tables and charts by selecting the option from the Refresh sub-menu as shown below.



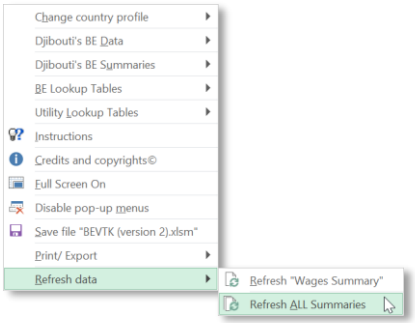
Refreshing using the BEVTK pop-up menu

Alternatively, the user may choose to run the equivalent refresh options from the **BEVTK pop-up menu** with two options similarly to the refresh sub-menu's options from the **BEVTK Menu Tab;** one option is to refresh the active sheet (in the example below, the active sheet is "*Wages Summary*") and the other option to refresh All summaries as

shown in the 2 quadrans below. To do so, first right click on any visible portion of the active sheet and select "Refresh data" then select either *Refresh "Wages Summary"* to refresh only the active sheet (here explicitly referred to by its name) or select "*Refresh All Summaries*" in which case the program will loop through all the pivot tables and pivot charts and refresh/ update them all sequentially. Note that if the Refresh option is triggered on a worksheet which cannot be refreshed, only the "Refresh All Summaries" option will be visible.

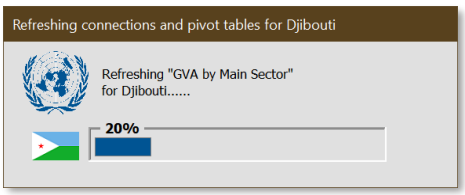


Refreshing only the active summary worksheet (e.g. here "*Wages Summmary*")

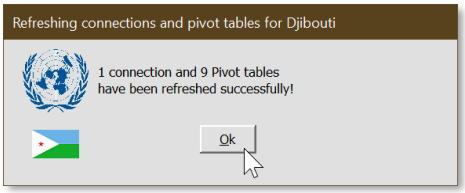


Refreshing All worksheet summaries

Whether the user refreshes the active worksheet or all the summary tables and charts, in both cases, a progress bar will appear indicating the percentage of tasks that has been treated so far and the pivot table being processed at any point during the refresh process.



Once the refresh process is over, a message will appear indicating that all pivot tables and connections have been refreshed[14]



[14] Note that not of instances of BEVTK version 2 will have active connections enabled; such connection refers at the time of writing to a live link to the spot exchange rate which has been disabled at this point in the latest version.

3 Appendix

3.1 Nomenclature Systems used in BEVTK

3.1.1 ISIC Rev 4

The ISIC rev 4 (UN, 2008) nomenclature was used in designing **BEVTK** to help identify potential economic activities contributing to the blue economy. The International Standard Industrial Classification of All Economic Activities (ISIC) is the international reference classification of productive activities. Its main purpose is to provide a set of activity categories that can be utilized for the collection and reporting of statistics according to such activities. From our discussion with the resident consultants in each of the three pilot countries, it became clear that the ISIC nomenclature from which their System of National Accounting (SNA) is based, was the best candidate to capture Economic Activity in the tool.

The ISIC nomenclature is in its 4th revision. ISIC rev 4 is organised around 4 hierarchical levels, 1) Sections, 2) Divisions, 3) Groups and 4) Classes.

- There are 21 Sections (or ISIC level 1) labelled from A to U, only 15 were identified as potentially relevant to activities contributing to the blue economy.
- There are 88 Divisions (or ISIC level 2) labelled from A01 to U99 from which only 27 were deemed relevant to activities contributing to the blue economy.
- There are 238 Groups (or ISIC level 3) labelled from A011 to U990 from which only 36 were deemed relevant to activities contributing to the blue economy.
- There are 419 Classes (or ISIC level 4) labelled from A0111 to U9900 from which only 48 were deemed relevant to activities contributing to the blue economy.

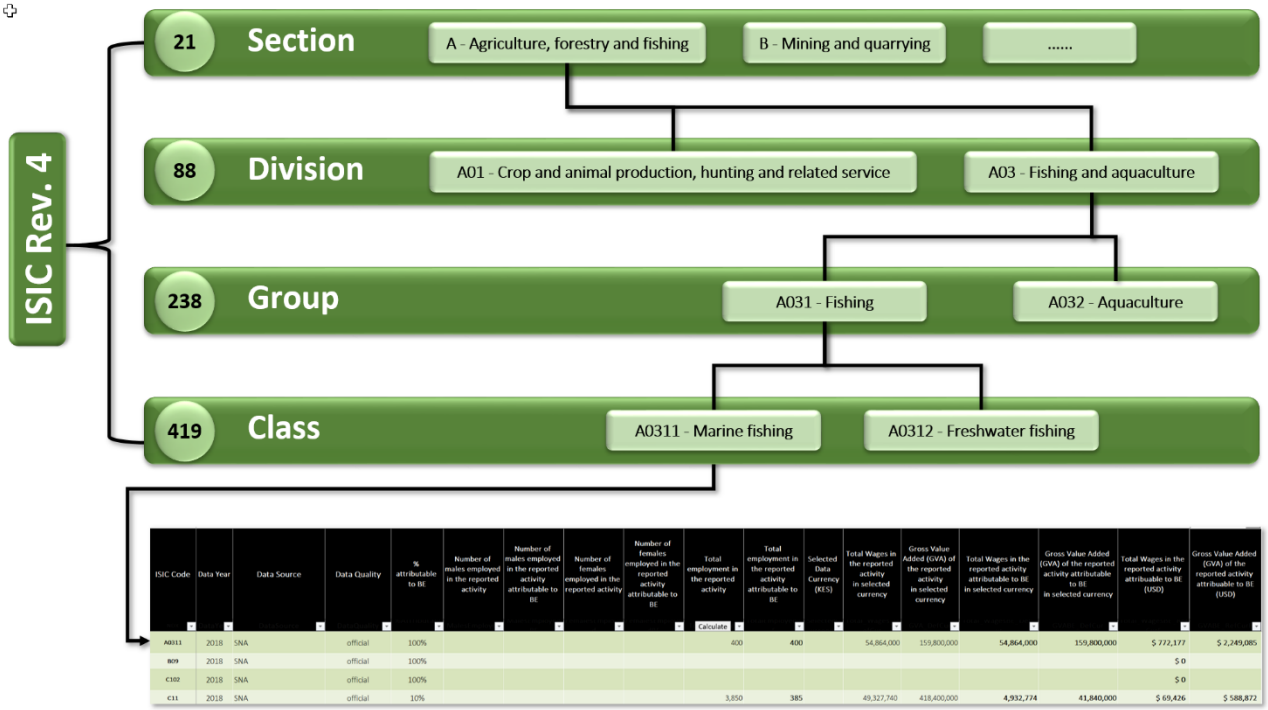


Figure 3-1: ISIC Rev 4 Nomenclature Structure

Table 3-1 to Table 3-4 show the ISIC Rev 4 nested reference tables used in the template for the Economic module. Note that we are only showing the rows in the classifications relevant to Blue Economy Activities

Table 3-1: Economic Activity Sections

Section Code	Section (Eng)	Section (Fr)
A	A - Agriculture, forestry and fishing	A - Agriculture, sylviculture et pêche
B	B - Mining and quarrying	B - Activités extractives
C	C - Manufacturing	C - Activités de fabrication
D	D - Electricity, gas, steam and air conditioning supply	D - Production et distribution d'électricité, de gaz, de vapeur et climatisation
E	E - Water supply; sewerage, waste management and remediation activities	E - Distribution d'eau; réseau d'assainissement; gestion des déchets et activités de remise en état
F	F - Construction	F - Construction
G	G - Wholesale and retail trade; repair of motor vehicles and motorcycles	G - Commerce de gros et de détail, réparations de véhicules automobiles et de motocycles
H	H - Transportation and storage	H - Transport et entreposage
I	I - Accommodation and food service activities	I - Activités d'hébergement et de restauration
J	J - Information and communication	J - Information et communication
K	K - Financial and insurance activities	K - Activités financières et d'assurances

M	M - Professional, scientific and technical activities	M - Activités professionnelles, scientifiques et techniques
N	N - Administrative and support service activities	N - Activités de services administratifs et d'appui
O	O - Public administration and defence; compulsory social security	O - Administration publique et défense; sécurité sociale obligatoire
P	P - Education	P - Éducation
R	R - Arts, entertainment and recreation	R - Arts, spectacles et loisirs
S	S - Other service activities	S - Autres activités de services

Table 3-2 Economic Activity Divisions

Division Code	Division (Eng)	Division (Fr)
A01	A01 - Crop and animal production, hunting and related service activities	A01 - Culture et production animale, chasse et activités de services connexes
A03	A03 - Fishing and aquaculture	A03 - Pêche et aquaculture
B08	B08 - Other mining and quarrying	B08 - Autres activités extractives
C10	C10 - Manufacture of food products	C10 - Fabrication de produits alimentaires et de boissons
C11	C11 - Manufacture of beverages	C11 - Fabrication de boissons
C13	C13 - Manufacture of textiles	C13 - Fabrication de textiles
C25	C25 - Manufacture of fabricated metal products, except machinery and equipment	C25 - Fabrication d'ouvrages en métaux (sauf machines et matériel)
C26	C26 - Manufacture of computer, electronic and optical products	C26 - Fabrication d'ordinateurs, d'articles électroniques et optiques
C28	C28 - Manufacture of machinery and equipment n.e.c.	C28 - Fabrication de machines et de matériel, n.c.a.
C30	C30 - Manufacture of other transport equipment	C30 - Fabrication d'autres matériels de transport
C32	C32 - Other manufacturing	C32 - Autres activités de fabrication
C33	C33 - Repair and installation of machinery and equipment	C33 - Réparation et installation de machines et de matériel
D35	D35 - Electricity, gas, steam and air conditioning supply	D35 - Production et distribution d'électricité, de gaz, de vapeur et climatisation
E36	E36 - Water collection, treatment and supply	E36 - Collecte et traitement des eaux, distribution d'eau
E39	E39 - Remediation activities and other waste management services	E39 - Activités de remise en état et autres services de traitement des déchets
F42	F42 - Civil engineering	F42 - Génie civil
G47	G47 - Retail trade, except of motor vehicles and motorcycles	G47 - Commerce de détail à l'exception des véhicules automobiles et des motocycles
H50	H50 - Water transport	H50 - Transports par eau
H51	H51 - Air transport	H51 - Transports aériens
H52	H52 - Warehousing and support activities for transportation	H52 - Magasinage et activités annexes des transports
H53	H53 - Postal and courier activities	H53 - Activités de poste et de courrier
I55	I55 - Accommodation	I55 - Hébergement
I56	I56 - Food and beverage service activities	I56 - Activités de services de restauration et de consommation de boissons
J61	J61 - Telecommunications	J61 - Télécommunications

Division Code	Division (Eng)	Division (Fr)
K65	K65 - Insurance, reinsurance and pension funding, except compulsory social security	K65 - Activités d'assurances, réassurance et de caisses de retraite, à l'exception de la sécurité sociale obligatoire
M71	M71 - Architectural and engineering activities; technical testing and analysis	M71 - Activités d'architecture et d'ingénierie; activités d'essais et d'analyses techniques
N77	N77 - Rental and leasing activities	N77 - Activités de location
N81	N81 - Services to buildings and landscape activities	N81 - Activités des services concernant les bâtiments, architecture paysagère
O84	O84 - Public administration and defense; compulsory social security	O84 - Administration publique et défense; sécurité sociale obligatoire
P85	P85 - Education	P85 - Éducation
R93	R93 - Sports activities and amusement and recreation activities	R93 - Activités sportives et de loisirs et activités récréatives
S94	S94 - Activities of membership organizations	S94 - Activités des organisations associatives

Table 3-3 Economic Activity Groups

Group Code	Group (Eng)	Group (Fr)
A017	A017 - Hunting, trapping and related service activities	A017 - Chasse, piégeage et activités de services connexes
A031	A031 - Fishing	A031 - Pêche
A032	A032 - Aquaculture	A032 - Aquaculture
B089	B089 - Mining and quarrying n.e.c.	B089 - Activités extractives, n.c.a.
C101	C101 - Processing and preserving of meat	C101 - Traitement et conservation de viande
C102	C102 - Processing and preserving of fish, crustaceans and molluscs	C102 - Traitement et conservation de poissons, crustacés et mollusques
C104	C104 - Manufacture of vegetable and animal oils and fats	C104 - Fabrication d'huiles et graisses végétales et animales
C107	C107 - Manufacture of other food products	C107 - Fabrication d'autres produits alimentaires
C110	C110 - Manufacture of beverages	C110 - Fabrication de boissons
C139	C139 - Manufacture of other textiles	C139 - Fabrication d'autres articles textiles
C251	C251 - Manufacture of structural metal products, tanks, reservoirs and steam generators	C251 - Construction et menuiserie métalliques; fabrication de citernes, réservoirs et générateurs de vapeur
C265	C265 - Manufacture of measuring, testing, navigating and control equipment; watches and clocks	C265 - Fabrication de matériel pour la mesure, la vérification, la navigation et le contrôle; horlogerie
C281	C281 - Manufacture of general-purpose machinery	C281 - Fabrication de machines d'usage général
C282	C282 - Manufacture of special-purpose machinery	C282 - Fabrication de machines d'usage spécifique
C301	C301 - Building of ships and boats	C301 - Construction de navires et de bateaux
C323	C323 - Manufacture of sports goods	C323 - Fabrication d'articles de sport
C331	C331 - Repair of fabricated metal products, machinery and equipment	C331 - Réparation d'ouvrages en métaux, de machines et matériel
D351	D351 - Electric power generation, transmission and distribution	D351 - Production, transport et distribution d'électricité
D353	D353 - Steam and air conditioning supply	D353 - Production et distribution de vapeur et climatisation
E360	E360 - Water collection, treatment and supply	E360 - Collecte et traitement des eaux, distribution d'eau

Group Code	Group (Eng)	Group (Fr)
E390	E390 - Remediation activities and other waste management services	E390 - Activités de remise en état et autres services de traitement des déchets
F422	F422 - Construction of utility projects	F422 - Projets d'installation d'équipements collectifs
F429	F429 - Construction of other civil engineering projects	F429 - Autres projets de génie civil
G476	G476 - Retail sale of cultural and recreation goods in specialized stores	G476 - Commerce de détail d'articles pour la culture et les loisirs, en magasins spécialisés
H501	H501 - Sea and coastal water transport	H501 - Transports maritimes et côtiers
H502	H502 - Inland water transport	H502 - Transports par voies navigables intérieures
H511	H511 - Passenger air transport	H511 - Transport aérien de voyageurs
H521	H521 - Warehousing and storage	H521 - Magasinage et entreposage
H522	H522 - Support activities for transportation	H522 - Activités annexes des transports
H532	H532 - Courier activities	H532 - Activités de courrier
I551	I551 - Short term accommodation activities	I551 - Activités d'hébergement temporaire
I552	I552 - Camping grounds, recreational vehicle parks and trailer parks	I552 - Terrains de camping, parcs pour véhicules de loisirs et caravanes
I561	I561 - Restaurants and mobile food service activities	I561 - Activités de restaurants et de services de restauration mobiles
J611	J611 - Wired telecommunications activities	J611 - Activités de télécommunications par câble
K651	K651 - Insurance	K651 - Activités d'assurances
M712	M712 - Technical testing and analysis	M712 - Activités d'essais et d'analyses techniques
N772	N772 - Renting and leasing of personal and household goods	N772 - Location d'articles personnels ou ménagers
N813	N813 - Landscape care and maintenance service activities	N813 - Activités des services d'entretien des espaces verts
O841	O841 - Administration of the State and the economic and social policy of the community	O841 - Administration générale; administration de la politique économique et sociale
O842	O842 - Provision of services to the community as a whole	O842 - Services fournis à l'ensemble de la collectivité
P854	P854 - Other education	P854 - Autres activités d'enseignement
R931	R931 - Sports activities	R931 - Activités sportives
R932	R932 - Other amusement and recreation activities	R932 - Autres activités récréatives et de loisirs
S949	S949 - Activities of other membership organizations	S949 - Activités d'autres organisations associatives

Table 3-4 Economic Activity Classes

Class Code	Class (Eng)	Class (Fr)
A0170	A0170 - Hunting, trapping and related service activities	A0170 - Chasse, piégeage et activités de services connexes
A0311	A0311 - Marine fishing	A0311 - Pêche en mer
A0312	A0312 - Freshwater fishing	A0312 - Pêche en eau douce
A0321	A0321 - Marine aquaculture	A0321 - Aquaculture en mer
A0322	A0322 - Freshwater aquaculture	A0322 - Aquaculture en eau douce
B0893	B0893 - Extraction of salt	B0893 - Extraction de sel
C1010	C1010 - Processing and preserving of meat	C1010 - Traitement et conservation de viande
C1020	C1020 - Processing and preserving of fish, crustaceans and molluscs	C1020 - Traitement et conservation de poissons, crustacés et mollusques
C1040	C1040 - Manufacture of vegetable and animal oils and fats	C1040 - Fabrication d'huiles et graisses végétales et animales
C1075	C1075 - Manufacture of prepared meals and dishes	C1075 - Fabrication de plats préparés
C1104	C1104 - Manufacture of soft drinks; production of mineral waters and other bottled waters	C1104 - Fabrication de boissons non alcoolisées; production d'eaux minérales et autres eaux en bouteille
C1394	C1394 - Manufacture of cordage, rope, twine and netting	C1394 - Fabrication de cordes, câbles, ficelles et filets
C2513	C2513 - Manufacture of steam generators, except central heating hot water boilers	C2513 - Fabrication de générateurs de vapeur (sauf chaudières de chauffage central à eau chaude)
C2651	C2651 - Manufacture of measuring, testing, navigating and control equipment	C2651 - Fabrication de matériel pour la mesure, la vérification, la navigation et le contrôle
C2811	C2811 - Manufacture of engines and turbines, except aircraft, vehicle and cycle engines	C2811 - Fabrication de moteurs et de turbines, sauf moteurs pour avions, automobiles et motocycles
C2825	C2825 - Manufacture of machinery for food, beverage and tobacco processing	C2825 - Fabrication de machines pour le traitement des produits alimentaires, des boissons et du tabac
C3011	C3011 - Building of ships and floating structures	C3011 - Construction de navires et d'engins flottants
C3012	C3012 - Building of pleasure and sporting boats	C3012 - Construction de bateaux de plaisance et de sport
C3230	C3230 - Manufacture of sports goods	C3230 - Fabrication d'articles de sport
C3311	C3311 - Repair of fabricated metal products	C3311 - Réparation d'ouvrages en métaux
C3315	C3315 - Repair of transport equipment, except motor vehicles	C3315 - Réparation de matériel de transport, à l'exception des véhicules à moteur
C3319	C3319 - Repair of other equipment	C3319 - Réparation d'autres matériels
D3510	D3510 - Electric power generation, transmission and distribution	D3510 - Production, transport et distribution d'électricité
D3530	D3530 - Steam and air conditioning supply	D3530 - Production et distribution de vapeur et climatisation
E3600	E3600 - Water collection, treatment and supply	E3600 - Collecte et traitement des eaux, distribution d'eau
E3900	E3900 - Remediation activities and other waste management services	E3900 - Activités de remise en état et autres services de traitement des déchets
F4220	F4220 - Construction of utility projects	F4220 - Projets d'installation d'équipements collectifs
F4290	F4290 - Construction of other civil engineering projects	F4290 - Autres projets de génie civil
G4763	G4763 - Retail sale of sporting equipment in specialized stores	G4763 - Commerce de détail de matériel pour le sport en magasins spécialisés

Class Code	Class (Eng)	Class (Fr)
H5011	H5011 - Sea and coastal passenger water transport	H5011 - Transports maritimes et côtiers de voyageurs
H5012	H5012 - Sea and coastal freight water transport	H5012 - Transports maritimes et côtiers de marchandises
H5021	H5021 - Inland passenger water transport	H5021 - Transport de voyageurs par voies navigables intérieures
H5022	H5022 - Inland freight water transport	H5022 - Transport de marchandises par voies navigables intérieures
H5110	H5110 - Passenger air transport	H5110 - Transport aérien de voyageurs
H5210	H5210 - Warehousing and storage	H5210 - Magasinage et entreposage
H5222	H5222 - Service activities incidental to water transportation	H5222 - Activités de services annexes des transports par eau
H5224	H5224 - Cargo handling	H5224 - Manutention
H5229	H5229 - Other transportation support activities	H5229 - Autres activités annexes des transports
H5320	H5320 - Courier activities	H5320 - Activités de courrier
I5510	I5510 - Short term accommodation activities	I5510 - Activités d'hébergement temporaire
I5520	I5520 - Camping grounds, recreational vehicle parks and trailer parks	I5520 - Terrains de camping, parcs pour véhicules de loisirs et caravanes
I5610	I5610 - Restaurants and mobile food service activities	I5610 - Activités de restaurants et de services de restauration mobiles
J6110	J6110 - Wired telecommunications activities	J6110 - Activités de télécommunications par câble
K6512	K6512 - Non-life insurance	K6512 - Activités d'assurances autres que sur la vie
M7120	M7120 - Technical testing and analysis	M7120 - Activités d'essais et d'analyses techniques
N7721	N7721 - Renting and leasing of recreational and sports goods	N7721 - Location d'articles pour le sport et les loisirs
N8130	N8130 - Landscape care and maintenance service activities	N8130 - Activités des services d'entretien des espaces verts
O8412	O8412 - Regulation of the activities of providing health care, education, cultural services and other social services, excluding social security	O8412 - Tutelle des activités des organismes qui s'occupent de santé, d'éducation, de culture et d'autres activités sociales, à l'exception de la sécurité sociale
O8422	O8422 - Defence activities	O8422 - Activités de défense
P8541	P8541 - Sports and recreation education	P8541 - Activités d'enseignement lié aux sports et aux loisirs
R9311	R9311 - Operation of sports facilities	R9311 - Exploitation d'installations sportives
R9312	R9312 - Activities of sports clubs	R9312 - Activités des clubs sportifs
R9319	R9319 - Other sports activities	R9319 - Autres activités sportives
R9321	R9321 - Activities of amusement parks and theme parks	R9321 - Activités des parcs d'attraction et à thèmes
R9329	R9329 - Other amusement and recreation activities n.e.c.	R9329 - Autres activités récréatives et de loisirs, n.c.a.
S9499	S9499 - Activities of other membership organizations n.e.c.	S9499 - Activités d'autres organisations associatives, n.c.a.

