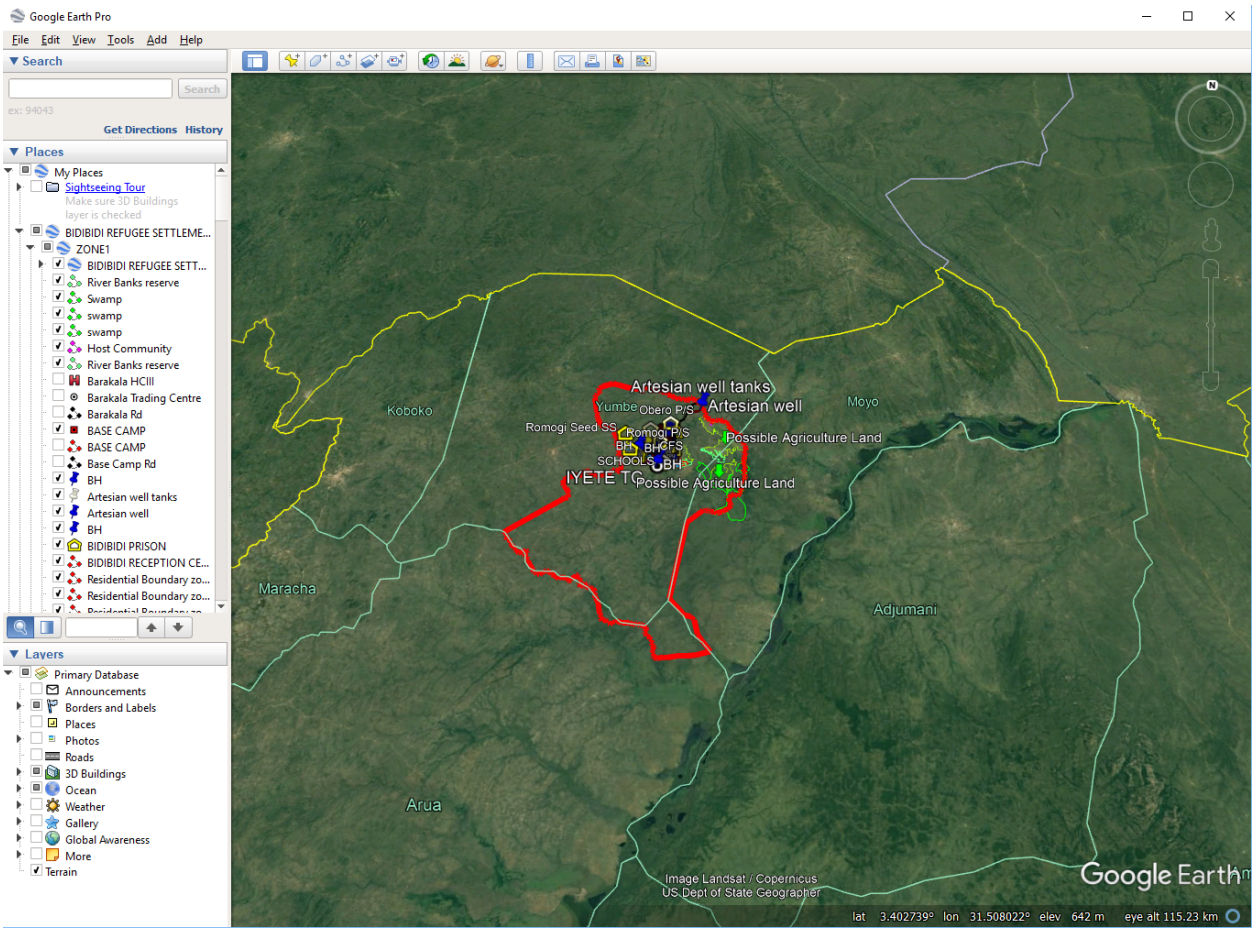
NEAT +
Nexus Environmental Assessment Tool

January 2021

Geospatial Guidance Note II

Collecting spatial data using Google Earth Pro



Who is this Guidance Document useful for?

