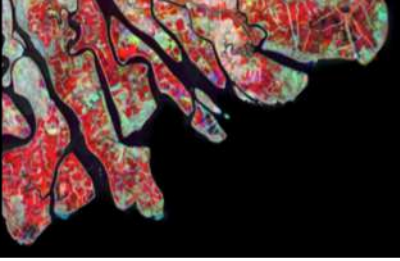
PRIFYSGOL ABERYSTWYTH UNIVERSITY

Earth Observation and Ecosystems Dynamics Laboratory

ZAMEP GIS Training

An Introduction to QGIS
Worksheet 1



Worksheet 1

Adding GIS layers into QGIS

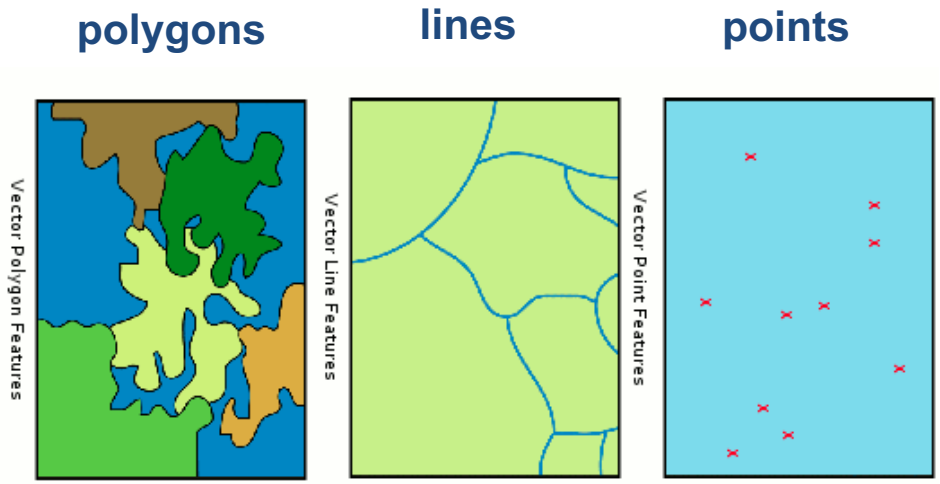
Creating a map

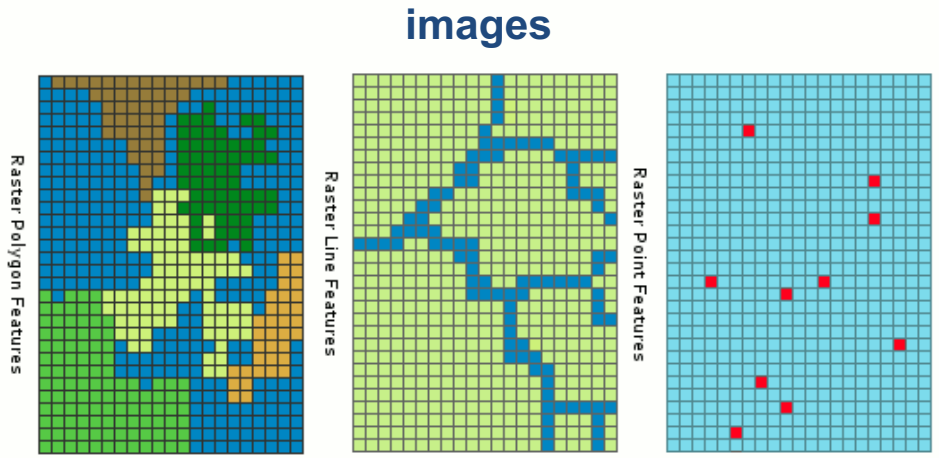
Creating a map from a template

Types of GIS Data Layers

Vector

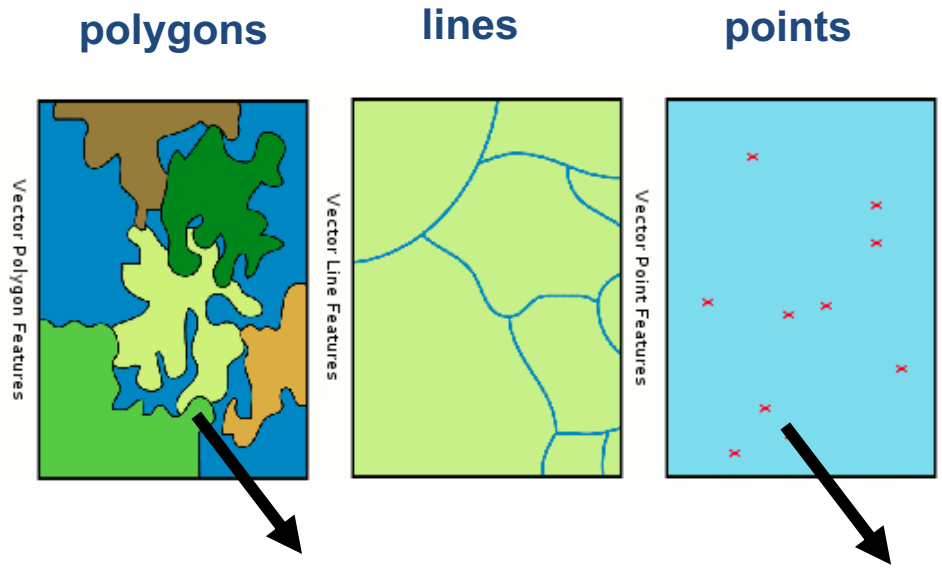
Raster





Types of GIS Data Layers

Vector



For each of these features, we can store information in an Attribute Table

ID	building_type	size
1	mosque	900
2	house	100
3	house	120
4	shop	60
5	house	110

ID	case_ID	imported
1	10045	yes
2	10046	yes
3	10047	no
4	10048	yes
5	10049	yes

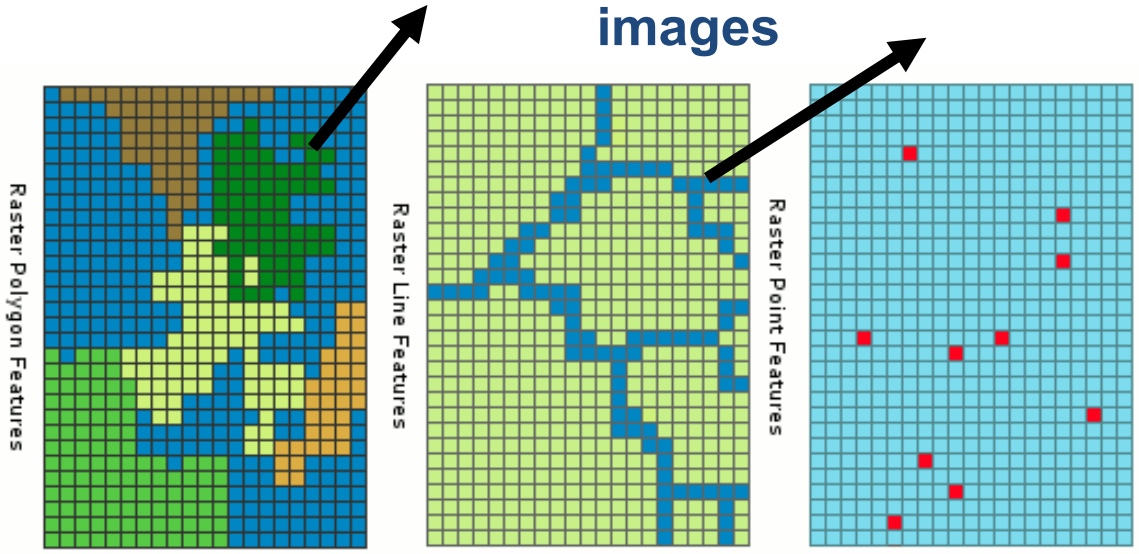
Types of GIS Data Layers

Behind each **pixel** we can store information

Raster

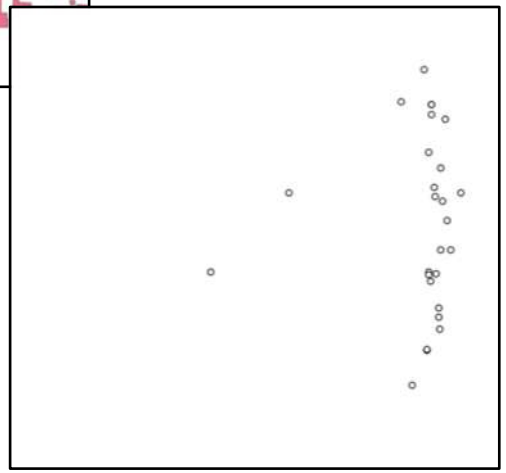
elevation	0 - 150 m

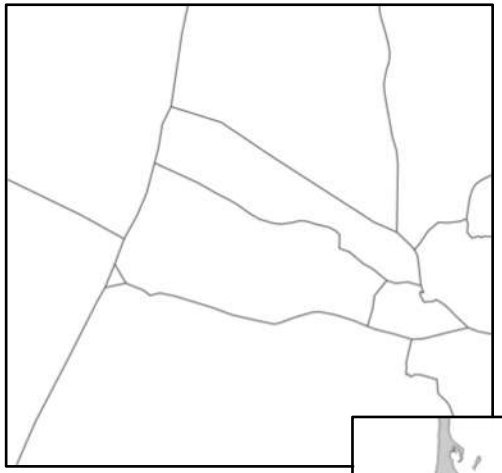
water	1
non-water	0



Types of GIS Data Layers

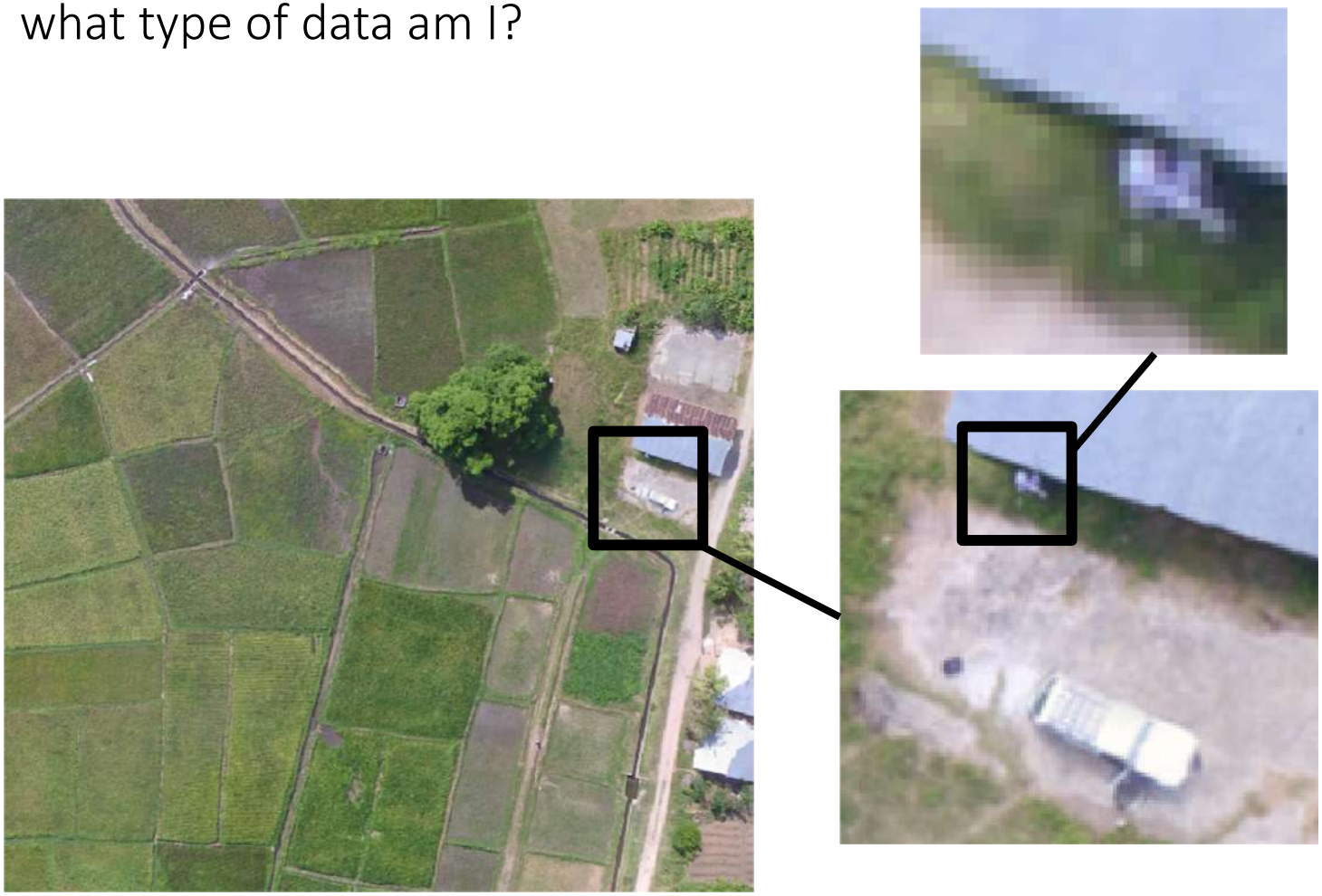
Quiz what type of data am I?