3.1.2 IUCN Global Ecosystem Typology 2.0

Following the Convention on Biological Diversity post-2020 agenda (CBD, 2020) and UN Sustainable Development Goals (UN, 2015a) which mandate global action that depends on ecosystem assessment, IUCN's Commission on Ecosystem Management (CEM) initiated and lead a global initiative to develop a new functional typology for the world's ecosystems. Information infrastructure supporting these global policy initiatives includes among others, the UN System of Environmental- Economic Accounting – Experimental Ecosystem Accounting (SEEA EEA). Such infrastructure requires a standardised, globally consistent, spatially explicit typology and terminology for managing the world's ecosystems and their services.

The IUCN Global Ecosystem Typology is a hierarchical classification system that, in its upper levels, defines ecosystems by their convergent ecological functions and, in its lower levels, distinguishes ecosystems with contrasting assemblages of species engaged in those functions (Keith, Ferrer-Paris, Nicholson, & Kingsford, 2020).

Version 2.0 of IUCN[15]'s Global Ecosystem Typology (IUCN, 2020) was used in version 2 of BEVTK. This superseded version 3.1 of IUCN's Ecosystem Classification system (IUCN, 2012) which was used in version 1 of BEVTK.

The Key features of the IUCN Global Ecosystem Typology include:

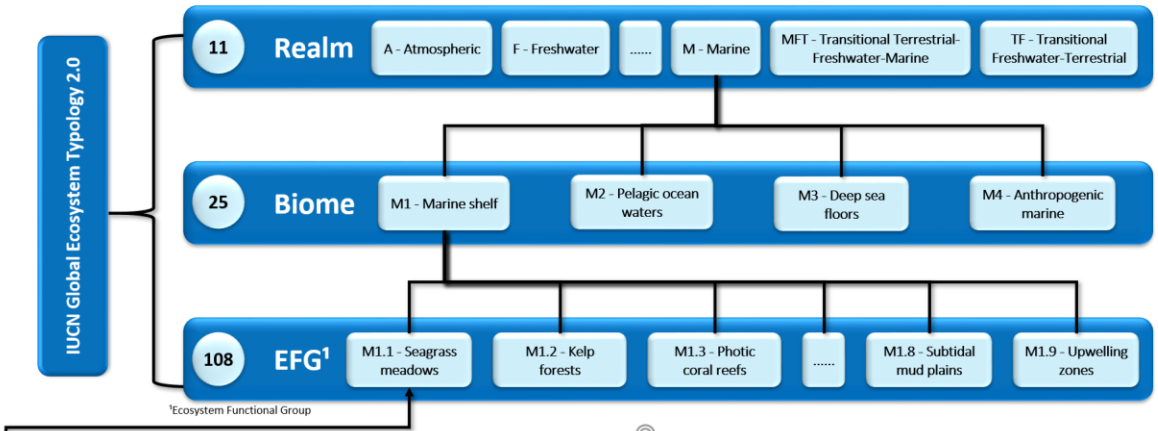
- A hierarchical structure that represents functional features of ecosystems in three upper levels and compositional features in three lower levels not used in BEVTK;
- Comprehensive coverage of earth's biosphere, encompassing terrestrial, subterranean, freshwater, marine and atmospheric environments;
- Top-down construction of upper levels to ensure global consistency and bottom-up construction of lower levels to promote local accuracy and ownership;
- Detailed documentation, including illustrated descriptive profiles for 108 Ecosystem Functional Groups (Level 3);
- Indicative global maps of Ecosystem Functional Groups (Level 3), to be developed into high resolution digital Models; at this time BEVTK's developer experimented with the raster coverage by EFG for each country to try to calculate the area covered by each relevant EFG, due to the coarse definition of the current raster files, the calculations are

[15] IUCN is a membership Union uniquely composed of both government and civil society organisations. It provides public, private and non-governmental organisations with the knowledge and tools that enable human progress, economic development and nature conservation to take place together. IUCN provides a neutral space in which diverse stakeholders including governments, NGOs, scientists, businesses, local communities, indigenous peoples organisations and others can work together to forge and implement solutions to environmental challenges and achieve sustainable development (Keith, Ferrer-Paris, Nicholson, & Kingsford, 2020).

rather approximative and not a long-term solution. The high-resolution digital models will improve that;

- Standard terminology and definitions to promote consistent application; and
- Strong scientific foundations in community assembly theory.

Overall, 11 types of Ecosystem Realms were identified, 25 Biomes and 108 Ecosystem Functional Groups or EFGs. Note that not all typologies correspond to Ecosystems which services can be attributable to the Blue Economy.



Ecosystem Classification & Service Index	Ecosystem Realm Type	Ecosystem Biome Type	Ecosystem Functional Group (EFG)	EFG description	EFG ecological traits	Ecosystem estimated size	Ecosystem estimated size unit of measurement	Quality of the Ecosystem (<30%= heavily damaged , 100%=pristine)
M11.2261	M - Marine	M1 - Marine shelf	M1.1 - Seagrass meadows	Indicative distributions of anchialine caves and pools were based on mapped areas of carbonate rock outcrop (Williams & Ting Fong, 2016) and lava flows intersecting the coast, which were aggregated within a template of 1-degree grid cells.	• Moderate-high productivity & diversity • Net autotrophic energy • Detrital & plant-based trophic structures • Structural complexity • Benthic life forms • Mega-herbivores	27,330.0 Km²		85%
M11.116	M - Marine	M1 - Marine shelf	M1.1 - Seagrass meadows	Indicative distributions of anchialine caves and pools were based on mapped areas of carbonate rock outcrop (Williams & Ting Fong, 2016) and lava flows intersecting the coast, which were aggregated within a template of 1-degree grid cells.	• Moderate-high productivity & diversity • Net autotrophic energy • Detrital & plant-based trophic structures • Structural complexity • Benthic life forms • Mega-herbivores	27,330.0 Km²		85%
M11.2112	M - Marine	M1 - Marine shelf	M1.1 - Seagrass meadows	Indicative distributions of anchialine caves and pools were based on mapped areas of carbonate rock outcrop (Williams & Ting Fong, 2016) and lava flows intersecting the coast, which were aggregated within a template of 1-degree grid cells.	• Moderate-high productivity & diversity • Net autotrophic energy • Detrital & plant-based trophic structures • Structural complexity • Benthic life forms • Mega-herbivores	27,330.0 Km²		85%

Figure 3-2: IUCN Global Ecosystem Typology 2.0 (example of nested classification linking hierarchically Realms, Biomes and EFGs)

Table 3-5 to Table 3-7 shows the IUCN nested classification system used in the template to describe the ecosystem category in the Ecosystem Services module. Note that we are only showing the rows in the classifications relevant to Blue Economy Activities.

Table 3-5 Ecosystem Classification Realms

Realm Code	Realm
F	F - Freshwater
FM	FM - Transitional Freshwater-Marine
M	M - Marine
MFT	MFT - Transitional Terrestrial-Freshwater-Marine
MT	MT - Transitional Marine-Terrestrial
S	S - Subterranean
SF	SF - Transitional Subterranean-Freshwater
SM	SM - Transitional Subterranean-Marine
T	T - Terrestrial
TF	TF - Transitional Freshwater-Terrestrial

Table 3-6 Ecosystem Classification Biomes

Biome Code	Biome
F1	F1 - Rivers and streams
F2	F2 - Lakes
F3	F3 - Artificial wetlands
FM1	FM1 - Semi-confined transitional waters
M1	M1 - Marine shelf
M2	M2 - Pelagic ocean waters
M3	M3 - Deep sea floors
M4	M4 - Anthropogenic marine
MFT1	MFT1 - Brackish tidal
MT1	MT1 - Shorelines
MT2	MT2 - Supralittoral coastal
MT3	MT3 - Anthropogenic shorelines
S1	S1 - Subterranean lithic
S2	S2 - Anthropogenic subterranean voids
SF1	SF1 - Subterranean freshwaters

SF2	SF2 - Anthropogenic subterranean freshwaters
SM1	SM1 - Subterranean tidal
T1	T1 - Tropical-subtropical forests
T2	T2 - Temperate-boreal forests and woodlands
T3	T3 - Shrublands and shrubby woodlands
T4	T4 - Savannas and grasslands
T5	T5 - Deserts and semi-deserts
T6	T6 - Polar-alpine (cryogenic)
T7	T7 - Intensive land-use
TF1	TF1 - Palustrine wetlands

Table 3-7 Ecosystem Functional Groups (EFG)

EFG Code	EFG	EFG Description	Ecological Traits
F1.1	F1.1 - Permanent upland streams	Distributions of aerobic caves and underground streams and pools were based on mapped area of carbonate rock outcrop (Williams & Ting Fong, 2016) mapped at 30 arc seconds spatial resolution. This provides an upper limit on the area of exposed karst terrain, as not all carbonate rocks are karstified. Lava tubes and other rocks that may contain these ecosystem functional groups are not shown on this indicative map, but are less extensive than those in carbonate rock.	▪ Limited productivity ▪ Low diversity ▪ Allochthonous energy subsidies ▪ Downstream energy export & beta-diversity ▪ Simple trophic structure ▪ Biofilm & bryophyte autotrophs ▪ Benthic biota dominant ▪ Filter feeding ▪ Small predators
F1.2	F1.2 - Permanent lowland rivers	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ High productivity ▪ Autochthonous & allochthonous energy ▪ Geomorphic dynamism ▪ Diverse trophic structure ▪ Microalgae & macrophytes ▪ Diverse pelagic life forms ▪ Diverse life histories & environmental tolerance ▪ Mobile links
F1.4	F1.4 - Seasonal upland streams	Major occurrences of freshwater marshes and floodplains were taken from the Global Lakes and Wetlands Database (Lehner & Döll, 2004). Occurrences in boreal and polar climates were excluded by removing Köppen-Geiger classes>26 in Beck et al., (2018). Additional areas with minor occurrences identified in selected freshwater ecoregions (Abell et al., 2008). Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile. Occurrences were aggregated to half degree spatial resolution.	▪ Simple trophic structure ▪ Allochthonous energy ▪ Primary productivity driven by benthic algae ▪ Low diversity, local endemism ▪ Dormant life phases ▪ Omnivorous diet ▪ Small body sizes
F1.5	F1.5 - Seasonal lowland rivers	Locations of pan, brackish and saline wetlands were taken from the Global Lakes and Wetlands Database GLWD3 class 7 from Lehner & Döll (2004). Occurrences were aggregated to half degree spatial resolution.	▪ Complex trophic structure ▪ High primary (algal) & secondary productivity ▪ High diversity ▪ Large, mobile predators ▪ Omnivory ▪ Seasonal reproduction, dispersal & migration ▪ Varied body sizes
F1.6	F1.6 - Episodic arid rivers	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ Moderate-high productivity ▪ Complex trophic structure ▪ Boom-bust dynamics ▪ Rapid recruitment ▪ Dormancy, resting phases ▪ High mobility ▪ Drought refugia
F1.7	F1.7 - Large lowland rivers	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ Very high productivity & endemism ▪ Autochthonous & allochthonous energy ▪ Geomorphic dynamism ▪ Complex trophic structure ▪ Microalgae & macrophytes ▪ Diverse pelagic life forms ▪ Large predators ▪ Mobile links
F2.1	F2.1 - Large permanent freshwater lakes	Freshwater ecoregions (Abell et al., 2008) containing urban and industrialised areas with water transfer infrastructure were identified by consulting available ecoregion descriptions (TNC & WWF, n.d.), maps of irrigation and other water infrastructure, and expertise of authors. Due to uncertainty and limited verification and likely limited spatial extent within mapped areas, all inferred occurrences were shown as minor at 30 arc seconds spatial resolution.	▪ High productivity ▪ Autochthous & allochthonous energy ▪ High diversity & trophic complexity ▪ Local endemism ▪ Buffered trophic states ▪ Biotic zonation ▪ Specialised life history & feeding traits
F2.2	F2.2 - Small permanent freshwater lakes	Point records of flooded mines were compiled from public databases (UNEXMIN, n.d.)), an internet search for "flooded mines" and locations of deep mines inferred from world mineral resources spatial data (USGS, n.d.). Terrestrial ecoregions (Dinerstein et al., 2017) with concentrations of these records were selected to represent an indicative global distribution of flooded mines at 30 arc seconds spatial resolution.	▪ Moderate seasonal variation in productivity ▪ Trophic complexity related to lake size and depth ▪ Oligotrophic-eutrophic state dynamics ▪ Biotic zonation ▪ Specialised life history and feeding traits

EFG Code	EFG	EFG Description	Ecological Traits
F2.3	F2.3 - Seasonal freshwater lakes	Freshwater ecoregions (Abell et al., 2008) were identified as containing occurrences of these functional groups if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile. Within those areas, locations of small lakes (<100 km2), excluding artificial lakes (inclusion on types 1 and 3 only), were taken from the HydroLAKES database (Messager et al., 2016) and combined with global estimates of surface water phenology (classes 1, 2 and 7 from Pekel et al., 2016), occurrences were aggregated to 10 minutes spatial resolution.	▪ Moderate-high, strongly seasonal productivity ▪ Local endemism in some regions ▪ Simple trophic structure ▪ Biotic zonation ▪ Seasonal dormancy & movement ▪ Ruderal life histories
F2.5	F2.5 - Ephemeral freshwater lakes	Location of natural ephemeral freshwater lakes was taken from global lake databases (Lehner & Döll, 2004; types 1 and 3 from Messager et al., 2016), excluding those from endorheic basins cf. F2.7 (Linke et al., 2019), and intersected with estimates of ephemeral surface water (classes 9 and 10 from Pekel et al., 2016). Occurrences were aggregated to 10 minutes spatial resolution.	▪ Variable productivity ▪ Simple trophic structure ▪ Algal primary producers ▪ Small detritivores & predators ▪ Ruderal life cycles ▪ Dormant life phases ▪ Planktonic life forms
F2.6	F2.6 - Permanent salt and soda lakes	Major occurrences were compiled from a list of known salt lakes in Wurtsbaugh et al., (2017) and augmented by authors, then matched with names in the HydroLAKES database to identify natural lakes (types 1 and 3 of Messager et al., 2016). Minor occurrences were mapped within arid and semi-arid parts of selected freshwater ecoregions (Abell et al., 2008) by clipping ecoregions to exclude areas with mean annual rainfall >250 mm (Harris et al., 2014a). Freshwater ecoregions (Abell et al., 2008) were selected if they contained occurrences of permanent salt, or soda lakes, if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile. Occurrences were aggregated to 10 minutes spatial resolution.	▪ Simple trophic structure ▪ Diversity decreases with salinity ▪ Bacteria & algae dominate primary production ▪ Crustacean-dominated secondary production ▪ Halophytic fringe ▪ Specialist waterbirds (i.e. flamingos)
F2.7	F2.7 - Ephemeral salt lakes	Location of ephemeral lakes was taken from global lake databases (Lehner & Döll, 2004; types 1 and 3 from Messager et al., 2016), intersected with estimates of ephemeral surface water (classes 9 and 10 from Pekel et al., 2016) and the distribution of arid and semi-arid, endorheic basins (Linke et al., 2019). Occurrences were aggregated to 10 minutes spatial resolution. Occurrences were aggregated to 10 minutes spatial resolution.	▪ Highly variable primary production ▪ Simple trophic structure ▪ Fringing halophytes ▪ Low diversity, high abundance ▪ Osmotic regulation ▪ Dormant life phases ▪ High mobility
F2.8	F2.8 - Artesian springs and oases	Freshwater ecoregions (Abell et al., 2008) were identified as containing occurrences of these functional groups if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile. Within those areas, locations of small lakes (<100 km2), excluding artificial lakes (inclusion on types 1 and 3 only), were taken from the HydroLAKES database (Messager et al., 2016) and combined with global estimates of surface water phenology (classes 1, 2 and 7 from Pekel et al., 2016), occurrences were aggregated to 10 minutes spatial resolution.	▪ Stable productivity ▪ High endemism ▪ Simple trophic structure ▪ Aquatic floating & amphibious plants ▪ Small detritivores & predators ▪ Continuous life cycles ▪ Mobile links
F2.9	F2.9 - Geothermal pools and wetlands	Freshwater ecoregions (Abell et al., 2008) were identified as containing occurrences of these functional groups if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile. Within those areas, locations of small lakes (<100 km2), excluding artificial lakes (inclusion on types 1 and 3 only), were taken from the HydroLAKES database (Messager et al., 2016) and combined with global estimates of surface water phenology (classes 1, 2 and 7 from Pekel et al., 2016), occurrences were aggregated to 10 minutes spatial resolution.	▪ Low productivity & diversity ▪ Simple trophic structure ▪ Chemoautotrophic & photoautotrophic energy ▪ Successional gradients ▪ Thermophilic & metallophilic biota ▪ Invertebrate detritivores ▪ Heat tolerance
F3.1	F3.1 - Large reservoirs	Point locations of large reservoirs were obtained from water bodies tagged as 'reservoirs' in 'reservoirs' in vector layers GLWD1 and GLWD2 of Lehner & Döll (2004). These were mapped with a spatial buffer of 15 minutes, enabling reservoirs to be represented in 0.5 degree grid cells.	▪ Low to moderate productivity ▪ Low diversity & endemism ▪ Simple trophic structure ▪ Littoral-limnetic zonation ▪ Dominated by managed biota & opportunists ▪ Mostly pelagic biota
F3.2	F3.2 - Constructed lacustrine wetlands	Freshwater ecoregions (Abell et al., 2008) were identified as containing major or minor occurrences of these functional groups if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile. The selections were check by expert reviewers. Occurrences were mapped at 30 arc seconds spatial resolution.	▪ Low to high productivity, dependent on context & management ▪ High to low diversity ▪ Low endemism ▪ Varied trophic complexity ▪ Managed biota & opportunists ▪ Limited zonation

EFG Code	EFG	EFG Description	Ecological Traits
F3.3	F3.3 - Rice paddies	The distribution of rice paddies was estimated from the percentage of rice cover at a 5 arc minute resolution based on Monfreda et al. (2008). Cells with > 10% rice cover were designated as major occurrences, and those with 1%–10% rice cover were designated as minor occurrences.	▪ Very high productivity ▪ Low diversity & endemism ▪ Simple trophic structure ▪ Dominated by managed biota & opportunists ▪ Low horizontal & vertical heterogeneity ▪ Movement traits ▪ Dormant life stages
F3.4	F3.4 - Freshwater aquafarms	Freshwater ecoregions (Abell et al., 2008) were identified as containing major or minor occurrences of these functional groups if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile. The selections were check by expert reviewers. Occurrences were mapped at 30 arc seconds spatial resolution.	▪ Very high productivity ▪ Strongly allochthonous ▪ Low biotic & functional diversity ▪ Simple trophic structure ▪ Dominated by managed biota & opportunists ▪ Few primary producers ▪ Low niche diversity ▪ Rapid growth traits
F3.5	F3.5 - Canals, ditches and drains	Freshwater ecoregions (Abell et al., 2008) were identified as containing major or minor occurrences of these functional groups if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile. The selections were check by expert reviewers. Occurrences were mapped at 30 arc seconds spatial resolution.	▪ Low diversity ▪ Low heterogeneity ▪ Simple trophic structure ▪ Primary production by algal films, macrophytes & phytoplankton ▪ Opportunistic life histories ▪ Small body sizes
FM1.1	FM1.1 - Deepwater coastal inlets	Known locations of fjords where selected from a global geographical gazetteer (GeoNames, 2020) and the composite gazetteer of Antarctica (SCAR, 1992-2020). We further selected related coastal areas from a global coastal typology (Type IV in Dürr et al., 2011) and the adjacent marine shelfs to 2,000 meter depth (Becker et al., 2009). A composite map was created at 30 arc seconds spatial resolution in geographic projection, occurrences were then aggregated to half degree spatial resolution and reclassified as major occurrences (cells with at least one known occurrence) and minor occurrences (cells with > 5% occurrence of coastal/marine shelf areas). Minor occurrences were clipped to a 50-km buffer along the coast to remove inland and oceanic areas.	▪ Seasonally high productivity ▪ Pelagic-benthic coupling ▪ Links to marine systems ▪ Abundant consumers ▪ Density-dependent fish ▪ Broad salinity tolerance ▪ Biogeochemical processing
FM1.2	FM1.2 - Permanently open riverine estuaries and bays	Marine ecoregions (Spalding et al., 2008) containing major or minor occurrences of each EFG were identified by consulting global and regional reviews, maps of relevant ecosystems, imagery available in Google Earth and expertise of authors. Occurrences were converted to 30 arc seconds spatial resolution and clipped to a 50-km buffer along the coastline to exclude inland and offshore areas of the ecoregions.	▪ Locally high productivity ▪ Complex trophic structure ▪ Links with marine, freshwater & terrestrial food webs ▪ Abundant consumers ▪ Broad salinity tolerance ▪ Biogeochemical processing
FM1.3	FM1.3 - Intermittently closed and open lakes and lagoons	Marine ecoregions (Spalding et al., 2008) containing major or minor occurrences of each EFG were identified by consulting global and regional reviews, maps of relevant ecosystems, imagery available in Google Earth and expertise of authors. Occurrences were converted to 30 arc seconds spatial resolution and clipped to a 50-km buffer along the coastline to exclude inland and offshore areas of the ecoregions.	▪ High productivity ▪ Moderate diversity ▪ Net heterotrophic energy ▪ Simple trophic network ▪ Structurally complex ▪ Benthic-dominated ▪ Short life cycles
M1.1	M1.1 - Seagrass meadows	Indicative distributions of anchialine caves and pools were based on mapped areas of carbonate rock outcrop (Williams & Ting Fong, 2016) and lava flows intersecting the coast, which were aggregated within a template of 1-degree grid cells.	▪ Moderate-high productivity & diversity ▪ Net autotrophic energy ▪ Detrital & plant-based trophic structures ▪ Structural complexity ▪ Benthic life forms ▪ Mega-herbivores
M1.2	M1.2 - Kelp forests	Indicative distributions of anchialine caves and pools were based on mapped areas of carbonate rock outcrop (Williams & Ting Fong, 2016) and lava flows intersecting the coast, which were aggregated within a template of 1-degree grid cells.	▪ High productivity & diversity ▪ Net autotrophic energy ▪ Complex trophic structures ▪ Macroalgal dominants ▪ Structural complexity ▪ Epibiotic life forms ▪ Benthic herbivores
M1.3	M1.3 - Photic coral reefs	Marine ecoregions (Spalding et al., 2008) containing occurrences of rocky coastline (see MT1.1) were verified by inspection of imagery available in Google Earth to identify an envelope of potential distribution for sea caves. The coastlines within these ecoregions were summarised using a template of 1-degree grid cell intersected with the coast. As caves represent a small portion of such coastlines, all mapped areas were designated as minor occurrences.	▪ High diversity & endemism ▪ Autotrophic energy ▪ Extended trophic structure ▪ Dominated by corals ▪ Structural dependents ▪ Specialised feeding & reproductive behaviour
M1.4	M1.4 - Shellfish beds and reefs	Major and minor occurrences of shellfish beds and reefs were identified by overlaying a global map of oyster reefs (Beck et al., 2011) on marine ecoregions (Spalding et al., 2008), and then clipping to the extent of the marine 'shelf' base layer as mapped by Harris et al. (2014b). Occurrences were converted to 30 arc seconds spatial resolution.	▪ High productivity & moderate diversity ▪ Heterotrophic energy ▪ Structural complexity from shell aggregations ▪ Dominated by sessile filter-feeders ▪ Secondary deposit-feeders

