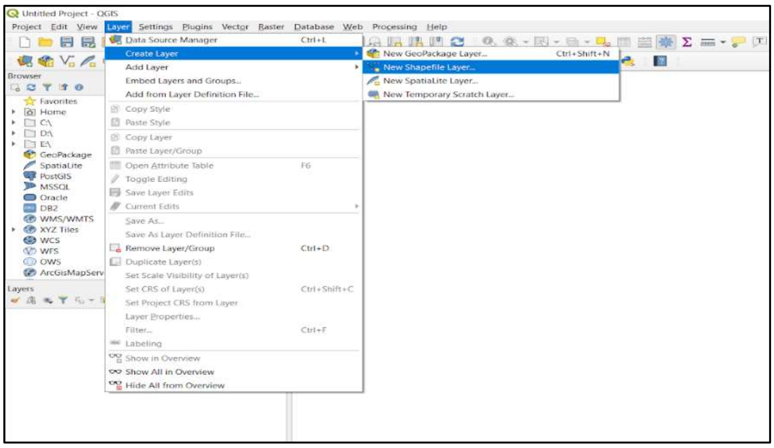
Practical no:-1

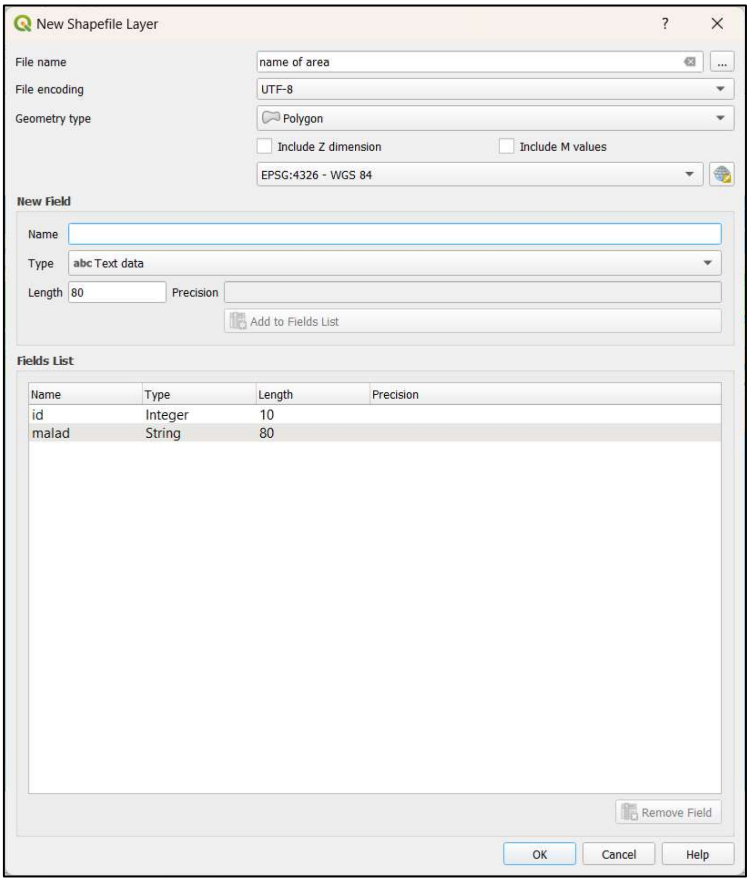
Aim: Creating and Managing vector data: Adding vector layers, setting properties, formatting, calculating Line length and statistics.

Part-I: Adding vectors layers, setting properties, formatting.

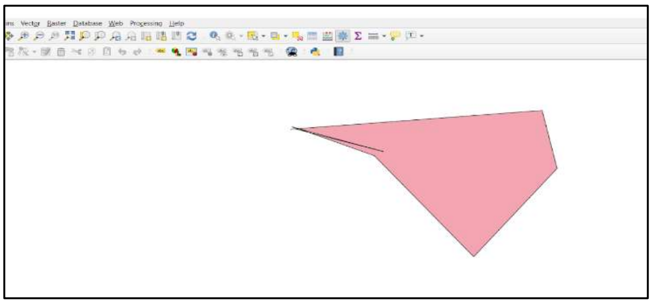
Step-1: Open QGIS→ Go to layers from toolbox → Create layers→ New shape file layers.

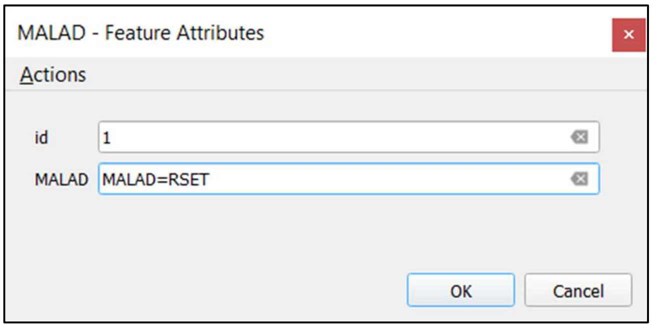


Step-2: New shape file layers → File name = **NAME OF AREA,** Encoding system = **SYSTEM** or UTS, geometry type= **POLYGON**, Name=**MALAD**, Type =**TEXT**→ Add to field list → OK.

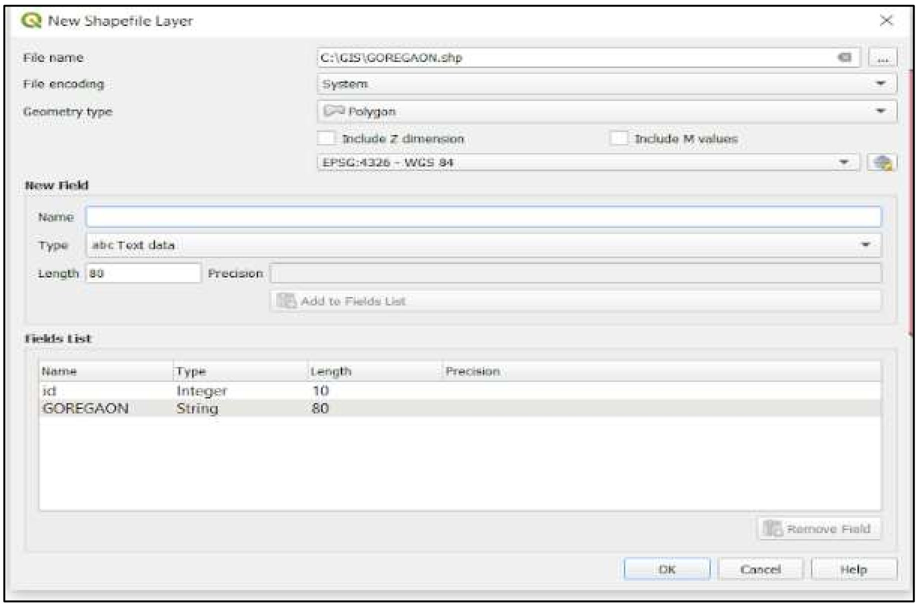


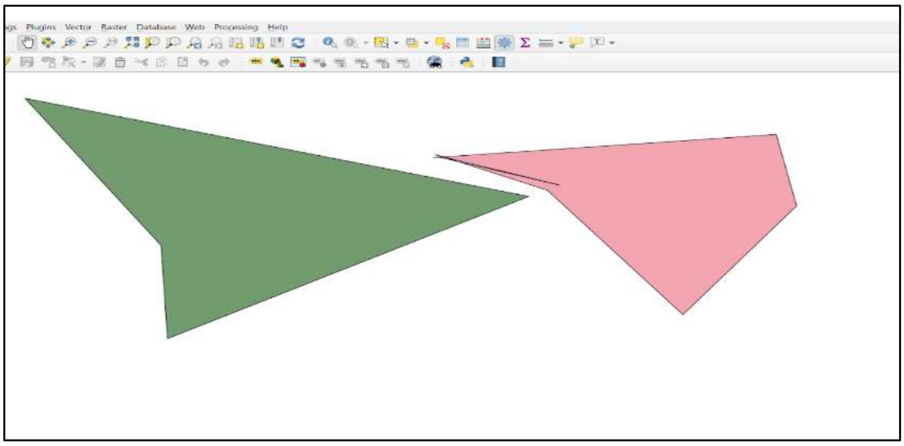
Step-3: Click on Toggle Editing→ Click Polygon →Draw on display window→ Right click on it to give Name → Malad =**RSET**→ OK.

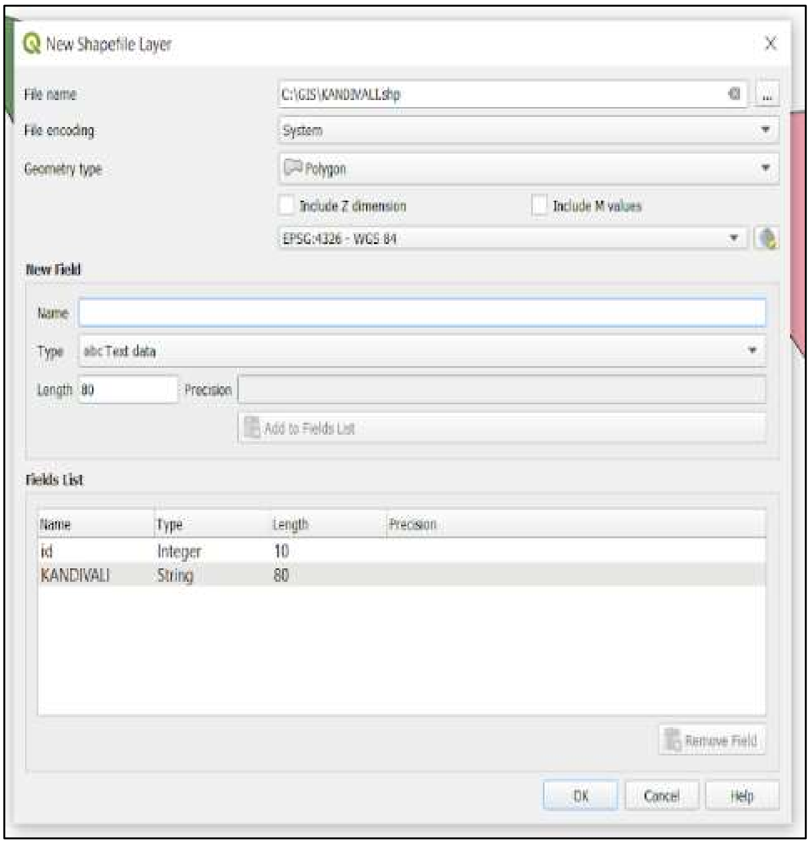


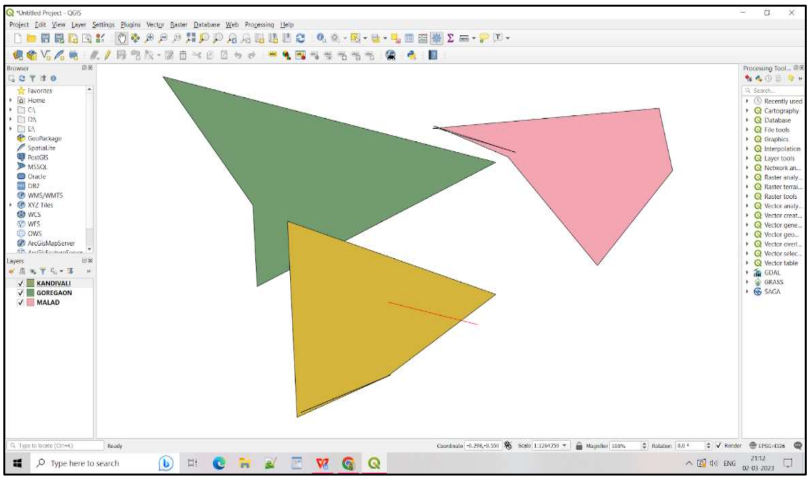


Step-4: Draw two more polygons and give them name.

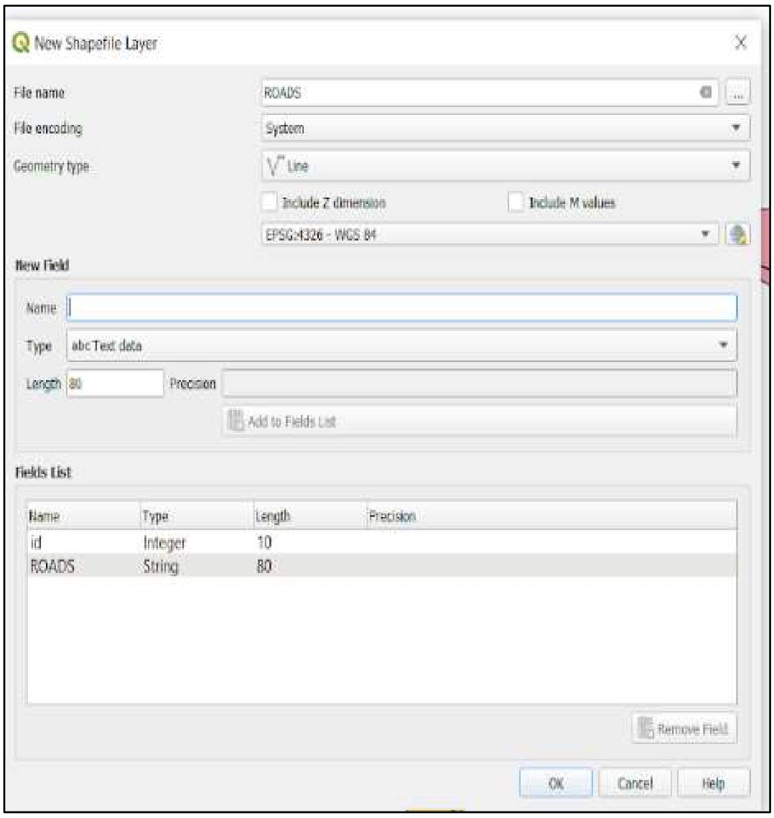




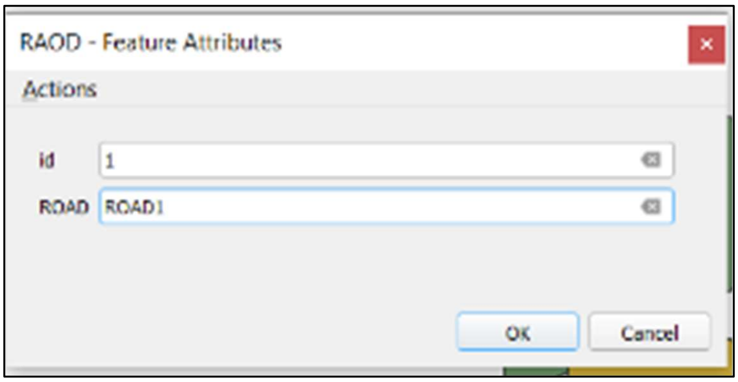




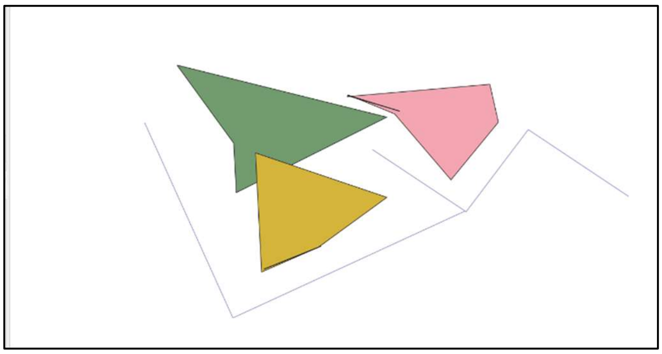
Step-5: Create layers→ new shape file layers →File Name= **ROADS**, Geometry type=**LINE** Name **ROADNAME** → Add to field list → OK.



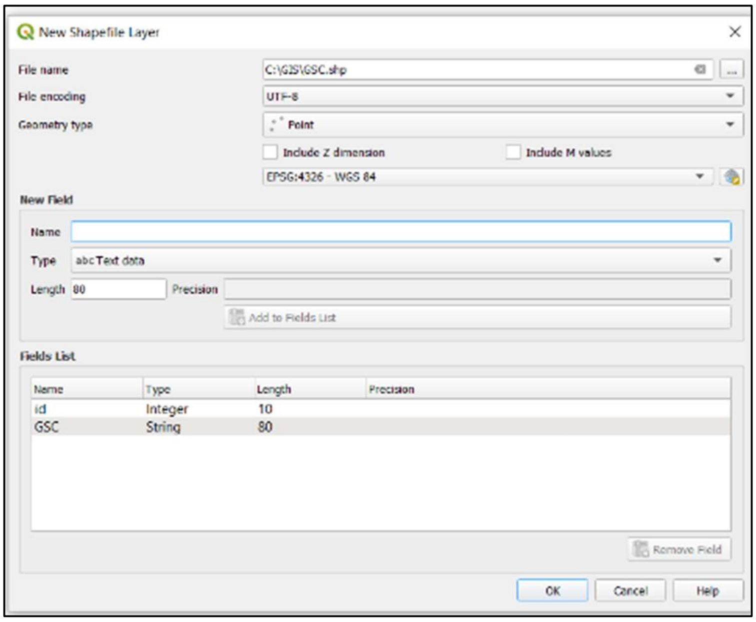
Step-6: click on toggle editing → click line → Draw on display window→ right click on it to give name→ road name= **ROAD 1**



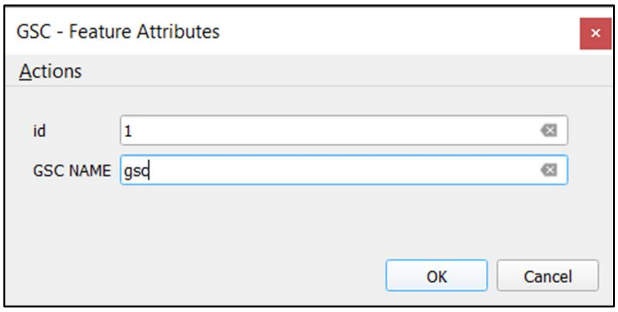
Step-7: Draw two three roads.



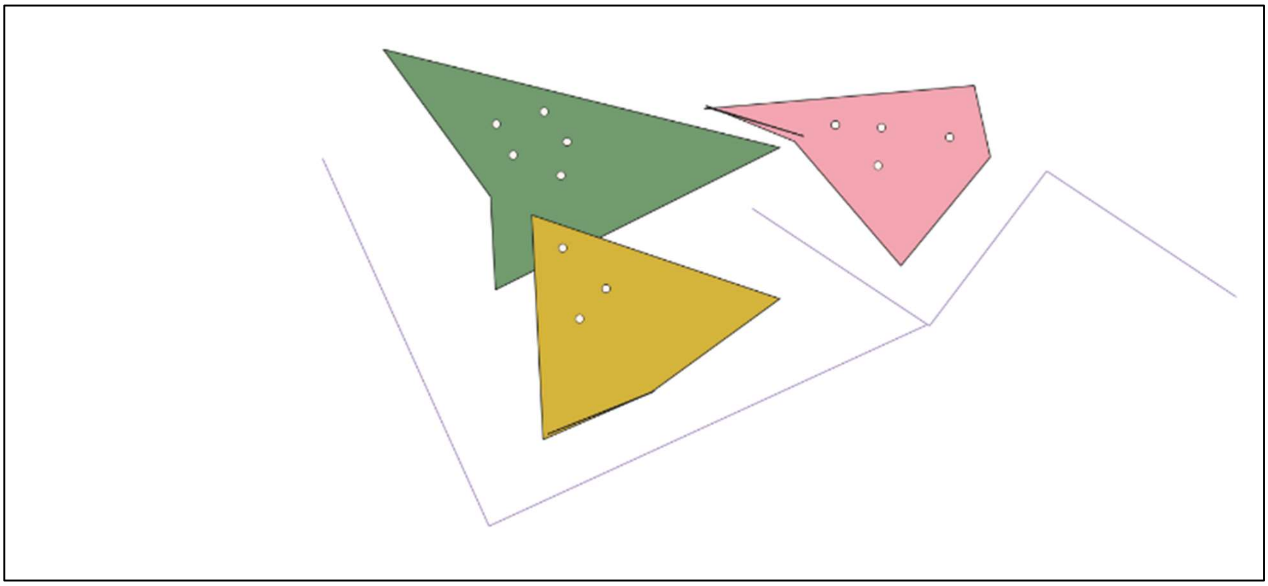
Step-8: Create layers→ New shape file→ Layers → file name= GSC, Geometry type= **POINT** ,Name: **GSC NAME** → Add to filed list→ OK.



