

## Mountain Green Cover Index

# Guide on Data Collection and Validation

December 12, 2018

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This guide has been prepared to support countries in using Collect Earth, an FAO tool for the collection of relevant data for the indicator 15.4.2 Mountain Green Cover Index. If you need any further support, feel free to contact the Open Foris team through our [community support forum](#) or a direct email to [marcelo.rezende@fao.org](mailto:marcelo.rezende@fao.org)

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# Contents

<b>Contents</b>	<b>2</b>
<b>Concept</b>	<b>3</b>
<b>Methodology</b>	<b>4</b>
<b>Software Installation</b>	<b>6</b>
Installing Google Earth	6
Downloading Google Earth	6
Setting Up Google Earth	7
Installing Collect Earth	10
Downloading Collect Earth	10
Setting up Collect Earth	12
Loading the Survey File	13
Loading the Data for Validation	15
Loading the Grid	16
<b>Collect Earth Interface</b>	<b>18</b>
Google Earth Engine Explorer	20
Google Earth Engine Code Editor	22
Plot Design and Interpretation	29
Classification	30
<b>Saiku</b>	<b>34</b>
<b>Uncertainties</b>	<b>40</b>
<b>Sampling Design Intensification</b>	<b>42</b>
<b>Tutorials</b>	<b>43</b>

This guide has been prepared with a specific focus on the data collection and validation of existing data for the Sustainable Development Goal (SDG) Indicator 15.4.2. However, Collect Earth has been extensively used for the reporting to other conventions, with a strong focus on the collection of data for the UNFCCC and UNCCD conventions. For more information, please check: [Open Foris Collect Earth Website](#)

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# Concepts and Definitions

## Concept

The “Mountain Green Cover Index” (MGCI) measures changes of the green vegetation in mountain areas - i.e. forest, shrubs, trees, pasture land, crop land, etc. – to provide indications on the status of conservation of their environment.

This index contributes to the achievement of SDG Goal 15: “Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss” and more specifically to Target 15.4: “By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development”. The Food and Agriculture Organization of the United Nation (FAO) through the Mountain Partnership Secretariat is the custodian agency for this index . The Mountain Partnership ([www.fao.org/mountain-partnership/en/](http://www.fao.org/mountain-partnership/en/)) is a United Nations voluntary alliance that brings members together to work towards a common goal: improving the lives of mountain peoples and protecting mountain environments around the world. Launched as a voluntary United Nations (type 2) partnership by Italy, Switzerland, FAO and the United Nations Environment Programme (UNEP) in Johannesburg in 2002, the Mountain Partnership has over 350 members from governments, intergovernmental organizations, civil society organizations and the private sector. Its work is supported by a Secretariat hosted at FAO.

The scientific mountain community recognizes that – with a few exceptions, such as the one produced by climate change at high altitudes and latitudes and in zones covered by glaciers - there is a direct correlation between the green coverage of mountain areas and mountain ecosystems’ state of health, which also relates to mountains’ capacity to fulfil their ecosystem roles. In this context, the objective of the Mountain Green Cover Index is to monitor changes in mountain vegetation and to provide information on forests and woody / vegetal cover in general. It aims at addressing the need for more detailed information about the status of mountain ecosystems at global and regional levels since there is a serious lack of those

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disaggregated data required for monitoring and analysing environmental trends in mountain areas.

## Methodology

The Mountain Green Cover Index results from the interpretation of remote sensing images used for deriving [land cover/land use](#) patterns of the world's mountain areas. Data is analyzed using the FAO Collect Earth software application developed by FAO and Google (consult the site <http://www.openforis.org/tools/collect-earth.html> for more details) while mountains are defined in accordance with the UNEP-WCMC mountain classification ([Kapos et al. 2000](#)).



The estimates of the Mountain Green Cover Index take in consideration the distribution of forest, grassland and cropland classes as per the formula indicated below:

$$\text{Mountain Green Cover Index} = \frac{(\text{Area cover by Cropland} + \text{Area cover by Forest} + \text{Area cover by Grassland})}{\text{Total Mountain Area}}$$

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The index has a range from 0 to 1, where 0 indicates no green vegetation and 1 indicates that the entire area is covered by vegetation.

The amounts of land in square kilometers covered by each of these three IPCC land cover/land use classes are aggregated to calculate the size of the total mountain area that they cover.

The Mountain Green Cover Index statistics are available at country level, disaggregated by IPCC land cover types and mountain elevation classes – both as absolute figures and percentage values.

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# Workflow



## Software Installation

### Installing Google Earth

Before installing Collect Earth, it is necessary to have Google Earth installed in your computer. This is a requirement, because Collect Earth runs together with Google Earth.

### Downloading Google Earth

Google Earth can be easily downloaded in the [Google Earth website](#). The latest version is the Google Earth Pro, but other versions would work as well. We recommend always to download the latest version. Click on the [link](#) and download it.





## Download Google Earth Pro for PC, Mac, or Linux

By installing, you agree to [Google Earth's Privacy Policy](#).

### Google Maps/Google Earth Additional Terms of Service

Last Modified: January 31, 2018

Thanks for using Google Maps and Google Earth ("Google Maps/Google Earth").

Google Maps/Google Earth allow you to view and use a variety of content, including map and terrain data, imagery, business listings, traffic, reviews, and other related information provided by Google, its licensors, and users (the "Content").

By accessing, downloading, or using Google Maps/Google Earth, you are agreeing to:

1. the [Google Terms of Service](#) (the "Universal Terms");

You are downloading **version 7.3** of Google Earth Pro. This version automatically installs recommended updates. If you'd like previous versions of Google Earth Pro, please visit the [Direct Installers](#) page.

Help make Google Earth better by automatically sending anonymous usage statistics and crash reports to Google. [Learn more](#).

[Agree and Download](#)

#### System requirements:

PC - Windows 7 or newer

Mac - Mac OS X 10.8 or later

Ubuntu 14/Fedora 23 (or equivalent) or newer

#### Features of Earth Pro:

Use advanced GIS data importing features to your advantage

Measure area, radius and circumference on the ground

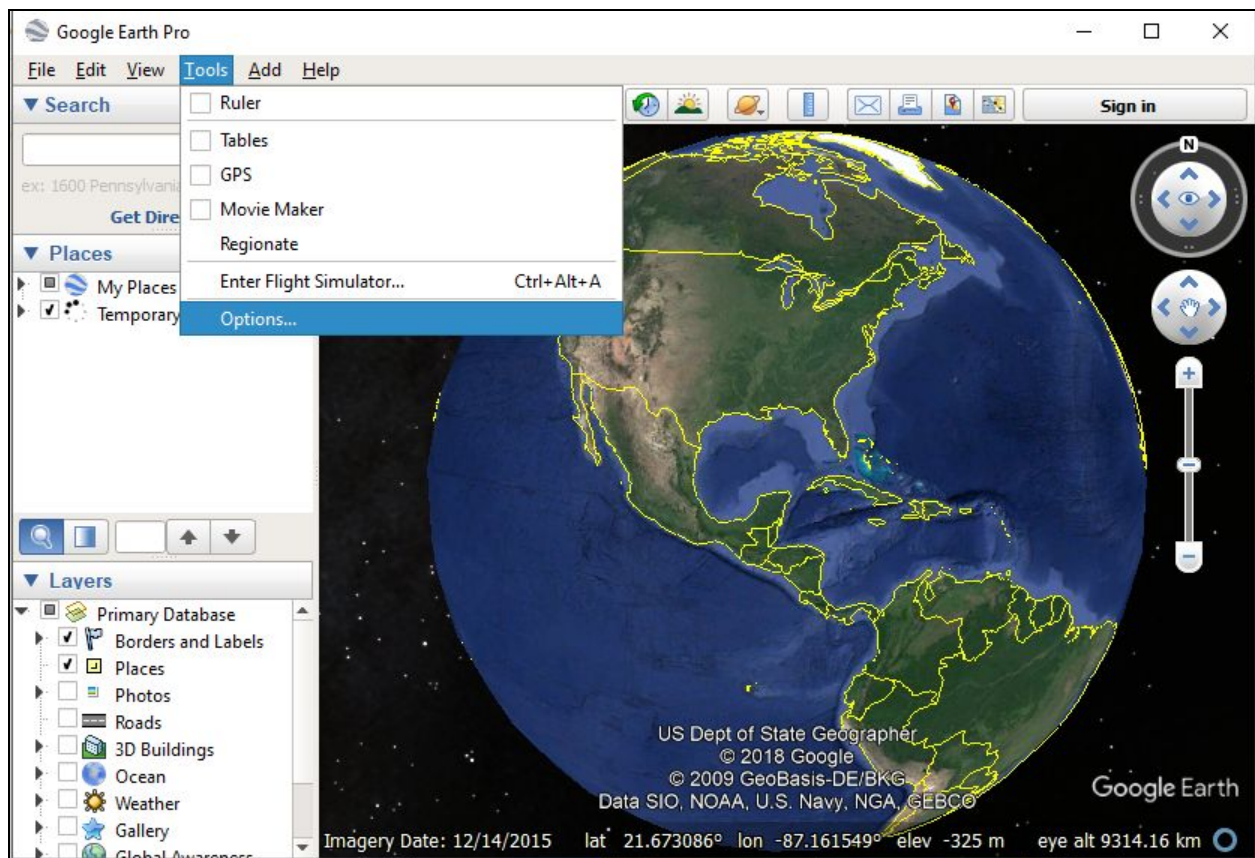
Print high-resolution screenshots

Make compelling offline movies to share

Before downloading, the user has to agree with Google Earth's Terms of Service.

## Setting Up Google Earth

After the installation of Google Earth has finished, go to **Tool > Options** to change some setting that can facilitate the assessment of the sampling plots in Collect Earth.