Humanitarian emergencies necessitate the fast and effective use and sharing of geographical information. Mapping technologies are becoming more accessible and streamlined, and there is a growing demand from humanitarian practitioners for guidance on how to use these tools in their work.

This guidance has been developed for humanitarian workers who would like to learn how they could use Google Earth Pro, which is freely available, to collect spatial data relevant to the NEAT+ or other humanitarian processes. The guidance is intended for beginners who are new to Google Earth Pro. While the downloading of the software and caching of satellite imagery will require an internet connection, Google Earth can also be used offline provided some basic set-up is conducted first.

Introduction: What is GIS?

For an introduction to GIS and list of useful data sources and platforms, see the Geospatial Guidance Note I, provided in the NEAT+ Toolkit.

What is Google Earth Pro and what is it useful for?

Maps are vital tools for decision making, especially in emergency response and humanitarian planning. The use of maps is not limited to the post-disaster response phase, but also a prerequisite for understanding natural hazards and communities' vulnerability to them. Understanding how to access maps and collect data is becoming a valued resource in humanitarian organizations.

Google Earth and Google Maps are widely used to explore the world's geography. Google Earth Pro is a free desktop 3D interactive mapping software, useful for planning, development, and mapping. It allows viewing and exploration of the whole of earth's surface, and other geographical information such as settlement names, roads, and thematic information. It is possible to use Google Earth as a platform to view and map spatial data that you collect yourself or obtain from partner organizations in appropriate formats.

Google Earth and Google Earth Pro differ from Google Maps in that both programs are three-dimensional, viewed in a separate application, and **users must first be connected to the internet.** Google Earth is a simplified version of Google Earth Pro which is available online. Google Earth Pro, however, offers several more advanced features such as mapping multiple points at once, creating high resolution photos, and advanced geolocation search. It is also possible to cache satellite imagery in Google Earth Pro for offline use, which makes it more advantageous to use than Google Earth. You can download Google Earth Pro here: https://www.google.com/earth/versions/

Why use Google Earth Pro:

- Collect spatial data about the area of interest
- Create maps using collected data
- Explore satellite imagery
- Designed for users who are not highly technical or map experts
- Powerful interactive tool for communicating spatial information

Beyond collecting data for the NEAT+, Google Earth Pro can also be useful for other humanitarian work, such as collecting and displaying "who-what-where" data, obtaining and displaying information to orientate new arrivals, display information about infrastructure, damage and hazards, and showing possible evacuation routes.

