

Exercise 4 – Focus on Data

Objectives: As the title suggests, this section requires you to get involved with the data side of GIS operations, in all its various forms. Accurate, stable data is the bedrock on which insightful analysis is produced. In this exercise we'll learn about...

- In built QGIS Data Management functionality
- Using the Plugins manager to access online earth imagery data (openLayers)
- Organising non-spatial table data and bringing it into QGIS

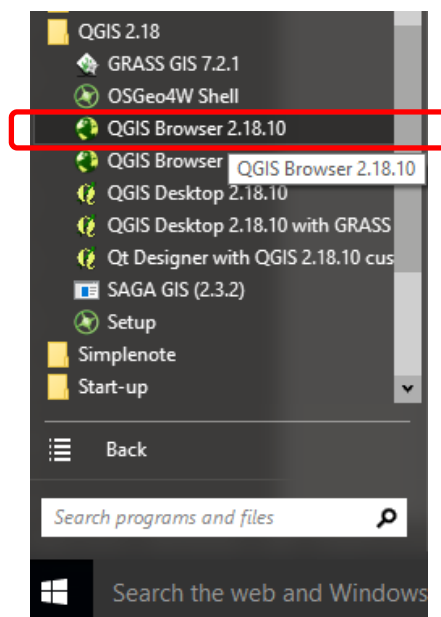
Please ask if there is anything you don't understand!

Part 1 – Opening QGIS Browser

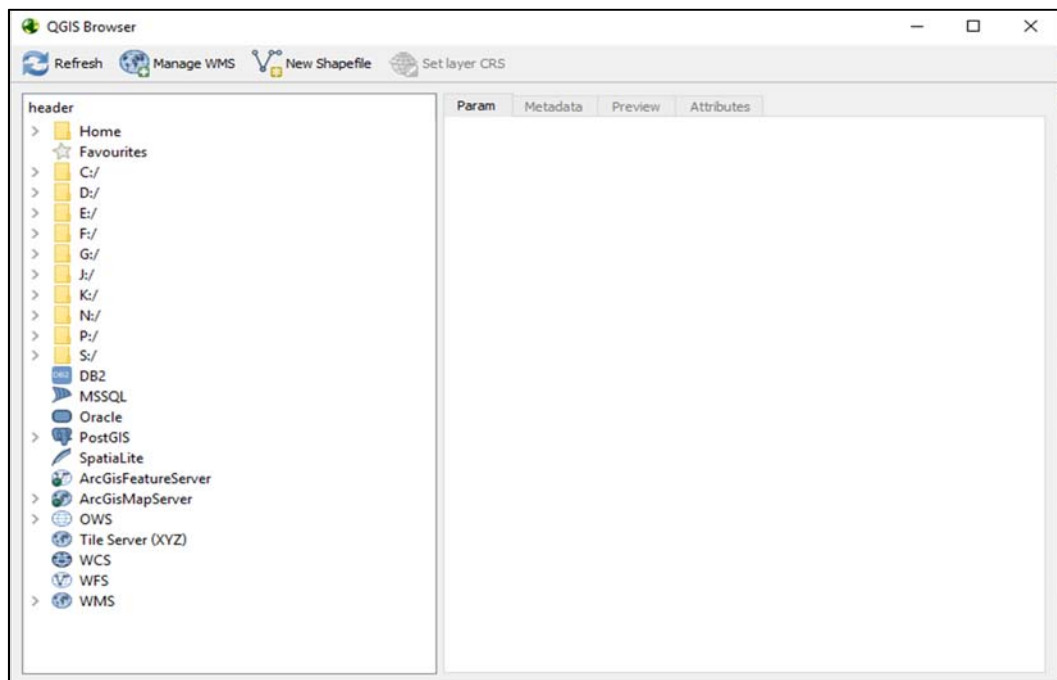
QGIS comes with a standalone application called QGIS Browser that is useful for managing and viewing your spatial data's metadata

