

CERTIFICATE

Class-TYBSCIT

YEAR-2022-2023

This is to certify that the work entered in this journal is the work of

Shri/kumara-

Of **TYBSCIT** division-

Roll no-

Has satisfactorily completed the required number of practical and worked for term of the year 2022 to 2023 in the college laboratory as laid down by the university

Head of the

Department

External

Examiner

Internal Examiner

Subject teacher

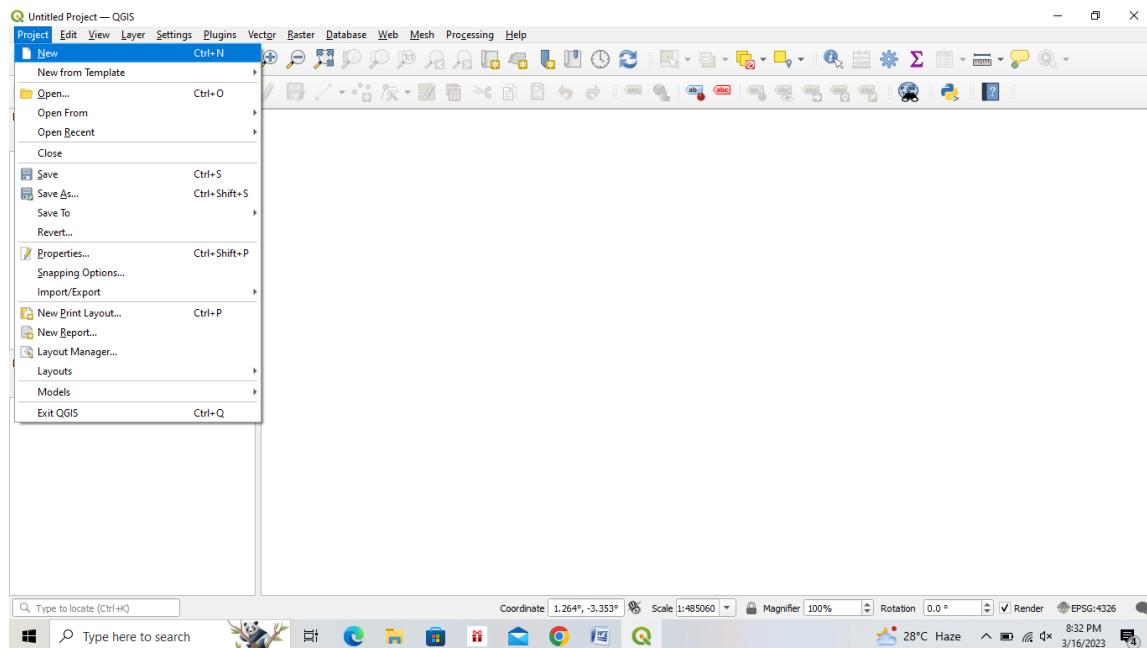
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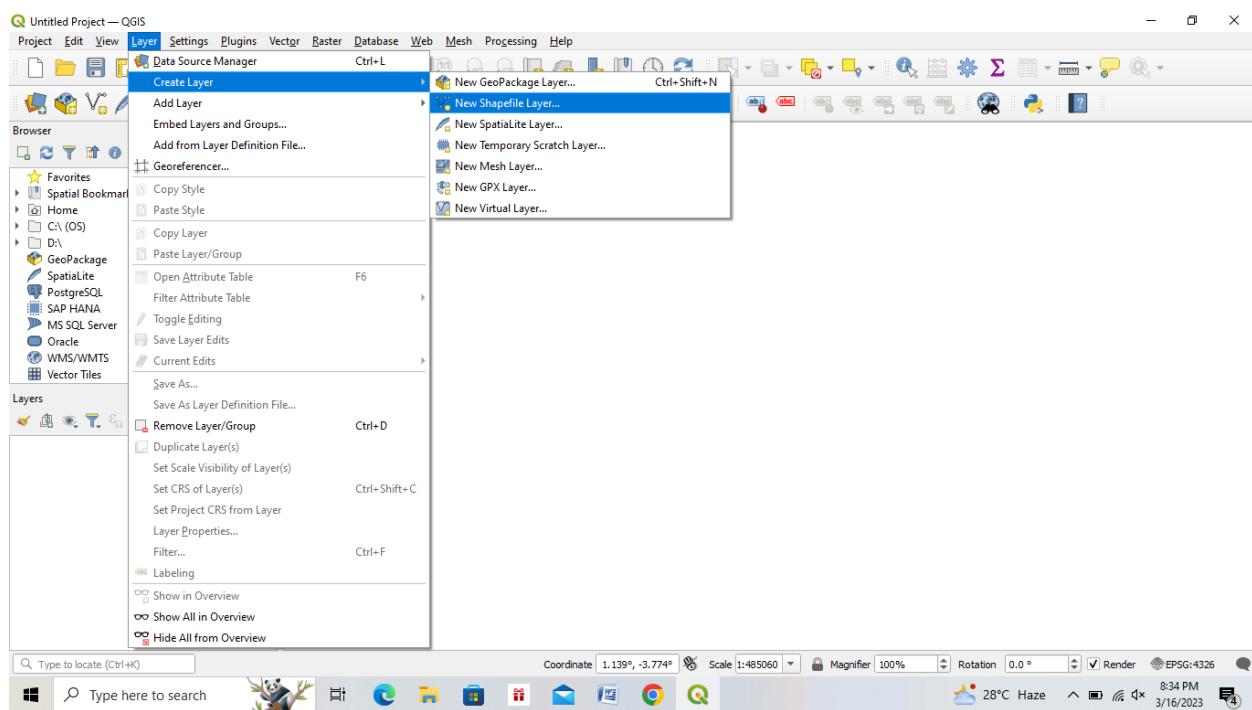
Practical 1: Creating and Managing Vector Data: Adding vector layers, setting properties, formatting, calculating line lengths and statistics.

Aim: The aim of this practical is to create a map step-by-step using various vector layers (polygon layer, linelayers and point layers)

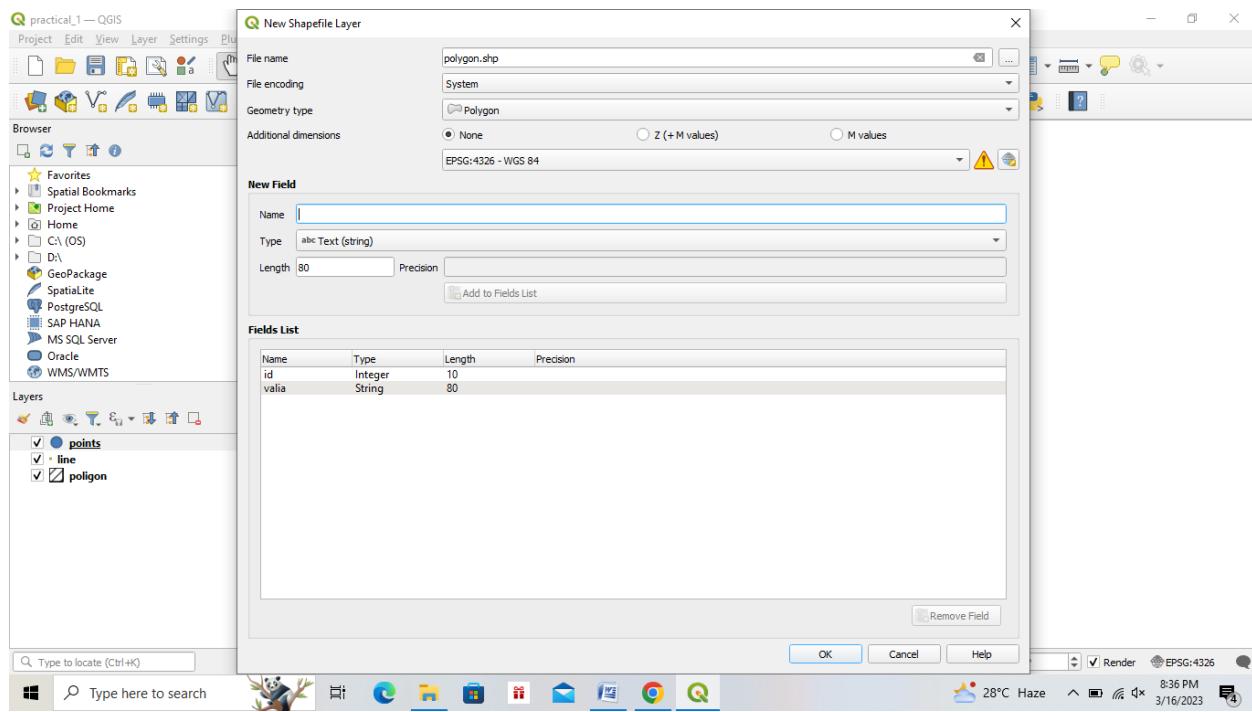
Step 1: Open a new project in QGIS Software



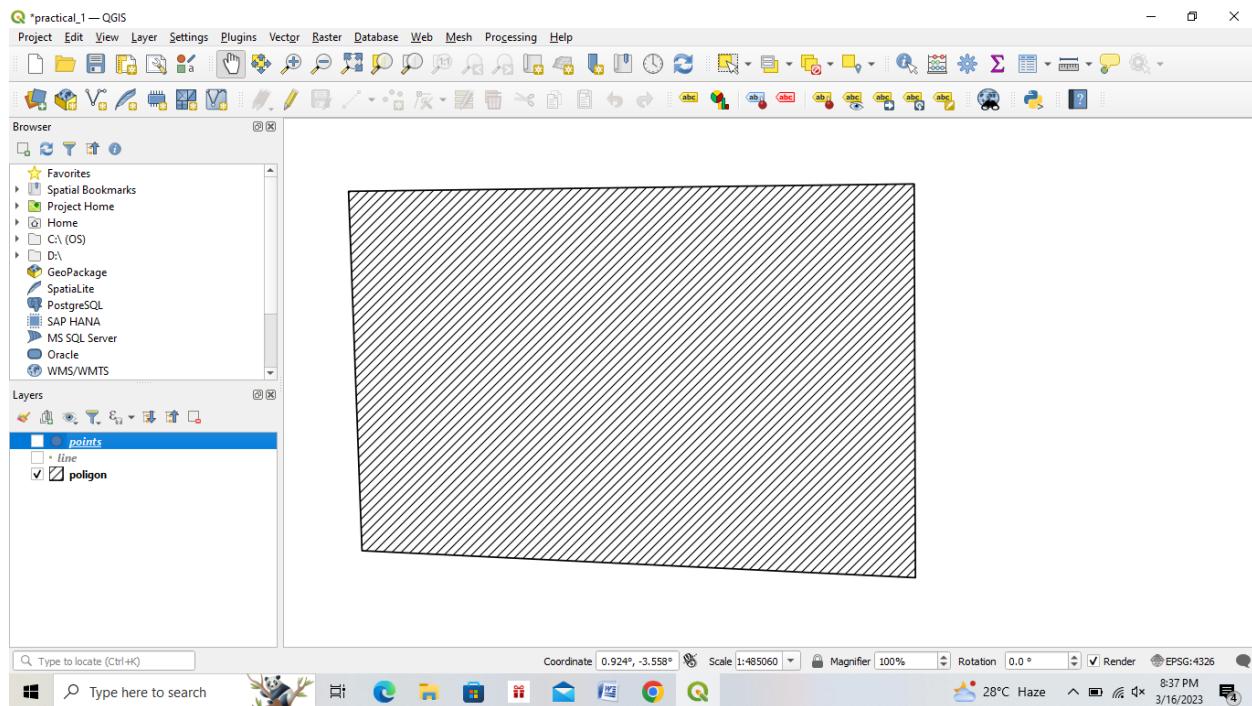
Step 2: Create a Shape File Layer



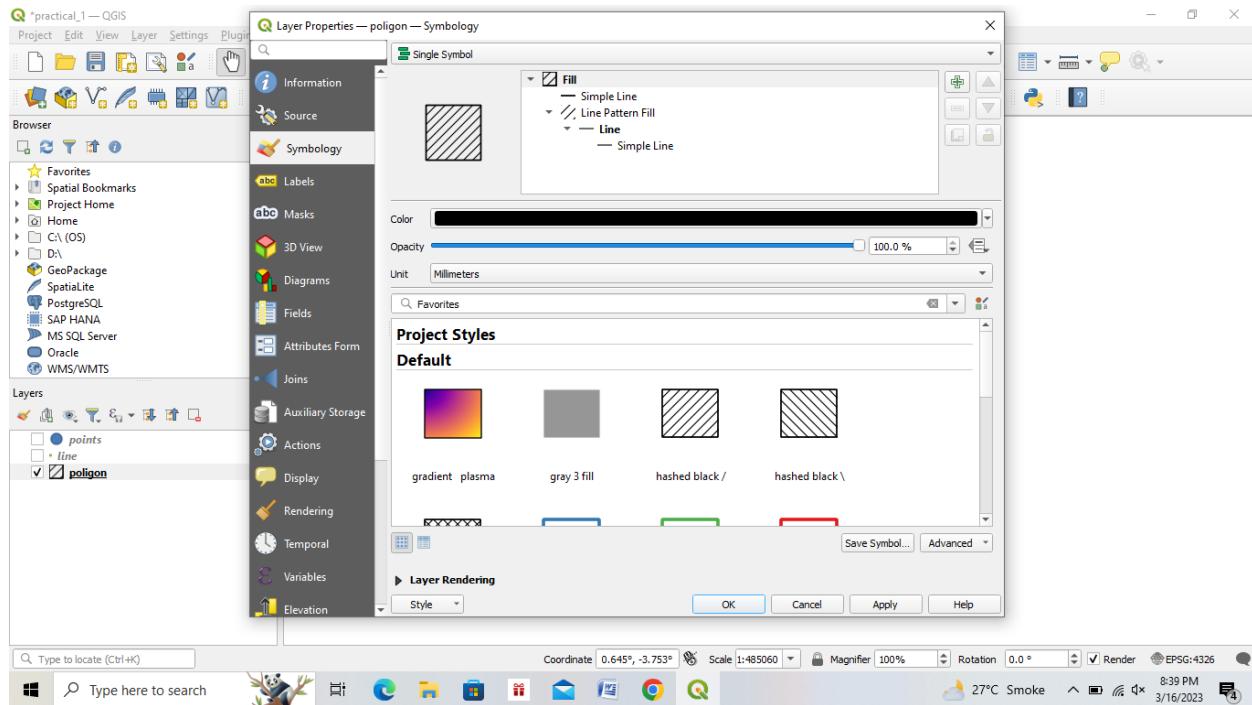
Step 3: Fill in the appropriate details in the dialog box.



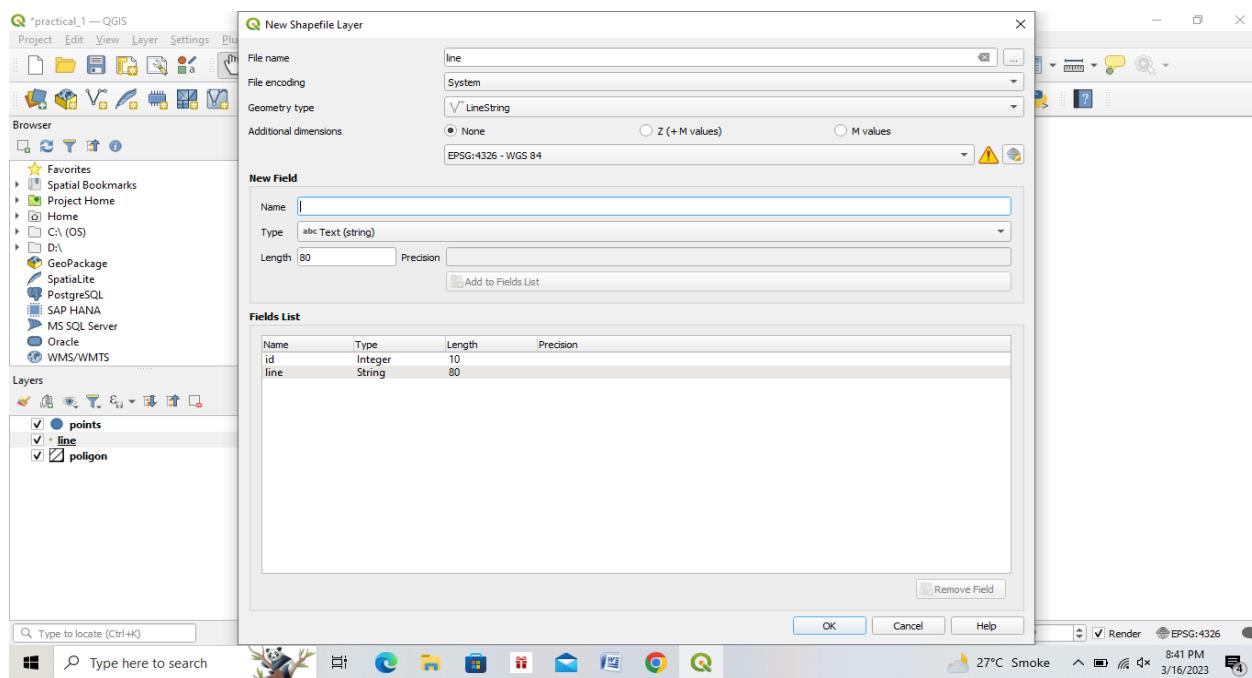
Step 4: With the help of the pen (Toggle Editing), make a polygon as you require

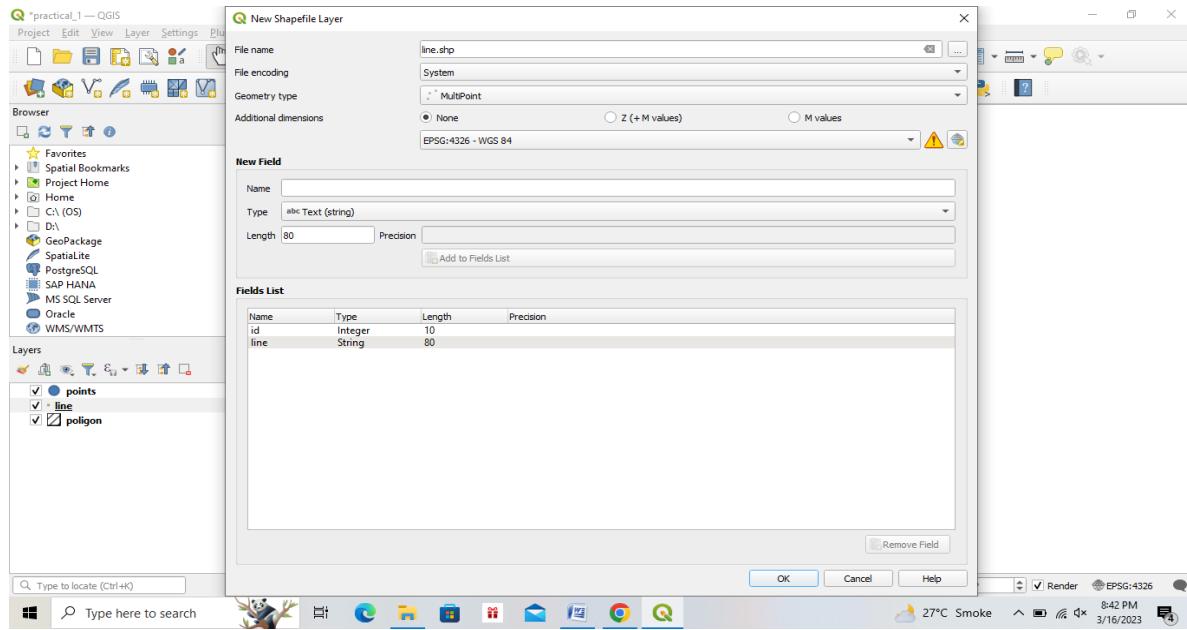


Step 5: You can change the color of the area. Right click on the layer (Practical1), go to Properties and change the color. You can change many things which are given in the Properties.

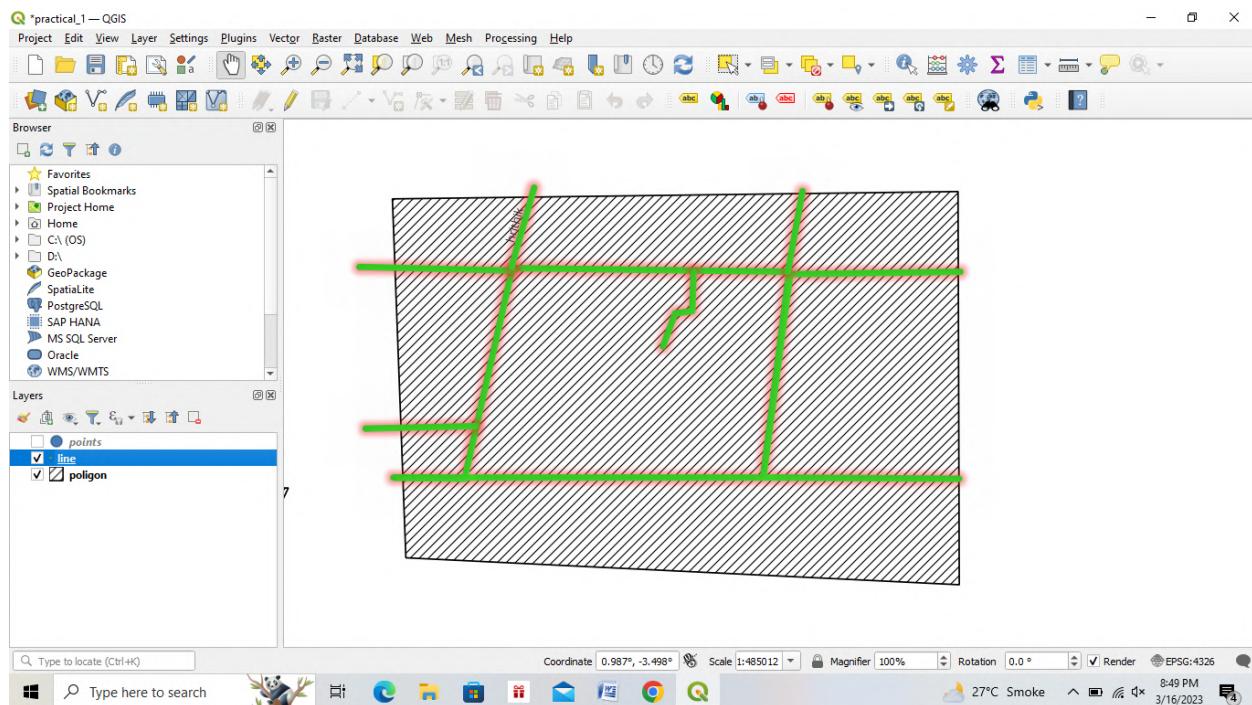


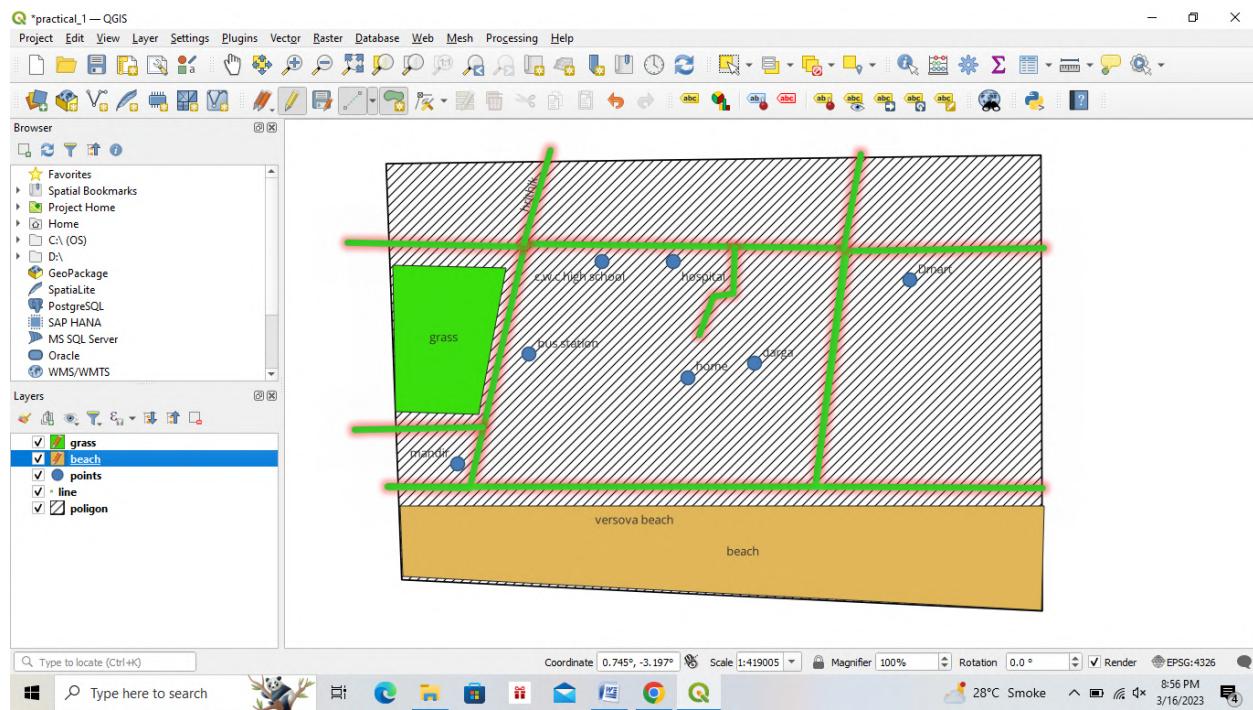
Step 6: Create a new Shape File Layer for Roads as Line, Bank, School, Buildings as Points and Garden as Polygons.





Step 7: After creating Shape Files for each one them as in Step 6, make the components wherever required.

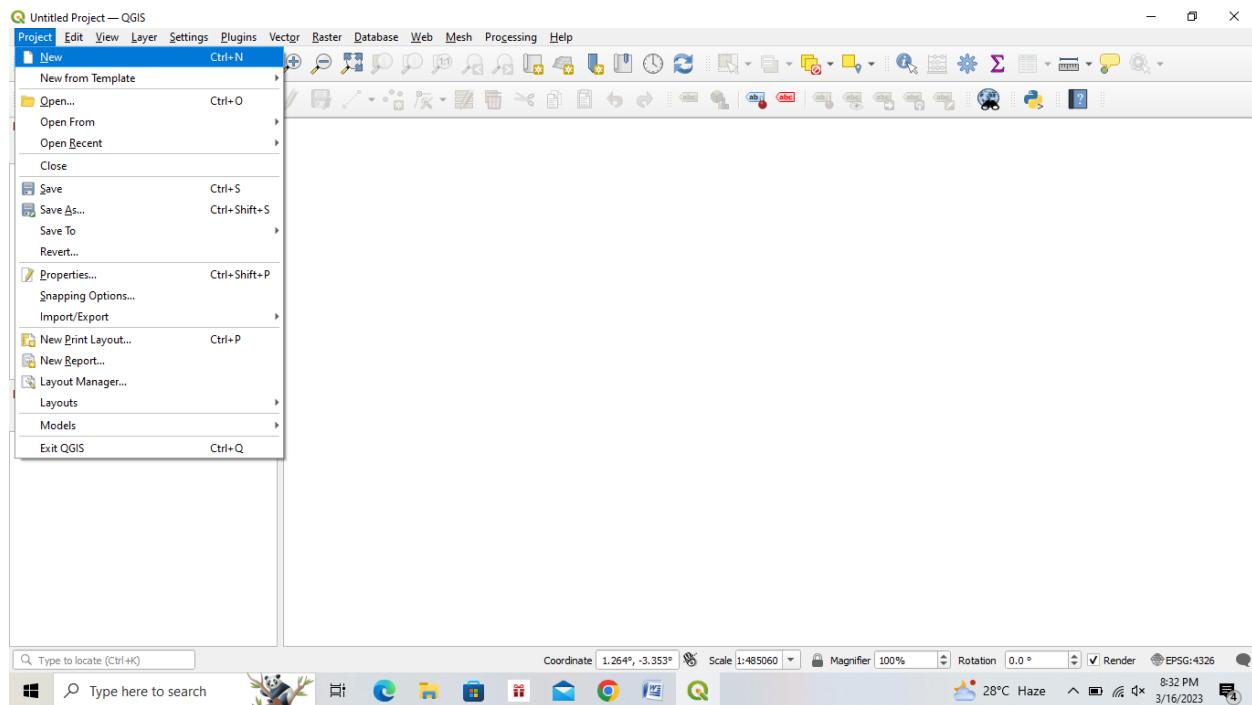




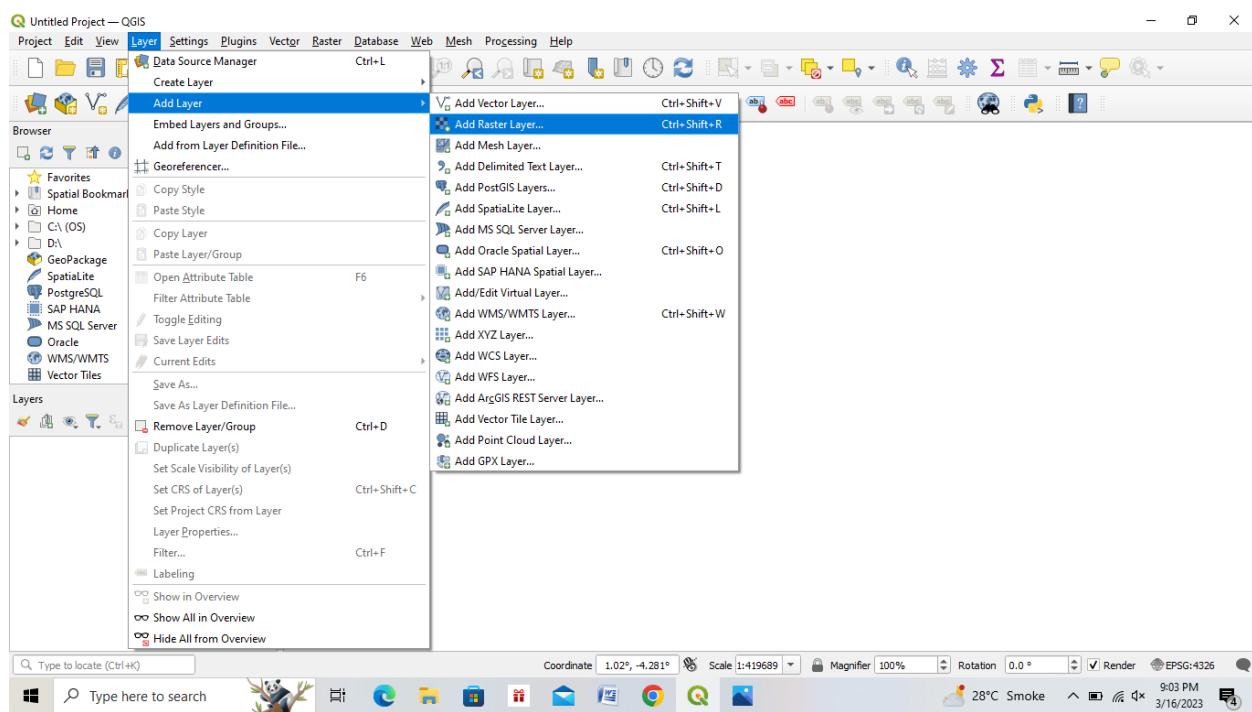
Practical 2: Exploring and Managing Raster Data: Adding raster layers, raster styling and analysis, raster mosaicking and clipping

Aim: The aim of this practical is to create a map step-by-step using various raster layers.

Step 1: Open a new project in QGIS Software

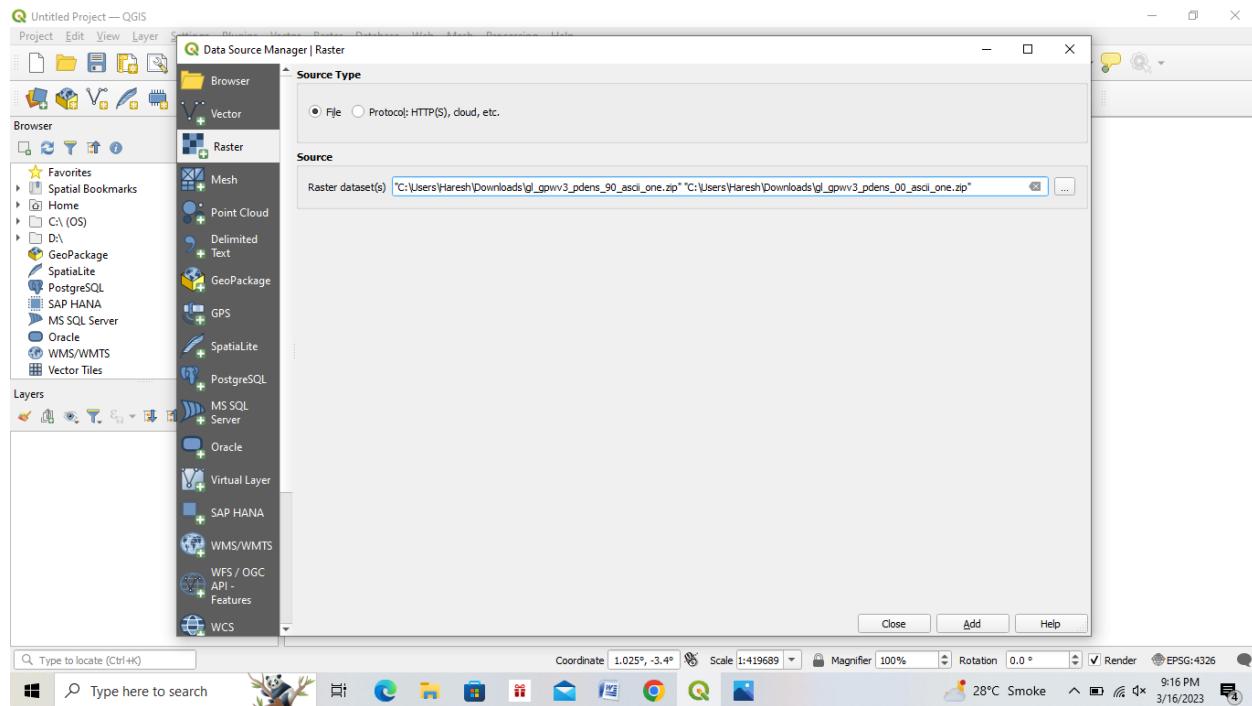


Step 2: Adding raster layers Add Raster Layer◊ Add Layer ◊From menu bar select Layer

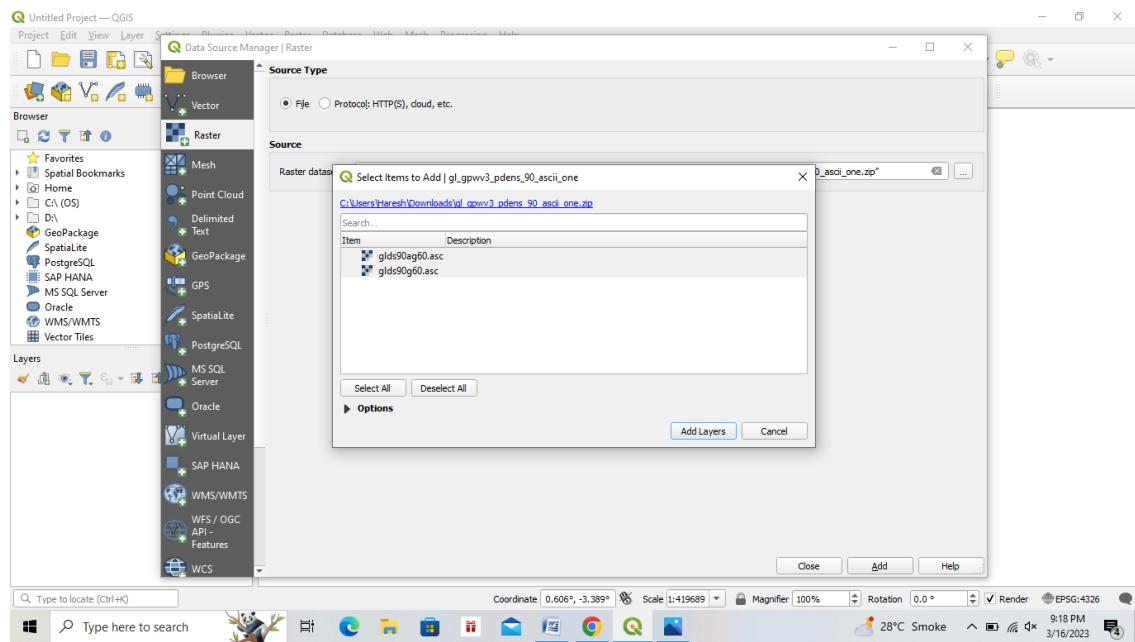


Step 3: Raster Styling and Analysis)

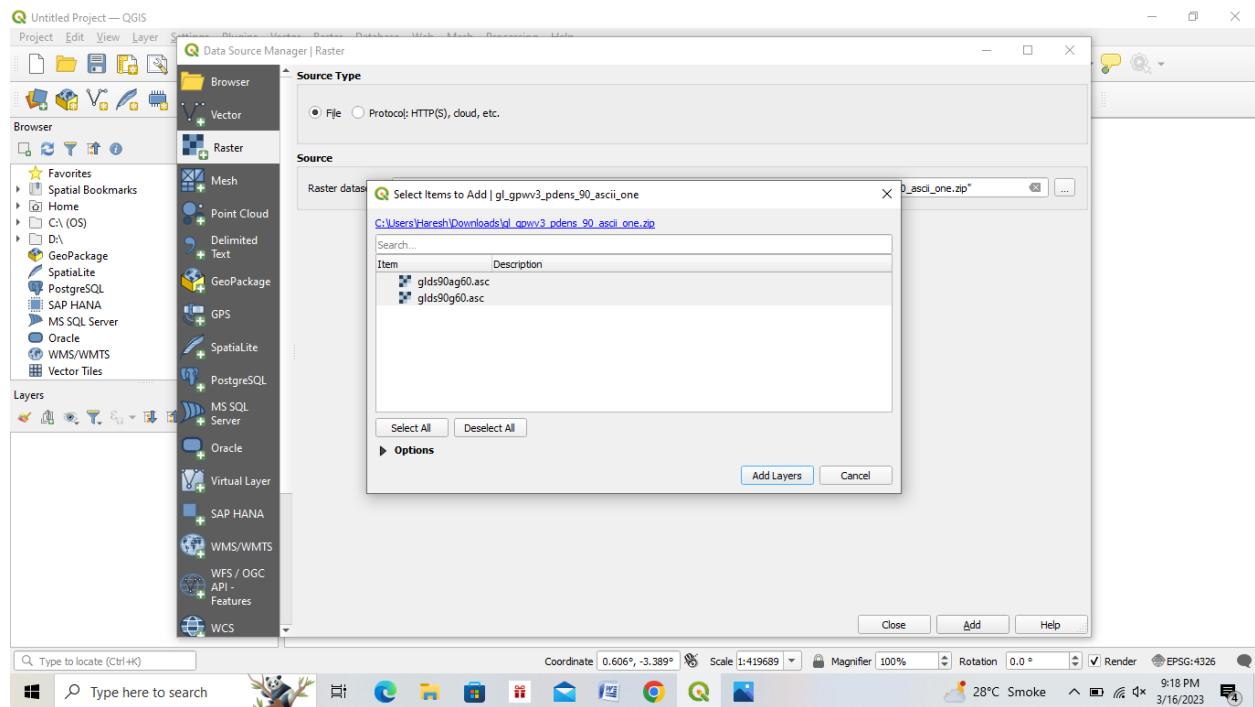
1. Locate the downloaded zip files. Hold down the Ctrl key and click on both the zip files to select them. This way you are able to load both the files in a single step.



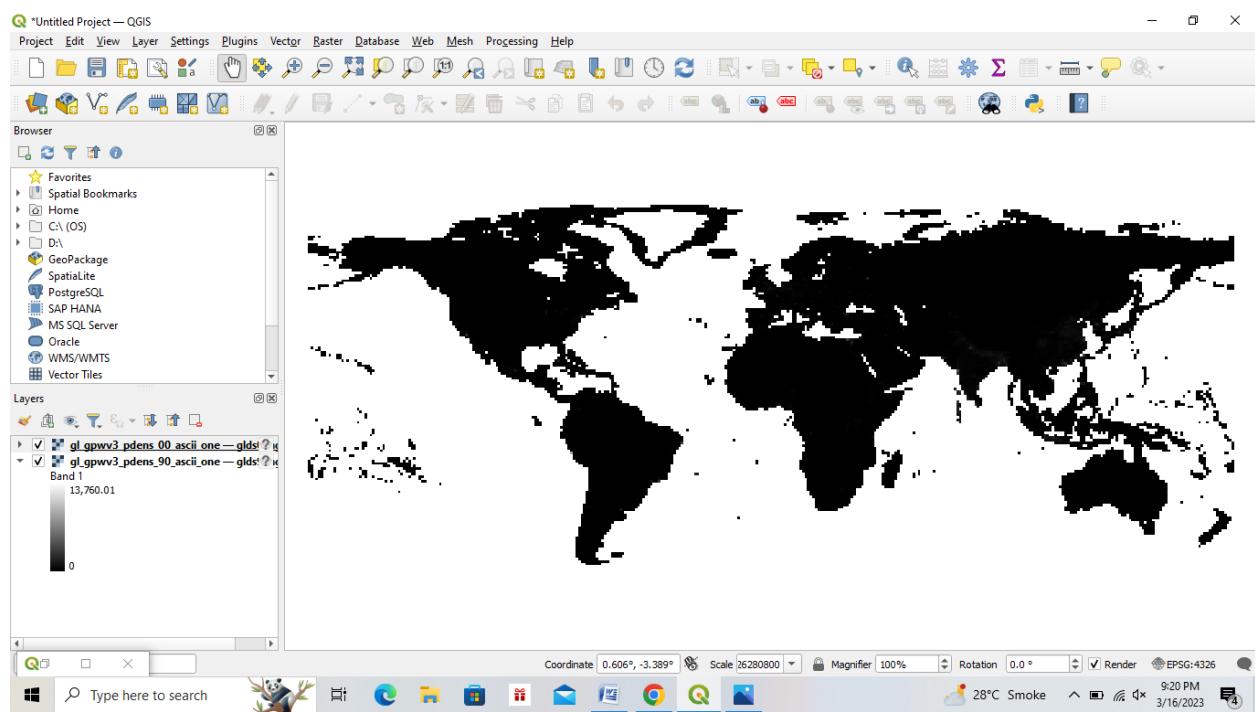
Step 4: Each zip file contain 2 grid files. The in the filename suggests that the population counts were adjusted to match the UN totals. We will use the adjusted grids for this tutorial. Select glds90ag60.asc as the layer to add. Click OK.



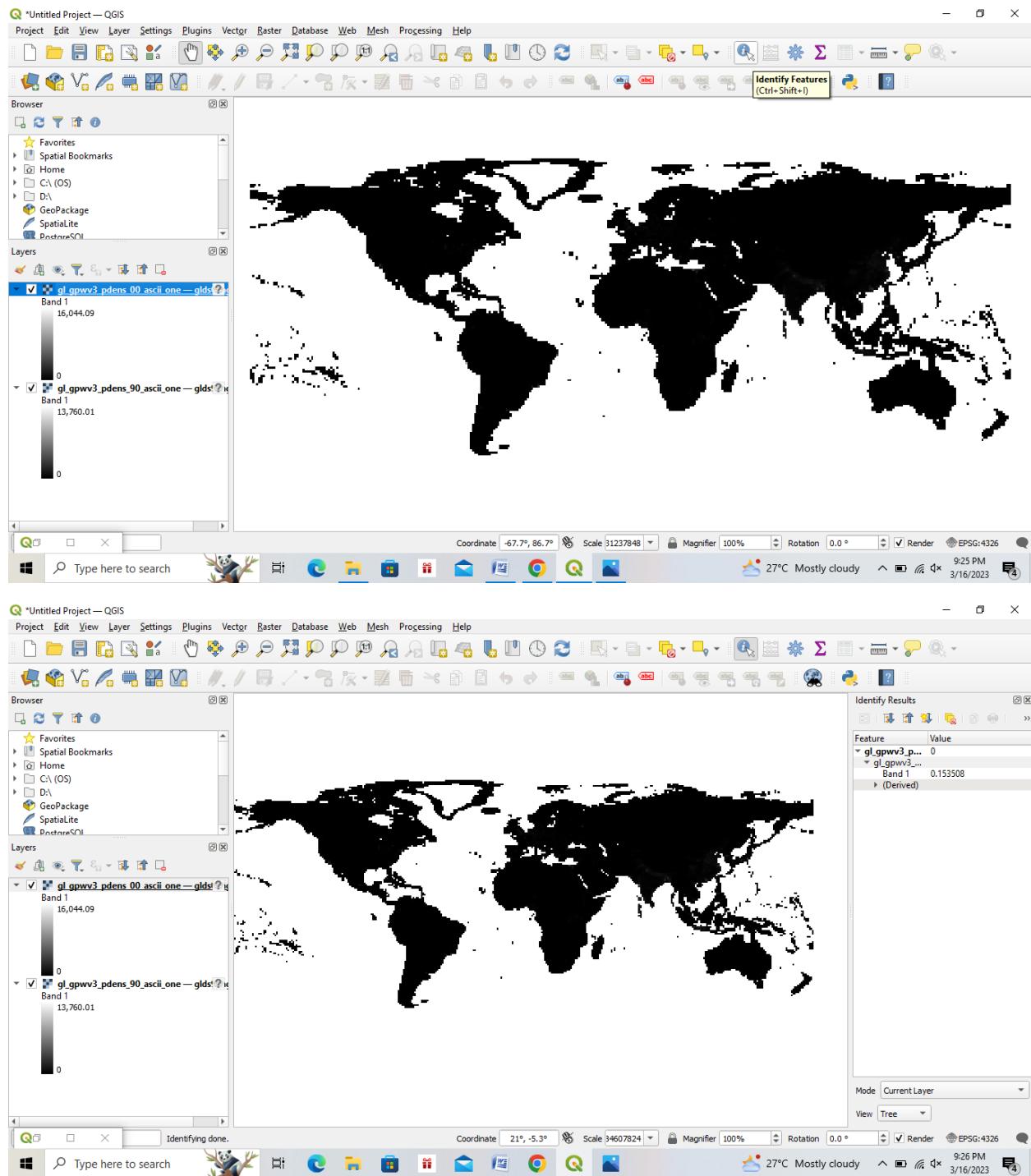
Step 5: Since we selected both the zip files, you will see similar dialogs once again. Repeat the process and select glds00ag60.asc grid as the layer to add. Click OK.



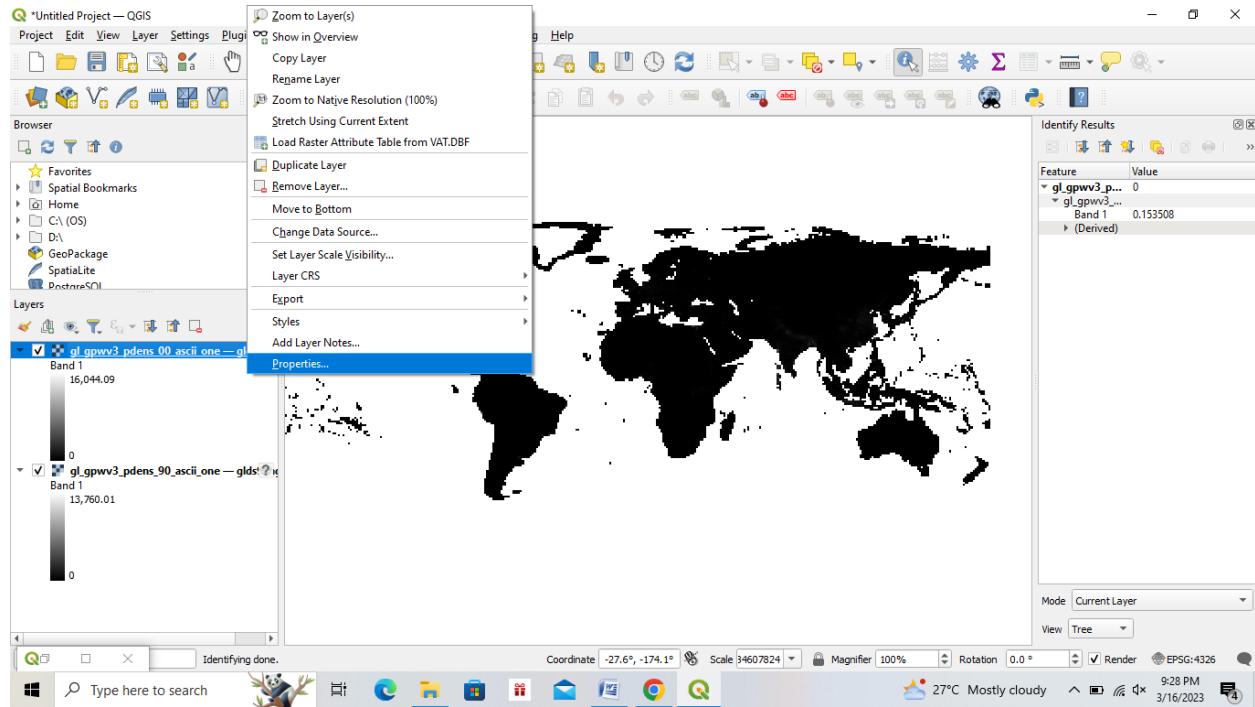
Step 6: Now you will see both the rasters loaded in QGIS. The raster is rendered as in grayscale, where darker pixels indicate lower values and lighter pixels indicate higher values.



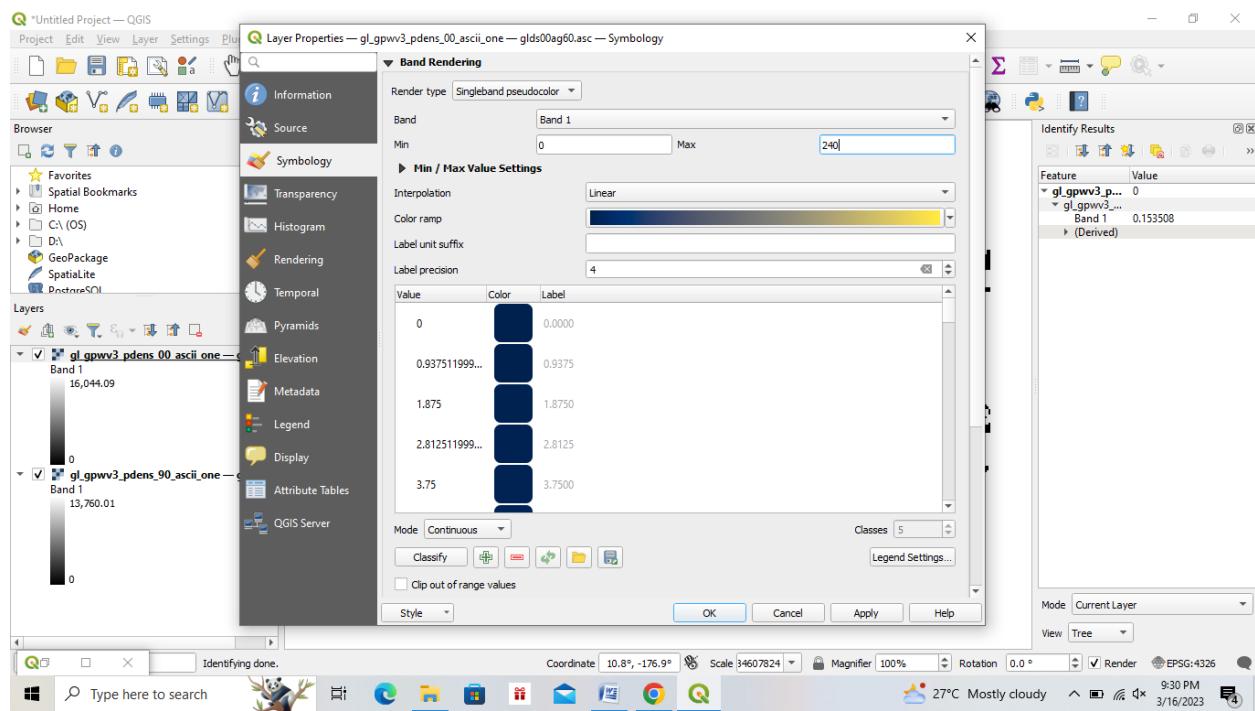
Step 7: Each pixel in the raster has a value assigned. This value is the population density for that grid. Click on Identify Features button to select the tool and click anywhere on the raster to see the value of that pixel.

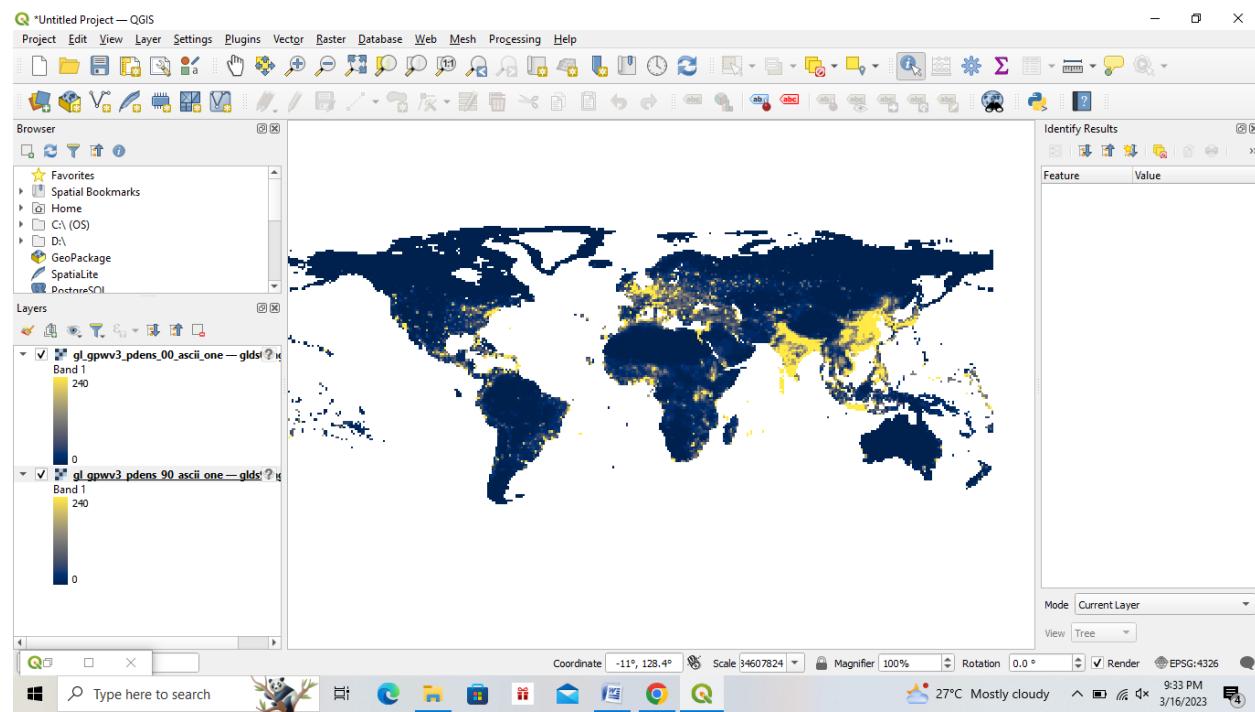
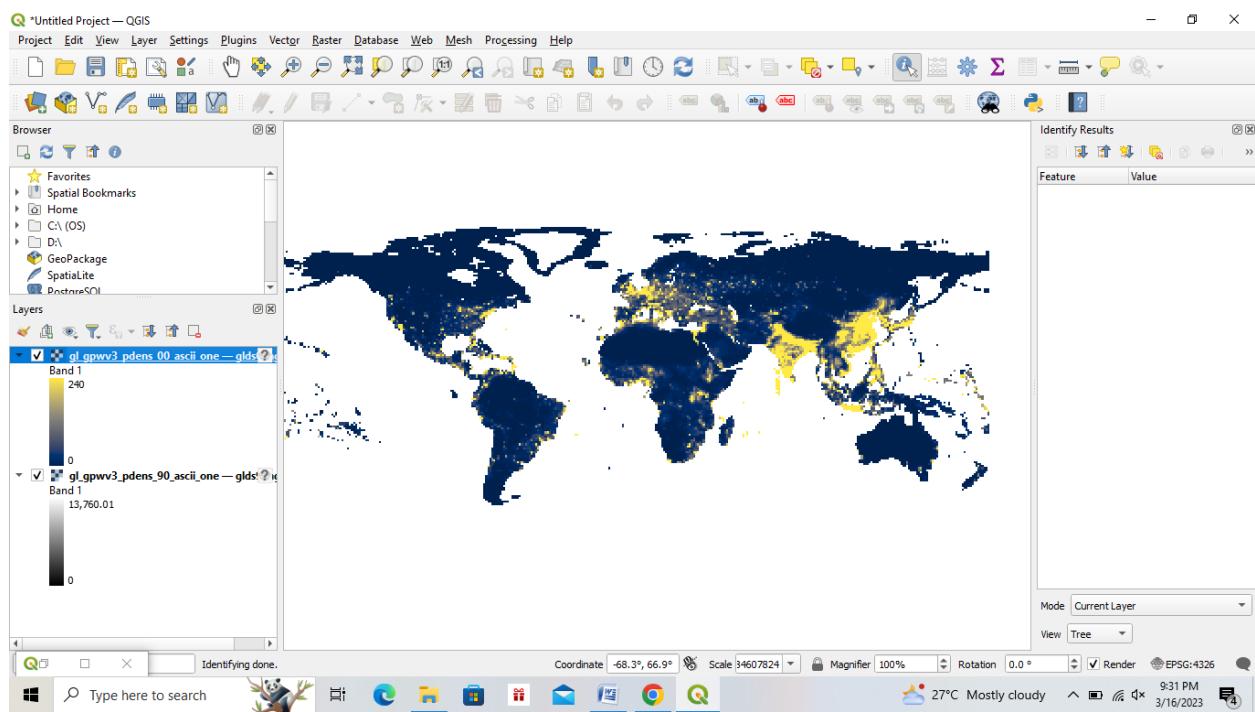


Step 8: To better visualize the pattern of population density, we would need to style it. Right-click on the layer name and select Properties. You can also double-click on the layer name in the TOC to bring up the Layer Properties dialog.

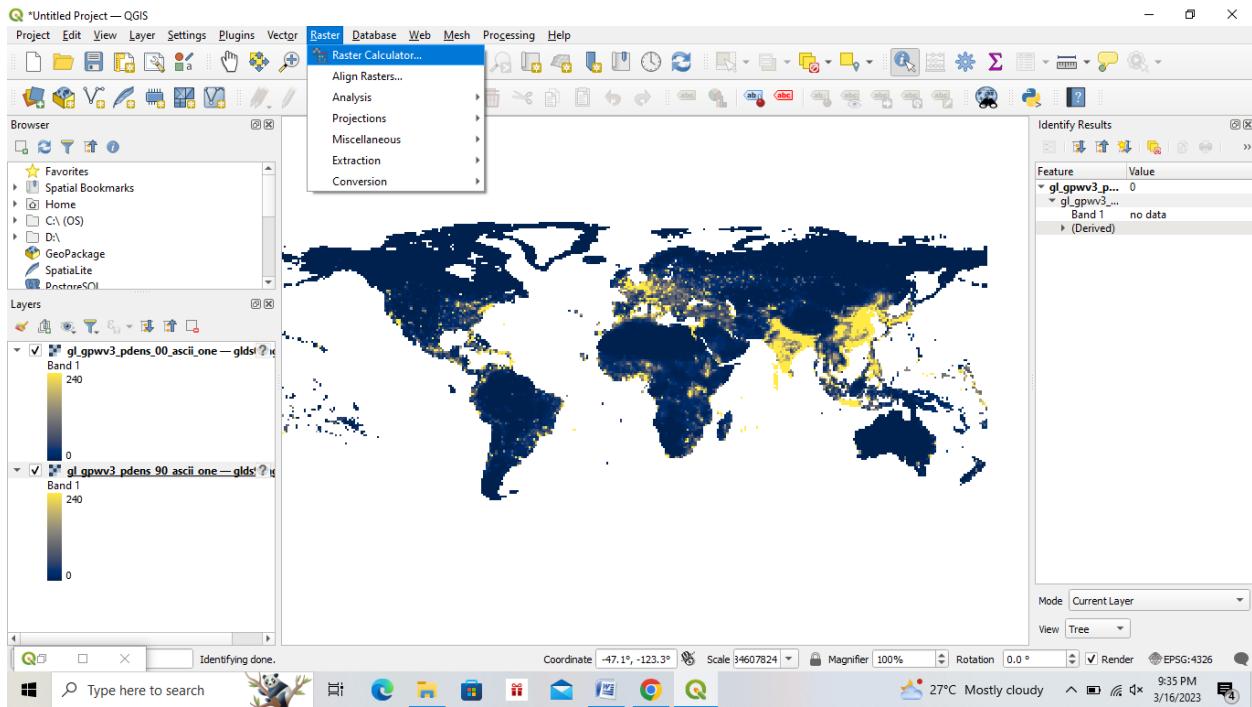


Step 9: Under the Symbology tab, change the Render type to Singleband pseudocolor. Next, click Classify under Generate a new color map. You will see 5 new color values created. Click OK.

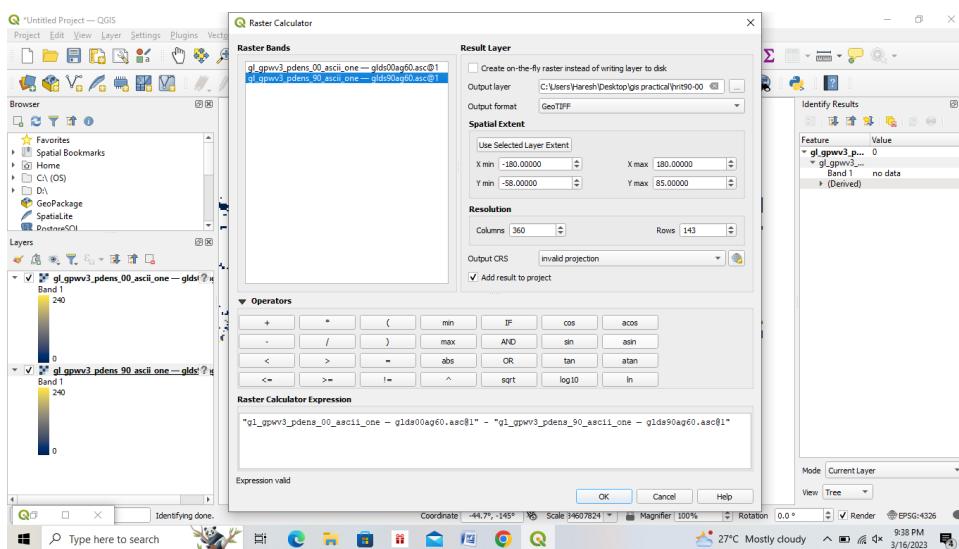




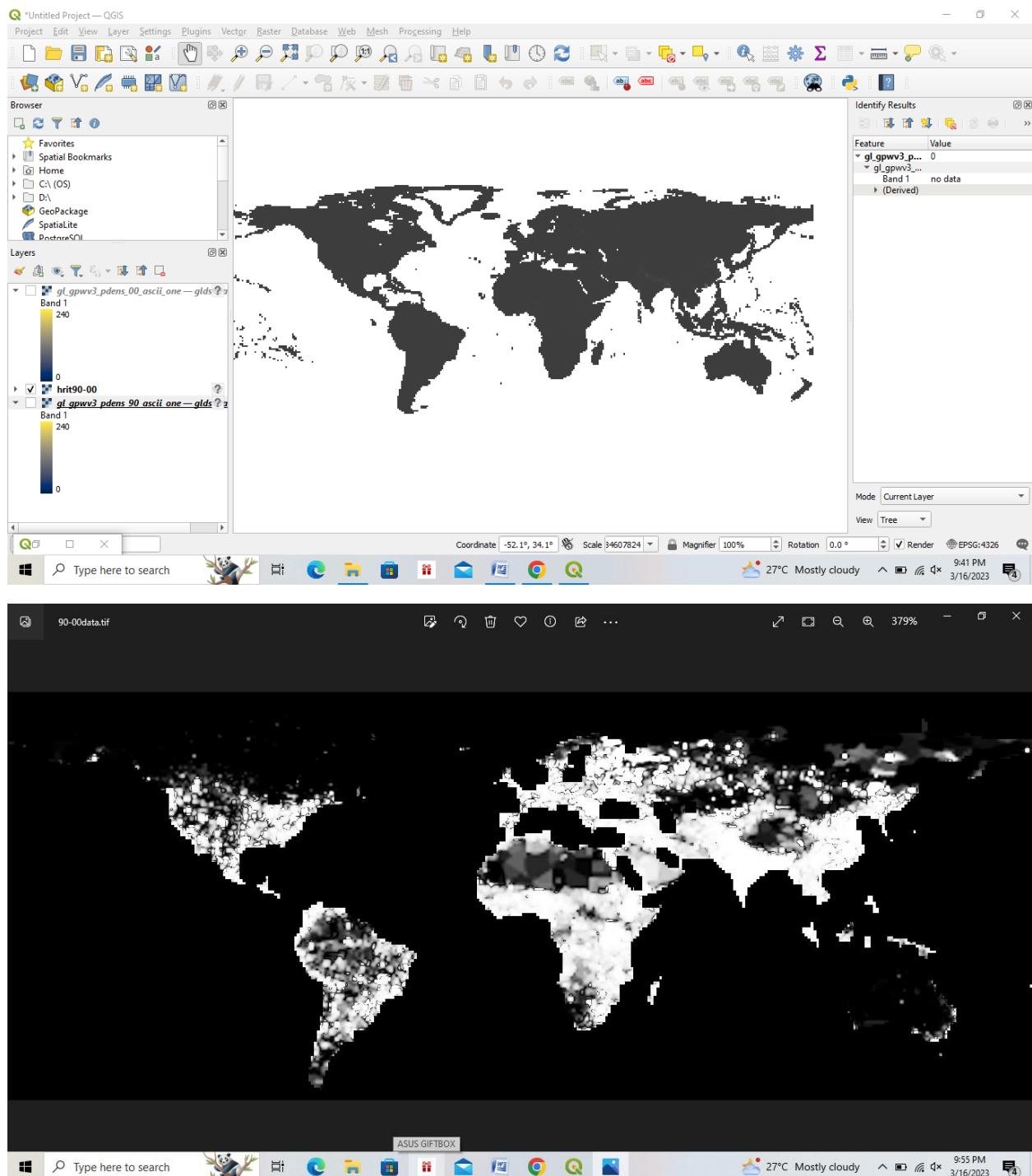
Step 10: For our analysis, we would like to find areas with largest population change between 1990 and 2000. The way to accomplish this is by finding the difference between Raster Calculator each grid's pixel value in both the layer. Select Raster



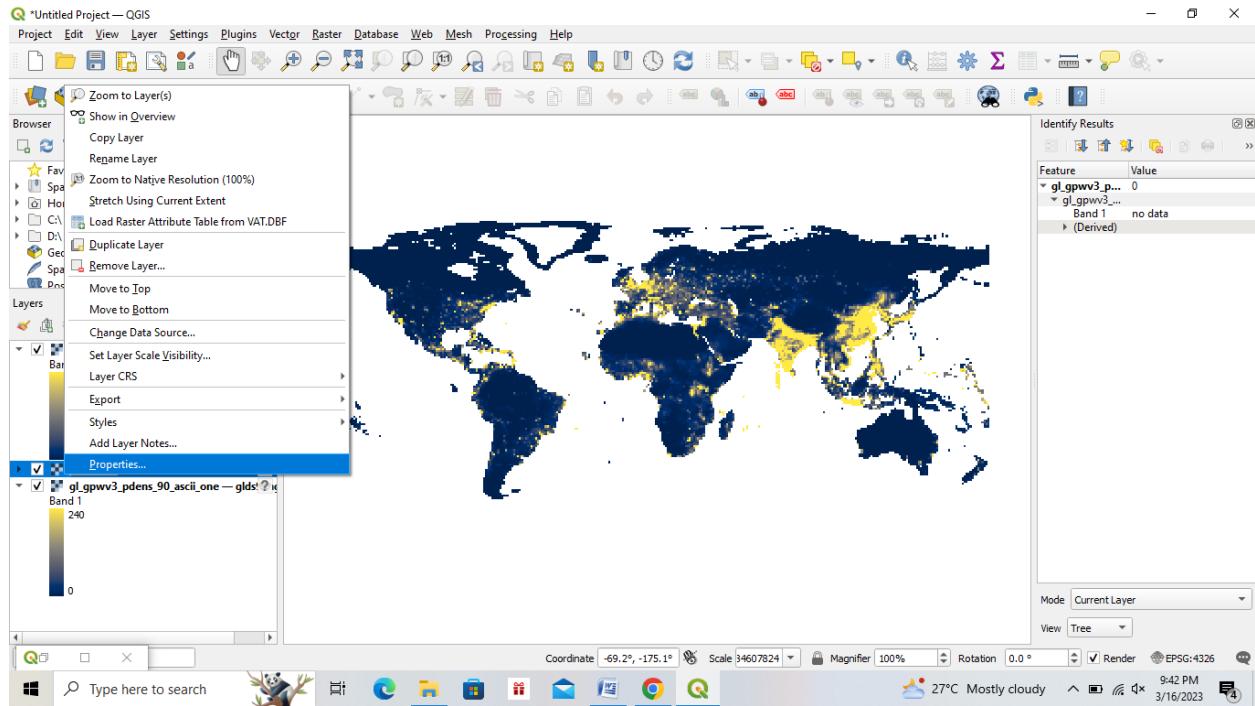
Step 11: In the Raster bands section, you can select the layer by double-clicking on them. The bands are named after the raster name followed by @ and band number. Since each of our rasters have only 1 band, you will see only 1 entry per raster. The raster calculator can apply mathematical operations on the raster pixels. In this case we want to enter a simple formula to subtract the 1990 population density from 2000. Enter “glrs00ag60@1” – “glrs90ag60@1” as the formula. Name your output layer as pop_density_change_2000_1990.tif and check the box next to Add result to project. Click OK.



Step 12: Once the operation is complete, you will see the new layer load in QGIS.

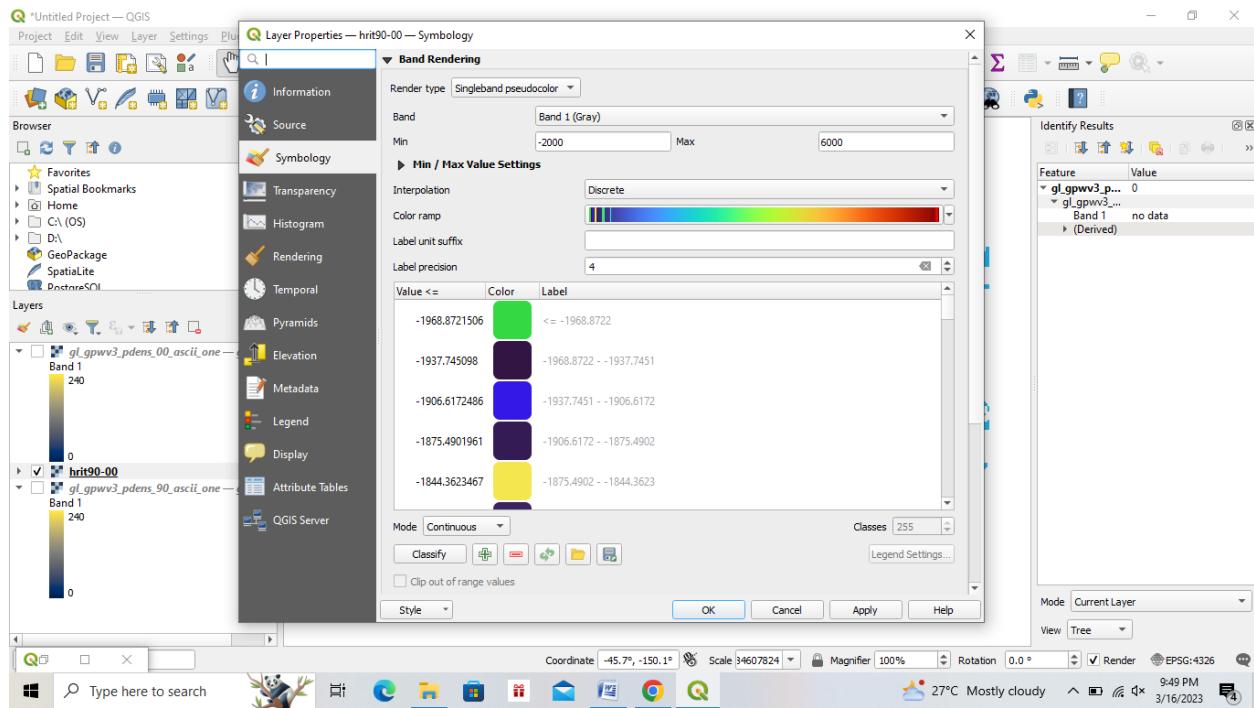


Step 13: This grayscale visualization is useful, but we can create a much more informative output. Right-click on the pop_density_change_2000_1990 layer and select Properties.

