

INTRODUCTION TO QGIS

Note: Most of contents were directly quoted from <http://maps.cga.harvard.edu/qgis/>

EE464: Urban Economics

EE562: Selected Topics in Development Economics 2

Semester 1 / 2020

Faculty of Economics, Thammasat University

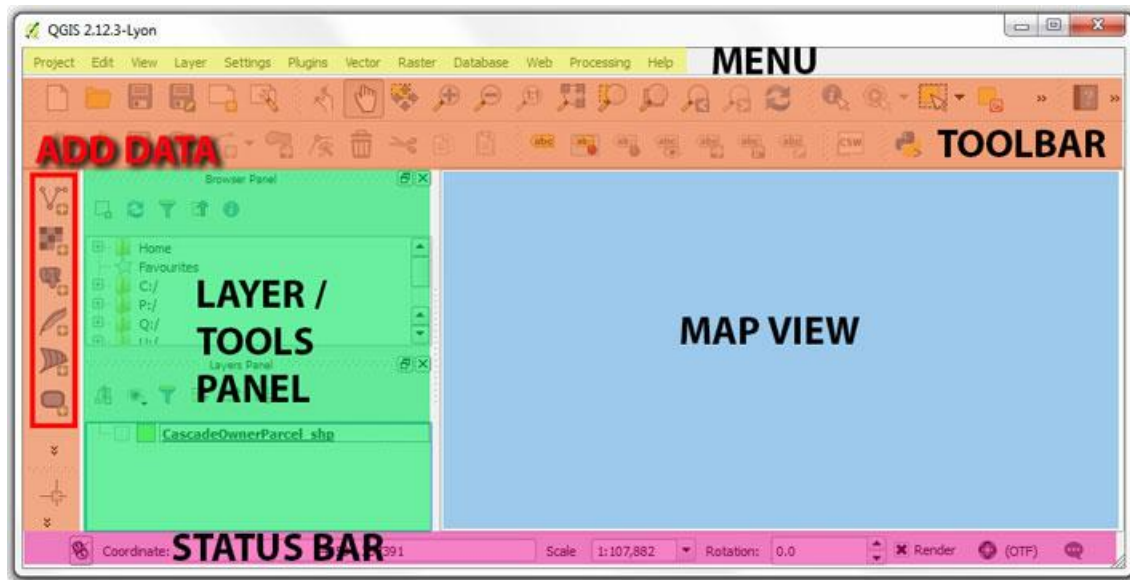
Why QGIS?

Why should anyone be using QGIS over some other GIS software package?

Here are only some of the reasons:

- **It's free, as in lunch:** Installing and using the [QGIS program costs you a grand total of zero money](#). No initial fee, no recurring fee, nothing.
- **It's free, as in liberty:** If you need extra functionality in QGIS, you can do more than just hope it will be included in the next release.
- **It's constantly developing:** Because [anyone can add new features](#) and improve on existing ones, QGIS never stagnates. The development of a new tool can happen as quickly as you need it to.
- **Extensive help and documentation is available:** If you're [stuck with anything](#), you can turn to the [extensive documentation](#), your fellow QGIS users, or even the developers.
- **Cross-platform:** QGIS can be installed on MacOS, Windows and Linux.

Source: Directly quoted from https://docs.qgis.org/2.18/en/docs/training_manual/introduction/intro.html

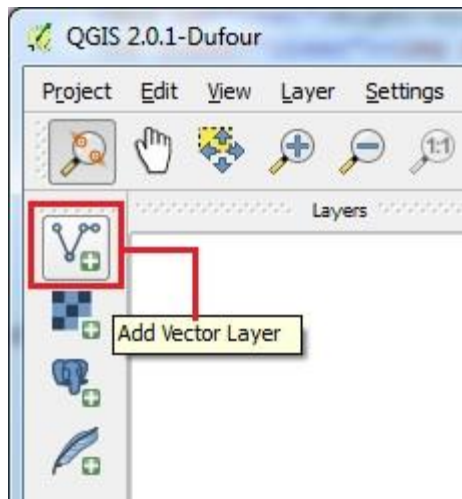


- MENU BAR provides access to all the main functions and plugins
- TOOLBAR provides one-click common functions, and task-specific functions
- ADD DATA is the new default location for the Manage Layers Toolbar
- LAYER LIST shows all data layers currently added to the project
- MAP VIEW provides a dynamic visualization of the active data layers that can be mapped
- STATUS BAR provides some vital information about the current file menu is for Opening, Saving, Printing the data layers, and closing the current project
- EDIT menu is for adding, modifying, deleting spatial features within an editable data layer
- VIEW menu is for primary Pan, Zoom, Feature Selection, and Toolbar Controls
- LAYER menu is for Adding, Removing, Visibility of data layers, and for changing Layer Projections
- SETTINGS menu controls the basic Project settings, Project projection, Language Locale, & other defaults
- PLUGINS menu lists the installed Plugins and their sub-routines, and can Add or Remove Plugins
- RASTER menu is for Raster processing functions (more are enabled with GRASS)
- VECTOR menu is for standard Vector GIS spatial operations -- buffering, dissolving, point-in-polygon query, etc.

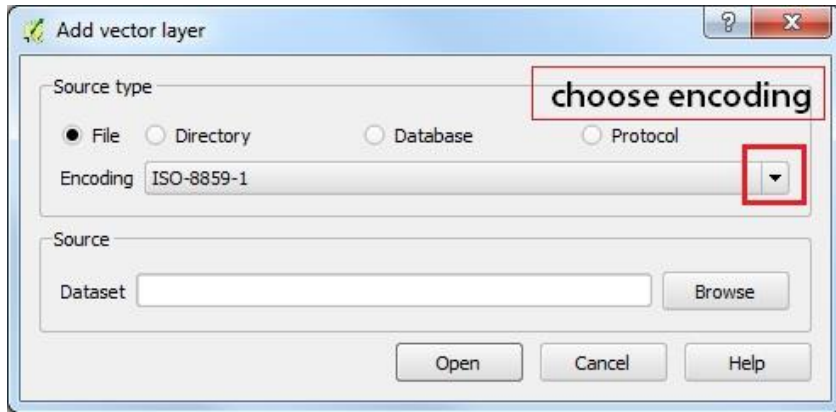
Add Data, Pan, Zoom, Identify

On your own, you can download other free basic datasets for all countries from DIVA-GIS

- Select a Country Name and Subject (for example: Admin Areas), then click OK
- You will see a preview of the data. Click the RED "Download" link to the lower left.
- After downloading is complete, create a working folder and UNZIP the downloaded .zip archives. You should now have a number of files in your working folder. These can be opened as ESRI Shapefiles in QGIS.