Using Google Earth Pro to collect information relevant to the NEAT+

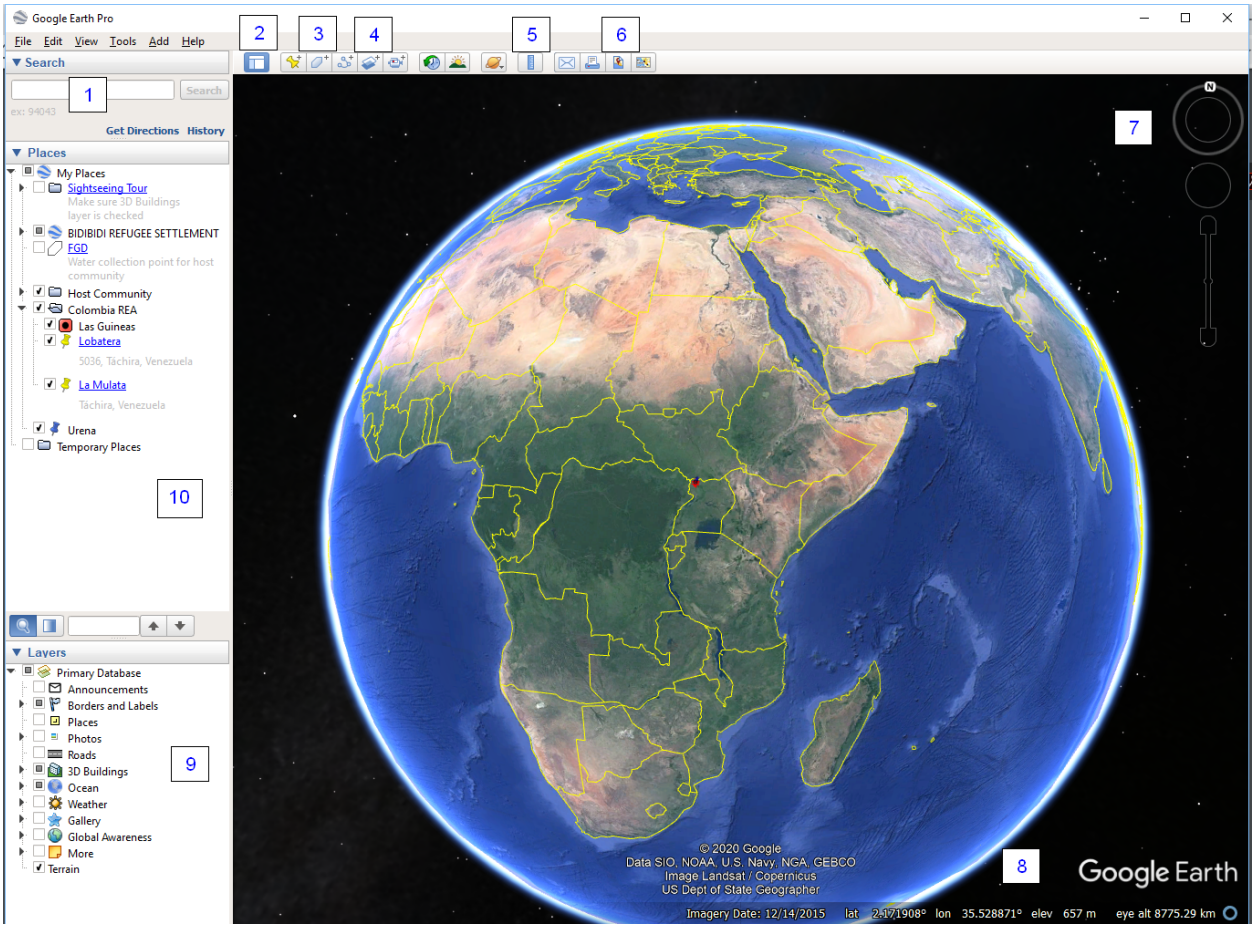
In cases where site-level information is not available, it may be necessary to conduct discussions and interviews with host and refugee communities to gain a more integrated understanding of the environmental history and context of the situation. Using Google Earth Pro provides an unparalleled opportunity to conduct detailed participatory and spatially explicit discussions about land-based practices. Basic equipment includes a laptop running Google Earth Pro (with key imagery 'cached') and note-taking equipment such as paper, an audio-recorder or video camera. It is important to note that much of the data, including imagery, roads, borders and other information is stored on Google servers and the software dynamically downloads only the data you are viewing. The imagery in Google Earth Pro is not in real-time. The following guidance is not a guide to participatory mapping processes, merely to help you use Google Earth Pro as a technical means to understand site level information. For more information about best practices in participatory mapping, please visit http://www.ppgis.net/.

Questions that may be useful to ask that are relevant to the NEAT+ and humanitarian planning:

- What natural resources are you using for shelter and fuel? Where do you collect them and how has this changed over time?
- Where do you conduct your livelihood activity?
- Where do you dispose of waste?
- Where do you experience natural hazards (if any) and how has this changed over time?

The Google Earth Interface

Each time you start Google Earth Pro, the Earth appears in the main window. The area that shows the Earth is called the 3D viewer.