Step-9: Right click on it and give A Name → Add two three buildings

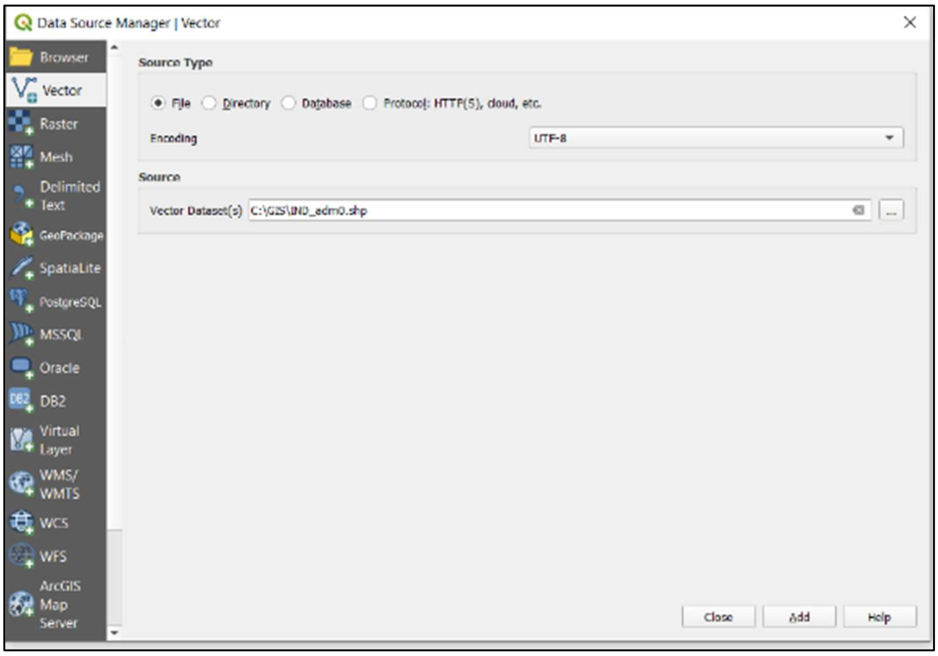


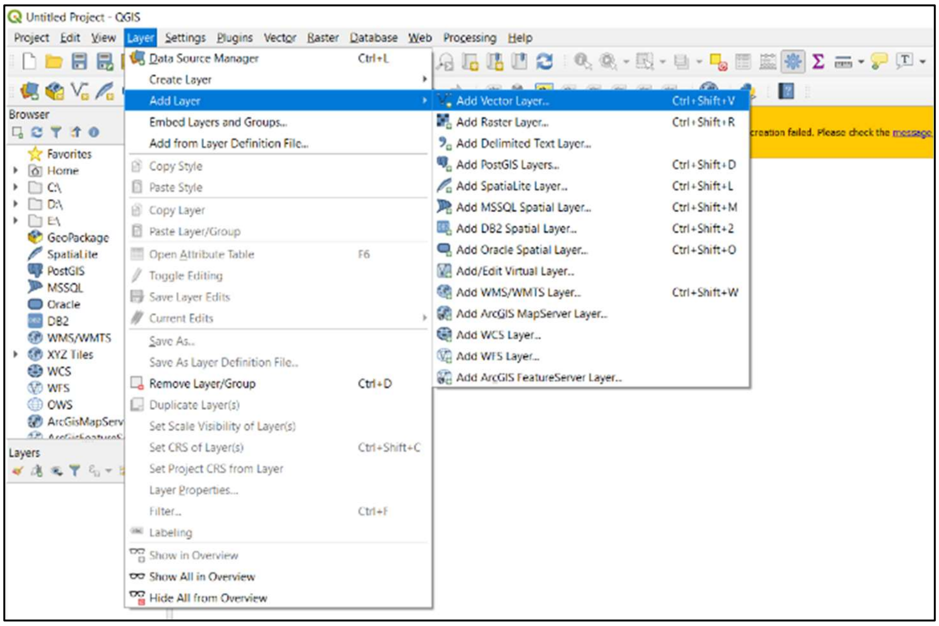
OUTPUT:-



Part-II: Calculating Line length and statistics.

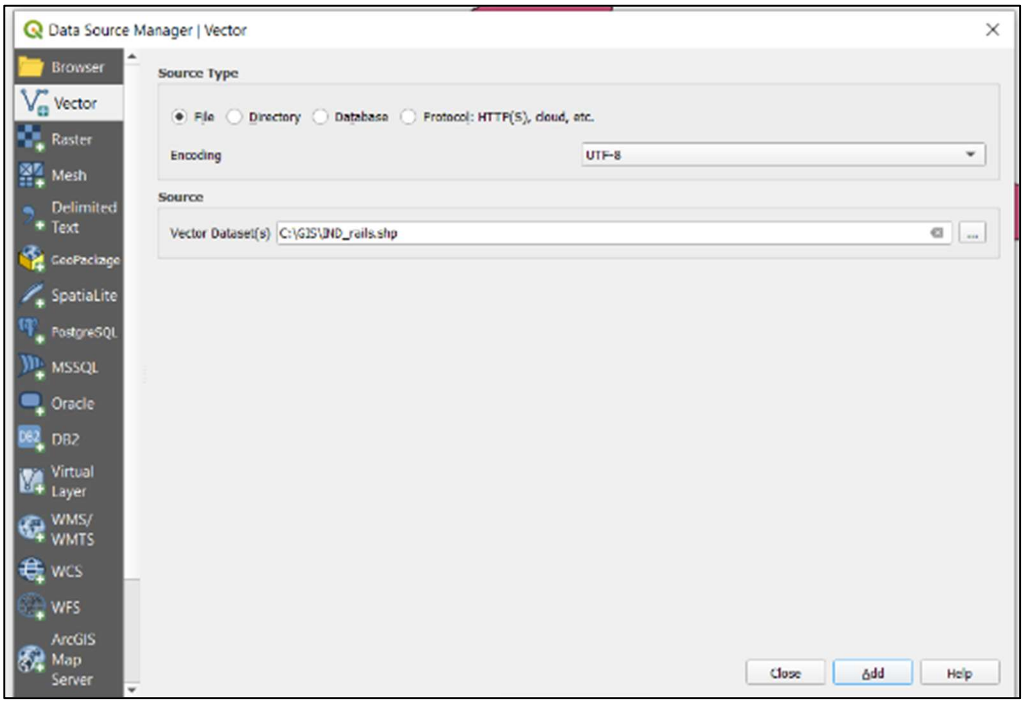
Step 1: Open QGIS → Go to layers → Add layers →Add Vector layer → Source-vector dataset [...] click on 3 dots → browse the file → open Practical1_IND_adm folder → Select IND_adm0.shpfile → Add → Close (India outline map will be added).

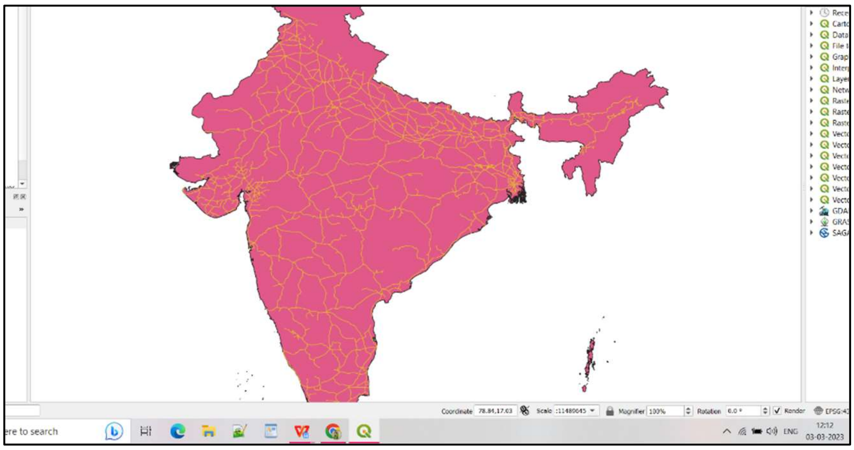




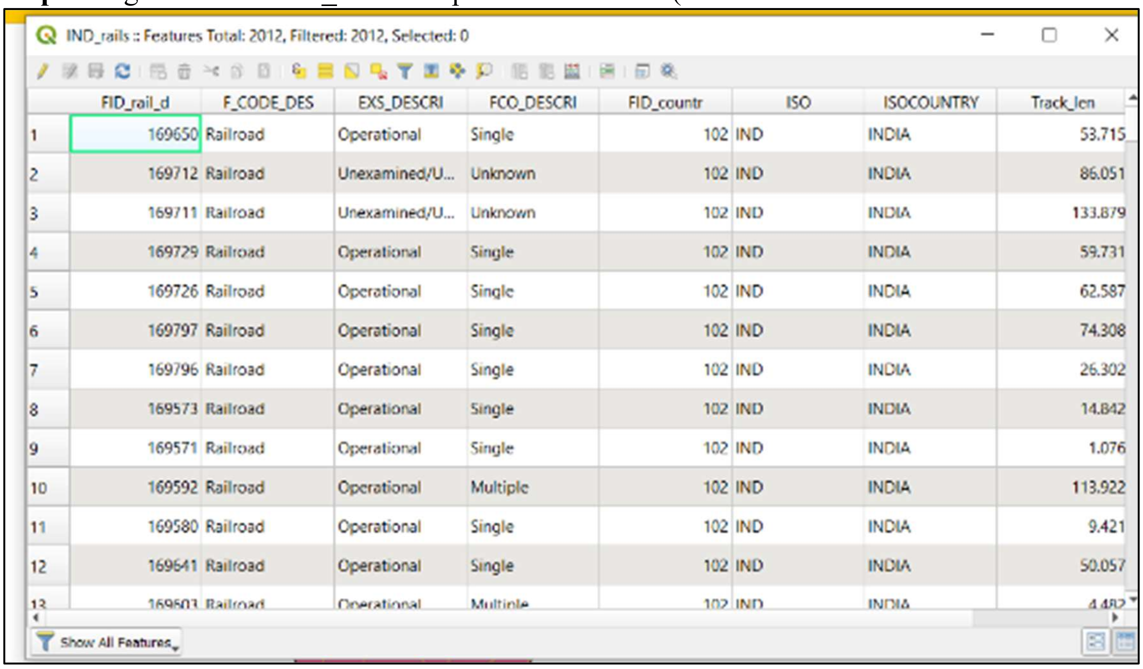
Step 2: Add another layer.

Add layer → Add vector layer → [...] click on three dots → Browse the file→ Open IND_rails.shp file → Add → close





Step 3: Right click on IND_rails → Open attribute table (We have to add one more attribute in thing table)



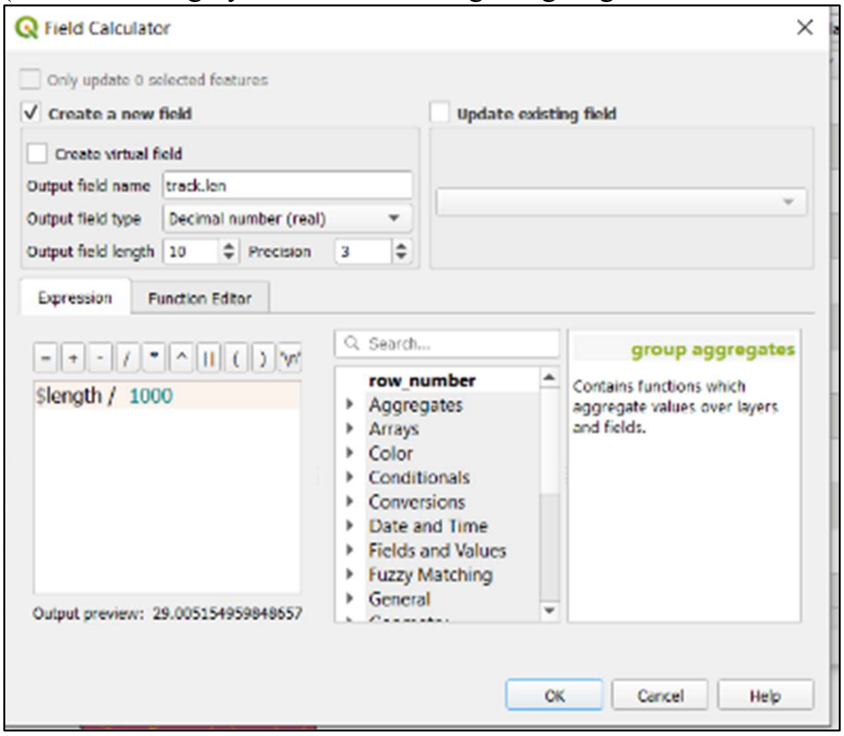
IND_rails :: Features Total: 2012, Filtered: 2012, Selected: 0

	FID_rail_d	F_CODE_DES	EXS_DESCRI	FCO_DESCRI	FID_countr	ISO	ISOCOUNTRY	Track_len
1	169650	Railroad	Operational	Single	102	IND	INDIA	53.715
2	169712	Railroad	Unexamined/U...	Unknown	102	IND	INDIA	86.051
3	169711	Railroad	Unexamined/U...	Unknown	102	IND	INDIA	133.879
4	169729	Railroad	Operational	Single	102	IND	INDIA	59.731
5	169726	Railroad	Operational	Single	102	IND	INDIA	62.587
6	169797	Railroad	Operational	Single	102	IND	INDIA	74.308
7	169796	Railroad	Operational	Single	102	IND	INDIA	26.302
8	169573	Railroad	Operational	Single	102	IND	INDIA	14.842
9	169571	Railroad	Operational	Single	102	IND	INDIA	1.076
10	169592	Railroad	Operational	Multiple	102	IND	INDIA	113.922
11	169580	Railroad	Operational	Single	102	IND	INDIA	9.421
12	169641	Railroad	Operational	Single	102	IND	INDIA	50.057
13	169603	Railroad	Operational	Multiple	102	IND	INDIA	4.482

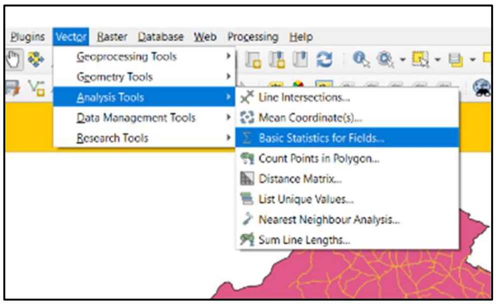
Show All Features

Step 4: Click on Toggle Editing button.

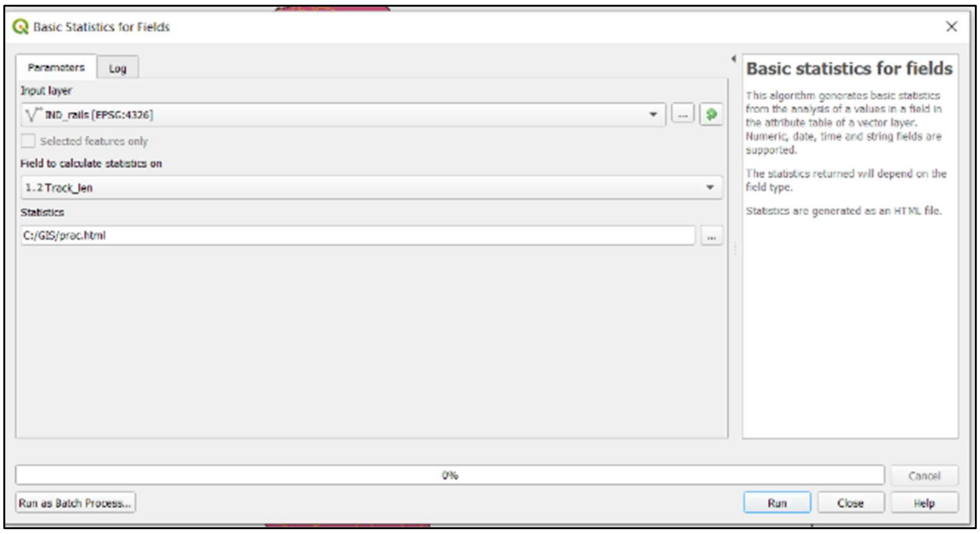
Step 5: Click on open field calculator
field name: [Track.lenz]
field type: [Decimal number (real)]
Write formula → Click on OK button
(We are finding by /1000 As we are getting larger Value. So we convert from M to KM.)



Step 6: Vector → Analysis tools → Basic statistics for fields. (Note: If you want to perform statistics on rail map. By default we are getting rail_map)



Field to calculate statistics on = Track_len2

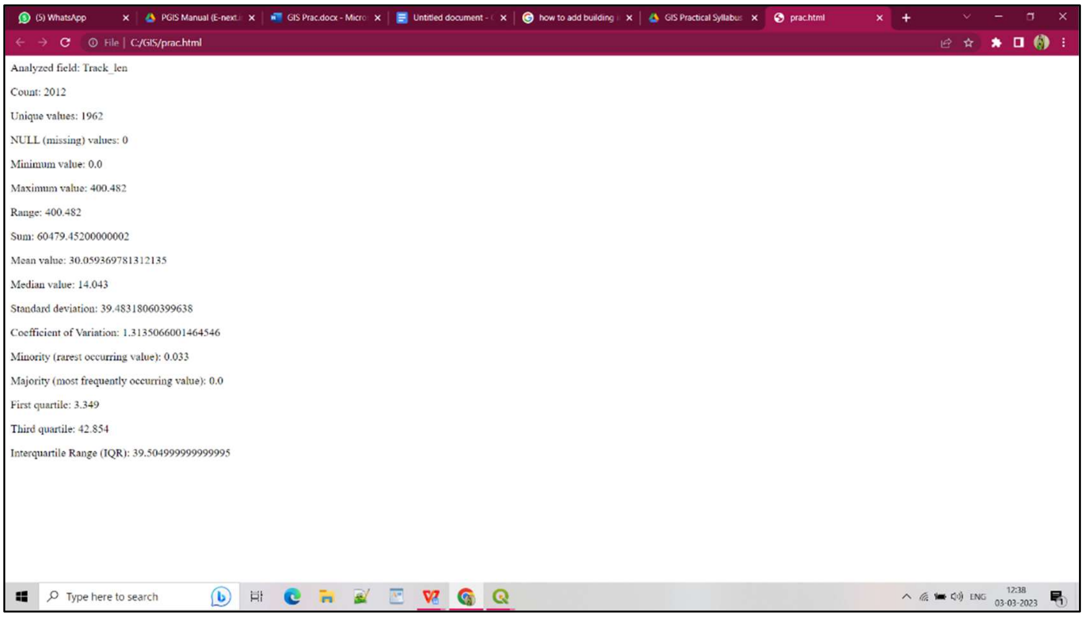


Step 7: Click on Run

Step 8: Close it

Step 9: Select the link (.html file) from Right bottom corne

OUTPUT:-

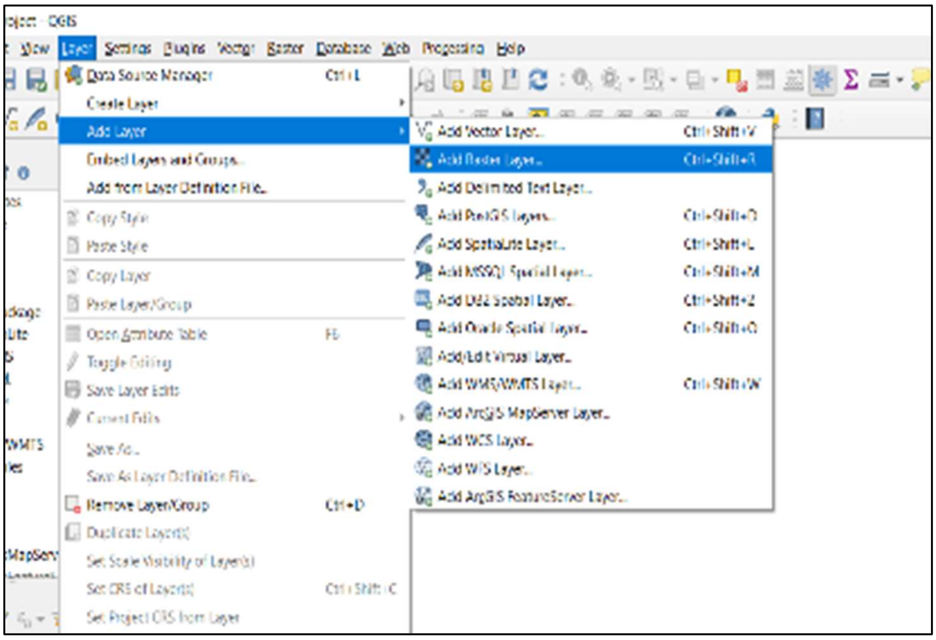


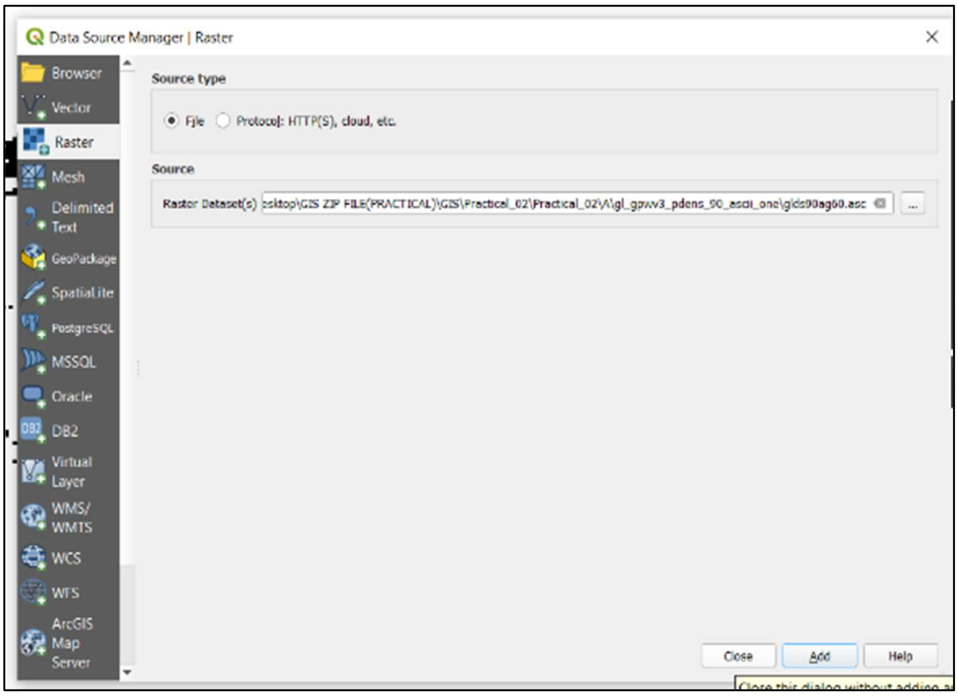
Practical no :- 2

Aim: Exploring and Managing Raster data: Adding raster layers, raster styling and analysis, raster mosaicking and clipping.