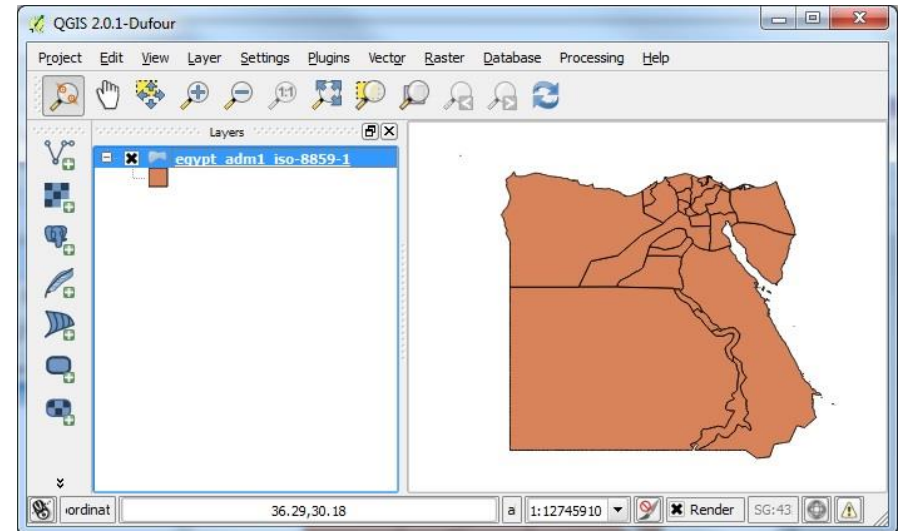
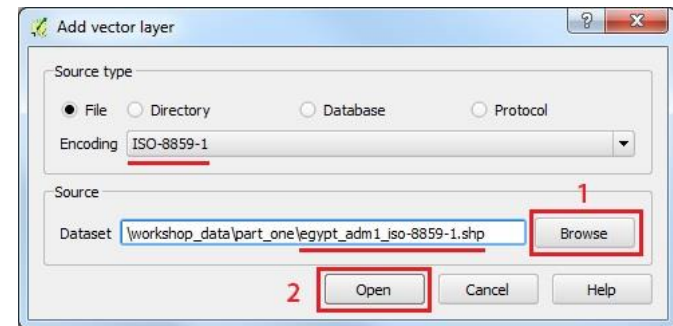


- We must first add a layer of data to use the map navigation controls.



Click OPEN to add the selected layer to the current project. The LAYER NAME will appear in the LAYER LIST AREA, and the MAP VIEW will default to the extent of the vector data.

Notice that the Source Type will default to SYSTEM encoding. QGIS is VERY good at handling various character set encodings (such as multi-byte Chinese & Japanese, or UTF-8)! Simply declare the correct codepage at the time of opening the layer, and QGIS will handle the rest! For our example, set encoding = ISO-8859-1.



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https://docs.qgis.org/2.18/en/docs/training_manual/introduction/intro.html

If it is not already active, click on the PAN tool. Move the hand-shaped cursor over the MAP view, then click and drag to PAN the map. Letting go of the click button will set the MAP view the new position.



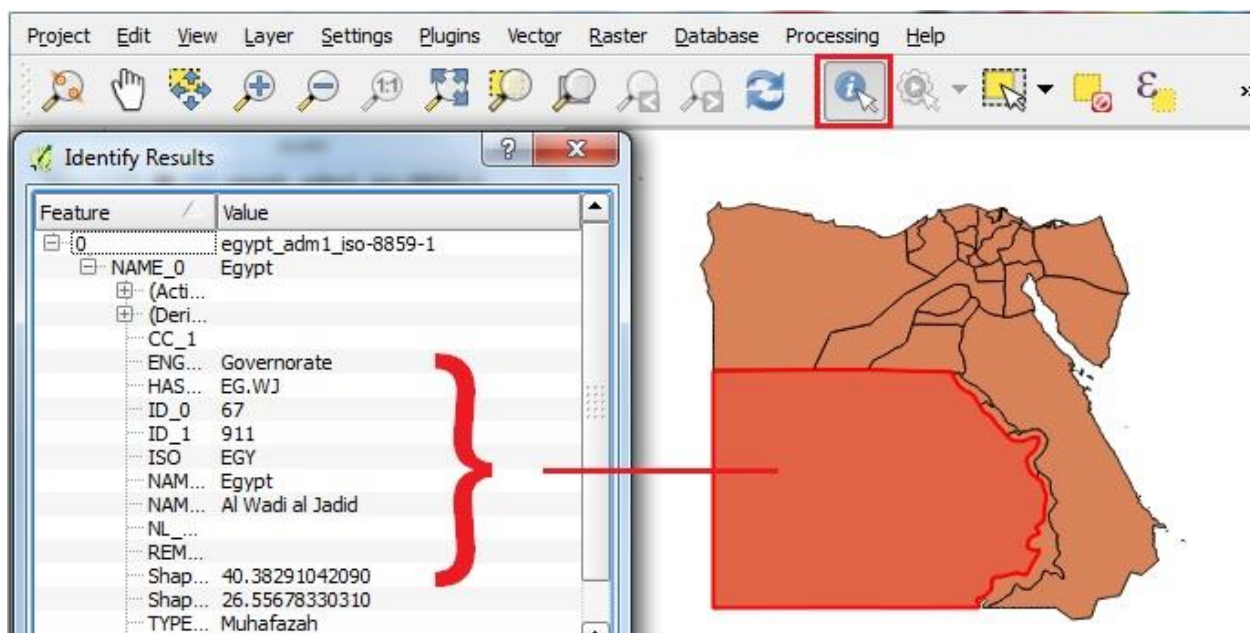
Click the ZOOM tool. With the ZOOM tool active, both click and drag a box shape over an area of the map. Letting go of the click button will zoom into the extent of the selection.