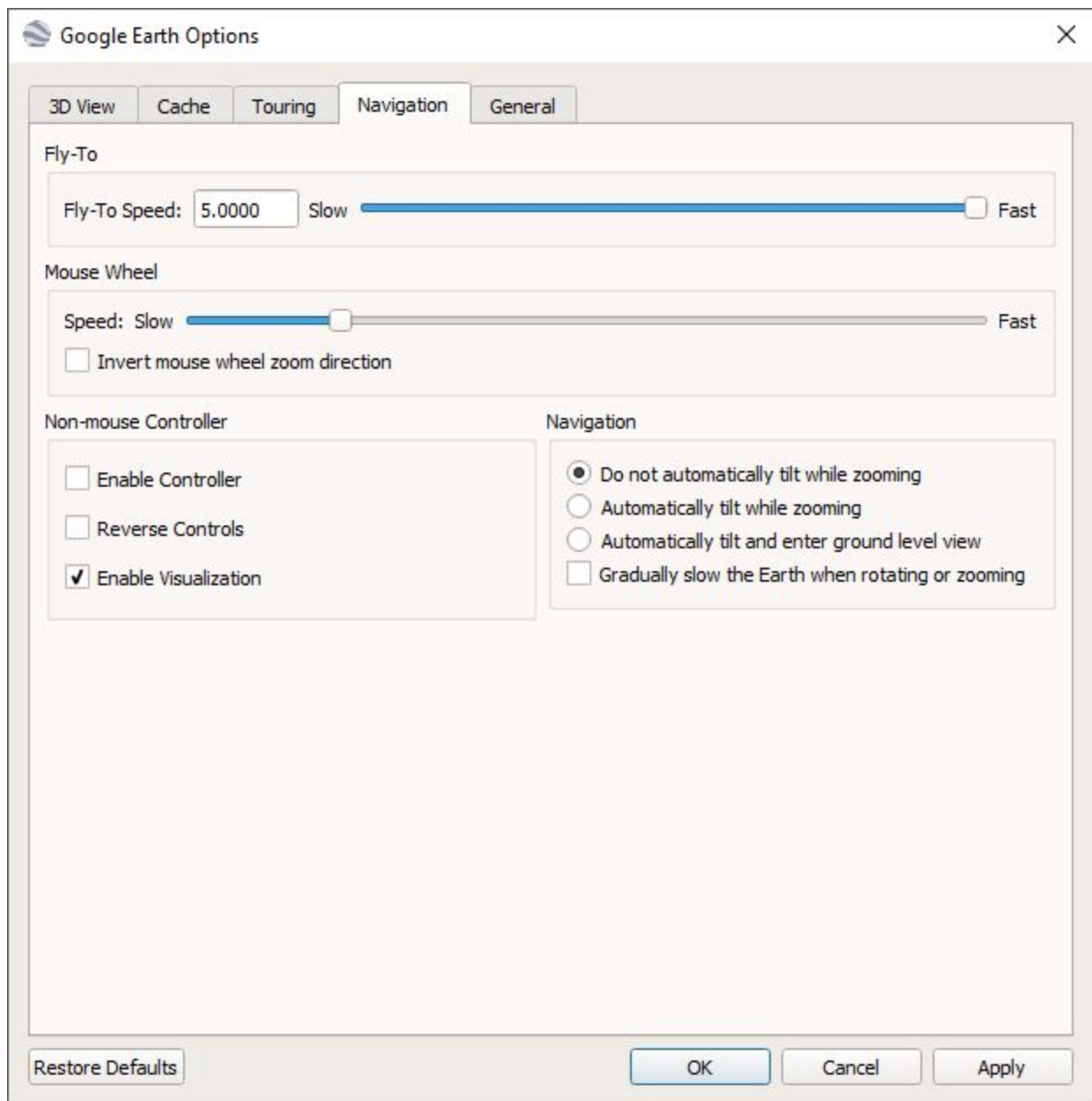


After clicking on Options, go to the Navigation tab and change the following settings:

- **Fly-To Speed:** Put the bat in **Fast**;
- In the **Navigation box**, mark only **Do Not Automatically Tilt While Zooming**.

See image below for more information.





Click **Apply** and you can close Google Earth.

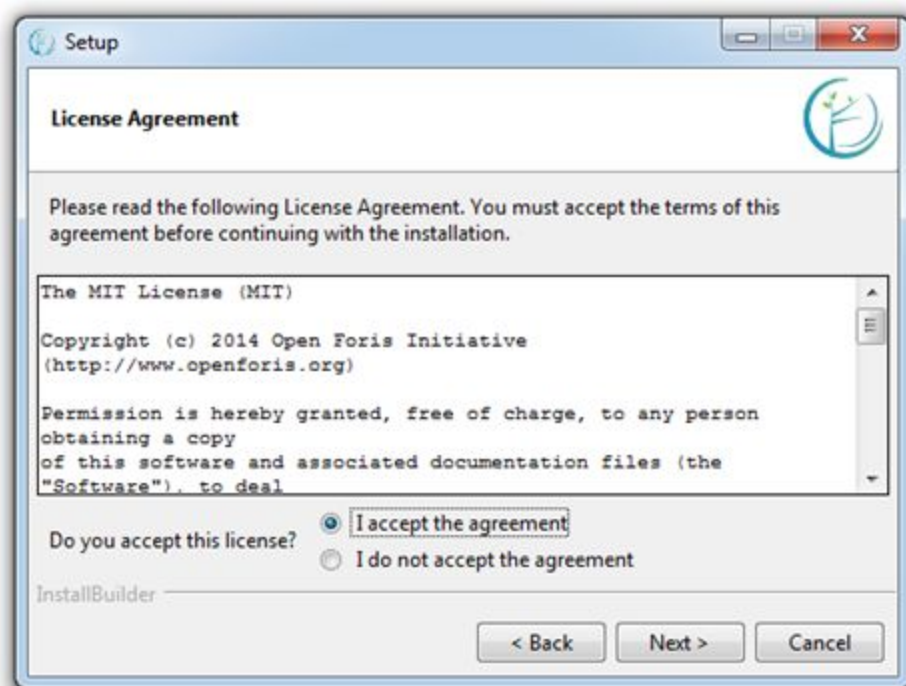
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## Installing Collect Earth

### Downloading Collect Earth

[Download the Collect Earth installer](#) and double-click on the file to begin the installation process. Follow the instructions to complete the installation. English is the default language. Collect Earth Spanish and French versions are also available.

Accept the license agreement and click Next.

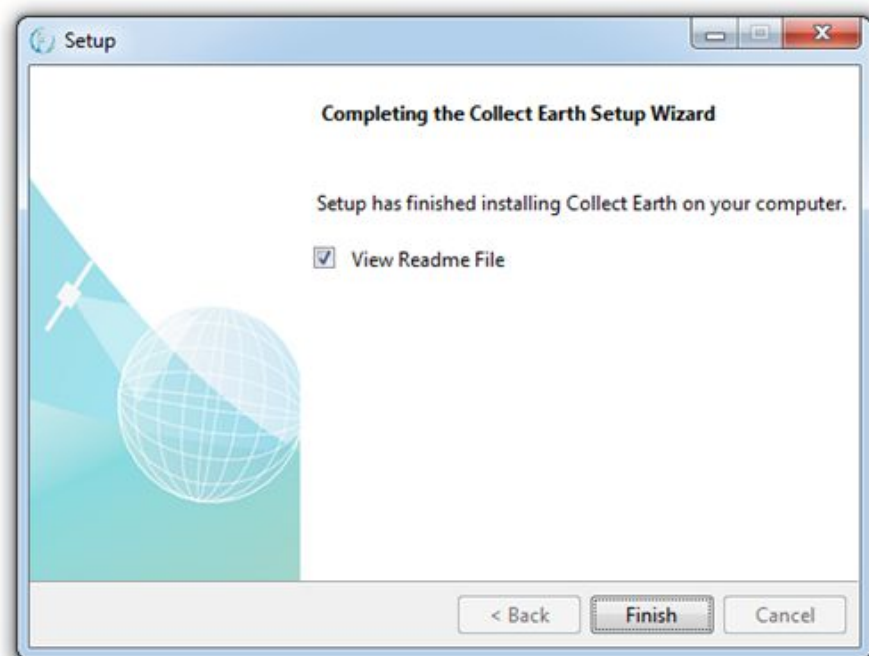


Click next to install Collect Earth on your C drive, or click on the folder icon to browse to and select an alternate location.

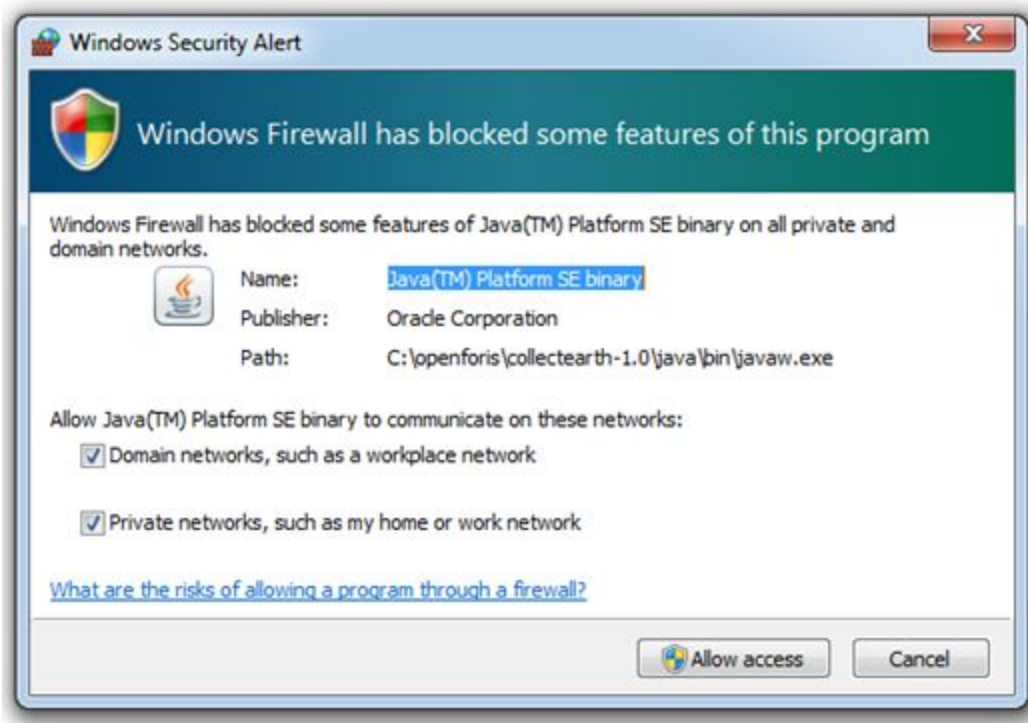
Click next here and on the subsequent window to begin the installation.



This window will appear when the installation is complete. Click finish.

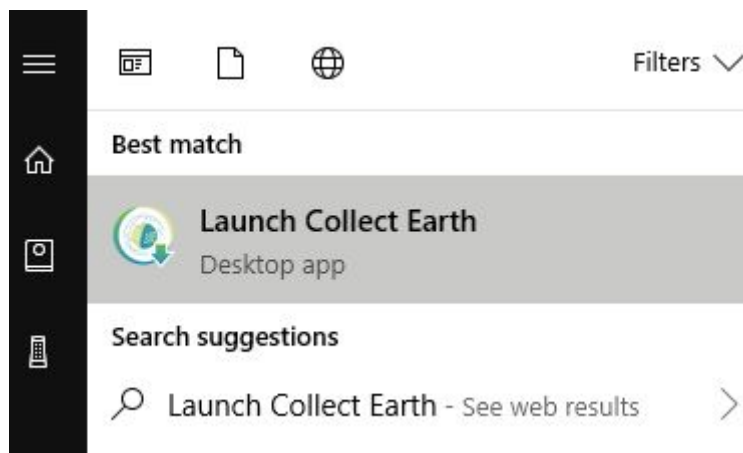


Depending upon your computer's firewall settings, a security warning may pop up. If so, Click Allow access.