- 1) Open QGIS Browser using the windows start menu

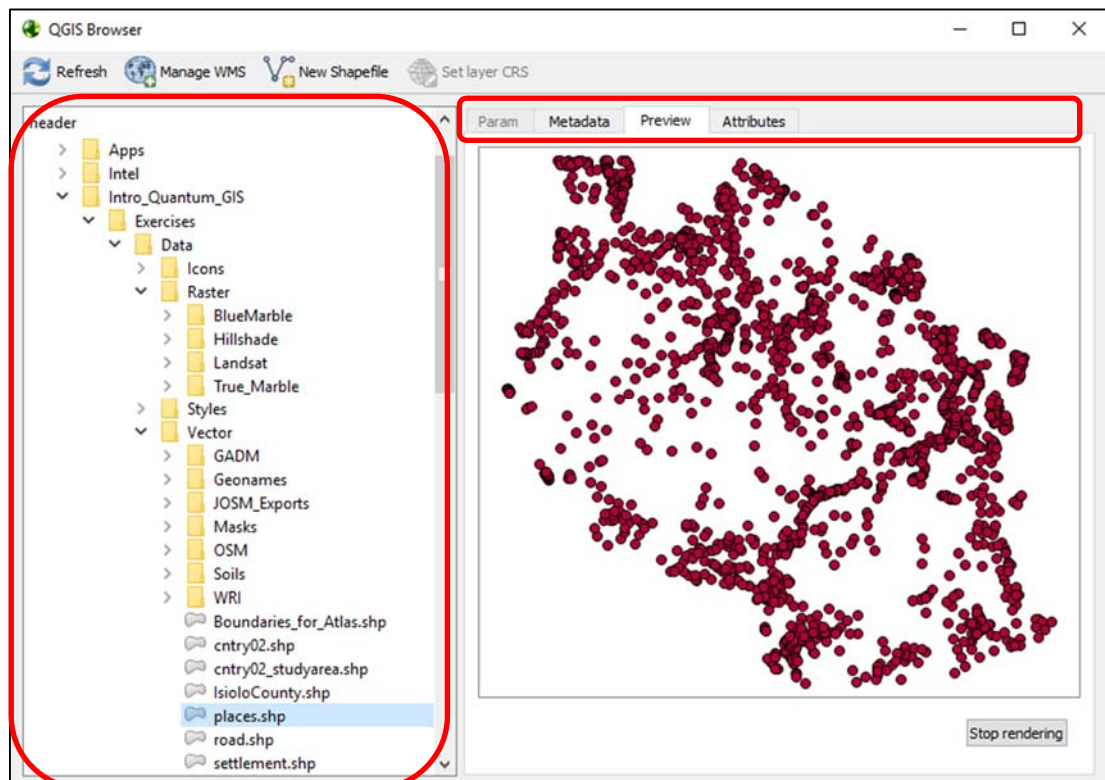
Start > All Programs > QGIS 2.18 > QGIS Browser 2.18.10 Please note the name of the browser will vary according to your installed version of QGIS



