Practical 1

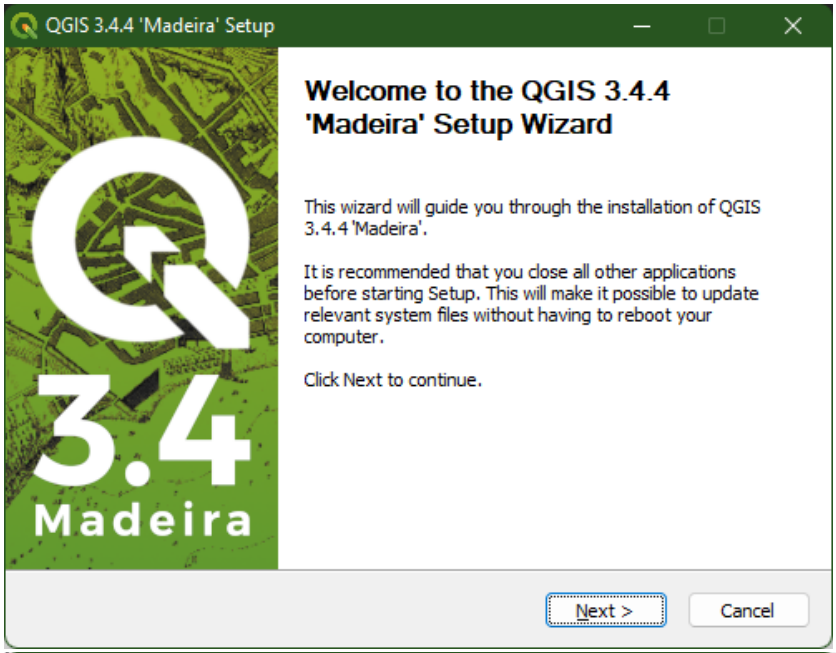
AIM: Familiarizing Quantum GIS: Installation of QGIS, datasets for both Vector and Raster data, Maps.

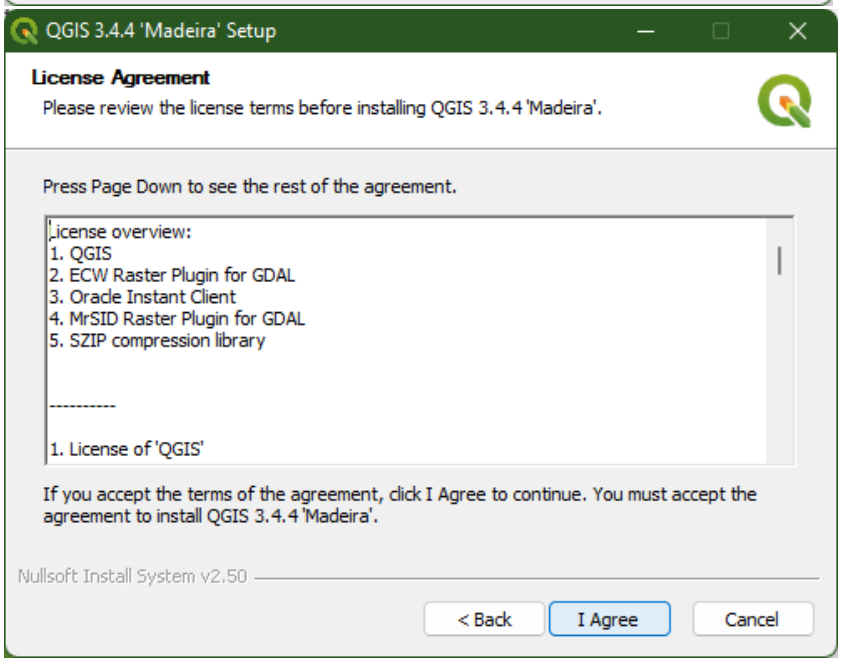
Solution:

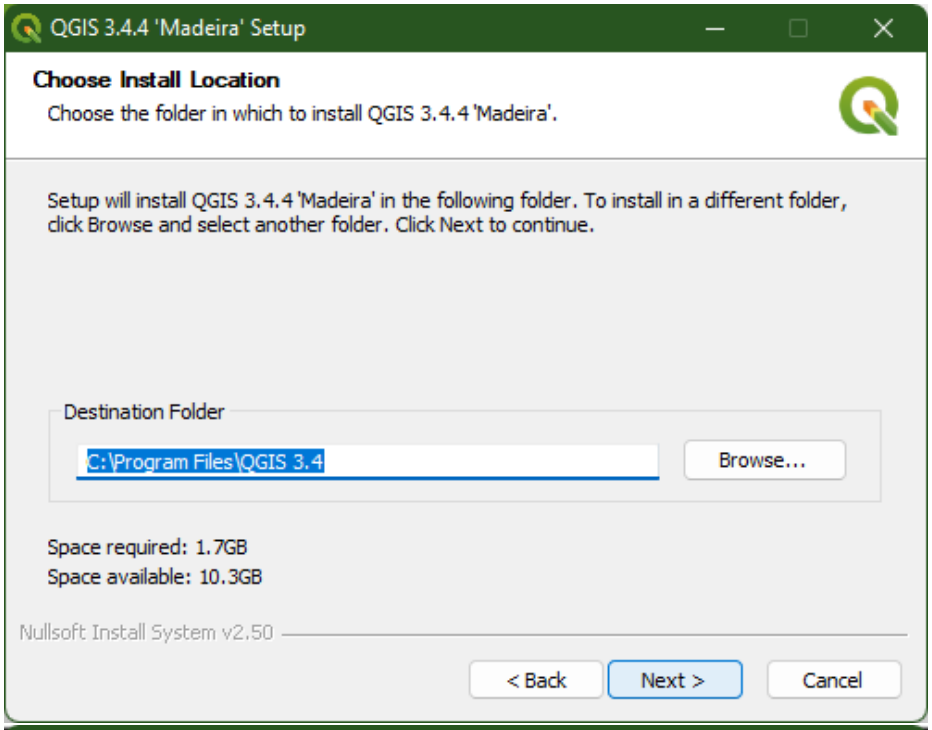
Go to, https://www.qgis.org/en/site/forusers/download.html

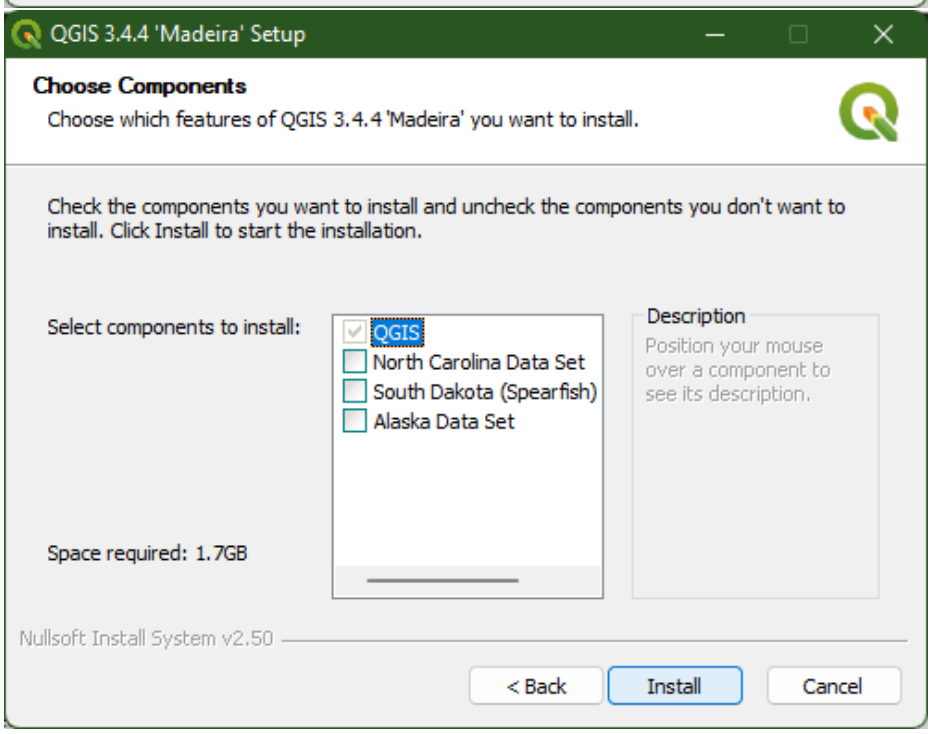
And download Latest QGIS.

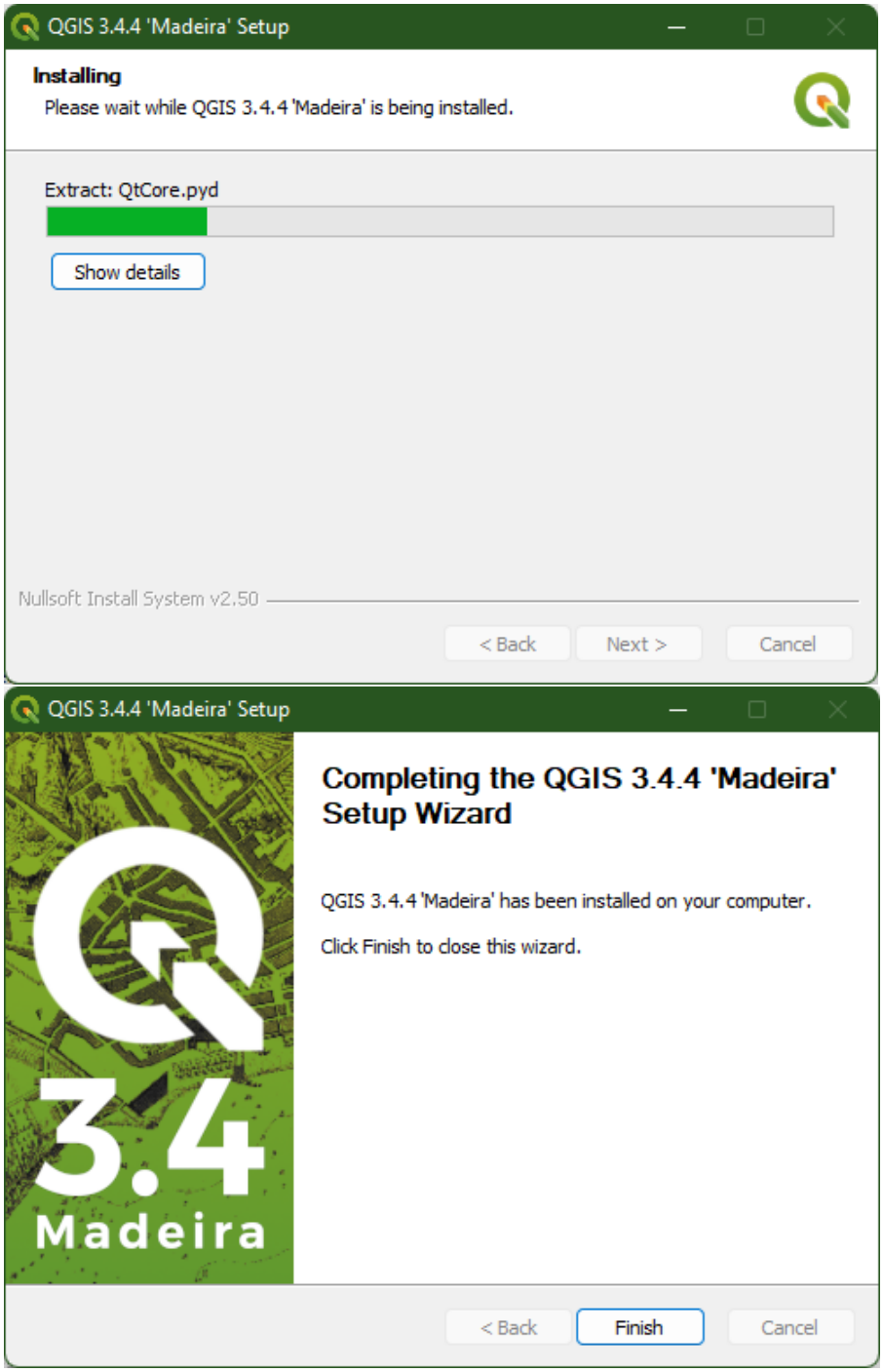
Installation:



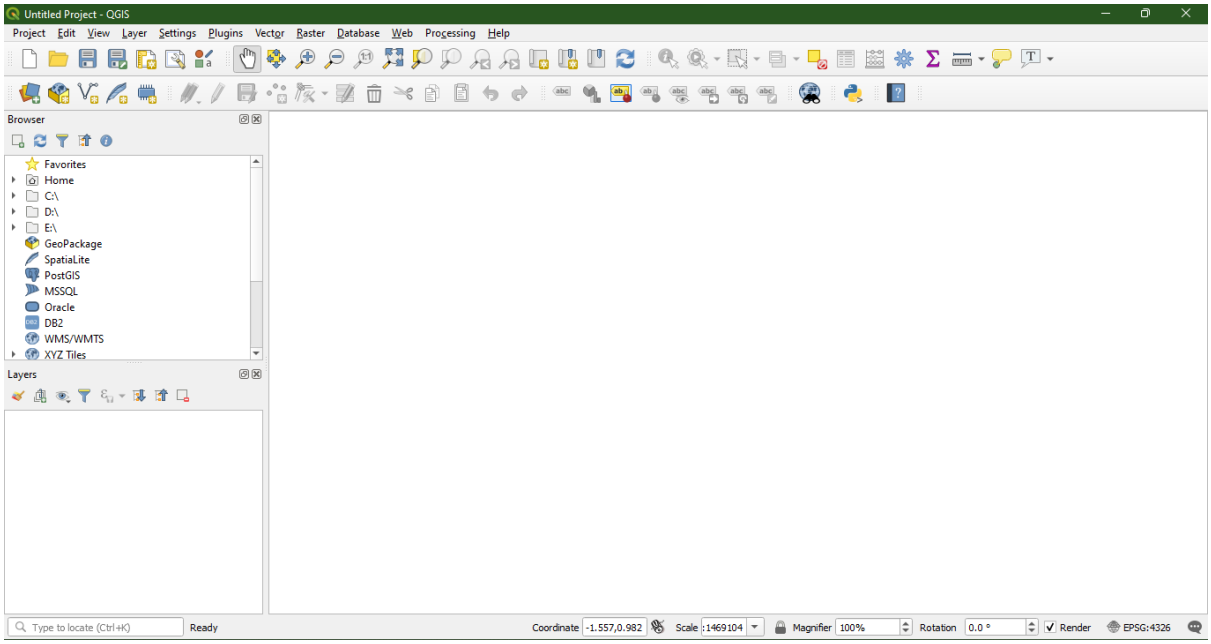



QGIS 3.4.4 'Madeira' Setup
Choose Install Location
Choose the folder in which to install QGIS 3.4.4 'Madeira'.
Setup will install QGIS 3.4.4 'Madeira' in the following folder. To install in a different folder, click Browse and select another folder. Click Next to continue.
Destination Folder
C:\Program Files\QGIS 3.4
Browse...
Space required: 1.7GB
Space available: 10.3GB
Nullsoft Install System v2.50
< Back
Next >
Cancel


QGIS 3.4.4 'Madeira' Setup
Choose Components
Choose which features of QGIS 3.4.4 'Madeira' you want to install.
Check the components you want to install and uncheck the components you don't want to install. Click Install to start the installation.
Select components to install:
QGIS
North Carolina Data Set
South Dakota (Spearfish)
Alaska Data Set
Description
Position your mouse over a component to see its description.
Space required: 1.7GB
Nullsoft Install System v2.50
< Back
Install
Cancel


QGIS 3.4.4 'Madeira' Setup
Installing
Please wait while QGIS 3.4.4 'Madeira' is being installed.
Extract: QtCore.pyd
Show details
Nullsoft Install System v2.50
< Back
Next >
Cancel
QGIS 3.4.4 'Madeira' Setup
3.4
Madeira
Completing the QGIS 3.4.4 'Madeira' Setup Wizard
QGIS 3.4.4 'Madeira' has been installed on your computer.
Click Finish to close this wizard.
< Back
Finish
Cancel

QGIS Screen.

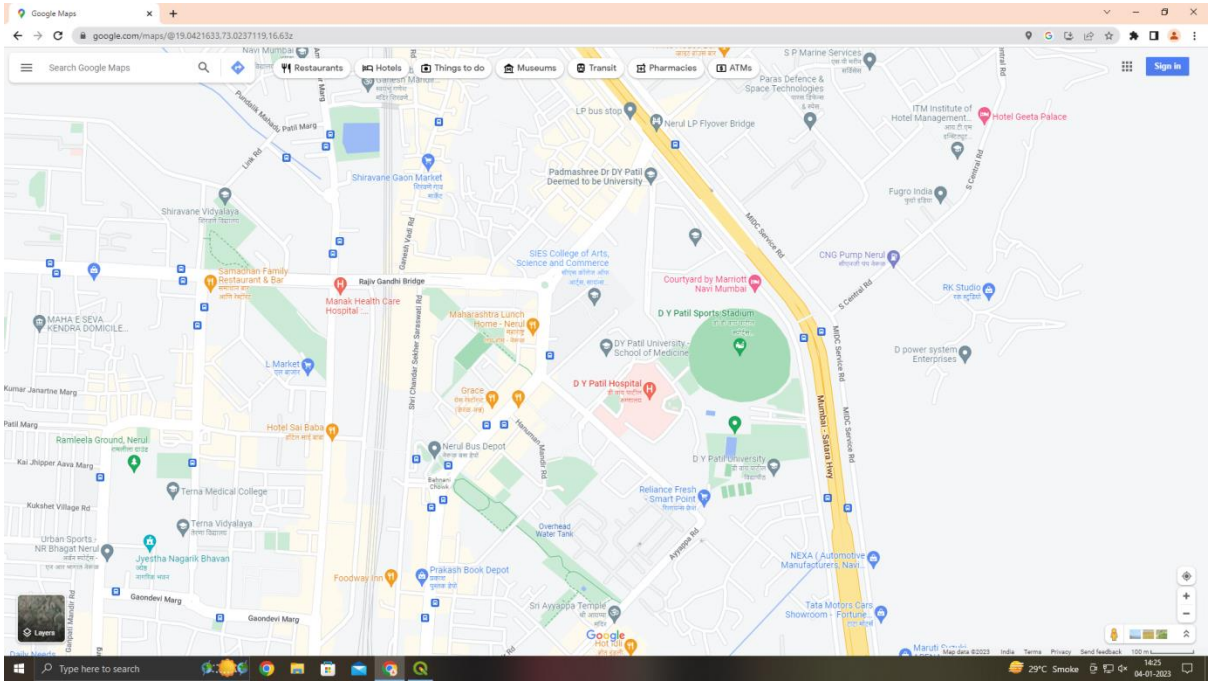

Untitled Project - QGIS
Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help
Browser
Favorites
Home
C:\
D:\
E:\
GeoPackage
SpatiaLite
PostGIS
MSSQL
Oracle
DB2
WMS/WMTS
XYZ Tiles
Layers
Type to locate (Ctrl+K)
Ready
Coordinate -1.557,0.982
Scale 1:469104
Magnifier 100%
Rotation 0.0 °
Render
EPSG:4326

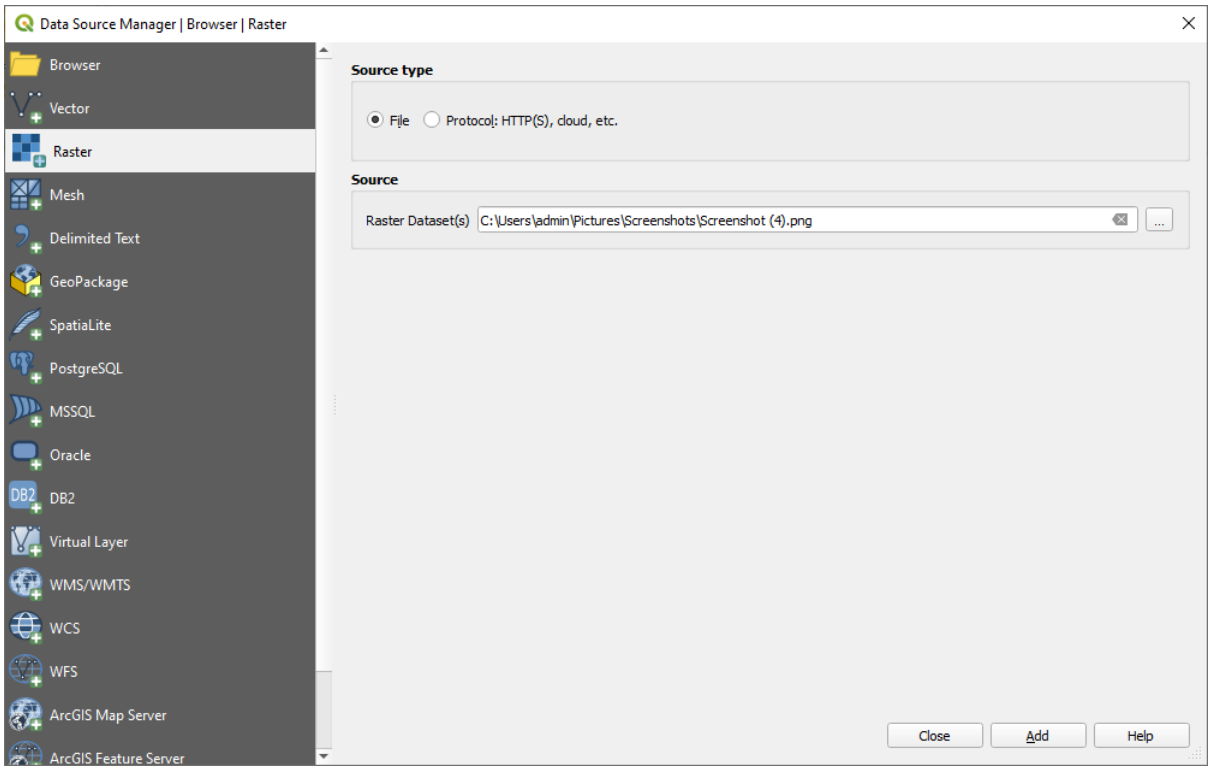
Practical 2

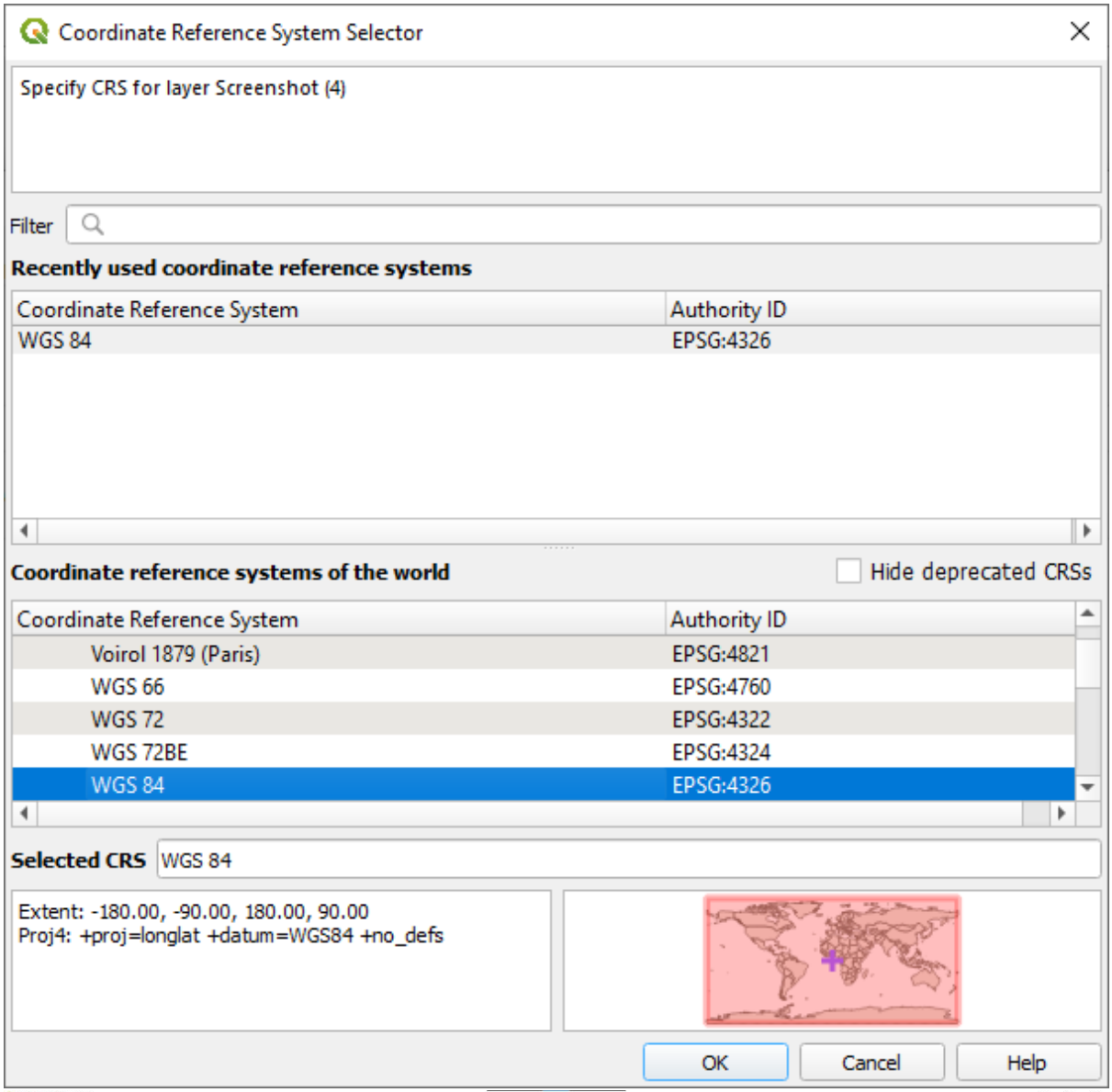
AIM: Creating and Managing Vector Data: Adding vector layers, setting properties, formatting, calculating line lengths and statistics.

Solution:

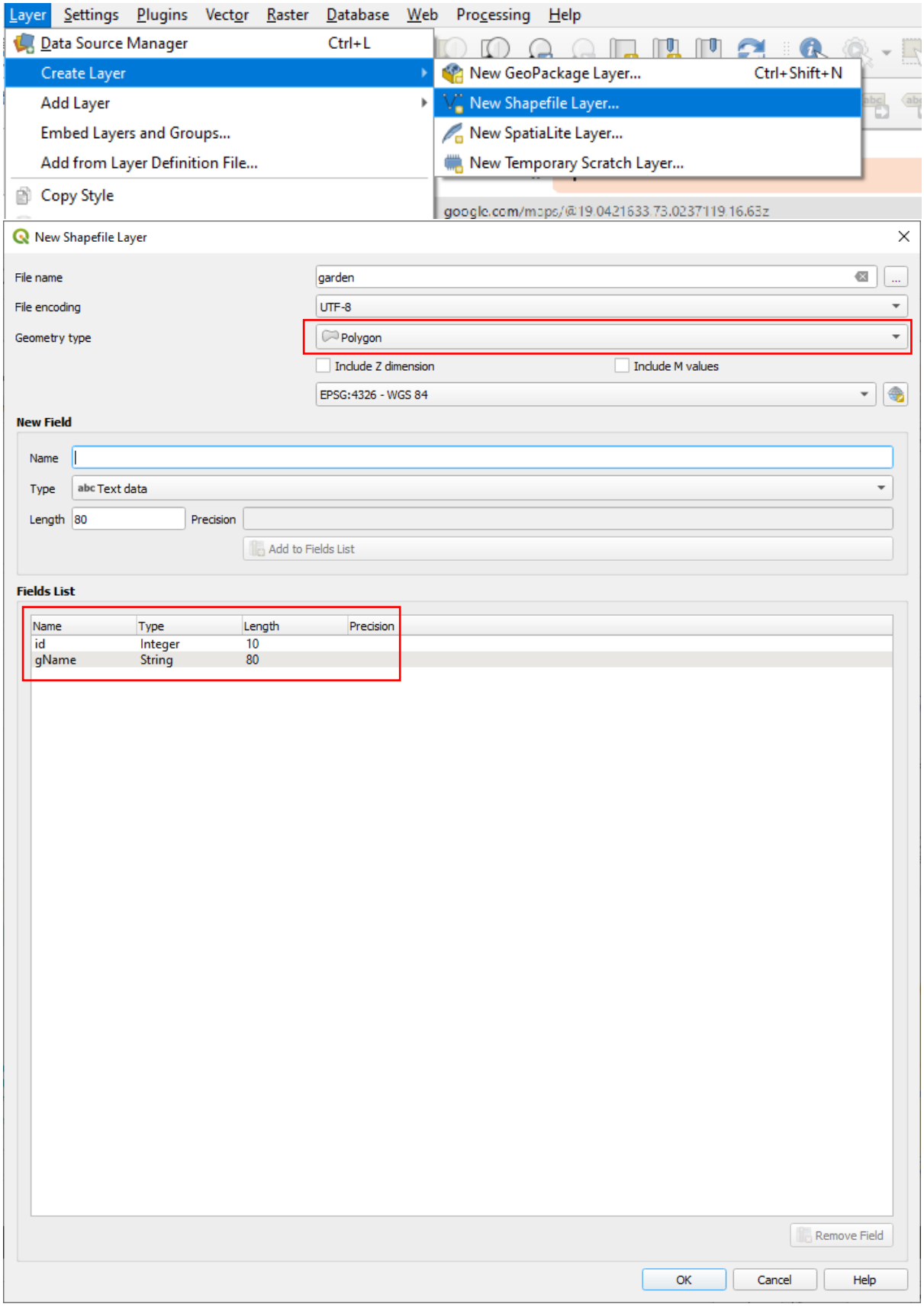
Take Screenshot of the google map, and Add it as Raster Layer in QGIS.

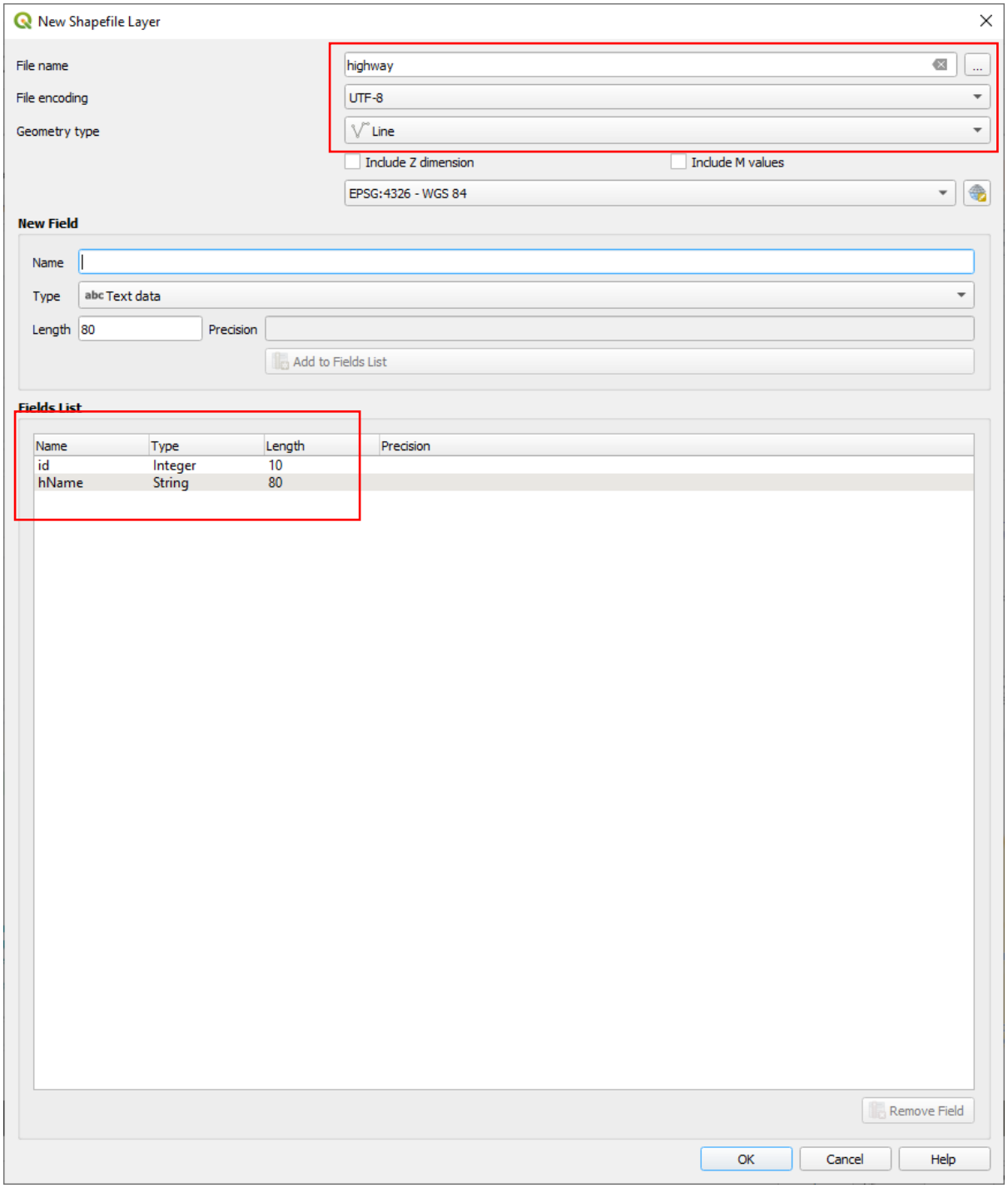




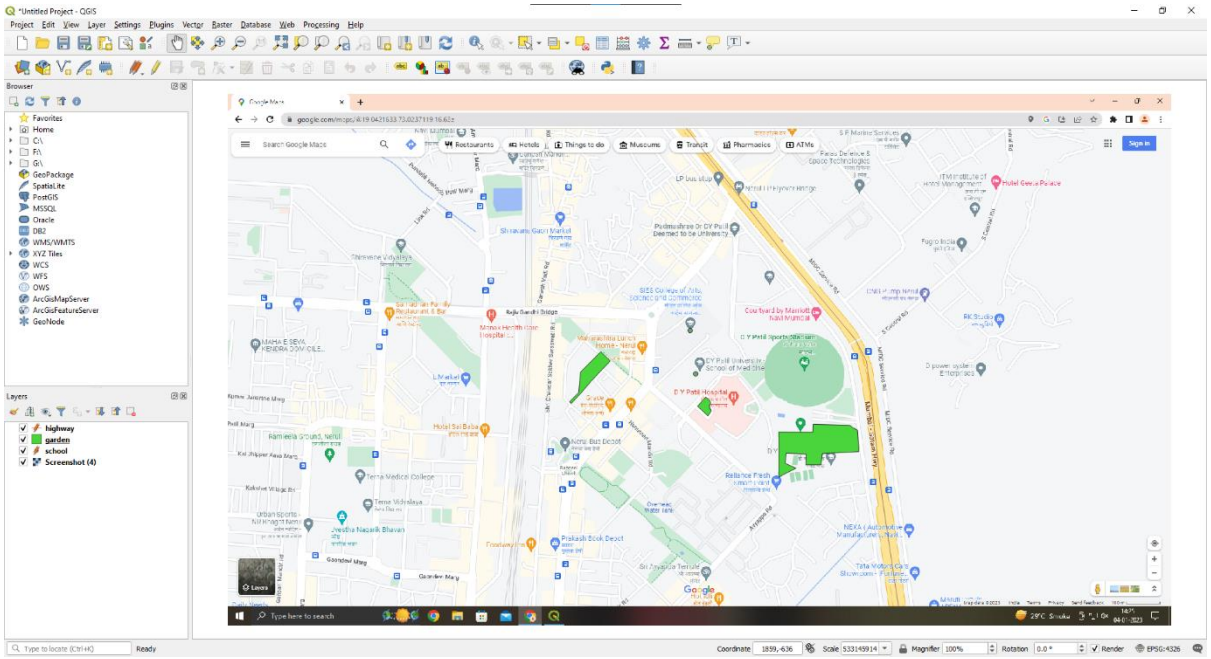

Coordinate Reference System Selector
Specify CRS for layer Screenshot (4)
Filter
Recently used coordinate reference systems
Coordinate Reference System
Authority ID
WGS 84
EPSG:4326
Coordinate reference systems of the world
Hide deprecated CRSs
Coordinate Reference System
Authority ID
Voirol 1879 (Paris)
EPSG:4821
WGS 66
EPSG:4760
WGS 72
EPSG:4322
WGS 72BE
EPSG:4324
WGS 84
EPSG:4326
Selected CRS
WGS 84
Extent: -180.00, -90.00, 180.00, 90.00
Proj4: +proj=longlat +datum=WGS84 +no_defs
OK
Cancel
Help

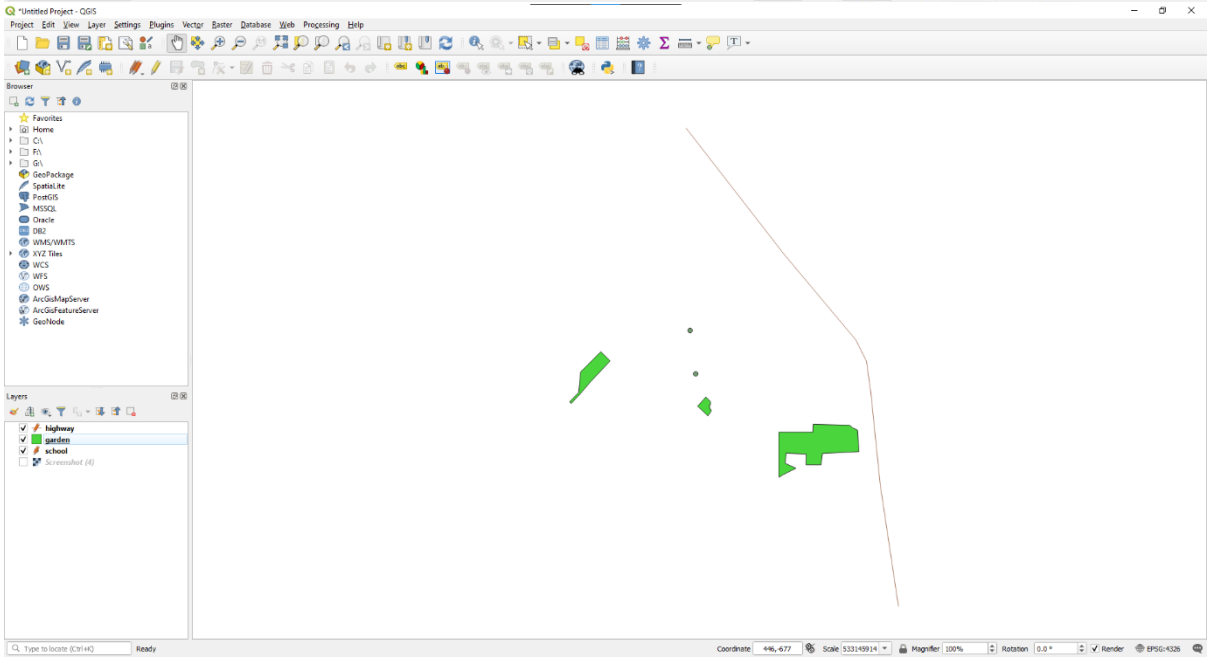
Now, add New Shapefile Layer.



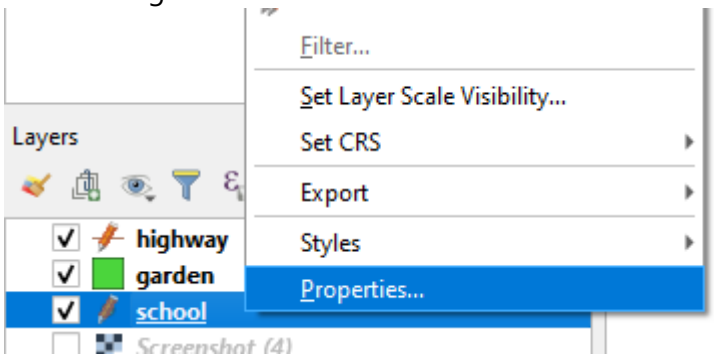


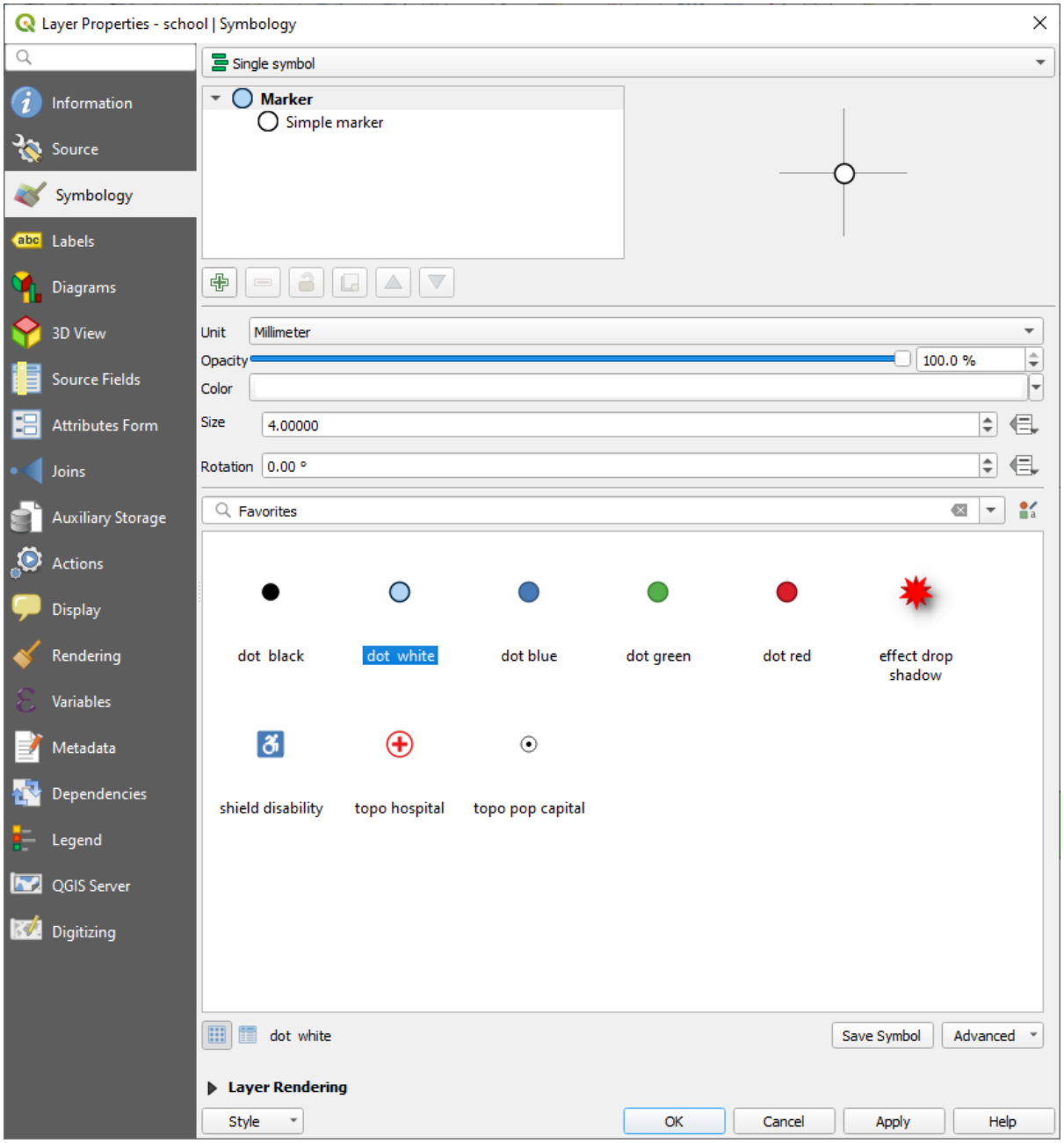
After editing the map,

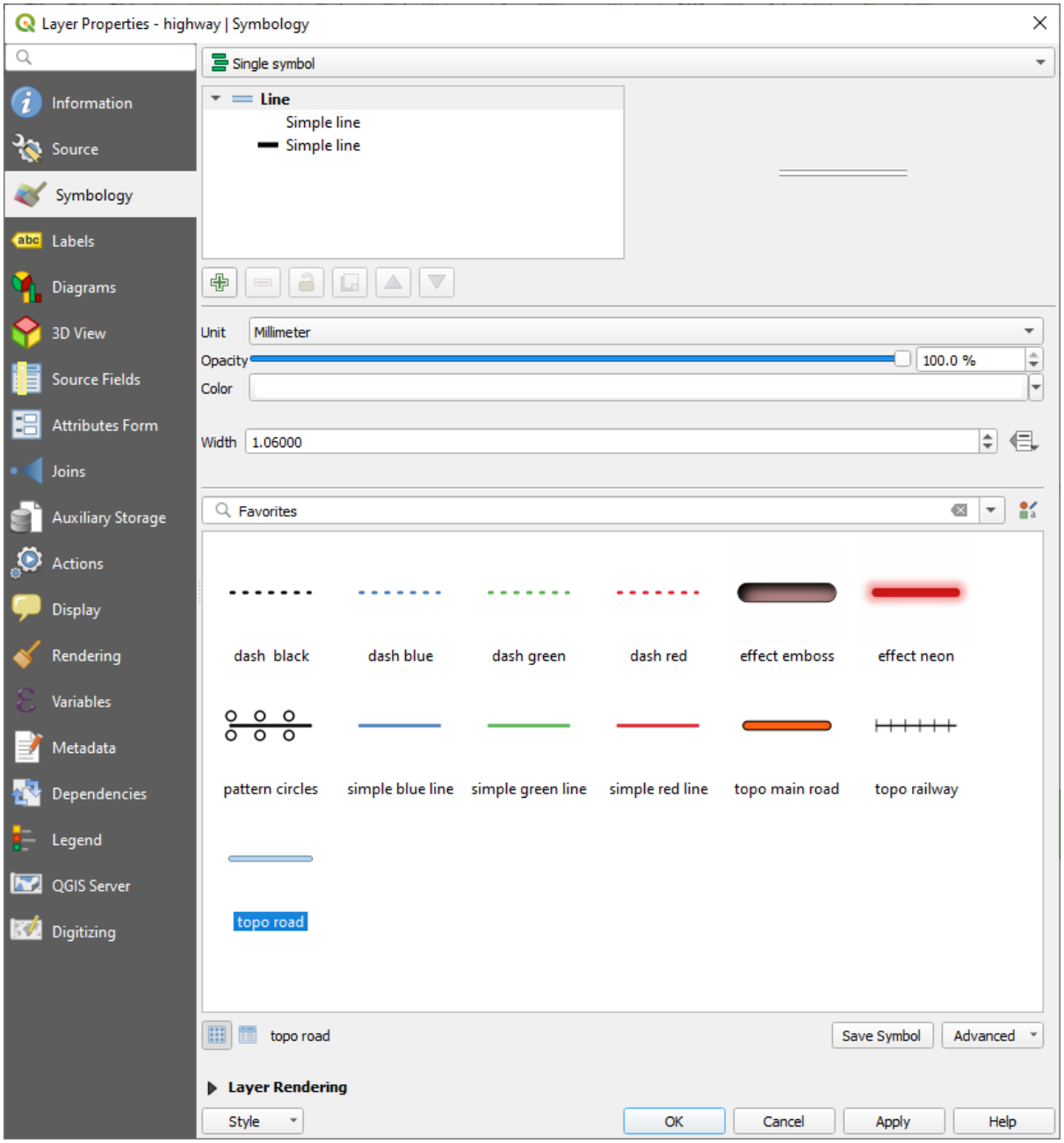


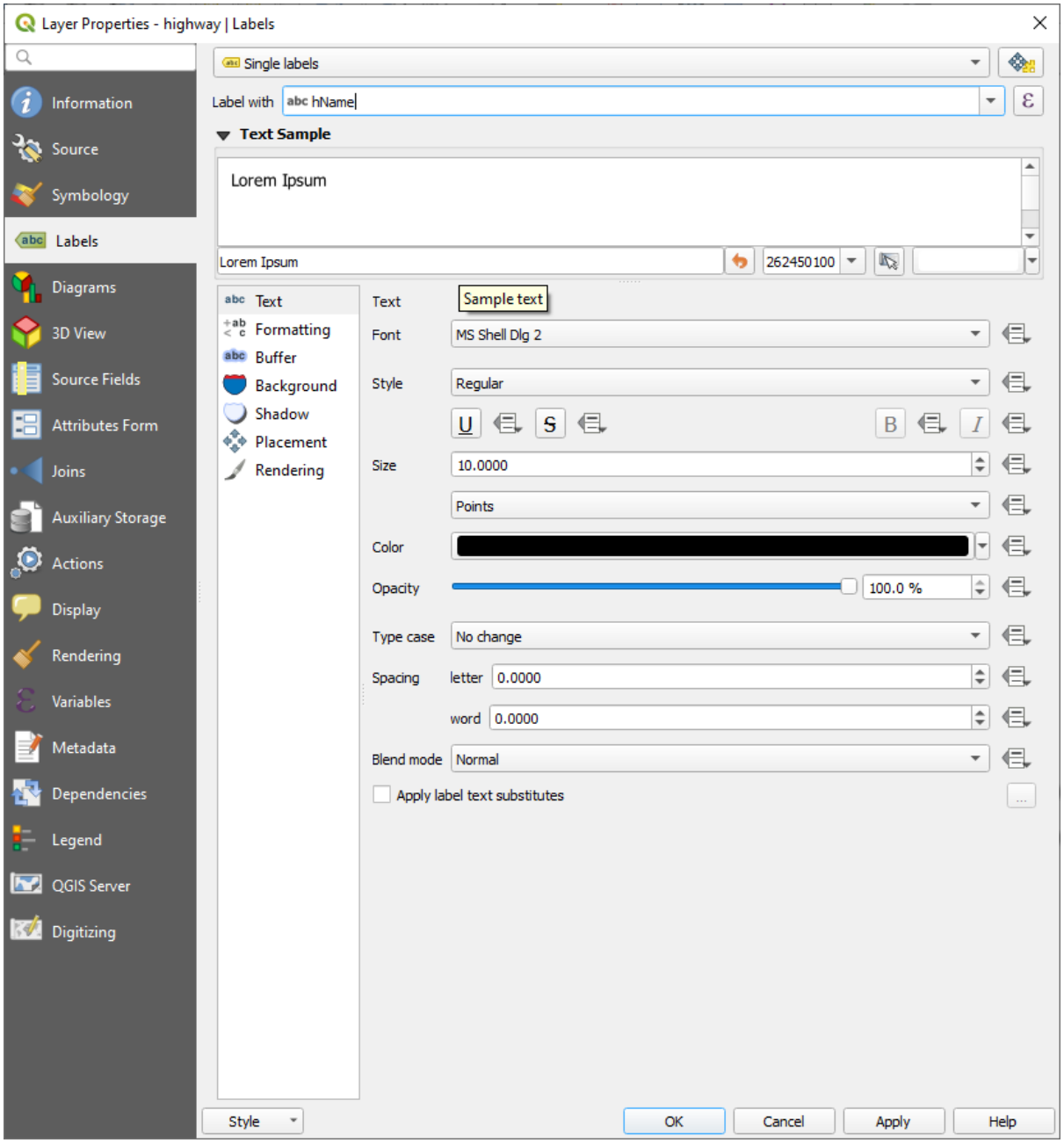


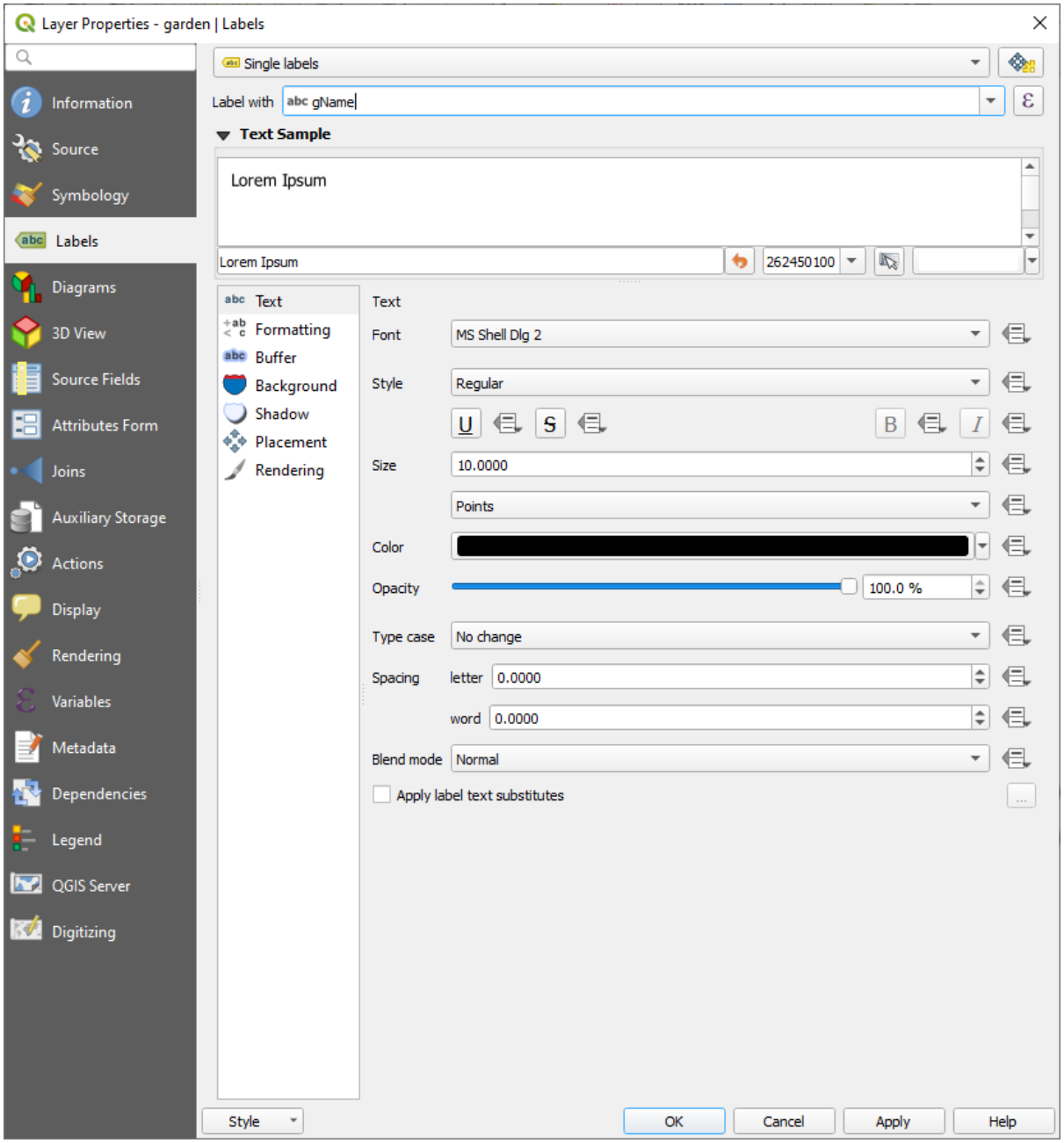
Customizing

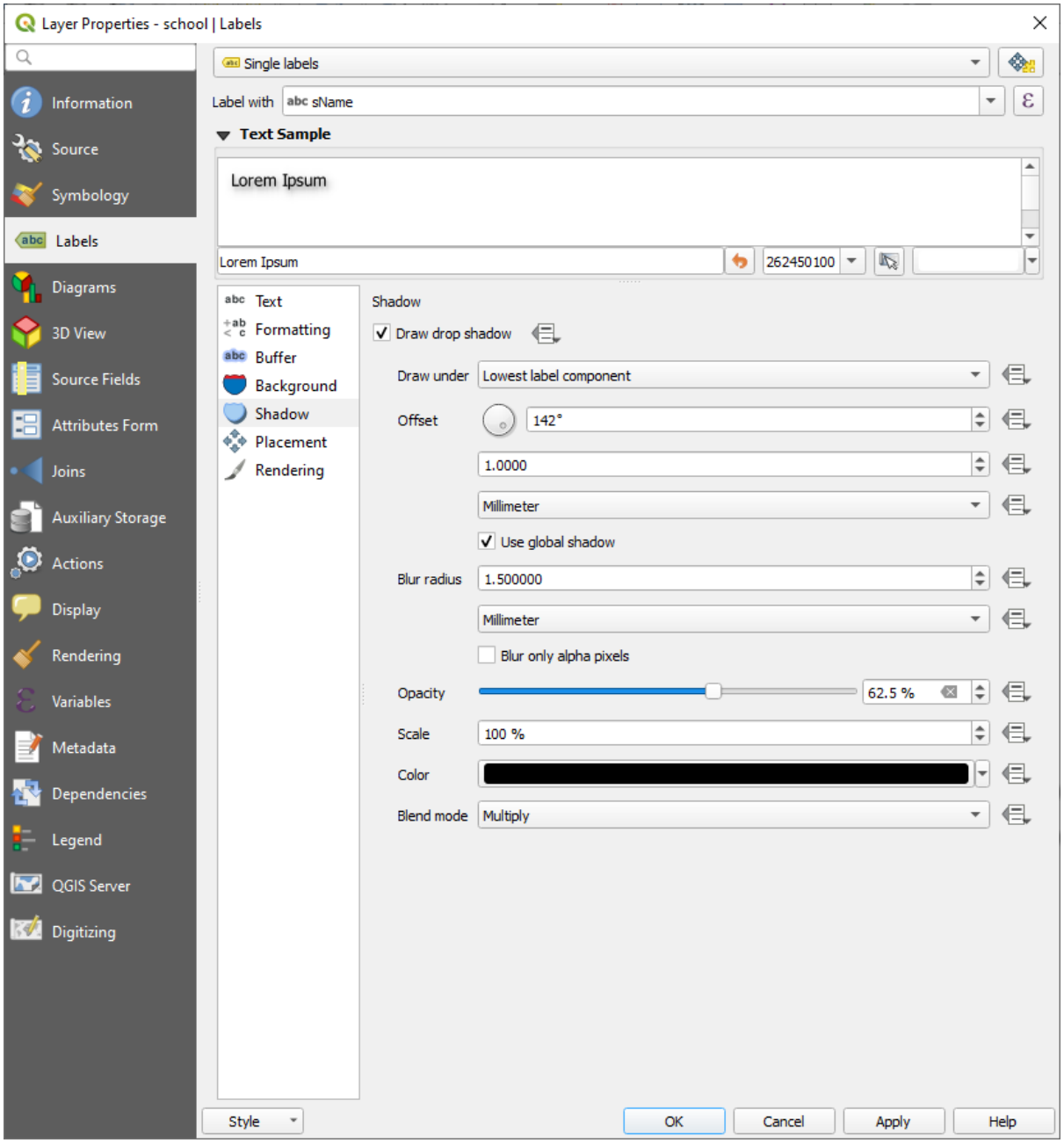



Layer Properties - school | Symbology
Information
Source
Symbology
Labels
Diagrams
3D View
Source Fields
Attributes Form
Joins
Auxiliary Storage
Actions
Display
Rendering
Variables
Metadata
Dependencies
Legend
QGIS Server
Digitizing
Single symbol
Marker
Simple marker
Unit
Millimeter
Opacity
100.0 %
Color
Size
4.00000
Rotation
0.00 °
Favorites
dot black
dot white
dot blue
dot green
dot red
effect drop shadow
shield disability
topo hospital
topo pop capital
dot white
Save Symbol
Advanced
Layer Rendering
Style
OK
Cancel
Apply
Help

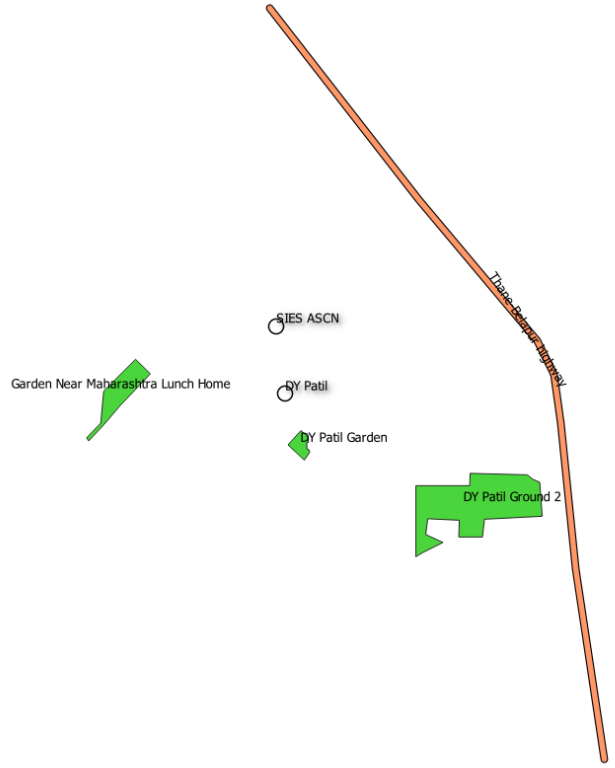

Layer Properties - highway | Symbology
Information
Source
Symbology
Labels
Diagrams
3D View
Source Fields
Attributes Form
Joins
Auxiliary Storage
Actions
Display
Rendering
Variables
Metadata
Dependencies
Legend
QGIS Server
Digitizing
Single symbol
Line
Simple line
Simple line
Unit
Millimeter
Opacity
100.0 %
Color
Width
1.06000
Favorites
dash black
dash blue
dash green
dash red
effect emboss
effect neon
pattern circles
simple blue line
simple green line
simple red line
topo main road
topo railway
topo road
topo road
Save Symbol
Advanced
Layer Rendering
Style
OK
Cancel
Apply
Help


Layer Properties - highway | Labels
Information
Source
Symbology
Labels
Diagrams
3D View
Source Fields
Attributes Form
Joins
Auxiliary Storage
Actions
Display
Rendering
Variables
Metadata
Dependencies
Legend
QGIS Server
Digitizing
Single labels
Label with
abc hName
Text Sample
Lorem Ipsum
Lorem Ipsum
262450100
Text
Formatting
Buffer
Background
Shadow
Placement
Rendering
Text
Sample text
Font
MS Shell Dlg 2
Style
Regular
Size
10.0000
Points
Color
Opacity
100.0 %
Type case
No change
Spacing
letter
0.0000
word
0.0000
Blend mode
Normal
Apply label text substitutes
Style
OK
Cancel
Apply
Help


Layer Properties - garden | Labels
Information
Source
Symbology
Labels
Diagrams
3D View
Source Fields
Attributes Form
Joins
Auxiliary Storage
Actions
Display
Rendering
Variables
Metadata
Dependencies
Legend
QGIS Server
Digitizing
Single labels
Label with
abc gName
Text Sample
Lorem Ipsum
Lorem Ipsum
262450100
Text
Formatting
Buffer
Background
Shadow
Placement
Rendering
Text
Font
MS Shell Dlg 2
Style
Regular
Size
10.0000
Points
Color
Opacity
100.0 %
Type case
No change
Spacing
letter
0.0000
word
0.0000
Blend mode
Normal
Apply label text substitutes
Style
OK
Cancel
Apply
Help


Layer Properties - school | Labels
Information
Source
Symbology
Labels
Diagrams
3D View
Source Fields
Attributes Form
Joins
Auxiliary Storage
Actions
Display
Rendering
Variables
Metadata
Dependencies
Legend
QGIS Server
Digitizing
Single labels
Label with
abc sName
Text Sample
Lorem Ipsum
Lorem Ipsum
262450100
Text
Formatting
Buffer
Background
Shadow
Placement
Rendering
Shadow
Draw drop shadow
Draw under
Lowest label component
Offset
142°
1.0000
Millimeter
Use global shadow
Blur radius
1.500000
Millimeter
Blur only alpha pixels
Opacity
62.5 %
Scale
100 %
Color
Blend mode
Multiply
Style
OK
Cancel
Apply
Help

OUTPUT:

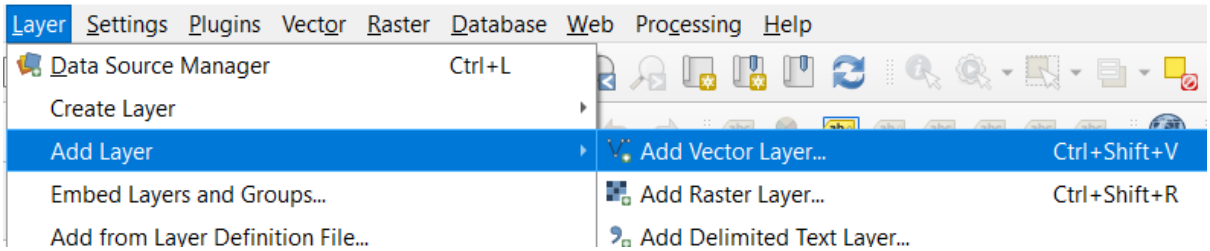


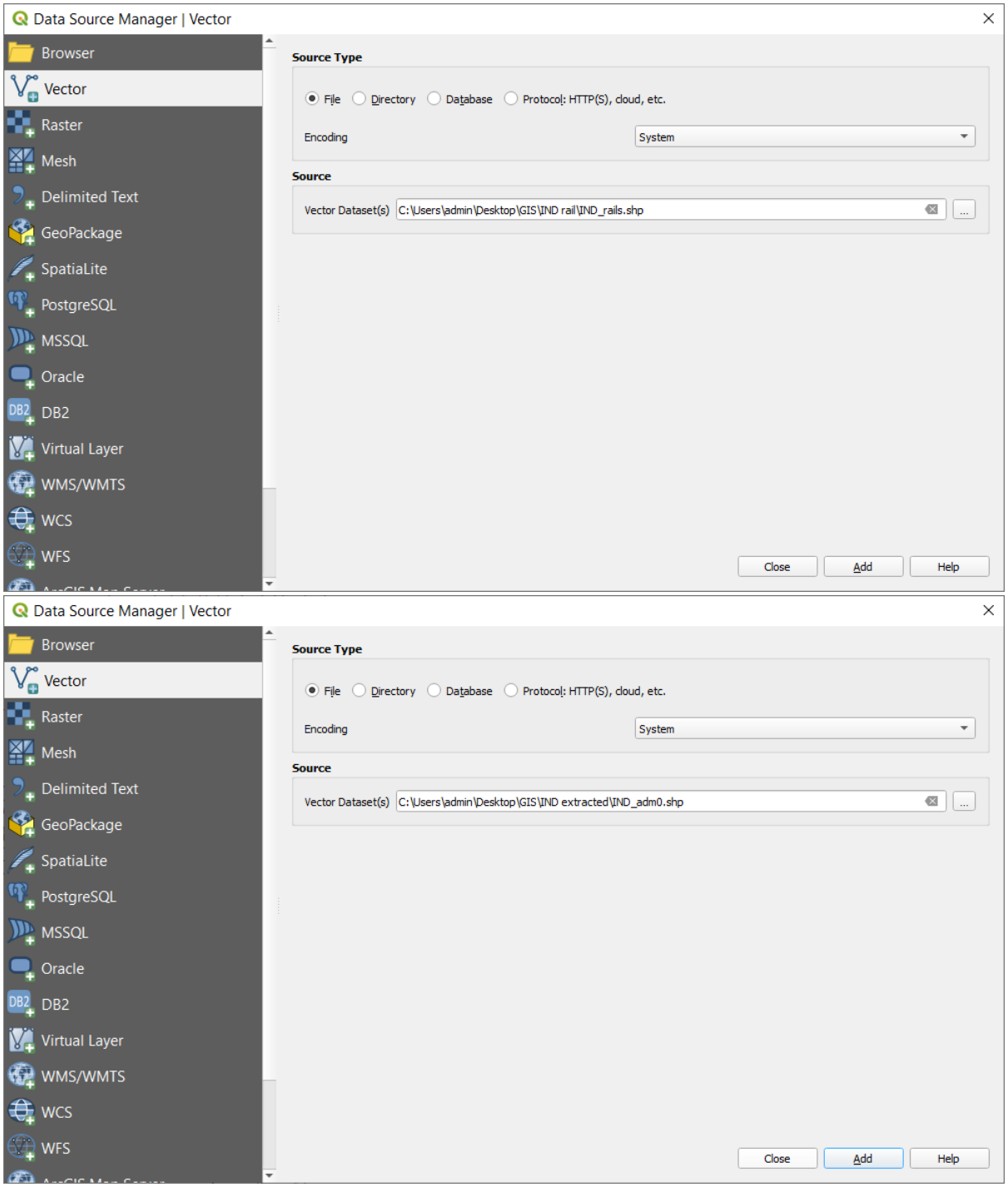
Calculating line lengths and statistics

Step 1:

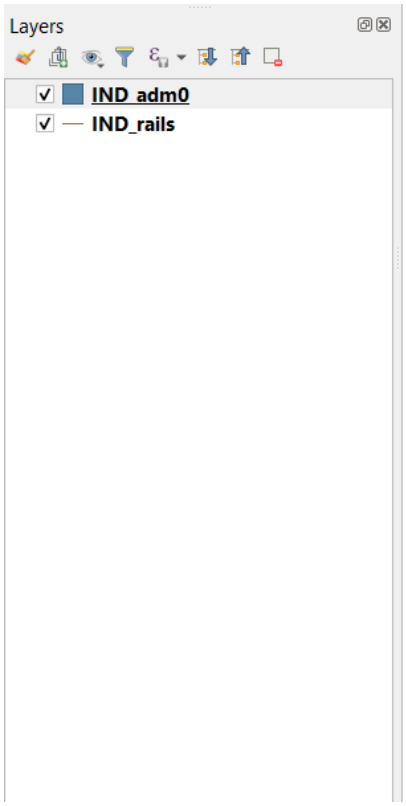
Go to Layer → Add Layer → Add Vector Layer

Add the IND_rails.shp and IND_adm0.shp files to project

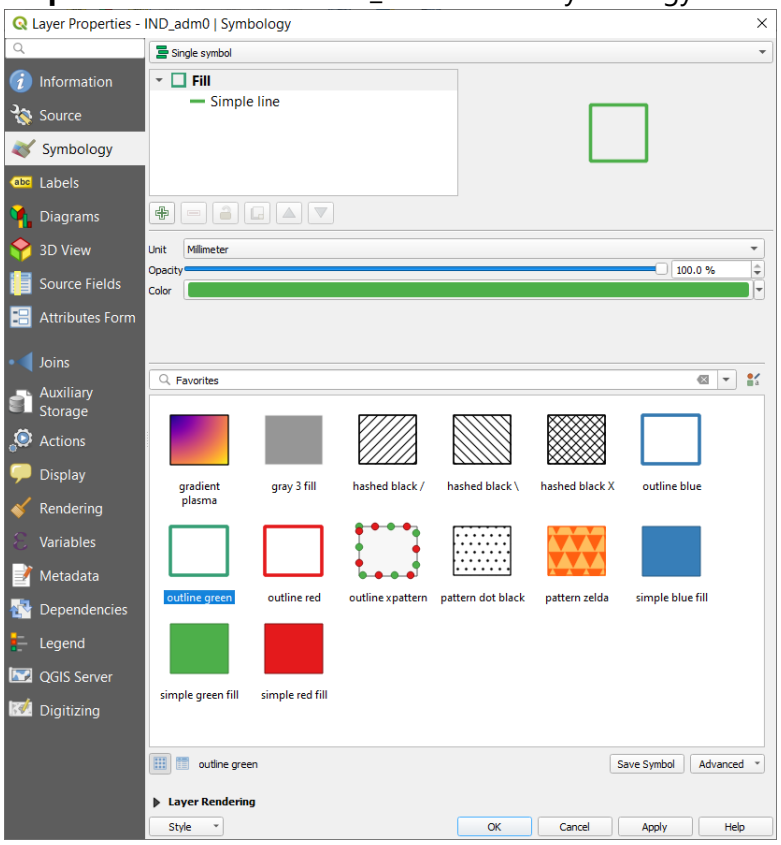




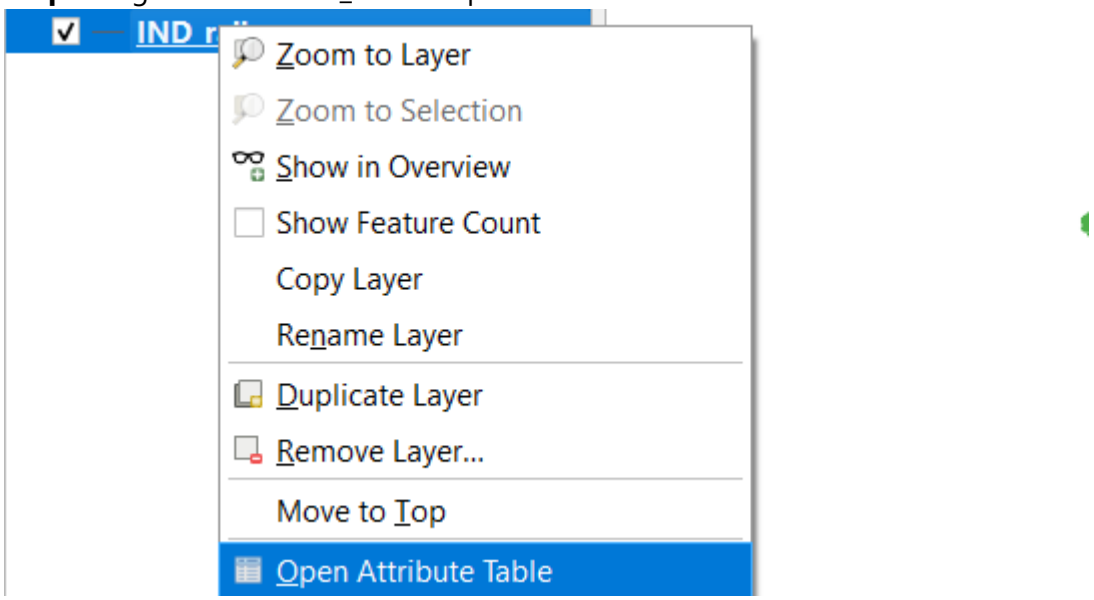
Output of step 1



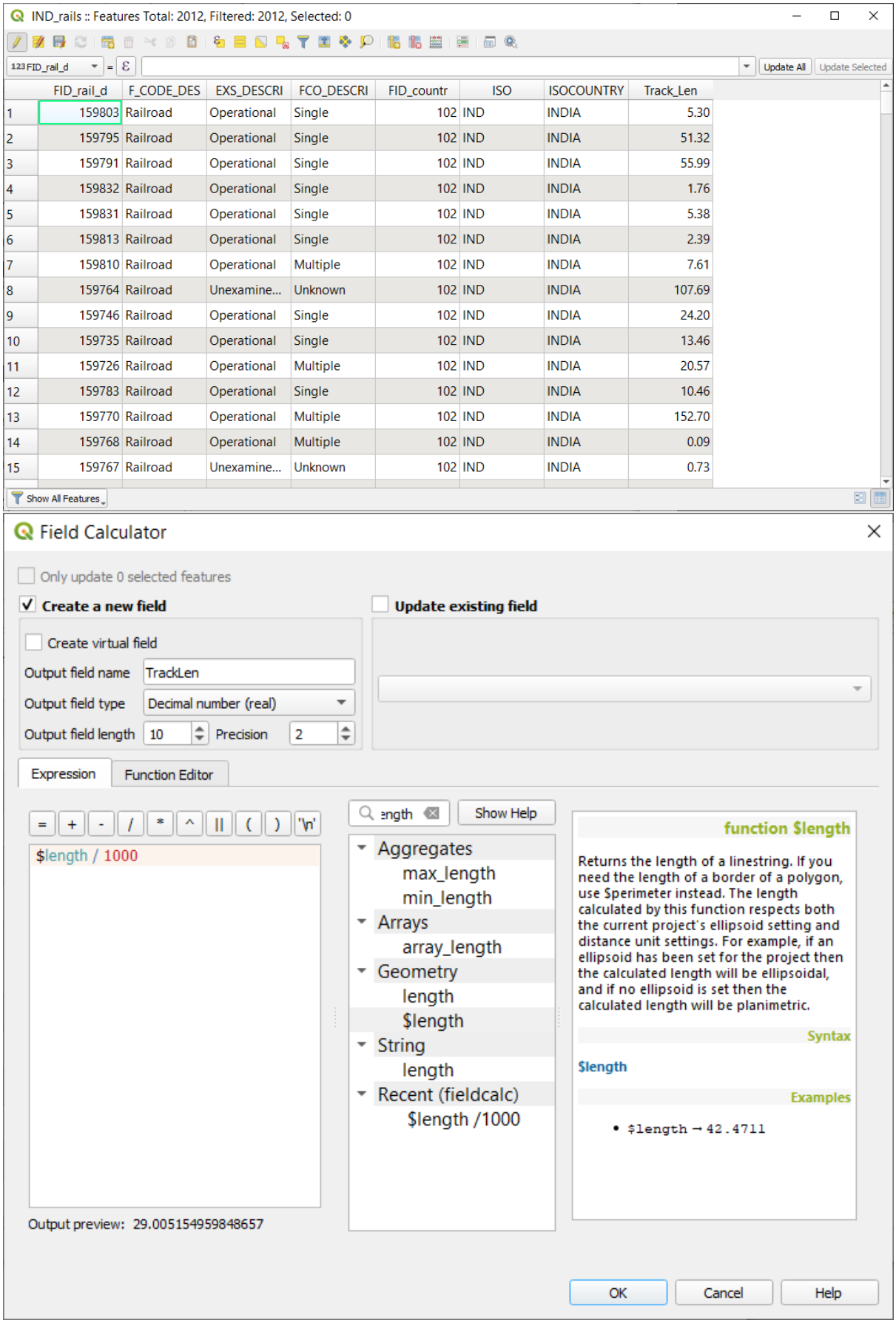
Step 2: Double Click on IND_adm0 and in symbology select any outline



Step 3: Right click on IND_rails → Open Attribute Table



Press Toggle Editing button then press Open Field Calculator and set the output field as "Track_Len", field type to "Decimal Number".



	FID_rail_d	F_CODE_DES	EXS_DESCRI	FCO_DESCRI	FID_countr	ISO	ISOCOUNTRY	Track_Len
1	159803	Railroad	Operational	Single	102	IND	INDIA	5.30
2	159795	Railroad	Operational	Single	102	IND	INDIA	51.32
3	159791	Railroad	Operational	Single	102	IND	INDIA	55.99
4	159832	Railroad	Operational	Single	102	IND	INDIA	1.76
5	159831	Railroad	Operational	Single	102	IND	INDIA	5.38
6	159813	Railroad	Operational	Single	102	IND	INDIA	2.39
7	159810	Railroad	Operational	Multiple	102	IND	INDIA	7.61
8	159764	Railroad	Unexamine...	Unknown	102	IND	INDIA	107.69
9	159746	Railroad	Operational	Single	102	IND	INDIA	24.20
10	159735	Railroad	Operational	Single	102	IND	INDIA	13.46
11	159726	Railroad	Operational	Multiple	102	IND	INDIA	20.57
12	159783	Railroad	Operational	Single	102	IND	INDIA	10.46
13	159770	Railroad	Operational	Multiple	102	IND	INDIA	152.70
14	159768	Railroad	Operational	Multiple	102	IND	INDIA	0.09
15	159767	Railroad	Unexamine...	Unknown	102	IND	INDIA	0.73

Then press “OK”

IND_rails :: Features Total: 2012, Filtered: 2012, Selected: 0

Update All | Update Selected

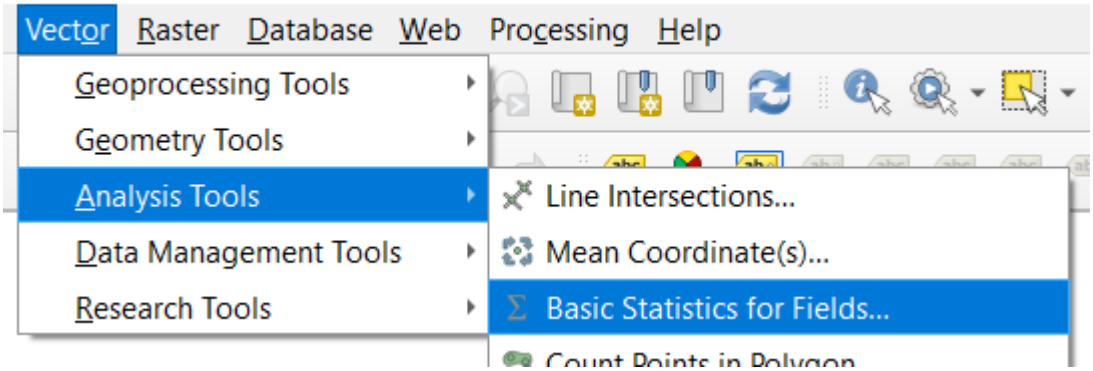
	FID_rail_d	F_CODE_DES	EXS_DESCRI	FCO_DESCRI	FID_countr	ISO	ISOCOUNTRY	Track_Len	TrackLen
1	144645	Railroad	Operational	Single	102	IND	INDIA	29.01	29.01
2	145991	Railroad	Operational	Single	102	IND	INDIA	66.13	66.13
3	146001	Railroad	Operational	Single	102	IND	INDIA	2.33	2.33
4	146008	Railroad	Operational	Single	102	IND	INDIA	63.81	63.81
5	146096	Railroad	Operational	Single	102	IND	INDIA	92.71	92.71
6	146394	Railroad	Operational	Single	102	IND	INDIA	22.24	22.24
7	146464	Railroad	Operational	Single	102	IND	INDIA	77.24	77.24
8	146693	Railroad	Operational	Single	102	IND	INDIA	48.99	48.99
9	146708	Railroad	Operational	Single	102	IND	INDIA	32.27	32.27
10	147055	Railroad	Operational	Single	102	IND	INDIA	26.83	26.83
11	147427	Railroad	Operational	Single	102	IND	INDIA	17.26	17.26
12	147450	Railroad	Operational	Single	102	IND	INDIA	4.41	4.41
13	147522	Railroad	Unexamine...	Unknown	102	IND	INDIA	4.48	4.48
14	147524	Railroad	Unexamine...	Unknown	102	IND	INDIA	26.35	26.35
15	147558	Railroad	Operational	Single	102	IND	INDIA	74.95	74.95

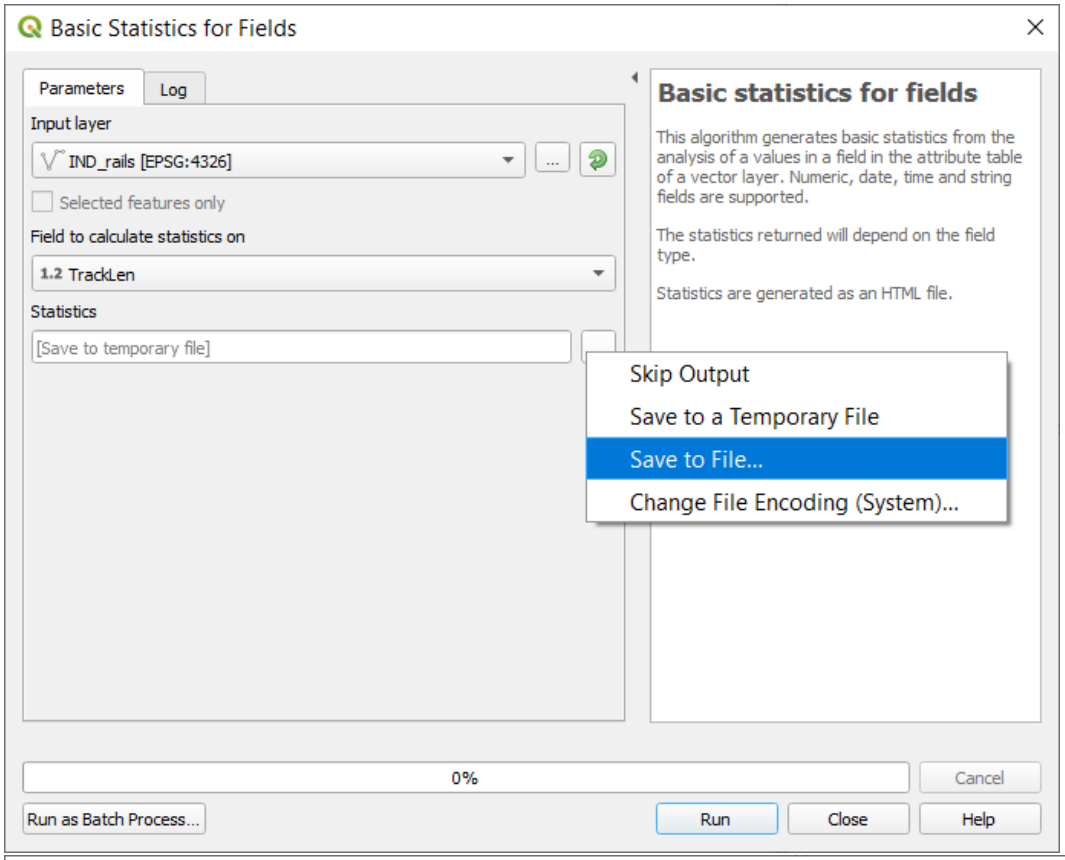
Show All Features

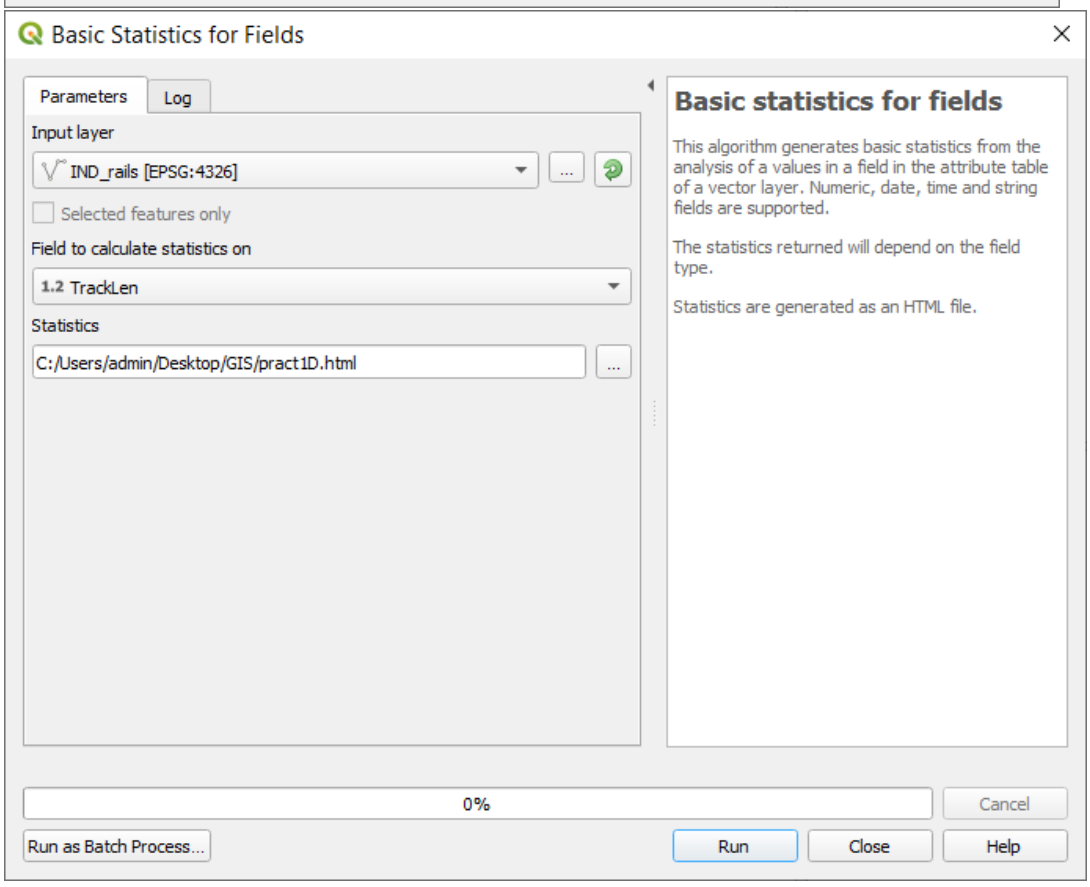
Press “ctrl + s” to save.

Step 4: To calculate total length of Indian railway tracks,

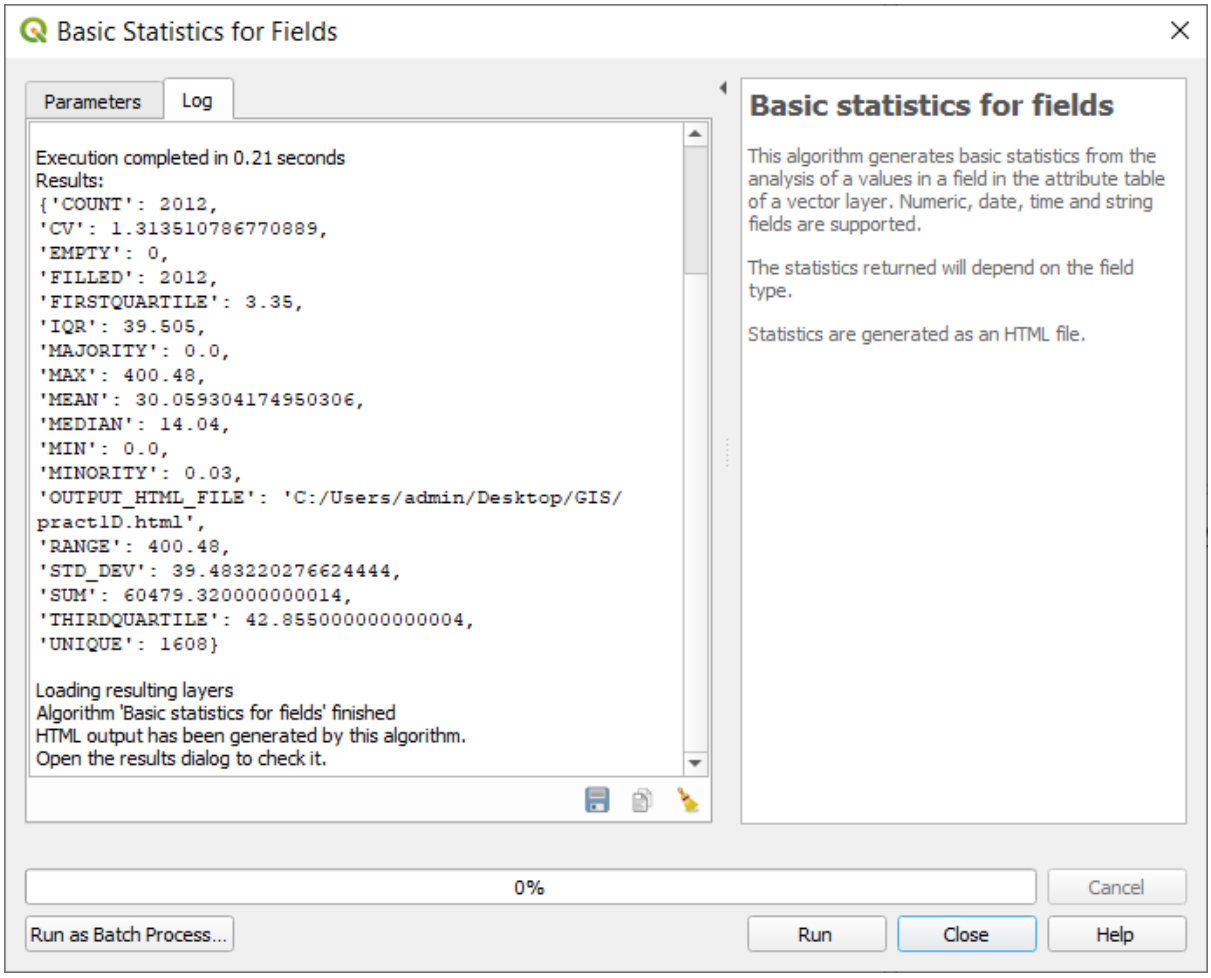
Select Vector→ Analysis Tools→ Basic Statics for Fields




Basic Statistics for Fields
Parameters
Log
Input layer
IND_rails [EPSG:4326]
Selected features only
Field to calculate statistics on
1.2 TrackLen
Statistics
[Save to temporary file]
Skip Output
Save to a Temporary File
Save to File...
Change File Encoding (System)...
Basic statistics for fields
This algorithm generates basic statistics from the analysis of a values in a field in the attribute table of a vector layer. Numeric, date, time and string fields are supported.
The statistics returned will depend on the field type.
Statistics are generated as an HTML file.
0%
Cancel
Run as Batch Process...
Run
Close
Help


Basic Statistics for Fields
Parameters
Log
Input layer
IND_rails [EPSG:4326]
Selected features only
Field to calculate statistics on
1.2 TrackLen
Statistics
C:/Users/admin/Desktop/GIS/pract1D.html
Basic statistics for fields
This algorithm generates basic statistics from the analysis of a values in a field in the attribute table of a vector layer. Numeric, date, time and string fields are supported.
The statistics returned will depend on the field type.
Statistics are generated as an HTML file.
0%
Cancel
Run as Batch Process...
Run
Close
Help

Click “Run”



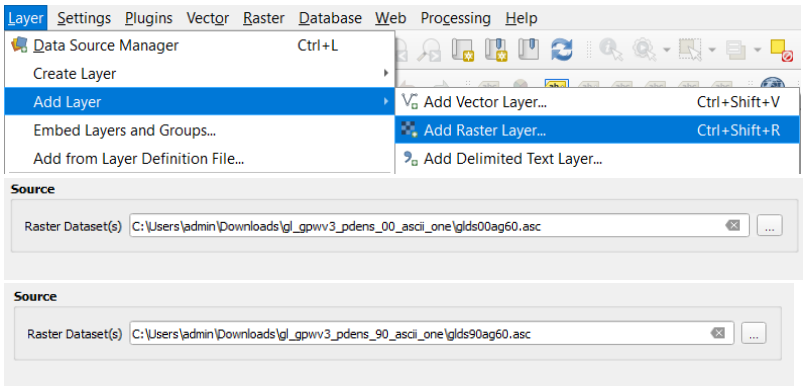
Analyzed field: TrackLen
Count: 2012
Unique values: 1608
NULL (missing) values: 0
Minimum value: 0.0
Maximum value: 400.48
Range: 400.48
Sum: 60479.320000000014
Mean value: 30.059304174950306
Median value: 14.04
Standard deviation: 39.483220276624444
Coefficient of Variation: 1.313510786770889
Minority (rarest occurring value): 0.03
Majority (most frequently occurring value): 0.0
First quartile: 3.35
Third quartile: 42.855000000000004
Interquartile Range (IQR): 39.505

Practical 3

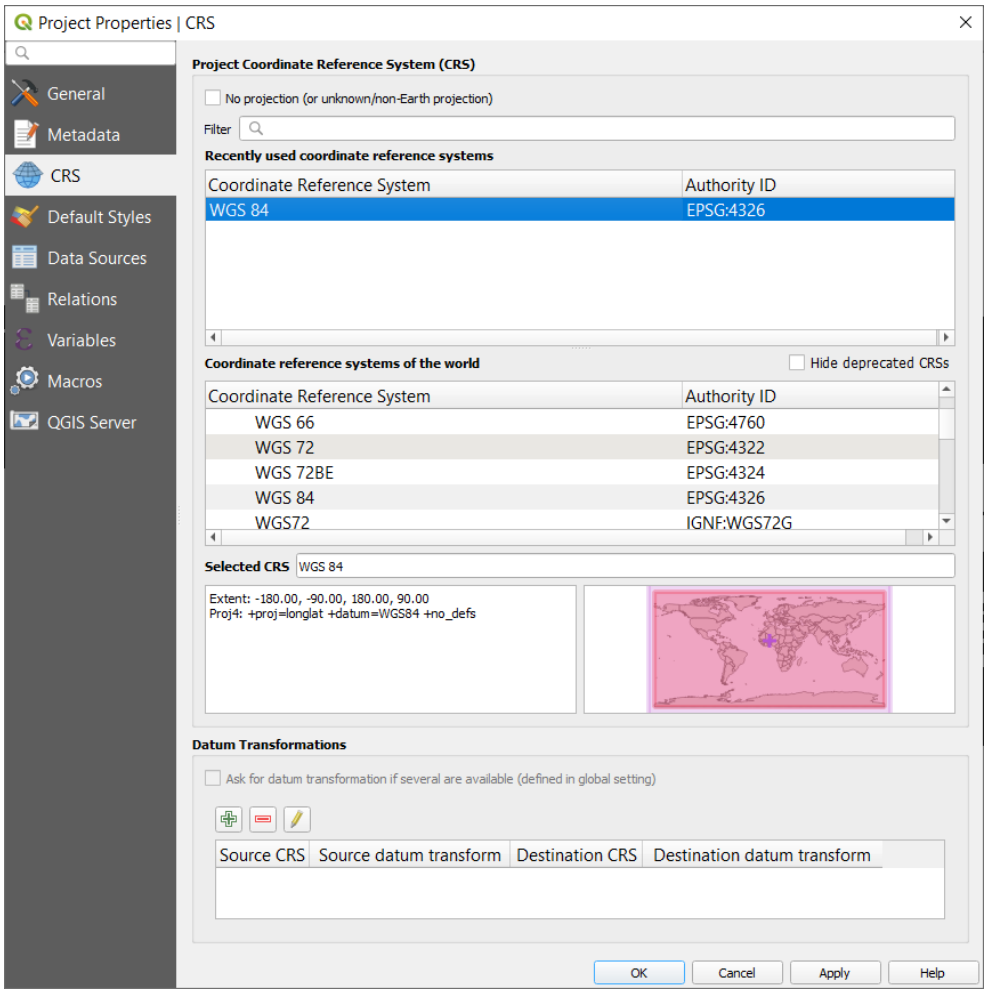
AIM: Exploring and Managing Raster data

3.A) Adding raster layer

- From menu bar select Layer → Add Layer → Add Raster Layer
- Add glds90ag60.asc and glds00ag60.asc

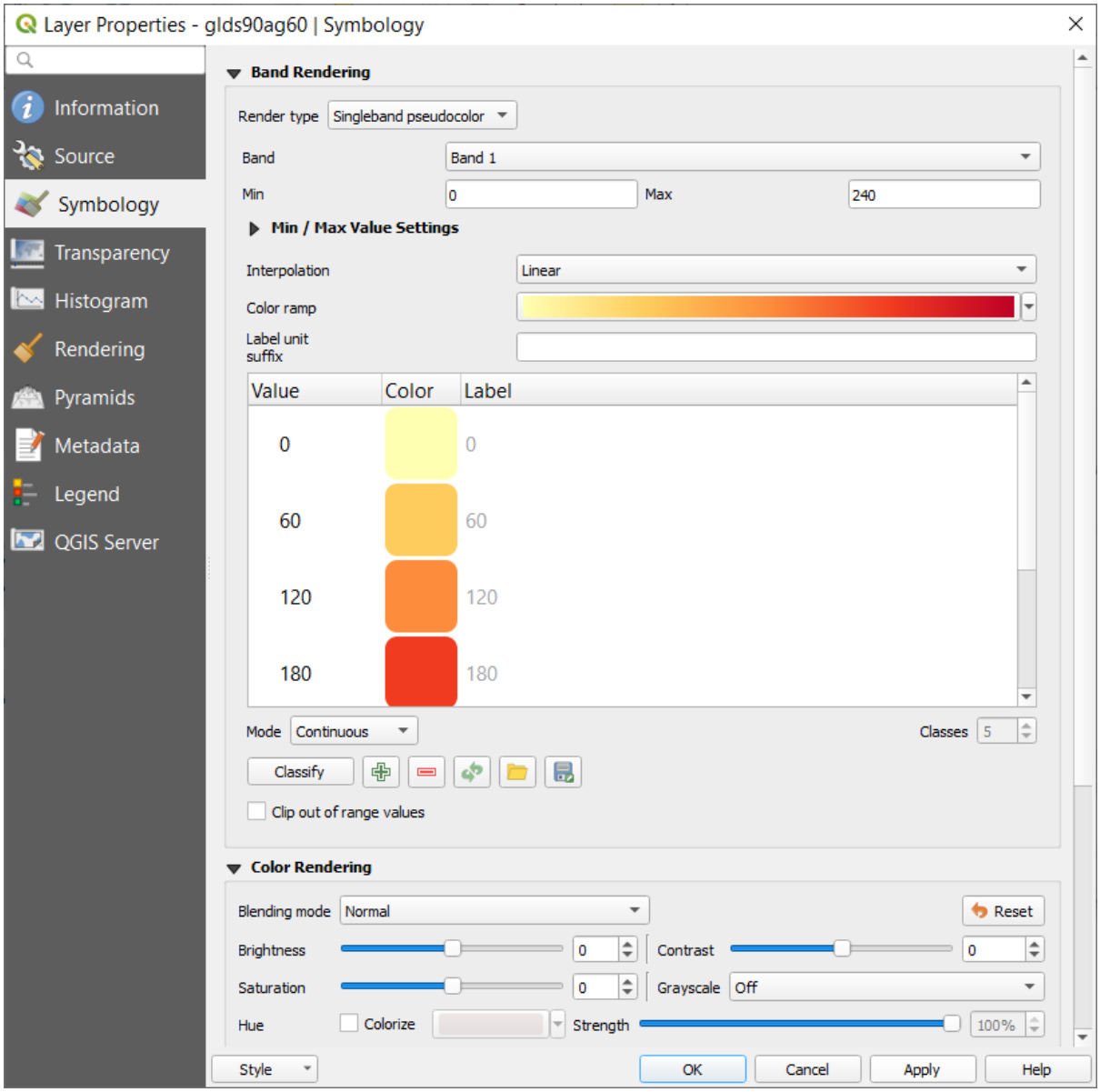


Go to Project → Properties OR Press the Set CRS option on bottom right corner. Select WGS 84 EPSG: 4326 and Press OK

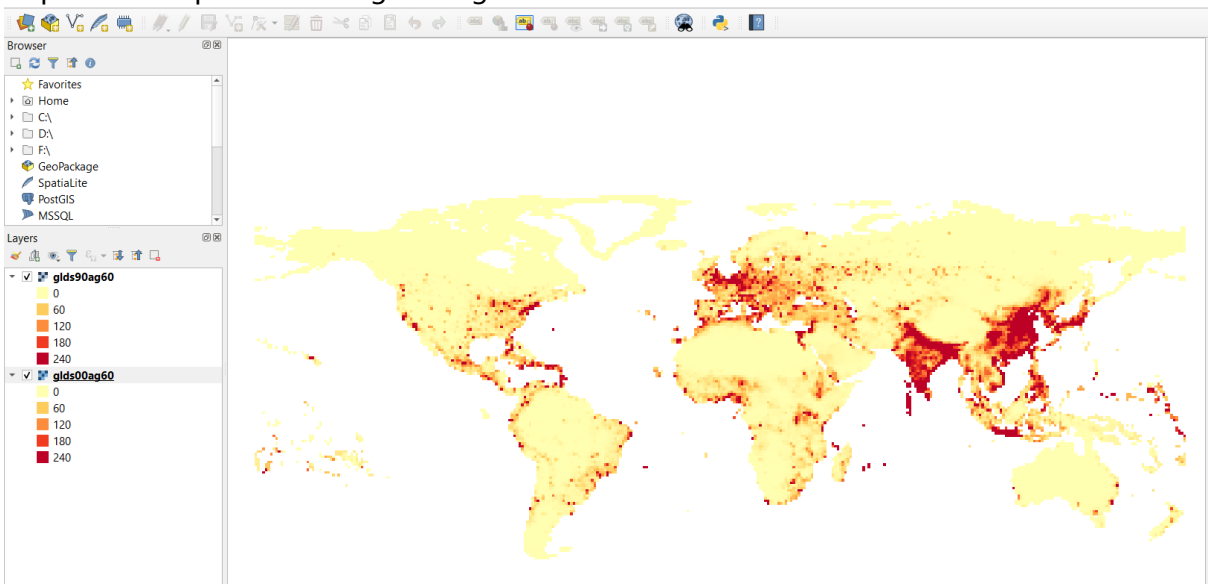


3.B) Raster Styling and Analysis

Select "glds90ag60.asc" layer, then go to symbology

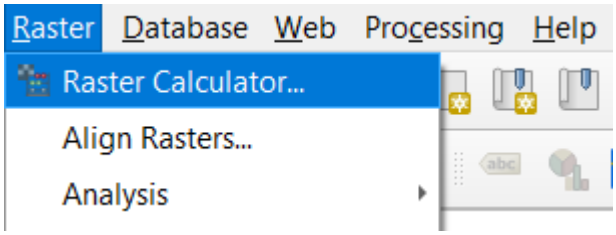


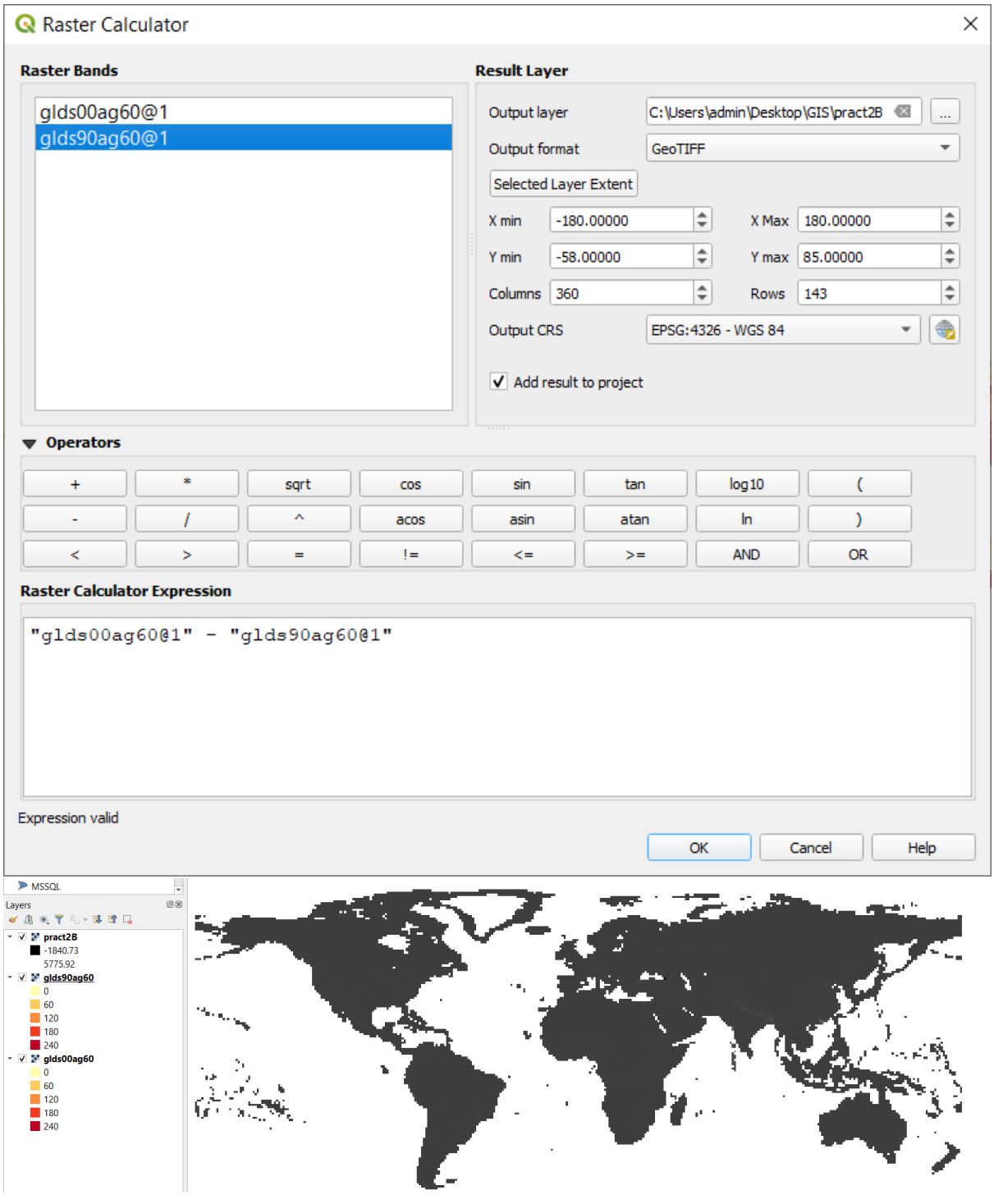
Repeat same process for "glds00ag60.asc"



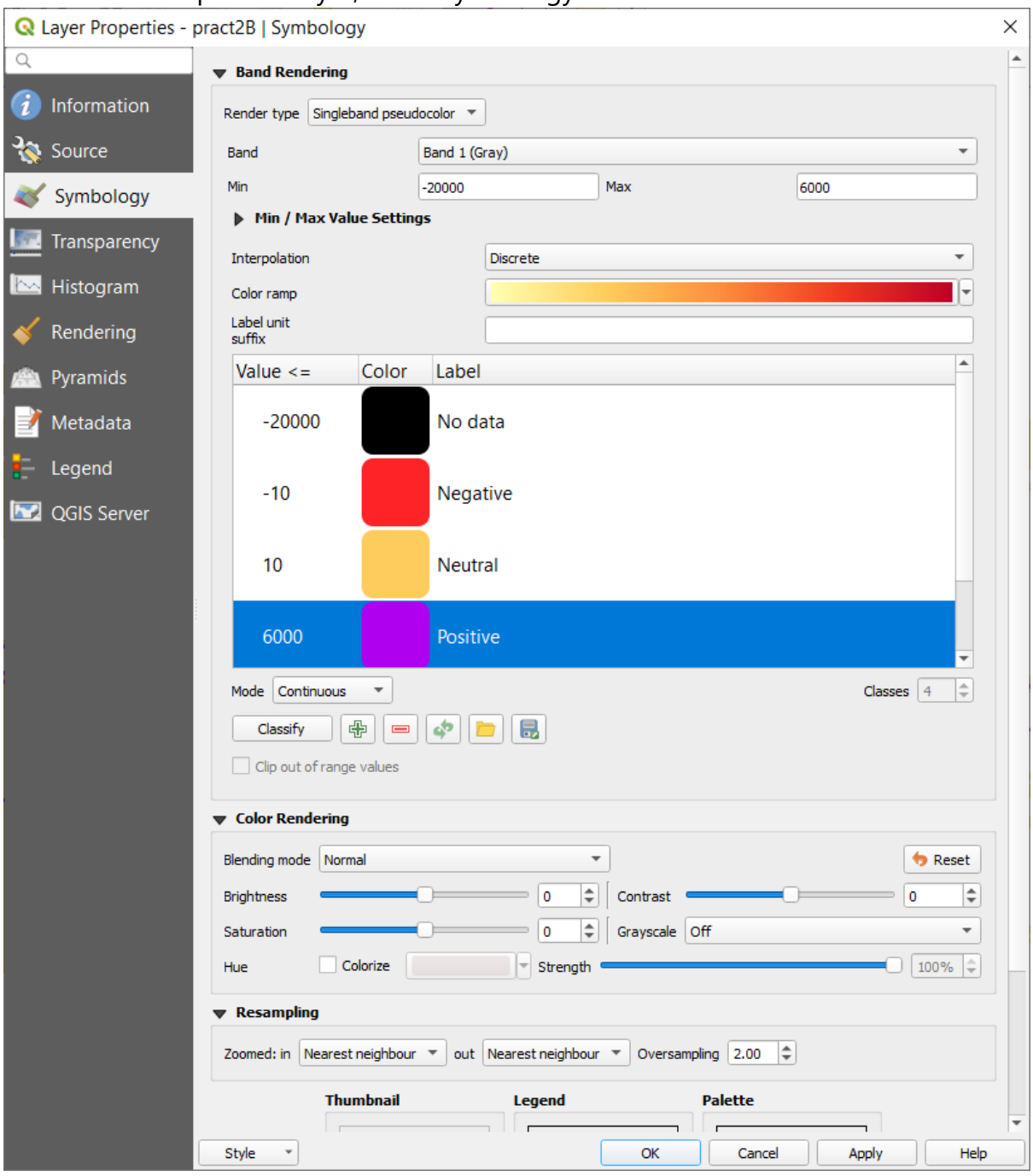
The objective of this experiment is to analyze raster data, as an example we will find areas with largest population change between 1990 and 2000, by calculating the difference between each pixel values.

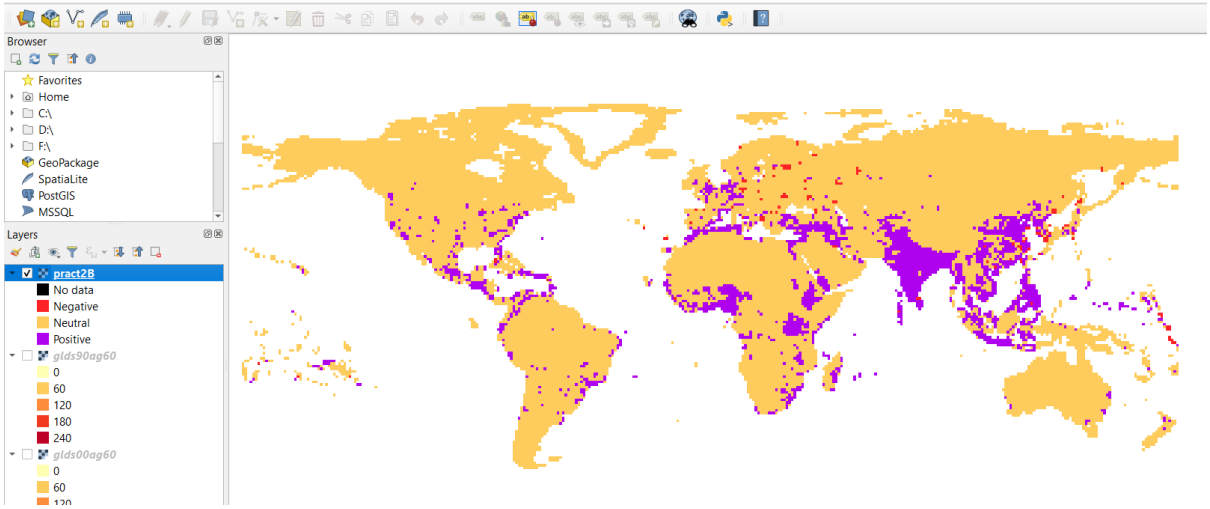
- Go to Raster → Raster Calculator



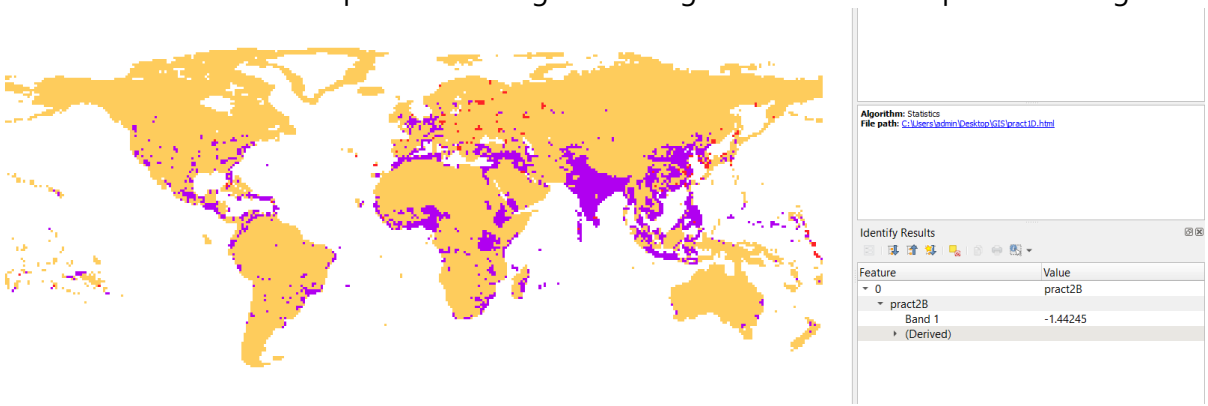


Double click on pract2B layer, select symbology





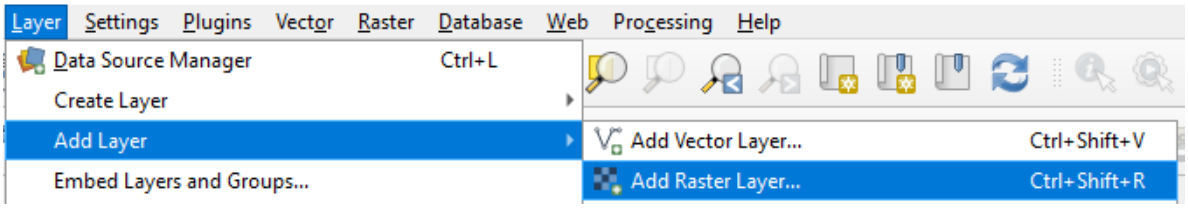
Explore an area of your choice and check the raster band value using to verify the classification rule. The red pixel shows negative changes and blue shows positive changes.

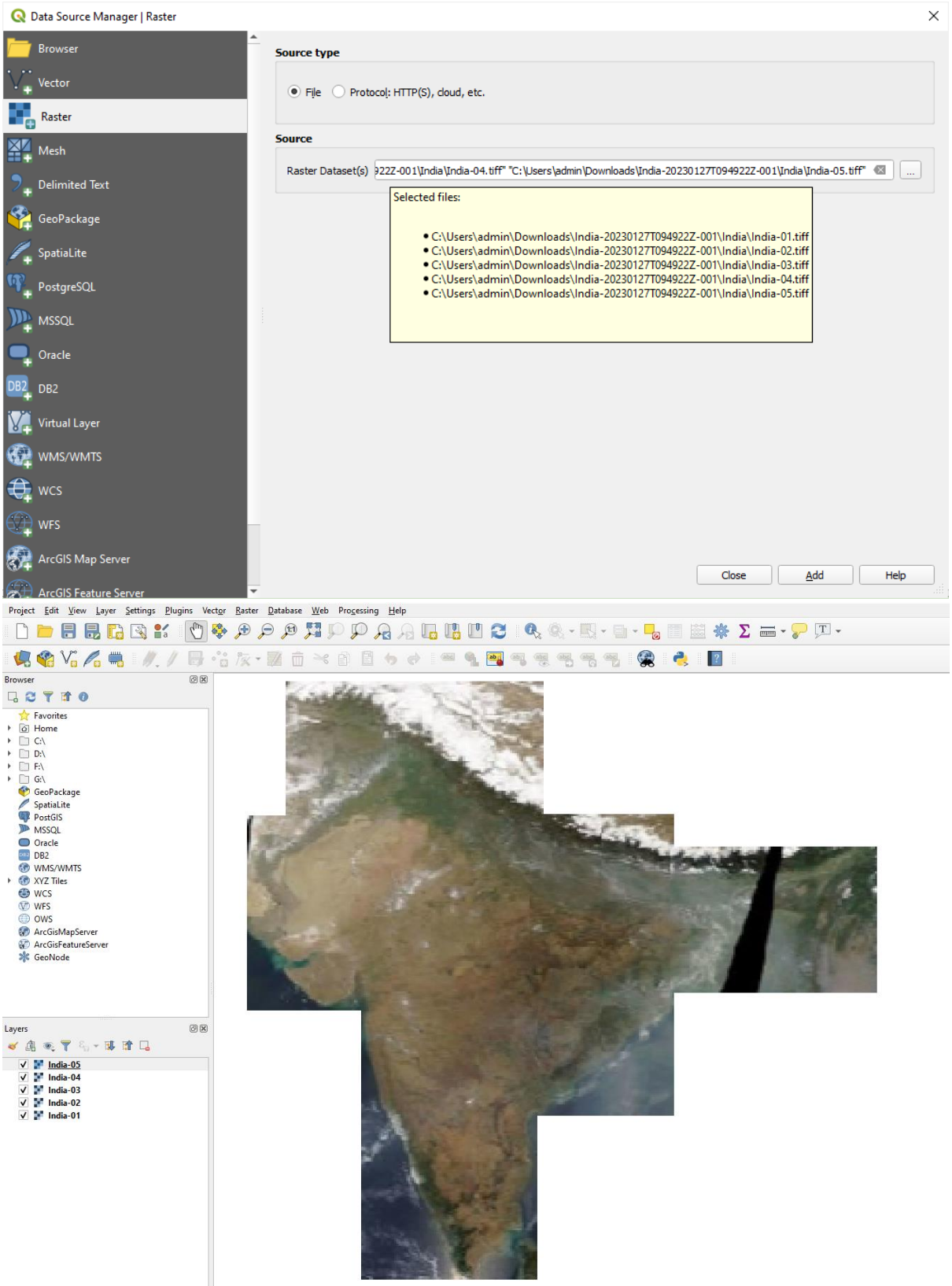


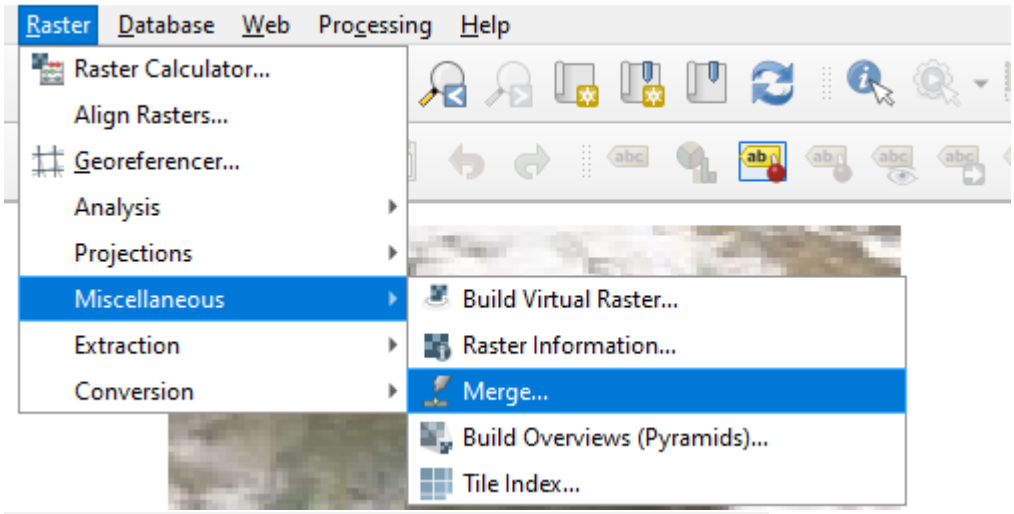
3.C) Raster Mosaicking and Clipping

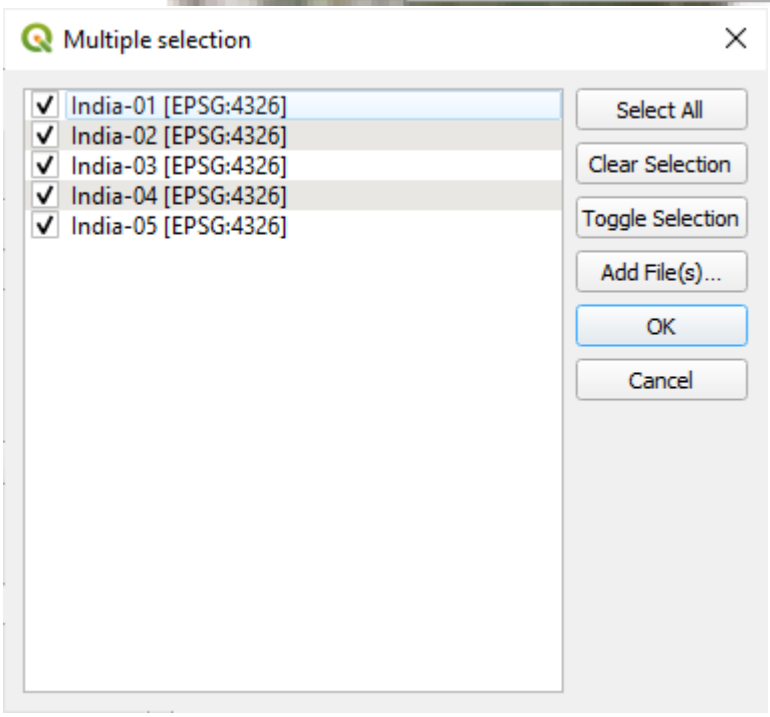
Add raster layer

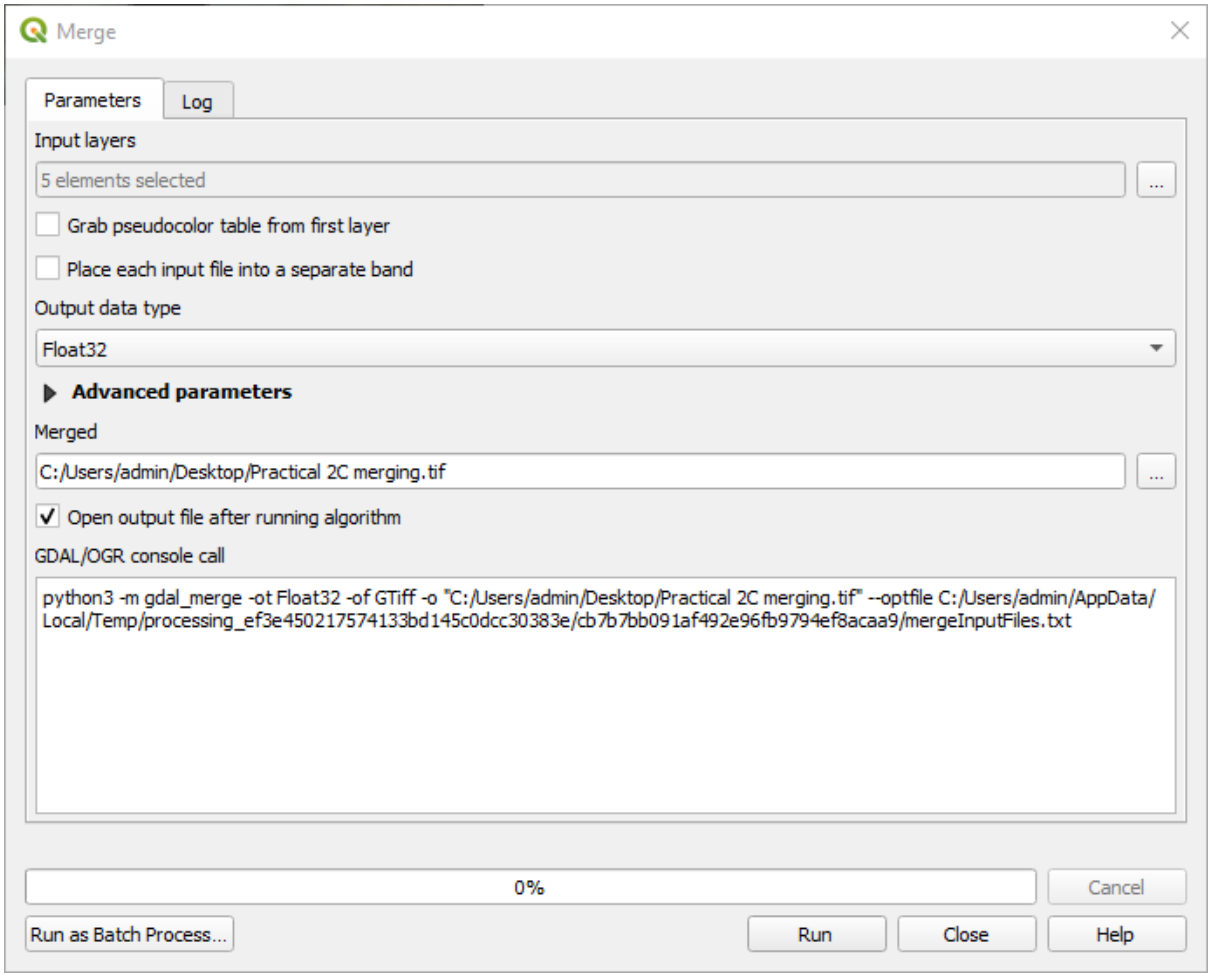
Go to Layer → Add Layer → Add Raster Layer.



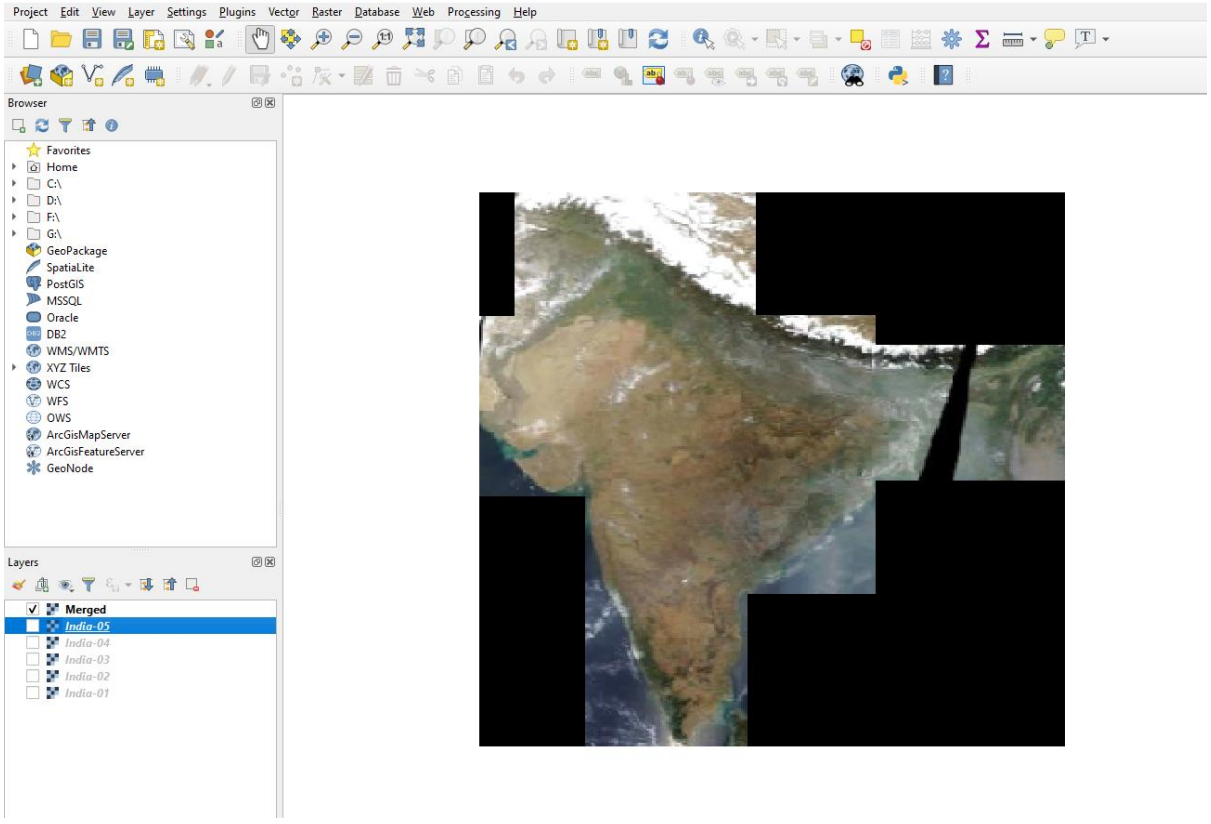

Data Source Manager | Raster
Browser
Vector
Raster
Mesh
Delimited Text
GeoPackage
SpatiaLite
PostgreSQL
MSSQL
Oracle
DB2
Virtual Layer
WMS/WMTS
WCS
WFS
ArcGIS Map Server
ArcGIS Feature Server
Source type
File
Protocol: HTTP(S), cloud, etc.
Source
Raster Dataset(s)
Selected files:
C:\Users\admin\Downloads\India-20230127T094922Z-001\India\India-01.tiff
C:\Users\admin\Downloads\India-20230127T094922Z-001\India\India-02.tiff
C:\Users\admin\Downloads\India-20230127T094922Z-001\India\India-03.tiff
C:\Users\admin\Downloads\India-20230127T094922Z-001\India\India-04.tiff
C:\Users\admin\Downloads\India-20230127T094922Z-001\India\India-05.tiff
Close
Add
Help
Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help
Browser
Favorites
Home
GeoPackage
SpatiaLite
PostGIS
MSSQL
Oracle
DB2
WMS/WMTS
XYZ Tiles
WCS
WFS
OWS
ArcGisMapServer
ArcGisFeatureServer
GeoNode
Layers
India-05
India-04
India-03
India-02
India-01


Raster
Database
Web
Processing
Help
Raster Calculator...
Align Rasters...
Georeferencer...
Analysis
Projections
Miscellaneous
Extraction
Conversion
Build Virtual Raster...
Raster Information...
Merge...
Build Overviews (Pyramids)...
Tile Index...