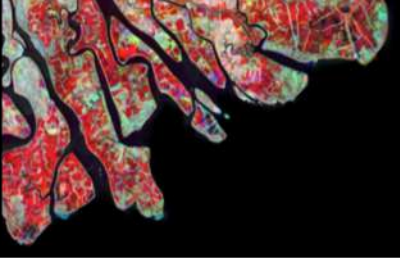




Types of GIS Data Layers

Quiz what type of data am I?



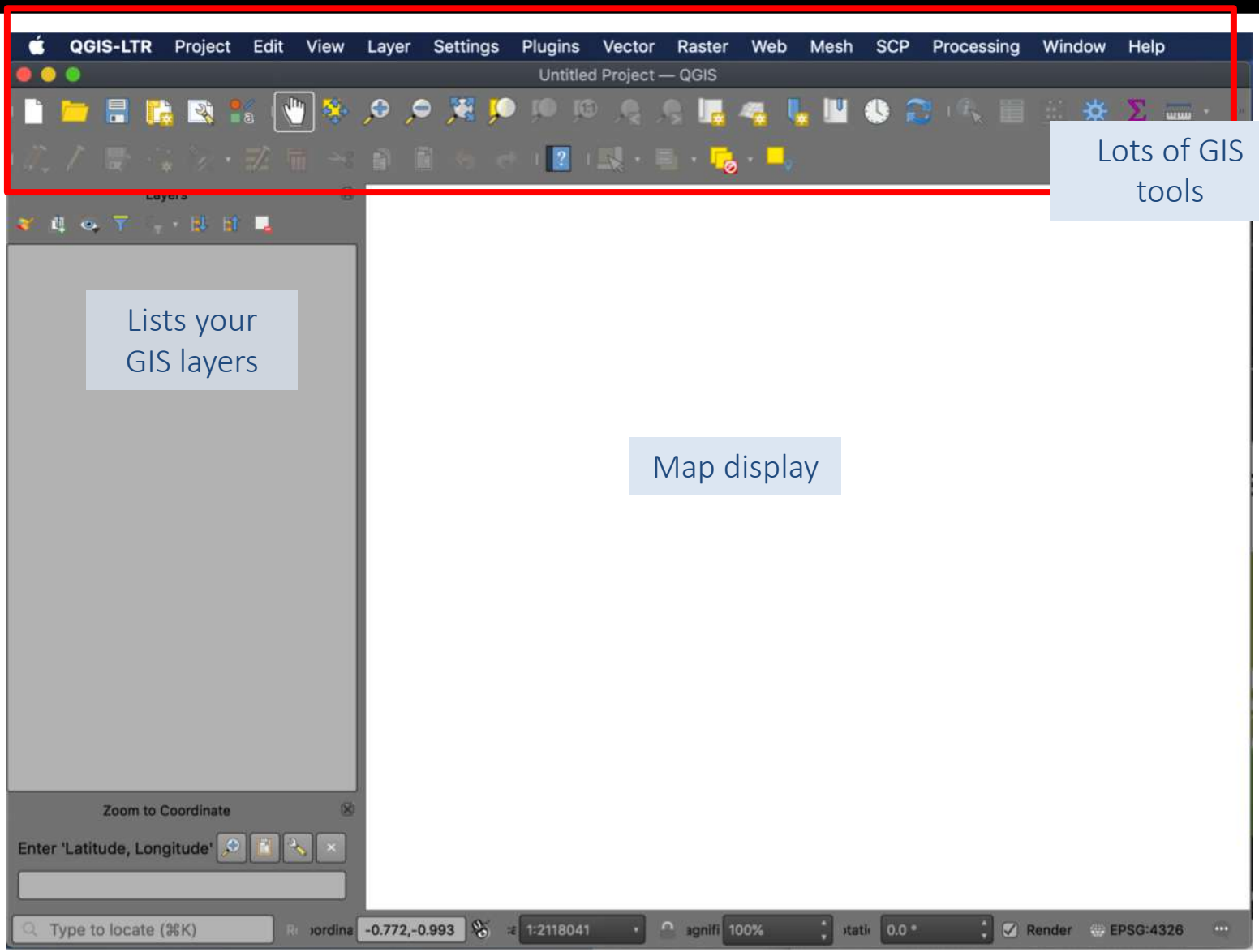


Adding Layers to QGIS

We will now learn how to add Layers to QGIS and move around the map

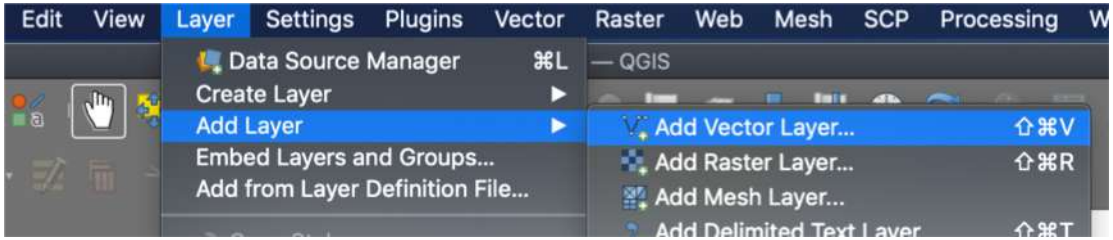
We shall do this using some GIS layers downloaded from OpenStreetMap for Maboga

QGIS

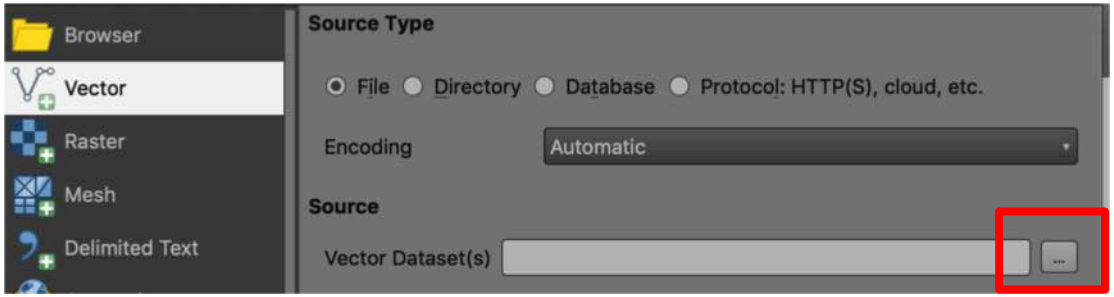

QGIS-LTR Project Edit View Layer Settings Plugins Vector Raster Web Mesh SCP Processing Window Help
Untitled Project — QGIS
Lots of GIS tools
Lists your GIS layers
Map display
Zoom to Coordinate
Enter 'Latitude, Longitude'
Type to locate (⌘K)
-0.772,-0.993
1:2118041
100%
0.0 °
Render
EPSG:4326

Add layers to QGIS

Go to: Layer > Add Layer > Add Vector Layer



Browse for files and open the vector dataset maboga_line.geojson

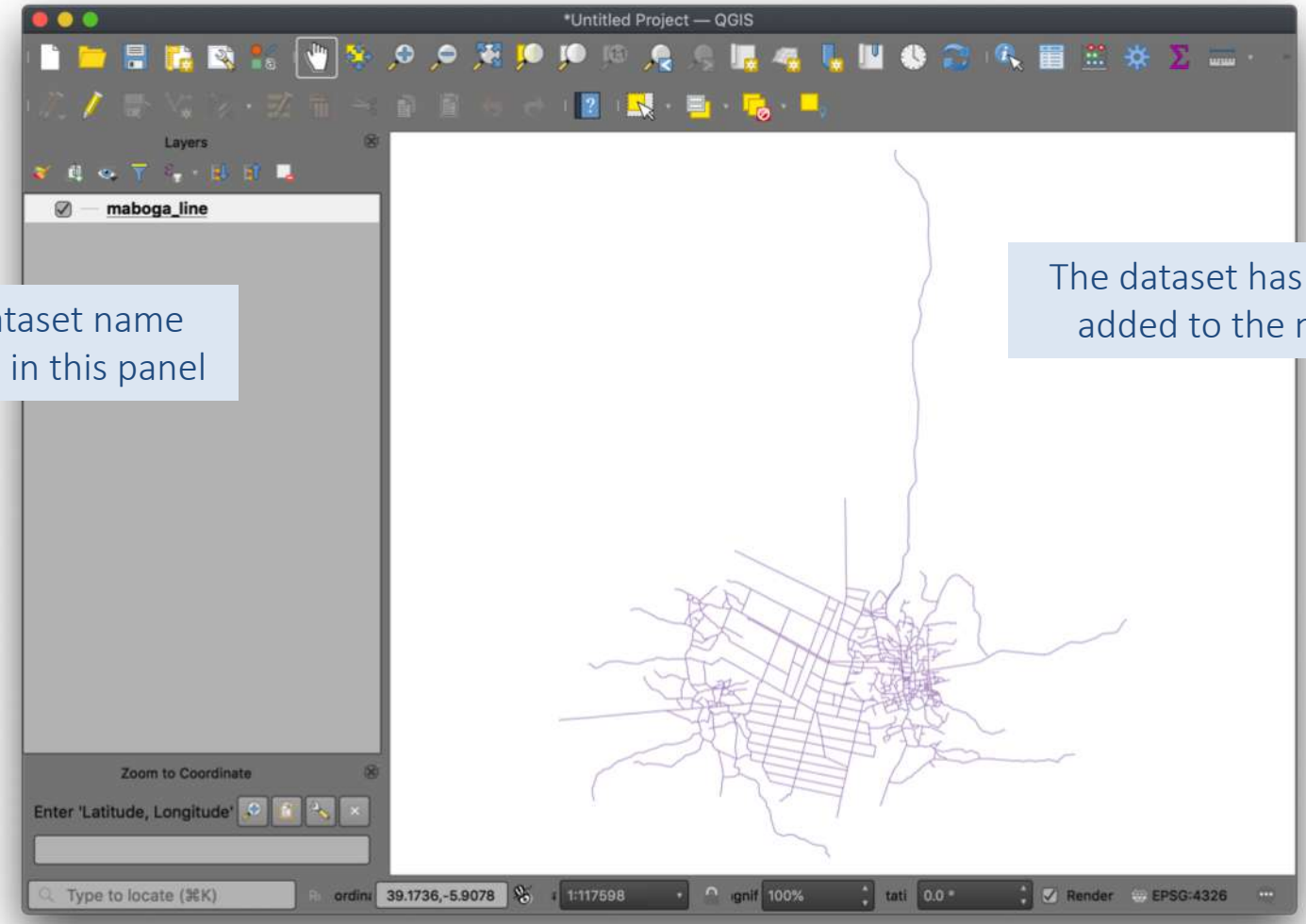


Click Add, then Close

This vector line dataset will be added to the map display…

Video 1.1

Adding layers to QGIS



The dataset name appears in this panel

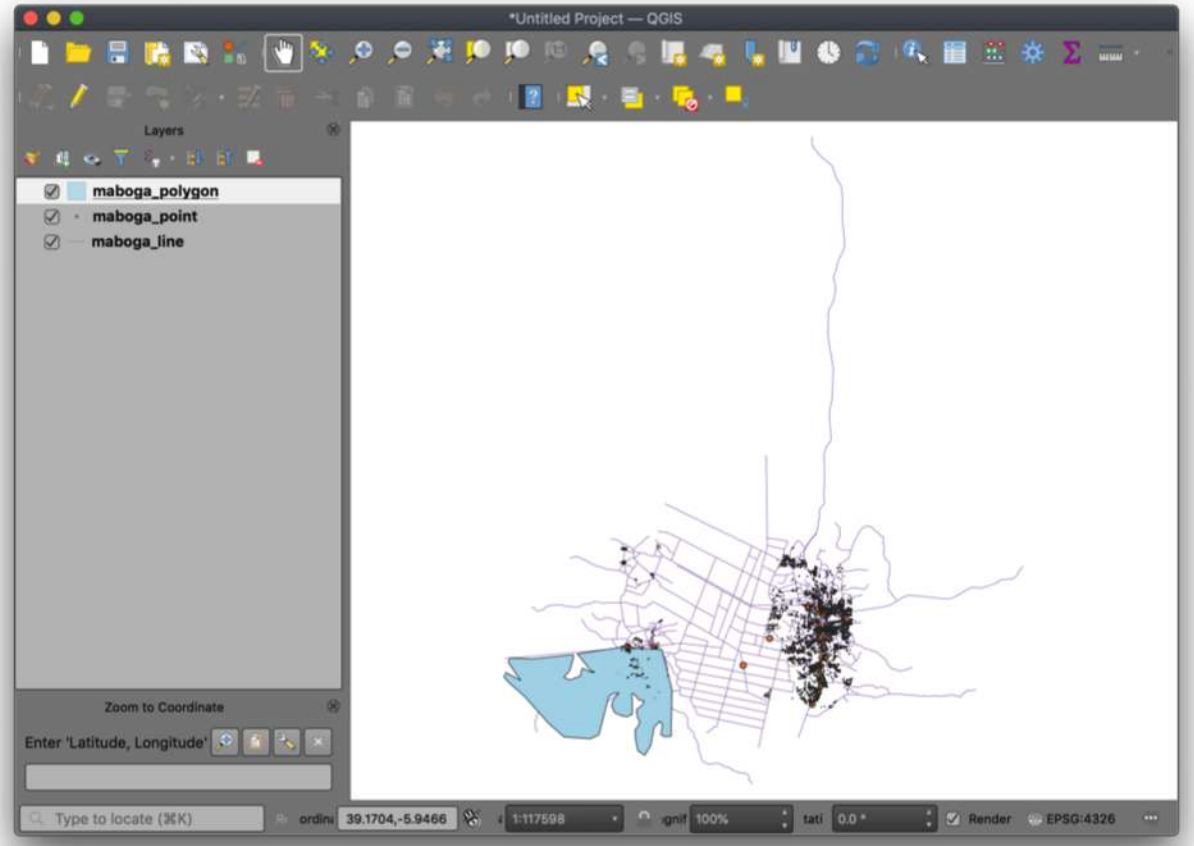
The dataset has been added to the map

Adding Layers to QGIS

Task:

Repeat the last task to add in two more Layers: maboga_point.geojson and maboga_polygon.geojson

Your map should now look like this…

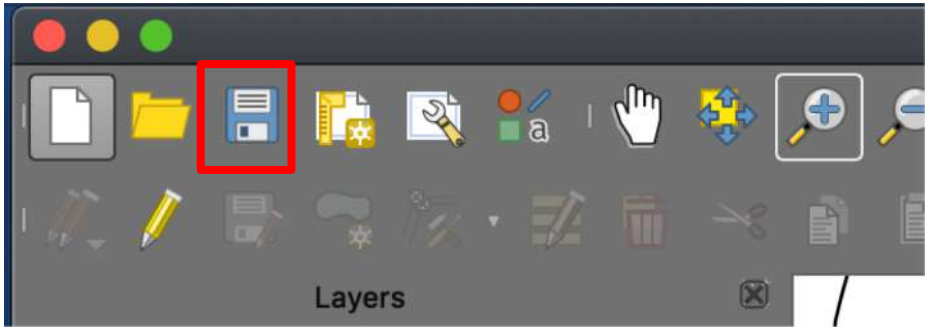


Save your Project

We should now save our Map Project

Note, you should constantly save your progress as you work through the worksheet

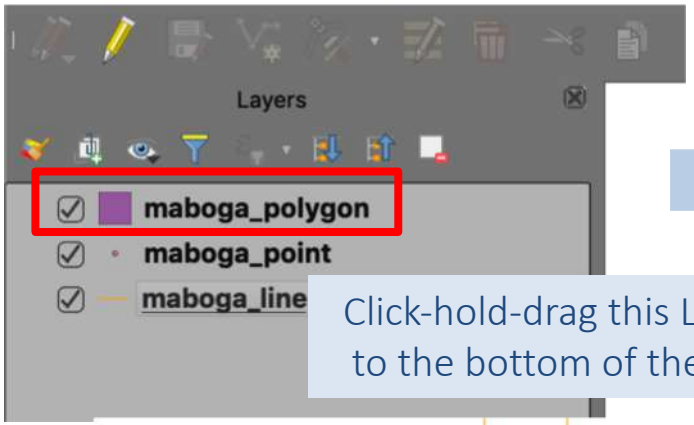
Click the Save button and save the project as my_first_map



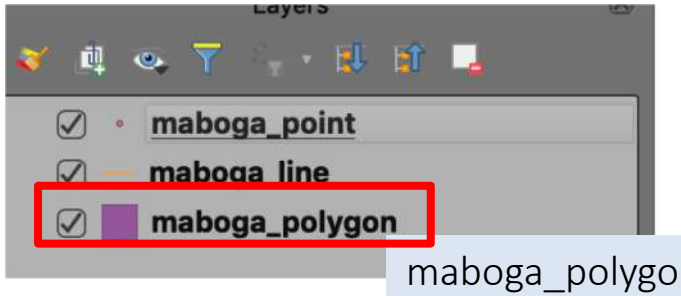
Reorder Layers

We can change the order of our GIS Layers to improve the map

We do this by click-hold-drag the layer name from the Layers panel:



Click-hold-drag this Layer to the bottom of the list



maboga_polygon is now at the bottom

Before

After

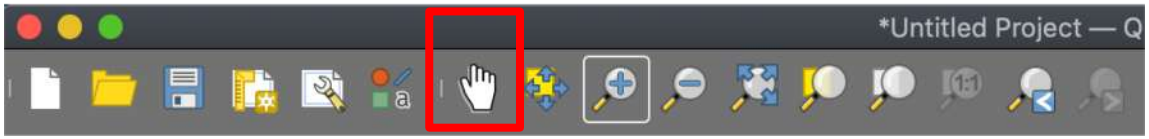
The polygon is moved underneath the other layers

Video 1.2

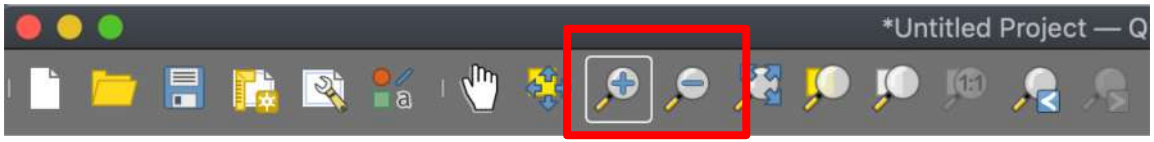
Browsing the Map

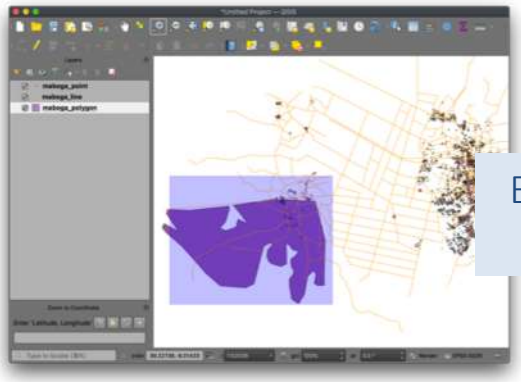
We have tools to browse the map and zoom in/out

Explore your map firstly using the Browse tool. Click-hold-drag the move the around the map

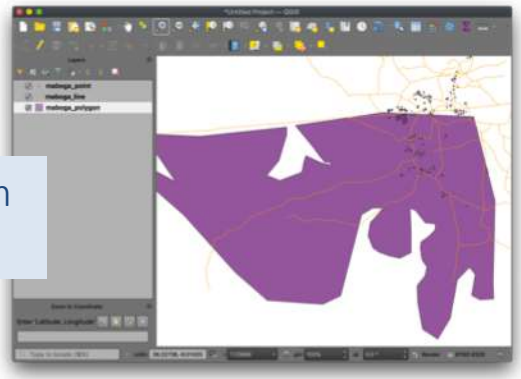


And then use the zoom-in tool. Try click-hold-drag and create a box over an area of interest:





Example zoom to this area...

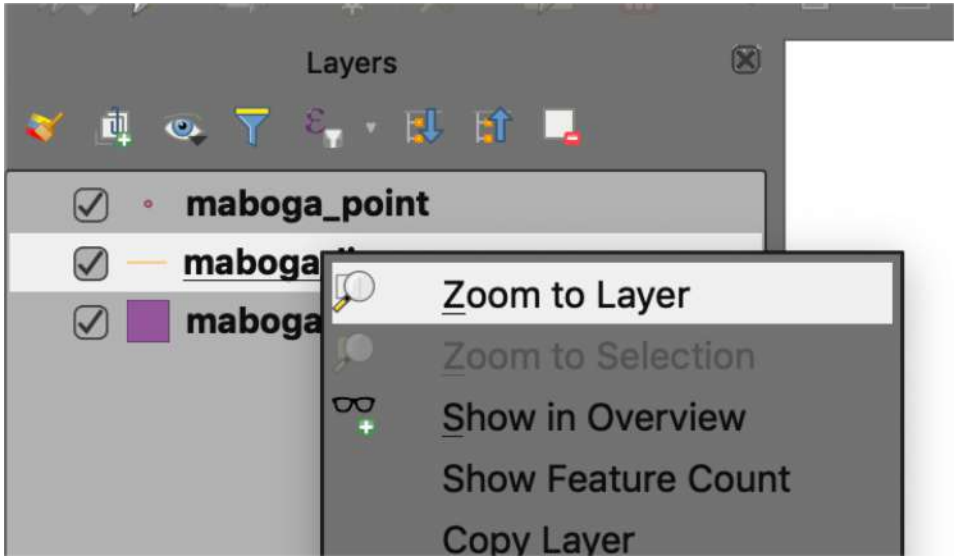


Video 1.3

Browsing the Map

Note that you can zoom to the extent of any layer

Right-click a layer and select Zoom To Layer



Symbology

Video 1.4

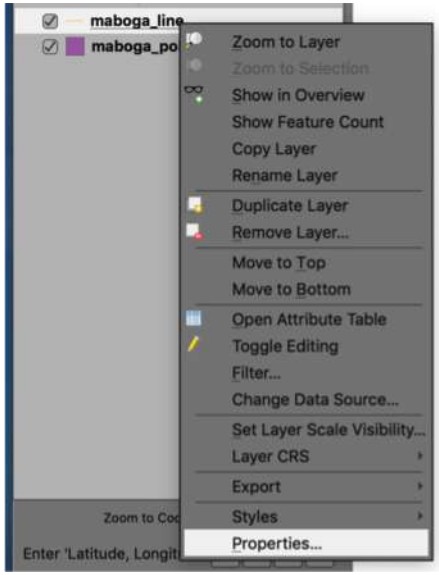
The way a GIS layer looks is called its Symbology:

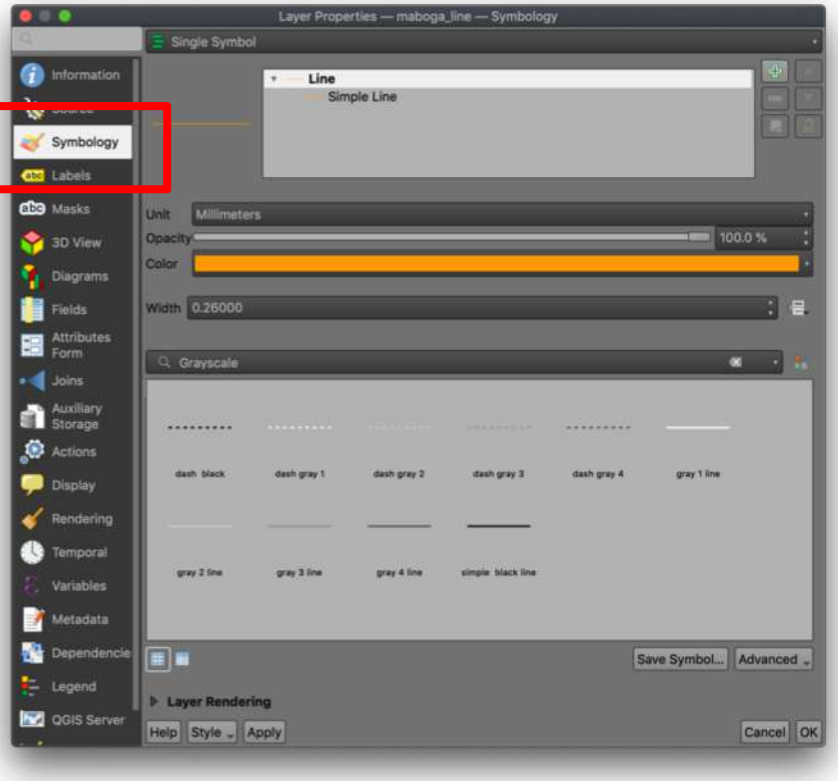
Colour, size etc.