- The browser should appear as shown below



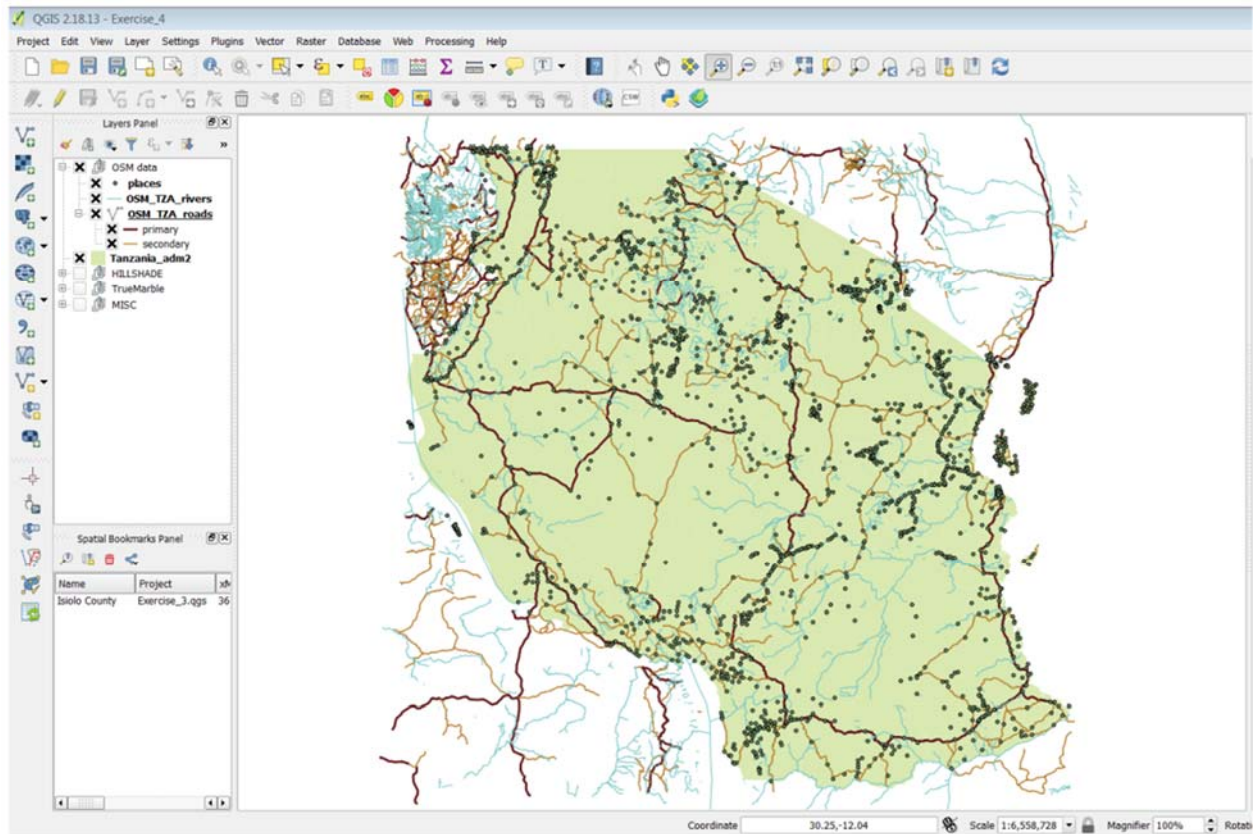
- Within the file explorer panel navigate to:
C:\Intro_Quantum_GIS\Exercises\Data\Vector
- Select **places.shp** and then step through the 3 accessible tabs: **metadata**, **Preview** and **Attributes**; this is very useful outline information for datasets. QGIS Browser is particularly useful if you have a large volume of data to review.



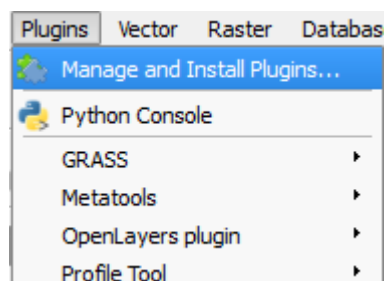
- Try using the browser to explore some of the other vector and raster datasets.

Part 2 – The Open Layers Plugin

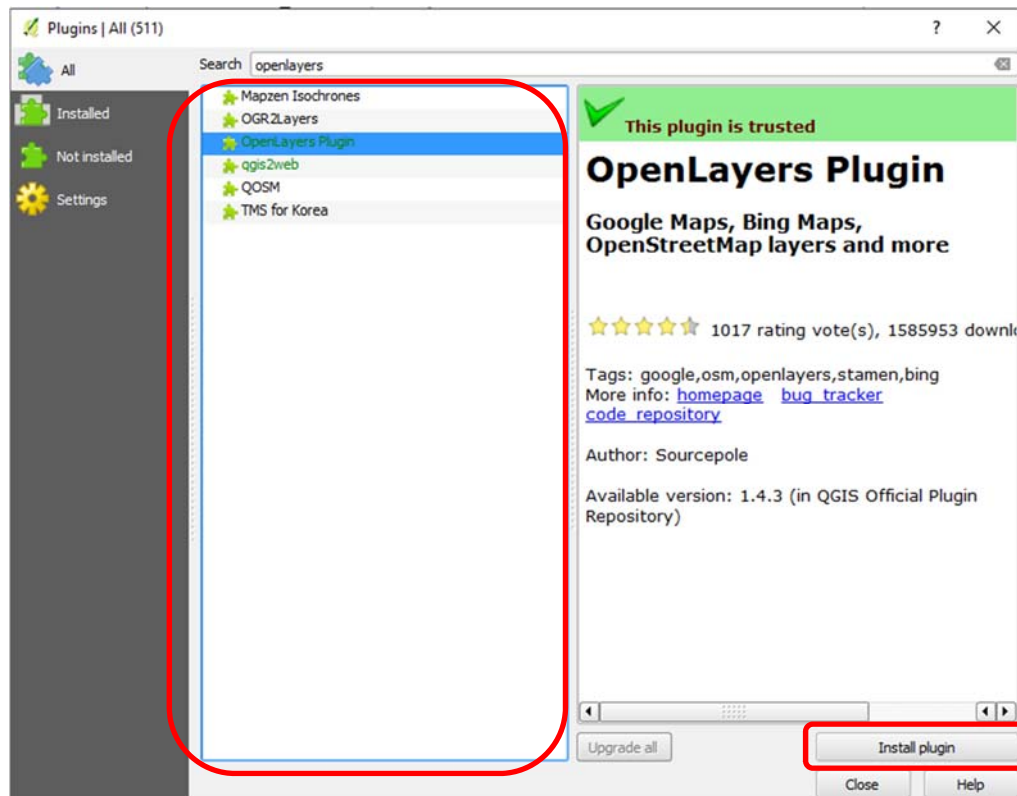
- Returning to QGIS desktop, open Exercise_4.qgs from C:\Intro_Quantum_GIS\Exercises\.
- You are looking at Tanzania with some settlement, road and river data, sourced from Open Street Map.