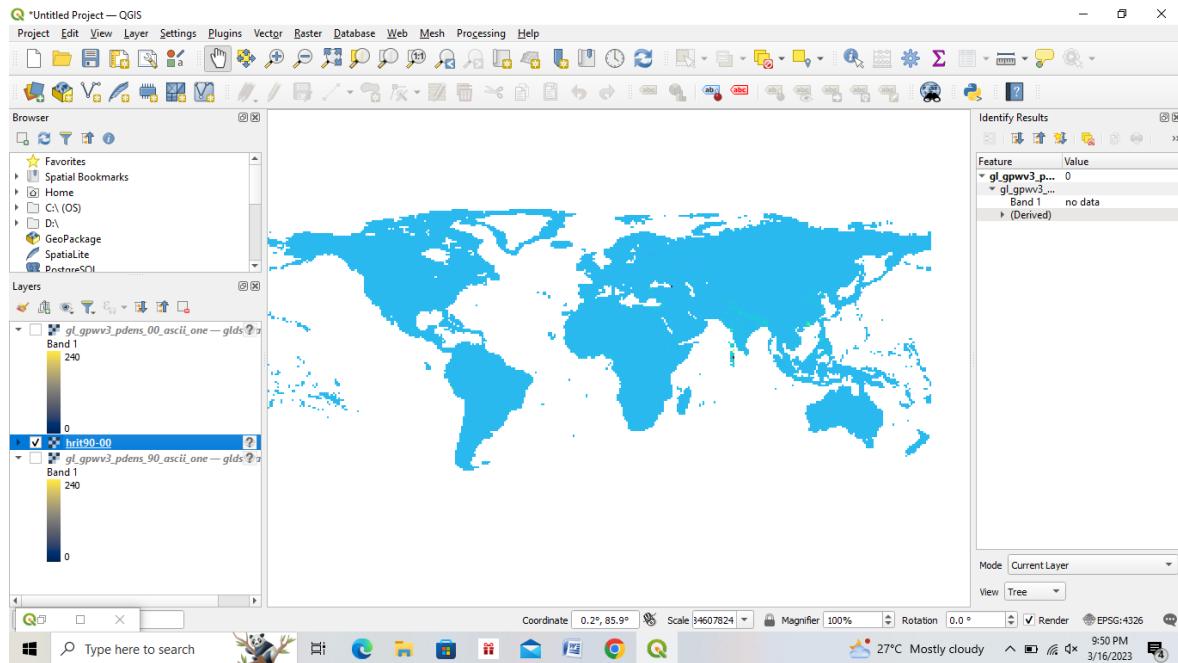


Step 14: We want to style the layer so pixel values in certain ranges get the same color. Before we dive in to that, go to the Metadata tab and look at the properties of the raster. Note the minimum and maximum values of this layer

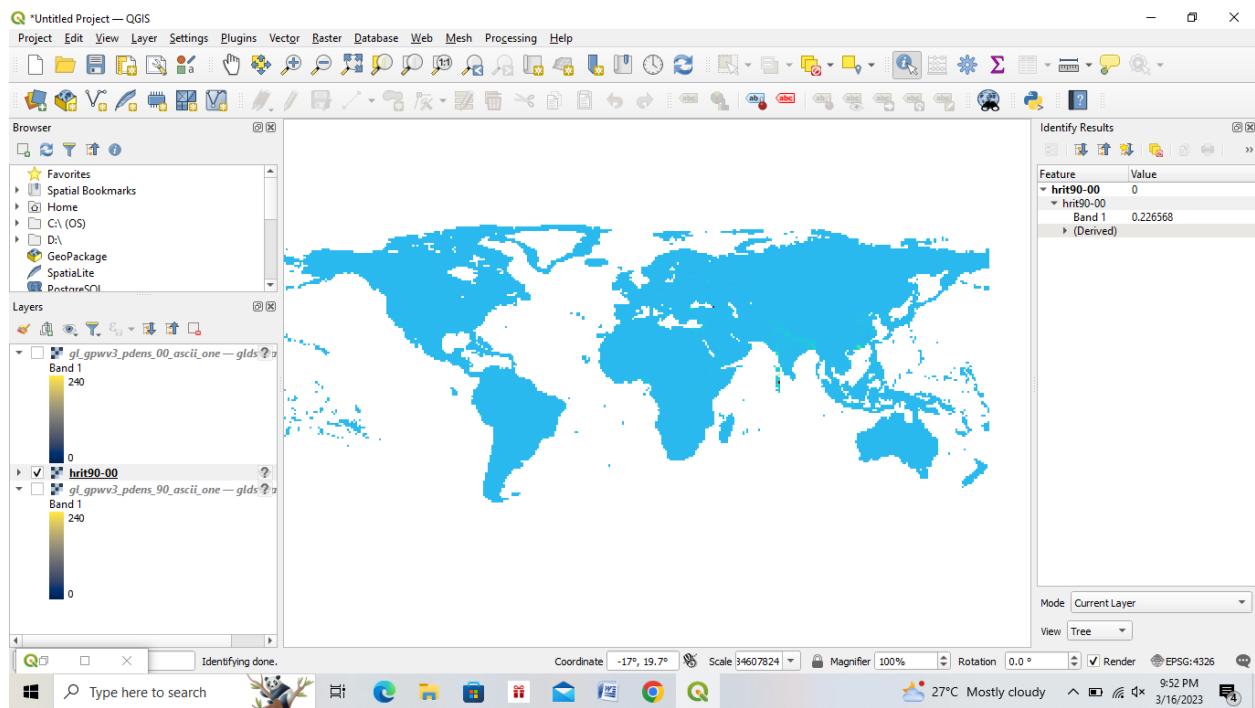
Step 14: Now go to the Symbology tab. Select Singleband pseudocolor as the Render type under Band Rendering. Set the Color interpolation to Discrete. Click the Add entry button 4 times to create 4 unique classes. Click on an entry to change the values. The way color map works is that all values lower than the value entered will be given the color of that entry. Since the minimum value in our raster is just above -2000, we choose -2000 as the first entry. This will be for the No Data values. Enter the values and Labels for other entries as below and click OK.



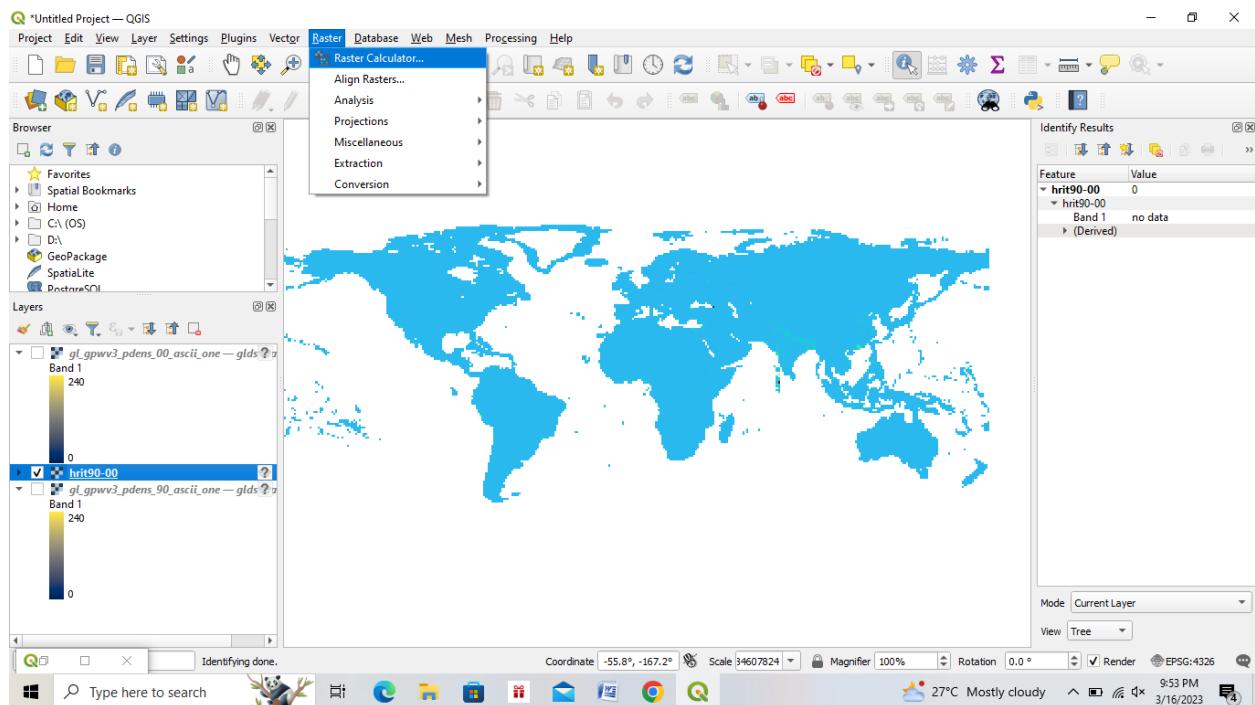
Step 15: Now you will see a much more powerful visualization where you can see areas which has seen positive and negative population density changes. Click on Zoom In button and draw a rectangle around Europe to explore the region in more detail.



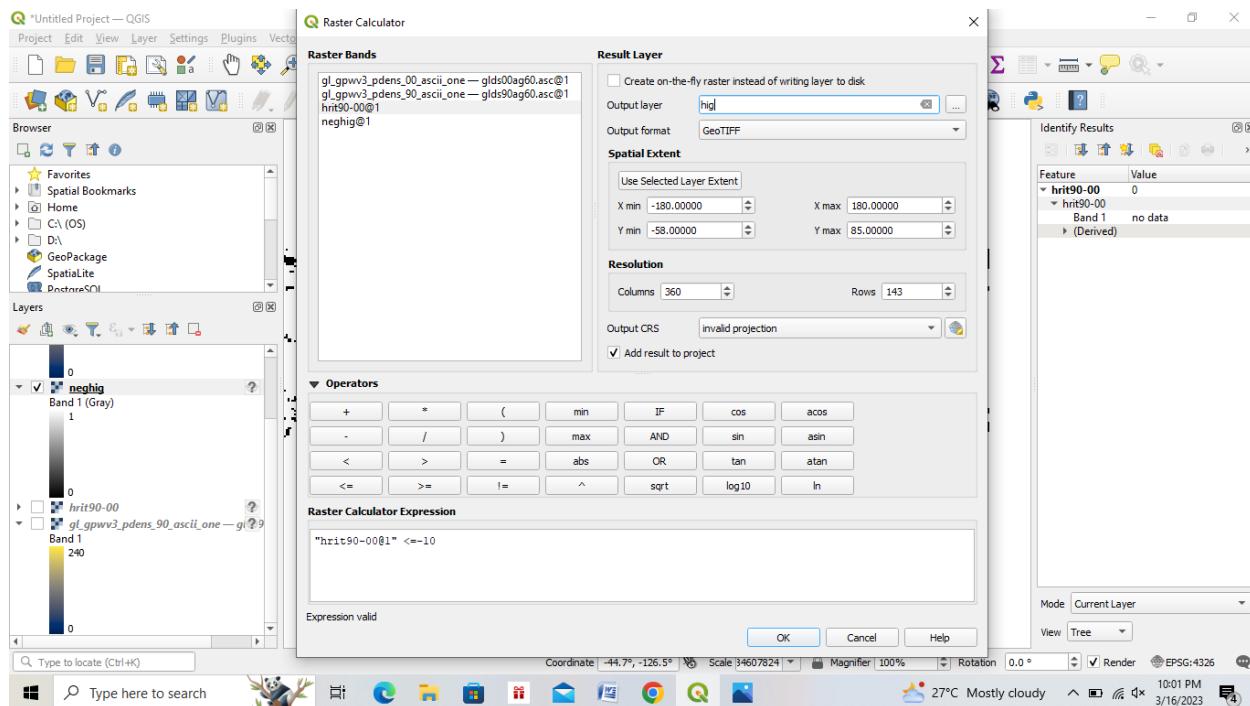
Step 16: Select the Identify tool and click on the Purple and Yellow regions to verify that your styling rules worked as intended.



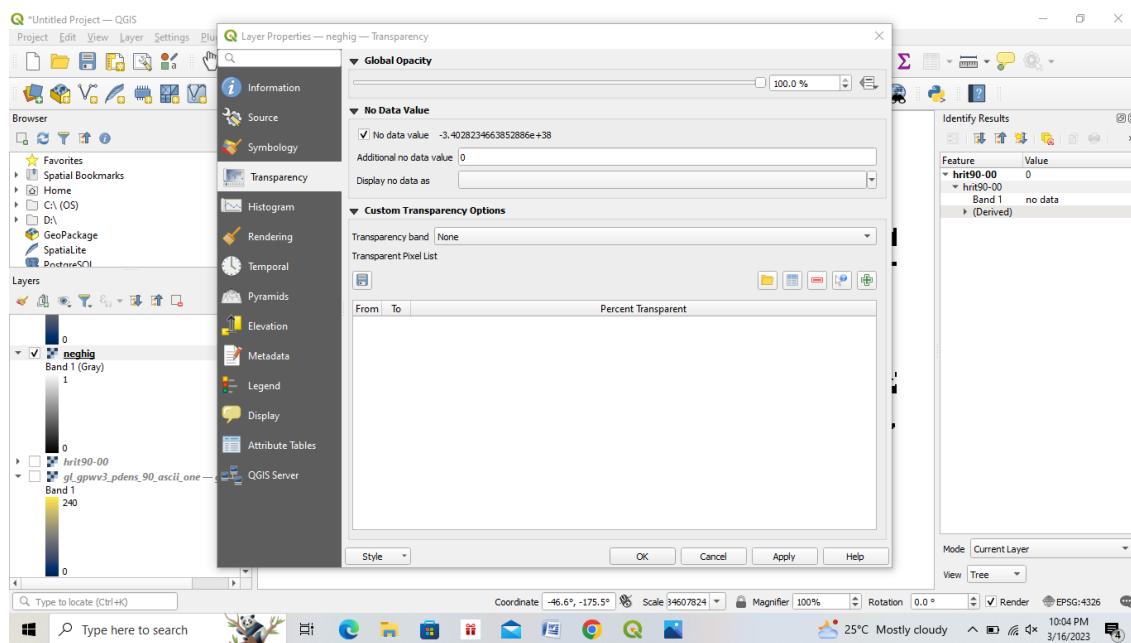
Step 17: Now let's take this analysis one-step further and find areas with only negative population density change. Open Raster ▶ Raster calculator



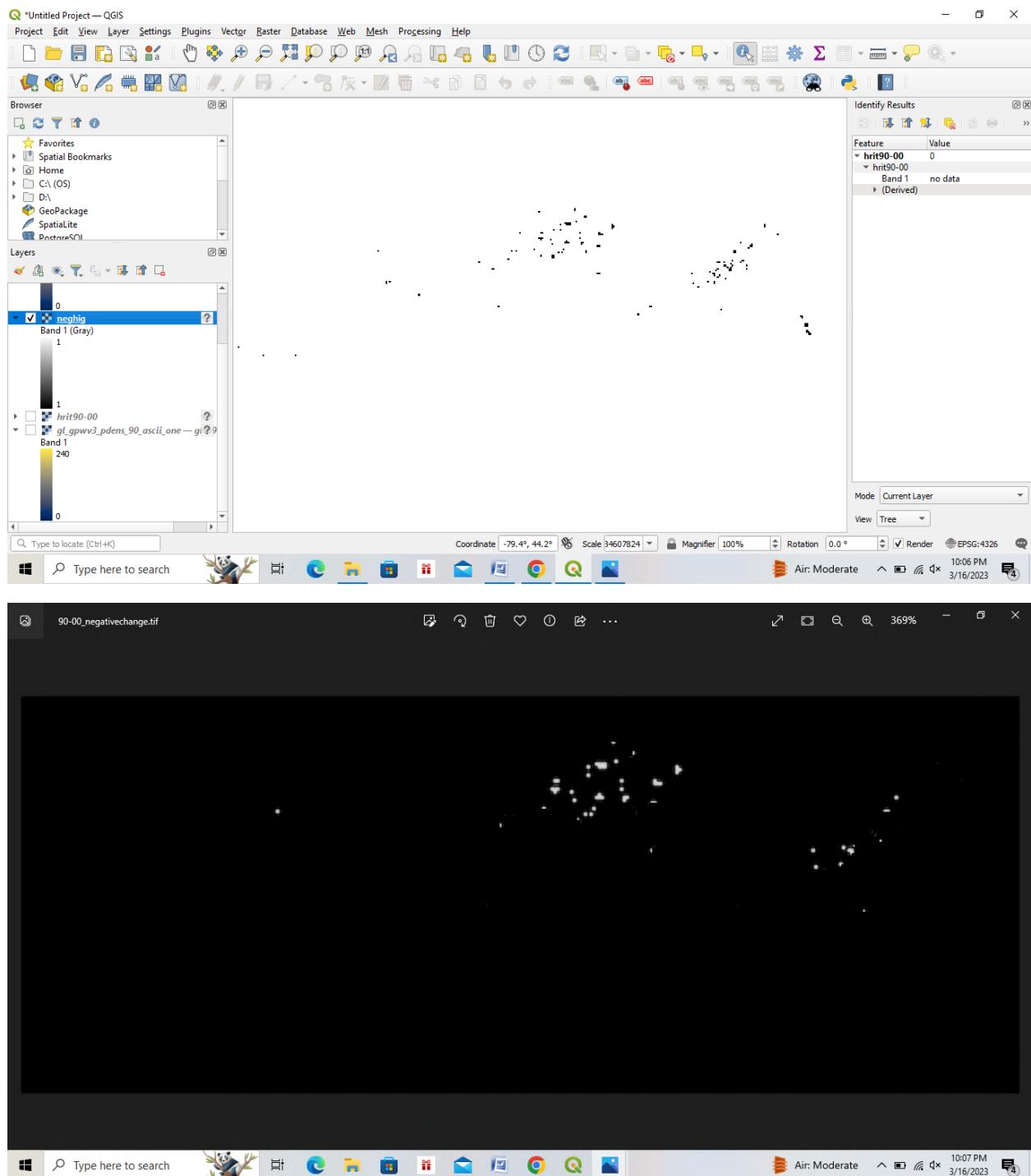
Step 18: Enter the expression as shown below. What this expression will do is set the value of the pixel to 1 if it matches the expression and 0 if it doesn't. So we will get a raster with pixel value of 1 where there was negative change and 0 where there wasn't. Name the output layer as pop_negative_change_2000_1990 and check the box next to Add result to project. Click OK.



Step 19: Once the new layer is loaded, right-click on it and select Properties. In the Transparency tab, add 0 as the Additional no data value. This setting will make the pixels with 0 values also transparent. Click OK.



Step 20: Now you will see the areas of negative population density change as gray pixels.

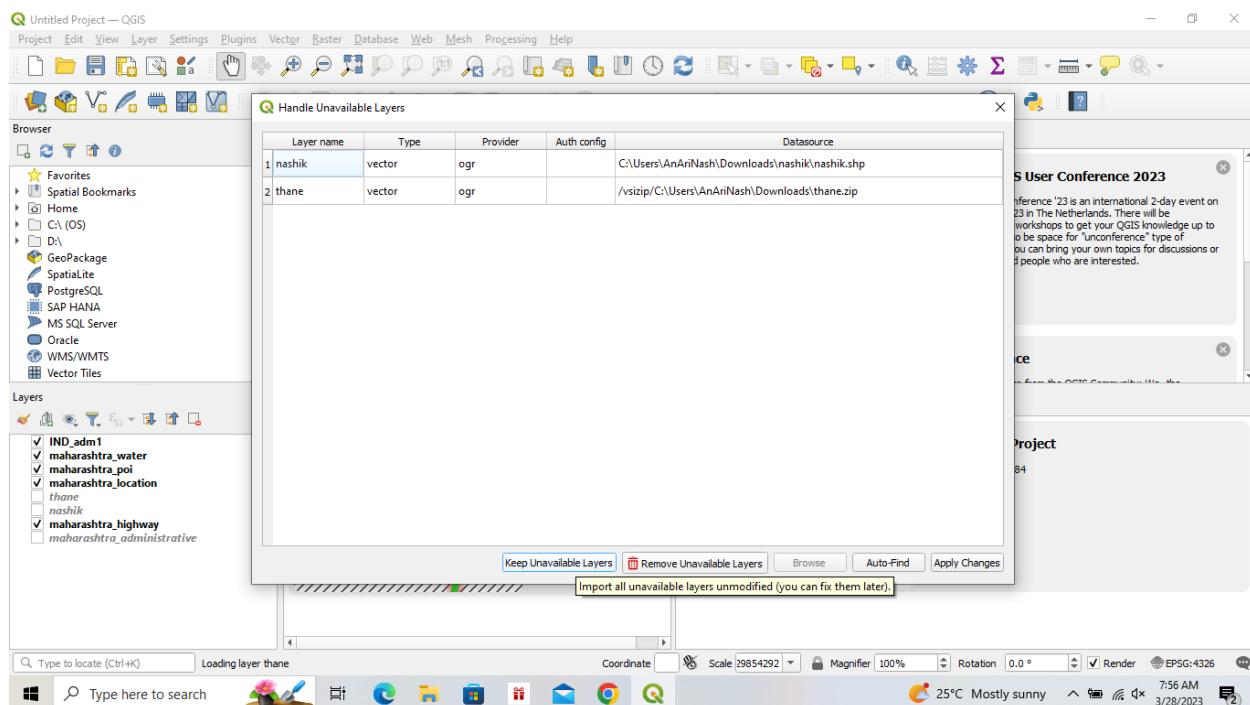
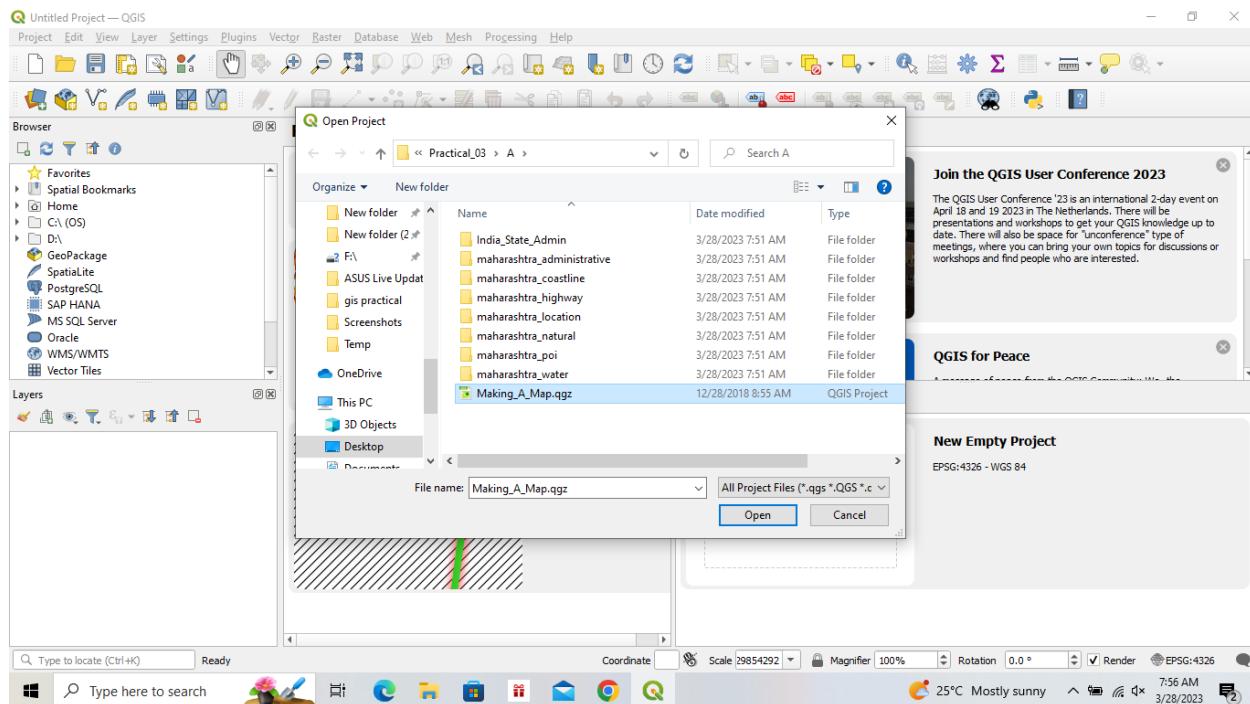


Practical 3: Making a Map, Working with Attributes, Importing Spreadsheets or CSV files Using Plugins, Searching and Downloading Open Street Map Data.

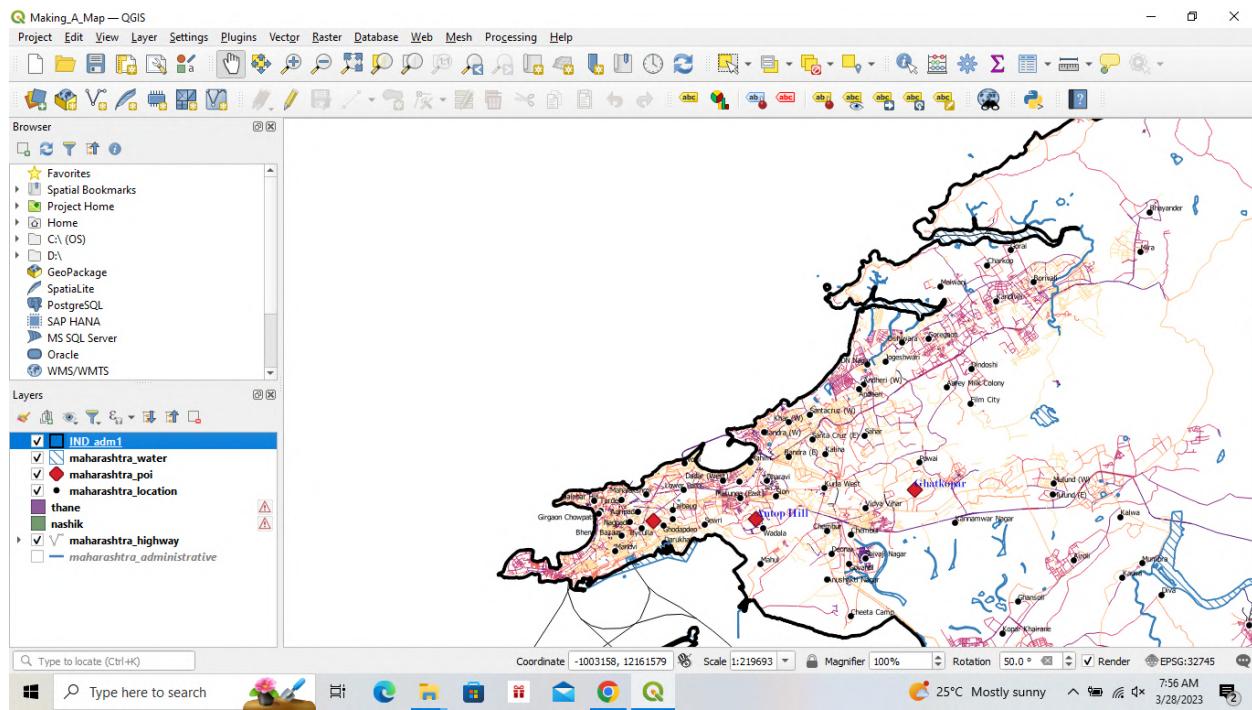
Aim: The aim of this practical is to create a map step-by-step using OpenStreetMap Data.

a) Making a Map

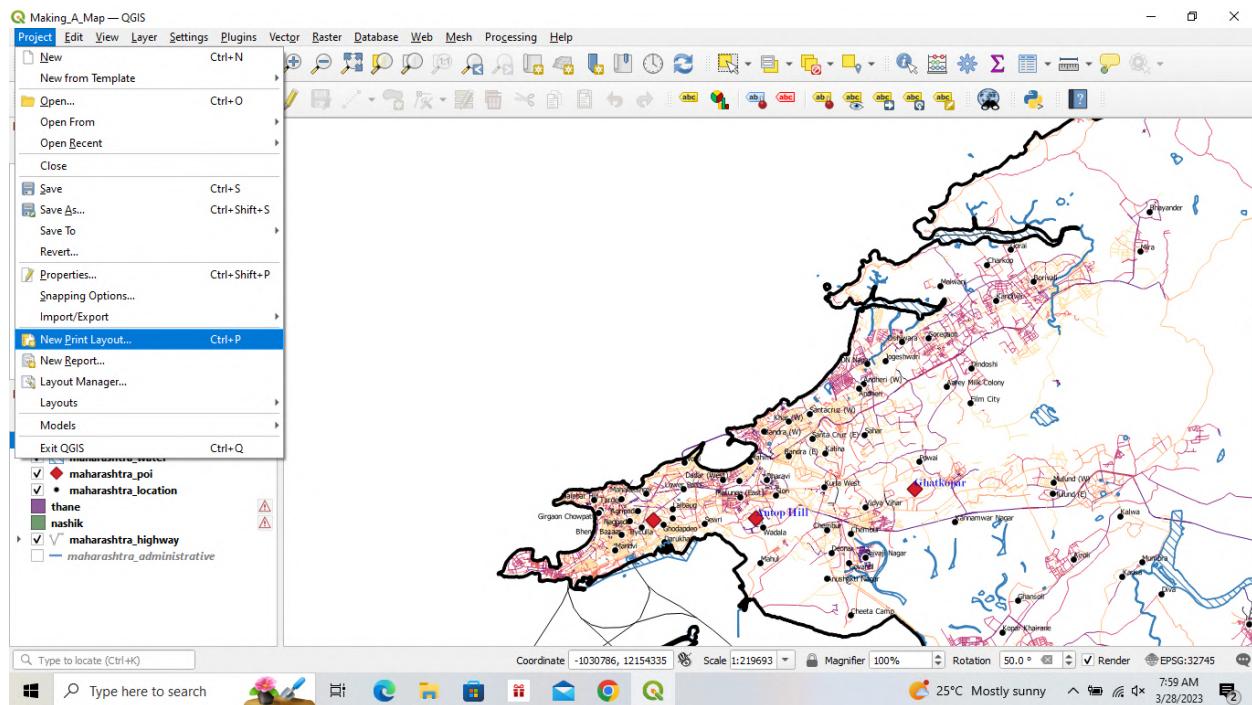
Step 1: Create a new Thematic Map or open an existing one by clicking on Project ,Open



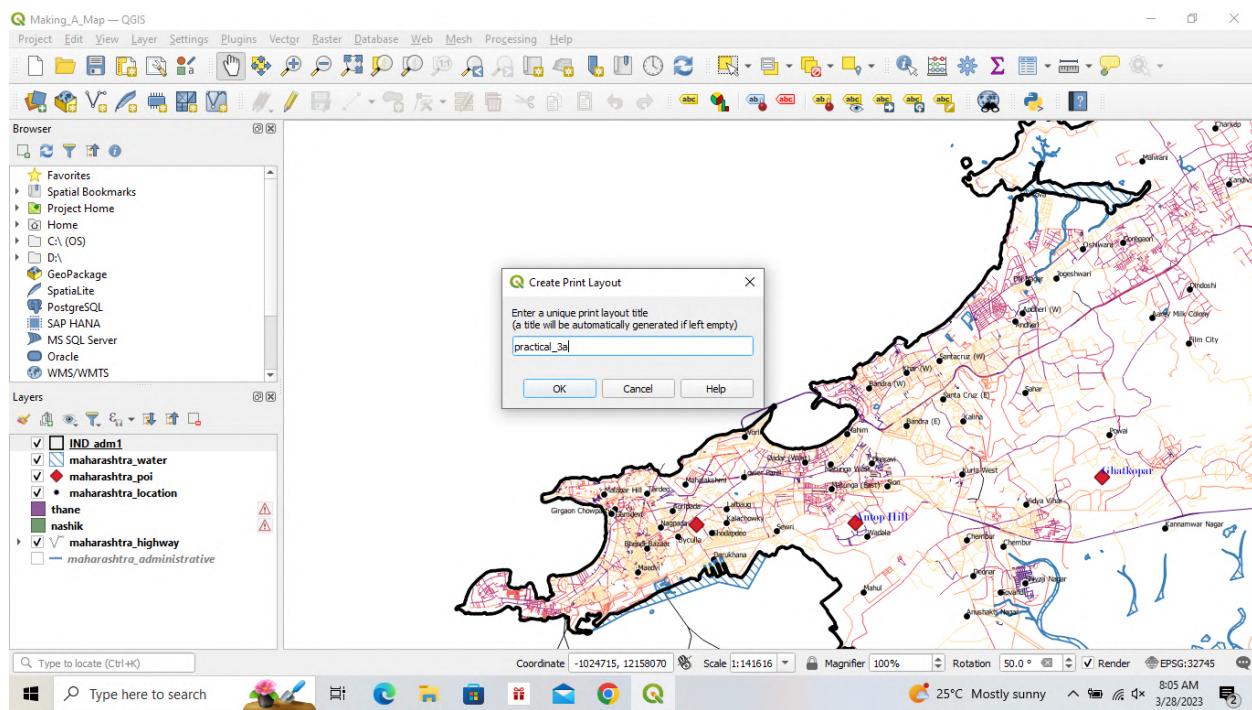
Step 2: After opening the map, it should look somewhat like this in your QGIS application



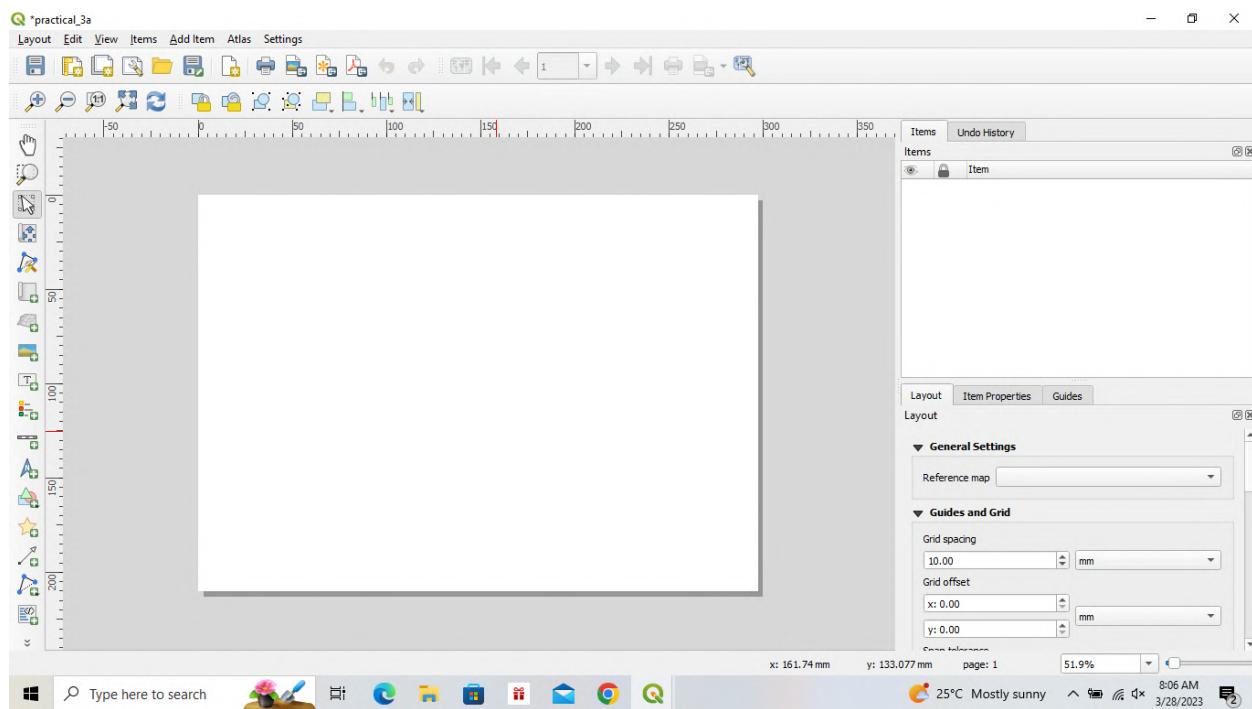
Step 3: Next, Click on Project ,New Print Layout



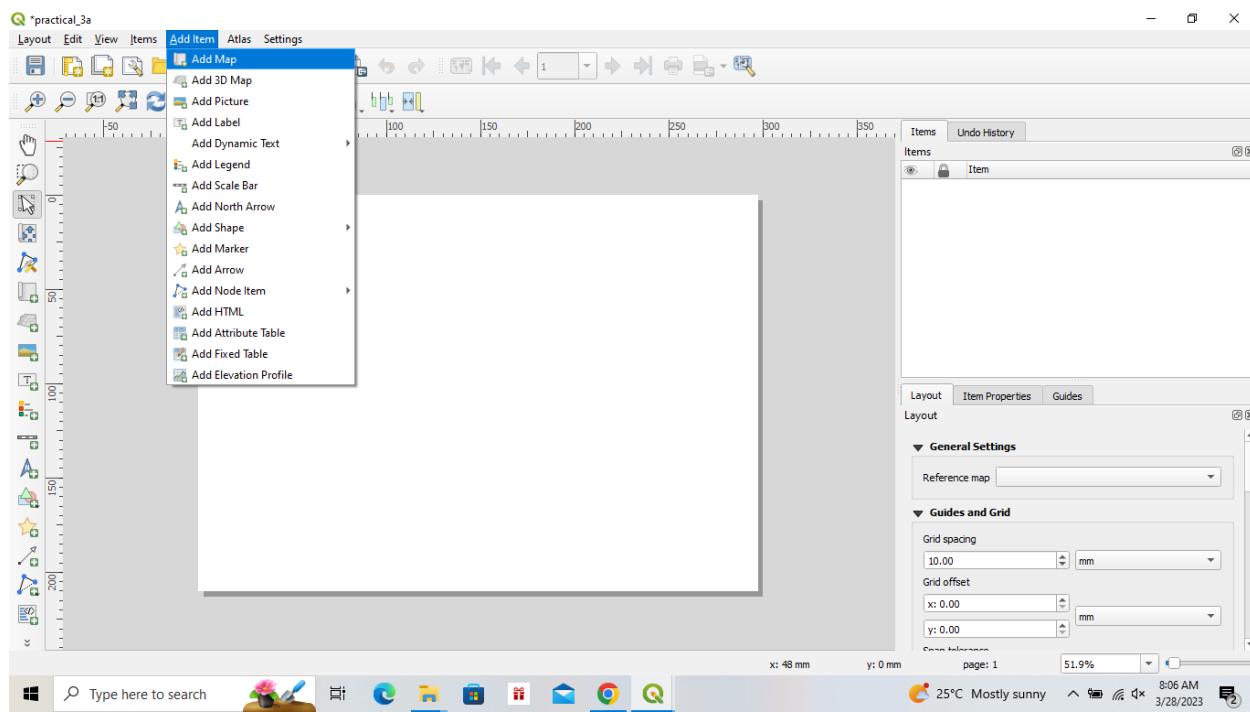
Step 4: Insert a suitable title and press “OK”



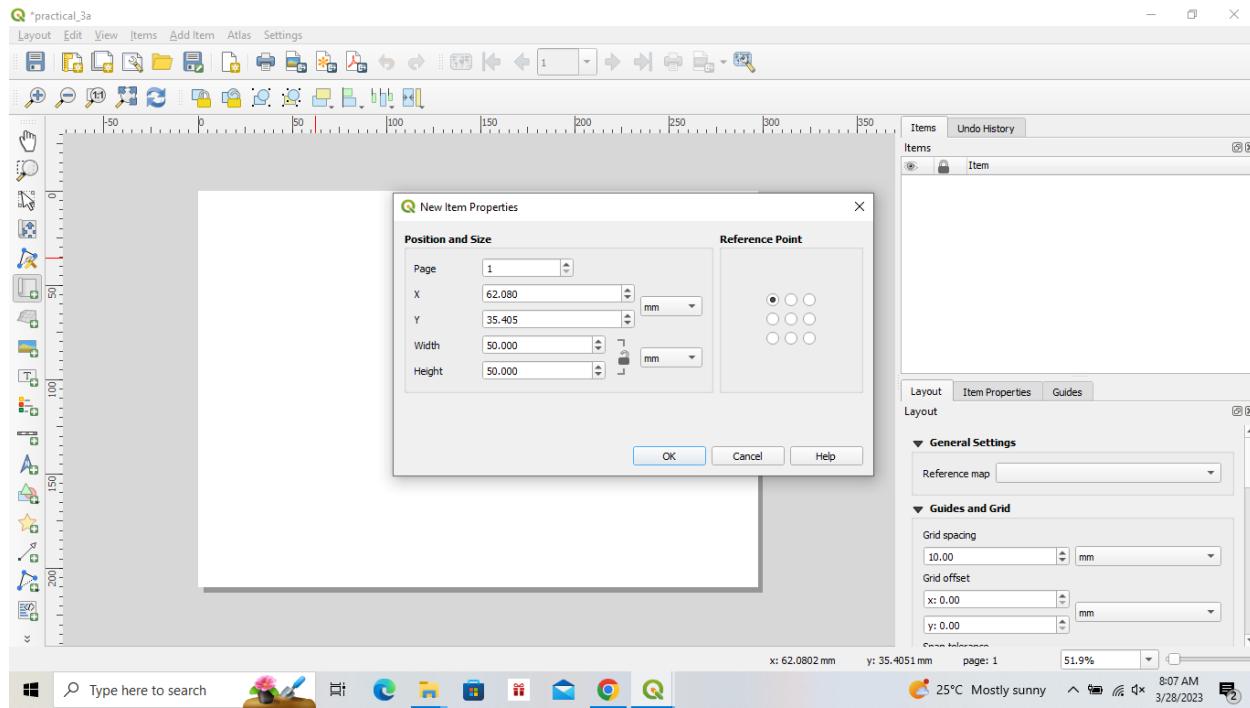
Step 5: A new Print Layout Window will Open



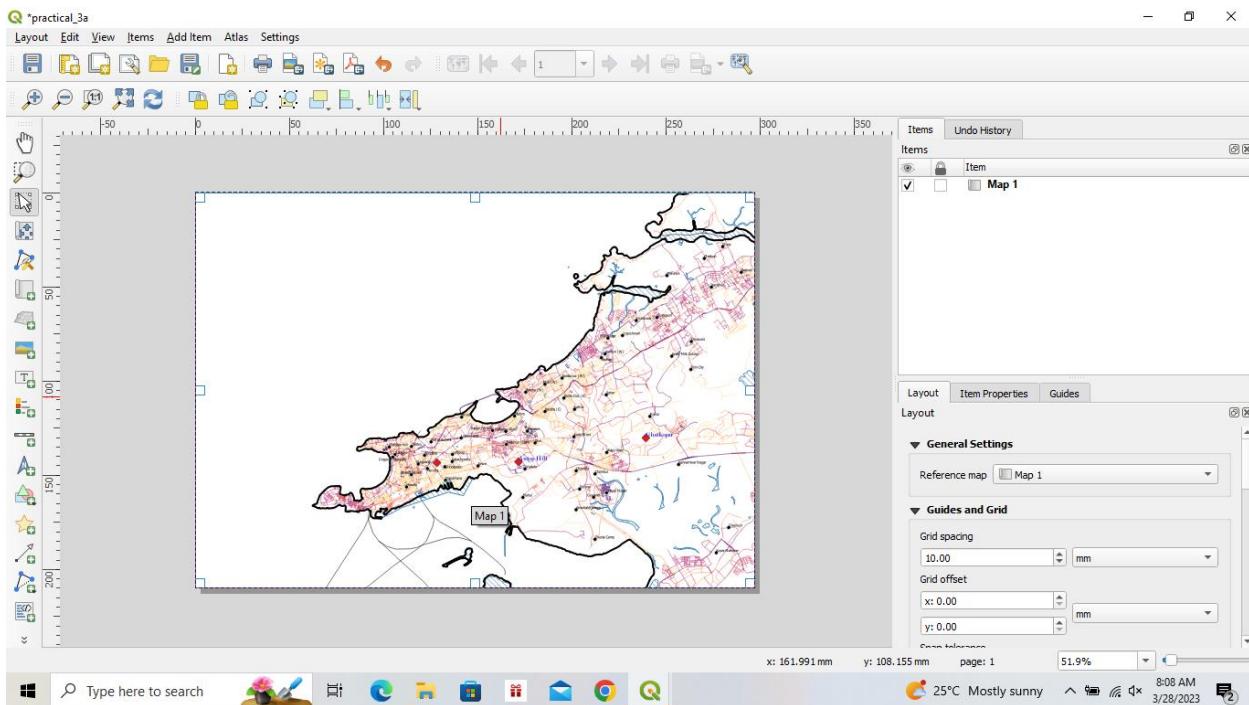
Step 6: Select Add Item. Add Map



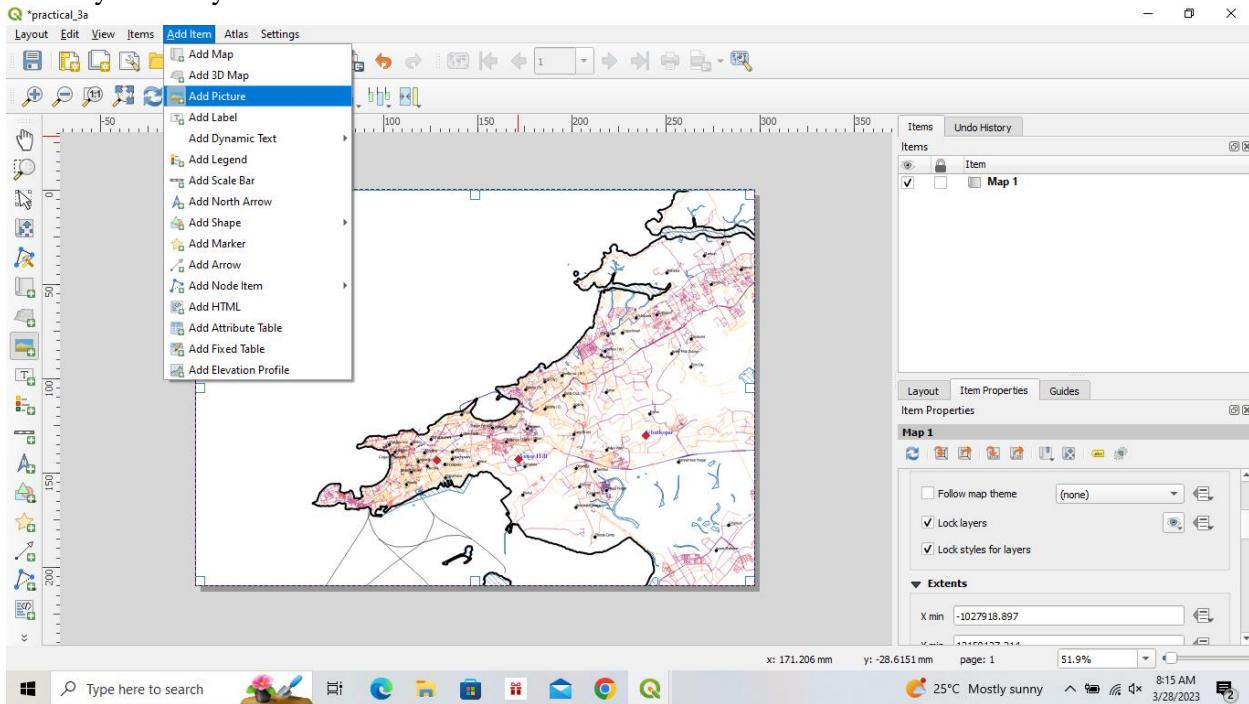
Step 7: Left click on the canvas and you should be presented with the following dialog box.



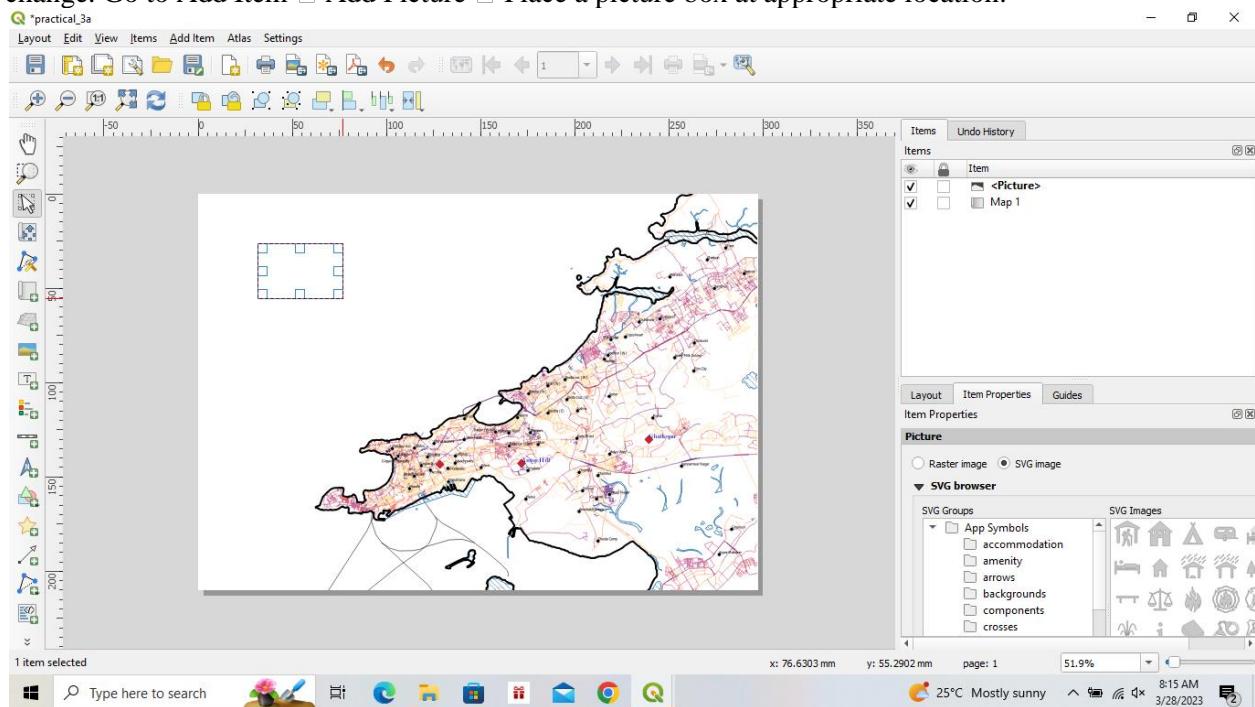
Step 8: Click “OK” to keep and select the default values and your map should now be created. Resize it so that it takes up the entire space of the canvas and should look like below:



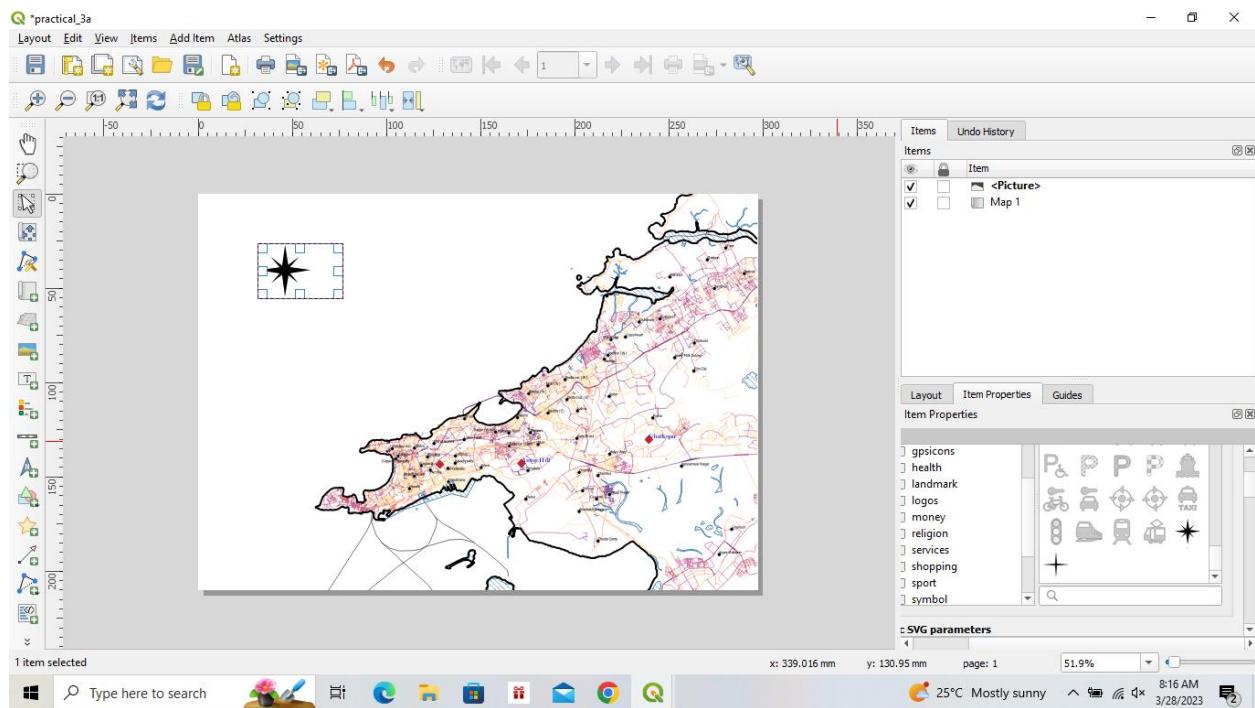
Step 9: After adding the map, go to Item Properties □ Map1 □ Layers and Check on Lock Layers and Lock Styles for layers.



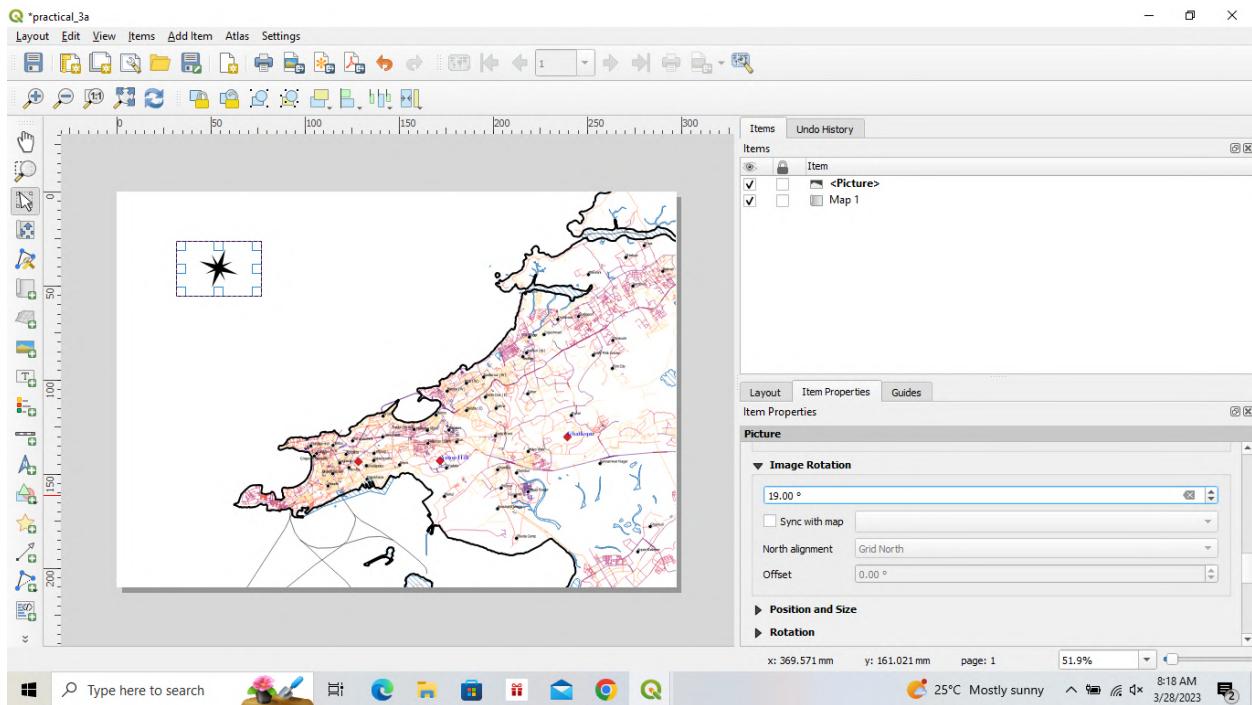
Step 10: This will ensure that if any change in layers or change their styles, the Print Layout view will not change. Go to Add Item □ Add Picture □ Place a picture box at appropriate location.



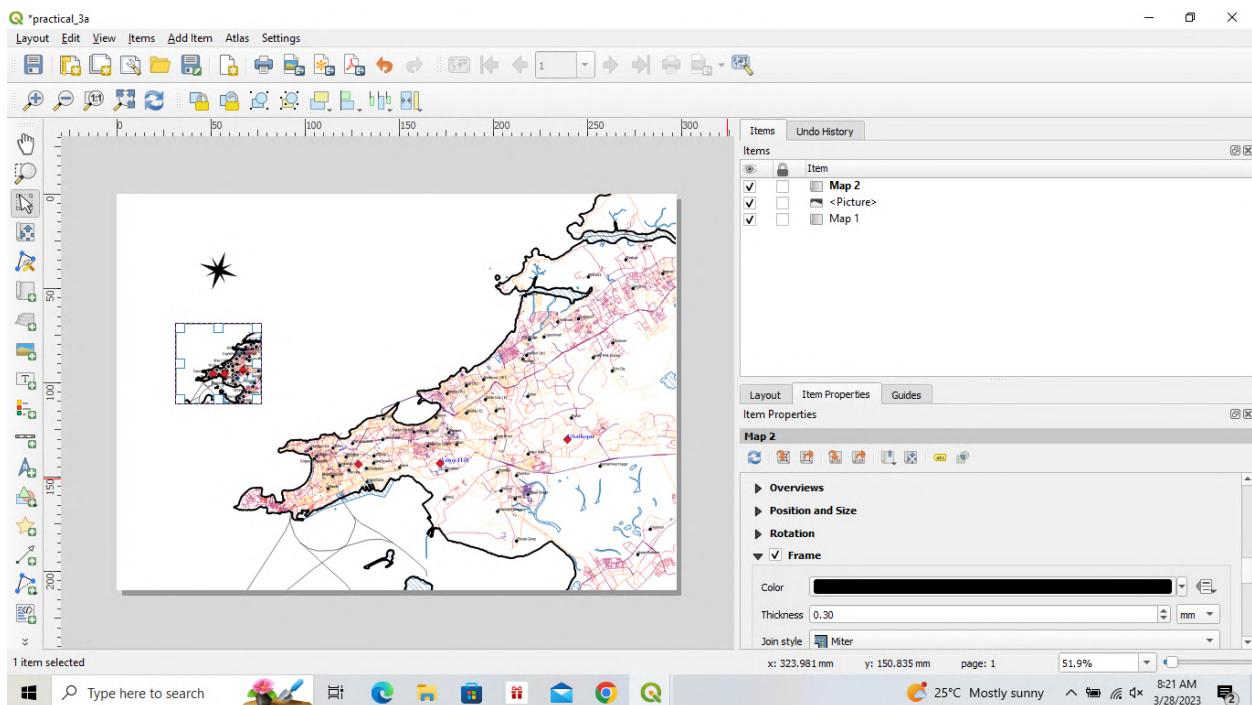
Step 11: Next, select “SVG browser” and select any symbol from “SVG images” you like as seen below:



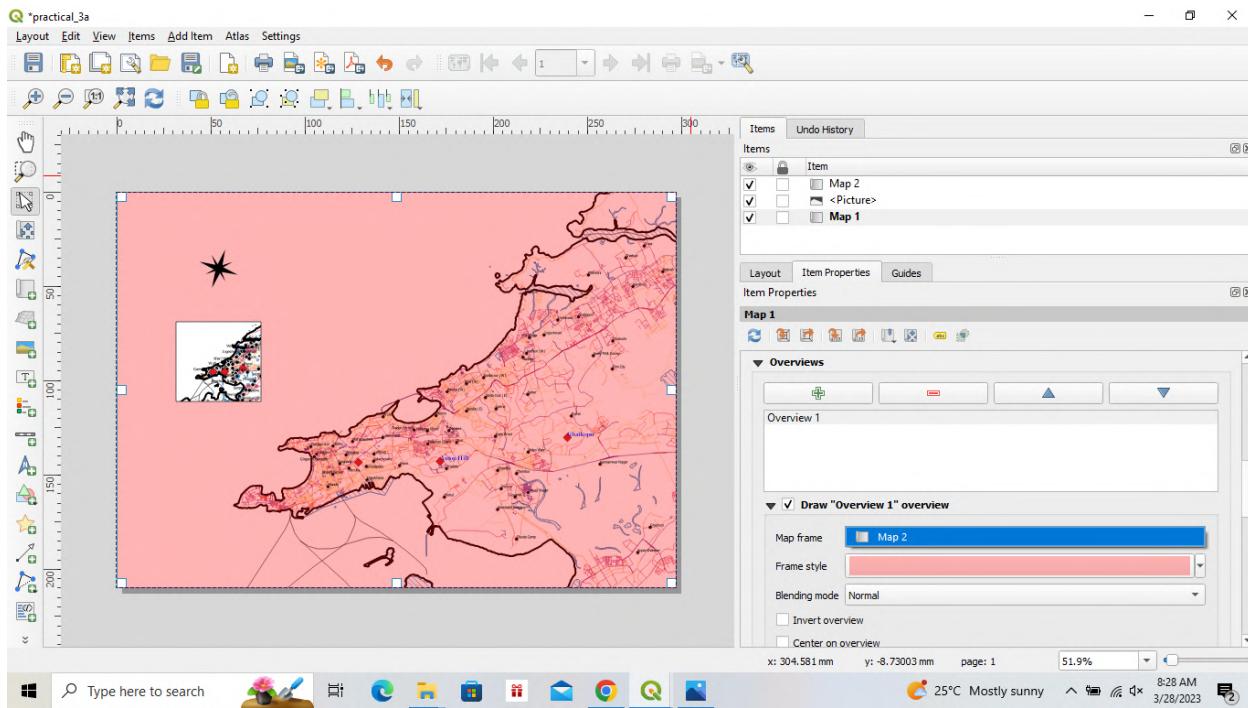
Step 12: Also adjust Image Rotation to its appropriate value by navigating to Item Properties □ Image Rotation. I've rotated it at an angle of 19 degree as shown below:



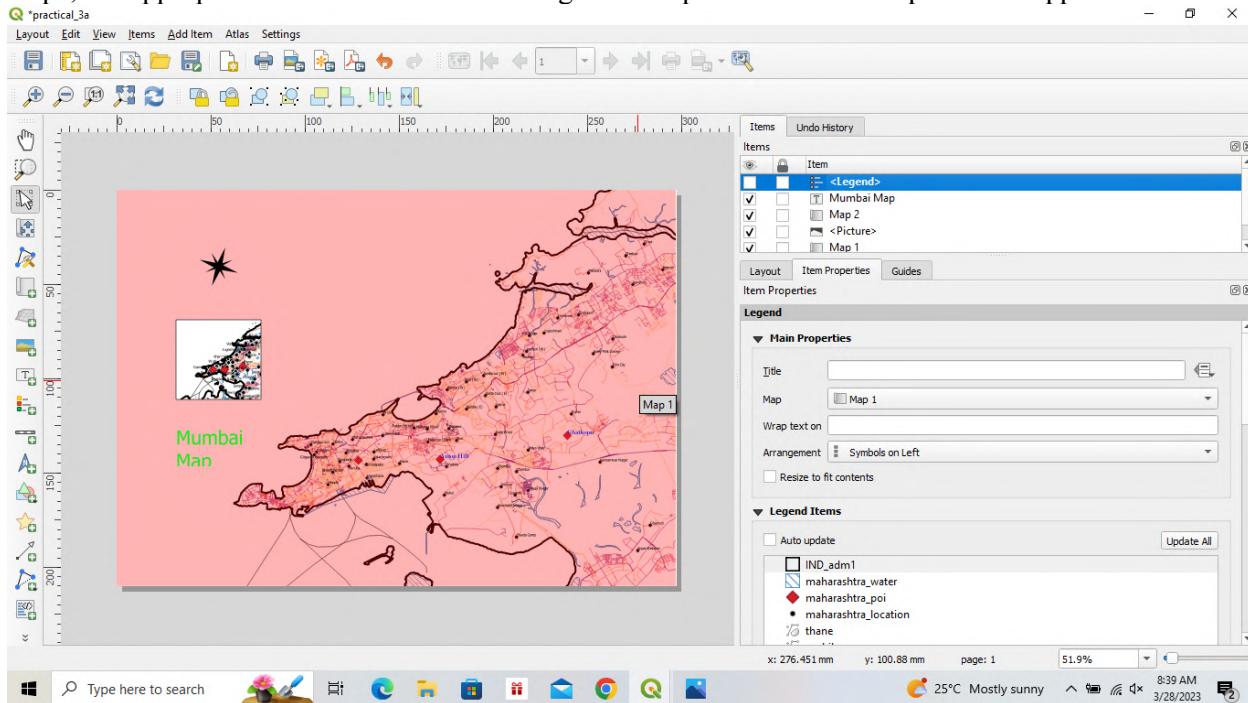
Step 13: Add an inset Using Add Item □ Add Map □ Select an area to be highlighted on main Map. Set a frame for Inset by enabling the check box for Frame



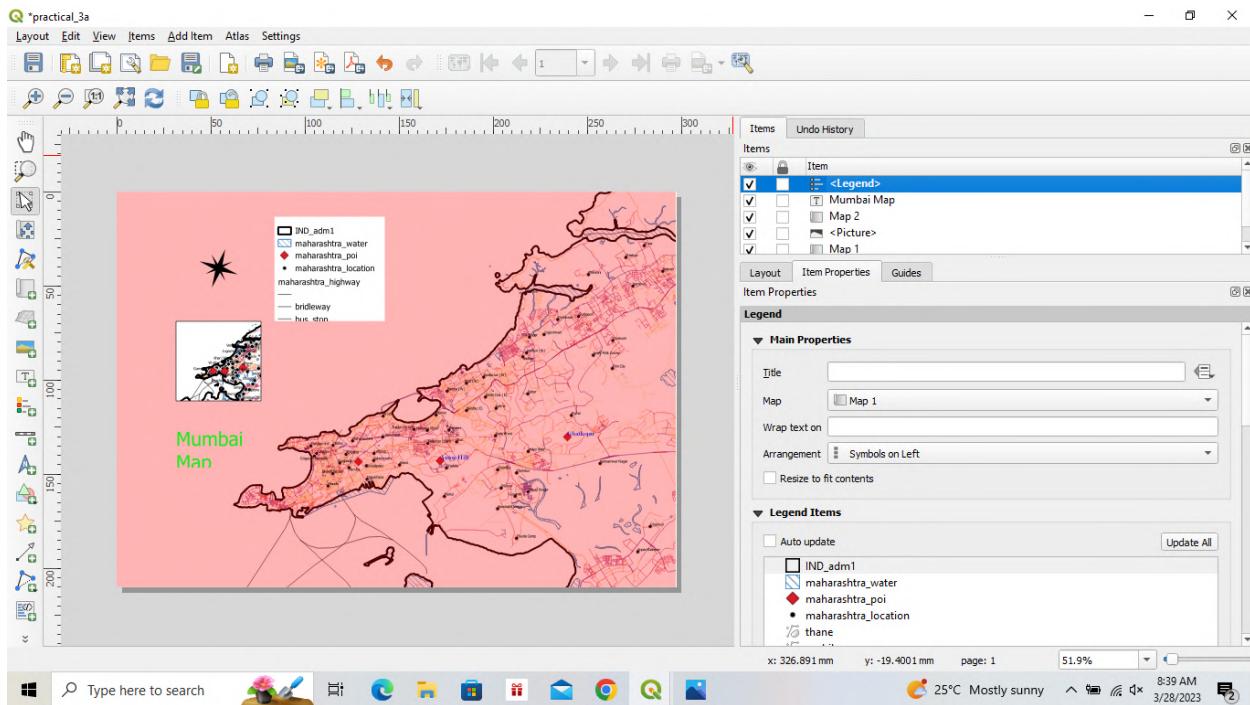
Step 14: To highlight the area shown in Inset, select the Picture representing main Map from Items pane. In Item Properties □ Overviews □ using icon add an overview. Select the checkbox. Draw Overview and name the Picture object representing inset (Map1 in our case) □ What this is telling the Print Composer is that it must highlight our current object **Map 1** with the extent of the map shown in the **Map 2** object).



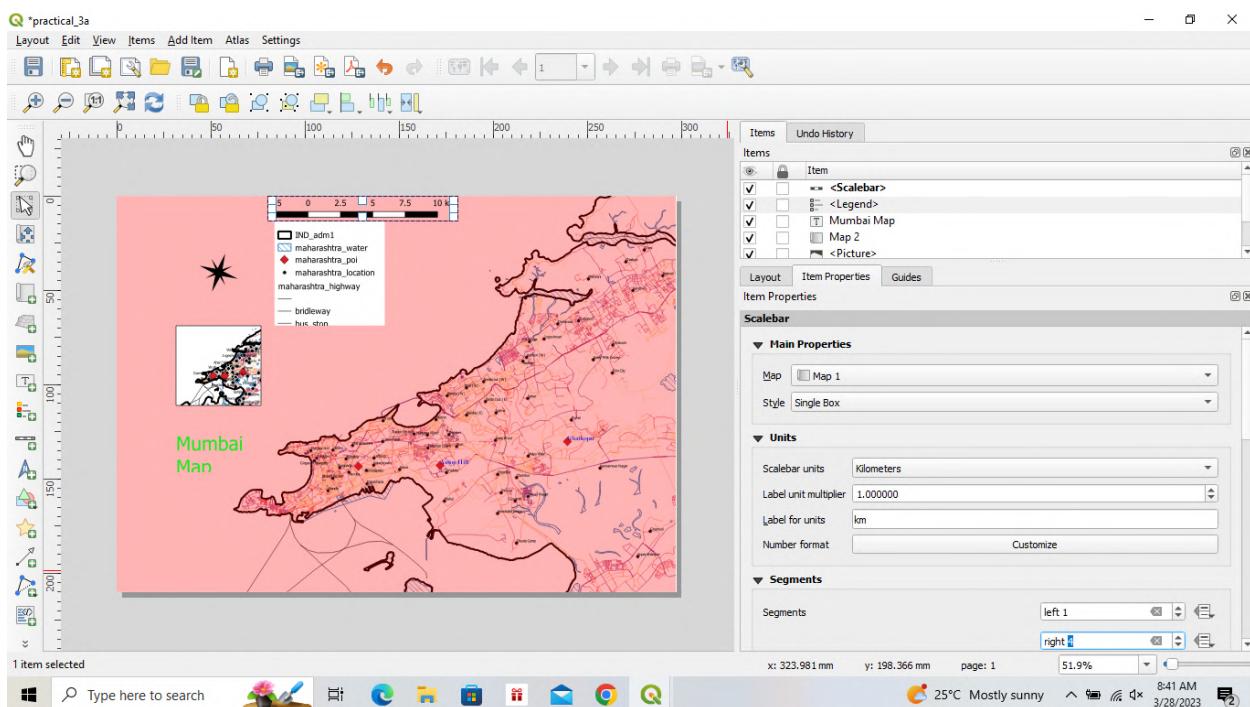
Step 15: Next, add a label by navigating to Add Item □ Add Label. Change the Label text To “Mumbai Map”, Set appropriate font size and colour using Item Properties □ Main Properties □ Appearance.