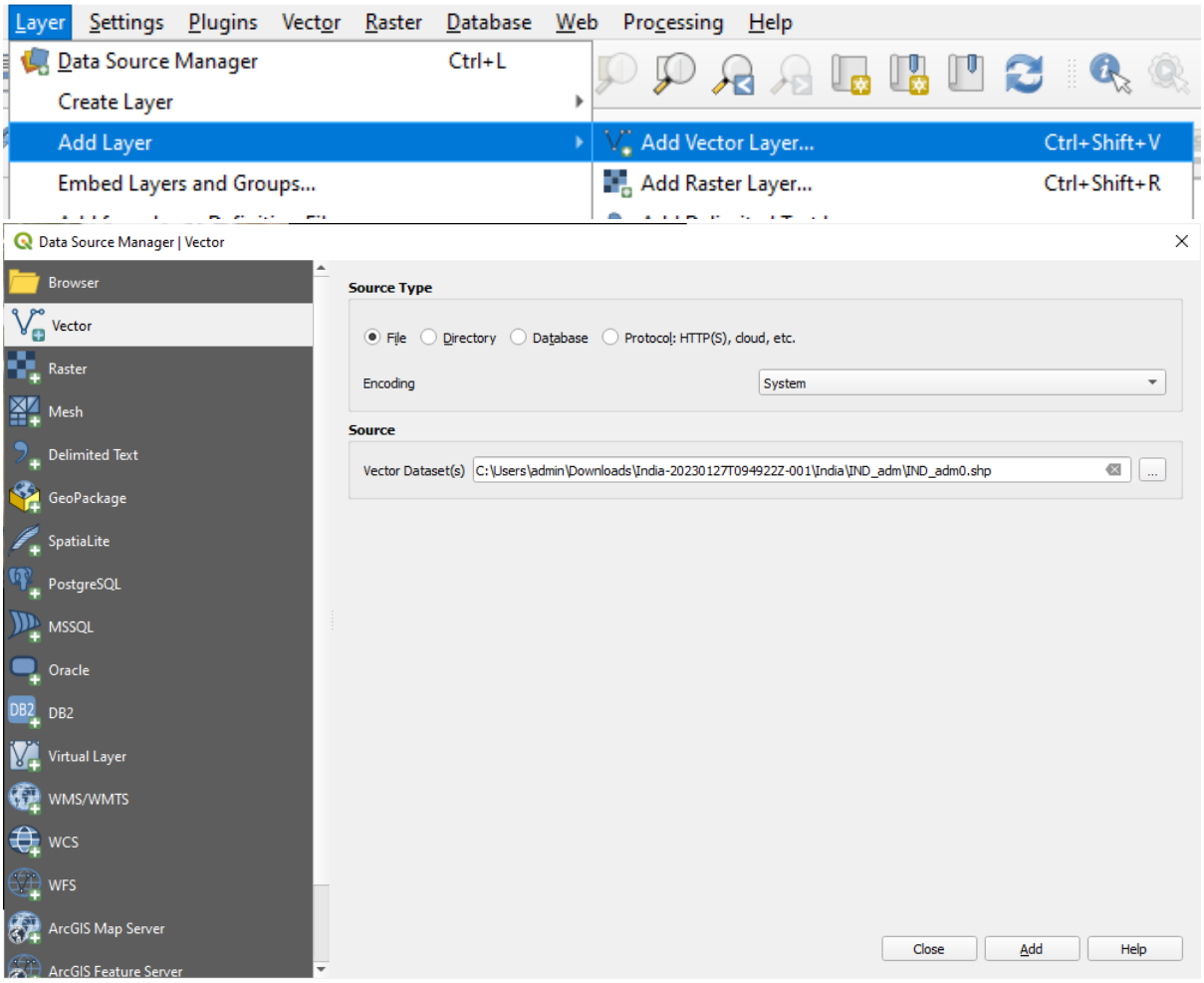

Multiple selection
India-01 [EPSG:4326]
India-02 [EPSG:4326]
India-03 [EPSG:4326]
India-04 [EPSG:4326]
India-05 [EPSG:4326]
Select All
Clear Selection
Toggle Selection
Add File(s)...
OK
Cancel


Merge
Parameters
Log
Input layers
5 elements selected
Grab pseudocolor table from first layer
Place each input file into a separate band
Output data type
Float32
Advanced parameters
Merged
C:/Users/admin/Desktop/Practical 2C merging.tif
Open output file after running algorithm
GDAL/OGR console call
python3 -m gdal_merge -ot Float32 -of GTiff -o "C:/Users/admin/Desktop/Practical 2C merging.tif" --optfile C:/Users/admin/AppData/Local/Temp/processing_ef3e450217574133bd145c0dcc30383e/cb7b7bb091af492e96fb9794ef8acaa9/mergeInputFiles.txt
0%
Cancel
Run as Batch Process...
Run
Close
Help

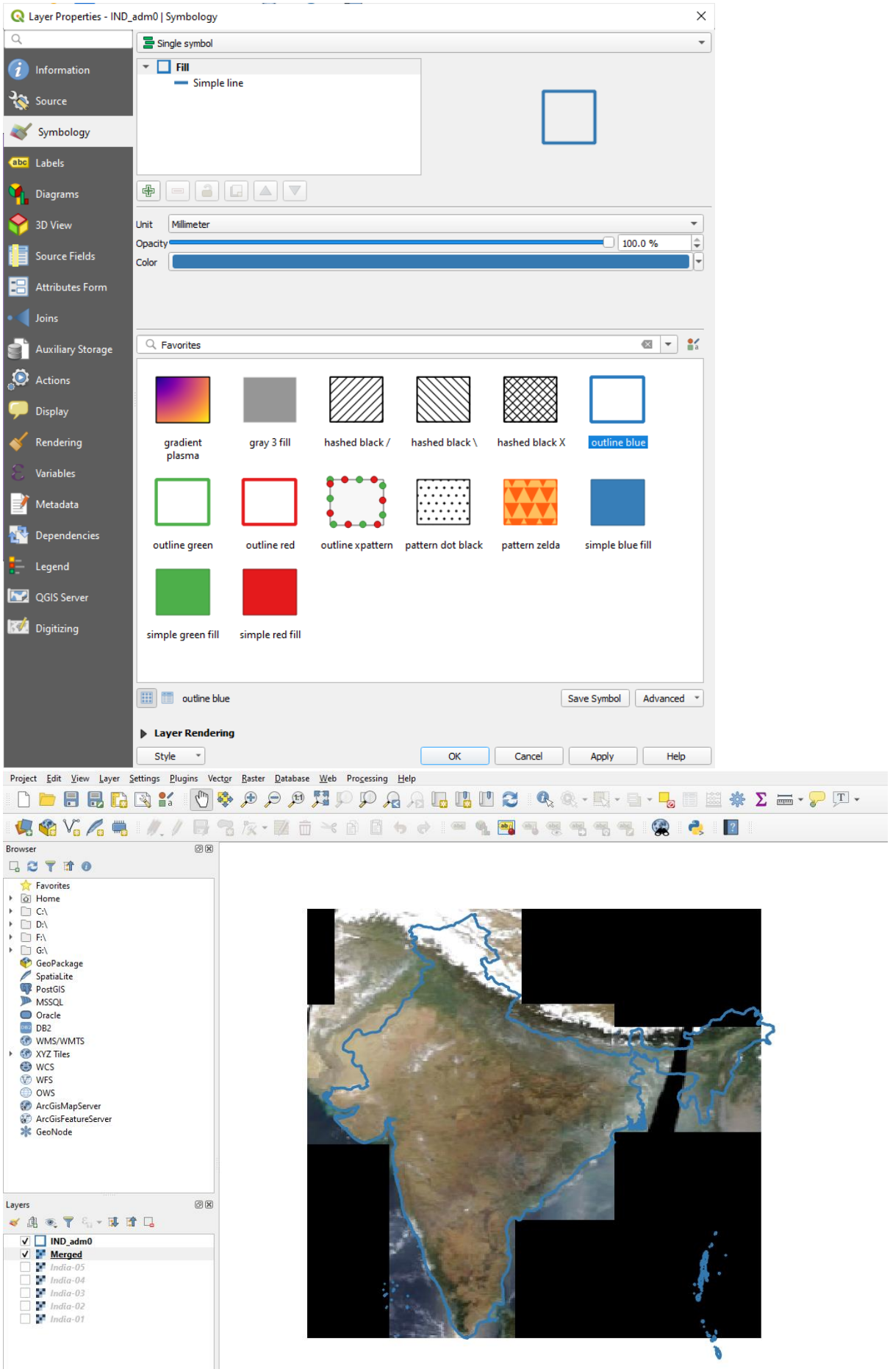
Click run.


Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help
Browser
Favorites
Home
C:\
D:\
F:\
G:\
GeoPackage
SpatiaLite
PostGIS
MSSQL
Oracle
DB2
WMS/WMTS
XYZ Tiles
WCS
WFS
OWS
ArcGisMapServer
ArcGisFeatureServer
GeoNode
Layers
Merged
India-05
India-04
India-03
India-02
India-01

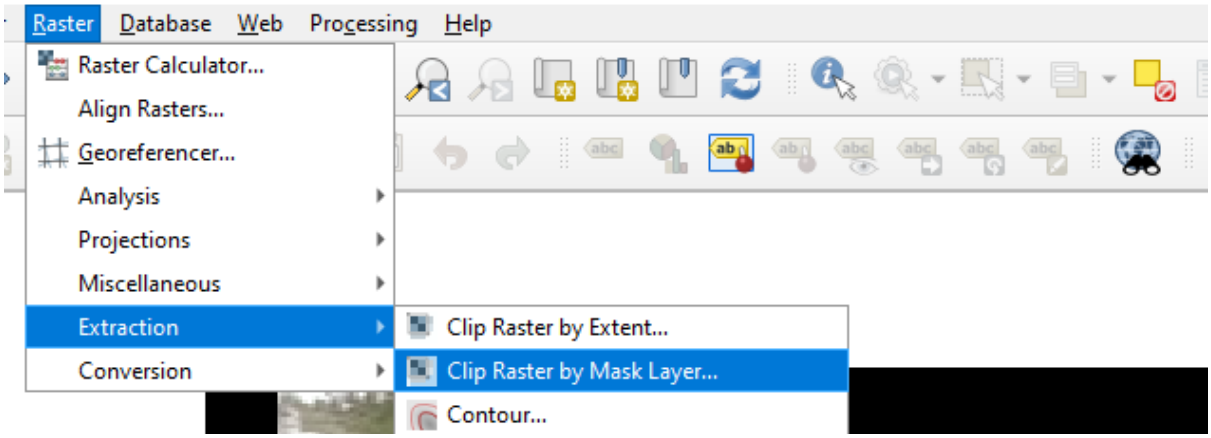
Go to Layer→ Add Vector Layer → Select IND_adm0.shp file.

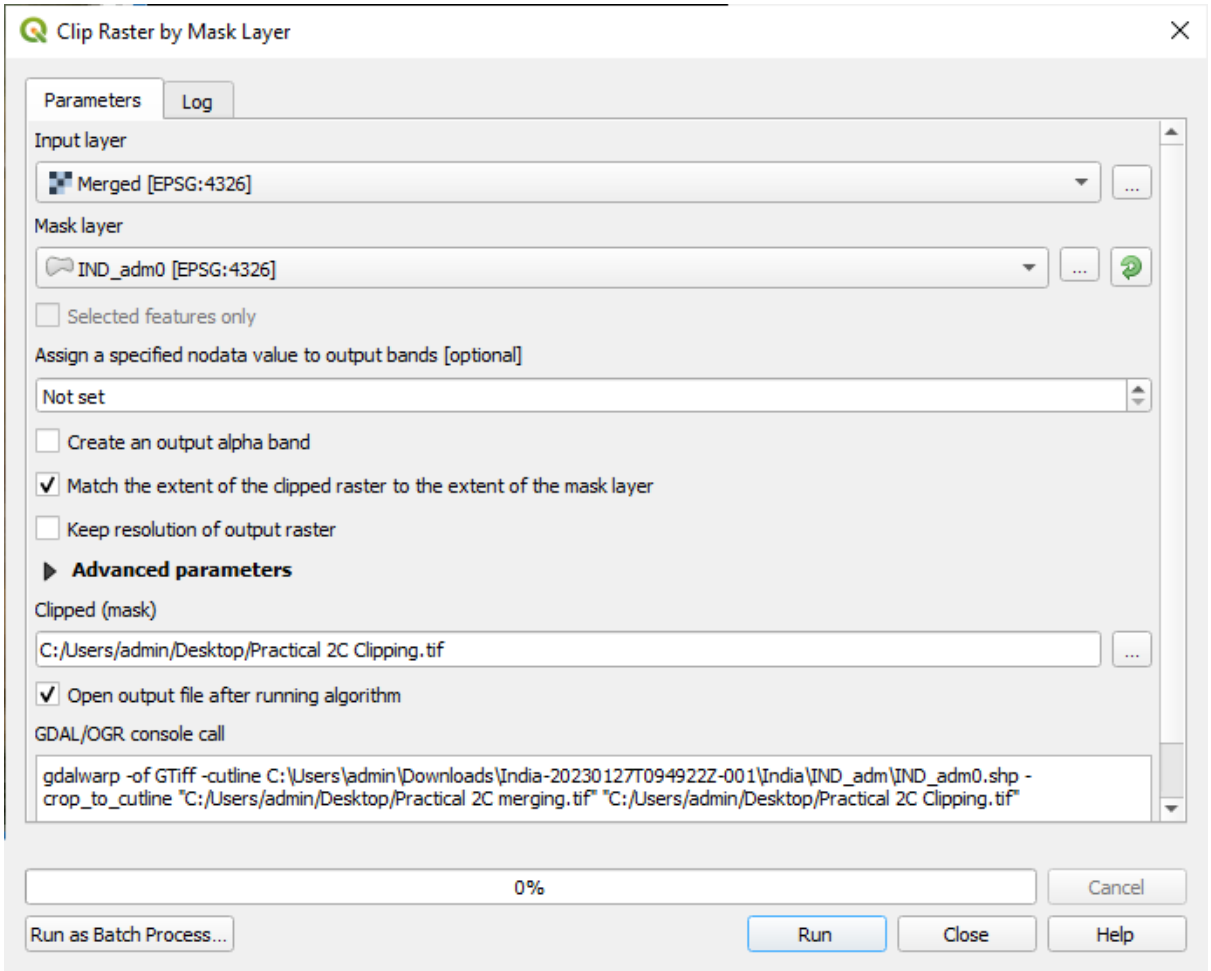


From layer properties → select any outline

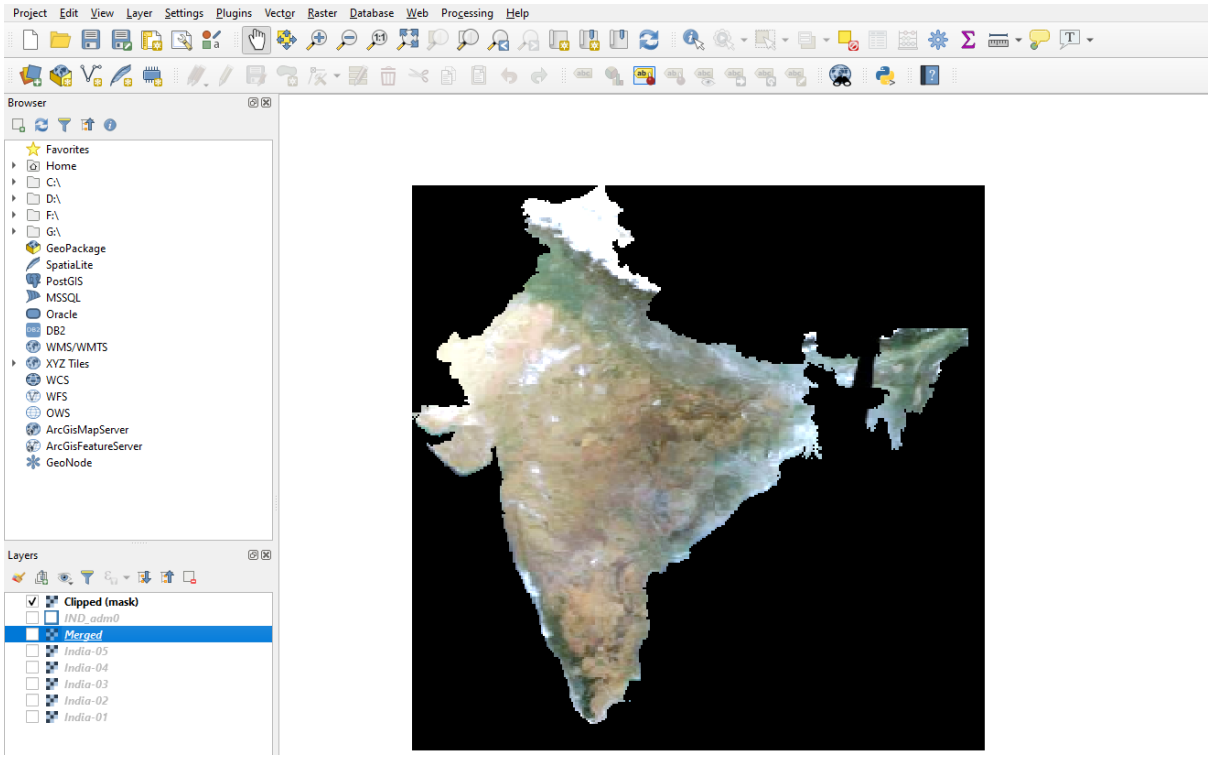

Layer Properties - IND_adm0 | Symbology
Information
Source
Symbology
Labels
Diagrams
3D View
Source Fields
Attributes Form
Joins
Auxiliary Storage
Actions
Display
Rendering
Variables
Metadata
Dependencies
Legend
QGIS Server
Digitizing
Single symbol
Fill
Simple line
Unit
Millimeter
Opacity
100.0 %
Color
Favorites
gradient plasma
gray 3 fill
hashed black /
hashed black \
hashed black X
outline blue
outline green
outline red
outline xpattern
pattern dot black
pattern zelda
simple blue fill
simple green fill
simple red fill
outline blue
Save Symbol
Advanced
Layer Rendering
Style
OK
Cancel
Apply
Help
Project
Edit
View
Layer
Settings
Plugins
Vector
Raster
Database
Web
Processing
Help
Browser
Favorites
Home
C:\
D:\
F:\
G:\
GeoPackage
SpatiaLite
PostGIS
MSSQL
Oracle
DB2
WMS/WMTS
XYZ Tiles
WCS
WFS
OWS
ArcGisMapServer
ArcGisFeatureServer
GeoNode
Layers
IND_adm0
Merged
India-05
India-04
India-03
India-02
India-01

Go to Raster → Extraction → Clip Raster by Mask Layer





FINAL OUTPUT:


Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help
Browser
Favorites
Home
C:\
D:\
F:\
G:\
GeoPackage
SpatiaLite
PostGIS
MSSQL
Oracle
DB2
WMS/WMTS
XYZ Tiles
WCS
WFS
OWS
ArcGisMapServer
ArcGisFeatureServer
GeoNode
Layers
Clipped (mask)
IND_adm0
Merged
India-05
India-04
India-03
India-02
India-01

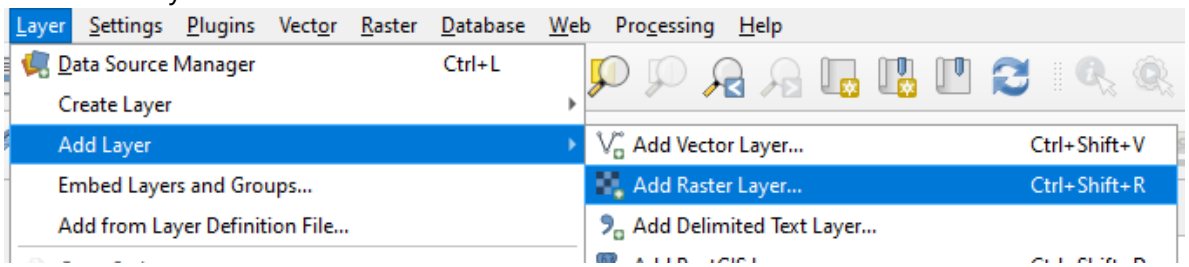
Practical 4

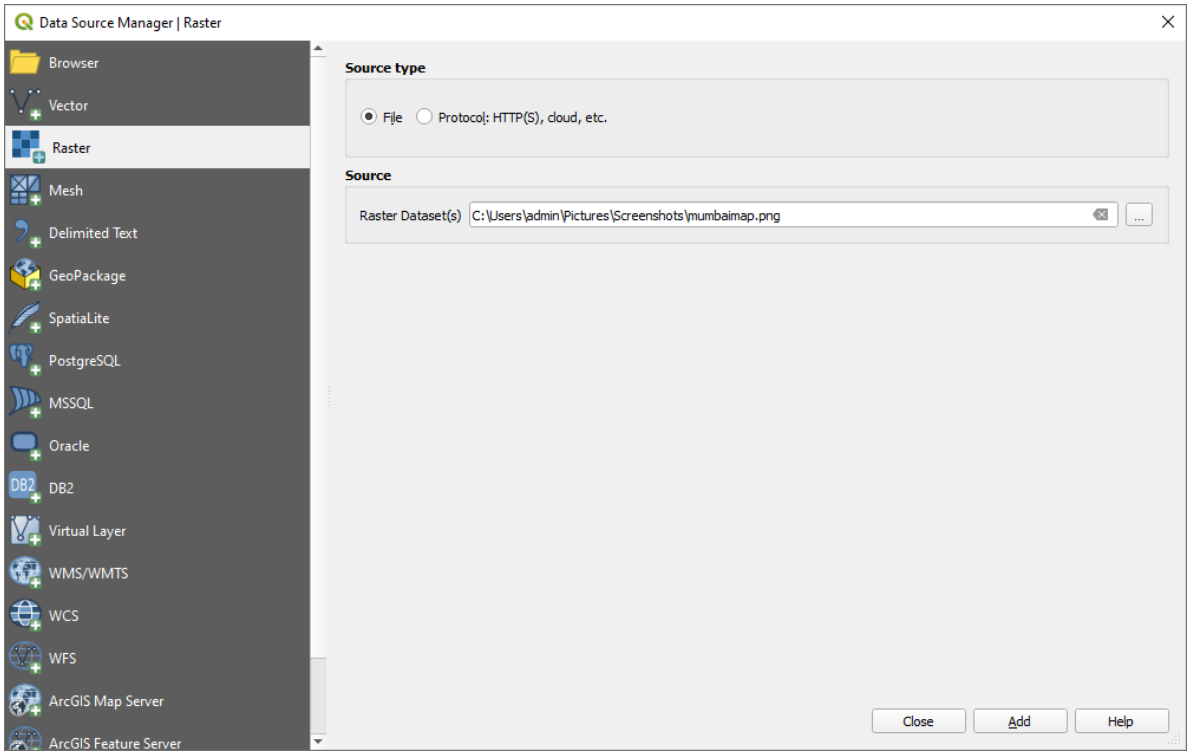
AIM: Making a Map, Working with Attributes, Importing Spreadsheets or CSV files Using Plugins, Searching and Downloading OpenStreetMap Data.

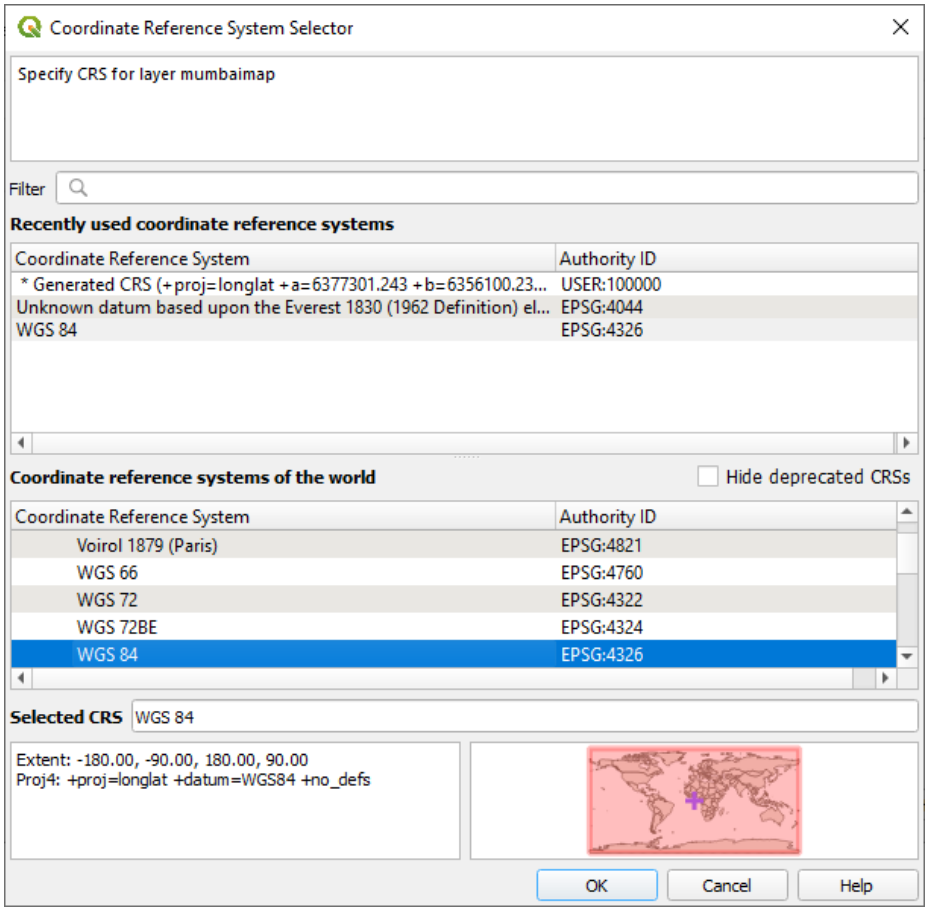
Solution:

4.A) Making a Map

Add raster layer

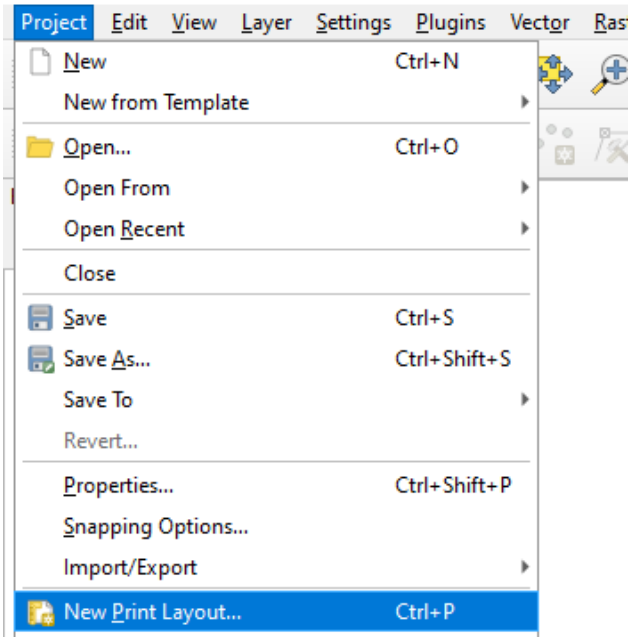


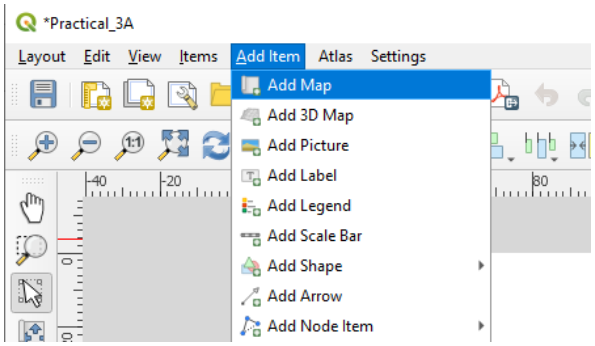


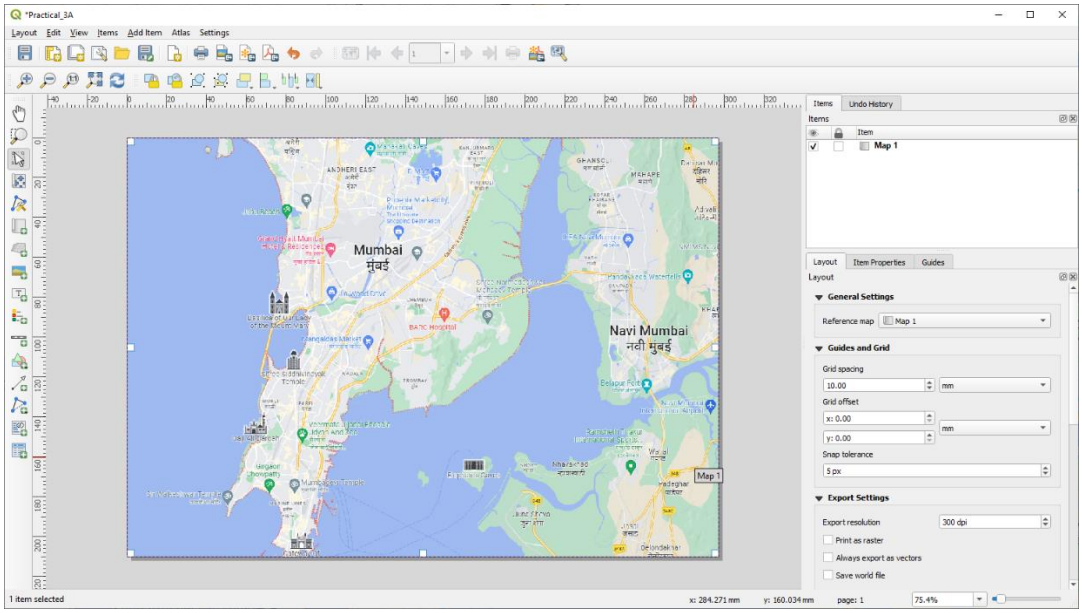


Making Map

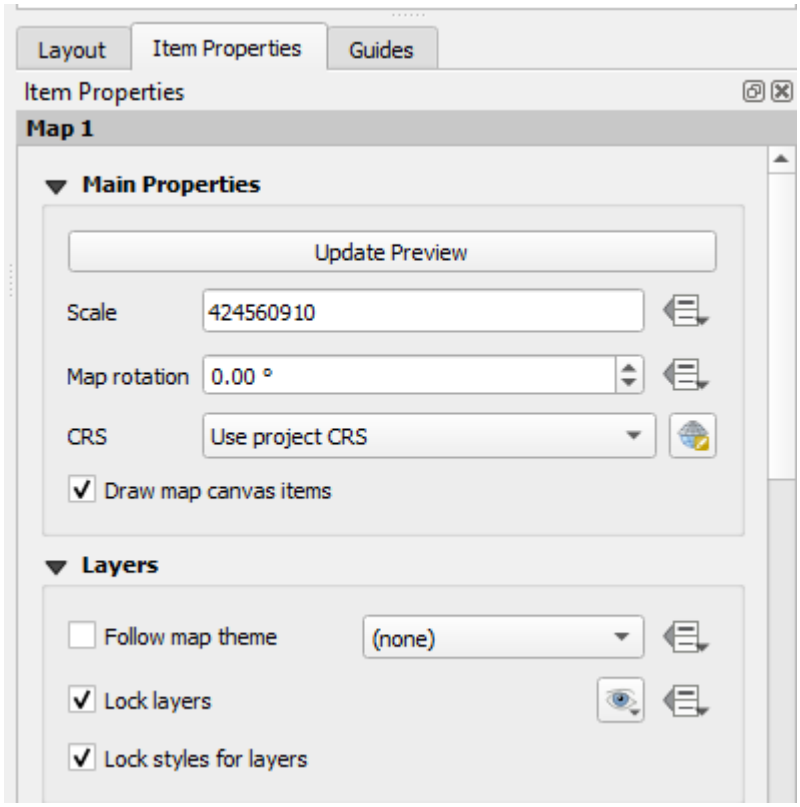
1. Add new print layout



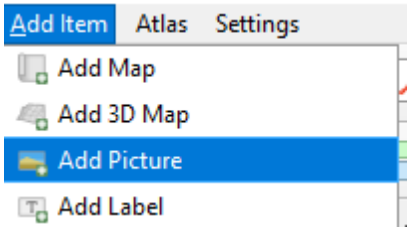


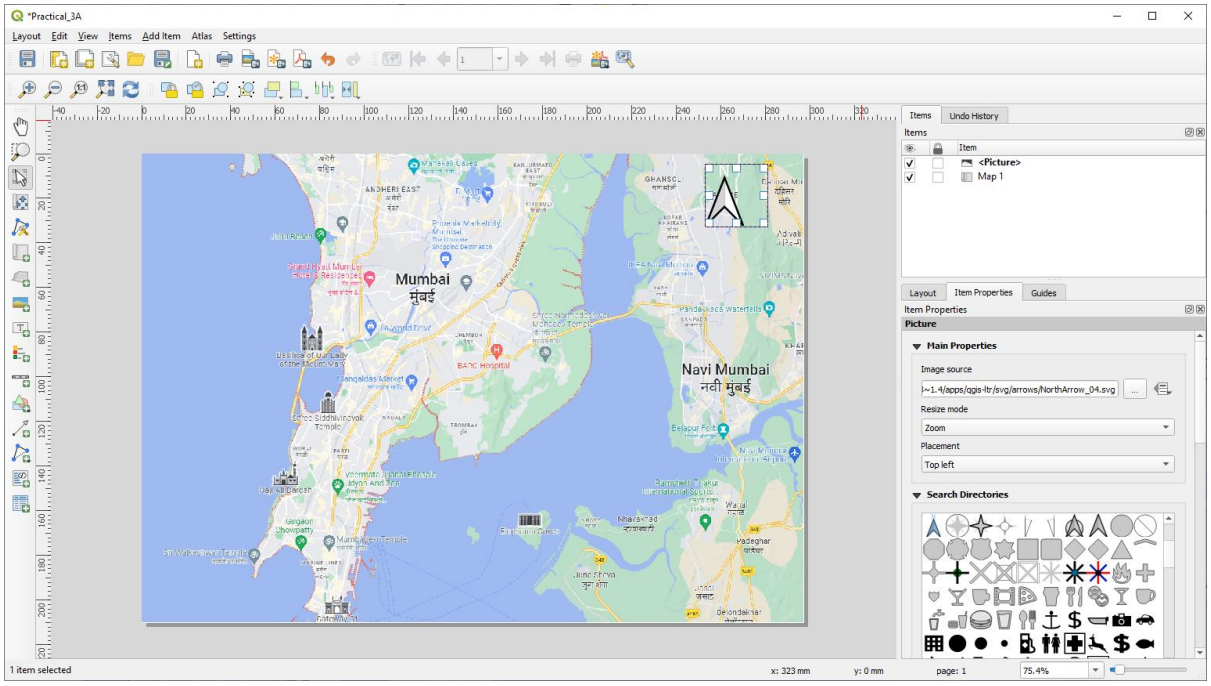


Lock the layers from item properties

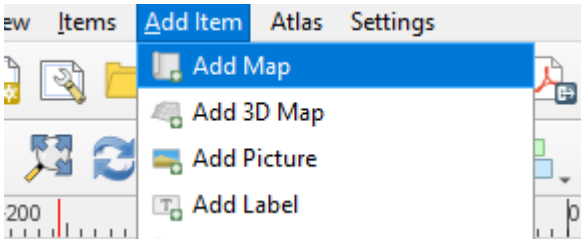


Add picture

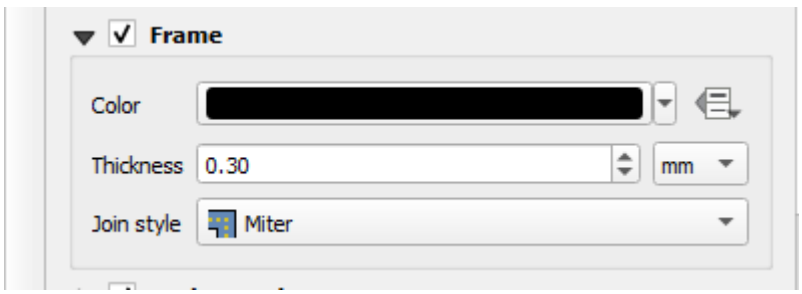


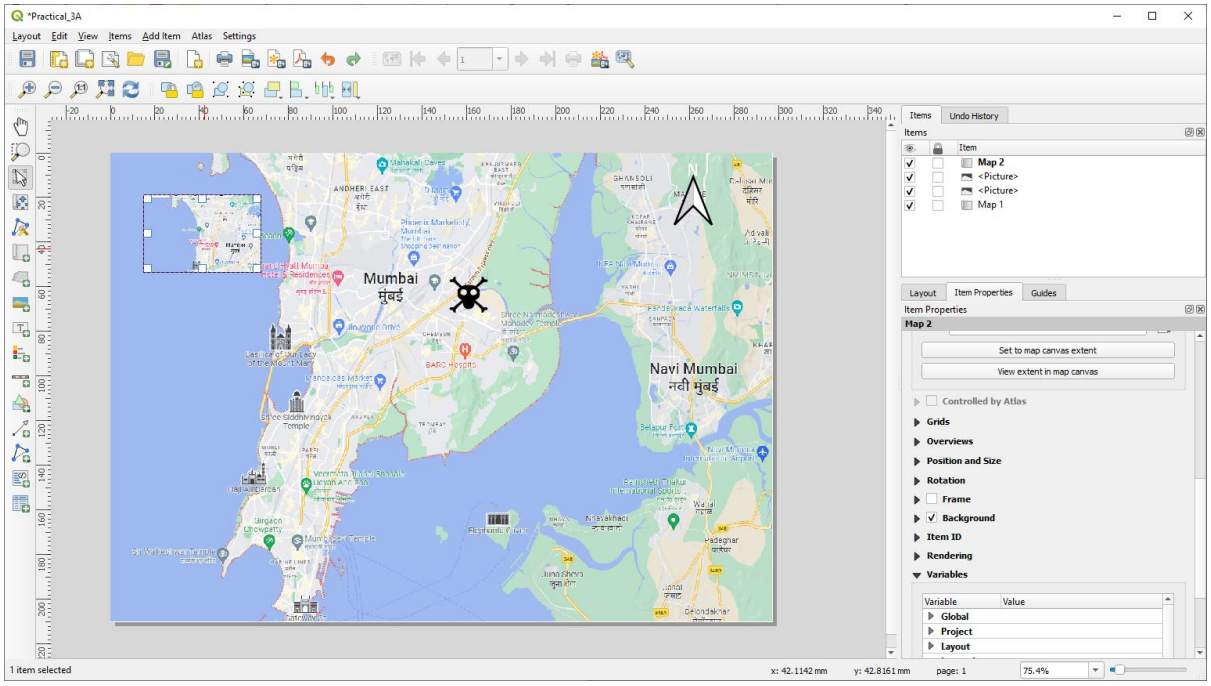


Adding a Frame



Set a frame for Inset by enabling the check box for Frame.





(Adding overview)

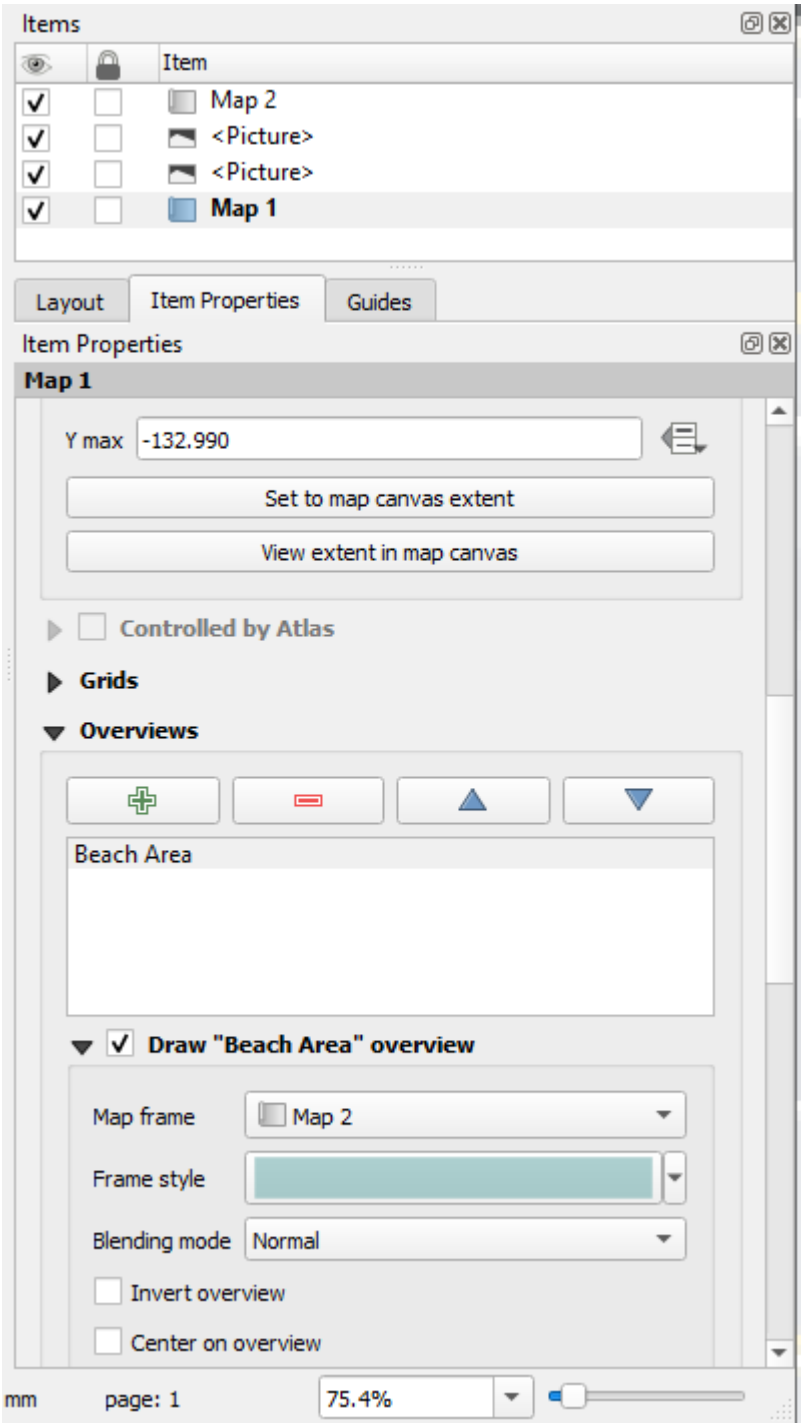
To highlight the area shown in Inset

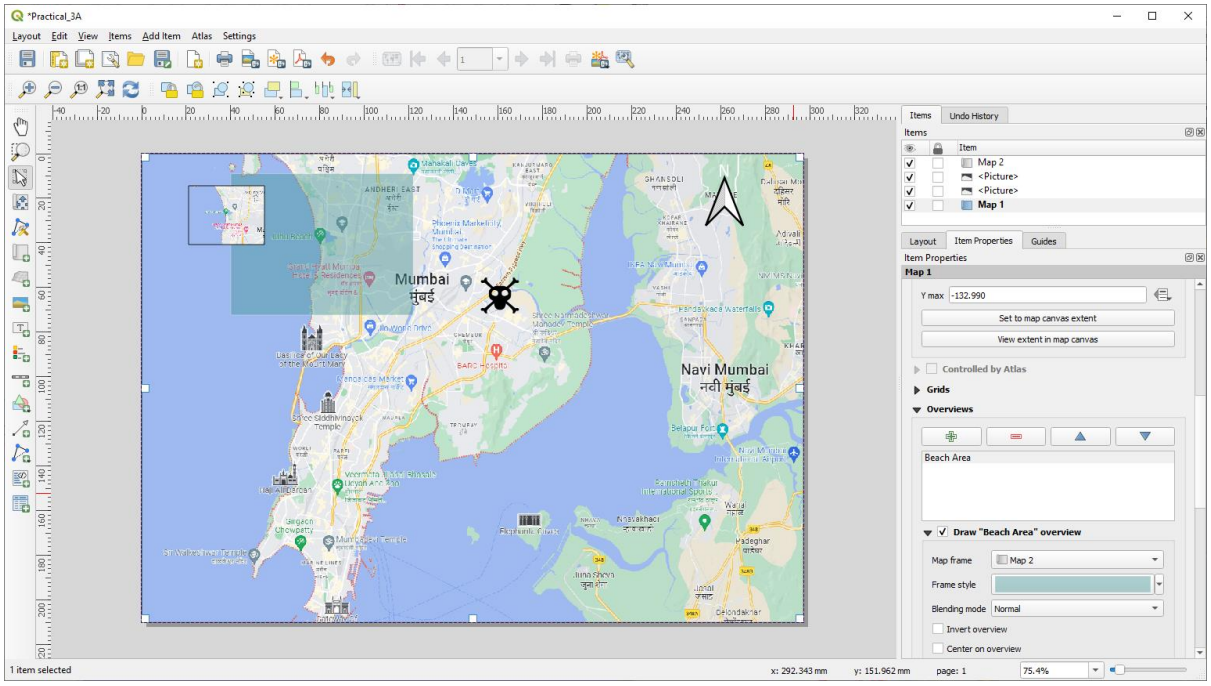
Select the Picture representing main Map from Items pane.

In Item Properties → Overviews → using icon add an overview.

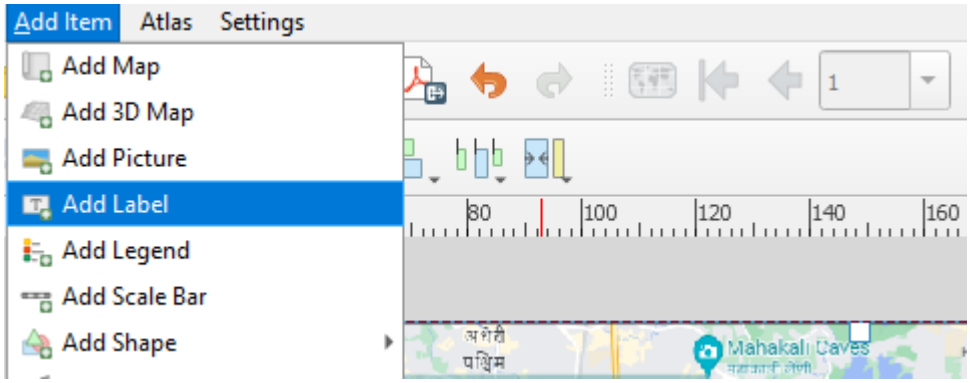
Select the checkbox Draw Overview

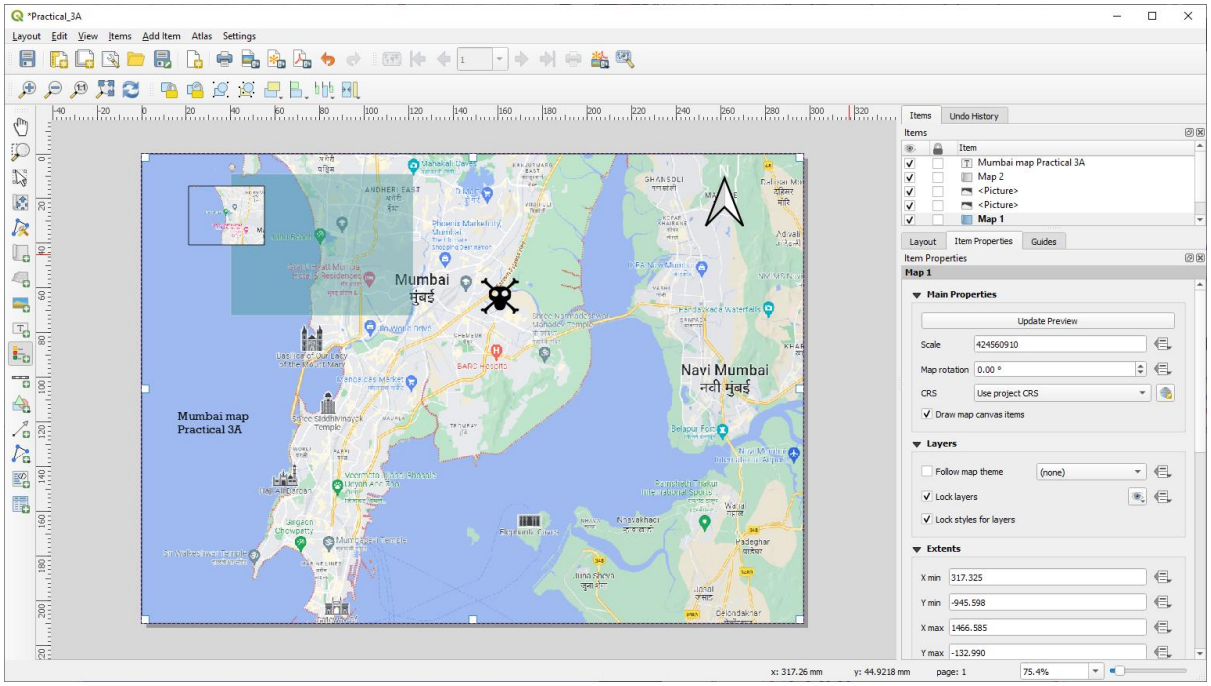
Name the Picture object representing inset (Map2 in our case).


Items
Item
Map 2
<Picture>
<Picture>
Map 1
Layout
Item Properties
Guides
Item Properties
Map 1
Y max
-132.990
Set to map canvas extent
View extent in map canvas
Controlled by Atlas
Grids
Overviews
Beach Area
Draw "Beach Area" overview
Map frame
Map 2
Frame style
Blending mode
Normal
Invert overview
Center on overview
mm
page: 1
75.4%

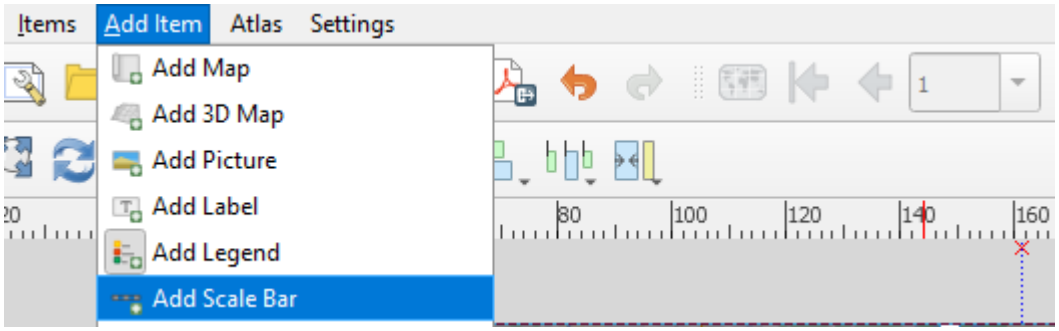


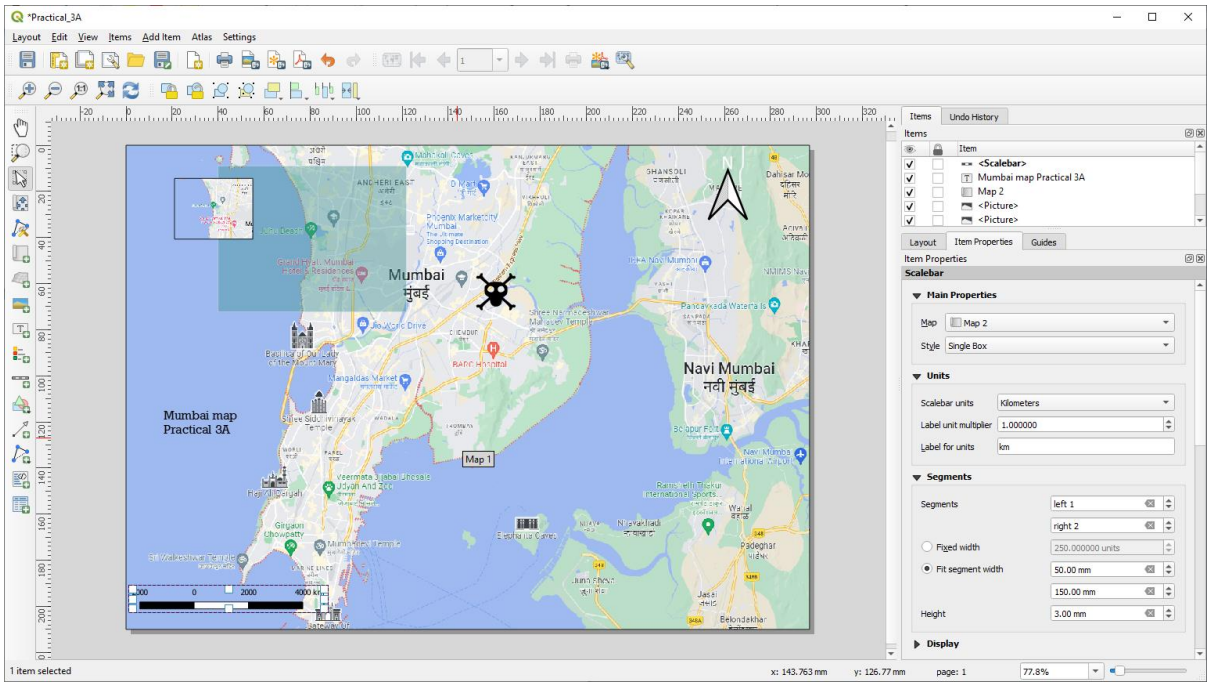
Adding Label

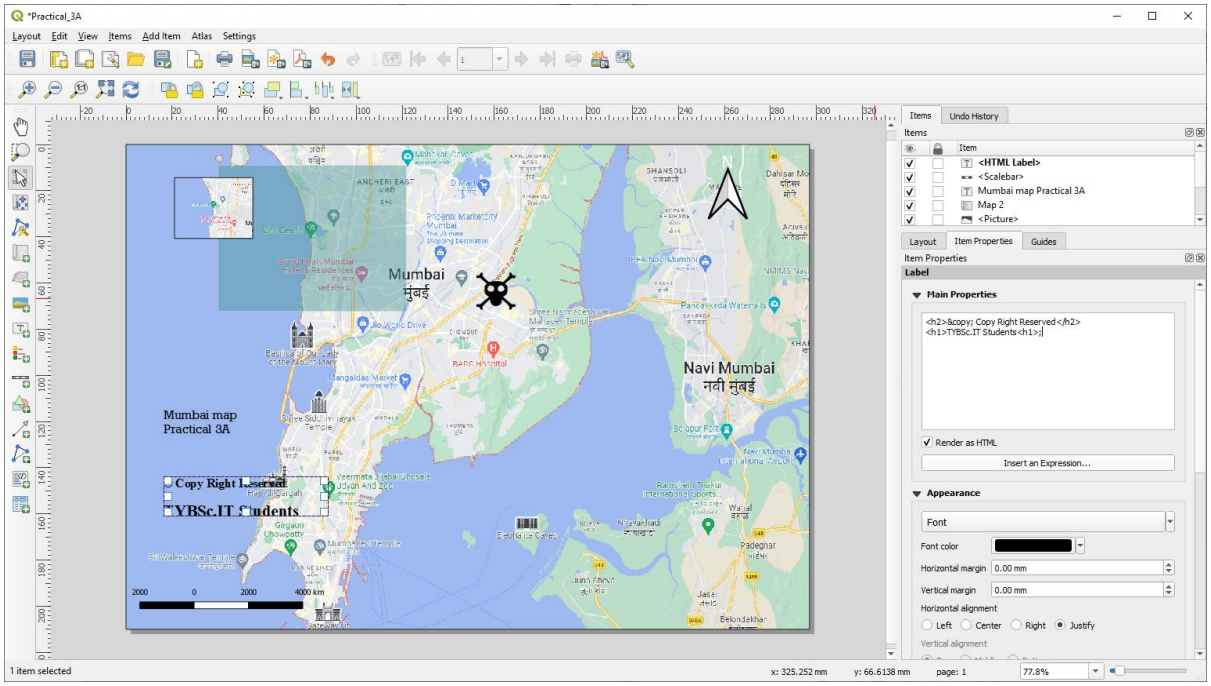


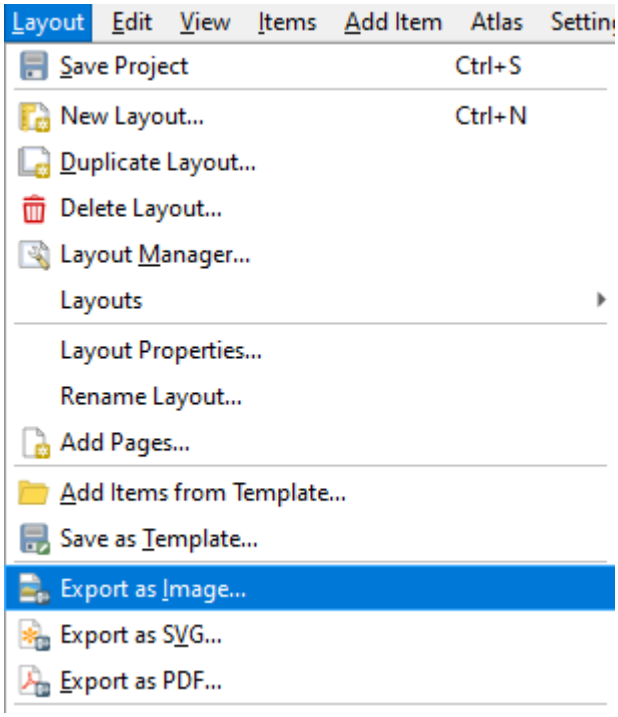


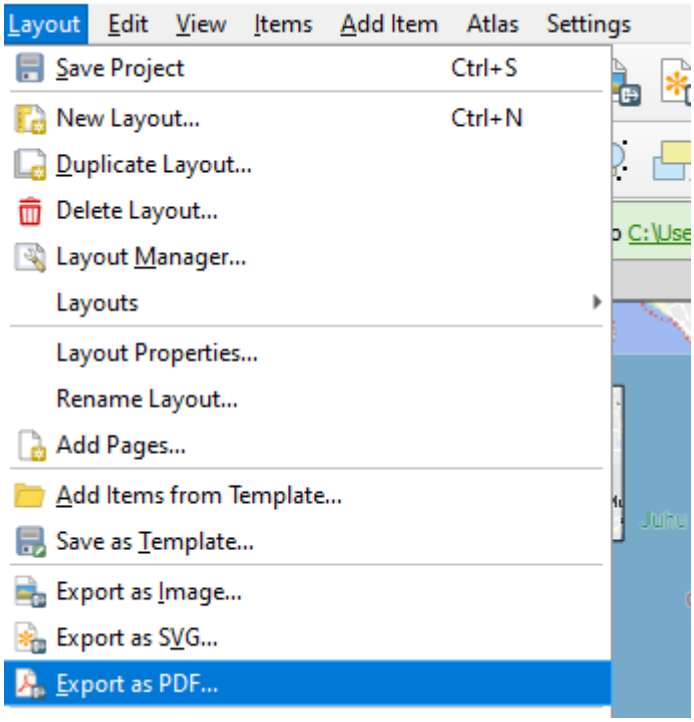
Adding scalebar



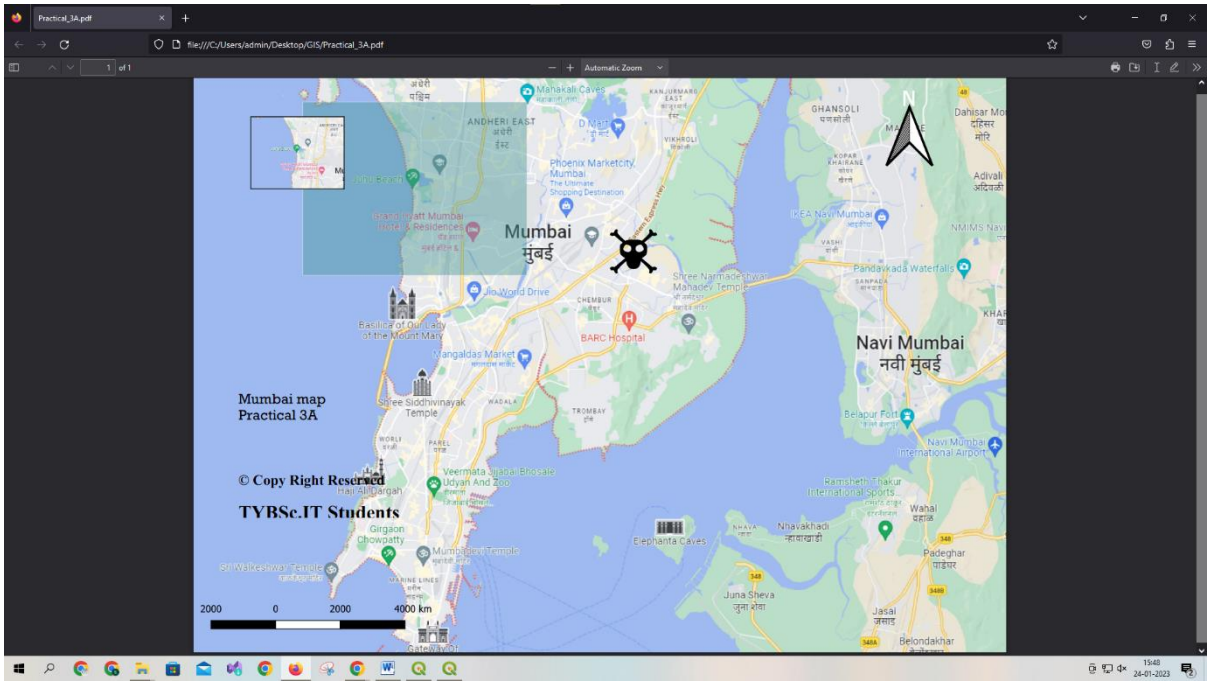





Layout
Edit
View
Items
Add Item
Atlas
Setting
Save Project Ctrl+S
New Layout... Ctrl+N
Duplicate Layout...
Delete Layout...
Layout Manager...
Layouts
Layout Properties...
Rename Layout...
Add Pages...
Add Items from Template...
Save as Template...
Export as Image...
Export as SVG...
Export as PDF...


Layout
Edit
View
Items
Add Item
Atlas
Settings
Save Project Ctrl+S
New Layout... Ctrl+N
Duplicate Layout...
Delete Layout...
Layout Manager...
Layouts
Layout Properties...
Rename Layout...
Add Pages...
Add Items from Template...
Save as Template...
Export as Image...
Export as SVG...
Export as PDF...