- We will now add some background mapping to give the data some context. We will do that using the **OpenLayers** plugin
- From the **Plugins** drop-down menu click **Manage and Install Plugins**



- Type **OpenLayers** into the search bar

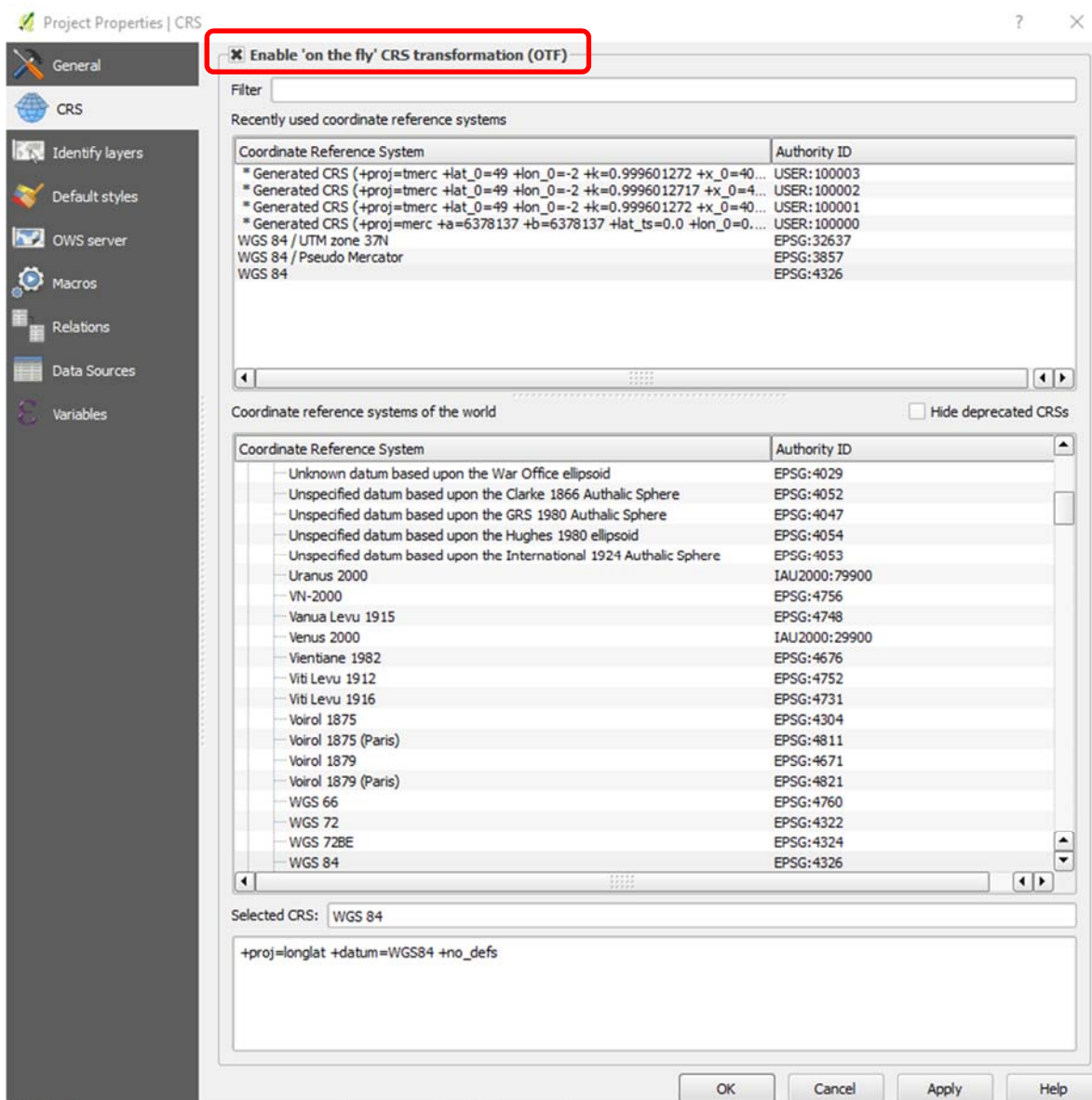


- Select the **OpenLayers Plugin** and then click install plugin
- QGIS will download and install the plugin
- Close the **Plugins** window

Part 3 – Configuring coordinate reference systems to accurate display data