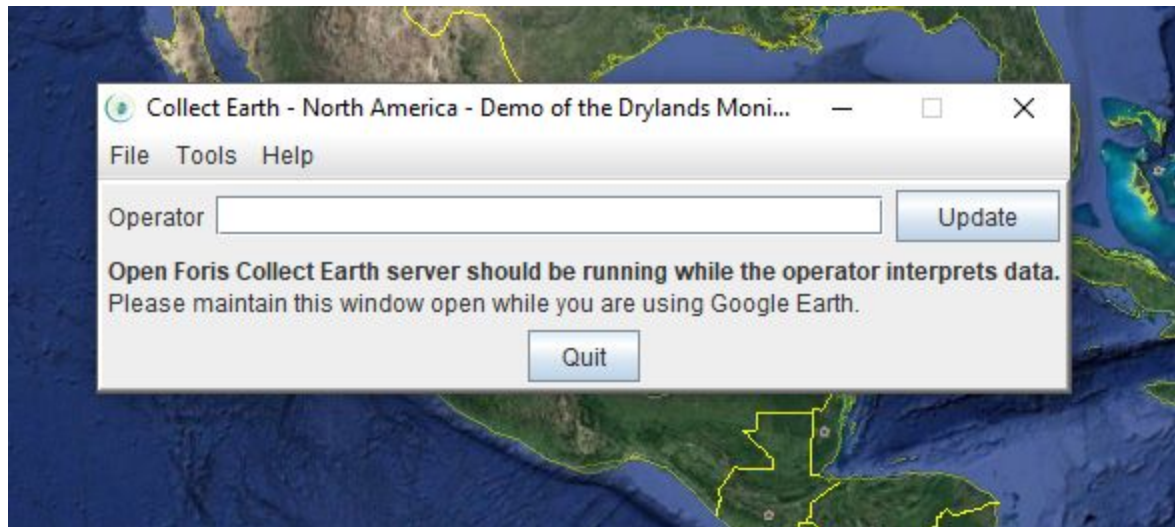
## Setting up Collect Earth

Once installed, the Collect Earth Launcher can be found in the Windows Start Menu. Just search for the **Launch Collect Earth** file and click on it to run the application.



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When Collect Earth is opened, it also opens automatically Google Earth. The Collect Earth software is represented by the window below, where operators **have to write a name** in order to proceed and click **Update**.



### Loading the Survey File

A Collect Earth Survey is a file that contains all the questions and attributes that the operators will have to fill for each plot. It can be design by the user using the [Open Foris Collect software](#).

The survey that comes with Collect Earth when you first download the software is a demo survey and needs to be replaced with the survey designed to collect the Mountain Green Cover Index.

In order to download the correct survey file, please go the this link: [MGCI Survey Repository](#).



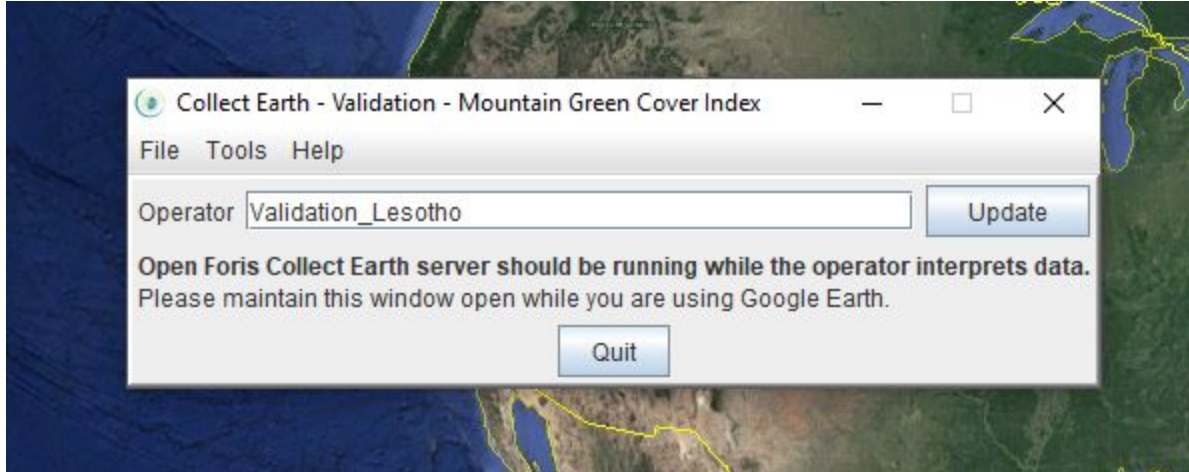
Name

The image shows a Google Drive interface with a list of files. The file 'mountain\_green\_cover\_index\_validation\_en.cep' is selected, and a context menu is open over it. The menu options are: Preview, Open with, Share..., Get shareable link, Add to My Drive, Add star, Rename..., View details, Make a copy, Download (highlighted in yellow), and Remove.

Name	Icon	Shareability
grids	Folder	Private
Grids_ExceptBolivia.csv	CSV	Private
AllDataExceptBolivia.csv	CSV	Private
mountain_green_cover_index_validation_es.cep	CEP	Private
mountain_green_cover_index_validation_pt.cep	CEP	Private
mountain_green_cover_index_validation_fr.cep	CEP	Private
mountain_green_cover_index_validation_en.cep	CEP	Private
mountain_green_cover_index_validation.collect	Collect Earth	Private

- Preview
- Open with
- Share...
- Get shareable link
- Add to My Drive
- Add star
- Rename...
- View details
- Make a copy
- Download
- Remove

In this link, you will find the MGCI Survey files for Collect Earth in different languages. Select the file with the language you are more comfortable with, click with the right-button and select **Download**. Run the file after download to open the survey.

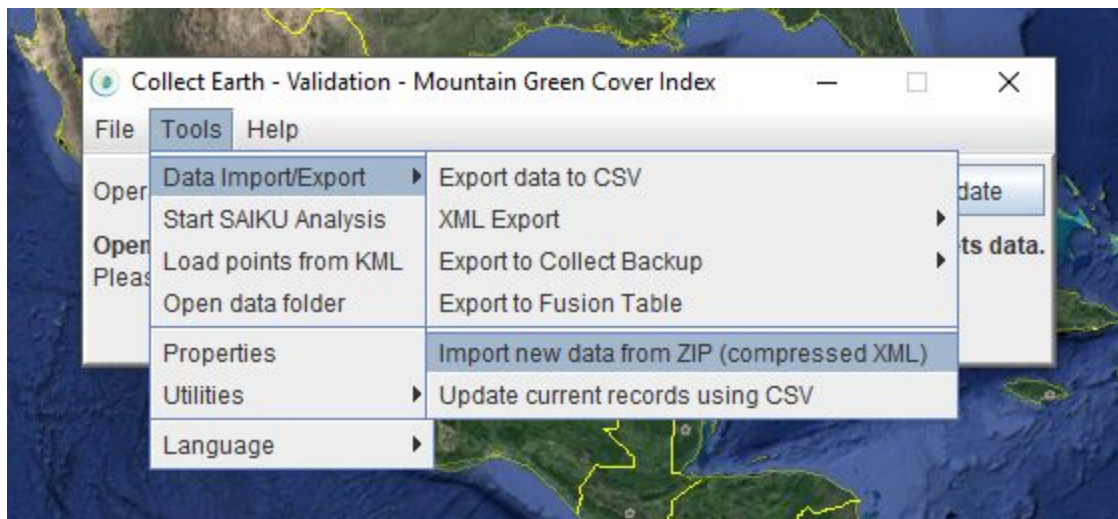


If you followed the steps correctly, you should have the Collect Earth windows as shown above. Note that the name of the survey appears on top of the Collect Earth window and should be **Collect Earth - Validation - Mountain Green Cover Index**.

For the validation purpose we suggest that the Operator name is composed of the word **Validation** and the **country's name** (see above).

### Loading the Data for Validation

The data used for the MGCI will be shared by the FAO team during the workshop. In order to load it into the Survey, go to **Tools > Data Import/Export > Import new Data from ZIP (compressed XML)**.

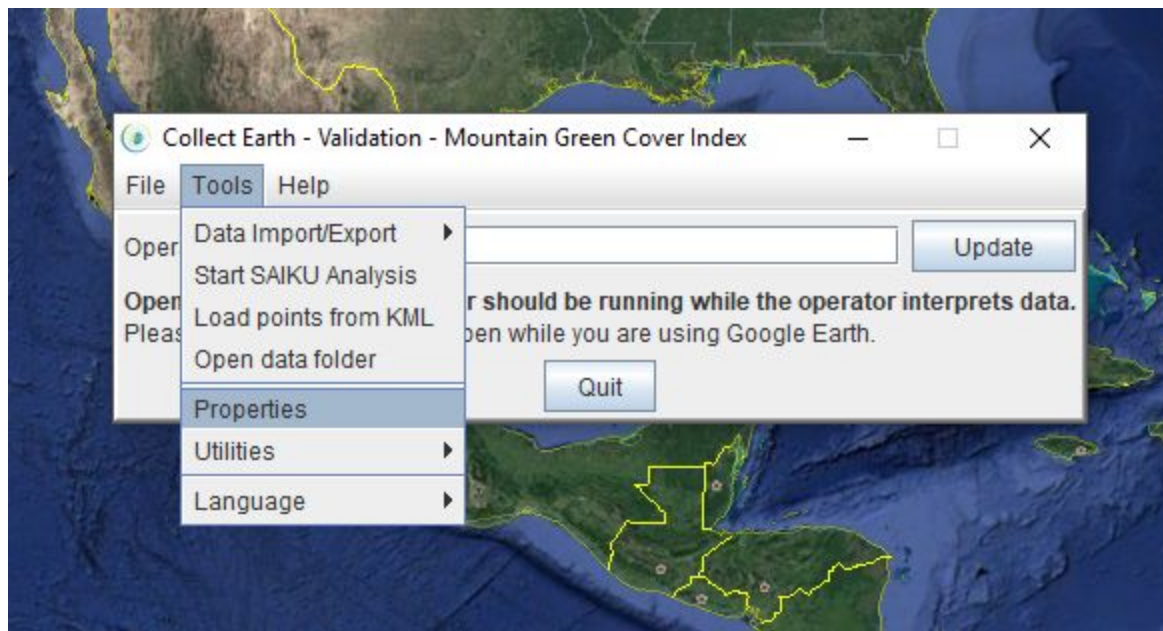


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Navigate to the file that was shared with you and select it and click **Open**.

## Loading the Grid

In Collect Earth, go to **Tools > Properties**.



In the **Sample Data** tab, click on **Browse...** and search for the grid file containing the plots for your country.