Part (A):- Adding Raster Layer

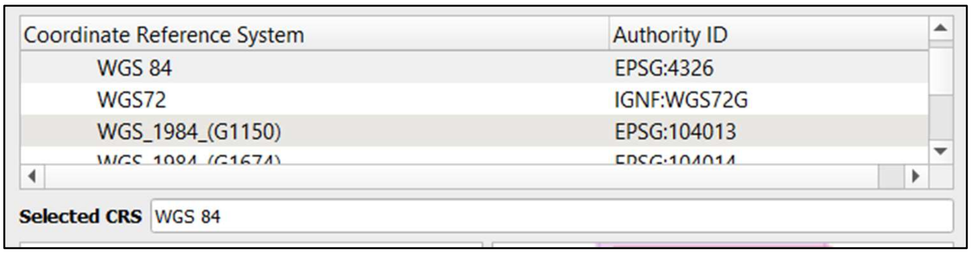
Step-1: Layer→ Add layers→ Add raster layer→[…] →(A→ gl_gpwv3_pdens_90_ascii_one → glds90ag60.asc) →Add →close.





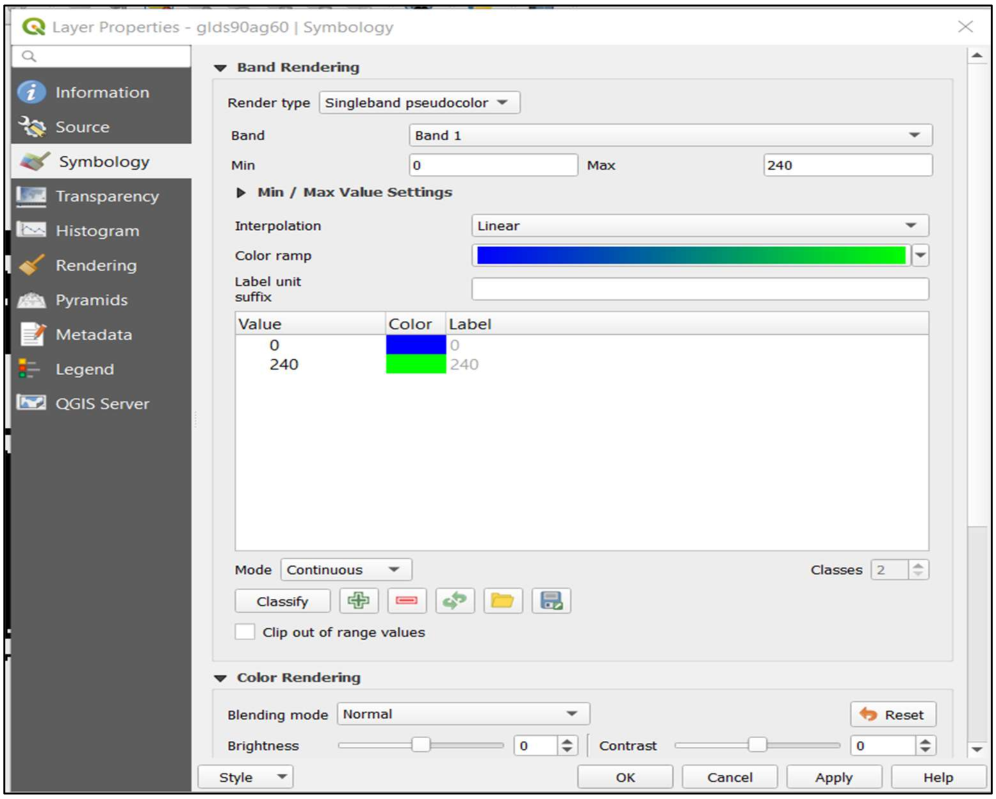
Layer→ Add layers→ Add raster layer→[…] →(A→ gl_gpwv3_pdens_00_ascii_one → glds00ag60.asc).

Note: It's in gray scale (pixel format)



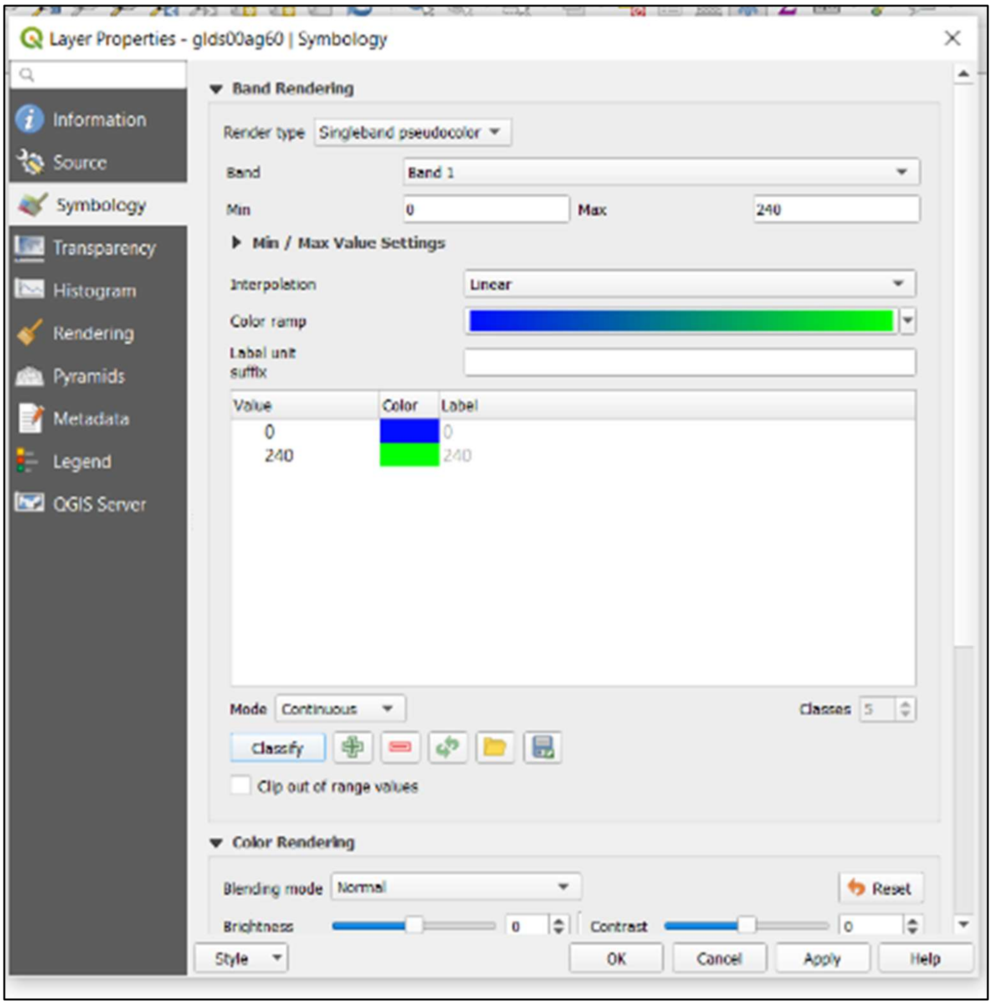
(B) Raster Styling

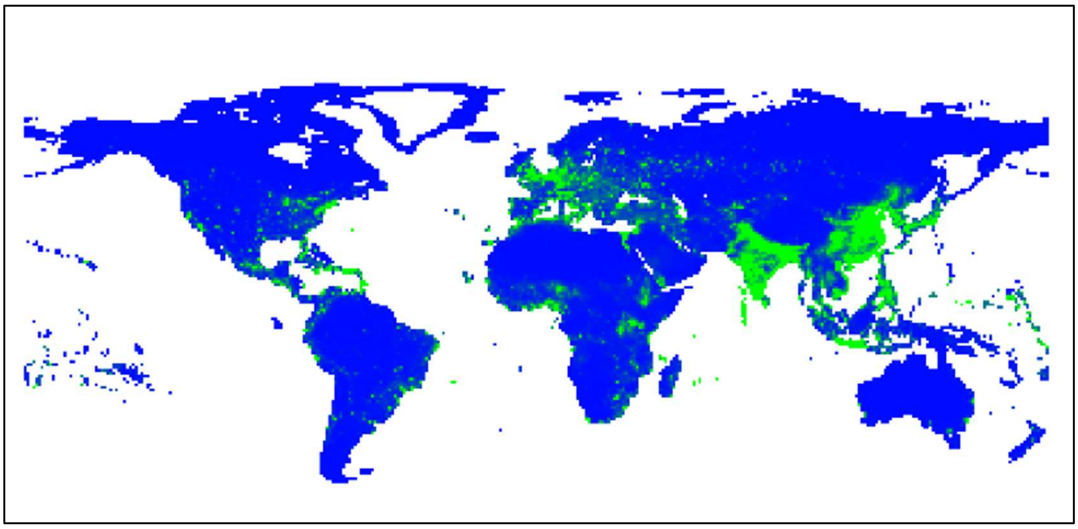
(Eg: We have to find an area where population has been changed between year 1990 to 2000) (Largest Population Change)
Now we have to convert gray scale image into colour format.
Step 1: Right click on glds90ag60 →properties→ Render type :- Singleband pseudocolor Min 0 , Max 240 mode Continuos → Classify → Apply → OK.



Step 1: Right click on glds00ag60 →properties-- Render type:- Singleband pseudocolor

Min :- 0 Max :- 240 , mode :- Continuous →classify → Apply → OK.





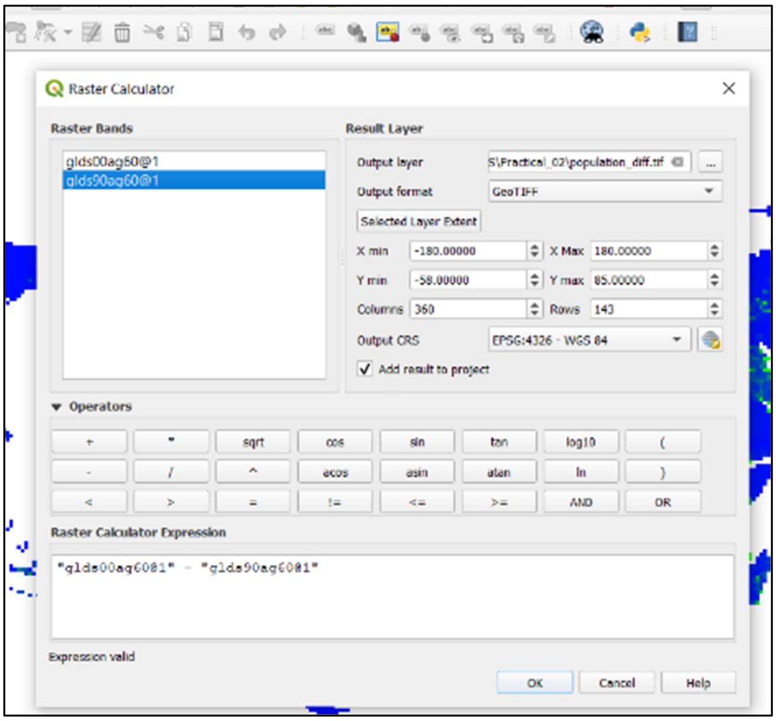
(c) Analysis.

Step 1: Menu →Raster → Raster Calculator.

Output | Population Difference | layer

Output | Geo TIFF | Format:

Click On […] to save layer (C:\GIS \ pract2\Population_Difference)



Step 2: Select the first layer (glds00gs60@1) and – select the second layer (glds90gs60@1)

Raster Calculator Expression :- glds00ag60@1 - glds90ag60@1

Output CRS: - Project CRS : EPSG: 4326 - WGS84→ OK.

Step 3: Select population difference ☑ → Right click on point → properties.

Render type : Singleband pseudocolor ,min -20,000 max 6000 , Interpolation Discrete ,

Colour Ramp and color label using shift - and then click on +

Click on and Give Range

-20000 No Data

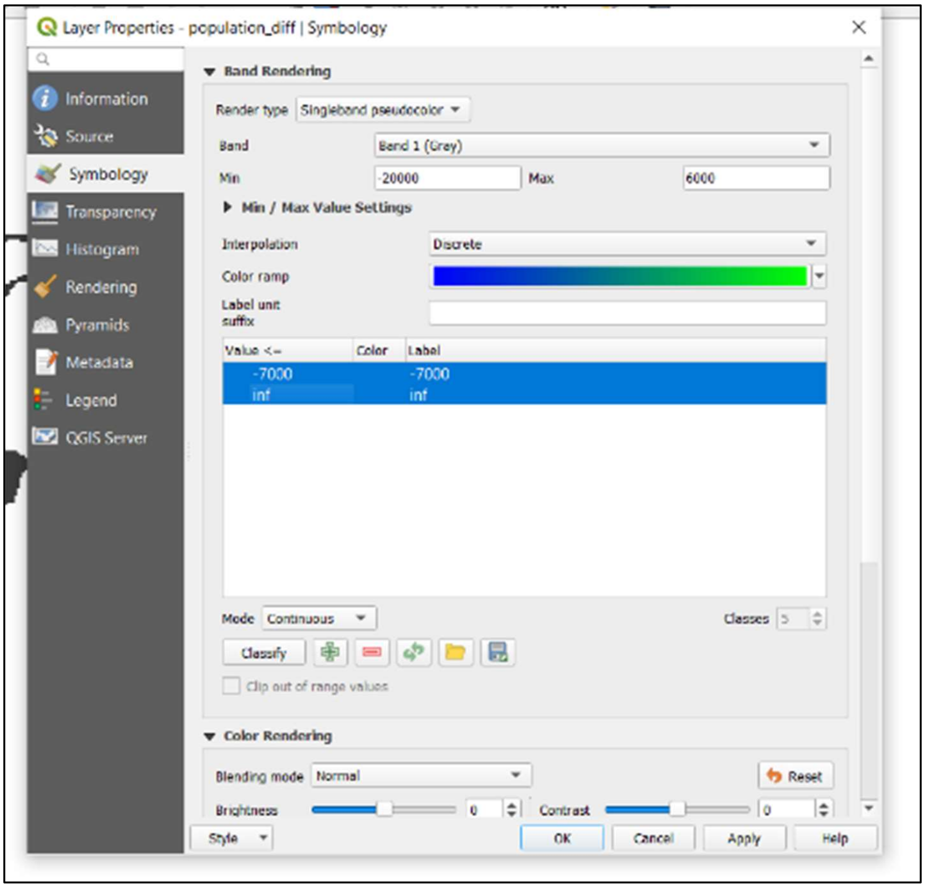
-10 Negative

10 Neutral

6000 vivids Positive

Color ramp

→ Apply → OK



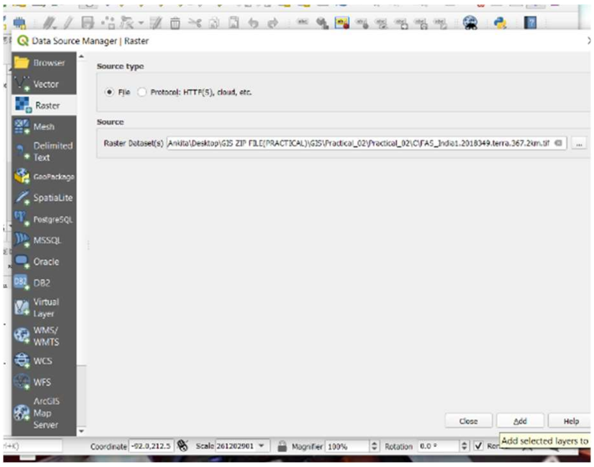
Step 4: Click on i from menu (we can verify classification)

(D) Raster Mosaicking and Clipping

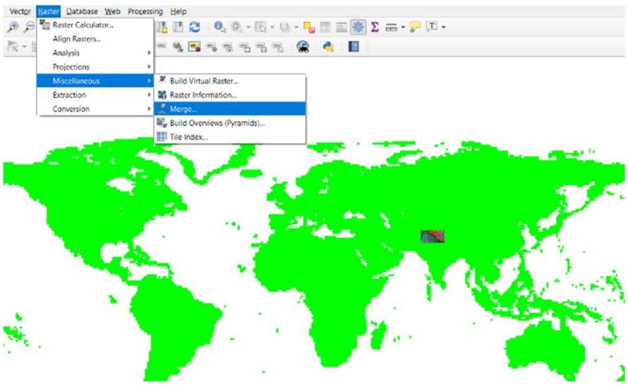
A mosaic is a combination or merge of two or more images. In GIS, a single raster datasheet can be created from multiple raster datasheet be mosaicking them together.

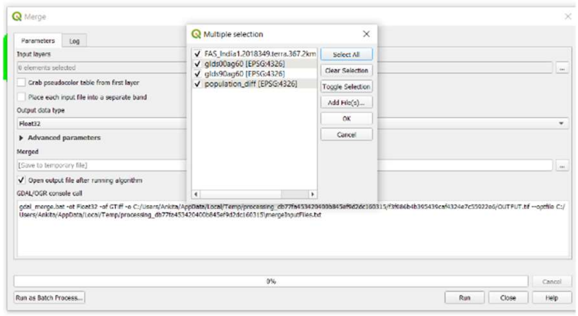
(we are combining two raster, datasheet – Mosaicking we are creating)

Step-1: Layer→ Add layers→ Add Raster layers →[…] → A →(FAS_India1.2018349.terra.367.2km, FAS_India2.2018349.terra.367.2km, FAS_India3.2018349.terra.367.2km, FAS_India4.2018349.terra.367.2km) → open →add →close.

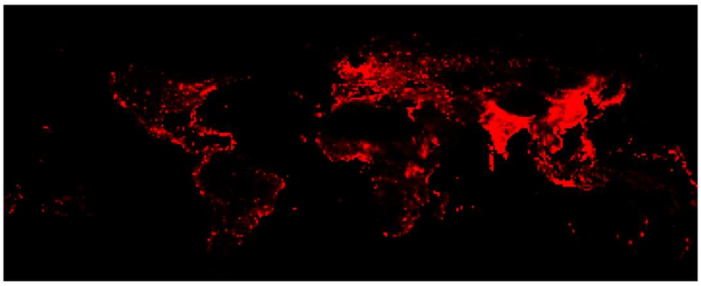


Step-2: Raster→ Miscellaneous→ Merge Input layer→ Check all images click on Select All → Run→ close.



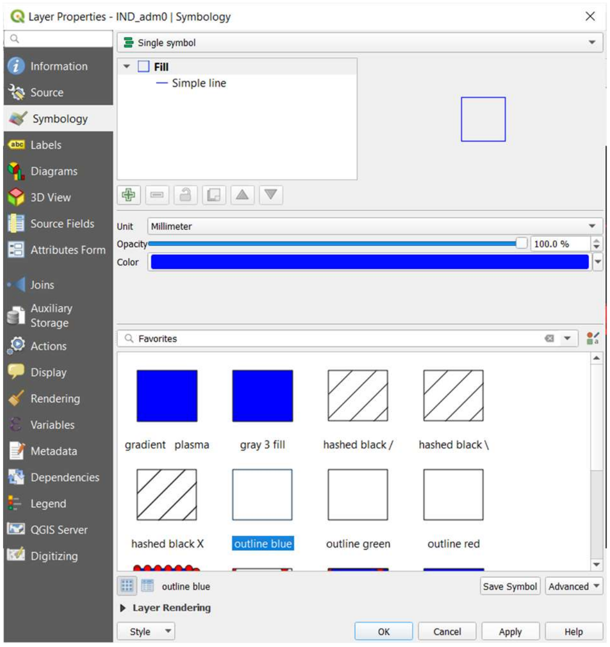


Step-3: Disselect All the layers (uncheck) select only merger from layers panel.