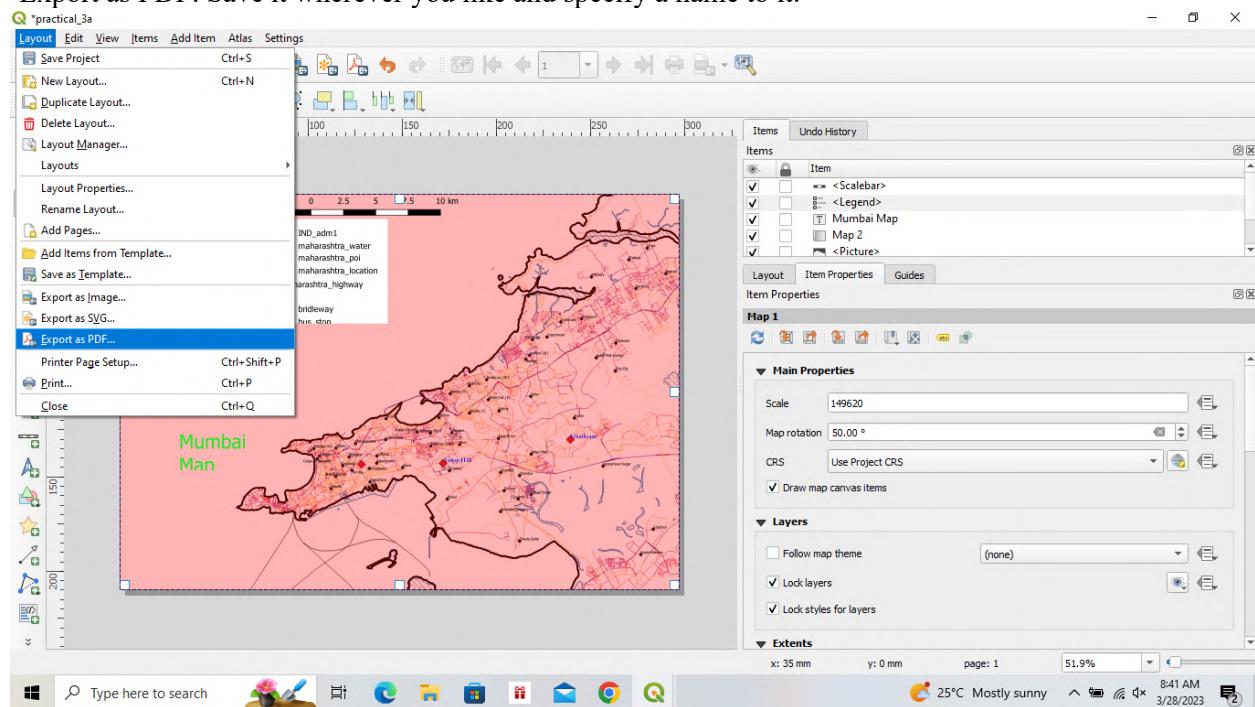
Step 16: Next go to Add Item □ Add Legend □ Place the legend indicator at appropriate location. Uncheck “Resize to fit contents and Auto update” and use suitable legend indicator label



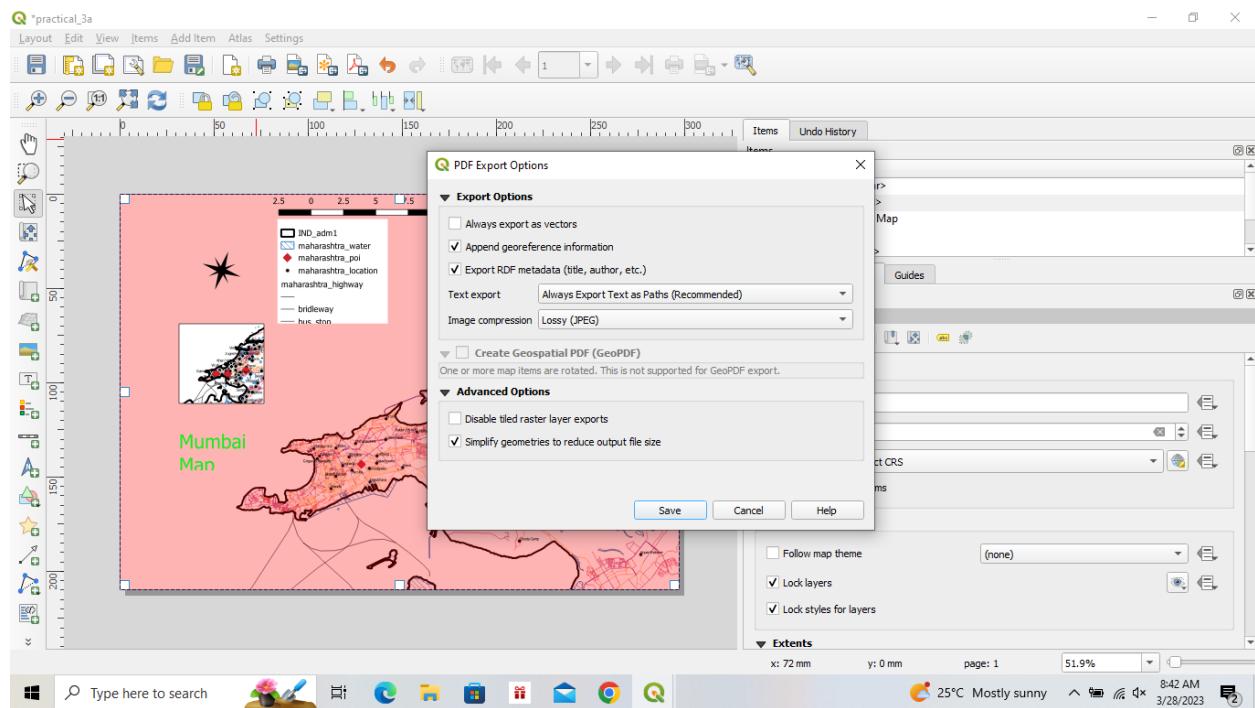
Step 17: Next, add a Scale bar by navigating to Add Item □ Add Scale Bar and add left 1 and right 4 respectively in the segments section:

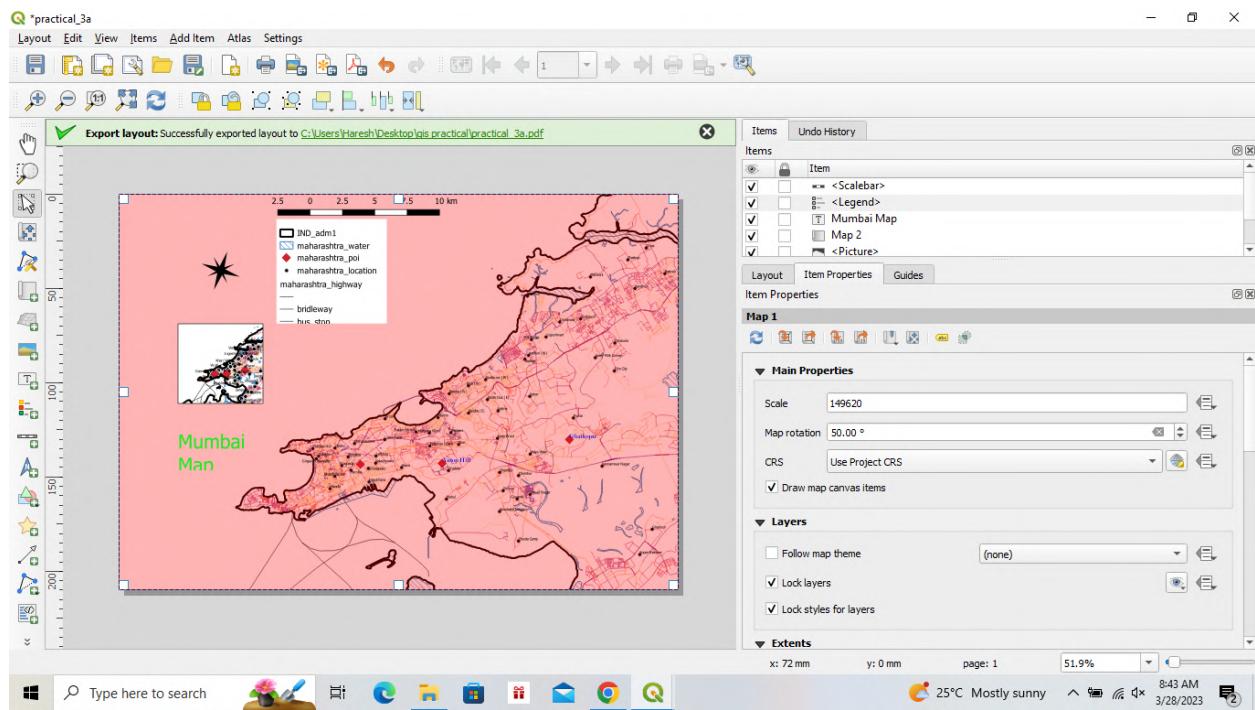


Step 18: Your image is now ready and can be exported. To do so, click on the “Layout” tab and select “Export as PDF”. Save it wherever you like and specify a name to it.



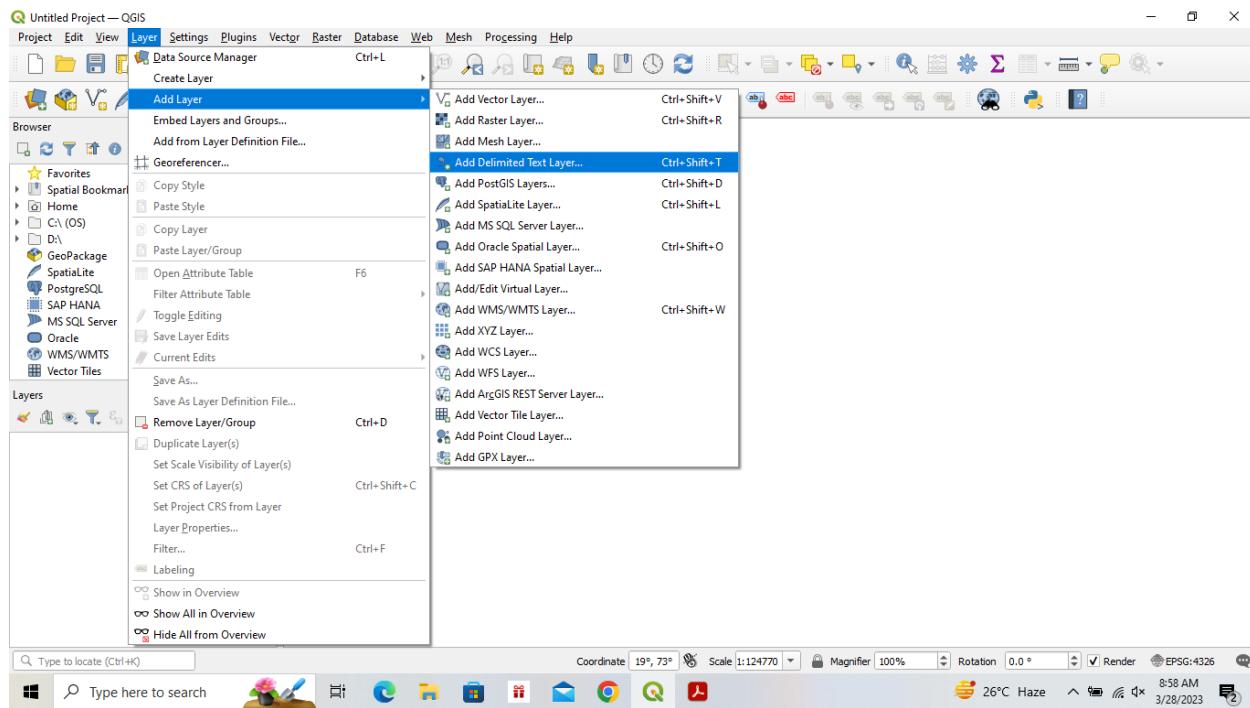
Step 19: At the end, a green dialog box stating “Export Layout: Successfully exported” with a green tick to the left will be displayed as shown below:



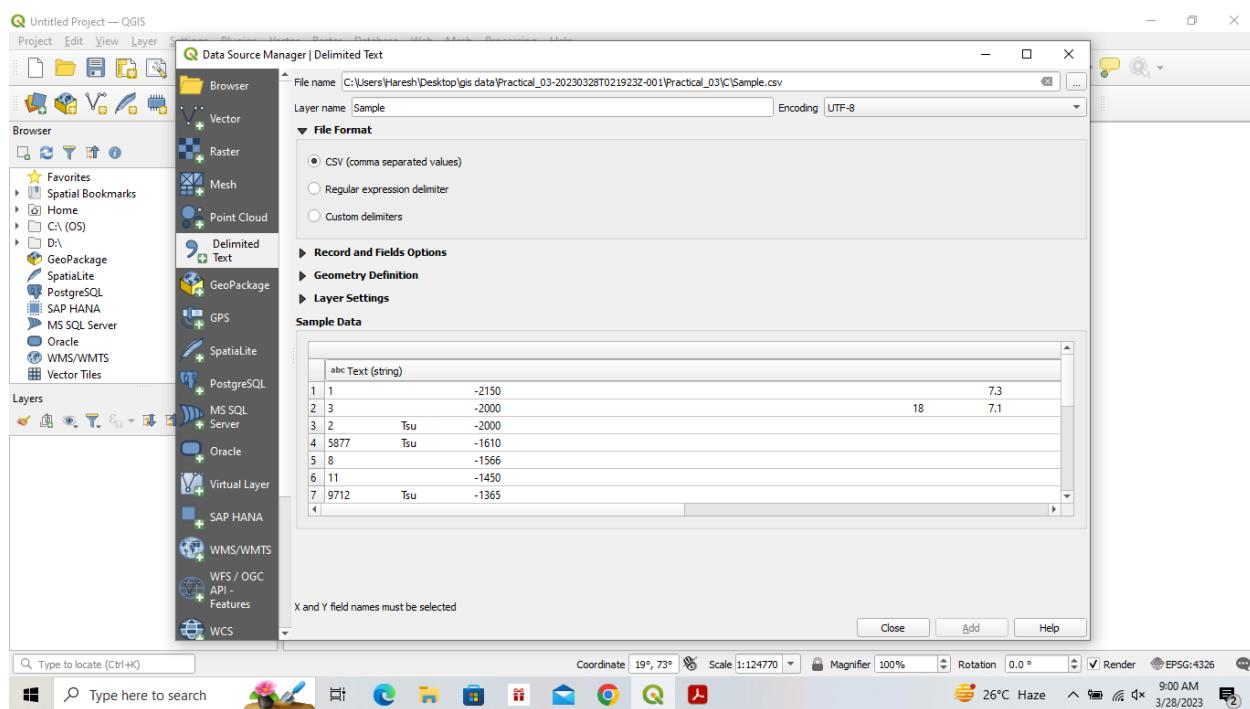


3b. Importing Spreadsheets or CSV files.

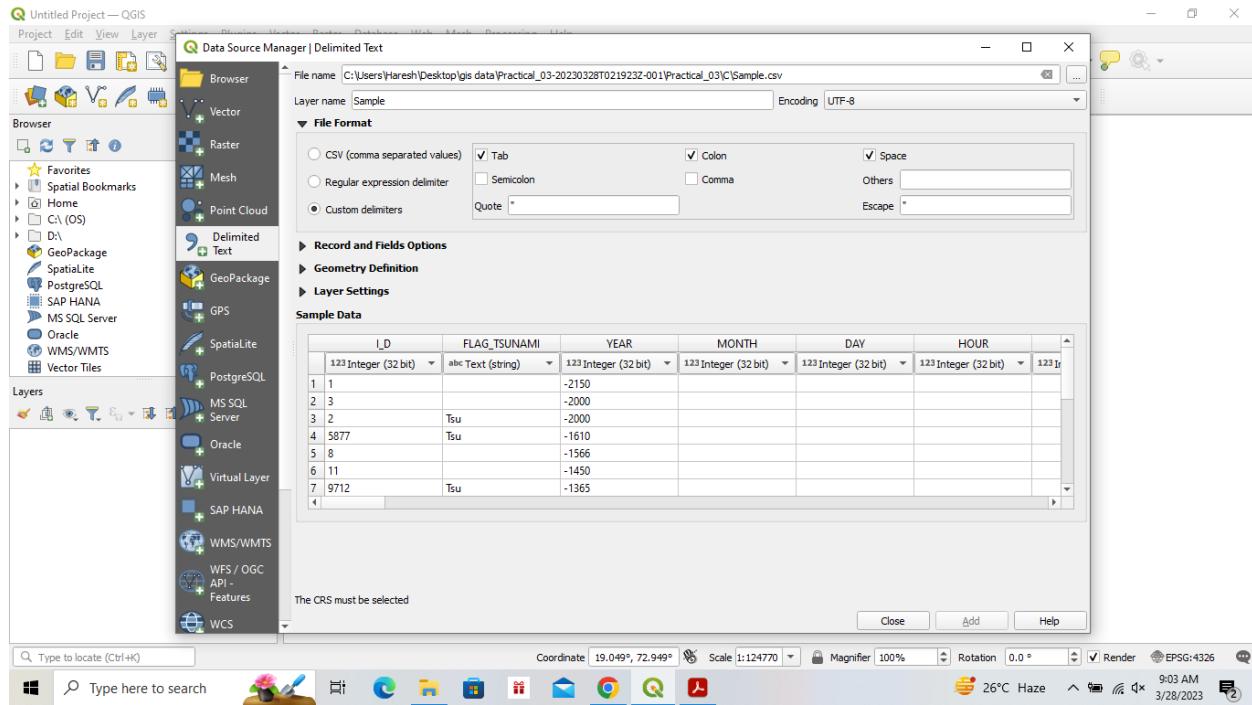
Step 1: Many times the GIS data comes in a table or an Excel spreadsheet or a list lat/long coordinates, therefore it has to be imported in a GIS project. Sample file for Earthquake data will be used in this practical. Go to Layer → Add Layer → Add Delimited text Layer



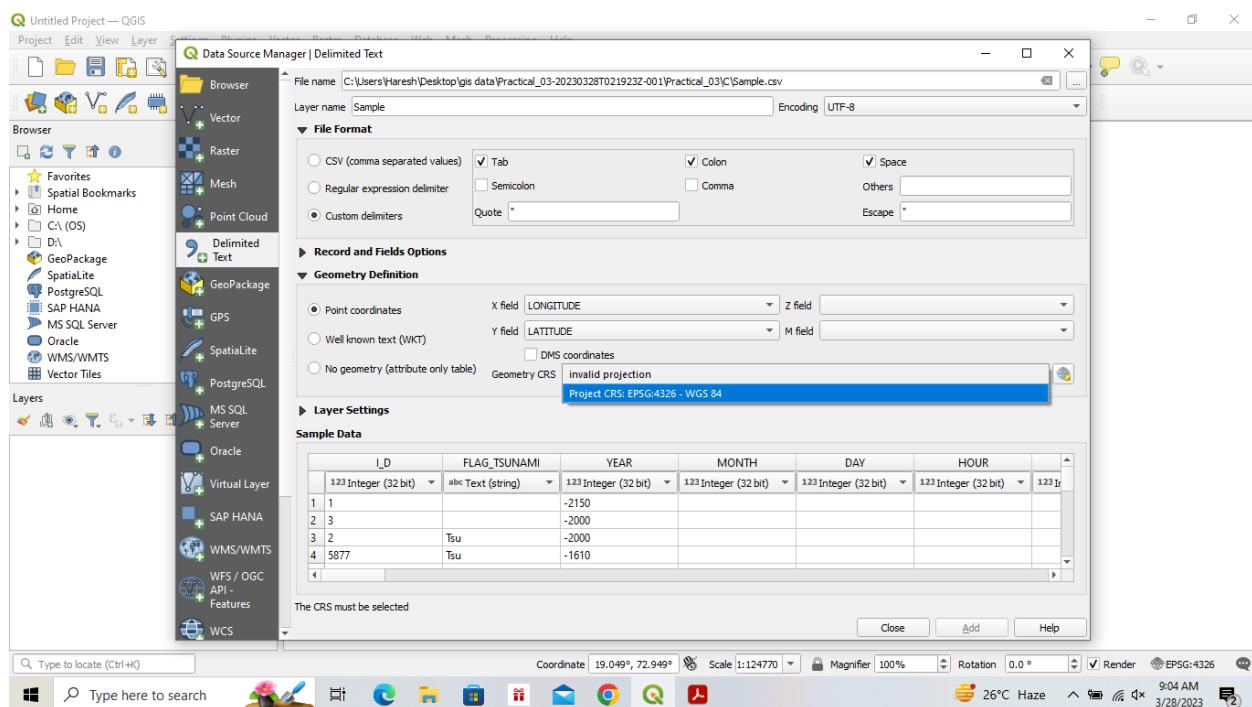
Step 2: Data Source Manager | Delimited Text window will appear. Select the \GIS_Workshop\Practicals\Practical_03\C\Sample.csv file from data folder.



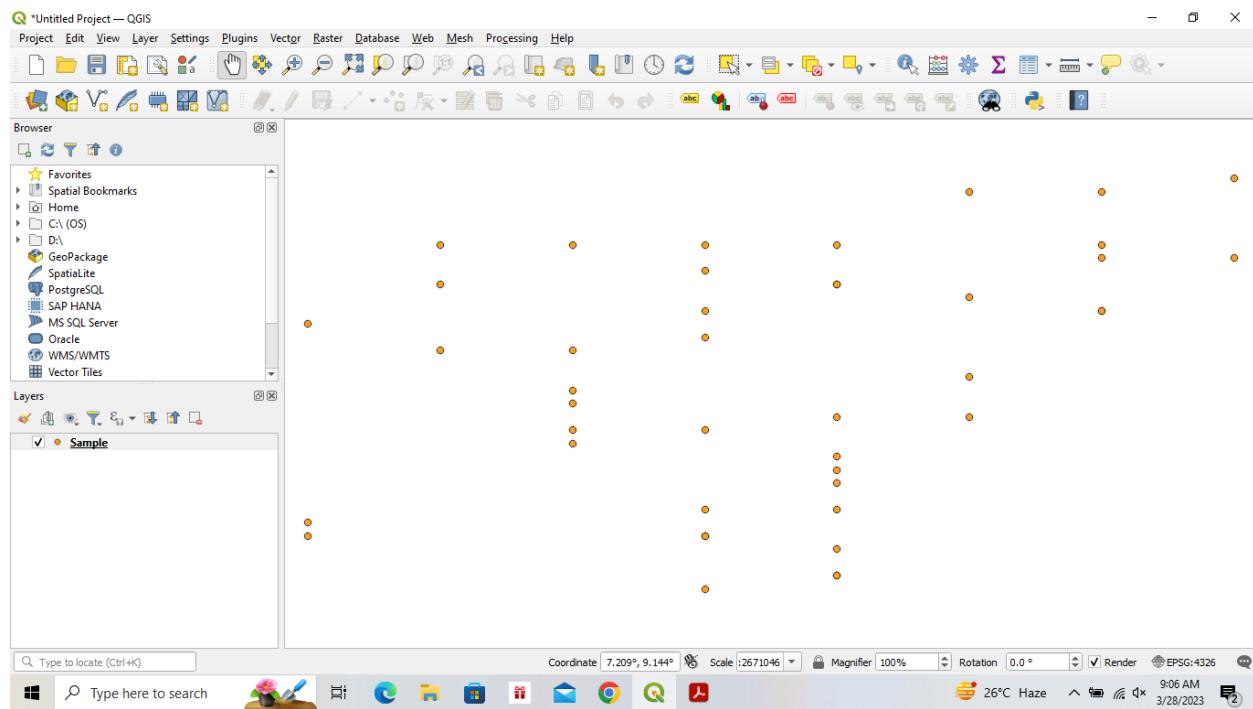
Step 3: Select the “Custom Delimiters” radio buttons and check the “Tab”, “Colon” and “Space” checkboxes.



Step 4: Change the “Geometry CRS: Project CRS” value from the “Geometry Definition” tab in the same window. Select “Longitude” in the X Field and “Latitude” in the Y Field and click on the “Add” button.



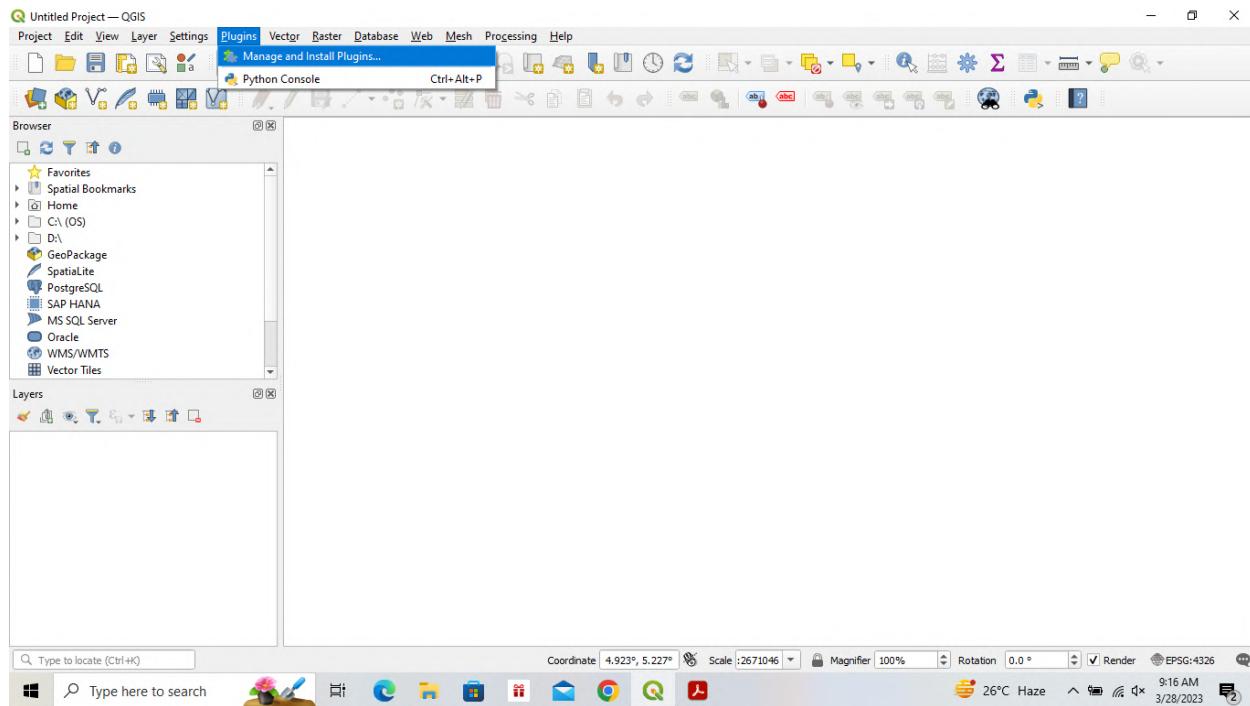
Step 5: These coordinates should then be displayed.



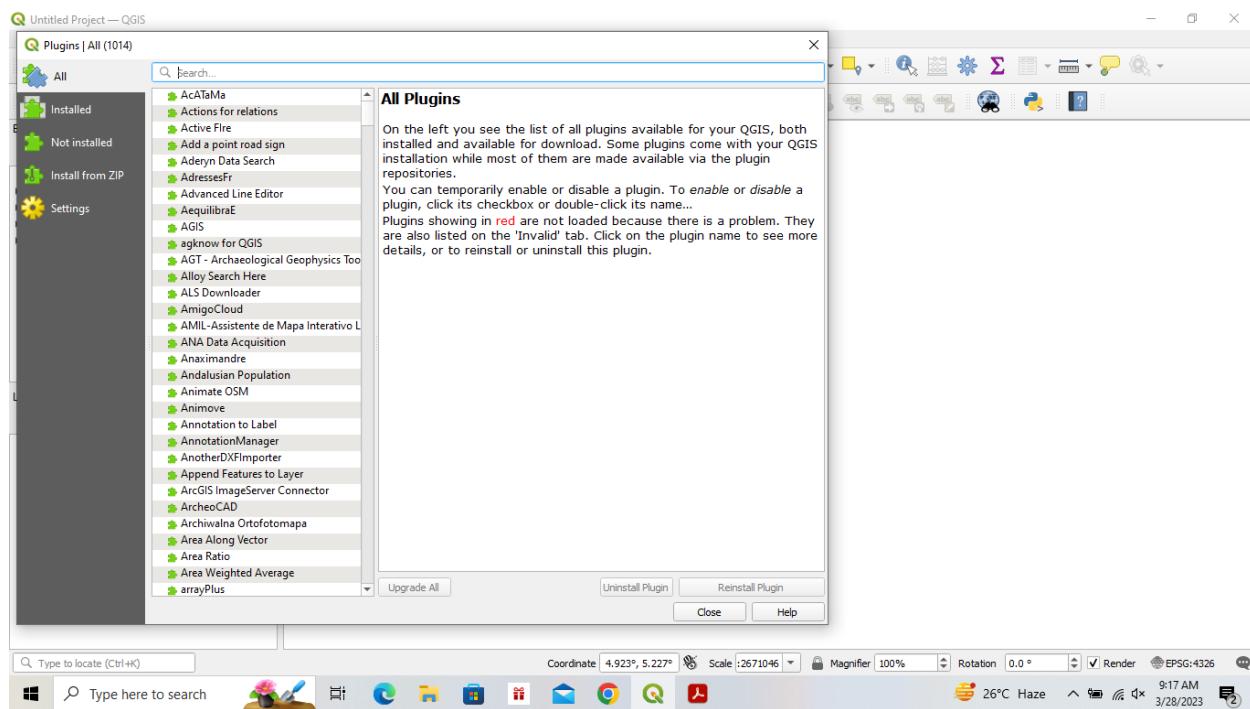
3c. Using Plugins

Step 1: Core plugins are already part of the standard QGIS installation. To use these, just enable them.

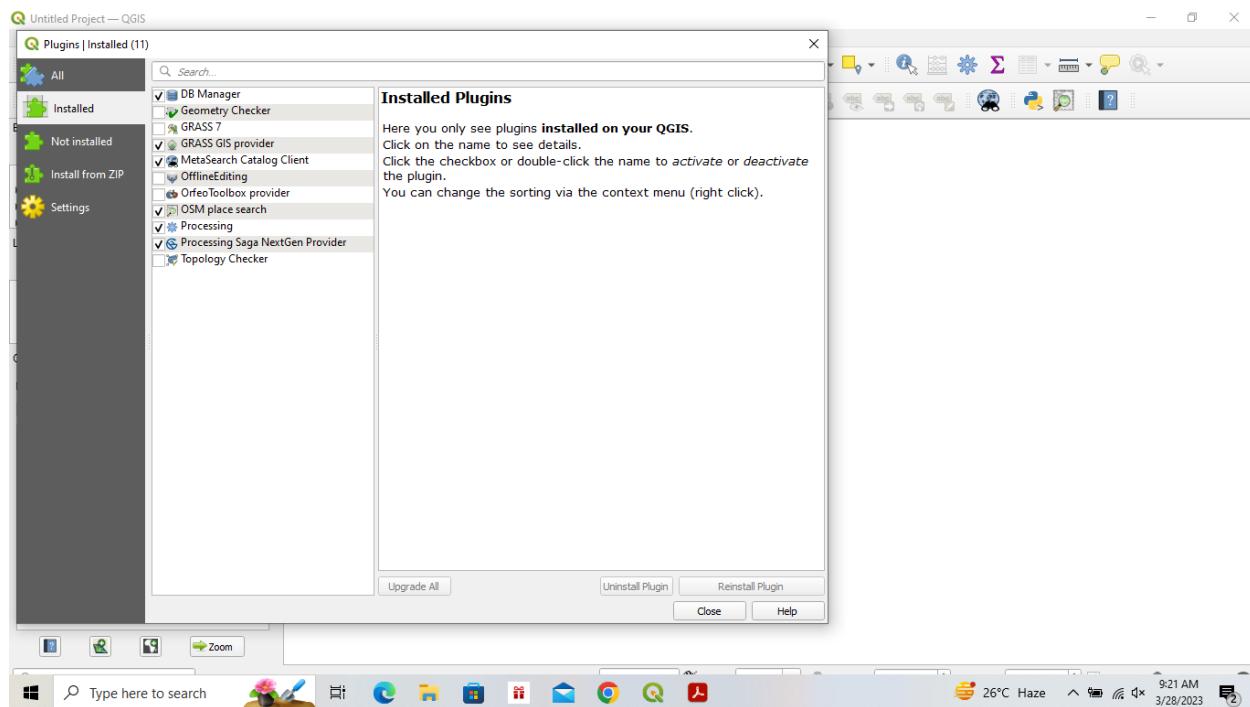
Step 2: Open QGIS. Click on Plugins □ Manage and Install Plugins



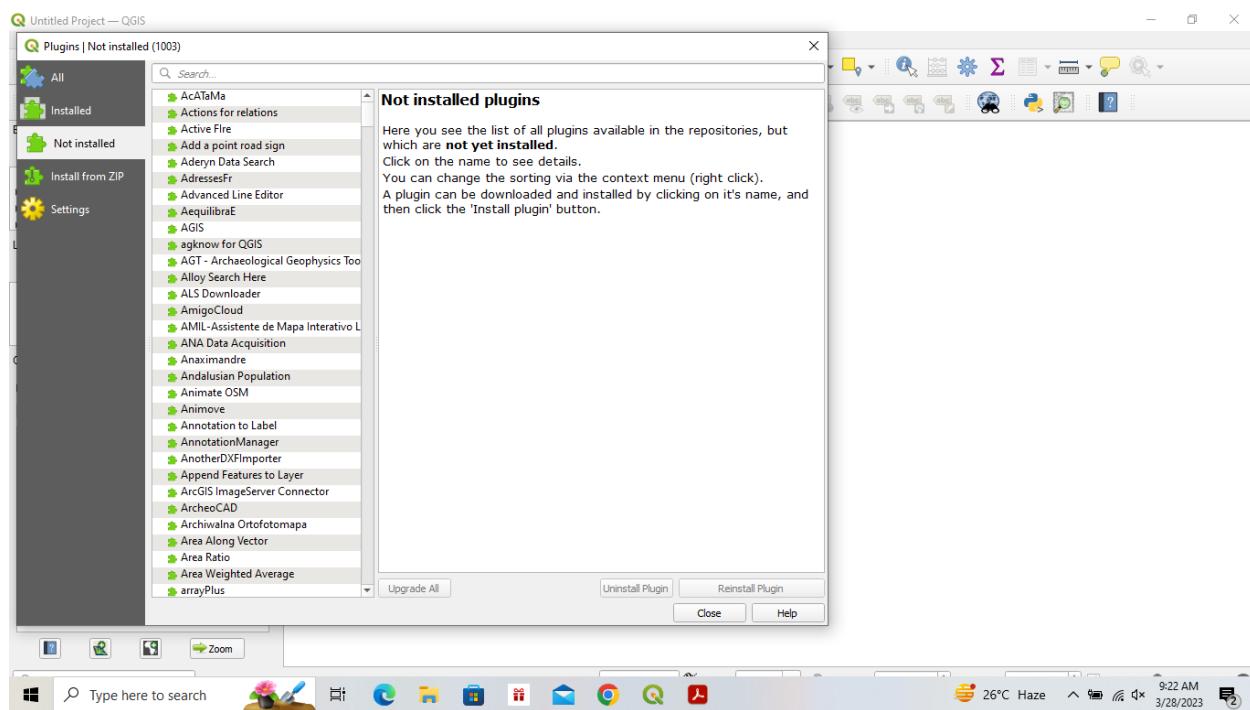
Step 3: After clicking on it, the following window will show up.



Step 4: To enable a plugin, check the checkbox next to the plugin and then you can use it.



Step 5: External plugins are available in the QGIS Plugins repository and need to be installed by you before using them.

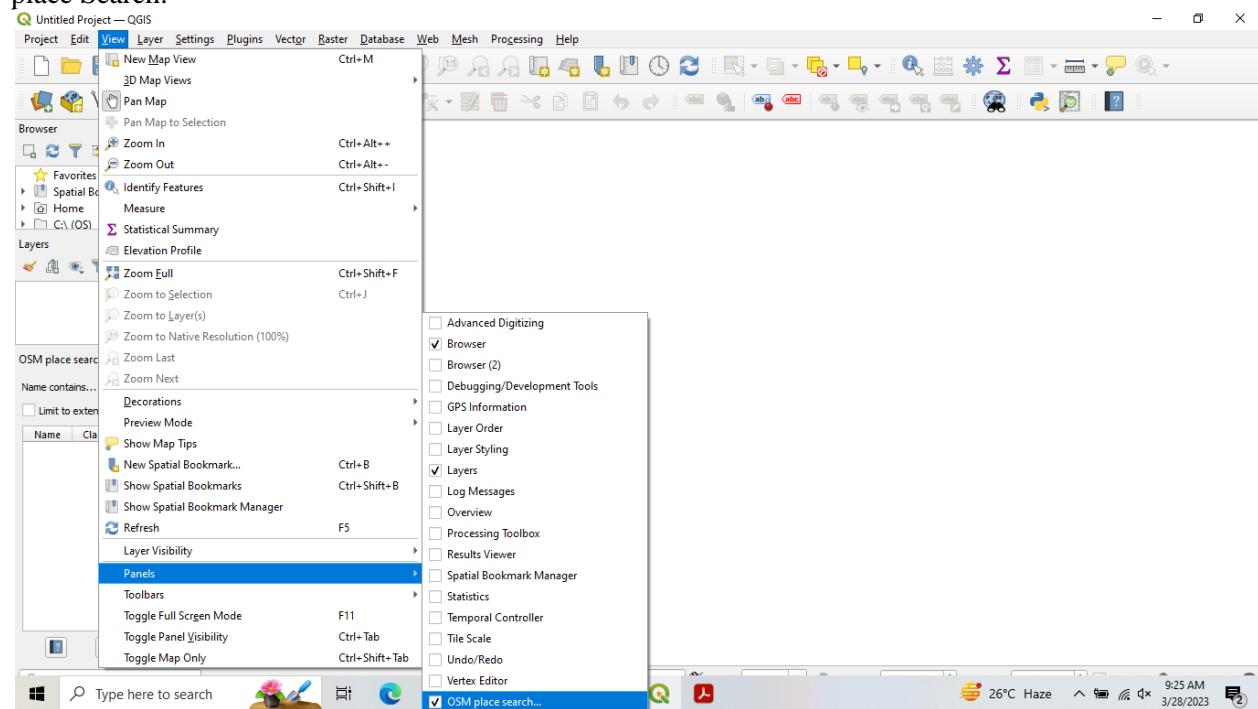


3d. Searching and Downloading OpenStreetMap Data

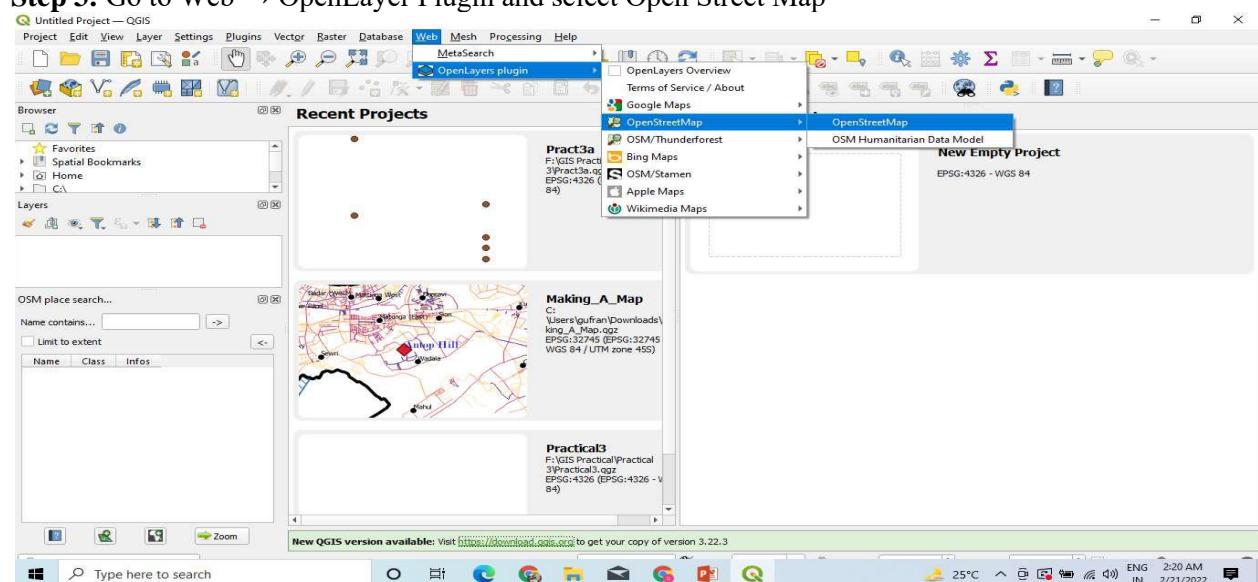
OpenStreetMap (OSM) created by Steve Coast in the UK in 2004 is a collaborative project to create a free editable map of the world. Rather than the map itself, the data generated by the project is considered its primary output. The creation and growth of OSM has been motivated by restrictions on use or availability of map information across much of the world, and the advent of inexpensive portable satellite navigation devices.

Step 1: Add “Open Layer (https://plugins.qgis.org/plugins/openlayers_plugin/)” and “OSM place Search” Plugin from Not Installed option from Plugin Manager Dialog Box.

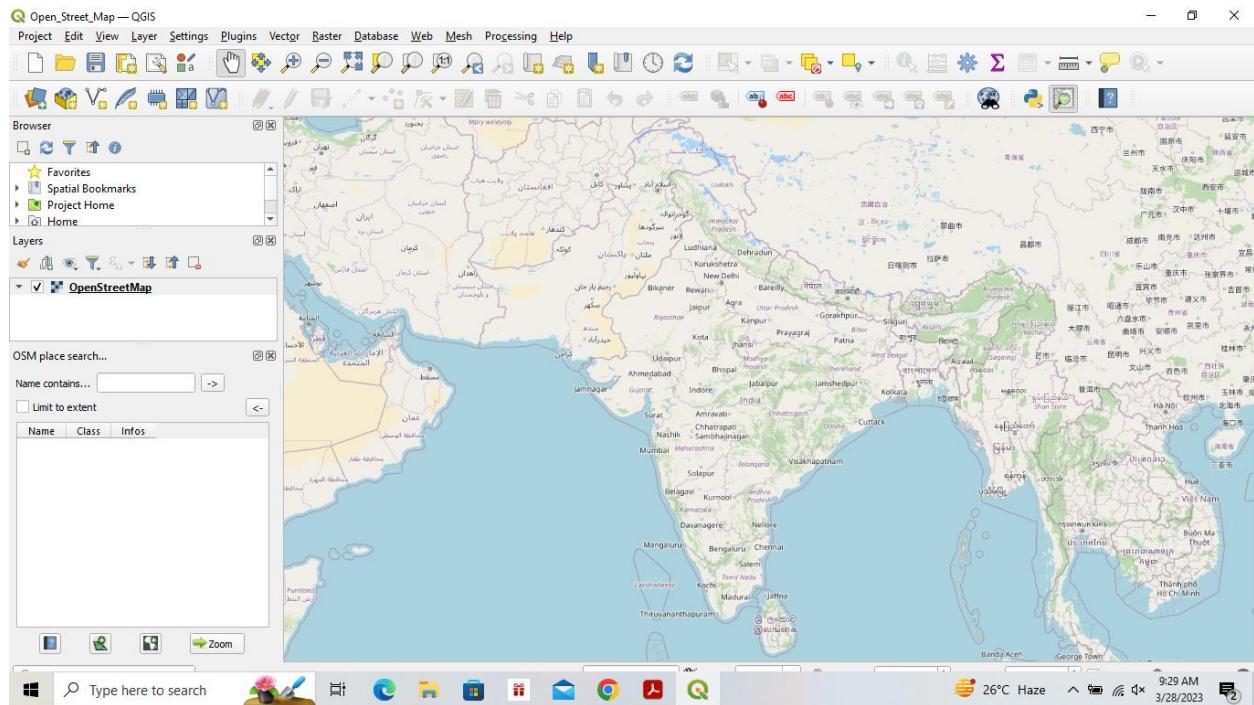
Step 2: The OSM Place Search plugin will install itself as a Panel in QGIS, if not go to View → Panels → select OSM place Search.



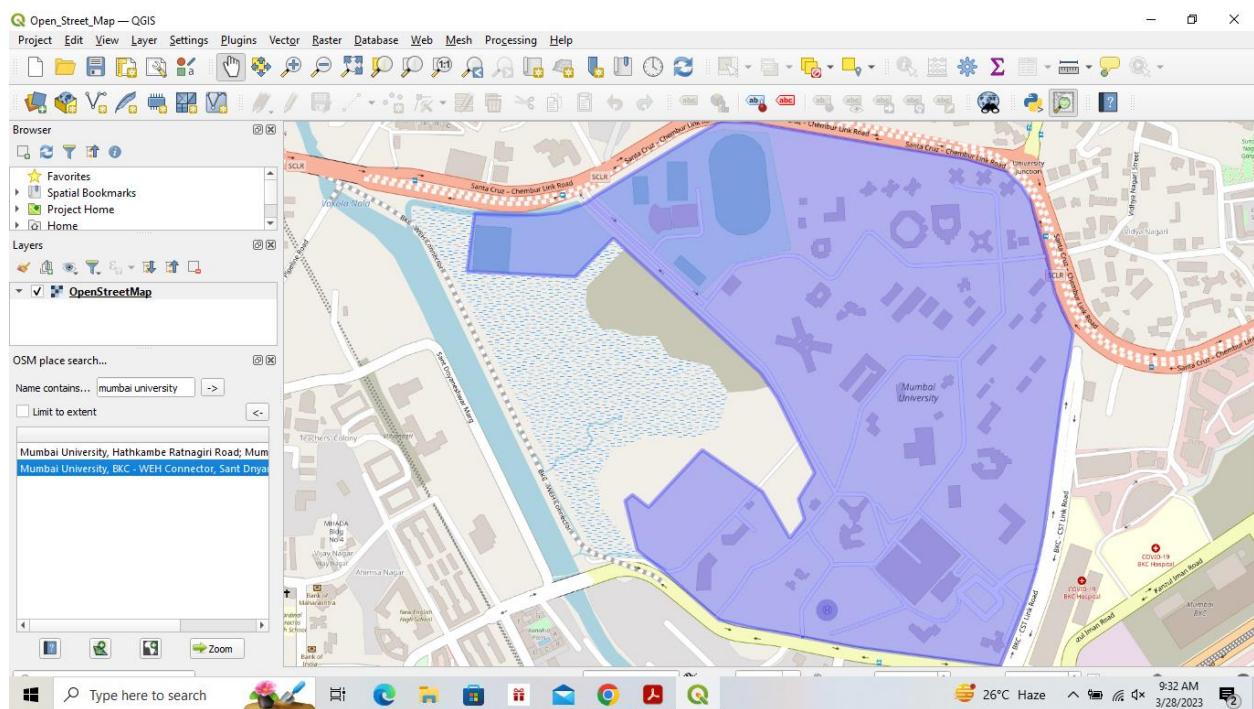
Step 3: Go to Web → OpenLayer Plugin and select Open Street Map



Step 4: A World map will appear on screen. If an error occurs in loading maps, go to project properties → CRS → Check “No CRS (or unknown/non-Earth projection)”



Step 5: In OSM Place search Pane → Enter Mumbai University or any place name to search. Double click on the desired place in OSM Place search Panel or Click and press on the “Zoom” button.

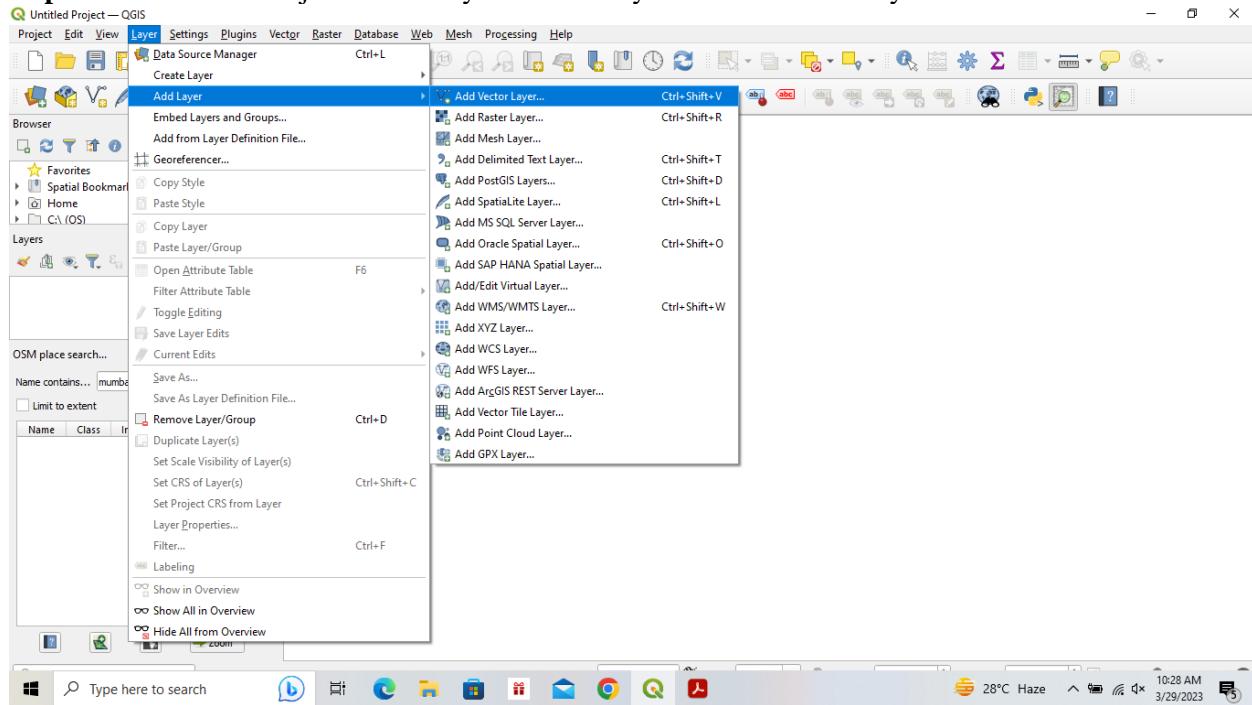


Practical 4: Working with attributes, terrain data.

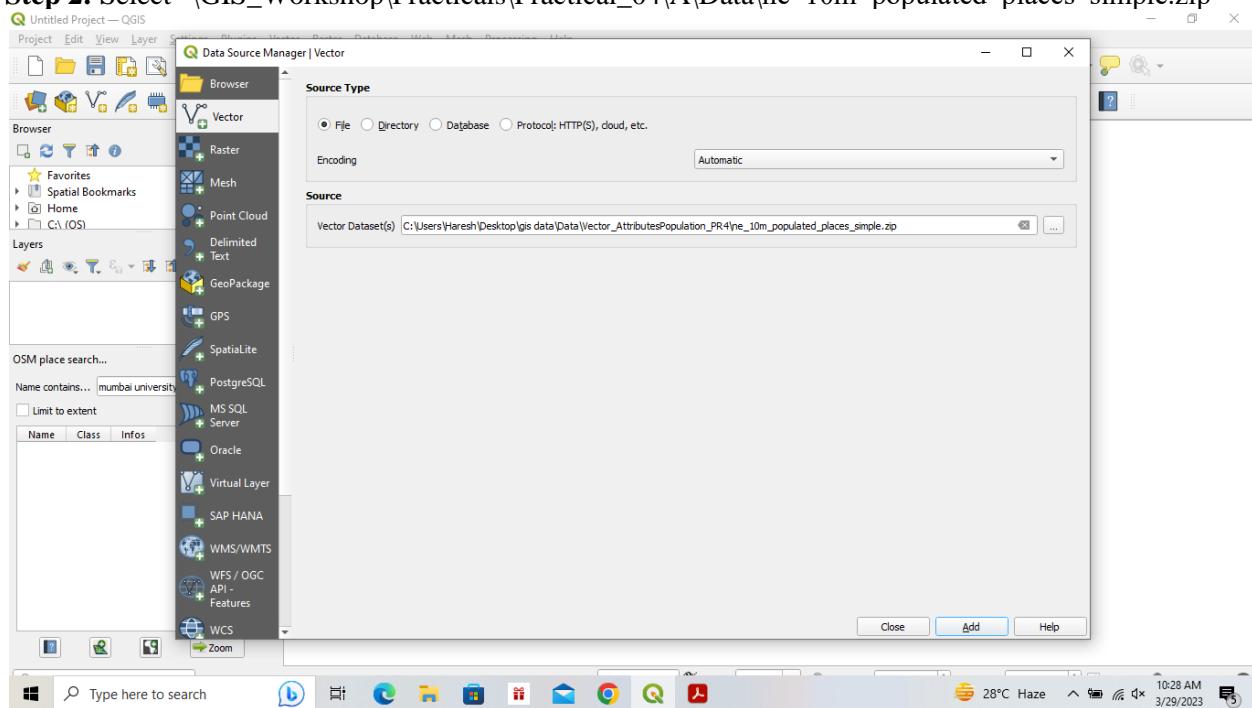
Aim: The aim of this practical is to understand attributes & terrain data.

a) Working with attributes

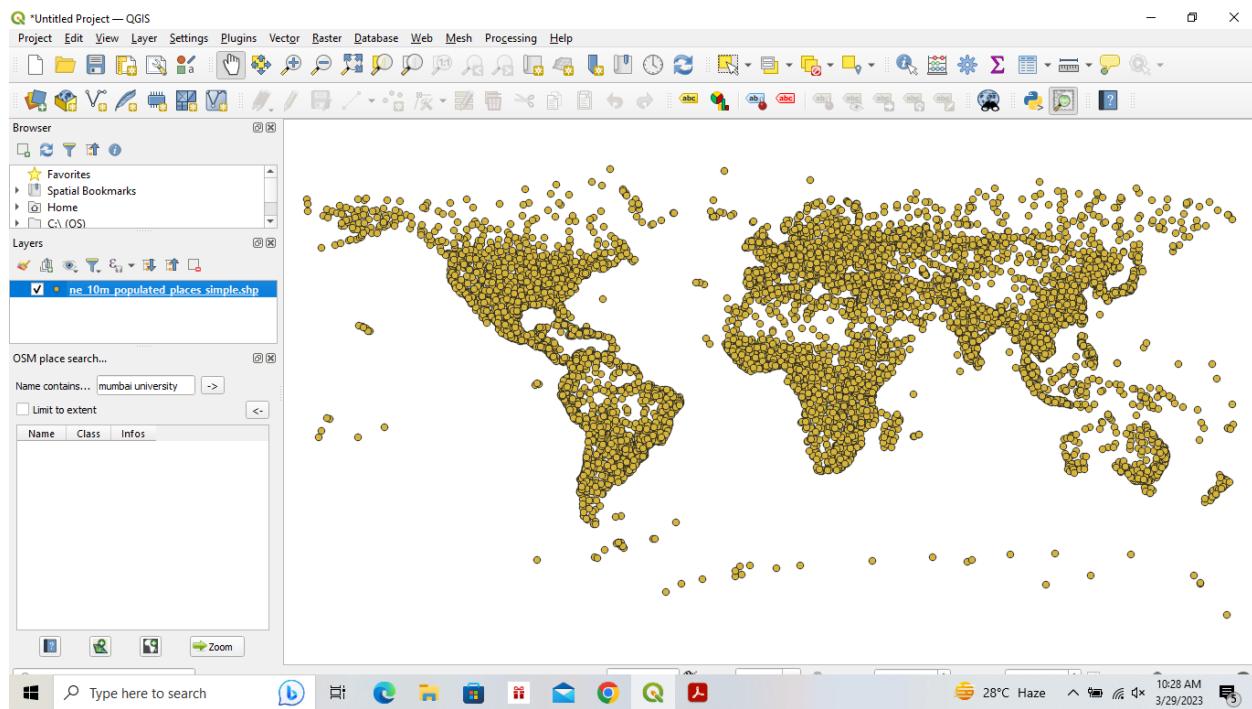
Step 1: Create a new Project. Go to Layer → Add Layer → Add Vector Layer



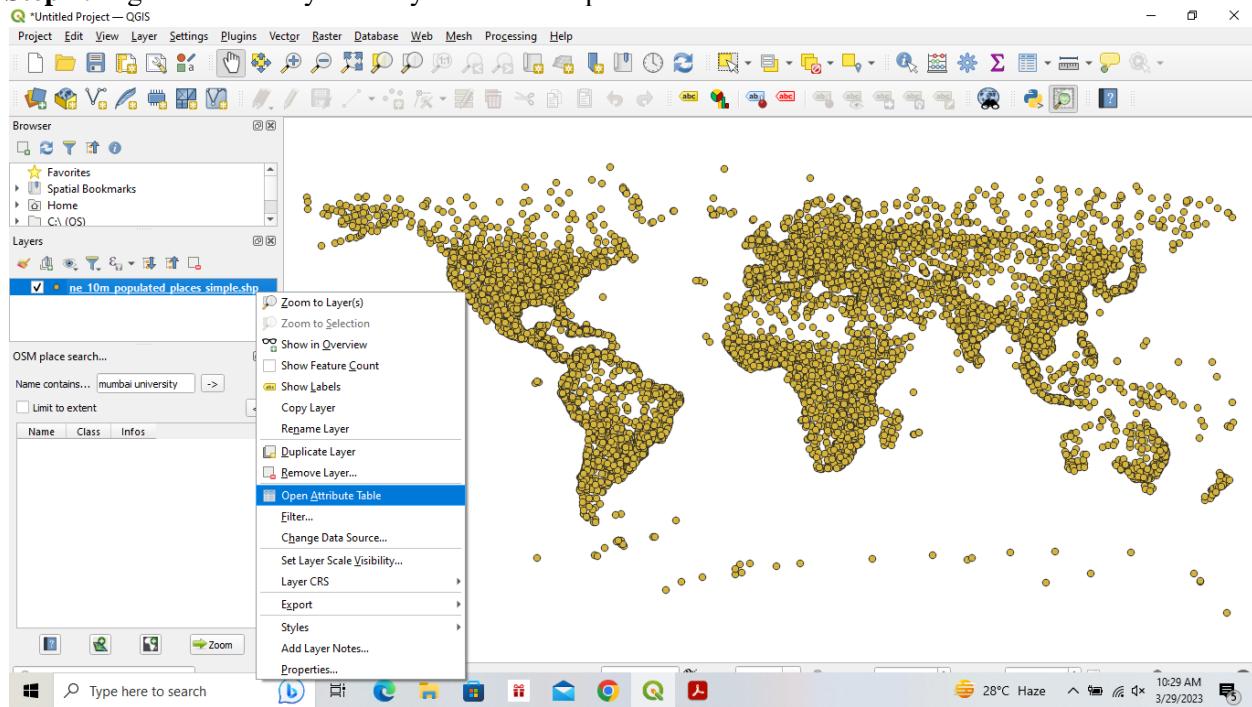
Step 2: Select “\GIS_Workshop\Practicals\Practical_04\A\Data\ne_10m_populated_places_simple.zip”



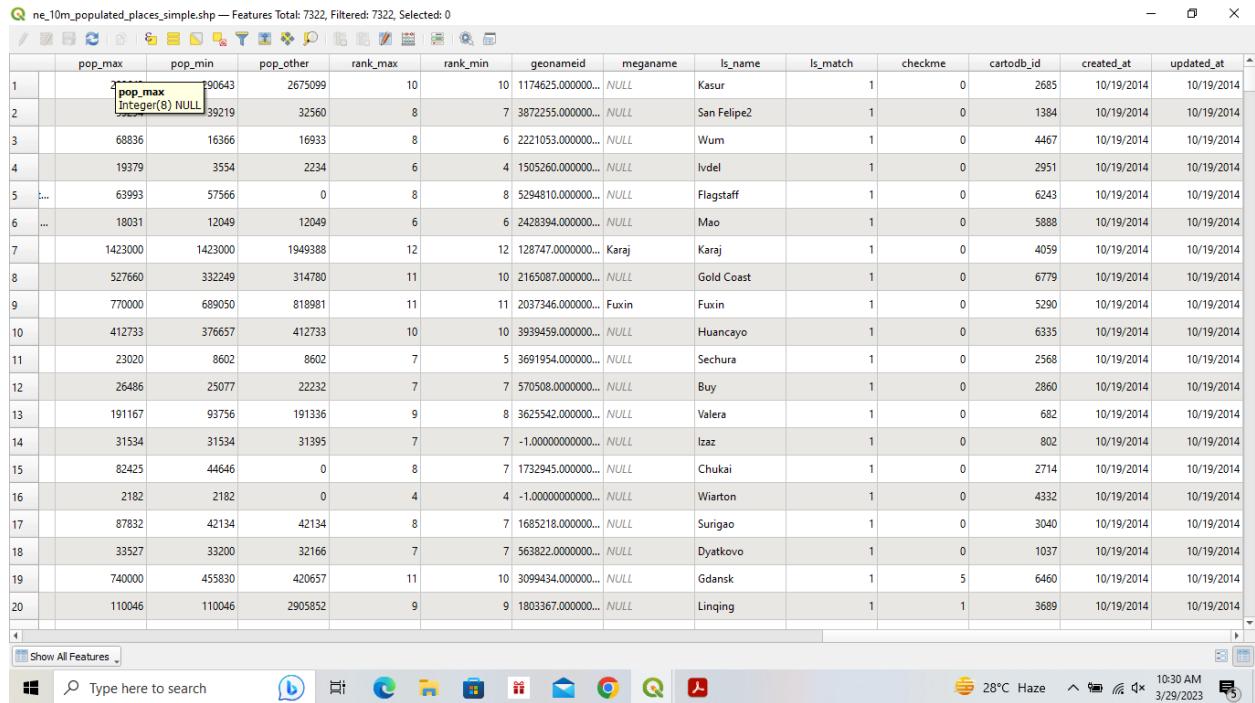
Step 3: After clicking on Add, the following window will show up.



Step 4: Right click on Layer in Layer Panel → Open Attribute Table.

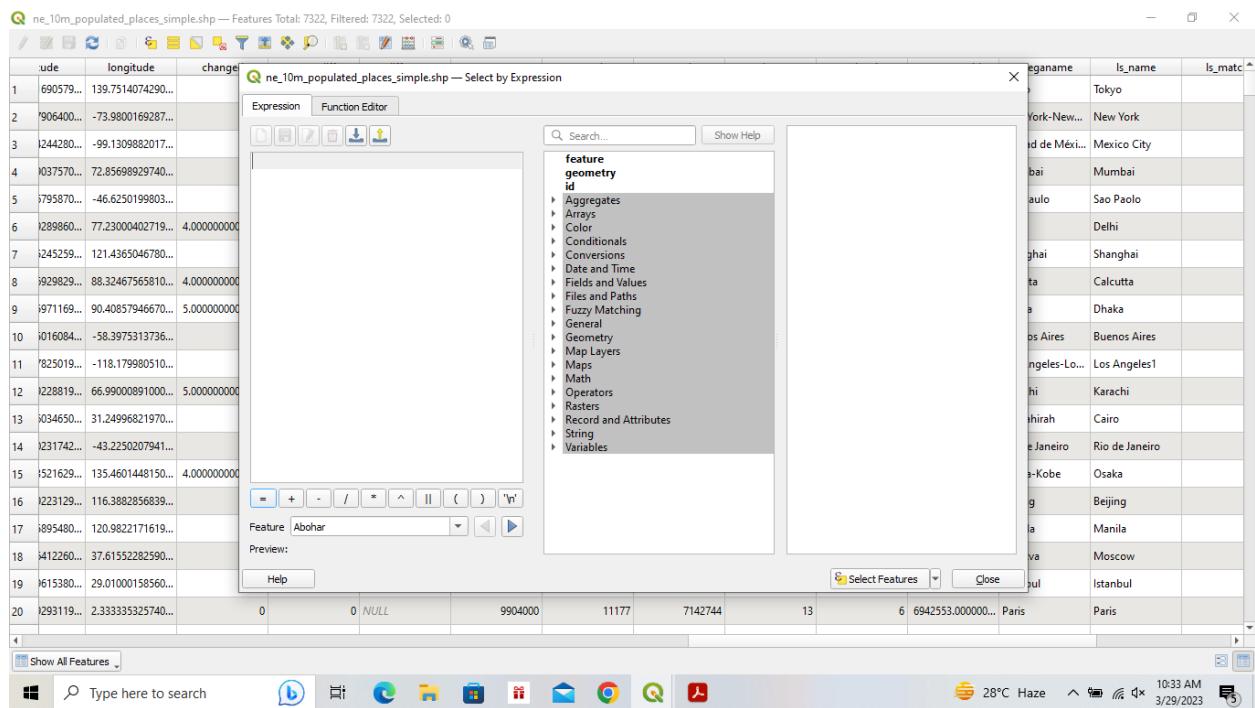


Step 5: Explore various attributes and their values in the Attribute table. To find the Place with maximum population click on “pop_max” file.

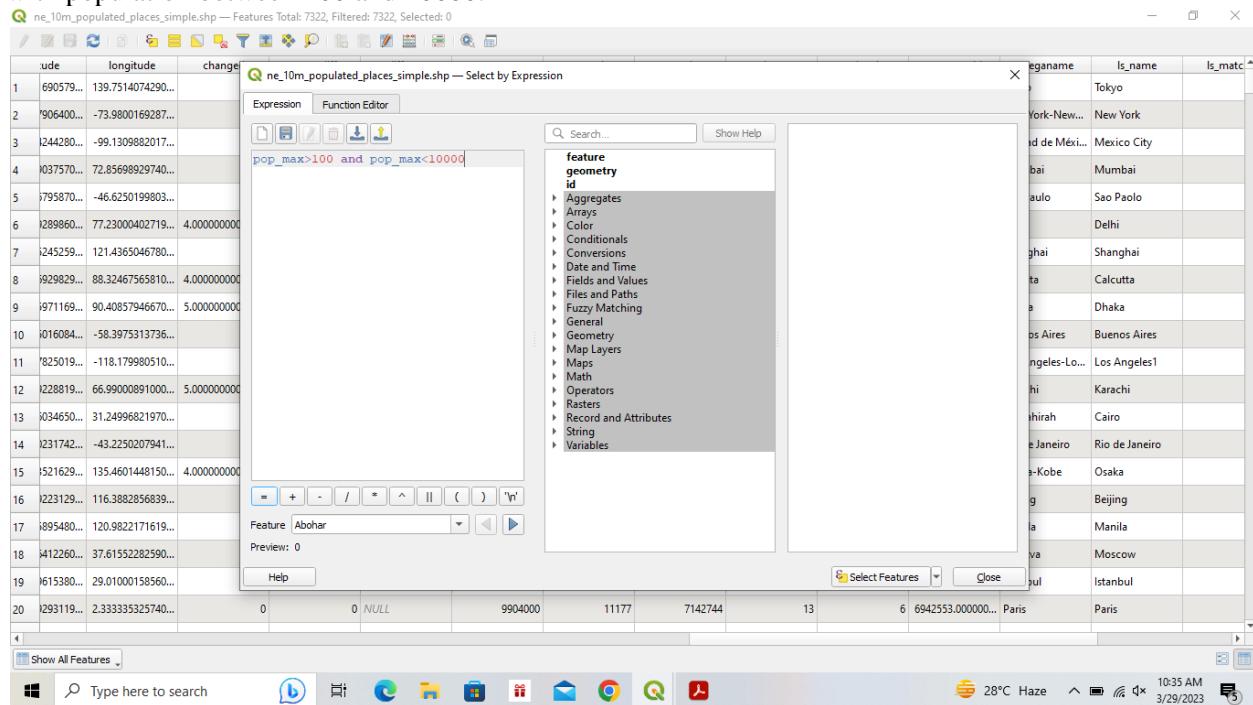


	pop_max	pop_min	pop_other	rank_max	rank_min	geonameid	megename	ls_name	ls_match	checkme	cartodb_id	created_at	updated_at
1	190643	2675099		10	10	1174625.000000...	NULL	Kasur	1	0	2685	10/19/2014	10/19/2014
2	39219	32560		8	7	3872255.000000...	NULL	San Felipe2	1	0	1384	10/19/2014	10/19/2014
3	68836	16366	16933	8	6	2221053.000000...	NULL	Wum	1	0	4467	10/19/2014	10/19/2014
4	19379	3554	2234	6	4	1505260.000000...	NULL	Ivdel	1	0	2951	10/19/2014	10/19/2014
5	63993	57566	0	8	8	5248410.000000...	NULL	Flagstaff	1	0	6243	10/19/2014	10/19/2014
6	18031	12049	12049	6	6	2428394.000000...	NULL	Mao	1	0	5888	10/19/2014	10/19/2014
7	1423000	1423000	1949388	12	12	128747.000000...	Karaj	Karaj	1	0	4059	10/19/2014	10/19/2014
8	527660	332249	314780	11	10	2165087.000000...	NULL	Gold Coast	1	0	6779	10/19/2014	10/19/2014
9	770000	689050	818981	11	11	2037346.000000...	Fuxin	Fuxin	1	0	5290	10/19/2014	10/19/2014
10	412733	376657	412733	10	10	3939459.000000...	NULL	Huancayo	1	0	6335	10/19/2014	10/19/2014
11	23020	8602	8602	7	5	3691954.000000...	NULL	Sechura	1	0	2568	10/19/2014	10/19/2014
12	26486	25077	22232	7	7	570508.000000...	NULL	Buy	1	0	2860	10/19/2014	10/19/2014
13	191167	93756	191336	9	8	3625542.000000...	NULL	Valera	1	0	682	10/19/2014	10/19/2014
14	31534	31534	31395	7	7	-1.0000000000...	NULL	Itaz	1	0	802	10/19/2014	10/19/2014
15	82425	44646	0	8	7	1732945.000000...	NULL	Chukai	1	0	2714	10/19/2014	10/19/2014
16	2182	2182	0	4	4	-1.0000000000...	NULL	Wiariton	1	0	4332	10/19/2014	10/19/2014
17	87832	42134	42134	8	7	1685218.000000...	NULL	Surigao	1	0	3040	10/19/2014	10/19/2014
18	33527	33200	32166	7	7	563822.000000...	NULL	Dyatkovo	1	0	1037	10/19/2014	10/19/2014
19	740000	455830	420657	11	10	3099434.000000...	NULL	Gdansk	1	5	6460	10/19/2014	10/19/2014
20	110046	110046	2905852	9	9	1803367.000000...	NULL	Linqing	1	1	3689	10/19/2014	10/19/2014

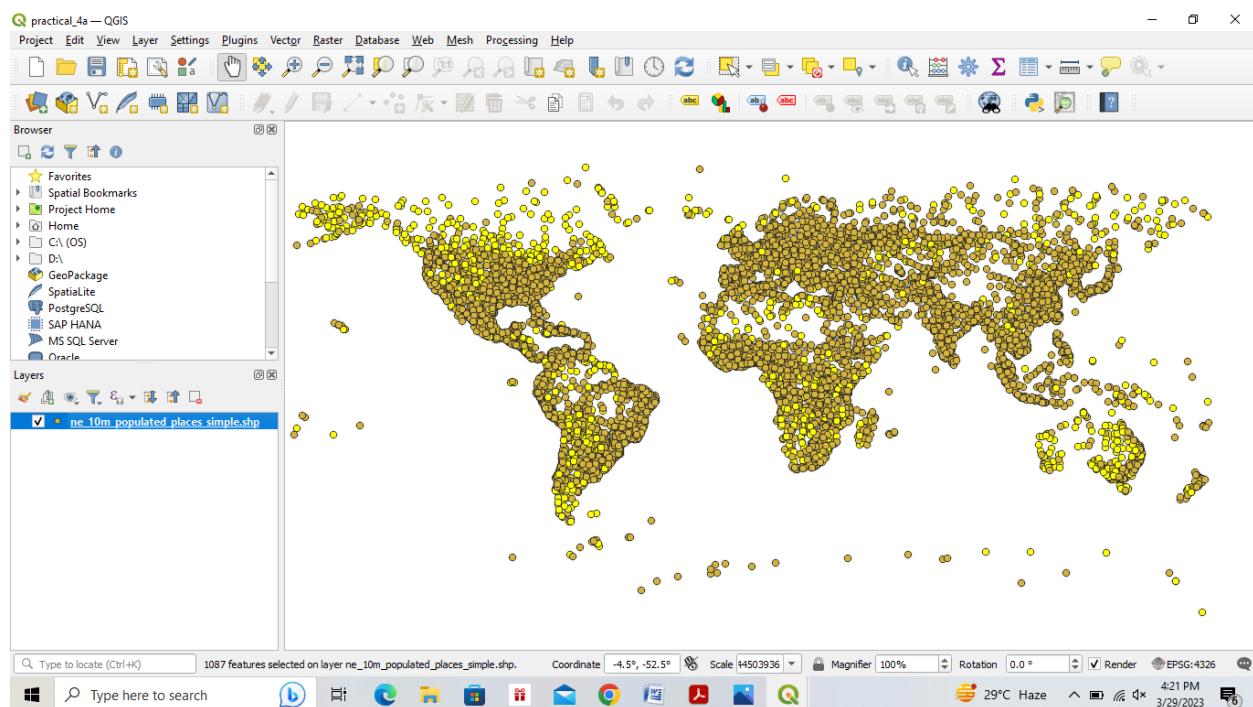
Step 6: On clicking the Select feature using expression button the following window will appear.



Step 7: Enter pop_max>100 and pop_max<10000 and click “select features” button to get all the places with population between 100 and 10000.



Step 8: Enter pop_max>100 and pop_max<10000 and click “select features” button to get all the places with population between 100 and 10000 and click close. The places matching the criteria will appear in different color.



Step 9: Different queries can be performed using the dataset. Enter `pop_max>100` and `pop_max<1000000` and “sov0name” = ‘India’ and click “select features” button to get all the places with population between 100 and 1000000 and click close. The places matching the criteria will appear in different color.

The screenshot shows two windows of the QGIS application. The top window is a 'Select by Expression' dialog for the layer 'ne_10m_populated_places_simple.shp'. The expression entered is `pop_max>100 and pop_max<1000000 and "sov0name" = 'India'`. The bottom window shows a world map with numerous yellow and orange points representing populated places in India, while other countries are shown in grey.

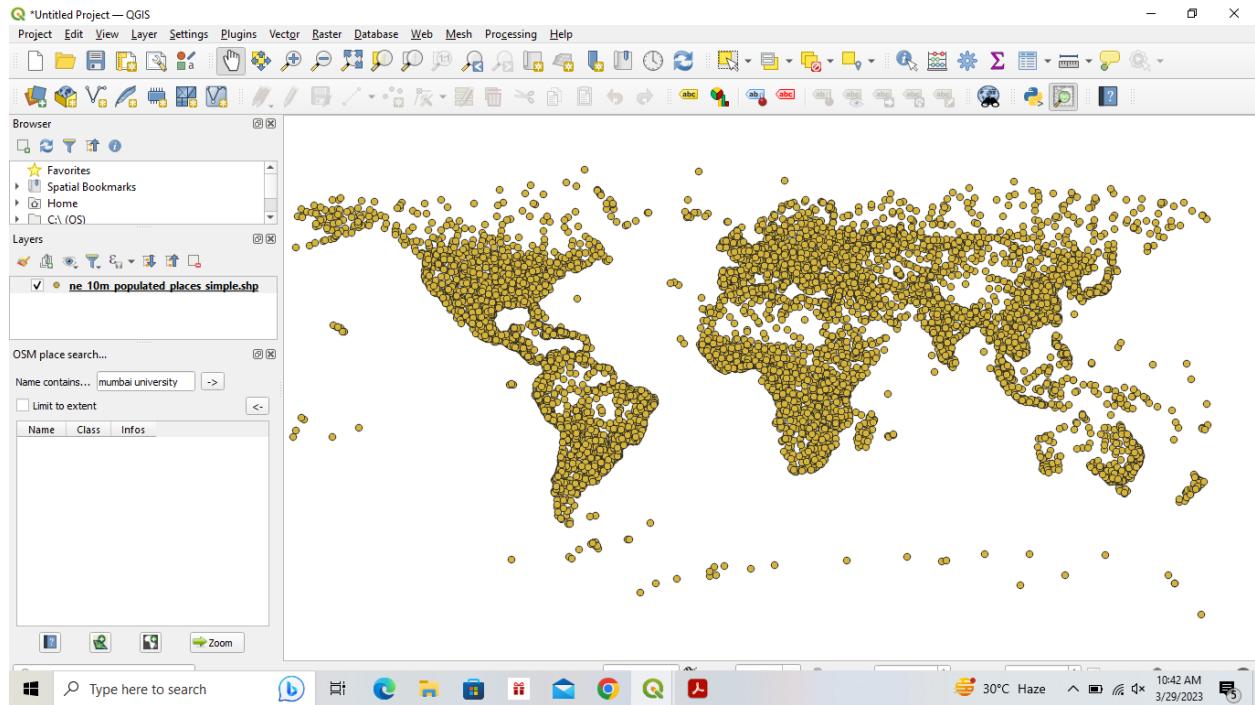
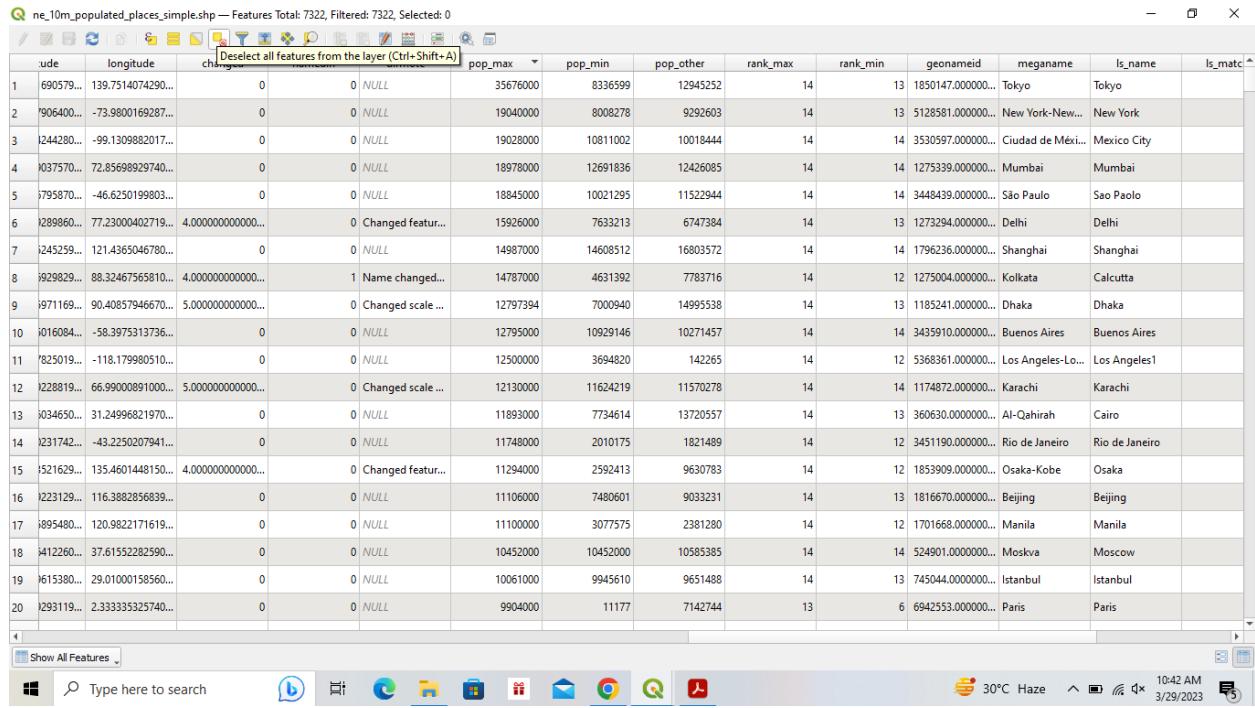
QGIS Top Window (Select by Expression):

- Layer: ne_10m_populated_places_simple.shp — Features Total: 7322, Filtered: 7322, Selected: 1087
- Expression: `pop_max>100 and pop_max<1000000 and "sov0name" = 'India'`
- Function Editor: A sidebar with various functions listed under 'feature geometry id'.
- Preview: Shows one feature selected with the identifier 123129...
- Buttons: Select Features, Close.