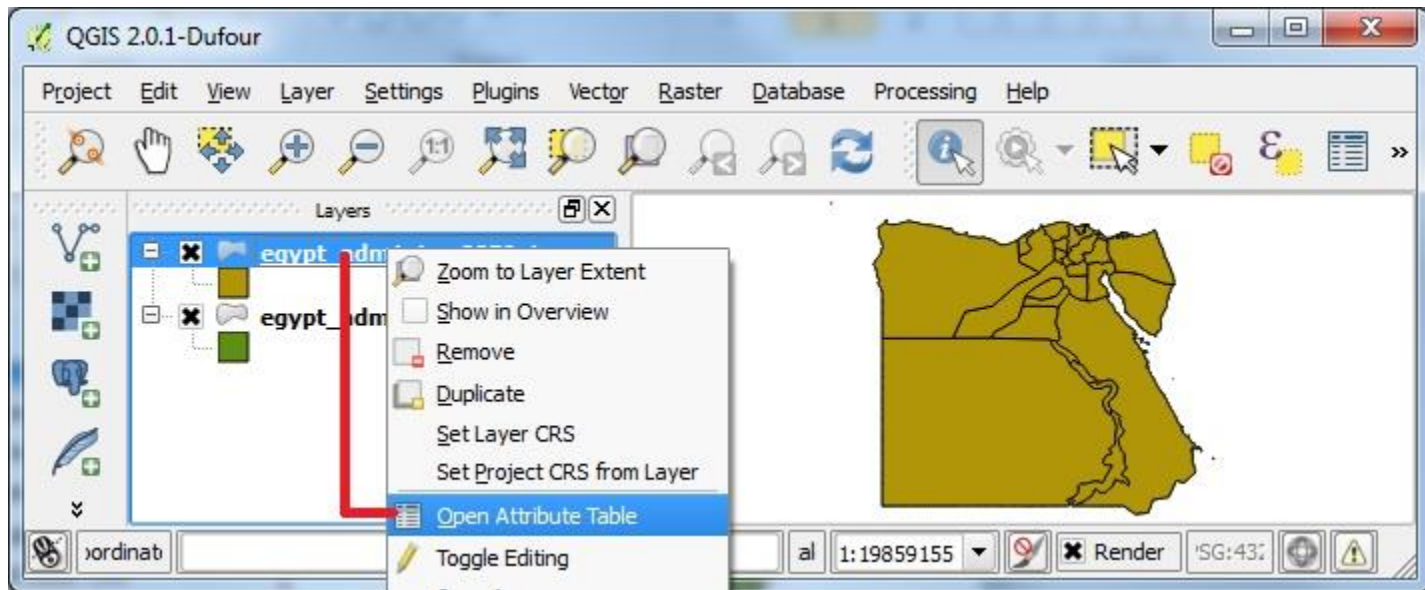
Now make the ZOOM OUT tool active. Click any spot on the map view and the view will zoom out, centered on the selected point.



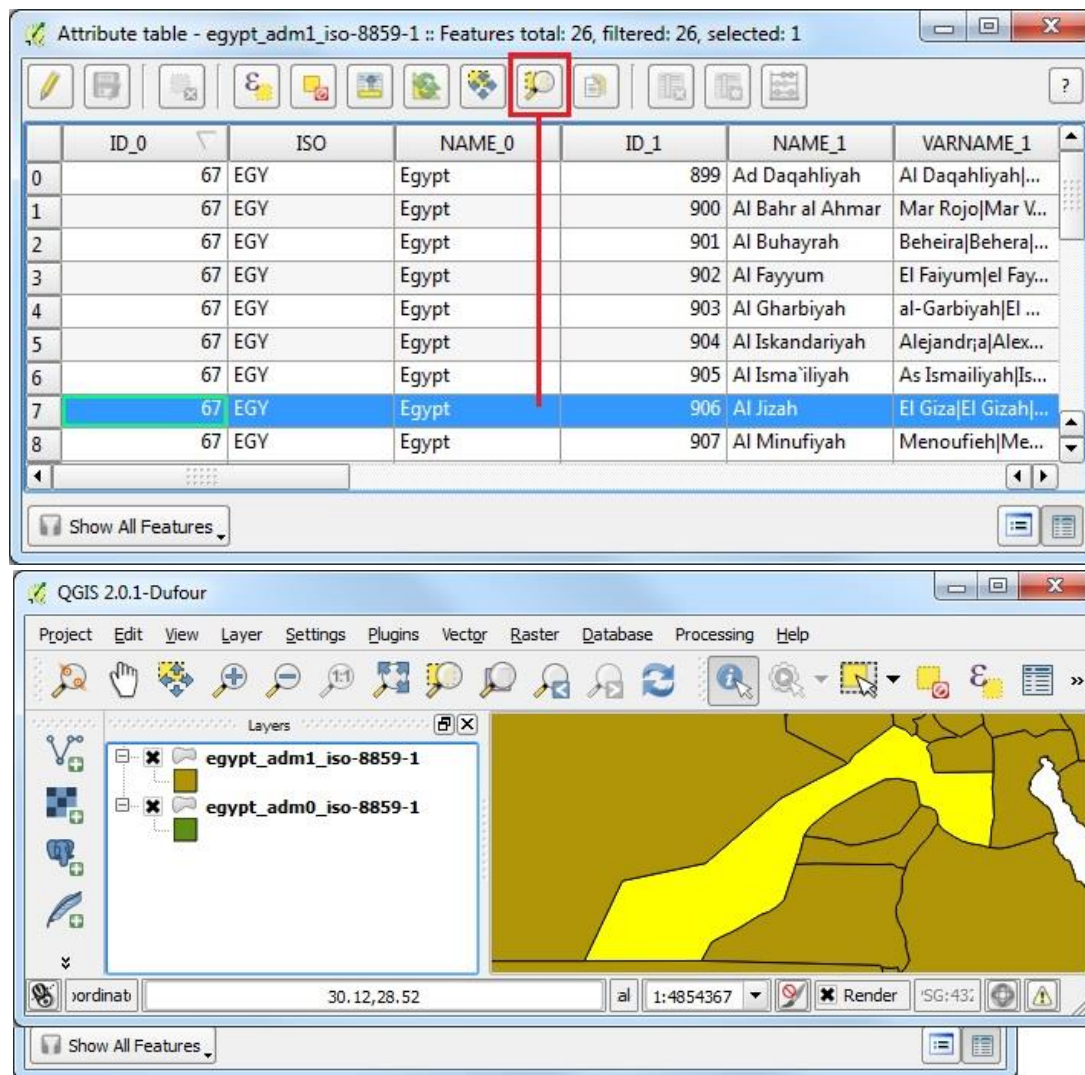
- To use the IDENTIFY tool, first right-click on the TOOLBAR AREA and check the ATTRIBUTES toolbar. Now you will be able to make the IDENTIFY tool active (a white letter "i" in a small blue circle).
- Move the cursor to a spot on the MAP VIEW that has NOT got any features (a blank spot) and click on it.
- You will see a message in the lower left part of the STATUS BAR, "no features at this position found."
- Now try clicking on an area of the MAP VIEW that DOES have colored features. You should see a small pop-up window containing attribute information for the feature that was clicked on.