EFG Code	EFG	EFG Description	Ecological Traits
M1.5	M1.5 - Photo-limited marine animal forests	These are EFGs that are widespread through the global extent of the marine shelf biome. Reliable data on their precise distribution are limited. To represent regional uncertainty, their indicative distributions were mapped in as minor occurrences through the full extent of the marine 'shelf' base layer as mapped by Harris et al. (2014b). Occurrences were converted to 30 arc seconds spatial resolution.	▪ Moderate productivity ▪ High epifaunal diversity ▪ Trophic complexity ▪ Allochthonous energy ▪ Micro-autotrophs ▪ Dominant sessile filterfeeders, detritivores ▪ Benthic specialists, ambush predators
M1.6	M1.6 - Subtidal rocky reefs	These are EFGs that are widespread through the global extent of the marine shelf biome. Reliable data on their precise distribution are limited. To represent regional uncertainty, their indicative distributions were mapped in as minor occurrences through the full extent of the marine 'shelf' base layer as mapped by Harris et al. (2014b). Occurrences were converted to 30 arc seconds spatial resolution.	▪ High productivity & diversity ▪ Trophic complexity ▪ Authochthonous & allochthonous energy ▪ Dominated by sessile filter feeders & algae ▪ Benthic specialists, ambush predators
M1.7	M1.7 - Subtidal sand beds	These are EFGs that are widespread through the global extent of the marine shelf biome. Reliable data on their precise distribution are limited. To represent regional uncertainty, their indicative distributions were mapped in as minor occurrences through the full extent of the marine 'shelf' base layer as mapped by Harris et al. (2014b). Occurrences were converted to 30 arc seconds spatial resolution.	▪ Moderate productivity ▪ Low-moderate diversity ▪ Simple trophic structure ▪ Allochthonous energy ▪ Detritivores & filter-feeders dominant ▪ Few autotrophs ▪ Burrowing organisms ▪ Benthic camouflage
M1.8	M1.8 - Subtidal mud plains	These are EFGs that are widespread through the global extent of the marine shelf biome. Reliable data on their precise distribution are limited. To represent regional uncertainty, their indicative distributions were mapped in as minor occurrences through the full extent of the marine 'shelf' base layer as mapped by Harris et al. (2014b). Occurrences were converted to 30 arc seconds spatial resolution.	▪ Moderate productivity ▪ Low-moderate diversity ▪ Allochthonous energy ▪ Simple trophic structure ▪ Burrowing deposit-feeders dominant ▪ Few autotrophs ▪ Forage predators
M1.9	M1.9 - Upwelling zones	Marine ecoregions (Spalding et al., 2008) with major and minor occurrences of Upwelling zones were identified by consulting global and regional reviews (cited in descriptive profile), maps of relevant ecosystems and expertise of authors, proofed by specialist reviewers. The identified ecoregions were then clipped to the extent of the marine 'shelf' base layer as mapped by Harris et al. (2014b). Occurrences were converted to 30 arc seconds spatial resolution.	▪ High variable productivity ▪ Moderate -high diversity ▪ Complex trophic structure dominated by forage fish ▪ Autochthonous energy ▪ Planktonic autotrophs ▪ Abundant predatory fish ▪ Schooling behaviour in forage fish
M2.1	M2.1 - Epipelagic ocean waters	Indicative distributions of the marine pelagic EFGs were derived from bathymetric spatial data obtained from Becker et al. (2009) using depth range thresholds cited in respective descriptive profiles for each functional group. Occurrences were mapped at 30 arc seconds spatial resolution.	▪ High productivity ▪ Seasonal variation in productivity with latitude ▪ Autochthonous energy ▪ Planktonic autotrophs ▪ Variable trophic structure ▪ Abundant predatory fish ▪ Migration (vertical & horizontal)
M2.2	M2.2 - Mesopelagic ocean waters	Indicative distributions of the marine pelagic EFGs were derived from bathymetric spatial data obtained from Becker et al. (2009) using depth range thresholds cited in respective descriptive profiles for each functional group. Occurrences were mapped at 30 arc seconds spatial resolution.	▪ Low productivity ▪ Low diversity ▪ Allochthonous energy ▪ Truncated trophic structure, no autotrophs ▪ Detritivores & predators ▪ Bioluminescence ▪ Vertical diurnal migration
M2.3	M2.3 - Bathypelagic ocean waters	Indicative distributions of the marine pelagic EFGs were derived from bathymetric spatial data obtained from Becker et al. (2009) using depth range thresholds cited in respective descriptive profiles for each functional group. Occurrences were mapped at 30 arc seconds spatial resolution.	▪ Low productivity ▪ Low diversity ▪ Allochthonous energy ▪ Truncated trophic structure, no autotrophs ▪ Detritivores & predators ▪ Sensory specialisations ▪ Vertical diurnal migration ▪ Slow metabolism & life history
M2.4	M2.4 - Abyssopelagic ocean waters	Indicative distributions of the marine pelagic EFGs were derived from bathymetric spatial data obtained from Becker et al. (2009) using depth range thresholds cited in respective descriptive profiles for each functional group. Occurrences were mapped at 30 arc seconds spatial resolution.	▪ Very low productivity ▪ Low diversity ▪ Allochthonous energy ▪ Truncated trophic structure, no autotrophs ▪ Detritivores & predators ▪ Sensory specialisations ▪ Slow metabolism & life history
M3.1	M3.1 - Continental and island slopes	Major occurrences of continental and island slopes were based on the 'slope' geomorphic unit of Harris et al. (2014b). Occurrences were converted to 30 arc seconds spatial resolution.	▪ Decreasing biomass ▪ High diversity ▪ Allochthonous energy ▪ Truncated trophic structure (no autotrophs) ▪ Heterotrophs dominant: scavengers & detritivores ▪ High pressure tolerance ▪ Darkness adaptations
M3.2	M3.2 - Submarine canyons	Major occurrences of submarine canyons was based on the 'canyons' geomorphic unit of Harris et al. (2014b). Occurrences were converted to 30 arc seconds spatial resolution.	▪ High productivity & biomass ▪ High heterotrophic diversity ▪ Filter-feeders inhabit walls ▪ Deposit-feeders & predators dominate axis ▪ Habitat heterogeneity ▪ Refuge, nursery & spawning sites

EFG Code	EFG	EFG Description	Ecological Traits
M3.3	M3.3 - Abyssal plains	Major occurrences of Abyssal plains was based on the 'plains' and 'hills' classes within the abyssal geomorphic unit of Harris et al. (2014b). Occurrences were converted to 30 arc seconds spatial resolution.	▪ Low productivity & biomass ▪ High diversity ▪ Allochthonous energy ▪ Truncated trophic structure (no autotrophs) ▪ Heterotrophs dominant: scavengers & detritivores ▪ High pressure tolerance ▪ Benthic lifeforms
M3.4	M3.4 - Seamounts, ridges and plateaus	Major occurrences of seamounts, ridges and plateaus was based on the 'mountains' classes within the abyssal geomorphic unit of Harris et al. (2014b). Occurrences were converted to 30 arc seconds spatial resolution.	▪ High secondary productivity & diversity ▪ Allochthonous energy ▪ Structural heterogeneity ▪ Truncated trophic structure, no autotrophs ▪ Suspension feeders & predators dominant ▪ Endemism
M3.5	M3.5 - Deepwater biogenic beds	The distribution of deepwater biogenic beds was based on the 'mountains' and 'hills' classes within the abyssal geomorphic unit of Harris et al. (2014b). These were mapped in yellow as minor occurrences to acknowledge considerable uncertainties in the distribution of biogenic beds within these geomorphic units. Occurrences were converted to 30 arc seconds spatial resolution.	▪ Structural heterogeneity ▪ High diversity ▪ Allochthonous energy ▪ Truncated trophic structure, no autotrophs ▪ Suspension feeders, detritivores & predators ▪ Slow metabolism & life history, low productivity
M3.6	M3.6 - Hadal trenches and troughs	Major occurrences of Hadal trenches and troughs was based on the 'hadal' and 'trenches' geomorphic units of Harris et al. (2014b). Occurrences were converted to 30 arc seconds spatial resolution.	▪ Low productivity & biomass ▪ Allochthonous energy ▪ Simple trophic structure ▪ Heterotrophs dominant: scavengers & detritivores ▪ Chemoautotrophic symbiosis ▪ High pressure tolerance ▪ Darkness adaptations ▪ Gigantism in crustaceans
M3.7	M3.7 - Chemosynthetic-based ecosystems (CBE)	Major occurrences of Chemosynthetic-based ecosystems was based on the distribution of hydrothermal vents on spreading plate boundaries mapped in 'Plate lines and polygons' data by USGS, ESRI (n.d.). Occurrences were converted to 30 arc seconds spatial resolution. The distribution of cold seeps is poorly known and was not mapped.	▪ High productivity & biomass ▪ Local endemism ▪ Low diversity (particularly vents and seeps) ▪ Chemoautotrophy ▪ Symbiosis: fauna-microbes ▪ High pressure tolerance ▪ Darkness adaptations
M4.1	M4.1 - Submerged artificial structures	Marine ecoregions that include occurrences of submerged artificial structures were identified by overlaying a mapped distribution of shipwrecks (Monfils, 2004) on marine ecoregions (Spalding et al., 2008). Occurrences were converted to 30 arc seconds spatial resolution. In many cases these ecoregions encompassed other submerged structures such as energy infrastructure. To represent uncertainty, indicative distributions were mapped as minor occurrences.	▪ Very high productivity ▪ Moderate diversity & high abundance ▪ No endemism ▪ Opportunistic dispersal & colonisation traits ▪ Abundant zooplankton ▪ Filter-feeders ▪ Zooplanktivorous fish ▪ Large predators
M4.2	M4.2 - Marine aquafarms	Marine ecoregions (Spalding et al., 2008) containing marine aquafarms were identified by consulting global and regional reviews, suitability maps (Gentry et al., 2017) and expertise of authors, proofed by specialist reviewers. These were clipped to the extent of the marine 'shelf' base layer as mapped by Harris et al. (2014b) and converted to 30 arc seconds spatial resolution. Occurrences were aggregated to half degree spatial resolution.	▪ Very high productivity ▪ Strongly allochthonous ▪ Low biotic diversity ▪ Simple trophic structure ▪ Dominated by managed biota & opportunists ▪ Few primary producers ▪ Low niche diversity ▪ Rapid growth traits
MFT1.1	MFT1.1 - Coastal river deltas	The extent of major coastal deltas was taken directly from Tessler et al. (2015), which was checked for completeness against point locations shown in Figure 1 of Goodbred & Saito (2012) and found to be inclusive of major occurrences. The data from Tessler et al. (2015) were at 30 arc seconds spatial resolution.	▪ Very high productivity ▪ Net allochthonous energy ▪ Complex trophic structure ▪ High niche diversity ▪ High endemism ▪ Complex spatial mosaics ▪ Salinity tolerance ▪ In-sediment specialists ▪ Opportunistic life histories
MFT1.2	MFT1.2 - Intertidal forests and shrublands	The indicative map for Intertidal forests and shrublands was based on mapping by Giri et al. (2011) summarised within a template of 1-degree grid cells. Cells with >200 km2 of intertidal woody cover were reclassified as major occurrences, and those with 5 km2–200 km2 of intertidal woody cover were reclassified as minor occurrences.	▪ High productivity, autotrophic energy ▪ Low diversity & endemism ▪ Structural & trophic complexity ▪ Salt tolerance traits ▪ Oxygen transport traits ▪ Itinerant terrestrial & marine biota
MFT1.3	MFT1.3 - Coastal saltmarshes and reedbeds	The indicative map for Coastal saltmarshes was based on mapping by McOwen et al. (2017) summarised within a template of 1-degree grid cells. Cells with >5% cover of marsh vegetation were reclassified as major occurrences, and those with non-zero cover up to 5% were reclassified as minor occurrences.	▪ Moderate productivity ▪ Autochthonous & allochthonous energy ▪ Spatial zonation ▪ Trophic complexity ▪ Salt tolerance traits ▪ Oxygen transport traits ▪ Foraging & nesting birds ▪ Itinerant terrestrial & marine biota

EFG Code	EFG	EFG Description	Ecological Traits
MT1.1	MT1.1 - Rocky shorelines	Marine ecoregions (Spalding et al., 2008) containing rocky shorelines and boulder and cobble shorelines, respectively, were identified by consulting regional substrate maps, imagery available in Google Earth (to exclude ecoregions with extensive sandy or muddy shores) and expertise of authors, proofed by specialist reviewers. Occurrences were aggregated to 1 degree spatial resolution.	▪ Moderate-high productivity ▪ High diversity & endemism ▪ Stunted growth forms ▪ Moisture-retention traits ▪ Filter-feeders & scrapers ▪ Terrestrial and marine predators
MT1.2	MT1.2 - Muddy shorelines	Tidal flats were mapped directly from remote sensing time series and aggregated to 1 degree spatial resolution by Murray et al. (2018). Major occurrences were mapped in 1-degree cells with >200 km2 mudflat extent, and minor occurrences were mapped in cells with 5 km2–200 km2 mudflat extent.	▪ High productivity, allochthonous sources ▪ Low-medium diversity ▪ Soft- and hard-bodied invertebrates ▪ Detritivore & deposit-feeding modes ▪ Terrestrial and marine predators ▪ Migratory stopovers
MT1.3	MT1.3 - Sandy shorelines	The indicative map of Sandy shorelines was based on point records of sandy coastlines mapped by Vousdoukas et al. (2020) aggregated to 1 degree spatial resolution. Cells with >50 points were reclassified as major occurrences, and those with 1–50 points were reclassified as minor occurrences.	▪ Low productivity, net heterotrophic energy ▪ Moderate-high diversity, low endemism ▪ Meio-fauna dominance ▪ Adaptations to shifting sediments ▪ Itinerant terrestrial & marine biota
MT1.4	MT1.4 - Boulder and cobble shores	Marine ecoregions (Spalding et al., 2008) containing rocky shorelines and boulder and cobble shorelines, respectively, were identified by consulting regional substrate maps, imagery available in Google Earth (to exclude ecoregions with extensive sandy or muddy shores) and expertise of authors, proofed by specialist reviewers. Occurrences were aggregated to 1 degree spatial resolution.	▪ Low productivity, net heterotrophic energy ▪ Low diversity & endemism ▪ Adaptations to shifting particles – low tenacity ▪ Nocturnal activity ▪ Desiccation tolerance ▪ Salt tolerance
MT2.1	MT2.1 - Coastal shrublands and grasslands	Coastlines were mapped between 60°S and 60°N with a 20-km buffer applied.	▪ Moderate productivity ▪ Mostly low endemism ▪ Simple trophic structure ▪ Salinity tolerance ▪ Opportunistic life histories ▪ Desiccation tolerance ▪ Long-distance dispersal ▪ Clonal plant forms
MT3.1	MT3.1 - Artificial shorelines	Marine ecoregions (Spalding et al., 2008) containing major and minor occurrences of urbanised shorelines were identified from the map of night lights (see T7.4), imagery available on Google Earth and expertise of authors. Occurrences were aggregated to 1 degree spatial resolution and intersected with the coastline to exclude areas inland and in the open ocean.	▪ High productivity ▪ Low diversity & high abundance ▪ No endemism ▪ Opportunistic dispersal & colonisation traits ▪ Biofilms & filter-feeders ▪ Few large predators
S1.1	S1.1 - Aerobic caves	Distributions of aerobic caves and underground streams and pools were based on mapped area of carbonate rock outcrop (Williams & Ting Fong, 2016) mapped at 30 arc seconds spatial resolution. This provides an upper limit on the area of exposed karst terrain, as not all carbonate rocks are karstified. Lava tubes and other rocks that may contain these ecosystem functional groups are not shown on this indicative map, but are less extensive than those in carbonate rock.	▪ Very low productivity ▪ Aphotic energy synthesis ▪ Slow decomposition ▪ Low diversity, high endemism ▪ Truncated trophic networks (heterotrophic) ▪ Dominated by microorganism & invertebrate detritivores
S1.2	S1.2 - Endolithic systems	Global distribution throughout the earth's crust. Not mapped.	▪ Very low productivity ▪ Aphotic energy synthesis ▪ Slow metabolism, growth & decomposition ▪ Low diversity ▪ Truncated trophic networks dominated by microorganisms (lithoautotrophs & heterotrophs)
S2.1	S2.1 - Anthropogenic subterranean voids	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ Very low productivity ▪ Slow decomposition ▪ Low diversity ▪ Low endemism ▪ Truncated trophic networks ▪ Heterotrophic opportunists dominant
SF1.1	SF1.1 - Underground streams and pools	Distributions of aerobic caves and underground streams and pools were based on mapped area of carbonate rock outcrop (Williams & Ting Fong, 2016) mapped at 30 arc seconds spatial resolution. This provides an upper limit on the area of exposed karst terrain, as not all carbonate rocks are karstified. Lava tubes and other rocks that may contain these ecosystem functional groups are not shown on this indicative map, but are less extensive than those in carbonate rock.	▪ Very low productivity ▪ Truncated trophic networks (heterotrophic) ▪ Dominated by microorganism & invertebrate detritivores & predators ▪ Slow decomposition ▪ Low diversity, high endemism