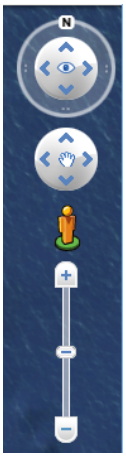
1. Search panel
2. Hide/show sidebar
3. Draw features (placemark, polygon, path)
4. Image overlay
5. Measure
6. Save image/print
7. Navigation
8. Status bar
9. Layer panel
10. Places panel

Changing the Language

You can change the language displayed in Google Earth Pro. To do this:

- Click Tools > Options > General tab
- Under the Language settings, choose the language of your choice.

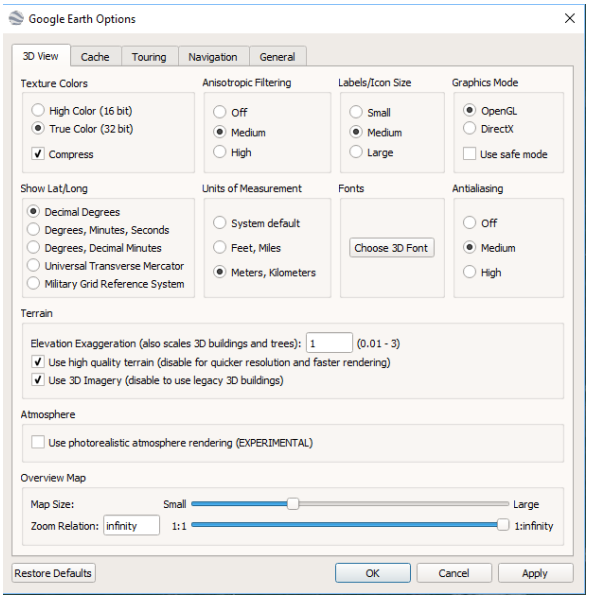
Navigating in Google Earth



To navigate in Google Earth, use the navigation tools in the upper-right corner of the 3D viewer.

- Rotate the map by clicking on the grey ring and dragging it around. To turn the map north again, click once on the “N”.
- Move your view, or tilt the viewer and look around from a different perspective, by clicking on the arrows around the eye.
- Move (or “pan”) around the map, by clicking the arrows outside hand.
- Zoom in or out on the map, by clicking and dragging the zoom slider. You can also click on the zoom in the “+” or out “-“ buttons to zoom in, or double-click these buttons to zoom in or out all the way.

Set up measurements and settings



Prior to mapping, you can pre-set how Google Earth records your data. This can be set up through Tools > Options.

Once in Google Earth Options, click on the 3D View tab.

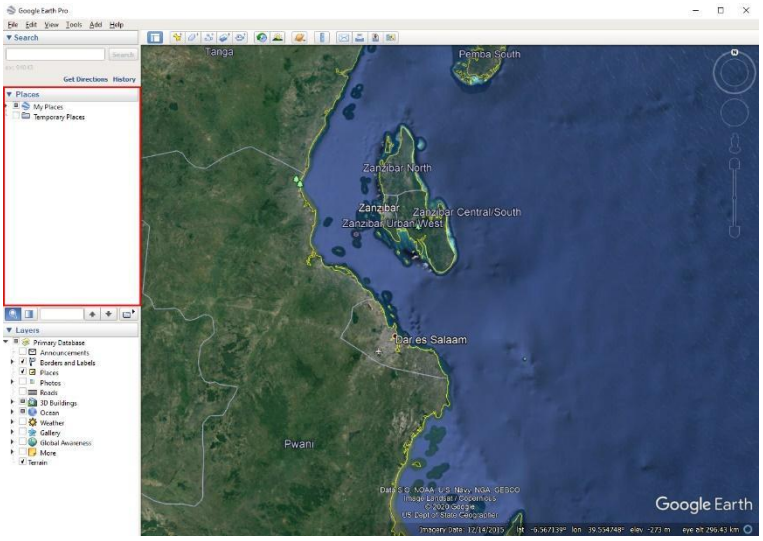
- On “Show Lat/Long,” click on “Decimal Degrees.”
- On “Show Elevation,” click on “Meters, Kilometers.”
- On “Terrain Quality,” adjust the slider to “Higher.”
- Click “Apply”.