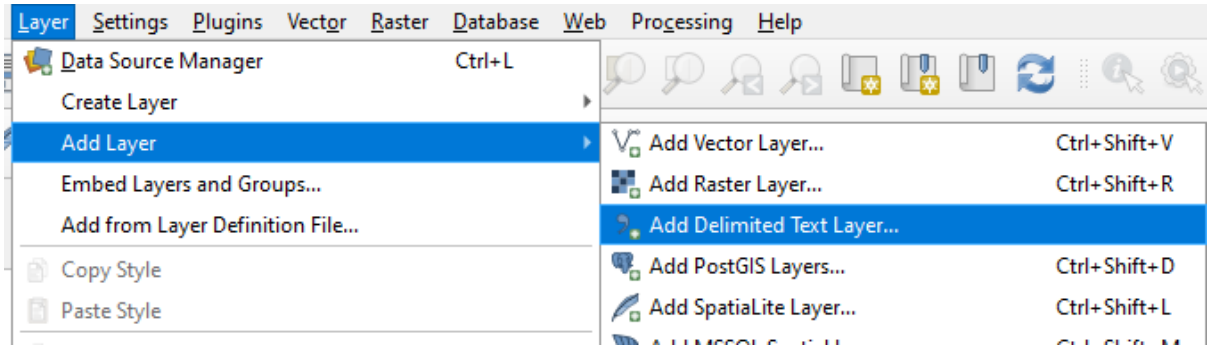
Final Output for practical 4A

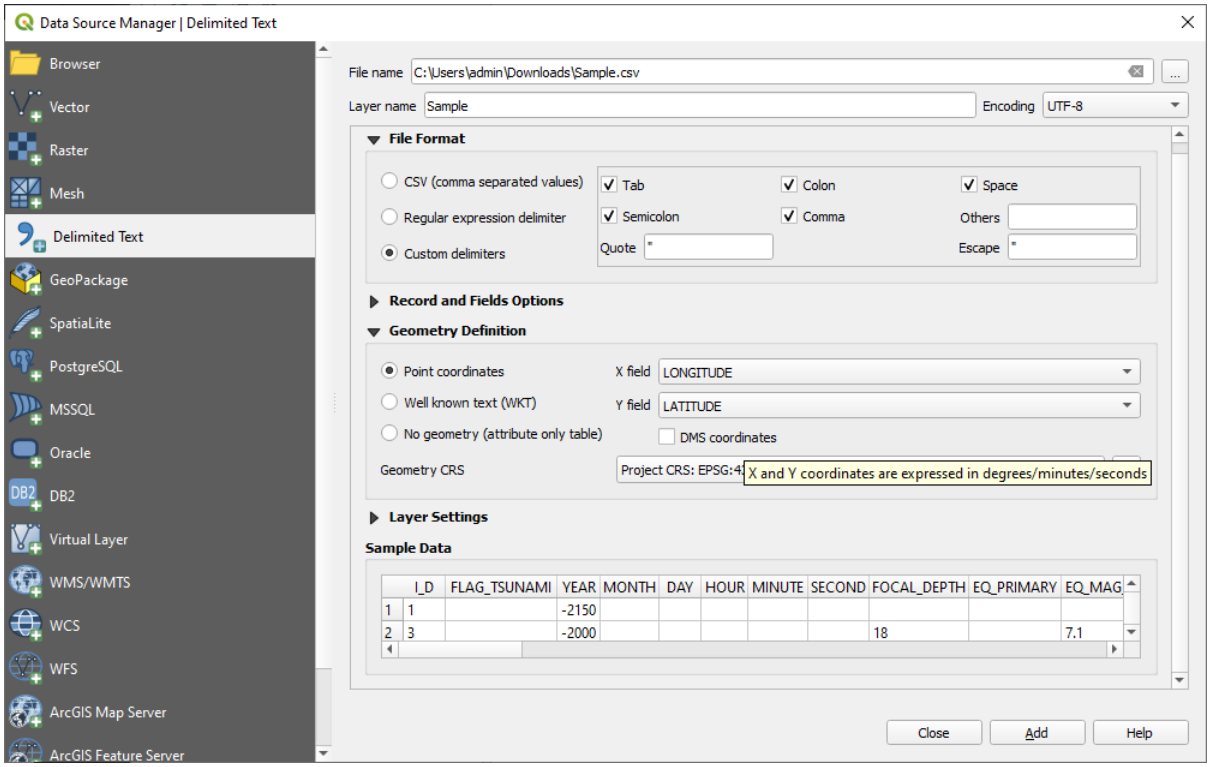


4.B) Importing Spreadsheets or CSV files

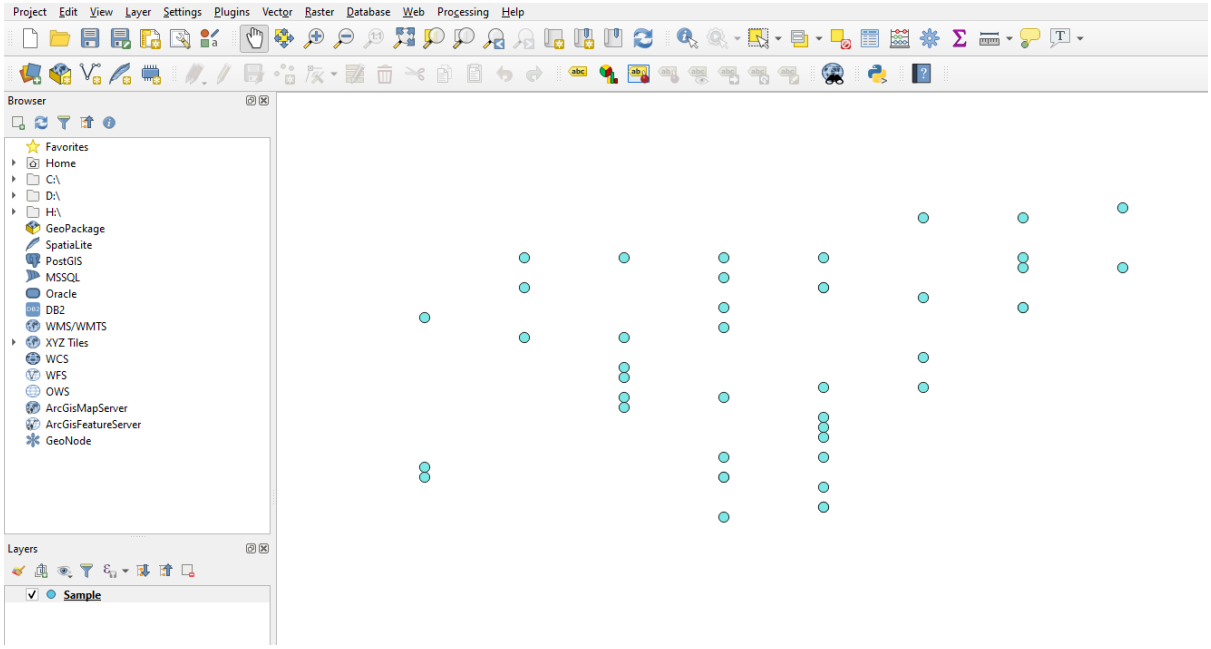
Add csv file

Go to Layer → Add Layer → Add Delimited text Layer





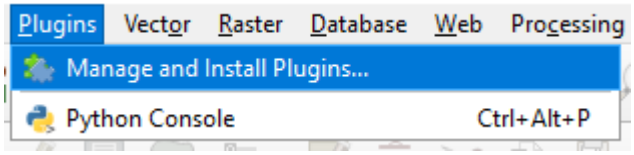
OUTPUT

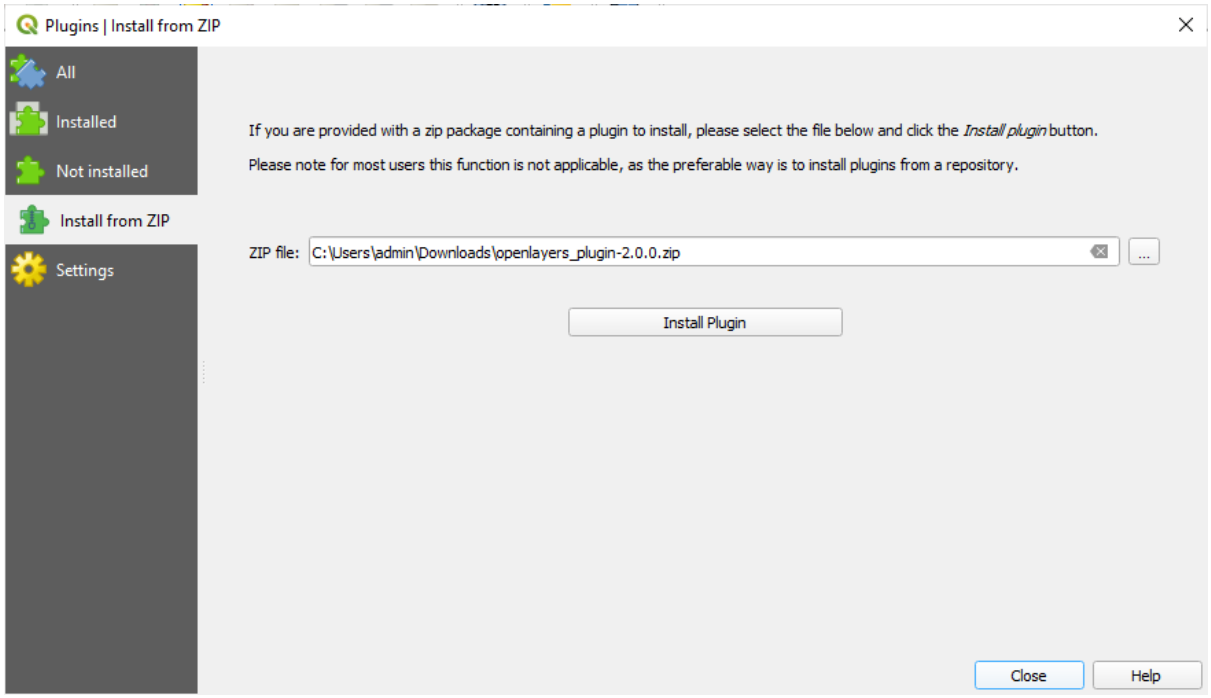


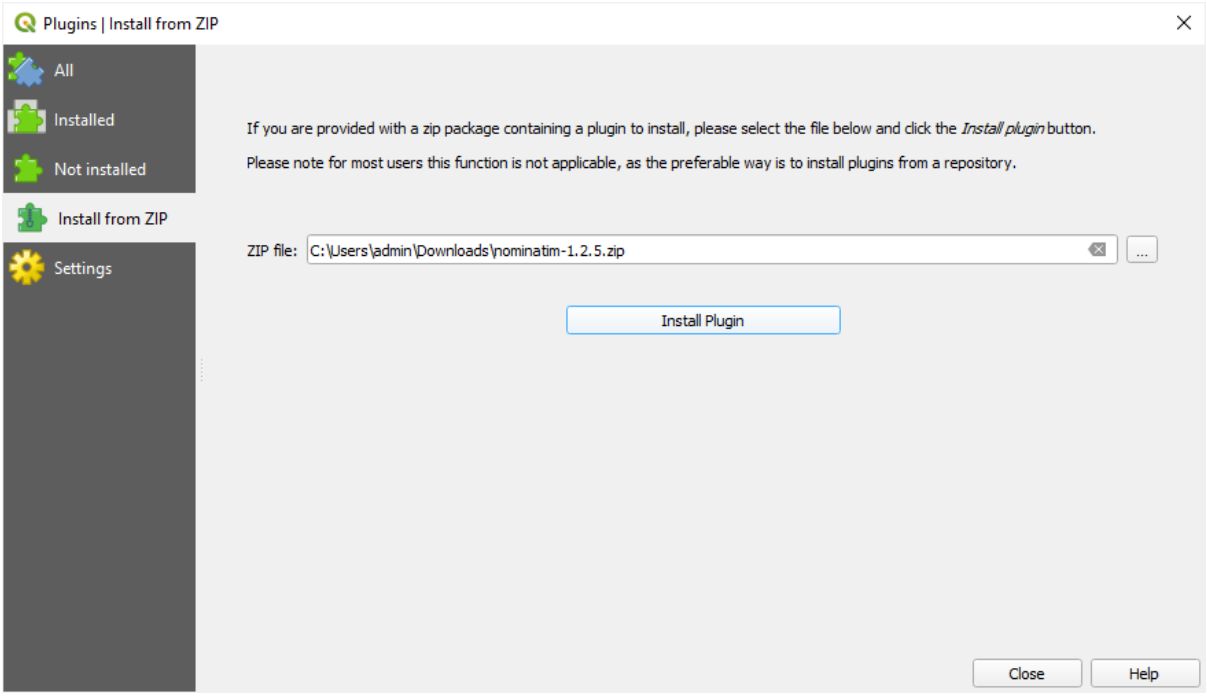
4.C) Using Plugin

Download plugins from given links
https://plugins.qgis.org/plugins/nominatim/version/1.2.5/
https://plugins.qgis.org/plugins/openlayers_plugin/version/2.0.0/

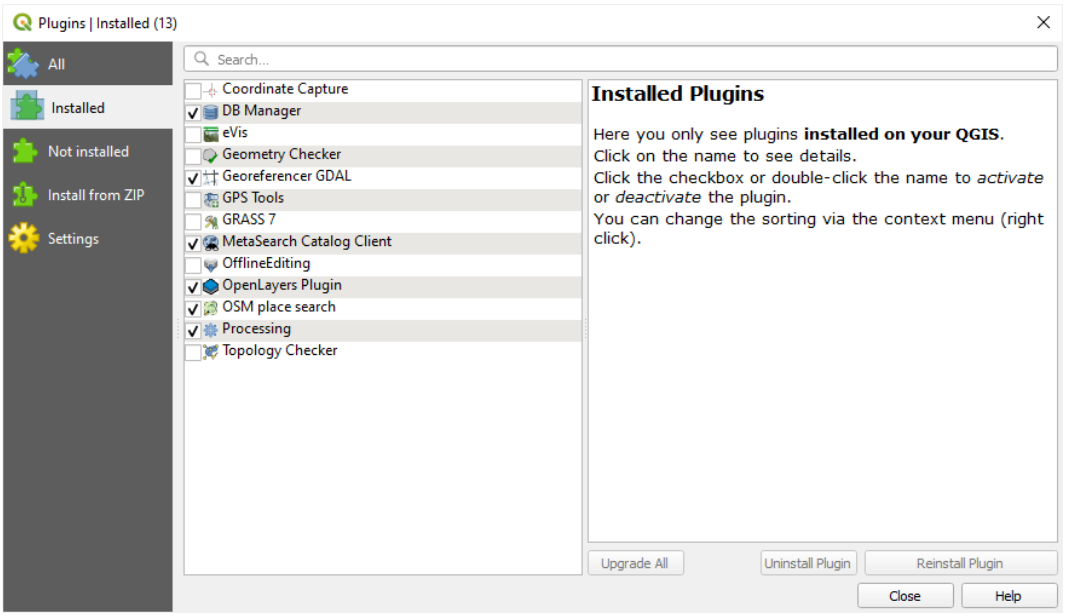
Click on Plugins → Manage and Install Plugins





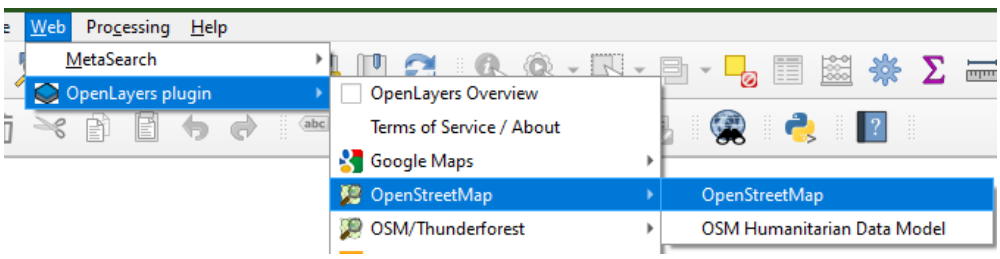


Click on Install

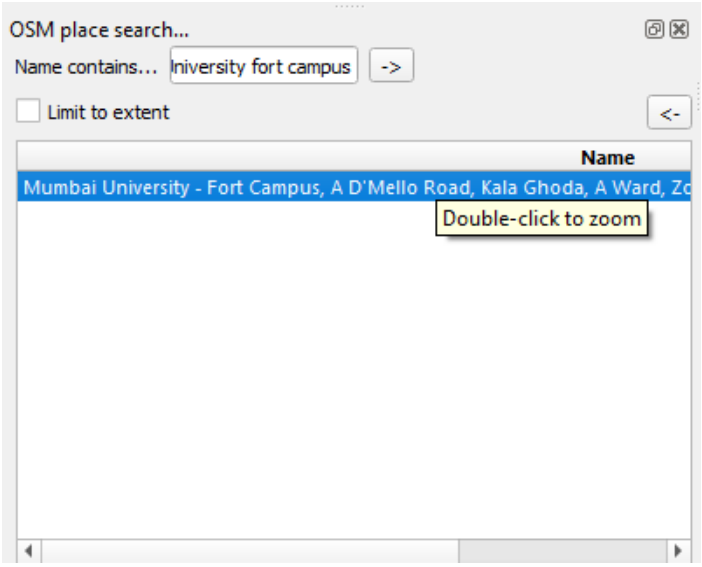


4.D) Searching and Downloading OpenStreetMap Data

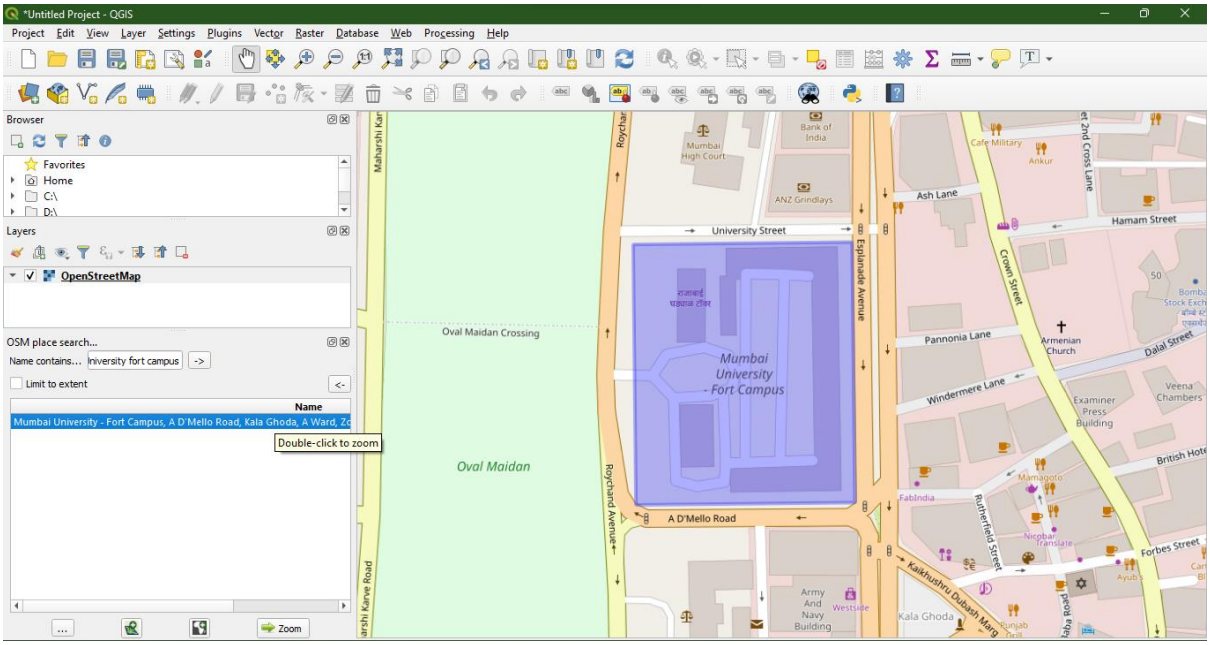
After installing above plugins, go to Web → OpenLayer Plugin and select Open Street Map



Then, search for Mumbai University fort campus



Final OUTPUT:



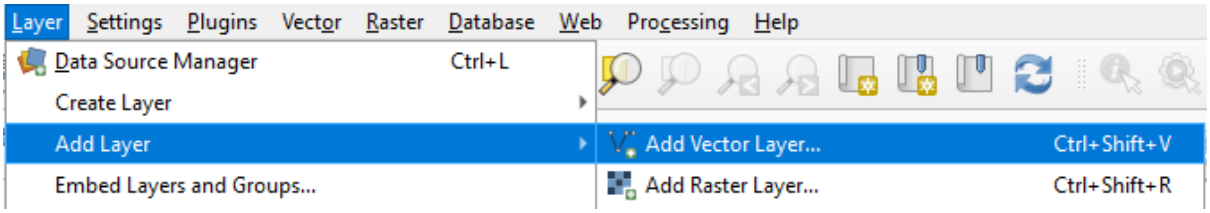
Practical 5

AIM: Working with attributes, terrain Data

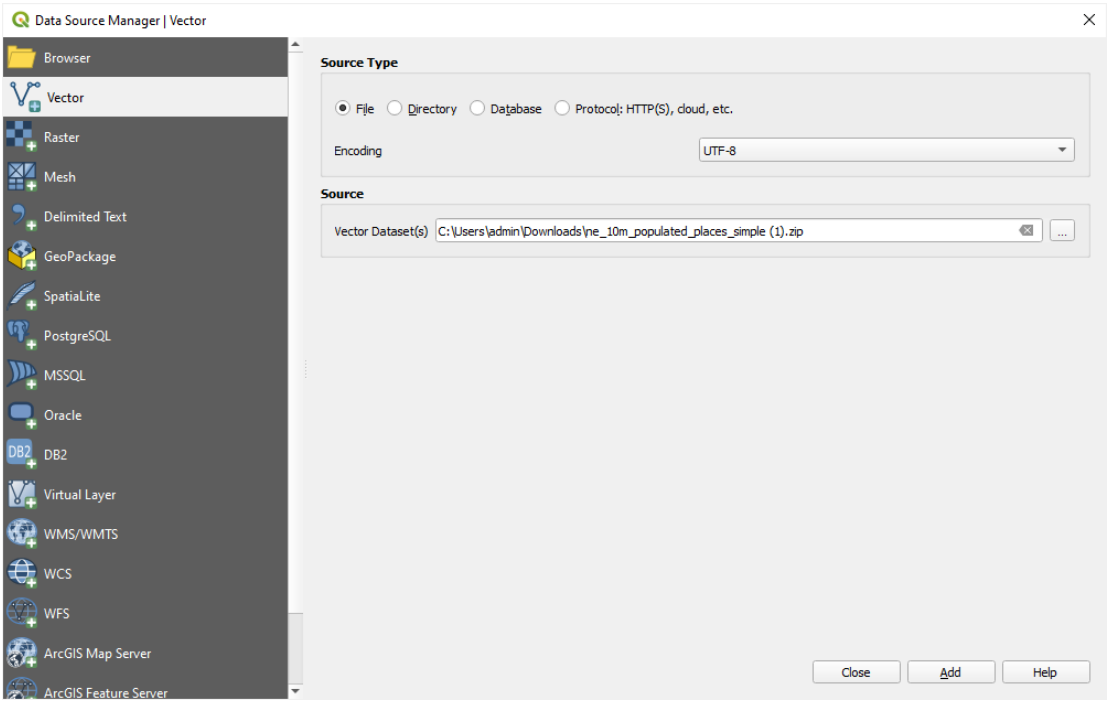
Solution:

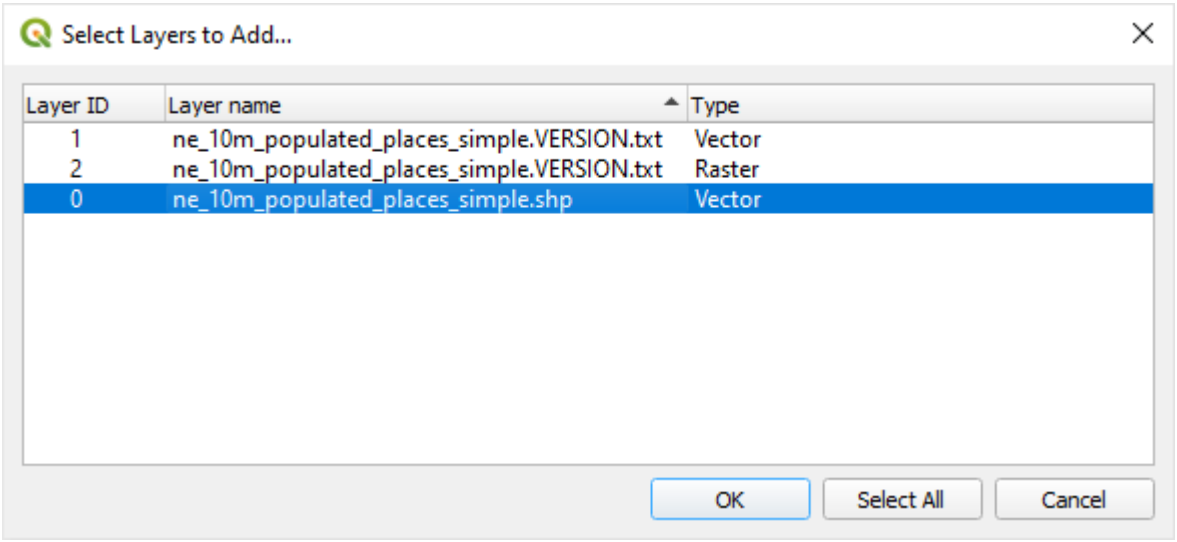
5.A) Steps:

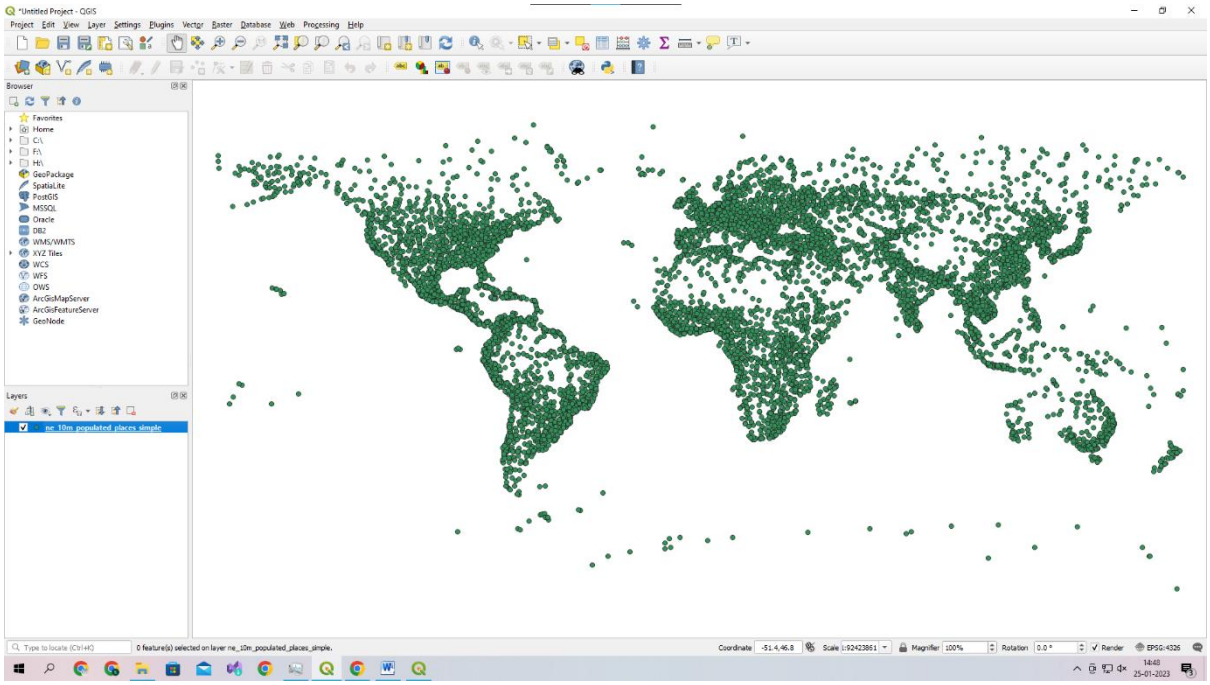
Go to Layer → Add Layer → Add Vector Layer



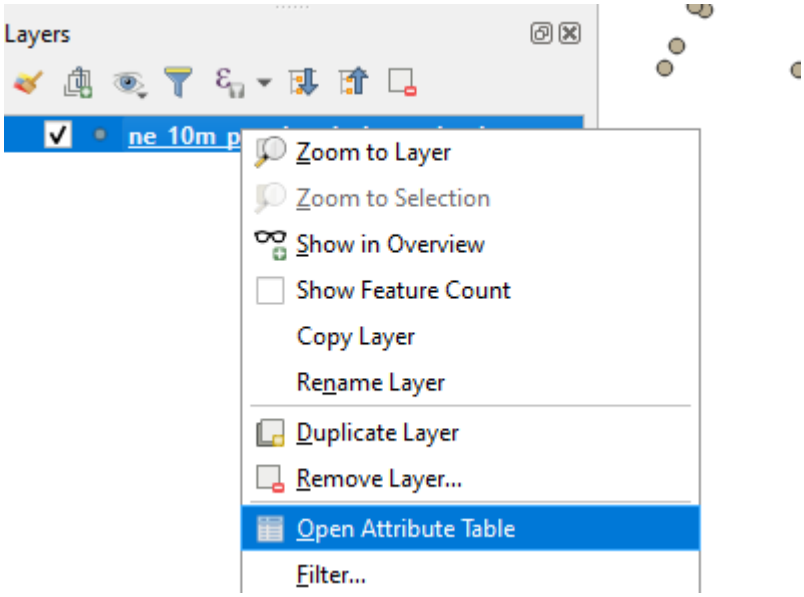
Select ne_10m_populated_places_simple.zip

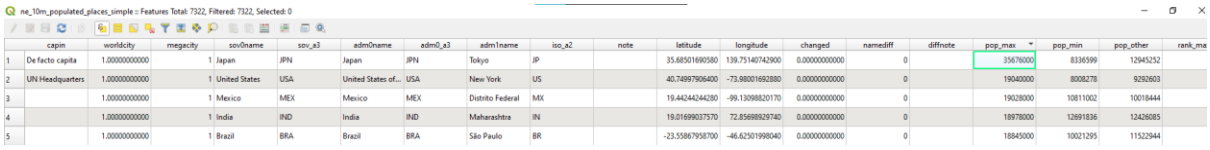






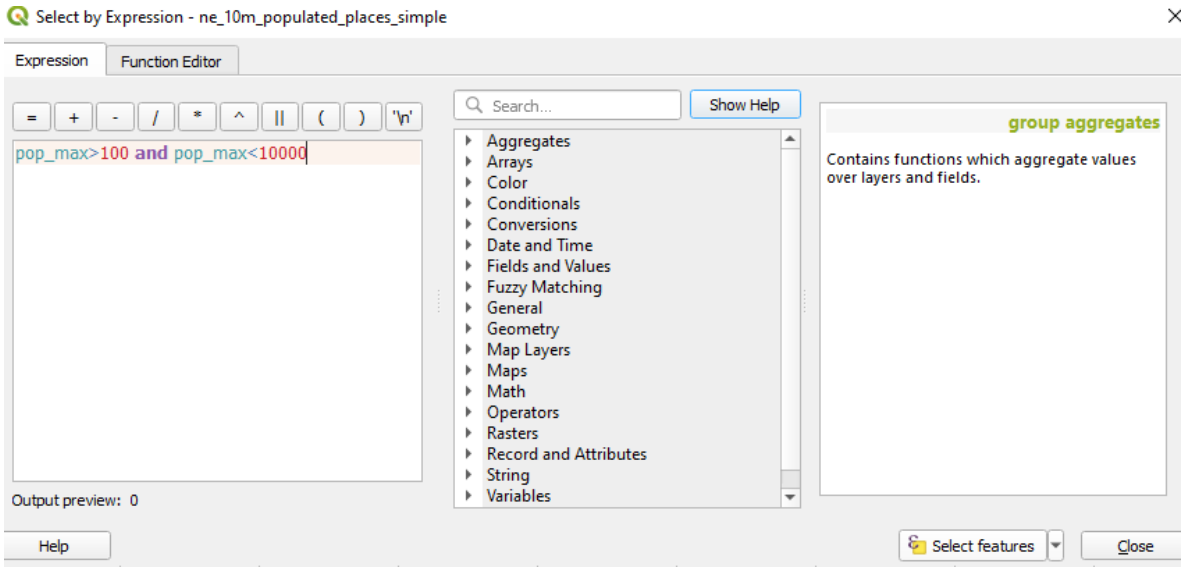
Open attribute table and select “pop_max”



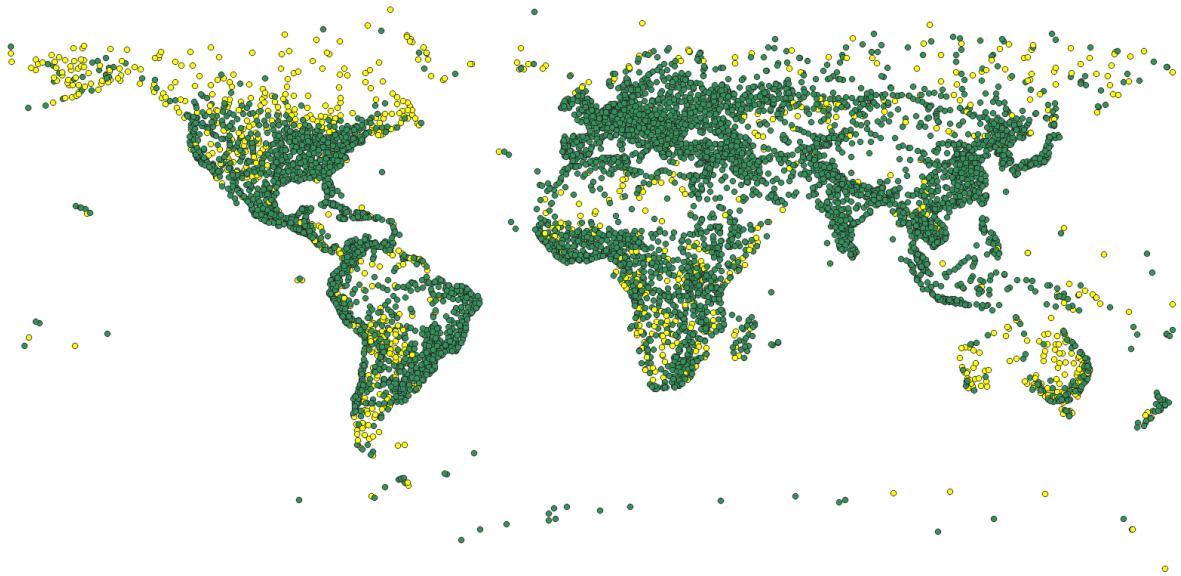


On clicking the Select feature using expression button the following window will appear.

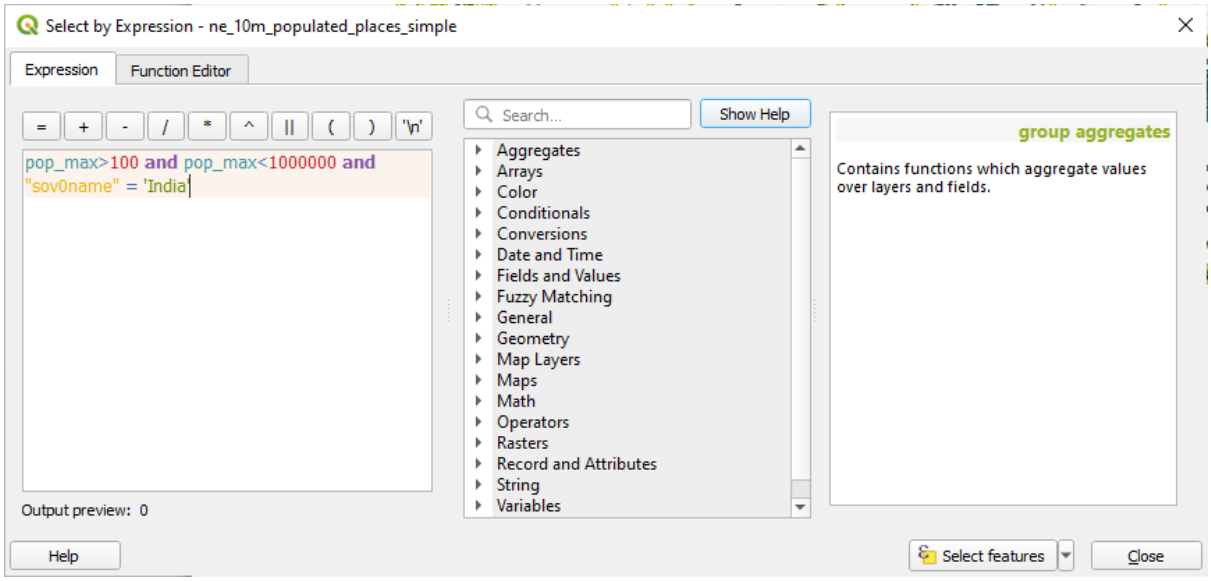
Enter command: pop_max>100 and pop_max<10000 then click on Select Features



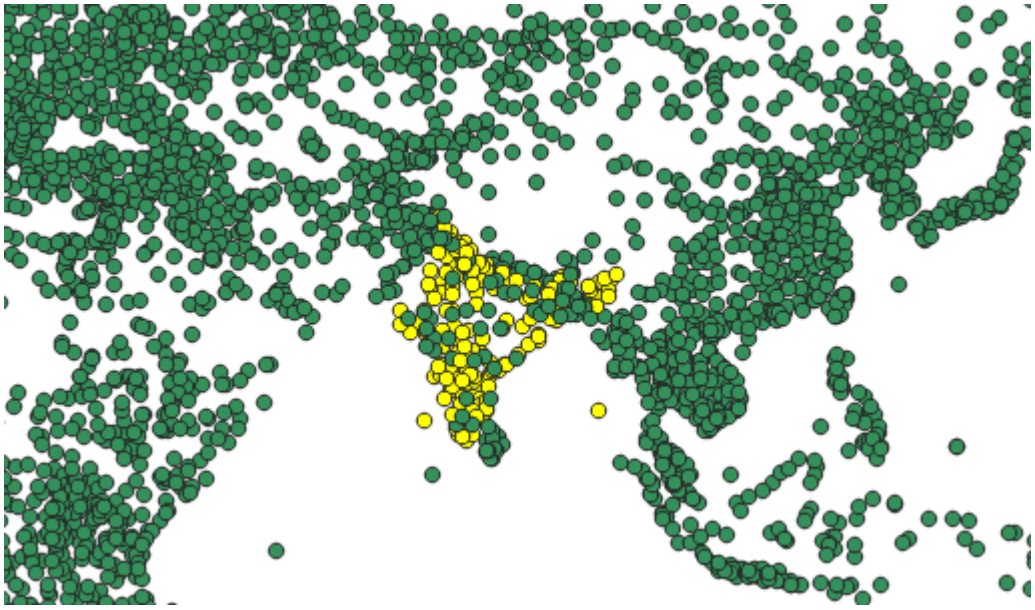
OUTPUT



Query 2: pop_max>100 and pop_max<1000000 and "sov0name" = 'India'



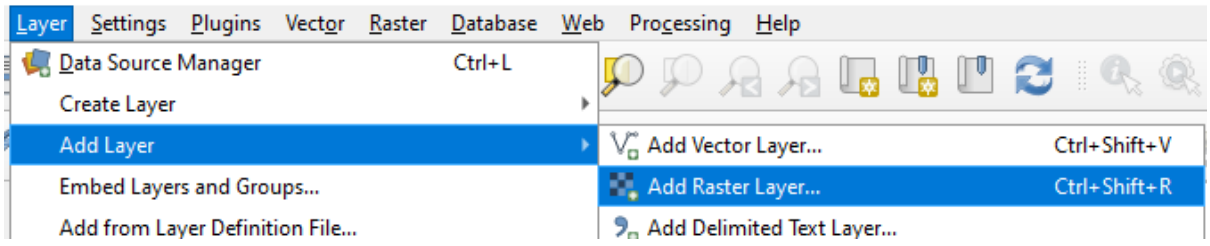
OUTPUT

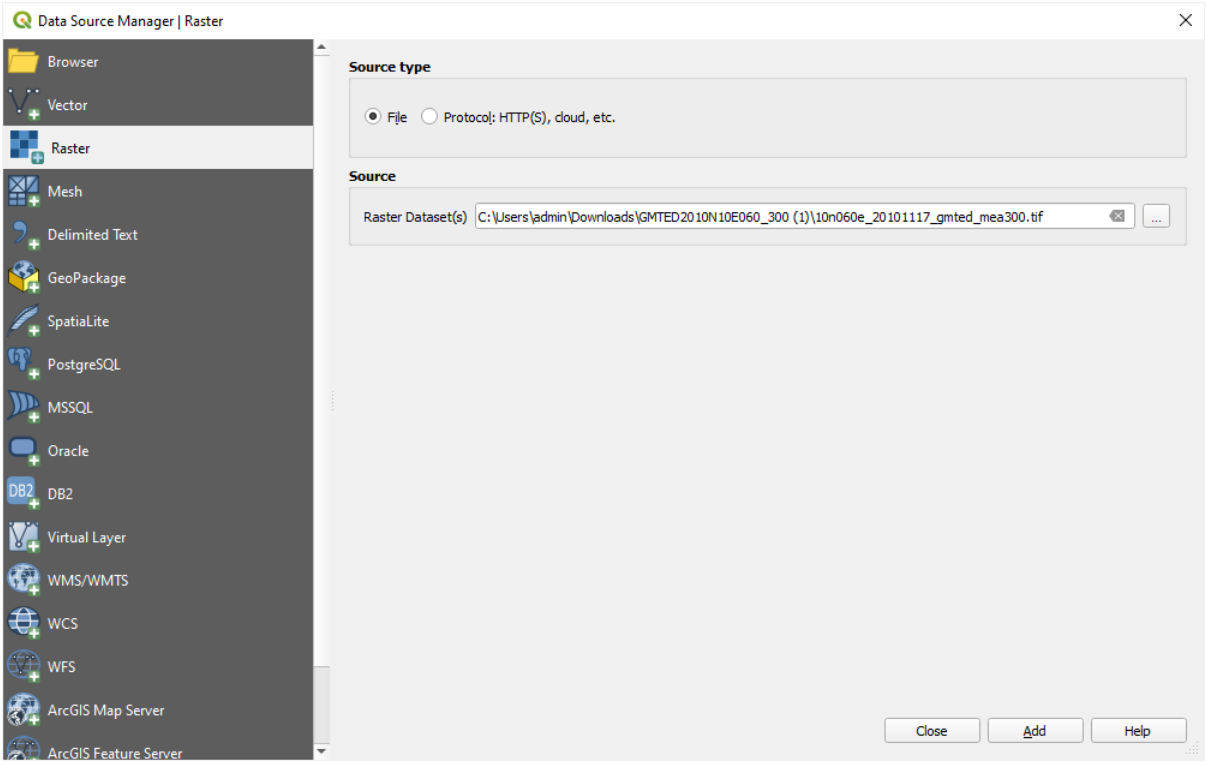


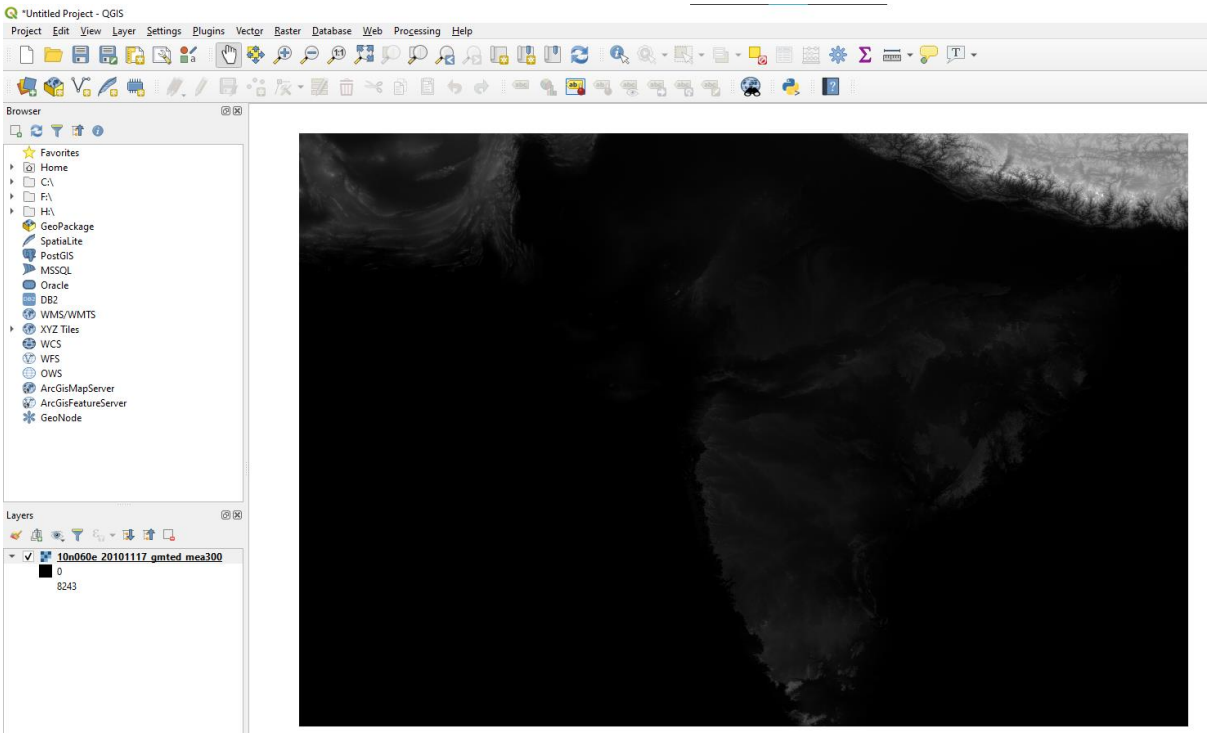
5.B) Terrain Data and Hill shade analysis

Steps:

Go to Layer → Add Raster Layer → select "10n060e_20101117_gmted_mea300.tif", from Data folder

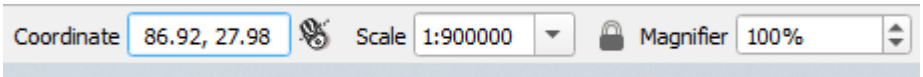


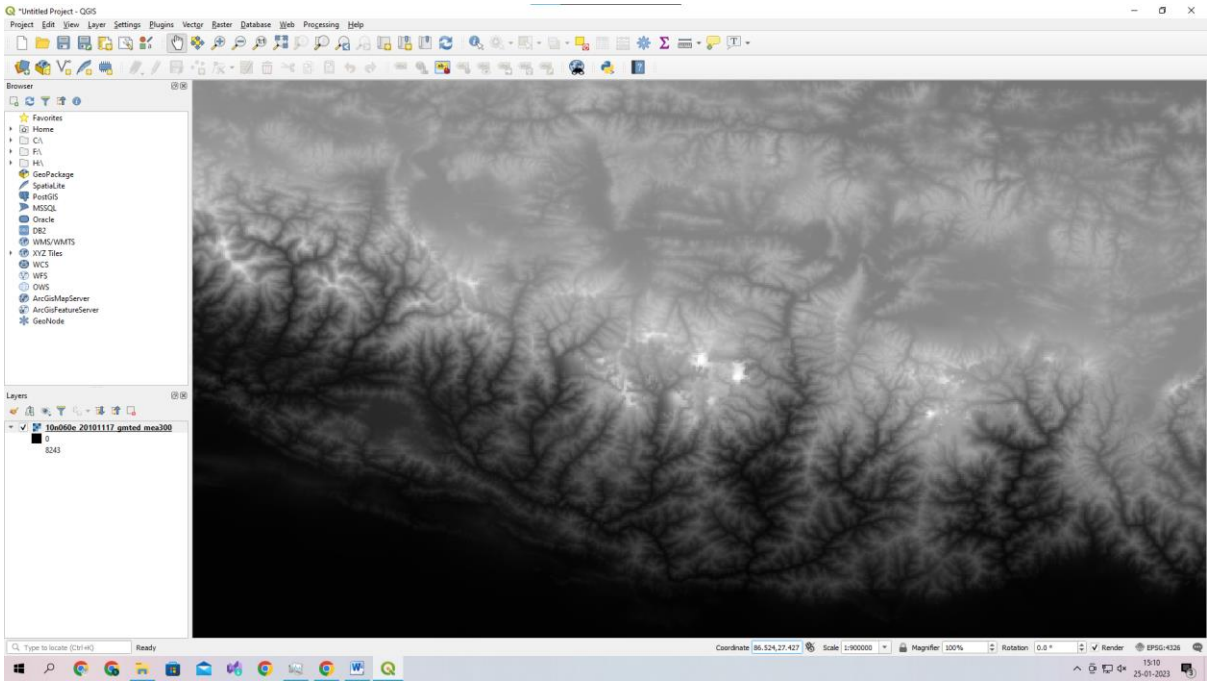




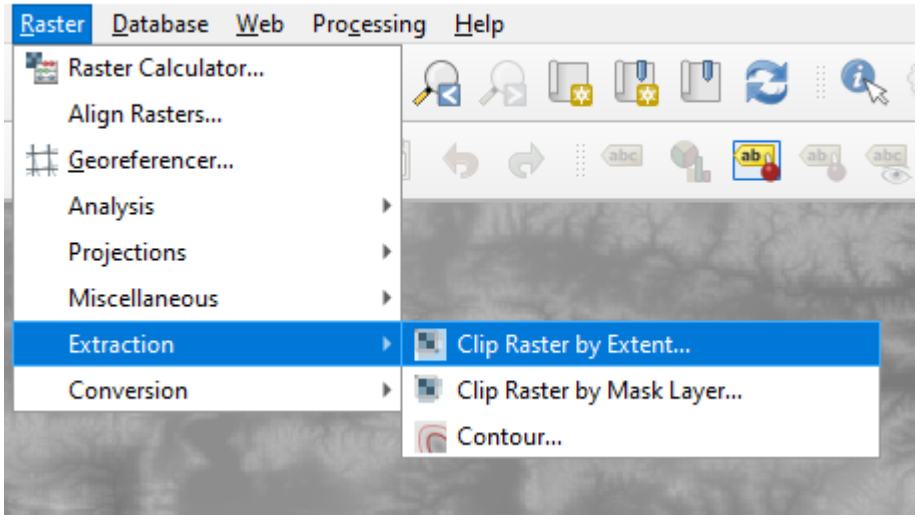
Mt. Everest - is located at the coordinates 27.9881° N, 86.9253° E.

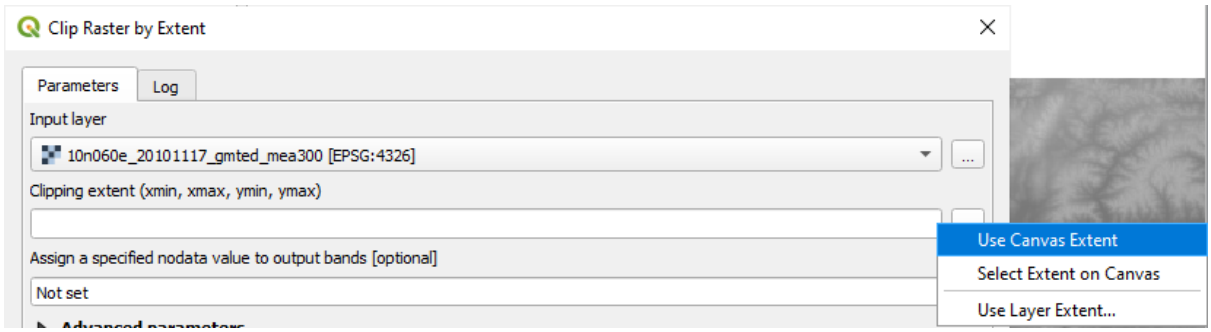
Enter 86.92, 27.98 in the coordinate field, Scale 900000 and Magnifier 100% at the bottom of QGIS.

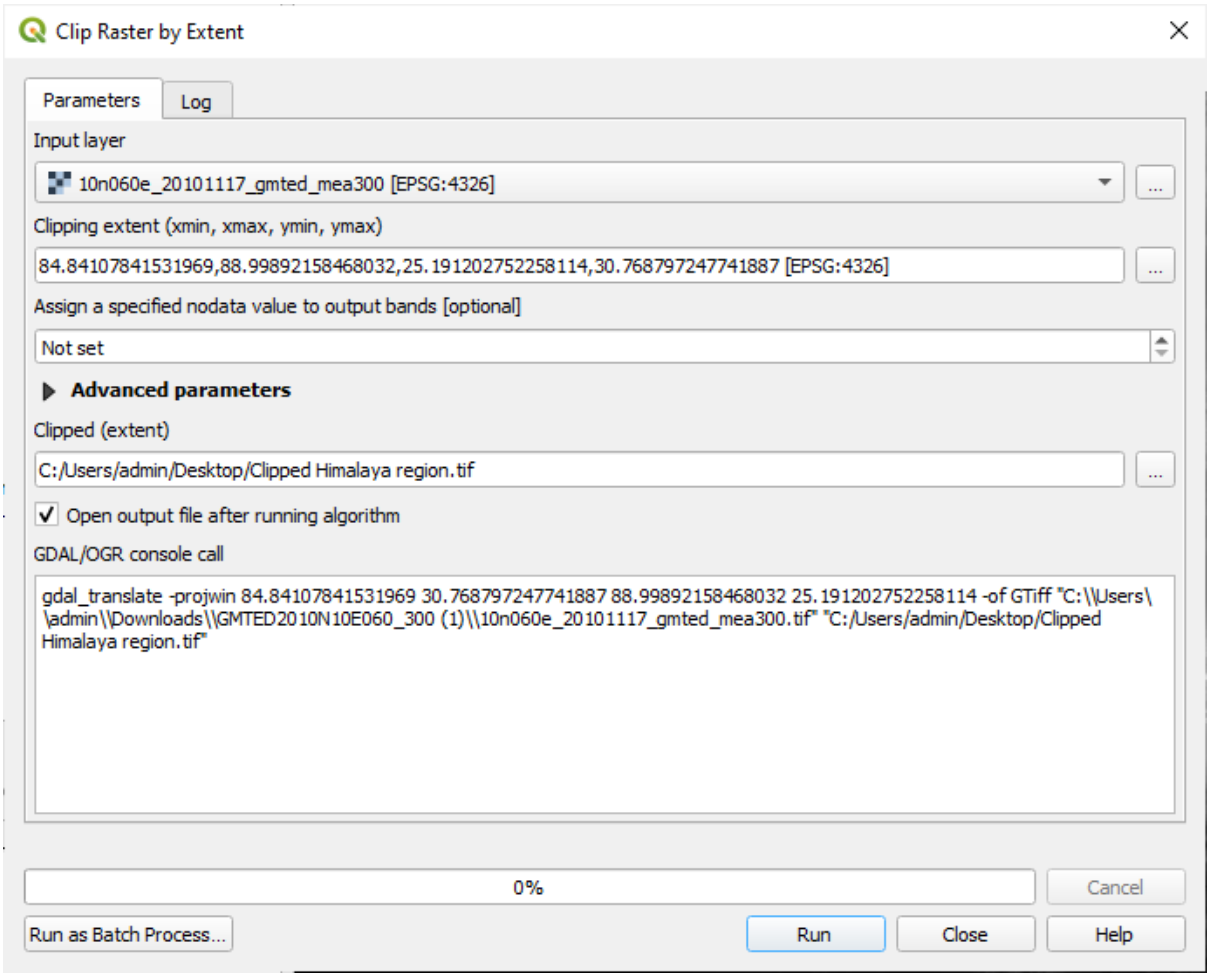


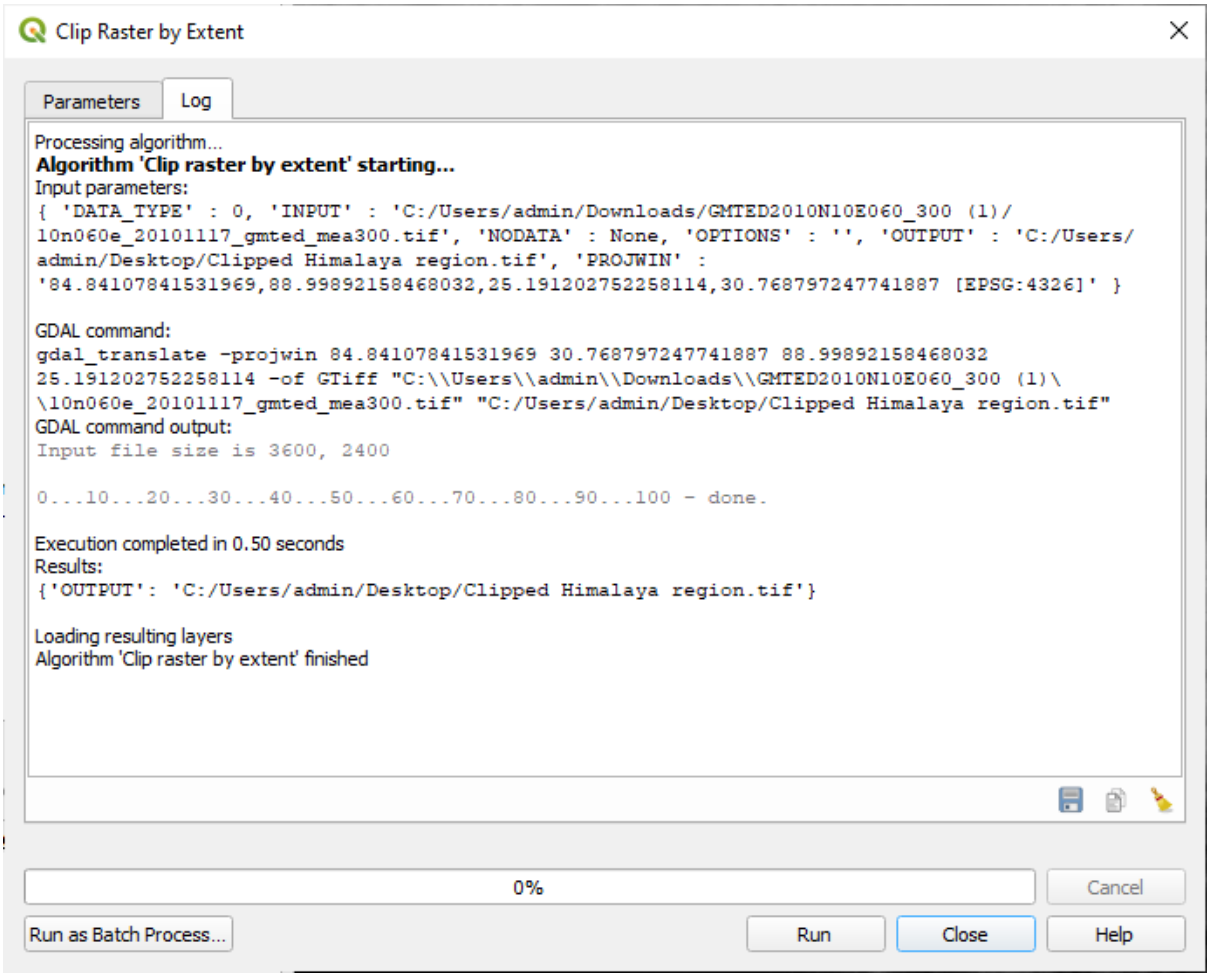


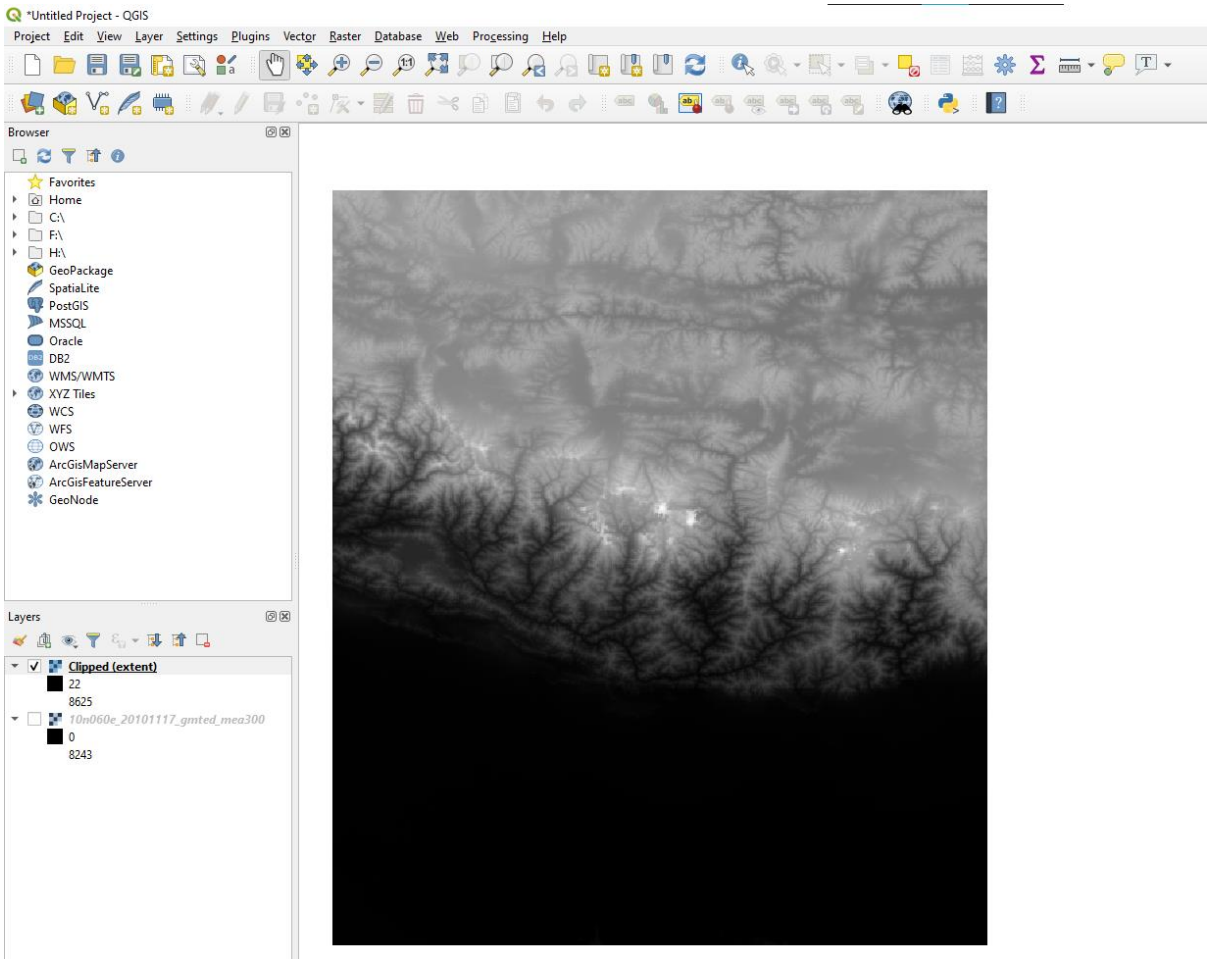
Go to Raster → Extraction→ Clip Raster by Extent