EFG Code	EFG	EFG Description	Ecological Traits
SF1.2	SF1.2 - Groundwater ecosystems	Indicative global maps of Groundwater aquifers were based on BGR & UNESCO (2012) with colour ramp showing type of aquifer by recharge rate, only in major groundwater basins (type 11 (minor occurrences) to type 15 (major occurrences).	▪ Low productivity ▪ Truncated trophic networks (heterotrophic) ▪ Microbial & invertebrate decomposers & predators ▪ Low diversity, high endemism ▪ Darkness traits ▪ Slow metabolism ▪ Body shape & segmentation
SF2.1	SF2.1 - Water pipes and subterranean canals	Freshwater ecoregions (Abell et al., 2008) containing urban and industrialised areas with water transfer infrastructure were identified by consulting available ecoregion descriptions (TNC & WWF, n.d.), maps of irrigation and other water infrastructure, and expertise of authors. Due to uncertainty and limited verification and likely limited spatial extent within mapped areas, all inferred occurrences were shown as minor at 30 arc seconds spatial resolution.	▪ Low taxonomic & functional diversity ▪ Allochthonous energy ▪ Very low productivity ▪ Simple, truncated trophic networks ▪ Heterotrophs dominant, autotrophs absent ▪ Few predators
SF2.2	SF2.2 - Flooded mines and other voids	Point records of flooded mines were compiled from public databases (UNEXMIN, n.d.)), an internet search for "flooded mines" and locations of deep mines inferred from world mineral resources spatial data (USGS, n.d.). Terrestrial ecoregions (Dinerstein et al., 2017) with concentrations of these records were selected to represent an indicative global distribution of flooded mines at 30 arc seconds spatial resolution.	▪ Low taxonomic & functional diversity ▪ Autochthonous energy ▪ Very low productivity ▪ Simple, truncated trophic networks ▪ Heterotrophs dominant, photoautotrophs absent ▪ Few predators
SM1.1	SM1.1 - Anchialine caves	Indicative distributions of anchialine caves and pools were based on mapped areas of carbonate rock outcrop (Williams & Ting Fong, 2016) and lava flows intersecting the coast, which were aggregated within a template of 1-degree grid cells.	▪ Low productivity ▪ High endemism ▪ Truncated but diverse trophic networks ▪ Suspension feeders, detritivores & predators ▪ Heterotrophic marine microbes, macroinvertebrates & fish ▪ In situ biogeochemical cycling
SM1.2	SM1.2 - Anchialine pools	Indicative distributions of anchialine caves and pools were based on mapped areas of carbonate rock outcrop (Williams & Ting Fong, 2016) and lava flows intersecting the coast, which were aggregated within a template of 1-degree grid cells.	▪ High productivity, increasing with age ▪ Diverse trophic networks ▪ Abundant photoautotrophs ▪ Suspension feeders, detritivores & predators ▪ Heterotrophic microbes & macro-invertebrates ▪ Predatory fish & birds ▪ Ecological dynamism
SM1.3	SM1.3 - Sea caves	Marine ecoregions (Spalding et al., 2008) containing occurrences of rocky coastline (see MT1.1) were verified by inspection of imagery available in Google Earth to identify an envelope of potential distribution for sea caves. The coastlines within these ecoregions were summarised using a template of 1-degree grid cell intersected with the coast. As caves represent a small portion of such coastlines, all mapped areas were designated as minor occurrences.	▪ Low productivity ▪ High diversity, some endemics ▪ Truncated but diverse trophic networks ▪ Stygophiles & stygoxenes ▪ Suspension feeders, detritivores & predators ▪ Heterotrophic marine microbes, macroinvertebrates & fish
T1.1	T1.1 - Tropical subtropical lowland rainforests	Major and minor occurrences were initially identified using consensus land-cover maps (Tuanmu & Jetz, 2014) and then cropped to selected terrestrial ecoregions (Dinerstein et al., 2017) at 30 arc second spatial resolution. Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile.	▪ High productivity ▪ High plant & canopy fauna diversity ▪ Complex dense tree canopy & substrata ▪ Complex vertically stratified trophic network ▪ Shade tolerance & gap phase dynamics
T1.2	T1.2 - Tropical subtropical dry forests and thickets	Major and minor occurrences were initially identified using consensus land-cover maps (Tuanmu & Jetz, 2014) and then cropped to selected terrestrial ecoregions (Dinerstein et al., 2017) at 30 arc second spatial resolution. Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile.	▪ High productivity ▪ Semi-deciduous canopy ▪ Complex dense tree canopy & substrata ▪ Complex trophic network ▪ Shade tolerance & gap phase dynamics
T1.3	T1.3 - Tropical-subtropical montane rainforests	The distribution of tropical montane rainforest was approximated from a model of environmental suitability based on climatic variables and cloud cover (Wilson & Jetz, 2016). Occurrences were aggregated to half degree spatial resolution and cells reclassified as major occurrences (>25% of cell area) and minor occurrences (< 25% of cell area).	▪ Moderate productivity ▪ Low-moderate diversity ▪ Local endemism ▪ Simple, short dense tree canopy ▪ Abundant bryophytes ▪ Shade tolerance & gap phase dynamics
T1.4	T1.4 - Tropical heath forests	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ Moderate productivity ▪ Low diversity, high endemism ▪ Closed-open low evergreen microphyll canopy ▪ Simple trophic network ▪ Nutrient capture & retention traits ▪ Shade tolerance & gap phase dynamics

EFG Code	EFG	EFG Description	Ecological Traits
T2.2	T2.2 - Deciduous temperate forests	Major and minor occurrences were initially identified using consensus land-cover maps (Tuanmu & Jetz, 2014) and then cropped to selected terrestrial ecoregions (Dinerstein et al., 2017) at 30 arc second spatial resolution. Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile.	▪ Moderate productivity ▪ Simple tree canopy & layered substrata ▪ Seasonal growth & reproduction ▪ Winter dormancy, hibernation & migration ▪ Frost tolerance ▪ Seed physiological dormancy
T2.3	T2.3 - Oceanic cool temperate rainforests	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ Moderate productivity ▪ Low diversity ▪ High endemism ▪ Simple trophic structure ▪ Simple tree canopy & layered substrata ▪ Seasonal growth & reproduction ▪ Shade & frost tolerance
T2.4	T2.4 - Warm temperate laurophyll forests	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ Moderate productivity ▪ Simple trophic structure ▪ Moderate diversity ▪ Low-moderate endemism ▪ Simple tree canopy & layered substrata ▪ Seasonal growth & reproduction ▪ Shade tolerance
T2.5	T2.5 - Temperate pyric humid forests	Remote sensing estimates of canopy height were used as a direct indicator of the distribution of this group of tall forest ecosystems (Armston et al., 2015: Tang et al., 2019). We selected all areas with tree canopies taller than 40 m, and clipped to the spatial extent of temperate climate types (Beck et al., 2018). Mapped occurrences were then aggregated to half degree spatial resolution and reclassified as major occurrences (>20% of cell area) and minor occurrences (< 20% of cell area).	▪ High productivity & biomass ▪ Seasonal growth & reproduction ▪ Complex structure & trophic networks ▪ Fire-cued life histories & successional dynamics ▪ Seed banks ▪ Fire resistance & avoidance traits
T2.6	T2.6 - Temperate pyric sclerophyll forests and woodlands	Major and minor occurrences were initially identified using consensus land-cover maps (Tuanmu & Jetz, 2014) and then cropped to selected terrestrial ecoregions (Dinerstein et al., 2017) at 30 arc second spatial resolution. Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile.	▪ Low-moderate productivity & biomass ▪ Diversity & endemism in some taxa ▪ Simple structure ▪ Nutrient acquisition & conservation traits ▪ Seed banks ▪ Fire-cued life histories ▪ Fire resistance & avoidance traits
T3.1	T3.1 - Seasonally dry tropical shrublands	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ Moderate productivity ▪ High endemism ▪ Low SLA in shrubs & C4 grasses ▪ Seasonal drought tolerance ▪ Nutrient capture & retention traits ▪ Simple trophic structure ▪ Fire-cued life histories
T3.2	T3.2 - Seasonally dry temperate heaths and shrublands	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ Moderate productivity ▪ Diversity & endemism ▪ Sclerophyll shrub dominance ▪ Simple trophic structure ▪ Fire-cued life histories ▪ Seasonal drought tolerance ▪ Nutrient capture & retention traits
T3.3	T3.3 - Cool temperate heathlands	Major and minor occurrences were identified using consensus land-cover maps (Tuanmu & Jetz, 2014; Latifovic et al., 2016), then cropped to selected terrestrial ecoregions at 30 arc seconds spatial resolution (Dinerstein et al., 2017; CEC, 1997). Ecoregions were selected if they contained areas mentioned or mapped in published regional studies (Loidi et al., 2015; Luebert & Pliscoff, 2017), or if: i) their descriptions mentioned features consistent with those identified in the profile of the Ecosystem Functional Group; and ii) if their location was consistent with the ecological drivers described in the profile.	▪ Low productivity ▪ Low diversity & endemism ▪ Simple trophic structure ▪ Sclerophyll shrub & C3 grass dominance ▪ Modular plant growth ▪ Vertebrate browsers ▪ Nutrient capture & retention traits

EFG Code	EFG	EFG Description	Ecological Traits
T3.4	T3.4 - Rocky pavements, lava flows and screes	Major and minor occurrences were initially identified using consensus land-cover maps (Tuanmu & Jetz, 2014) and then cropped to selected terrestrial ecoregions (Dinerstein et al., 2017) at 30 arc second spatial resolution. Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile.	▪ Low productivity & biomass ▪ Low diversity & endemism ▪ Simple trophic structure ▪ Moss & lichen dominance with pioneer shrubs ▪ Nutrient capture & retention traits
T4.1	T4.1 - Trophic savannas	Major and minor occurrences were initially identified using consensus land-cover maps (Tuanmu & Jetz, 2014) and then cropped to selected terrestrial ecoregions (Dinerstein et al., 2017) at 30 arc second spatial resolution. Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile.	▪ Herbivore-mediated tree-grass coexistence ▪ Seasonally high productivity ▪ Seasonal drought tolerance ▪ Megafauna & complex trophic structure ▪ C4 stoloniferous grasses ▪ Short grass dominance
T4.2	T4.2 - Pyric tussock savannas	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ Fire-mediated tree-grass coexistence ▪ Dominance of tall C4 grass with some C3 grass ▪ Woody biomass & grass biomass depend on rainfall ▪ High regional endemism ▪ Seasonal productivity & drought tolerance ▪ Extended trophic structure ▪ Limited herbivore defence
T4.3	T4.3 - Hummock savannas	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ Fire- and resource-mediated tree-grass coexistence ▪ C4 hummock grass dominance ▪ Low woody biomass & SLA ▪ Moderate diversity & endemism ▪ Seasonal productivity & drought tolerance ▪ Moderate mammal diversity & trophic complexity
T4.4	T4.4 - Temperate woodlands	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ Temporally & spatially variable C3-C4 grass mixture ▪ High diversity, low endemism ▪ Seasonally high productivity ▪ Extended trophic structure ▪ Fine-scale heterogeneity ▪ Seasonal drought tolerance ▪ Fire tolerance ▪ Frost tolerance ▪ Wide dispersal & vegetative reproduction
T4.5	T4.5 - Temperate subhumid grasslands	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ Temporally & spatially variable C3-C4 grass mixture ▪ High diversity, low endemism ▪ Seasonally high productivity ▪ Seasonal drought tolerance ▪ Frost tolerance ▪ Extended trophic structure ▪ Modular growth forms & vegetative reproduction
T5.1	T5.1 - Semi-desert steppes	Major and minor occurrences were initially identified using consensus land-cover maps (Tuanmu & Jetz, 2014) and then cropped to selected terrestrial ecoregions (Dinerstein et al., 2017) at 30 arc second spatial resolution. Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile.	▪ Low productivity ▪ Mixed subsucculent shrub & grass vegetation ▪ Stress tolerator & ruderal life histories ▪ C3 & C4 photosynthesis ▪ Water capture & conservation traits ▪ Nomadic herbivores & predators
T5.2	T5.2 - Succulent or Thorny deserts and semi-deserts	Major and minor occurrences were initially identified using consensus land-cover maps (Tuanmu & Jetz, 2014) and then cropped to selected terrestrial ecoregions (Dinerstein et al., 2017) at 30 arc second spatial resolution. Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile.	▪ Low productivity ▪ Succulent spiny perennial vegetation ▪ Stress tolerator & ruderal life histories ▪ CAM & C4 photosynthesis ▪ Water capture & storage ▪ Nocturnal & burrowing mammals ▪ Nomadic herbivores & predators

EFG Code	EFG	EFG Description	Ecological Traits
T5.3	T5.3 - Sclerophyll hot deserts and semi-deserts	Major and minor occurrences were initially identified using consensus land-cover maps (Tuanmu & Jetz, 2014) and then cropped to selected terrestrial ecoregions (Dinerstein et al., 2017) at 30 arc second spatial resolution. Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile.	▪ Low productivity ▪ Mixed sclerophyll shrubs & hummock grasses ▪ Stress tolerator & ruderal life histories ▪ Water capture & conservation traits ▪ Nocturnal & burrowing mammals & invertebrates ▪ Nomadic herbivores & predators
T5.4	T5.4 - Cool deserts and semi-deserts	Major and minor occurrences were initially identified using consensus land-cover maps (Tuanmu & Jetz, 2014) and then cropped to selected terrestrial ecoregions (Dinerstein et al., 2017) at 30 arc second spatial resolution. Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile.	▪ Low productivity ▪ Low vegetation cover & stature, biocrusts ▪ C3 photosynthesis ▪ Drought tolerance & water extraction traits ▪ Slow metabolism & life histories ▪ Cold tolerance ▪ Nomadic herbivores & predators
T5.5	T5.5 - Hyper-arid deserts	Major and minor occurrences were initially identified using consensus land-cover maps (Tuanmu & Jetz, 2014) and then cropped to selected terrestrial ecoregions (Dinerstein et al., 2017) at 30 arc second spatial resolution. Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile.	▪ Very low productivity ▪ Low vegetation cover & stature, biocrust ▪ Local endemism ▪ Drought tolerance & water extraction traits ▪ Slow metabolism & life histories ▪ Nomadic herbivores & predators
T6.4	T6.4 - Temperate alpine grasslands and shrublands	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ Low productivity ▪ Slow decomposition ▪ Simple trophic networks ▪ Low vegetation stature ▪ Frost tolerance ▪ Ruderal & stress tolerator life histories ▪ Dormancy & hibernation ▪ Migratory birds and mammals
T6.5	T6.5 - Tropical alpine grasslands and herbfields	Major and minor occurrences were initially identified using consensus land-cover maps (Tuanmu & Jetz, 2014) and then cropped to selected terrestrial ecoregions (Dinerstein et al., 2017) at 30 arc second spatial resolution. Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile.	▪ Low productivity ▪ Slow growth & long life spans ▪ Low diversity, high endemism ▪ Slow decomposition ▪ Simple trophic networks with itinerant vertebrates ▪ Rosette & cushion plant forms
T7.1	T7.1 - Annual croplands	Major occurrences of croplands were taken from the map of Habitat type 14.1 by Jung et al. (2020) based on the IUCN Habitats Classification Scheme (version 3.1) (IUCN, 2012). We compared this to cropping areas in consensus land-cover maps (Tuanmu & Jetz, 2014) and found that maps of Jung et al. (2020) more closely matched the concept of T7.1. Occurrences were extracted from fractional aggregated 1 km resolution base data (Jung et al. 2020), approximating 30 arc seconds spatial resolution.	▪ High productivity ▪ Very low diversity ▪ Simple trophic structure ▪ Low vertebrate density ▪ Dominated by one or few non-woody, annual shallow-rooted crop plants & opportunists ▪ Disequilibrium
T7.2	T7.2 - Sown pastures and fields	The presence of sown pastures was approximated by selecting areas of overlap between existing irrigation infrastructure (Siebert et al., 2005; 2013) and presence of major livestock (Gilbert et al., 2018). Occurrences were aggregated to half degree spatial resolution and reclassified as major occurrences (>60% cell area) and minor occurrences (<60% cell area).	▪ High-moderate productivity ▪ Low diversity ▪ Simple trophic structure ▪ Dominated by grass, herbivorous mammals & opportunists ▪ Disequilibrium
T7.3	T7.3 - Plantations	Major occurrences of plantations were taken from the map of Habitat type 14.3 by Jung et al. (2020) based on the IUCN Habitats Classification Scheme v3.1 (IUCN, 2012). We compared this to cropping areas in consensus land-cover maps (Tuanmu & Jetz, 2014) and found that maps of Jung et al. (2020) more closely matched the concept of T7.3. Occurrences were extracted from fractional aggregated 1-km resolution base data (Jung et al., 2020), approximating 30 arc seconds spatial resolution.	▪ High-moderate productivity ▪ Low-moderate diversity ▪ Simple trophic structure ▪ Dominated by trees or shrubs with opportunists ▪ Successional feedbacks ▪ Disequilibrium
T7.4	T7.4 - Urban and industrial ecosystems	The indicative distribution of Urban and infrastructure lands was estimated using spatial data for night light brightness (values >0) (NOAA/NCEI, 2019; Cinzano et al., 2019).	▪ Net allochthonous energy sources ▪ Low diversity (+legacies) ▪ Fine-grain heterogeneity & contrasting patches ▪ Sparse trophic structure ▪ Dense human populations ▪ Disequilibrium dynamics

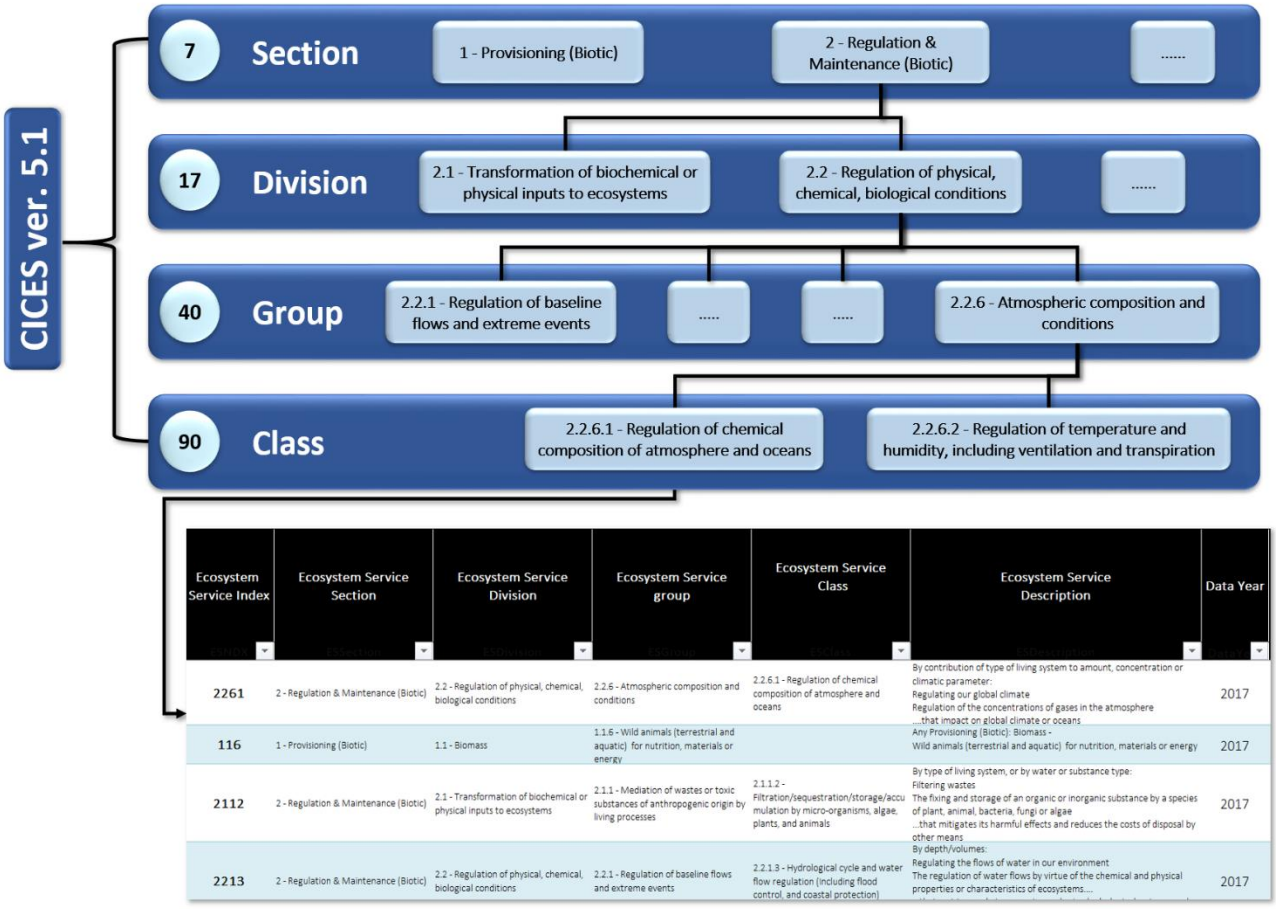
EFG Code	EFG	EFG Description	Ecological Traits
T7.5	T7.5 - Derived semi-natural pastures and old fields	Major and minor occurrences were initially identified using consensus land-cover maps (Tuanmu & Jetz, 2014) and then cropped to selected terrestrial ecoregions (Dinerstein et al., 2017) at 30 arc second spatial resolution. Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile.	▪ Moderate productivity ▪ Low-high diversity ▪ Well-developed trophic structure ▪ Dominated by grasses & forbs, maybe shrubs ▪ Herbivorous mammals & opportunists ▪ Autogenic succession
TF1.1	TF1.1 - Tropical flooded forests and peat forests	Major occurrences of tropical swamp forest and flooded forest were taken from the map of Habitat type 1.8 by Jung et al. (2020) based on the IUCN Habitats Classification Scheme v3.1 (IUCN, 2012). We compared this to areas of tropical swamp forest and flooded forest mapped Global Lakes and Wetlands Database (Lehner & Döll, 2004) as well as ecoregions with such forests mentioned in their description (Dinerstein et al., 2017), and found that maps of Jung et al. (2020) more closely matched the concept of TF1.1. Occurrences were extracted from fractional aggregated 1-km resolution base data (Jung et al. 2020), approximating 30 arc seconds spatial resolution.	▪ High productivity ▪ Moderate diversity ▪ Complex trophic structure ▪ Tree dominance ▪ Tree dependent biota ▪ High peat content ▪ Oxygen capture & transport traits ▪ Microhabitat diversity
TF1.2	TF1.2 - Subtropical-temperate forested wetlands	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ Periodically high productivity ▪ Dominant trees & shrubs: low diversity ▪ Spatial heterogeneity ▪ Flood-cued life histories ▪ Seasonally variable avifaunas ▪ River-floodplain fluxes
TF1.3	TF1.3 - Permanent marshes	Terrestrial ecoregions containing major or minor occurrences of this ecosystem functional group were identified by consulting available ecoregion descriptions (Dinerstein et al., 2017), global and regional reviews, national and regional ecosystem maps, locations of relevant examples, and proofed by expert reviewers. Consequently, they are coarse-scale indicative representations of distribution, except where they occupy small ecoregions. Ecoregions were mapped at 30 arc seconds spatial resolution.	▪ High stable productivity ▪ Complex trophic network ▪ Functionally diverse autotrophs ▪ Non-woody emergent vegetation ▪ Oxygen transport traits ▪ Organic deposition exceeds decomposition
TF1.4	TF1.4 - Seasonal floodplain marshes	Major occurrences of freshwater marshes and floodplains were taken from the Global Lakes and Wetlands Database (Lehner & Döll, 2004). Occurrences in boreal and polar climates were excluded by removing Köppen-Geiger classes>26 in Beck et al., (2018). Additional areas with minor occurrences identified in selected freshwater ecoregions (Abell et al., 2008). Ecoregions were selected if: i) their descriptions mentioned features consistent with those identified in the profile of the EFG; and ii) if their location was consistent with the ecological drivers described in the profile. Occurrences were aggregated to half degree spatial resolution.	▪ High productivity ▪ Complex trophic network ▪ Functionally diverse autotrophs ▪ Dormant life phases in lower trophic levels ▪ High abundance & diversity in vertebrates
TF1.5	TF1.5 - Episodic arid floodplains	Locations of pan, brackish and saline wetlands were taken from the Global Lakes and Wetlands Database GLWD3 class 7 from Lehner & Döll (2004). Occurrences were aggregated to half degree spatial resolution.	▪ Low productivity but high when inundated ▪ Dormant life phases in lower trophic levels ▪ High mobility in higher trophic levels ▪ Water conservation & ruderal life traits ▪ Detritivore, collectorgatherer life forms

3.1.3 Common International Classification of Ecosystem Services (CICES)

The Common International Classification of Ecosystem Services (CICES)[16] (Haines-Young & Potschin, 2018) has been designed to help measure, account for, and assess ecosystem services. Although it was developed in the context of work on the System of Environmental and Economic Accounting (SEEA) that is being led by the United Nations Statistical Division (UNSD), it has been used widely in ecosystem services research for designing indicators, mapping and for valuation.