You can change the symbology of a Layer by right-clicking and going to Properties (or just double-click the layer name)

In Properties, find the Symbology tab

Do this for the maboga_line layer

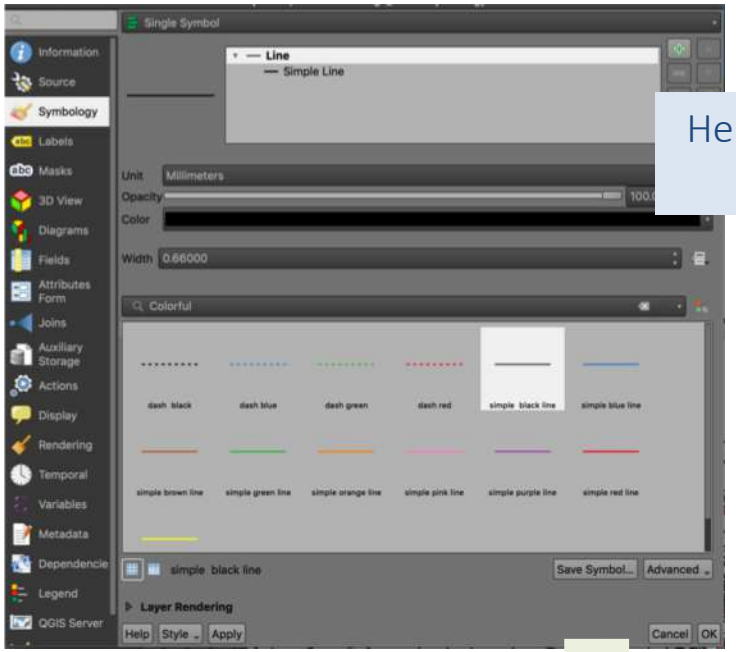




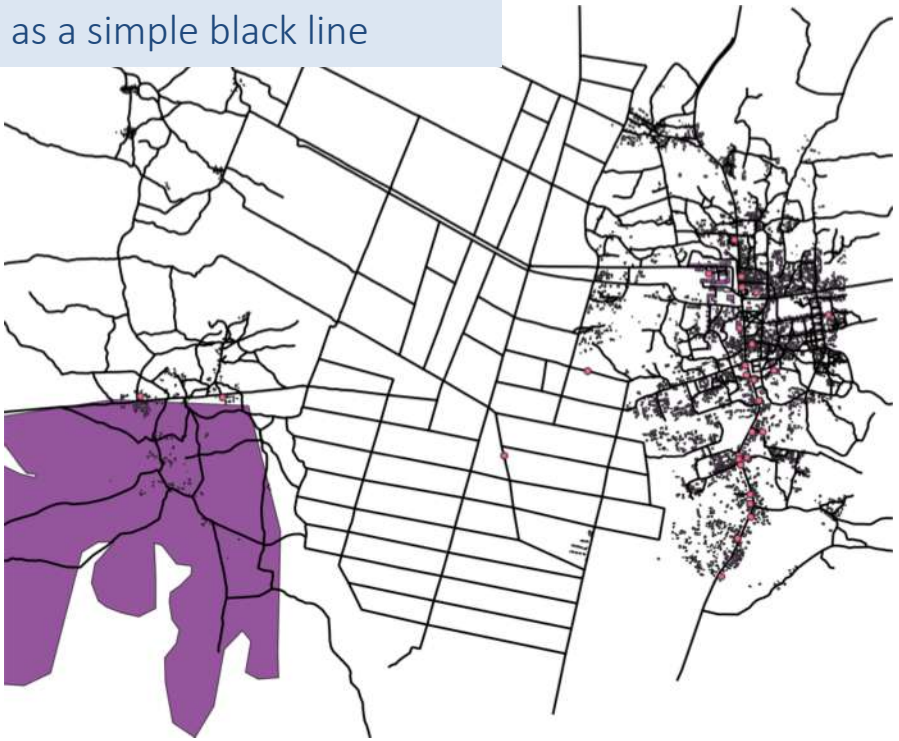
Symbology

Look through the various options, choose one and click OK

Notice how you have changed the appearance of this layer in the map



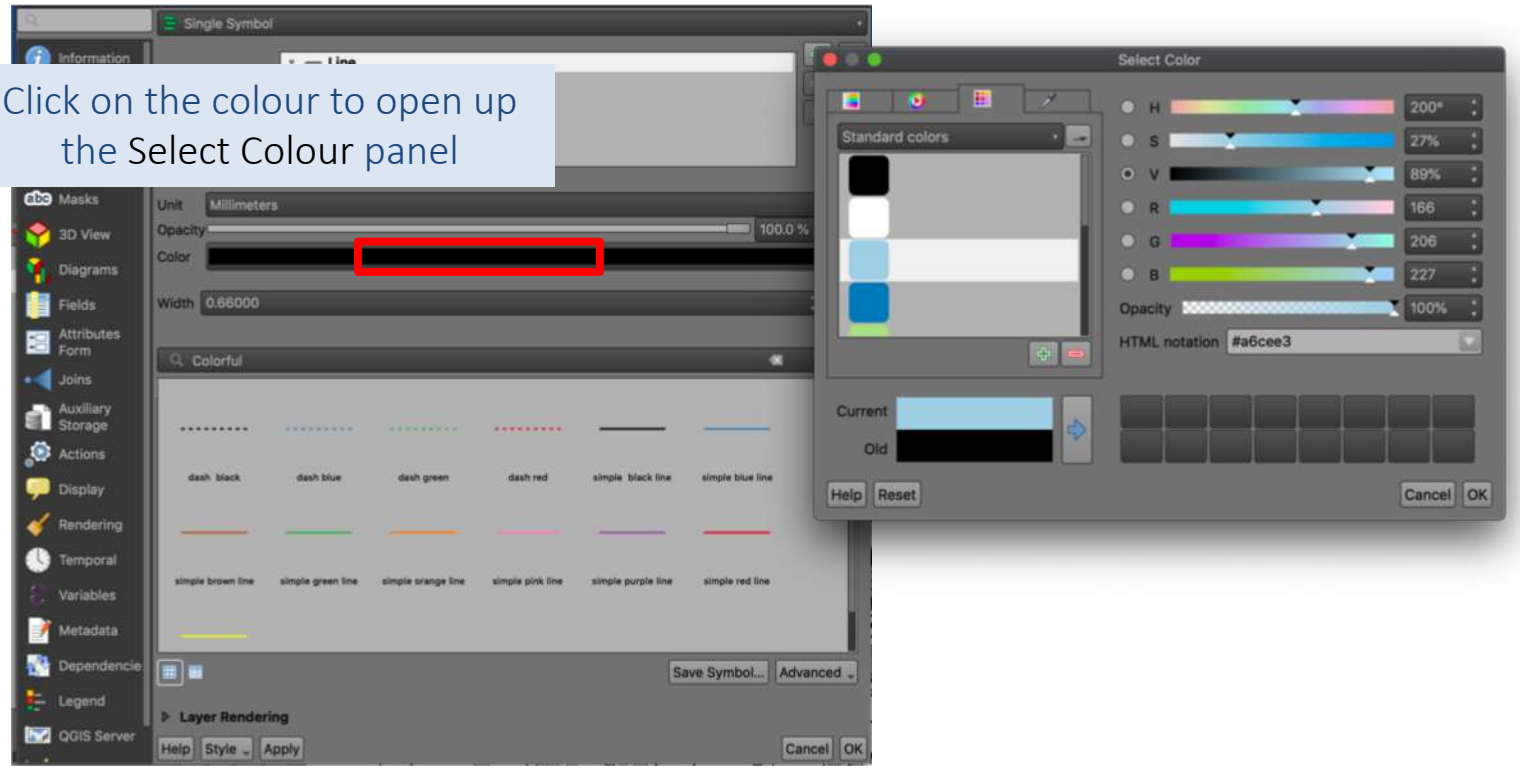
Here we have chosen to draw out line data as a simple black line



Symbology

Note that you can change the symbol or colour to whatever you like

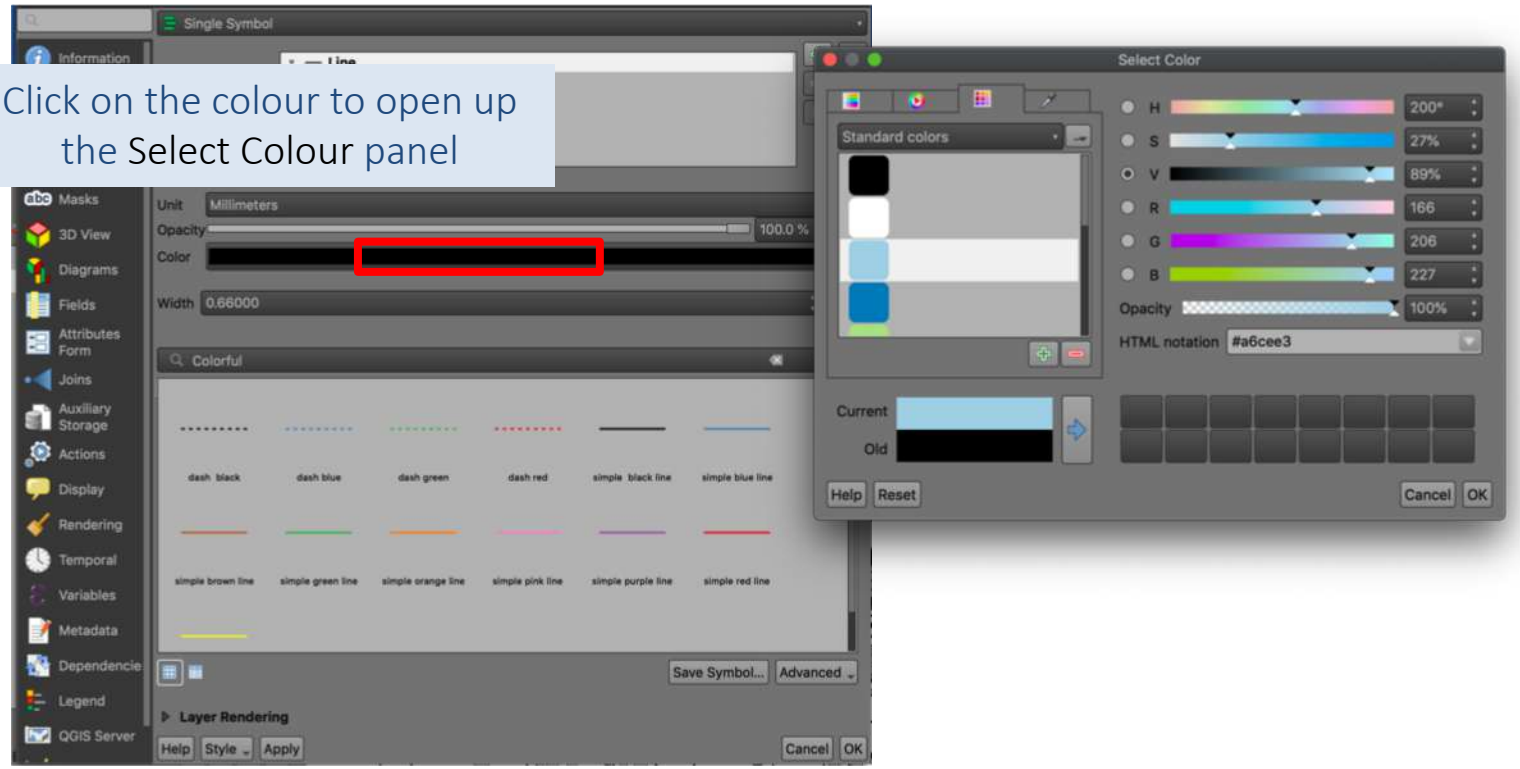
Click on the colour to open up the Select Colour panel



Symbology

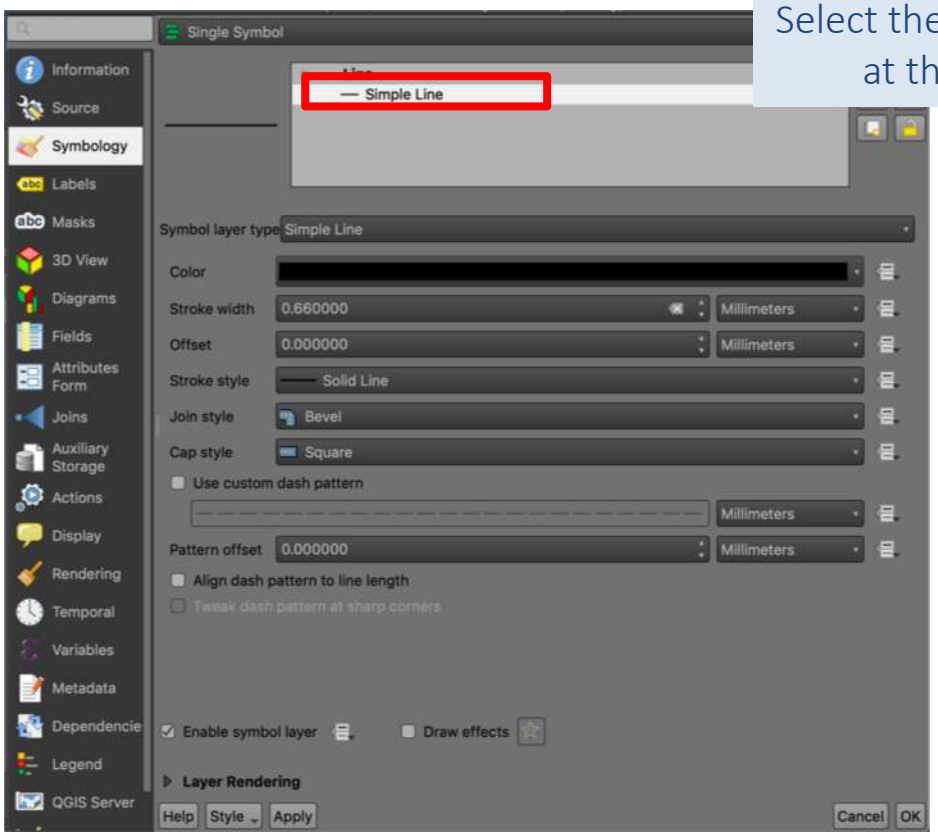
Note that you can change the symbol or colour to whatever you like

Click on the colour to open up the Select Colour panel



Symbology

You can also change the appearance or thickness of the line



Select the symbol here and look at the various options

Symbology

Task

Try changing the symbology of the other layers so your map looks like the one below:

Symbology

Task

You have also been provided with vector polygon layers for i) Unguja (shehias_unguja.geojson) and ii) the whole of Tanzania (admin_tanzania.geojson).