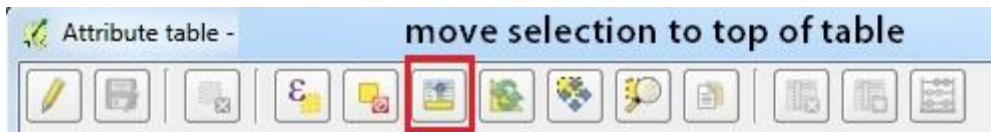
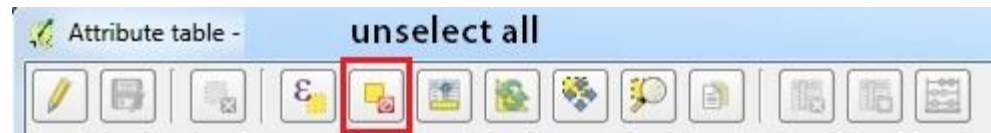
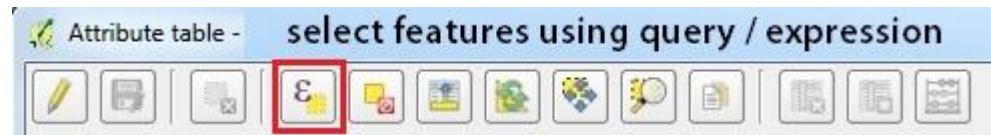
- Another way to view all the attributes for the features in a given layer, is to right-click on the LAYER in the LAYER LIST,
- Then select OPEN ATTRIBUTE TABLE from the drop-down choices.
- Browse the Attribute Table and notice the top row contains FIELD names, and each row contains the values for those field types for a particular features. One ROW = one spatial feature in the chosen layer.



- Select a single feature by clicking on the ROW NUMBER at the left side of the Attribute Table. The SELECTED ROW will be highlighted.
- Move your cursor over the SELECTION OPTIONS along the top of the Attribute Table.
- Tooltips will appear indicating various options, such as TOGGLE EDITS, SAVE EDITS, etc.
- Click on ZOOM TO SELECTION, and the MAP VIEW

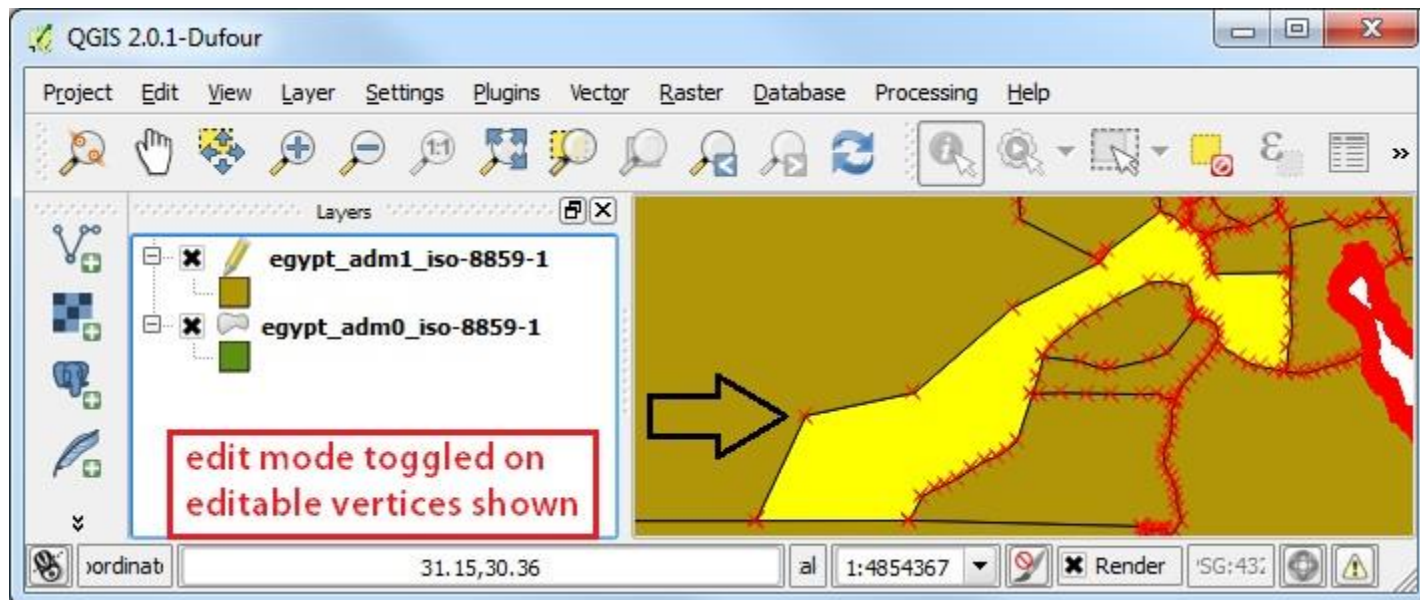
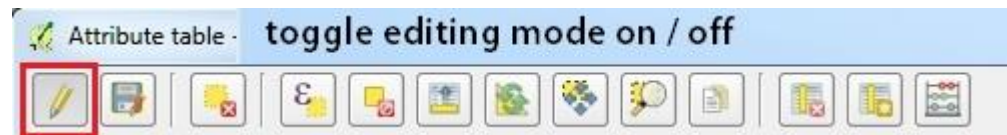


- Convenient selections options for working with attributes are: UNSELECT, MOVE SELECTED ROWS TO TOP, INVERT SELECTION, SELECT BY EXPRESSION or SQL QUERY, and ZOOM TO SELECTION.



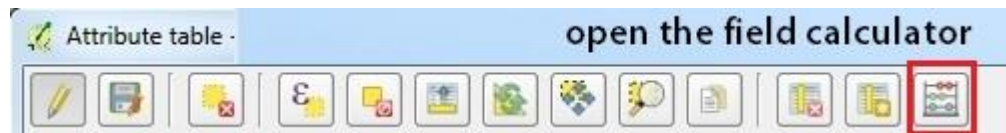
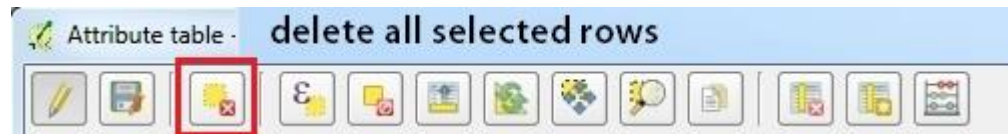
Source: Directly quoted from https://docs.qgis.org/2.18/en/docs/training_manual/introduction/intro.html

The TOGGLE EDIT button turns the editing mode on or off. This will also be reflected in the Map View, where vector features that can be edited will be highlighted. If the the number of features (and their vertices) is large, the Map View may take a moment to refresh.