Step-4: Layers→ add Layers → Add vector layers […](pract02 → C →India AdminBoundary →IND-adm0.shp) → Add → Close.

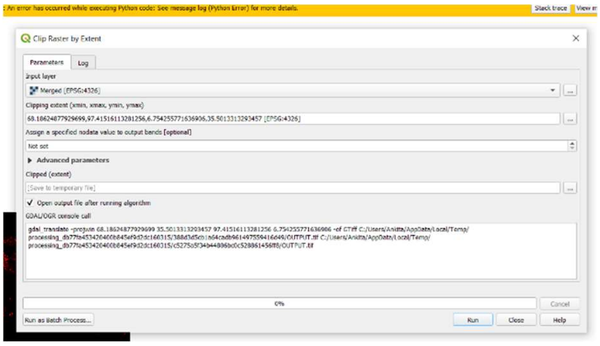
Step-5: Double click on the IND_adm0 (should be checked) → Symbology →Outline Blue→ Apply →OK.



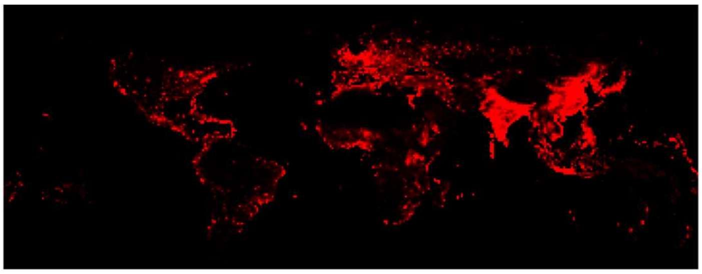
Step-6: Raster→ Extraction→ clip Raster by Mask layer.

Input layer : MERGED(EPSG:4326)

Mask layer : IND-adm0(EPSG:4326) → Run → CLOSE.


: An error has occurred while executing Python code: See message log (Python Error) for more details.
Stack trace
Clip Raster by Extent
Parameters
Log
Input layer
Merged [EPSG:4326]
Clipping extent (xmin, xmax, ymin, ymax)
68.18624877929699,97.41516113281256,6.754255771636906,35.5013313293457 [EPSG:4326]
Assign a specified nodata value to output bands [optional]
Not set
Advanced parameters
Clipped (extent)
[Save to temporary file]
Open output file after running algorithm
GDAL/OGR console call
gdal_translate -projwin 68.18624877929699 35.5013313293457 97.41516113281256 6.754255771636906 -of GTiff C:/Users/Anitta/AppData/Local/Temp/
0%
Cancel
Run as Batch Process...
Run
Close
Help

OUTPUT:



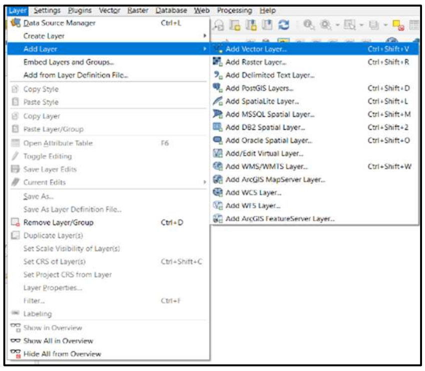
Practical no:-3

Aim: Making a Map, Working with Attributes, Importing Spreadsheets or CSV files

Using Plugins, Searching and Downloading OpenStreetMap Data

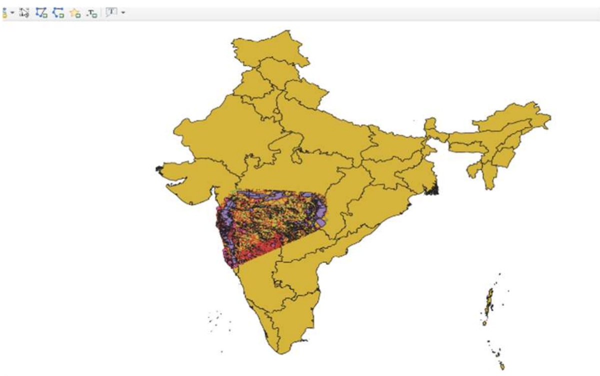
A) Making a thematic map using print layout

Step I: Layer -> Add Layer -> Add vector layer

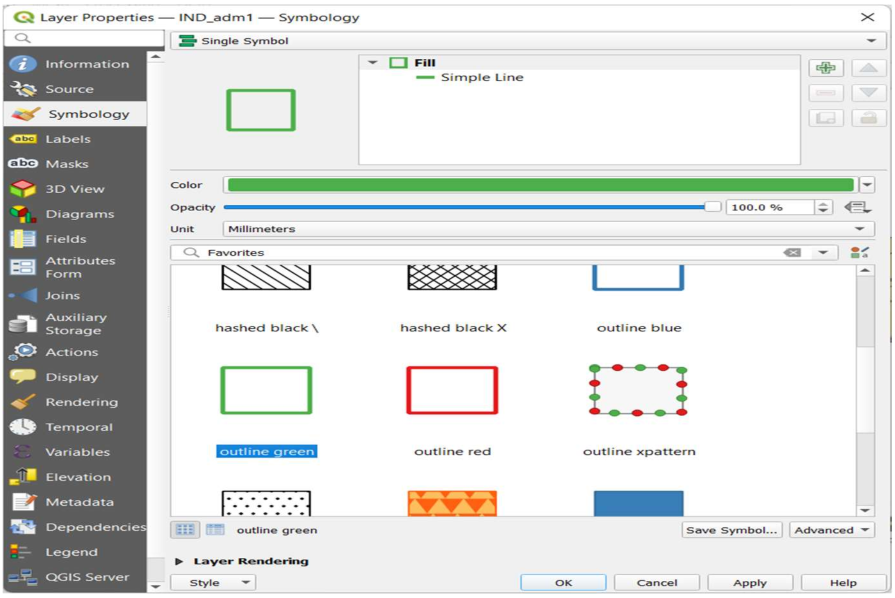


1: (Practical 03-> A -> India_State_Admin -> IND_admi.shp) -> Add

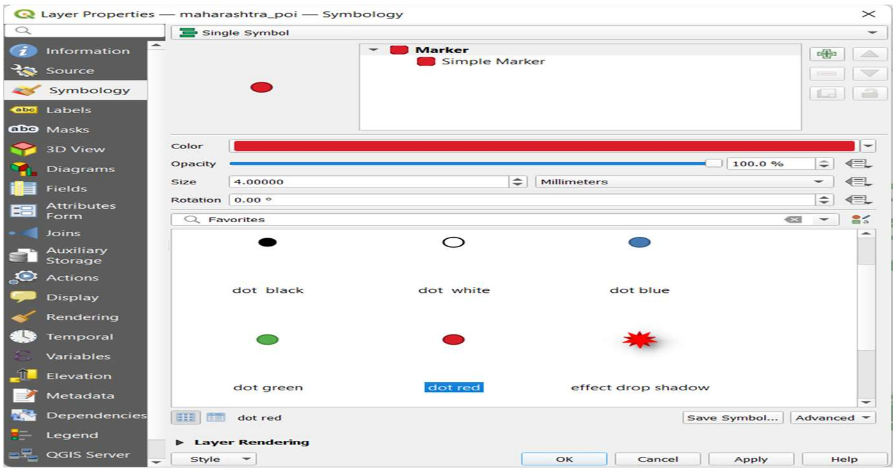
2: (" A -> maharashtra_administrative -> maharashtra_administrative.shp) -> Add
3: (" A -> maharashtra_coastline -> maharashtra_coastline.shp) -> Add
4: (" A -> maharashtra_highway -> maharashtra_highway.shp) -> Add
5: (" A -> maharashtra_location -> maharashtra_location.shp) -> Add
6: (" A -> maharashtra_natural -> maharashtra_natural.shp) -> Add
7: (" A -> maharashtra_poi -> maharashtra_poi.shp) -> Add
8: (" A -> maharashtra_water -> maharashtra_water.shp) -> Add

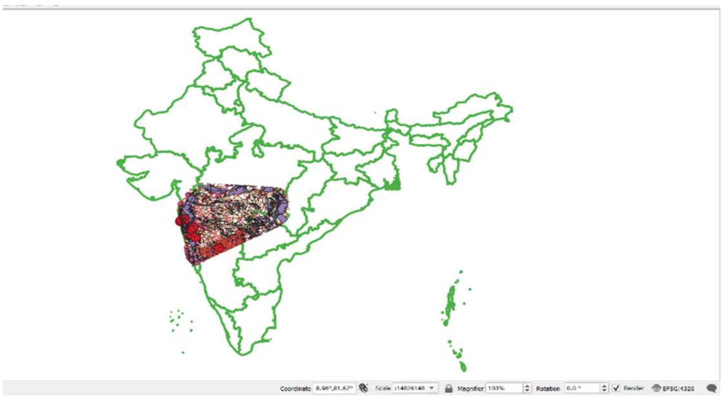


Step 2: select IND_adm1.shp from layer panel -> right click ->properties -> colour -> outline green

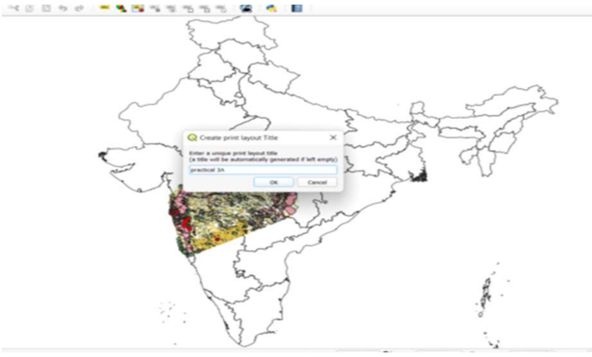


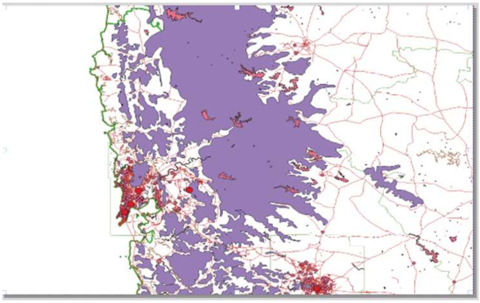
Step 3: select maharashtra_poi.shp from layer panel -> right click ->properties -> colour -> dot red



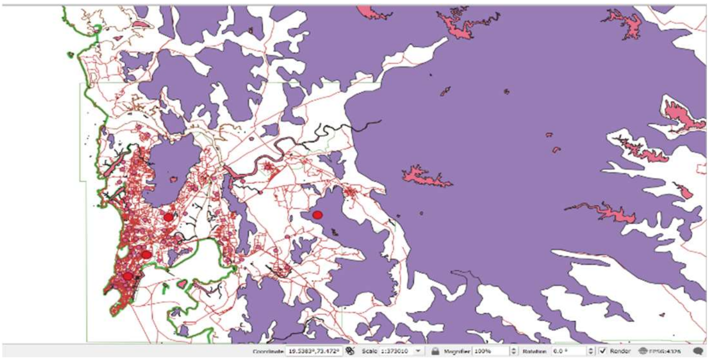


Step 4: Project -> new print layout ->(Practical 3a)-> ok-> add item->add map-> (select the white area -> drag & drop (map will appear Right side of the window) item properties -> check the lock Styles for Layers)

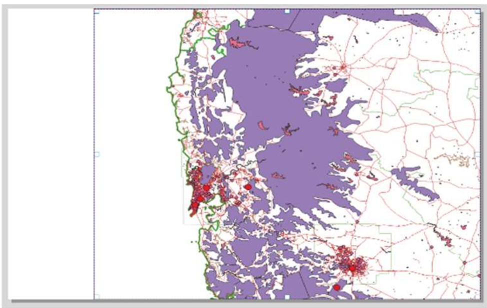




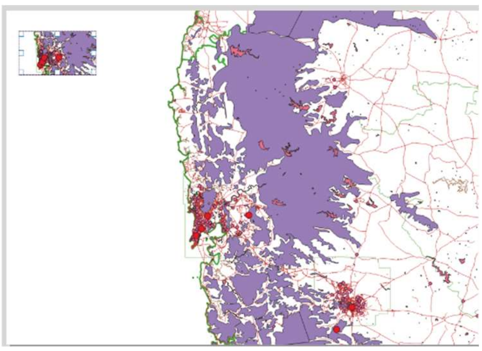
Step 5: go to the main window(Don't close the back window) -> zoom it & focus on Mumbai region



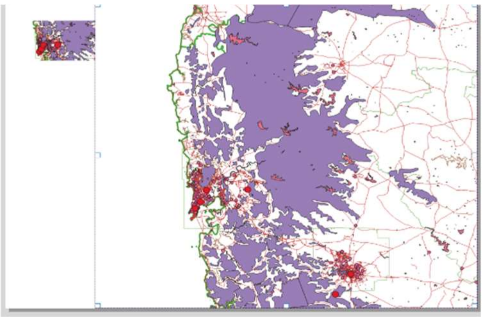
Step 6: Go back to the back window(Practical 3A). ADJUST THE POSITION



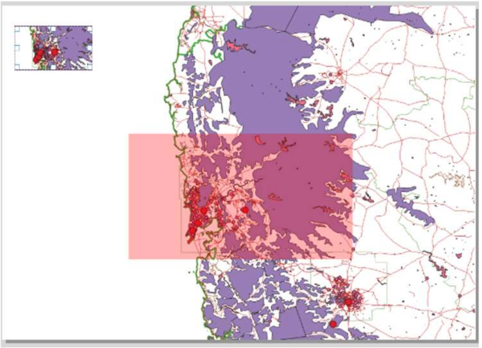
Step 7: add item -> Add Map



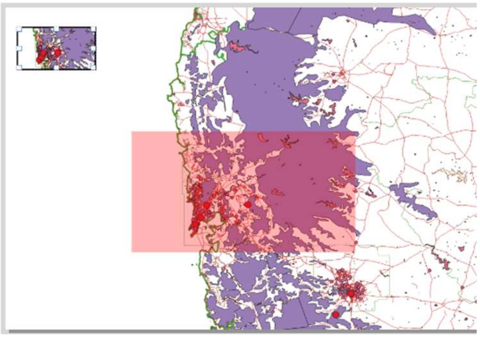
Step 8: right side of the window-> select map1 from Items-> right click properties



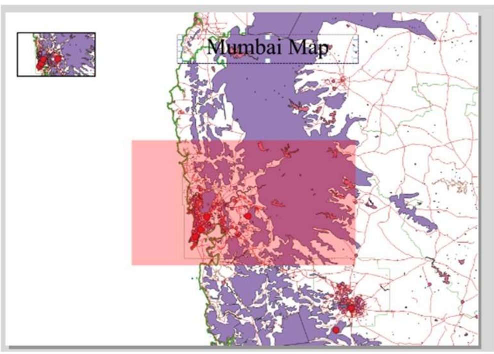
Step 9: go to the Item properties-> Overviews-> click on + -> select Overviews 1 -> select Map Frame (map 2)



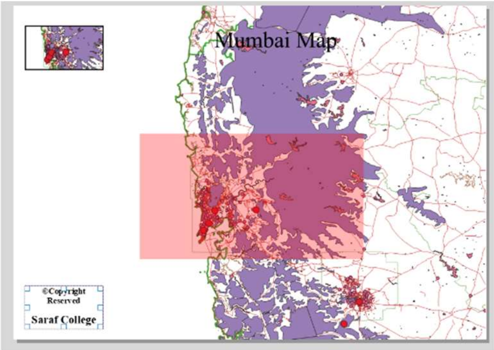
Step 10: select map2 from items-> right click on properties-> Frame (✓)-> colour black-> Thickness 0.70



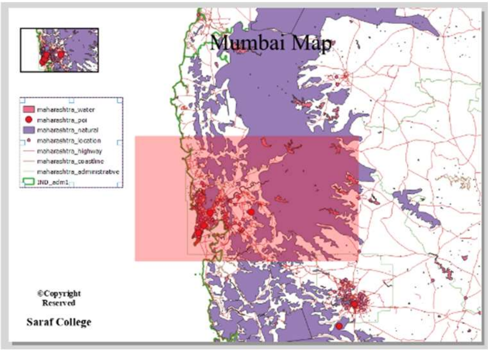
Step 11: add item-> Add label-> select the region-> go to the right side of Item properties-> give name as Mumbai map-> we can change the font, color, alignment, rotation,etc.



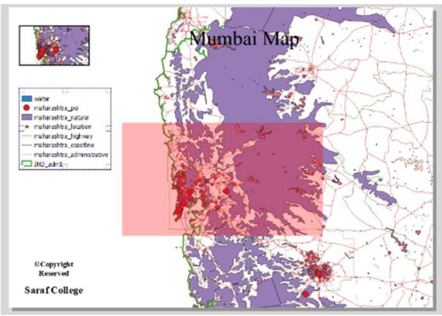
Step 12: add item-> Add label(now we are adding copyright symbol) So we will right some html code -> go to item properties-> <h2>© Copyright Reserved </h2> <h1>Saraf college</h1>
Check the Render as HTML
You can change the color, font , alignment



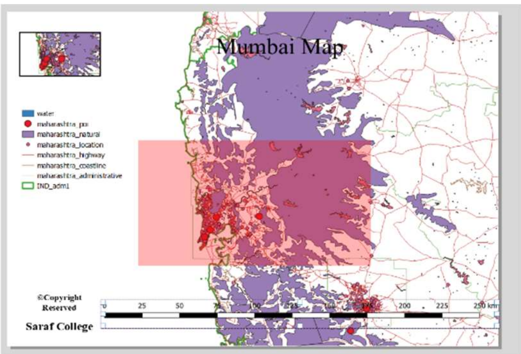
Step 13: add item-> Add legends-> (all layer will appear in the window)-> go to the properties-> item properties-> legend items-> auto update (deselect it)



Step 14:double click on maharashtra_water from auto update-> change it to [water]. You can change the colour-> custom symbol (check it) -> change it to blue colour (same way we change other layer)

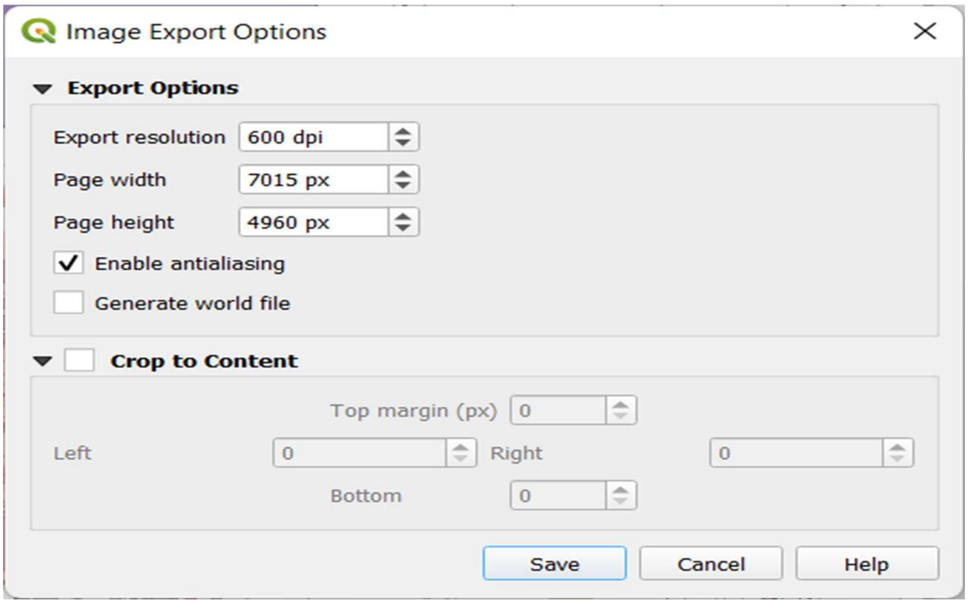


Step 15: add item-> Add scale bar-> Item properties-> Segments-> right 10(from where to start)

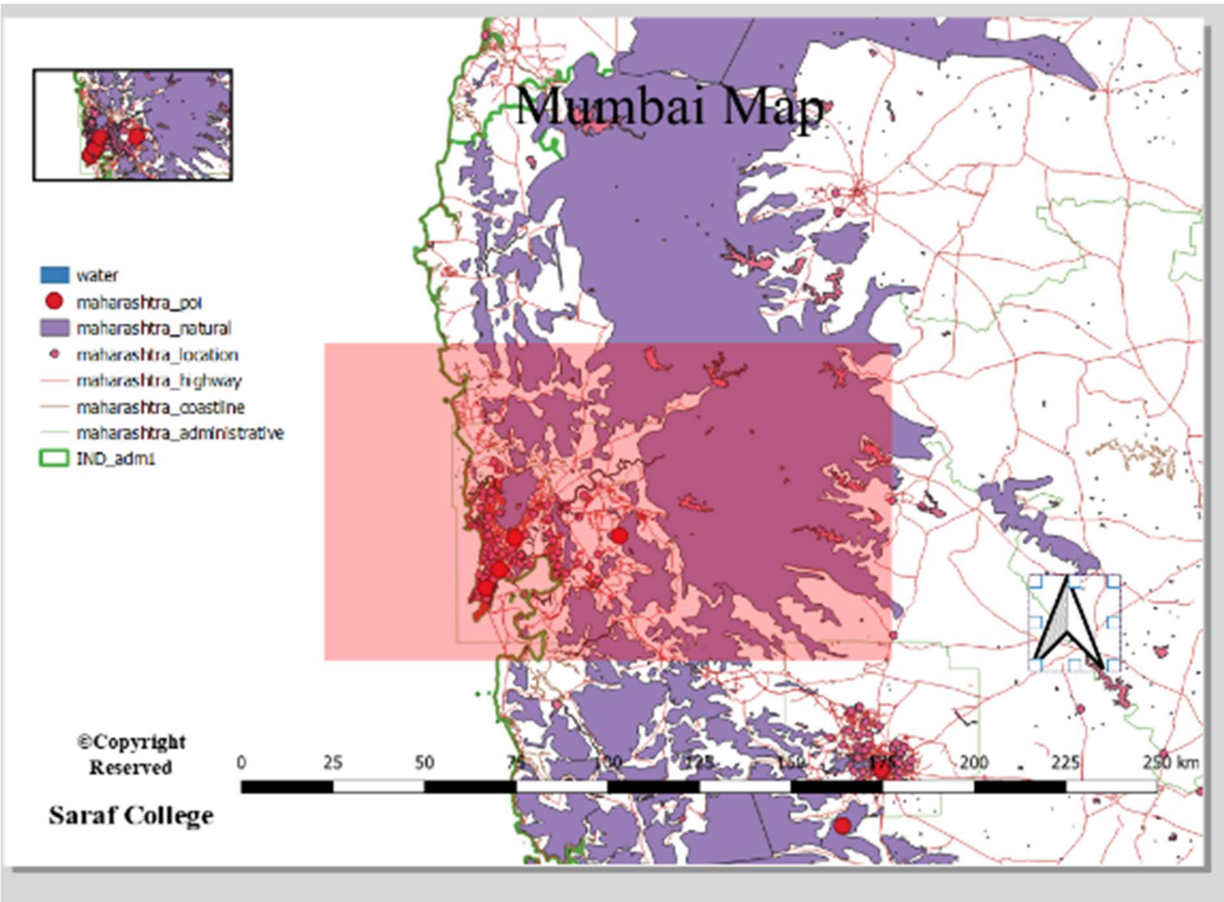


Step 16: add item-> Add North arrow(we can show the orientation)-> item properties-> svg images

Step 17:layout -> Export as image(.jpeg)-> file name prac 3a (already given)-> Save resolution [600 dpi] -> save.