Moreover, one can find equivalences between The American USEPA FEGS1 categories and the CICES V5.1 nomenclature.

Equivalences between CICES V5.1 and the USEPA FEGS1 categories are also available (Landers et al. 2016). https://www.epa.gov/eco-research/national-ecosystem-services-classification-system-nescs-plus



Ecosystem Service Index	Ecosystem Service Section	Ecosystem Service Division	Ecosystem Service group	Ecosystem Service Class	Ecosystem Service Description	Data Year
2261	2 - Regulation & Maintenance (Biotic)	2.2 - Regulation of physical, chemical, biological conditions	2.2.6 - Atmospheric composition and conditions	2.2.6.1 - Regulation of chemical composition of atmosphere and oceans	By contribution of type of living system to amount, concentration or climatic parameter: Regulating our global climate Regulation of the concentrations of gases in the atmosphere ...that impact on global climate or oceans	2017
116	1 - Provisioning (Biotic)	1.1 - Biomass	1.1.6 - Wild animals (terrestrial and aquatic) for nutrition, materials or energy		Any Provisioning (Biotic): Biomass - Wild animals (terrestrial and aquatic) for nutrition, materials or energy	2017
2112	2 - Regulation & Maintenance (Biotic)	2.1 - Transformation of biochemical or physical inputs to ecosystems	2.1.1 - Mediation of wastes or toxic substances of anthropogenic origin by living processes	2.1.1.2 - Filtration/sequestration/storage/accumulation by micro-organisms, algae, plants, and animals	By type of living system, or by water or substance type: Filtering wastes The fixing and storage of an organic or inorganic substance by a species of plant, animal, bacteria, fungi or algae ...that mitigates its harmful effects and reduces the costs of disposal by other means	2017
2213	2 - Regulation & Maintenance (Biotic)	2.2 - Regulation of physical, chemical, biological conditions	2.2.1 - Regulation of baseline flows and extreme events	2.2.1.3 - Hydrological cycle and water flow regulation (including flood control, and coastal protection)	By depth/volumes: Regulating the flows of water in our environment The regulation of water flows by virtue of the chemical and physical properties or characteristics of ecosystems...	2017

Figure 3-3: CICES Version 5.1 Nomenclature Structure

[16] See https://cices.eu/content/uploads/sites/8/2018/03/Finalised-V5.1_18032018.xlsx and https://cices.eu/resources/

7 Sections (4 useable in this context), 17 Divisions (11 probable), 48 groups (27 probable) and 90 potential classes were identified, narrowed down to only 58 that were probable.

Table 3-8 to Table 3-11 shows the CICES rev. 5.1 nested services classification system used in the template to describe the ecosystem services in the Ecosystem Services module. Note that we are only showing the rows in the classifications relevant to Blue Economy Activities.

Table 3-8 Ecosystem Services Sections

Section Code	Section
1	1 - Provisioning (Biotic)
2	2 - Regulation & Maintenance (Biotic)
3	3 - Cultural (Biotic)
4	4 - Provisioning (Abiotic)

Table 3-9 Ecosystem Services Divisions

Division Code	Division
1.1	1.1 - Biomass
1.2	1.2 - Genetic material from all biota (including seed, spore or gamete production)
1.3	1.3 - Other types of provisioning service from biotic sources
2.1	2.1 - Transformation of biochemical or physical inputs to ecosystems
2.2	2.2 - Regulation of physical, chemical, biological conditions
2.3	2.3 - Other types of regulation and maintenance service by living processes
3.1	3.1 - Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting
3.2	3.2 - Indirect, remote, often indoor interactions with living systems that do not require presence in the environmental setting
3.3	3.3 - Other characteristics of living systems that have cultural significance
4.2	4.2 - Water
4.3	4.3 - Non-aqueous natural abiotic ecosystem outputs

Table 3-10 Ecosystem Services Groups

Group Code	Group
1.1.1	1.1.1 - Cultivated terrestrial plants for nutrition, materials or energy
1.1.2	1.1.2 - Cultivated aquatic plants for nutrition, materials or energy
1.1.4	1.1.4 - Reared aquatic animals for nutrition, materials or energy
1.1.5	1.1.5 - Wild plants (terrestrial and aquatic) for nutrition, materials or energy
1.1.6	1.1.6 - Wild animals (terrestrial and aquatic) for nutrition, materials or energy
1.2.1	1.2.1 - Genetic material from plants, algae or fungi
1.2.2	1.2.2 - Genetic material from animals
1.2.2	1.2.2 - Genetic material from organisms
1.3.X	1.3.X - Other
2.1.1	2.1.1 - Mediation of wastes or toxic substances of anthropogenic origin by living processes
2.1.2	2.1.2 - Mediation of nuisances of anthropogenic origin
2.2.1	2.2.1 - Regulation of baseline flows and extreme events
2.2.2	2.2.2 - Lifecycle maintenance, habitat and gene pool protection
2.2.3	2.2.3 - Pest and disease control
2.2.4	2.2.4 - Regulation of soil quality
2.2.5	2.2.5 - Water conditions
2.2.6	2.2.6 - Atmospheric composition and conditions
2.3.X	2.3.X - Other
3.1.1	3.1.1 - Physical and experiential interactions with natural environment
3.1.2	3.1.2 - Intellectual and representative interactions with natural environment
3.2.1	3.2.1 - Spiritual, symbolic and other interactions with natural environment
3.2.2	3.2.2 - Other biotic characteristics that have a non-use value
3.3.X	3.3.X - Other
4.2.1	4.2.1 - Surface water used for nutrition, materials or energy
4.2.2	4.2.2 - Ground water for used for nutrition, materials or energy
4.2.X	4.2.X - Other aqueous ecosystem outputs
4.3.1	4.3.1 - Mineral substances used for nutrition, materials or energy

Table 3-11 Ecosystem Services Classes

Class Code	Class	Class type	Simple descriptor	Ecological clause	Use clause	Example Service
1.1.1.2	1.1.1.2 - Fibres and other materials from cultivated plants, fungi, algae and bacteria for direct use or processing (excluding genetic materials)	Material by amount, type, use, media (land, soil, freshwater, marine)	Material from plants, fungi, algae or bacterial that we can use	The ecological contribution to the production of plants, fungi, algae or bacterial...	...that can be harvested and used as raw material for non-nutritional purposes	Harvestable surplus of annual tree growth
1.1.2.1	1.1.2.1 - Plants cultivated by in- situ aquaculture grown for nutritional purposes	Plants, algae by amount, type	Plants that are cultivated in fresh or salt water that we eat	The ecological contribution to the growth of plants and algae under aquaculture....	...that can be harvested and used as raw material for the production of food	Harvestable surplus of seaweed biomass in situ
1.1.2.2	1.1.2.2 - Fibres and other materials from in-situ aquaculture for direct use or processing (excluding genetic materials)	Plants, algae by amount, type	Plants that are cultivated in fresh or salt water that we can use as a material	The ecological contribution to the growth of plants and algae under aquaculture....	...that can be harvested and used as raw material for non-nutritional purposes	Harvestable surplus of seaweed biomass in situ
1.1.2.3	1.1.2.3 - Plants cultivated by in- situ aquaculture grown as an energy source	Plants, algae by amount, type	Plants that are cultivated in fresh or salt water that we can use as an energy source	The ecological contribution to the growth of plants and algae under aquaculture....	...that can be harvested and used as a source of energy	Harvestable surplus of seaweed biomass in situ
1.1.4.1	1.1.4.1 - Animals reared by in-situ aquaculture for nutritional purposes	Animals by amount, type	Animals that are cultivated in fresh or salt water that we eat.	The ecological contribution to the growth of cultivated aquatic animals	...that can be used as raw material for the production of food	Harvestable stock of bivalves
1.1.4.2	1.1.4.2 - Fibres and other materials from animals grown by in-situ aquaculture for direct use or processing (excluding genetic materials)	Animals by amount, type	Animals that are cultivated in fresh or salt water that we can use as a material.	The ecological contribution to the growth of cultivated aquatic animals	...that can be harvested and used as raw material for non-nutritional purposes	Harvestable pearls produced by oyster beds
1.1.4.3	1.1.4.3 - Animals reared by in-situ aquaculture as an energy source	Animals by amount, type	Animals that are cultivated in fresh or salt water that we can use as a source of energy.	The ecological contribution to the growth of cultivated aquatic animals	...that can provide a source of energy	Biogas from aquaculture waste
1.1.5.1	1.1.5.1 - Wild plants (terrestrial and aquatic, including fungi, algae) used for nutrition	Plants, algae by amount, type	Food from wild plants	Parts of the standing biomass of a non-cultivated plant species...	...that can be harvested and used for the production of food	Harvestable volume of wild berries or wild mushrooms, Or Benthic macroalgae (e.g. Dulse, Laminaria (Kelp)) and macrophytes (e.g. Salicornia and other saltmarsh plants) harvested in the shallow sublittoral and/or littoral zone
1.1.5.2	1.1.5.2 - Fibres and other materials from wild plants for direct use or processing (excluding genetic materials)	Plants, algae by amount, type	Materials from wild plants	Parts of the standing biomass of a non-cultivated plant species...	...that can be harvested and used as raw material for	Harvestable volume of reeds Or Macroalgae used for thickening

Class Code	Class	Class type	Simple descriptor	Ecological clause	Use clause	Example Service
					non-nutritional purposes	agents, agar and superconductor electrodes
1.1.5.3	1.1.5.3 - Wild plants (terrestrial and aquatic, including fungi, algae) used as a source of energy	Material by type/source	Materials from wild plants, fungi and algae used for energy	Parts of the standing biomass of a non-cultivated plant, fungi, algae or bacteria species…	…that can be harvested and used as and energy source	Volume of harvested wood
1.1.6.1	1.1.6.1 - Wild animals (terrestrial and aquatic) used for nutritional purposes	Animals by amount, type	Food from wild animals	Non-domesticated, wild animal species and their outputs…	…that can be used as raw material for the production of food	Harvestable surplus of cod population, or deer population
1.1.6.2	1.1.6.2 - Fibres and other materials from wild animals for direct use or processing (excluding genetic materials)	Material by type/source	Materials from wild animals	Materials from wild animals….	…that can be harvested and used as raw material for non-nutritional uses	Reindeer skins Or Zooplankton – jellyfish used to produce collagen for various purposes
1.1.6.3	1.1.6.3 - Wild animals (terrestrial and aquatic) used as a source of energy	By amount, type, source	Material from wild animals that can be used as a source of energy	Biomass from wild animals….	…that can be used as a source of energy	Seal blubber used by traditional cultures in lamps Or Sand eels (Historical) or Cetaceans
1.2.1.1	1.2.1.1 - Seeds, spores and other plant materials collected for maintaining or establishing a population	By species or varieties	Seed collection	Seeds and spores and other plant materials…	…that can be used to maintain or establish a new population	Seeds or spores that we can harvest
1.2.1.2	1.2.1.2 - Higher and lower plants (whole organisms) used to breed new strains or varieties	By species or varieties	Plants. fungi or algae that we can use for breeding	Wild plants, fungi algae and bacteria …	…that can be used to maintain populations or develop new varieties	Population of plant algae or fungi species used to in breeding programmes
1.2.1.3	1.2.1.3 - Individual genes extracted from higher and lower plants for the design and construction of new biological entities	Material by type	Genetic material from wild plants. fungi or algae that we can use	Generic information or material from plants, fungi algae and bacteria …	…that can be used in gene synthesis	Harvestable share of population of plant species used to extract genes
1.2.2.1	1.2.2.1 - Animal material collected for the purposes of maintaining or establishing a population	By species or varieties	Animals used for replenishing stock	0	…that can be used to maintain or establish a new population	Spat for fish and shellfish farms
1.2.2.2	1.2.2.2 - Wild animals (whole organisms) used to breed new strains or varieties	By species or varieties	Wild animals that we can use for breeding	Wild animals	…that can be used to maintain populations or develop new varieties	Population of animals used in breeding programmes
1.2.2.3	1.2.2.3 - Individual genes extracted from organisms for the design and construction of new biological entities	Material by type	The genetic information that is stored in wild animals that we can use	Generic material from animals …	…that can be used in gene synthesis	Harvestable share of population of a given species used to extract genes

Class Code	Class	Class type	Simple descriptor	Ecological clause	Use clause	Example Service
1.3.X.X	1.3.X.X - Other	Use nested codes to allocate other provisioning services from living systems to appropriate Groups and Classes				
2.1.1.1	2.1.1.1 - Bio-remediation by micro-organisms, algae, plants, and animals	By type of living system or by waste or subsistence type	Decomposing wastes	Transformation of an organic or inorganic substance by a species of plant, animal, bacteria, fungi or algae…	…that mitigates its harmful effects and reduces the costs of disposal by other means	Bio-remediation of industrial wastes by disposal on agricultural land Or Bacteria such as Marionobacter that can break the oil down into simple monomers
2.1.1.2	2.1.1.2 - Filtration/sequestration/storage/accumulation by micro-organisms, algae, plants, and animals	By type of living system, or by water or substance type	Filtering wastes	The fixing and storage of an organic or inorganic substance by a species of plant, animal, bacteria, fungi or algae	…that mitigates its harmful effects and reduces the costs of disposal by other means	Dust filtration by urban trees Or Macrophytes, for example salt marsh grass, can trap particles in their roots, sequestering wastes/toxicants in the sediment (Govers et al. 2014)
2.1.2.1	2.1.2.1 - Smell reduction	By type of living system	Reducing smells	The reduction in the impact of odours on people…	…that mitigates its harmful or stressful effect, or the cost of the nuisance	Shelter belts that filter particulates that carry odours Or Birds, epifauna, infauna and bacterial communities contribute to this service by removing material such as rotting algal mats, which is in the littoral zone or offshore but could potentially wash up on shore and produce olfactory and visual impacts
2.1.2.3	2.1.2.3 - Visual screening	By type of living system	Screening unsightly things	The reduction in the visual impact of human structures on people…	…that mitigates its harmful or stressful effect, or the cost of the nuisance	Shelter belts around industrial structures
2.2.1.1	2.2.1.1 - Control of erosion rates	By reduction in risk, area protected	Controlling or preventing soil loss	The reduction in the loss of material by virtue of the stabilising effects of the presence of plants and animals…	…that mitigates or prevents potential damage to human use of the environment or human health and safety	The capacity of vegetation to prevent or reduce the incidence of soil erosion Or Macroalgae, microphytobenthos, macrophytes and biogenic reef structures

Class Code	Class	Class type	Simple descriptor	Ecological clause	Use clause	Example Service
						(epifauna and infauna) all contribute through sediment stabilisation
2.2.1.2	2.2.1.2 - Buffering and attenuation of mass movement	By reduction in risk, area protected	Stopping landslides and avalanches harming people	The reduction in the speed of movement of solid material by virtue of the stabilising effects of the presence of plants and animals...	...that mitigates or prevents potential damage to human use of the environment or human health and safety	The capacity of forest cover to prevent or mitigate the extent and force of snow avalanche
2.2.1.3	2.2.1.3 - Hydrological cycle and water flow regulation (Including flood control, and coastal protection)	By depth/volumes	Regulating the flows of water in our environment	The regulation of water flows by virtue of the chemical and physical properties or characteristics of ecosystems....	...that assists people in managing and using hydrological systems, and mitigates or prevents potential damage to human use, health or safety	The capacity of vegetation to retain water and release it slowly, Or The capacity of mangroves to mitigate the effects of tsunamis Or Localised coastal influences on the hydrological cycle by phytoplankton producing Dimethylsulphide (DMS) and localised flow changes due to algal and higher plant structures. Macroalgae beds, such as a kelp forest, macrophytes and biogenic reefs (epifauna and infauna) contribute to attenuation of wave energy and flood prevention
2.2.2.1	2.2.2.1 - Pollination (or 'gamete' dispersal in a marine context)	By amount and pollinator	Pollinating our fruit trees and other plants	The fertilisation of crops by plants or animals...	...that maintains or increases the abundance and/or diversity of other species that people use or enjoy	Providing a habitat for native pollinators Or In the context of societal efforts for the restoration of, for example, seagrass beds , it can be considered final since seed dispersal can occur through this service rather than artificially.
2.2.2.2	2.2.2.2 - Seed dispersal	By amount and dispersal agent	Spreading the seeds of wild plants	The dispersal of seeds an spores....	....of plants and other organisms that are important to people in use and non-use terms	Acorn dispersal by Eurasian Jays
2.2.2.3	2.2.2.3 - Maintaining nursery populations and habitats (Including gene pool protection)	By amount and source	Providing habitats for wild plants and animals that can be useful to us	The presence of ecological conditions (usually habitats) necessary for sustaining populations of species....	...that people use or enjoy	Important nursery habitats include estuaries, seagrass, kelp forest, wetlands, soft sediment,

Class Code	Class	Class type	Simple descriptor	Ecological clause	Use clause	Example Service
						hard bottom, shell bottom and water column habitats. Floating seaweed clumps (macroalgae) form rafts under which juvenile fish aggregate e.g. in the North Sea in pelagic habitats
2.2.3.1	2.2.3.1 - Pest control (including invasive species)	By reduction in incidence, risk, area protected by type of living system	Controlling pests and invasive species	The reduction by biological interactions of the incidence of species...	...that prevent or reduce the output of food, material or energy from ecosystems, or their cultural importance, by consumption of biomass or competition	Providing a habitat for native pest control agents Or In the Black Sea, the recovery of fish populations and an alien invader, the Beroe comb jelly, (both of whom predate nuisance alien comb jellies, Finenko et al.2009) may have been the most important contributing factors for the control of the Mnemiopsis leidyi alien comb jelly, which caused an ecosystem shift in the late 80s.
2.2.3.2	2.2.3.2 - Disease control	By reduction in incidence, risk, area protected by type of living system	Controlling disease	The reduction by biological interactions of the incidence of species...	...that otherwise could prevent or reduce the output of food, material or energy from ecosystems, or their cultural importance, by hindering or damaging the ecological functioning of useful species	Presence of native disease control agents such as microbial antagonists for the control of postharvest diseases

Class Code	Class	Class type	Simple descriptor	Ecological clause	Use clause	Example Service
2.2.4.2	2.2.4.2 - Decomposition and fixing processes and their effect on soil quality	By amount/concentration and source	Ensuring the organic matter in our soils is maintained	Decomposition of biological materials and their incorporation in soils	...that maintains their characteristics necessary for human use	Decomposition of plant residue; N-fixation by legumes
2.2.5.2	2.2.5.2 - Regulation of the chemical condition of salt waters by living processes	By type of living system	Controlling the chemical quality of salt water	Maintenance of the chemical condition of salt waters by plant or animal species....	...that enable human use or health	Fish communities that regulate the resilience and resistance of coral reefs to eutrophication
2.2.6.1	2.2.6.1 - Regulation of chemical composition of atmosphere and oceans	By contribution of type of living system to amount, concentration or climatic parameter	Regulating our global climate	Regulation of the concentrations of gases in the atmosphere	....that impact on global climate or oceans	Sequestration of carbon in tropical peatlands
2.2.6.2	2.2.6.2 - Regulation of temperature and humidity, including ventilation and transpiration	By contribution of type of living system to amount, concentration or climatic parameter	Regulating the physical quality of air for people	Mediation of ambient atmospheric conditions (including micro- and mesoscale climates) by virtue of presence of plants....	...that improves living conditions for people	Evaporative cooling provided by urban trees
2.3.X.X	2.3.X.X - Other	Use nested codes to allocate other regulating and maintenance services from living systems to appropriate Groups and Classes	0	0	0	0
3.1.1.1	3.1.1.1 - Characteristics of living systems that that enable activities promoting health, recuperation or enjoyment through active or immersive interactions	By type of living system or environmental setting	Using the environment for sport and recreation; using nature to help stay fit	The biophysical characteristics or qualities of species or ecosystems (settings/ cultural spaces)....	.... that are engaged with, used or enjoyed in ways that require physical and cognitive effort	Ecological qualities of woodland that make it attractive to hiker; private gardens Or Opportunities for diving, swimming