Collect Earth options

Sample data Plot layout Survey Definition Advanced Operation Mode Projects

Path to ced/csv file with plot data

ing\CollectEarth\projects\mountain\_green\_cover\_index\_validation\grid\CHANGE\_ME.csv

Browse...

id	YC...	XC...	pu...	soi...	cli...	ele...	slo...	as...	dryl...	co...	cou...	dis...	dryl...	rea...	bio...	ec...	fao...	ka...
id	YC...	XC...	pu...	soi...	cli...	ele...	slo...	as...	dryl...	co...	cou...	dis...	dryl...	rea...	bio...	ec...	fao...	ka...
CA...	0	0	pu...	1	1	0	0	0	dryl...	Afri...	co...	dis...	No...	AA	1	-99...	41	0

Open

Look In: grid

- Argentina\_0.csv
- Argentina\_1.csv
- Argentina\_2.csv
- Brazil\_0.csv
- Brazil\_1.csv
- Brazil\_2.csv
- CHANGE\_ME.csv
- Chile\_0.csv
- Chile\_1.csv
- Chile\_2.csv
- Colombia\_0.csv
- Colombia\_1.csv
- Colombia\_2.csv
- Ecuador.csv
- Paraguay.csv
- Peru\_0.csv
- Peru\_1.csv
- Peru\_2.csv
- Venezuela\_0.csv
- Venezuela\_1.csv
- Venezuela\_2.csv

File Name:

Files of Type: CSV/CED file with only coordinates (\*.csv,.ced)

Open

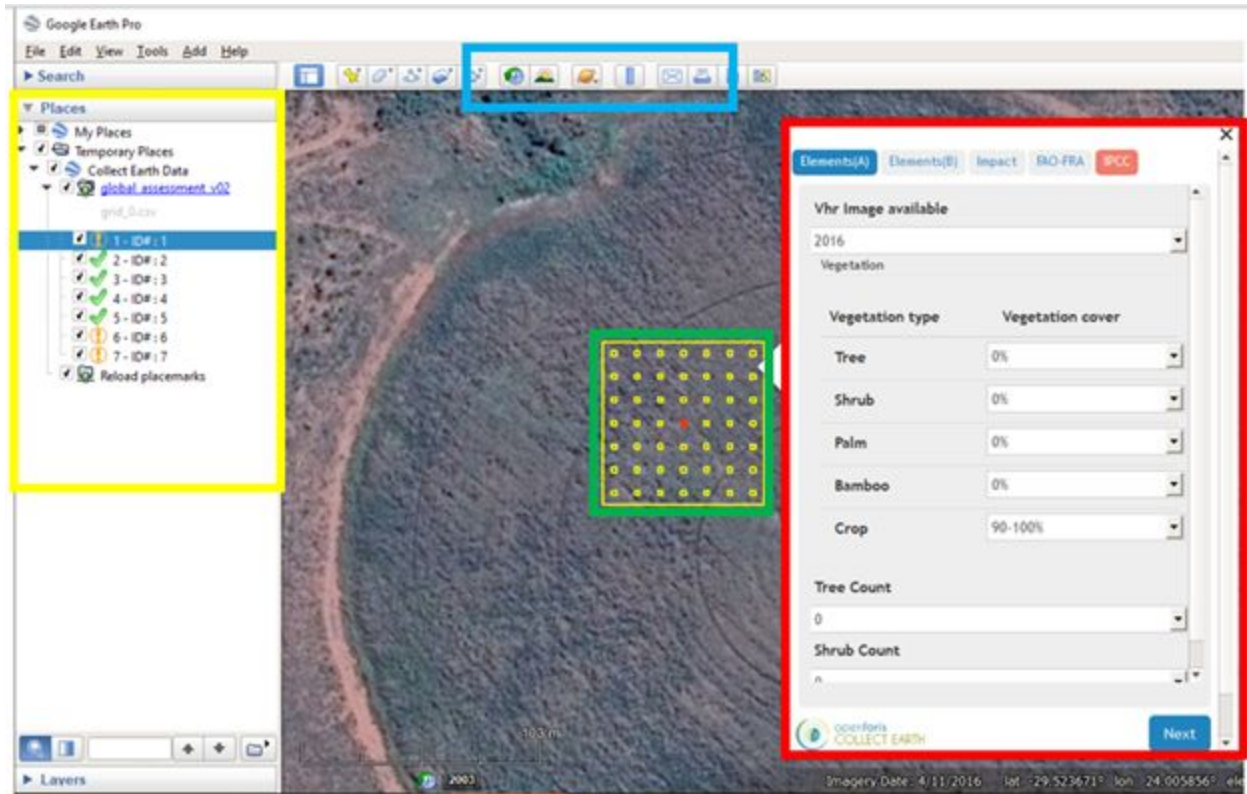
Cancel

Save & Apply changes

Cancel



## Collect Earth Interface

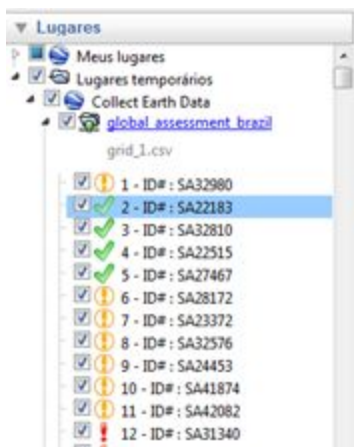


Collect Earth works together with Google Earth to allow user to collect data from Google's free catalog of very high-resolution imagery.

In the image above, the left-panel (yellow box) displays the sampling plots used in the assessment. Sampling plots are the locations in the images where data will be collected. Their dimensions exist to limit where data should be collected. The grid is a group of plots for a specific survey.

Different surveys can have different sampling grids and they display the status of the assessment of the plot.





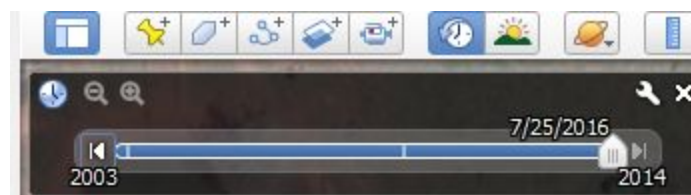
**Green** - Plot saved.

**Orange** - Plot not finalized.

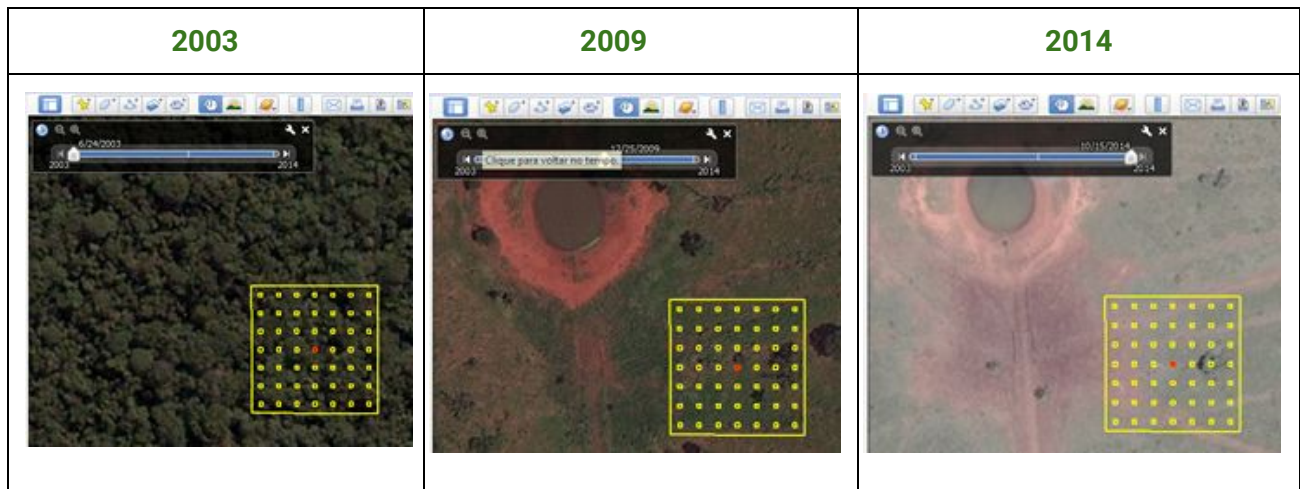
**Red** - Plot not started.

In the image of the interface above, the red box shows the data collection cards/forms, where users will enter the information based on their interpretation of the image and ancillary information for each plot. The blue area indicates a menu with tools from Google Earth that can be used in the assessment.

The clock icon has historical images for the plot location that help users in understanding the history of the land cover/use for that area.



The images below show deforestation happening in the plot seen from the historical very high-resolution images.



In addition to Google Earth, the users have also access to the Google Earth Engine Explorer and Google Earth Engine Code Editor. These are ancillary windows to help reconstruct the history of the land cover/use of the plot based on freely available satellite imagery such as the ones from the [Landsat program \(USGS\)](#) and [Copernicus \(ESA\)](#).

## Google Earth Engine Explorer

Earth Engine Explorer is an additional window to help the operator to identify changes in the vegetation within the boundaries of the plots.

Using Earth Engine Explorer, you can access multiple satellites archive images to determine changes in vegetation.

### **Bands for highlight vegetation:**

**Landsat 7** 32 day TOA Reflectance Composite - Bands: B4 / B5 / B3

**Landsat 8** 32 day TOA Reflectance Composite - Bands: B5 / B6 / B4

**Landsat 8** 8-day TOA (weekly product) B5 / B6 / B4

**Landsat 7** 8-day TOA (weekly product) B5 / B6 / B4

For more information of the differences between Landsat 7 and Landsat 8, as well as Bands, please [follow this link](#).

Google Earth Engine

Explorer

Landsat

RASTERS

- Landsat 4 Surface Reflectance
- Landsat 7 Surface Reflectance
- Landsat 5 Surface Reflectance
- Landsat 8 Surface Reflectance
- Landsat Global Land Survey 1975
- Landsat Global Land Survey 1975 Mosaic
- Landsat 7 3-year TOA percentile composites
- Landsat Global Land Survey 2005, Landsat 5+7 scenes
- more »

Google Earth Engine

Search Places, Keywords, Tables, or Asset IDs...

Explorer

Manage workspace

Data

Landsat 7 Collection 1 Tier 1 8-Day TOA Refle...

Add data Add computation

Analysis: None

Landsat 7 Collection 1 Tier 1 8-Day TOA Refle...