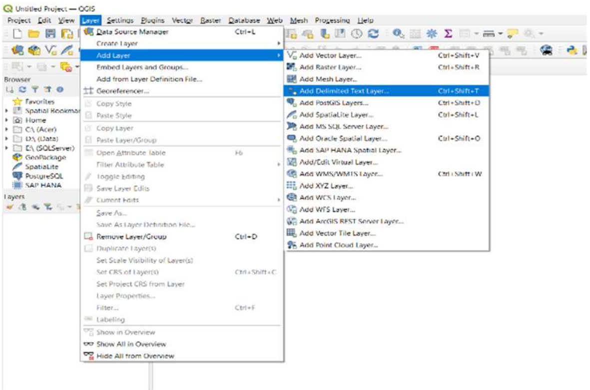


OUTPUT:-



B) importing spreadsheets or csv file

Step 1: layer-> add layer-> add delimited text layer



File name: (practical_03-> data -> sample.csv-> open)

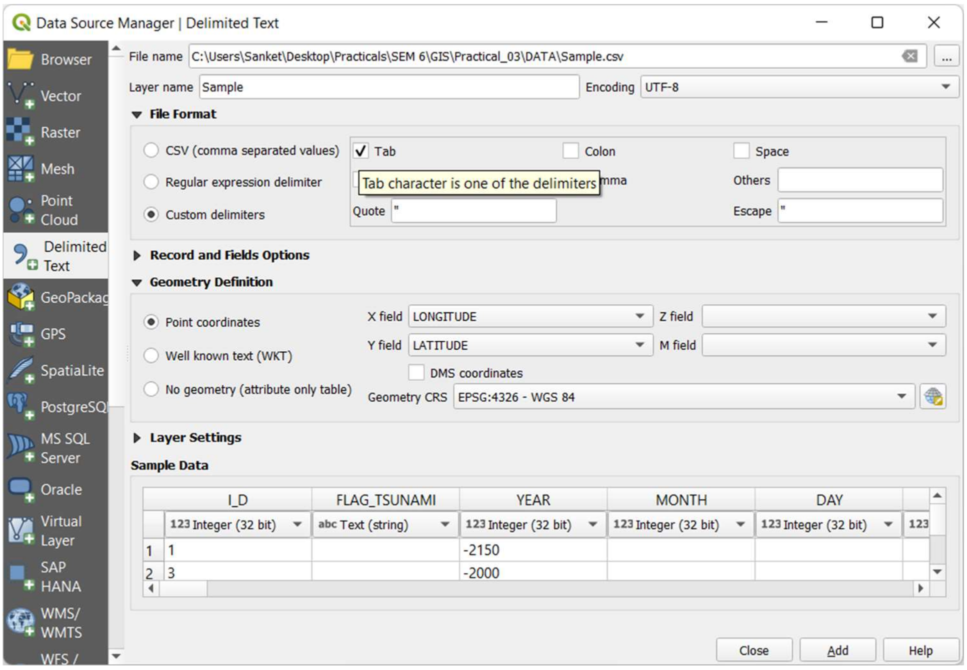
File format (✓ tab)

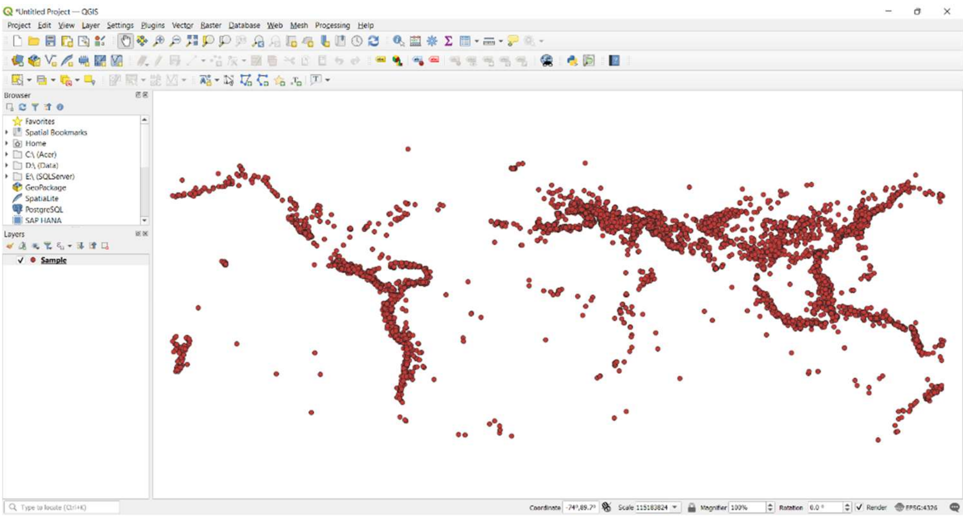
Check for longitude & latitude value

X field longitude

Y field latitude

Geometry CRS– EPSG:4326-WGS 84-> add -> close

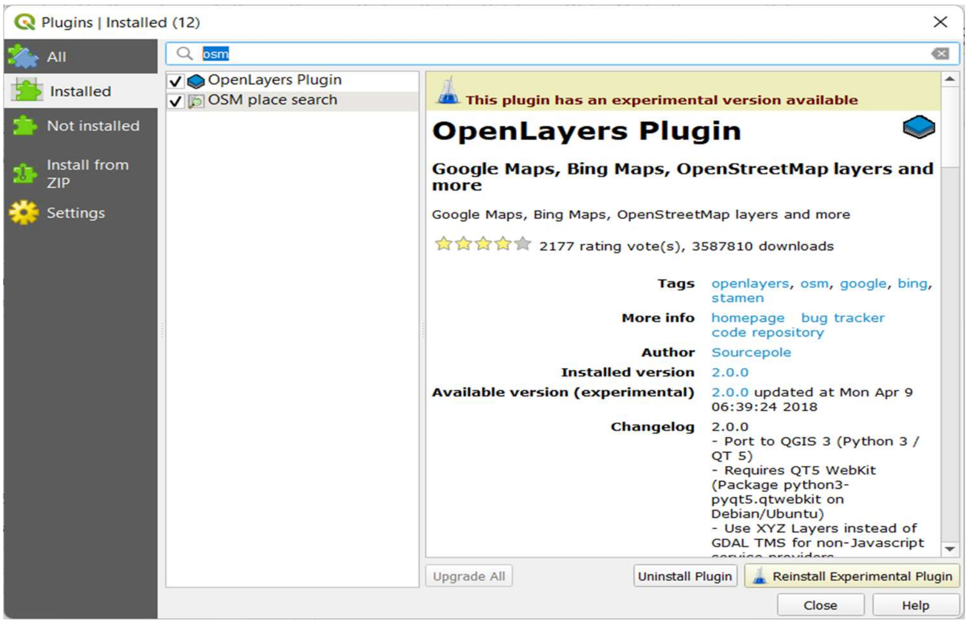




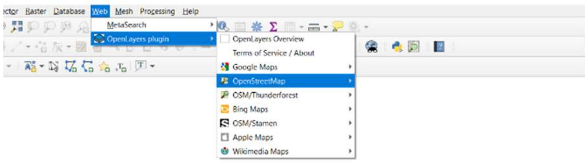
C) using plugins

D) searching amd downloading openStreetMap date

Step 1: take a new file-> plugins-> manage and install plugins-> search for [OSM place search] -> select osm place search-> click on install plugins -> search for openLayer plugins -> click on install experimental plugin. (We can see in plugin options -> osm place search & web -> open layers plugin)

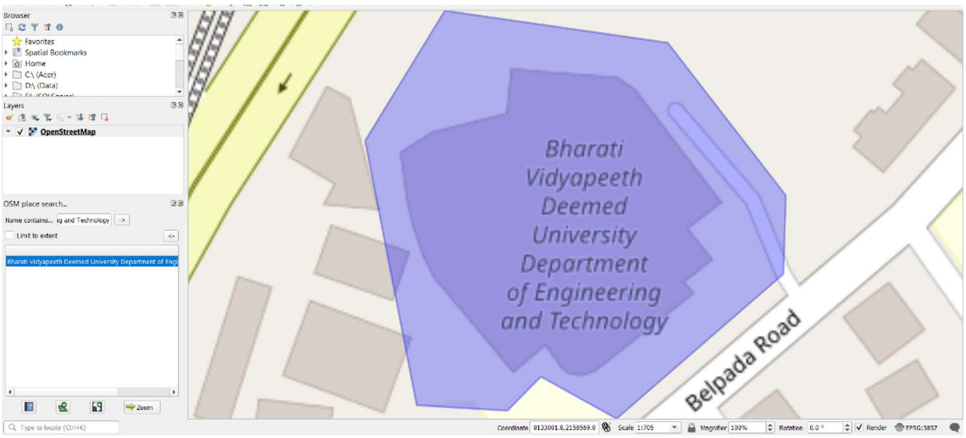


Step 2:web-> open layers plugins -> openStreetMap-> openStreetMap



Step 3: go to the left side of the panel-> name contains-> university of mumbai-> click on (->) -> select bharti vidyapeeth deemed university department from the list-> click on zoom.

OUTPUT:-



Browser
Favorites
Spatial Bookmarks
Home
Layers
OpenStreetMap
OSM place search...
Limit to extent
Bharati Vidyapeeth Deemed University Department of Engineering and Technology
Belpada Road

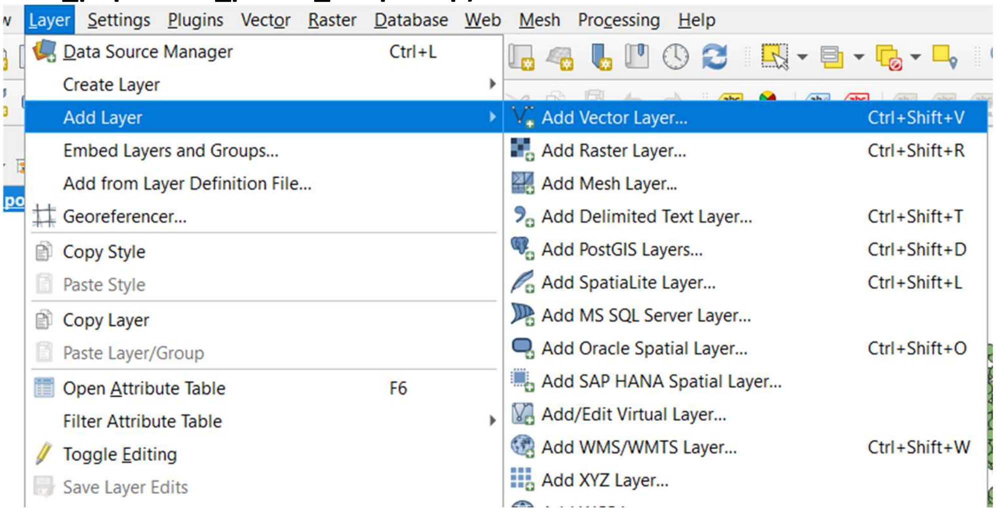
Practical no :- 4

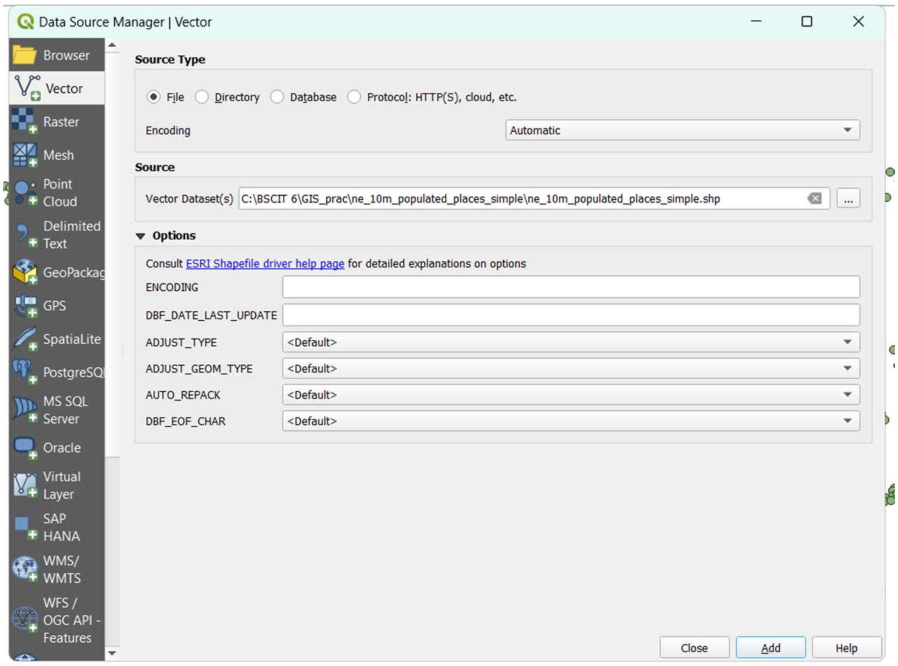
working with terrain Data

(a) working with attributes.

Step I:

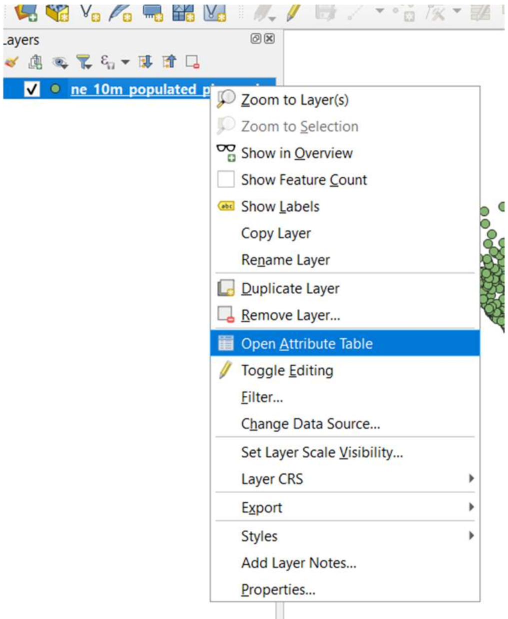
Layer → Add Layer → Add vector Layer→ Select **(Practical_04→A→ne-10m_populated_places_Simple.zip)**→Add→close.

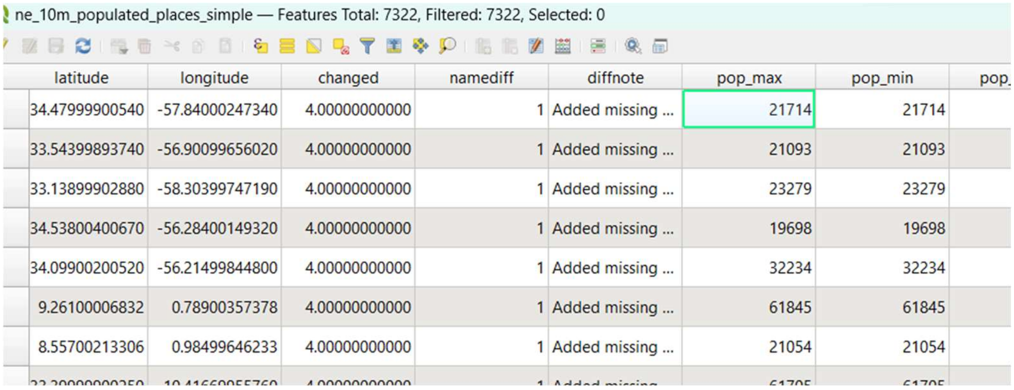


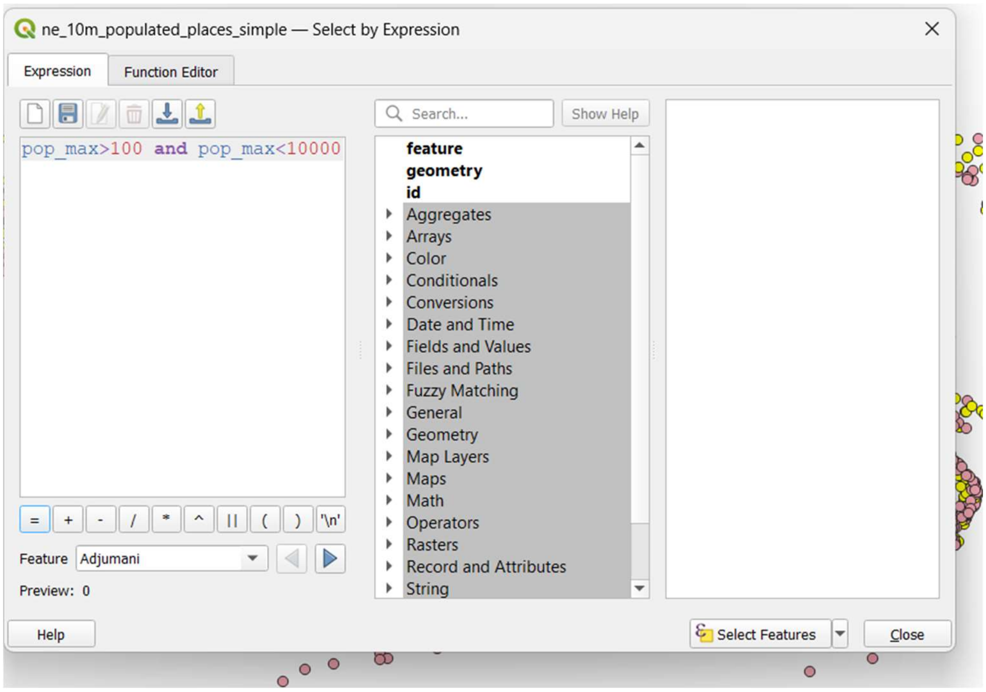


Step II:

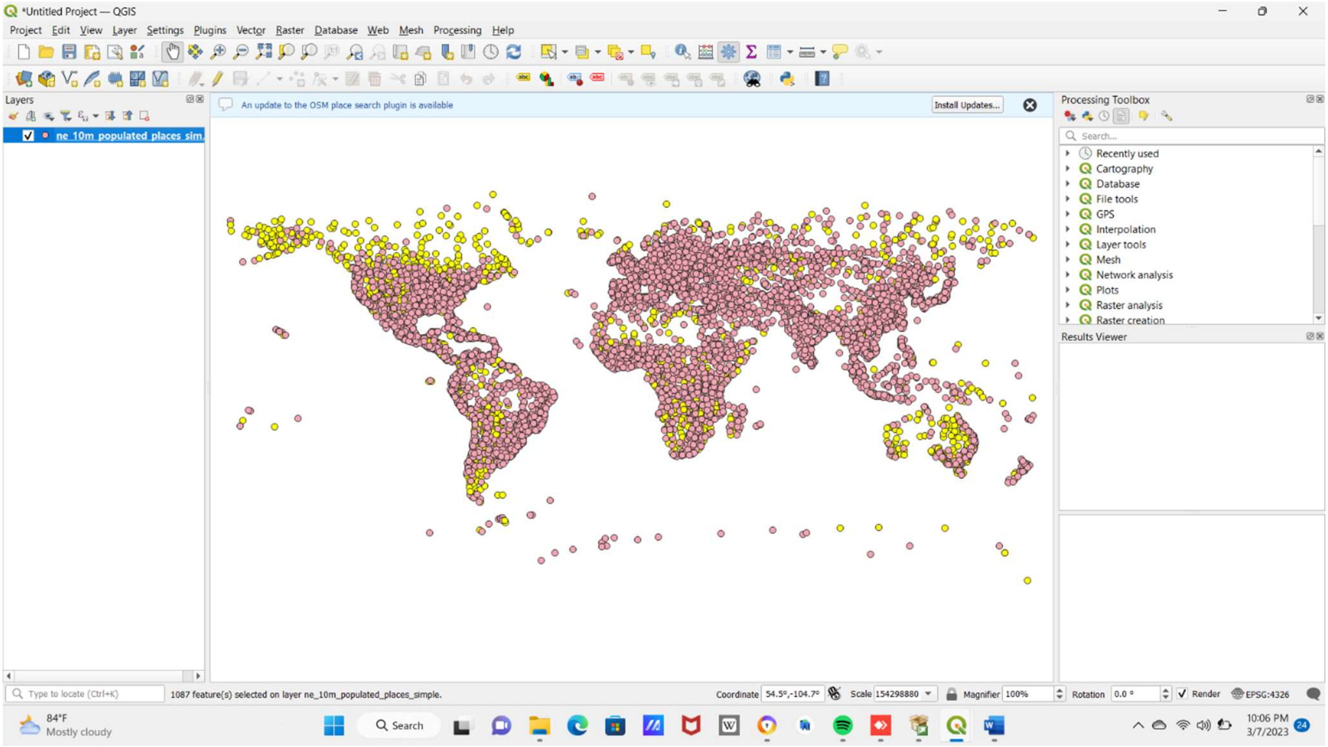
Right click on layer ne-10m-populated_places_Simple→ Open attributes tables **(search for pop-max column)** click on first value of pop-max → Select → Select **[E.]** select features using an expression (you will get a new window) →Type Expression pop_max > 100 and pop_max <1000 **(so we are searching for places which have population between 100 & 1000**) →Click on select features button → click on close button →close the window.


Layers
ne_10m_populated_p
Zoom to Layer(s)
Zoom to Selection
Show in Overview
Show Feature Count
Show Labels
Copy Layer
Rename Layer
Duplicate Layer
Remove Layer...
Open Attribute Table
Toggle Editing
Filter...
Change Data Source...
Set Layer Scale Visibility...
Layer CRS
Export
Styles
Add Layer Notes...
Properties...


ne_10m_populated_places_simple — Features Total: 7322, Filtered: 7322, Selected: 0
latitude
longitude
changed
namediff
diffnote
pop_max
pop_min
34.47999900540 -57.84000247340 4.00000000000 1 Added missing ... 21714 21714
33.54399893740 -56.90099656020 4.00000000000 1 Added missing ... 21093 21093
33.13899902880 -58.30399747190 4.00000000000 1 Added missing ... 23279 23279
34.53800400670 -56.28400149320 4.00000000000 1 Added missing ... 19698 19698
34.09900200520 -56.21499844800 4.00000000000 1 Added missing ... 32234 32234
9.26100006832 0.78900357378 4.00000000000 1 Added missing ... 61845 61845
8.55700213306 0.98499646233 4.00000000000 1 Added missing ... 21054 21054


ne_10m_populated_places_simple — Select by Expression
Expression
Function Editor
pop_max>100 and pop_max<10000
Search...
Show Help
feature
geometry
id
Aggregates
Arrays
Color
Conditionals
Conversions
Date and Time
Fields and Values
Files and Paths
Fuzzy Matching
General
Geometry
Map Layers
Maps
Math
Operators
Rasters
Record and Attributes
String
Feature Adjumani
Preview: 0
Help
Select Features
Close

OUTPUT:

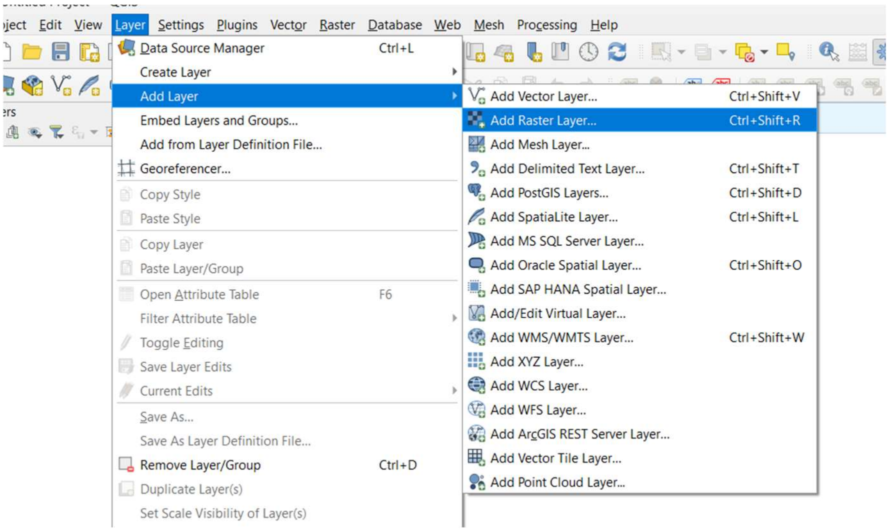

*Untitled Project — QGIS
Project Edit View Layer Settings Plugins Vector Raster Database Web Mesh Processing Help
Layers
ne_10m_populated_places_sim
An update to the OSM place search plugin is available
Install Updates...
Processing Toolbox
Search...
Recently used
Cartography
Database
File tools
GPS
Interpolation
Layer tools
Mesh
Network analysis
Plots
Raster analysis
Raster creation
Results Viewer
Type to locate (Ctrl+K)
1087 feature(s) selected on layer ne_10m_populated_places_simple.
Coordinate 54.5°,-104.7°
Scale 154298880
Magnifier 100%
Rotation 0.0 °
Render
EPSG:4326
84°F
Mostly cloudy
Search
10:06 PM
3/7/2023

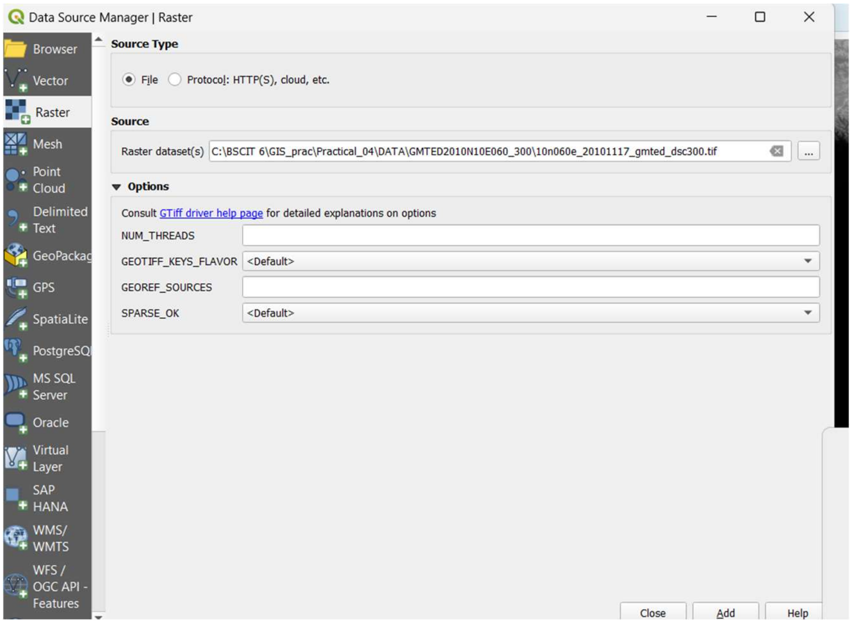
(b) Terrain Data & Hill shade Analysis (Geographical Surface)

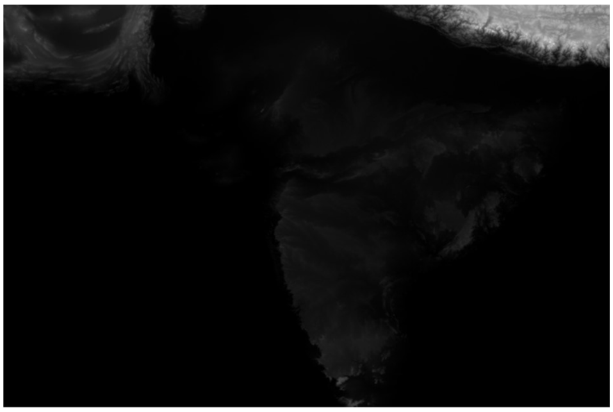
A terrain dataset is multiresolution, TIN-based Surface built from measurements stored as features in a geodatabase. Terrain or elevation data is useful for many GIS analysis like to generate various products from elevation date such as contours, will shades etc.
(We represent high / extreme low) elevation, mountains, slops TIN- Triangular Irregular Network (It's vector based. geographic data) we use Series of number to represent TIN
Hill shade is a gray scale 3D representation of the surface, showing the topographical shape of hills & mountains using shading (levels of gray) on map, just to indicate relative slopes, mountains ridges, not absolute height.
Eg. upper regions indicated by light shader & lower region indicated by dark shade.

Step 1:

Layer →Add layer→ Add raster Layer → **[...] (Practical_04_Data → GMTED 2010N10E060_300 → 10n060e-2010 1117_gmted-mea300.tif)** → Add→ close (lower region is dark & upper region is light).

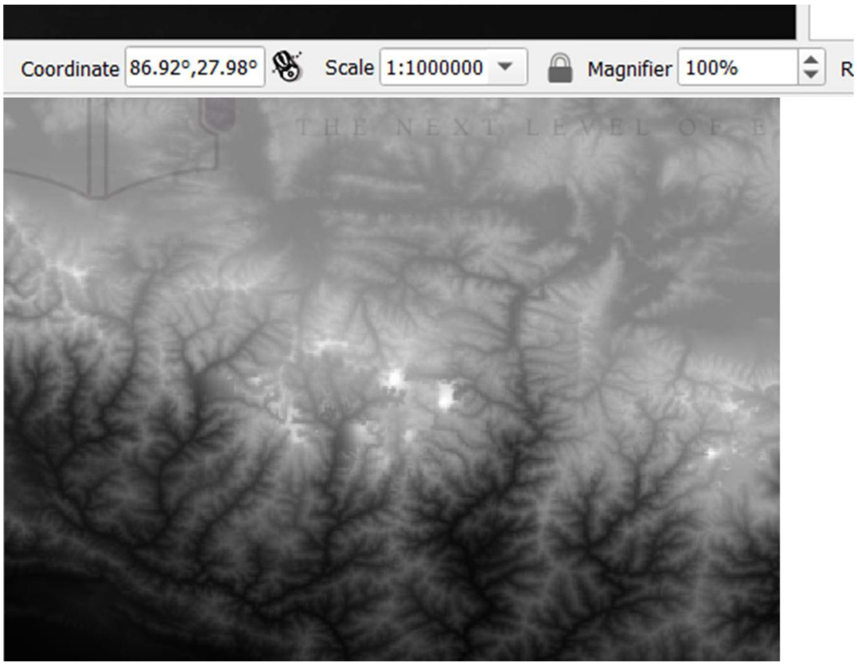






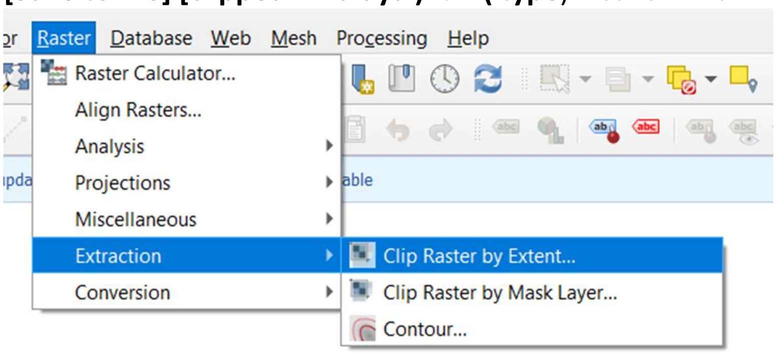
Step 2:

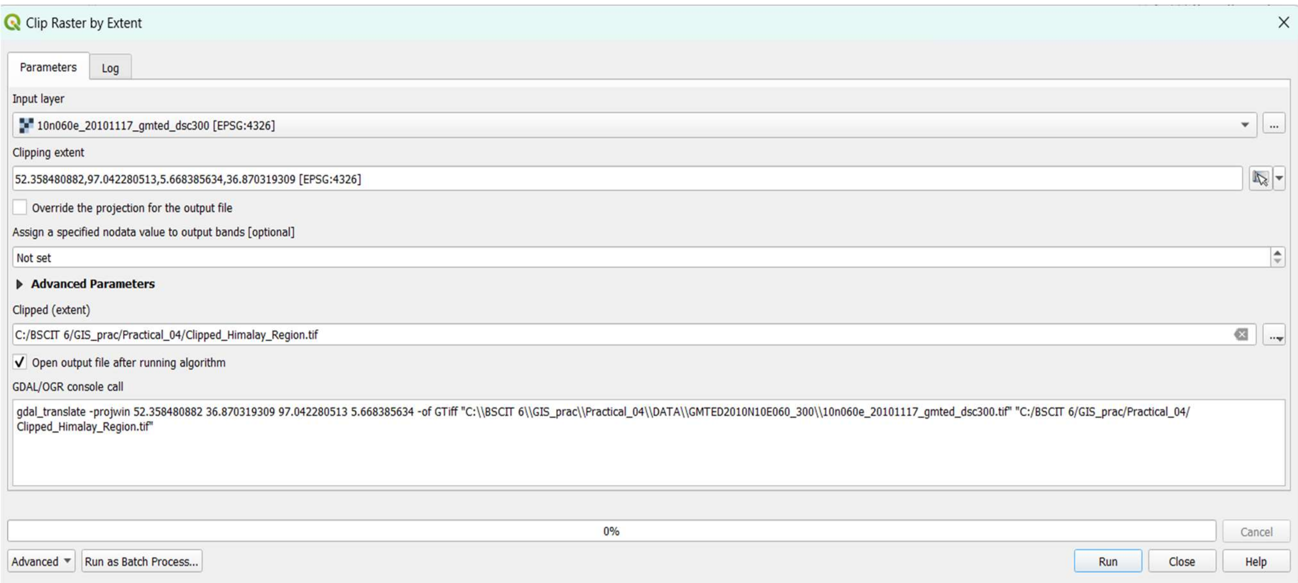
Change the coordinate. We have to set the co-ordinate of Mt. Everest. change it to 86.92, 27. 98. Change the scale to 1:900000 magnifier is 100 % .

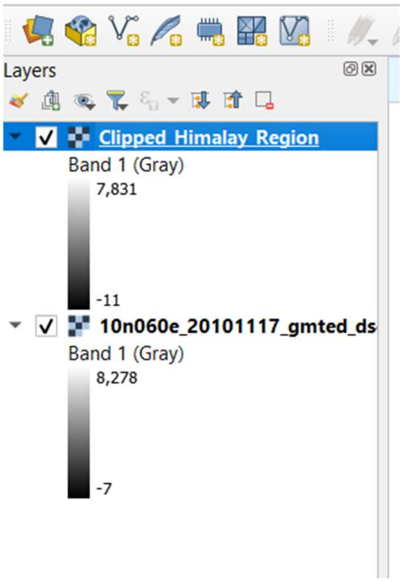


Step 3:

Raster→ Extraction →clip Raster by Extent (As we are interested Mt. Everest area) → **[Input Layer][10 n060e - 20101117_grited_mea 300.][EPSG: 4326]** →Clipping extent**: […] [Use deep Canvas Extent]**→ Clipped **[…] [Save to file] [clippedhimalaya)** .tif **(type)**→save →Run →Close.

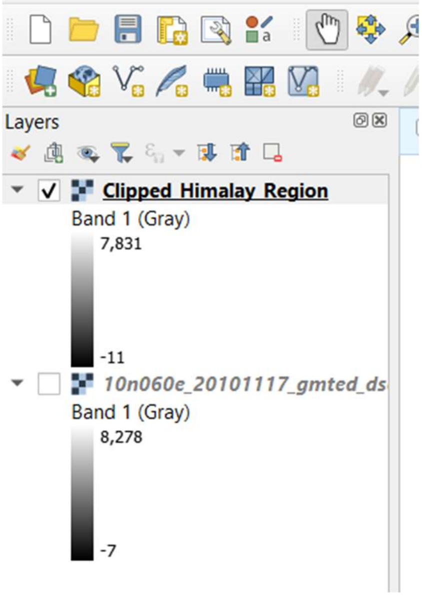


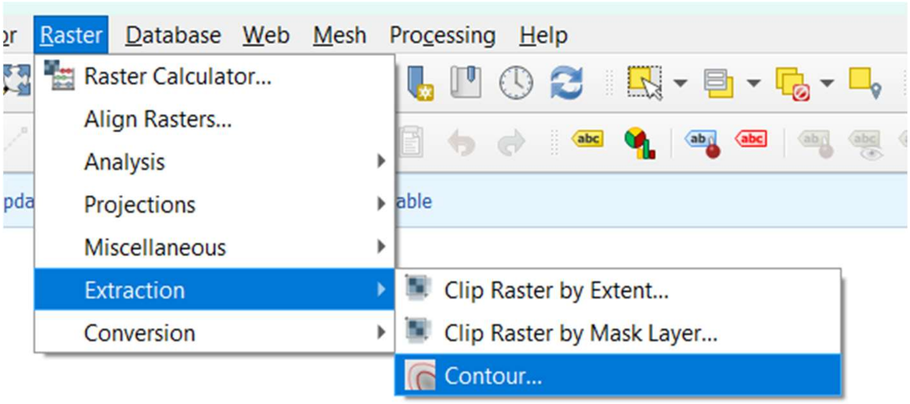


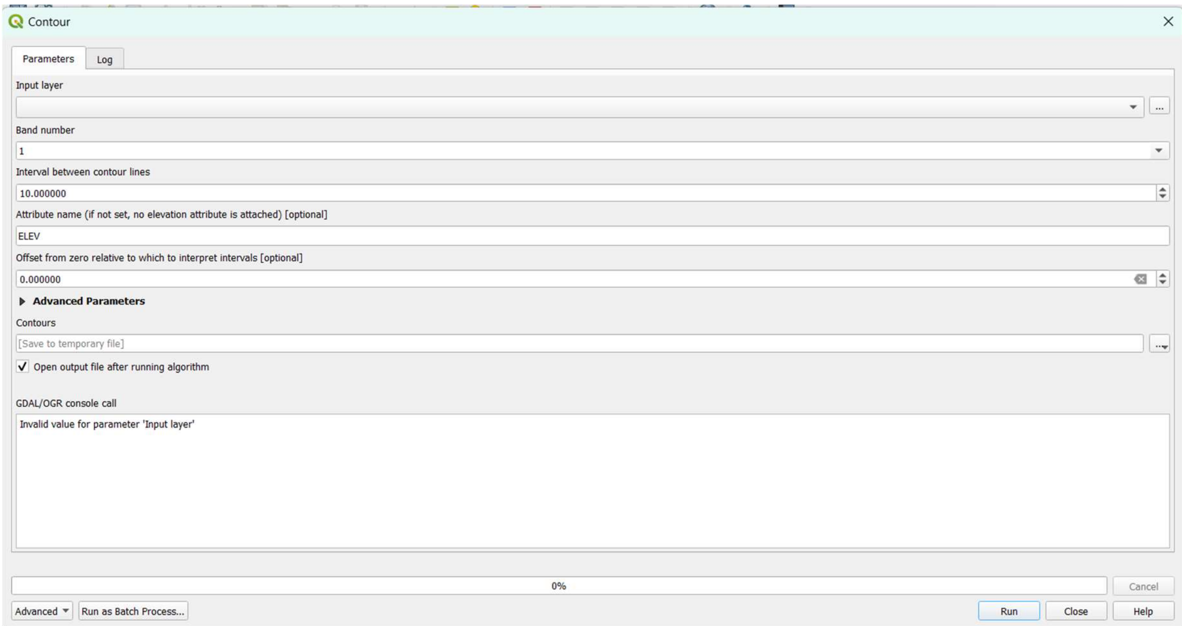


Step 4:

Disselect the 10n060e-2010111-7-gmted_mea300.tif Raster →Extraction→Contour →Interval **[100.0000000]** → Contours **[…] save to file [Contourhimalaya]**.gpkg [**type**] →save →Run→close**(Input layer should be clippedhimalaya [EPSG: 4326])**

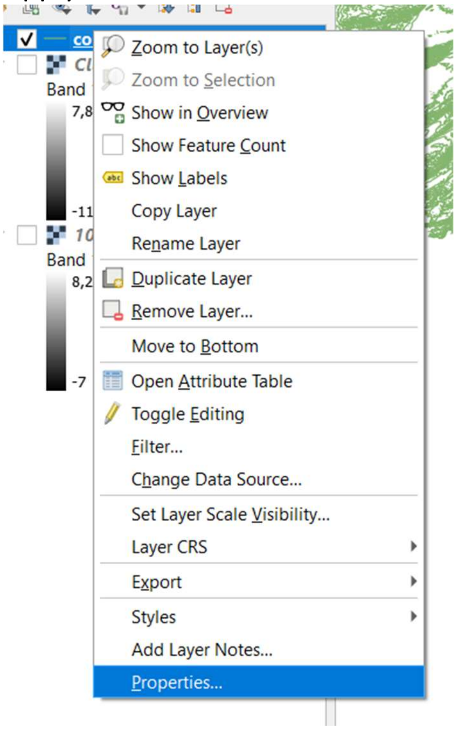

Layers
Clipped Himalay Region
Band 1 (Gray)
7,831
-11
10n060e_20101117_gmted_ds
Band 1 (Gray)
8,278
-7

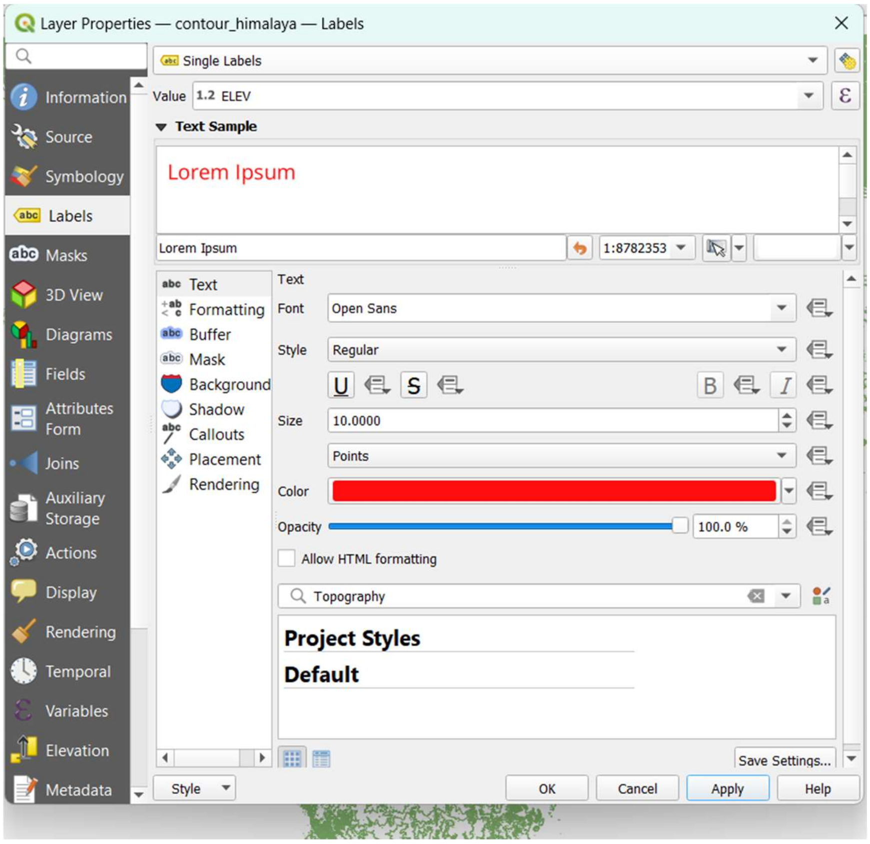

Raster
Database
Web
Mesh
Processing
Help
Raster Calculator...
Align Rasters...
Analysis
Projections
Miscellaneous
Extraction
Conversion
Clip Raster by Extent...
Clip Raster by Mask Layer...
Contour...

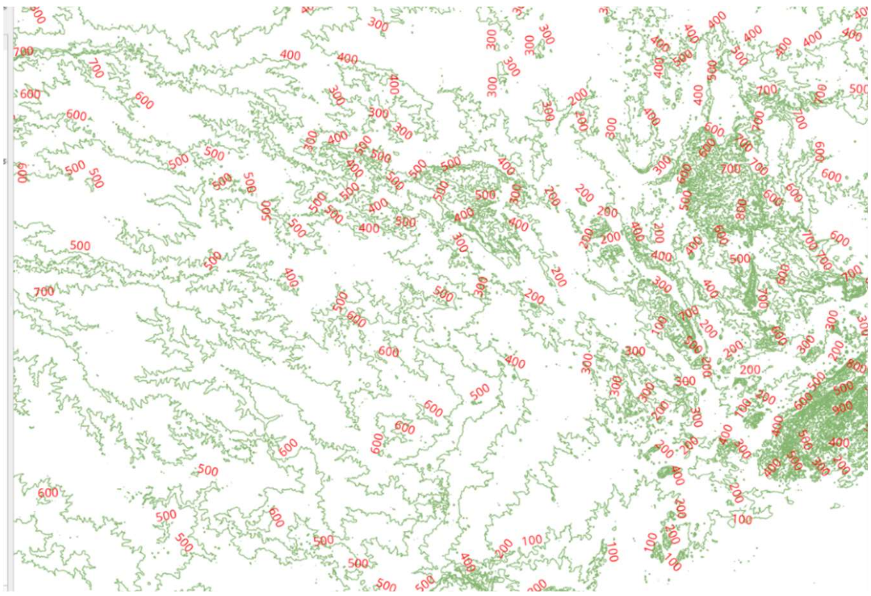

Contour
Parameters
Log
Input layer
Band number
1
Interval between contour lines
10.000000
Attribute name (if not set, no elevation attribute is attached) [optional]
ELEV
Offset from zero relative to which to interpret intervals [optional]
0.000000
Advanced Parameters
Contours
[Save to temporary file]
Open output file after running algorithm
GDAL/OGR console call
Invalid value for parameter 'Input layer'
0%
Cancel
Advanced
Run as Batch Process...
Run
Close
Help


0.000000
Advanced Parameters
Contours
C:/BSCIT 6/GIS_prac/Practical_04/Himlaya_Region_Contour.gpkg
Open output file after running algorithm
Contours
Python identifier: 'OUTPUT'

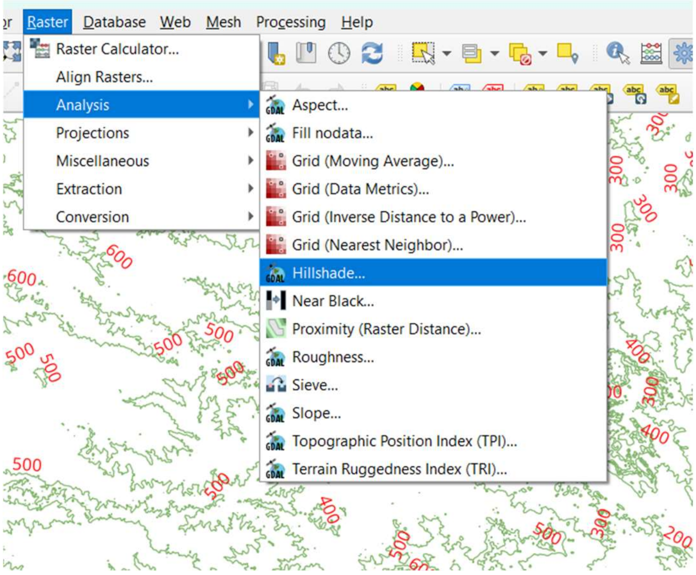
Step 5: Now we are going to show (elevation)
Right click on contourhimalaya → properties → Labels →**[Single Labels]** →value **[1.2 ELEV]** → color **[red]** → Apply → ok.





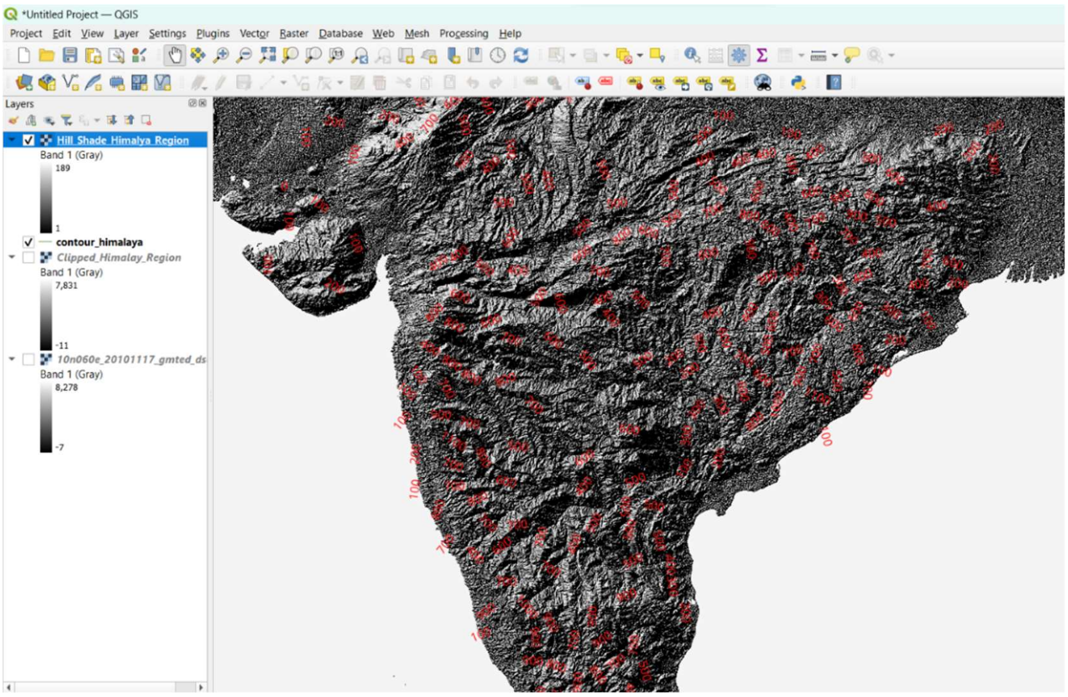


Step 6:
Now we are going to show hill shades.
Raster → Analysis → Hillshade
Input Layer**: [clipped himalaya [EPSG: 4326]]**
Hillshade: **[…]→ [save to file] →[Hillshade].tif** (type) →save →Run →Close


Raster
Database
Web
Mesh
Processing
Help
Raster Calculator...
Align Rasters...
Analysis
Projections
Miscellaneous
Extraction
Conversion
Aspect...
Fill nodata...
Grid (Moving Average)...
Grid (Data Metrics)...
Grid (Inverse Distance to a Power)...
Grid (Nearest Neighbor)...
Hillshade...
Near Black...
Proximity (Raster Distance)...
Roughness...
Sieve...
Slope...
Topographic Position Index (TPI)...
Terrain Ruggedness Index (TRI)...


Hillshade
Parameters
Log
Input layer
Clipped_Himalay_Region [EPSG:4326]
Band number
Band 1 (Gray)
Z factor (vertical exaggeration)
1.000000
Scale (ratio of vertical units to horizontal)
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:/BSCIT 6/GIS_prac/Practical_04/Hill_Shade_Himalya_Region.tif
Open output file after running algorithm
GDAL/OGR console call
gdaldem hillshade "C:/BSCIT 6/GIS_prac/Practical_04/Clipped_Himalay_Region.tif" "C:/BSCIT 6/GIS_prac/Practical_04/Hill_Shade_Himalya_Region.tif" -of GTiff -b 1 -z 1.0 -s 1.0 -az 315.0 -alt 45.0
0%
Cancel
Advanced
Run as Batch Process...
Run
Close
Help

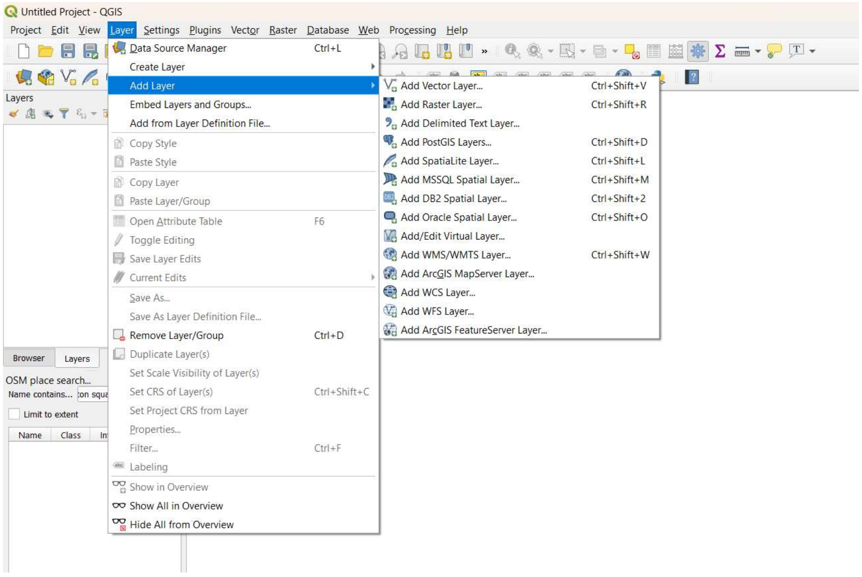
OUTPUT:


*Untitled Project — QGIS
Project Edit View Layer Settings Plugins Vector Raster Database Web Mesh Processing Help
Layers
Hill Shade Himalya Region
Band 1 (Gray)
189
1
contour_himalaya
Clipped_Himalay_Region
Band 1 (Gray)
7,831
-11
10n060e_20101117_gmted_ds
Band 1 (Gray)
8,278
-7

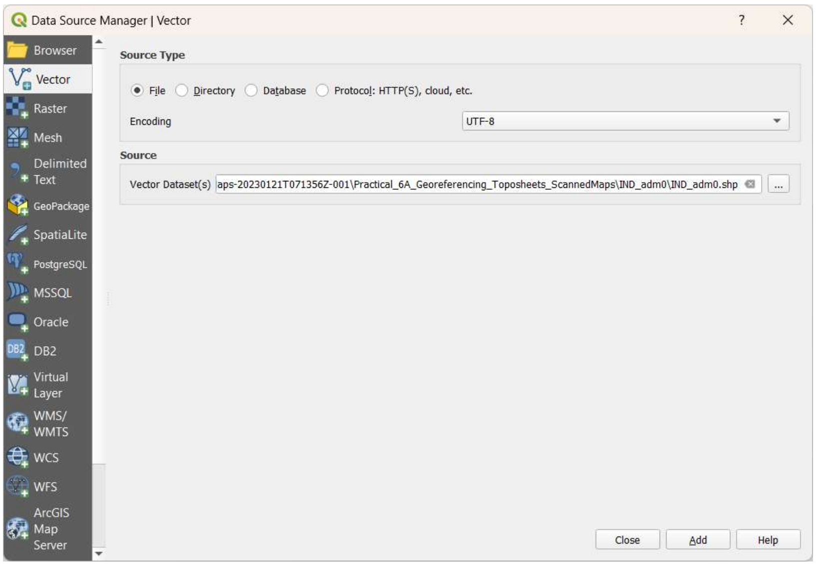
Practical no :- 6

A) Georeferencing Topo Sheets and Scanned Maps

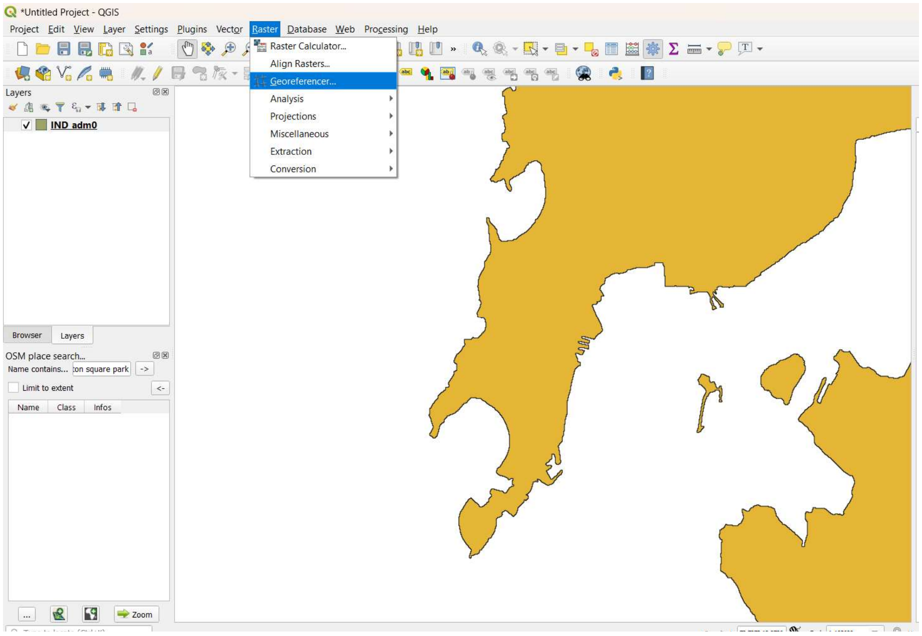
Step 1: Layer -> Add Layer →Add vector Layer ->



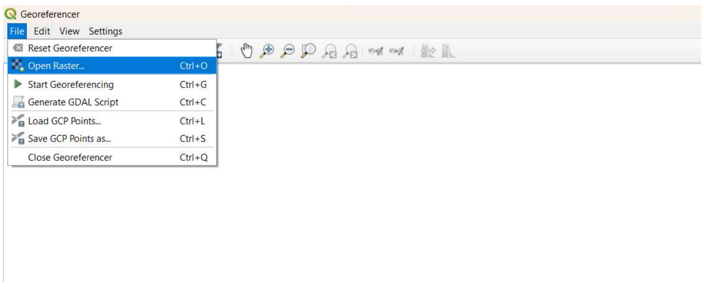
(Practical_6A_
Georeferencing_Toposheet->IND_admo→INDadm0.shp) → Add → close [Focus on Mumbai →zoom it out]

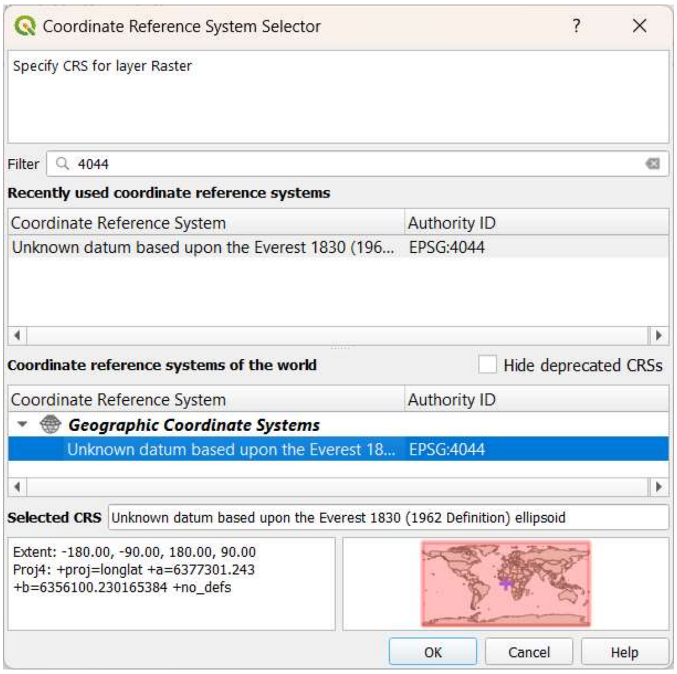


<u>Step 2:</u> Raster -> Georeferencer

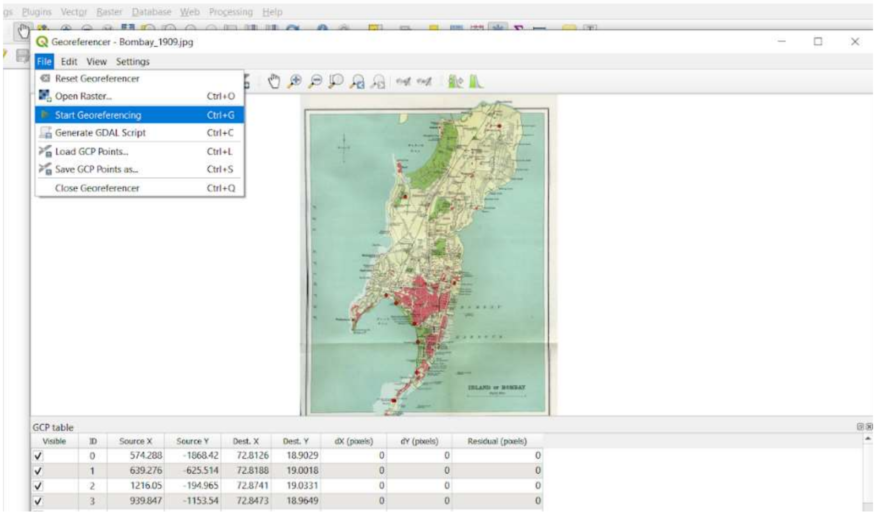


[File > Open Raster -> Bombay_1909.jpg] We have add co-ordinates. We are adding Three co-ordinates.