We must now ensure that 'on the fly' CRS transformation is enabled

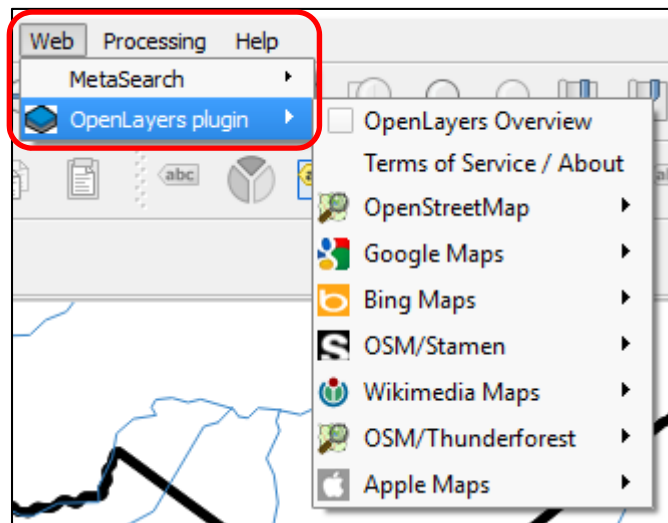
- From the **project** menu select **project properties**
- Click on the **CRS (Coordinate Reference System) tab** and make sure that **Enable 'on the fly' CRS transformation** is ticked.



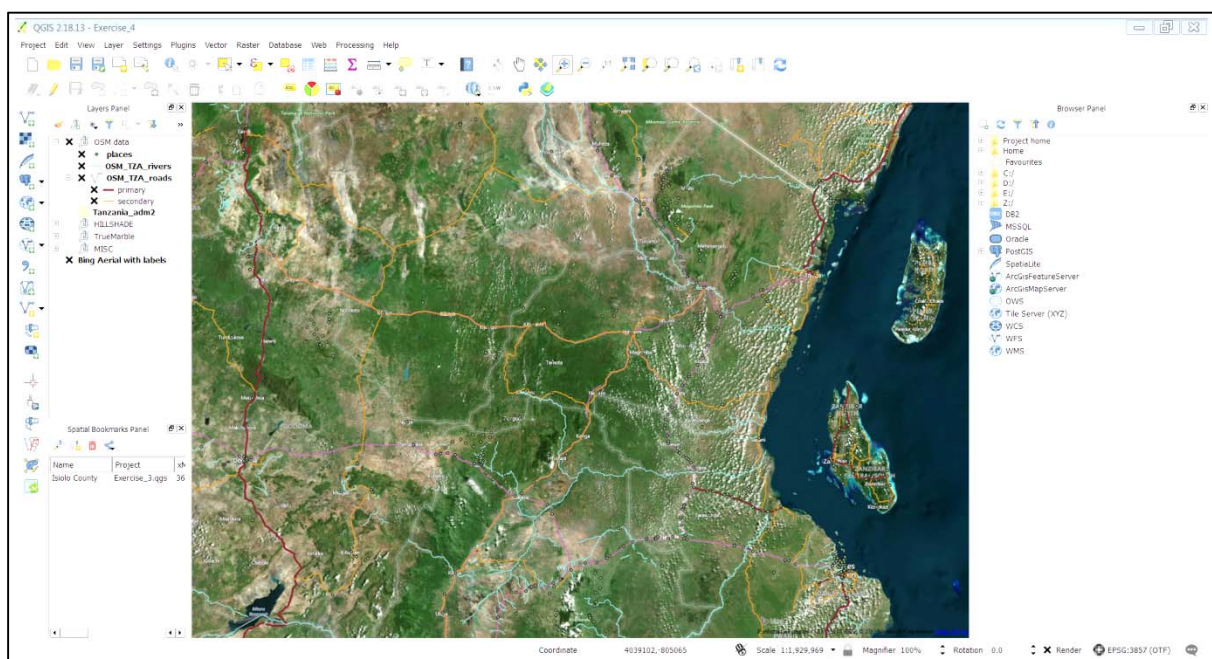
- This needs to be ticked because you are about to add some background mapping to your QGIS project which uses a different coordinate system to the data which is currently loaded.
- Press **OK**.