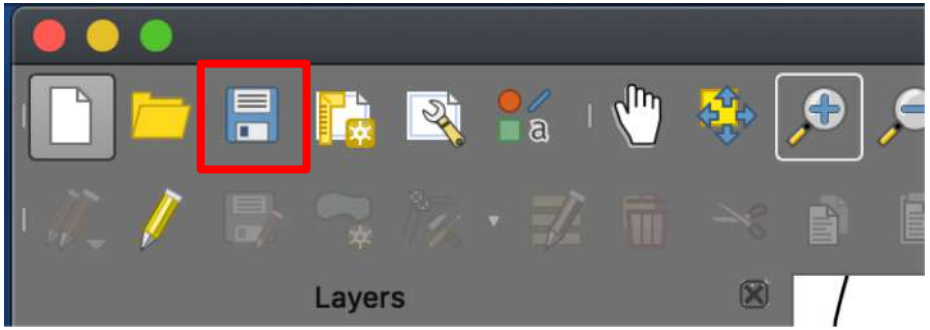
See if you can add them to QGIS and view them…

Note that many of these types of data are available for free

This data was obtained from the **The Humanitarian Data Exchange**

https://data.humdata.org/dataset

Save your map

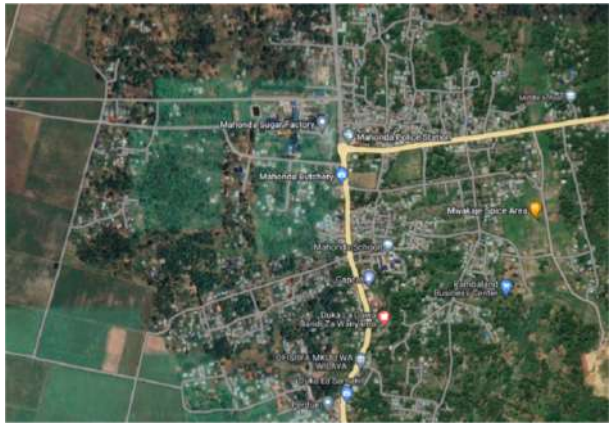


Basemap Imagery

Our maps can be more informative when we include some Basemap Imagery

Basemap imagery can be freely available satellite imagery or maps from Google or OpenStreetMap

OpenStreetMap



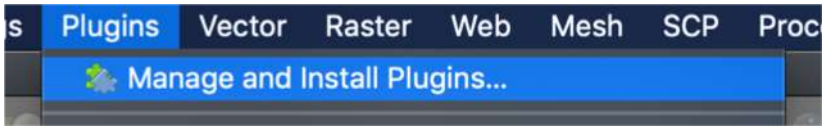
Google Earth Imagery

These Basemap layers will be placed behind the rest of our layers providing context to our map.

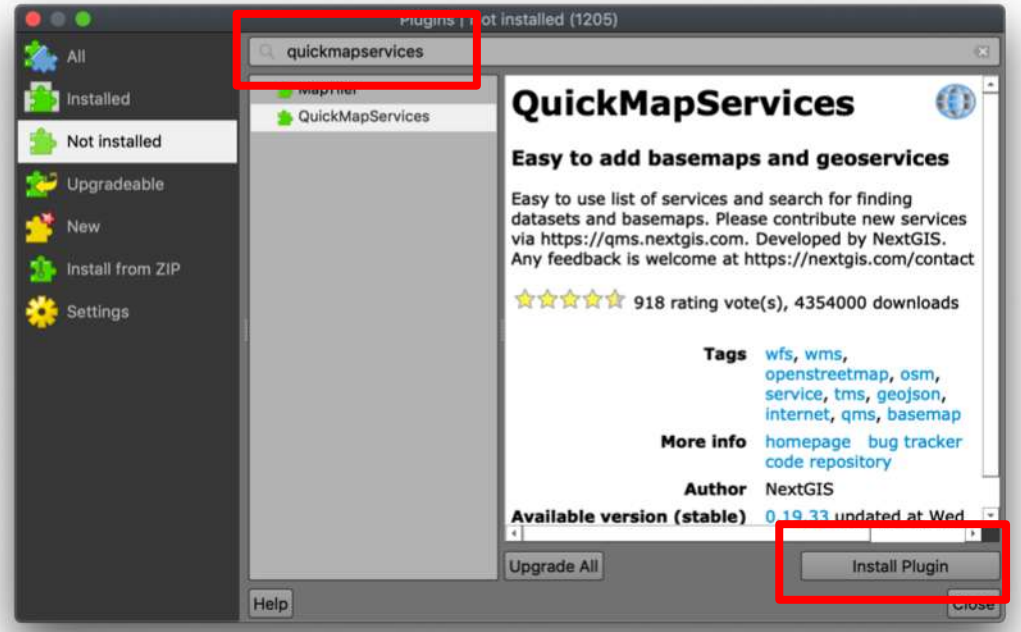
Basemap Imagery

To add basemaps to our map we shall use a QGIS PlugIn called QuickMapServices

Go to Plugins > Manage and Install Plugins:



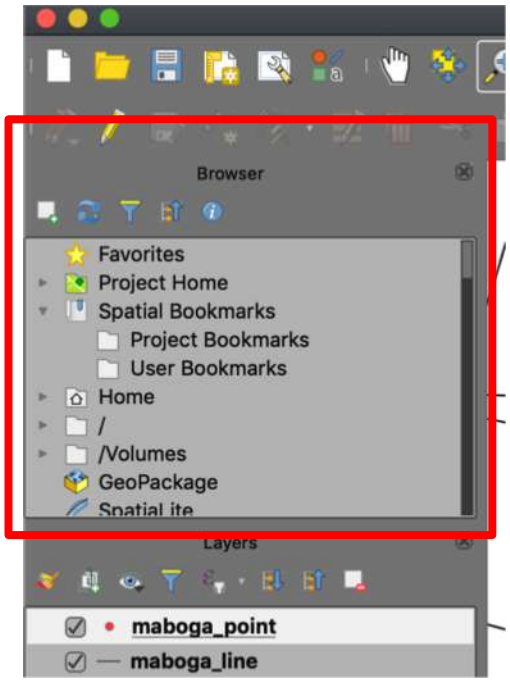
Search for QuickMapServices and click Install Plugin

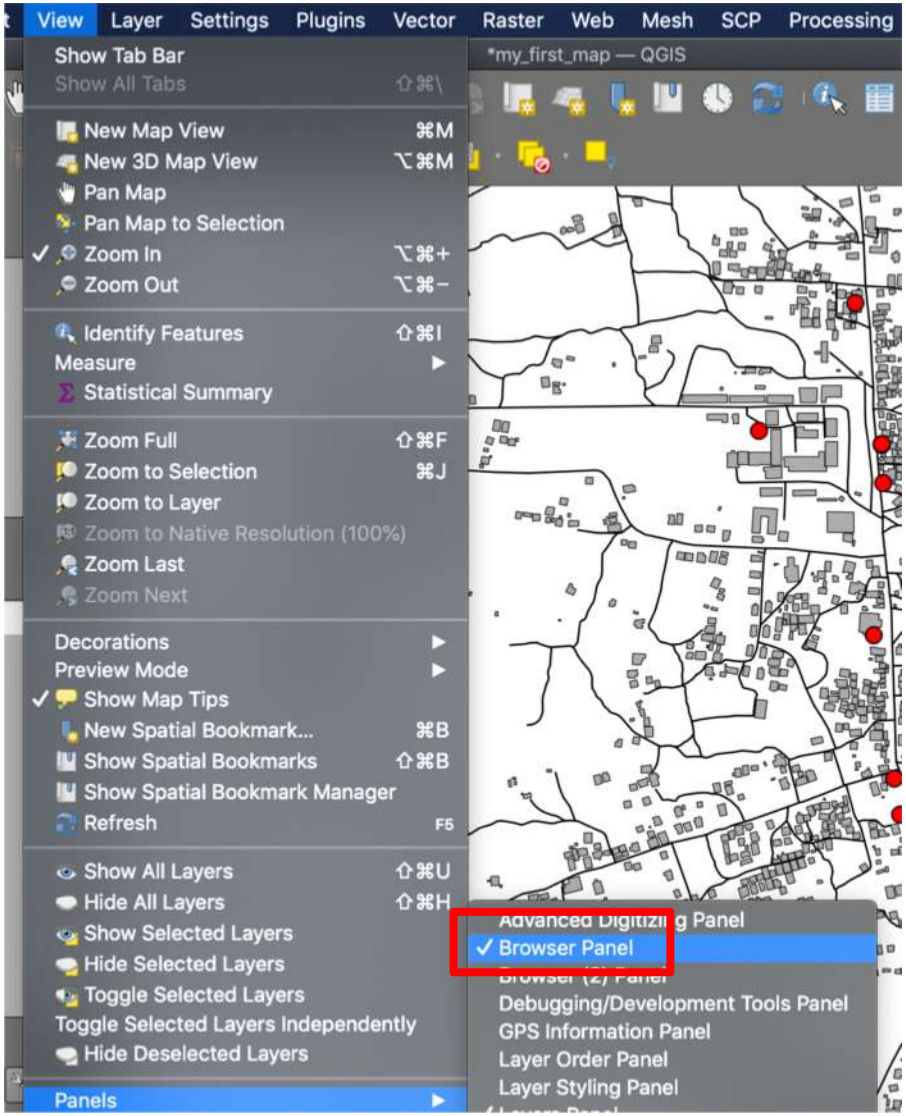


Basemap Imagery

Now, go to View > Panels > Browser Panel

This will add the Browser panel to the left of the QGIS window





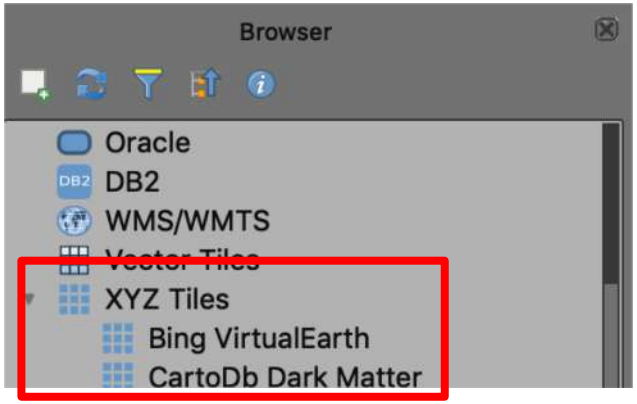
Browser Panel

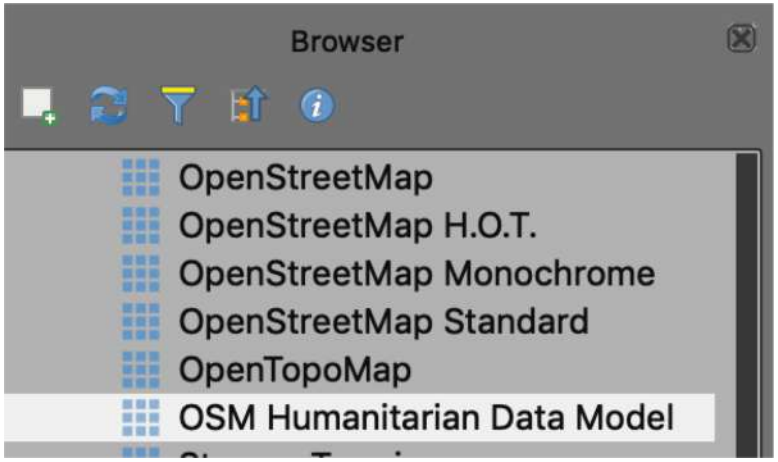
In the Browser panel, scroll down until you see XYZ Tiles

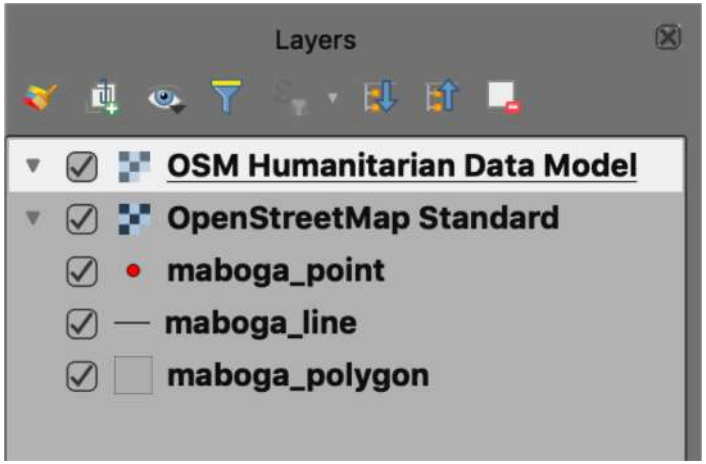
As you can see, there are many different basemap options for us to choose from