Dec 2002 Feb Mar

Nov 25, 2001 - Dec 3, 2001 [Jump to date](#)

Visualization

1 band (Grayscale)  3 bands (RGB)

B4 B5 B3

Range

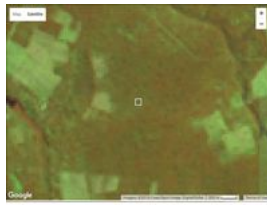
0 - 0.425 Custom

Opacity

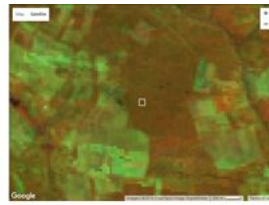
Gamma  Palette

1.00 1.20

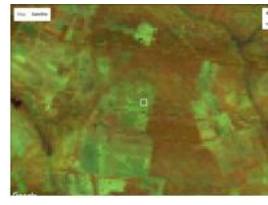
Save Apply Cancel



2001 - Landsat 5 TM Annual TOA



2010 - Landsat 7 annual TOA



2011 - Landsat 7 annual TOA



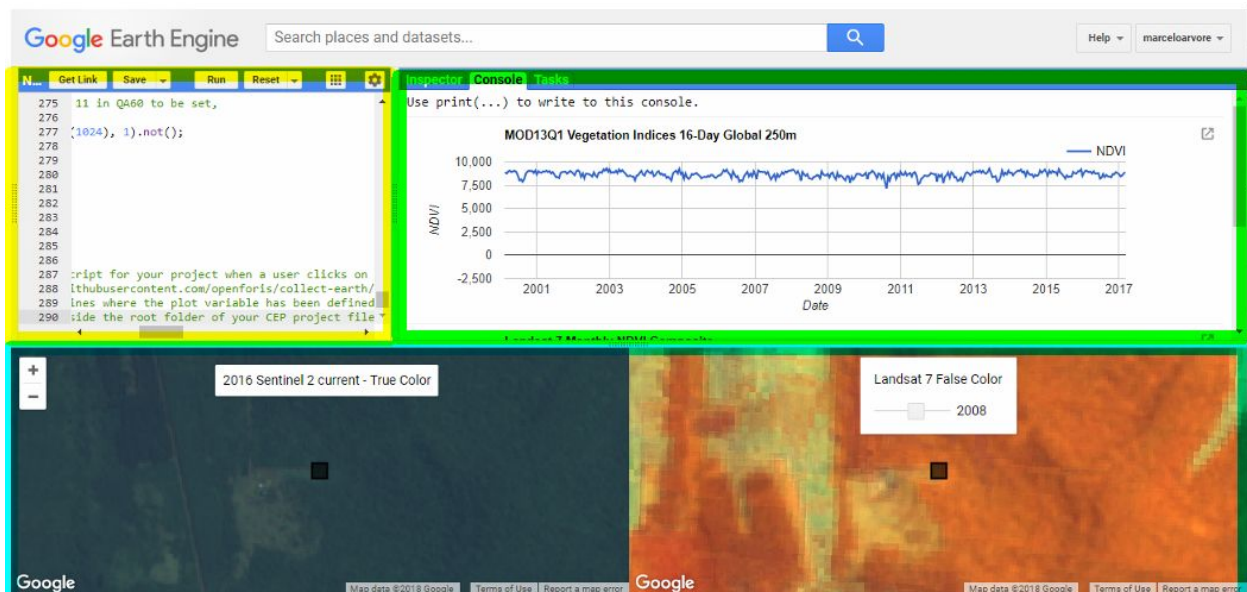
2015 - Sentinel 2

When using Landsat 7 and 8 images, the band combination to highlight vegetation makes all vegetation orange (the more productive the land, the brighter the orange appears), water appears as purple and bare land (dry vegetation) as green.



## Google Earth Engine Code Editor

The Earth Engine Code Editor is an additional window to assist the operator to identify changes in the vegetation within the boundaries of the plot. Through it, the operator has access to the historical data of vegetation index for the part.



Top left (yellow): Script to generate the chart. You do not need to change it. Only stretch the section script as much as you can, to make room for the graphics.

Top right (green): Time series of vegetation index.

Bottom: Satellite images.

### Graphs Interpretation:

**X - Years:** 2000-2016

**Y - vegetation index**

Vegetation index ([NDVI](#)) ranges from -1 to 1. ([MODIS](#) for the scale is 10,000, but the interpretation is the same).

Where:

**1:** Maximum value (a green sheet of paper on the floor).

**6-9:** Forest and living vegetation, very productive agriculture and grazing (probably irrigated).

**2.5 - 5:** Grassland /shrubland, sparse vegetation (often)

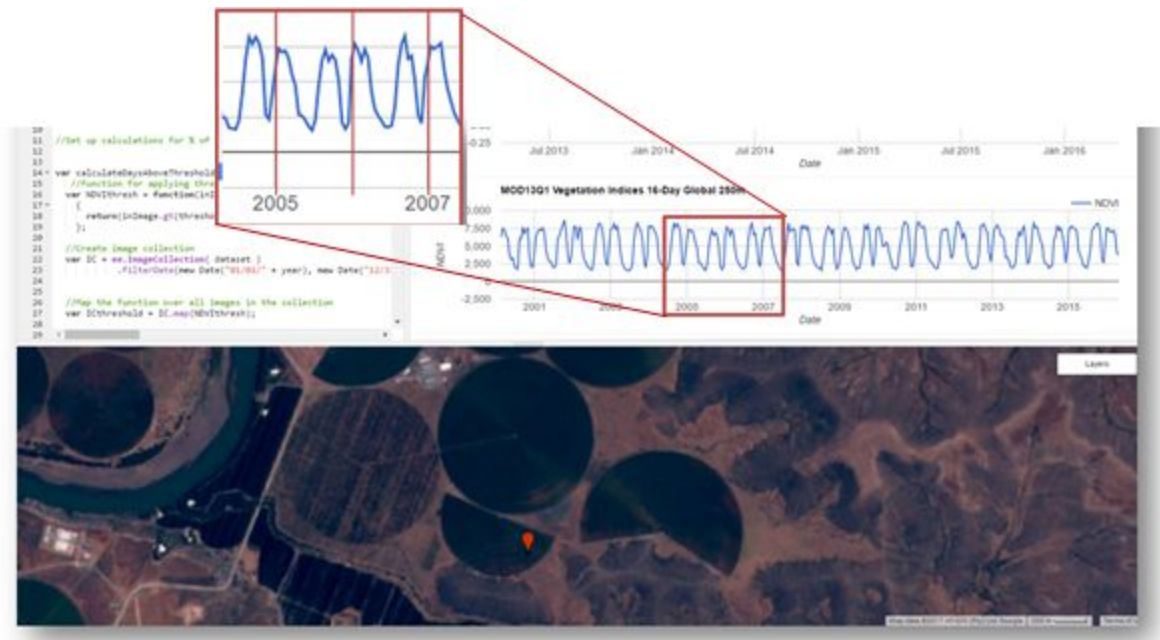
**1-2:** Sand desert.

**0:** clouds, snow.

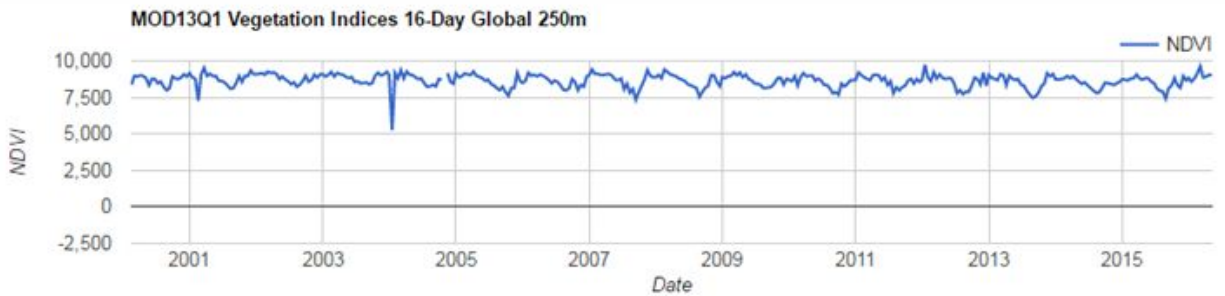
**Negative:** water (most of the time).



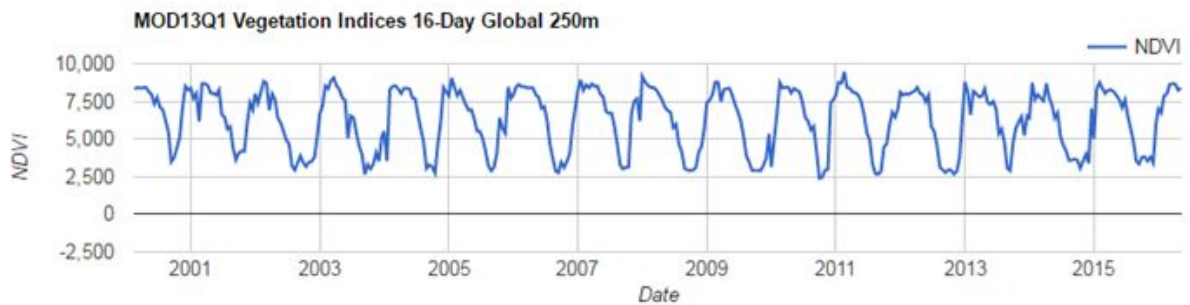
### Example: Irrigate agriculture with double cropping