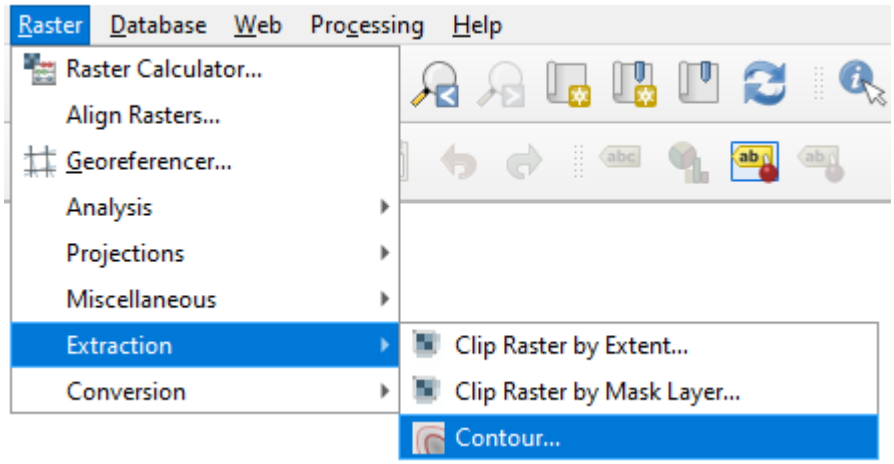


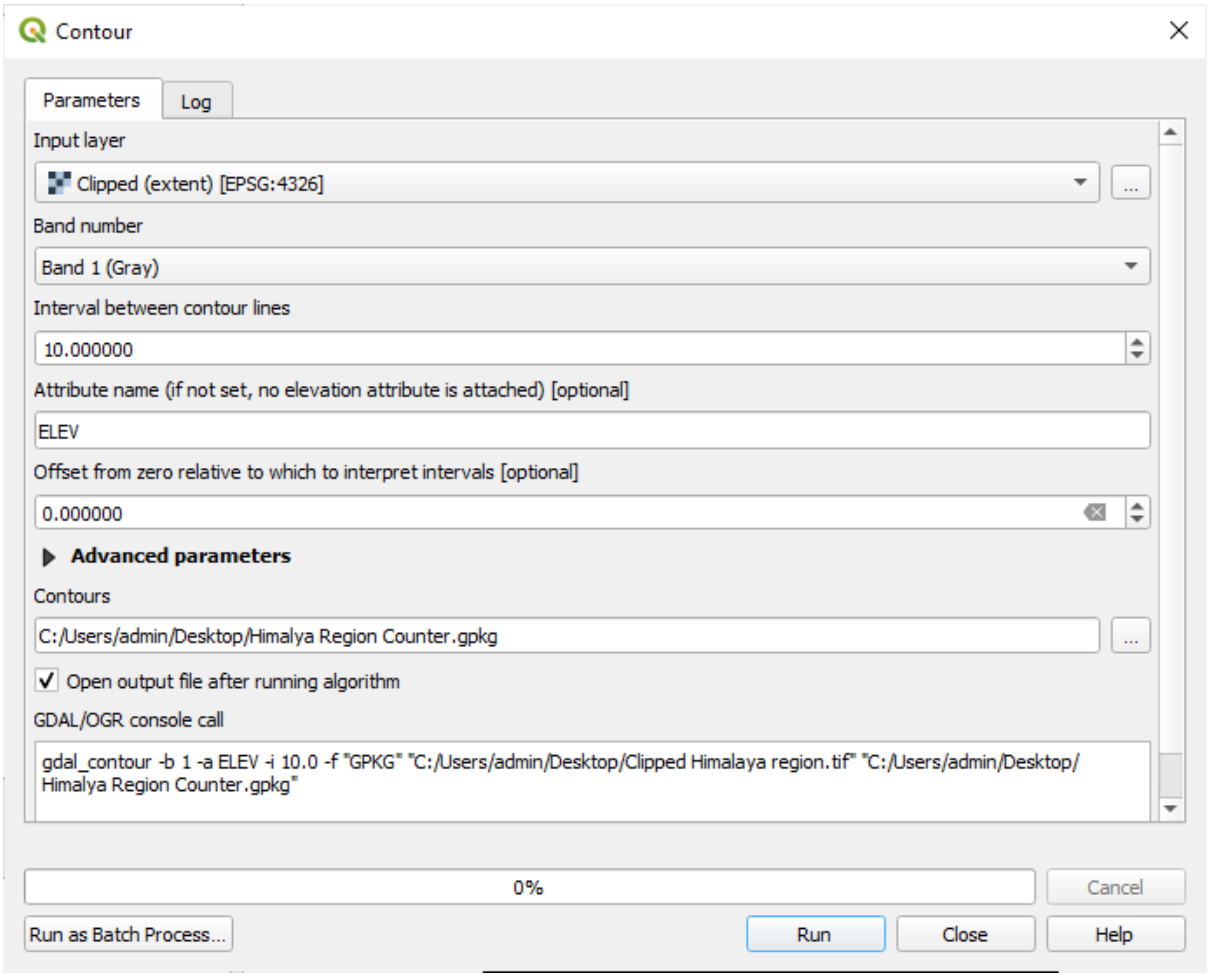

Clip Raster by Extent
Parameters
Log
Input layer
10n060e_20101117_gmted_mea300 [EPSG:4326]
Clipping extent (xmin, xmax, ymin, ymax)
84.84107841531969,88.99892158468032,25.191202752258114,30.768797247741887 [EPSG:4326]
Assign a specified nodata value to output bands [optional]
Not set
Advanced parameters
Clipped (extent)
C:/Users/admin/Desktop/Clipped Himalaya region.tif
Open output file after running algorithm
GDAL/OGR console call
gdal_translate -projwin 84.84107841531969 30.768797247741887 88.99892158468032 25.191202752258114 -of GTiff "C:\\Users\
\admin\\Downloads\\GMTED2010N10E060_300 (1)\\10n060e_20101117_gmted_mea300.tif" "C:/Users/admin/Desktop/Clipped
Himalaya region.tif"
0%
Cancel
Run as Batch Process...
Run
Close
Help

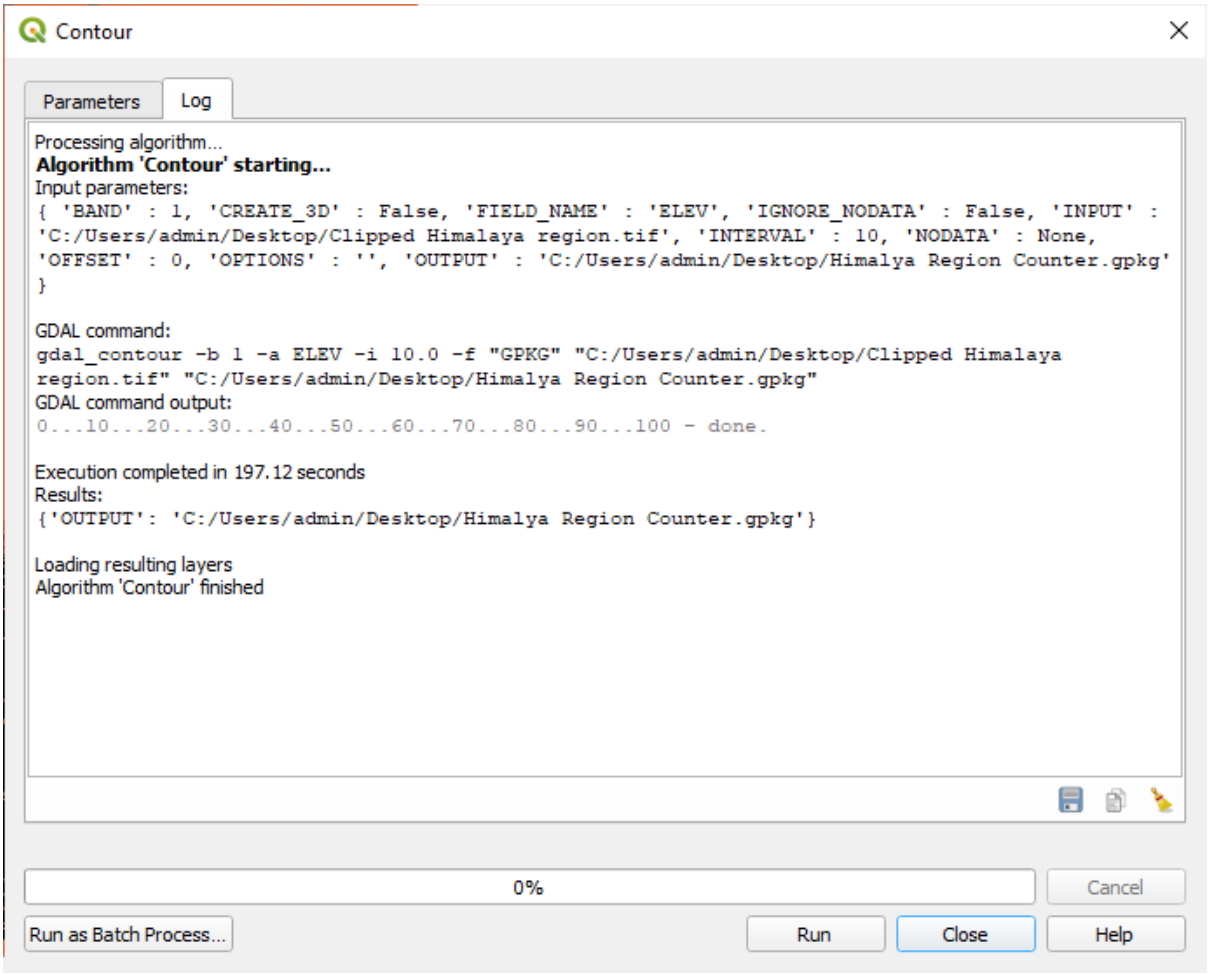

Clip Raster by Extent
Parameters
Log
Processing algorithm...
Algorithm 'Clip raster by extent' starting...
Input parameters:
{ 'DATA_TYPE' : 0, 'INPUT' : 'C:/Users/admin/Downloads/GMTED2010N10E060_300 (1)/
10n060e_20101117_gmted_mea300.tif', 'NODATA' : None, 'OPTIONS' : '', 'OUTPUT' : 'C:/Users/
admin/Desktop/Clipped Himalaya region.tif', 'PROJWIN' :
'84.84107841531969,88.99892158468032,25.191202752258114,30.768797247741887 [EPSG:4326]' }
GDAL command:
gdal_translate -projwin 84.84107841531969 30.768797247741887 88.99892158468032
25.191202752258114 -of GTiff "C:\\Users\\admin\\Downloads\\GMTED2010N10E060_300 (1)\
\10n060e_20101117_gmted_mea300.tif" "C:/Users/admin/Desktop/Clipped Himalaya region.tif"
GDAL command output:
Input file size is 3600, 2400
0...10...20...30...40...50...60...70...80...90...100 - done.
Execution completed in 0.50 seconds
Results:
{'OUTPUT': 'C:/Users/admin/Desktop/Clipped Himalaya region.tif'}
Loading resulting layers
Algorithm 'Clip raster by extent' finished
0%
Cancel
Run as Batch Process...
Run
Close
Help

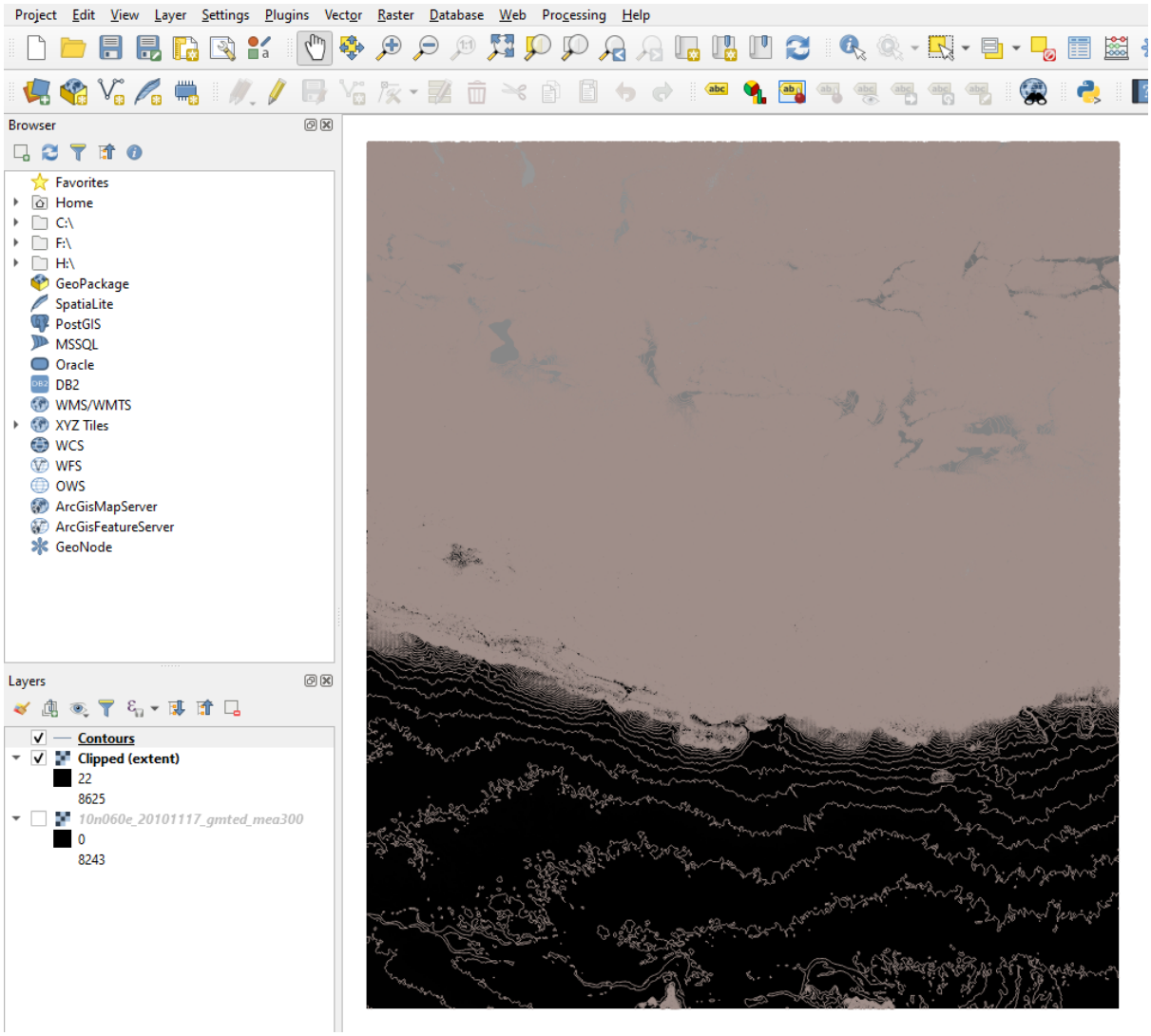


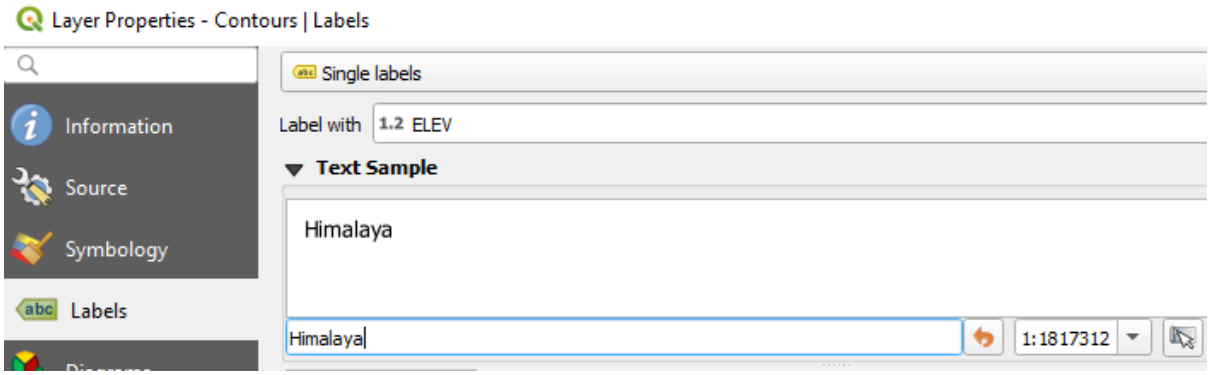
To derive counter lines from given raster.

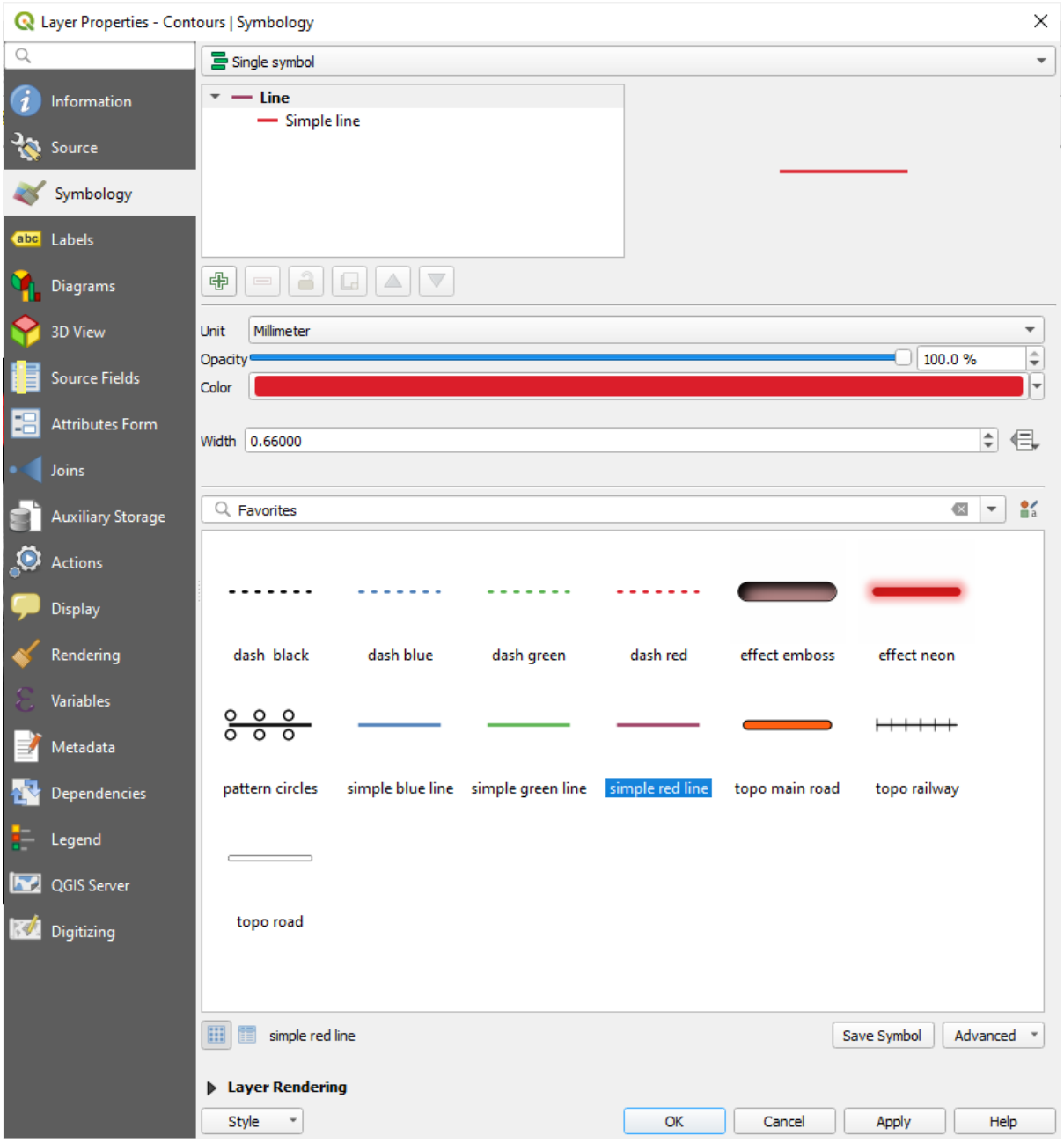


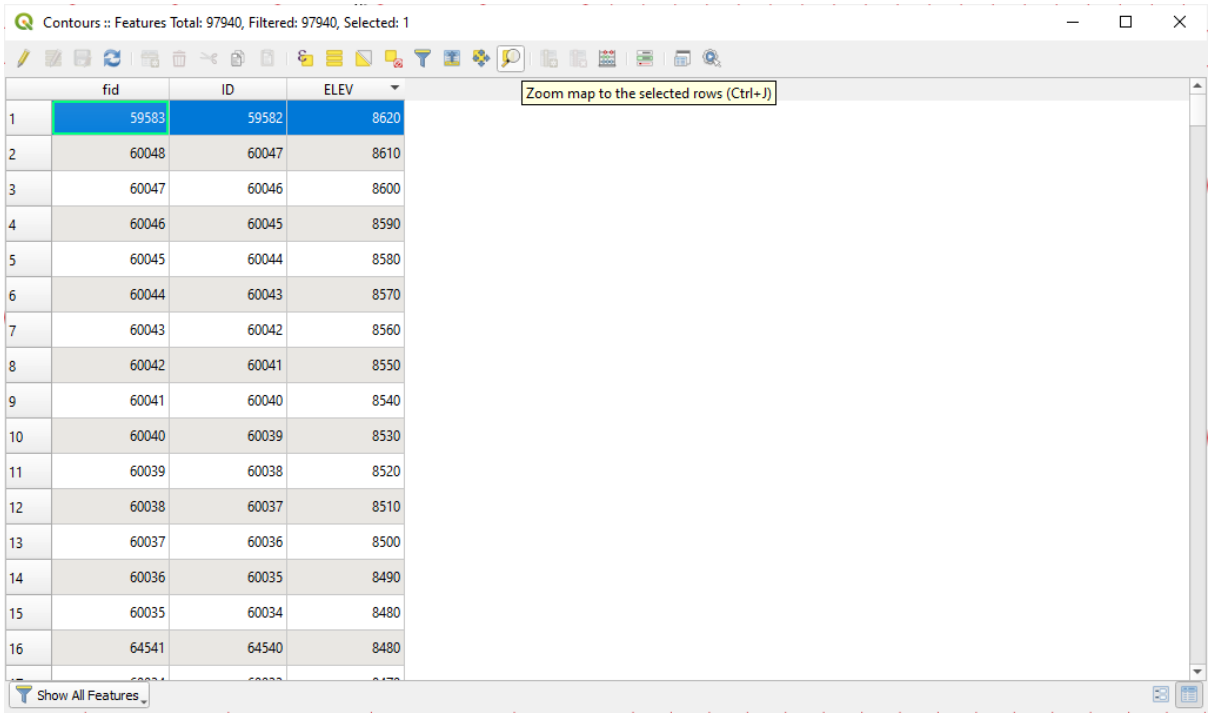

Contour
Parameters
Log
Input layer
Clipped (extent) [EPSG:4326]
Band number
Band 1 (Gray)
Interval between contour lines
10.000000
Attribute name (if not set, no elevation attribute is attached) [optional]
ELEV
Offset from zero relative to which to interpret intervals [optional]
0.000000
Advanced parameters
Contours
C:/Users/admin/Desktop/Himalya Region Counter.gpkg
Open output file after running algorithm
GDAL/OGR console call
gdal_contour -b 1 -a ELEV -i 10.0 -f "GPKG" "C:/Users/admin/Desktop/Clipped Himalaya region.tif" "C:/Users/admin/Desktop/Himalya Region Counter.gpkg"
0%
Cancel
Run as Batch Process...
Run
Close
Help


Contour
Parameters
Log
Processing algorithm...
Algorithm 'Contour' starting...
Input parameters:
{ 'BAND' : 1, 'CREATE_3D' : False, 'FIELD_NAME' : 'ELEV', 'IGNORE_NODATA' : False, 'INPUT' : 'C:/Users/admin/Desktop/Clipped Himalaya region.tif', 'INTERVAL' : 10, 'NODATA' : None, 'OFFSET' : 0, 'OPTIONS' : '', 'OUTPUT' : 'C:/Users/admin/Desktop/Himalya Region Counter.gpkg' }
GDAL command:
gdal_contour -b 1 -a ELEV -i 10.0 -f "GPKG" "C:/Users/admin/Desktop/Clipped Himalaya region.tif" "C:/Users/admin/Desktop/Himalya Region Counter.gpkg"
GDAL command output:
0...10...20...30...40...50...60...70...80...90...100 - done.
Execution completed in 197.12 seconds
Results:
{'OUTPUT': 'C:/Users/admin/Desktop/Himalya Region Counter.gpkg'}
Loading resulting layers
Algorithm 'Contour' finished
0%
Cancel
Run as Batch Process...
Run
Close
Help

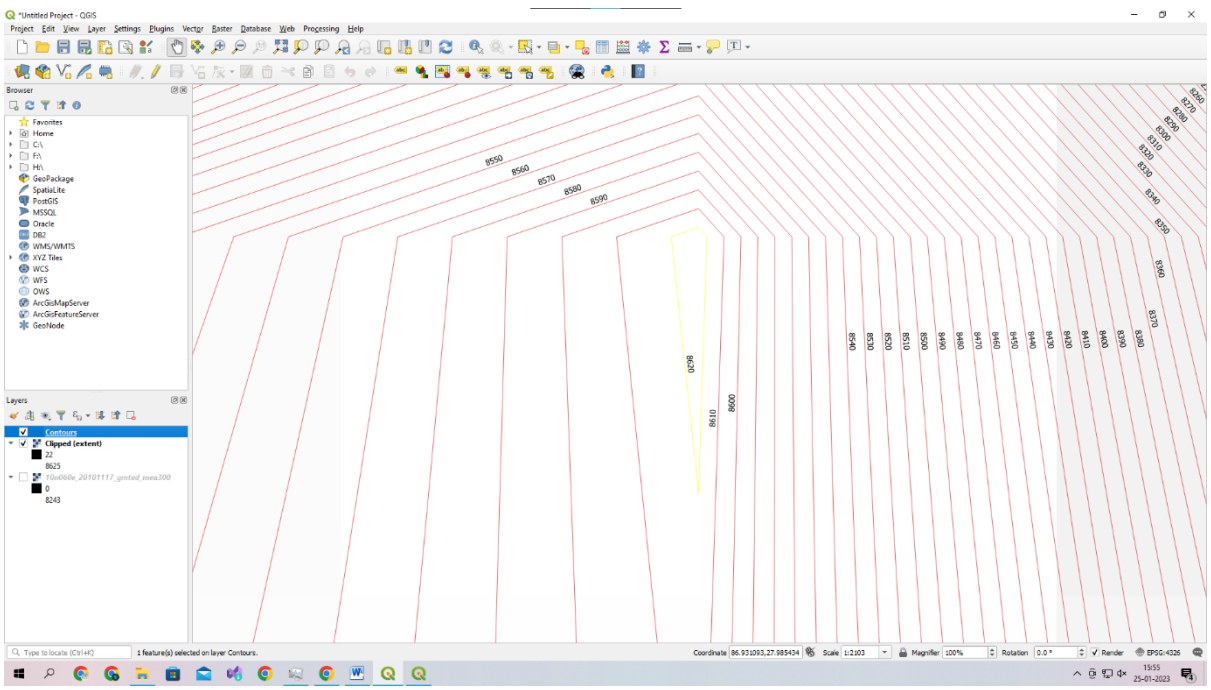

Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help
Browser
Favorites
Home
C:\
F:\
H:\
GeoPackage
SpatiaLite
PostGIS
MSSQL
Oracle
DB2
WMS/WMTS
XYZ Tiles
WCS
WFS
OWS
ArcGisMapServer
ArcGisFeatureServer
GeoNode
Layers
Contours
Clipped (extent)
22
8625
10n060e_20101117_gmted_mea300
0
8243


Layer Properties - Contours | Labels
Information
Source
Symbology
Labels
Single labels
Label with
1.2 ELEV
Text Sample
Himalaya
Himalaya
1:1817312

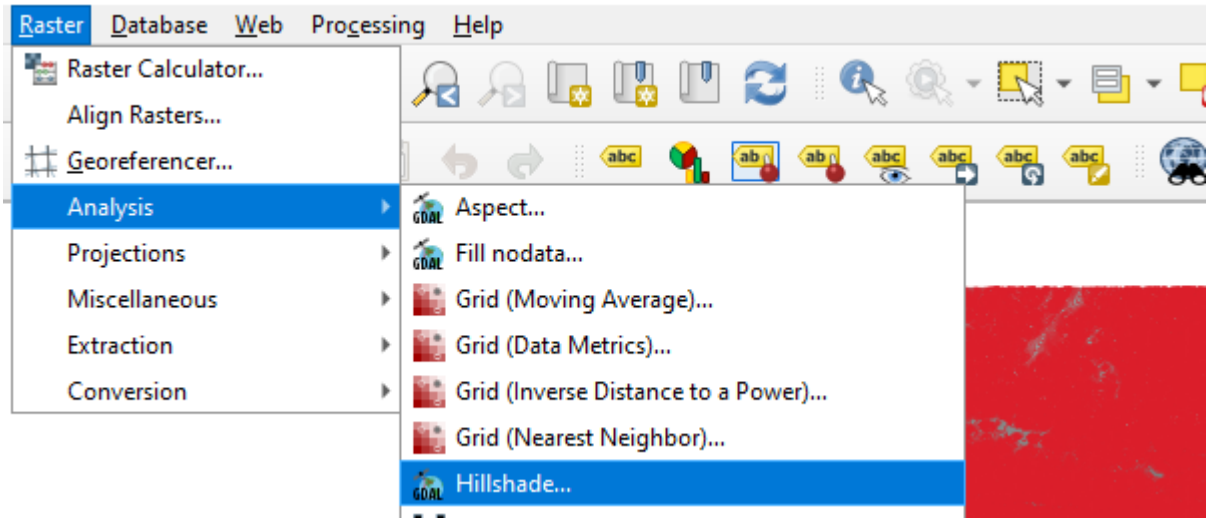

Layer Properties - Contours | Symbology
Information
Source
Symbology
Labels
Diagrams
3D View
Source Fields
Attributes Form
Joins
Auxiliary Storage
Actions
Display
Rendering
Variables
Metadata
Dependencies
Legend
QGIS Server
Digitizing
Single symbol
Line
Simple line
Unit
Millimeter
Opacity
100.0 %
Color
Width
0.66000
Favorites
dash black
dash blue
dash green
dash red
effect emboss
effect neon
pattern circles
simple blue line
simple green line
simple red line
topo main road
topo railway
topo road
simple red line
Save Symbol
Advanced
Layer Rendering
Style
OK
Cancel
Apply
Help

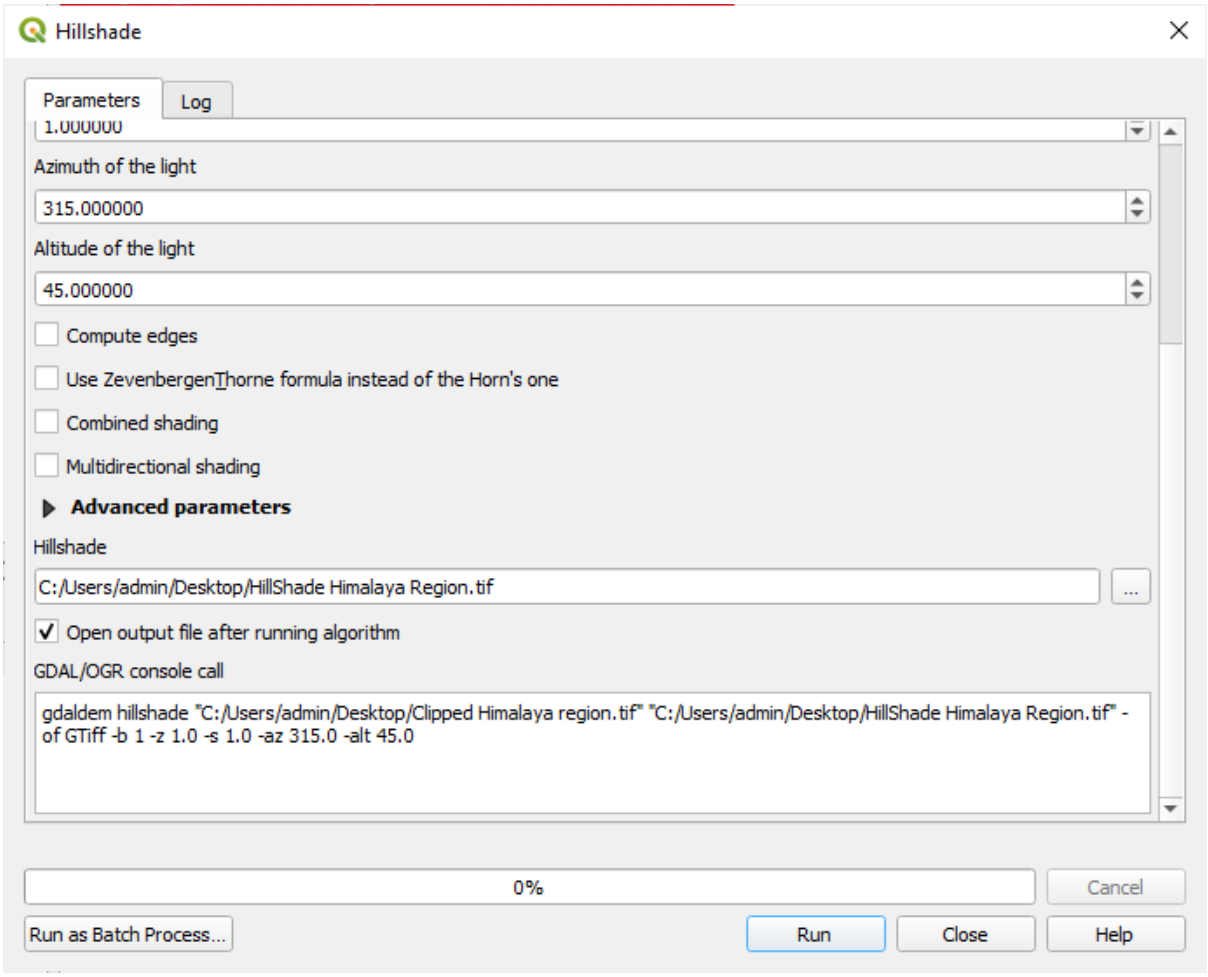


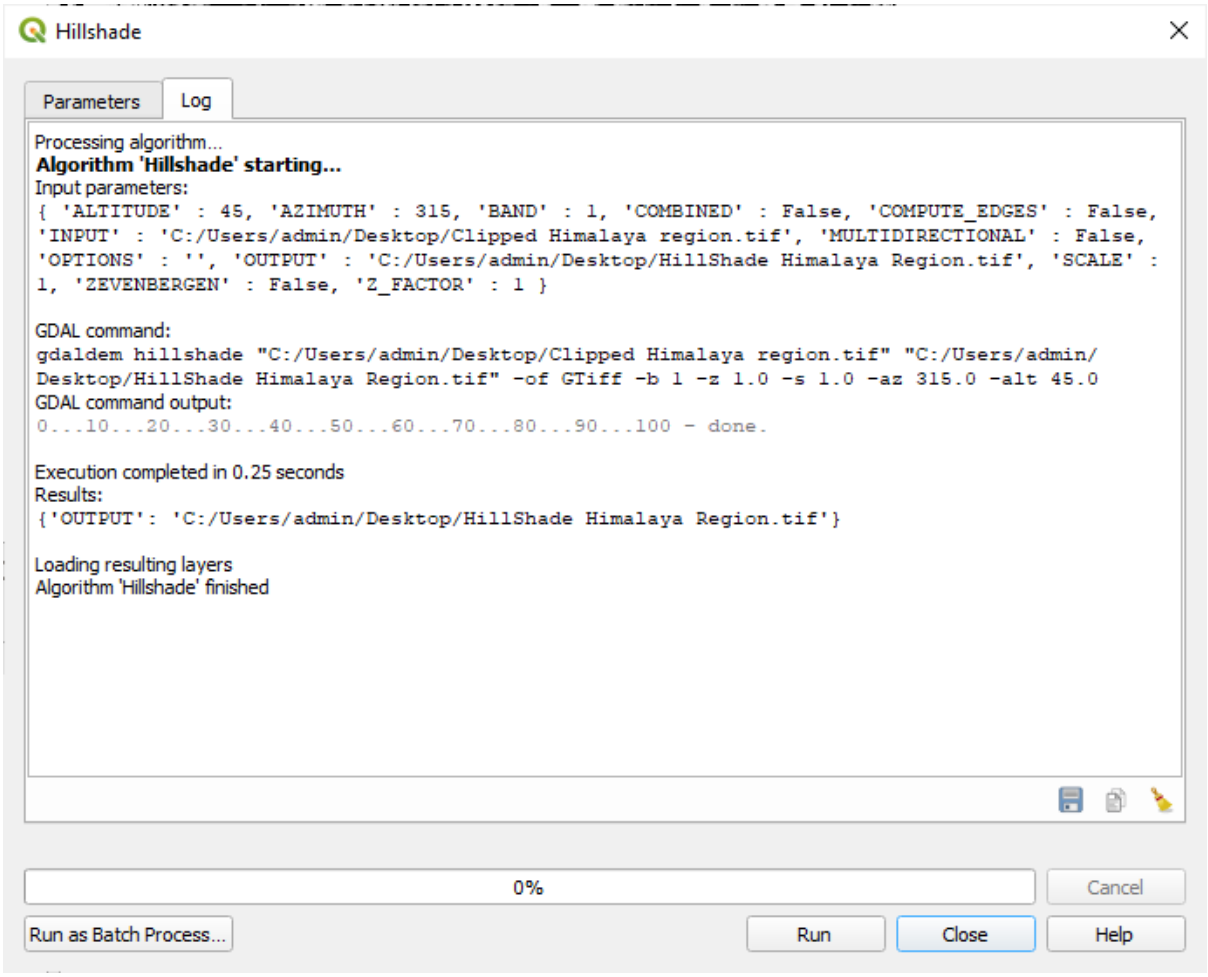
	fid	ID	ELEV
1	59583	59582	8620
2	60048	60047	8610
3	60047	60046	8600
4	60046	60045	8590
5	60045	60044	8580
6	60044	60043	8570
7	60043	60042	8560
8	60042	60041	8550
9	60041	60040	8540
10	60040	60039	8530
11	60039	60038	8520
12	60038	60037	8510
13	60037	60036	8500
14	60036	60035	8490
15	60035	60034	8480
16	64541	64540	8480



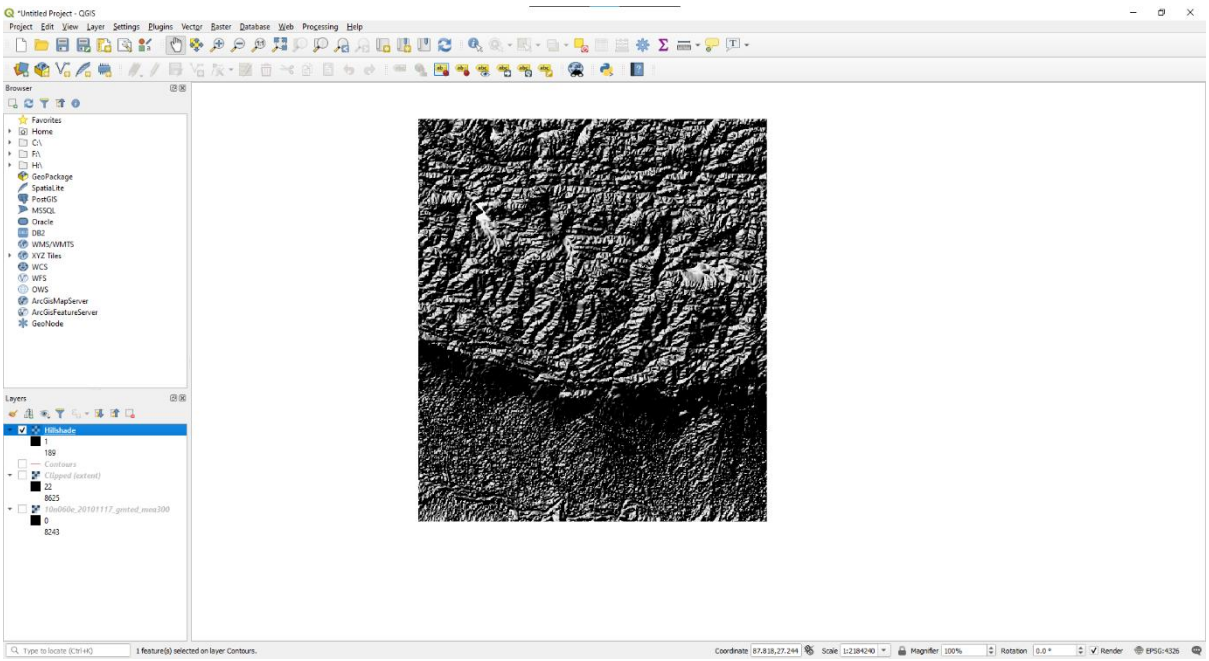
Hillshade


Raster
Database
Web
Processing
Help
Raster Calculator...
Align Rasters...
Georeferencer...
Analysis
Projections
Miscellaneous
Extraction
Conversion
Aspect...
Fill nodata...
Grid (Moving Average)...
Grid (Data Metrics)...
Grid (Inverse Distance to a Power)...
Grid (Nearest Neighbor)...
Hillshade...


Hillshade
Parameters
Log
1.000000
Azimuth of the light
315.000000
Altitude of the light
45.000000
Compute edges
Use ZevenbergenThorne formula instead of the Horn's one
Combined shading
Multidirectional shading
Advanced parameters
Hillshade
C:/Users/admin/Desktop/HillShade Himalaya Region.tif
Open output file after running algorithm
GDAL/OGR console call
gdaldem hillshade "C:/Users/admin/Desktop/Clipped Himalaya region.tif" "C:/Users/admin/Desktop/HillShade Himalaya Region.tif" -of GTiff -b 1 -z 1.0 -s 1.0 -az 315.0 -alt 45.0
0%
Cancel
Run as Batch Process...
Run
Close
Help


Hillshade
Parameters
Log
Processing algorithm...
Algorithm 'Hillshade' starting...
Input parameters:
{ 'ALTITUDE' : 45, 'AZIMUTH' : 315, 'BAND' : 1, 'COMBINED' : False, 'COMPUTE_EDGES' : False, 'INPUT' : 'C:/Users/admin/Desktop/Clipped Himalaya region.tif', 'MULTIDIRECTIONAL' : False, 'OPTIONS' : '', 'OUTPUT' : 'C:/Users/admin/Desktop/HillShade Himalaya Region.tif', 'SCALE' : 1, 'ZEVENBERGEN' : False, 'Z_FACTOR' : 1 }
GDAL command:
gdaldem hillshade "C:/Users/admin/Desktop/Clipped Himalaya region.tif" "C:/Users/admin/Desktop/HillShade Himalaya Region.tif" -of GTiff -b 1 -z 1.0 -s 1.0 -az 315.0 -alt 45.0
GDAL command output:
0...10...20...30...40...50...60...70...80...90...100 - done.
Execution completed in 0.25 seconds
Results:
{'OUTPUT': 'C:/Users/admin/Desktop/HillShade Himalaya Region.tif'}
Loading resulting layers
Algorithm 'Hillshade' finished
0%
Cancel
Run as Batch Process...
Run
Close
Help

OUTPUT



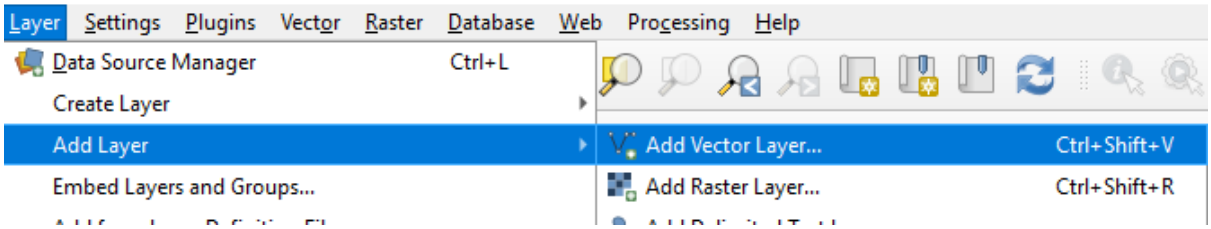
OUTPUT

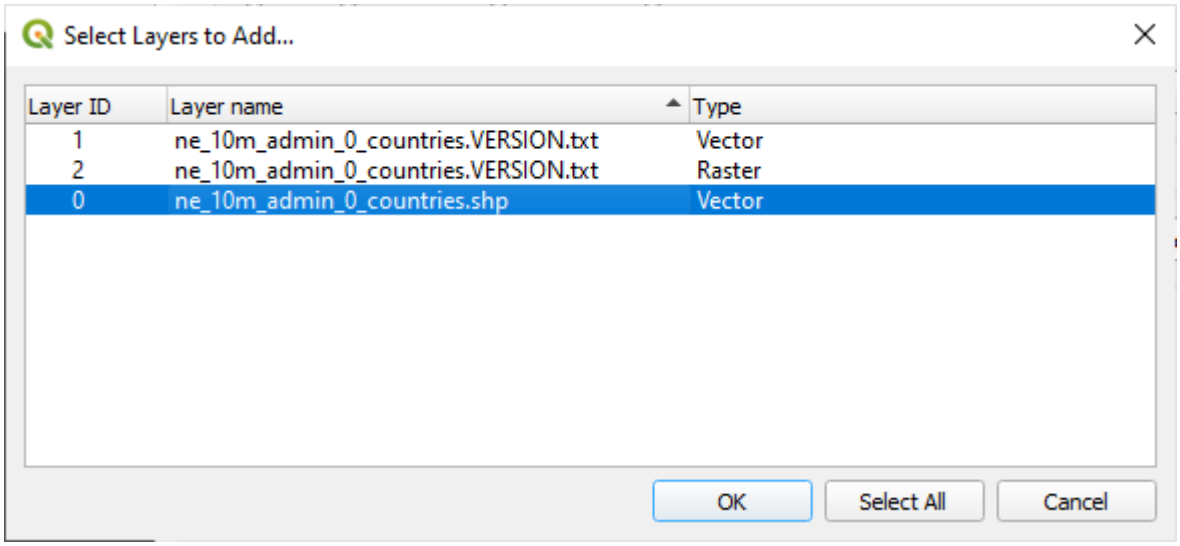
Practical 6

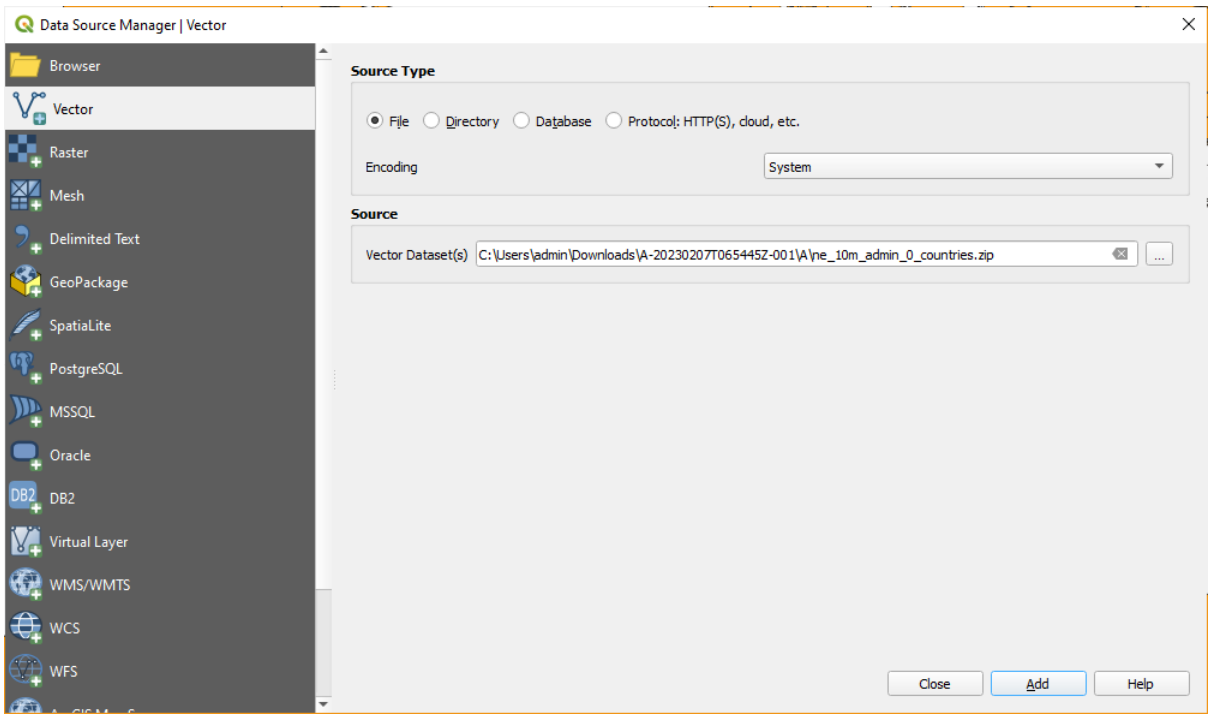
AIM: Working with Projections and WMS Data

Solution:

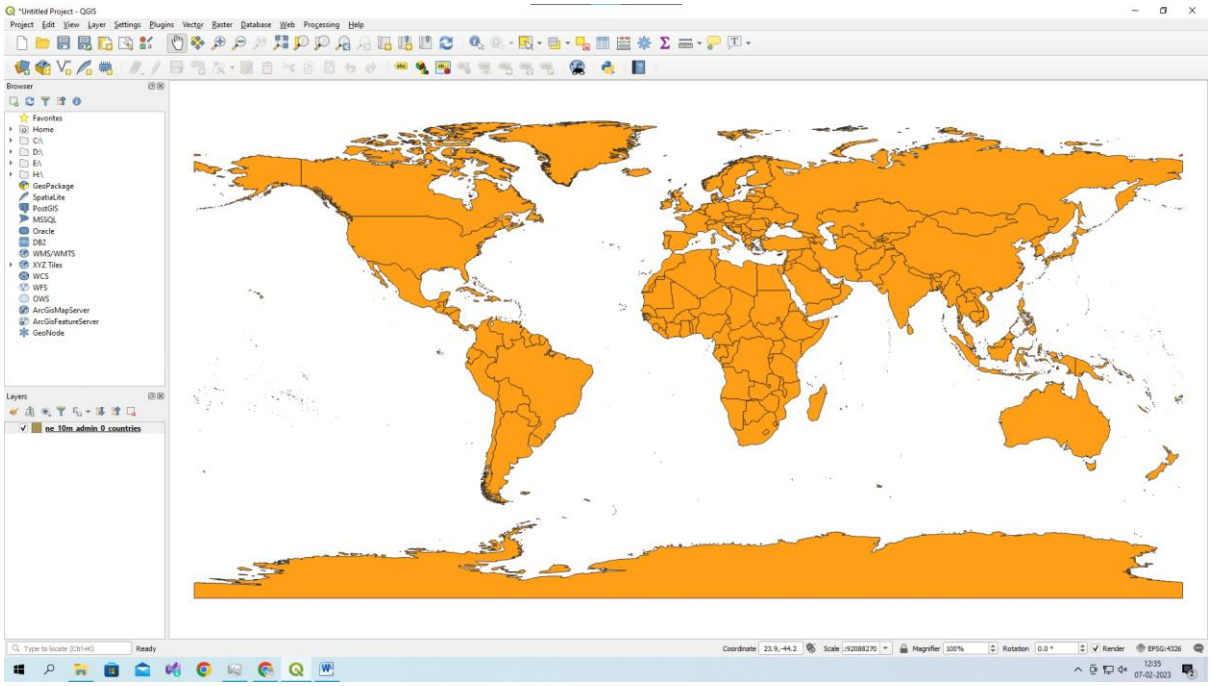
Add vector layer





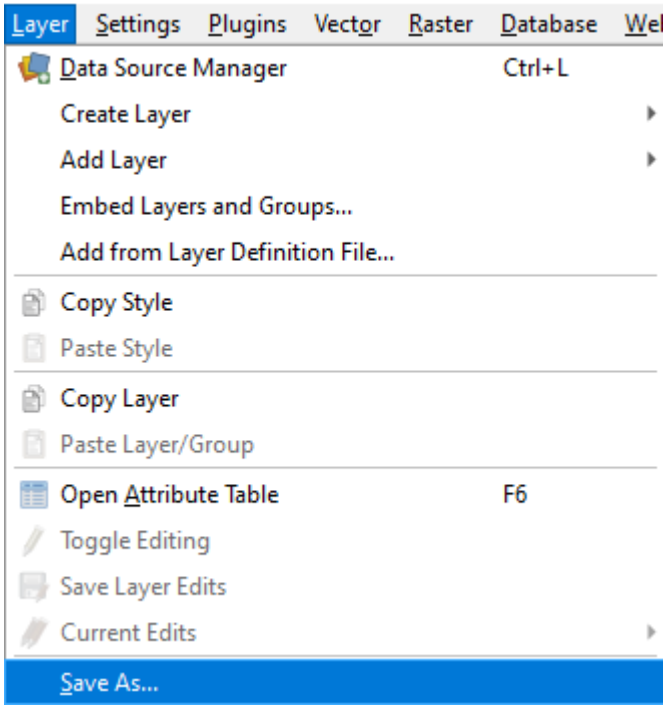


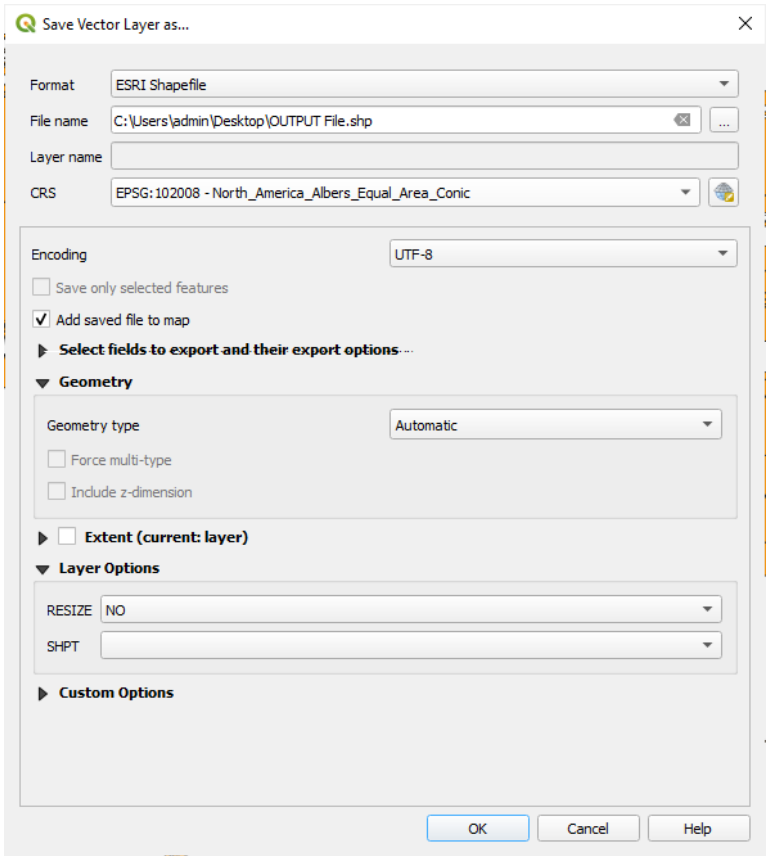
Map:

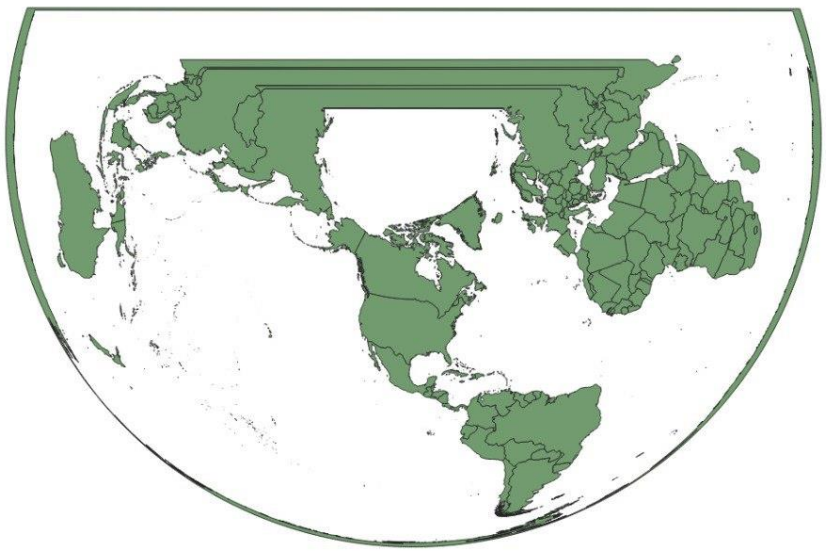


Now, go to Layer -> Save as

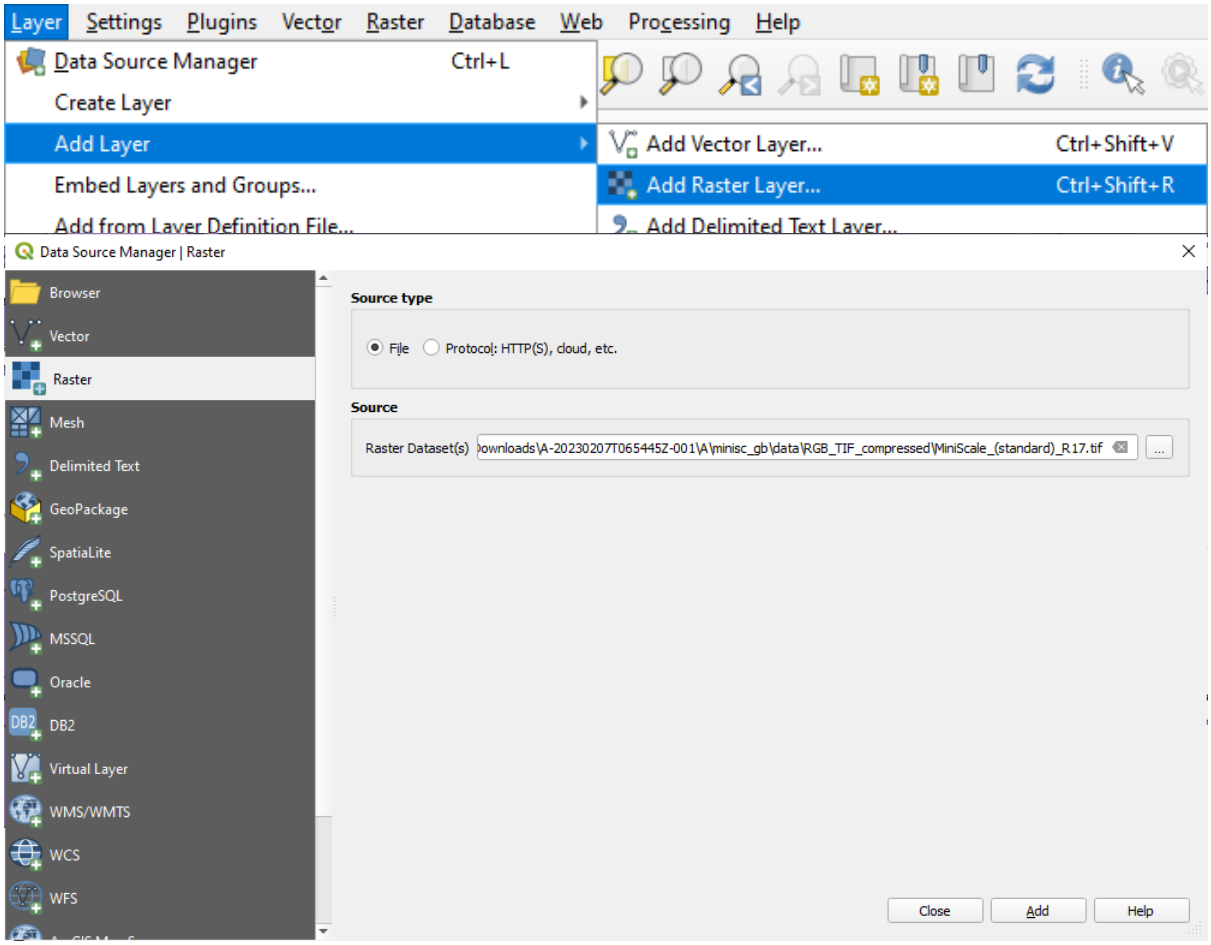
Select format as ESRI Shape File
Select folder location and file name
Set CRS North_America_Albers_Equal_Area_Conic EPSG: 102008



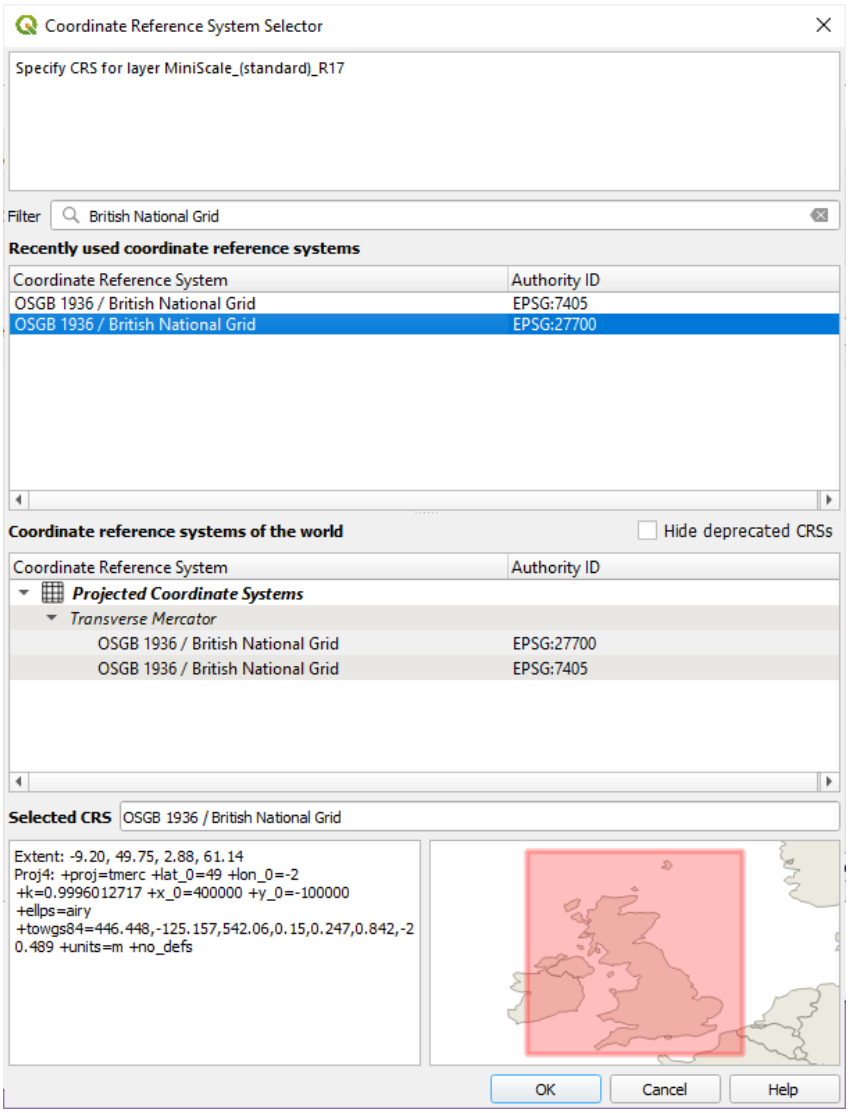




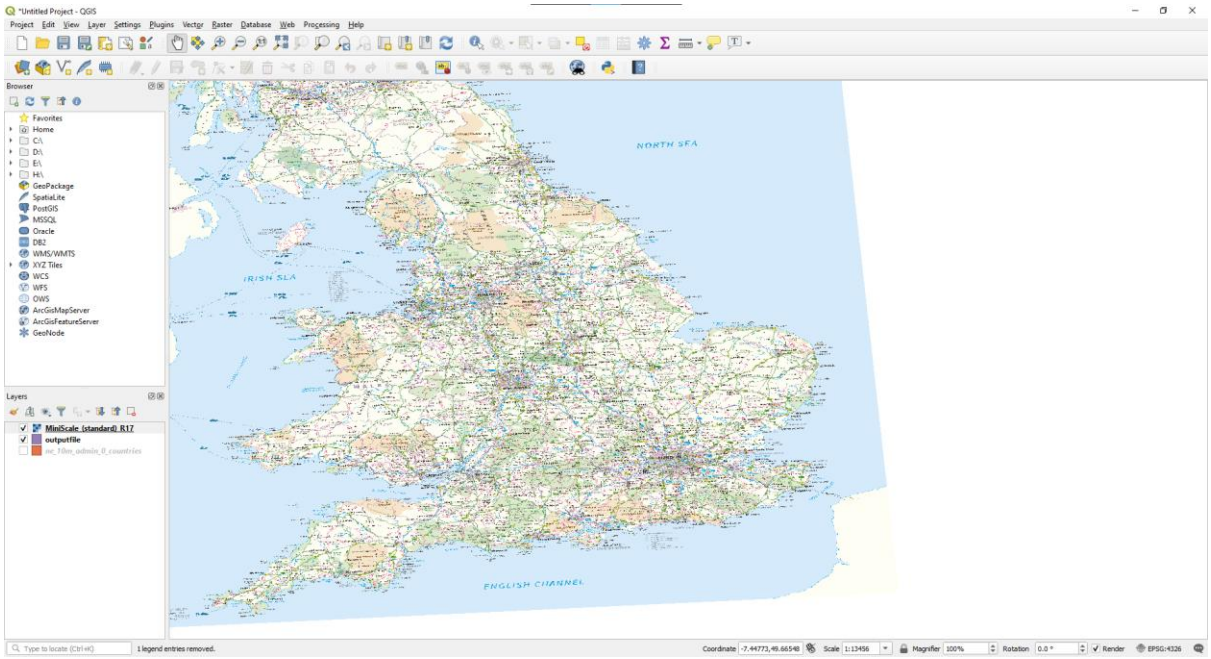
Now, add one raster layer: MiniScale_(standard)_R17.tif



Select CRS = British National Grid EPSG 27700.