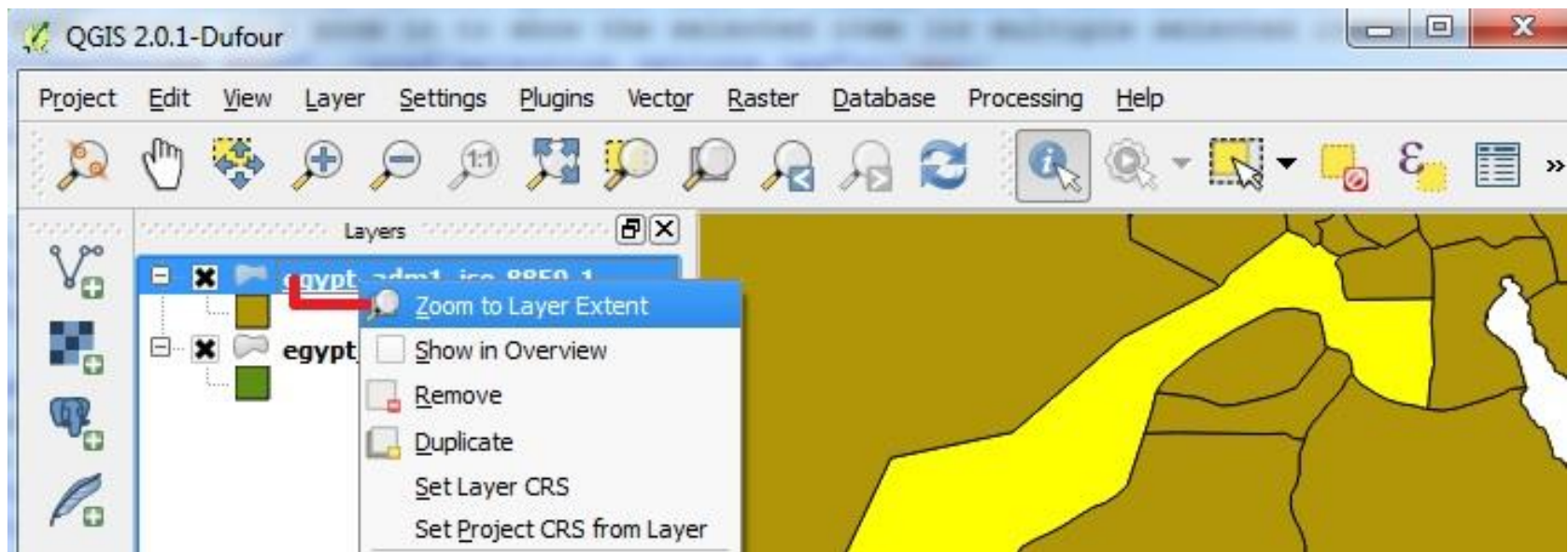


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When the EDIT MODE is ON, additional functions will be enabled in the attribute table options, for example: DELETE SELECTION, COPY SELECTION, DELETE COLUMN, INSERT NEW COLUMN, OPEN FIELD CALCULATOR. These options will be discussed in the EDIT section of this tutorial.

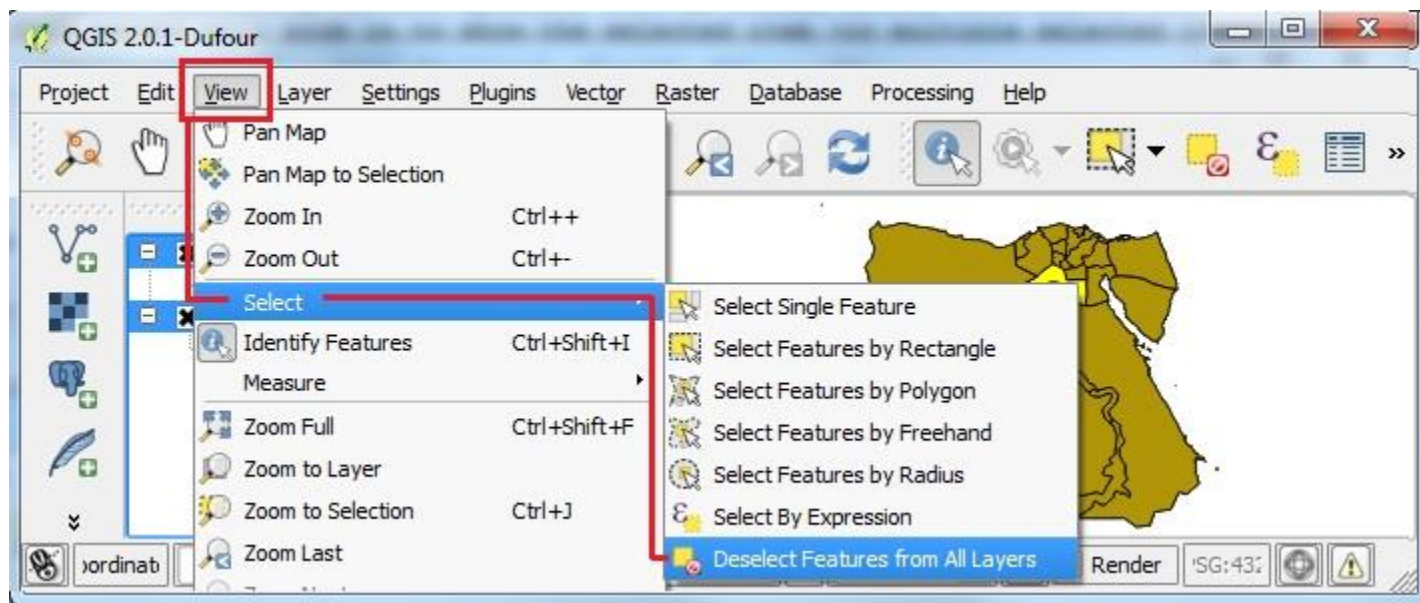


Click the EDIT TOGGLE button again, to exit the editing mode, and then DISCARD CHANGES. Right-click on a layer in the LAYER LIST, then select ZOOM TO LAYER EXTENT in order to see all the features of that layer in the MAP VIEW.