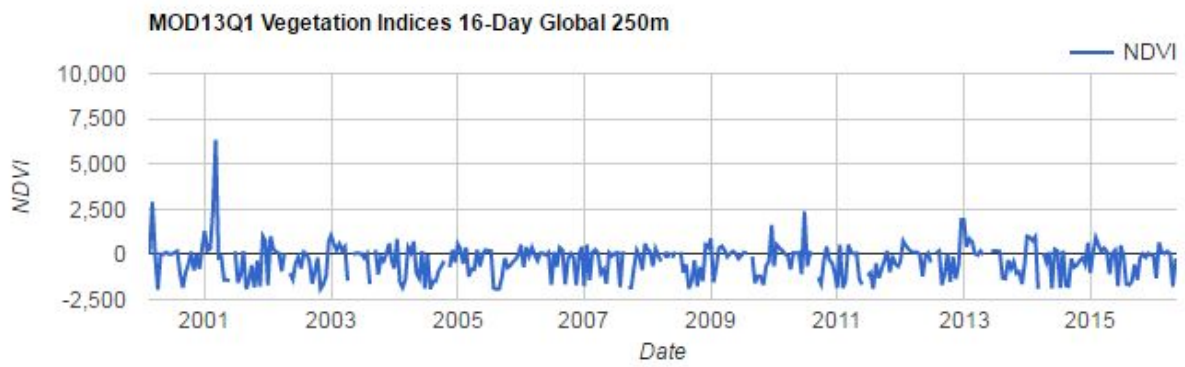
### Example: Evergreen Forest Chart



### Example: Deciduous Forests Chart



### Example: Water



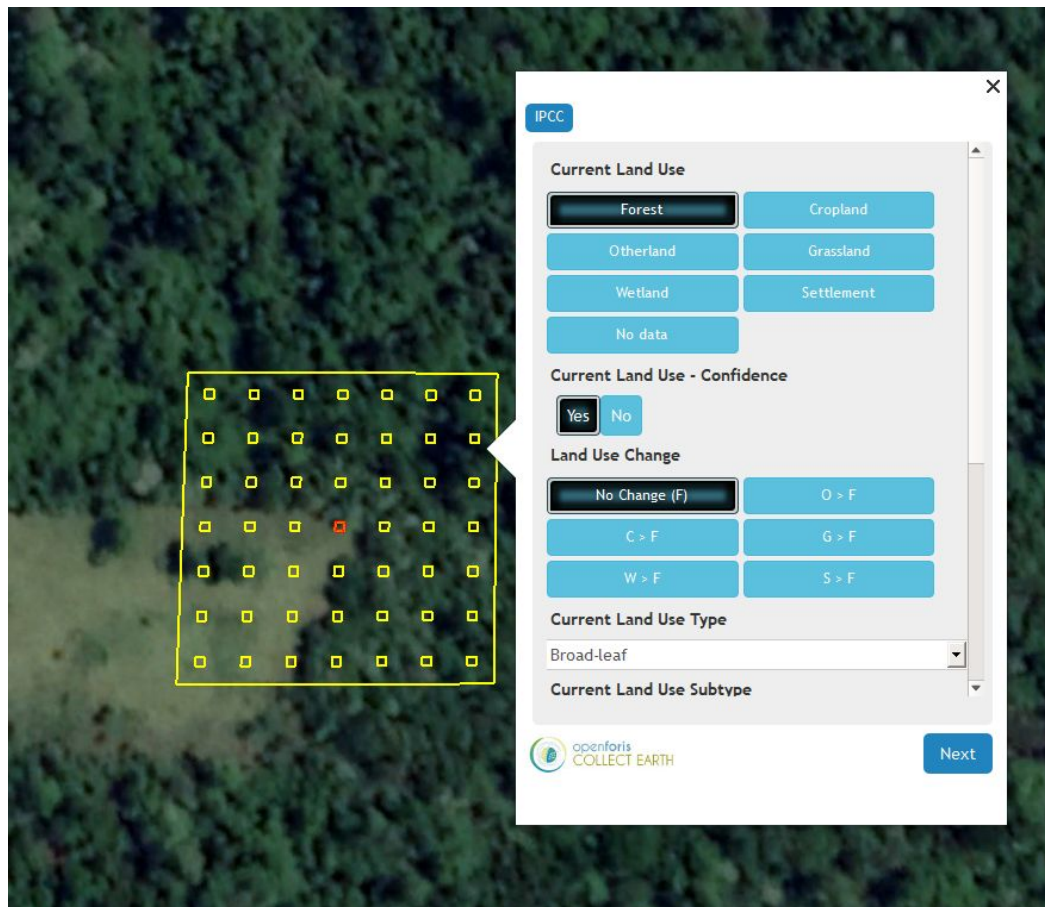
# Survey Design

Users can create their own survey for data collection using Open Foris Collect, another software developed by FAO. Open Foris Collect is a free, open source and easy to use tool with focus on survey design and data management.

FAO frequently support different projects and initiatives in the preparation of their surveys. There is a vast number of [documents and tutorials on Open Foris Collect](#) that can be found in the Open Foris Website.

For the purpose of the MGCI data collection, FAO has defined a standard survey that enables the user to collect information on specific parameters useful to the calculation of the index.

The survey is displayed as data collection cards in Collect Earth organized by sections (see image below).



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All data is collected from visual interpretation of the area within the plot.

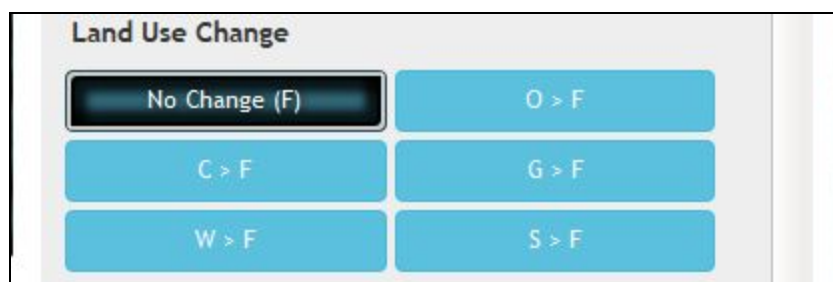
The first information to be collected is the **Current Land Use**. This is the land use in the plot for the year 2015 (from the previous [Global Forest Survey](#) project in FAO). This classification should follow the IPCC (see next section on the **Interpretation Methodology**).



The screenshot shows a web form titled "IPCC" with a close button (X) in the top right corner. The main section is "Current Land Use" and contains several buttons: "Forest" (highlighted with a dark border), "Cropland", "Otherland", "Grassland", "Wetland", "Settlement", and "No data". Below this is a section titled "Current Land Use - Confidence" with two buttons: "Yes" (highlighted with a dark border) and "No".

Below the information of Current Land Use, there is a **Confidence** attribute. Here the user can inform how confident he/she is in the assessment of the Current Land Use information.

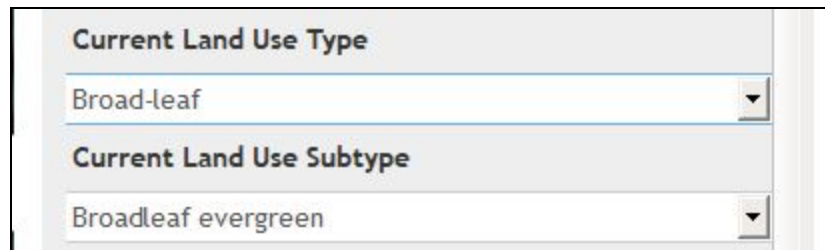
The following attribute is related to the changes in land use over the period of 2000-2015. In this attribute the user should inform the change (C > F means Cropland converted to Forest, and so on).



The screenshot shows a web form titled "Land Use Change" with several buttons: "No Change (F)" (highlighted with a dark border), "O > F", "C > F", "G > F", "W > F", and "S > F".

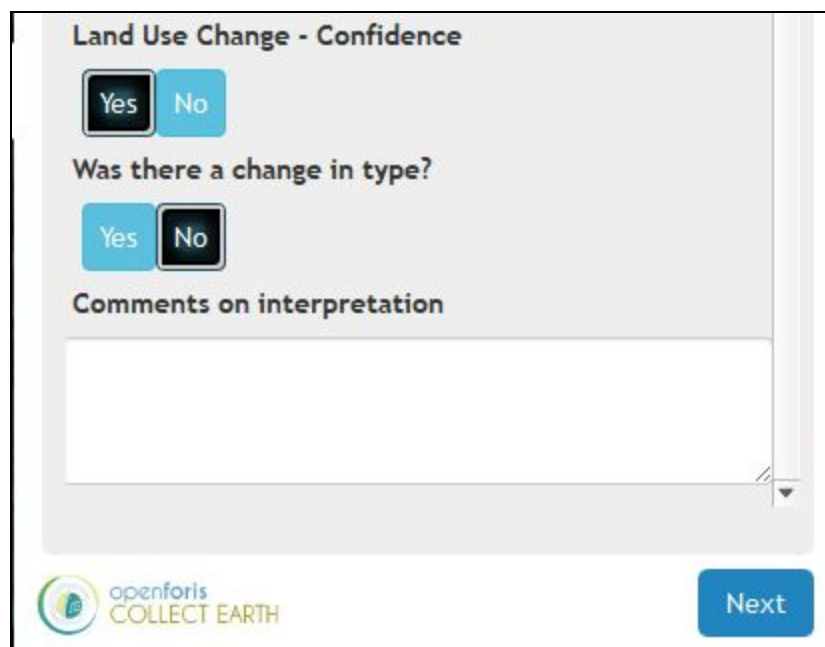
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After assessing the land use changes, the user assesses the Type and Subtype of the Current Land Use (and also of the previous land use in case of changes). In the dropdown button, there is option of various types and subtypes depending on the land use selected.



The screenshot shows a form with two dropdown menus. The first dropdown is titled "Current Land Use Type" and has "Broad-leaf" selected. The second dropdown is titled "Current Land Use Subtype" and has "Broadleaf evergreen" selected.

To finalize the data collection, the user has to inform the confidence on their assessment of the Land Use Change as well as to inform if there are additional changes.



The screenshot shows a form titled "Land Use Change - Confidence". It has two sets of radio buttons. The first set is for "Was there a change in type?" with "Yes" selected. The second set is for "Comments on interpretation" with "No" selected. There is a text area for "Comments on interpretation" and a "Next" button. The logo "openforis COLLECT EARTH" is visible at the bottom left.

The comment section enables the user to add information related to the plot that is not present in the data collection cards.



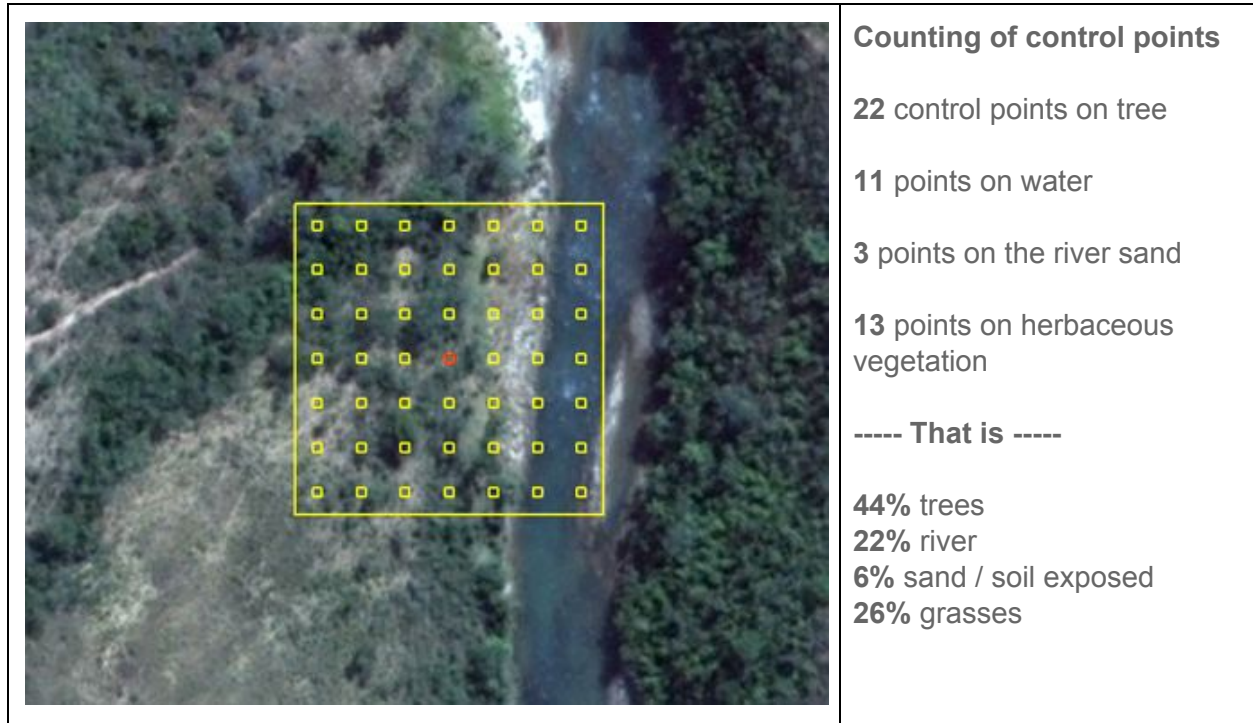
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# Interpretation Methodology and Data Collection

## Plot Design and Interpretation

Each plot on this survey has the design of a square of 70m by 70m (~ 0.5 ha). Inside, equally spaced, are 49 control points (7x7). These points will be the guide to the percentage count (%) of each element in the plot. Therefore, each control point counts as 2% of the total share.

### Example:



Plots with different number of control points will have a different % equivalent for each control point. Plots with 25 control points (5x5) will have each control point represent 4% of the plot, instead of 2% like the example above.

[Ground truthing](#) is always recommended when the information acquired from the images is not adequate for your purpose.

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## Tree or Shrub?

**Trees** = Canopy  $\geq$  3m diameter (pay attention to the trees' shadows, they help in identifying trees, but they should not be used in the counting of tree cover).