Coordinate Reference System Selector
Specify CRS for layer MiniScale_(standard)_R17
Filter
British National Grid
Recently used coordinate reference systems
Coordinate Reference System
Authority ID
OSGB 1936 / British National Grid
EPSG:7405
OSGB 1936 / British National Grid
EPSG:27700
Coordinate reference systems of the world
Hide deprecated CRSs
Coordinate Reference System
Authority ID
Projected Coordinate Systems
Transverse Mercator
OSGB 1936 / British National Grid
EPSG:27700
OSGB 1936 / British National Grid
EPSG:7405
Selected CRS
OSGB 1936 / British National Grid
Extent: -9.20, 49.75, 2.88, 61.14
Proj4: +proj=tmerc +lat_0=49 +lon_0=-2
+k=0.9996012717 +x_0=400000 +y_0=-100000
+ellps=airy
+towgs84=446.448,-125.157,542.06,0.15,0.247,0.842,-2
0.489 +units=m +no_defs
OK
Cancel
Help

OUTPUT

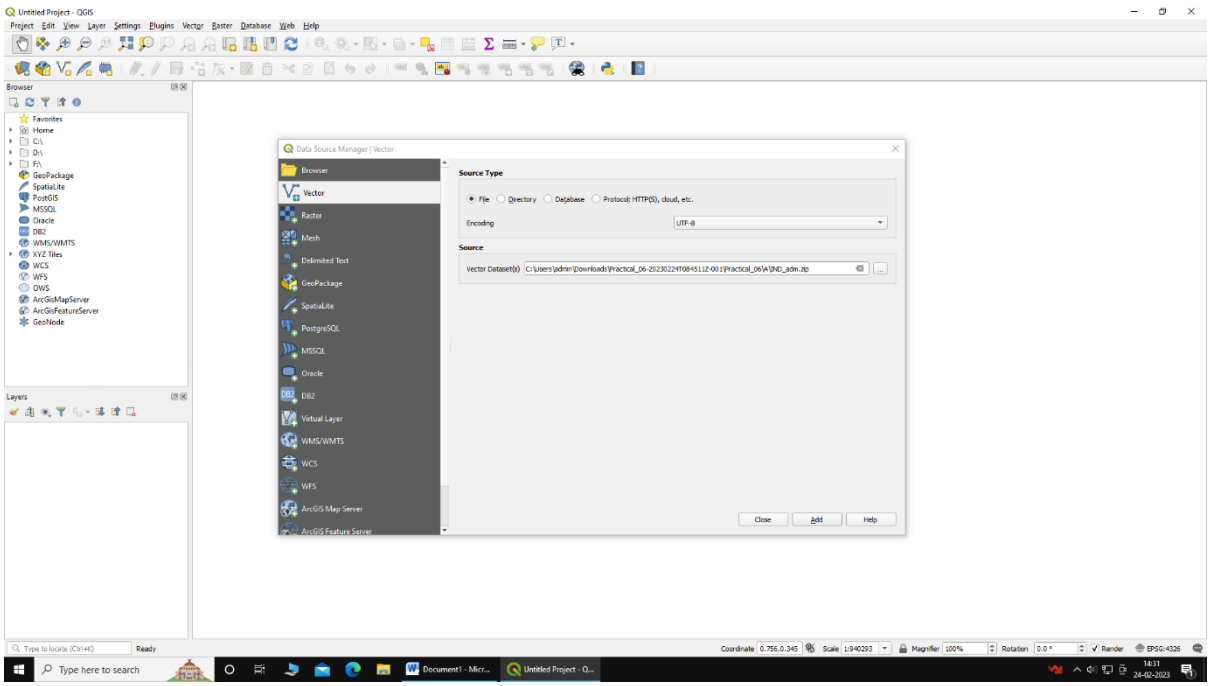

NORTH SEA
IRISH SEA
ENGLISH CHANNEL

Practical 7

AIM: Georeferencing Topo Sheets and Scanned Maps, Georeferencing Aerial Imagery, Digitizing Map Data.

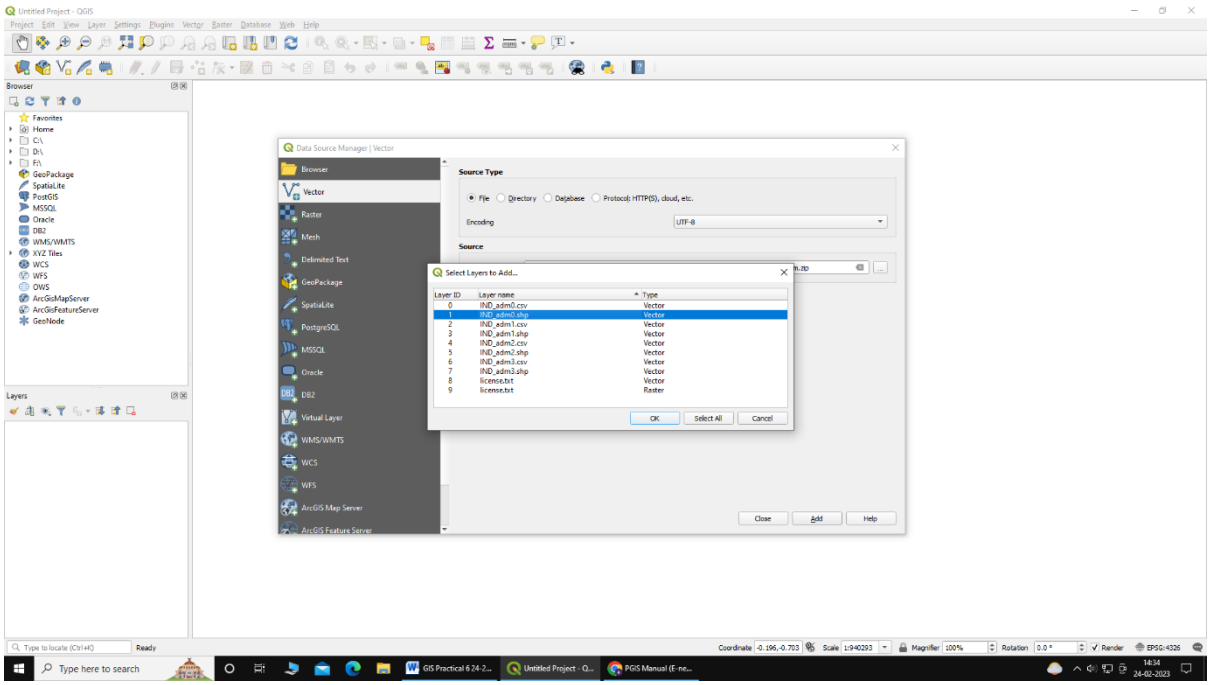
Solution:

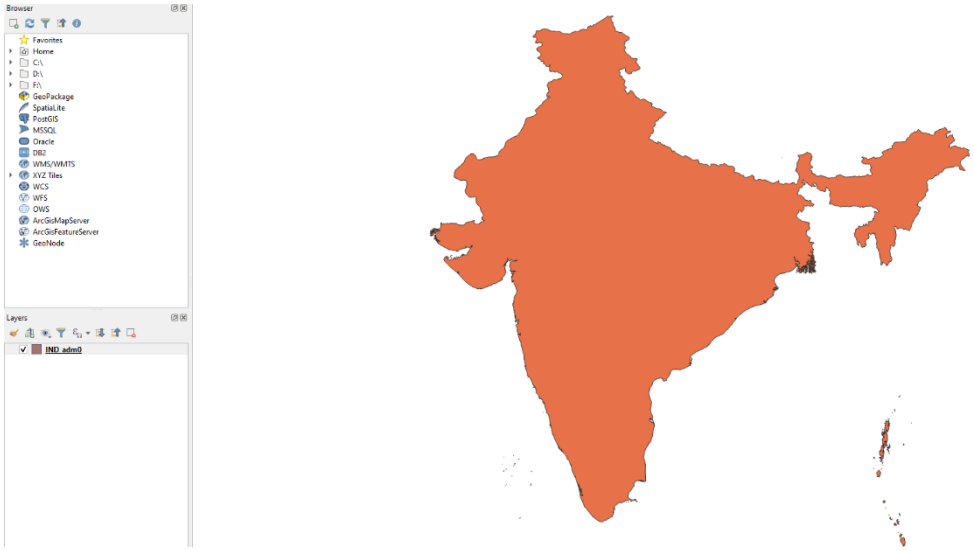
7.A) Georeferencing Topo Sheets and Scanned Maps



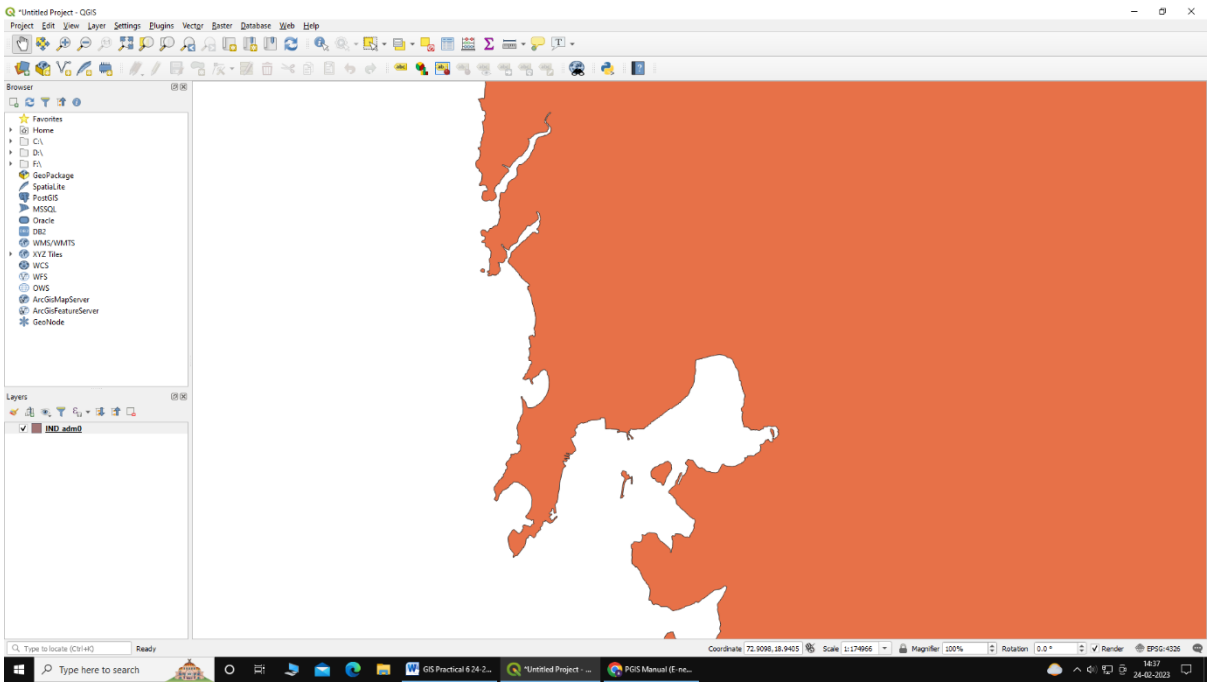
Go to Layers → Add Layer → Add vector Layer

Select GIS_Workshop\Manual\Prac06\IND_adm0.shp



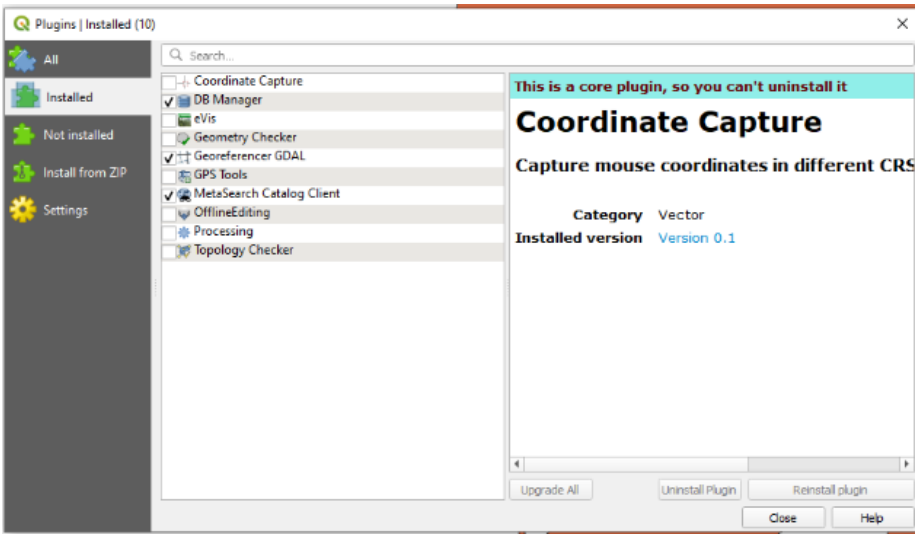


Zoom in to Mumbai region in the layer.



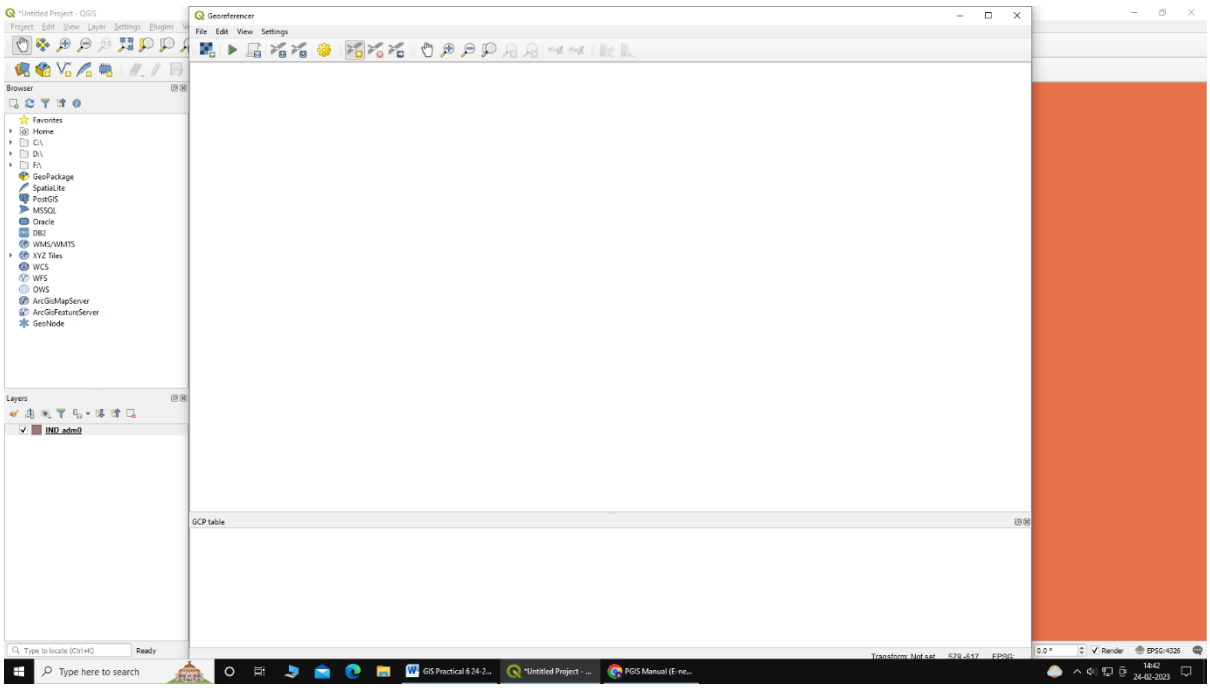
Go to Plugins→ Manage and Install Plugins

Ensure that Georeferencer GDAL is checked, if not install Georeferencer GDAL plugin.

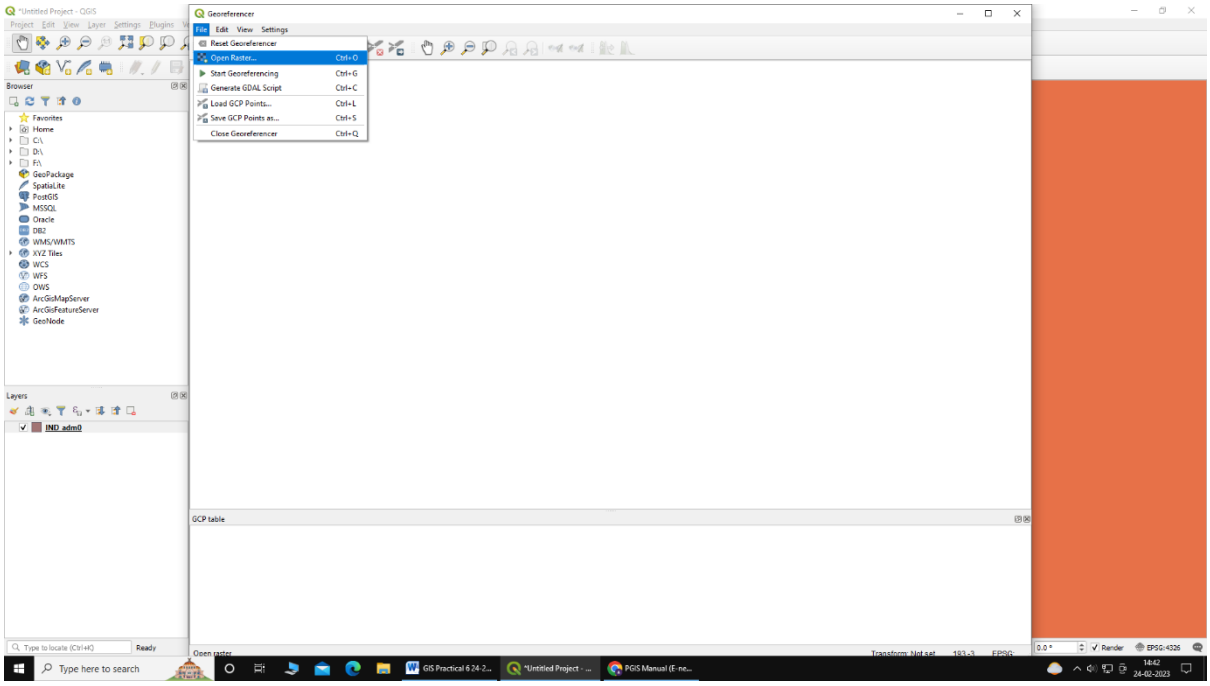


Go to Raster → Georefrencer

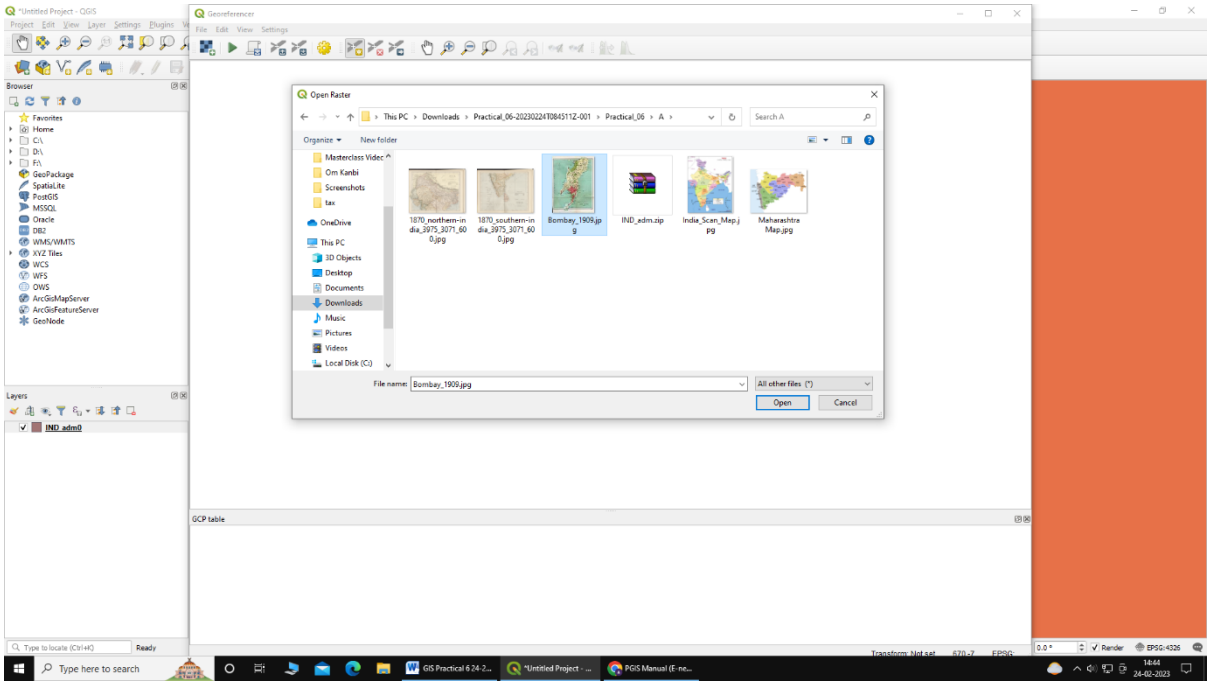
A new Georeferencer window will open



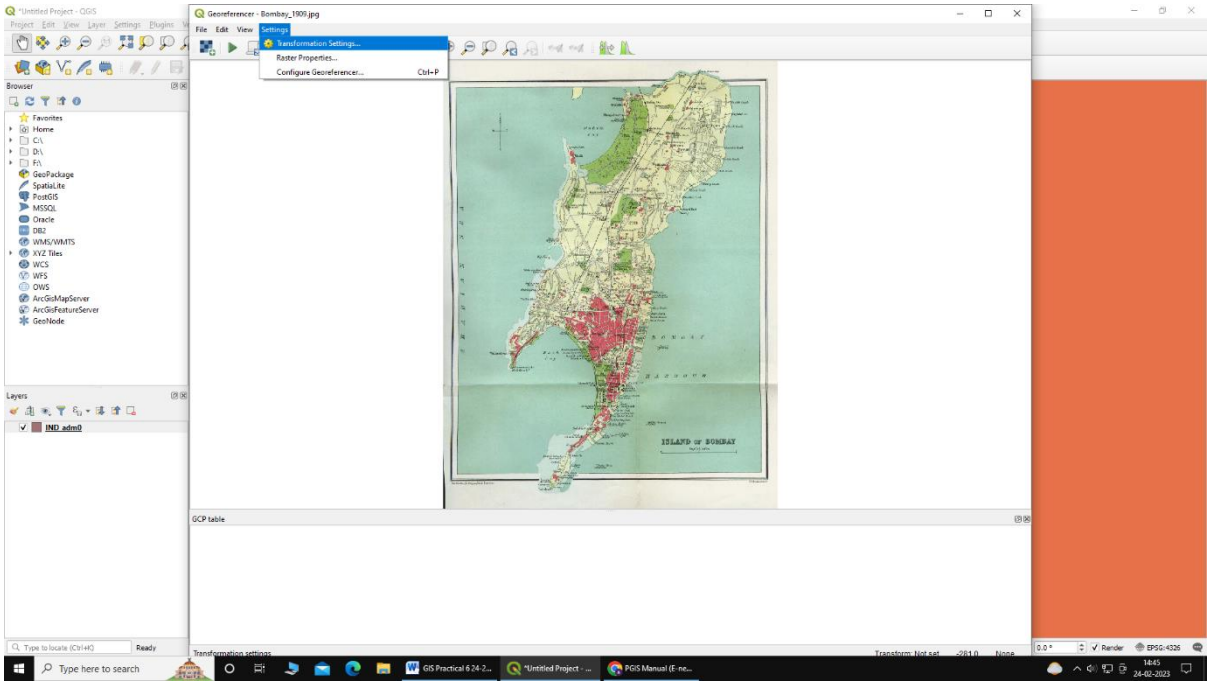
File → Open Raster



Select file “Bombay_1990.jpg” from project data folder

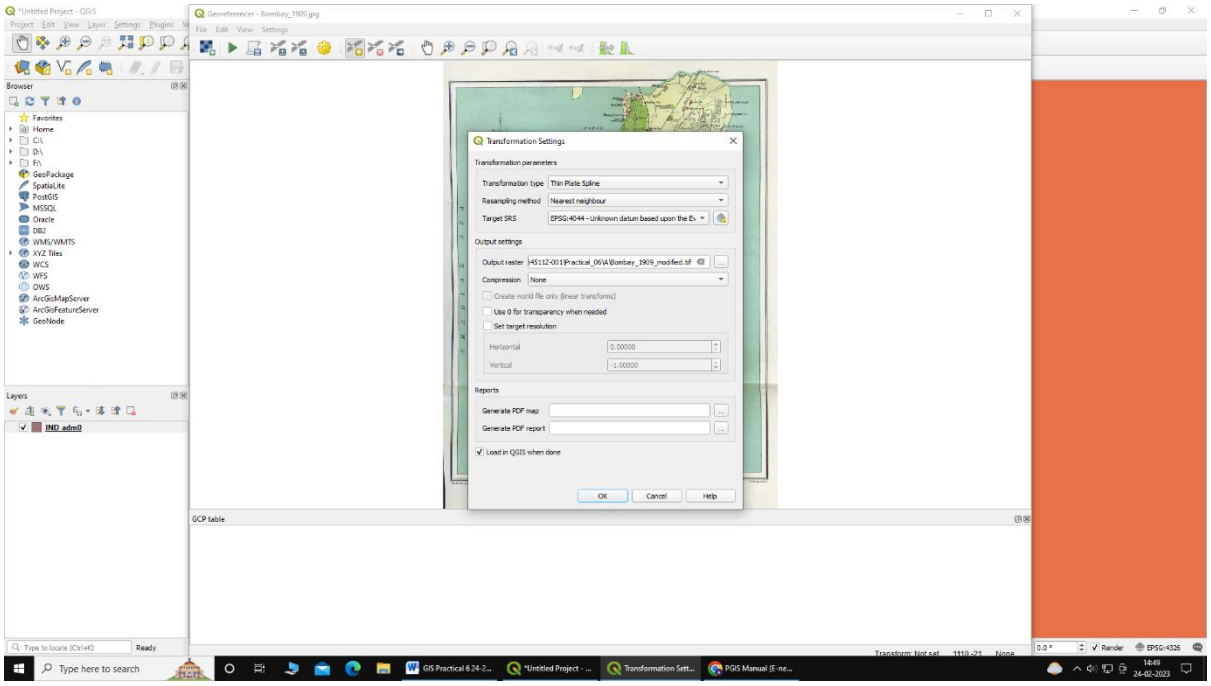


Go to Settings →Transformation Settings

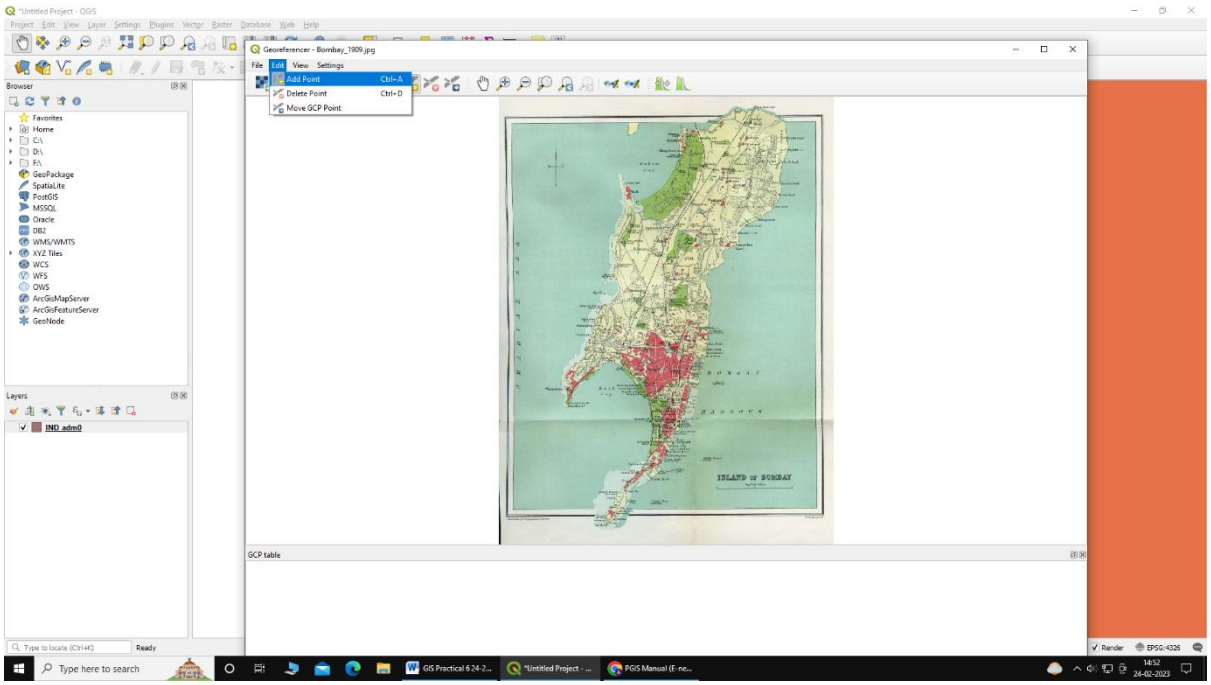


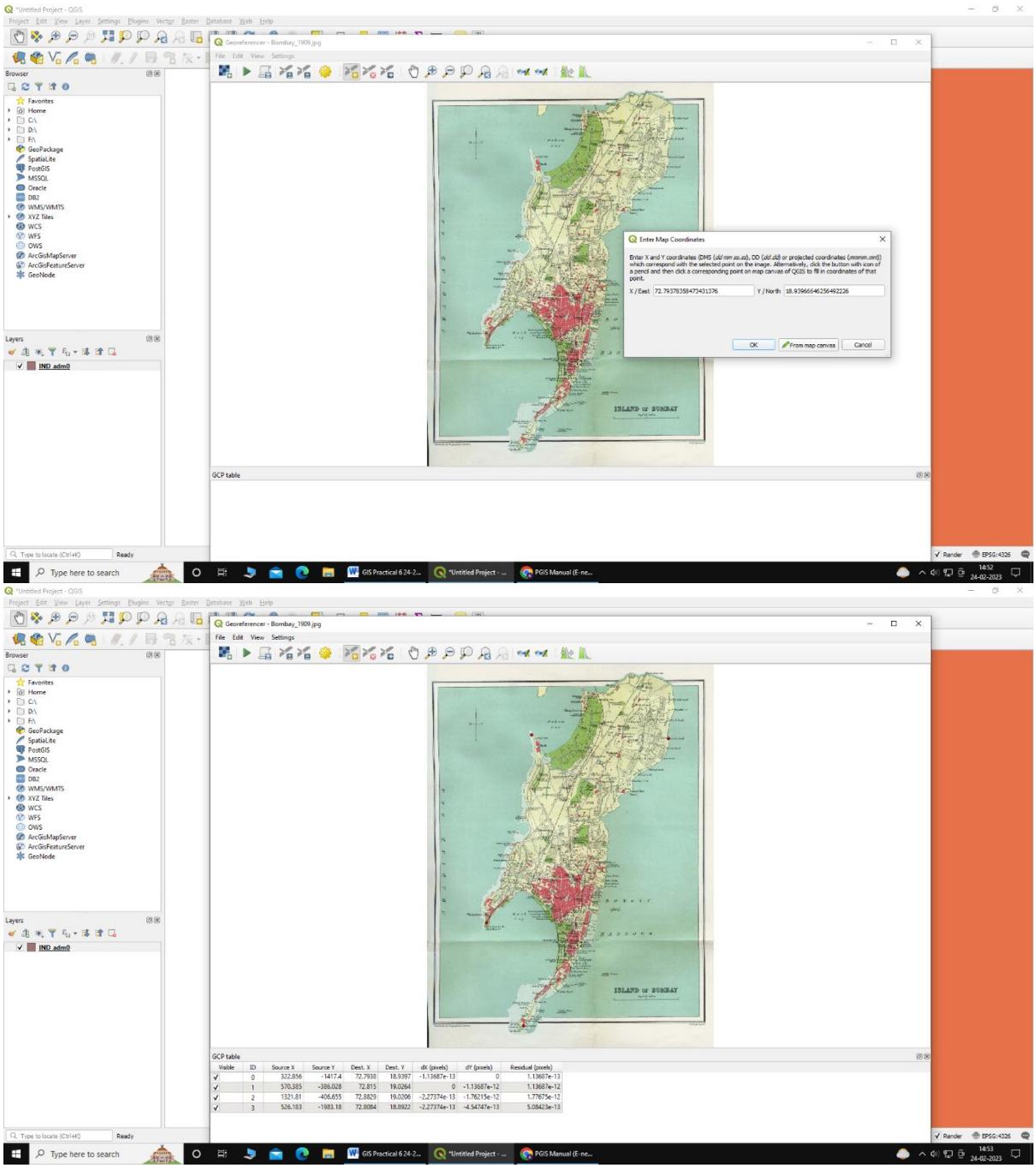
In the Transformation Settings window

- Select Transformation type → Thin Plate Spline
- Re-sampling Method → Nearest Neighbour
- Target TRS → Everest 1830 datum: EPSG 4044
- Select Output Raster Name and Location
- Check the Load in QGIS When Done Option
- Press “OK”.



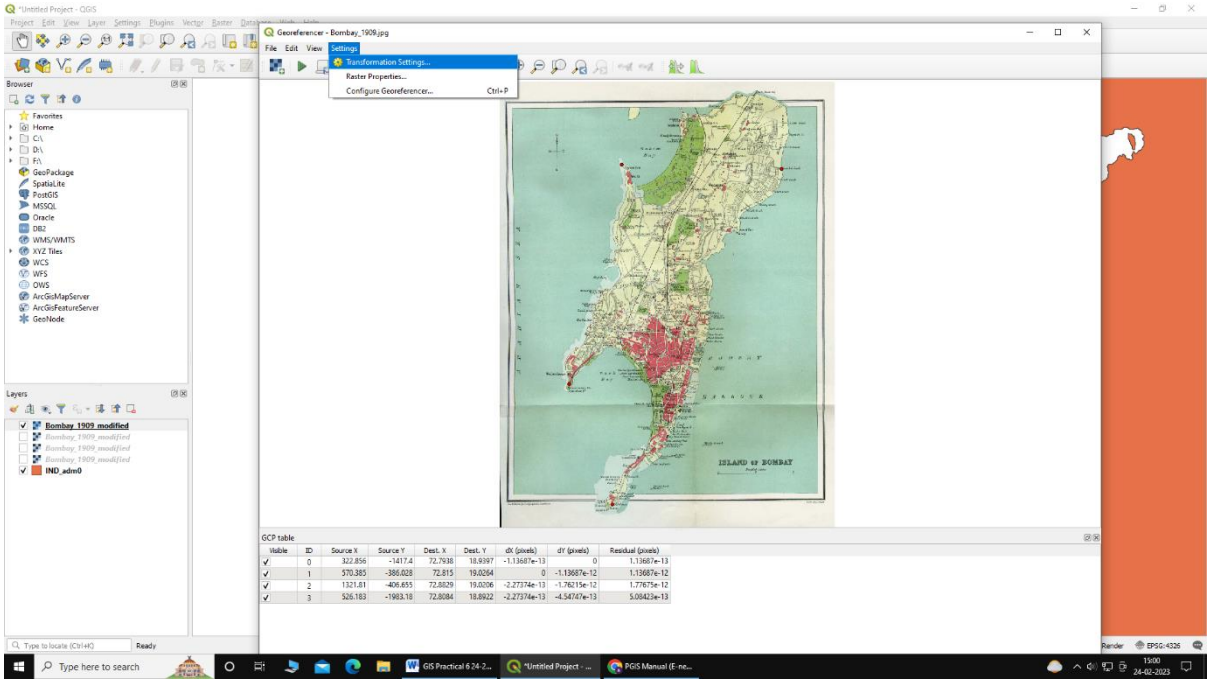
In Georeferencer window Go to Edit → Add Points





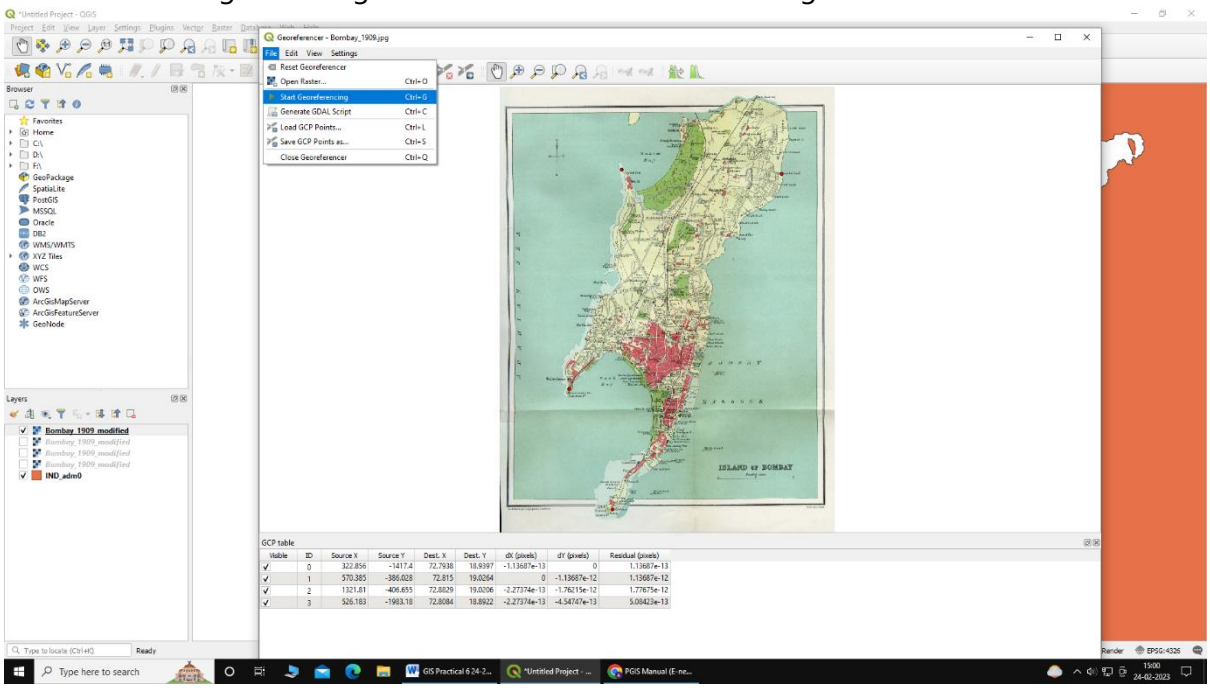
Select the set of control points.

Go to, Setting → transformation settings.



Press “RUN”

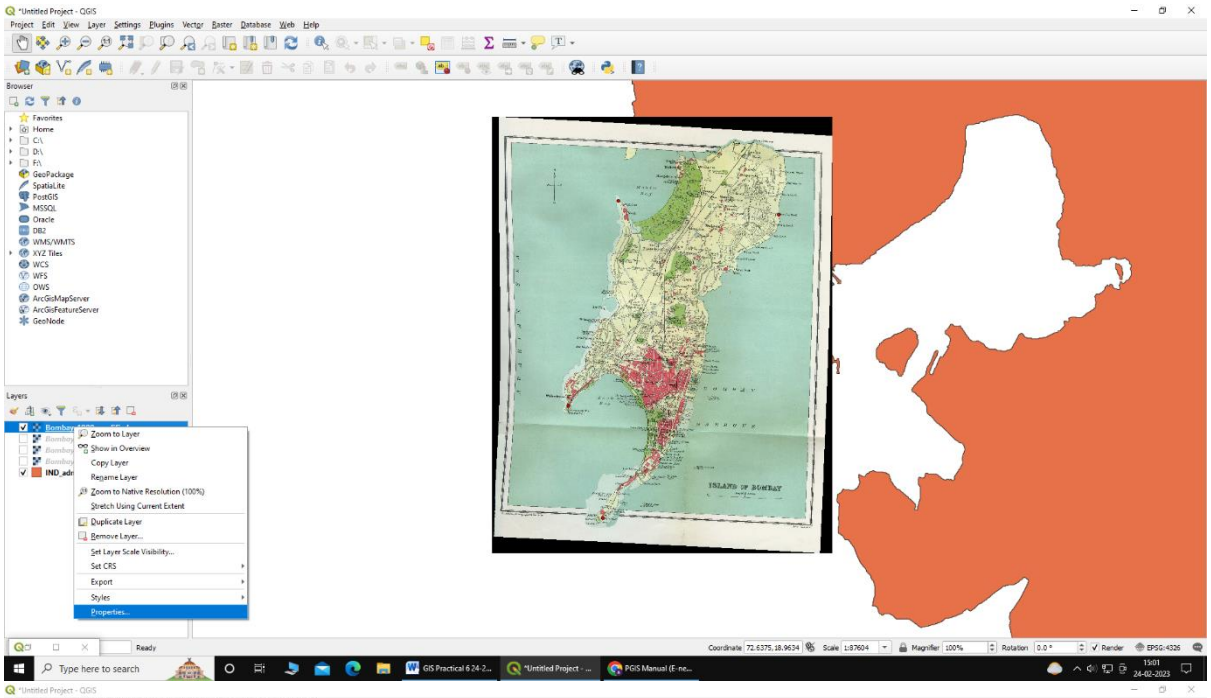
In Georeferencing window go to → File → Start Georeferencing

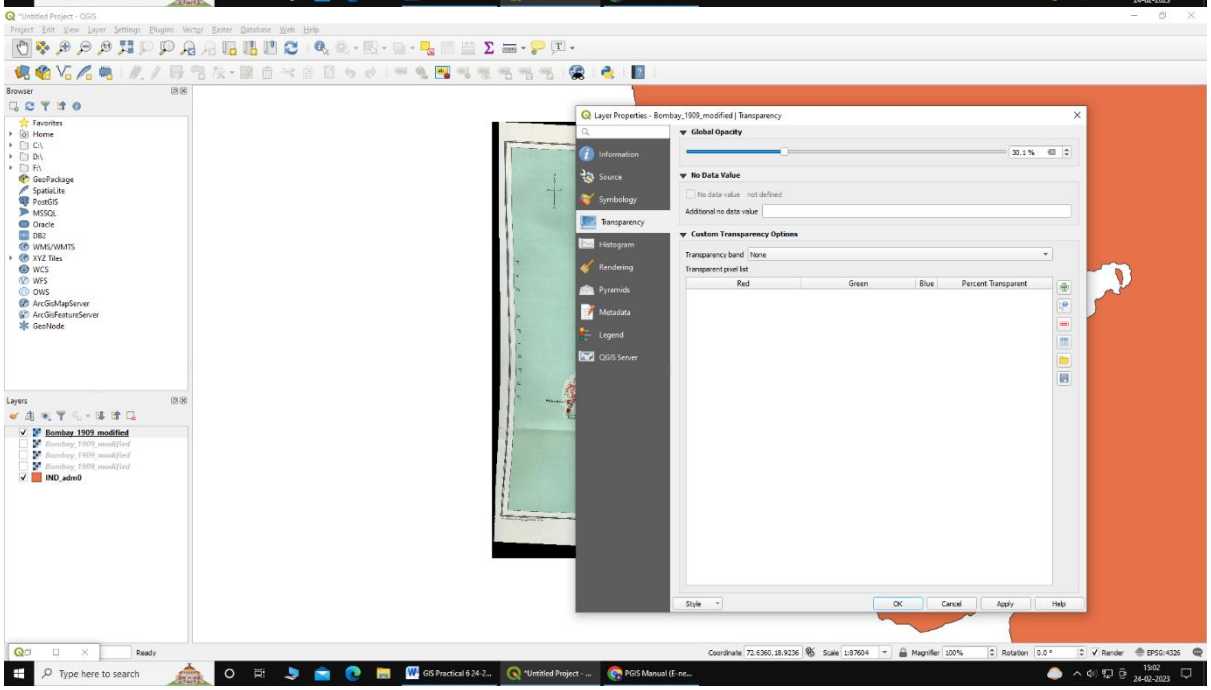


The canvas area will now have the scanned map of Mumbai referenced with control points.

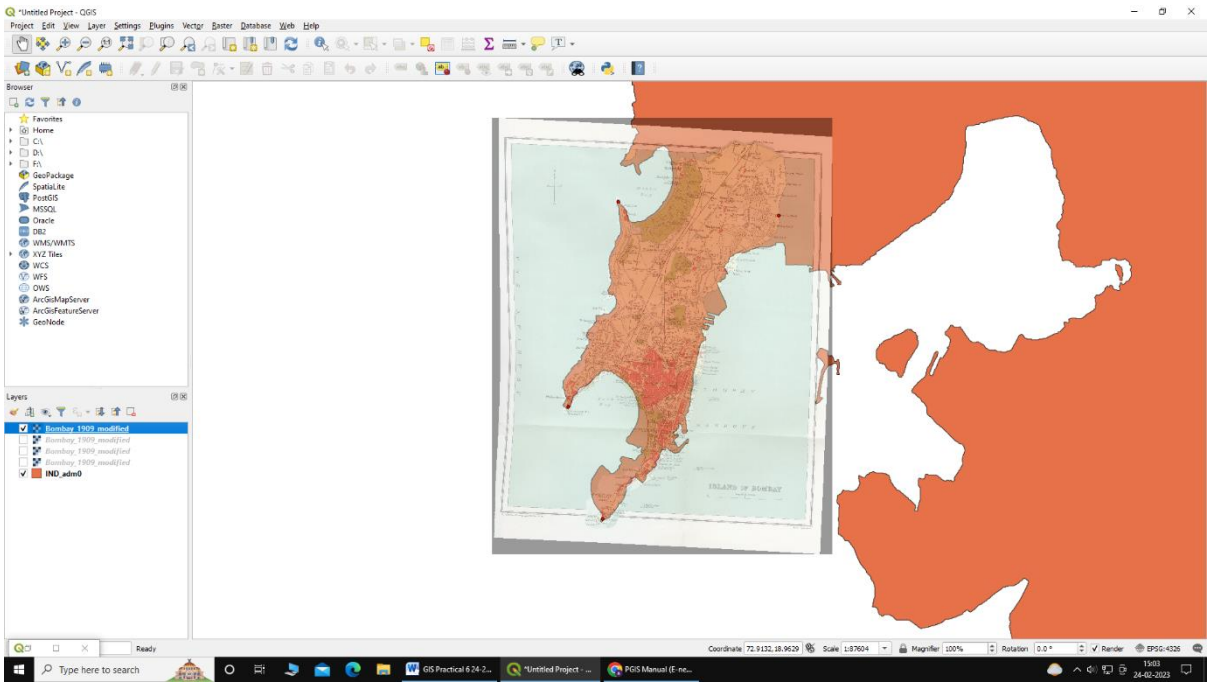
Select the newly added layer in Layer Panel Right click and go to property.

Set Transparency level of raster layer to appropriate level.


Zoom to Layer
Show in Overview
Copy Layer
Rename Layer
Zoom to Native Resolution (100%)
Stretch Using Current Extent
Duplicate Layer
Remove Layer...
Set Layer Scale Visibility...
Set CRS
Export
Styles
Properties...
ISLAND OF BOMBAY


Layer Properties - Bombay_1909_modified | Transparency
Information
Source
Symbology
Transparency
Histogram
Rendering
Pyramids
Metadata
Legend
QGIS Server
Global Opacity
No Data Value
Custom Transparency Options
Red
Green
Blue
Percent Transparent
Style
OK
Cancel
Apply
Help

OUTPUT:

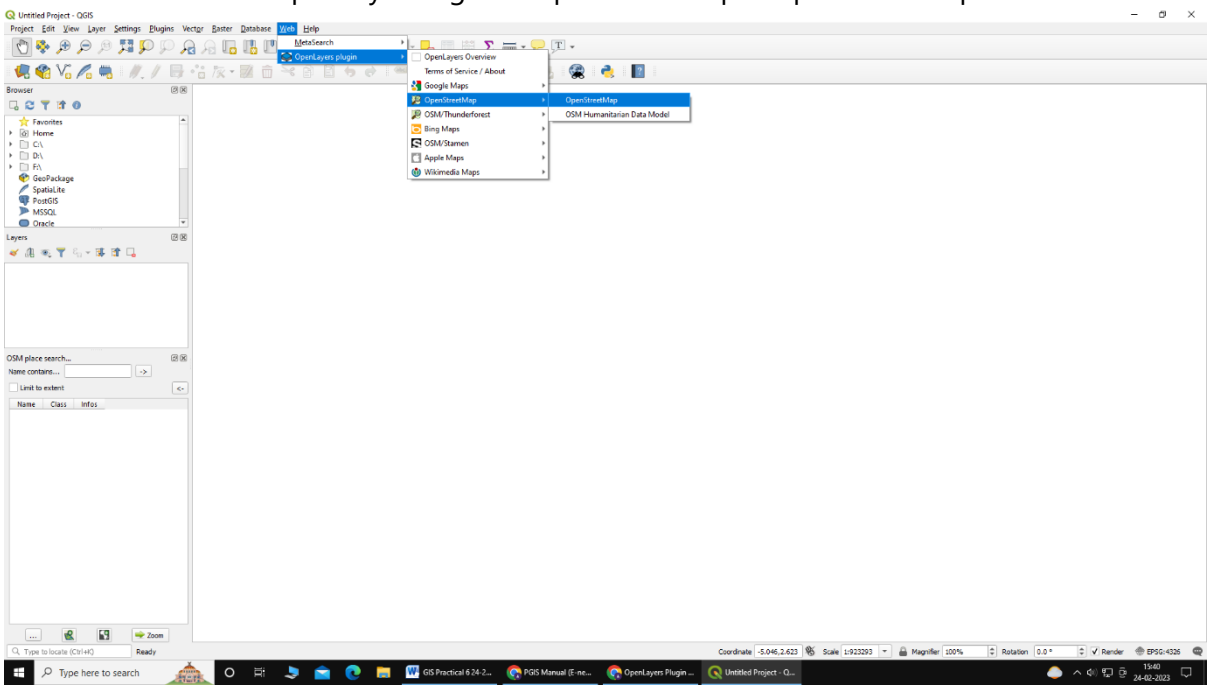


The Scanned Image map coincides with the existing map.

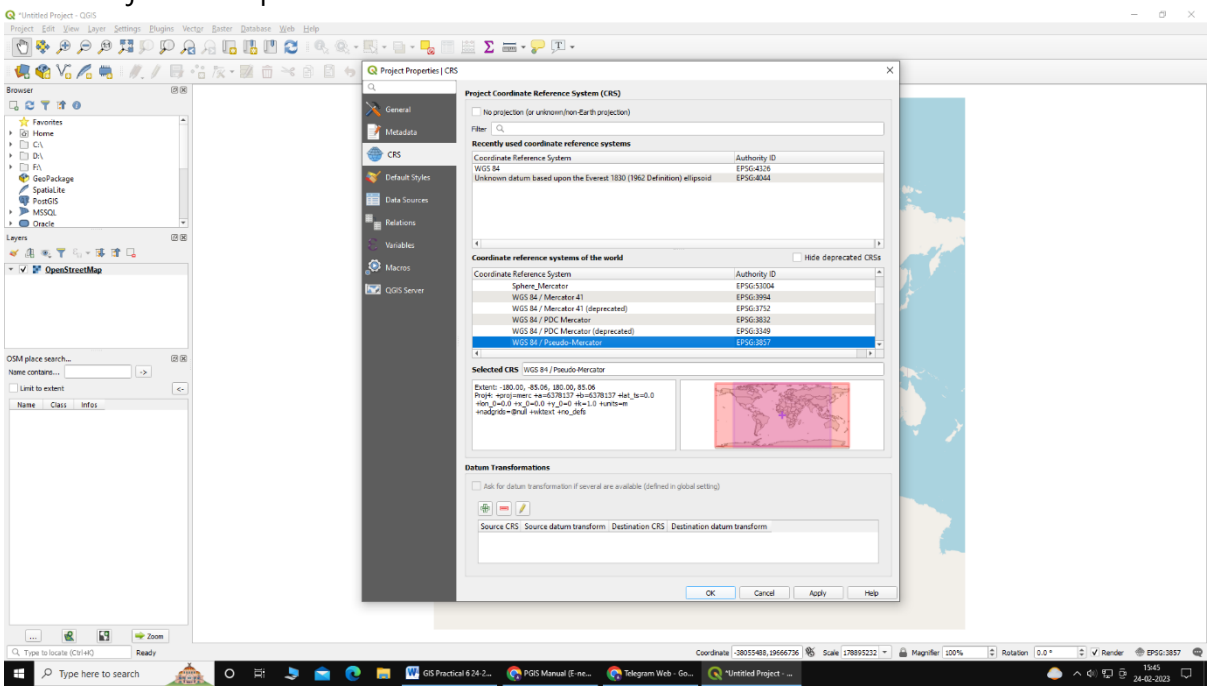
7.B) Georeferencing Aerial Imagery

Install plugin OpenStreetMap (OSM place search and OpenLayer plugin)

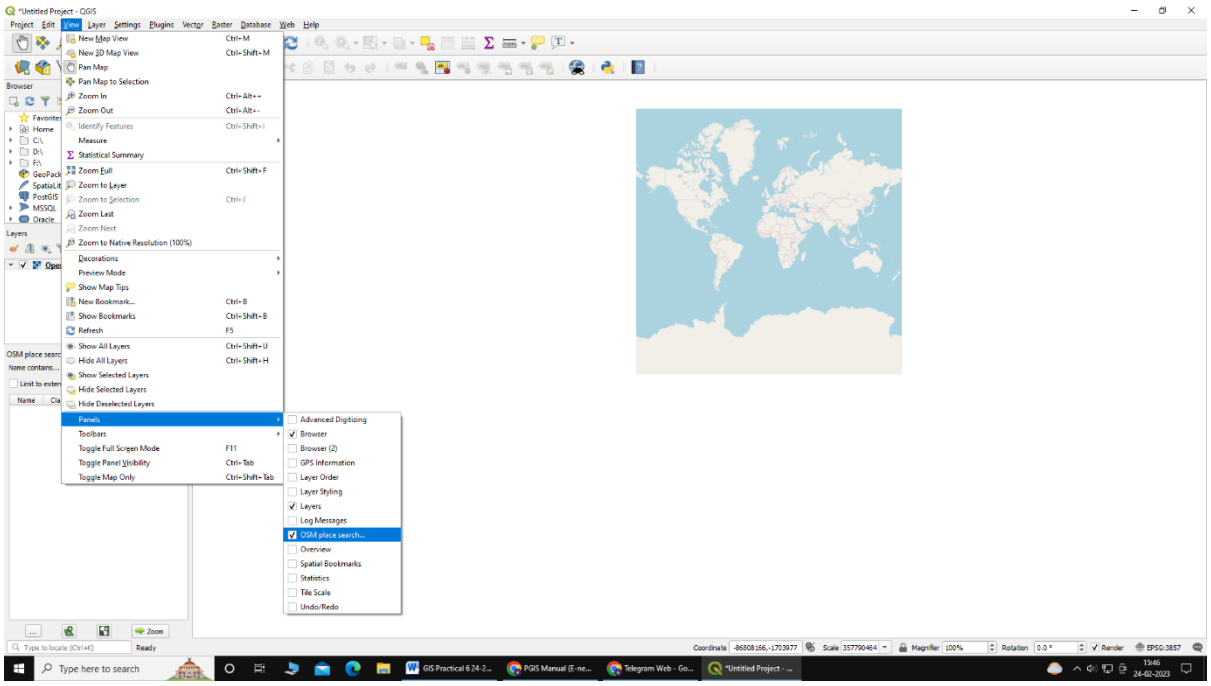
Go to Web Menu → OpenLayerPlugin → OpenStreetMap→ OpenStreetMap



Go to Project → Properties → Set CRS to EPSG 3857

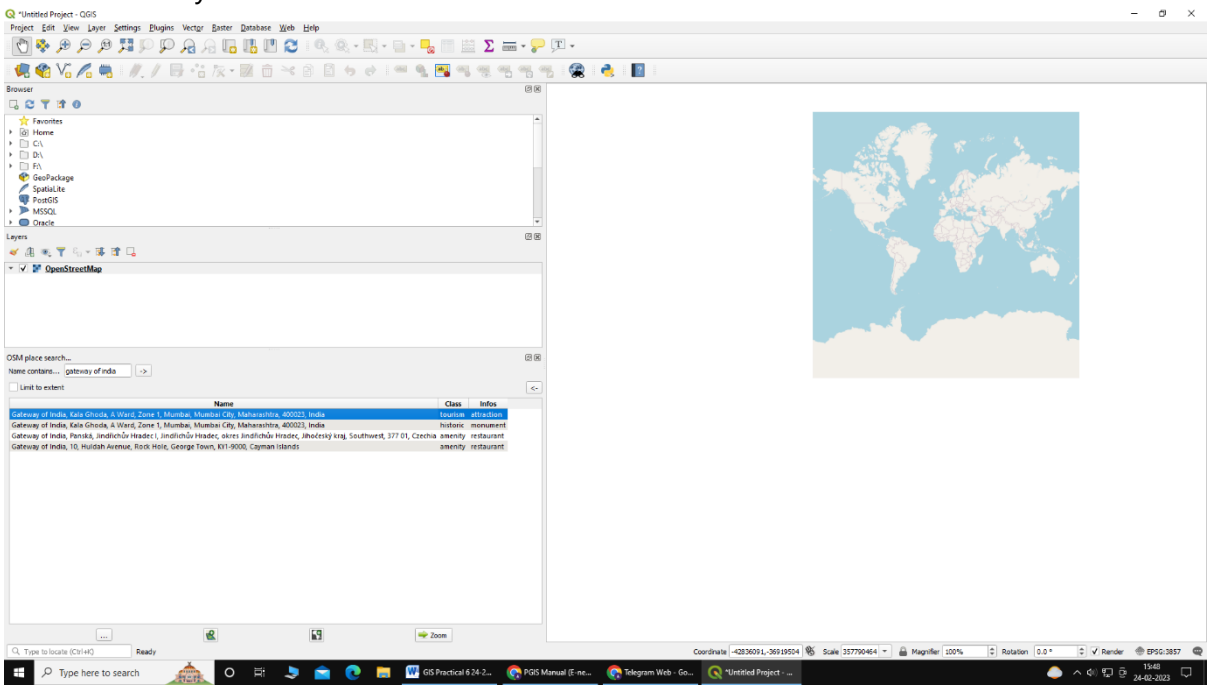


Go to View → Panels → select OSM Place search

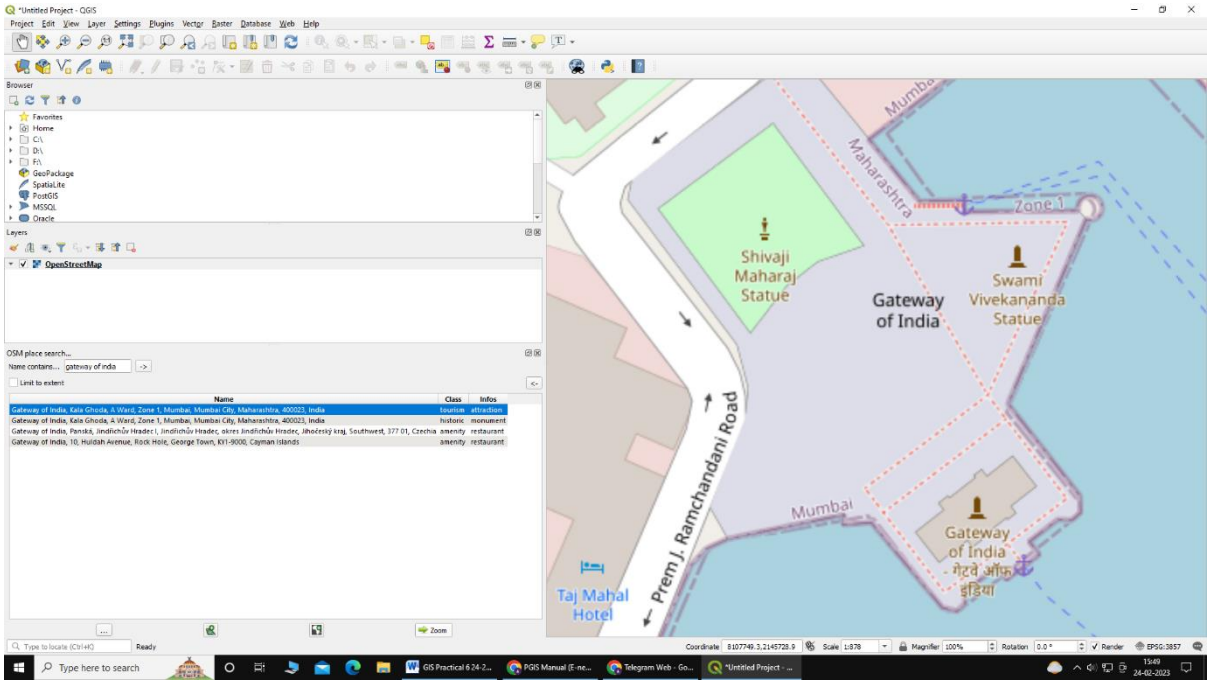


The Gateway of India, Mumbai is located at 18.92°N 72.83°E

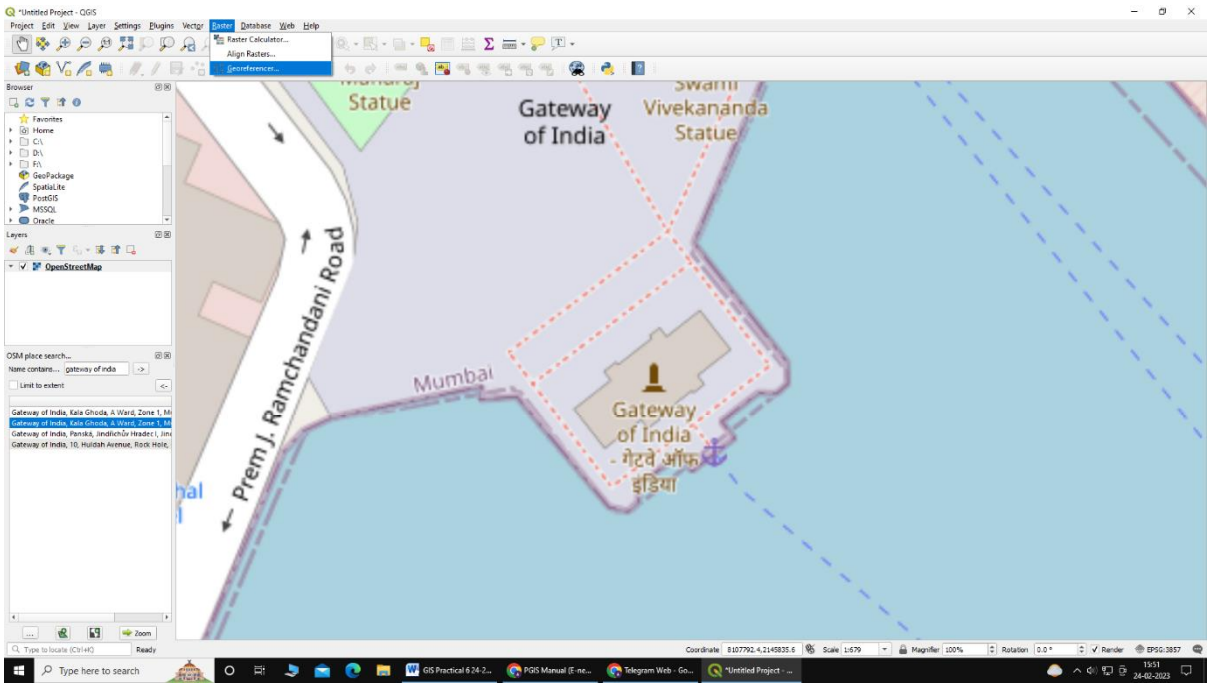
Search Gateway of India in OSM Search Panel



Select the location and click on zoom



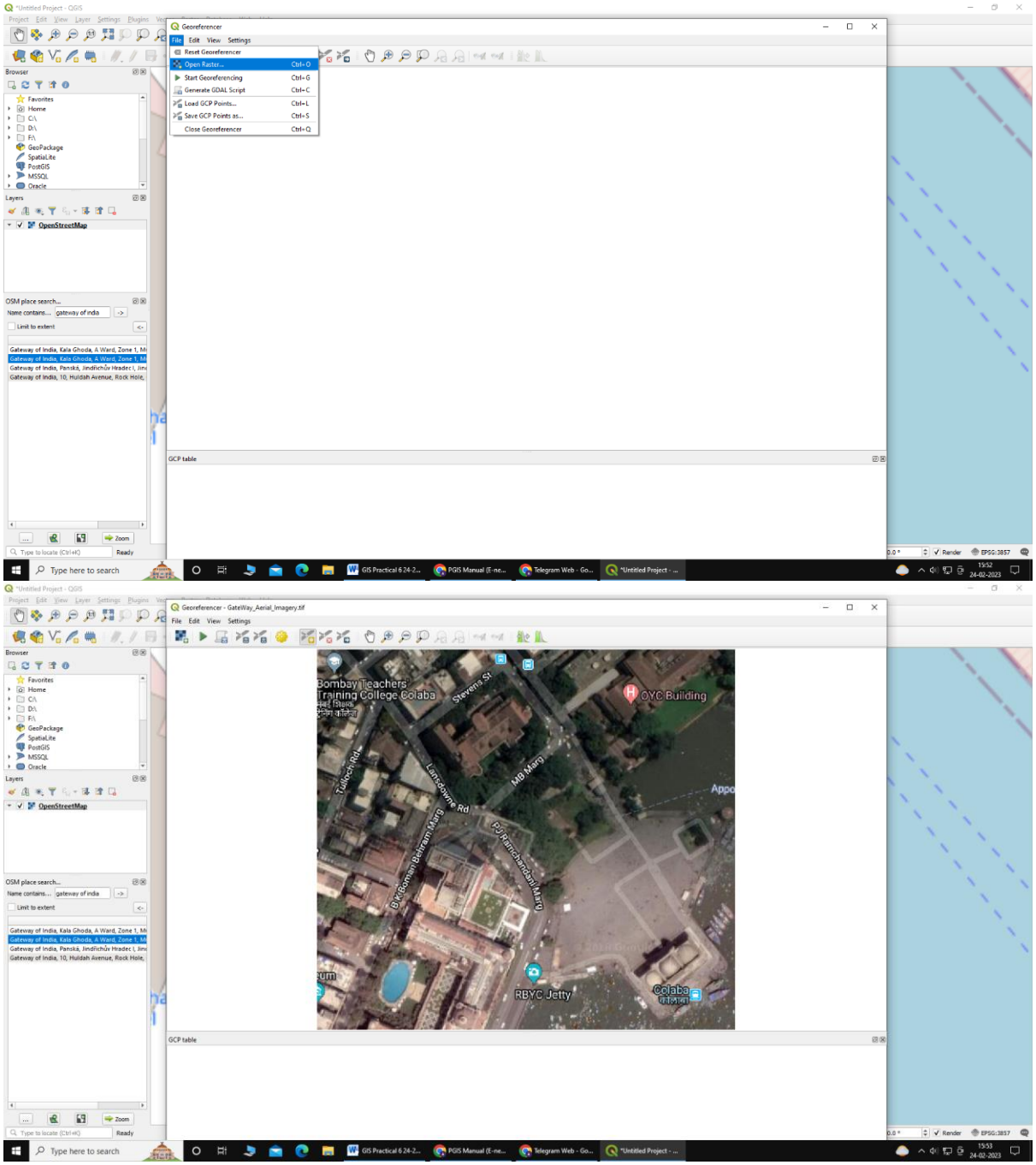
Go to Raster → Georefrencer



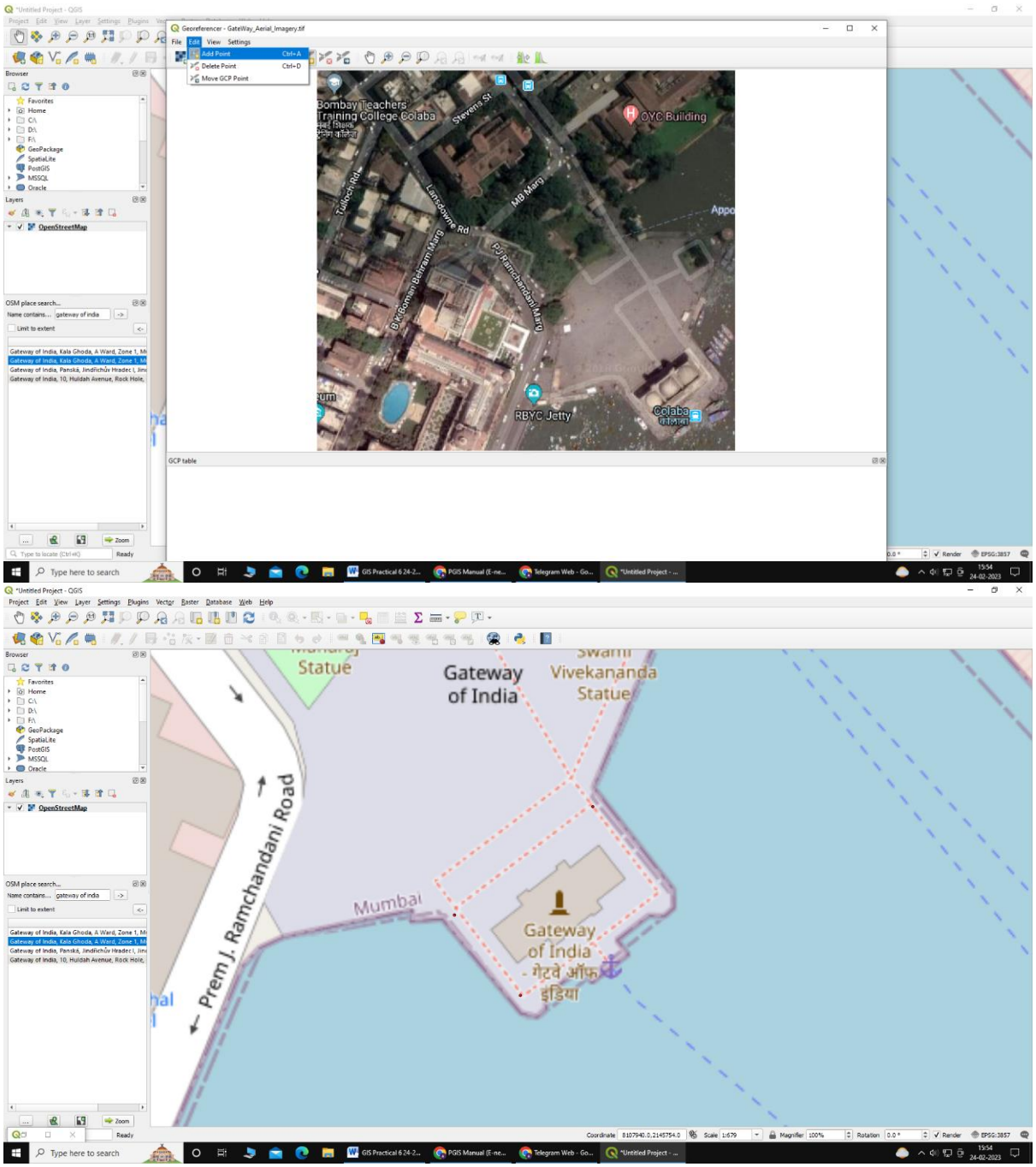
A new Georeferencer window will open

File → Open Raster

Select file “Gateway_Imagery.tif” from project data folder

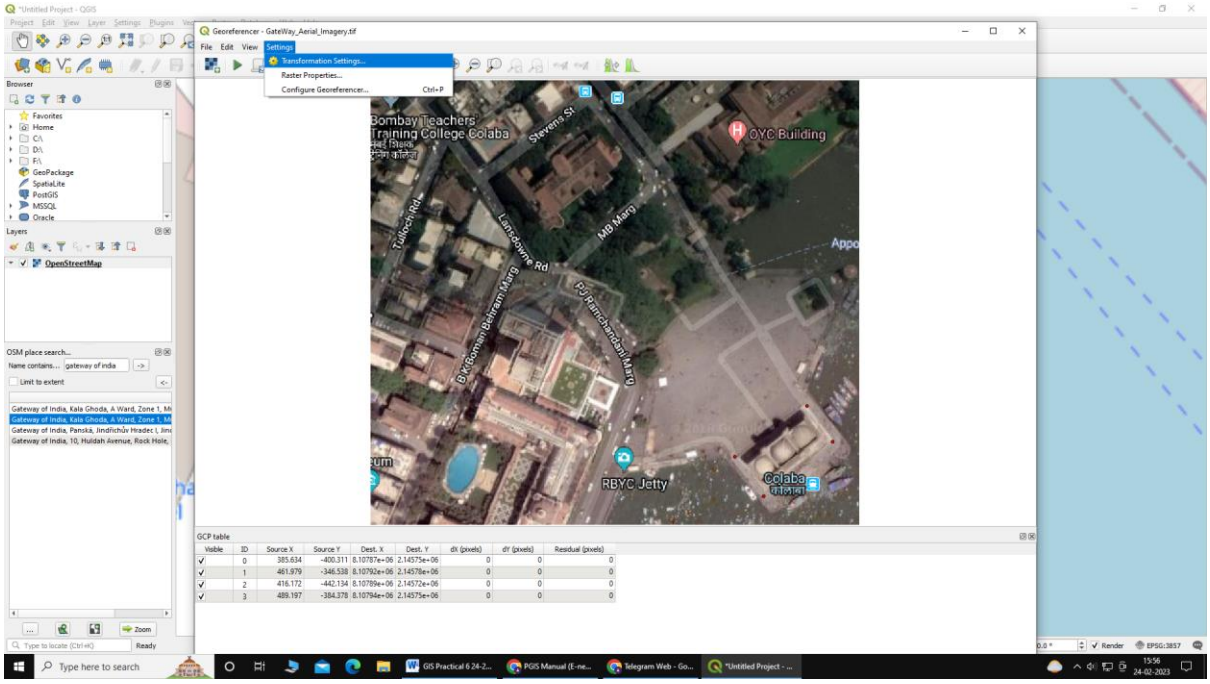


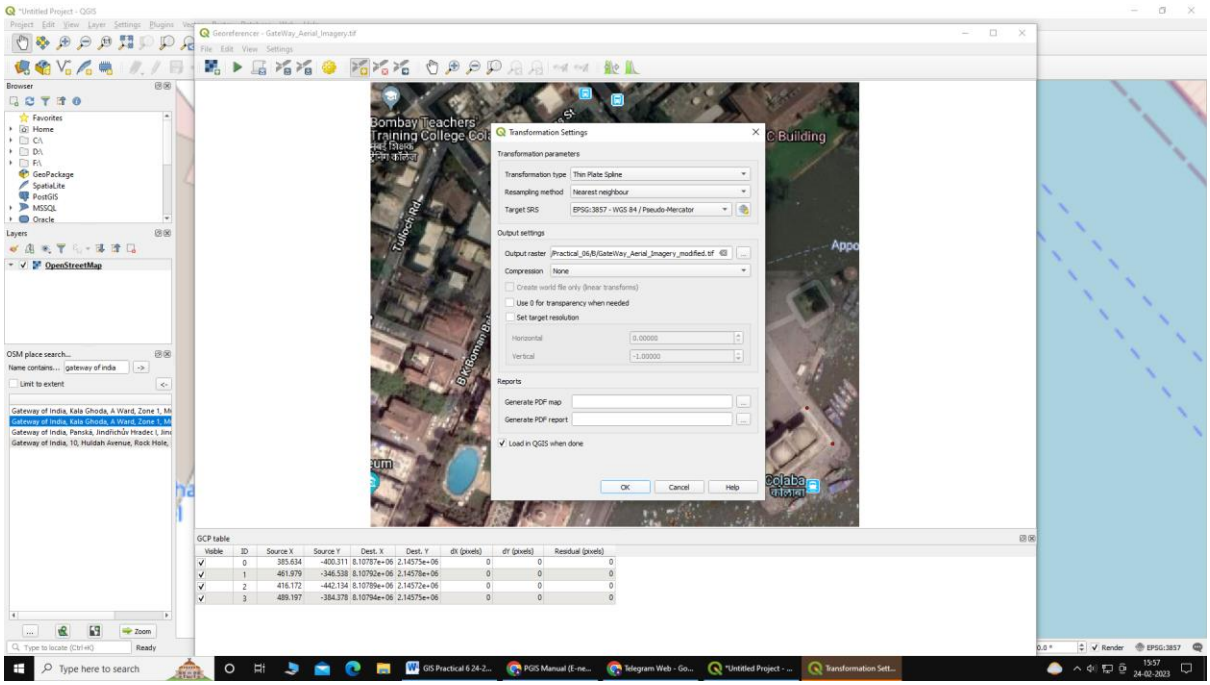
Go to Edit → Add Point



Select control points from map (Indicated in red color).