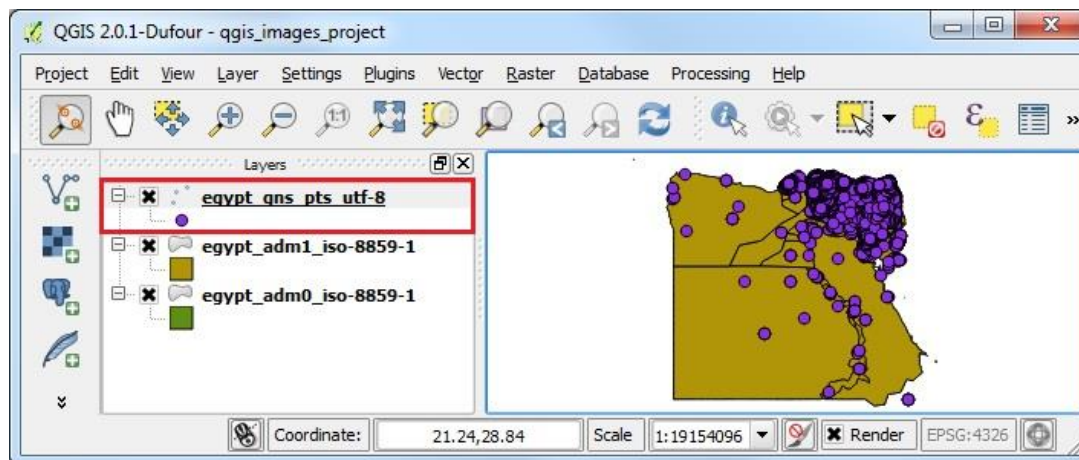


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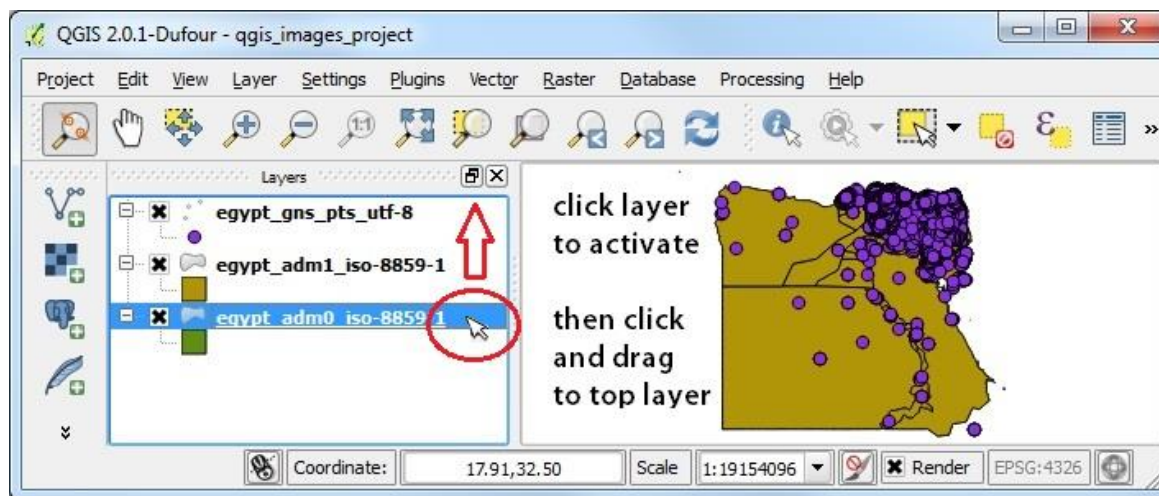
- Now we will use the Main Menu to unselect the highlighted features.
- On the top menu click on VIEW, then move the mouse cursor down to SELECT, over to the right to in order to scroll down to the last item: DESELECT FEATURES FROM ALL LAYERS.
- Clicking on the command DESELECT FROM ALL LAYERS will remove the selection status in both the attribute table and the MAP VIEW.



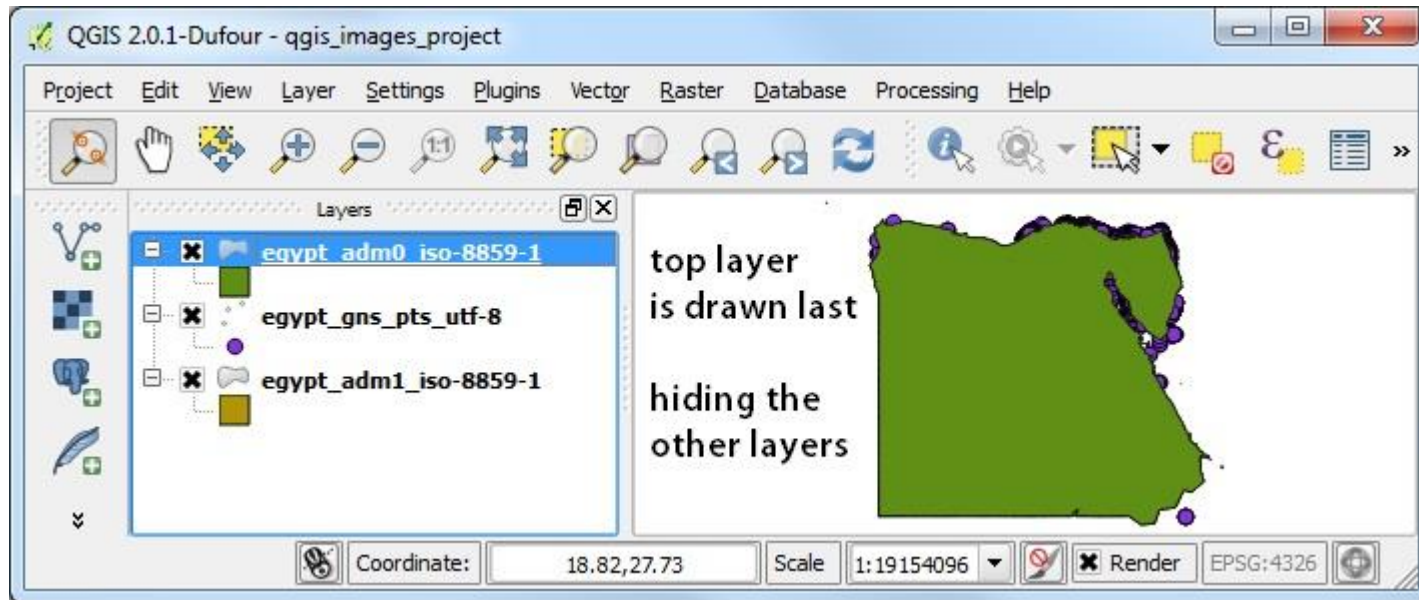
- There are be three layers in the LAYER LIST. Notice that each new layer appears on top of the other layers in the list, so that the Points are on top of the polygons.