Class Code	Class	Class type	Simple descriptor	Ecological clause	Use clause	Example Service
3.1.1.2	3.1.1.2 - Characteristics of living systems that enable activities promoting health, recuperation or enjoyment through passive or observational interactions	By type of living system or environmental setting	Watching plants and animals where they live; using nature to destress	The biophysical characteristics or qualities of species or ecosystems (settings/cultural spaces).....	.... that are viewed/observed by people or enjoyed in other passive ways by virtue of sounds and smells etc.	Mix of species in a woodland of interest to birdwatchers Or Whales, birds, seals and reptiles can be enjoyed by wildlife watchers
3.1.2.1	3.1.2.1 - Characteristics of living systems that enable scientific investigation or the creation of traditional ecological knowledge	By type of living system or environmental setting	Researching nature	The biophysical characteristics or qualities of species or ecosystems (settings/cultural spaces).....	...that are the subject matter for insitu research	Site of special scientific interest, Natura 2000 site
3.1.2.2	3.1.2.2 - Characteristics of living systems that enable education and training	By type of living system or environmental setting	Studying nature	The biophysical characteristics or qualities of species or ecosystems (settings/cultural spaces).....	...that are the subject matter for insitu teaching or skill development	Site used for voluntary conservation activities
3.1.2.3	3.1.2.3 - Characteristics of living systems that are resonant in terms of culture or heritage	By type of living system or environmental setting	The things in nature that help people identify with the history or culture of where they live or come from	The biophysical characteristics or qualities of species or ecosystems (settings/cultural spaces).....	...that contribute to cultural heritage or historical knowledge	Sherwood Forest
3.1.2.4	3.1.2.4 - Characteristics of living systems that enable aesthetic experiences	By type of living system or environmental setting	The beauty of nature	The biophysical characteristics or qualities of species or ecosystems (settings/cultural spaces).....	... that are appreciated for their inherent beauty	Area of Outstanding Natural Beauty; panorama site
3.2.1.1	3.2.1.1 - Elements of living systems that have symbolic meaning	By type of living system or environmental setting	Using nature to as a national or local emblem	The biophysical characteristics or qualities of species or ecosystems (settings/landscapes/cultural spaces).....	...that are recognised by people for their cultural, historical or iconic character and which are used as emblems or signifiers of some kind	Bald Eagle
3.2.1.2	3.2.1.2 - Elements of living systems that have sacred or religious meaning	By type of living system or environmental setting	The things in nature that have spiritual importance for people	The biophysical characteristics or qualities of species or ecosystems (settings/landscapes/cultural spaces).....	.....that are deemed to have sacred or religious significance for people.	Totemic species, such as the turtle

Class Code	Class	Class type	Simple descriptor	Ecological clause	Use clause	Example Service
3.2.1.3	3.2.1.3 - Elements of living systems used for entertainment or representation	By type of living system or environmental setting	The things in nature used to make films or to write books	The biophysical characteristics or qualities of species or ecosystems (settings/landscapes/cultural spaces).....	.. that provide material or subject matter that can be communicated to others via different media for amusement or enjoyment	Archive records or collections
3.2.2.1	3.2.2.1 - Characteristics or features of living systems that have an existence value	By type of living system or environmental setting	The things in nature that we think should be conserved	The biophysical characteristics or qualities of species or ecosystems (settings/landscapes/cultural spaces).....	.....which people seek to preserve because of their non-utilitarian qualities	Areas designated as wilderness
3.2.2.2	3.2.2.2 - Characteristics or features of living systems that have an option or bequest value	By type of living system or environmental setting	The things in nature that we want future generations to enjoy or use	The biophysical characteristics or qualities of species or ecosystems (settings/landscapes/cultural spaces).....	.....which people seek to preserve for future generations for whatever reason	Endangered species or habitat
3.3.X.X	3.3.X.X - Other	Use nested codes to allocate other cultural services from living systems to appropriate Groups and Classes				
4.2.1.1	4.2.1.1 - Surface water for drinking	By amount, type, source	Drinking water from sources at the ground surface	Natural, surface water bodies....	... that provide a source of drinking water	Volume and characteristics of water from a natural springs
4.2.1.2	4.2.1.2 - Surface water used as a material (non-drinking purposes)	By amount & source	Surface water that we can use for things other than drinking	Natural, surface water bodies....	... that provide water for that can be used as a material or for cooling	Temperature and volume of water that can be used for cooling or irrigation
4.2.1.3	4.2.1.3 - Freshwater surface water used as an energy source	By amount, type, source	Hydropower	The flow of water on land....	...that can be converted to electrical or mechanical energy	Hydraulic potential (Head)
4.2.1.4	4.2.1.4 - Coastal and marine water used as energy source	By amount, type, source	Wave or tidal power	The movement of waves or current...	...that can be converted to electrical or mechanical energy	Tidal velocity
4.2.2.1	4.2.2.1 - Ground (and subsurface) water for drinking	By amount, type, source	Dirking water from the below ground	Natural, below ground water bodies or aquifers...	... that provide a source of drinking water	Aquifer volume and characteristics
4.2.2.2	4.2.2.2 - Ground water (and subsurface) used as a material (non-drinking purposes)	By amount & source	Sub-surface water that we can use for things other than drinking	Natural below ground water bodies or aquifers...	... that provide water for that can be used as a material or for cooling	Characteristics and volume of water that can be used for washing purposes
4.2.2.3	4.2.2.3 - Ground water (and subsurface) used as an energy source	By amount & source	Sub-surface water that we can use as a source of energy	Natural below ground water bodies or aquifers...	... that provide water at temperatures that are useful	Hot water and steam vents

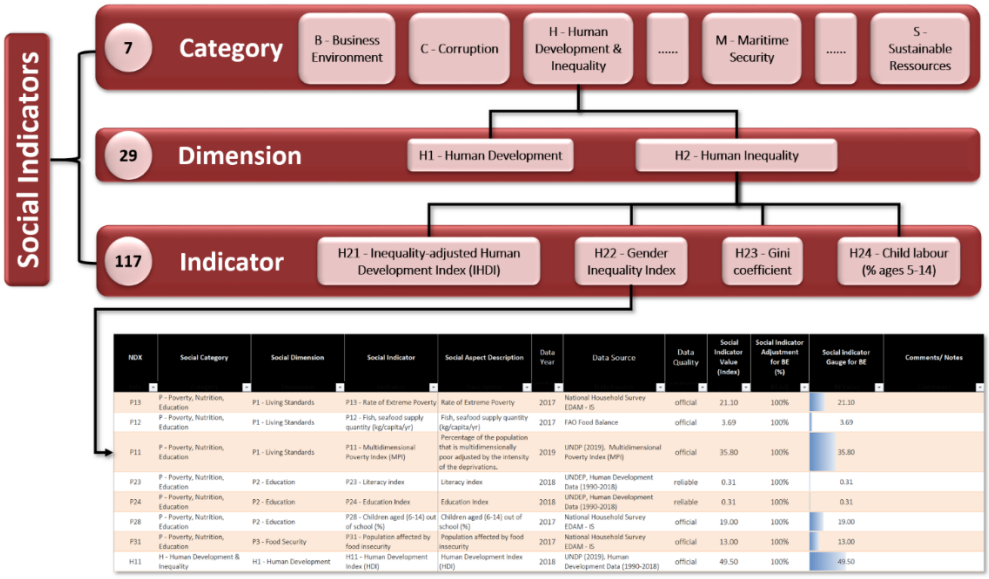
Class Code	Class	Class type	Simple descriptor	Ecological clause	Use clause	Example Service
4.2.X.X	4.2.X.X - Other	Use nested codes to allocate other provisioning services from non-living systems to appropriate Groups and Classes				
4.3.1.3	4.3.1.3 - Mineral substances used for as an energy source	Amount by type	Natural inorganic materials from nature that we can use as an energy source	Reference biophysical or inorganic chemical mechanism/characteristic/property...	...that can be used for as an energy source	Uranium

3.1.4 Social Dimension's Indicators

From UNECA BE Policy Handbook (UNECA, 2016a) the following types of indicators were identified:

- Sustainable Consumption/ food security
- Gender Equity
- Inclusive Job Creation
- Fair Trade
- Benefit Sharing
- gender mainstreaming
- food and water security
- poverty alleviation
- wealth retention
- jobs creation

After consulting several websites from UNDP (UN, 2019) (Alkire & Jahan, 2018), the World Bank (The World Bank, 2019a), Transparency International (Transparency Internationale, 2020) to Stable Seas (Stableseas, 2020) (Bell & Glaser, 2020), a list of potentially useful indicators was drawn. Although not exhaustive, a list of indicators was initially narrowed down to reflect a nested system starting with the indicator's category, it's dimension and finally the indicator itself. 7 Categories, 29 dimensions and 117 potential Indicators were identified some of which might be found irrelevant depending on the country (e.g. World Bank's doing business indicators).



NDX	Social Category	Social Dimension	Social Indicator	Social Aspect Description	Data Year	Data Source	Data Quality	Social Indicator Value (index)	Social Indicator Adjustment for BE (%)	Social Indicator Gauge for BE	Comments/ Notes
P13	P - Poverty, Nutrition, Education	P1 - Living Standards	P13 - Rate of Extreme Poverty	Rate of Extreme Poverty	2017	National Household Survey EDAM - IS	official	21.10	100%	21.10	
P12	P - Poverty, Nutrition, Education	P1 - Living Standards	P12 - Fish, seafood supply quantity (kg/capita/yr)	Fish, seafood supply quantity (kg/capita/yr)	2017	FAO Food Balance	official	3.69	100%	3.69	
P11	P - Poverty, Nutrition, Education	P1 - Living Standards	P11 - Multidimensional Poverty Index (MPI)	Percentage of the population that is multidimensionally poor adjusted by the intensity of the deprivations.	2019	UNDP (2019). Multidimensional Poverty Index (MPI)	official	35.80	100%	35.80	
P23	P - Poverty, Nutrition, Education	P2 - Education	P23 - Literacy index	Literacy index	2018	UNDEP, Human Development Data (1990-2018)	reliable	0.31	100%	0.31	
P24	P - Poverty, Nutrition, Education	P2 - Education	P24 - Education Index	Education Index	2018	UNDEP, Human Development Data (1990-2018)	reliable	0.31	100%	0.31	
P28	P - Poverty, Nutrition, Education	P2 - Education	P28 - Children aged (6-14) out of school (%)	Children aged (6-14) out of school (%)	2017	National Household Survey EDAM - IS	official	19.00	100%	19.00	
P31	P - Poverty, Nutrition, Education	P3 - Food Security	P31 - Population affected by food insecurity	Population affected by food insecurity	2017	National Household Survey EDAM - IS	official	13.00	100%	13.00	
H11	H - Human Development & Inequality	H1 - Human Development	H11 - Human Development Index (HDI)	Human Development Index (HDI)	2018	UNDP (2019). Human Development Data (1990-2018)	official	49.50	100%	49.50	

Figure 3-4: Selected Social and Human Development Indicators

Table 3-12 to Table 3-14 show the nested social indicators classification system used in the template to record the relevant social aspects of a country in the Social Dimension module. Note that we are only showing the rows in the classifications relevant to Blue Economy Activities.

Table 3-12 Social Indicators Categories

CategoryCode	Category
B	B - Business Environment
C	C - Corruption
H	H - Human Development & Inequality
I	I - Illegal actions
M	M - Maritime Security
P	P - Poverty, Nutrition, Education
S	S - Sustainable Ressources

Table 3-13 Social Indictors Dimension

DimensionCode	Dimension
B1	B1 - Access to Business
B2	B2 - Access to Electricity
B3	B3 - Access to Property
B4	B4 - Access to Credit
B5	B5 - Access to Investissement
B6	B6 - Access to ownership
B7	B7 - Strenght of Tax system
B8	B8 - Access to Foreign Trade
B9	B9 - Access to legal system
C1	C1 - Government
H1	H1 - Human Development
H2	H2 - Human Inequality
I1	I1 - illegal Traffiquing
I2	I2 - Substance Abuse
I3	I3 - Human Right Abuse
I4	I4 - Organised Actions
M1	M1 - Blue Economy
M2	M2 - Coastal Welfare
M3	M3 - Fisheries
M4	M4 - Illicit Trade
M5	M5 - Maritime Enforcement
M6	M6 - Piracy and Armed Robbery at Sea
M7	M7 - Rule Of Law
P1	P1 - Living Standards
P2	P2 - Education
P3	P3 - Food Security
S1	S1 - Stock vs. Production
S2	S2 - Domestic Consumption vs Exports
S3	S3 - Quality of important habitats

Table 3-14 Social Impacts Indicators

Indicator Code	Indicator	description	Outcomes	DataYear	DataSource	Burundi	Comoros	Congo (DRC)	Djibouti	Eritrea	Ethiopia	Kenya	Madagascar	Rwanda	Seychelles	Somalia	South Sudan	Tanzania	Uganda
B11	B11 - Ease of doing business (score)	Ease of doing business (score)	positive outcomes	2020	World Bank. Doing Business 2020	46.77	47.87	36.21	60.50	21.60	47.98	73.22	47.73	76.48	61.70	20.04	34.62	54.46	59.98
B12	B12 - Starting a business (Score)	Starting a business (Score)	positive outcomes	2020	World Bank. Doing Business 2020	92.92	76.49	91.63	84.30	52.86	71.70	82.73	88.46	93.24	78.76	46.00	71.01	74.40	71.38
B13	B13 - Business Procedures - Men (Score)	Business Procedures - Men (Score)	positive outcomes	2020	World Bank. Doing Business 2020	82.35	52.94	82.35	70.59	29.41	41.18	64.71	76.47	76.47	52.94	52.94	35.29	47.06	29.41
B14	B14 - Business Procedures - Women (Score)	Business Procedures - Women (Score)	positive outcomes	2020	World Bank. Doing Business 2020	82.35	52.94	82.35	70.59	29.41	41.18	64.71	76.47	76.47	52.94	52.94	35.29	47.06	29.41
B15	B15 - Overall Business Procedures (Score)	Overall Business Procedures (Score)	positive outcomes	2020	World Bank. Doing Business 2020	60.00	76.00	68.00	56.00	no data	60.00	56.00	52.00	60.00	56.00	no data	28.00	24.00	48.00
B21	B21 - Getting electricity (Score)	Getting electricity (Score)	positive outcomes	2020	World Bank. Doing Business 2020	26.45	60.17	34.67	64.57	no data	60.09	80.14	24.12	82.34	71.28	no data	no data	74.87	48.39
B22	B22 - Cost of Electricity (Score)	Cost of Electricity (Score)	negative outcomes	2020	World Bank. Doing Business 2020	no data	85.03	no data	89.74	no data	90.51	92.40	46.46	76.26	95.76	no data	no data	91.47	14.44
B23	B23 - Reliability of electricity supply and transparency of tariff (Score)	Reliability of electricity supply and transparency of tariff (Score)	positive outcomes	2020	World Bank. Doing Business 2020	no data	no data	no data	no data	no data	no data	62.50	no data	75.00	37.50	no data	no data	62.50	50.00
B31	B31 - Registering property (Score)	Registering property (Score)	positive outcomes	2020	World Bank. Doing Business 2020	62.55	58.39	46.62	58.31	35.31	50.92	53.78	44.40	93.71	70.75	48.22	36.78	50.15	53.59
B32	B32 - Cost of property registration (Score)	Cost of property registration (Score)	negative outcomes	2020	World Bank. Doing Business 2020	79.07	49.11	32.52	62.56	39.75	59.76	60.46	39.97	99.38	53.32	90.69	2.95	65.50	73.98
B33	B33 - Transparency of property information (Index)	Transparency of property information (Index)	positive outcomes	2020	World Bank. Doing Business 2020	no data	no data	4.00	1.50	no data	1.50	3.00	4.00	4.50	5.00	no data	no data	2.50	3.50
B34	B34 - Equal access to property rights (Index)	Equal access to property rights (Index)	positive outcomes	2020	World Bank. Doing Business 2020	no data	no data	-1.00	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
B35	B35 - Strength of legal property rights (Score)	Strength of legal property rights (Score)	positive outcomes	2020	World Bank. Doing Business 2020	16.67	50.00	50.00	66.67	no data	25.00	91.67	16.67	91.67	16.67	no data	16.67	41.67	41.67
B41	B41 - Getting Credit (Score)	Getting Credit (Score)	positive outcomes	2020	World Bank. Doing Business 2020	3.00	8.00	6.00	8.00	no data	3.00	19.00	8.00	19.00	7.00	no data	2.00	13.00	12.00
B51	B51 - Protecting minority investors (Score)	Protecting minority investors (Score)	positive outcomes	2020	World Bank. Doing Business 2020	34.00	26.00	22.00	52.00	16.00	10.00	92.00	36.00	44.00	34.00	no data	16.00	50.00	56.00
B61	B61 - Extent of ownership and control (Score)	Extent of ownership and control (Score)	positive outcomes	2020	World Bank. Doing Business 2020	no data	no data	no data	no data	no data	no data	85.71	no data	no data	no data	no data	no data	28.57	71.43
B71	B71 - Paying Taxes (Score)	Paying Taxes (Score)	positive outcomes	2020	World Bank. Doing Business 2020	60.87	49.86	40.93	62.73	55.90	63.26	72.79	62.62	84.57	84.72	no data	76.75	51.33	73.10
B72	B72 - Labor tax and contributions (% of profit)	Labor tax and contributions (% of profit)	negative outcomes	2020	World Bank. Doing Business 2020	10.20	no data	12.60	17.70	no data	12.40	1.90	20.30	6.00	2.30	no data	19.20	17.50	11.30
B73	B73 - Total tax and contribution rate (% of profit)	Total tax and contribution rate (% of profit)	negative outcomes	2020	World Bank. Doing Business 2020	41.20	219.60	50.70	37.90	83.70	37.70	37.20	38.30	33.20	30.10	no data	31.40	43.80	33.70
B81	B81 - Trading across borders (Score)	Trading across borders (Score)	positive outcomes	2020	World Bank. Doing Business 2020	47.34	66.87	3.45	59.37	no data	56.00	67.44	60.95	74.98	71.79	51.60	26.19	20.21	66.73
B82	B82 - Cost to export: Border compliance (Score)	Cost to export: Border compliance (Score)	negative outcomes	2020	World Bank. Doing Business 2020	89.73	38.60	no data	42.90	no data	83.82	86.56	18.14	82.70	68.65	53.30	28.07	no data	80.25
B83	B83 - Cost to import: Border compliance (Score)	Cost to import: Border compliance (Score)	negative outcomes	2020	World Bank. Doing Business 2020	63.04	36.22	no data	12.08	no data	90.00	30.63	50.42	76.49	71.61	20.67	34.90	no data	62.78
B91	B91 - Strength of enforcing contracts (Score)	Strength of enforcing contracts (Score)	positive outcomes	2020	World Bank. Doing Business 2020	42.97	32.97	33.28	48.43	55.93	62.77	58.27	50.04	69.11	51.25	54.58	58.99	61.66	60.60
B92	B92 - Quality of judicial processes (Score)	Quality of judicial processes (Score)	positive outcomes	2020	World Bank. Doing Business 2020	27.78	30.56	30.56	30.56	16.67	38.89	50.00	44.44	88.89	36.11	25.00	19.44	33.33	47.22
B93	B93 - Resolving insolvency (Score)	Resolving insolvency (Score)	positive outcomes	2020	World Bank. Doing Business 2020	30.61	no data	no data	65.86	no data	30.34	62.41	34.80	57.25	52.16	no data	no data	39.10	43.57
B94	B94 - Strength of insolvency framework (Score)	Strength of insolvency framework (Score)	positive outcomes	2020	World Bank. Doing Business 2020	53.13	no data	no data	84.38	no data	31.25	90.63	56.25	93.75	62.50	no data	no data	56.25	43.75
C11	C11 - Corruption Perception Index (CPI)	Corruption Perception Index (CPI)	negative outcomes	2019	Transparency Internationale. (2020). Corruption Perceptions Index (CPI) 2019	19.00	25.00	18.00	30.00	23.00	37.00	28.00	24.00	53.00	66.00	9.00	12.00	37.00	28.00
H11	H11 - Human Development Index (HDI)	Human Development Index (HDI)	positive outcomes	2018	UNDP (2019). Human Development Data (1990-2018)	29.60	29.40	31.60	49.50	44.00	47.00	42.60	38.60	53.60	80.10	no data	26.40	39.70	38.70
H12	H12 - Gender Development Index (GDI)	Gender Development Index (GDI)	positive outcomes	2018	UNDP (2019). Human Development Data (1990-2018)	100.30	88.80	84.40	no data	no data	84.40	93.30	94.60	94.30	no data	no data	83.90	93.60	86.30
H13	H13 - Youth unemployment rate (% youth pop)	Youth unemployment rate (% youth pop)	negative outcomes	2018	UNDEP, Human Development Data (1990-2018)	2.90	8.50	7.80	21.30	11.60	2.80	18.50	2.70	1.60	no data	24.90	19.60	3.50	2.60
H14	H14 - Overall unemployment rate (% Pop)	Overall unemployment rate (% Pop)	negative outcomes	2018	UNDEP, Human Development Data (1990-2018)	1.50	3.70	4.20	11.10	6.50	1.80	9.30	1.70	1.00	no data	14.00	12.70	1.90	1.70
H15	H15 - Overall unemployment rate (female to male ratio)	Overall unemployment rate (female to male ratio)	negative outcomes	2018	UNDEP, Human Development Data (1990-2018)	0.43	0.79	0.60	1.08	1.09	1.80	0.99	1.25	1.67	no data	1.12	0.87	1.41	1.41
H21	H21 - Inequality-adjusted Human Development Index (IHDI)	Inequality-adjusted Human Development Index (IHDI)	negative outcomes	2018	UNDP (2019). Human Development Data (1990-2018)	29.60	29.40	31.60	30.60	44.00	33.70	42.60	38.60	38.20	79.70	no data	26.40	39.70	38.70
H22	H22 - Gender Inequality Index	Gender Inequality Index (GII)	negative outcomes	2018	UNDP (2019). Human Development Data (1990-2018)	52.00	no data	65.50	no data	no data	50.80	54.50	no data	41.20	no data	no data	no data	53.90	53.10
H23	H23 - Gini coefficient	Gini coefficient	positive outcomes	2017	UNDEP, Human Development Data (1990-2018)	38.60	45.30	42.10	41.60	no data	39.10	40.80	42.60	43.70	46.80	no data	46.30	37.80	42.80
H24	H24 - Child labour (% ages 5-14)	Child labour (% ages 5-14)	negative outcomes	2017	UNDEP, Human Development Data (1990-2018)	30.90	28.50	26.70	no data	no data	48.60	no data	no data	19.00	no data	no data	no data	24.30	18.10
I11	I11 - Narcotic Traffic (% of population affected)	Narcotic Traffic (% of population affected)	negative outcomes	2020	User defined	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
I12	I12 - Human Traffiquing (% of population affected)	Human Traffiquing (% of population affected)	negative outcomes	2020	User defined	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
I21	I21 - Narcotic use (% of population affected)	Narcotic use (% of population affected)	negative outcomes	2020	User defined	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
I22	I22 - Other Illegal Substance use (% of population affected)	Other Illegal Substance use (% of population affected)	negative outcomes	2020	User defined	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
I31	I31 - Child Abuse (% of population affected)	Child Abuse (% of population affected)	negative outcomes	2020	User defined	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data