Part 4 - Display OpenLayers background mapping.

- From the **web** menu expand the **OpenLayers Plugin**



- You can choose to display any of the available background maps; try *Google Hybrid* or *Bing Aerial with Labels*
- The imagery will be streamed into your project as a new layer, the speed of rendering will depend on your internet connection speed
- You may need to move the new layer around in the layers panel to ensure the drawing order is correct.
- Try panning and zooming around your map
- remember to turn layers on and off as you require; having too many background mapping layers turned on at once may affect performance and rendering speed.



Challenge:

Return to the **Manage and Install Plugins** window (**Plugins** drop-down menu). If permissions for your PC enable you to do so, search for and Install **QuickOSM**; Once installed, go to the **Vector** drop-down menu and select **Quick OSM**. Try running a query to download some Open Street Map data.


Explore other plugins that are available and relevant to your interests.

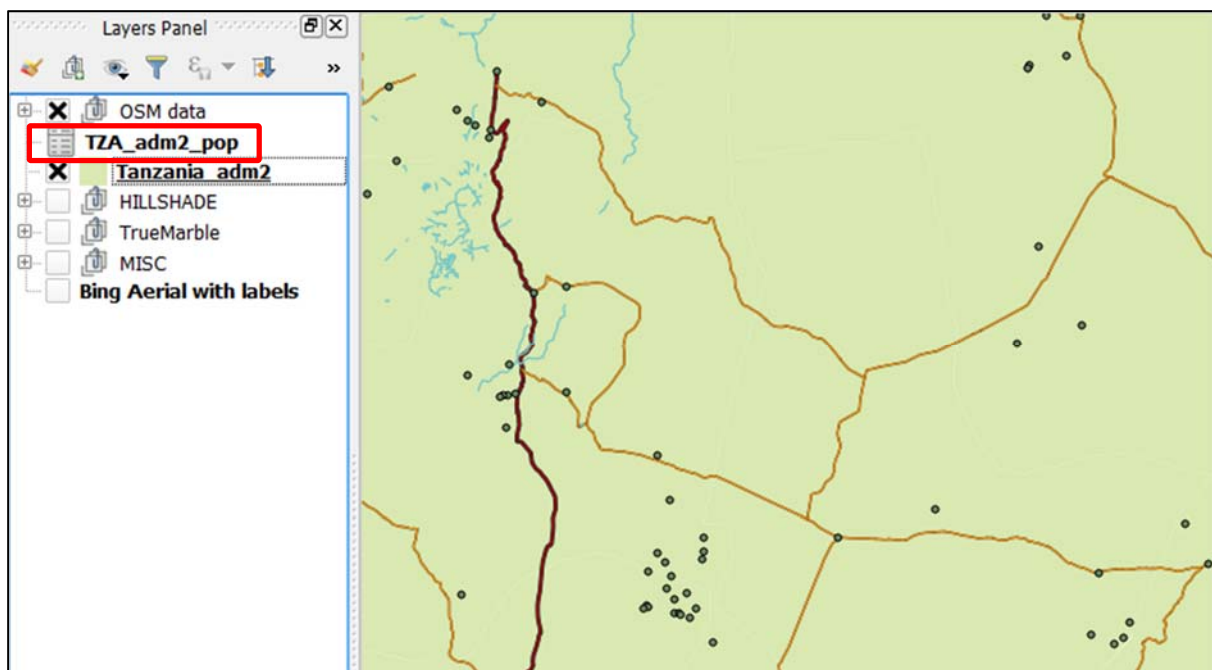
Part 5 – Data management: joining population data to boundaries