Let's change the layer order, by clicking and dragging the bottom layer to the top of the stack in the LAYER LIST and letting go.

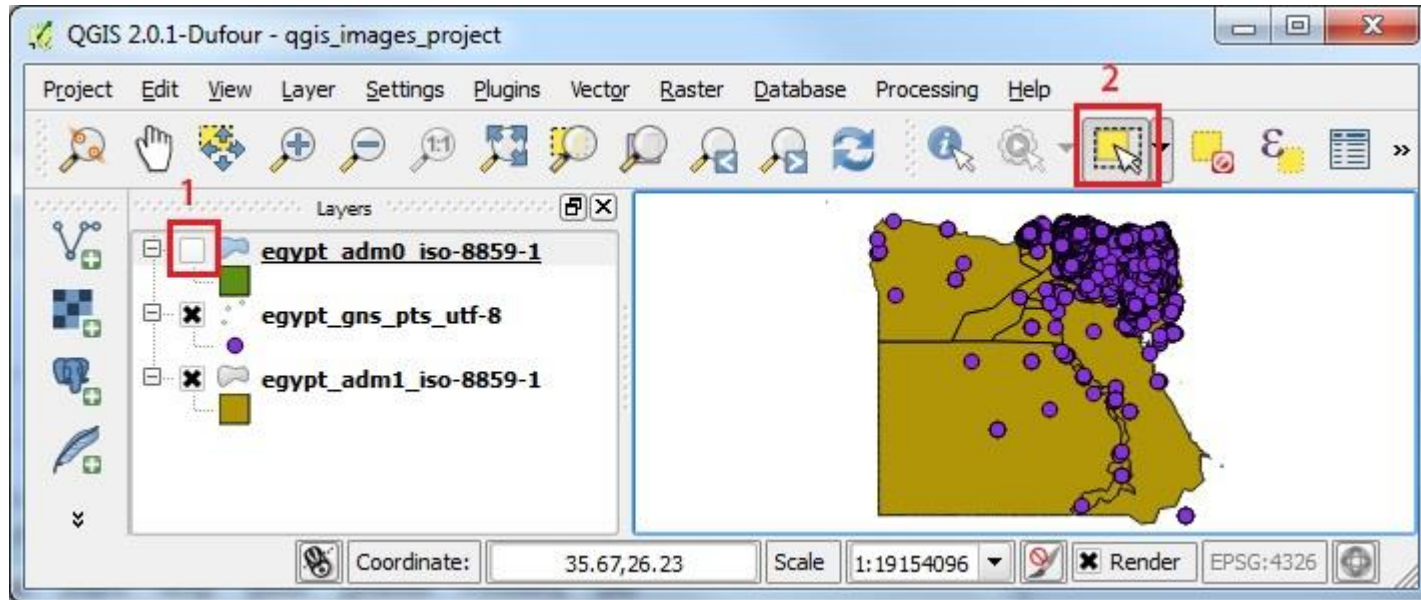


- The top layer should now be shown "on top" of the MAP VIEW. Basically, the LAYER LIST order controls the drawing order for the layers, with the top-most layer in the LAYER LIST drawn last ON TOP of the others.
- By selecting the drawing order, transparency and symbolization, you can control exactly what you want to see on your map view.



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- Another way to control the layers shown in the MAP VIEW is to UNCHECK them in the LAYER LIST.
- Because the TOP LAYER is the ACTIVE LAYER and is UNCHECKED you will see that NO features are selected.

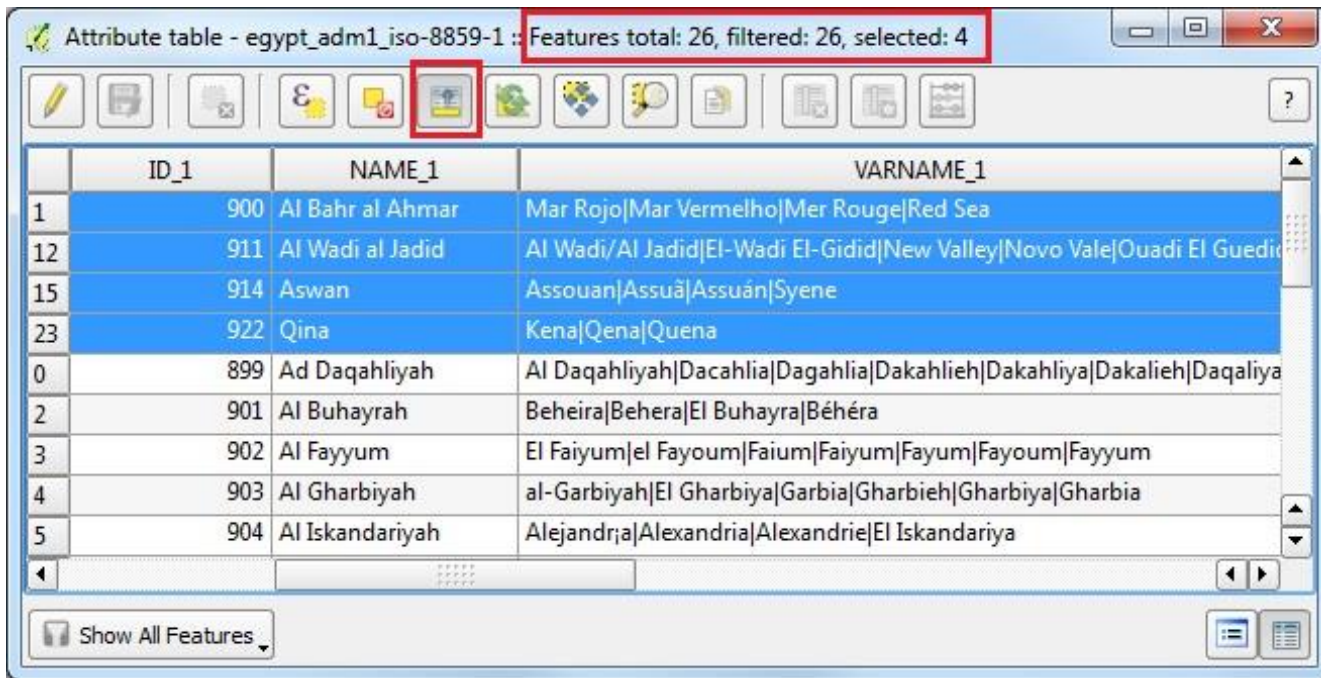


- By default in QGIS, the IDENTIFY or SELECTION tools will return features from only the ACTIVE layer in the LAYER LIST.