Indicator Code	Indicator	description	Outcomes	DataYear	DataSource	Burundi	Comoros	Congo (DRC)	Djibouti	Eritrea	Ethiopia	Kenya	Madagascar	Rwanda	Seychelles	Somalia	South Sudan	Tanzania	Uganda
I32	I32 - Woman Abuse (% of population affected)	Woman Abuse (% of population affected)	negative outcomes	2020	User defined	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
I41	I41 - Piracy (% of population affected)	Piracy (% of population affected)	negative outcomes	2020	User defined	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
I42	I42 - Organised Crime (% of population affected)	Organised Crime (% of population affected)	negative outcomes	2020	User defined	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
I43	I43 - IUU (% of population affected)	IUU (% of population affected)	negative outcomes	2020	User defined	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
M101	M101 - Blue Economy Score	Blue Economy Score	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	41.77	no data	39.53	32.38	no data	30.27	37.24	no data	49.63	26.50	no data	38.22	no data
M102	M102 - Adjusted Net Savings Component	Adjusted Net Savings Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	0.55	no data	0.74	0.56	no data	0.49	0.56	no data	0.54	0.58	no data	0.63	no data
M103	M103 - Climate Vulnerability Component	Climate Vulnerability Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	0.54	no data	0.48	0.59	no data	0.53	0.56	no data	0.50	0.68	no data	0.54	no data
M104	M104 - Fisheries Component	Fisheries Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	83.14	no data	4.79	11.44	no data	4.68	48.04	no data	50.89	23.51	no data	27.75	no data
M105	M105 - Marine And Coastal Tourism Component	Marine And Coastal Tourism Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	24.00	no data	47.00	46.00	no data	23.00	23.00	no data	100.00	no data	no data	27.00	no data
M106	M106 - Maritime Transportation and Shipping Component	Maritime Transportation and Shipping Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	42.72	no data	58.55	39.68	no data	58.67	52.07	no data	42.73	42.25	no data	53.21	no data
M107	M107 - Natural Gas Proved Reserves	Natural Gas Proved Reserves	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	0.20	no data	0.20	no data
M108	M108 - Port Quantity Indicator	Port Quantity Indicator	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	6.87	no data	32.52	4.36	no data	17.34	8.85	no data	10.45	9.50	no data	15.99	no data
M109	M109 - Port Services and Quality Indicator	Port Services and Quality Indicator	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	78.57	no data	84.57	75.00	no data	100.00	95.29	no data	75.00	75.00	no data	90.43	no data
M201	M201 - Coastal Welfare Score	Coastal Welfare Score	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	72.44	no data	65.05	69.07	no data	56.60	44.05	no data	83.49	26.07	no data	68.51	no data
M202	M202 - Artisanal Fishing Goal	Artisanal Fishing Goal	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	45.00	no data	53.00	57.00	no data	61.00	44.00	no data	77.00	49.00	no data	67.00	no data
M203	M203 - Coastal Economic Security Component	Coastal Economic Security Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	0.47	no data	0.51	0.29	no data	0.59	0.43	no data	0.73	0.42	no data	0.60	no data
M204	M204 - Coastal Livelihoods Goal	Coastal Livelihoods Goal	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	92.00	no data	97.00	3.00	no data	99.00	81.00	no data	85.00	95.00	no data	100.00	no data
M205	M205 - Coastal Physical Security Component	Coastal Physical Security Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	1.00	no data	0.76	1.00	no data	0.48	0.29	no data	1.00	no data	no data	0.85	no data
M206	M206 - Homicides Per 100,000 Per UNODC	Homicides Per 100,000 Per UNODC	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	7.70	no data	6.48	8.04	no data	4.92	7.69	no data	12.74	4.31	no data	6.95	no data
M207	M207 - Human Development Index From UNDP	Human Development Index From UNDP	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	0.54	no data	0.50	0.43	no data	0.58	0.52	no data	0.80	0.38	no data	0.53	no data
M208	M208 - Log-Transformed Countrywide Conflict Events	Log-Transformed Countrywide Conflict Events	negative outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	1.00	no data	0.80	1.00	no data	0.18	0.11	no data	1.00	no data	no data	0.57	no data
M209	M209 - Log-Transformed Homicide Rate	Log-Transformed Homicide Rate	negative outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	0.73	no data	0.78	0.72	no data	0.84	0.73	no data	0.50	0.86	no data	0.76	no data
M210	M210 - Log-Transformed IMR	Log-Transformed IMR	negative outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	0.58	no data	0.60	0.79	no data	0.79	0.73	no data	0.93	no data	no data	0.73	no data
M301	M301 - Fisheries Score	Fisheries Score	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	42.80	no data	34.70	49.30	no data	63.60	62.10	no data	76.40	37.30	no data	52.30	no data
M302	M302 - Fisheries Legislation Component	Fisheries Legislation Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	20.00	no data	40.00	50.00	no data	100.00	90.00	no data	60.00	60.00	no data	70.00	no data
M303	M303 - Fishery Health Component	Fishery Health Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	48.00	no data	45.00	52.00	no data	39.00	20.00	no data	81.00	12.00	no data	43.00	no data
M304	M304 - Foreign Fishing Component	Foreign Fishing Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	99.80	no data	71.10	39.90	no data	95.80	97.60	no data	39.50	40.80	no data	99.90	no data
M305	M305 - Marine Protected Areas Component	Marine Protected Areas Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	no data	no data	no data	no data	no data	no data	40.00	no data	100.00	no data	no data	no data	no data
M306	M306 - Ocean Pollution Component	Ocean Pollution Component	negative outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	39.00	no data	52.00	54.00	no data	47.00	58.00	no data	78.00	61.00	no data	51.00	no data
M307	M307 - Percentage of Total Catch by Foreign-Flagged Vessels	Percentage of Total Catch by Foreign-Flagged Vessels	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook	no data	0.20	no data	28.90	60.10	no data	4.20	2.40	no data	60.50	59.20	no data	0.10	no data

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					Version 3.0, 2020 Edition														
M308	M308 - RFMO Component	RFMO Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	50.00	no data	no data	100.00	no data	100.00	67.00	no data	100.00	50.00	no data	50.00	no data
M401	M401 - Illicit Trades Score	Illicit Trades Score	negative outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	31.67	no data	75.00	88.89	no data	43.33	43.89	no data	60.00	45.00	no data	43.33	no data
M403	M403 - Maritime Arms Trade Score	Maritime Arms Trade Score	negative outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	2.00	no data	2.00	no data	no data	3.00	4.00	no data	no data	4.00	no data	3.00	no data
M403	M403 - Maritime Arms Trade Score	Maritime Arms Trade Score	negative outcomes	2021	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	2.00	no data	10.00	no data	no data	3.00	4.00	no data	no data	4.00	no data	3.00	no data
M404	M404 - Maritime Cannabis Trade Score	Maritime Cannabis Trade Score	negative outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	3.00	no data	3.00	2.00	no data	1.00	3.00	no data	2.00	2.00	no data	2.00	no data
M405	M405 - Maritime Cocaine Trade Score	Maritime Cocaine Trade Score	negative outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	6.00	no data	no data	no data	no data	2.00	6.00	no data	2.00	no data	no data	2.00	no data
M406	M406 - Maritime Opiates Trade Score	Maritime Opiates Trade Score	negative outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	8.00	no data	4.00	2.00	no data	4.00	4.00	no data	8.00	4.00	no data	6.00	no data
M407	M407 - Maritime Synthetic Drugs Trade Score	Maritime Synthetic Drugs Trade Score	negative outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	6.00	no data	no data	no data	no data	4.00	no data	no data	no data	no data	no data	no data	no data
M408	M408 - Maritime Wildlife Products Trade Score	Maritime Wildlife Products Trade Score	negative outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	4.00	no data	2.00	no data	no data	6.00	6.00	no data	2.00	4.00	no data	6.00	no data
M501	M501 - Maritime Enforcement Score	Maritime Enforcement Score	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	21.72	no data	47.59	35.16	no data	53.92	28.35	no data	40.11	7.91	no data	47.28	no data
M502	M502 - Difficulty Component	Difficulty Component	negative outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	0.28	no data	0.49	0.33	no data	0.54	0.10	no data	0.37	0.20	no data	0.43	no data
M503	M503 - Final Naval Capacity Evaluation	Final Naval Capacity Evaluation	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	0.13	no data	0.38	0.17	no data	0.63	0.27	no data	0.31	0.04	no data	0.40	no data
M504	M504 - Geography (Coast/EEZ)	Geography (Coast/EEZ)	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	0.43	no data	0.22	0.57	no data	0.48	0.89	no data	0.65	0.81	no data	0.61	no data
M505	M505 - Maritime Neighbors Score	Maritime Neighbors Score	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	1.00	no data	0.80	0.78	no data	0.45	0.90	no data	0.60	0.80	no data	0.53	no data
M506	M506 - Neighbors Rescaled	Neighbors Rescaled	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	1.00	no data	0.60	0.80	no data	0.40	0.80	no data	1.00	0.60	no data	0.80	no data
M507	M507 - Rescaled Coastline Length	Rescaled Coastline Length	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	0.35	no data	0.33	0.74	no data	0.43	0.91	no data	0.42	0.81	no data	0.64	no data
M508	M508 - Rescaled EEZ Size	Rescaled EEZ Size	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	0.52	no data	0.10	0.39	no data	0.52	0.87	no data	0.89	0.80	no data	0.58	no data
M509	M509 - Rescaled Number Of Coastal Patrol Vessels	Rescaled Number Of Coastal Patrol Vessels	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	0.24	no data	0.56	0.56	no data	0.45	0.48	no data	0.52	no data	no data	0.59	no data
M510	M510 - Total Number Of Maritime Neighbors	Total Number Of Maritime Neighbors	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	5.00	no data	3.00	4.00	no data	2.00	4.00	no data	5.00	3.00	no data	4.00	no data
M601	M601 - Piracy and Armed Robbery at Sea Score	Piracy and Armed Robbery at Sea Score	negative outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	84.72	no data	100.00	100.00	no data	88.56	81.42	no data	84.93	78.16	no data	84.99	no data
M701	M701 - Rule Of Law Score	Rule Of Law Score	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	43.96	no data	36.71	21.75	no data	54.48	49.87	no data	73.53	24.90	no data	44.29	no data
M702	M702 - Converted Corruption Perceptions Index Indicator	Converted Corruption Perceptions Index Indicator	negative outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	31.25	no data	37.50	28.75	no data	35.00	30.00	no data	82.50	11.25	no data	46.25	no data
M703	M703 - Efficacy Component	Efficacy Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	33.33	no data	no data	8.33	no data	41.67	50.00	no data	66.67	no data	no data	41.67	no data
M704	M704 - Efficiency Component	Efficiency Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	66.90	no data	59.40	no data	no data	67.40	61.00	no data	71.80	51.60	no data	20.20	no data
M705	M705 - Inclusion Component	Inclusion Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	58.33	no data	36.67	26.67	no data	58.33	63.33	no data	66.67	36.67	no data	68.33	no data
M706	M706 - Judicial Accountability From Varieties of Democracy	Judicial Accountability From Varieties of Democracy	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	1.00	no data	1.00	1.00	no data	3.00	1.00	no data	3.00	no data	no data	1.00	no data
M707	M707 - Judicial Attacks From Varieties of Democracy	Judicial Attacks From Varieties of Democracy	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	2.00	no data	4.00	3.00	no data	2.00	3.00	no data	4.00	3.00	no data	3.00	no data
M708	M708 - Judicial Corruption From Varieties of Democracy	Judicial Corruption From Varieties of Democracy	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook	no data	1.00	no data	2.00	2.00	no data	3.00	2.00	no data	3.00	1.00	no data	2.00	no data

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					Version 3.0, 2020 Edition														
M709	M709 - Judicial Integrity Component	Judicial Integrity Component	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	30.00	no data	50.00	45.00	no data	70.00	45.00	no data	80.00	25.00	no data	45.00	no data
M710	M710 - Varieties Of Democracy Inclusion of Gender	Varieties Of Democracy Inclusion of Gender	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	2.00	no data	1.00	1.00	no data	2.00	2.00	no data	1.00	1.00	no data	2.00	no data
M711	M711 - Varieties Of Democracy Inclusion of Religion	Varieties Of Democracy Inclusion of Religion	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	1.00	no data	2.00	no data	no data	3.00	4.00	no data	4.00	2.00	no data	3.00	no data
M712	M712 - Varieties of Democracy Inclusion of Social Group	Varieties of Democracy Inclusion of Social Group	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	3.00	no data	3.00	no data	no data	2.00	2.00	no data	2.00	2.00	no data	3.00	no data
M713	M713 - Varieties of Democracy Inclusion of Socioeconomic Status	Varieties of Democracy Inclusion of Socioeconomic Status	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	3.00	no data	1.00	2.00	no data	2.00	2.00	no data	2.00	2.00	no data	3.00	no data
M714	M714 - Varieties of Democracy Inclusion of Subnational Region	Varieties of Democracy Inclusion of Subnational Region	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	2.00	no data	no data	2.00	no data	2.00	2.00	no data	4.00	no data	no data	2.00	no data
M715	M715 - World Bank Ease of Trading Across Borders	World Bank Ease of Trading Across Borders	positive outcomes	2020	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	66.90	no data	59.40	no data	no data	67.40	61.00	no data	71.80	51.60	no data	20.20	no data
M715	M715 - Varieties of Democracy Inclusion of Socioeconomic Status	Varieties of Democracy Inclusion of Socioeconomic Status	positive outcomes	2021	Stable Seas Maritime Security Index: Codebook Version 3.0, 2020 Edition	no data	66.90	no data	59.40	no data	no data	67.40	61.00	no data	71.80	51.60	no data	20.20	no data
P11	P11 - Multidimensional Poverty Index (MPI)	Percentage of the population that is multidimensionally poor adjusted by the intensity of the deprivations.	positive outcomes	2019	UNDP (2019). Multidimensional Poverty Index (MPI)	40.32	18.08	38.90	35.80	0.00	48.88	17.90	45.26	25.87	0.00	0.00	58.02	27.34	22.40
P12	P12 - Fish, seafood supply quantity (kg/capita/yr)	Fish, seafood supply quantity (kg/capita/yr)	positive outcomes	2017	FAO Food Balance	5.67	5.67	5.67	3.69	5.67	0.44	3.98	5.29	7.66	58.90	5.67	5.67	5.67	11.27
P13	P13 - Rate of Extreme Poverty	Rate of Extreme Poverty	positive outcomes	2017	National Household Survey EDAM - IS				21.10										
P23	P23 - Literacy index	Literacy index	positive outcomes	2018	UNDEP, Human Development Data (1990-2018)	0.42	0.48	0.50	0.31	0.27	0.34	0.53	0.49	0.46	0.75	0.00	0.30	0.42	0.52
P24	P24 - Education Index	Education Index	positive outcomes	2018	UNDEP, Human Development Data (1990-2018)	0.42	0.48	0.50	0.31	0.27	0.34	0.53	0.49	0.46	0.75	0.00	0.30	0.42	0.52
P25	P25 - Inequality Adjusted Education Index	Inequality Adjusted Education Index	positive outcomes	2018	UNDEP, Human Development Data (1990-2018)	0.25	0.25	0.35	0.00	0.00	0.19	0.41	0.32	0.32	0.00	0.00	0.18	0.31	0.37
P26	P26 - Mean years of schooling, female (years)	Mean years of schooling, female (years)	positive outcomes	2018	UNDEP, Human Development Data (1990-2018)	2.70	3.90	5.30	0.00	0.00	1.60	6.00	6.40	3.90	0.00	0.00	4.00	5.60	4.80
P27	P27 - Mean years of schooling, male (years)	Mean years of schooling, male (years)	positive outcomes	2018	UNDEP, Human Development Data (1990-2018)	3.60	5.90	8.40	0.00	0.00	3.90	7.20	5.80	4.90	0.00	0.00	5.30	6.40	7.40
P28	P28 - Children aged (6-14) out of school (%)	Children aged (6-14) out of school (%)	positive outcomes	2017	National Household Survey EDAM - IS				19.00										
P31	P31 - Population affected by food insecurity	Population affected by food insecurity	positive outcomes	2017	National Household Survey EDAM - IS				13.00										

3.2 BEVTK Lookup Tables

Table 3-15 and Table 3-16 are lookup tables used to standardised the monetary values in the input data tables.

3.2.1 Exchange rates lookup table

Table 3-15: Exchange rates lookup table by country

Between 2010 and 2020[17]

Code	Currency Name	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BIF	Burundian franc	1,230.75	1,261.07	1,442.51	1,555.09	1,546.69	1,571.90	1,654.63	1,729.06	1,782.88	1,845.62	1,928.12
CDF	Congolese franc	905.91	919.49	919.76	919.57	925.23	925.98	1,010.30	1,464.42	1,622.52	1,647.76	1,956.39
KMF	Comoro franc	371.10	353.44	382.92	370.42	370.32	443.41	444.45	435.49	416.58	439.46	413.72
DJF	Djiboutian franc	177.72	177.72	177.72	177.72	177.72	177.72	177.72	177.72	177.72	177.72	177.20
EUR	Euro	0.75	0.72	0.78	0.75	0.75	0.90	0.90	0.89	0.85	0.89	0.84
ERN	Eritrean nakfa	15.38	15.38	15.38	15.38	15.38	15.38	15.35	15.08	15.08	15.08	15.01
ETB	Ethiopian birr	14.41	16.90	17.70	18.63	19.59	20.58	21.73	23.87	27.43	29.07	38.05
GBP	U.K. Pound Sterling	0.65	0.62	0.63	0.64	0.61	0.65	0.74	0.78	0.75	0.78	0.75
KES	Kenyan shilling	79.23	88.81	84.53	86.12	87.92	98.18	101.50	103.41	101.30	101.99	109.37
MGA	Malagasy ariary	2,089.95	2,025.12	2,194.97	2,206.91	2,414.81	2,933.51	3,176.54	3,116.11	3,334.75	3,618.32	3,892.40
RWF	Rwandan franc	583.13	600.31	614.30	646.64	682.44	719.86	787.25	831.55	861.09	899.35	984.12
SOS	Somali shilling	1,600.00	1,639.04	1,599.58	1,218.99	824.96	625.55	575.68	585.27	579.38	570.00	575.85
SSP	South Sudanese pound	2.99	2.99	2.95	2.95	2.95	3.60	46.73	113.65	141.39	158.00	174.49
SCR	Seychelles rupee	12.07	12.38	13.70	12.06	12.75	13.31	13.32	13.65	13.91	14.03	20.71
TZS	Tanzanian shilling	1,395.63	1,557.43	1,571.70	1,597.56	1,653.23	1,991.39	2,177.09	2,228.86	2,263.78	2,288.21	2,308.03
UGX	Ugandan shilling	2,177.56	2,522.80	2,504.56	2,586.89	2,599.79	3,240.65	3,420.10	3,611.22	3,727.07	3,704.05	3,685.11
USD	US Dollars	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ZAR	South African Rand	7.32	7.26	8.21	9.66	10.85	12.76	14.71	13.32	13.23	14.45	15.36

[17] Source: International Monetary Fund, International Financial Statistics, http://api.worldbank.org/v2/en/indicator/PA.NUS.FCRF?downloadformat=excel , http://www.floatrates.com/daily/usd.xml

3.2.2 *Deflators Lookup table*

Table 3-16: GDP deflators lookup table by country *between 2010 and 2020*[18]