QGIS Bottom Window (World Map):

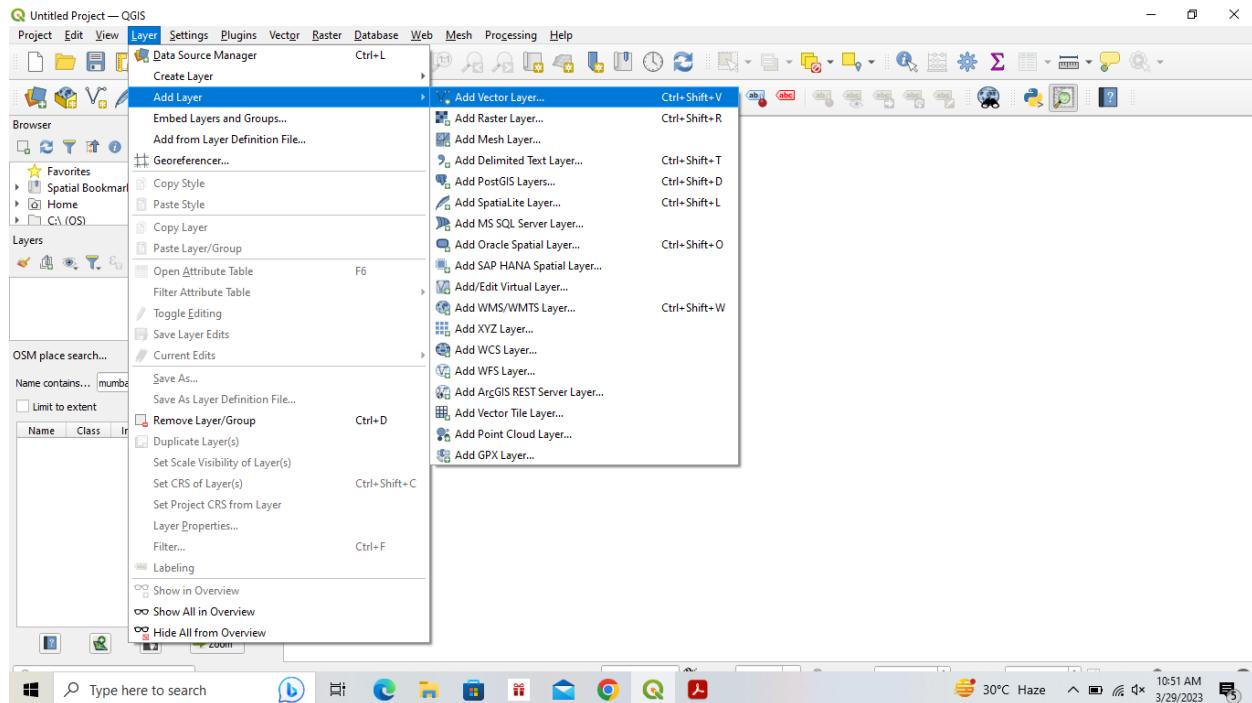
- Project: *Untitled Project — QGIS
- Layers: ne_10m_populated_places_simple.shp
- OSM place search...: Name contains... mumbai university
- Map View: A world map where India is densely populated with yellow and orange dots, while other continents have sparse or no points.

Step 10: Use the deselect button to deselect the feature to be rendered in original color.

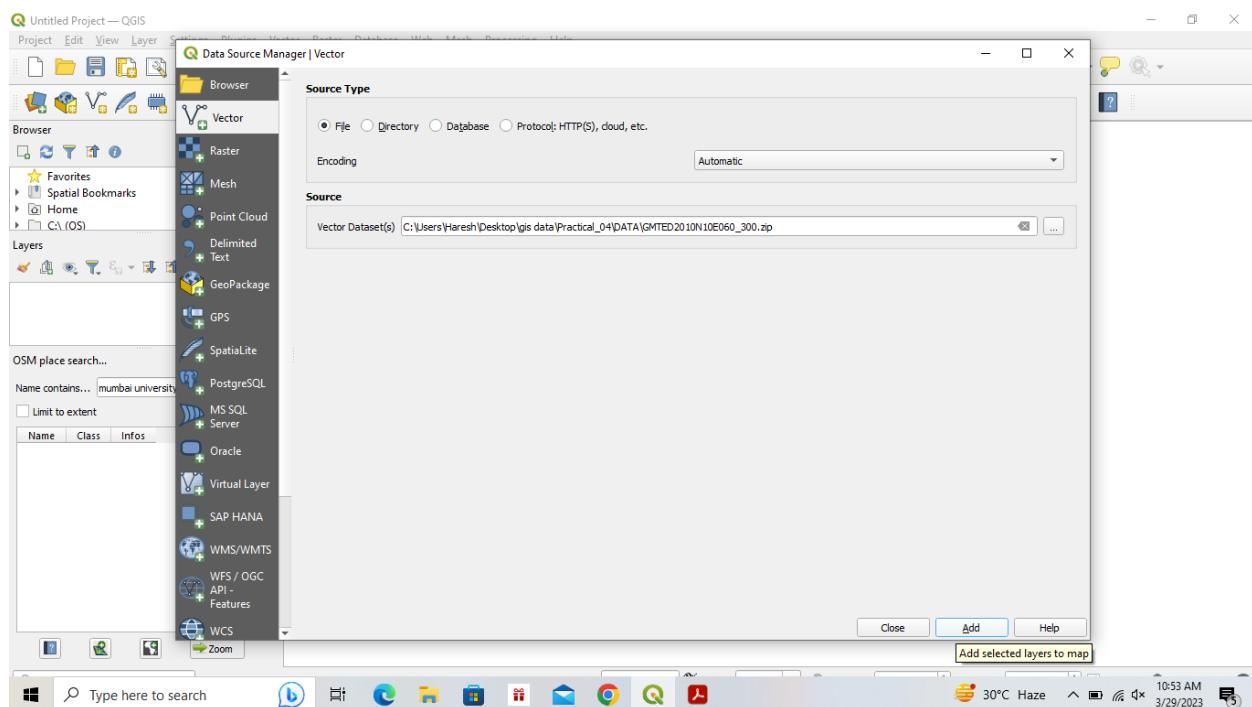


4b) Terrain Data and Hill shade analysis

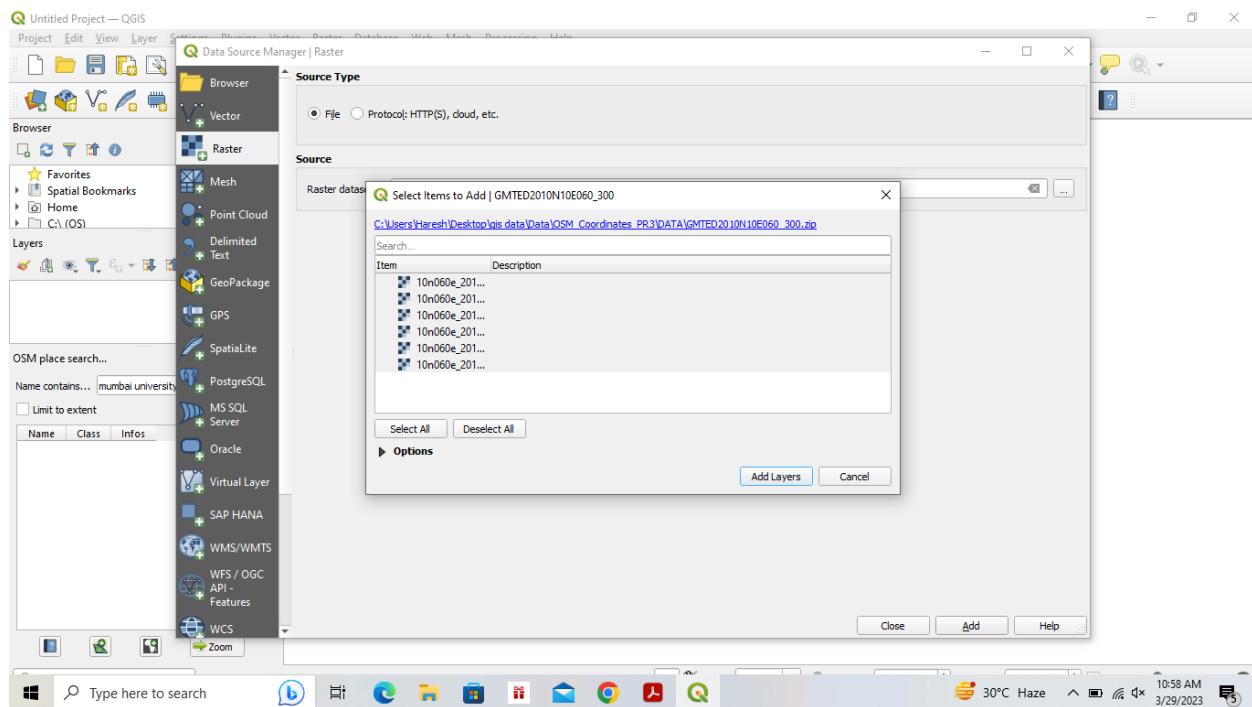
Step 1: Create a new Project. Go to Layer → Add Layer → Add Raster Layer



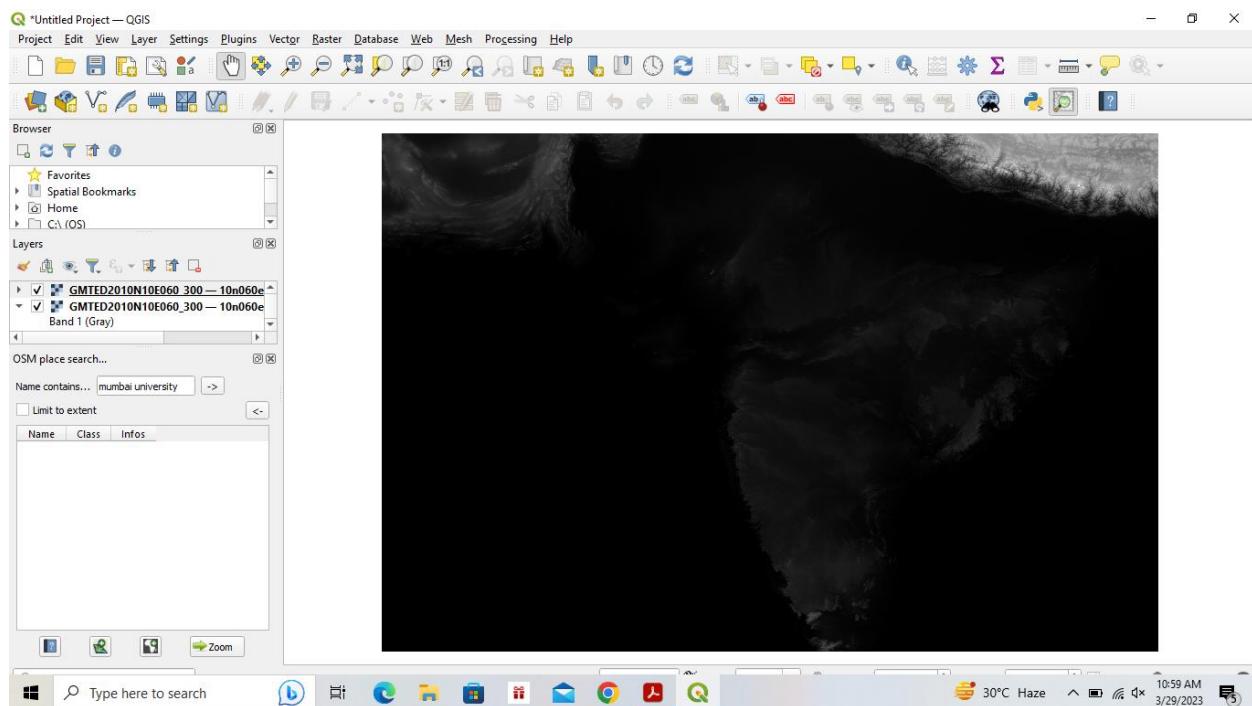
Step 2: Select “\GIS_Workshop\Practicals\Practical_04\A\Data\GMTED2010N10E060_300.zip”



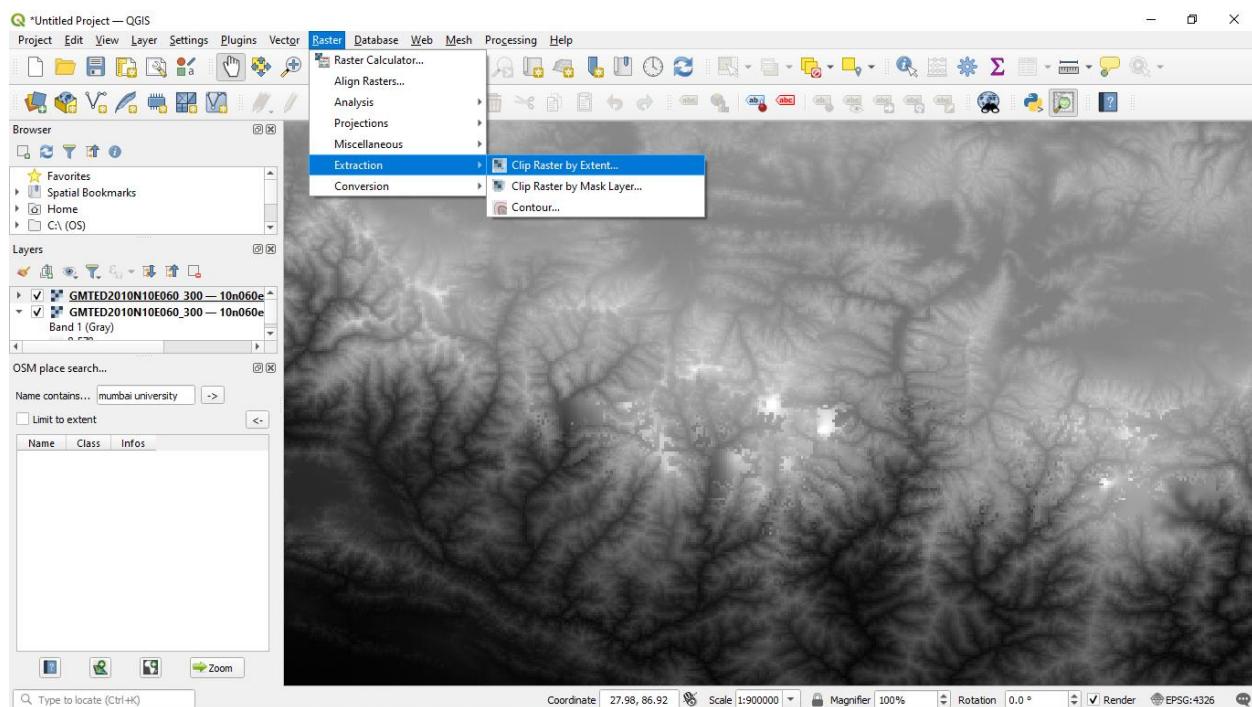
Step 3: After clicking on Add, the following window will show up.



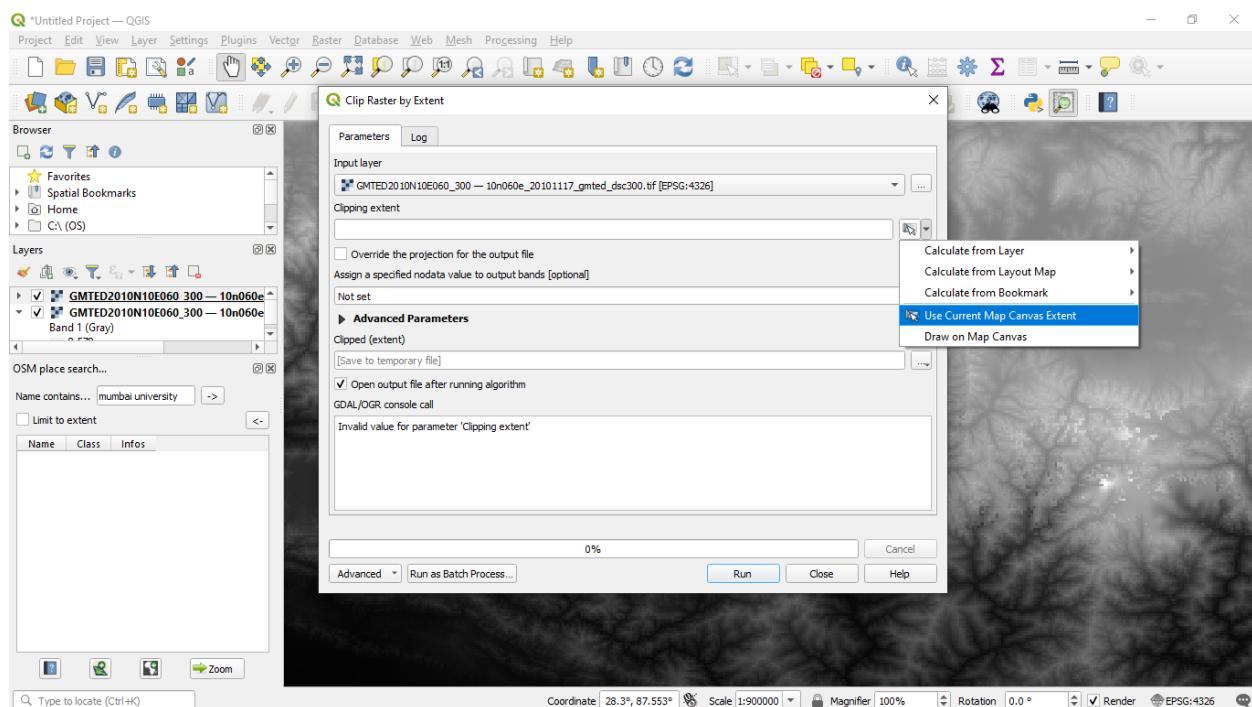
Step 4: Click Add Layers and close the Data Source Manager. Your terrain data is loaded.



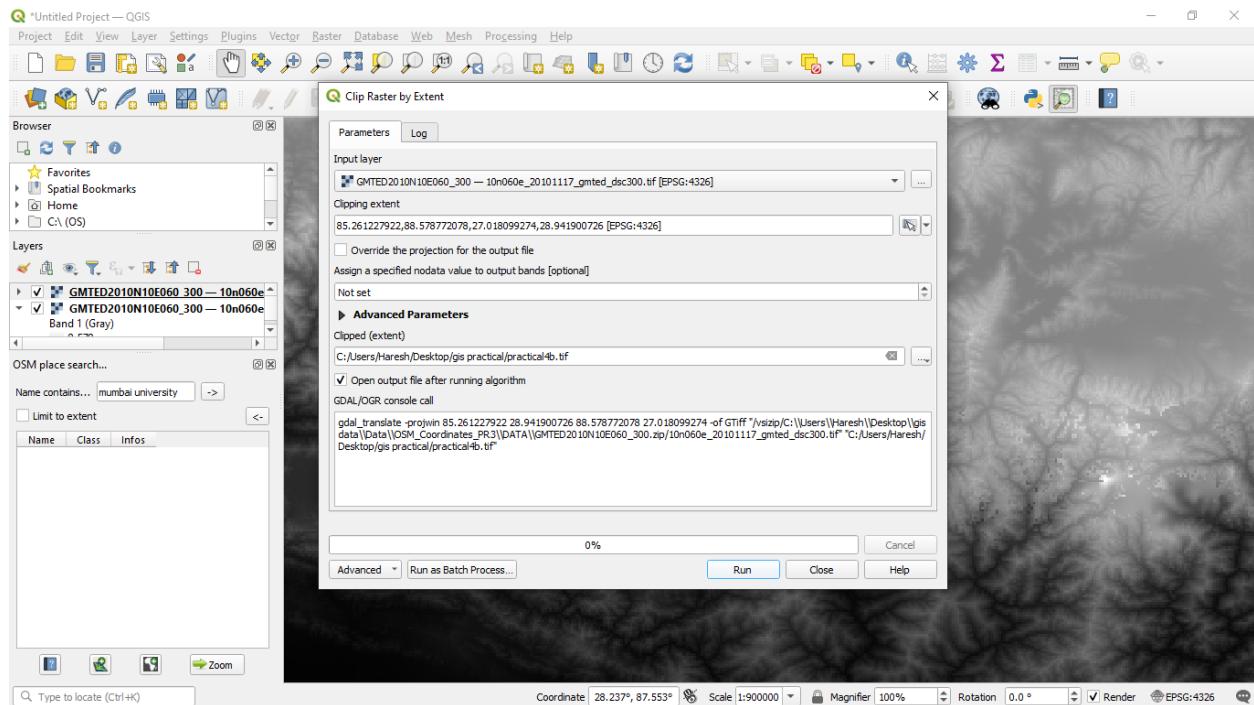
Step 5: Enter 86.92, 27.98 in the coordinate field, Scale 900000 and Magnifier 100% at the bottom of QGIS. Select Raster □ Extraction □ Clip raster by extent.



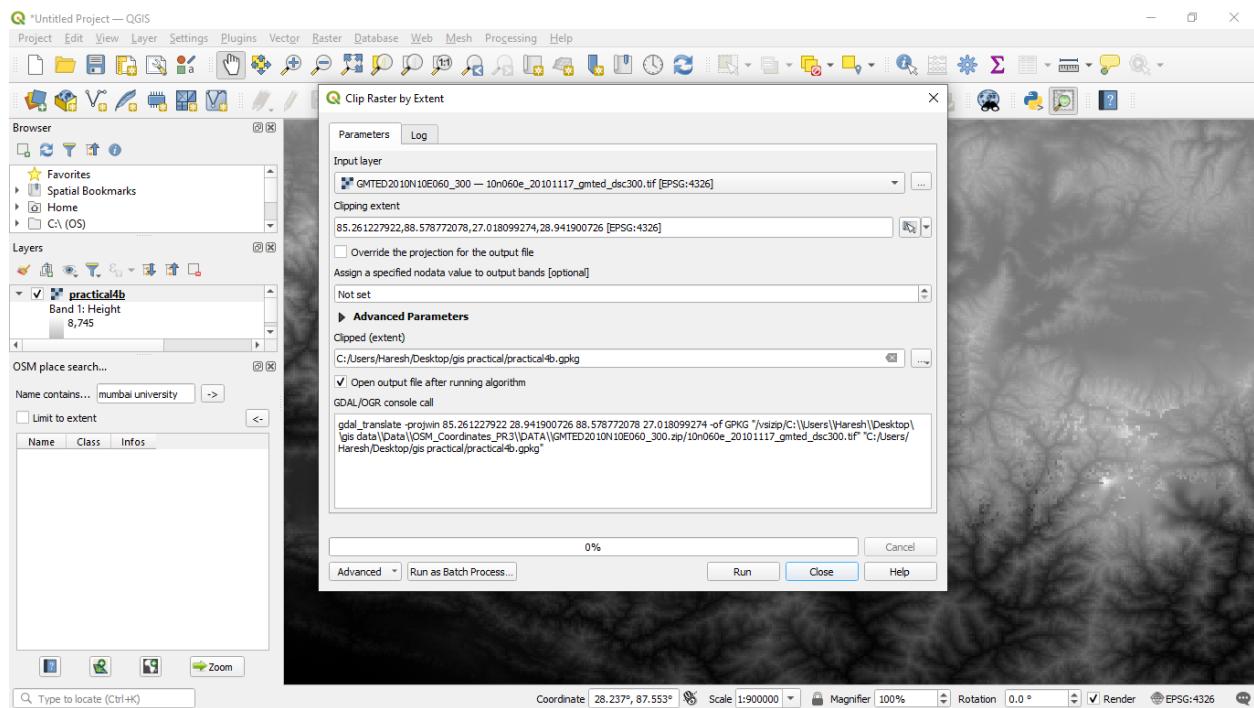
Step 6: Select the clipping area by selecting the option Use Map Canvas Extent if the visible part of map is to be selected or manually select an area on canvas by using Select Extent on Canvas.



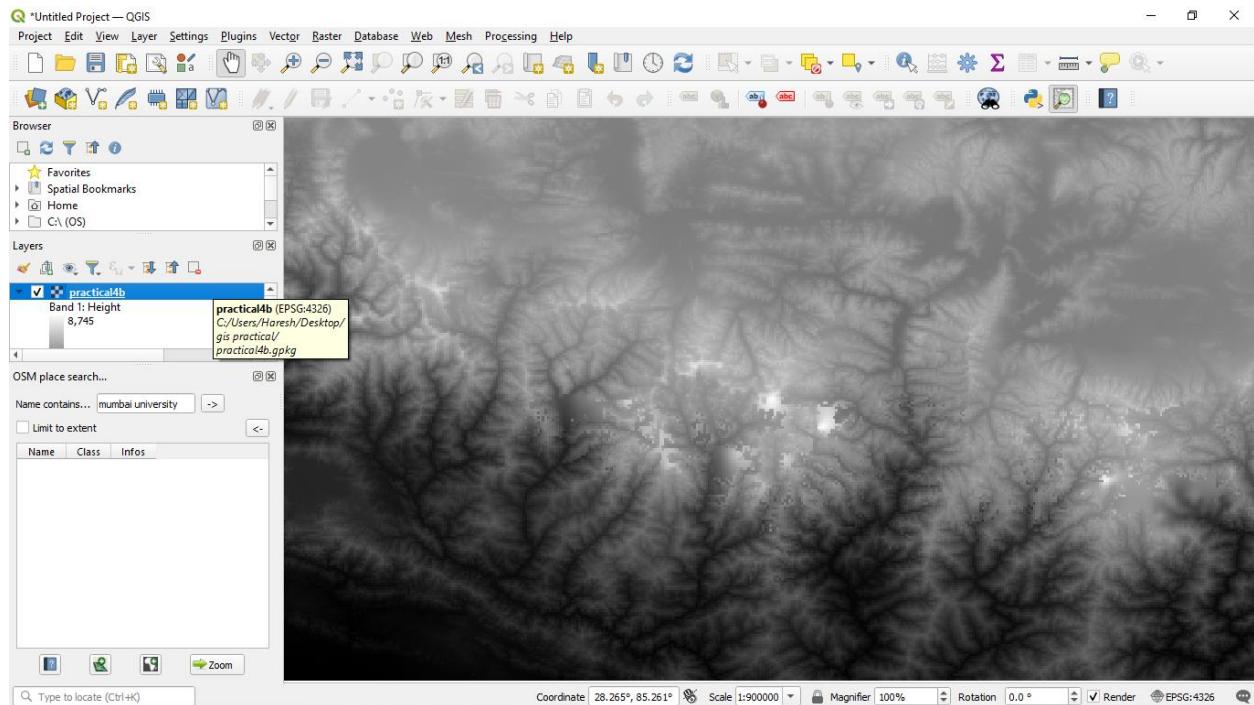
Step 7: Select the location and file name for storing clipped raster layer. Press RUN.



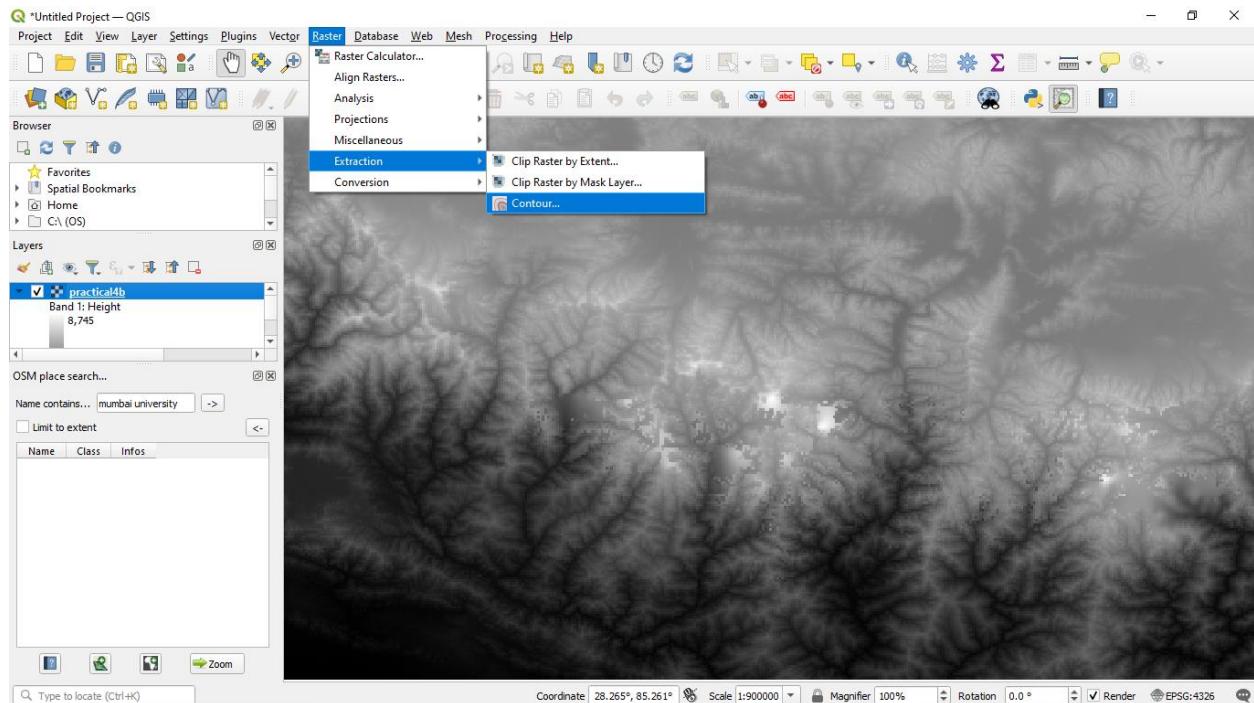
Step 8: After pressing the RUN the following window will appear and layer will be created for the given file name.



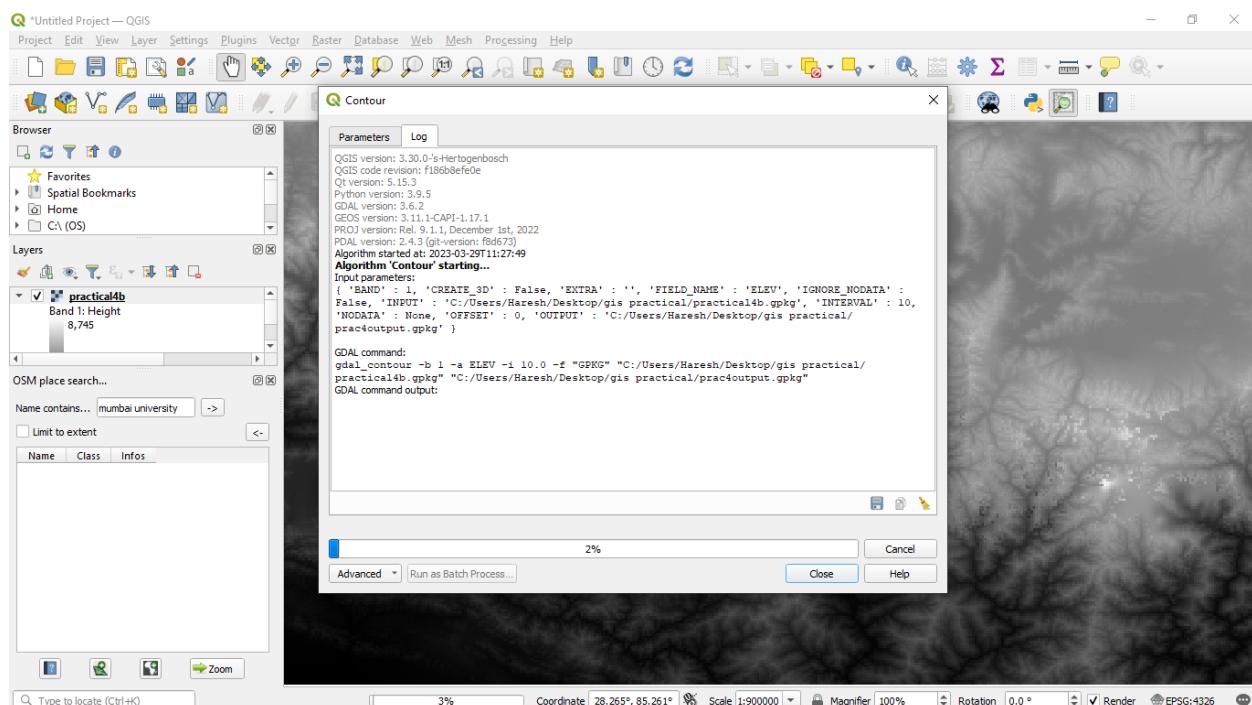
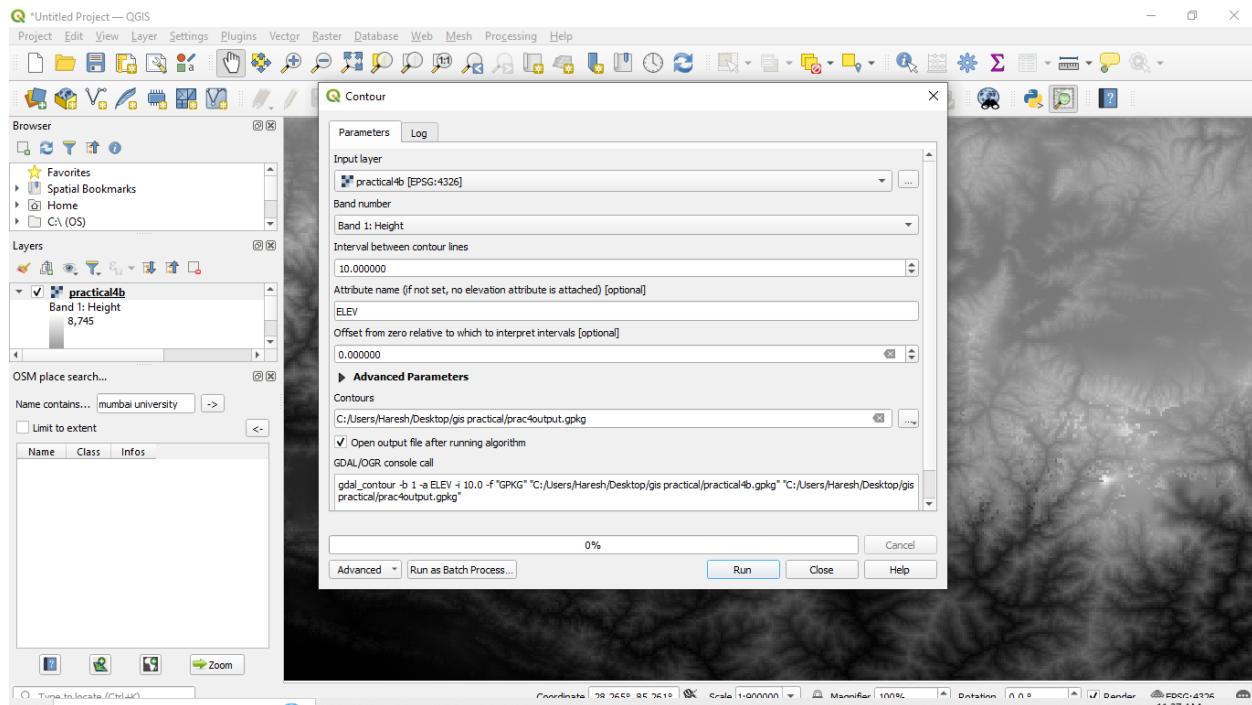
Step 9: Deselect the original layer and keep the clipped one under layer tab.

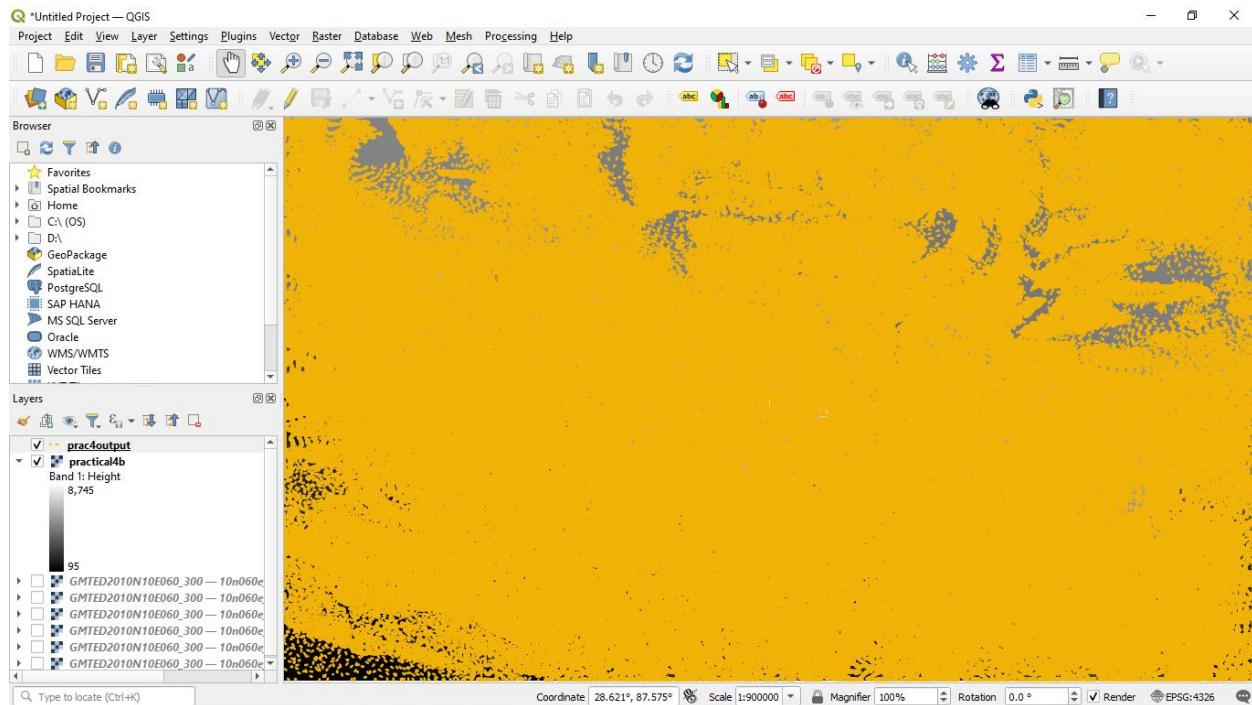
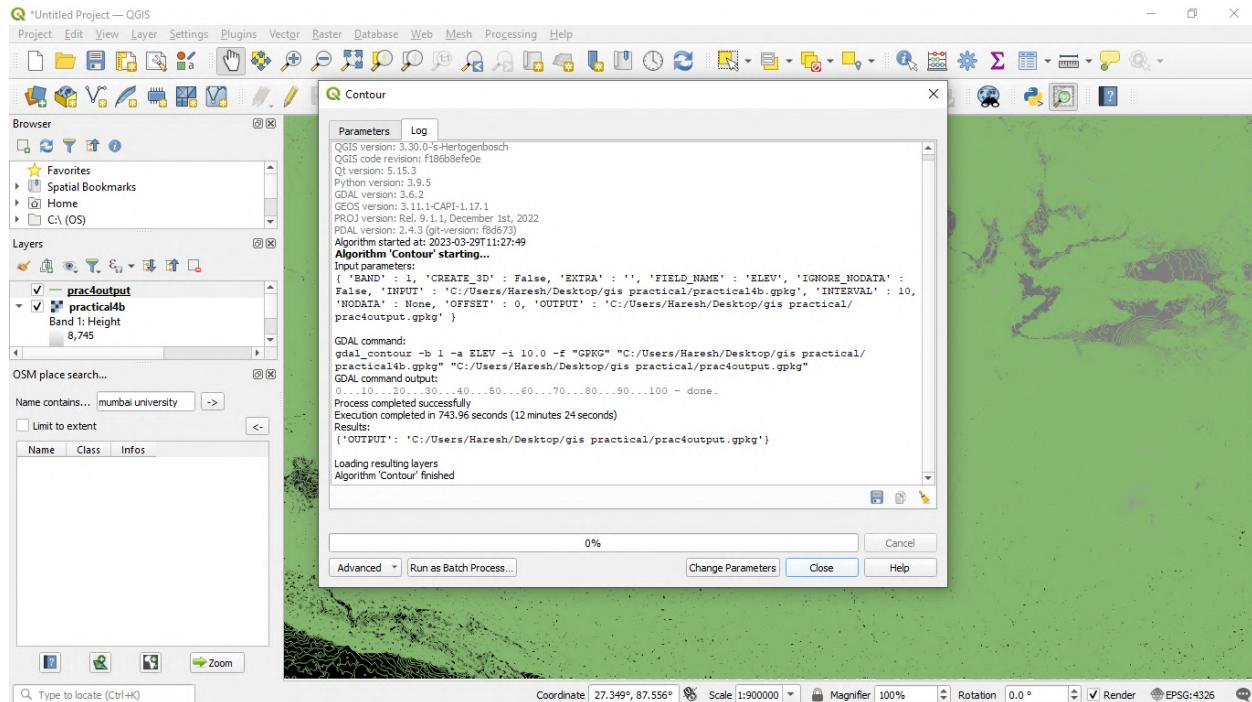


Step 10: Go to Raster □ Extraction □ Contour.

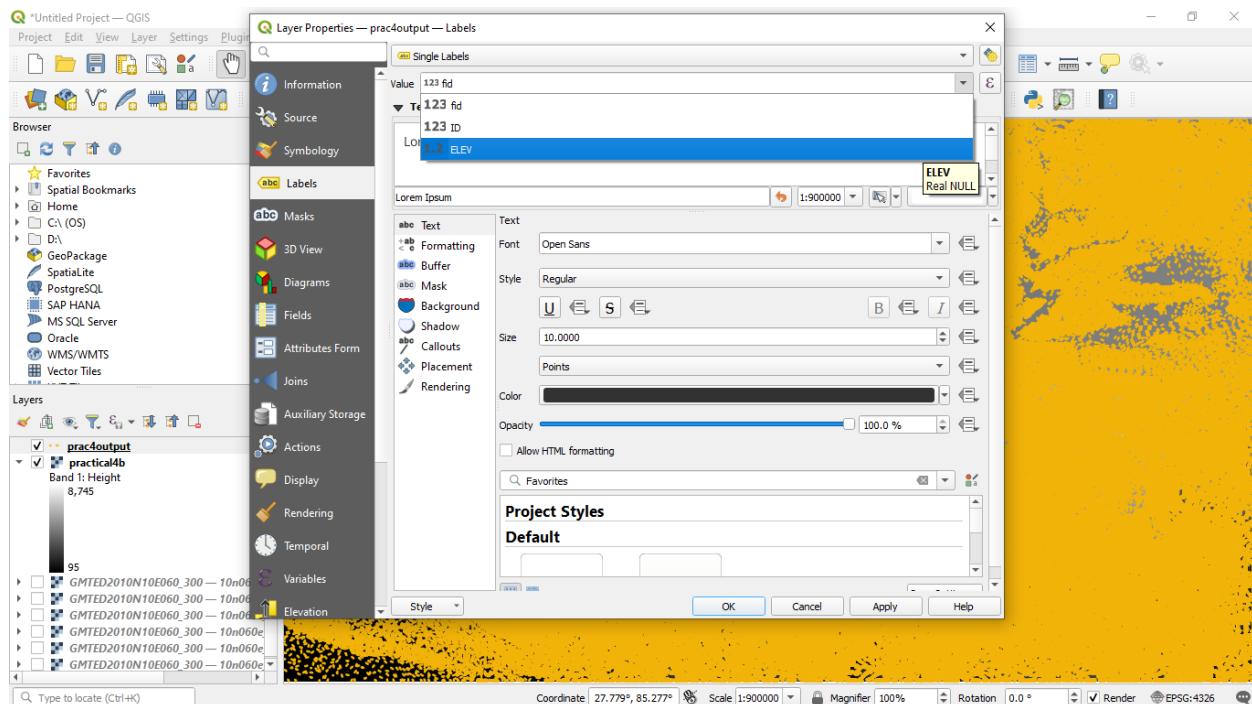
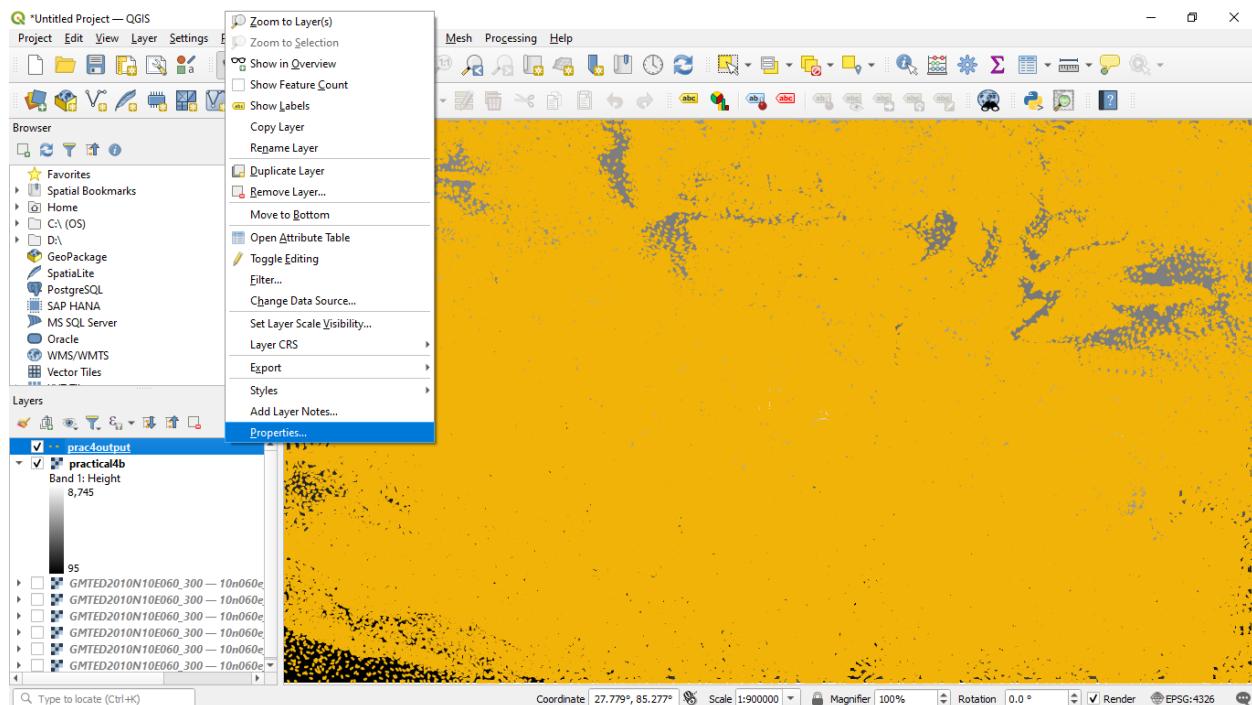


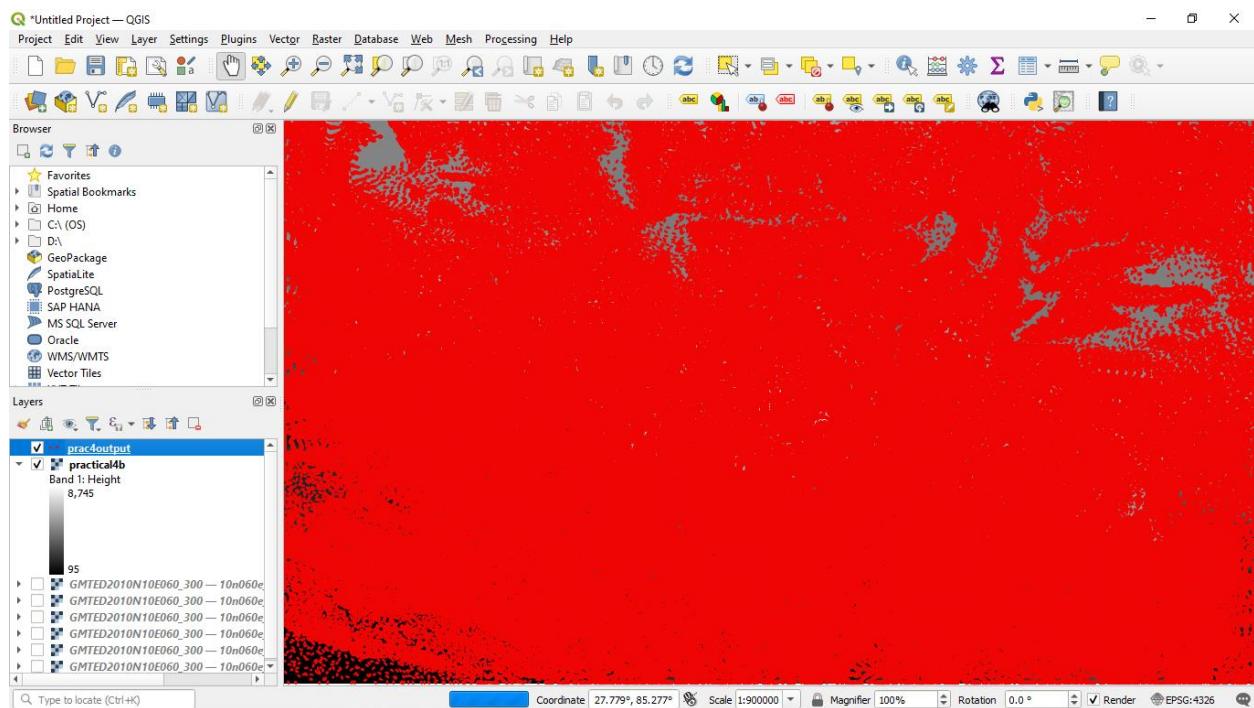
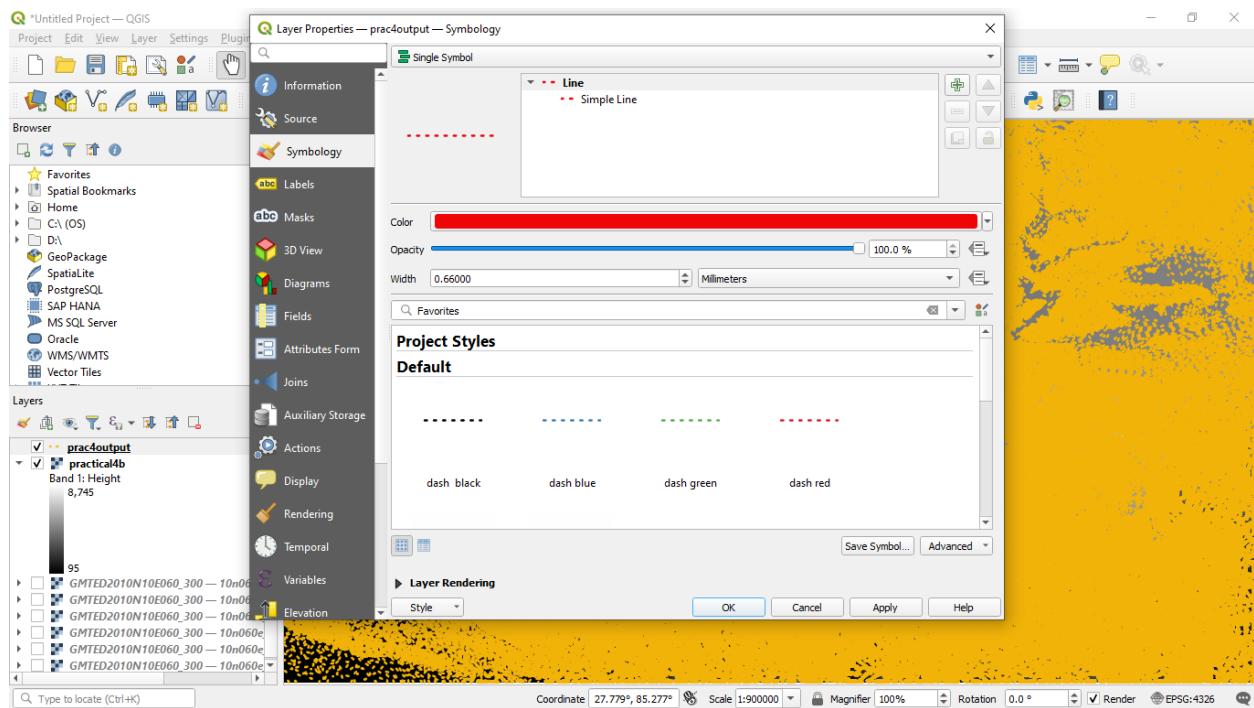
Step 11: Select output file and location and Press RUN.

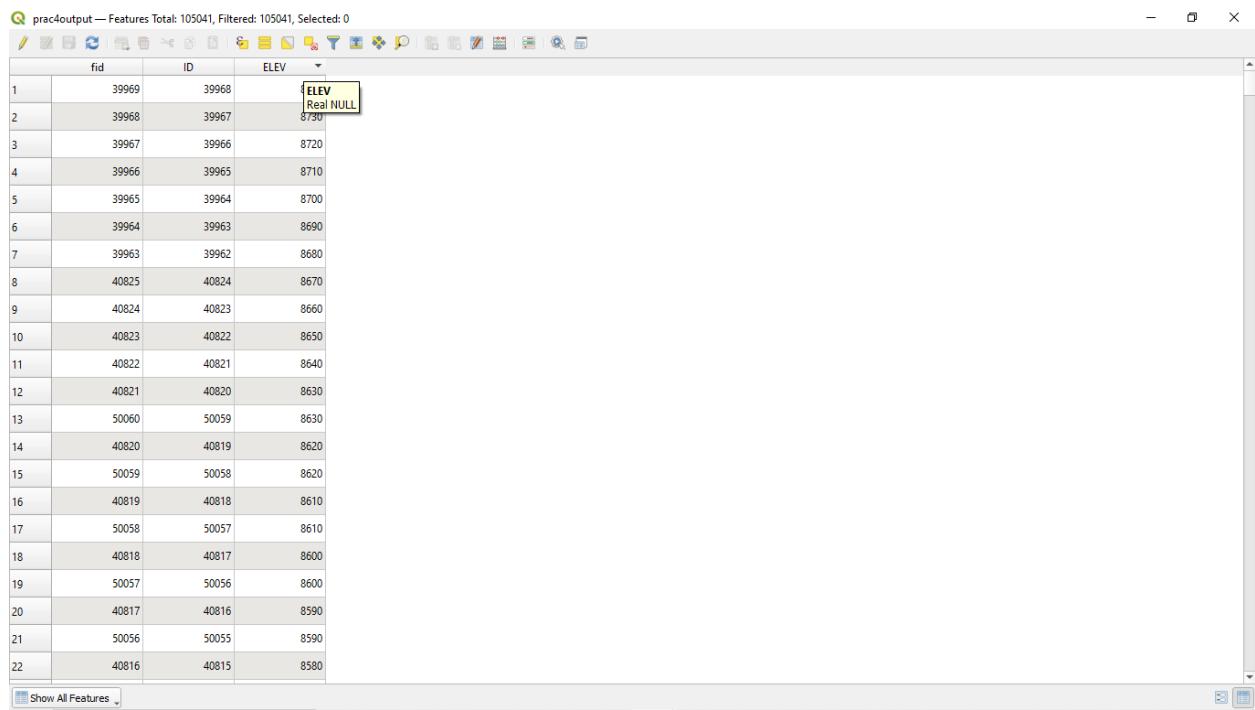




Step 12: Label the layer using “ELEV” field and set appropriate symbols for line. In the Layer panel right click on Contour Raster Layer and select “Open Attribute table”. Arrange the table in descending order based on the value of “ELEV” column.

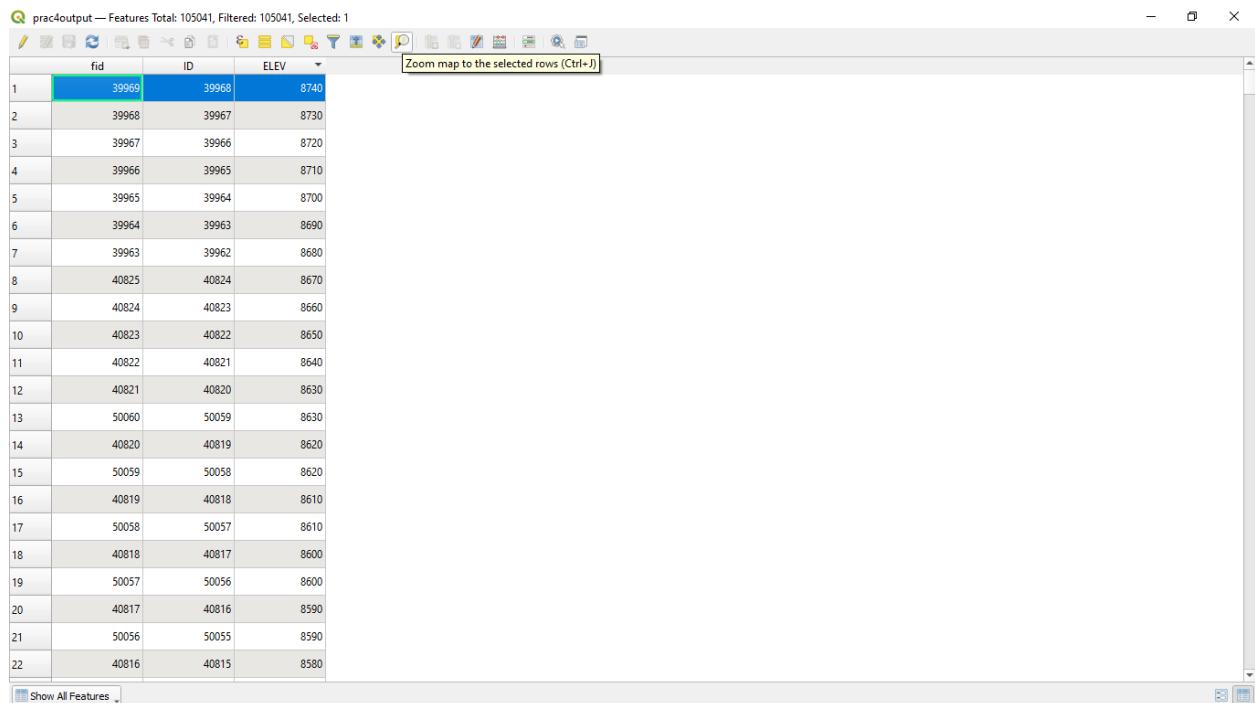




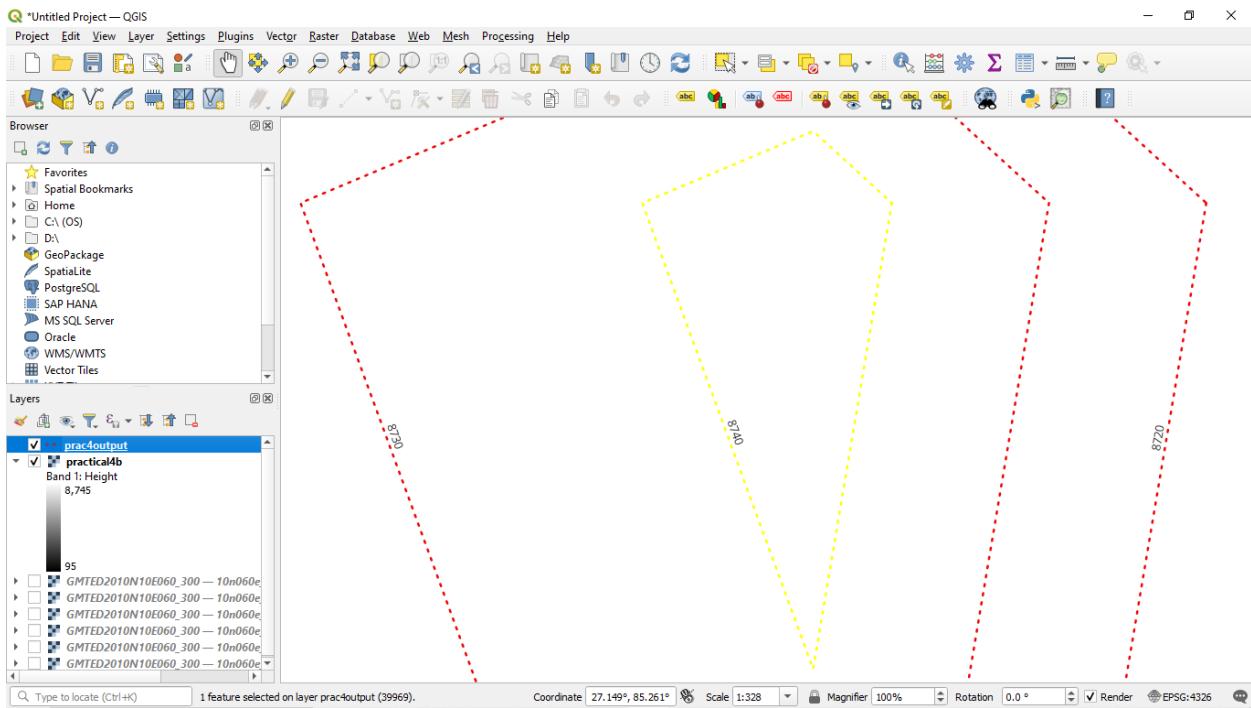


	fid	ID	ELEV
1	39969	39968	8740
2	39968	39967	8730
3	39967	39966	8720
4	39966	39965	8710
5	39965	39964	8700
6	39964	39963	8690
7	39963	39962	8680
8	40825	40824	8670
9	40824	40823	8660
10	40823	40822	8650
11	40822	40821	8640
12	40821	40820	8630
13	50060	50059	8630
14	40820	40819	8620
15	50059	50058	8620
16	40819	40818	8610
17	50058	50057	8610
18	40818	40817	8600
19	50057	50056	8600
20	40817	40816	8590
21	50056	50055	8590
22	40816	40815	8580

Step 13: Select first row & click on “Zoom map to the selected rows”.

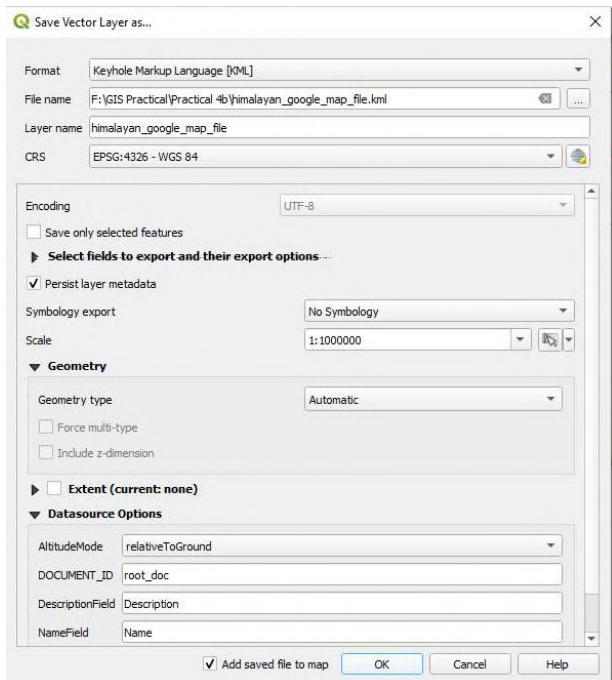


	fid	ID	ELEV
1	39969	39968	8740
2	39968	39967	8730
3	39967	39966	8720
4	39966	39965	8710
5	39965	39964	8700
6	39964	39963	8690
7	39963	39962	8680
8	40825	40824	8670
9	40824	40823	8660
10	40823	40822	8650
11	40822	40821	8640
12	40821	40820	8630
13	50060	50059	8630
14	40820	40819	8620
15	50059	50058	8620
16	40819	40818	8610
17	50058	50057	8610
18	40818	40817	8600
19	50057	50056	8600
20	40817	40816	8590
21	50056	50055	8590
22	40816	40815	8580



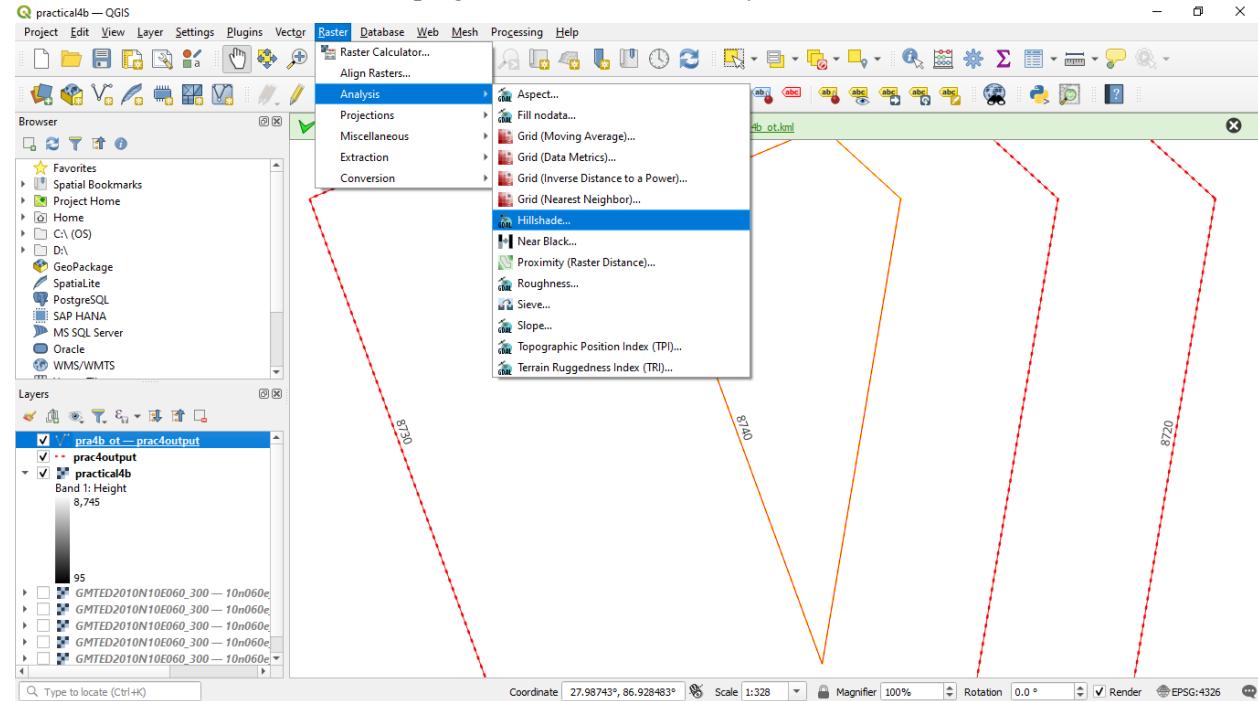
Step 14: Compare the above counter line raster layer with the previous Google map image or visit <https://www.google.com/maps/@27.9857765,86.9285378,14.75z/data=!5m1!1e4?hl=en-US>

- To verify the above contour files using Google Map
- Make a copy of Contour Layer, Go to Layer → Save As
- Select file format as “Keyhole Markup Language”, set file name, location and Layer Name.
- Also set CRS to WGS 84 EPSG:4326

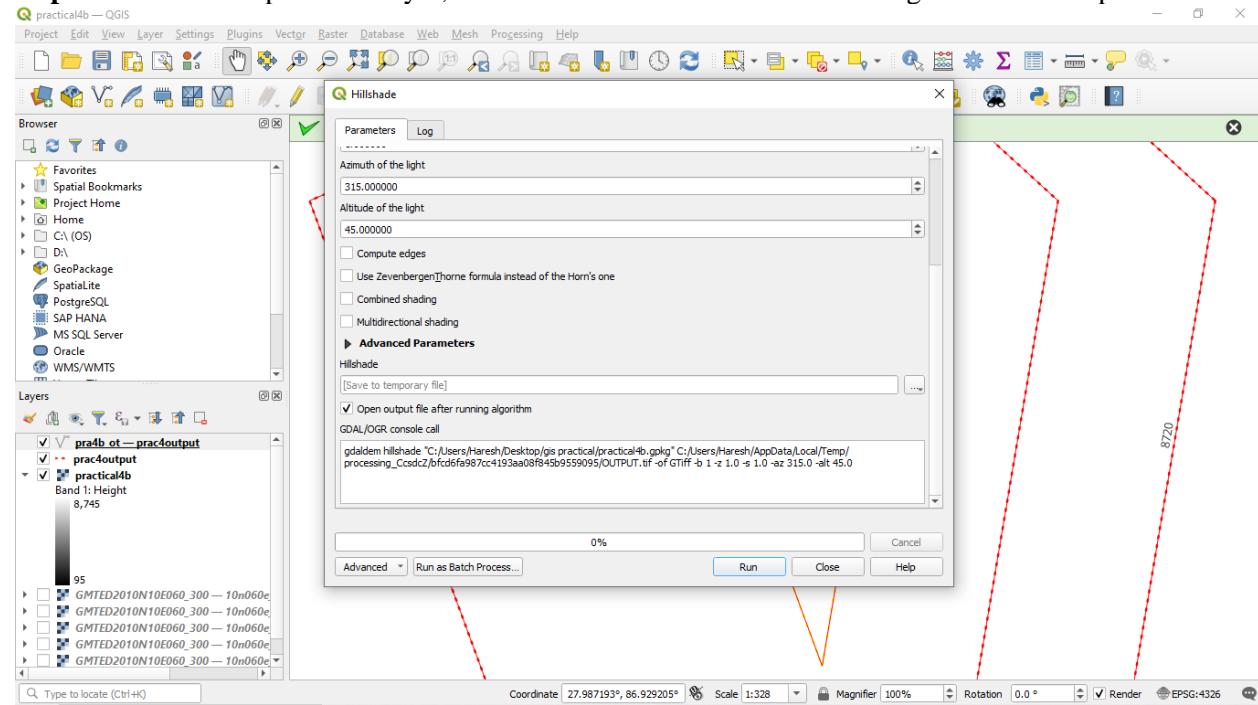


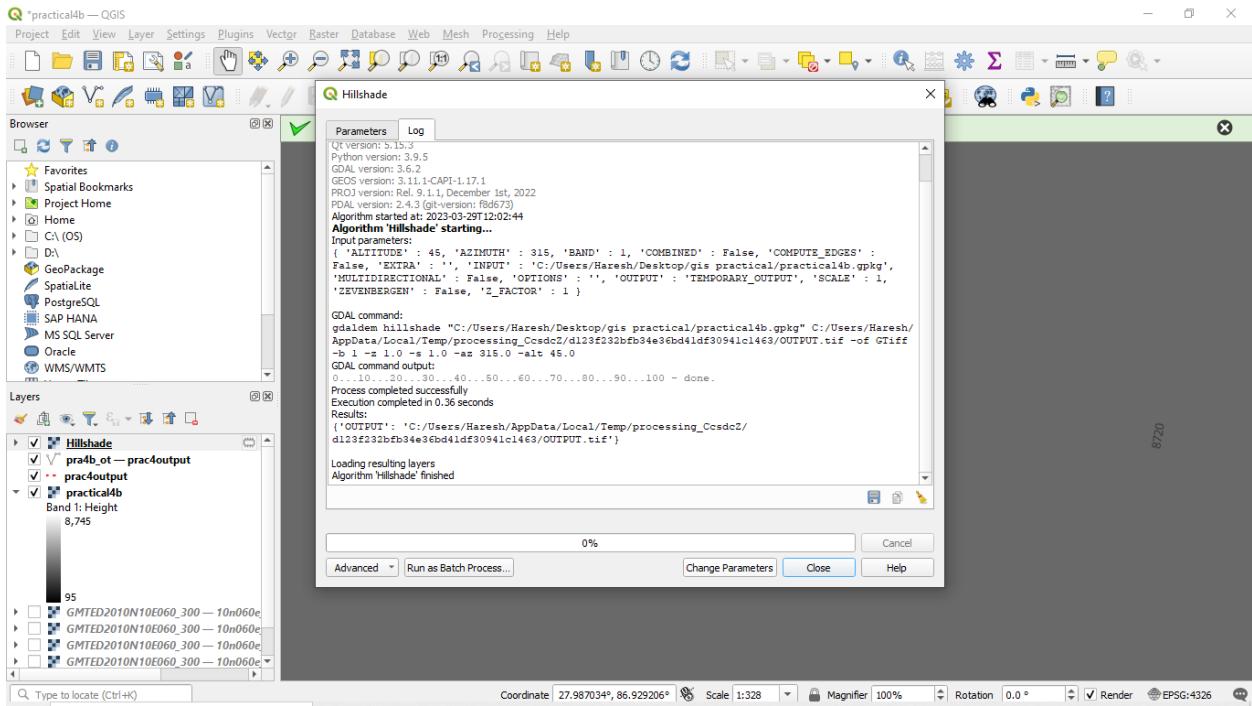
Step 15: Go to the stored location on Hard Disk and open the “Himalayan_Google_Map_File.kml” with Google Map.\A Hillshade is a grayscale 3D representation of the surface, showing the topographical shape of hills and mountains using shading (levels of gray) on a map, just to indicate relative slopes, mountain ridges, not absolute height.