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- Right-click on the ACTIVE LAYER and OPEN THE ATTRIBUTE TABLE.
- Click on the MOVE UP tool to see the highlighted rows that appeared on the map.
- Now you can see how the spatial selection in the map view can be used to discover all the attributes stored in the table.

NOTE: the top line of the Attribute Table will always explicitly state the total number of features in the table, and how many rows are CURRENTLY SELECTED. In this example, there are 26 features total in the egypt_adm1 layer, and our spatial selection found 4 features.

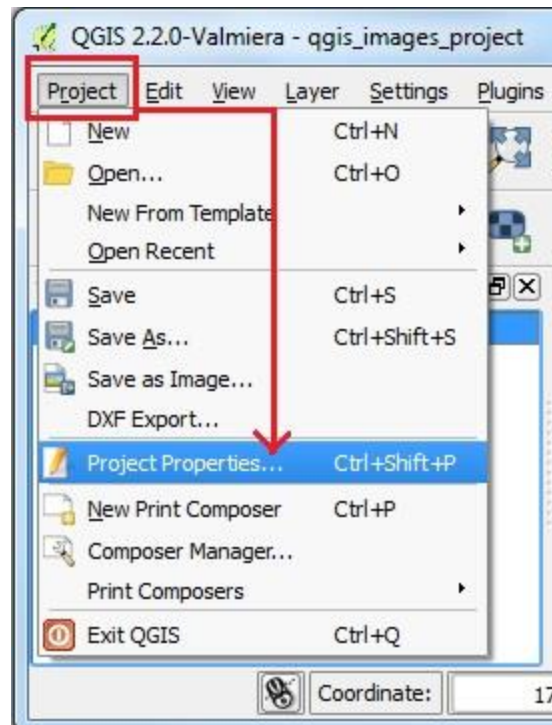


Attribute table - egypt_adm1_iso-8859-1 :: Features total: 26, filtered: 26, selected: 4

	ID_1	NAME_1	VARNAME_1
1	900	Al Bahr al Ahmar	Mar Rojo Mar Vermelho Mer Rouge Red Sea
12	911	Al Wadi al Jadid	Al Wadi Al Jadid El-Wadi El-Gidid New Valley Novo Vale Ouadi El Guedid
15	914	Aswan	Assouan Assuā Assuān Syene
23	922	Qina	Kena Qena Quena
0	899	Ad Daqahliyah	Al Daqahliyah Dacahlia Dagahlia Dakahlieh Dakahlia Dakalieh Daqaliya
2	901	Al Buhayrah	Beheira Behera El Buhayra Béhéra
3	902	Al Fayyum	El Faiyum el Fayoum Faïum Faiyum Fayum Fayoum Fayyum
4	903	Al Gharbiyah	al-Garbiyah El Gharbiya Garbia Gharbieh Gharbiya Gharbia
5	904	Al Iskandariyah	Alejandra Alexandria Alexandrie El Iskandariya

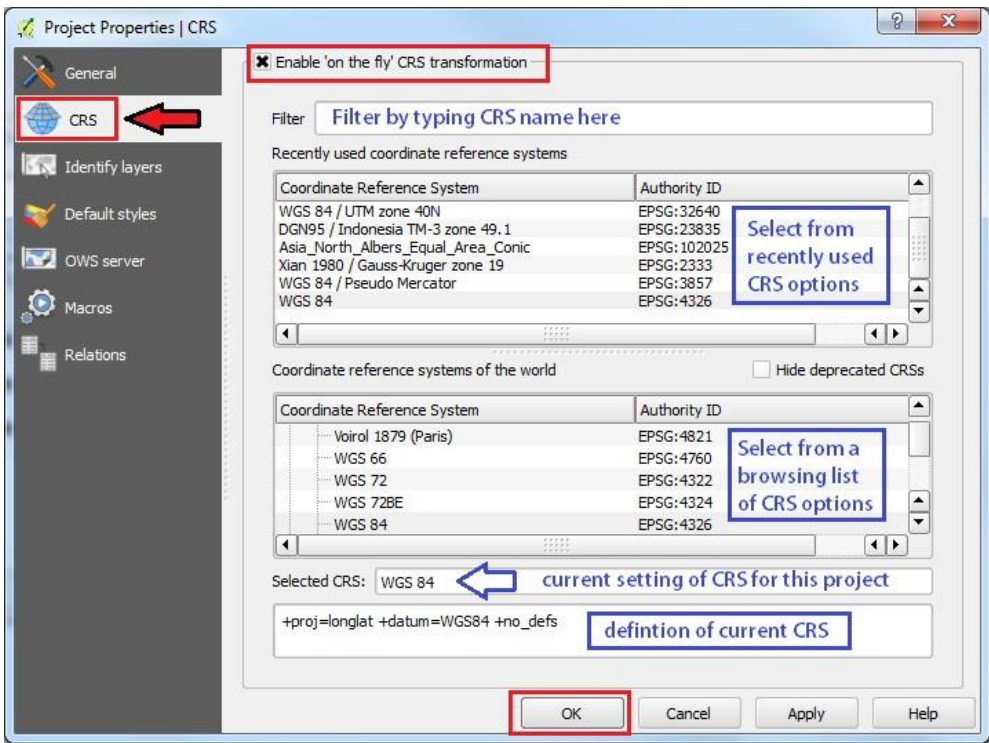
Show All Features

- In QGIS the default projection, or CRS, is WGS84 Geographic Coordinate System. This CRS has become a global standard for latitude and longitude positions, such as those captured with GPS devices.
- Note that "unprojected" data, or those with projections that cannot be interpreted will be projected by default in WGS-84 when using QGIS.
- It is possible to load layers with different CRS into a QGIS project and view them seamlessly in the same coordinate space. This exercise will introduce the basics of managing CRS in QGIS.



Source: Directly quoted from https://docs.qgis.org/2.18/en/docs/training_manual/introduction/intro.html

- Note the checkbox for enabling "only the fly" CRS transformations
- The CRS Selection Panel shows the current project CRS, and other pre-set CRS to choose from
- Next is a proj4 text panel, where projections can be set by pasting in proj4 format CRS statements. [You can look up proj4 statements by EPSG number at SpatialReference.org
- The Search by CRS Name panel provides a drop-down selection of the main Projection Authorities, such as EPSG, and a form to search for a name or ID number within that authority list.
- You can also select from Recently Used projection settings.



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