Country	Deflator	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Burundi	GDP Deflator	85.54	90.46	90.18	90.55	95.88	100.00	101.02	106.43	108.52	108.52	108.52
Burundi	Value Added Deflator (Agriculture, forestry and fishery)	81.17	87.53	86.26	90.55	94.08	100.00	102.43	115.46	112.69	112.69	112.69
Burundi	Value Added Deflator (Manufacturing)	79.02	83.16	87.69	92.41	93.31	100.00	114.84	112.62	111.52	111.52	111.52
Comoros	GDP Deflator	119.28	126.88	118.67	119.67	118.50	100.00	97.78	99.97	106.27	106.27	106.27
Comoros	Value Added Deflator (Agriculture, forestry and fishery)	120.00	128.85	120.62	119.08	117.28	100.00	97.14	106.35	110.18	110.18	110.18
Comoros	Value Added Deflator (Manufacturing)	106.51	128.75	115.38	122.08	130.87	100.00	110.85	104.03	98.09	98.09	98.09
Congo (DRC)	GDP Deflator	82.65	92.66	98.13	100.85	101.25	100.00	103.89	93.49	110.69	110.69	110.69
Congo (DRC)	Value Added Deflator (Agriculture, forestry and fishery)	81.23	91.73	98.27	99.32	100.15	100.00	108.06	102.50	121.69	121.69	121.69
Congo (DRC)	Value Added Deflator (Manufacturing)	79.38	88.48	95.38	96.77	97.81	100.00	108.16	102.46	117.33	117.33	117.33
Djibouti	GDP Deflator	84.83	87.90	91.12	96.30	97.58	100.00	100.15	100.71	100.71	100.71	100.71
Djibouti	Value Added Deflator (Agriculture, forestry and fishery)	73.62	77.73	76.43	83.15	90.96	100.00	113.17	129.56	115.54	115.54	115.54
Djibouti	Value Added Deflator (Manufacturing)	92.37	98.43	95.18	97.93	95.23	100.00	104.75	106.14	90.83	90.83	90.83
Eritrea	GDP Deflator	61.22	69.39	76.09	83.52	91.54	100.00	110.79	124.78	138.48	138.48	138.48
Eritrea	Value Added Deflator (Agriculture, forestry and fishery)	61.22	69.39	76.09	83.52	91.54	100.00	110.79	120.85	134.03	134.03	134.03
Eritrea	Value Added Deflator (Manufacturing)	61.22	69.39	76.09	83.52	91.54	100.00	110.79	122.43	136.05	136.05	136.05
Ethiopia	GDP Deflator	69.02	70.66	90.07	89.81	94.78	100.00	106.35	103.35	101.18	101.18	101.18
Ethiopia	Value Added Deflator (Agriculture, forestry and fishery)	67.06	69.68	98.84	94.66	97.58	100.00	107.58	104.48	97.44	97.44	97.44
Ethiopia	Value Added Deflator (Manufacturing)	78.47	72.83	83.78	85.52	91.99	100.00	124.85	115.87	108.01	108.01	108.01
European Union	GDP Deflator	114.07	120.87	113.01	117.69	118.28	100.00	100.26	102.86	108.38	108.38	108.38
European Union	Value Added Deflator (Agriculture, forestry and fishery)	116.17	124.45	126.02	120.31	113.55	100.00	103.52	107.45	116.46	116.46	116.46
European Union	Value Added Deflator (Manufacturing)	113.76	119.19	111.69	117.04	116.03	100.00	99.04	99.74	103.74	103.74	103.74
Kenya	GDP Deflator	81.77	80.82	92.88	95.88	101.49	100.00	102.09	110.82	116.34	116.34	116.34
Kenya	Value Added Deflator (Agriculture, forestry and fishery)	62.85	68.23	79.14	82.89	91.95	100.00	106.27	133.09	137.10	137.10	137.10
Kenya	Value Added Deflator (Manufacturing)	89.78	91.66	103.86	104.16	105.69	100.00	104.28	102.01	105.10	105.10	105.10
Madagascar	GDP Deflator	100.58	114.58	111.49	116.93	114.06	100.00	100.62	107.66	108.23	108.23	108.23
Madagascar	Value Added Deflator (Agriculture, forestry and fishery)	98.37	111.63	105.66	112.95	109.34	100.00	100.81	108.10	106.43	106.43	106.43
Madagascar	Value Added Deflator (Manufacturing)	98.41	110.30	107.44	117.33	120.85	100.00	118.73	114.13	125.78	125.78	125.78
Rwanda	GDP Deflator	100.36	105.63	108.66	107.90	105.44	100.00	96.61	98.15	94.06	94.06	94.06
Rwanda	Value Added Deflator (Agriculture, forestry and fishery)	90.51	98.71	106.96	106.36	104.41	100.00	103.20	110.22	101.66	101.66	101.66
Rwanda	Value Added Deflator (Manufacturing)	102.40	103.64	110.24	107.59	104.84	100.00	94.71	97.69	91.15	91.15	91.15
Seychelles	GDP Deflator	89.45	89.13	89.42	105.73	102.31	100.00	99.17	100.09	98.17	98.17	98.17
Seychelles	Value Added Deflator (Agriculture, forestry and fishery)	89.70	89.93	84.05	112.16	108.45	100.00	100.85	97.57	98.60	98.60	98.60
Seychelles	Value Added Deflator (Manufacturing)	109.92	97.85	94.72	116.96	113.76	100.00	97.94	103.04	98.87	98.87	98.87
Somalia	GDP Deflator	86.40	87.56	114.13	129.04	116.56	100.00	94.35	95.95	92.89	92.89	92.89
Somalia	Value Added Deflator (Agriculture, forestry and fishery)	84.47	85.56	114.45	129.40	115.87	100.00	95.95	96.67	93.84	93.84	93.84
Somalia	Value Added Deflator (Manufacturing)	84.42	85.51	114.42	129.47	115.81	100.00	95.92	96.61	93.78	93.78	93.78
South Africa	GDP Deflator	131.86	141.64	131.88	119.05	111.79	100.00	92.99	107.99	113.00	113.00	113.00
South Africa	Value Added Deflator (Agriculture, forestry and fishery)	147.33	153.42	136.20	116.61	108.25	100.00	110.55	114.17	116.50	116.50	116.50
South Africa	Value Added Deflator (Manufacturing)	136.30	134.87	122.81	111.35	110.20	100.00	92.64	109.17	111.61	111.61	111.61
South Sudan	GDP Deflator	93.14	107.36	119.23	128.16	123.71	100.00	51.17	57.87	60.27	60.27	60.27
South Sudan	Value Added Deflator (Agriculture, forestry and fishery)	93.14	107.36	119.23	128.16	123.71	100.00	51.17	57.87	60.27	60.27	60.27
South Sudan	Value Added Deflator (Manufacturing)	93.14	107.36	119.23	128.16	123.71	100.00	51.17	57.87	60.27	60.27	60.27
Tanzania	GDP Deflator	91.43	91.38	100.53	109.06	112.01	100.00	98.37	98.76	99.16	99.16	99.16
Tanzania	Value Added Deflator (Agriculture, forestry and fishery)	78.66	80.71	95.61	108.58	107.32	100.00	102.88	108.90	109.11	109.11	109.11
Tanzania	Value Added Deflator (Manufacturing)	100.55	111.94	121.88	131.29	130.80	100.00	94.24	91.43	95.09	95.09	95.09
Uganda	GDP Deflator	99.18	102.25	112.71	113.21	117.20	100.00	98.75	100.76	102.40	102.40	102.40
Uganda	Value Added Deflator (Agriculture, forestry and fishery)	90.25	103.68	118.00	115.38	121.23	100.00	99.98	108.91	100.05	100.05	100.05
Uganda	Value Added Deflator (Manufacturing)	99.63	116.60	119.22	118.79	112.81	100.00	100.36	103.77	116.34	116.34	116.34
United Kingdom	GDP Deflator	93.42	98.85	99.08	99.91	107.08	100.00	90.27	87.67	92.60	92.60	92.60
United Kingdom	Value Added Deflator (Agriculture, forestry and fishery)	100.76	99.27	113.52	118.22	113.32	100.00	94.68	95.80	103.49	103.49	103.49
United Kingdom	Value Added Deflator (Manufacturing)	89.23	92.84	94.53	100.72	105.37	100.00	89.77	85.79	90.42	90.42	90.42
United States of Am	GDP Deflator	91.78	93.70	95.50	97.17	98.97	100.00	101.04	102.94	105.45	105.45	105.45
United States of Am	Value Added Deflator (Agriculture, forestry and fishery)	94.28	121.27	124.96	128.66	118.59	100.00	86.77	93.60	90.54	90.54	90.54
United States of Am	Value Added Deflator (Manufacturing)	89.09	92.25	95.81	96.09	97.24	100.00	99.32	100.67	102.90	102.90	102.90

[18] Source: GDP Deflators USD 2015 - local 2015 - FAOSTAT data retreived on 11-7-2020

3.2.3 Economic Indicators Lookup table

Table 3-17: Real GDP for the UNECA SRO-EA countries between 2010 and 2020

Real GDP Billion USD (Nominal GDP divided by GDP deflator base 100 = 2015)
source: National Statistics and World Bank from tradingeconomics.com and https://www.statista.com/ and GDP deflator base 2015 =100 - FAOSTAT data retreived on 11-7-2020

Country Name	Country Code	Indicator	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trend
Burundi	BDI	Real GDP	2.38	2.47	2.59	2.71	2.83	3.10	2.93	2.98	2.80	2.78	2.53	
Comoros	COM	Real GDP	0.76	0.81	0.86	0.93	0.97	0.97	1.03	1.08	1.11	1.12	0.93	
Congo (DRC)	COD	Real GDP	26.09	27.89	29.86	32.40	35.46	37.92	35.74	40.67	42.31	42.75	36.59	
Djibouti	DJI	Real GDP	1.33	1.41	1.48	2.12	2.26	2.43	2.61	2.73	2.99	3.30	3.03	
Eritrea	ERI	Real GDP	3.46	3.76	4.02	4.21	4.33	4.44	4.52	4.66	4.85	4.69	3.79	
Ethiopia	ETH	Real GDP	43.36	45.22	48.09	53.06	58.67	64.59	69.86	79.12	83.29	94.99	92.90	
Kenya	KEN	Real GDP	48.92	51.91	54.27	57.47	60.55	64.01	67.77	71.26	75.45	82.09	69.62	
Madagascar	MDG	Real GDP	9.92	10.08	10.39	10.62	10.98	11.32	11.78	12.24	12.80	13.01	11.09	
Rwanda	RWA	Real GDP	6.13	6.54	7.08	7.28	7.85	8.58	9.04	9.42	10.24	10.76	9.89	
Seychelles	SYC	Real GDP	1.08	1.20	1.18	1.26	1.31	1.38	1.44	1.52	1.62	1.73	1.58	
Somalia	SOM	Real GDP	1.24	4.00	3.16	3.02	3.40	4.05	4.45	4.70	5.08	5.23	6.46	
South Sudan	SSD	Real GDP	15.68	13.89	10.01	14.38	11.28	12.00	39.11	33.28	32.37	36.65	38.69	
Tanzania	TZA	Real GDP	35.01	37.93	39.44	41.89	44.61	47.38	50.60	53.99	58.49	63.71	56.98	
Uganda	UGA	Real GDP	26.68	27.04	24.03	25.33	27.60	32.12	29.34	30.53	32.00	33.58	31.35	

note: The real gross domestic product (GDP) is an inflation-adjusted measure that reflects the value of all goods and services produced by an economy in a given year (expressed in base-year prices) and is often referred to as constant-price GDP, inflation-corrected GDP, or constant dollar GDP.

Table 3-18: Total employment for the UNECA SRO-EA countries between 2010 and 2020

Data Source: World Development Indicators, ILO (Derived using data from International Labour Organization, ILOSTAT database. The data retrieved in June 21, 2020) and estimations based on polynomial R^2=1 (Seychelles)
Employment

Country Name	Country Code	Indicator	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trend
Burundi	BDI	Labor force, total	3,748,367	3,860,027	3,972,540	4,086,043	4,201,649	4,350,268	4,503,184	4,660,778	4,822,373	4,983,237	5,148,173	
Comoros	COM	Labor force, total	171,254	176,337	181,731	187,180	193,020	199,105	204,984	211,006	217,181	223,593	229,999	
Congo (DRC)	COD	Labor force, total	23,053,225	23,378,057	23,709,989	24,482,056	25,282,845	26,127,406	26,995,422	27,898,477	28,829,943	29,741,906	30,690,929	
Djibouti	DJI	Labor force, total	344,434	352,285	360,171	367,950	375,763	383,775	391,027	398,751	406,696	415,214	423,670	
Eritrea	ERI	Labor force, total	1,399,724	1,412,071	1,420,769	1,426,943	1,432,917	1,438,419	1,458,352	1,476,283	1,495,202	1,518,958	1,550,174	
Ethiopia	ETH	Labor force, total	39,200,114	40,614,909	42,102,901	43,655,318	45,172,444	46,718,750	48,240,655	49,804,178	51,412,462	53,195,214	54,994,539	
Kenya	KEN	Labor force, total	16,791,816	17,540,848	18,328,404	19,149,317	19,993,005	20,855,980	21,750,718	22,401,022	23,057,935	23,879,160	24,728,107	
Madagascar	MDG	Labor force, total	10,638,131	10,958,031	11,286,313	11,611,874	11,931,368	12,238,090	12,620,212	13,010,466	13,409,202	13,851,504	14,307,144	
Rwanda	RWA	Labor force, total	4,958,711	5,089,382	5,226,281	5,368,436	5,513,220	5,668,191	5,837,087	6,007,191	6,178,259	6,362,559	6,555,834	
Seychelles	SYC	Labor force, total	35,168	39,547	42,399	44,101	45,029	45,556	46,062	46,922	49,886	53,632	55,368	
Somalia	SOM	Labor force, total	2,961,297	3,034,384	3,121,047	3,219,574	3,324,728	3,433,878	3,549,907	3,671,052	3,797,583	3,924,821	4,059,573	
South Sudan	SSD	Labor force, total	3,935,224	4,072,075	4,194,850	4,302,956	4,396,493	4,476,729	4,536,023	4,580,761	4,621,451	4,678,892	4,753,851	
Tanzania	TZA	Labor force, total	21,182,726	21,660,222	22,146,911	22,639,079	23,136,032	23,877,145	24,659,135	25,467,538	26,304,005	27,170,342	28,076,821	
Uganda	UGA	Labor force, total	11,717,458	12,149,266	12,606,240	13,061,480	13,549,586	14,078,249	14,657,926	15,285,775	15,935,453	16,658,774	17,383,132	

Table 3-19: Real GNI for the UNECA SRO-EA countries between 2010 and 2020

Source: UNSTATS (https://unstats.un.org/unsd/snaama/Downloads) and World Development Indicators, ILO (2019)
real GNI at constant prices in US Dollars

Country Name	Country Code	Indicator	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trend
Burundi	BDI	Real GNI	2.36	2.74	3.08	3.14	3.15	3.11	3.09	3.02	3.02	2.78	2.78	
Comoros	COM	Real GNI	0.76	0.80	0.85	0.93	0.97	0.99	1.04	1.07	1.06	1.12	1.12	
Congo (DRC)	COD	Real GNI	24.83	26.70	28.80	29.54	34.87	37.11	38.13	39.54	41.83	41.45	41.45	
Djibouti	DJI	Real GNI	1.60	1.81	2.04	2.31	2.46	2.64	2.81	2.91	3.06	3.43	3.43	
Eritrea	ERI	Real GNI	3.43	3.72	3.99	4.17	4.29	4.40	4.48	4.71	4.91	4.91	4.91	
Ethiopia	ETH	Real GNI	38.05	42.29	46.09	51.71	56.99	62.82	67.62	73.84	78.87	94.53	94.53	
Kenya	KEN	Real GNI	48.69	51.92	53.93	56.84	59.69	63.32	67.39	70.46	74.93	80.43	80.43	
Madagascar	MDG	Real GNI	9.82	9.92	10.06	10.29	10.67	10.89	11.29	11.86	12.38	12.59	12.59	
Rwanda	RWA	Real GNI	5.71	6.16	6.66	6.94	7.43	8.08	8.55	9.11	9.90	10.42	10.42	
Seychelles	SYC	Real GNI	1.00	1.04	1.12	1.19	1.23	1.29	1.33	1.39	1.54	1.68	1.68	
Somalia	SOM	Real GNI	1.21	1.25	1.28	1.36	1.41	1.45	1.52	1.55	1.60	1.60	1.60	
South Sudan	SSD	Real GNI	21.12	22.03	12.52	13.32	14.73	14.94	13.55	13.54	14.00	14.00	14.00	
Tanzania	TZA	Real GNI	33.88	36.55	38.59	41.16	44.11	46.66	49.63	52.95	56.75	62.10	62.10	
Uganda	UGA	Real GNI	19.51	20.67	21.26	22.23	23.23	24.70	25.24	26.36	28.46	32.69	32.69	

3.3 Other Utility Tables and Charts used in the BEVTK

Table 3-20 to Table 3-24 below are used throughout the tool to better identify the country selected as the active country.

Table 3-20: Country's maps lookup table

Country Name	Country Map
Burundi	
Comoros	
Congo (DRC)	
Djibouti	
Eritrea	
Ethiopia	
Kenya	
Madagascar	
Rwanda	
Seychelles	
Somalia	
South Sudan	
Tanzania	
Uganda	

Table 3-21: Country flags lookup table

Country	Code	Flag
Burundi	BDI	
Comoros	COM	
DRC	COD	
Djibouti	DJI	
Eritrea	ERI	
Ethiopia	ETH	
Kenya	KEN	
Madagascar	MDG	
Rwanda	RWA	
Seychelles	SYC	
Somalia	SOM	
South Sudan	SSD	
Tanzania	TZA	
Uganda	UGA	

Table 3-22: Lookup tables used to identify country's geographic situation, currency, etc.

Country Name	Nom du Pays	Shape	Situation	Alpha-2 code	Alpha-3 code	Numeric	Currency Name	Currency Code	Currency
Burundi	Burundi	Burundi	Landlocked	BI	BDI	108	Burundian franc	BIF	Burundian franc (BIF)
Comoros	Comores	Comoros	Island	KM	COM	174	Comoro franc	KMF	Comoro franc (KMF)
Congo (DRC)	Rep Dem du Congo	Congo_DRC	Landlocked	CD	COD	178	Congolese franc	CDF	Congolese franc (CDF)
Djibouti	Djibouti	Djibouti	Coastal	DJ	DJI	262	Djiboutian franc	DJF	Djiboutian franc (DJF)
Eritrea	Érythrée	Eritrea	Coastal	ER	ERI	232	Eritrean nakfa	ERN	Eritrean nakfa (ERN)
Ethiopia	Éthiopie	Ethiopia	Landlocked	ET	ETH	231	Ethiopian birr	ETB	Ethiopian birr (ETB)
Kenya	Kenya	Kenya	Coastal	KE	KEN	404	Kenyan shilling	KES	Kenyan shilling (KES)
Madagascar	Madagascar	Madagascar	Island	MG	MDG	450	Malagasy ariary	MGA	Malagasy ariary (MGA)
Rwanda	Rwanda	Rwanda	Landlocked	RW	RWA	646	Rwandan franc	RWF	Rwandan franc (RWF)
Seychelles	Seychelles	Seychelles	Island	SC	SYC	690	Seychelles rupee	SCR	Seychelles rupee (SCR)
Somalia	Somalie	Somalia	Coastal	SO	SOM	706	Somali shilling	SOS	Somali shilling (SOS)
South Sudan	Soudan du Sud	South_Sudan	Landlocked	SS	SSD	728	South Sudanese pound	SSP	South Sudanese pound (SSP)
Tanzania	Tanzanie	Tanzania	Coastal	TZ	TZA	834	Tanzanian shilling	TZS	Tanzanian shilling (TZS)
Uganda	Ouganda	Uganda	Landlocked	UG	UGA	800	Ugandan shilling	UGX	Ugandan shilling (UGX)

There are several prefetched lookup tables that can be used to offer predefined choices where relevant; these lookup table can be overwritten by the user and only constitute a guideline. These lists can be expanded to accommodate the user's choices.

Table 3-23: Deflator lookup table (predefined)

The 3 choices in this table correspond to lookup categories in Table 3-16.

Code	Deflator
1	GDP Deflator
2	Value Added Deflator (Agriculture, forestry and fishery)
3	Value Added Deflator (Manufacturing)

Table 3-24: Data source lookup table (prefetched)

NDX	Source
1	African Union
2	Grey Litterature
3	National Account
4	Survey
5	UN Comtrade
6	UNDEP
7	UNECA
8	user defined
9	World Bank

Table 3-25: Measurement types lookup table (prefetched)

NDX	Measurement type
1	Pourcentage of the population affectée
2	Gradients (poor, moderate, high)
3	monetary
4	boolean (yes, No)
5	number of people affected

Table 3-26: Measurement units lookup table (prefetched)

NDX	Unit
1	%age of population
2	ha
3	Kilogram
4	kilometer
5	Km^2
6	Km^3
7	Kilowatts per hour [kWh]
8	m^2
9	m^3
10	meter
11	number of individuals
12	ppb
13	tonne
14	user to define

Table 3-27: Data year lookup table (prefetched)

The table automatically adjust each year to list the past 10 years.

Ndx	Year
1	2010
2	2011
3	2012
4	2013
5	2014
6	2015
7	2016
8	2017
9	2018
10	2019
11	2020

Table 3-28: Data quality lookup table (prefetched)

Ndx	Data Quality
1	estimate
2	guestimate
3	official
4	other
5	poor
6	provisional
7	reliable
8	unknown
9	unofficial
10	unreliable
11	updated

Table 3-29: Alternative data source lookup table (prefetched)

Ndx	Data Source
1	Composite of various sources
2	FAO
3	Grey Litterature
4	Industry Data
5	Official Statistics
6	Other
7	Other International Organisation
8	Other NGO
9	Other official document
10	Other UNECA
11	Other United Nations
12	Personal Communication
13	UNDP
14	UNECA SRO-EA
15	UNEP
16	World Bank
17	WWF

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