We will now run through the process of joining population and demographic data to boundaries that correspond to admin areas in the data. Locate the following CSV data file and open it in **MS Excel** and inspect the data:

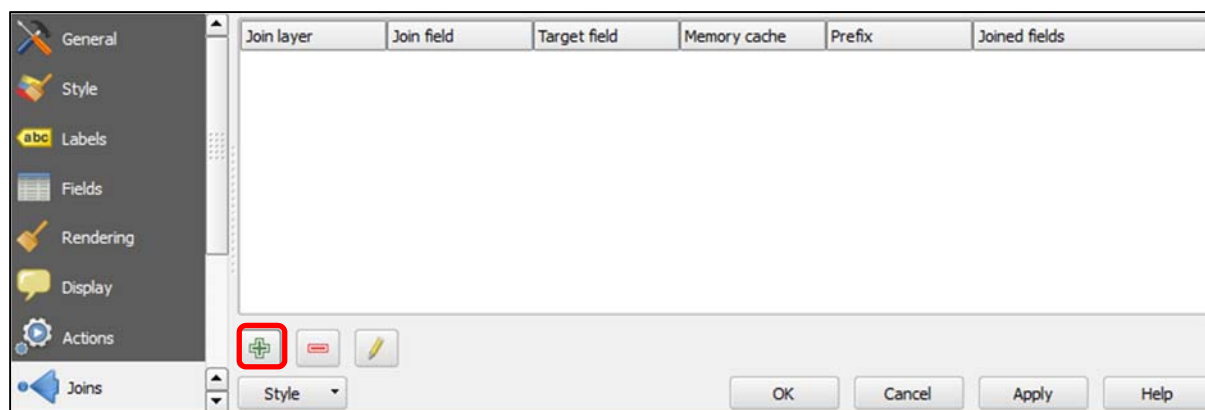
`C:\Intro_Quantum_GIS\Exercises\Data\Tables\TZA_adm2_pop.csv`

Now return to QGIS and locate the dataset *Tanzania_adm2* in your **Layers Panel**. Right-click the layer and **Open Attribute Table**. Looking at this boundary data and the population data, can you identify a common field to both tables on which we could join them? They both have one field named **GEO-MATCH**. You will now join these two tables based on this field.

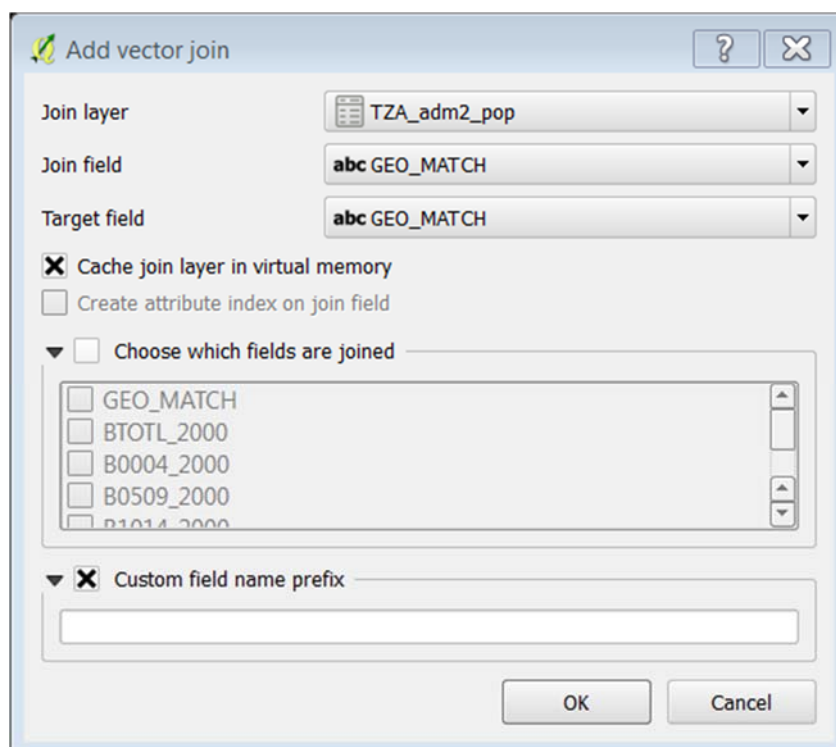
1. Bring the population data *TZA_adm2_pop.csv* into QGIS.
 - Locate the CSV file, via QGIS Browser or Windows Explorer, and drag it into the map window
 - Notice the alternative icon for table data (sometime known as *non-spatial data*) 