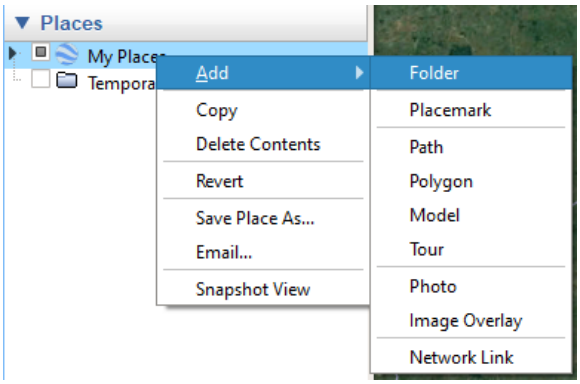
Google Earth “Places”

Use the Places panel (red box) to organize and save your data that you will create, and other peoples’ Google Earth data that you have downloaded from the Internet. All data stored in the “My

Places" folder will be saved for subsequent sessions and will still appear under "My Places" after you exit and restart the program.

Data located in the "Temporary Places" folder are temporary, and will not be saved the next time you start Google Earth again. To move data from "Temporary Places" to "My Places", click and drag each item to the "My Places" folder. Note that data in the Places panel can only be viewed on the computer you are using, as the file is not online or public.





Set up folders

To set up folders to store your data, right-click on "My Places".

- Click on "Add"
- Click on "Folder"
- Name the folder

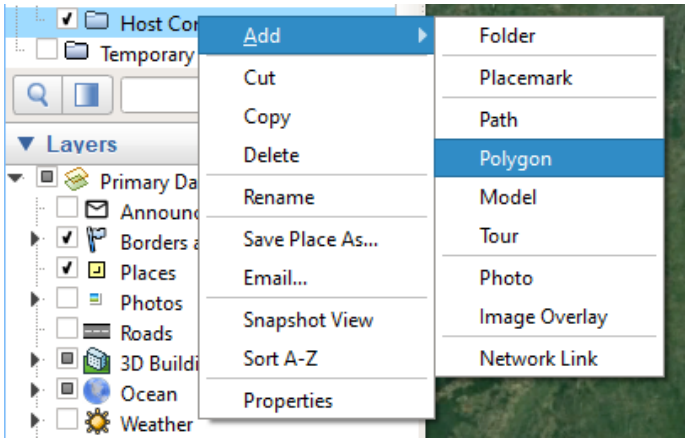
Organize folders

It is extremely important to be organized with your data, especially in a participatory mapping environment. Setting up the folders prior to discussions will ensure that capturing data will be easier and streamlined. You can place folders by question type or participants within other folders by clicking and dragging them into the desired hierarchy. Determine in advance what information you need to record for each site (for example, date of data collection or site name).