Scroll down until you see OSM Humanitarian Data Model, double-click to add it to your map

Notice that it is added to your Layers Panel





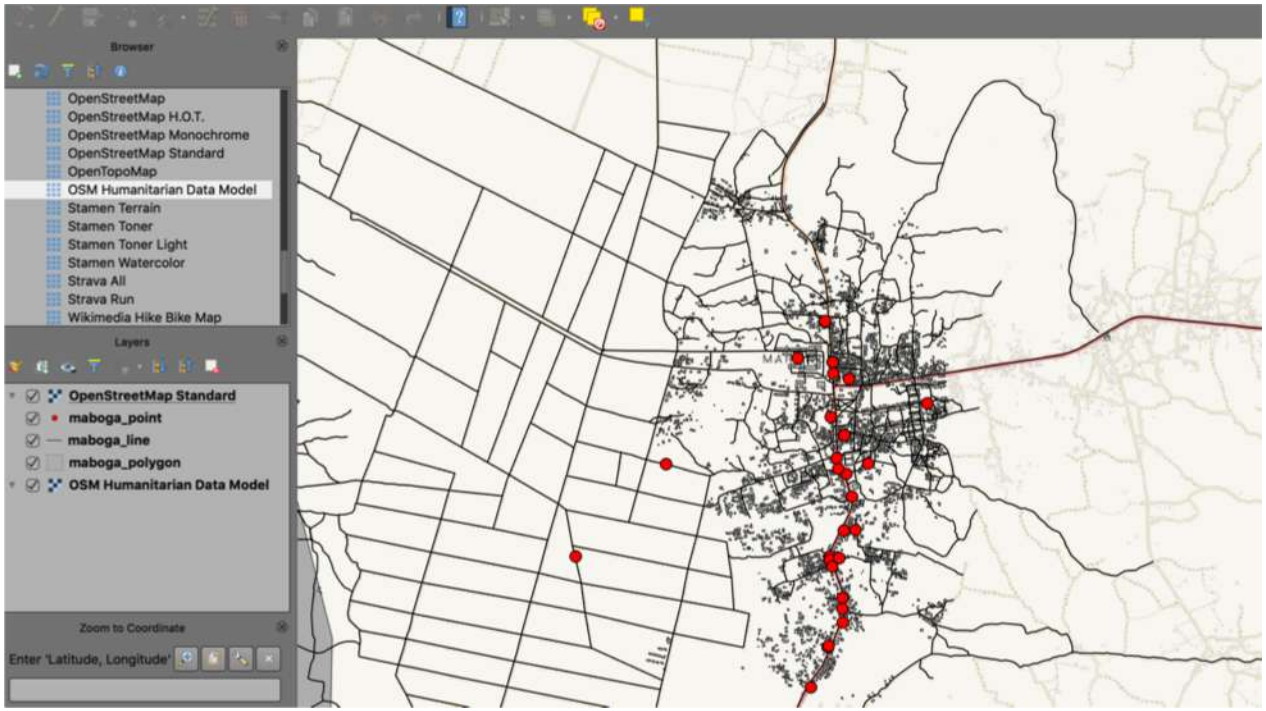


Basemap

By default, the basemap will be added at the top of your list of Layers and therefore hides the rest of your map

As you did before, reorder your layers so that the OSM basemap is at the bottom

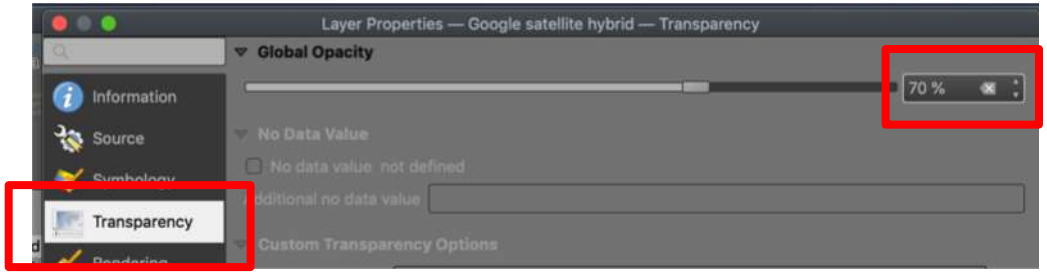
Your map should look something like this:

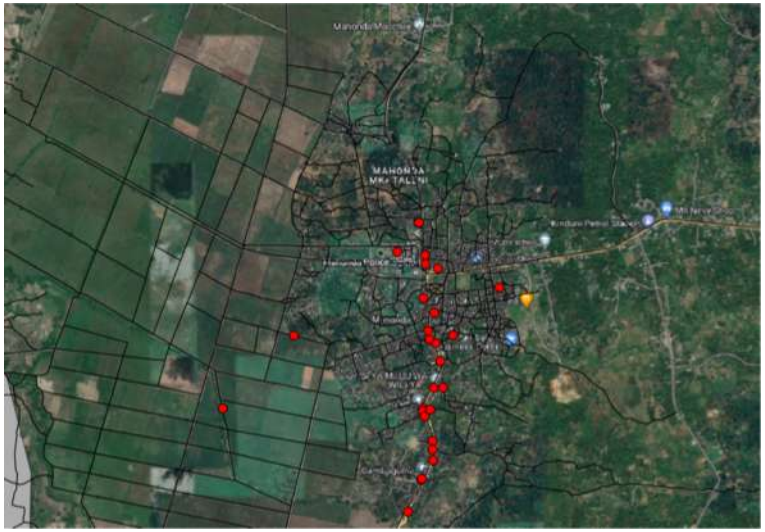


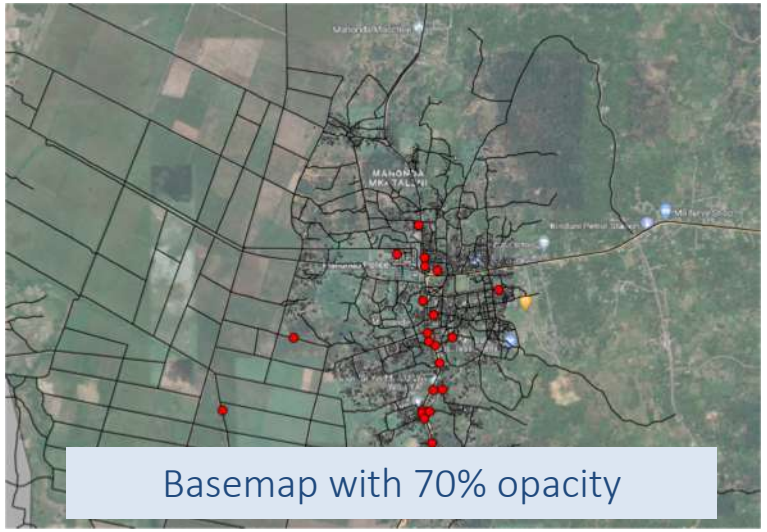
Basemap

Task Try changing the basemap to Google Satellite hybrid

Sometimes, the basemap can be too dark and we cannot see our map layers very well. To change this, in the Layer Properties go to the Transparency tab and change the Opacity to 70%

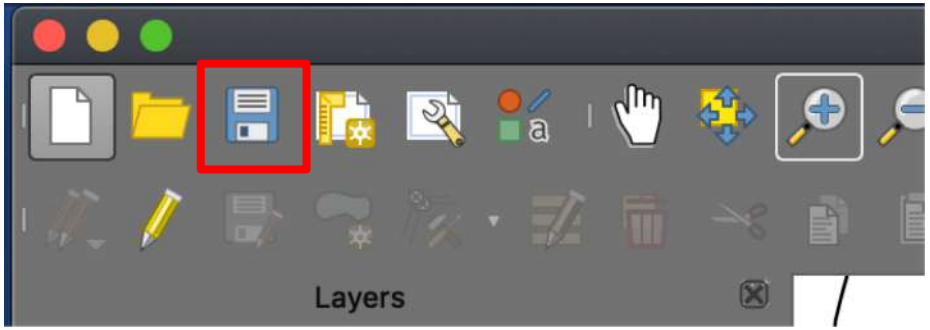


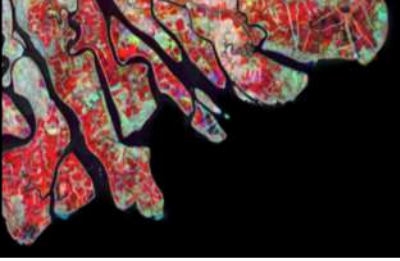




Basemap with 70% opacity

Save your map





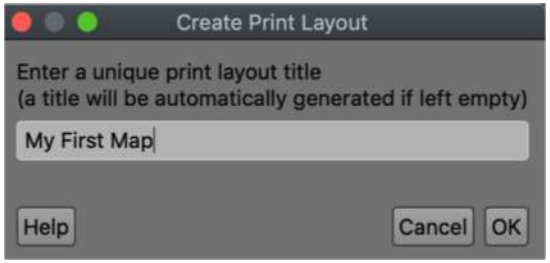
Creating a Map

Now we know how to add Layers to our map, we shall now try creating a map that can be used in reports

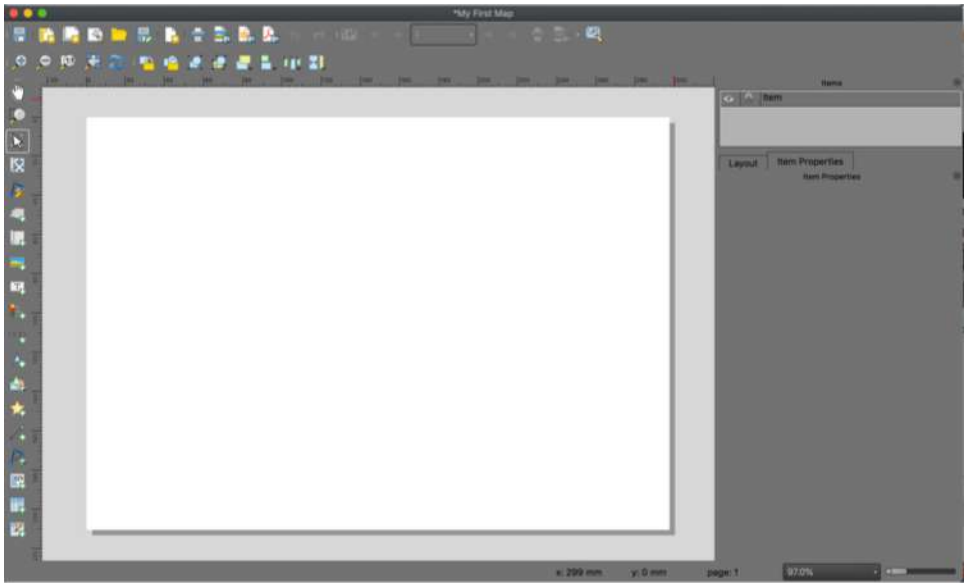
Creating a Map

Go to New Print Layout

Give the title My First Map



This opens up the Map Composer that we shall use to create a map

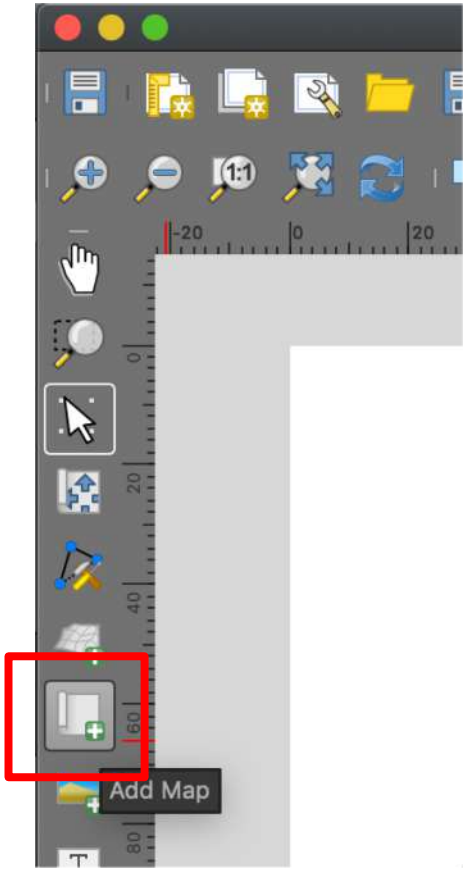


Video 1.5

Creating a Map

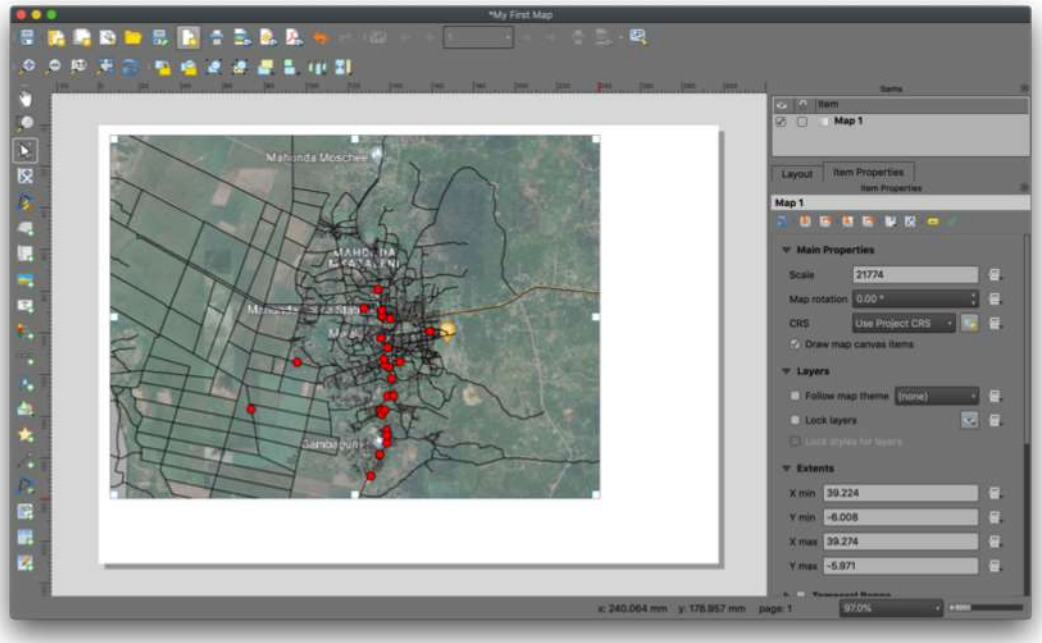
Firstly, we shall add our map from QGIS to the Map Composer