- For Hill Shade surface analysis
- Go to Plugin → Install Georeferencer GADL.
- After successful installation of plugin Go to Raster → Analysis → Hill Shade

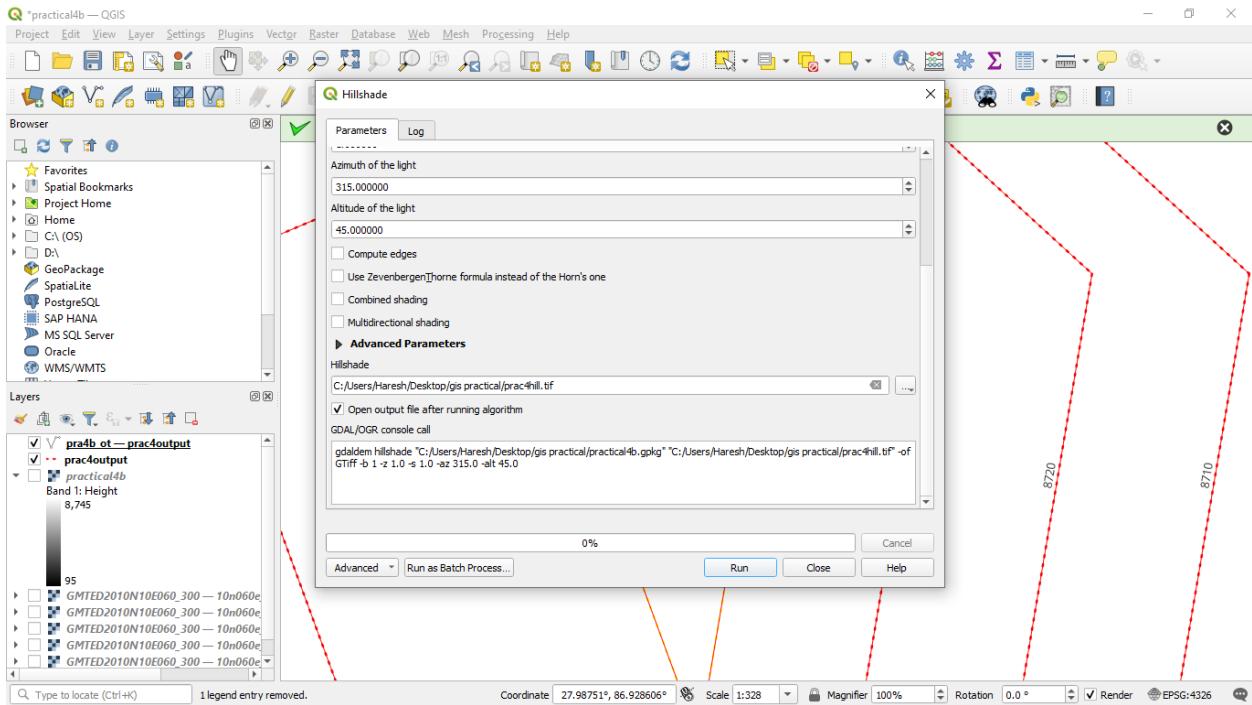


Step 16: Select the input raster layer, select file name and location for storing Hill Shade output file.

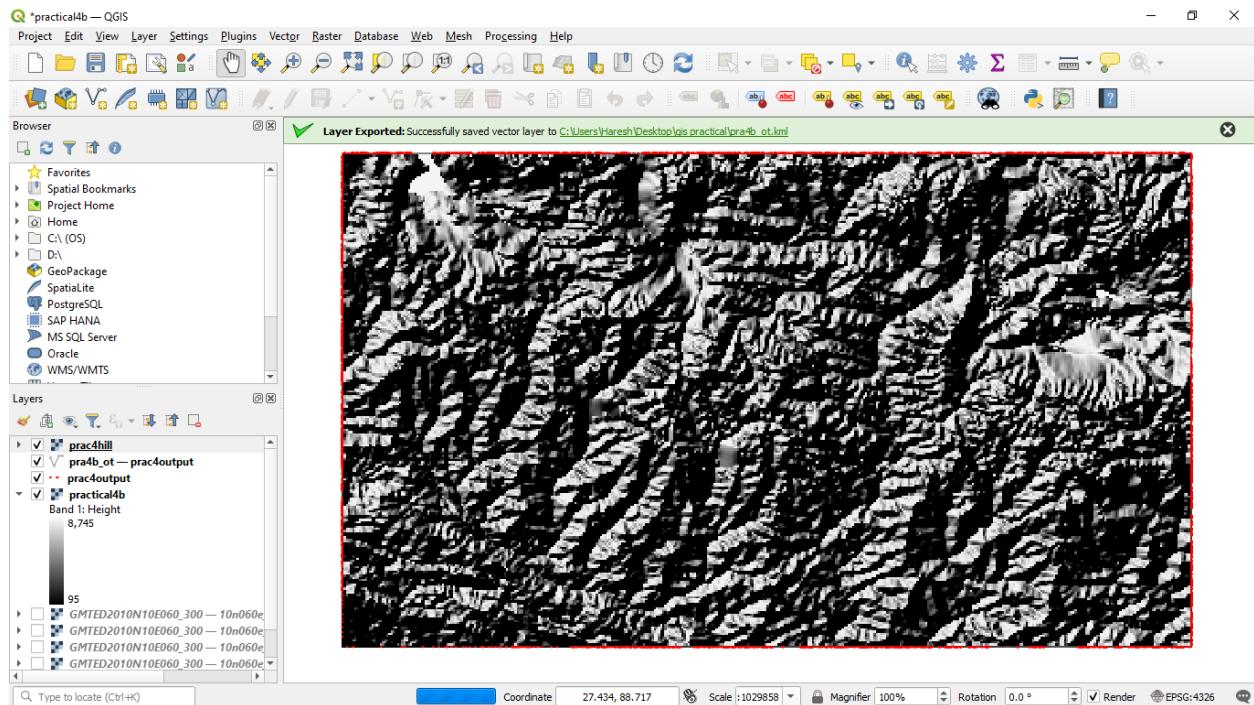




Step 17: Press “RUN” and Close the Hill Shape Dialog window.

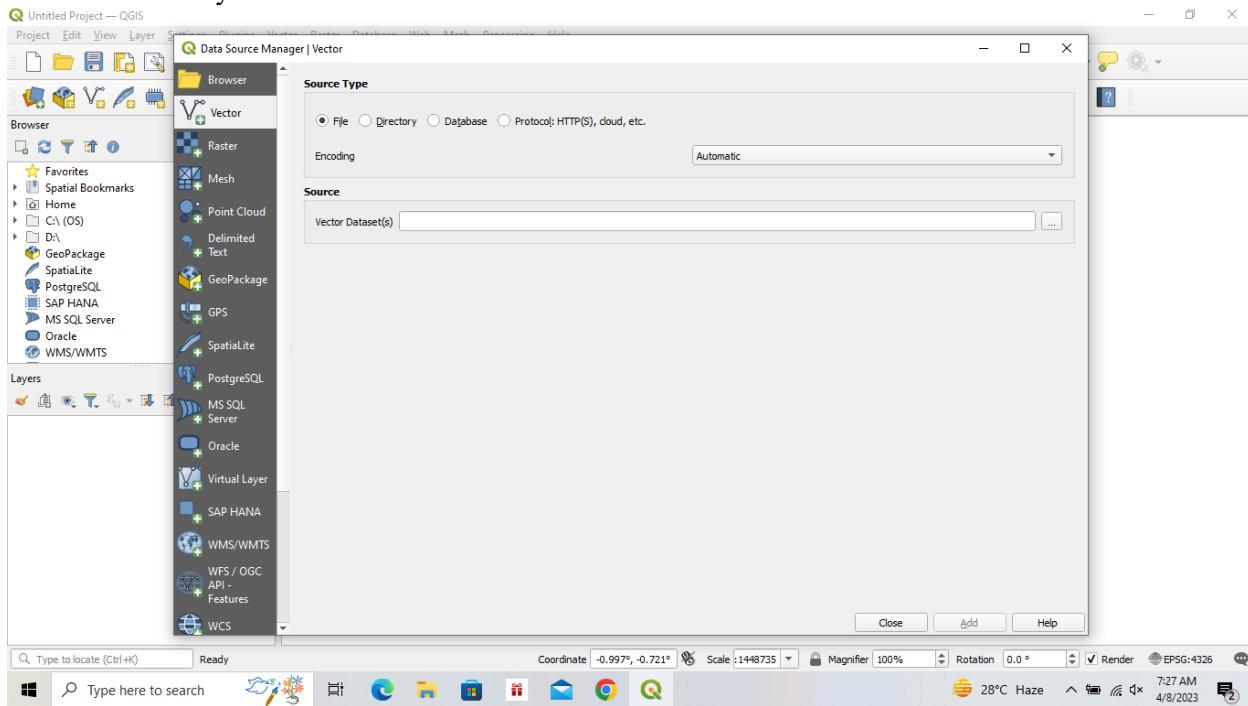


Step 18: After Raster styling the Output will appear like this.



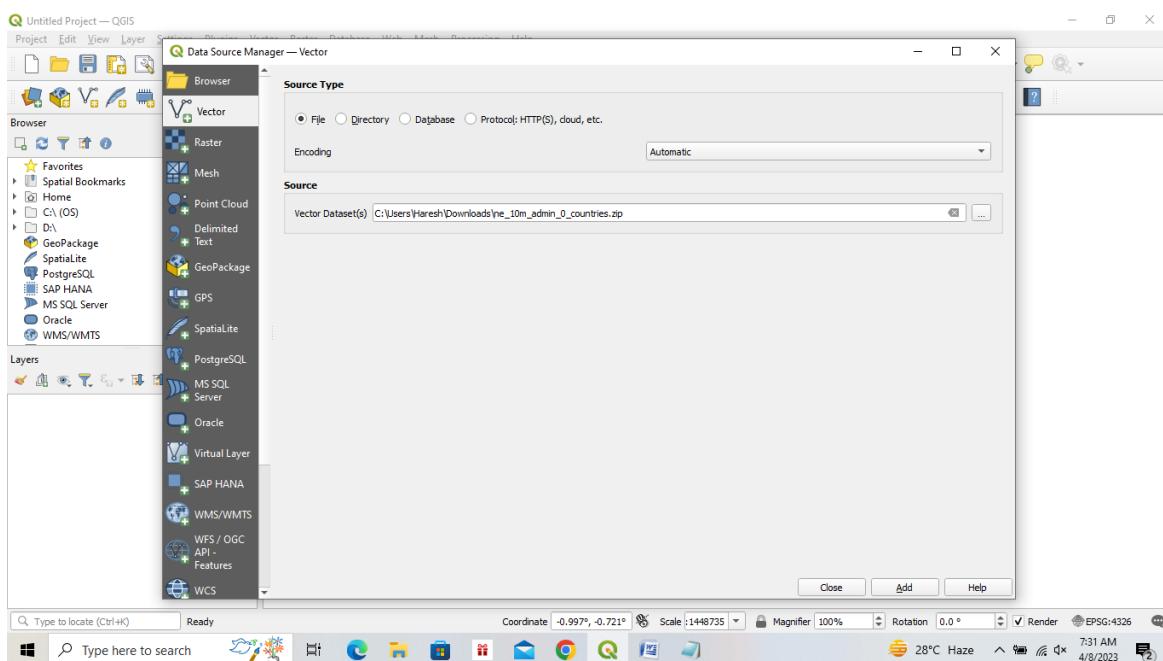
Practical 5: Working with Projections and WMS Data

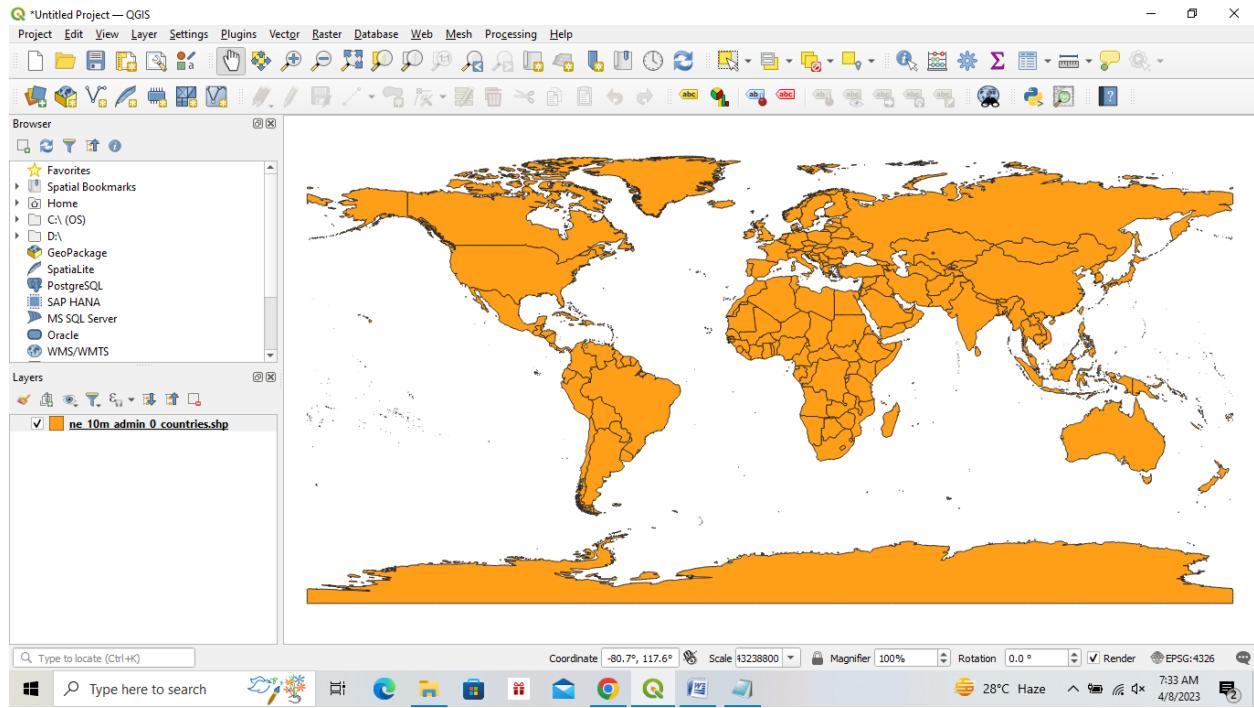
A Web Map Service (WMS) is a standard protocol developed by the Open Geospatial Consortium in 1999 for serving georeferenced map images over the Internet. These images are typically produced by a map server from data provided by a GIS database Step 1: Create a new Project. Go to Layer → Add Layer → Add Vector Layer



Step 2: Select “\GIS_Workshop\Practicals\Practical_05\Data\ne_10m_admin_0_countries.zip” Layer from data folder.”

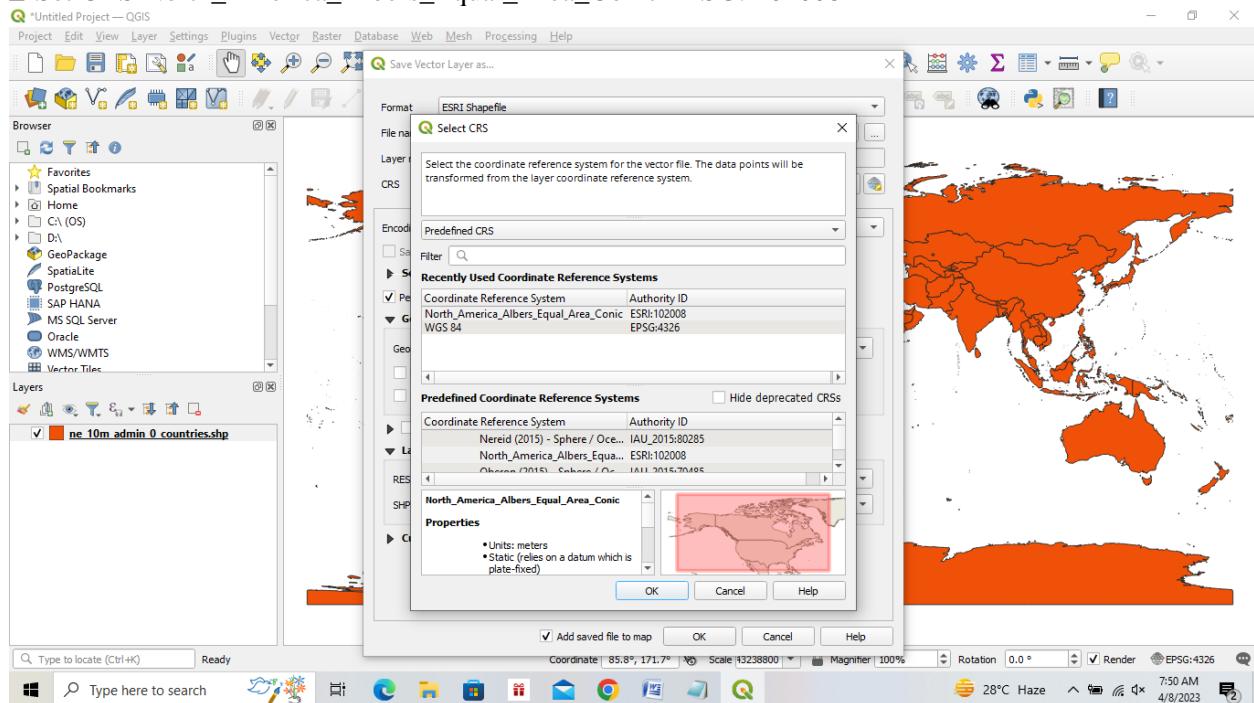
Click Add and close the window. (https://carto.com/dataset/ne_10m_populated_places_simple)



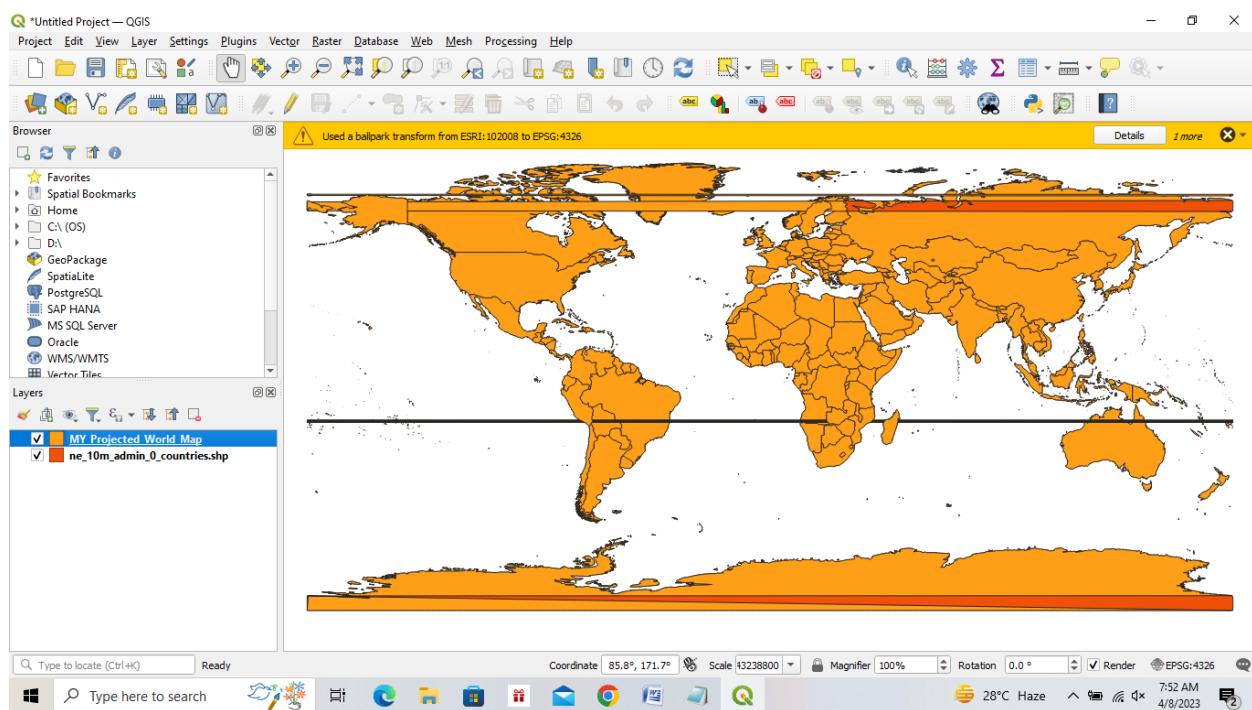
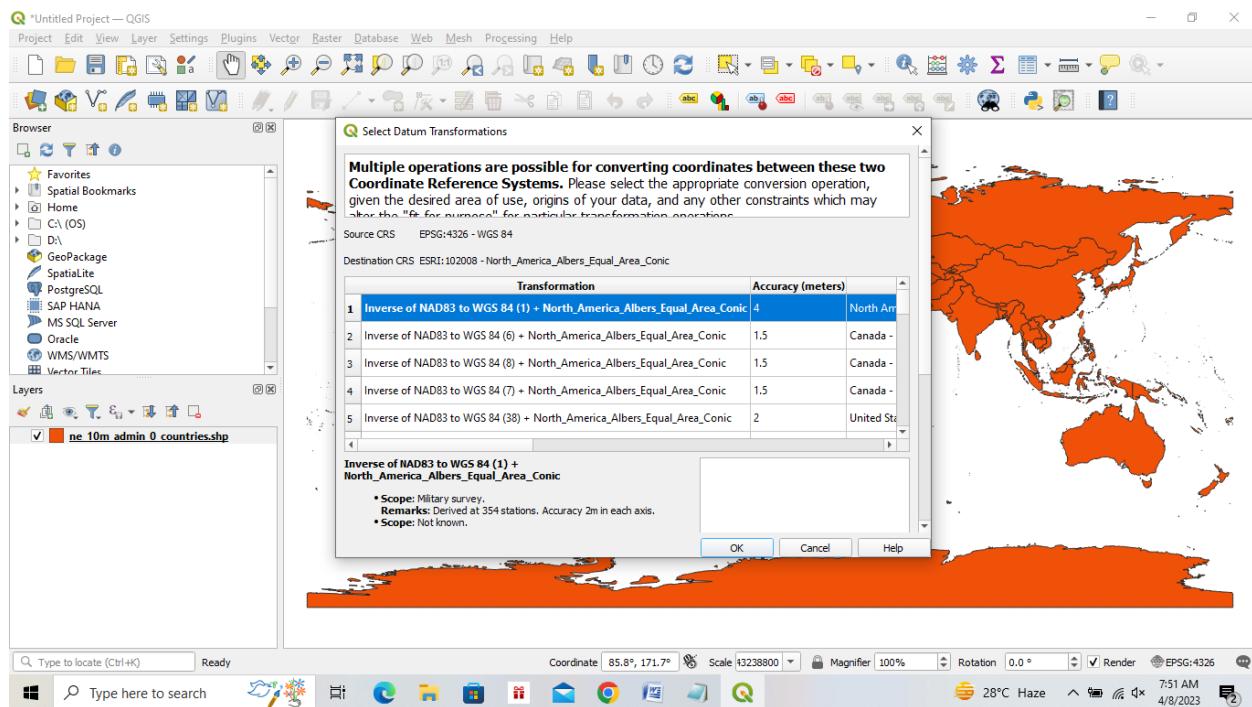


Step 3: Go to Layer → Save As

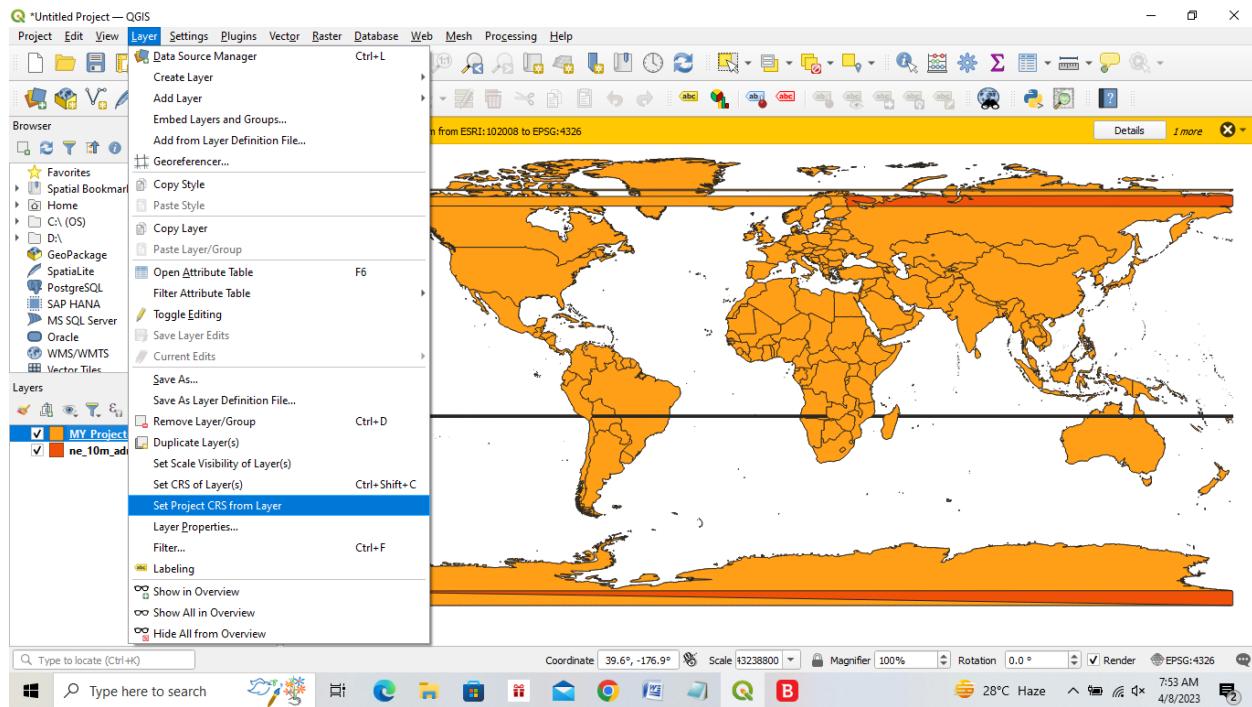
- Select format as ESRI Shape File
- Select folder location and file name
- Set CRS North_America_Albers_Equal_Area_Conic EPSG: 102008



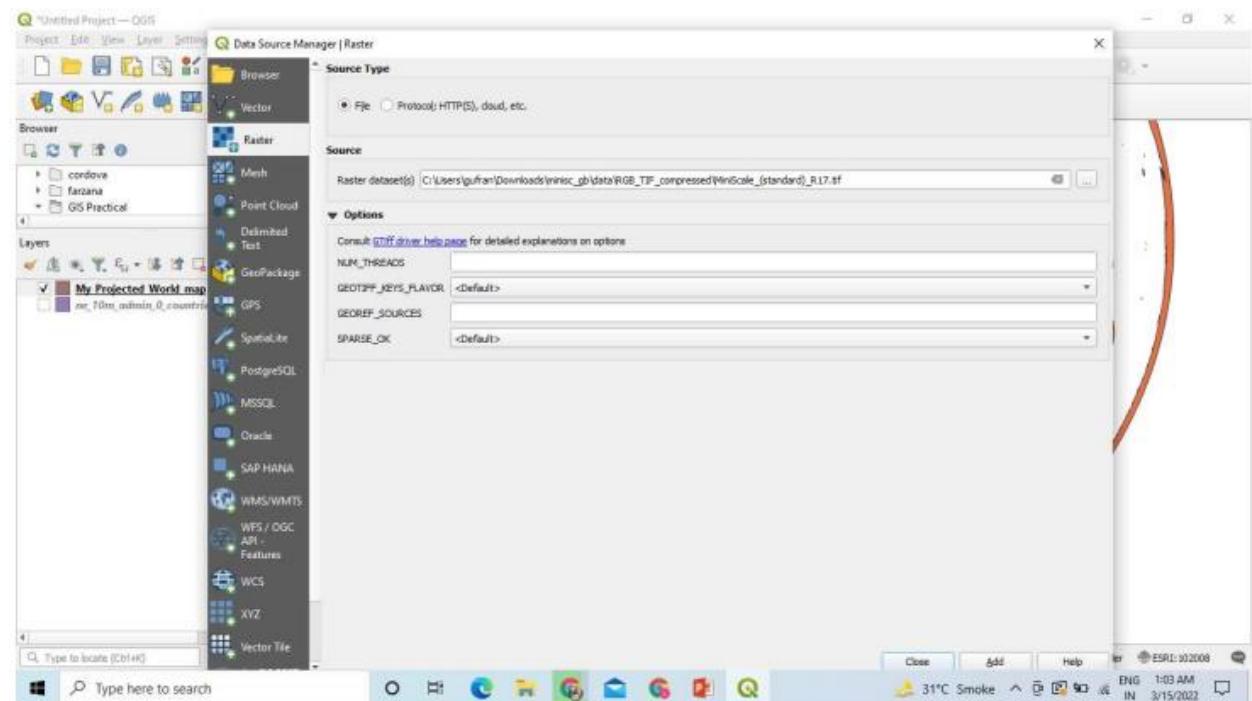
Step 4: Press “OK”. Deselect the original Image and keep the projected layer visible.



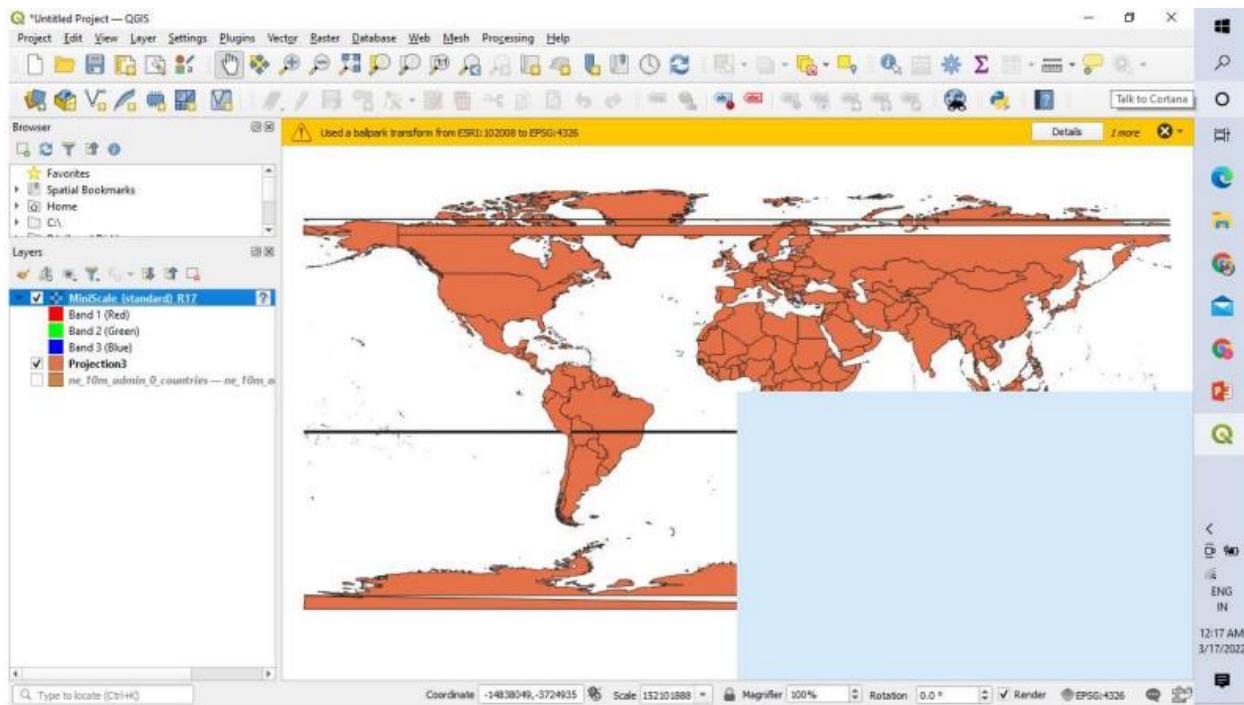
Step 5: Select Layer □ Set Project CRS from Layer



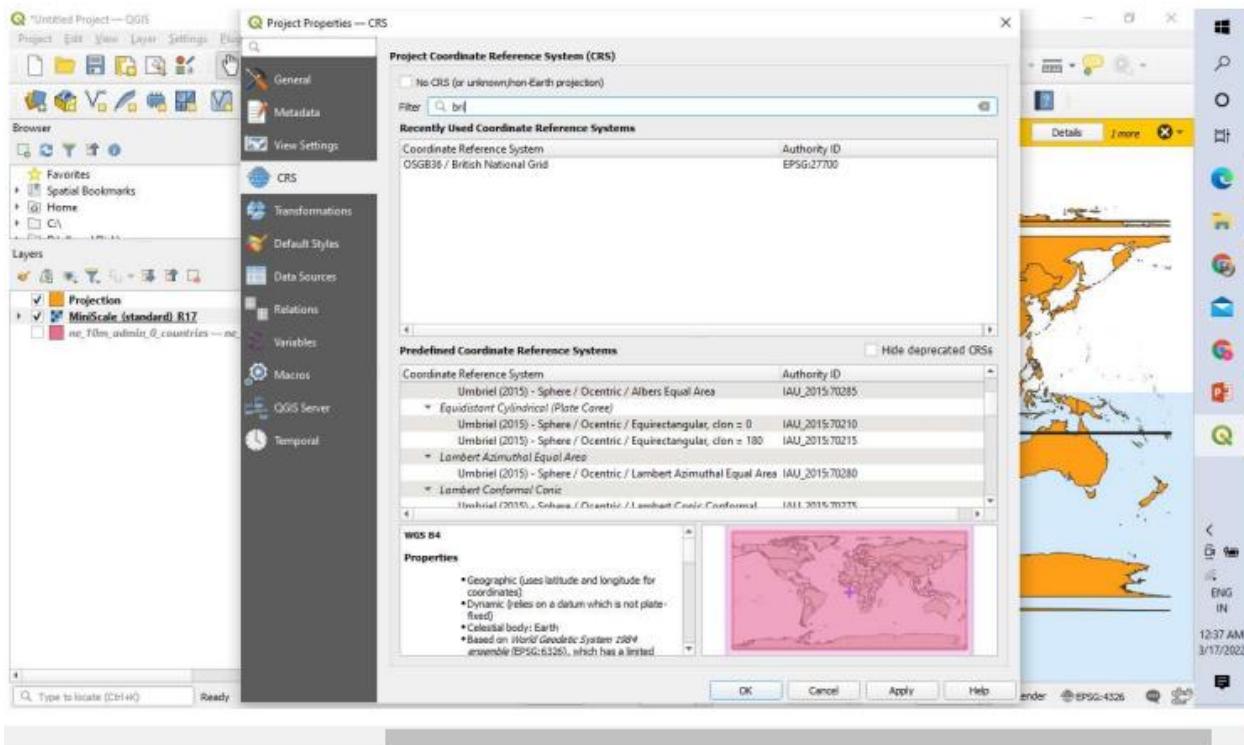
Step 6: Select Layer → Add Layer → Add Raster Layer → Select C:\Users\gufran\Downloads\minisc_gb\data\RGB_TIF_compressed\MiniScale_(standard)_R17.tif from Location.

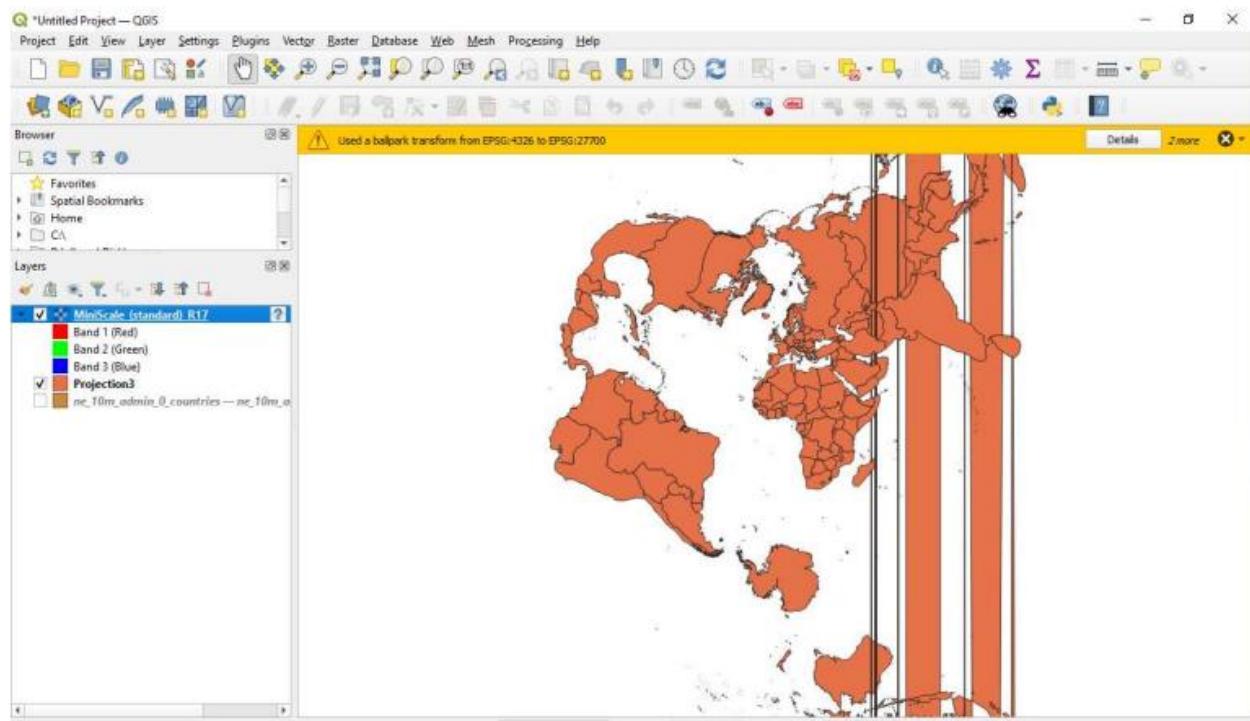


Step 7: The Layer appears on a different location than the location where Great Britain is shown on Map.

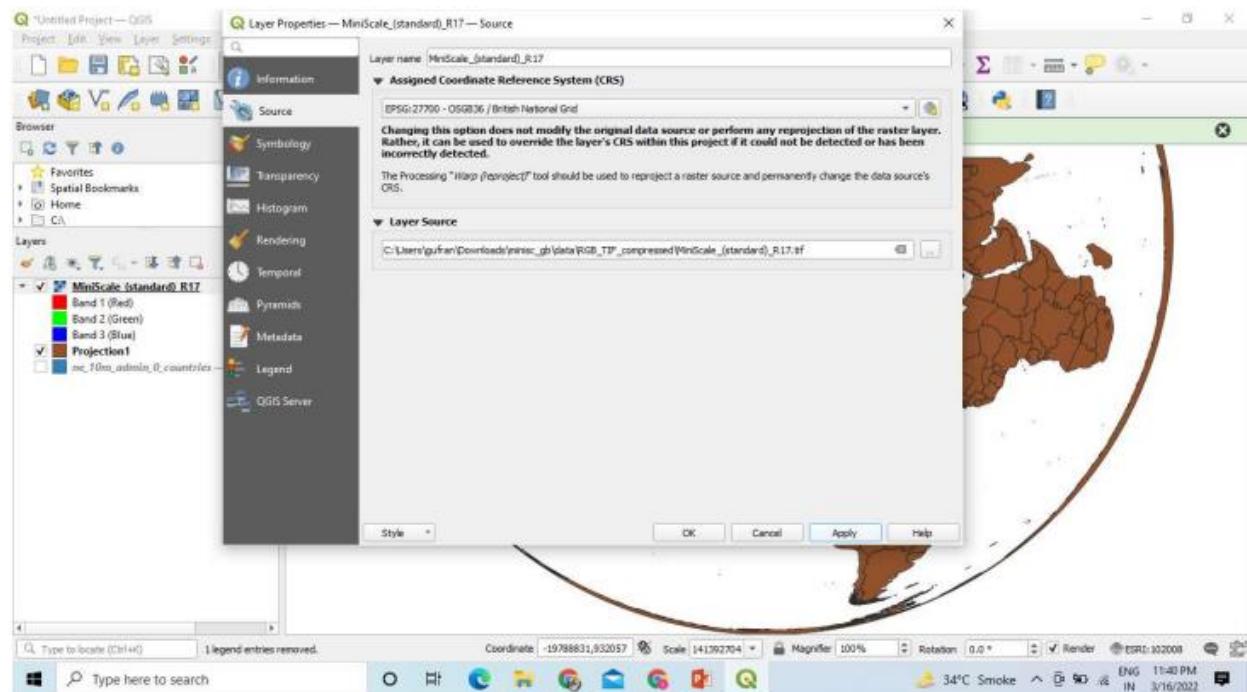


Step 8: Open Project □ Properties → CRS → Search bri → select British National Grid EPSG 27700.

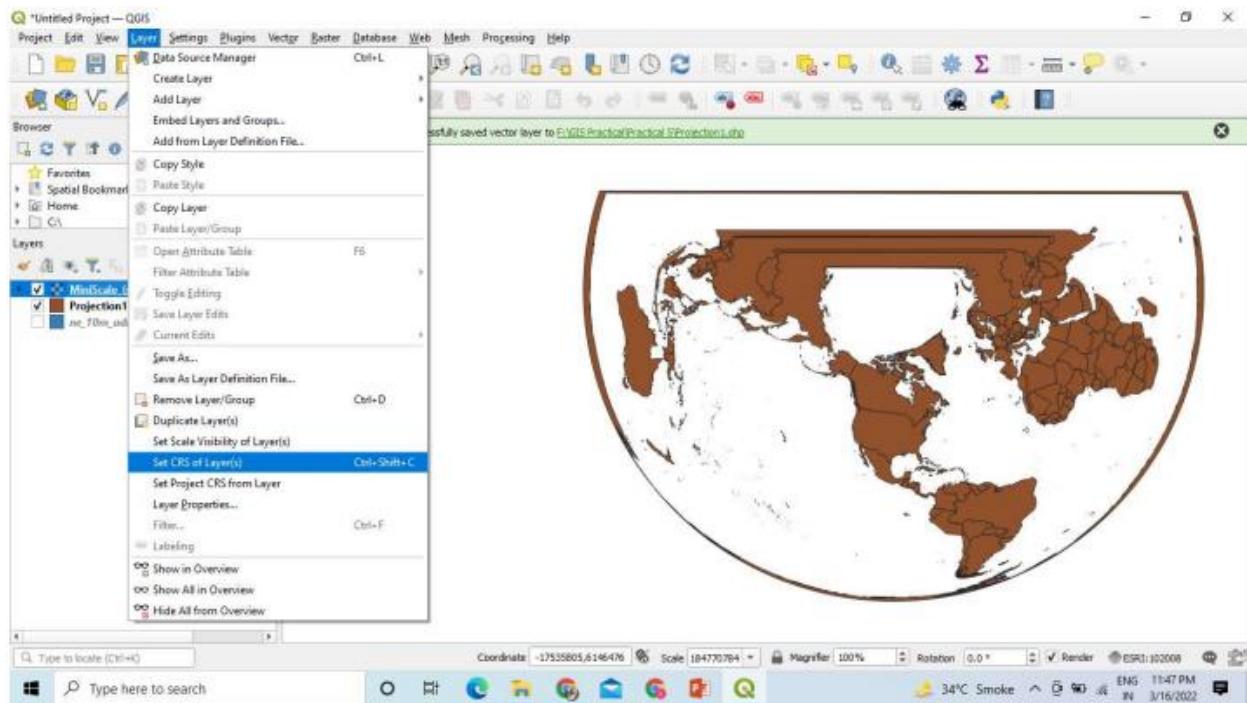




Step 9: Open Layer Properties → CRS → Search bri → select British National Grid EPSG 27700. Select format as ESRI Shape File → Set CRS British National Grid EPSG 27700 →



Step 10: Open Layer Properties → CRS → Search bri → select British National Grid EPSG 27700. Select format as ESRI Shape File → Set CRS British National Grid EPSG 27700 →



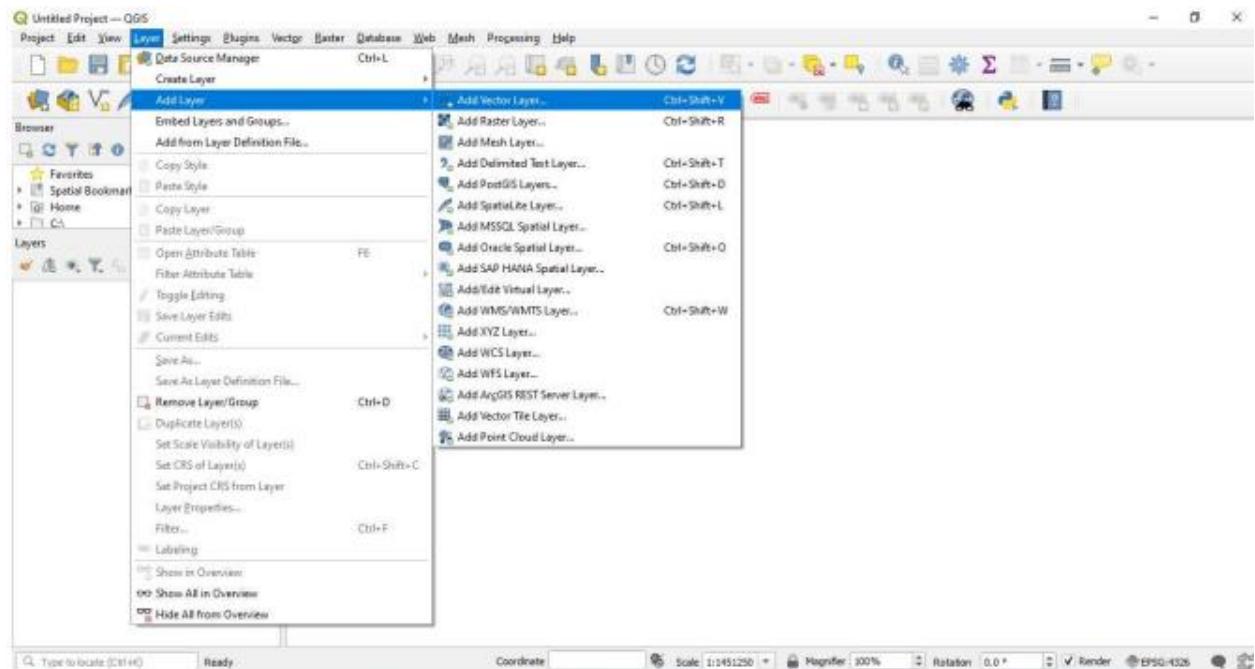
Step 11: Processing may take some time. ➤ Locate United Kingdom on Layer; the vector layer exactly coincides by the raster layer covering United Kingdom



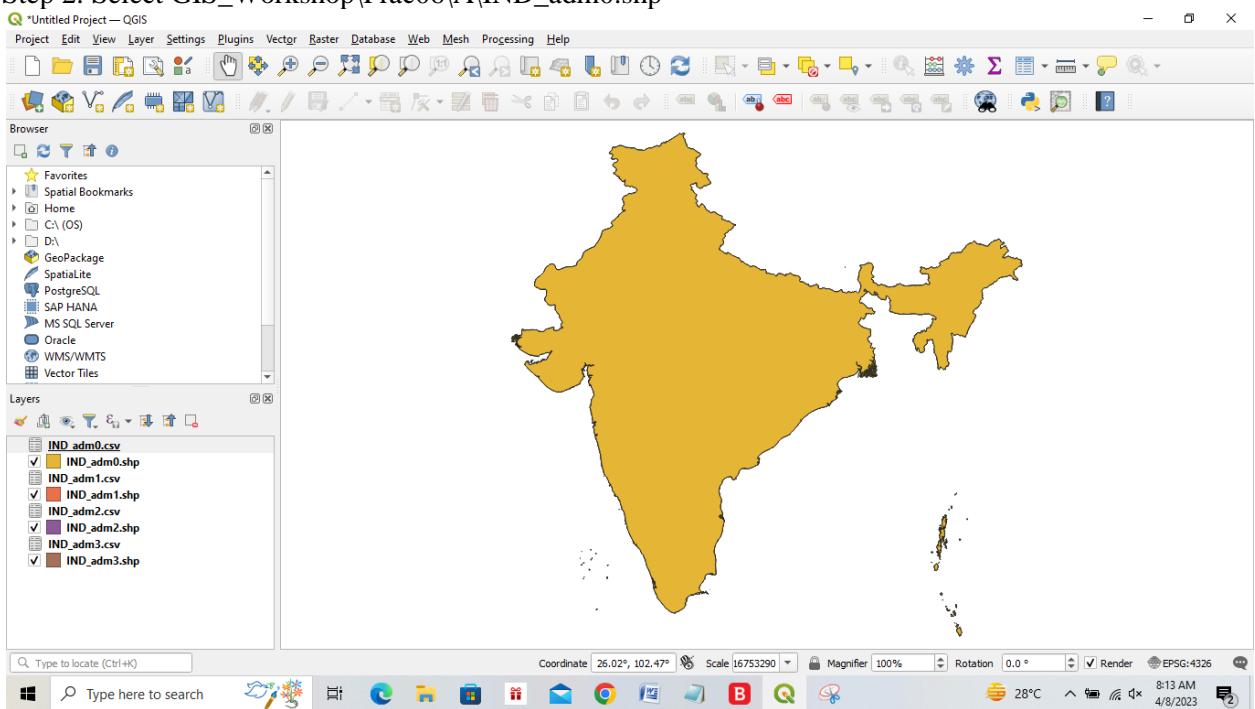
Practical 6: Georeferencing

A. Georeferencing Topo Sheets and Scanned Maps

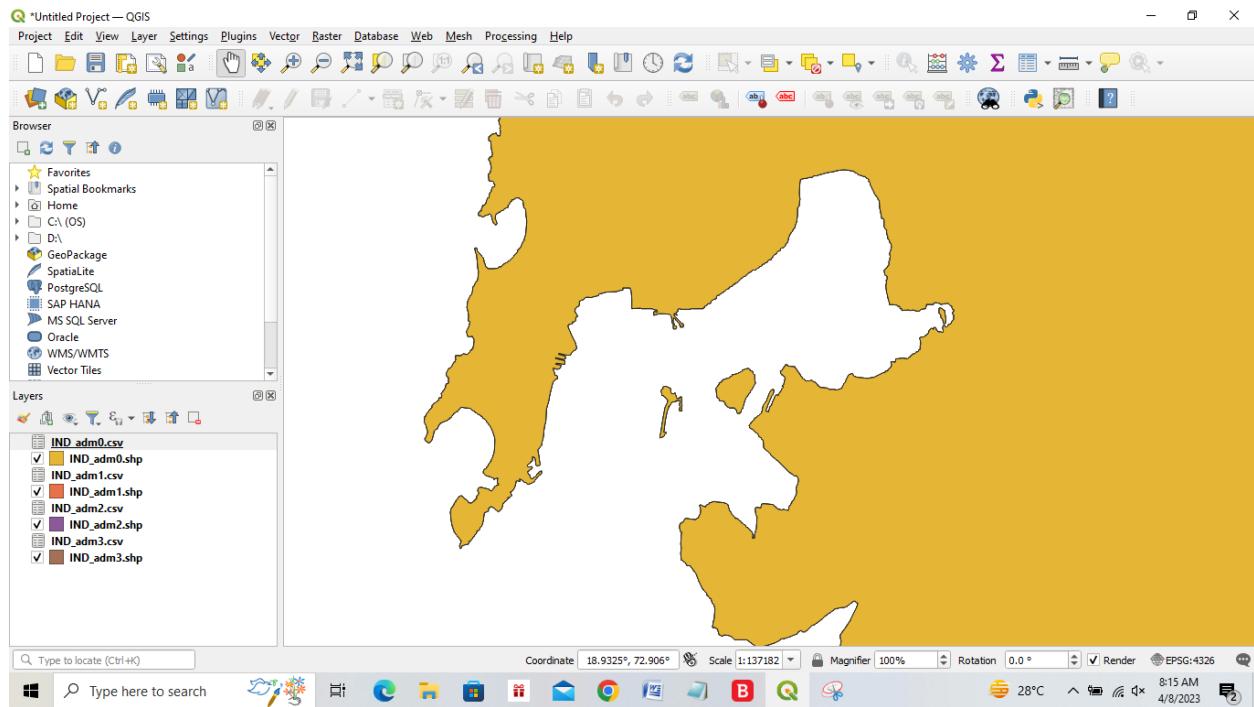
Step 1: Create a new Project. Go to Layer → Add Layer → Add Vector Layer



Step 2: Select GIS_Workshop\Prac06\A\IND_adm0.shp



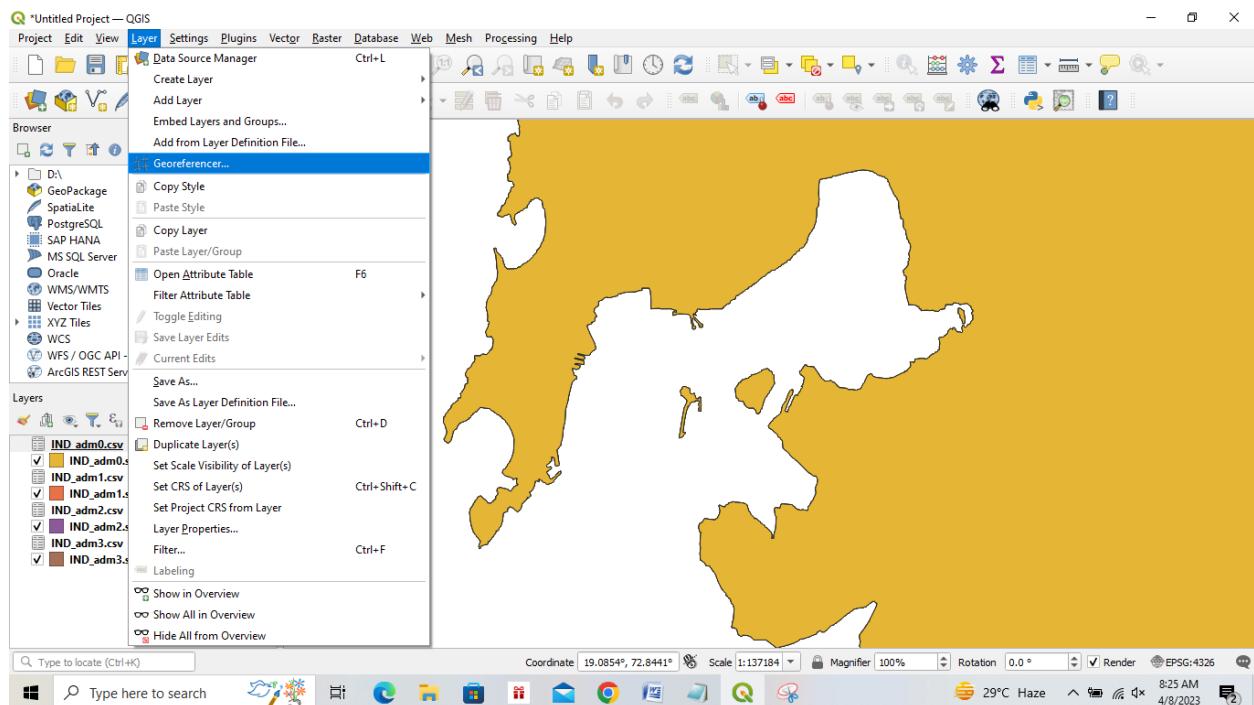
Step 3: Zoom in to Mumbai region in the layer



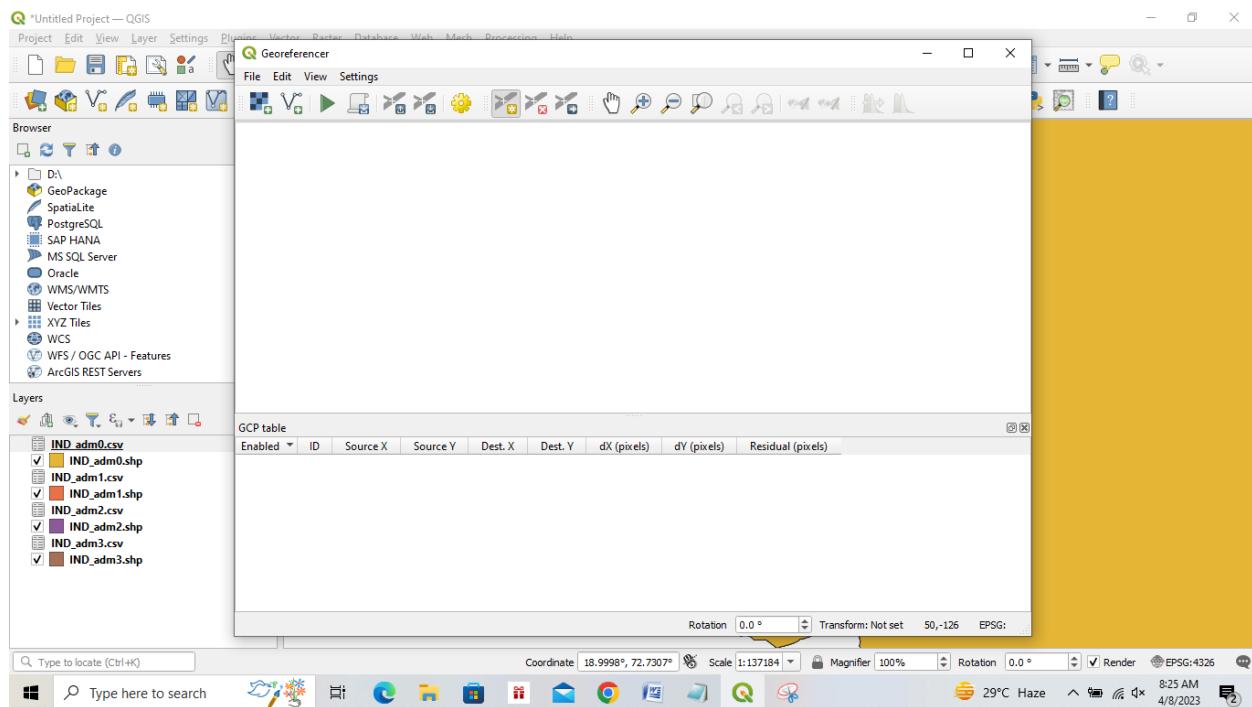
Step 4: Go to Plugins □ Manage and Install Plugins

Step 5: Ensure that is checked, if not install Georeferencer GDAL plugin (Not required in latest version).

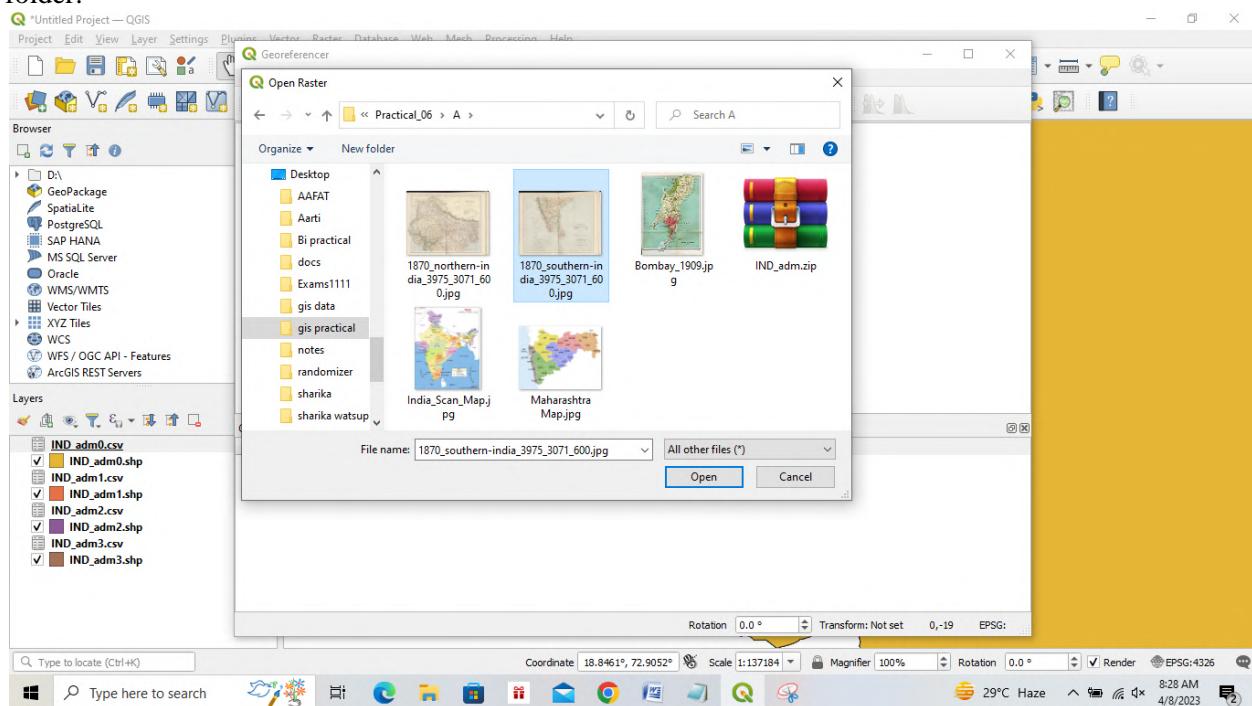
Step 6: Go to Raster □ Georeferencer



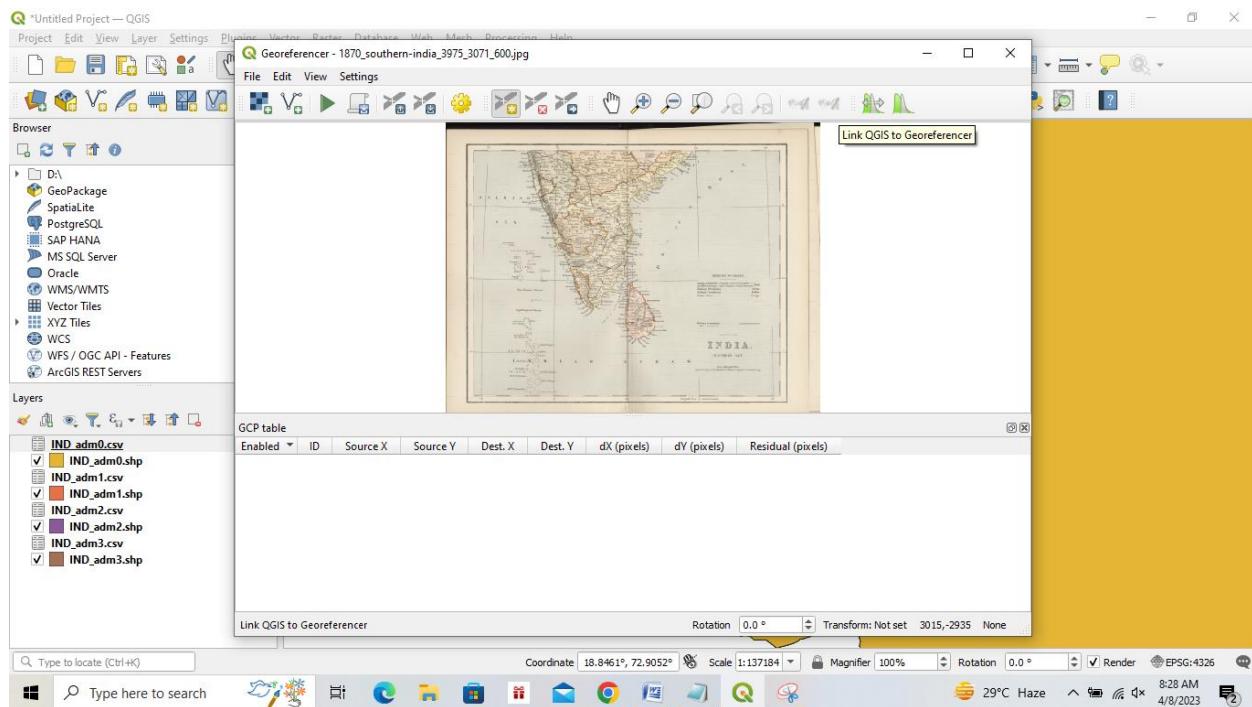
Step 7: A new Georeferencer window will appear.



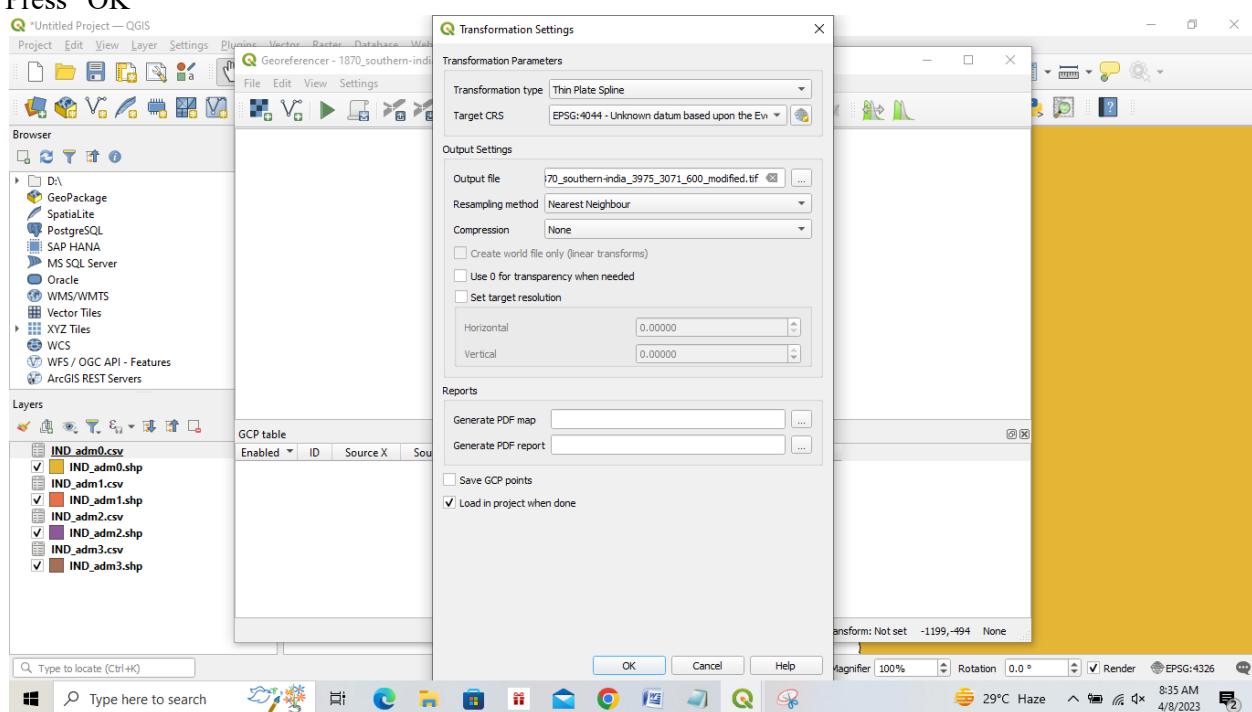
Step 8: File □ Open Raster □ Select file “1870_southern-india_3975_3071_600.jpg” from project data folder.



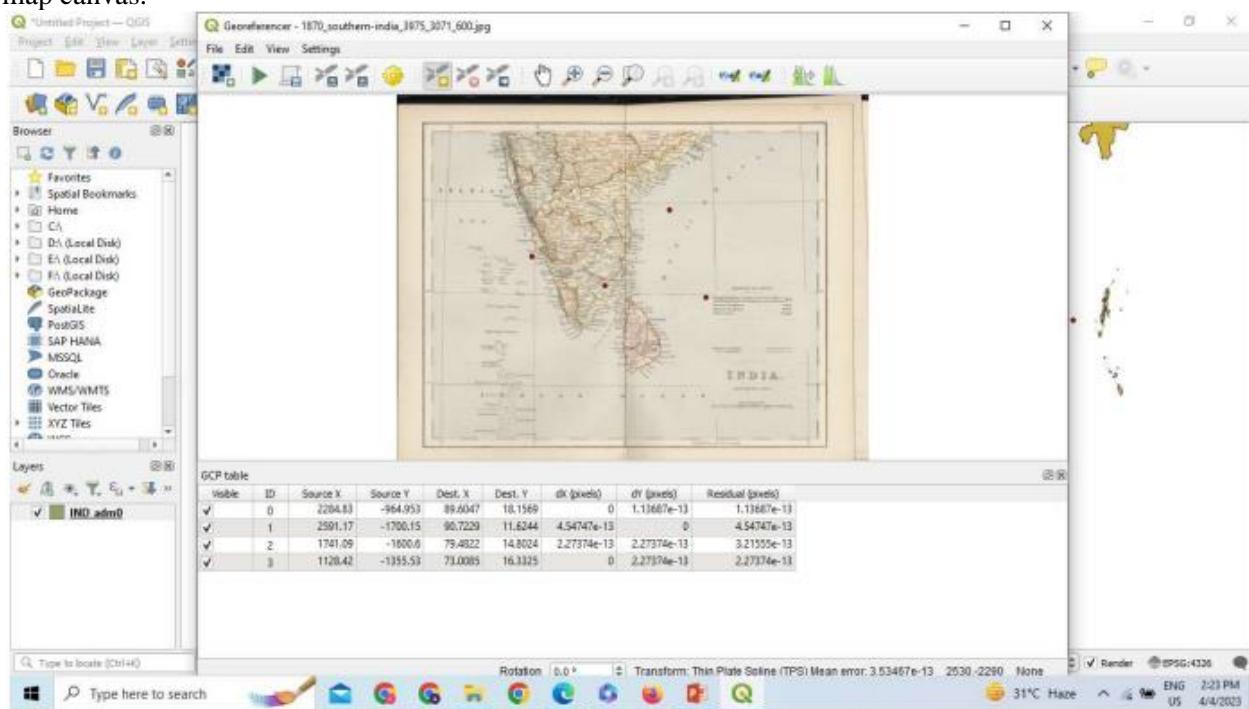
Step 9: The following screen will appear



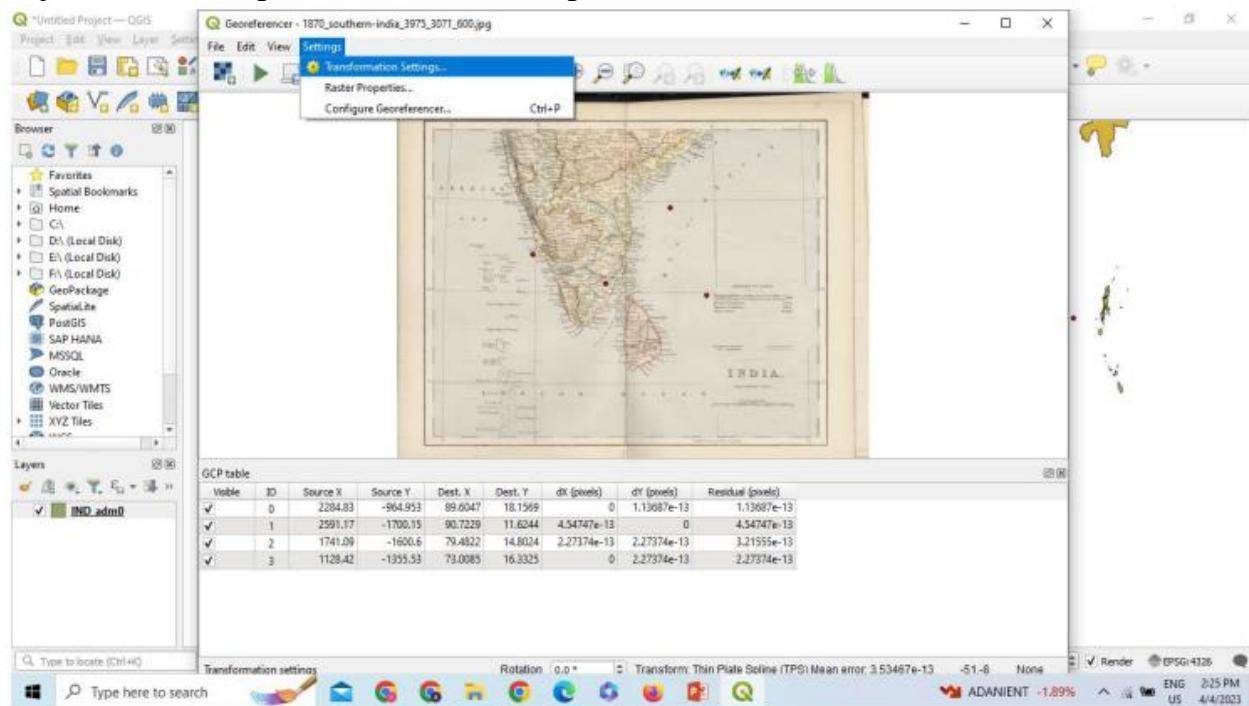
Step 10: Go to Settings □ Transformation Settings □ Select Transformation type □ Thin Plate Spline
 Sampling Method □ Nearest Neighbour
 Target SRS □ Everest 1830 datum: EPSG 4044
 Select Output Raster Name and Location
 Check the “Load in QGIS when done” option
 Press “OK”



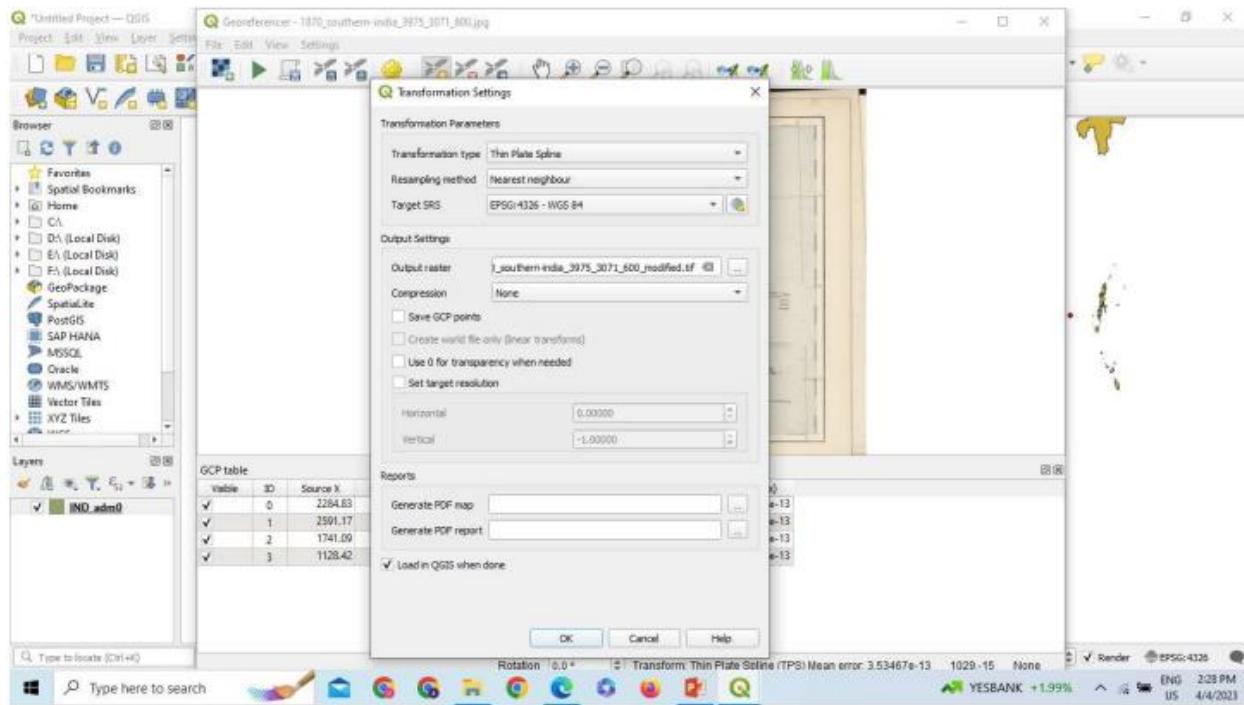
Step 11: In Georeferencer window Go to Edit □ Add Points □ Select the set of control points □ From map canvas.