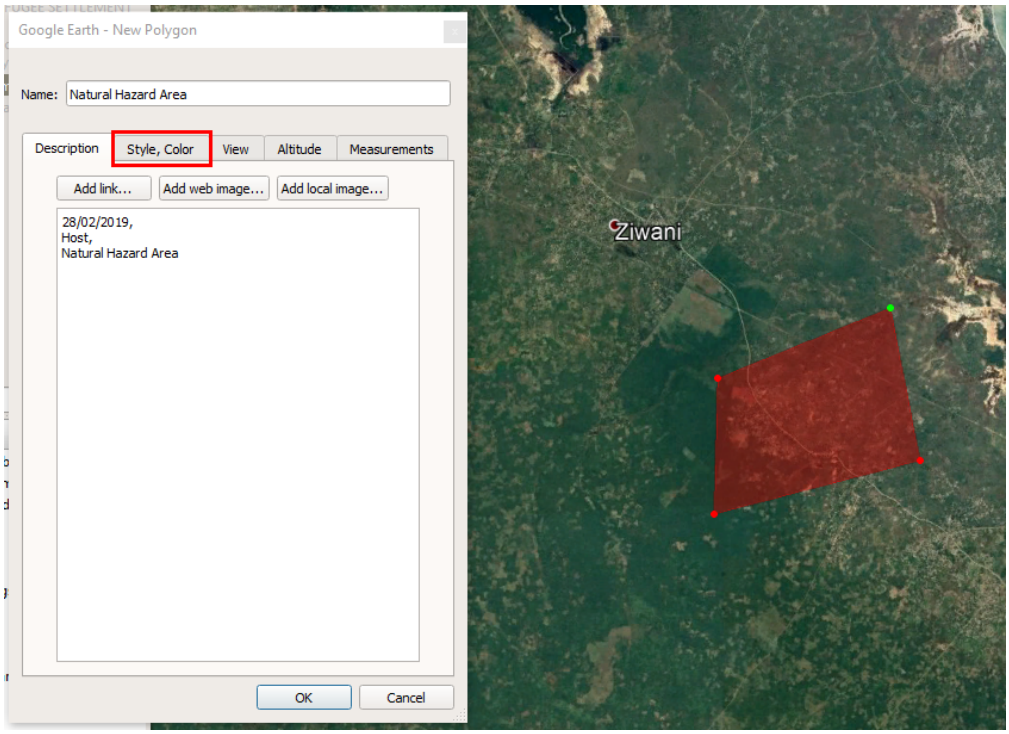
If you downloaded Google Earth Pro, you can import GIS files (e.g. ESRI shape files, MapInfo, KML/KMZ, etc.) from a variety of sources with relative ease. Once loaded, you can see the points, lines and areas, along with an embedded table showing data from the attribute tables of the file. You cannot edit this table in Google Earth Pro.

How to Map in Google Earth Pro

To add features:



- Zoom into the area on the map where you would like to add a feature.
- Right click on the folder you would like to add it to.
- Click “Add”.
- Click “Placemark” for a point, “Polygon” for a polygon, or “Path” for a line. In this example we will create a polygon feature.
- Add a name for the polygon feature and a description.
- At this point you can change the color and style of the polygon feature (red box). This can also be changed later.
- Keep the dialogue open and move it to the side of the screen. Start drawing the polygon feature, double-clicking when you are finished. If you make a mistake, right-click anywhere in the viewer to undo the most recent portion that has been drawn.
- Click “OK” when you are finished. Your new place should appear in the folder you selected in the “My Places” panel.



Editing Mapped Data

To edit a placemark (point):

- Right-click on the placemark in the viewer or in the Places panel.
- Choose “Properties”.
- Click and drag the icon to change the location or edit the text and click “OK” when finished.

To edit a path or polygon:

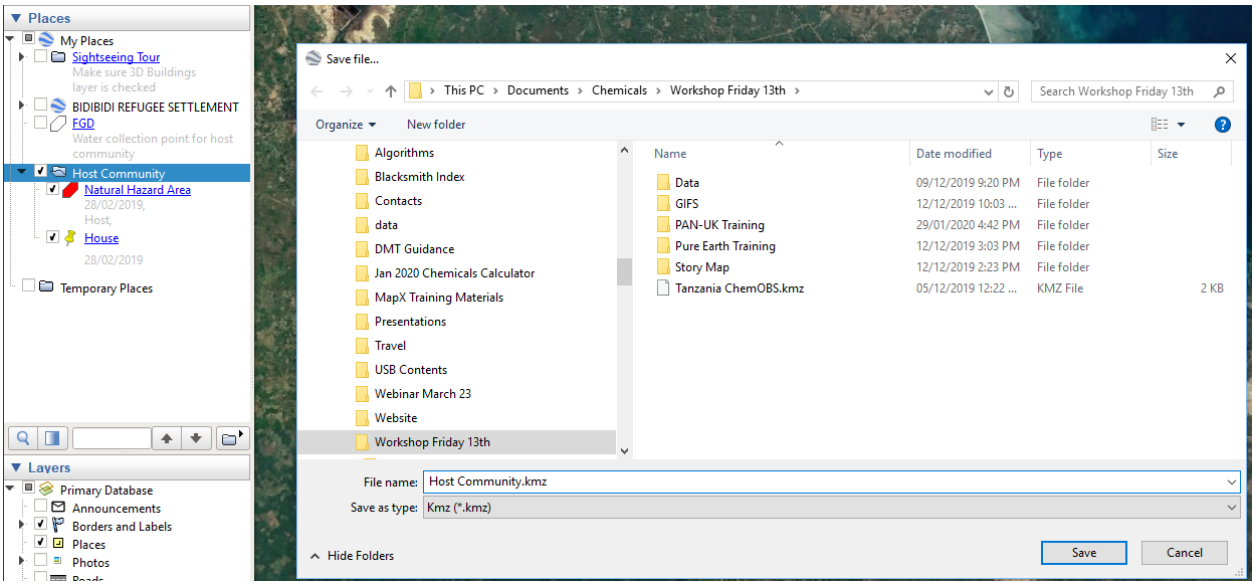
- Right-click on the path or polygon in the 3D viewer or in the Places panel.
- Choose “Properties”.
- Click on any part of the line or polygon to select a node, then click and drag to the correct location.
- Edit the text if required, and click “OK” when you are finished.

Saving your Places

You can save your project and places to your computer in a KMZ and/or KML file format. A Google Earth project file is a KML file, with a filetype extension of .kml or .kmz. KMZ files are compressed files that are smaller than KML files. Be sure to save regularly throughout any interviewing process, as Google Earth is known to shut down unexpectedly.

To save your entire project as a KMZ file:

- Right-click on the folder you want to save.
- Select “Save Place As…” and navigate to the correct folder on your computer.
- Enter the file name and in the “Save as type” dialogue, select KMZ.
- Click Save.



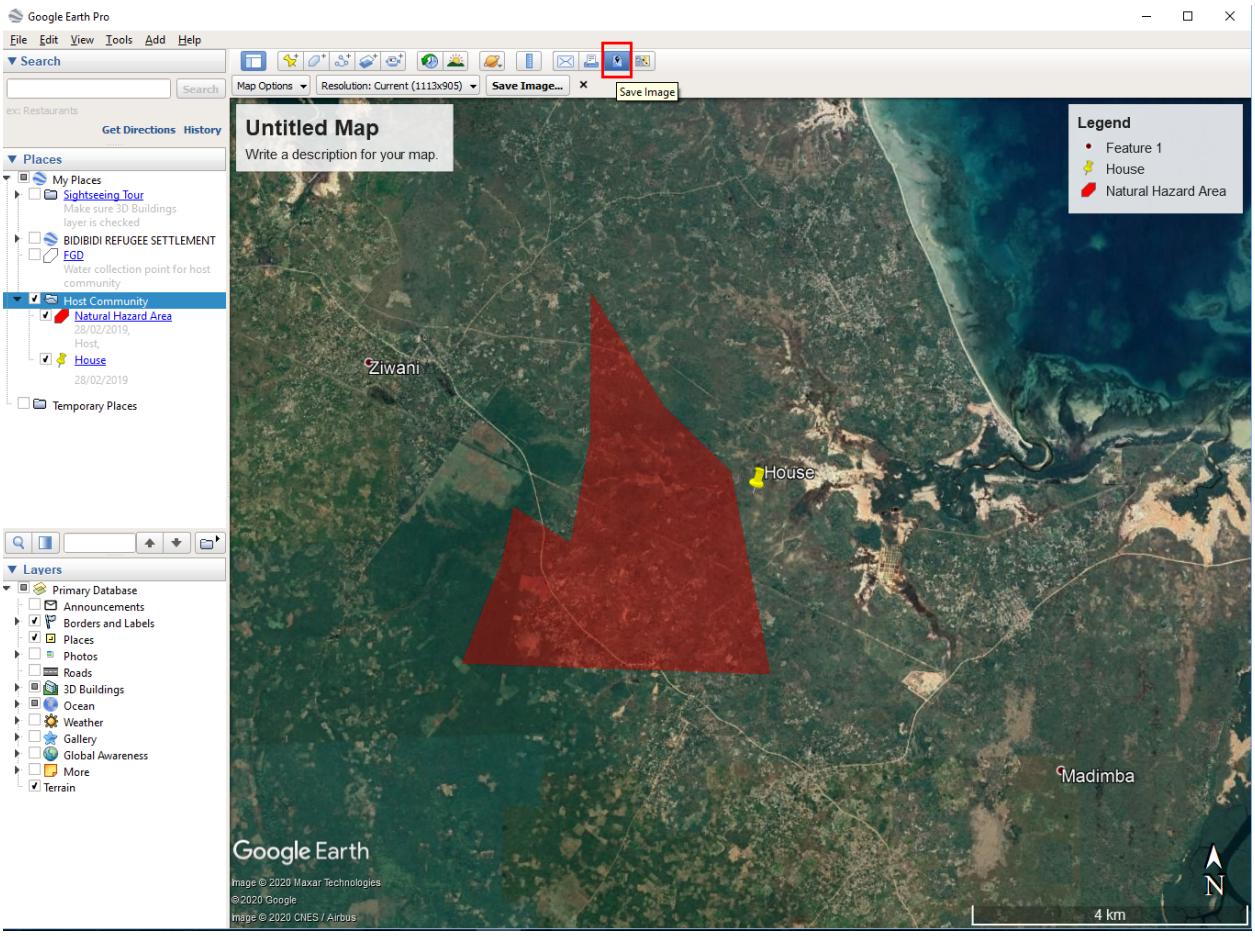
If you want to save individual data as KML files, repeat the process but select KML in the “Save as type” dialogue.