Go to the Add Map tool



Click-hold-drag to draw a box where we want our map layers to appear

This will automatically add our layers to the Map Composer

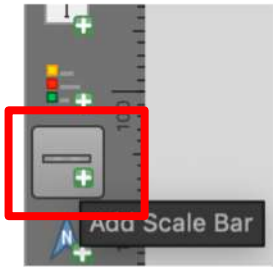


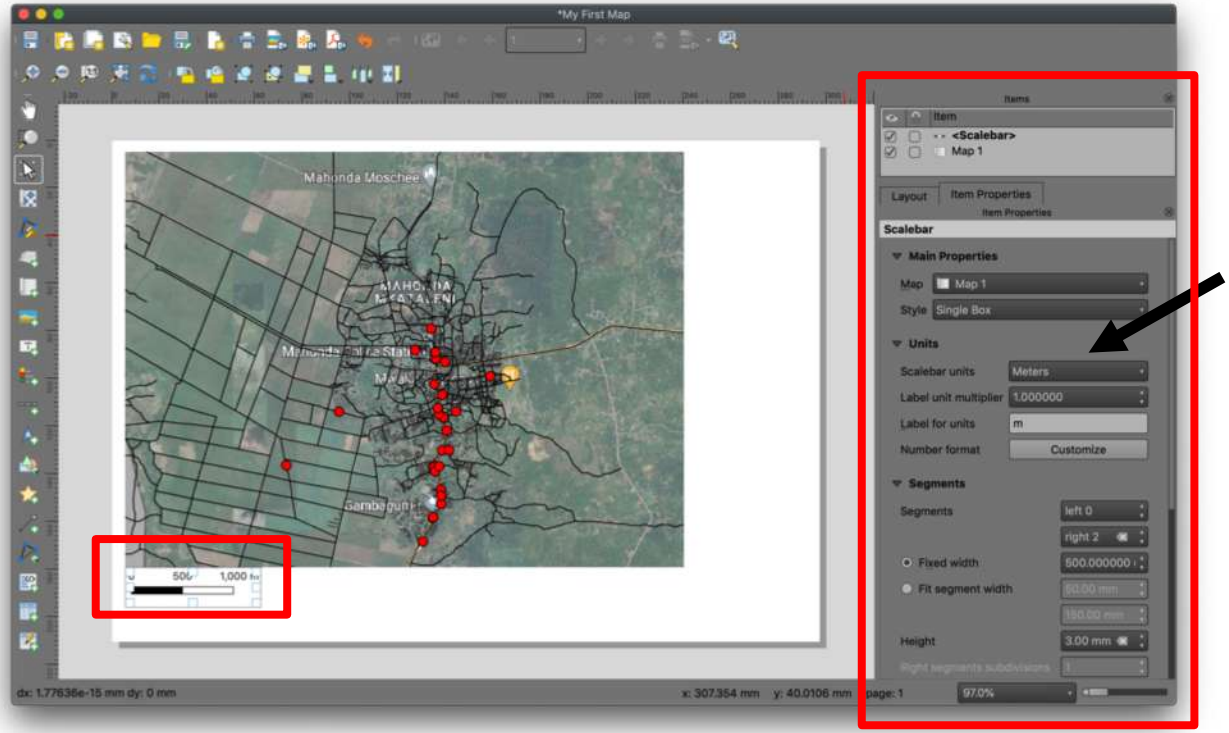
Adding Map Elements

Already our map is looking good but we are missing some important elements like a map scale and legend

To add a scale, go to Add Scalebar

Click-drag-hold and draw a scalebar at the bottom of the map





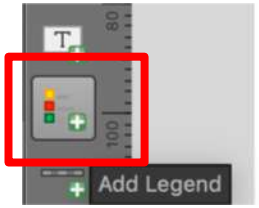
Notice that there are a range of options for changing the scale bar

Video 1.6

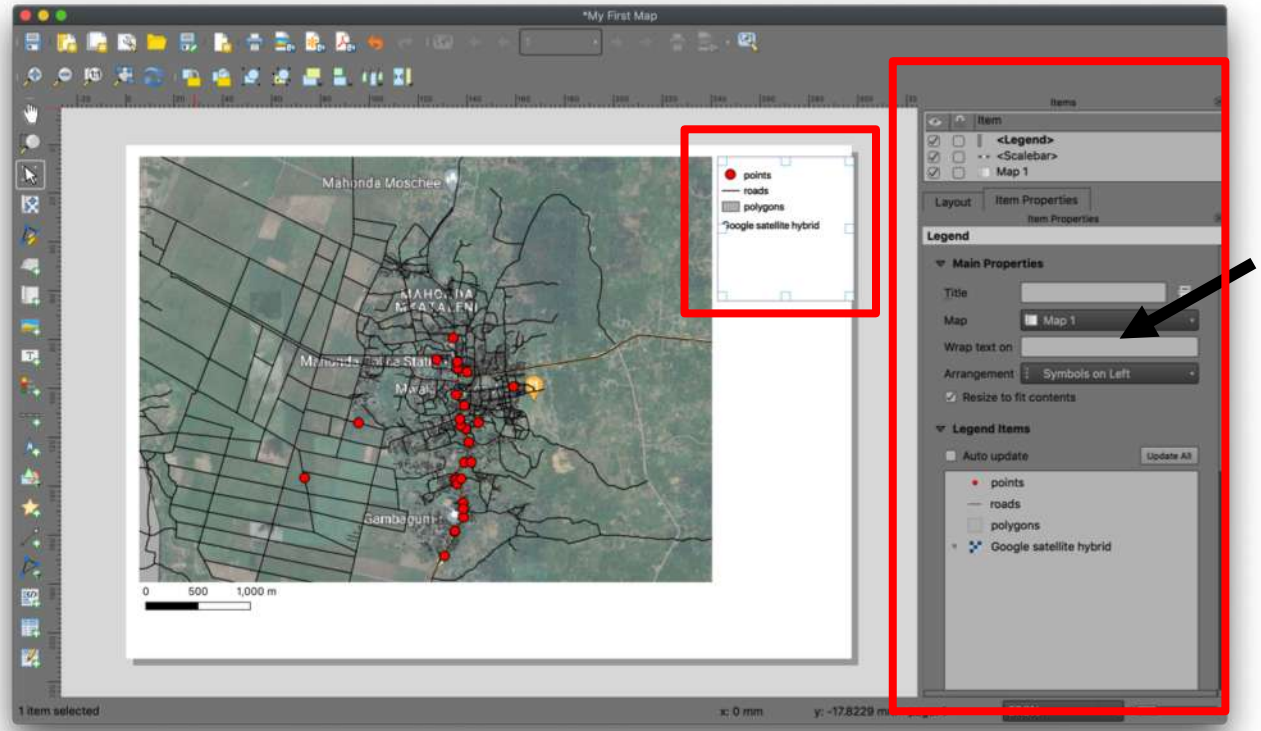
Adding Map Elements

Now let's add a legend: this tells the reader what the various items are in the map

Go to Add Legend



Click-drag-hold and draw a legend at the top-right of the map



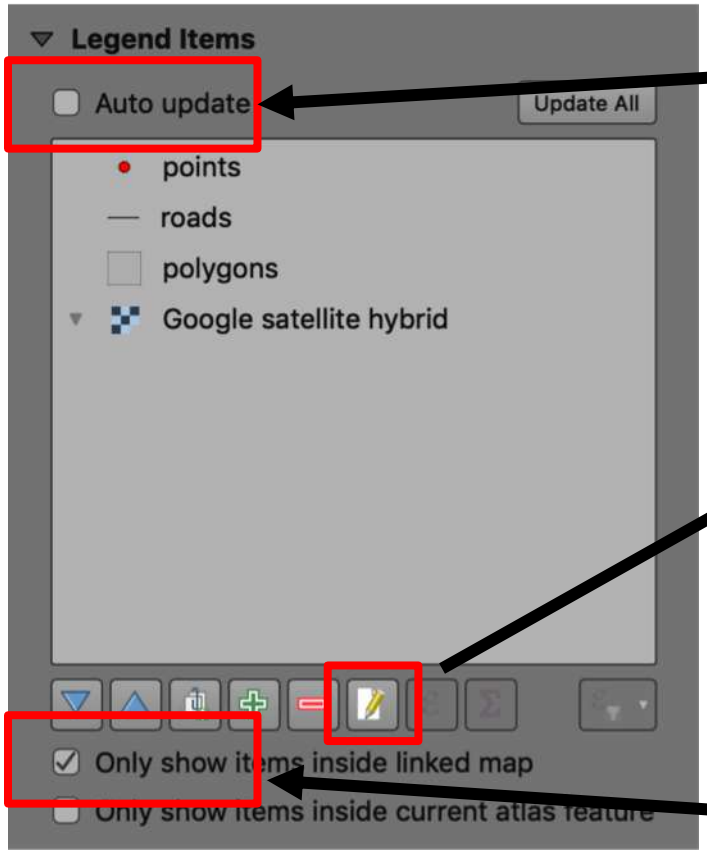
A range of options for changing the legend

Video 1.7

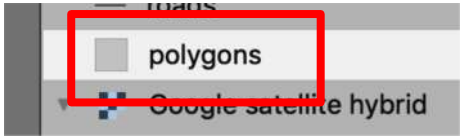
Editing the Legend

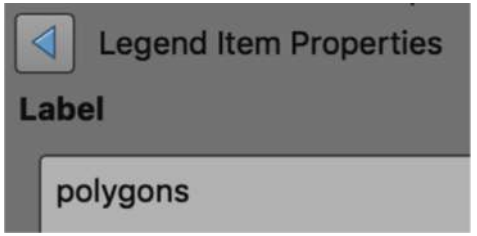
The default Legend often has a few items that we do not want