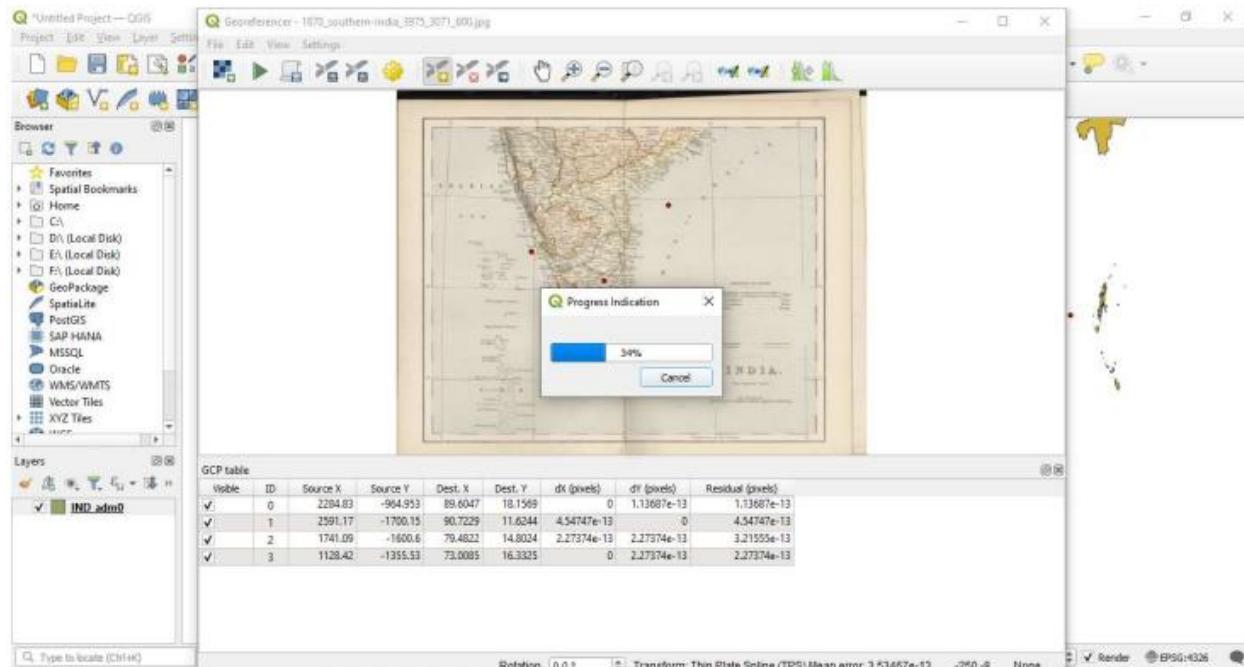
Step 12: Go to, Setting □ Transformation Settings

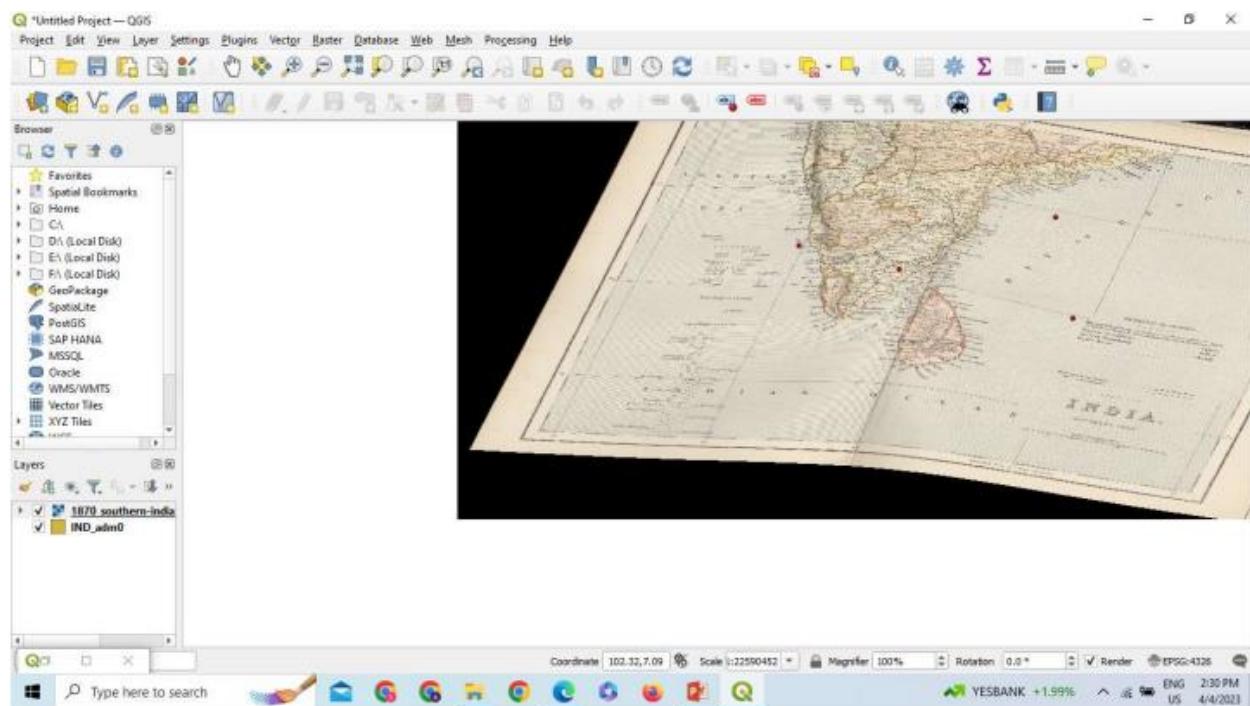


Step 13: Go to, Setting □ Transformation Settings □ Set Target SRS □ EPSG: 4326 – WGS 84



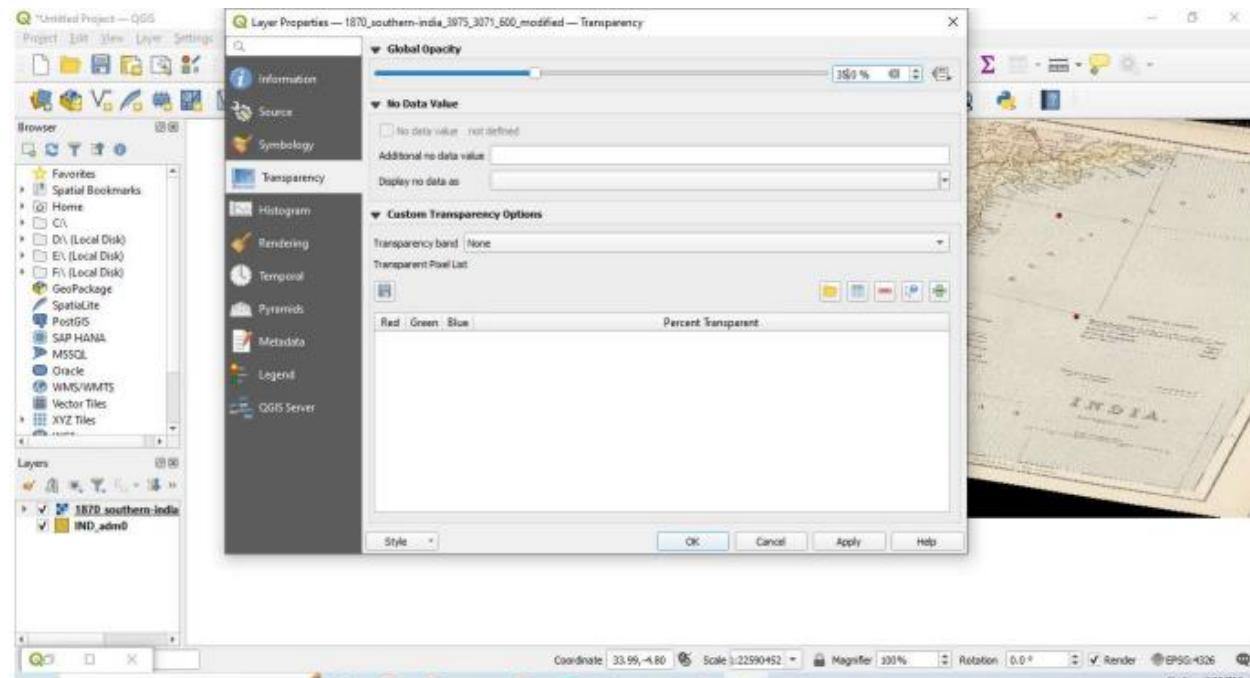
Step 14: Press Run

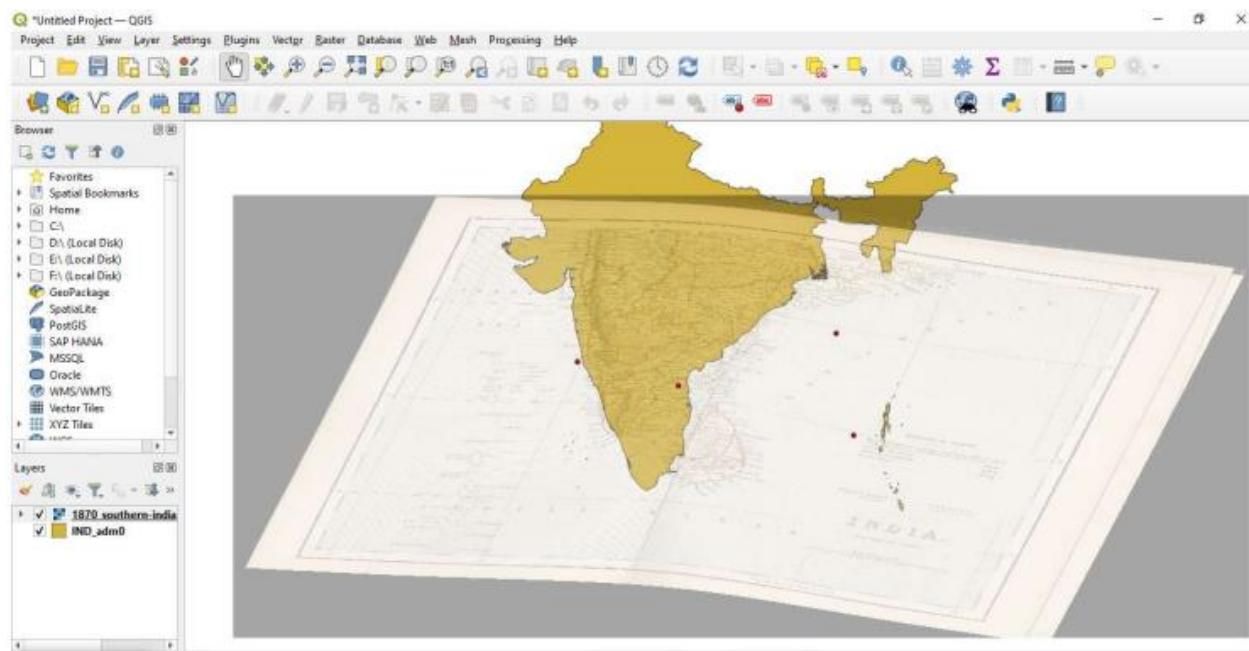




Step 15: Set Transparency level of raster layer to appropriate level.

Right Click 1870_southern-india □ Properties □ Transparency □ Global Opacity □ 35%



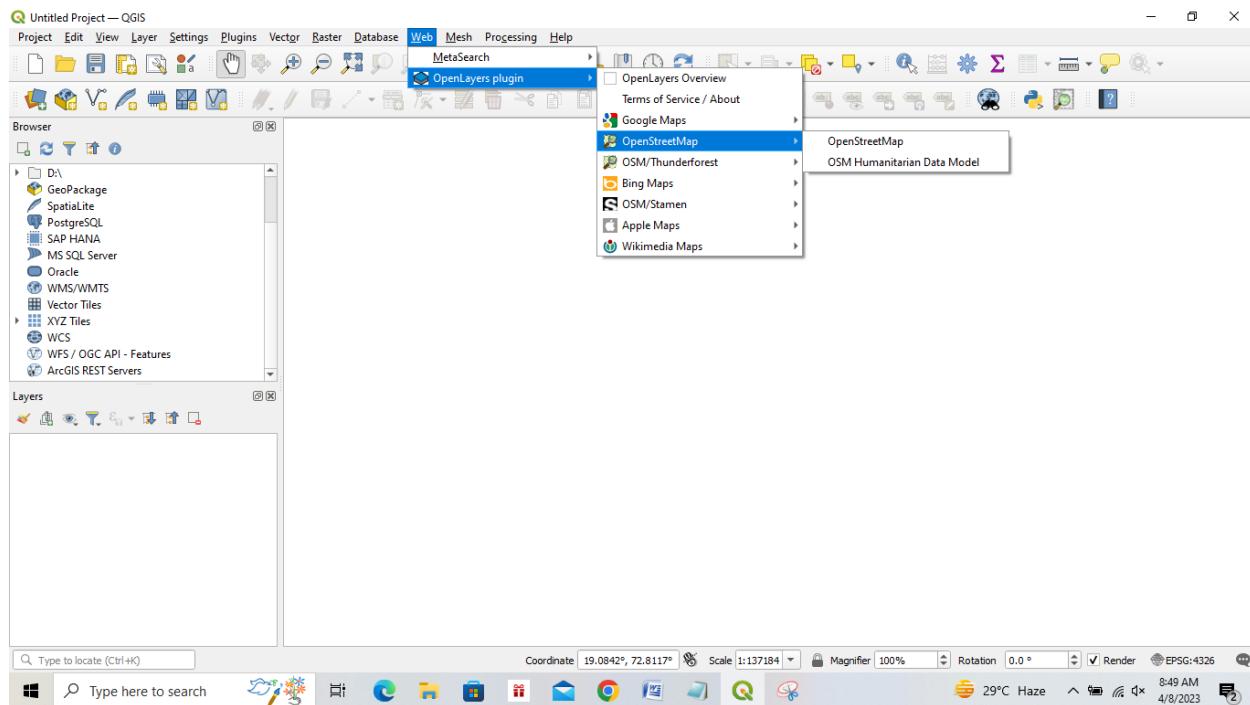


Practical 6: Georeferencing

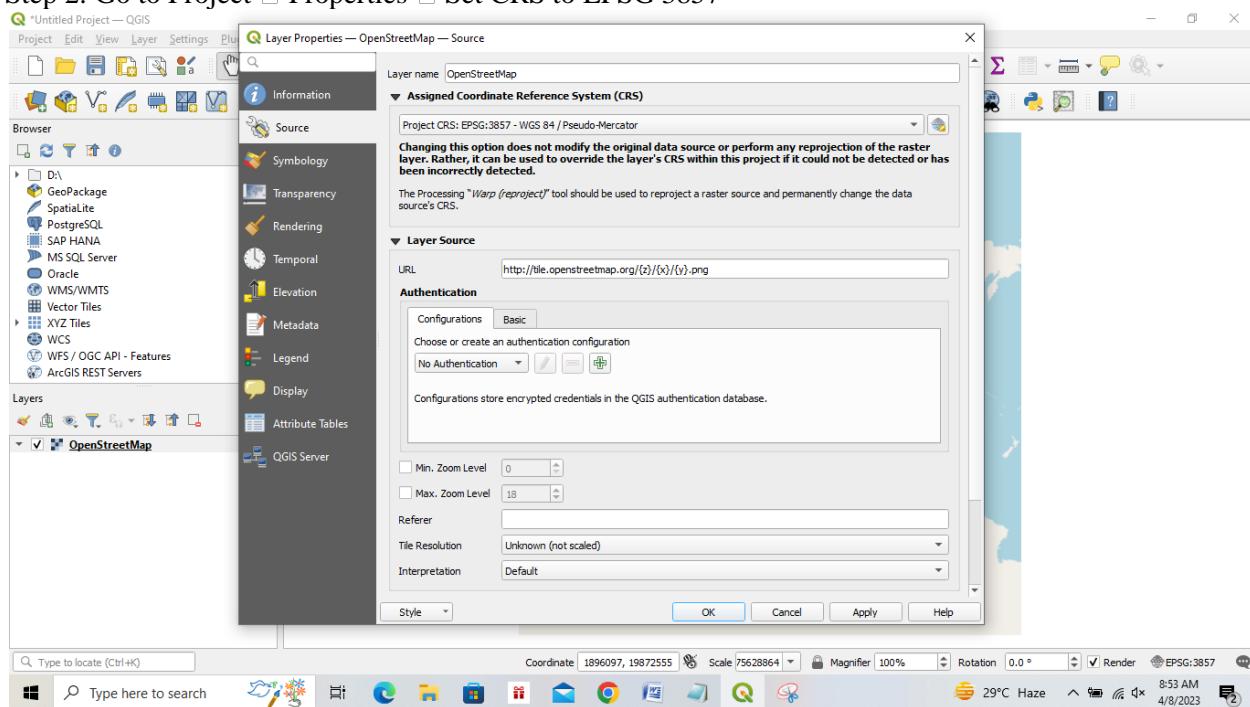
B. Georeferencing Aerial Imagery

Step 1: Install plugin OpenStreetMap

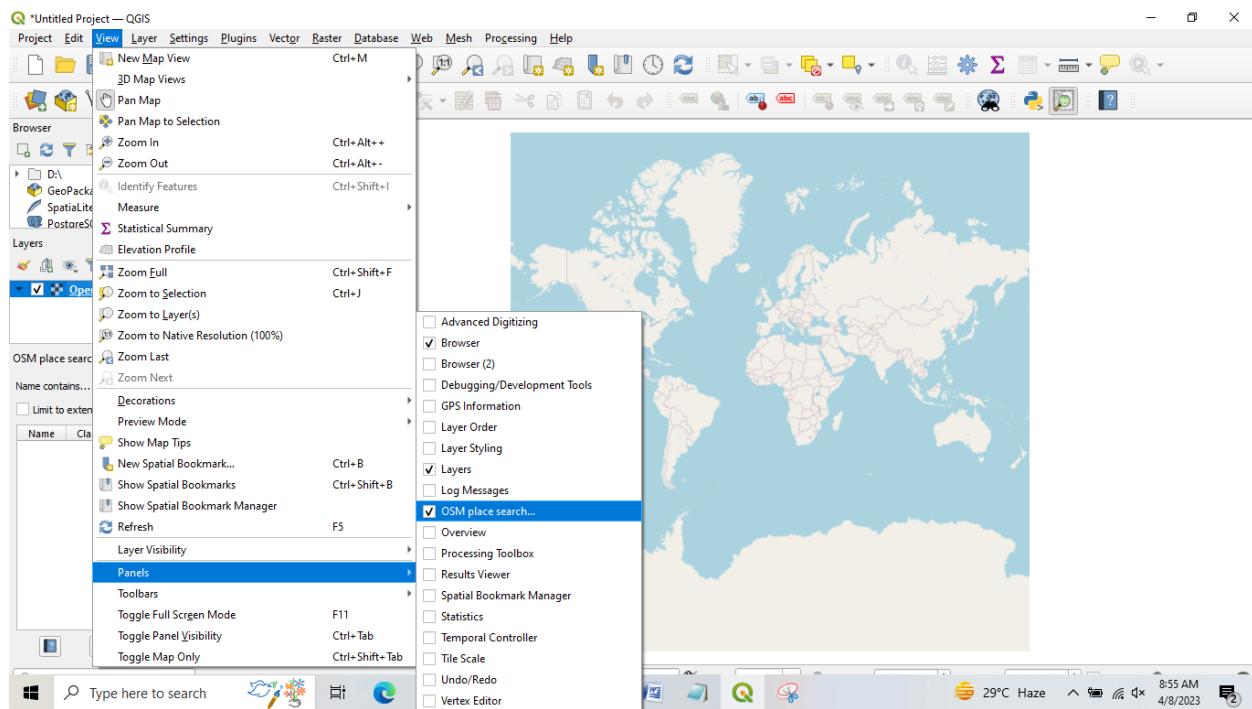
Go to Web Menu → OpenLayerPlugin → OpenStreetMap →OpenStreetMap



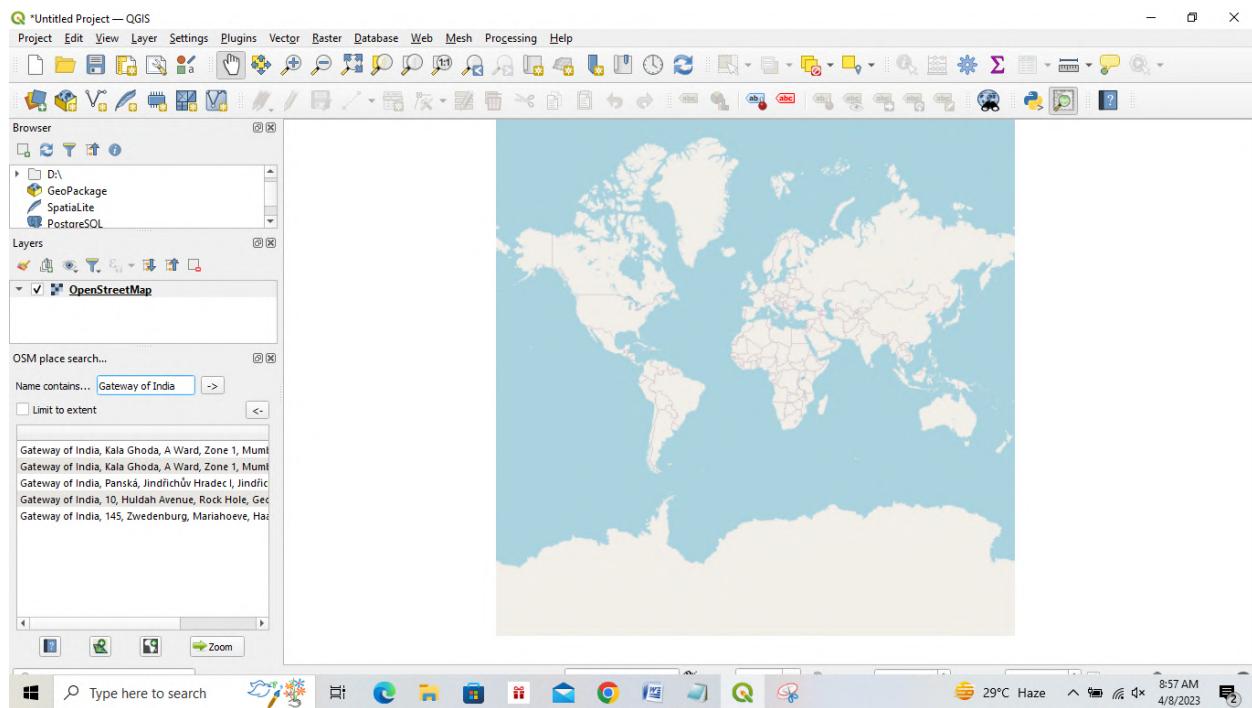
Step 2: Go to Project □ Properties □ Set CRS to EPSG 3857



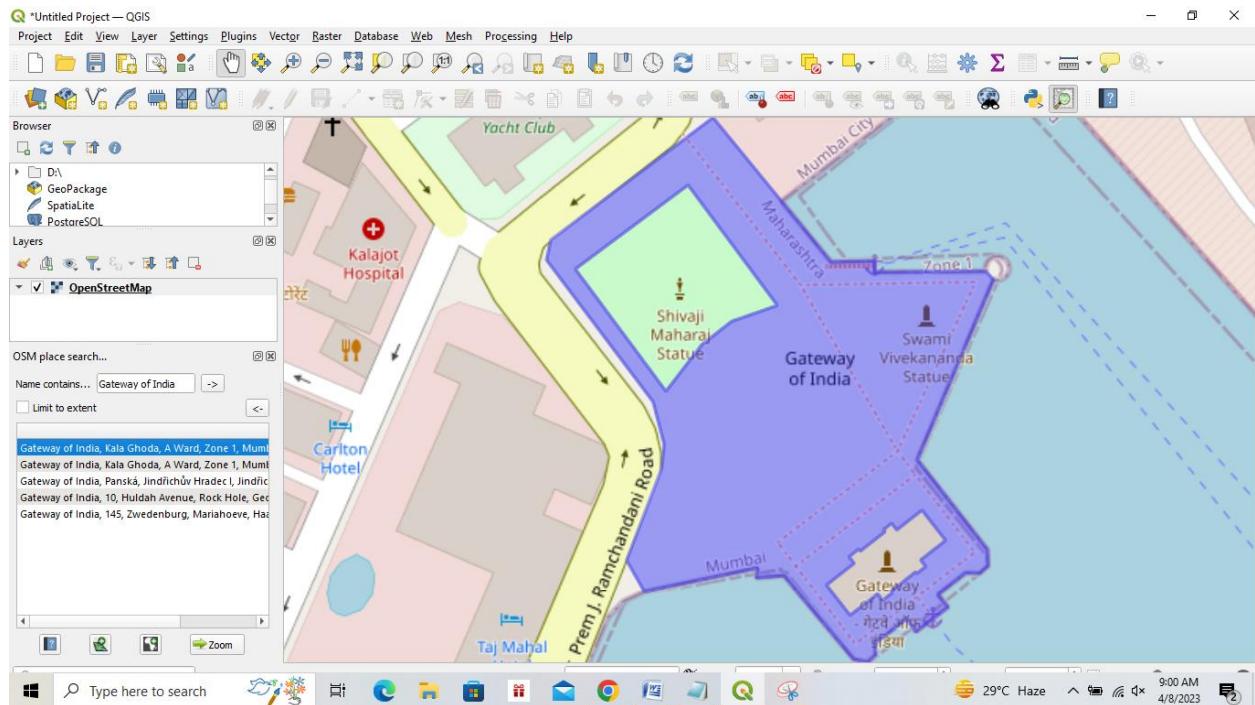
Step 3: Go to View → Panels → select OSM Place search



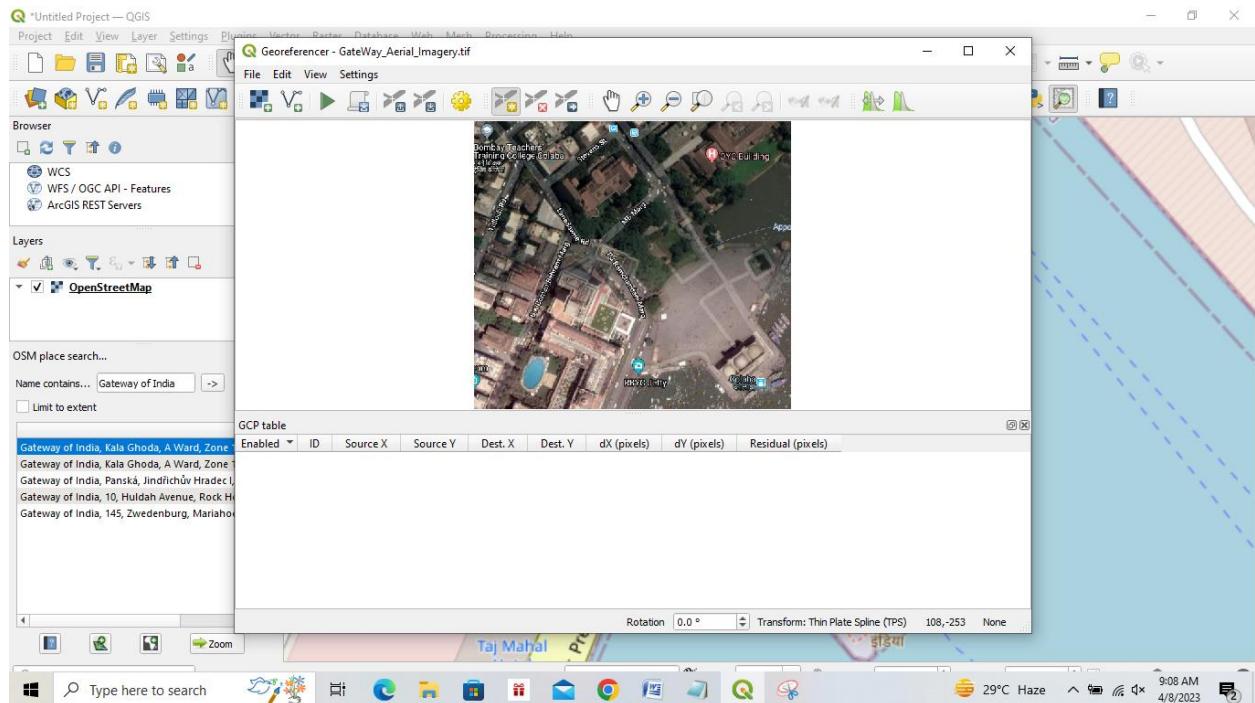
Step 4: The Gateway of India, Mumbai is located at 18.92°N 72.83°E
Search Gateway of India in OSM Search Panel



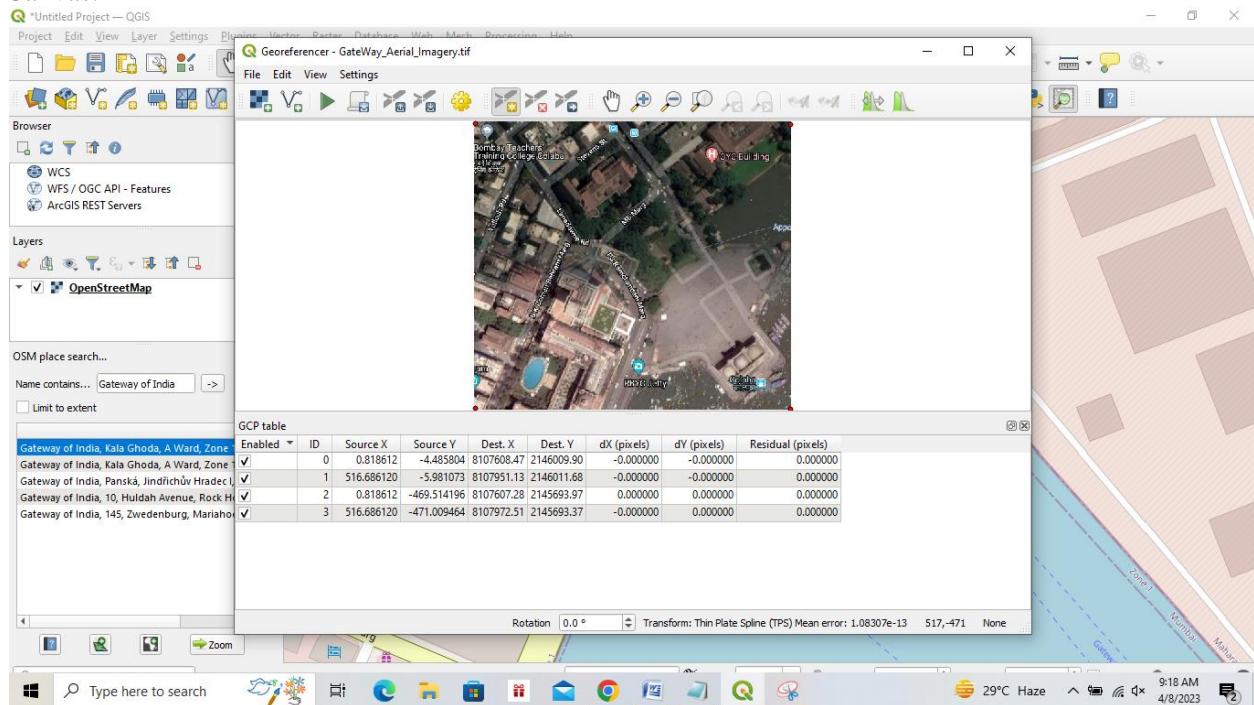
Step 5: Zoom in to appropriate level. The map will appear like this.



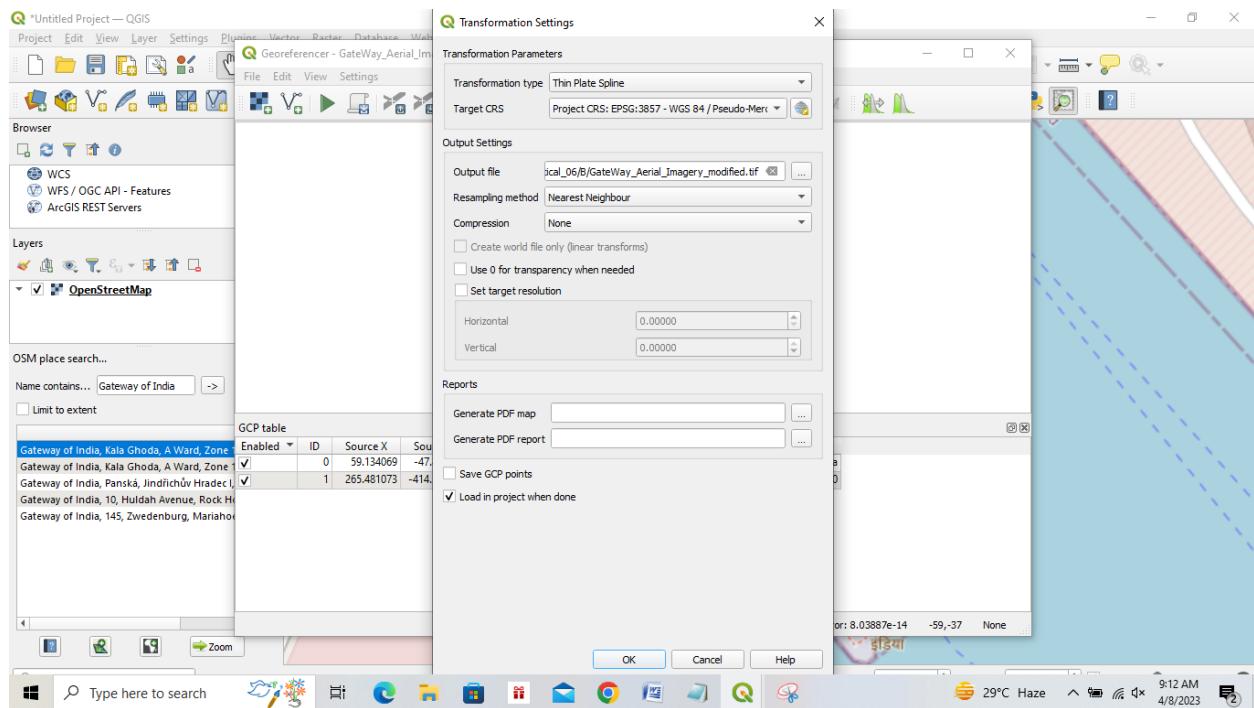
Step 6: File → Open Raster. Select file “Gateway_Aerial_Imagery.tif” from project data folder



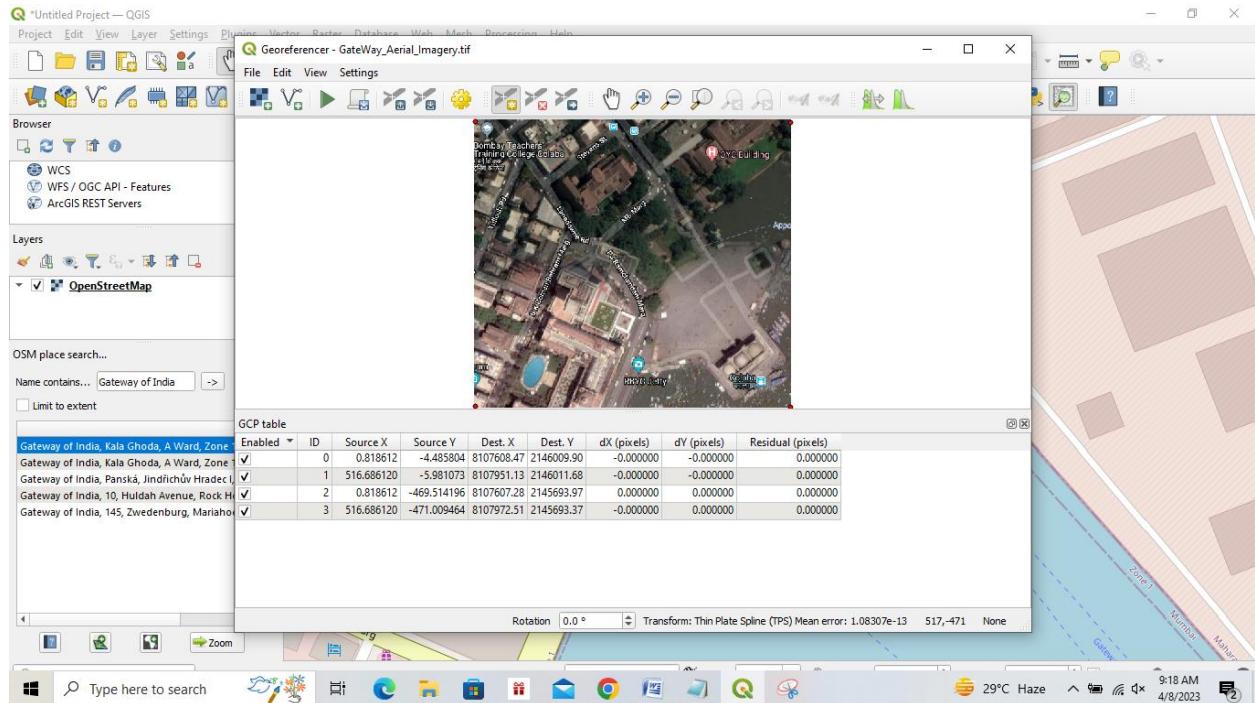
Step 7: Go to Edit □ Add Point. Select control points from map (Indicated in red color) □ From Map Canvas.



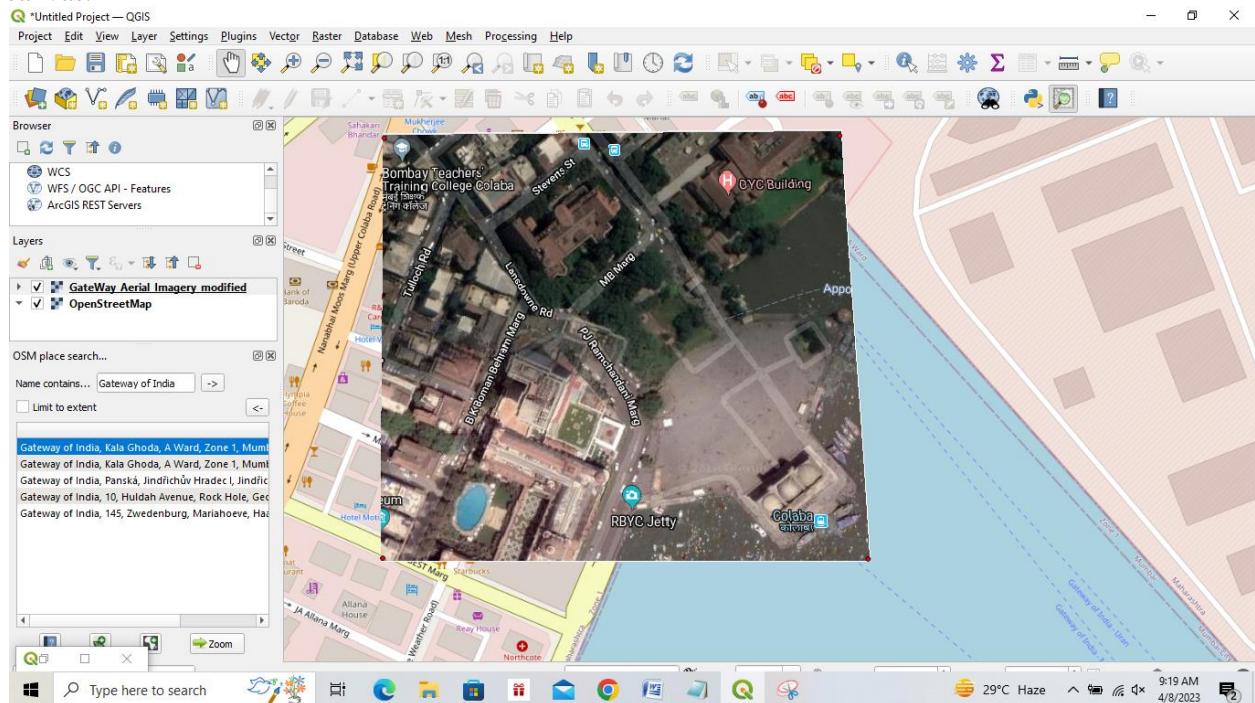
Step 8: Go to Setting □ Transformation Setting □ Set Target SRS □ EPSG:3857 – WGS 84 and Output raster path.



Step 9: Press Run



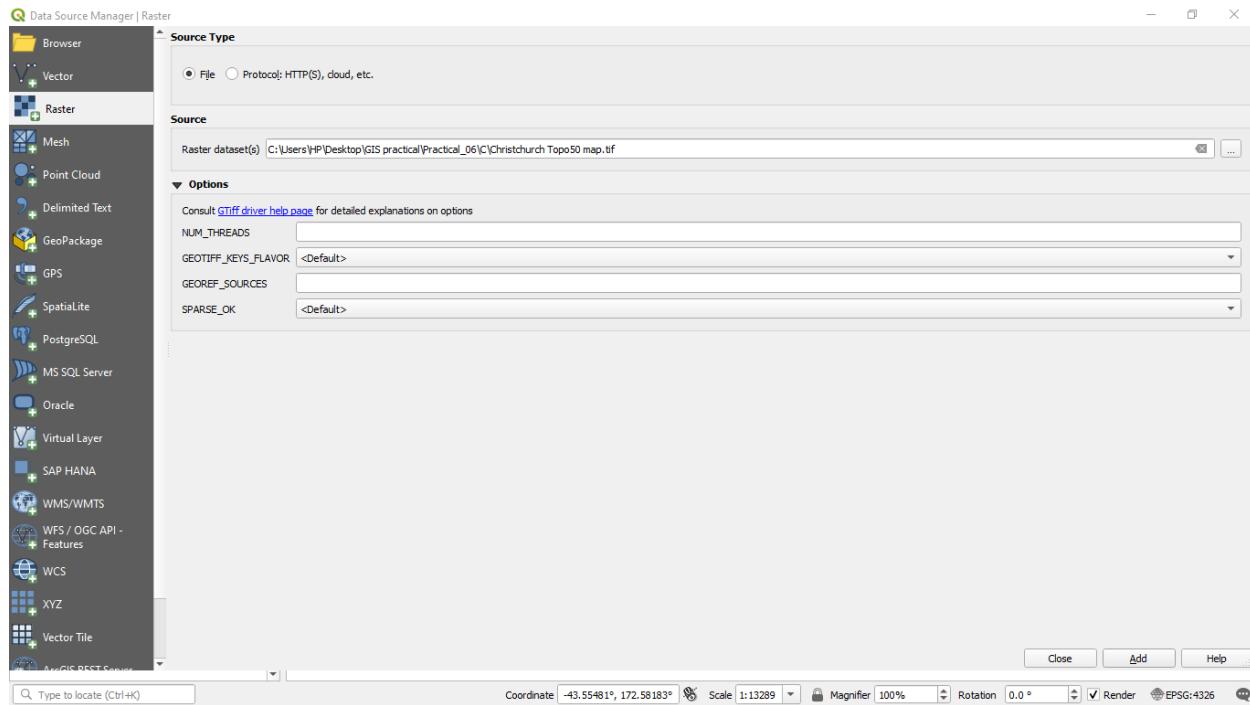
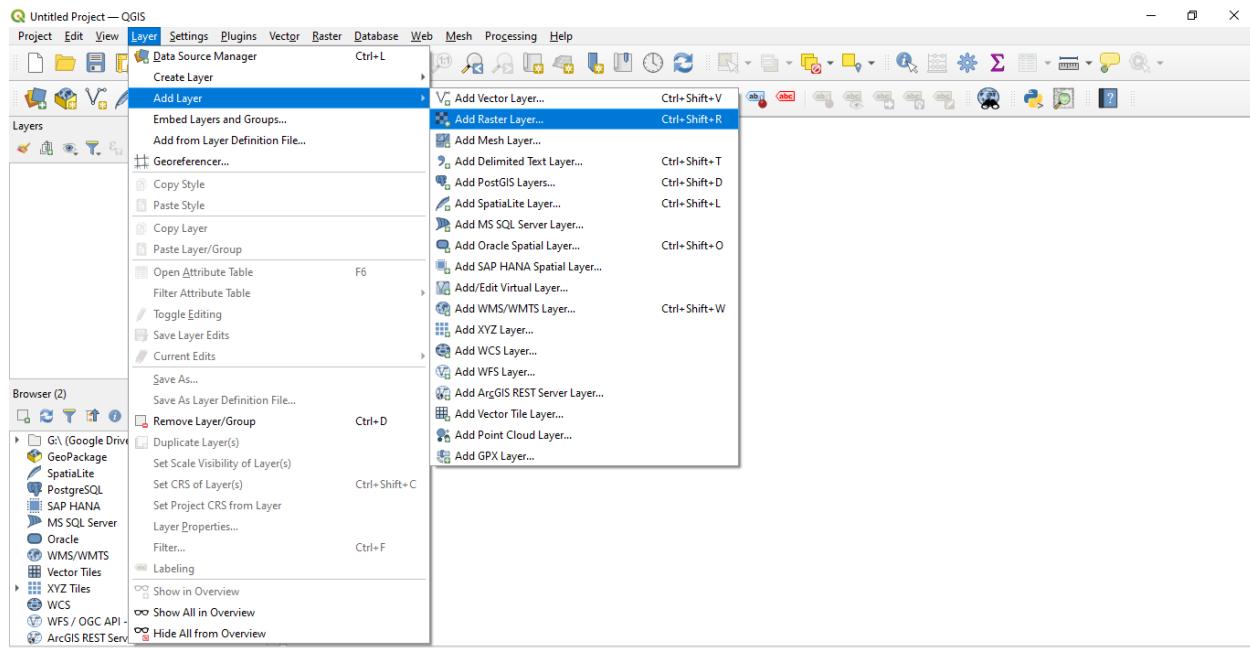
Step 10: Observe that the aerial image of the Gateway of India is georeferenced on OSM in the map canvas.



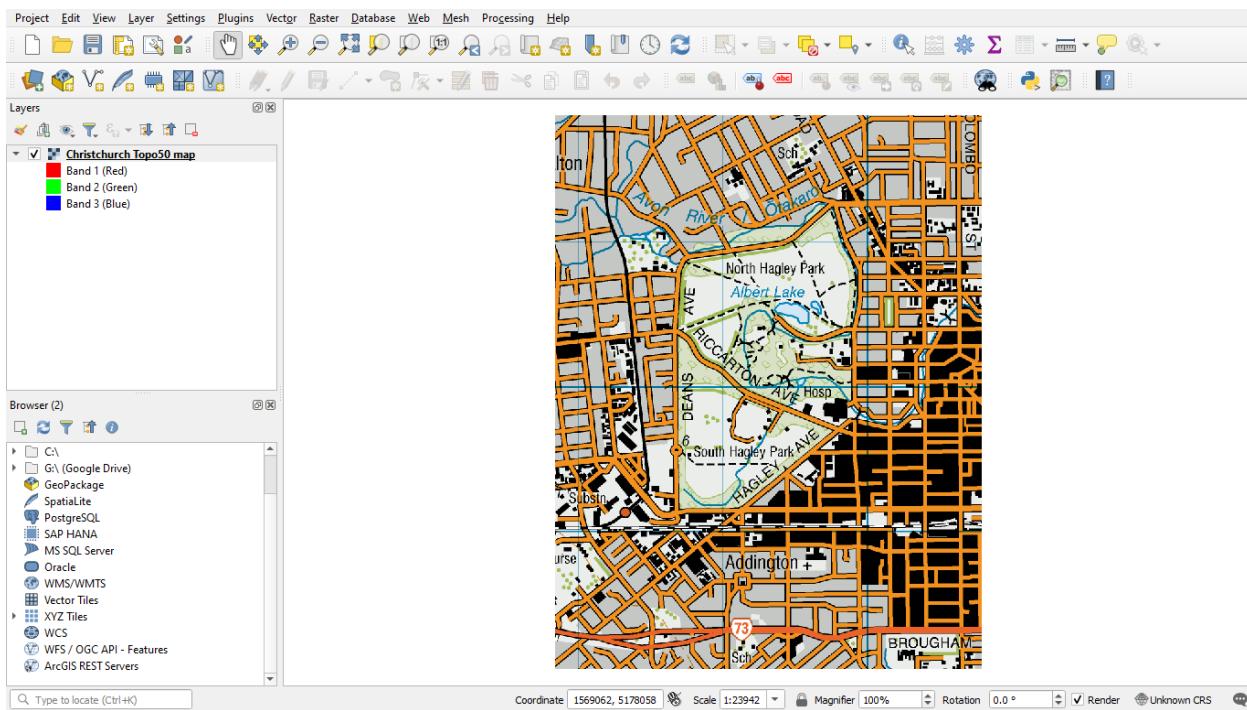
Practical 6: Georeferencing

C. Digitizing Map Data

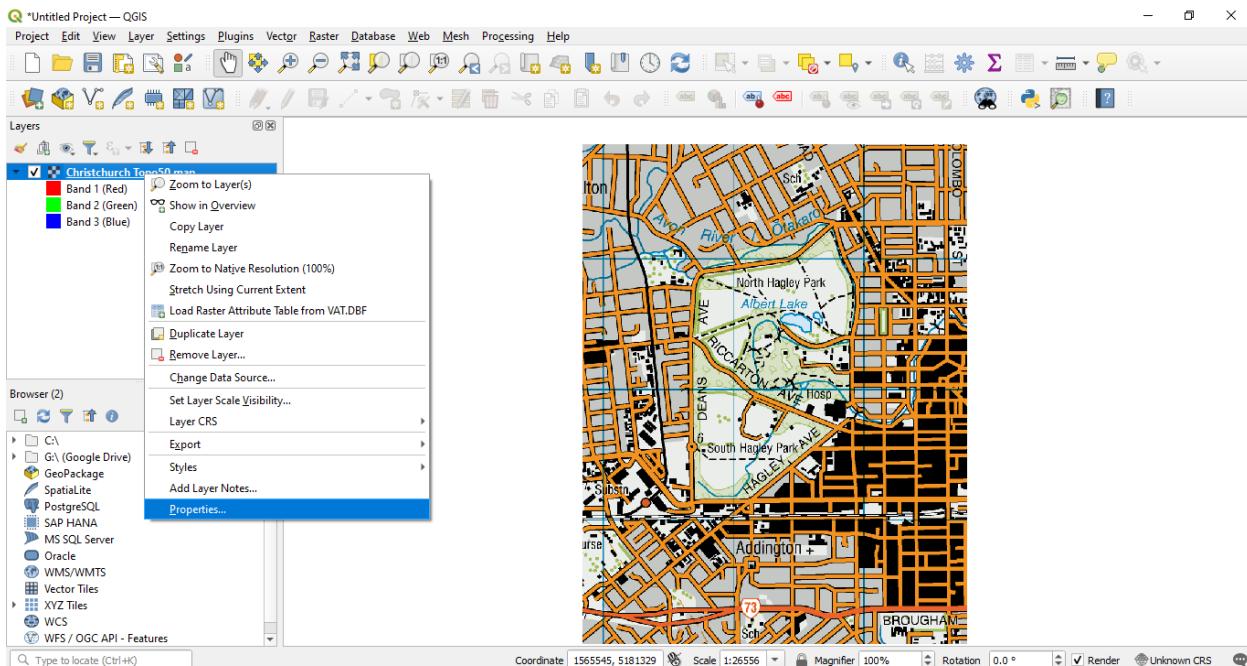
Step1: Go to layer → Add raster → Select “Christchurch Topo50 map.tif” from project Folder



Step 2: QGIS offers a simple solution to make raster load much faster by using Image Pyramids

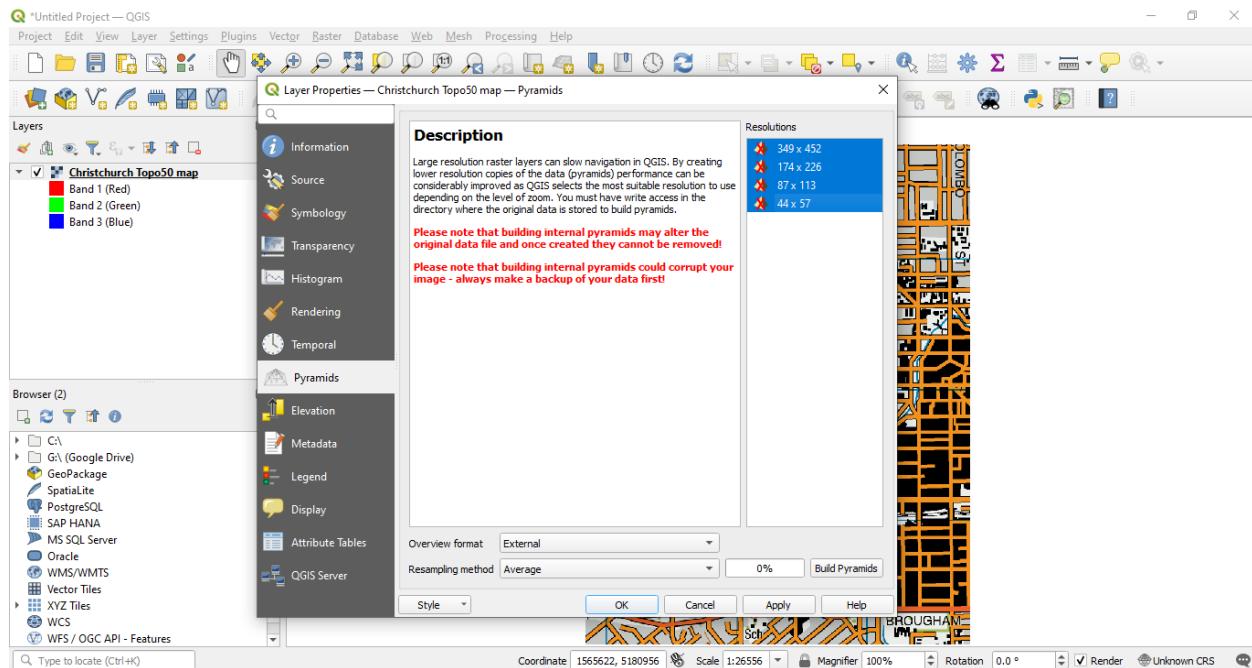


Step 3: Right-click the Christchurch Topo50 map.tif layer and select Properties

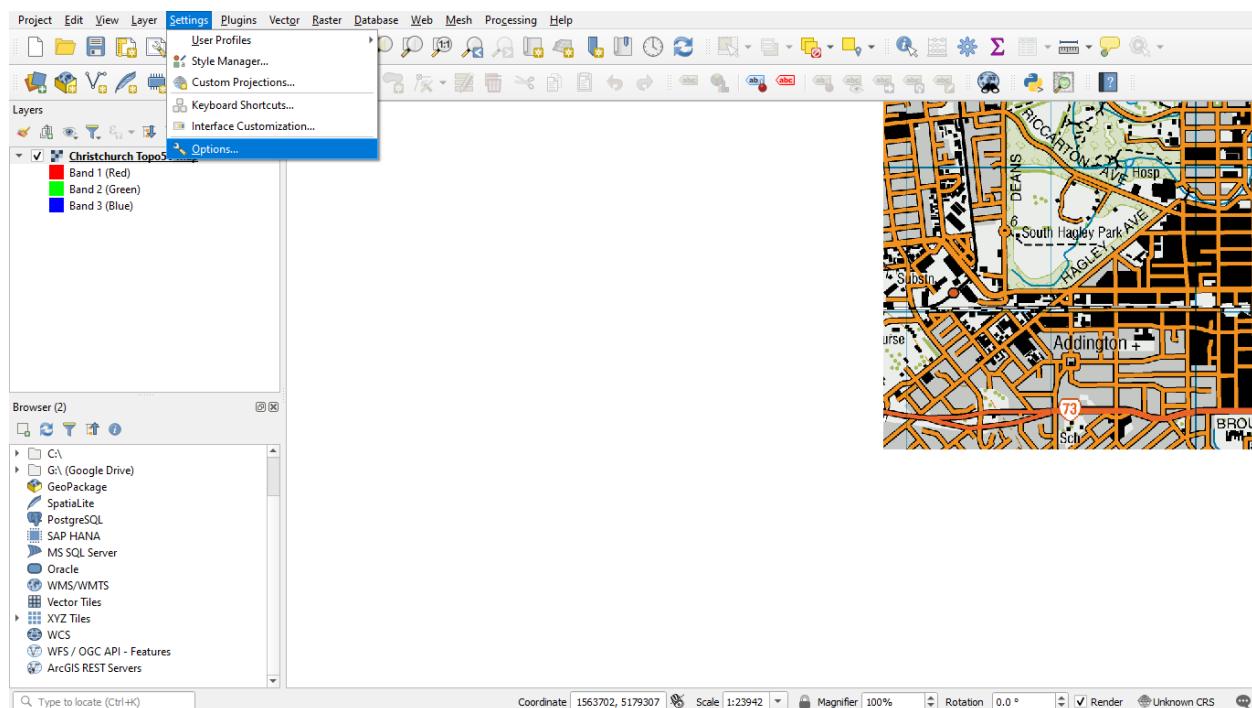


Step 4: Choose the Pyramids tab. Hold the Ctrl key and select all the resolutions offered in the Resolutions panel.

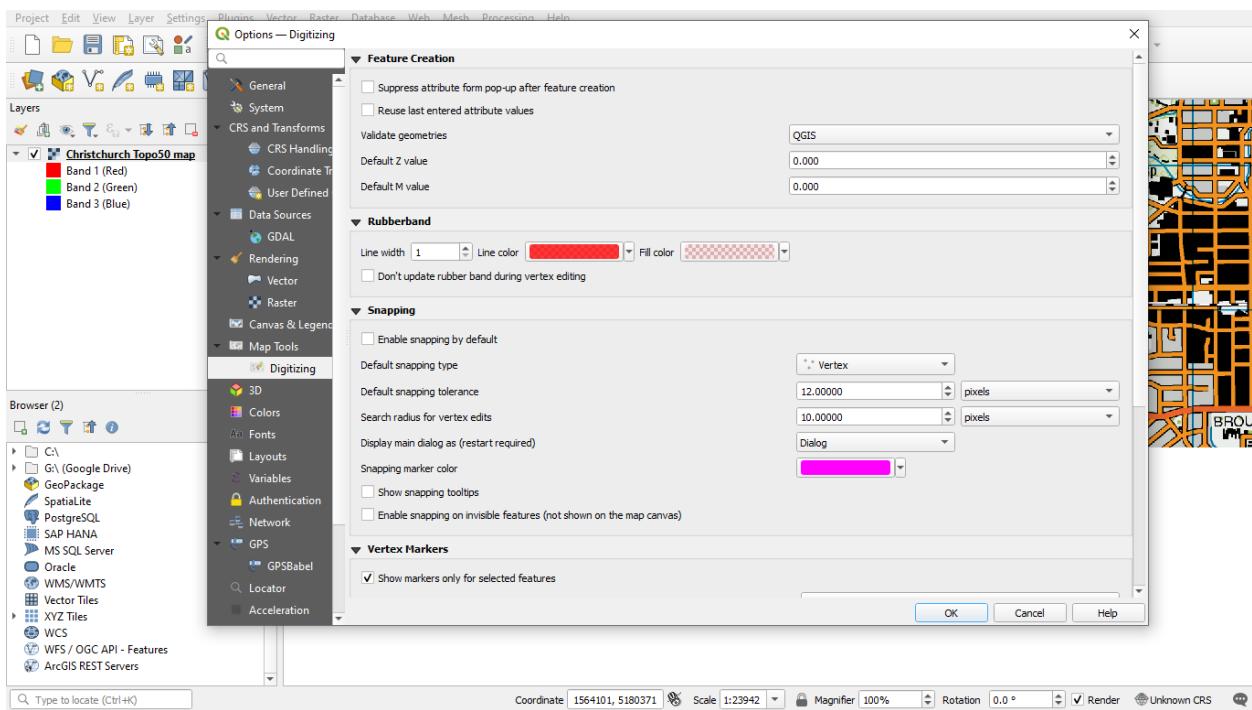
Step 5: Click Build pyramids. Then click OK.



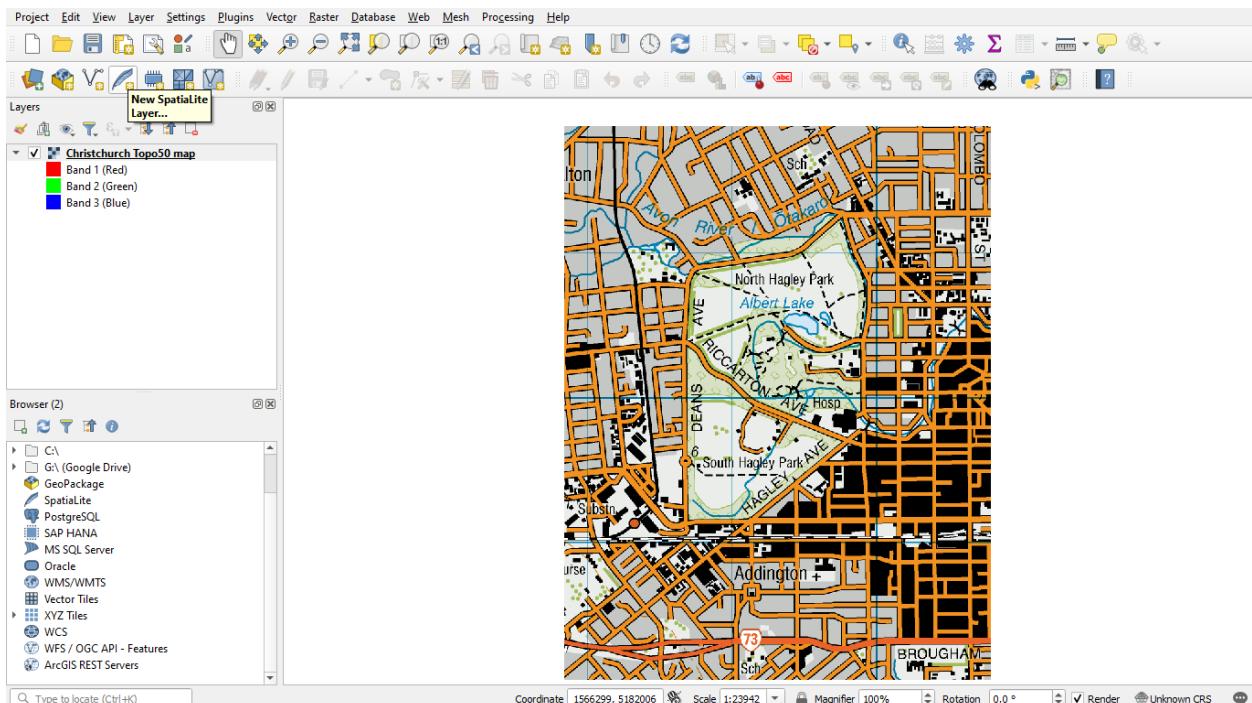
Step 6: Go to Settings → Options



Step 7: Select the Digitizing tab in the Options dialog. Set the Default snap mode to vertex and segment. Press OK.