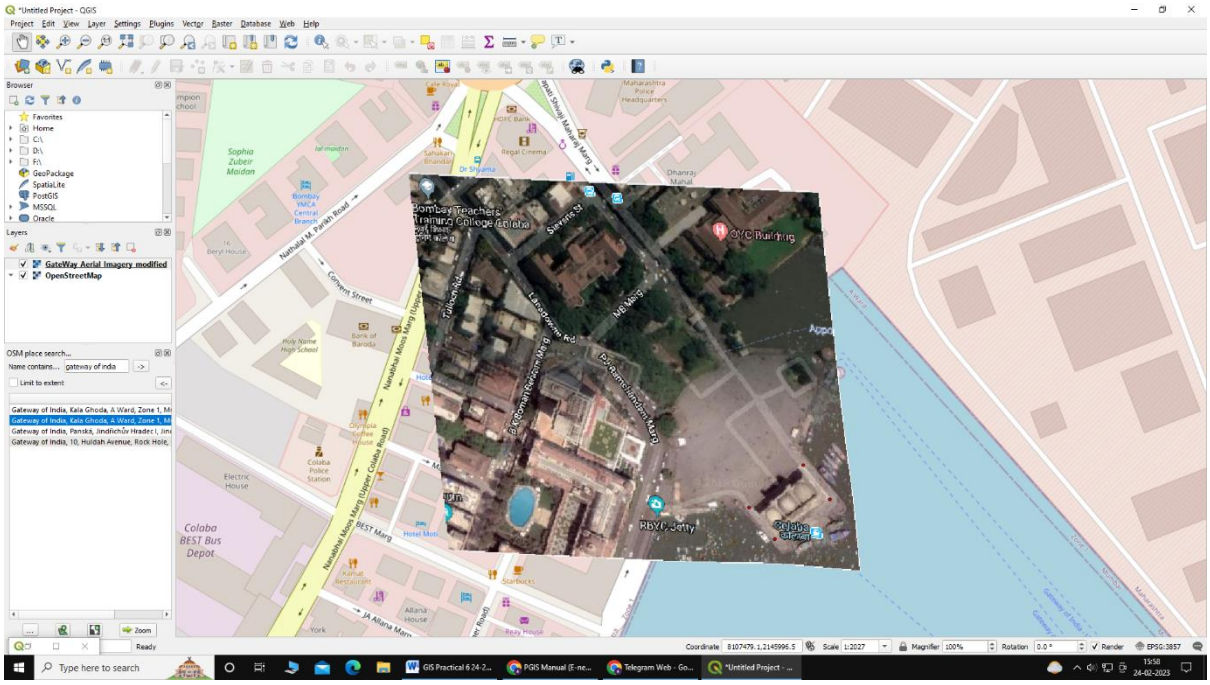
Go to Setting → Transformation Setting


Georeferencer - GateWay_Aerial_Imagery.tif
File Edit View Settings
Transformation Settings...
Raster Properties...
Configure Georeferencer... Ctrl+P
Bombay Teachers Training College Colaba
OYC Building
Stevens St
Tulloch Rd
Landsowne Rd
MB Marg
P J Ramchandani Marg
B K Boman Behram Marg
RBYC Jetty
Colaba
GCP table


Georeferencer - GateWay_Aerial_Imagery.tif
Transformation Settings
Transformation parameters
Transformation type Thin Plate Spline
Resampling method Nearest neighbour
Target SRS EPSG:3857 - WGS 84 / Pseudo-Mercator
Output settings
Output raster /Practical_06/B/GateWay_Aerial_Imagery_modified.tif
Compression None
Reports
Generate PDF map
Generate PDF report
Load in QGIS when done
OK
Cancel
Help
GCP table

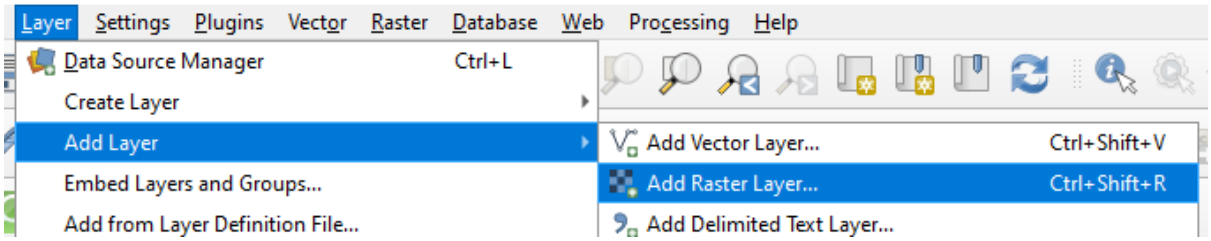
Go to File → Start Georeferencing or Press the run button in Georegerencing Window. Observe that the aerial image of the Gateway of India is georeferenced on OSM in the map canvas.

OUTPUT



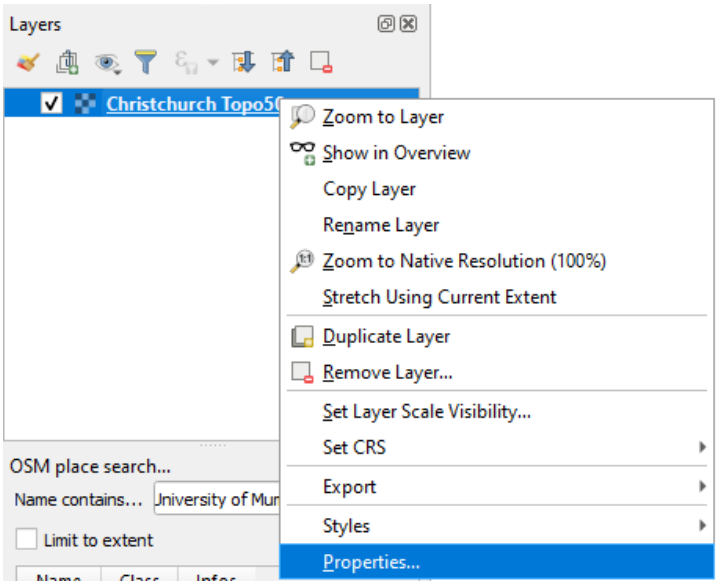
7.C) Digitizing Map Data

➢ Go to Layer ▸ Add Raster→ Select "Christchurch Topo50 map.tif" from project Folder.

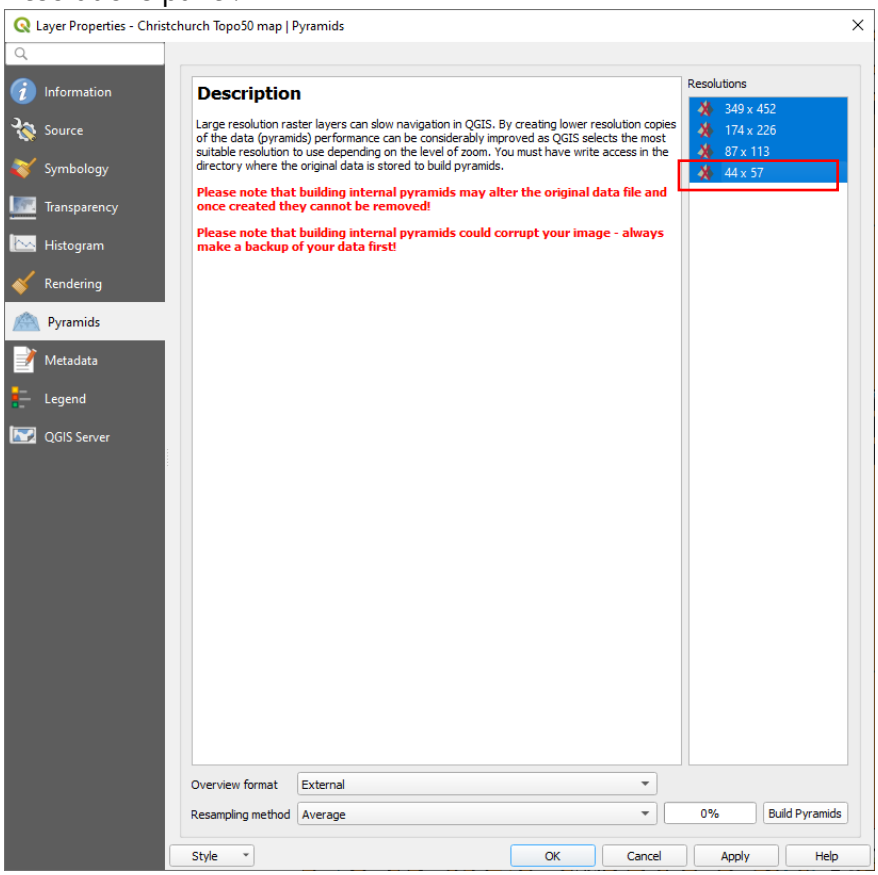


➢ QGIS offers a simple solution to make raster load much faster by using Image Pyramids.

➢ Right-click the Christchurch Topo50 map.tif layer and select Properties.

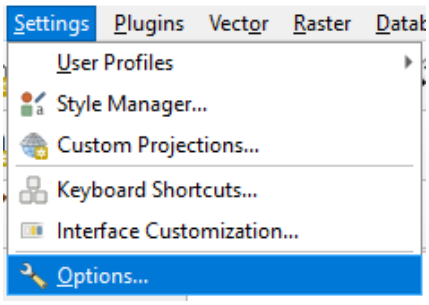


Choose the Pyramids tab. Hold the Ctrl key and select all the resolutions offered in the Resolutions panel.

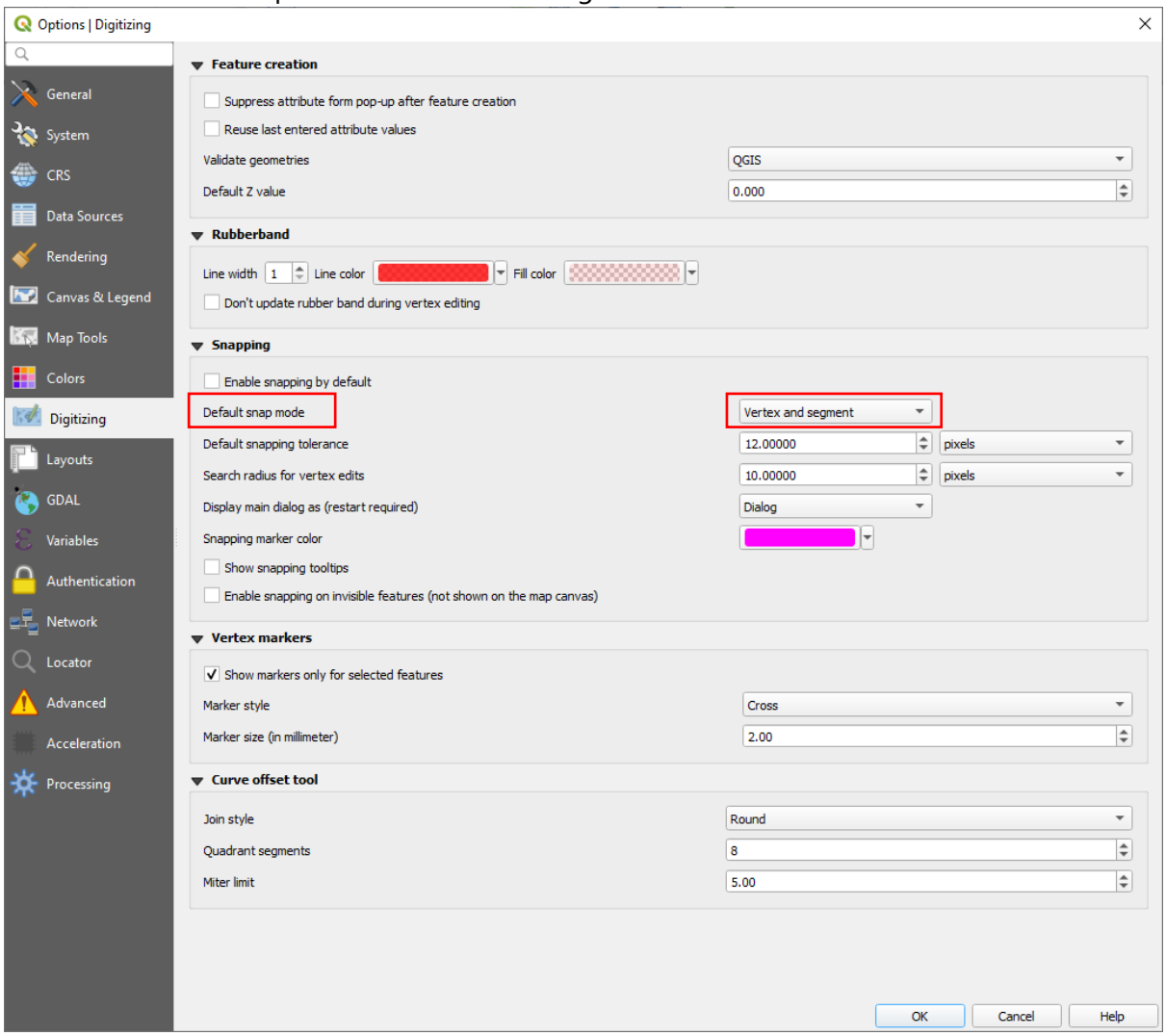


➢ Click Build pyramids. Then click OK.

➢ Go to Settings →Options.... Select the Digitizing tab in the Options dialog.

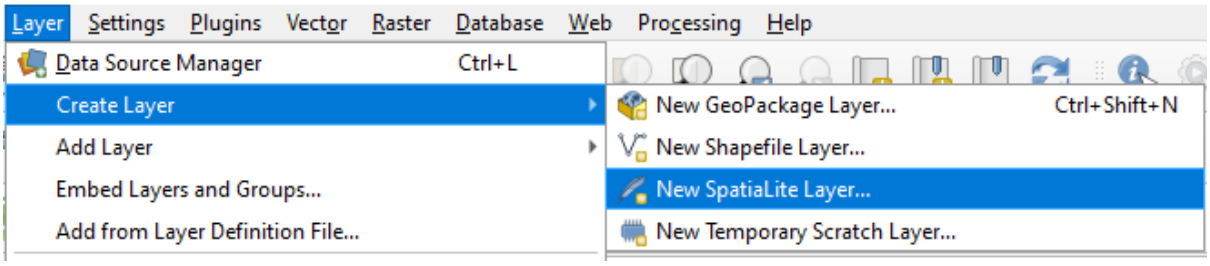


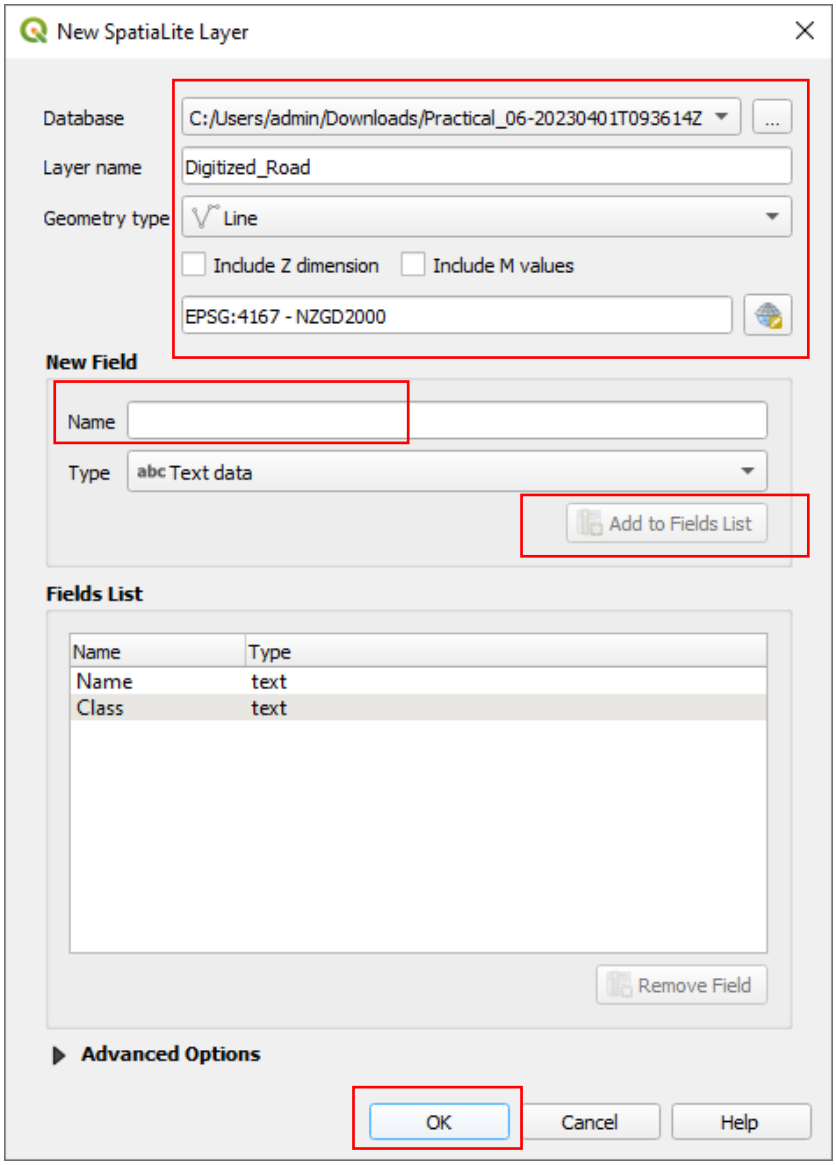
➢ Set the Default snap mode to vertex and segment.



➢ Press OK.

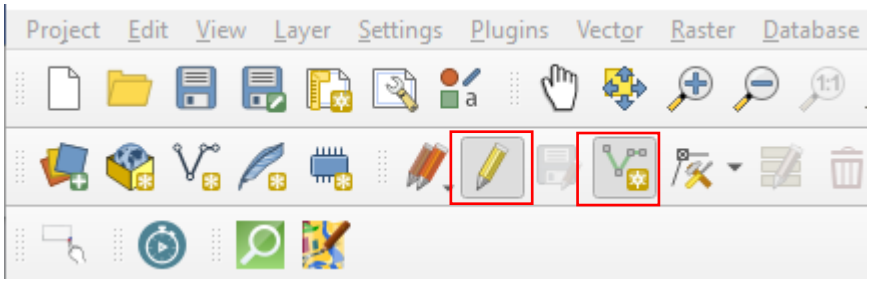
➢ Go to Layer → Create Layer → Add Spatialite Layer.

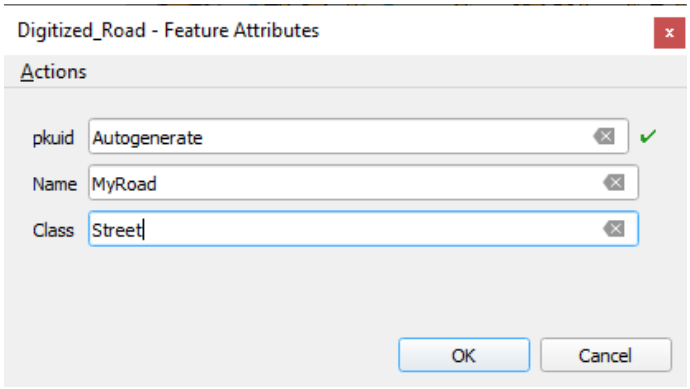




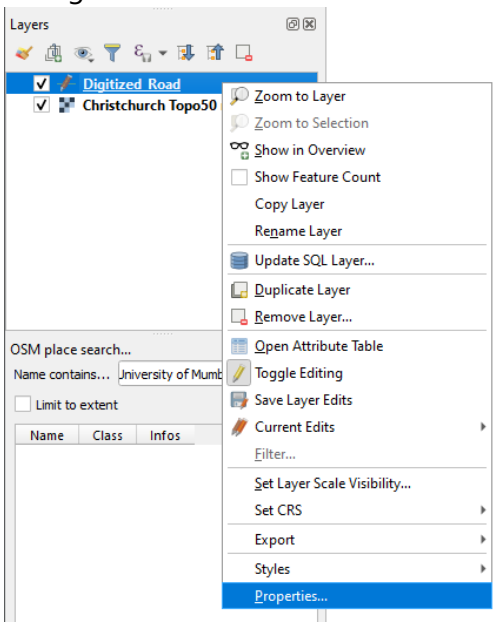
➢ Add "Name" and "Class" fields using "Add to Fields List".
➢ Once the layer is loaded, click the Toggle Editing button to put the layer in editing mode.

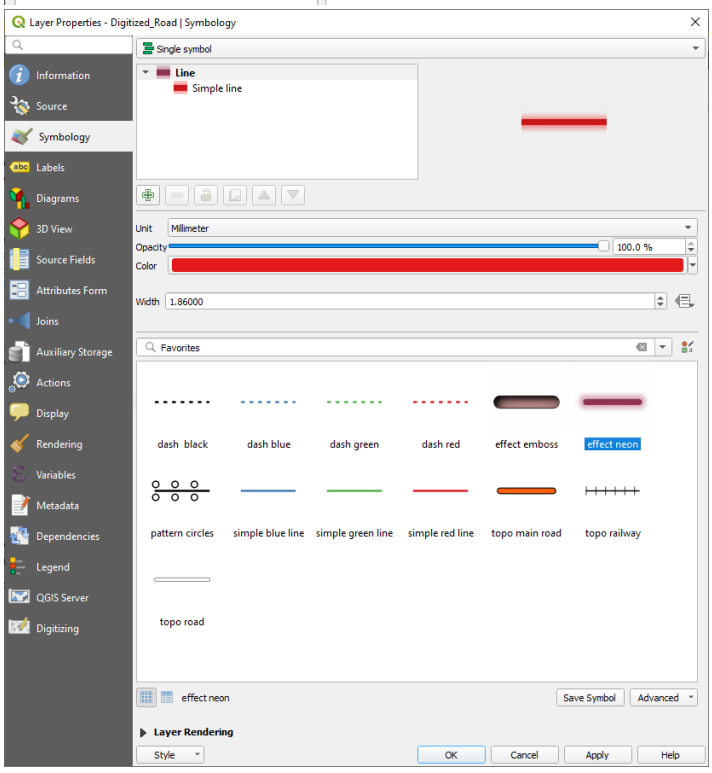
➢ Click the Add feature button. Click on the map canvas to add a new vertex.
Add new vertices along the road feature. Once you have digitized a road segment, right-click to
end the feature.

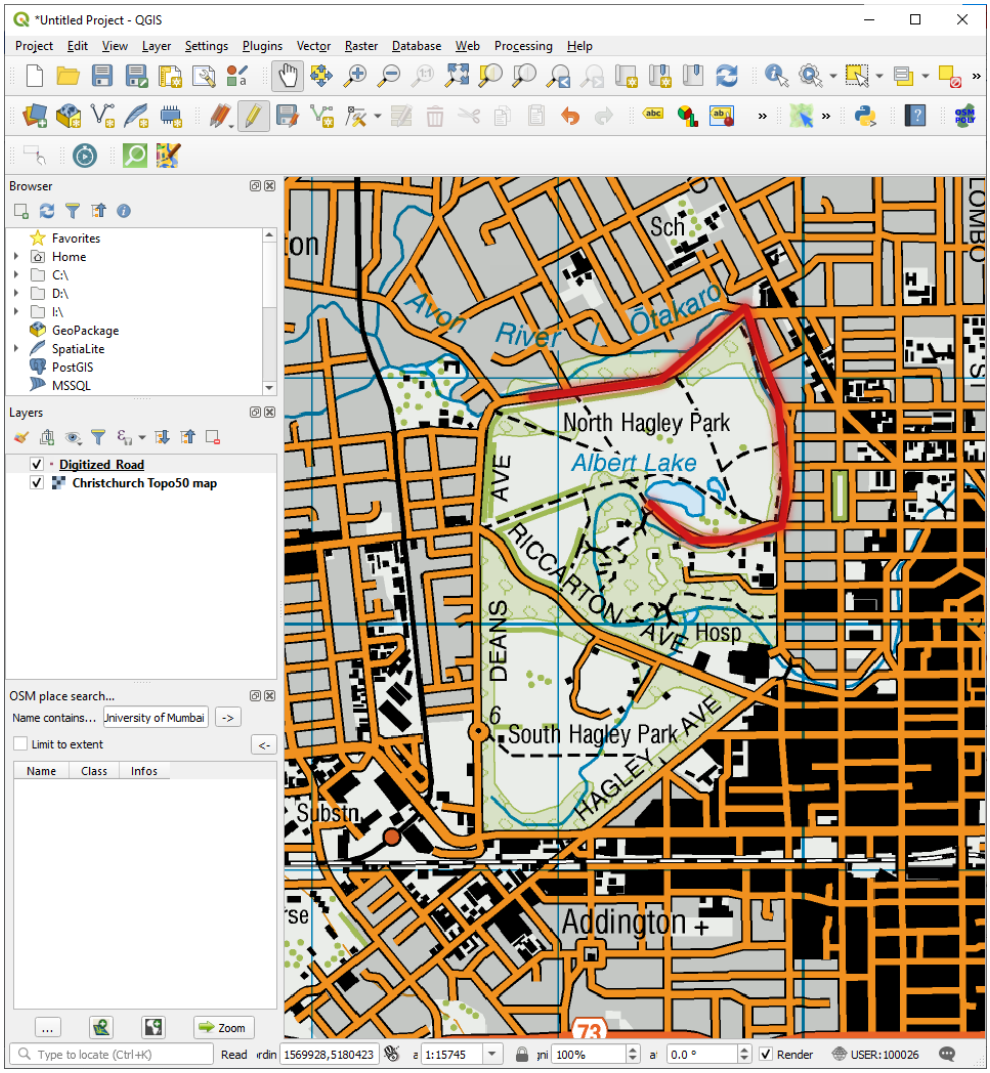




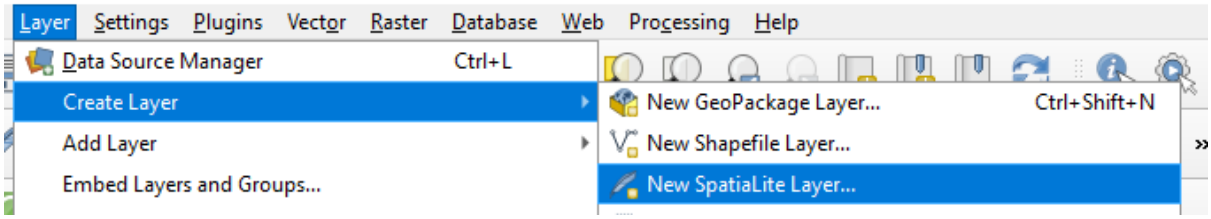
➢ On Layer Panel Right Click on Digitze_Road, Select the Style tab in the Layer Properties dialog.

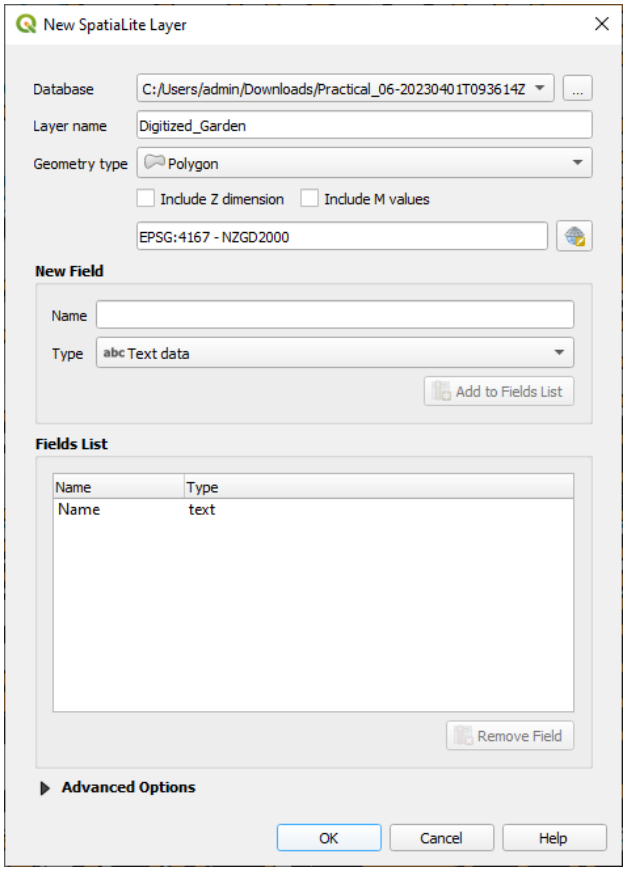






➢ Select appropriate style to see the digitized road feature clearly.

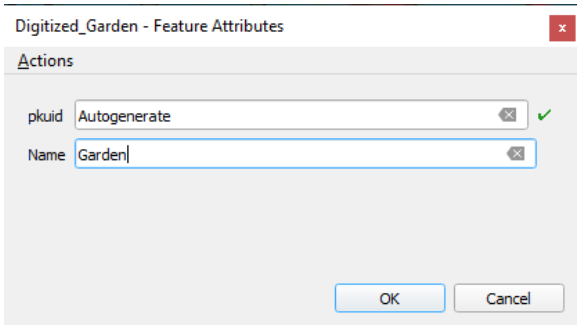




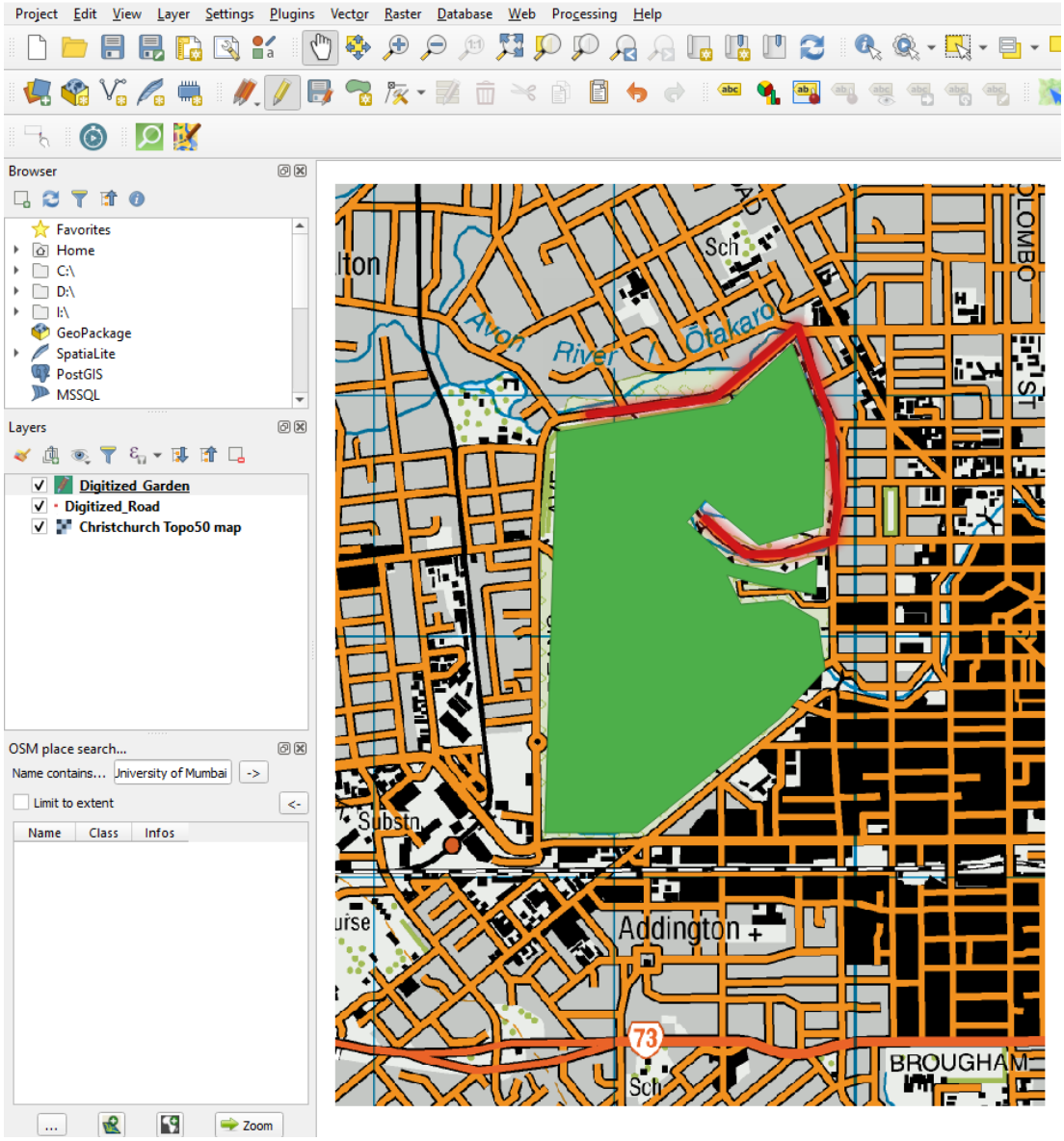
➢ After creating a new Spatialite layer

➢ Select Digitized_Garden layer in Layer Panel and click on Toggle Editing button and then Add Polygon Feature button on Tool bar.

➢ Add two gardens to the region by adding polygon.



➢ The Layer will appear on map canvas



➢ Using the above procedure a point feature can also be digitized.

➢ The digitizing task is now complete. You can play with the styling and labeling options in layer properties to create a nice-looking map from the data you created.

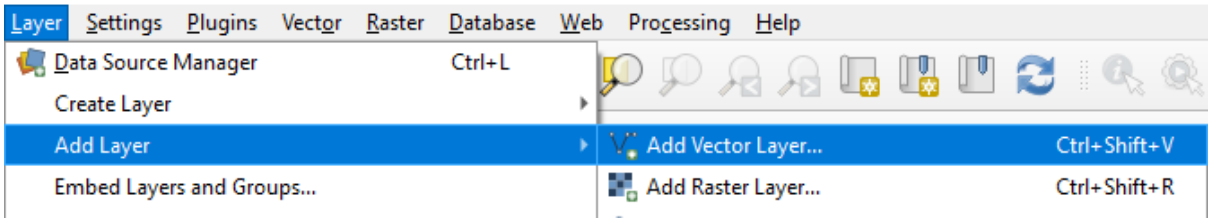
Practical 8

AIM: Managing Data Tables and Spatial data Sets: Table joins, spatial joins, points in polygon analysis, performing spatial queries

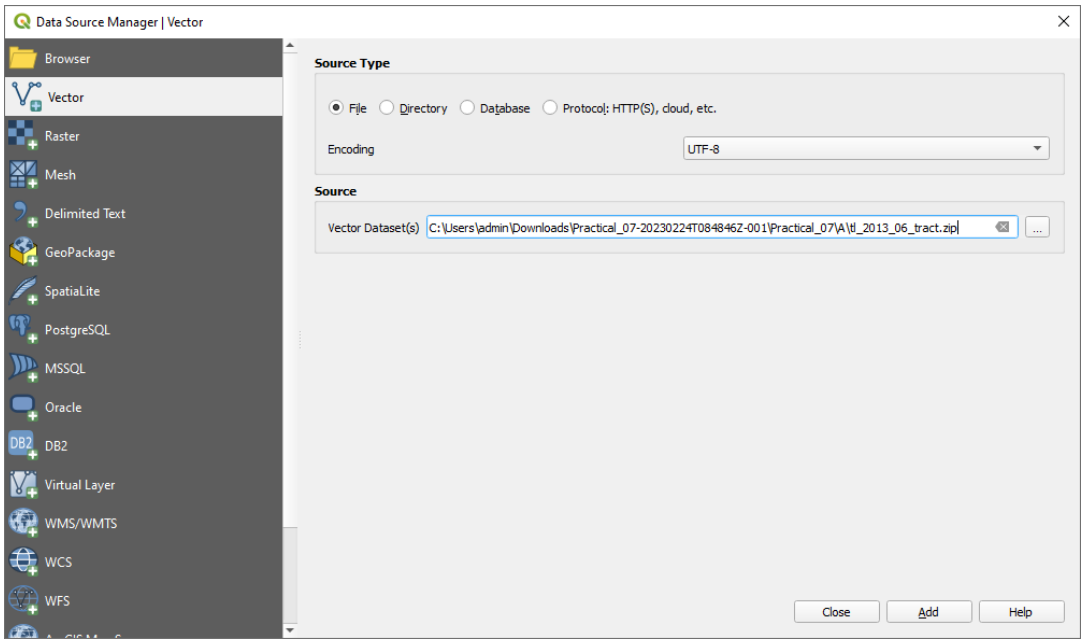
Solution:

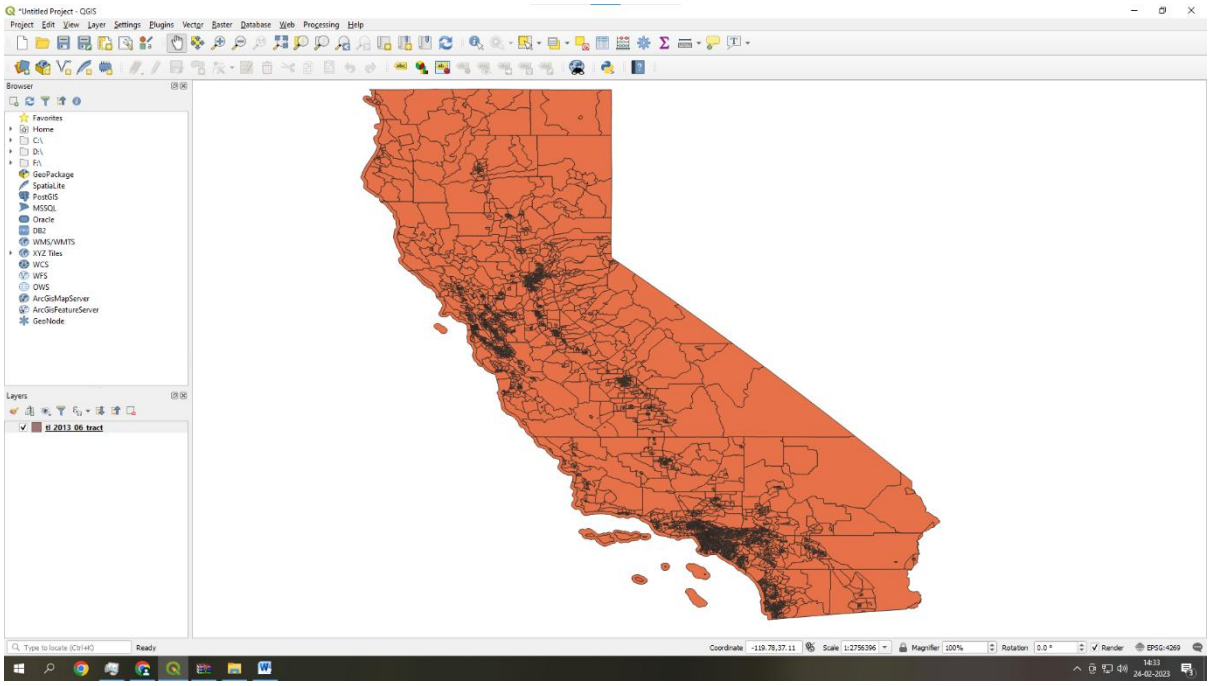
8.A) Table joins

Create new project and Add new vector layer

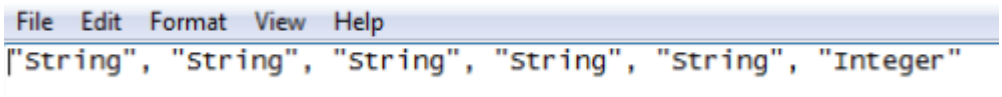


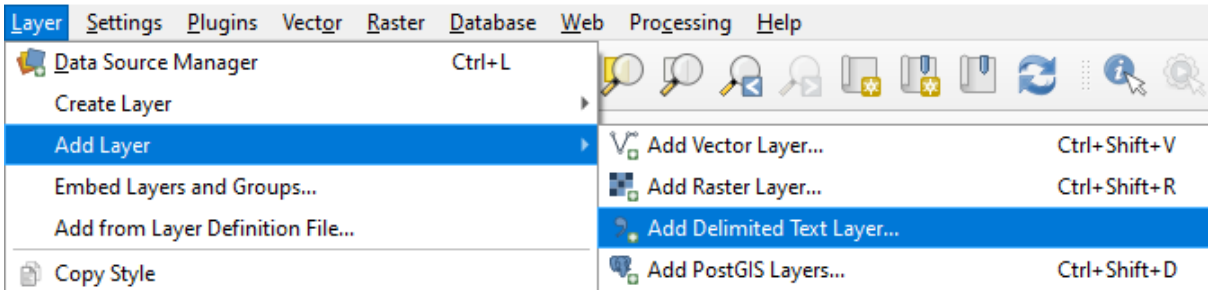
Select tl_2013_06_tract.zip

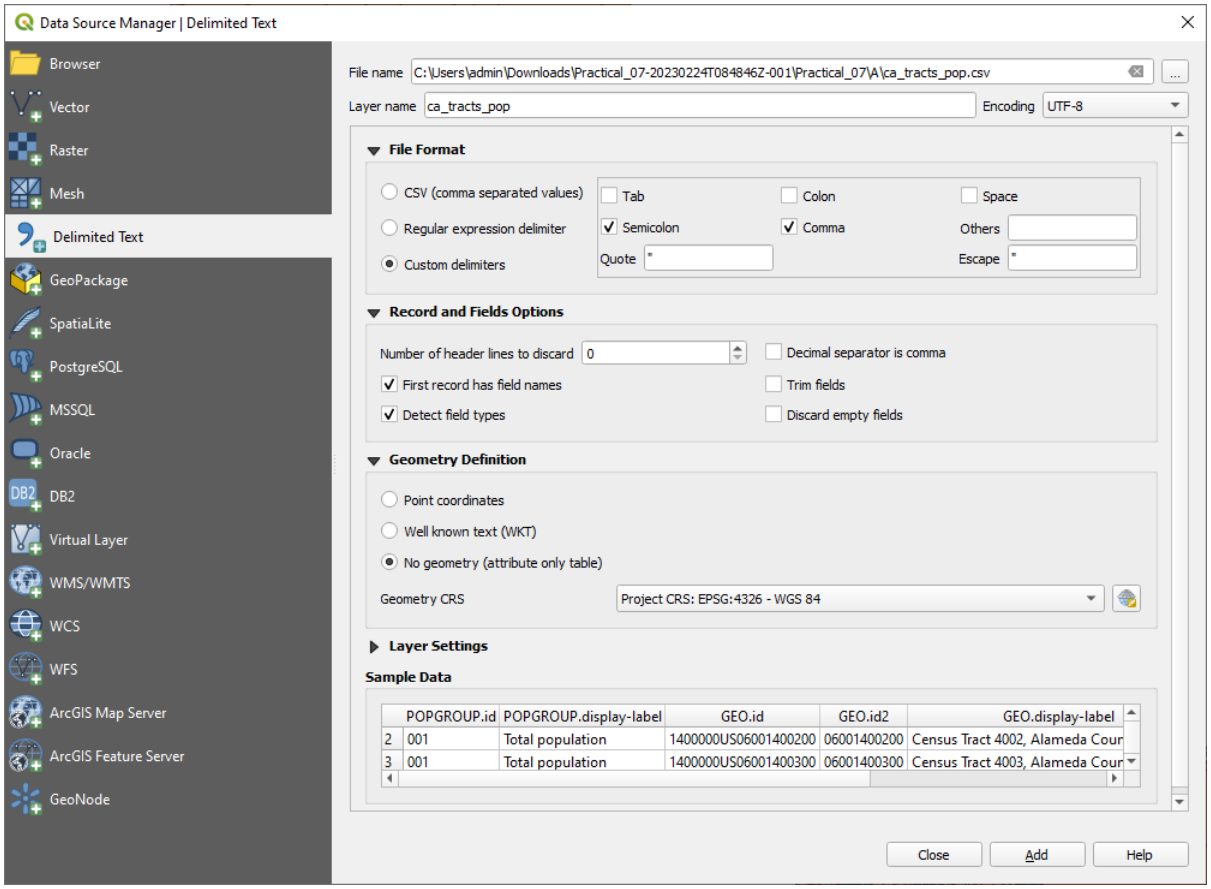




Now add ca_tracts_pop.csvt as Delimited text layer

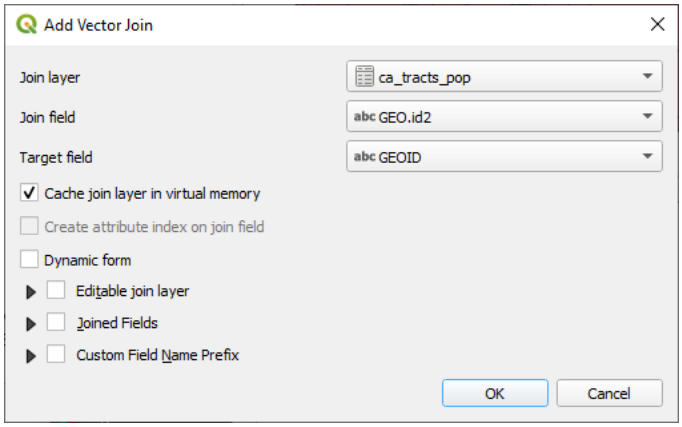


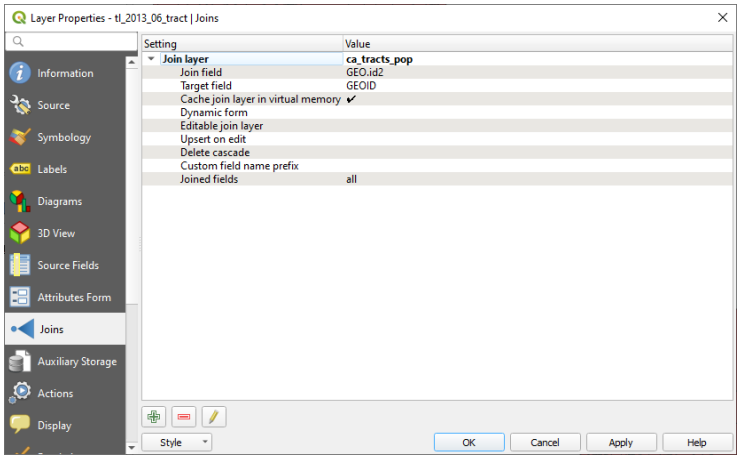




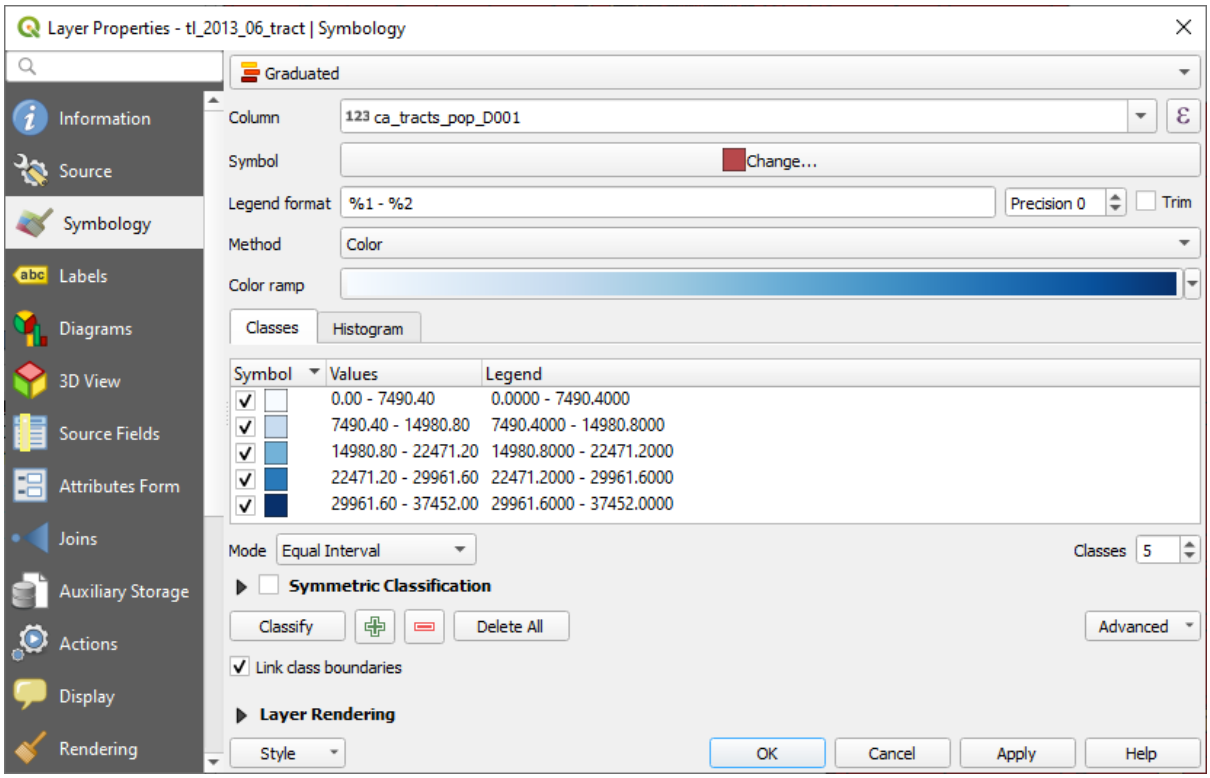
Right click on tl_2013_06_tract and select properties.