To to the editing panel on the right



Untick Auto Update





Select an item and edit the name

Tick this option so that legend items are linked to the main map

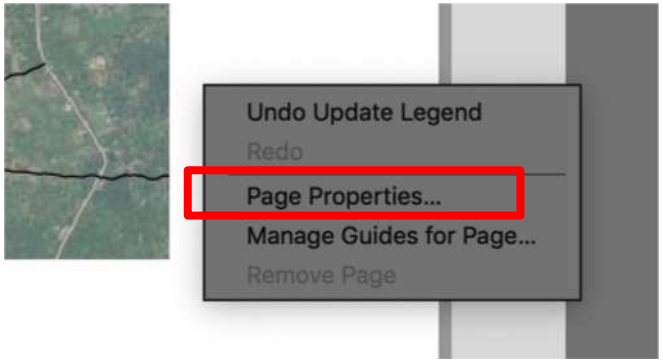
Adjusting the Page Size

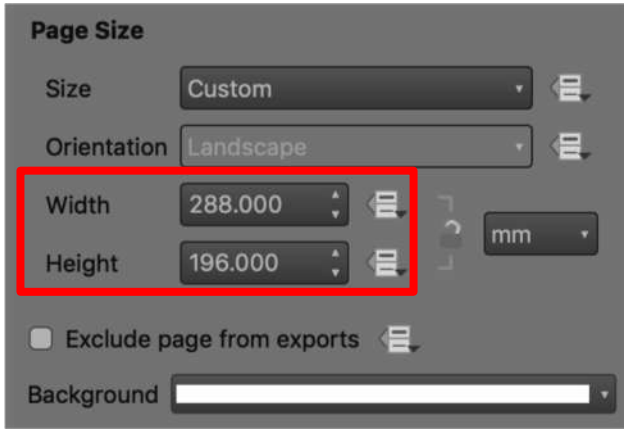
We now have a nice map

Finally, we shall adjust the page size so it fits the map and all its elements

Right-click a blank space in the composer and select Page Properties

Then change the size of the page so it matches the values below



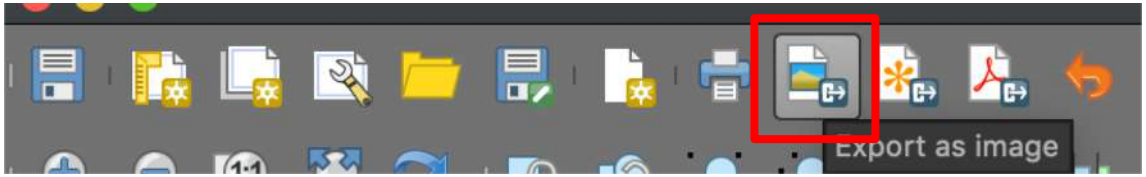


Save

Save your Map Composer

Saving your Map

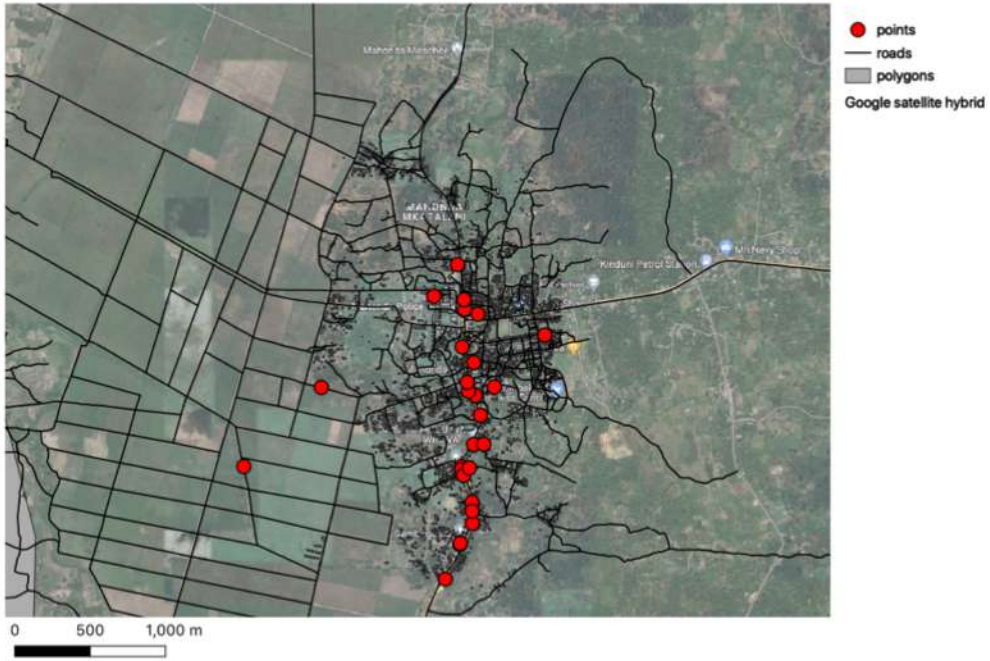
Export this as a PNG image (for use in reports and presentations) by going to Export as image

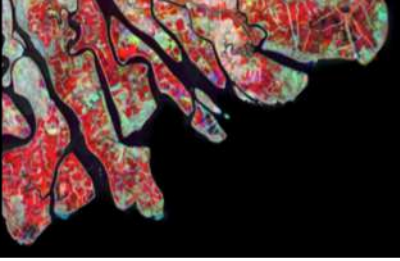


Save the map as
my_first_map_v1.png

Open this image up and check that you are happy

Your first map: Well done!





Map Templates

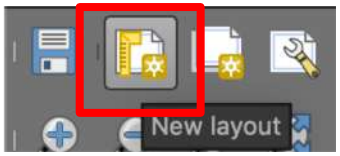
We created a professional map but at ZAMEP we will want standard Map Templates that everyone can use

By using a Template, all ZAMEP maps will be produced with same professional standard

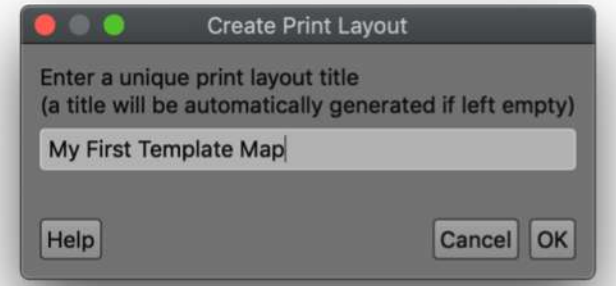
We shall try using one that was made for ZAMEP by Aberystwyth University

Map Templates

In the Map Composer window go to New Layout



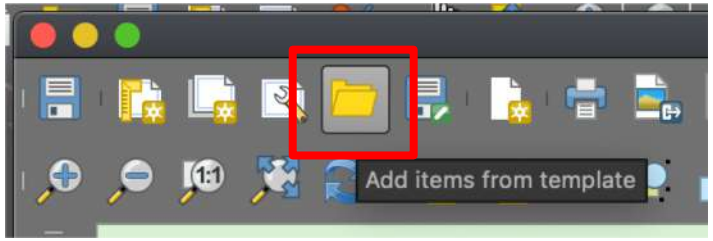
Give your new map the name My First Template Map



In the new Map Composer window, go to Add Items from template

Locate and open

map_template_A4_landscape_zamep.qpt

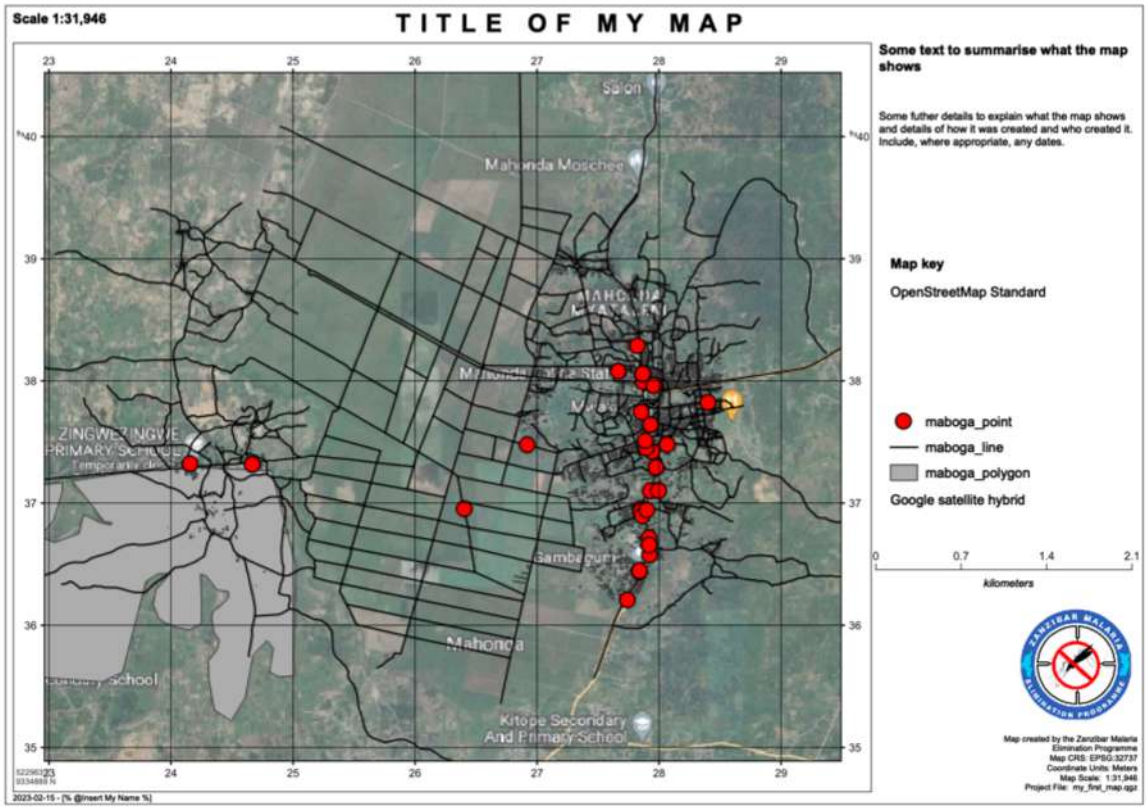


Video 1.8

Map Templates

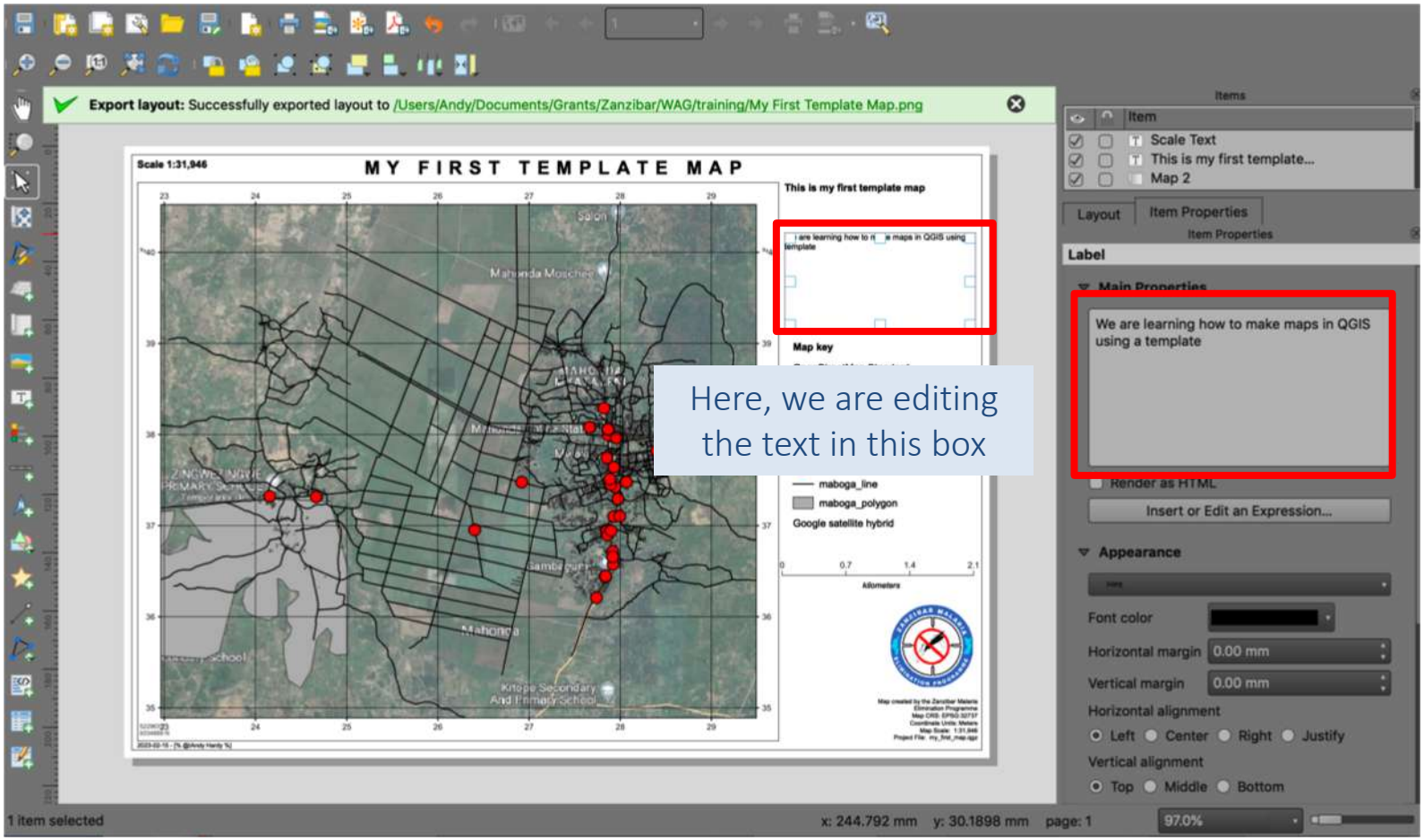
After a few moments, all the data from QGIS will be added to the template

Take a moment to look at the various items that are included in the template



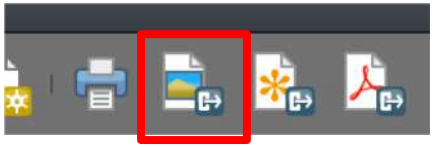
Map Templates

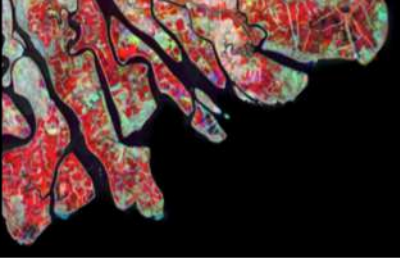
Try adding some text to the title at the top and text boxes on the right-hand side and the author name in the bottom-left



Map Templates

As you did before, try exporting this as a PNG image





End of Worksheet 1

Well done, you now know how to add GIS layers to QGIS and create a professional looking map