What to do with the data?

KML and KMZ files can be imported into GIS software such as ArcGIS Pro or QGIS and integrated into geodatabases to support planning processes for the area of interest. Sharing information, collaborations on tasks and coordination of activities among personnel in different organizations is an important part of successful humanitarian work. Sharing data helps to provide near real time situational awareness and collect/display assessment data for operations. With new data against old you can evaluate and monitor change in a situation and transfer knowledge within a community. Some specific applications for humanitarian work have been mentioned in the introduction to this guidance note.

Making maps

You can also create maps directly in Google Earth by clicking on the “Save Image” button in the top toolbar (redbox), as in the example below.



Caching Google Earth Imagery

You can cache Google Earth imagery if you will be interviewing in a low-bandwidth location or in a location with no internet.

How to cache imagery:

1. Draw a quick polygon around what you want to cache.
2. Turn off layers in the Layers Panel (unless you need them).
3. Clear the cache (Google Earth > Preferences > Cache > Clear disk cache)
4. Fly around the area of interest, and let the imagery load and cache.
5. Turn off Wifi and test your cache.

Additional tips:

- You can cache up to 2000MB of imagery - so prioritize:
- Do a low-resolution sweep of a larger area OR do a high-resolution sweep of a smaller area,
- Monitor how much cache space you are using as you go,
- Save cache folders of locations you frequently work in.

Annex A: Additional learning resources

Google Earth and Participatory Mapping:

1. Google Earth Outreach:

http://earth.google.com/outreach/

a) Showcase – View KMZ files produced by others
b) Tutorials – Watch video tutorials and find helpful tools and resources
c) Community – Connect with others using Google Earth tools
d) Grants – Available for non-profits and communities

2. PPGis.net: Open Forum on Participatory Geographic Information Systems and Technologies

http://www.ppgis.net/

Remote sensing:

1. Satellite Observations in Science Education: Principles in Remote Sensing. https://www.ssec.wisc.edu/sose/pirs_activity.html