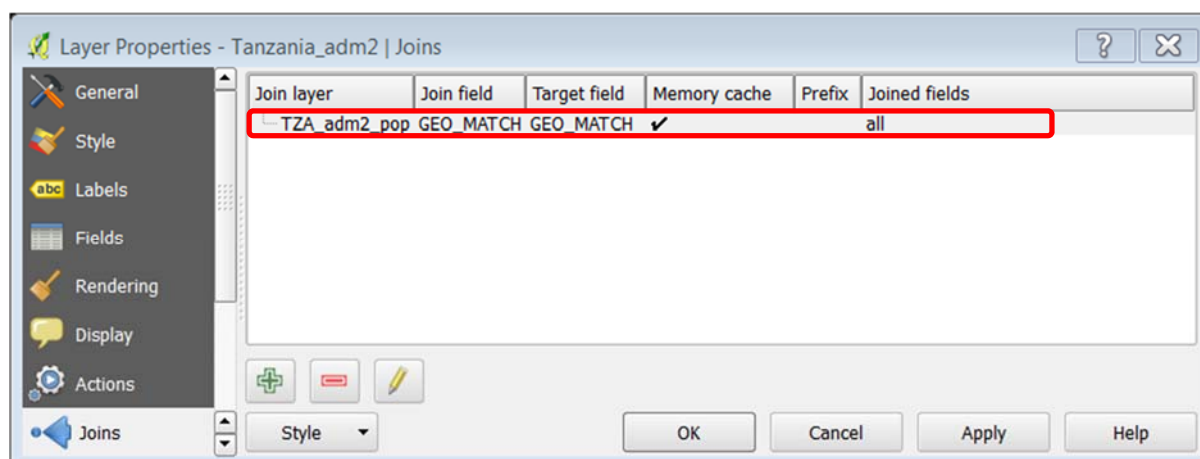
2. Configure the Join
 - Right-click the spatial boundary dataset **Tanzania_adm2** and click **Properties**; these are Tanzanian administrative boundary data from *United States Census Bureau*
 - Click on the **Joins** tab.
 - Click on the green plus sign



- A new window will appear.
- Select *TZA_adm2_pop* as the Join Layer.
- Select *GEO_MATCH* as the Join and Target field
- Tick **Custom field name prefix** and delete all text (N.B. if this text is not deleted, each new joined field will have the prefix '*TZA_adm2_pop_*' – this is a nuisance!)



- Press **OK**.
- You will now see that the Layer properties window shows you that *TZA_adm2_pop* has been joined to *Tanzania_adm2*



- Press **OK**.

3. View your join

- Open the attribute table for *Tanzania_adm2* and ensure that the population data has successfully joined the boundary data
- This join is temporary and can be deleted at any time by clicking the 'red minus' in the Joins tab of the layer **Properties**.

4. Save your join as a new shapefile dataset.

- Right click on *Tanzania_adm2* and click **Save as**.
- Save it as an **ESRI shapefile**.
- Save it in here: C:\Intro_Quantum_GIS\Exercises\Data\Vector
- Call it *Tanzania_adm2_pop*
- Tick **Add saved file to map**.
- Click **Ok**

5. View attributes for your new shapefile.

- Open the attribute table for this new layer. Notice that it has all the attributes of the join you created.
- Open up the properties for this new layer and look at the **Joins** tab. You will see that there is no join. This means that you have now made a permanent dataset containing the attributes of both *Tanzania_adm2* and *TZA_adm2_pop*.

6. Remove the original pre-joined tables

- Right-click on *Tanzania_adm2* and click **Remove**.
- Right-click on *TZA_adm2_pop* and click **Remove**.

Challenge

Refer back to exercise 3 and style your data with a graduated symbology, to represent variable population counts in counties of Tanzania. You can choose to symbolise any of the population age group fields. Also, see if you can display labels showing the admin level 2 names. Your map may look something like this...