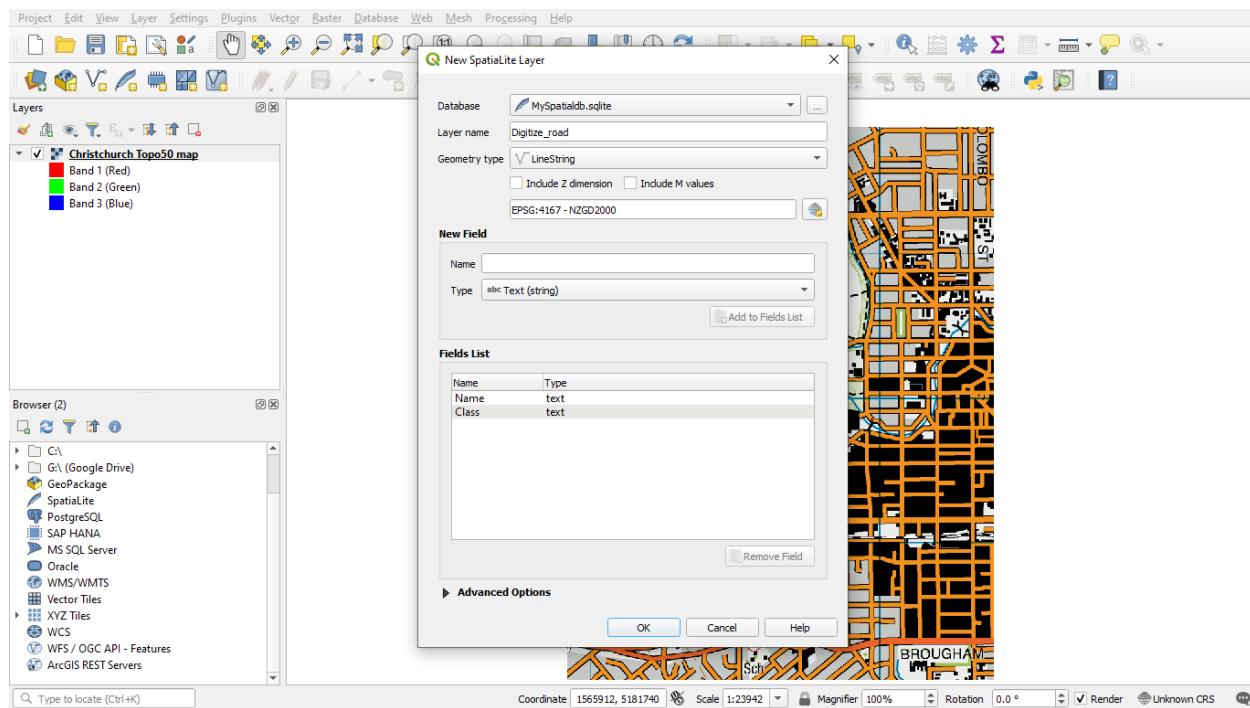


Step 8: Click New SpatialLite Layer

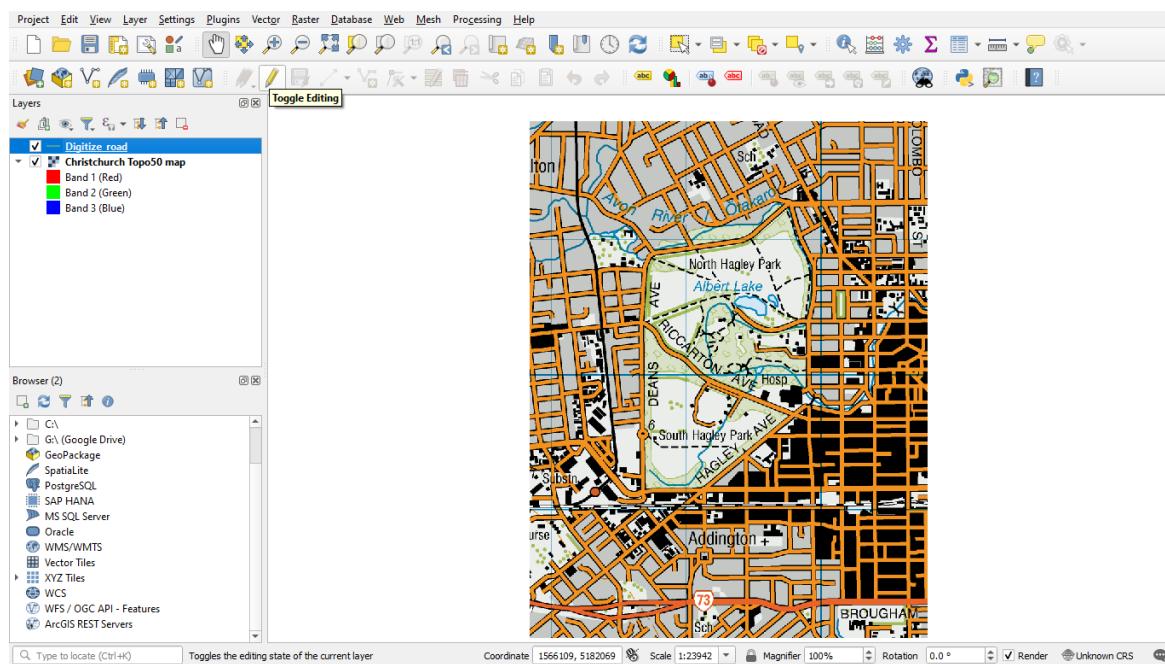


Step 9: Select the name and location for Spatial database eg: "GIS_Workshop\Practicals\Practical_06\C\MySpatialDataBase.sqlite". Name the Layer as "Digitized_Road". Set Geometry type as "Line". Set CRS EPSG:4167 – NZGD2000

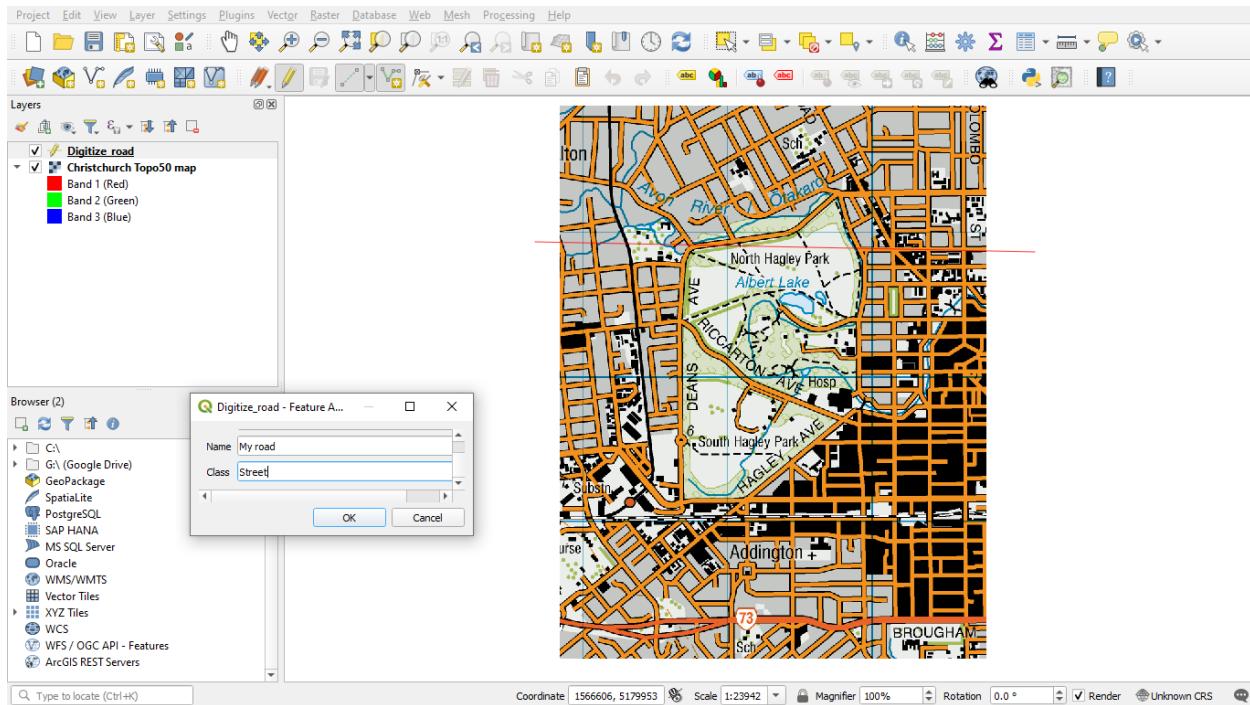
Step 10: Add "Name" and "Class" fields using "Add to Fields List"



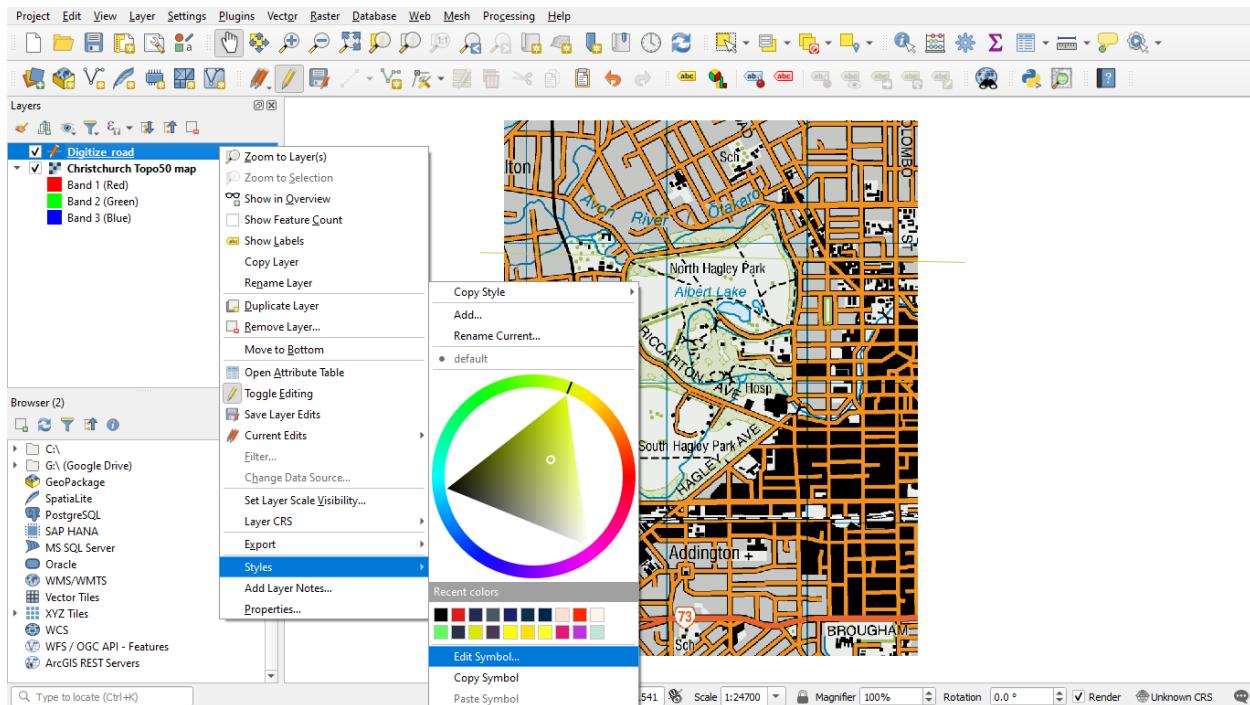
Step 11: Once the layer is loaded, click the Toggle Editing button to put the layer in editing mode. Click the Add feature button



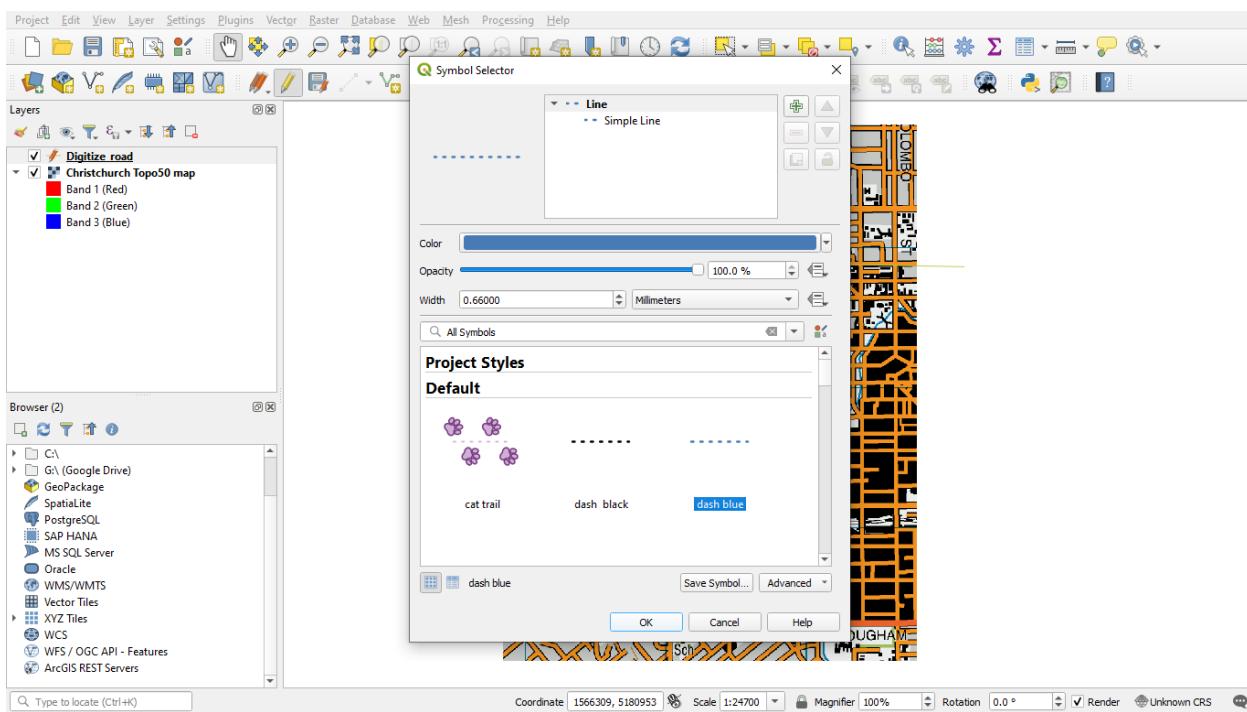
Step 12: Click on the map canvas to add a new vertex. Add new vertices (red line) along the roadfeature. Once you have digitized a road segment, right-click to end the feature



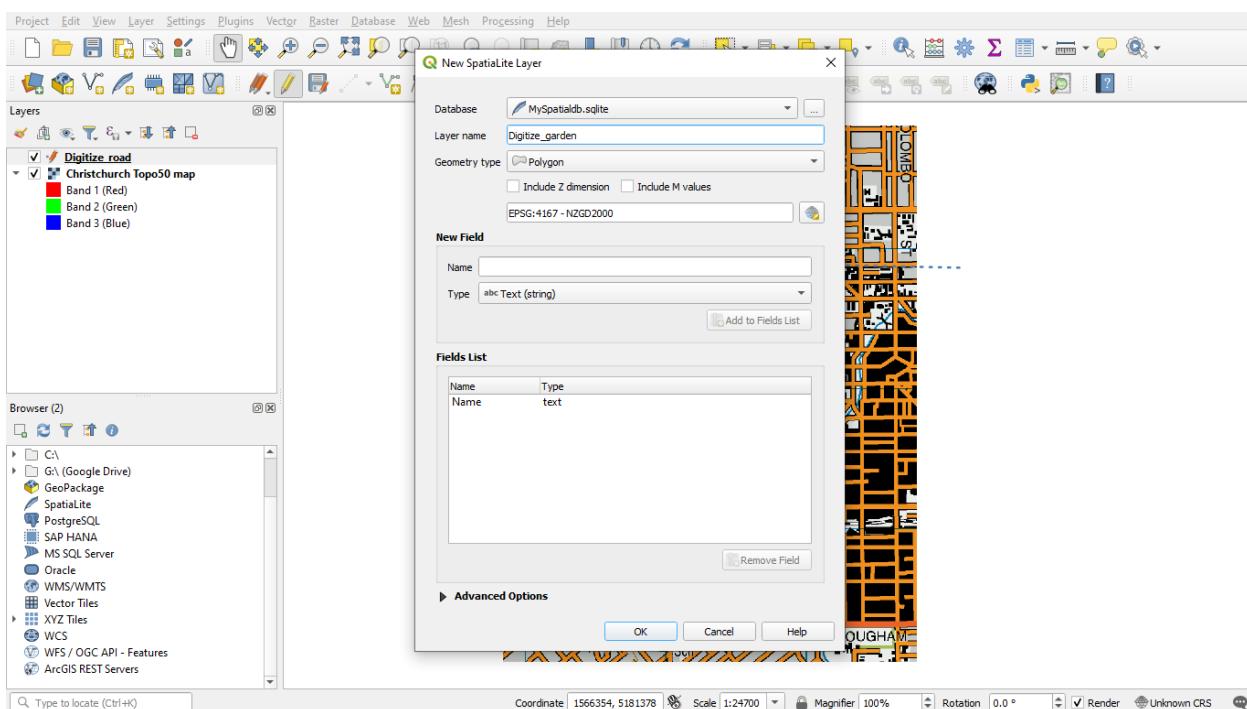
Step 13: On Layer Panel Right Click on Digitize_Road, Select the Style tab in the Layer Properties dialog



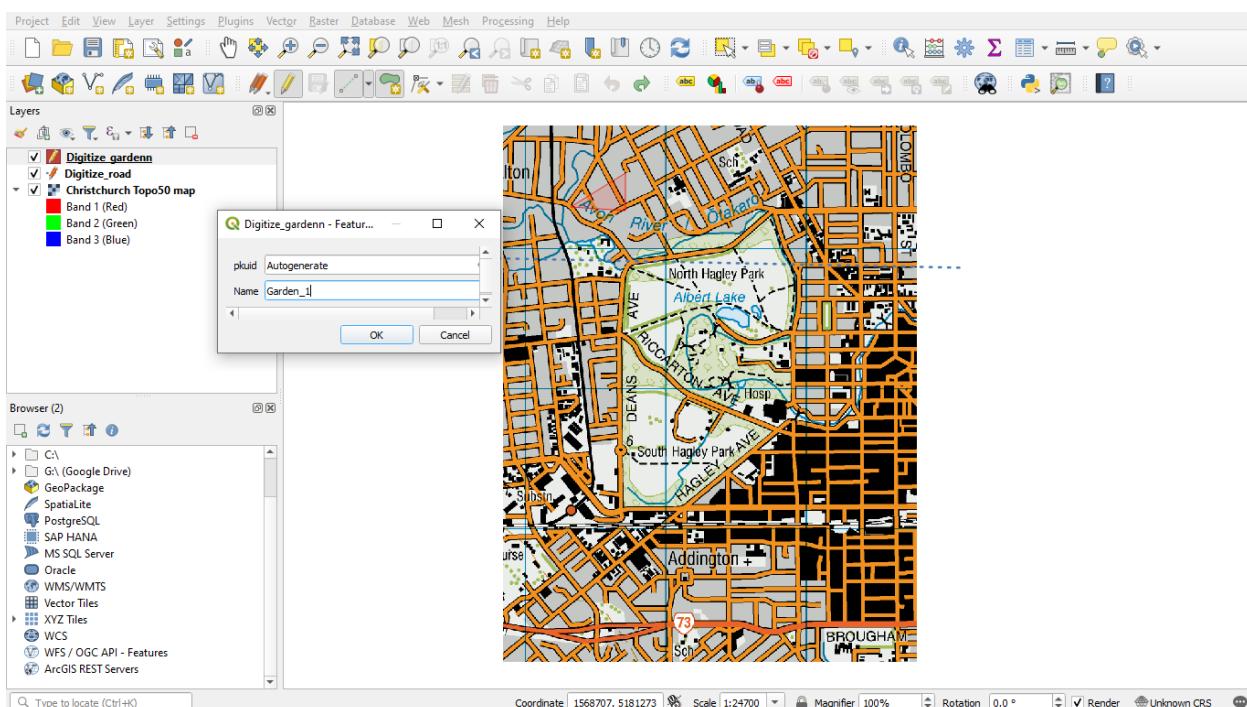
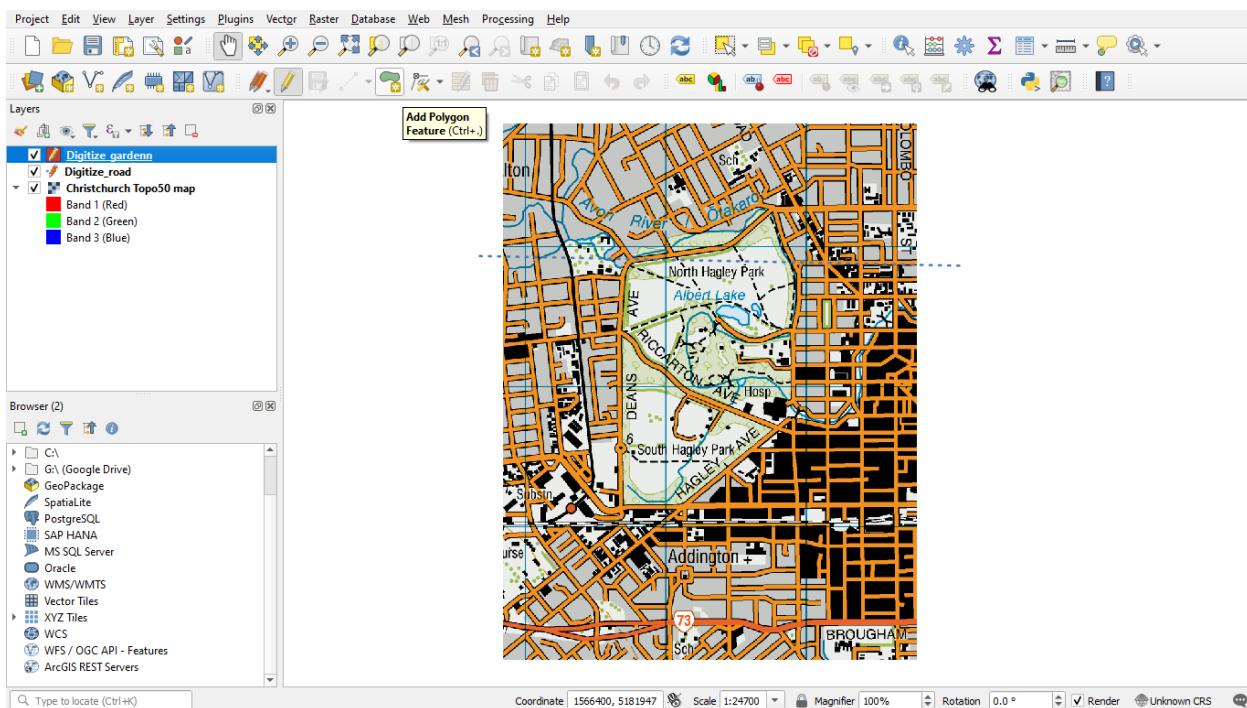
Step 14: Click on the “OK” button after choosing your appropriate style.



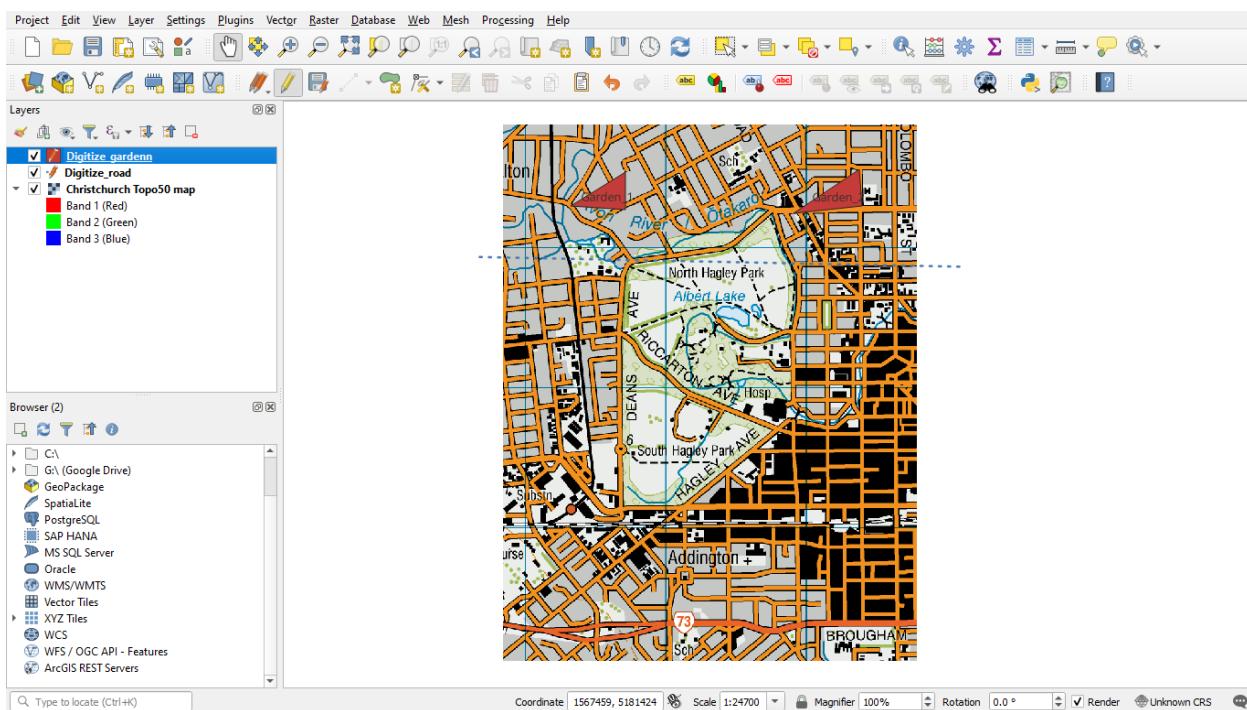
Step 15: Create a new spatial layer once again, but this time it should be a polygon based layer. Set the CRS to 4167 and name as Digitized_Garden. Add new Field “Name”.



Step 16: Select Digitized_Garden layer in Layer Panel and click on Toggle Editing button and then AddPolygon Feature button on the tool bar. Add gardens to the region by adding polygon. The layer will appear on map canvas.



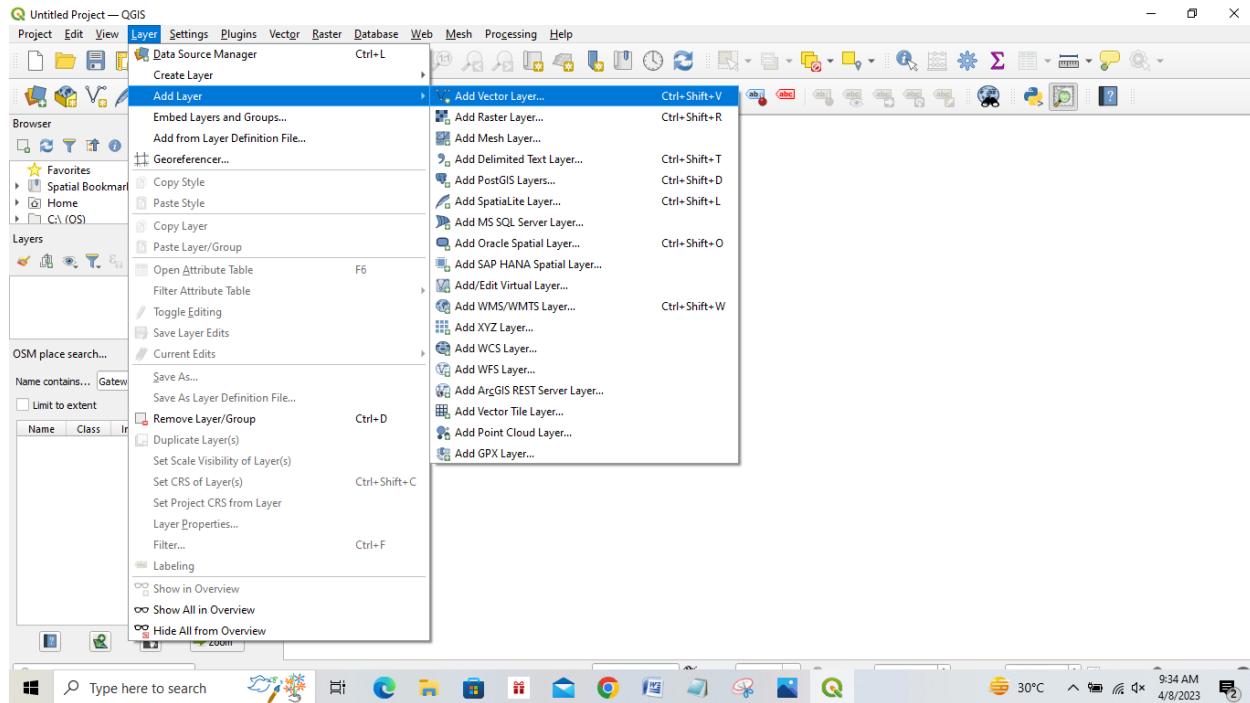
Step 17: Add one more polygon “Garden_2”



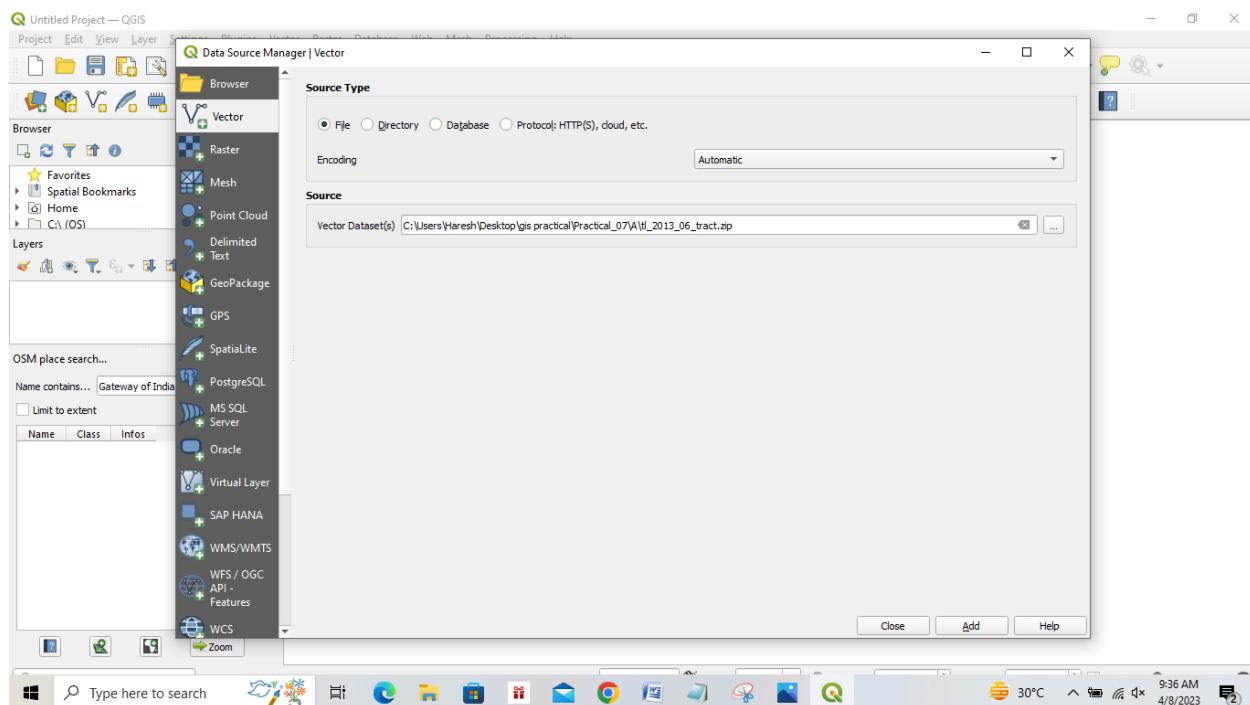
Practical 7: Managing Data Tables and Saptial data Sets

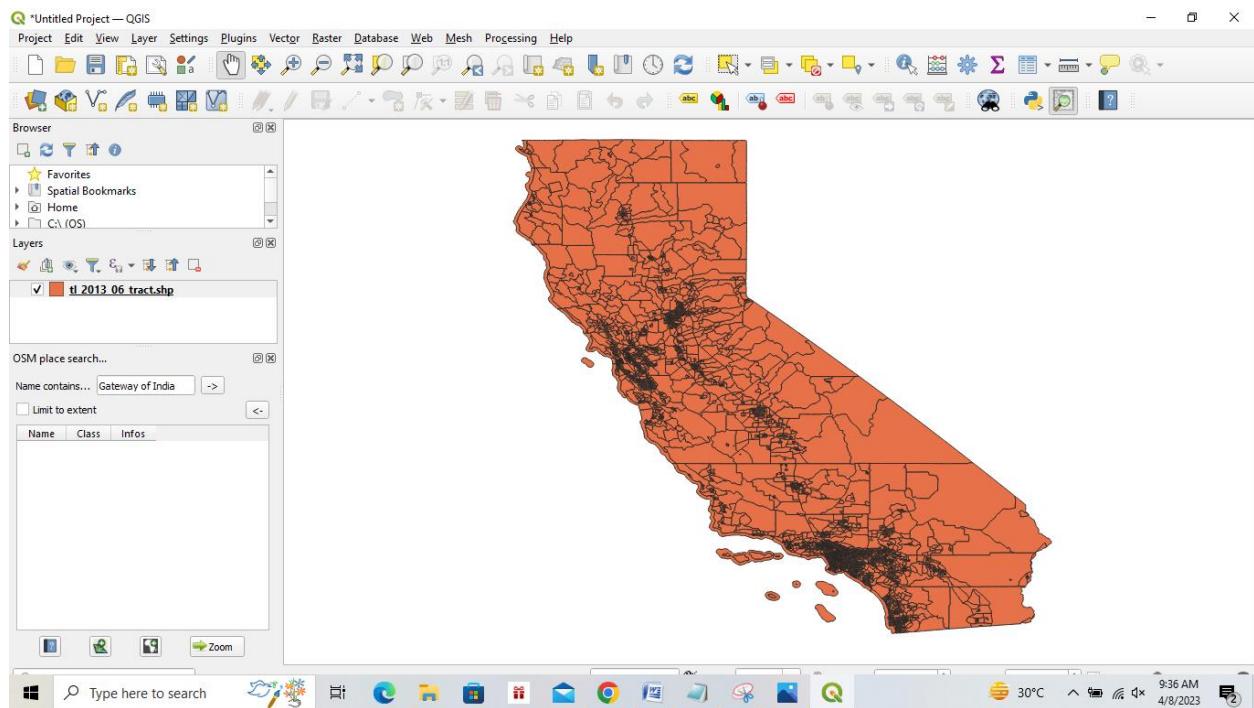
Step 1: Start a new Project.

Step 2: Go to Layers □ Add Layer □ Add Vector Layer

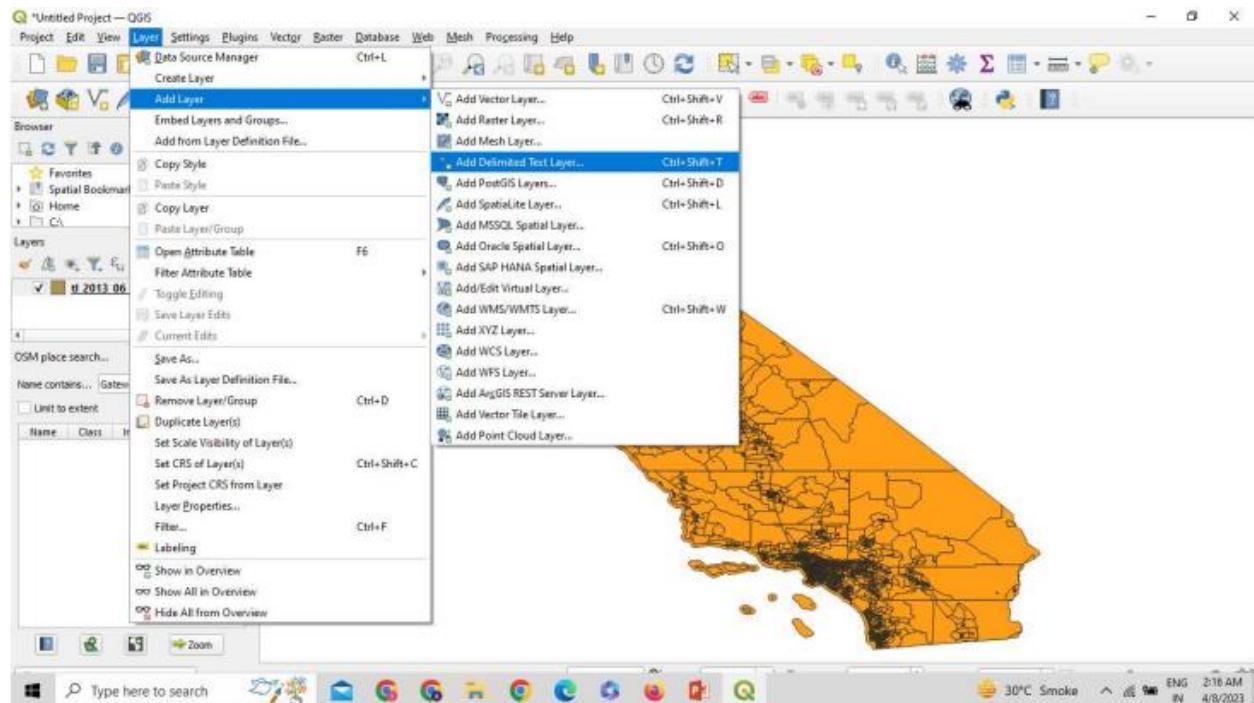


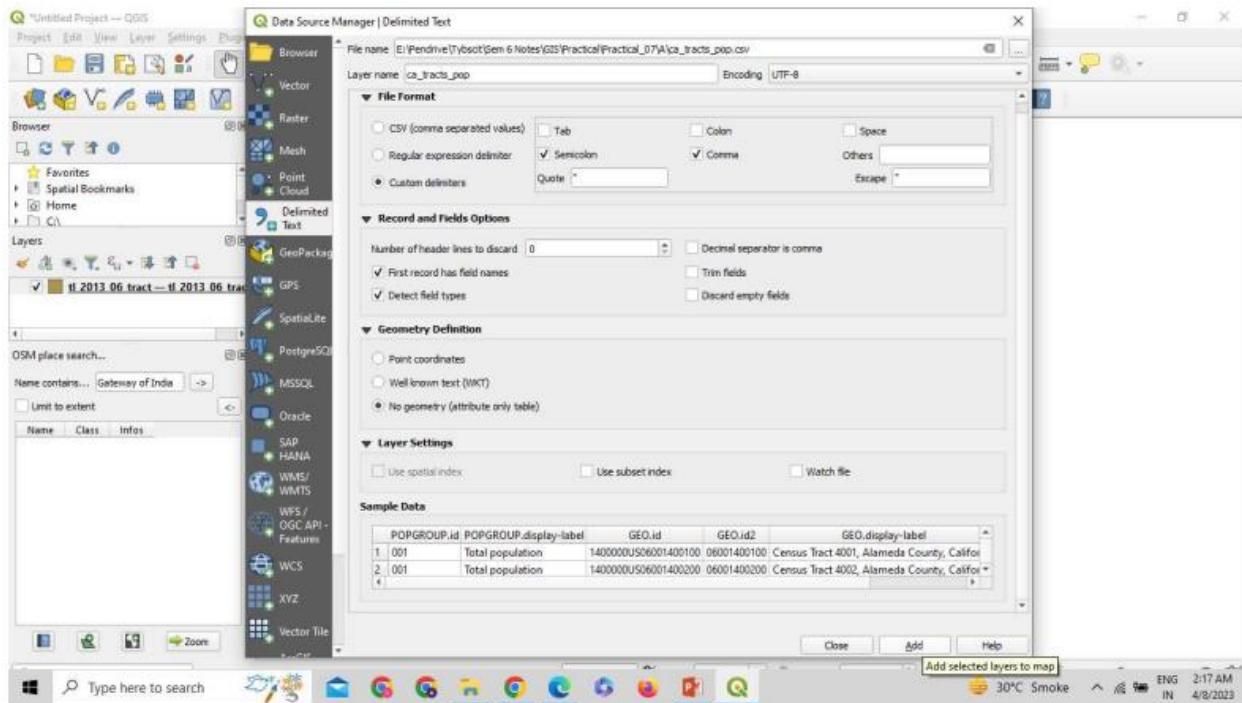
Step 2: Select E:\Pendrive\Tybscit\Sem 6 Notes\GIS\Practical\Practical_07\A\tl_2013_06_tract.zip



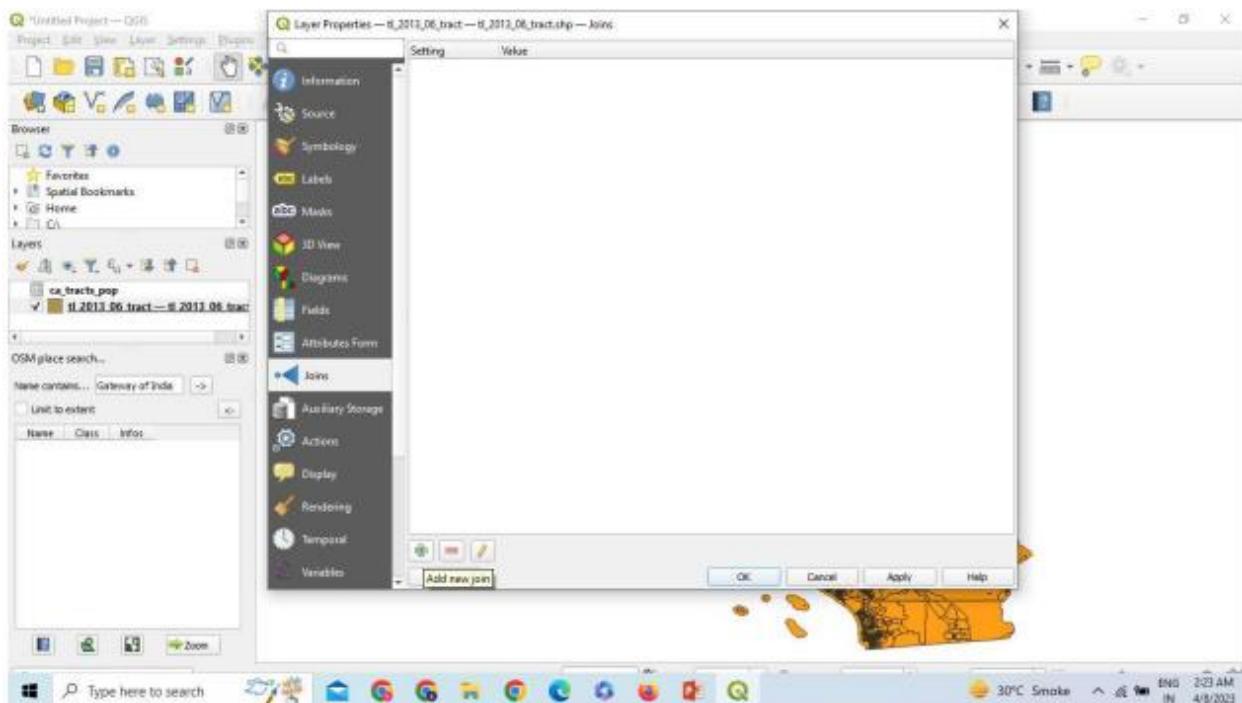


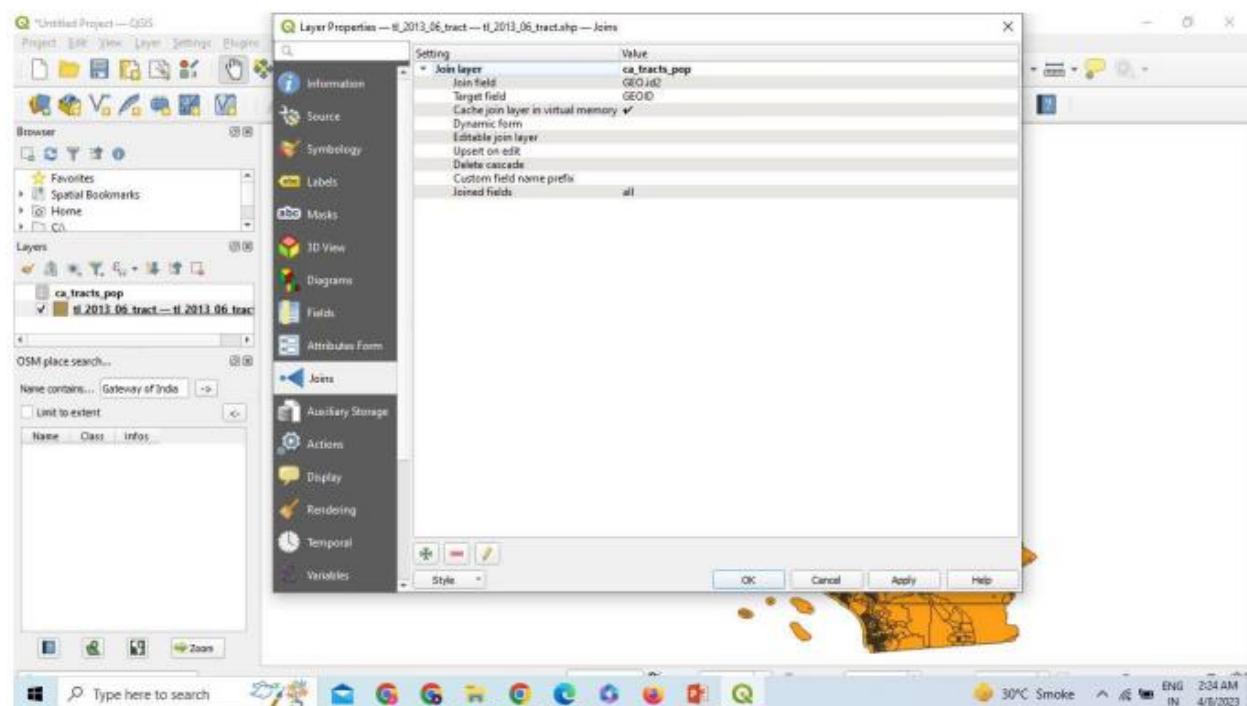
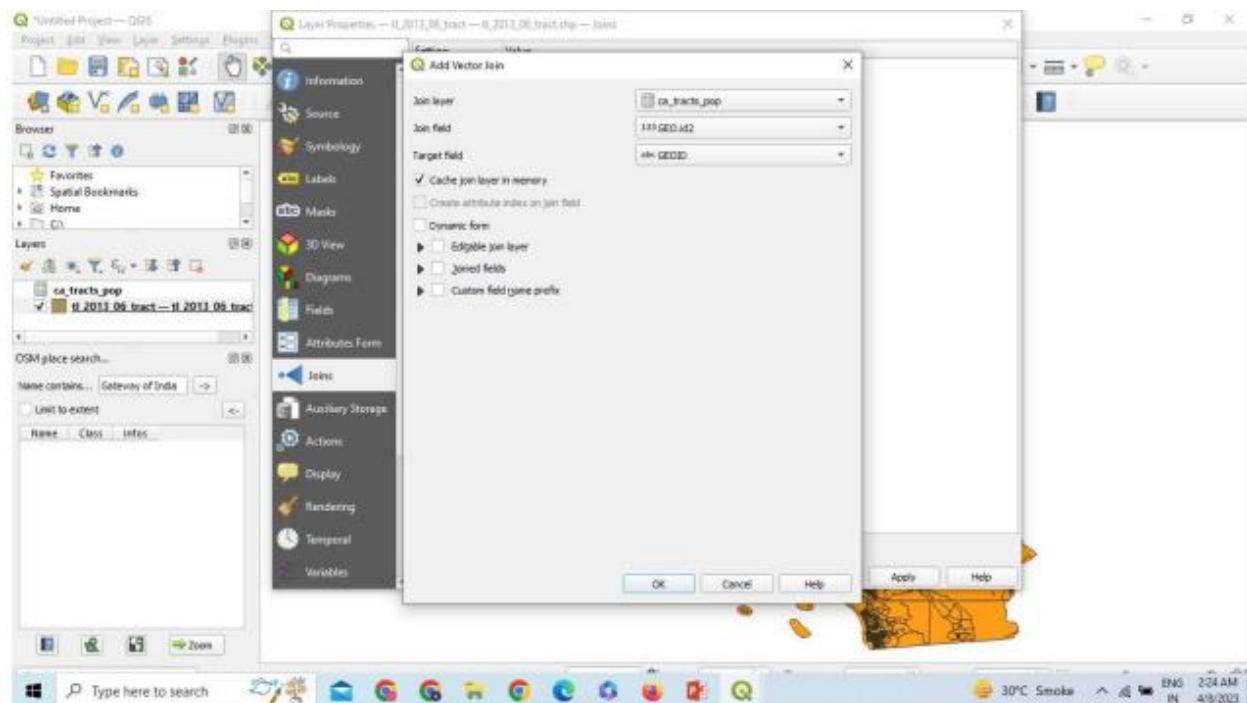
step 3 go to layer > add layer > add delimited text layer

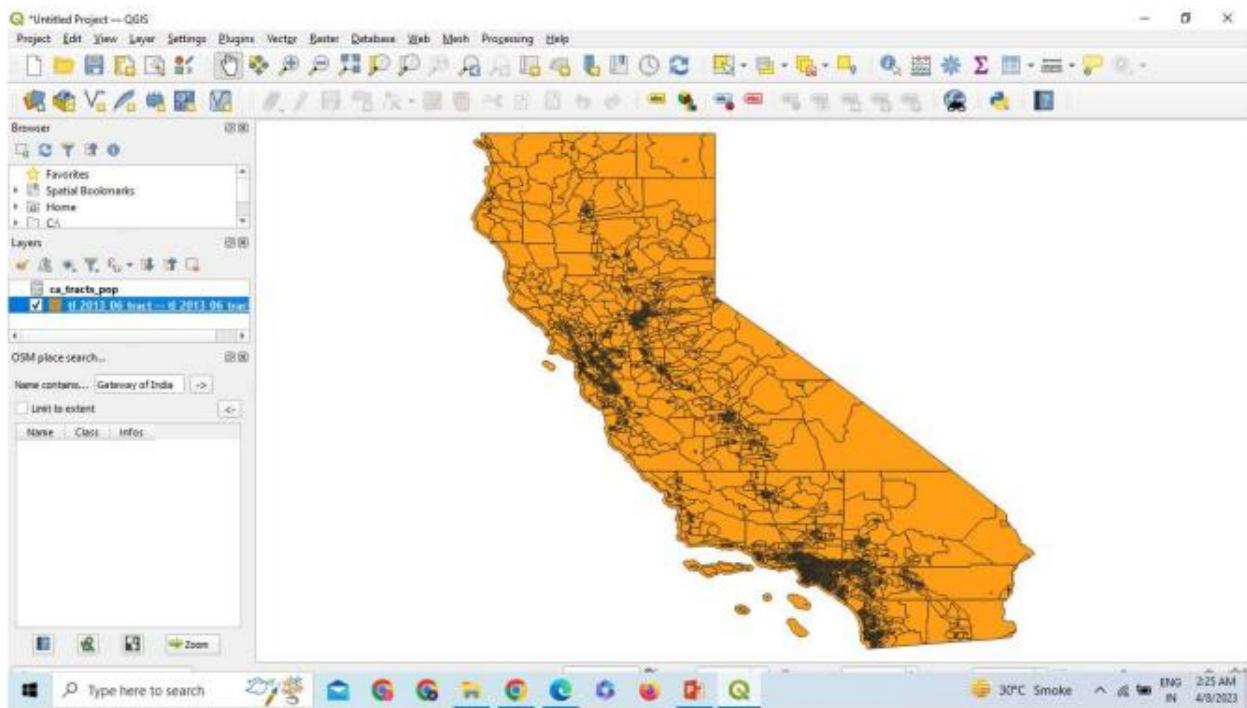




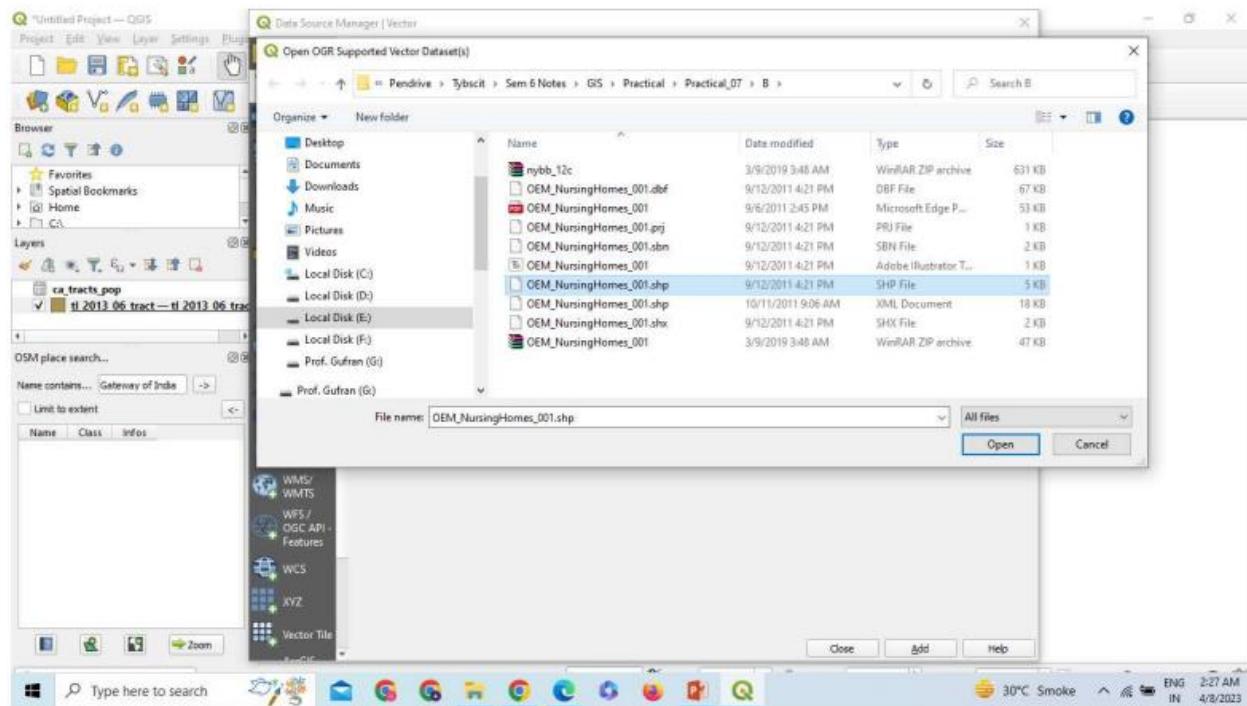
Step 4 - select layer properties >joins >add new joins > press ok

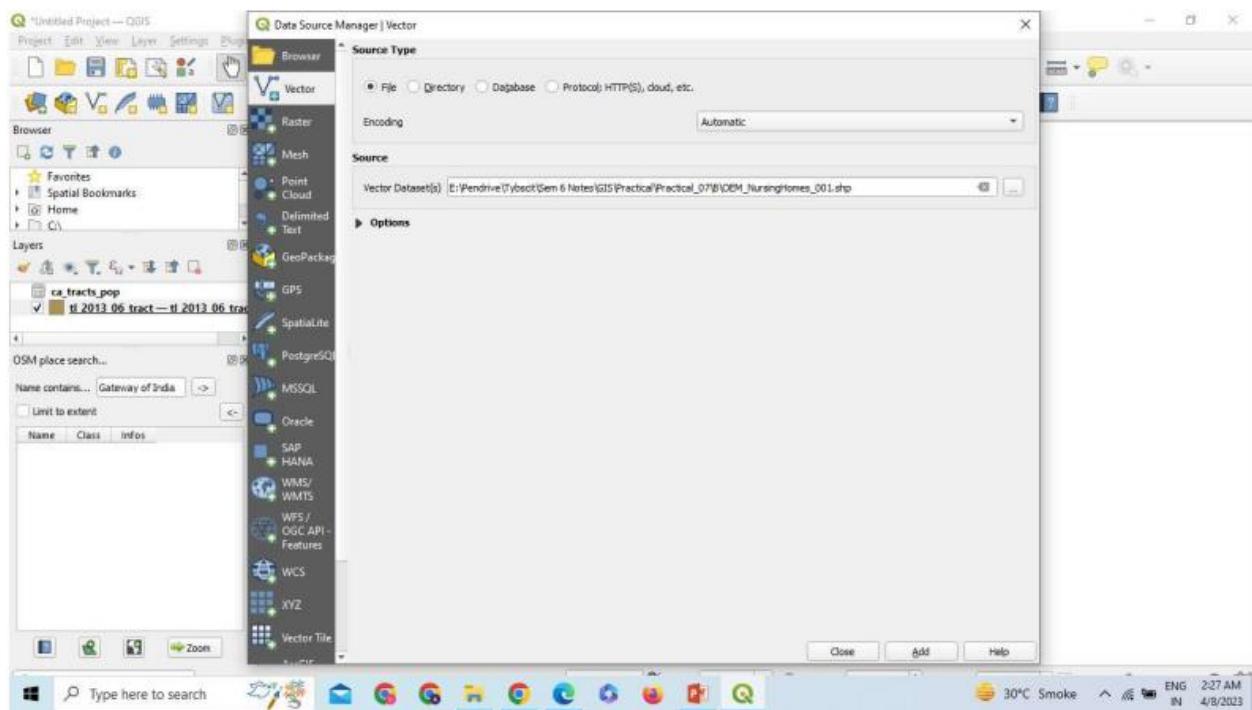




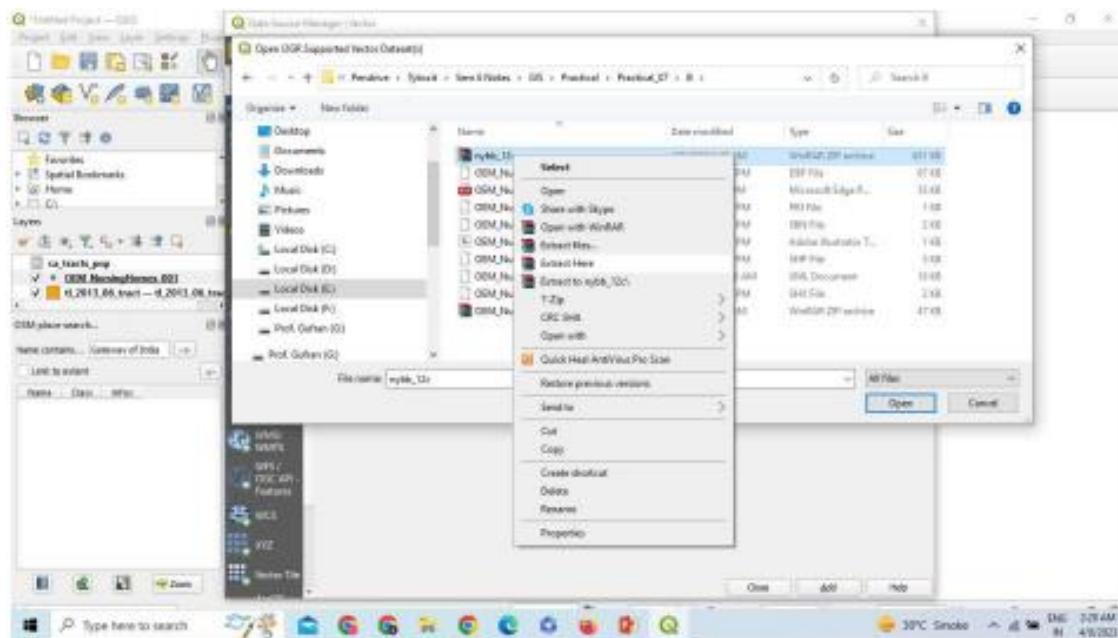


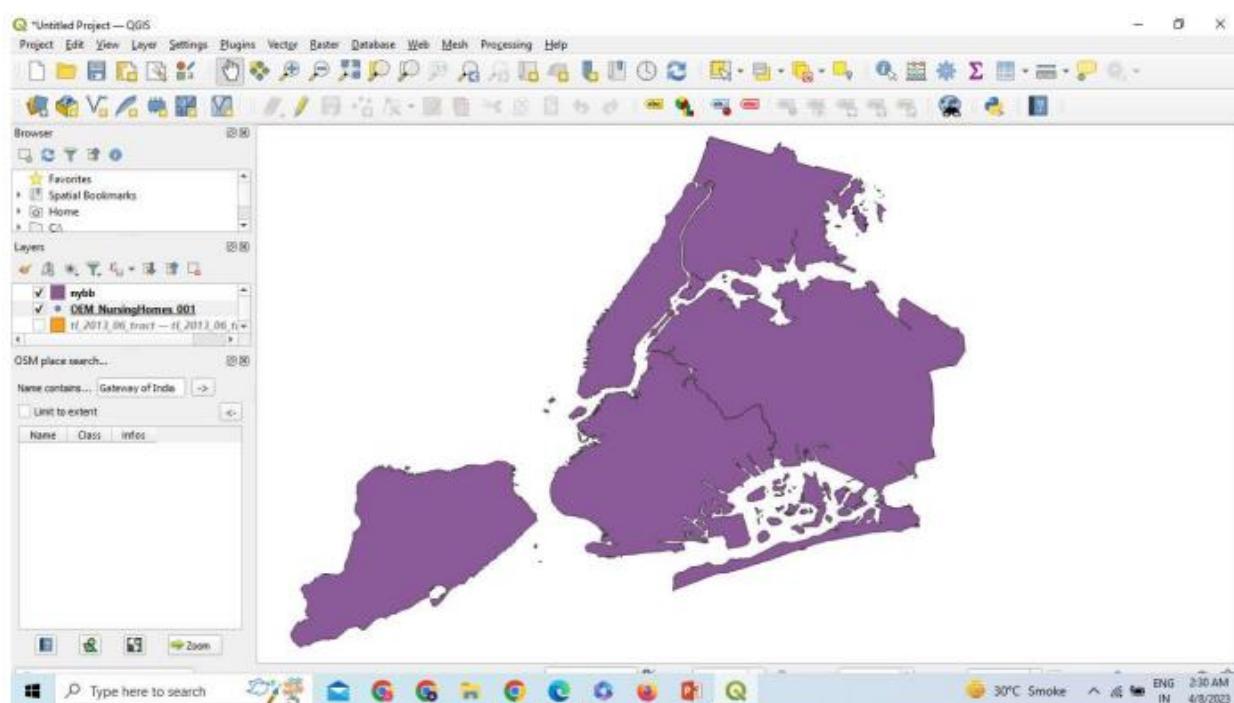
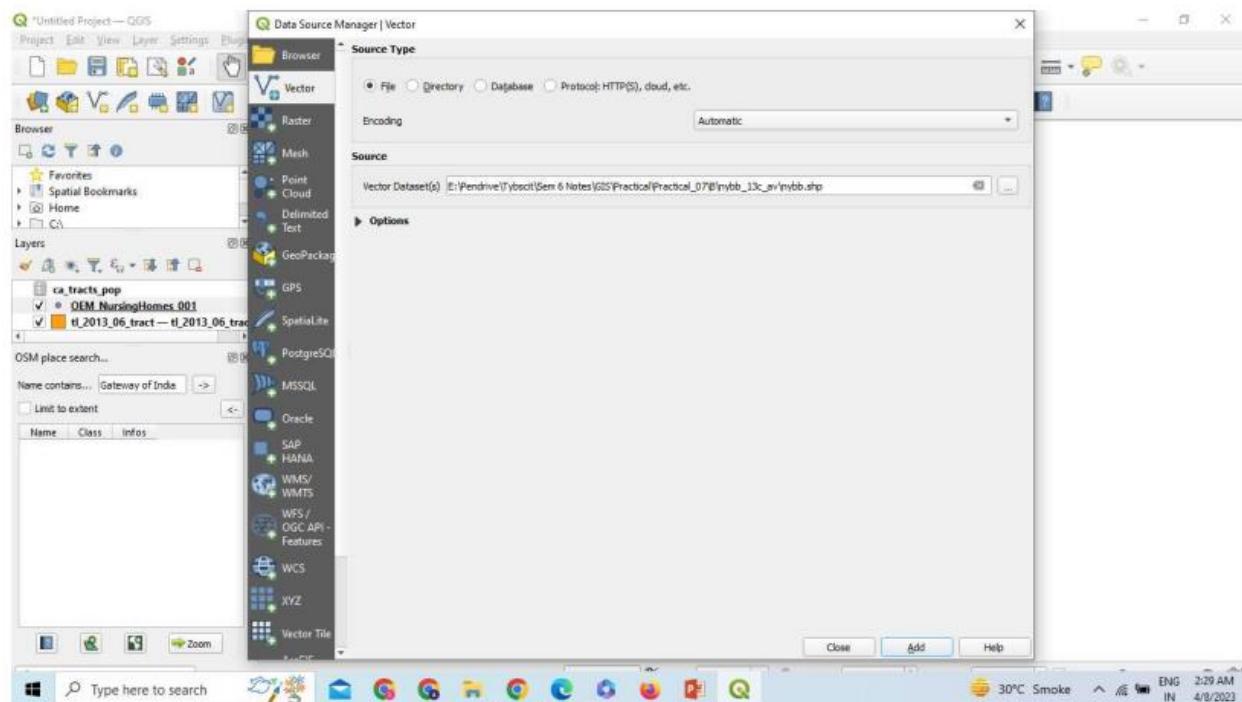
Step 5- Go to Layer > add layer > add vector layer
open OEM_NursingHome_001.zip >add



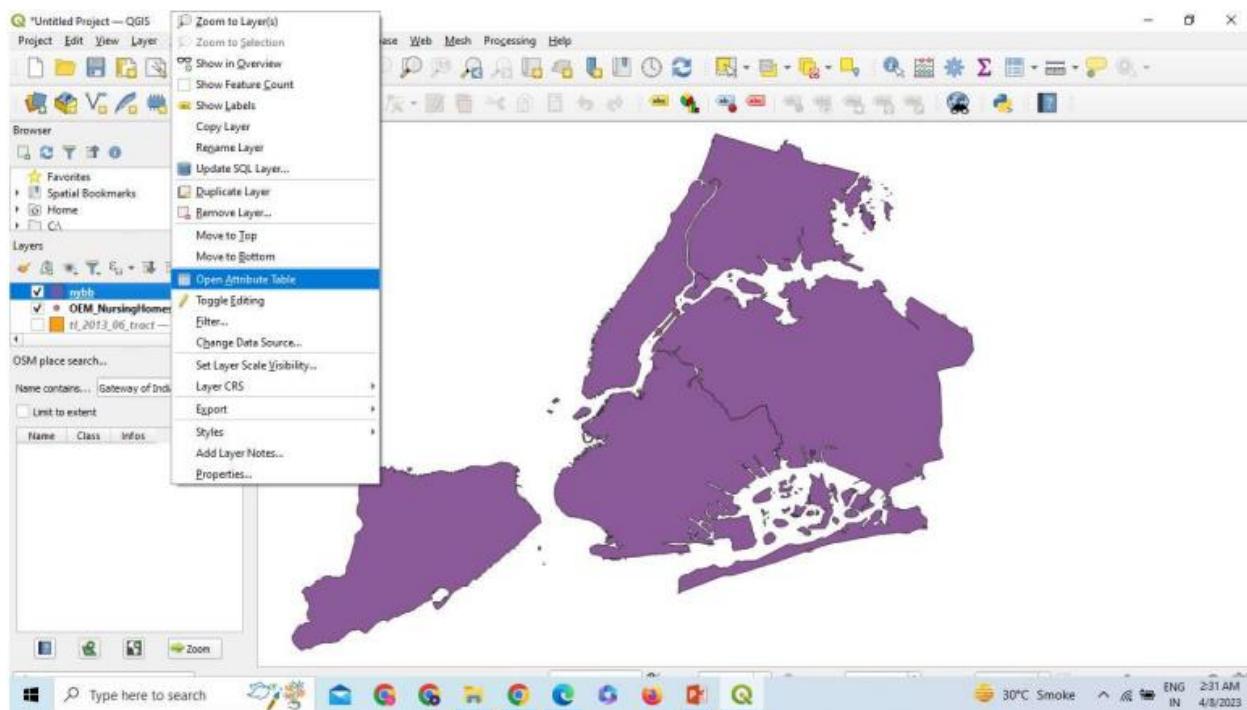


Step 6- add nybb_12c > click on extract here/ you will get nybb_13c_av /open file nybb_13c_av





Step 7- open attribute table



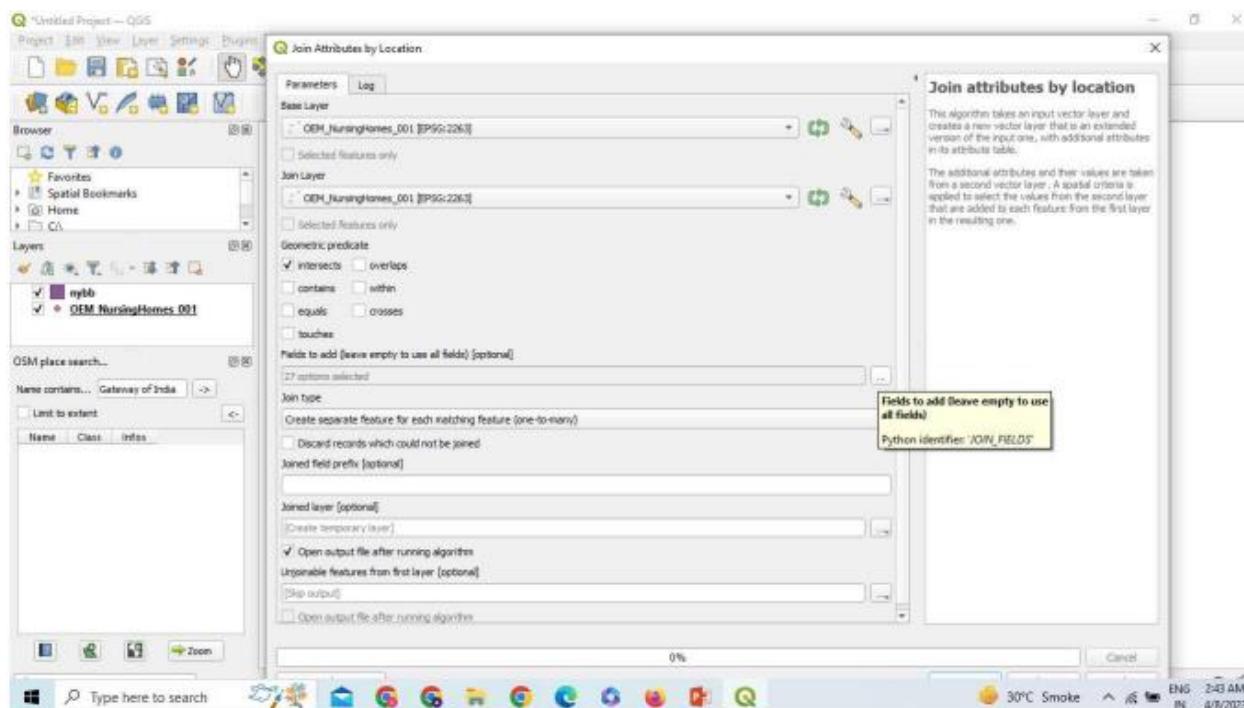
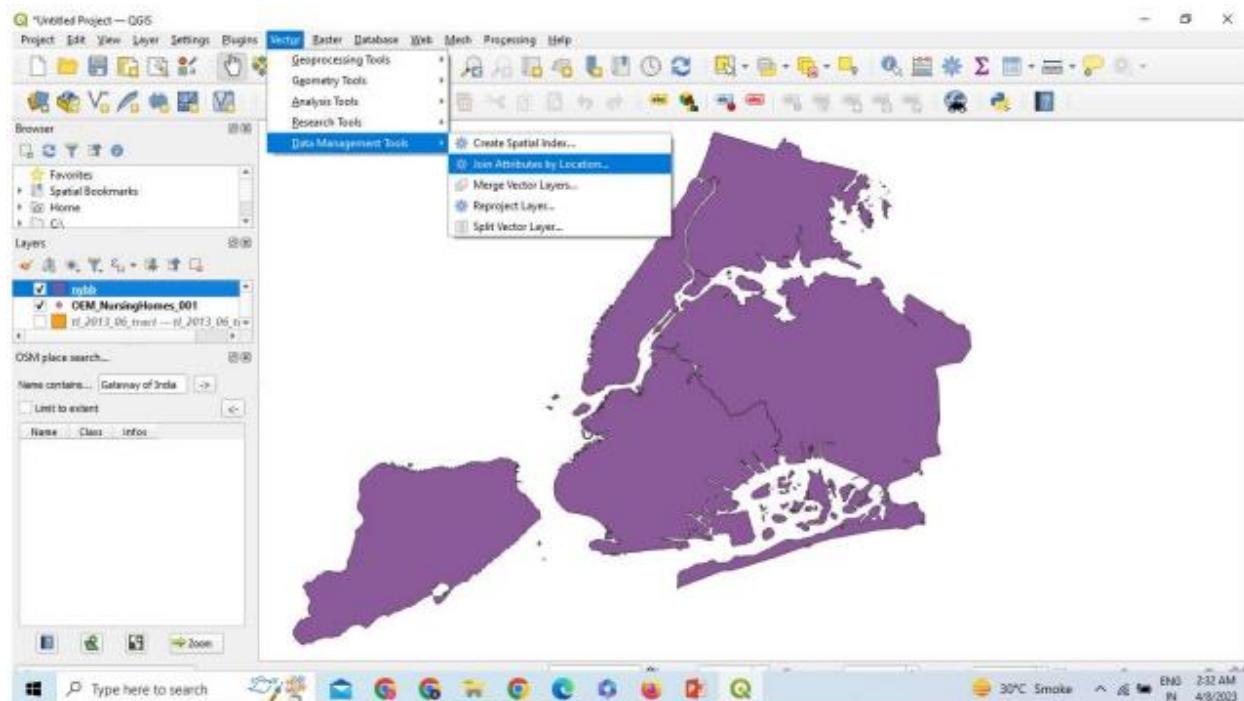
The screenshot shows the QGIS attribute table for the 'nybb' layer. The table has four columns: BoroCode, BoroName, Shape_Leng, and Shape_Area. The data is as follows:

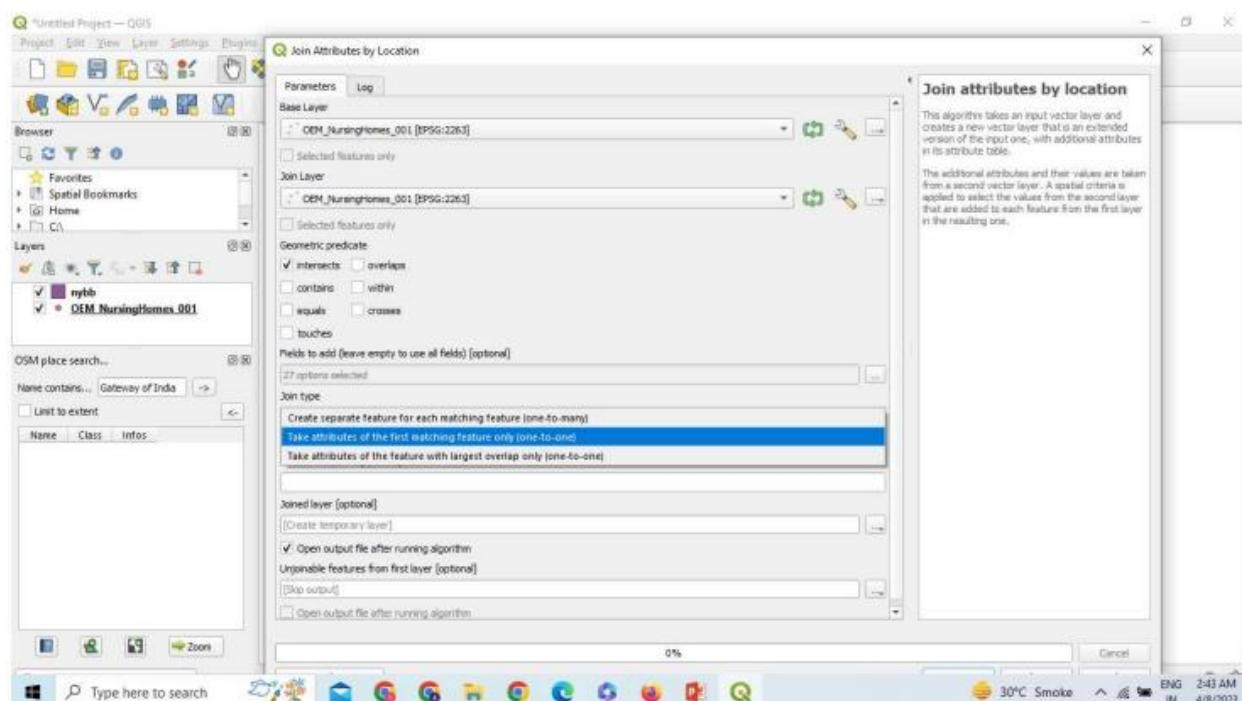
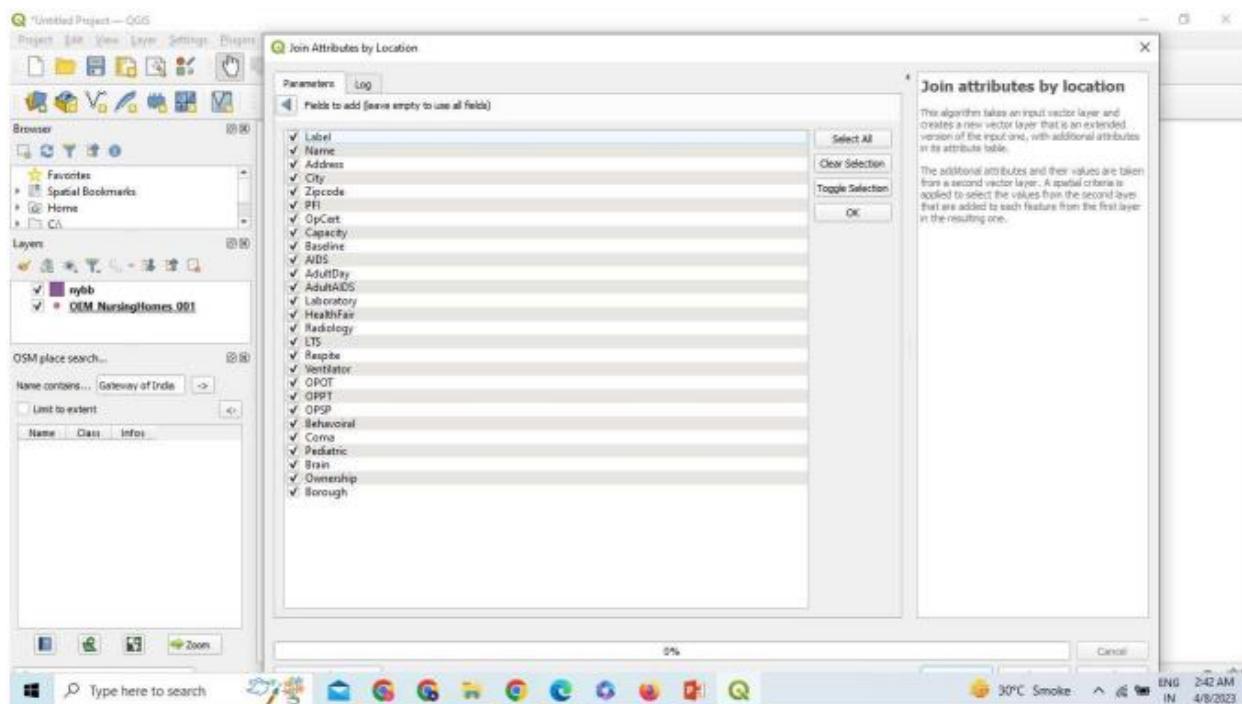
	BoroCode	BoroName	Shape_Leng	Shape_Area
1	5	Staten Island	330454.8066070...	1623846991.529...
2	1	Manhattan	357176.1325809...	636397842.6720...
3	2	Bronx	464475.0676990...	1186923812.599...
4	3	Brooklyn	742297.8304019...	1937844335.480...
5	4	Queens	874225.1394040...	3048478676.510...