**Shrubs** = 2m in diameter (i.e, about the size of the control points).

Normally, is a default plot design, the control points within the plot have a 2mx2m dimension. Therefore, if in doubt regarding the definition of an element as a tree or a shrub, use the control points. If the element is bigger than the control point, it is likely to be a tree.

## Classification

Each plot is classified according to the dominant land use, according to the following predominant land use hierarchy. This is necessary for plots falling in complex landscapes with multiple land uses occurring simultaneously. The following is a proposed hierarchy for the IPCC land uses:

1. **Settlement**, if  $\geq$  20%;
2. **Cropland**, if  $\geq$  20% and **Settlement** < 20%;
3. **Forest**, if  $\geq$  20% and **Settlement** or **Cropland** < 20%;
4. **Grassland**, if  $\geq$  20% and **Settlement** or **Cropland** or **Forest** < 20%;
5. **Wetland**, if  $\geq$  20% and **Settlement** or **Cropland** or **Forest** or **Grassland** < 20%;
6. **Other land**, if  $\geq$  80% and **Settlement**, **Cropland**, **Forest**, **Grassland** and **Wetland** <20%;

Besides the dominant land use, the percentage of each IPCC land use class is also reported to cover the entire sample area. The extensions of the area covered by the different land uses are calculated multiplying the number of plots classified per each land use class for their specific area expansion factors.

Some Examples:



Collect Earth plot design

Each control dot = 2% of the total plot



Classification of the control dots:

	<u>Threshold:</u>
Settlement	20%
Cropland	20%
Forest land	20%
Grassland	20%
Wetland	20%
Otherland	20%



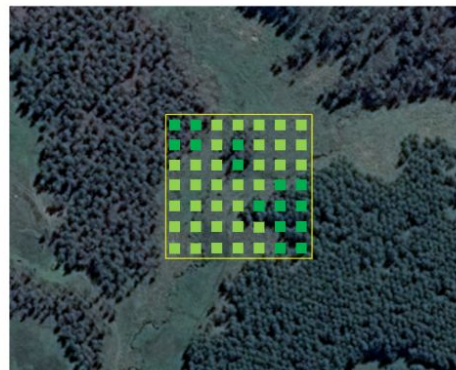
Plot classified as  
**Settlement**

Type : **Village**



Collect Earth plot design

Each control dot = 2% of the total plot



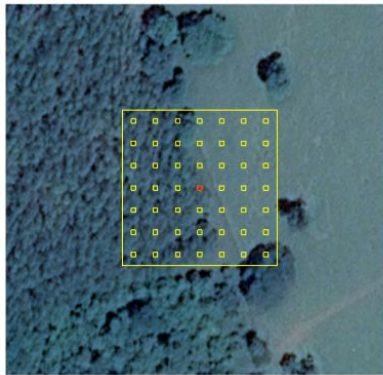
Classification of the control dots:

	<u>Threshold:</u>
Settlement	20%
Cropland	20%
Forest land	20%
Grassland	20%
Wetland	20%
Otherland	20%



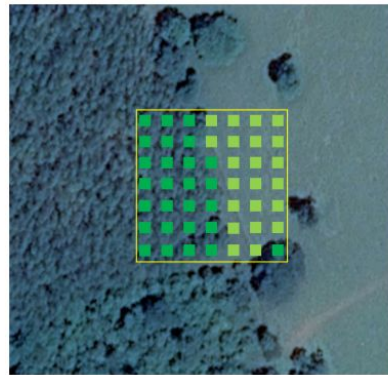
Plot classified as  
**Forest Land**

Type : **Plantation**  
Subtype : **Coniferous plantation**



Collect Earth plot design

Each control dot = 2% of the total plot



Classification of the control dots:

Settlement	20%
Cropland	20%
Forest land	20%
Grassland	20%
Wetland	20%
Otherland	20%

Threshold:



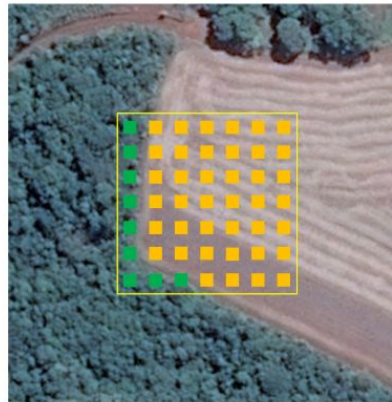
Plot classified as  
Forest Land

Type : Broadleaf  
Subtype : Broadleaf evergreen



Collect Earth plot design

Each control dot = 2% of the total plot



Classification of the control dots:

Settlement	20%
Cropland	20%
Forest land	20%
Grassland	20%
Wetland	20%
Otherland	20%

Threshold:



Plot classified as  
Cropland

Type : Non-irrigated rainfed





Collect Earth plot design

Each control dot = 2% of the total plot



Classification of the control dots: Threshold:

Settlement	20%
Cropland	20%
Forest land	20%
Grassland	20%
Wetland	20%
Otherland	20%



Plot classified as  
Forest Land

Type : Riparian forest



Collect Earth plot design

Each control dot = 2% of the total plot



Classification of the control dots: Threshold:

Settlement	20%
Cropland	20%
Forest land	20%
Grassland	20%
Wetland	20%
Otherland	20%



Plot classified as  
Cropland

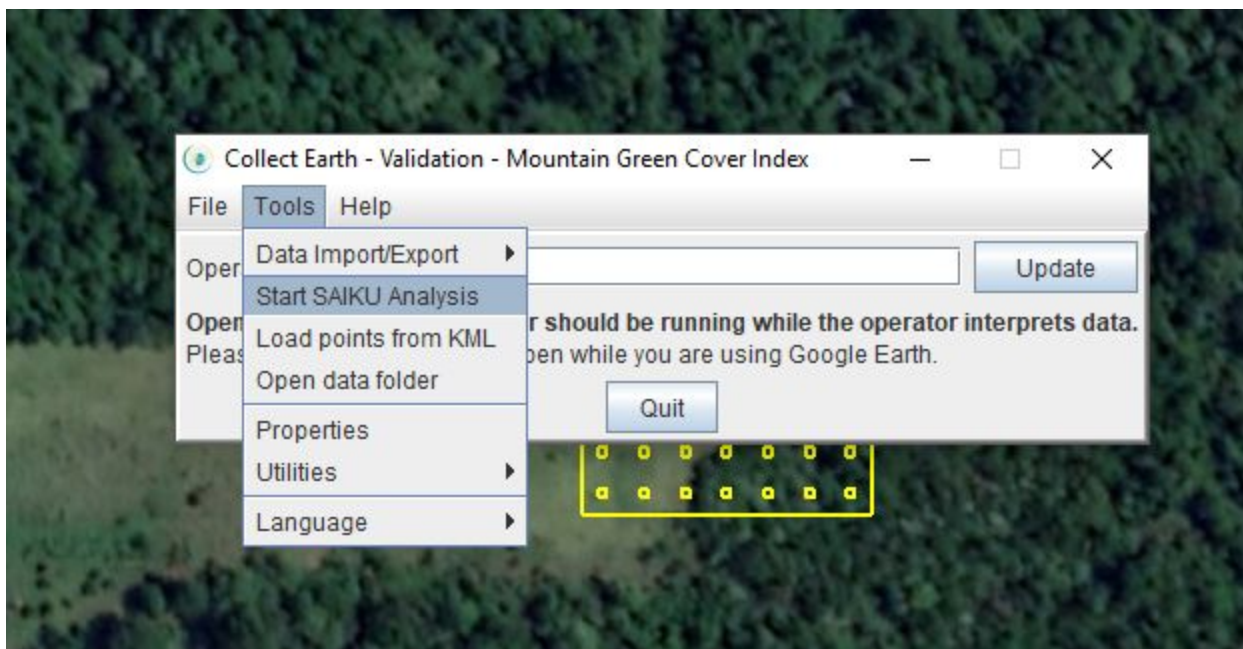
Type : Permanent  
Subtype : Palm

---

# Analysis

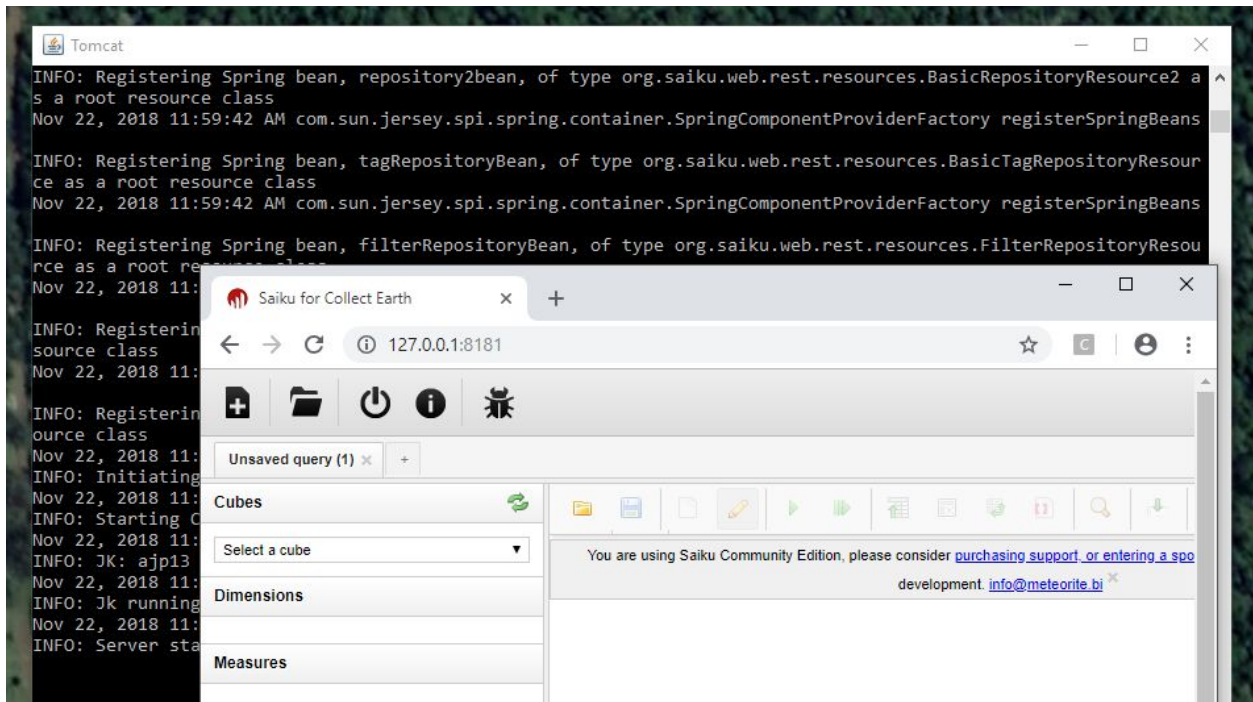
## Saiku

At any point during the assessment, the user can select **Tools > Start SAIKU Analysis** to use the SAIKU tool to visualize the data, perform a multitude of analysis and export the data through reports.