Click on + icon to add new table join

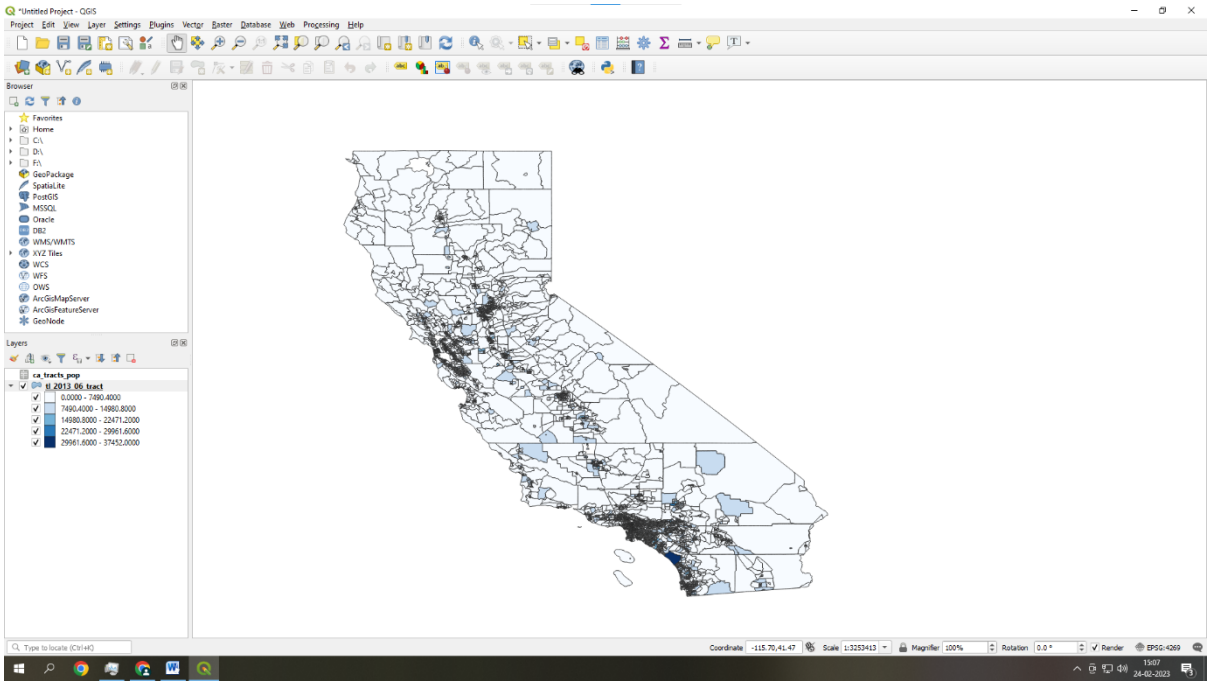




Again, right click on tl_2013_06_tract and select properties then select Symbology

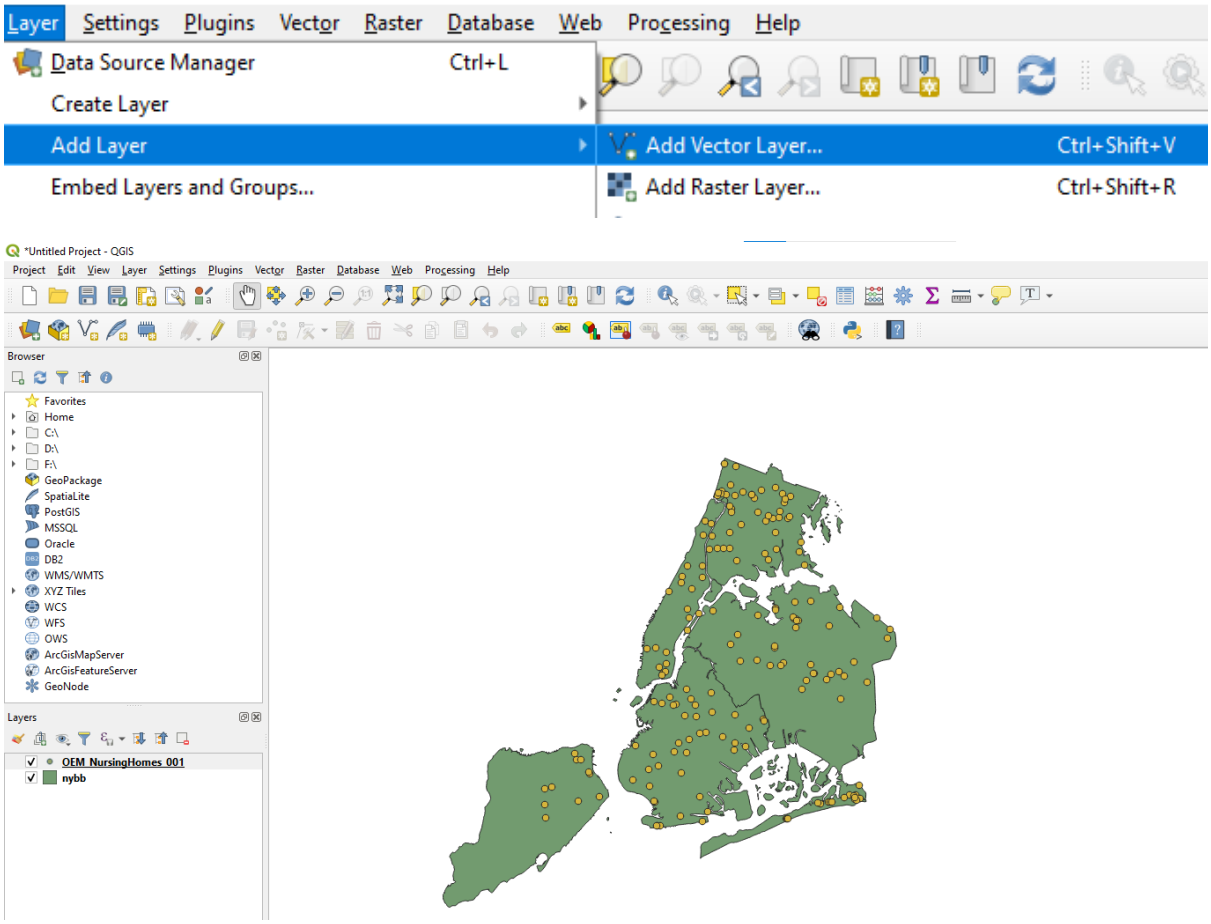


OUTPUT

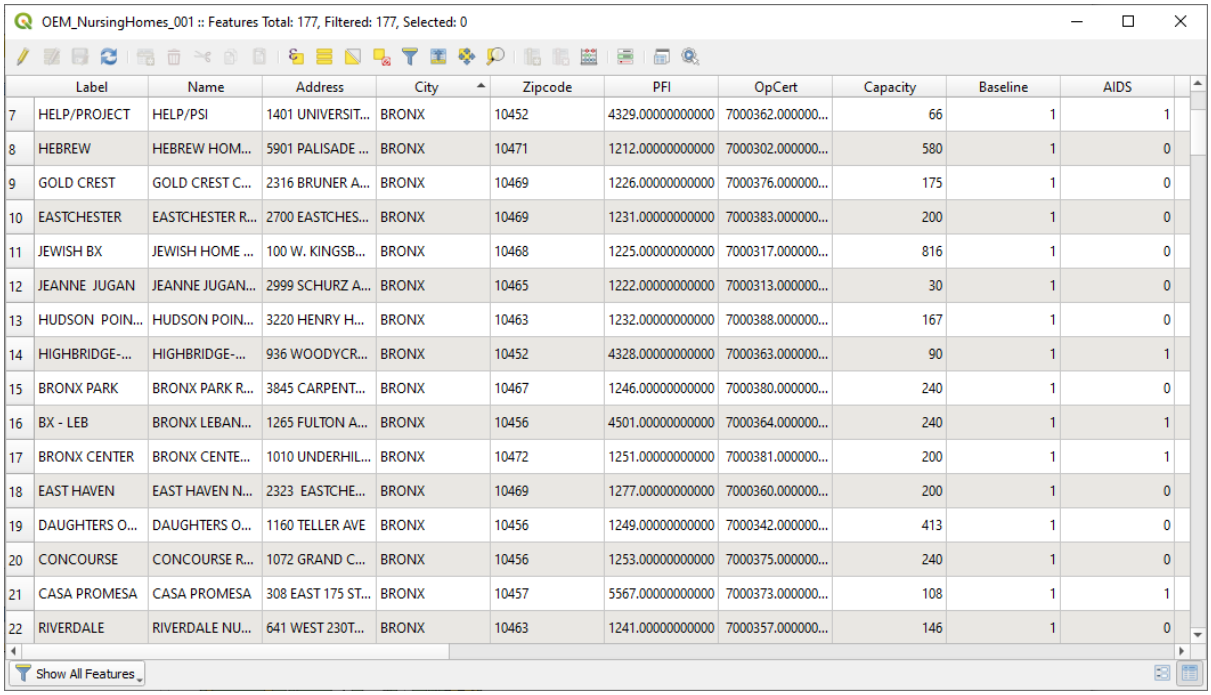


8.B) Spatial joins

Add 2 vector layers nybb.shp and OEM_NursingHomes_001.shp

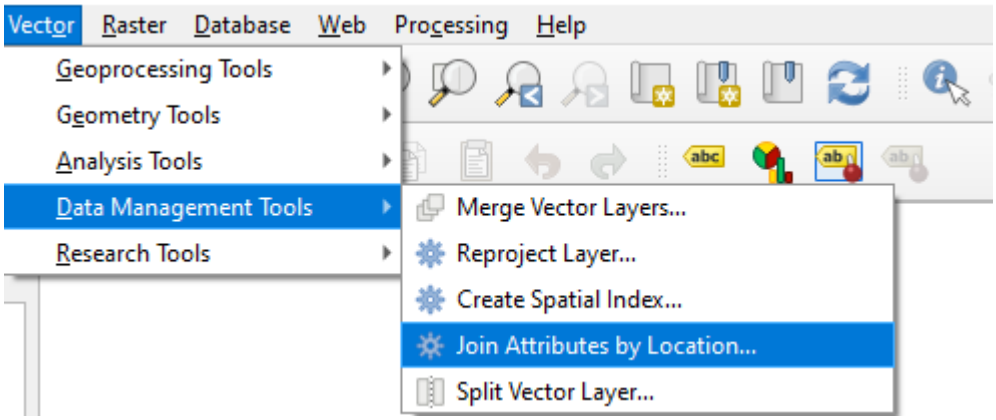


Attribute table before Join

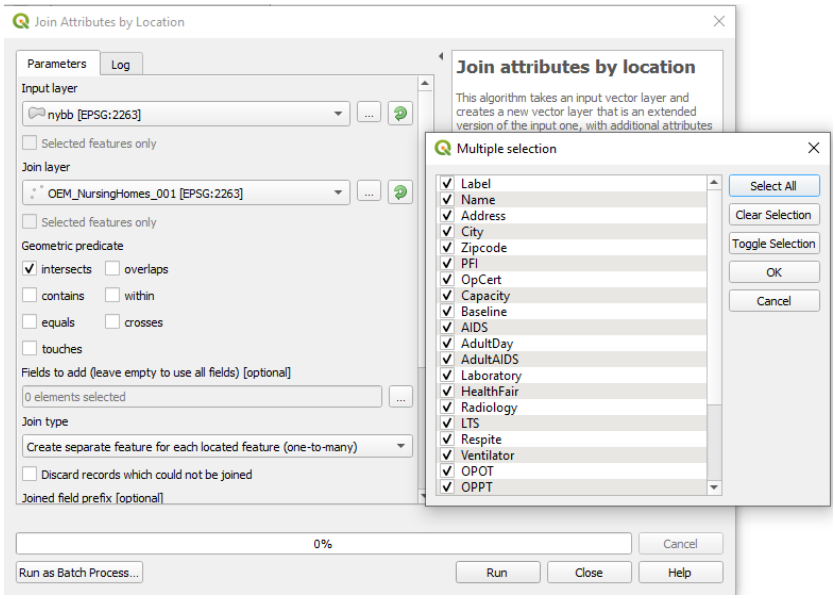


	Label	Name	Address	City	Zipcode	PFI	OpCert	Capacity	Baseline	AIDS
7	HELP/PROJECT	HELP/PSI	1401 UNIVERSIT...	BRONX	10452	4329.00000000000	7000362.000000...	66	1	1
8	HEBREW	HEBREW HOM...	5901 PALISADE ...	BRONX	10471	1212.00000000000	7000302.000000...	580	1	0
9	GOLD CREST	GOLD CREST C...	2316 BRUNER A...	BRONX	10469	1226.00000000000	7000376.000000...	175	1	0
10	EASTCHESTER	EASTCHESTER R...	2700 EASTCHES...	BRONX	10469	1231.00000000000	7000383.000000...	200	1	0
11	JEWISH BX	JEWISH HOME ...	100 W. KINGSB...	BRONX	10468	1225.00000000000	7000317.000000...	816	1	0
12	JEANNE JUGAN	JEANNE JUGAN...	2999 SCHURZ A...	BRONX	10465	1222.00000000000	7000313.000000...	30	1	0
13	HUDSON POIN...	HUDSON POIN...	3220 HENRY H...	BRONX	10463	1232.00000000000	7000388.000000...	167	1	0
14	HIGHBRIDGE-...	HIGHBRIDGE-...	936 WOODYCR...	BRONX	10452	4328.00000000000	7000363.000000...	90	1	1
15	BRONX PARK	BRONX PARK R...	3845 CARPENT...	BRONX	10467	1246.00000000000	7000380.000000...	240	1	0
16	BX - LEB	BRONX LEBAN...	1265 FULTON A...	BRONX	10456	4501.00000000000	7000364.000000...	240	1	1
17	BRONX CENTER	BRONX CENTE...	1010 UNDERHIL...	BRONX	10472	1251.00000000000	7000381.000000...	200	1	1
18	EAST HAVEN	EAST HAVEN N...	2323 EASTCHE...	BRONX	10469	1277.00000000000	7000360.000000...	200	1	0
19	DAUGHTERS O...	DAUGHTERS O...	1160 TELLER AVE	BRONX	10456	1249.00000000000	7000342.000000...	413	1	0
20	CONCOURSE	CONCOURSE R...	1072 GRAND C...	BRONX	10456	1253.00000000000	7000375.000000...	240	1	0
21	CASA PROMESA	CASA PROMESA	308 EAST 175 ST...	BRONX	10457	5567.00000000000	7000373.000000...	108	1	1
22	RIVERDALE	RIVERDALE NU...	641 WEST 230T...	BRONX	10463	1241.00000000000	7000357.000000...	146	1	0

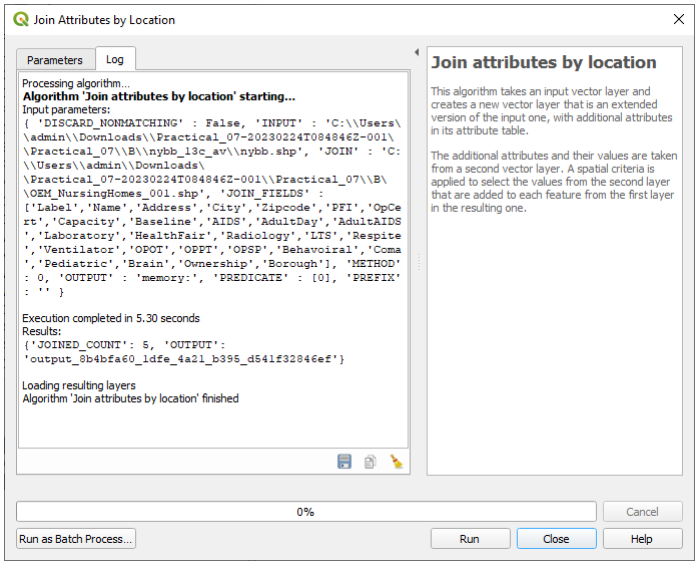
Now, Go to Vector → Data Management Tools → Join Attributes by Location



Add all fields in "Fields to add"

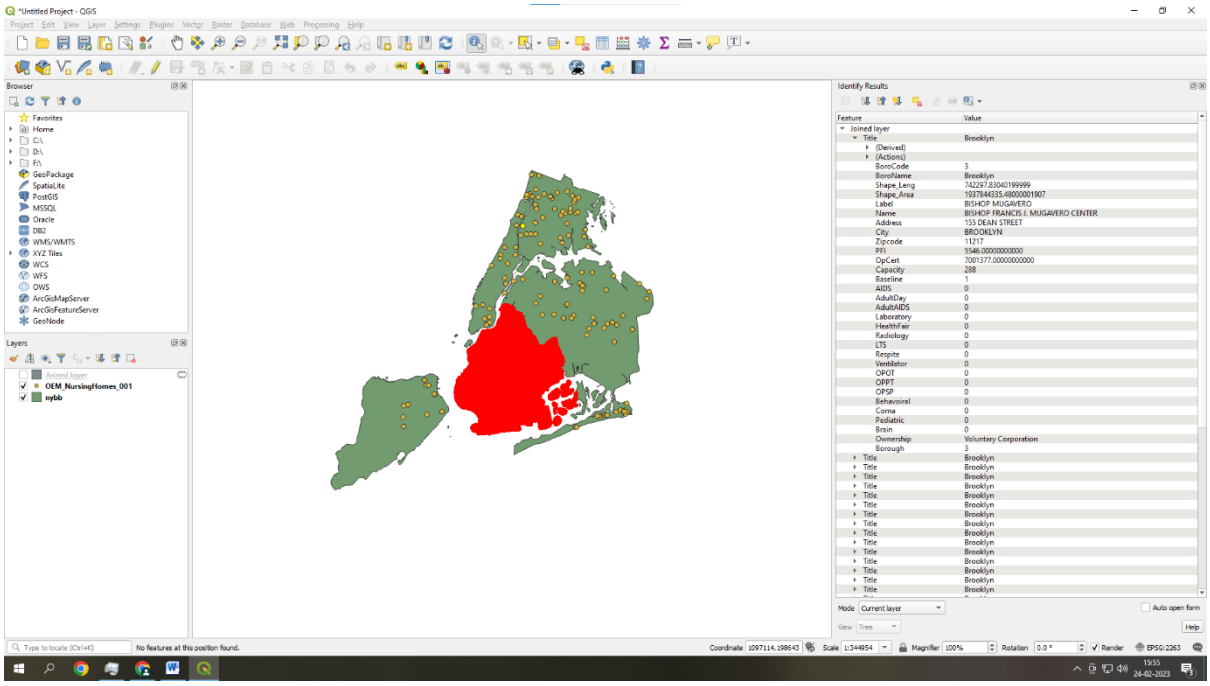


Hit run,



Use identify Feature  button to select a region to view join data.

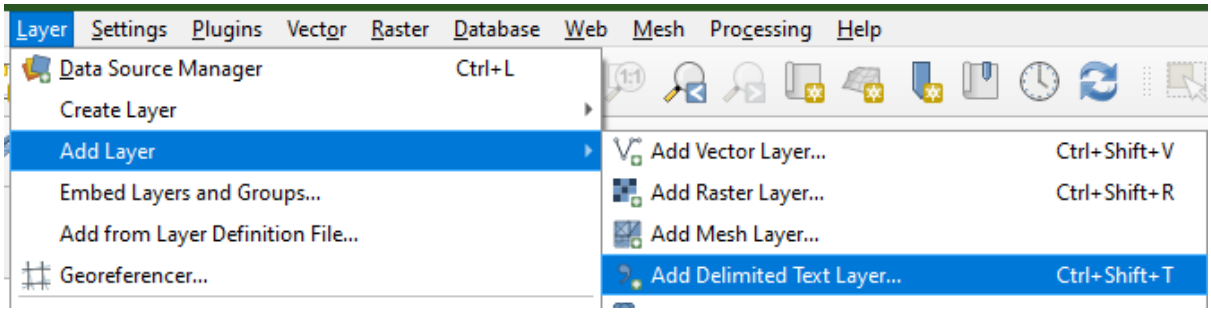
OUTPUT

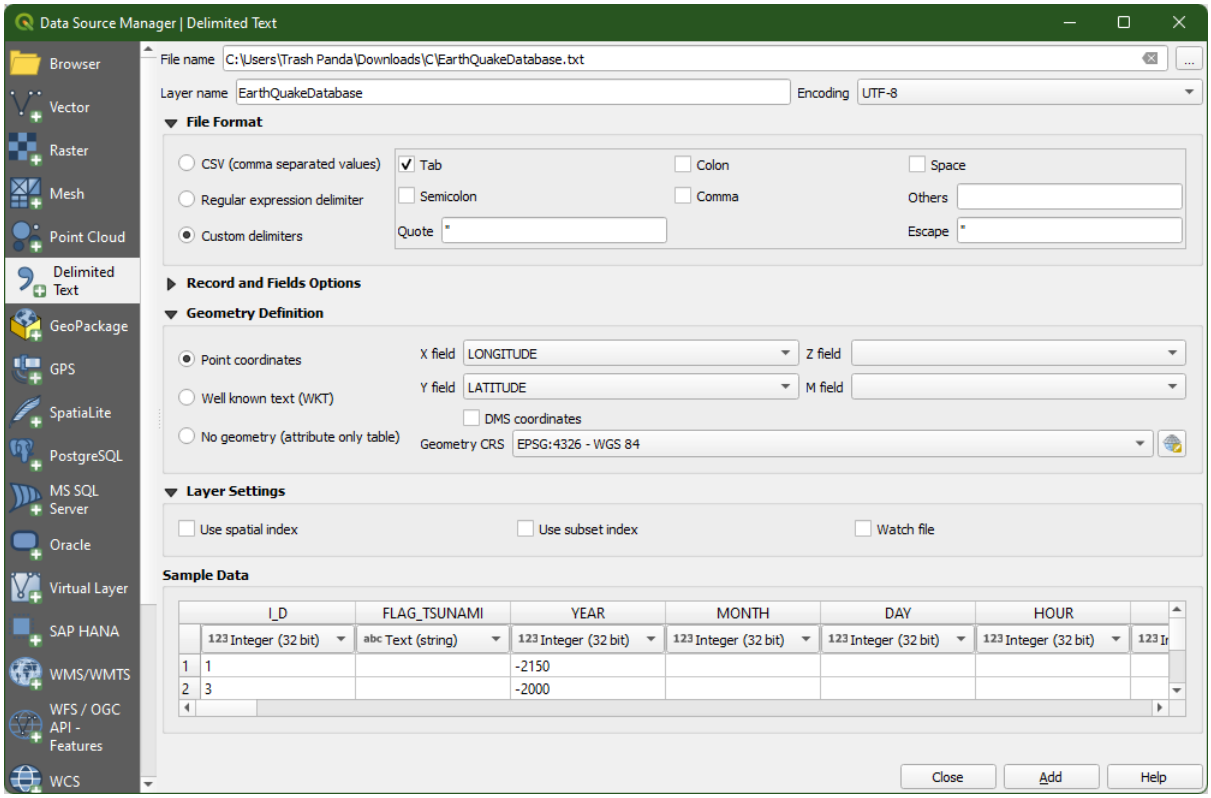


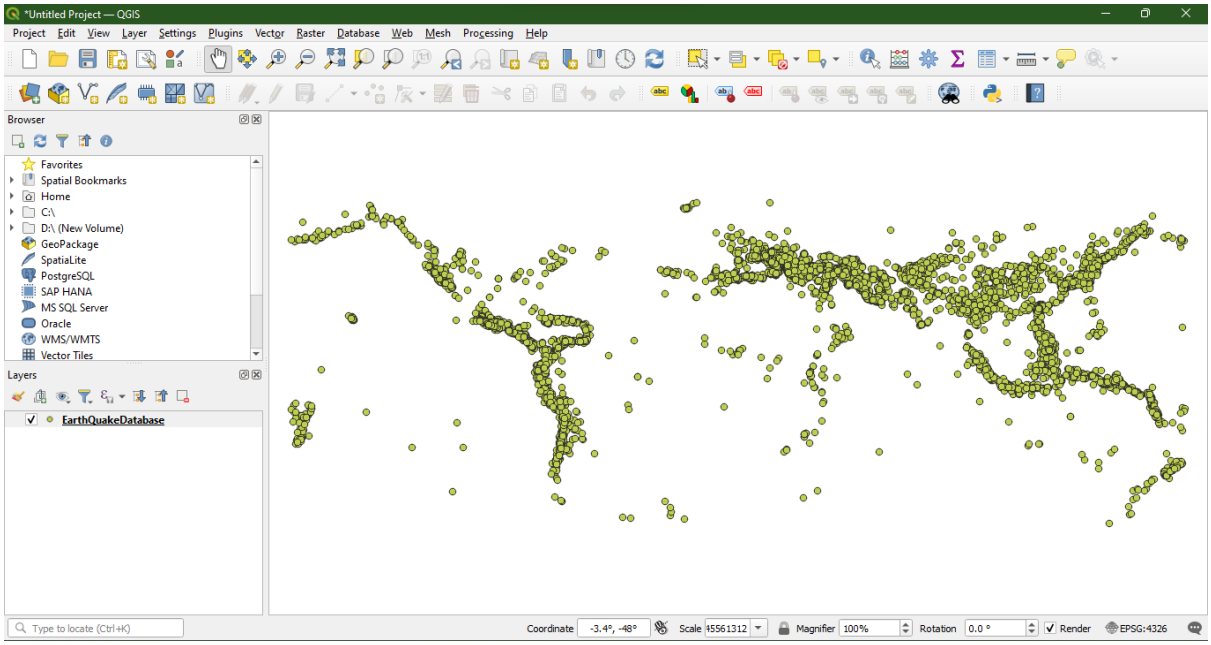
8.C) Points in polygon analysis

Create new QGIS Project,

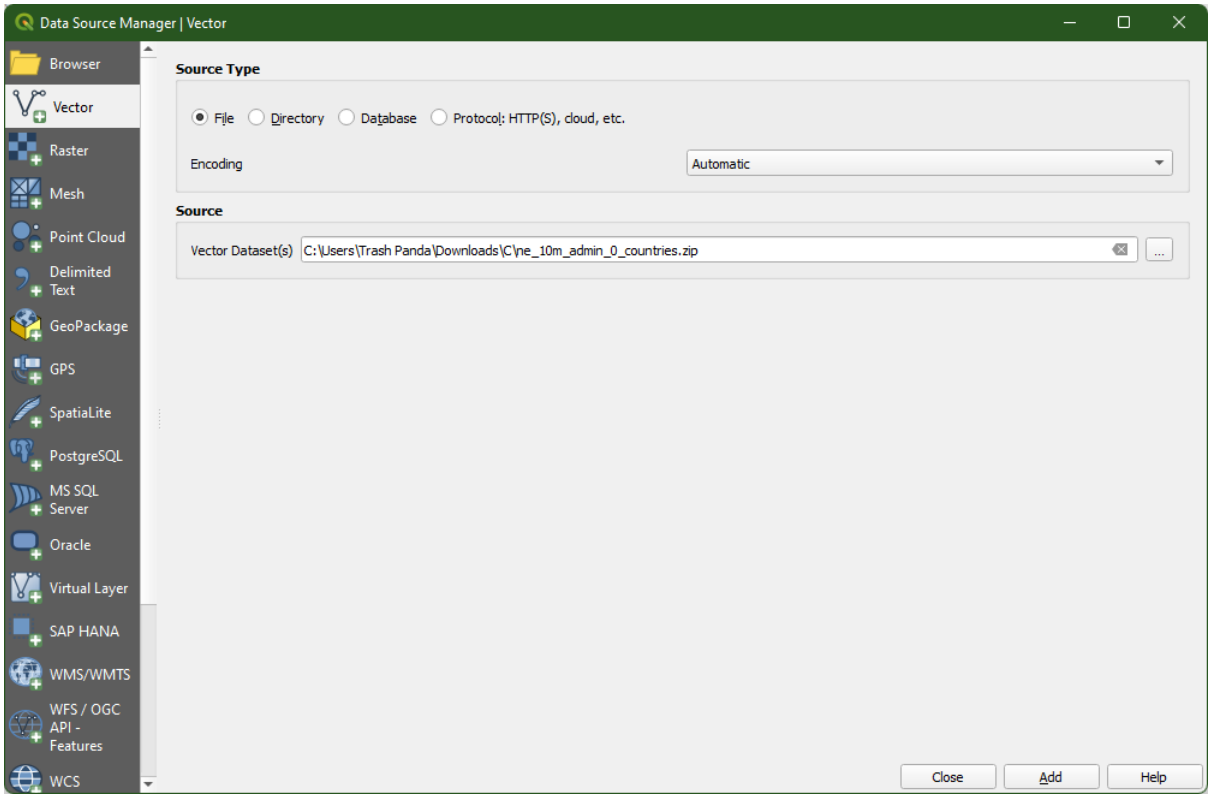
And add Delimited Text Layer

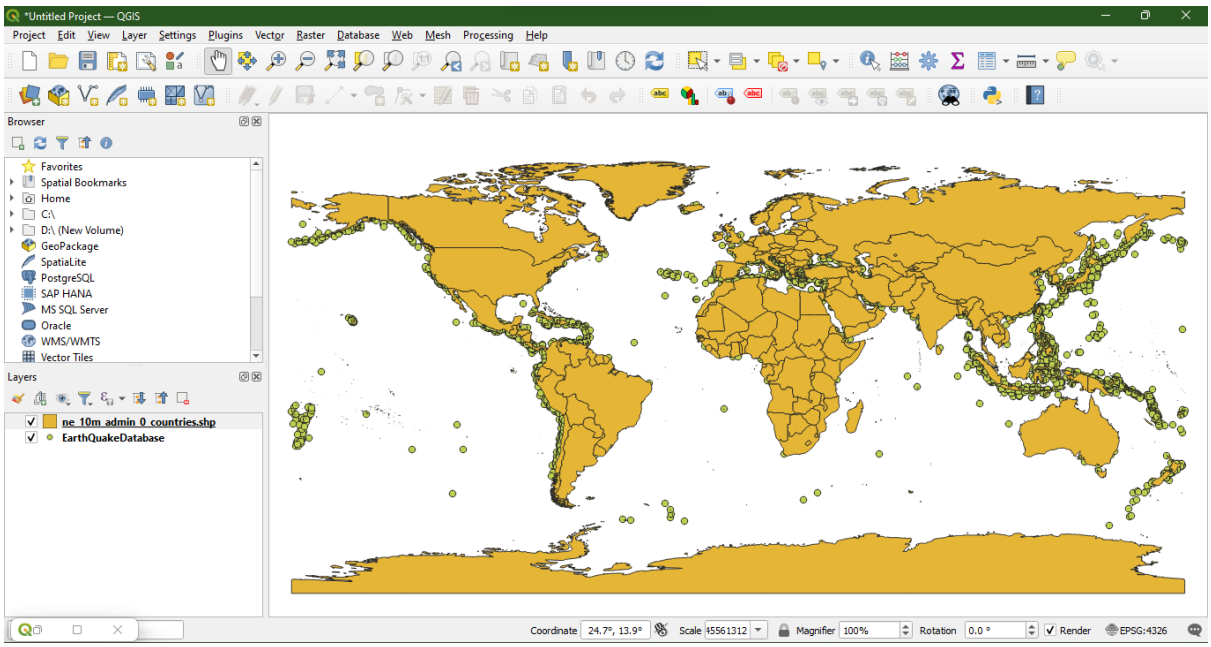




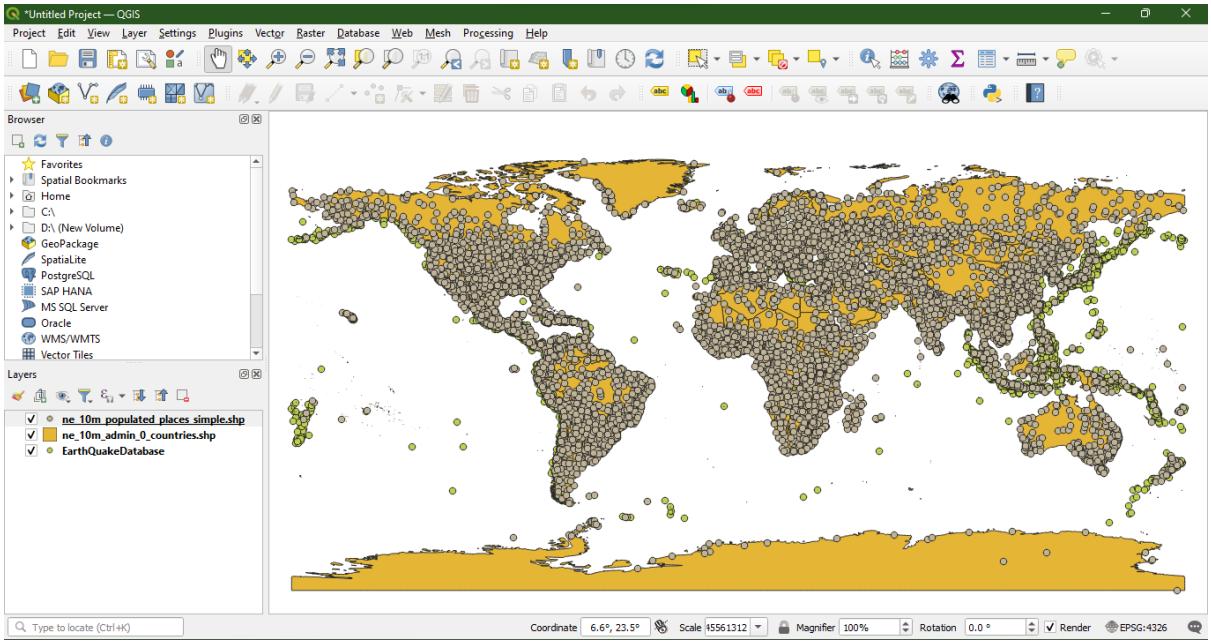


Now add vector layer ne_10m_admin_0_countries.shp,

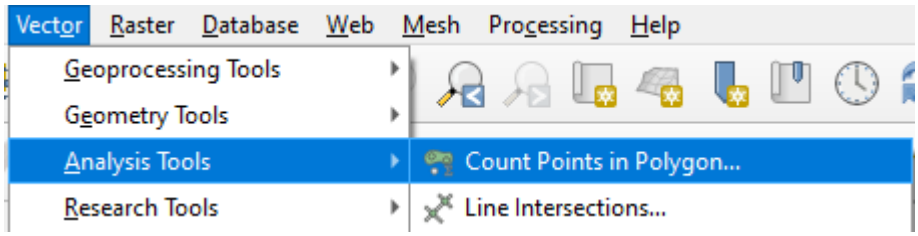


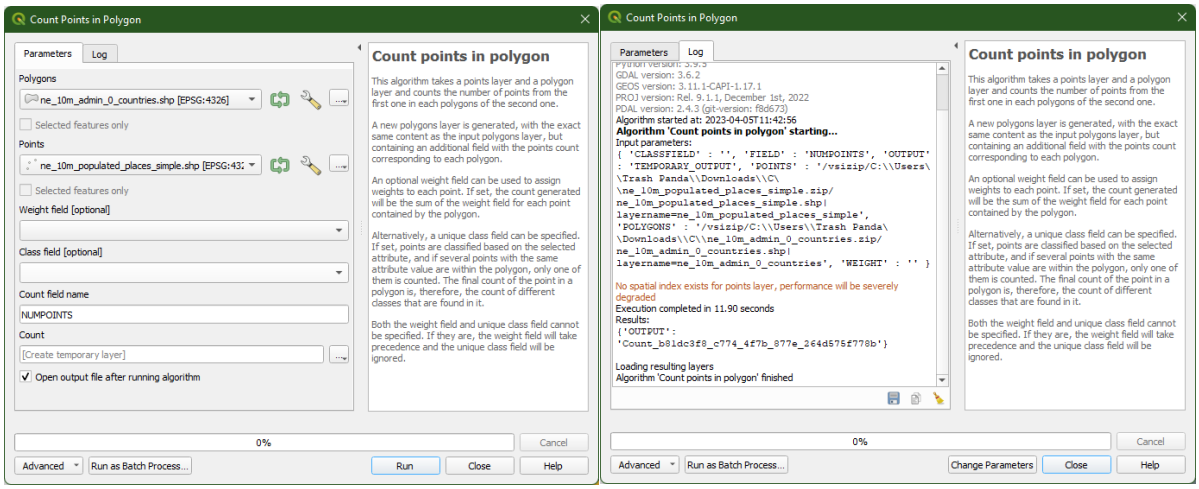


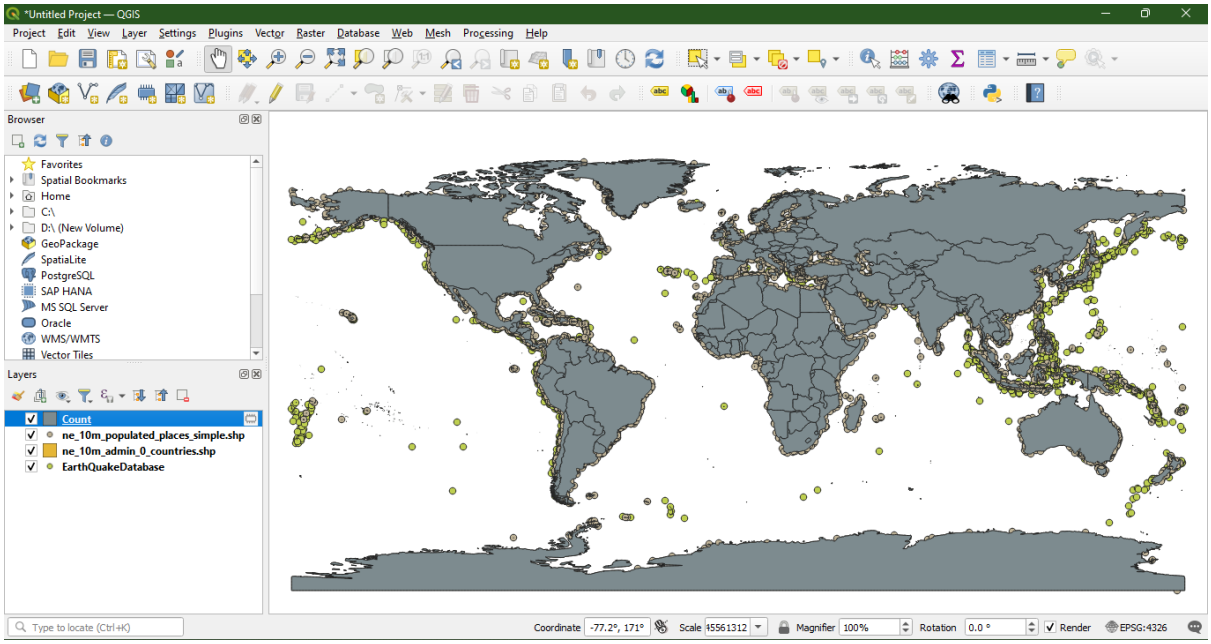
Now add another vector layer ne_10m_populated_places_simple.shp,



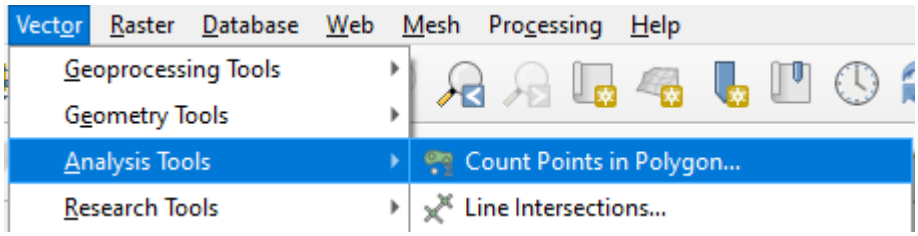
Now go to vector -> Analysis tools -> Count points in polygon.

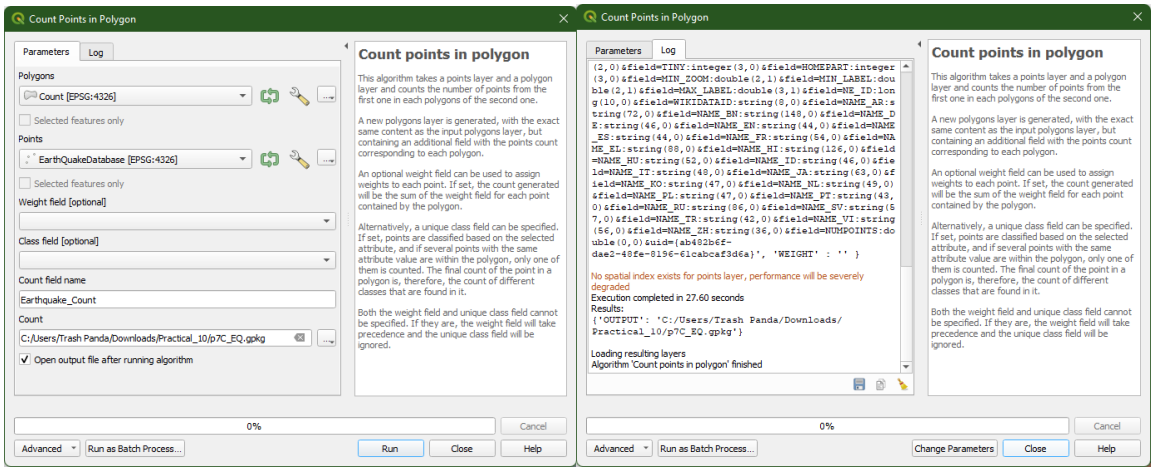


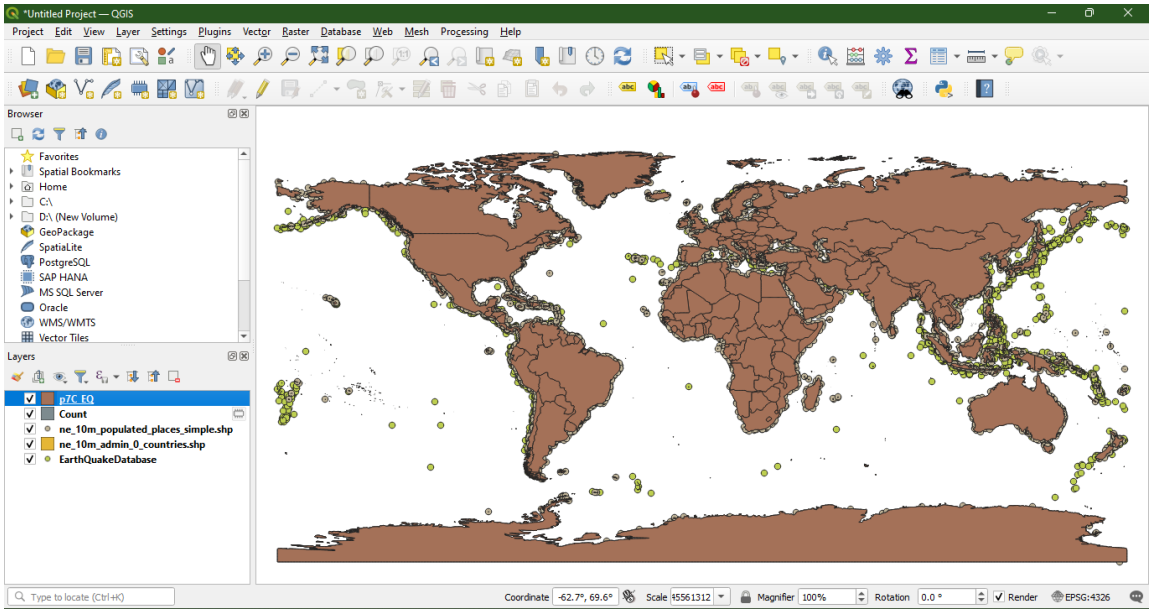




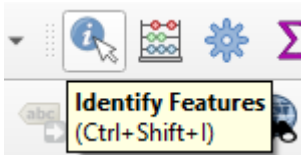
Again, go to vector -> Analysis tools -> Count points in polygon.





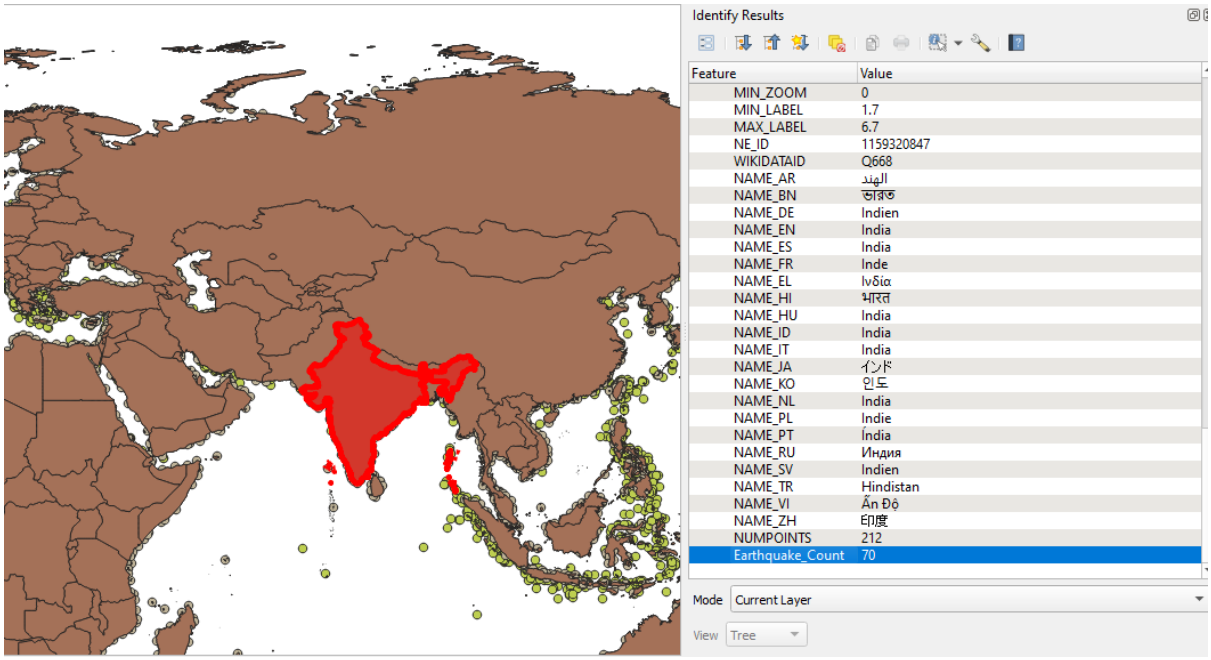


Now select identify feature



Then Select India country.

OUTPUT:

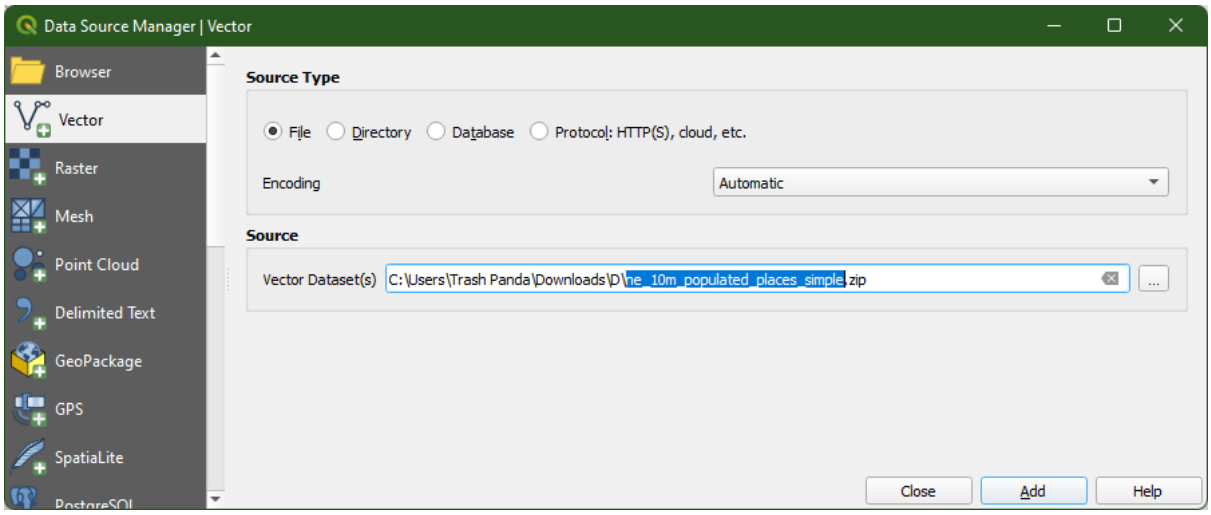


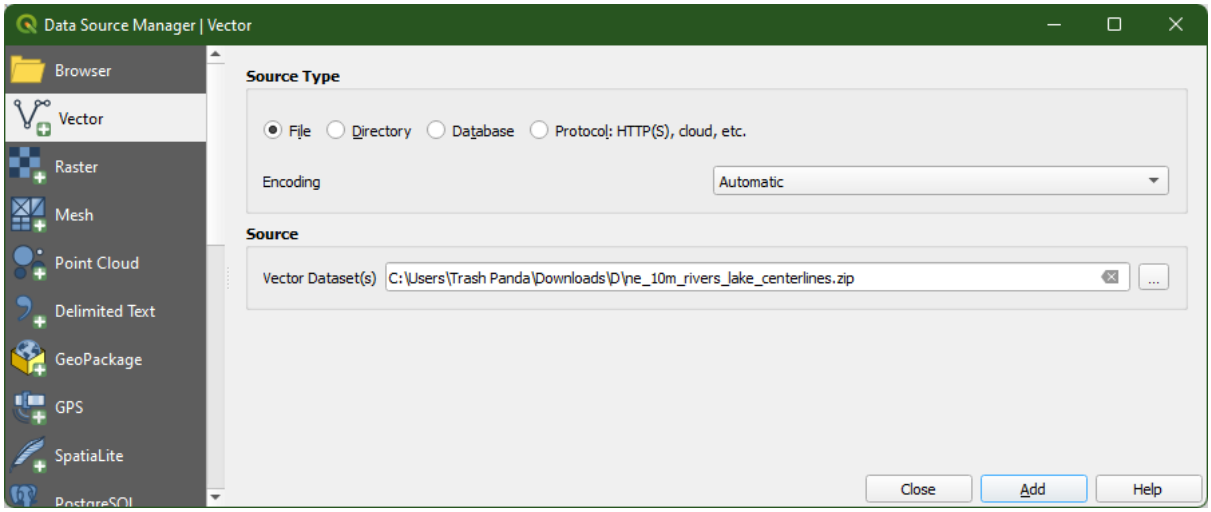
8.D) Performing spatial queries

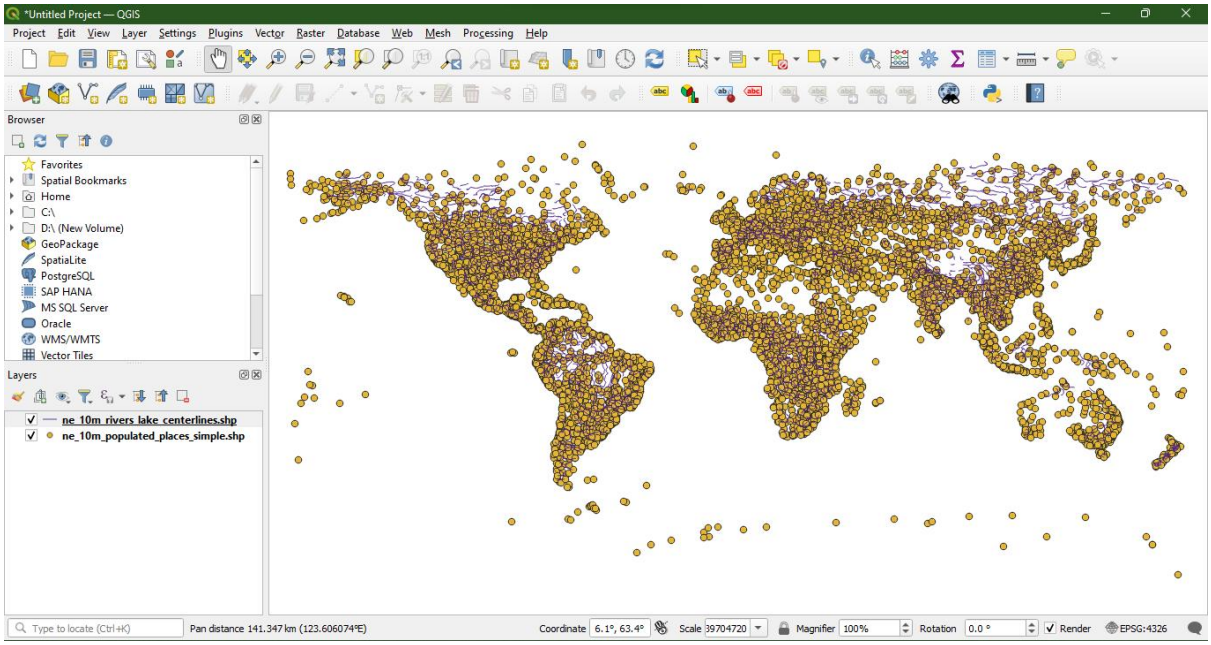
Add following two vector layers,

a) ne_10m_rivers_lake_centerlines.shp

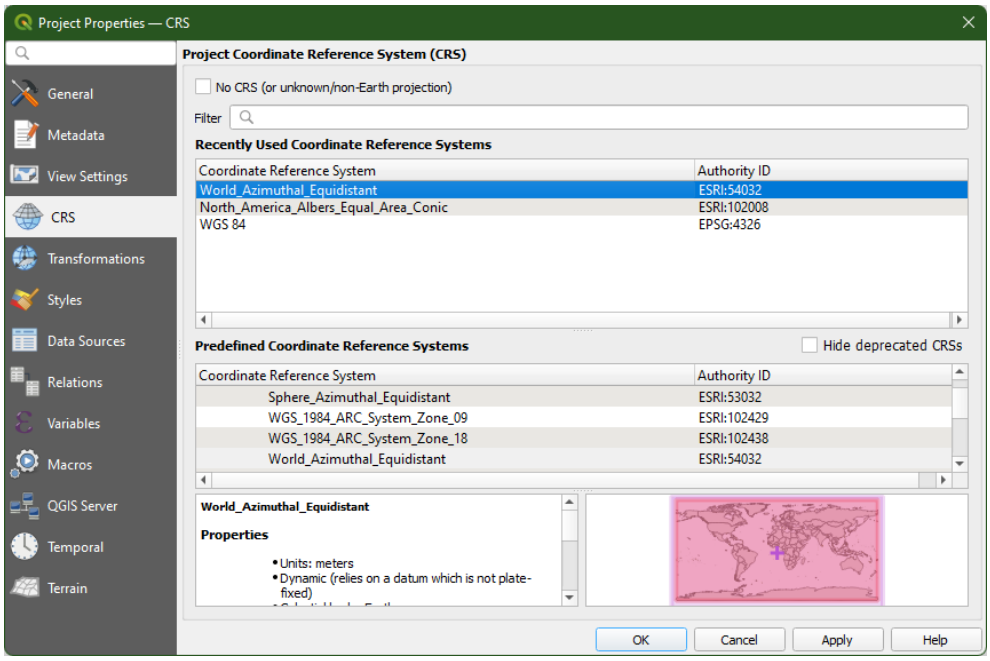
b) ne_10m_populated_places_simple.shp

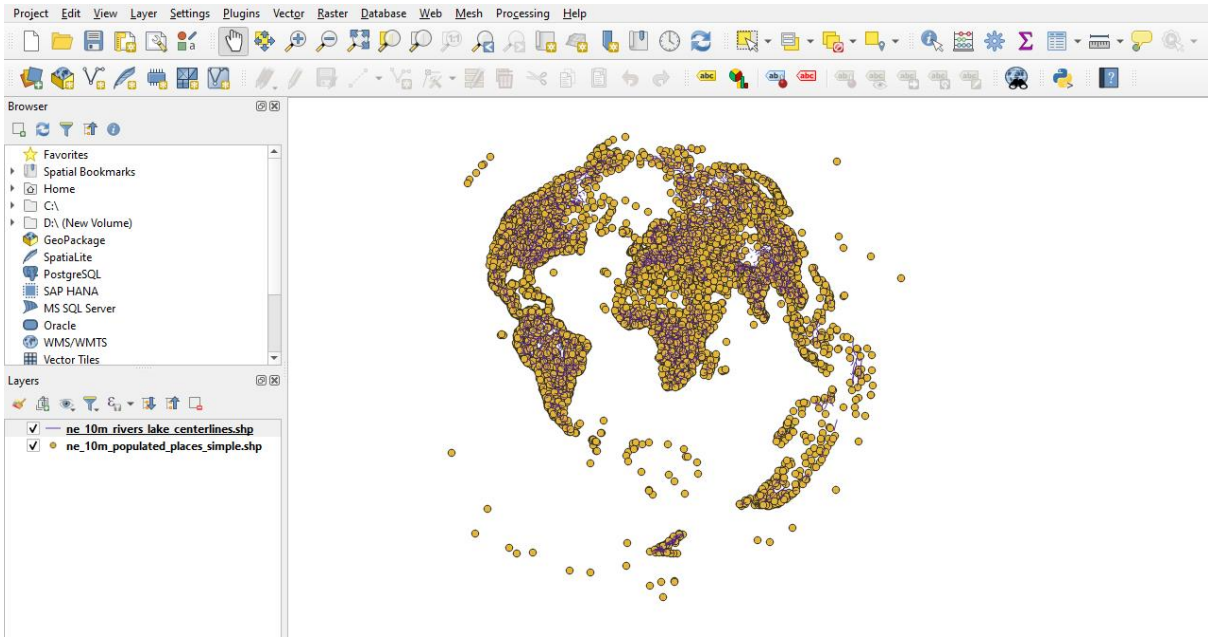




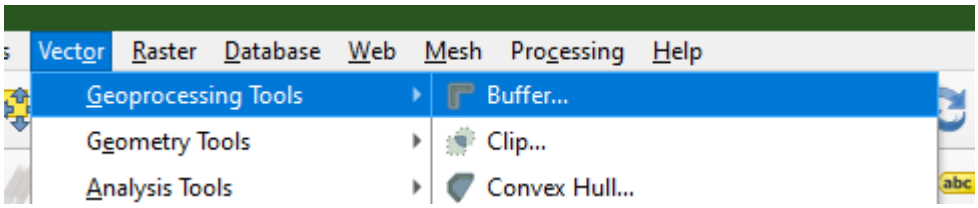


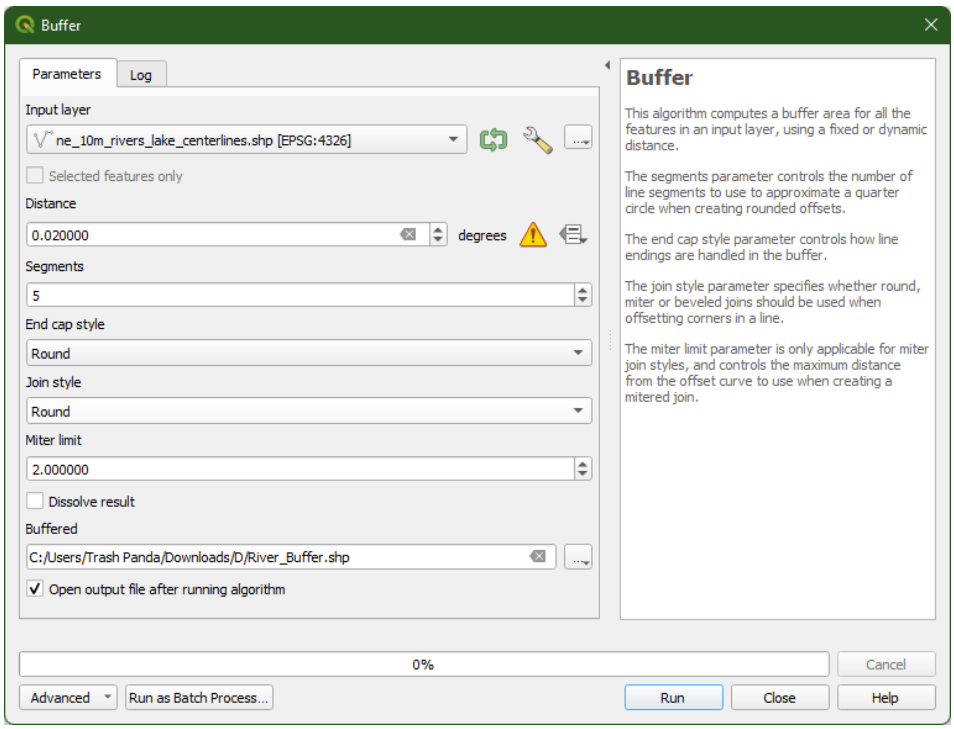
Now open project properties and set CRS = World_Azimuthal_Equidistant EPSG 54032

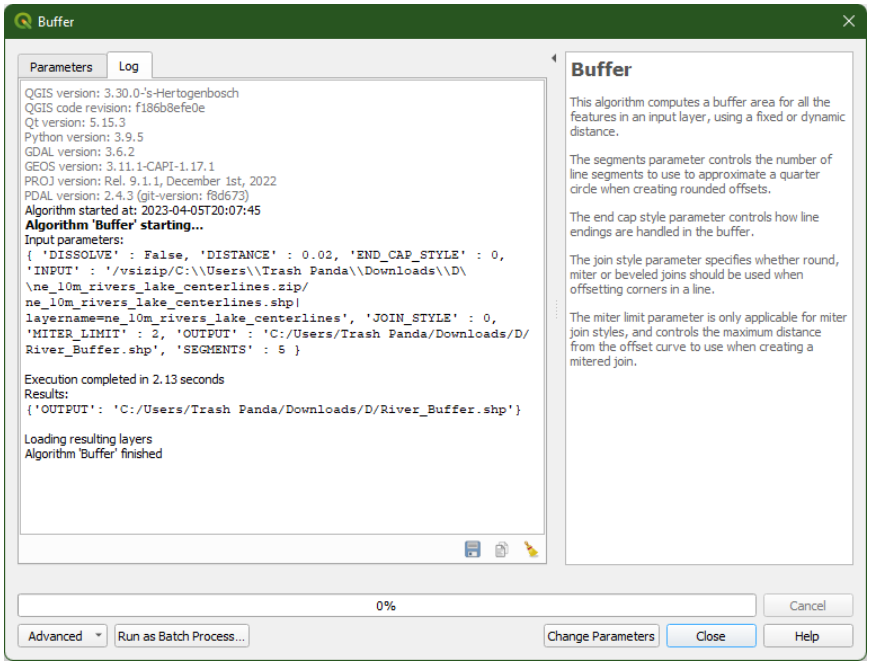




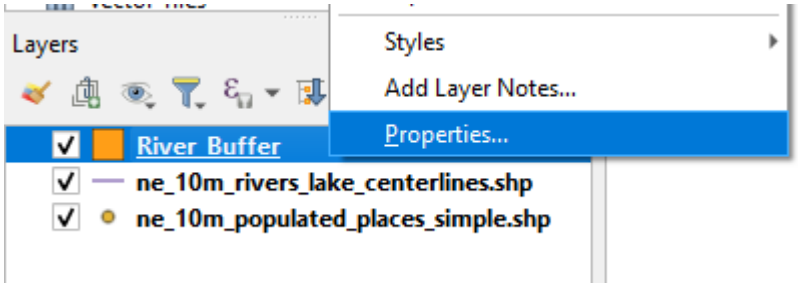
Now go to Vector -> Geoprocessing Tools -> Buffer

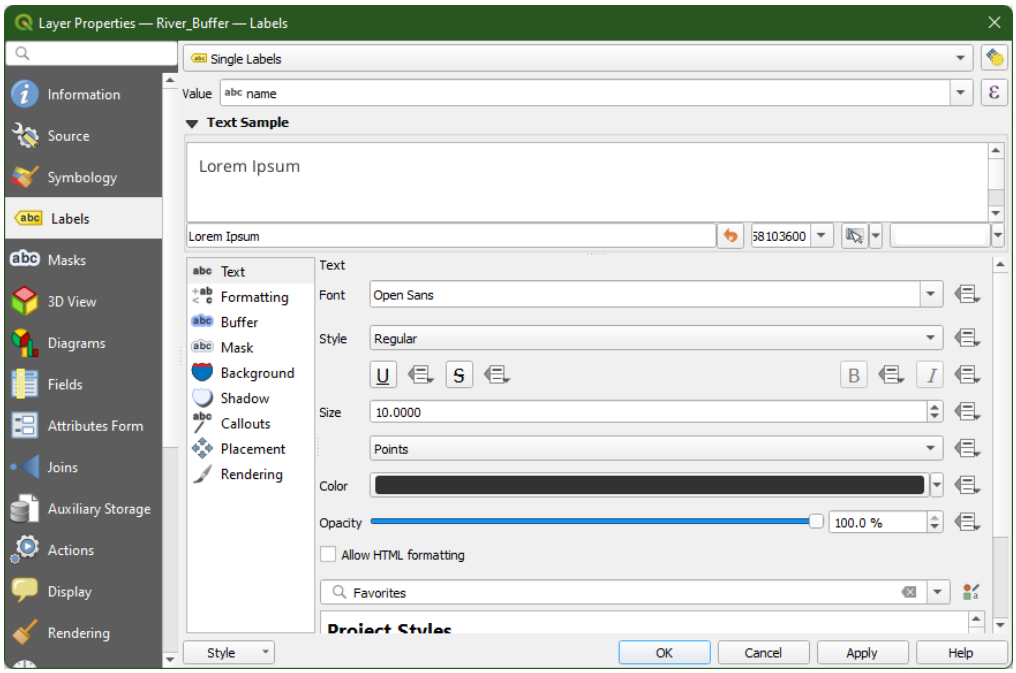




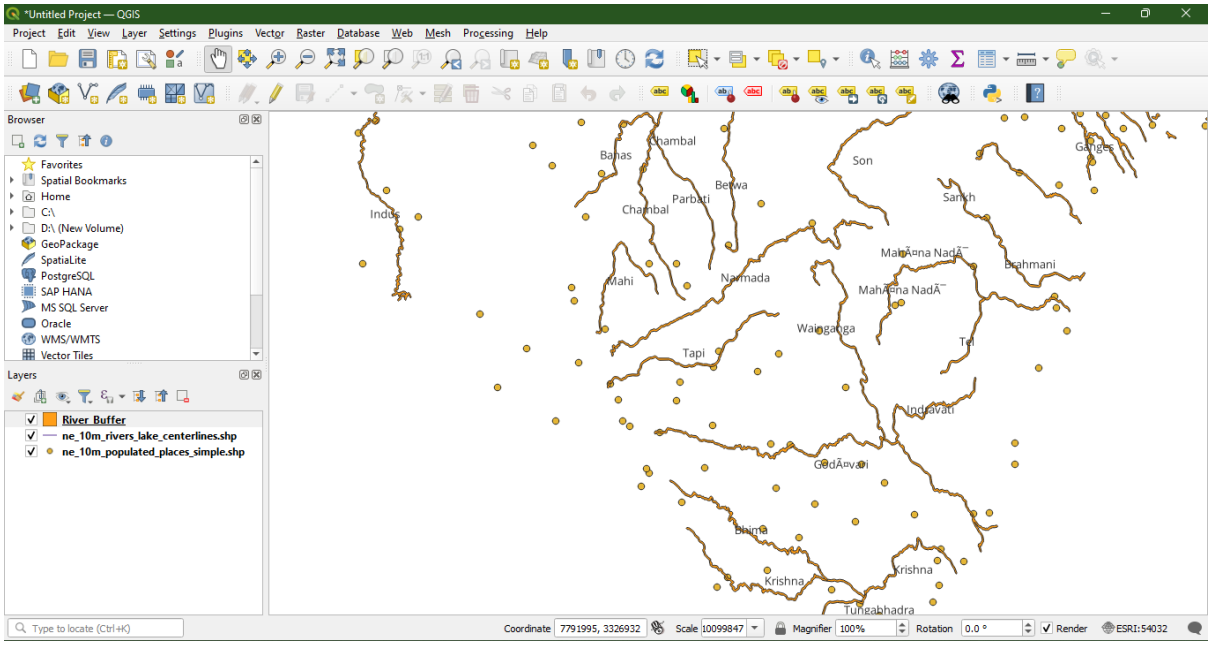


Now select generated layer and go to properties and set Label to Single Label

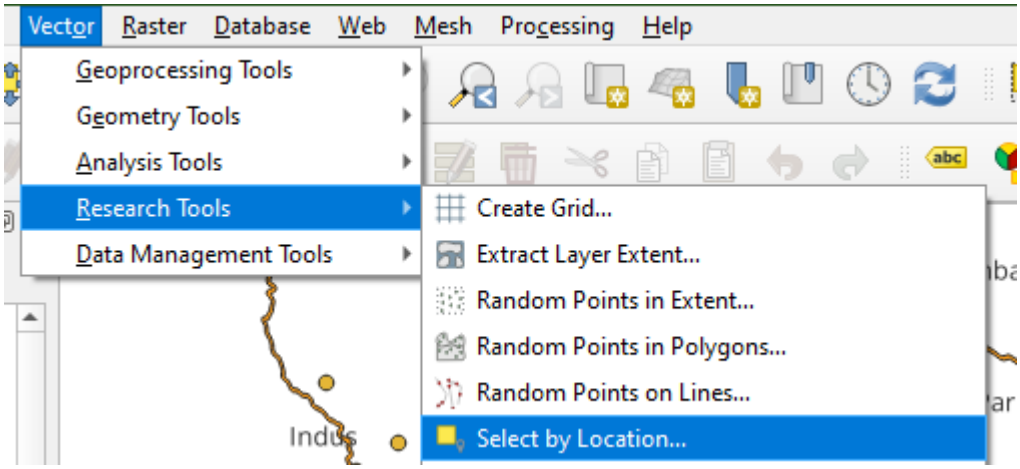


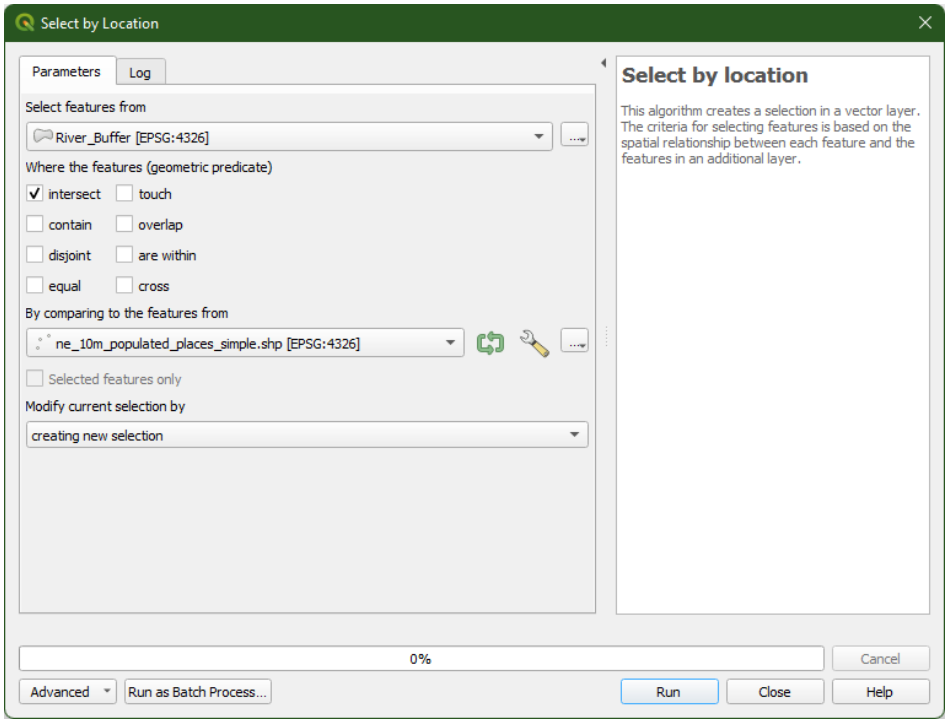


Click Apply.



Now, Go to vector -> Research Tool -> Select by Location





Click Run.

OUTPUT