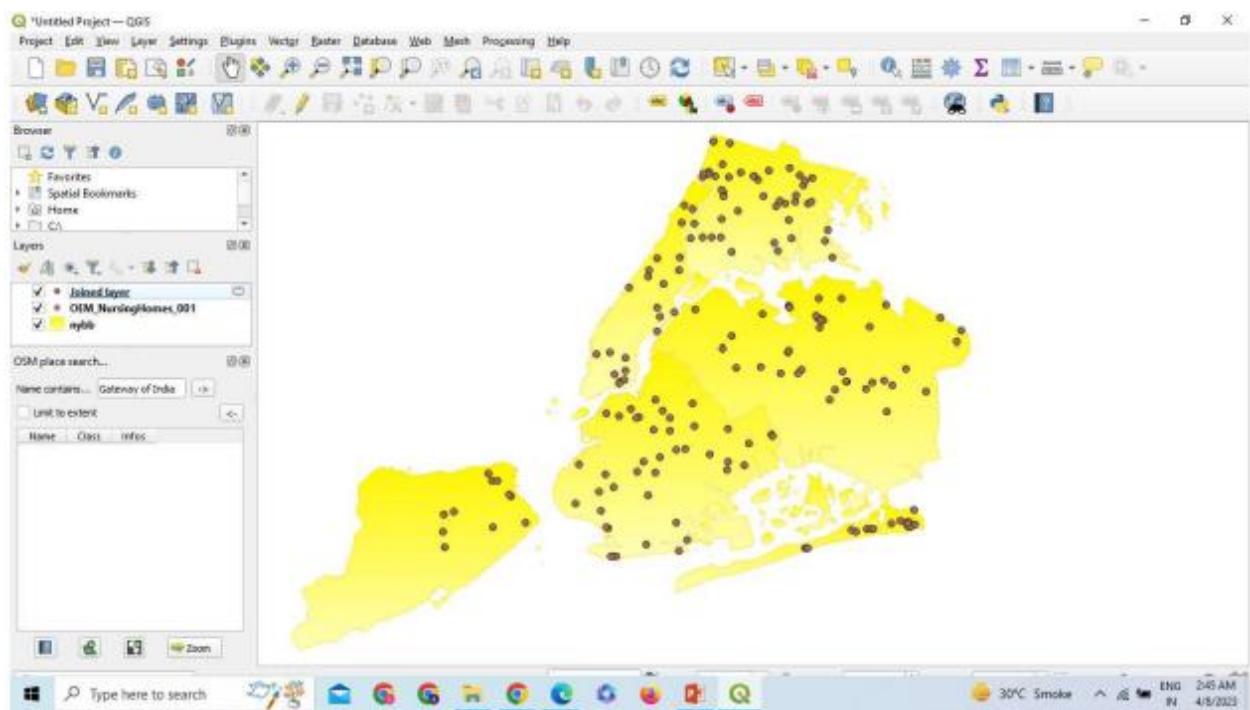
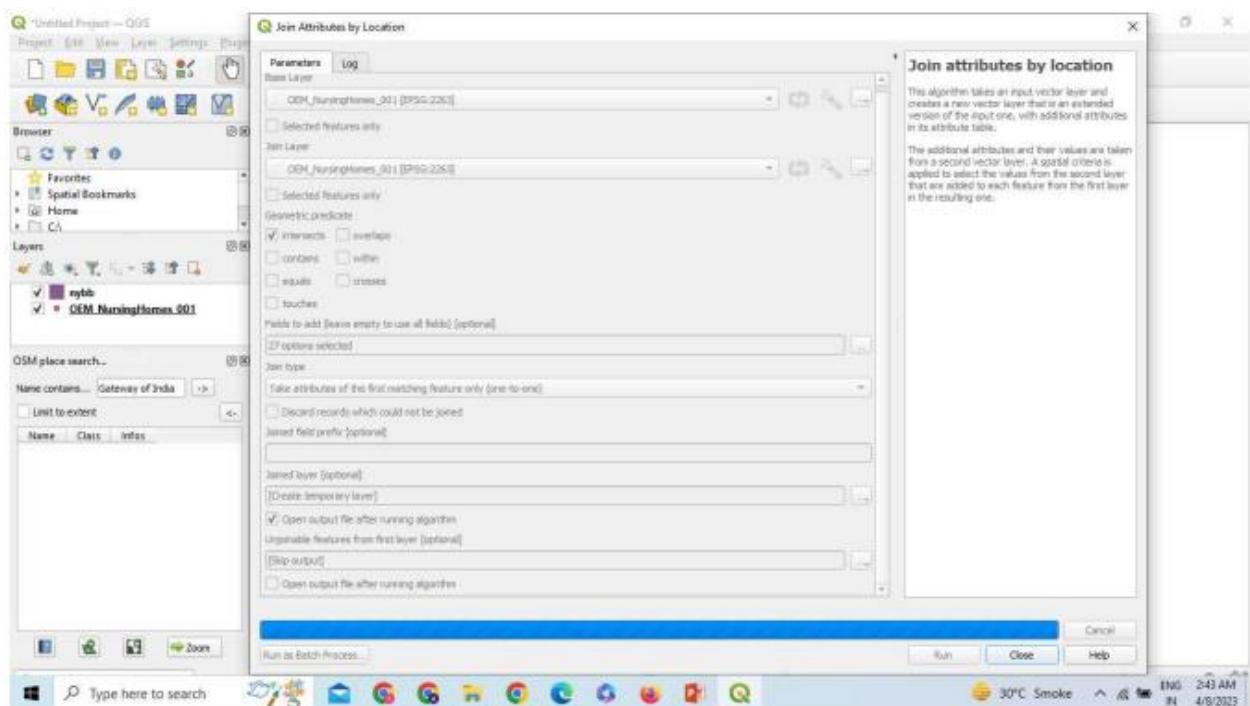
Step 8- Go to vector > Data management tools > join Attribute by location

1) A window will be shown >click on filed to add

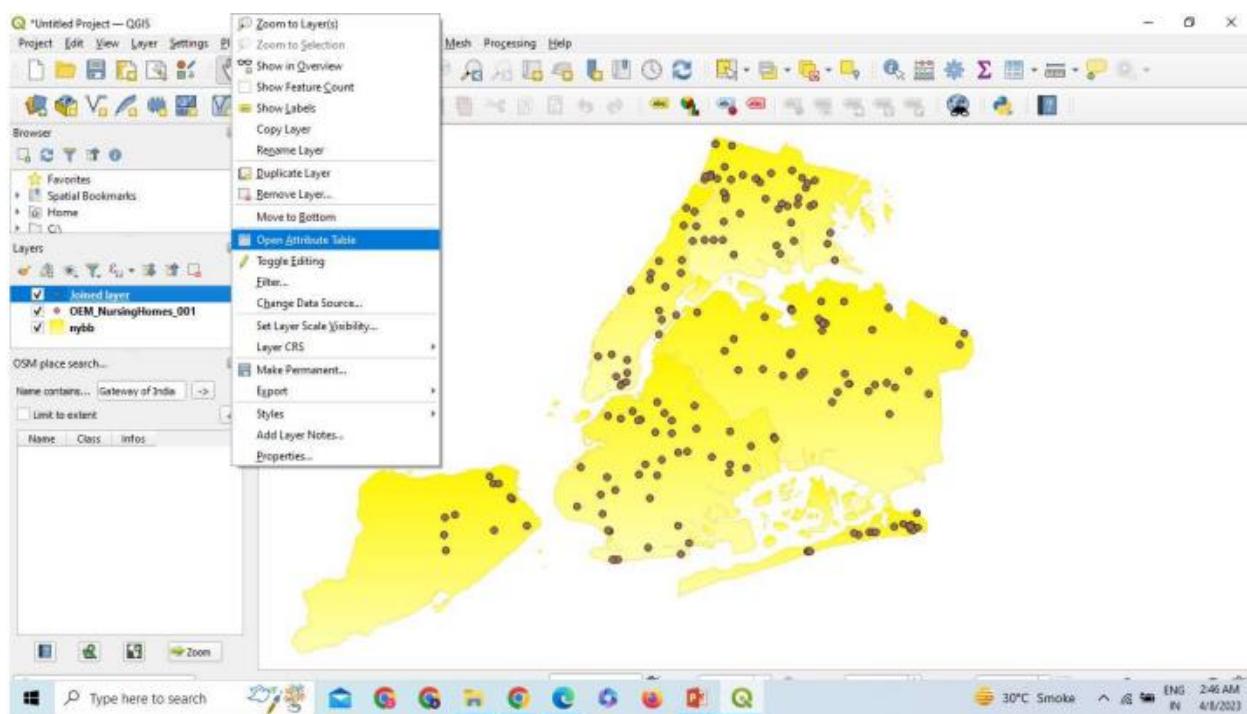
2) Join type > select take attributes of the first matching feature only(one to one)



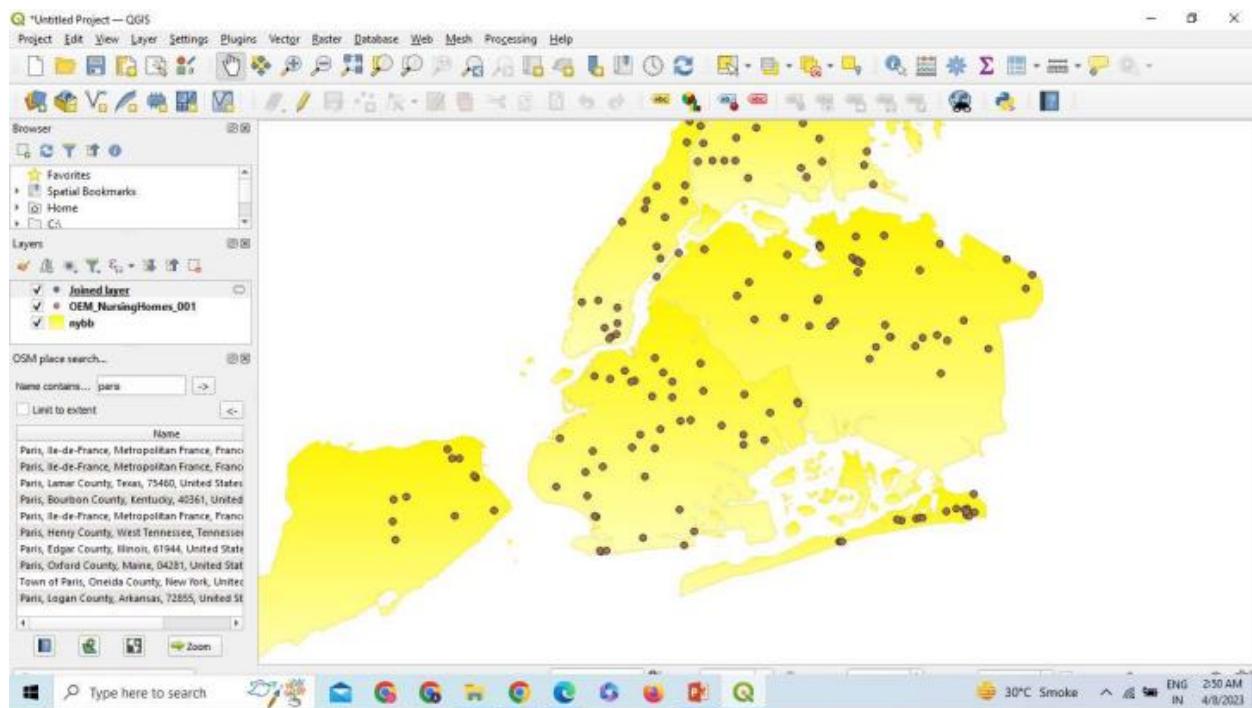




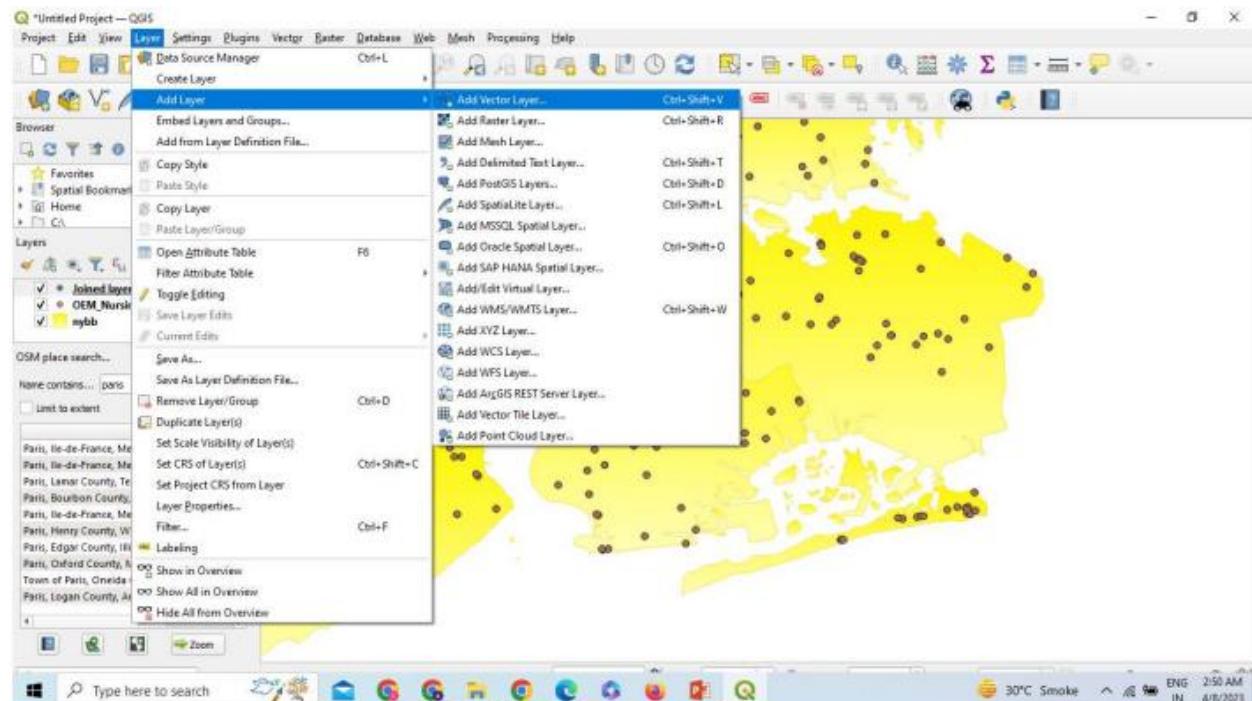
Step 9-open attribute table of Joined layer



	Label	Name	Address	City	Zipcode	PFI	OpCert	Capacity	Baseline	AIDS	AdrAIDS	AdrRADS	Laboratory	
1	JEWISH BX	JEWISH HOME ...	100 W. KINGSB...	BRONX	10468	1225.0000000000	7000317.000000...	816	1	0	1	0	1	
2	COLER	COLER MEMOR...	ROOSEVELT ISL...	NEW YORK	10044	1600.0000000000	7002337.000000...	815	1	0	0	0	1	
3	KINGS HARBOR	KINGS HARBO...	2000 E GUNHL...	BRONX	10469	1250.0000000000	7000372.000000...	720	1	1	0	0	0	
4	ISABELLA	ISABELLA GER...	515 AUDUBON ...	NEW YORK	10040	1566.0000000000	7002352.000000...	705	1	0	1	0	0	
5	TERENCE CARD...	TERENCE CARD...	1249 FIFTH AVE...	NEW YORK	10029	3089.0000000000	7002345.000000...	679	1	1	0	0	0	
6	HEBREW	HEBREW HCM...	5901 PALISADE ...	BRONX	10471	1212.0000000000	7000302.000000...	580	1	0	1	0	1	
7	CLOVE LAKES	CLOVE LAKES ...	25 FANNING ST...	STATEN ISLAND	10314	1750.0000000000	7004321.000000...	576	1	0	0	0	1	
8	GOLDWATER	GOLDWATER M...	1 MAIN STREET ...	NEW YORK	10044	1601.0000000000	7002337.000000...	574	1	0	0	0	1	
9	RUTLAND	RUTLAND NUR...	585 SCHENECT...	BROOKLYN	11203	1316.0000000000	7001033.000000...	538	1	0	1	0	1	
10	PARKER JEWISH	PARKER JEWISH...	271-11 78TH AV...	NEW HYDE PARK	11040	1671.0000000000	7003307.000000...	527	1	0	0	0	1	
11	WORKMEN'S	WORKMEN'S CL...	3155 GRACE AV...	BRONX	10469	1219.0000000000	7000309.000000...	524	1	0	0	0	1	
12	KATERI	KATERI RESIDE...	150 RIVERSIDE ...	NEW YORK	10024	1370.0000000000	7002344.000000...	520	1	0	0	0	0	
13	COBBLE HILL	COBBLE HILL H...	380 HENRY STR...	BROOKLYN	11201	1381.0000000000	7001323.000000...	520	1	0	1	0	1	
14	BETH ABRAHAM	BETH ABRAHAM...	812 ALLENTON ...	BRONX	10467	1218.0000000000	7000308.000000...	520	1	0	1	0	1	
15	JEWISH HOME	JEWISH HOME ...	120 WEST 106...	NEW YORK	10025	1603.0000000000	7002340.000000...	514	1	0	1	0	1	
16	DEWITT	DEWITT REHAB ...	211 EAST 79 ST	NEW YORK	10021	1582.0000000000	7002347.000000...	499	1	0	0	0	0	
17	BAY PARK	BAY PARK CEN...	301 CO-OP CIT...	BRONX	10475	1260.0000000000	7000389.000000...	480	1	0	1	0	1	
18	SCHULMAN A.	SCHULMAN A...	555 ROCKAWAY...	BROOKLYN	11212	1376.0000000000	7001318.000000...	448	1	1	0	0	1	
19	OZANAM HALL	OZANAM HAL...	42-41 201ST ST...	BAYSIDE	11361	1670.0000000000	7003306.000000...	432	1	0	0	0	1	
20	DAUGHTERS O...	DAUGHTERS O...	1160 TELLER AVE	BRONX	10436	1249.0000000000	7000342.000000...	413	1	0	1	0	1	

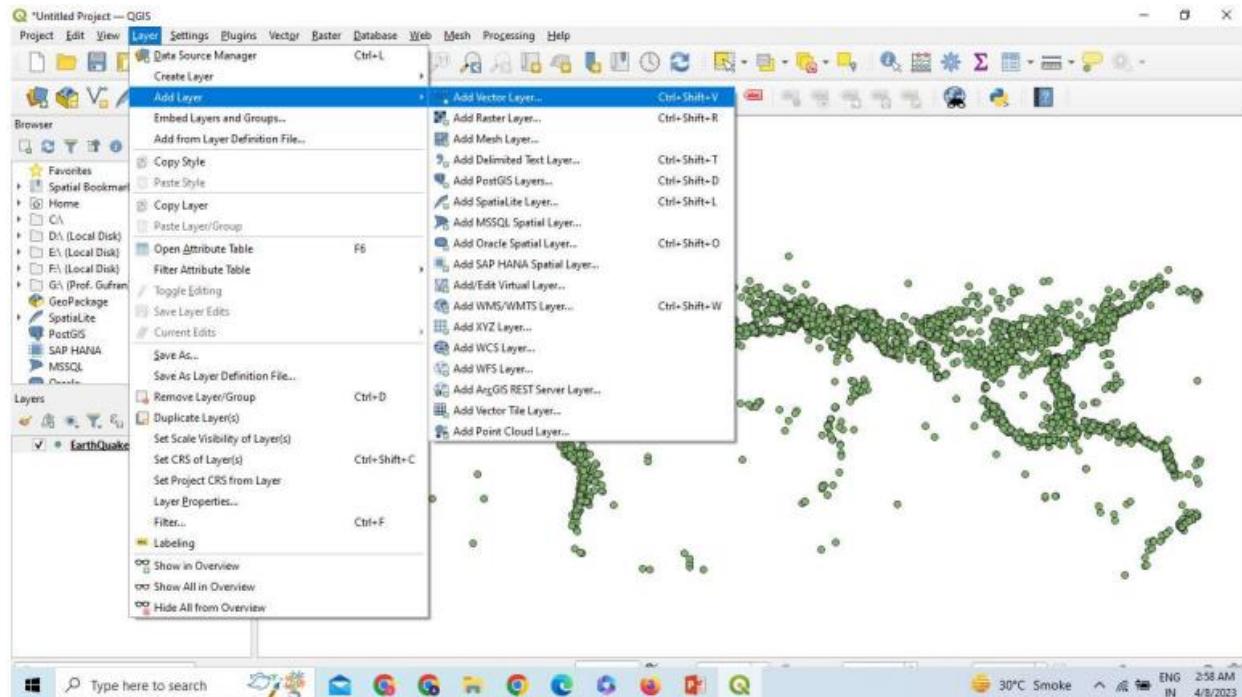
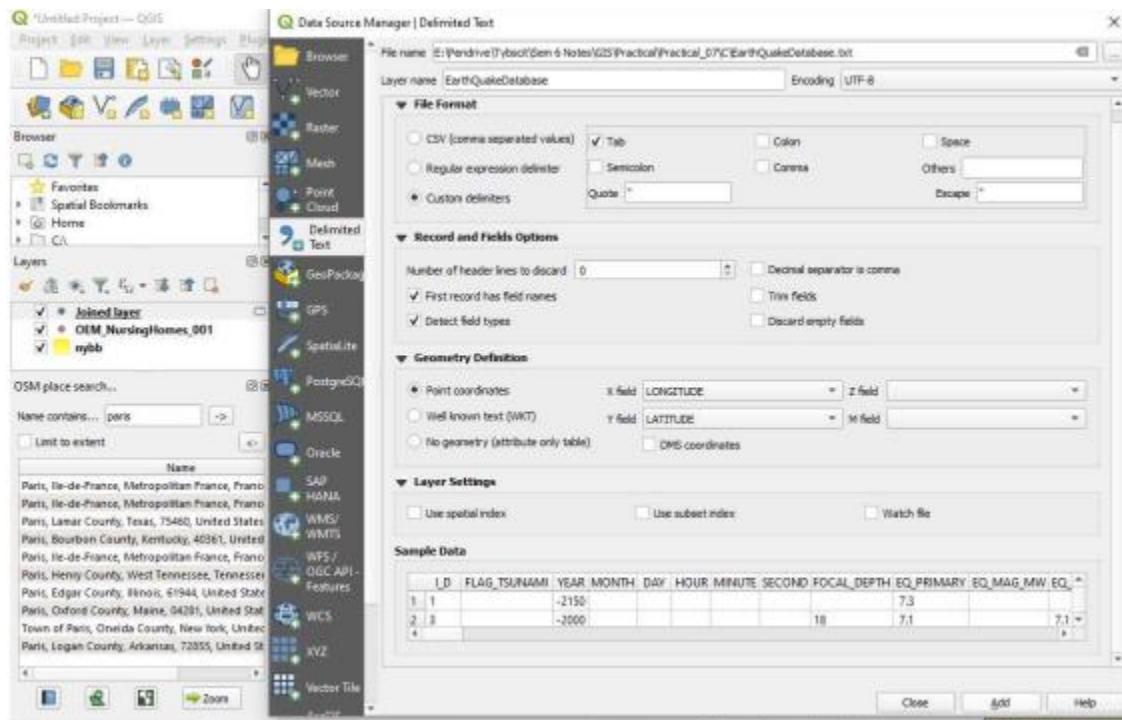


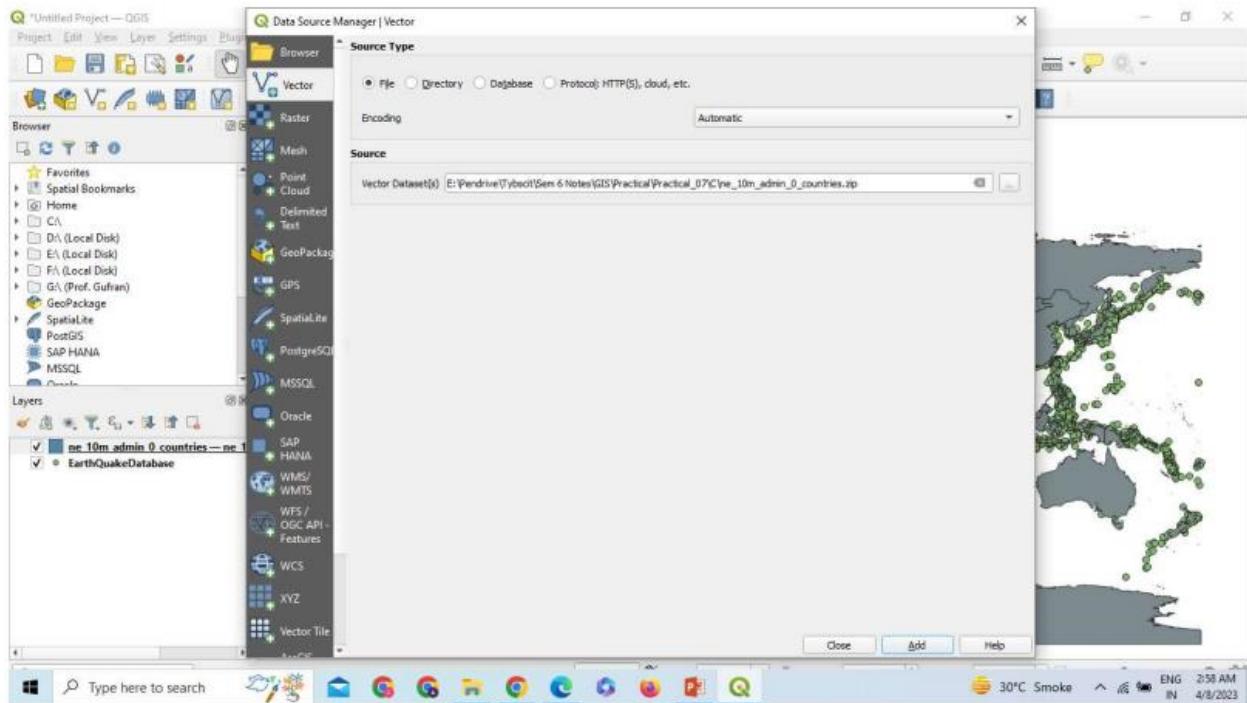
Step 10-Go to layer > Add layer > Add vector layer



Step 11- open Layer properties > Delimited text

- 1) Layer name earthquake data base
- 2) Press Add
- 3) Go to layer> Add layer > Add vector Layer select ne_10_admin_0_countries.zip > Add



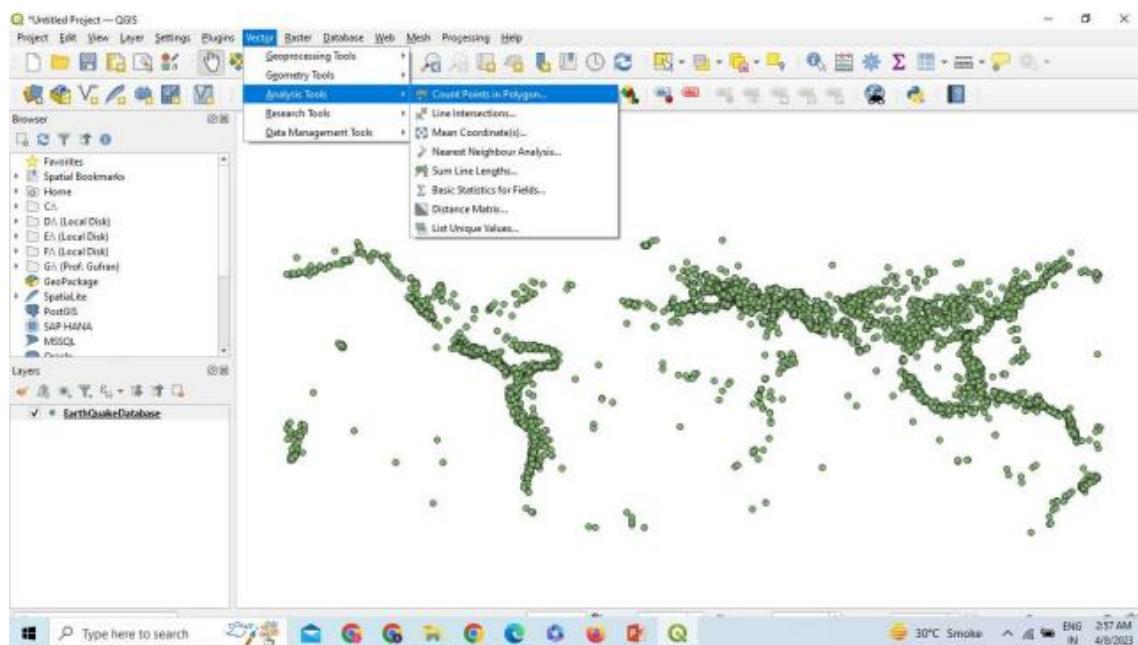


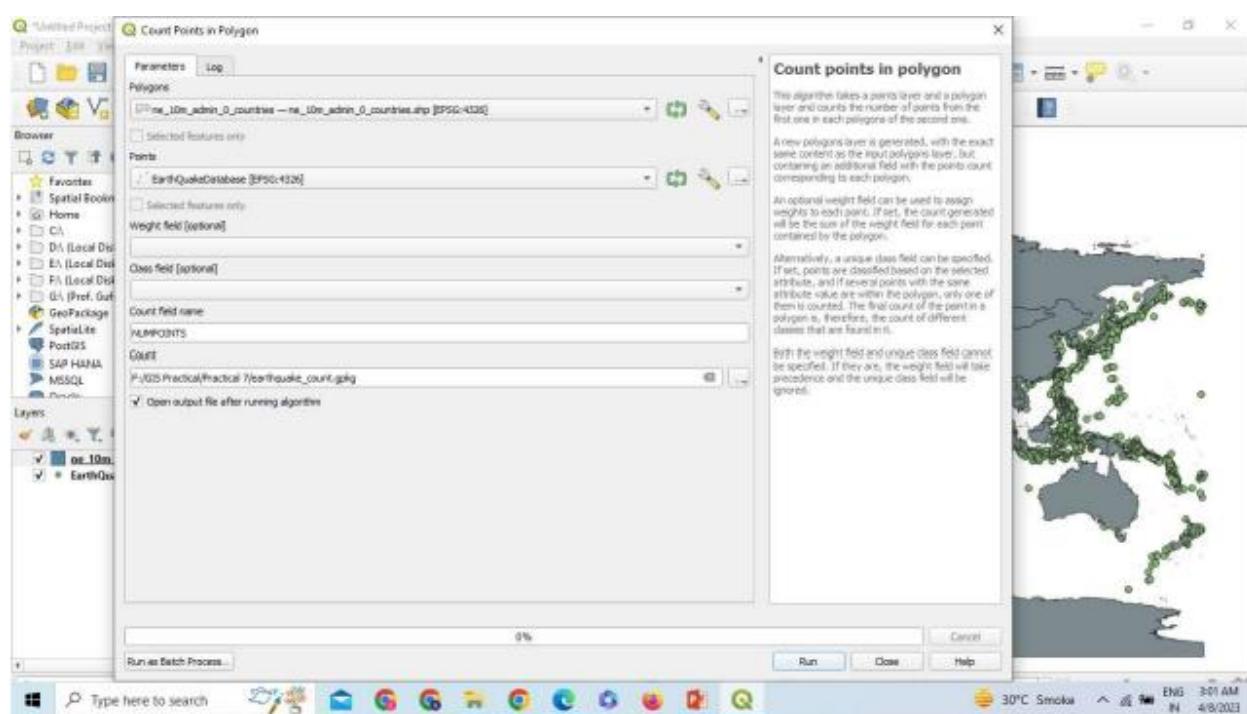
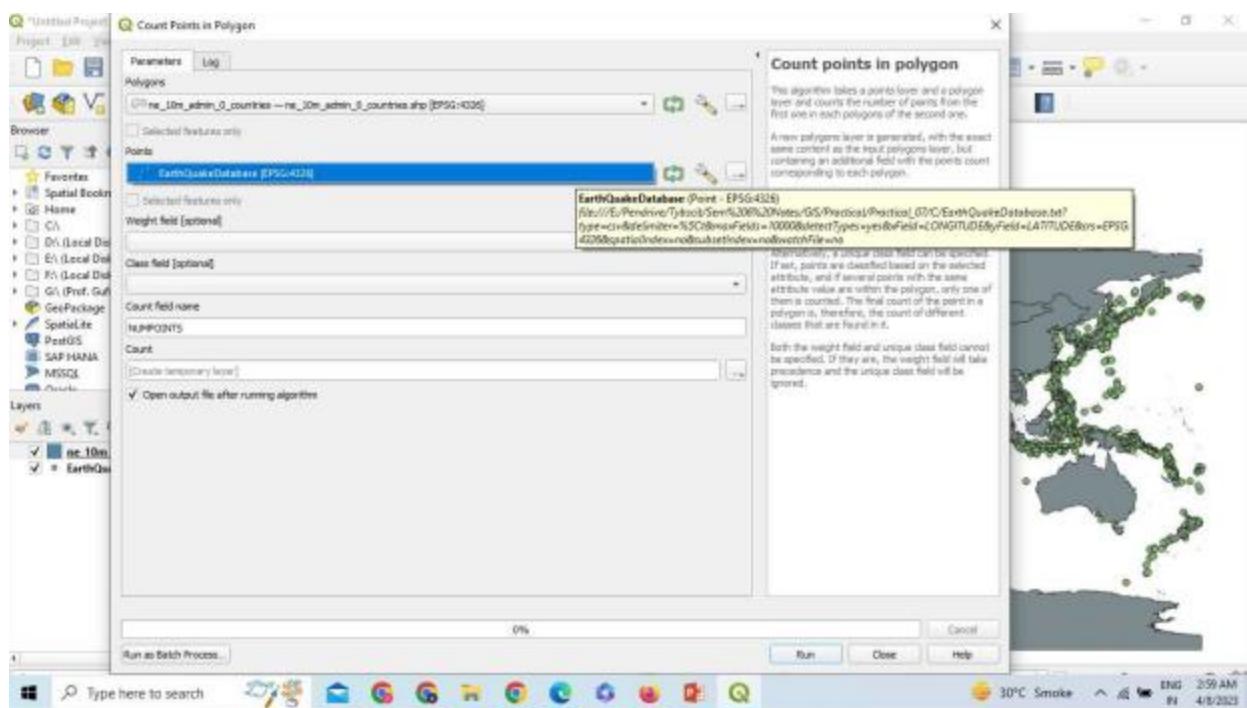
Step 12- 1) Go to Vector >Analysis Tools > Count point in polygon

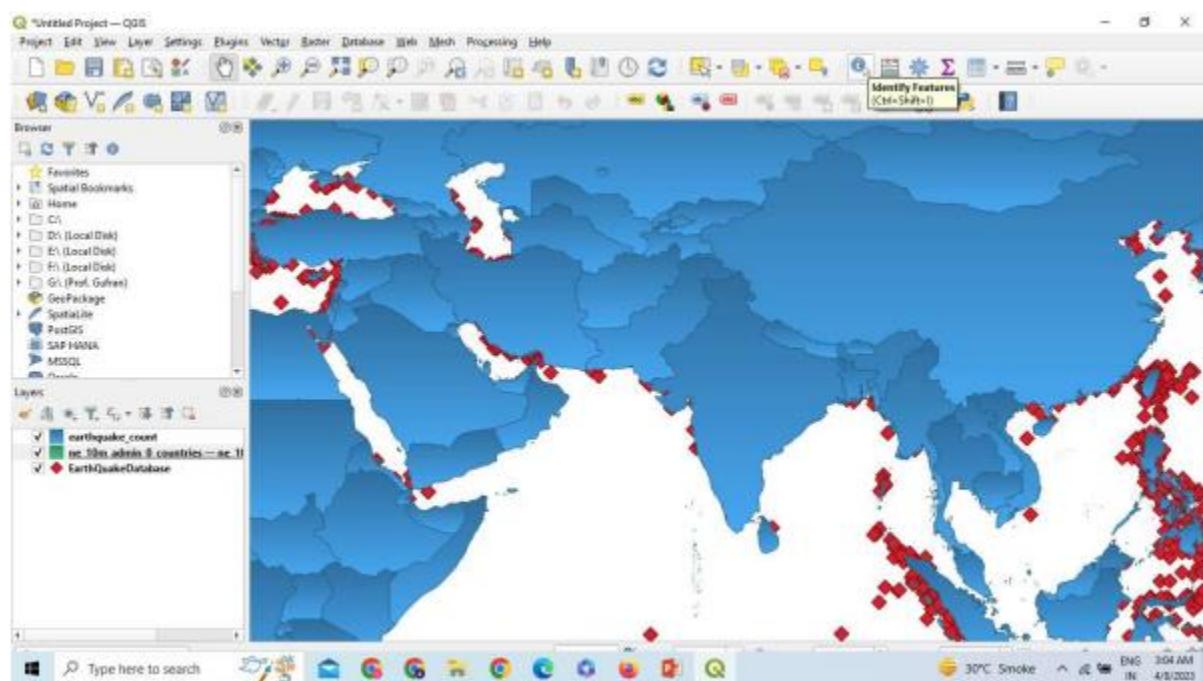
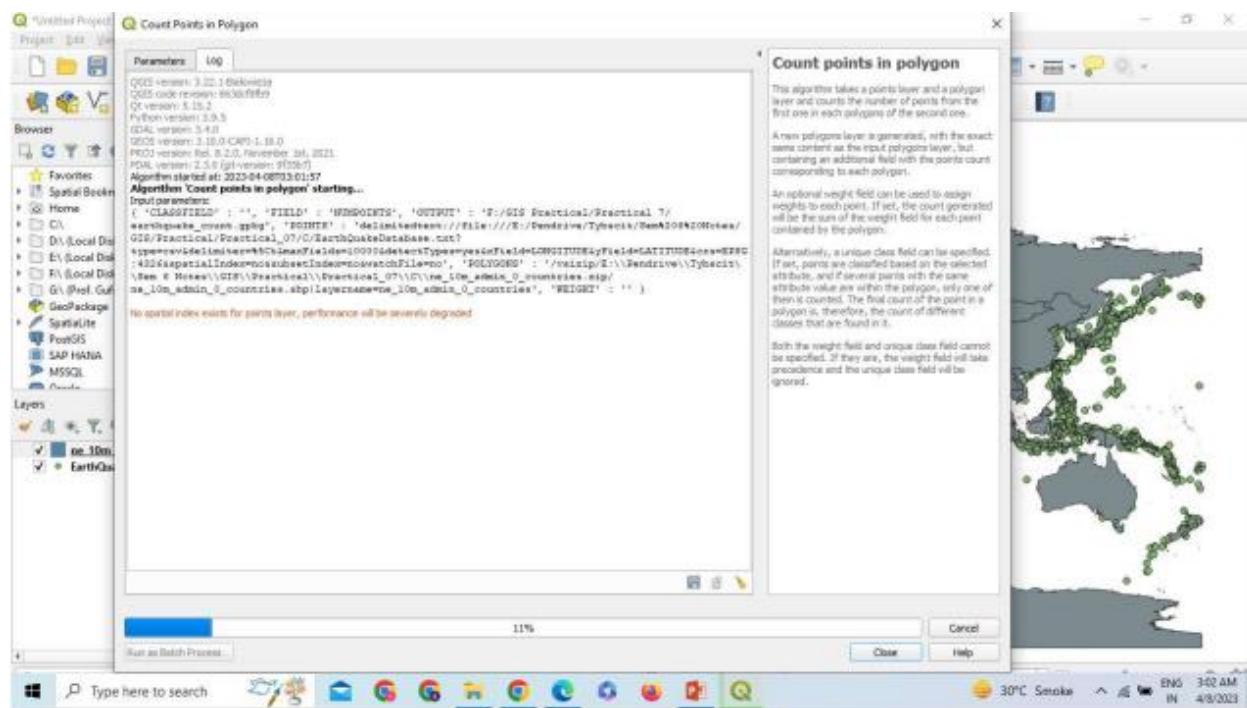
2) points > EarthquakeDataBase [EPS:4326]

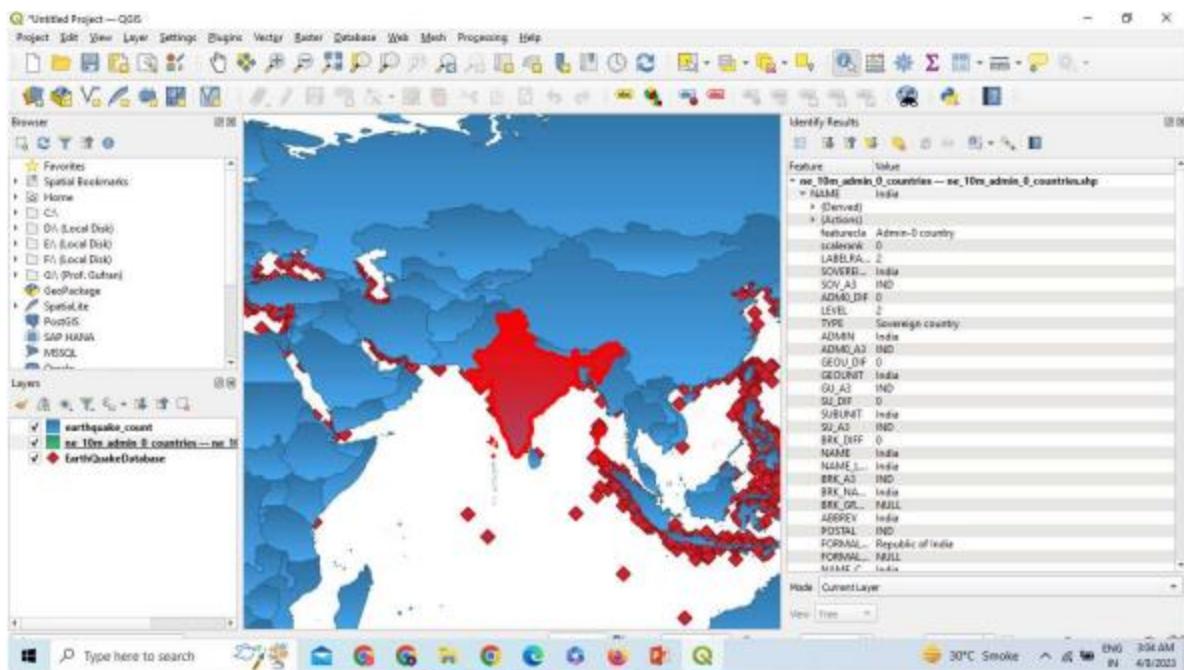
3) count > earthquake_count.gpkg

4) Run 5) click on identity result

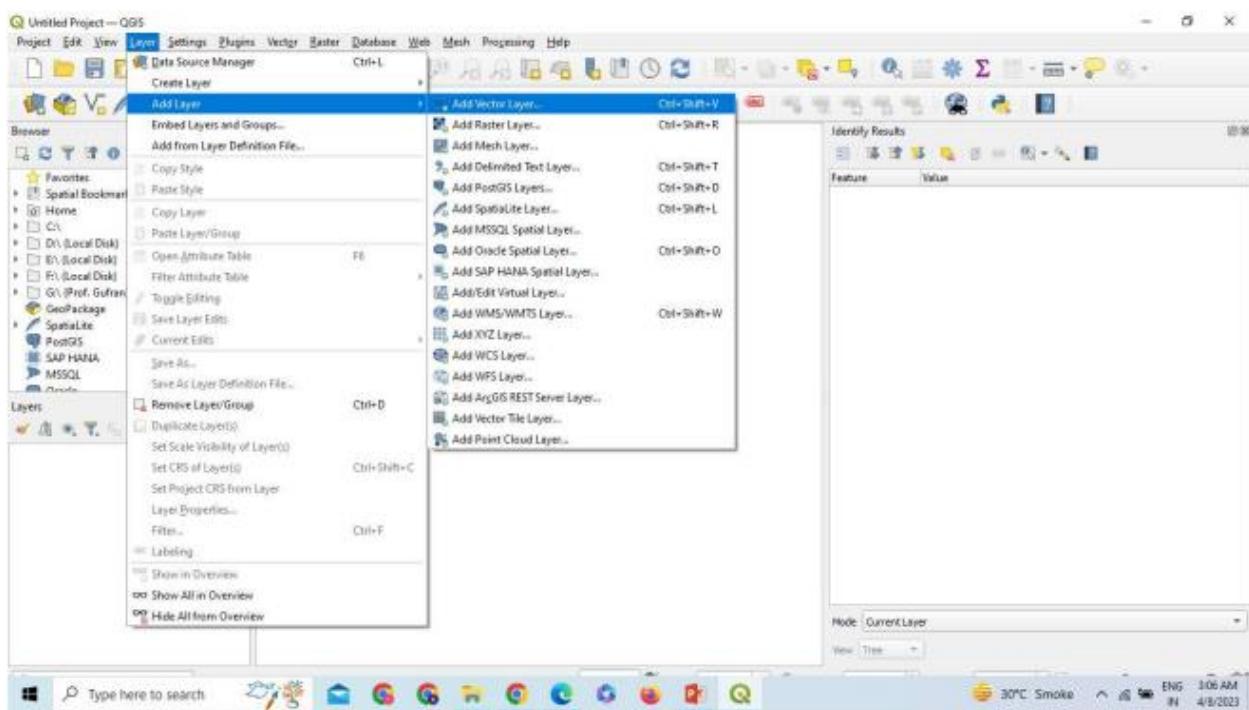


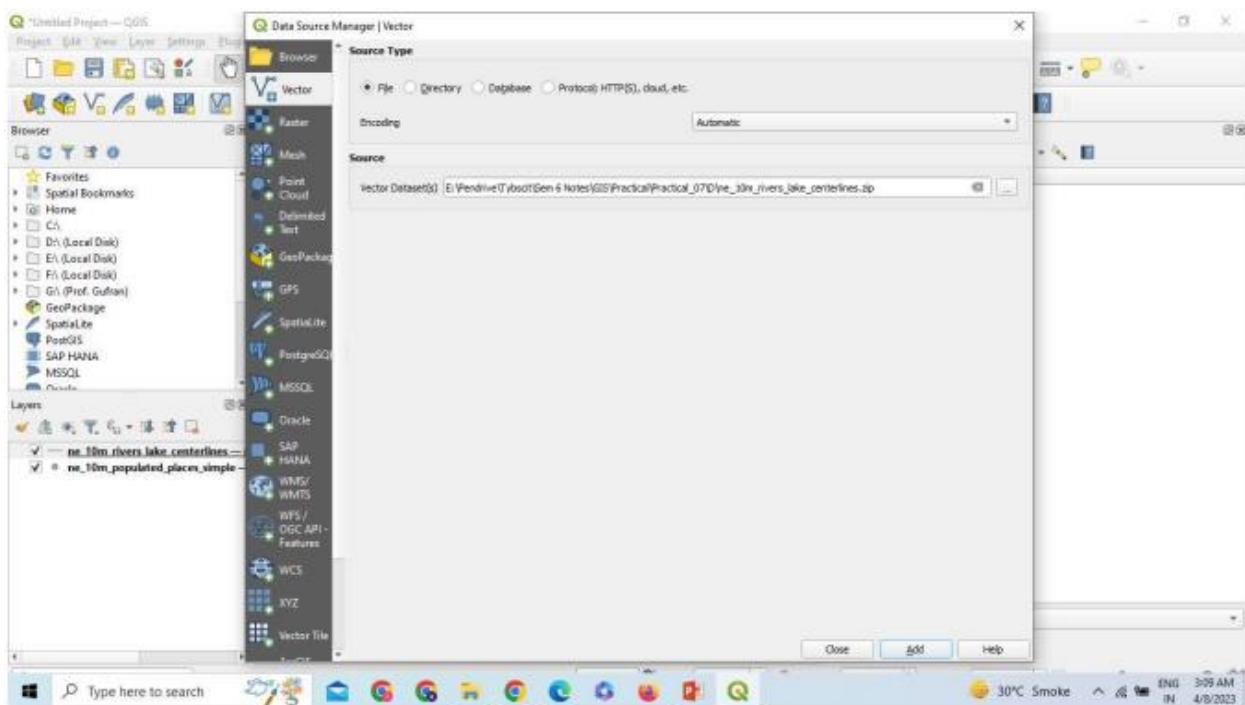
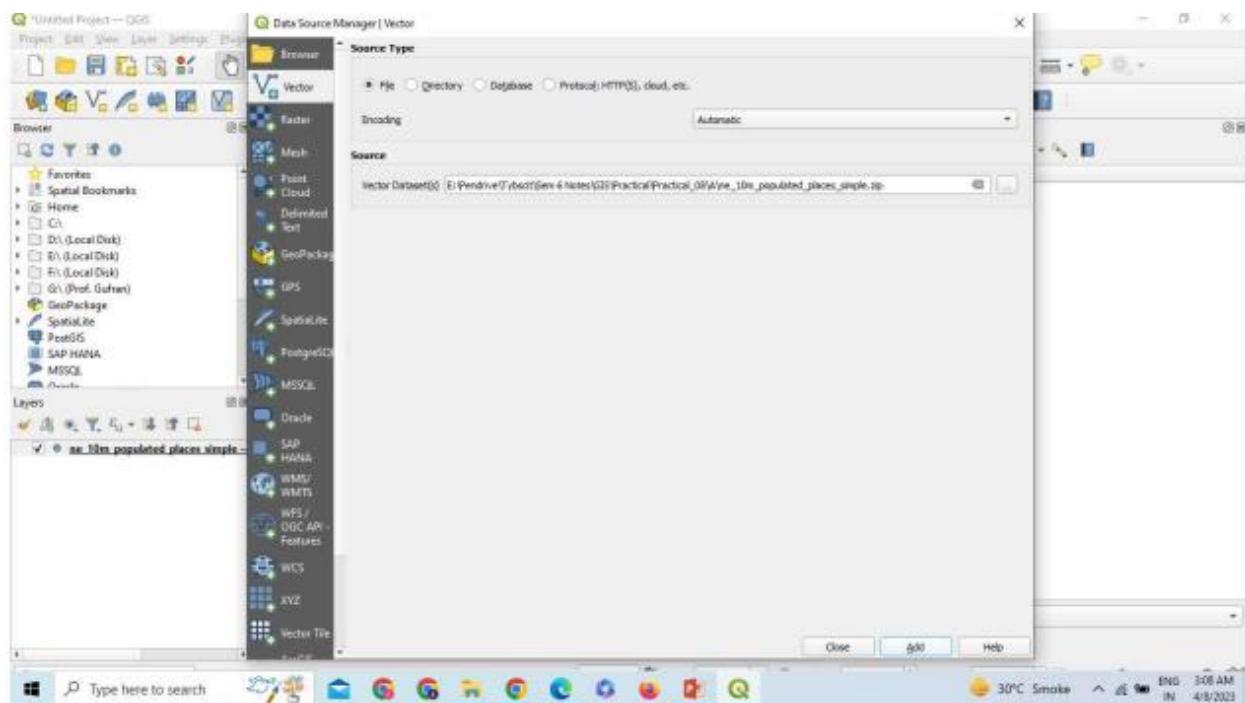






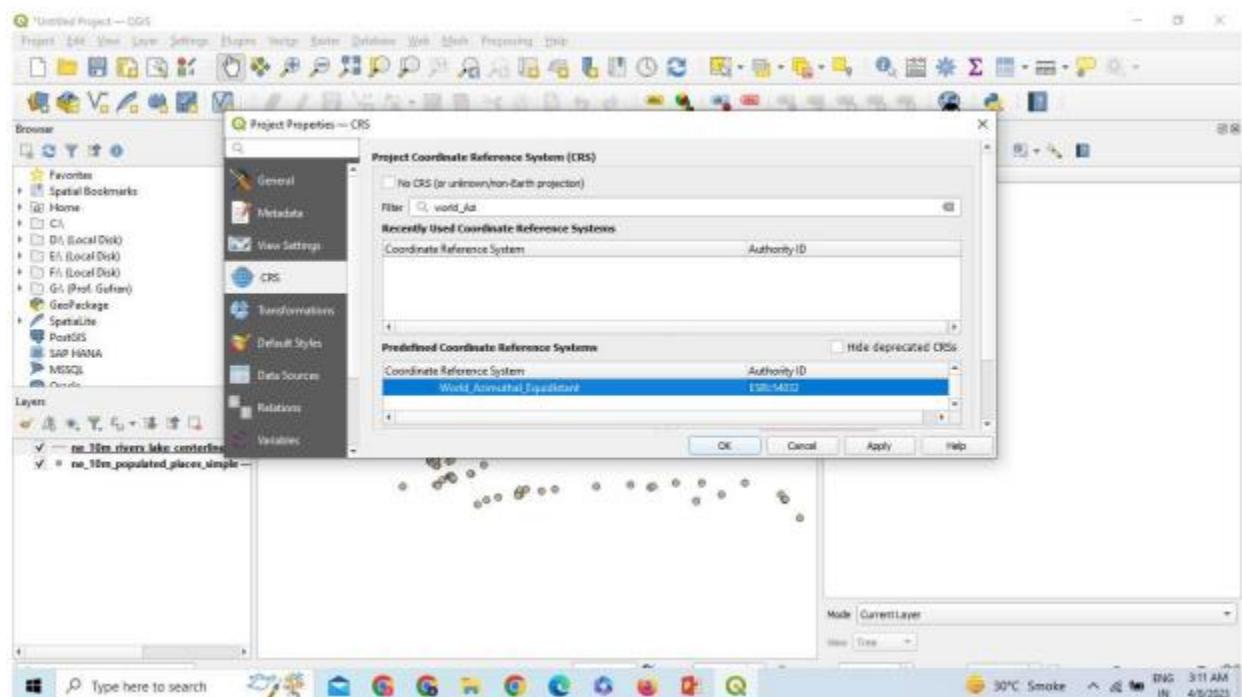
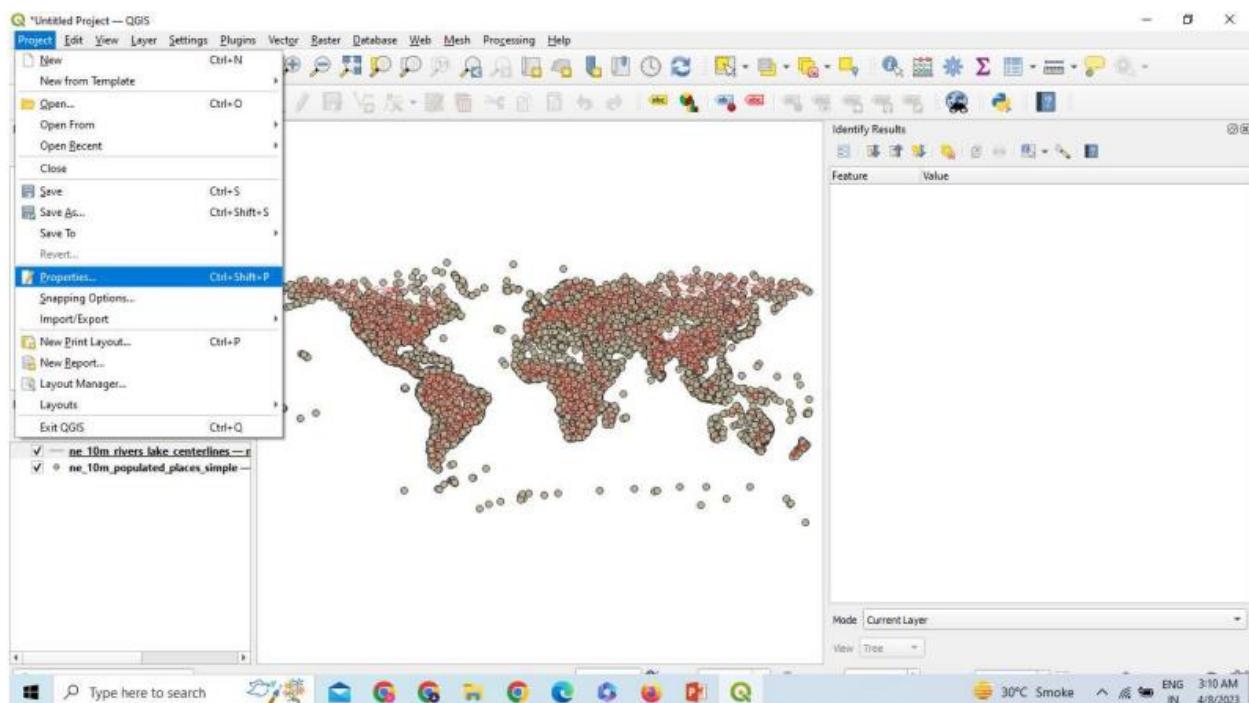
- Step 13-**
- 1) Go to layer > Add Layer > Add Vector Layer
 - 2) Add file ne_100m_populated_places_simple.zip > Add
 - 3) Add file ne_10m_rivers_lake_centerlines.zip





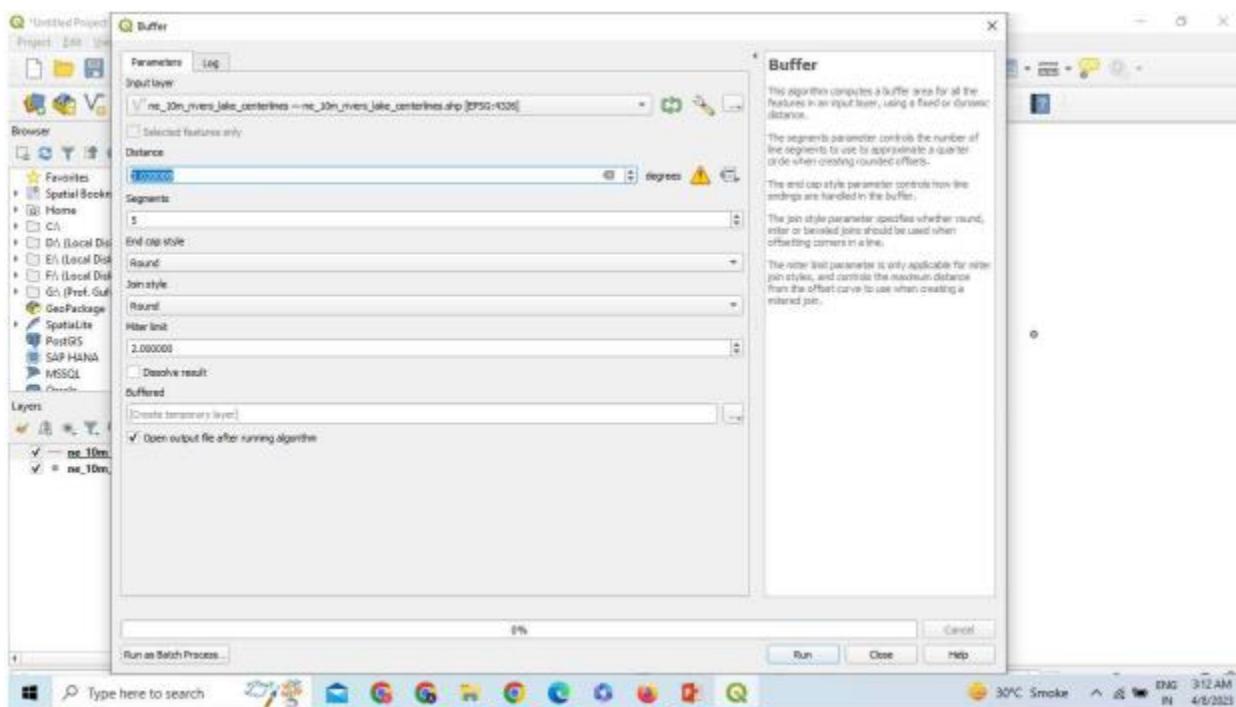
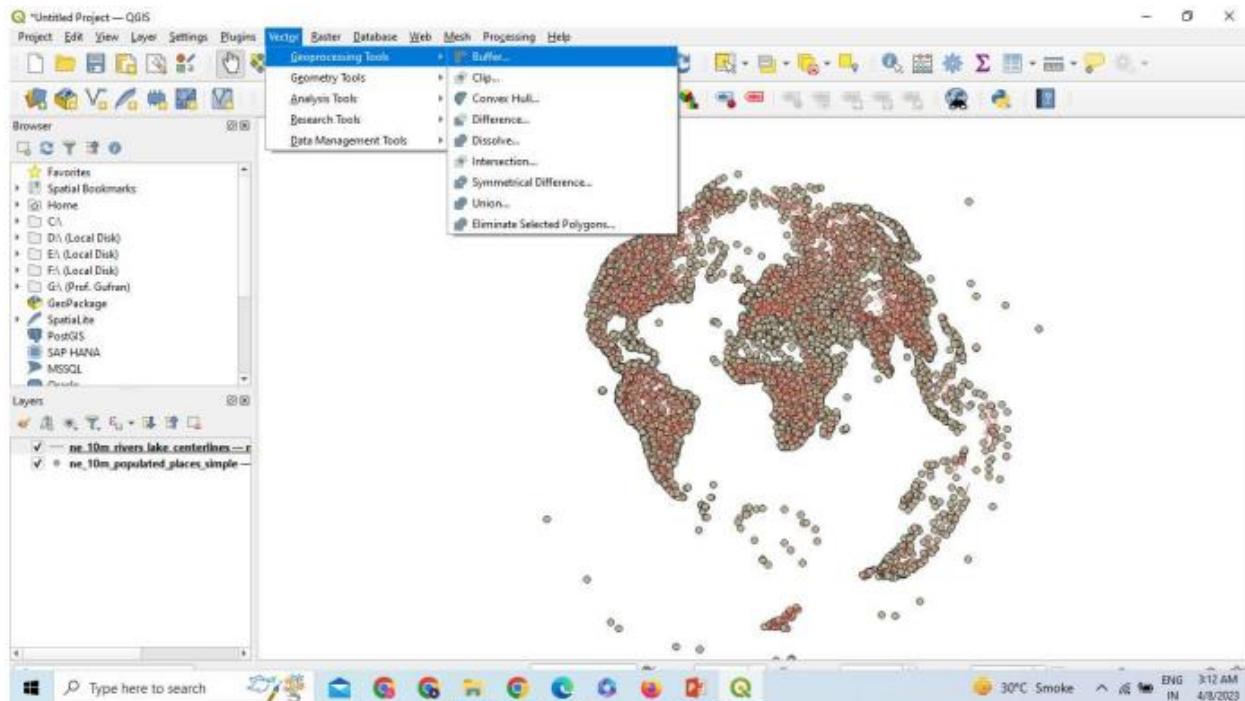
Step 14 - 1) project > properties

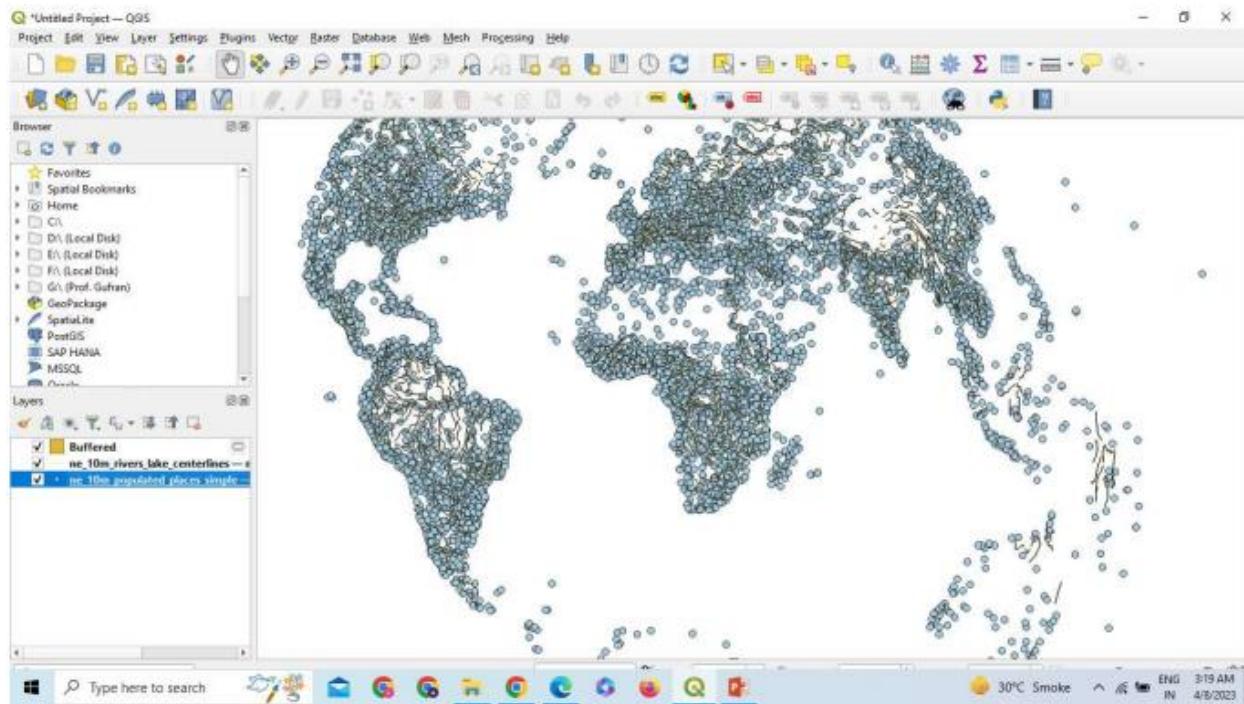
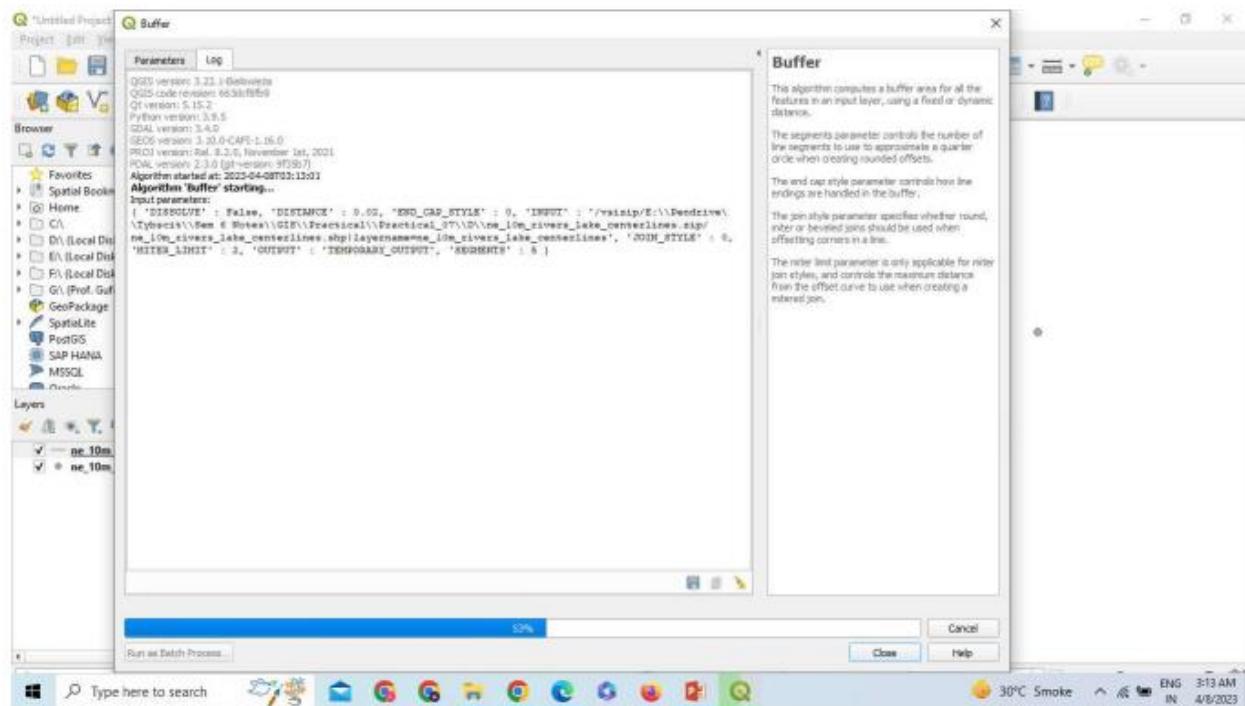
2) CRS > predefined coordinate reference System > coordinate reference System change to World_Azimuthal_Equidistant >ok



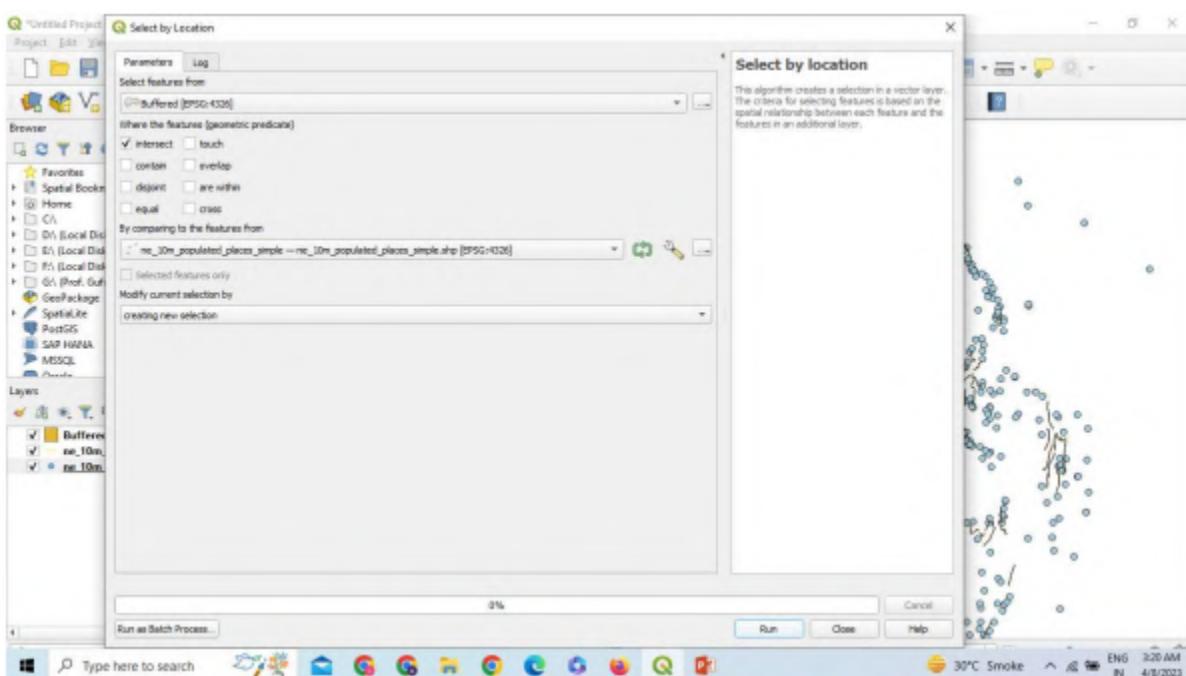
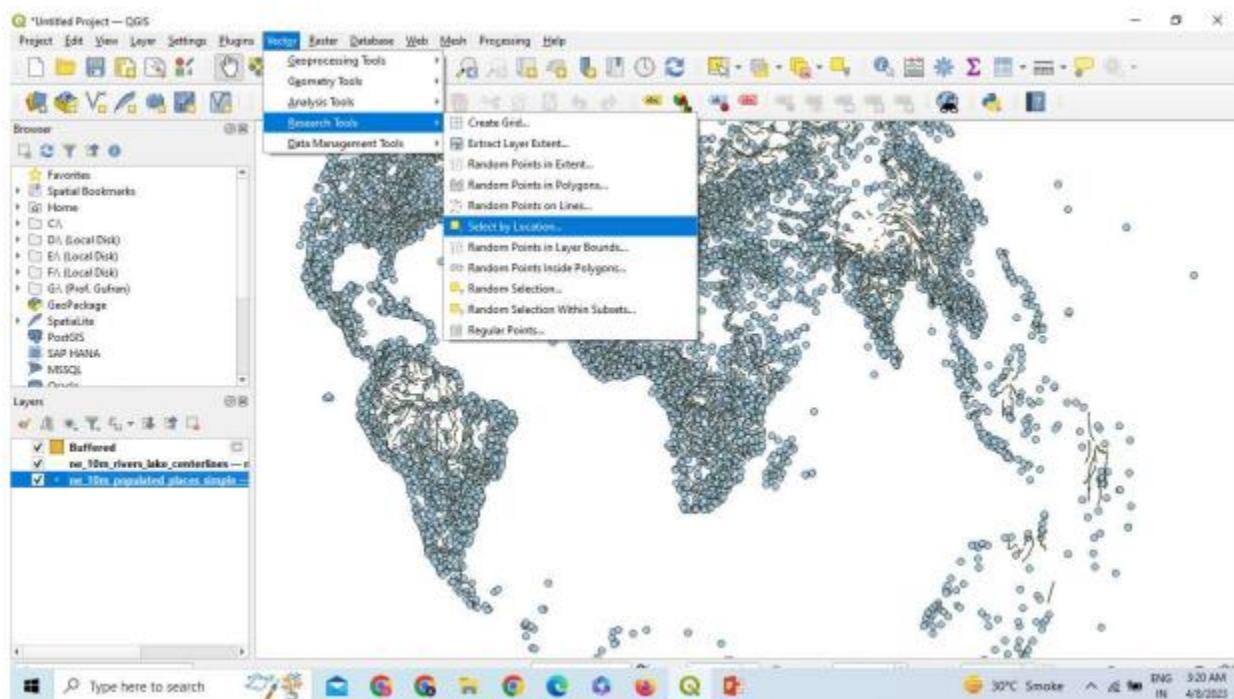
Step 15- 1) Go to vector >Geoprocessing Tools > Buffer

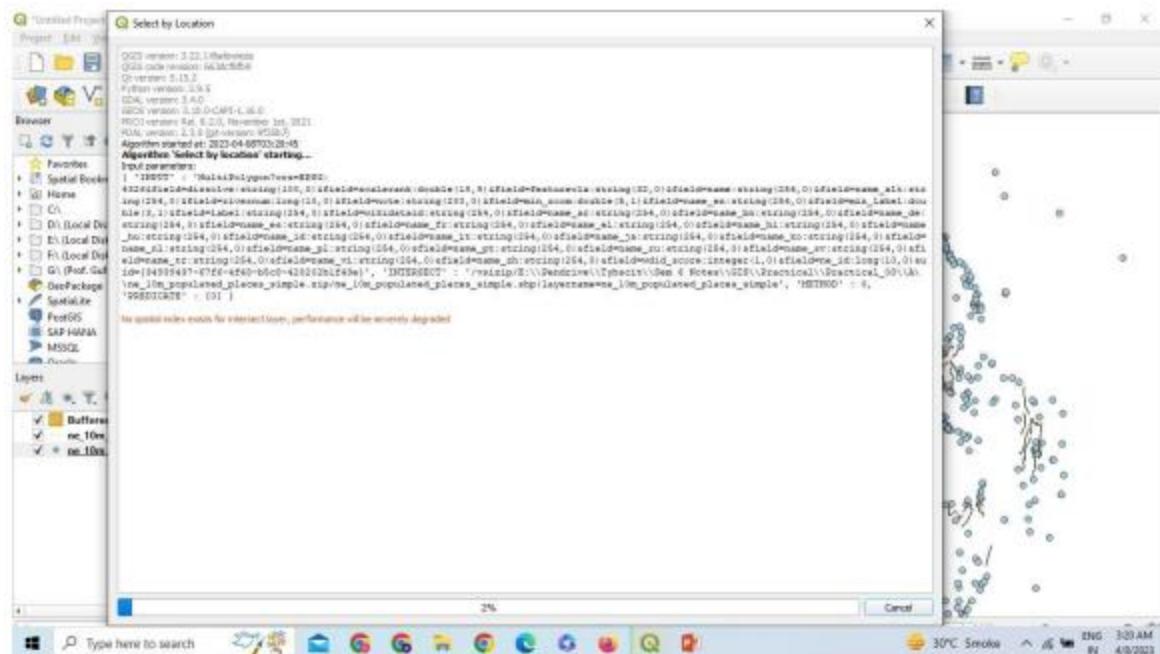
2) Distance is 0.020000 3) Run





Step 16- Go to Vector > research tool >select by location > run





This will highlight only those rivers containing a populated place within 2 KM