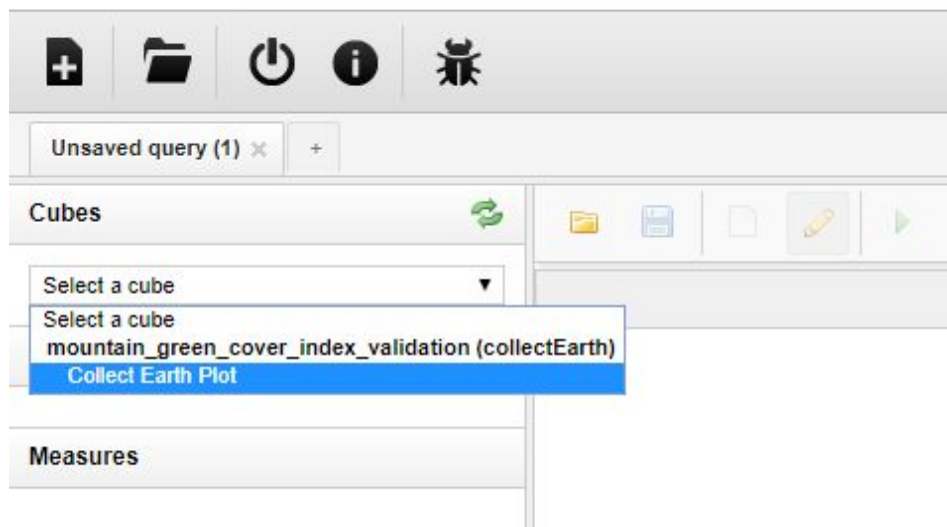


**SAIKU** is a free browser-based application that works offline. By clicking on it in Collect Earth, it opens two windows. One is the browser page where the software will be displayed and another is a Tomcat (where the software logs are displayed) (images below). **Do not close any of these windows while using SAIKU.**





To open your data in SAIKU, click on Select Cube in the upper left part of the SAIKU page and choose Collect Earth Plot.



This will allow the user to see all attributes related to the survey that have been collected. The image below shows the different section of the SAIKU platform.

The screenshot displays the SAIKU platform interface. At the top, there is a toolbar with icons for adding, saving, and refreshing. Below this, the 'Cubes' section shows a dropdown menu for 'Collect Earth Plot'. A yellow box highlights the 'Dimensions' panel on the left, which lists various attributes such as Aspect, Biome, Country, and Land Use Current. A cyan box highlights the 'Columns', 'Rows', and 'Filter' configuration area. The 'Columns' section shows 'Plot Count'. The 'Rows' section shows 'Country' and 'Land Use Current'. A green box highlights the resulting data table, which shows the following data:

Country	Land Use Current	Plot Count
Angola	Forest	2,850
	Cropland	342
	Otherland	230
	Grassland	1,940
	Wetland	180
	Settlement	33
Botswana	Forest	1,220
	Cropland	85
	Otherland	30
	Grassland	2,575
	Wetland	57
	Settlement	16

On the left-side (yellow) there are all the attributes from the survey. Users can drag and drop the

attributes (blue items inside the folders) to the rows and columns section (blue box in the photo above) in order to generate tables and aggregate values. Data is then displayed in the bottom-right section (green box in the photo above). There are many tools for downloading and mining the data in the upper panel (pink in the image above) that can help the user in performing more refined analysis.

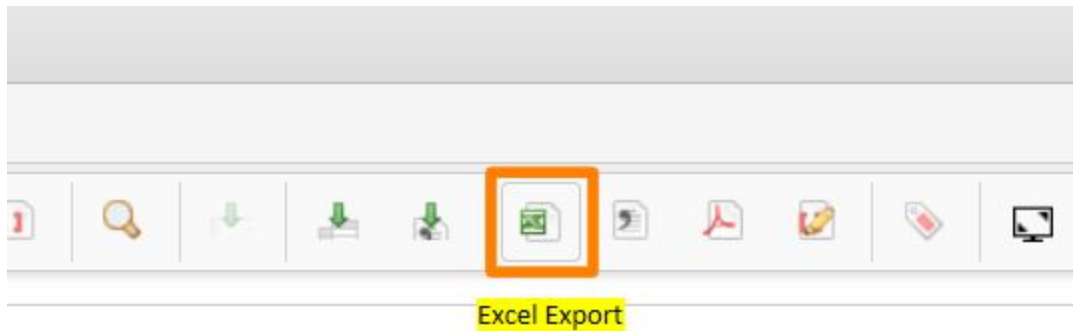
The screenshot displays the SAIKU interface with the following configuration:

- Columns:** Area (HA), Land Use Current
- Rows:** Kapos
- Filter:** Country

The resulting data table is as follows:



Kapos	Area (HA)					
	Cropland	Forest	Grassland	Otherland	Settlement	Wetland
K1		25,357	787,432	1,505,261		
K2	1,536,766	262,177	9,113,371	5,880,520	116,350	1,998,984
K3	382,358	1,556,832	4,024,435	1,122,702	64,859	211,698
K4	3,637,289	6,471,789	9,065,223	795,444	346,664	171,133
K5	2,201,378	9,223,800	9,810,697	491,896	174,447	186,065
K6	2,279,930	12,917,266	12,064,215	754,088	243,310	199,060

Using SAIKU, users can aggregate the data by [Kapos](#) and calculate the percentage of each land use in each Kapos class. Kapos with value “0” should be removed from the assessment, because it is not included in mountain areas. This information can then be inserted in the MGCI equation to calculate the final 15.4.2 indicator.



On the top menu in Saiku, there are options to export the data on the table in different formats. In order to facilitate the calculations, export it to an Excel file to perform the calculation below.

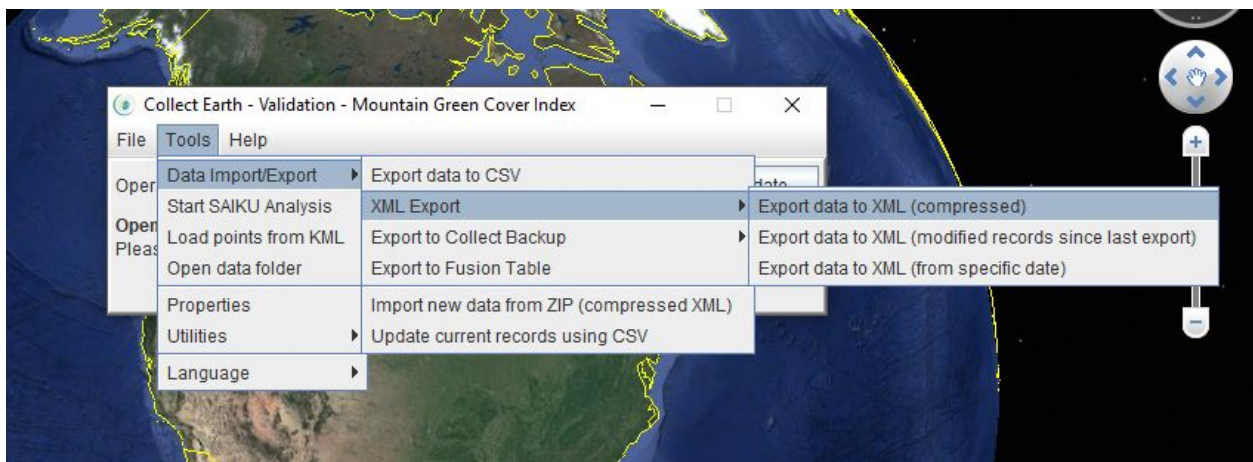
$$\text{Mountain Green Cover Index} = \frac{(\text{Area cover by Cropland} + \text{Area cover by Forest} + \text{Area cover by Grassland})}{\text{Total Mountain Area}}$$

At any point in Saiku, queries can be saved by clicking on the  icon. This saves the layout of the table you have opened and facilitates future repetition of the same analysis. To Open a query, click on this icon .

# Validation

After going through the plots, the countries should export the plots and send them to [marcelo.fao.training@gmail.com](mailto:marcelo.fao.training@gmail.com).

To export the data from Collect Earth, go to **Tools > Data Import/Export > XML Export > Export data to XML (compressed)**, see image below:



In addition to the plots, the summary tables with the areas should be provided. See image below:


Kapos	Area (HA)					
	Cropland	Forest	Grassland	Otherland	Settlement	Wetland
K1		25,357	787,432	1,505,261		
K2	1,536,766	262,177	9,113,371	5,880,520	116,350	1,998,984
K3	382,358	1,556,832	4,024,435	1,122,702	64,859	211,698
K4	3,637,289	6,471,789	9,065,223	795,444	346,664	171,133
K5	2,201,378	9,223,800	9,810,697	491,896	174,447	186,065
K6	2,279,930	12,917,266	12,064,215	754,088	243,310	199,060

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# Additional Information

## Uncertainties

Sampling Error is calculated using the IPCC 2006 guidelines for the consistent representation of lands. You can find additional information on [this publication](#). Calculation can be done with support from the Excel file available in [this link](#).





Excel spreadsheet showing a table with the following data:

	Land Use Conversion	Plot Count	Area (HA)
3	F > F	900.00	16,366,002.16
4	G > F	3.00	56,790.46
5	C > C	670.00	11,164,684.20
6	F > C	1.00	15,544.91
7	G > C	1.00	15,445.56
8	O > O	210.00	3,424,378.70
9	G > G	1,060.00	17,818,107.93
10	F > G	5.00	98,135.37
11	W > W	17.00	274,250.24
12	O > W	1.00	15,544.91
13	S > S	40.00	683,346.62
14	O > S	2.00	30,990.46
15	C > S	1.00	15,544.91
16	G > S	1.00	15,544.91

Calculation of all uncertainties related to the sampling design is automatically linked to the above table that can be exported from Saiku.

In order to calculate the uncertainty of the validated data, you can copy and paste the land use conversion into the above table. The excel file that you can download above is already set in order to calculate the data uncertainty.

# Sampling Design Intensification

In order to generate a sampling grid to be used in Collect Earth, FAO has created a sampling tool that enables users to define their own sampling design.

## [Grid Generation Tool](#)

Google Earth Engine Search places and datasets...

Choose a country... ▾

Province

District

Use a shapefile as a table asset or use a Fusion Table id (with the prefix ft. )

Fusion Table/Table Ass:

Set the EPSG that fits best in your study area. For large countries we recommended to use EPSG:4326. Look for EPSG codes here : <http://epsg.io>

EPSG:4326

Add DEM (elevation,slope,aspect) data

Add IPCC (soil,climate,gez) data

Add Kapos Class (mountain areas)

Add Land Productivity Dynamic) data

Add Administrative Units data

Generate systematic grid

Set the distance in meters of the systematic grid. At least 100 meters (reccomended > 500 )

Distance in meters

---

# Tutorials



## Creating a new Collect Earth survey

Collect Earth • 3.1K views • 2 years ago

Part 1.2.1 of the tutorial. This video teaches you how to start creating a new Collect Earth survey using the Open Foris Collect ...



## Importing and editing a Collect Earth survey

Collect Earth • 1.9K views • 2 years ago

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## Open Foris Collect : Installation and execution

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