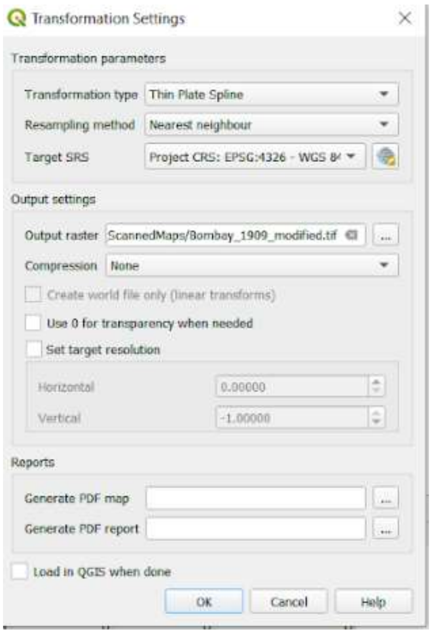




Enter map co-ordinates [put the point on original map] -> From map canvas.→ Click on original map → ok.

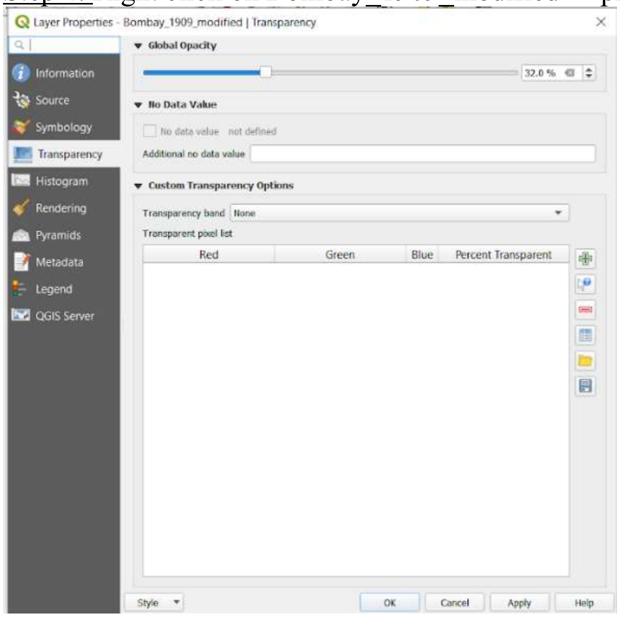


File -> start Georeferencing
Settings -> Transformation settings
Transformation type [Thin Plate spline]
Resampling method [Nearest neighbor]
Target SRS [EPSG:4044-unknown datum based upon the Everest 1830 EPSG:4044] ->OK
⇒✓ load in QGIS when done (select it) ->ok File -> Start
Georeferencing.



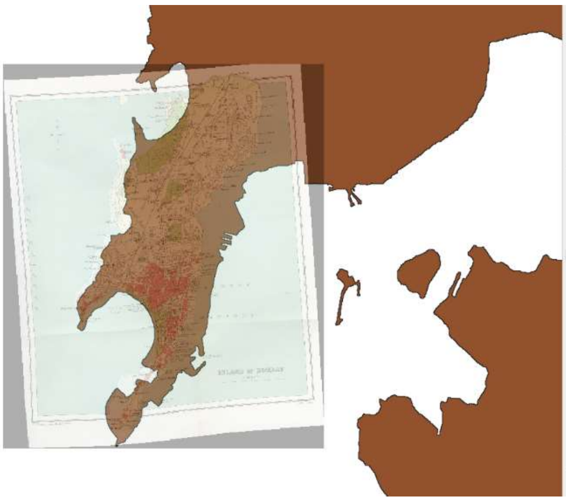
Step3: close the Georeferencer → save → replace it yes

Step 4: Right click on Bombay_1909_modified -> properties -> Transparency -> Global opacity 32.0 %



[Output: we have mapped the image on a vector layer which is called georeferencing]

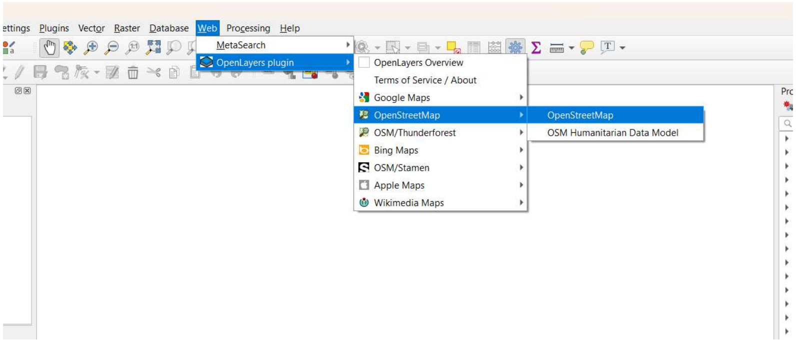
OUTPUT:

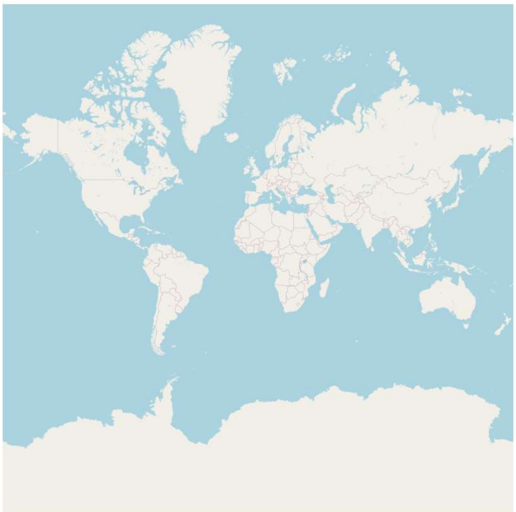


B) Georeferencing Aerial Imagery

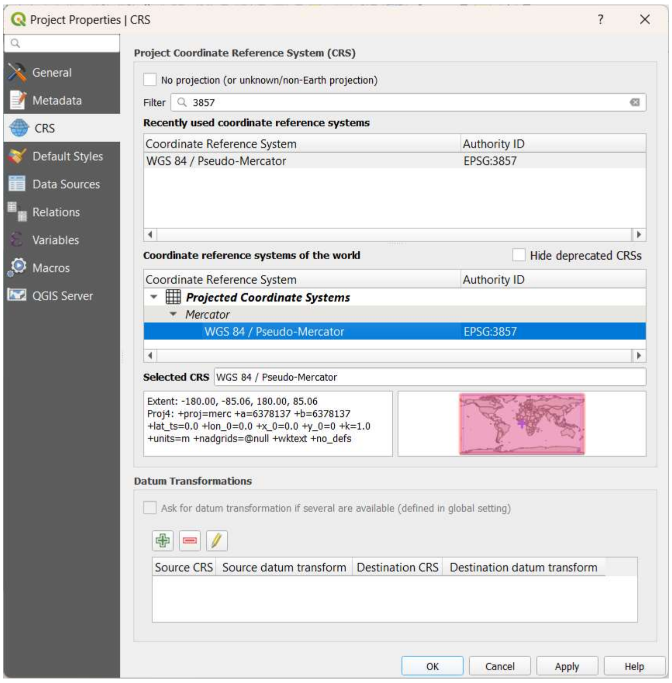
[Check for openlayers plugin & openstreetmap]

Step 1: Web -> openLayers plugin -> OpenStreetMap -> OpenStreetMap

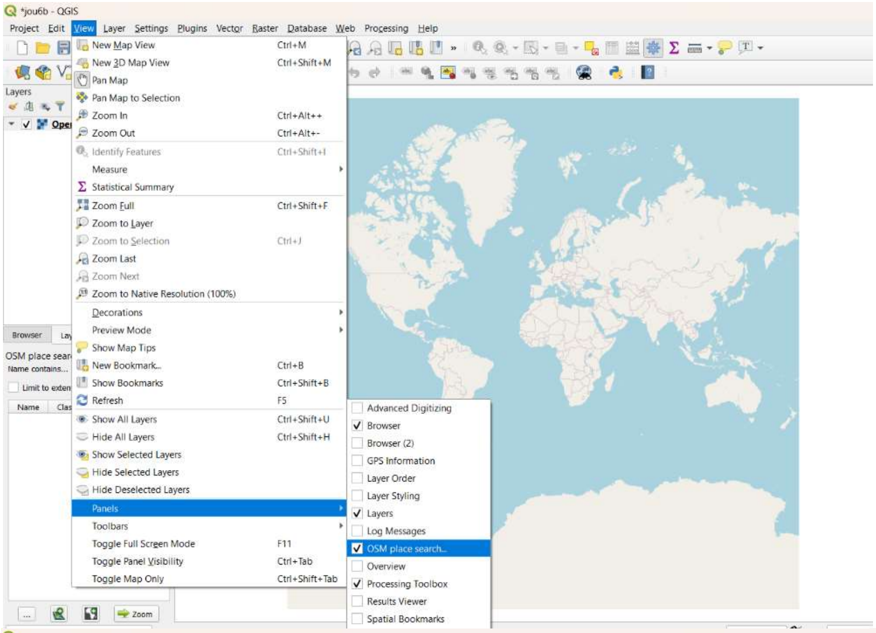


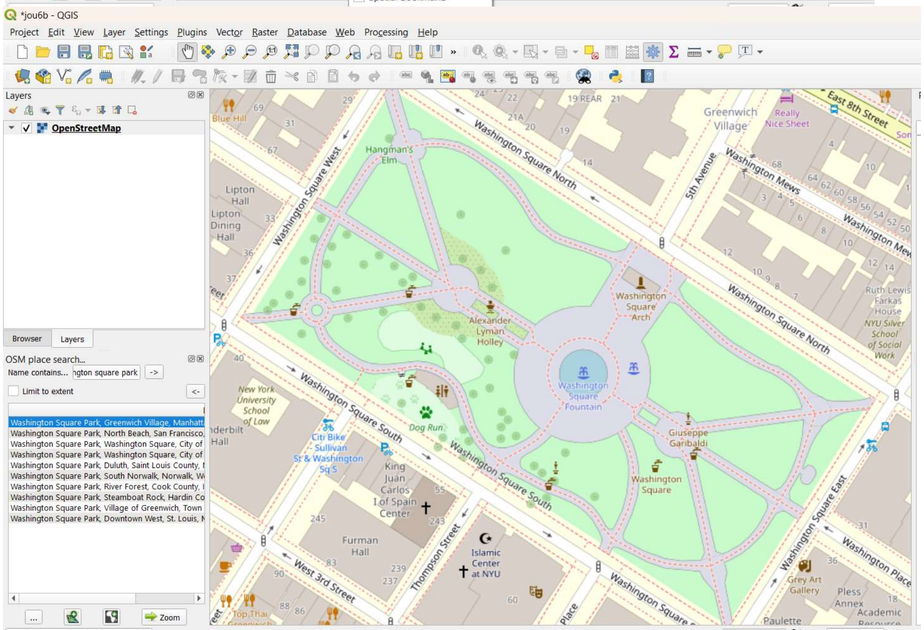


Step 2: Project -> Properties -> CRS -> [WGS 84/Pseudo Mercator EPSG:3857]-> Apply-> OK

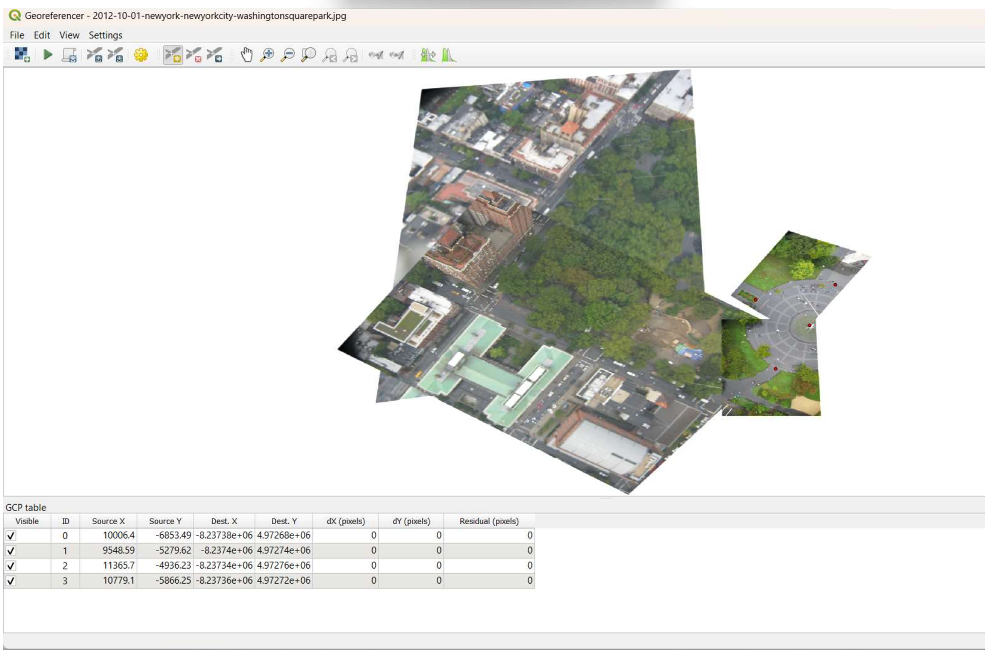


Step 3: View-> Panels-> OSM Place Search [✓](select it) OSM place search -> Name contains [Washington Square Park] zoom

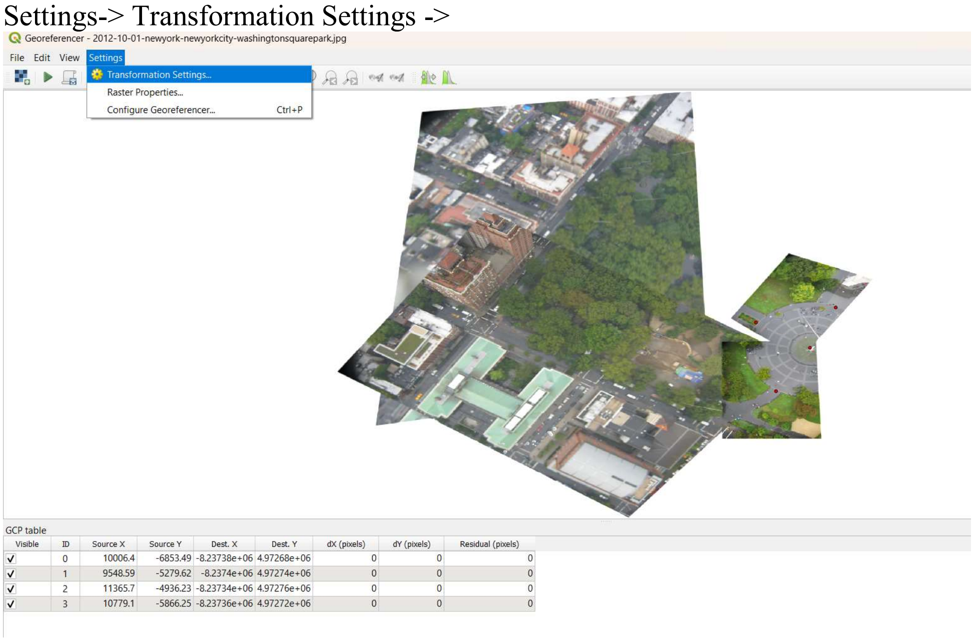




Step 4: Raster-> Georeferencer ->File-> Open Raster -> [NewYork_Washington]
Edit ->Add point (Click on image) From MapCanvas Take a point in the original image ->OK (Take Four points in all the corners)

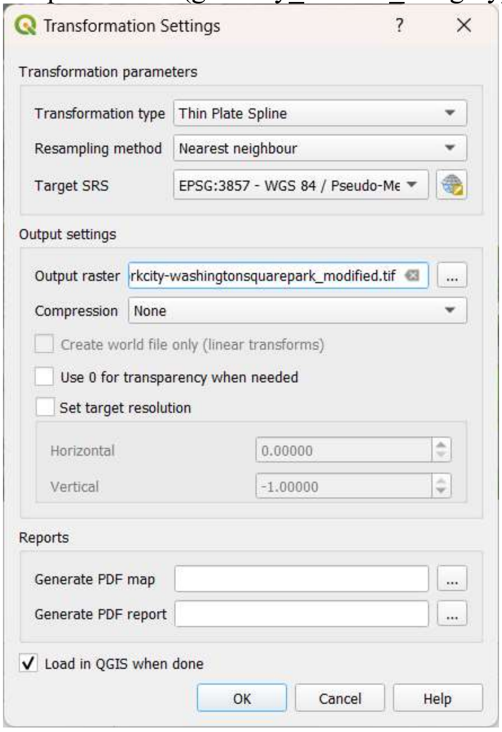


Settings-> Transformation Settings ->



Transformation Type [This plate spline]
Resampling method [nearest Neighbour]
Target SRS (EPSG:3857-WGS 84/Pseudo-me)

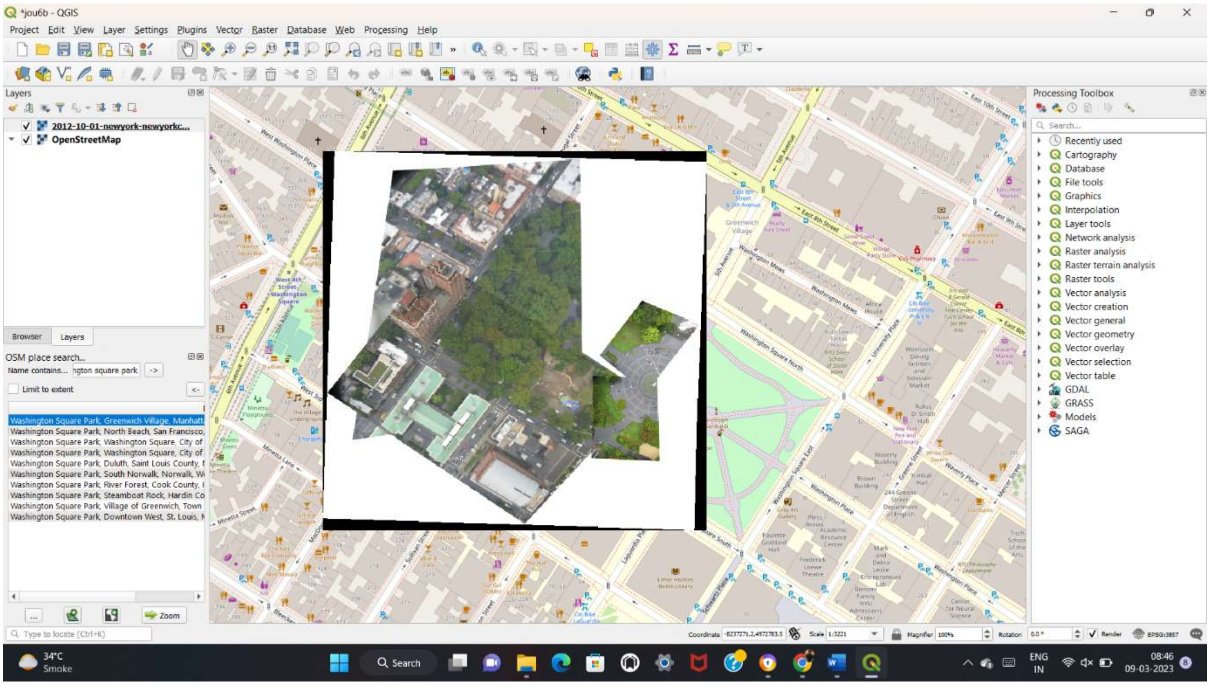
Output - raster (gateway_Aenial _Imagery_modified.tif) Load in QGIS when done (select) ok



File-> start georeferencing

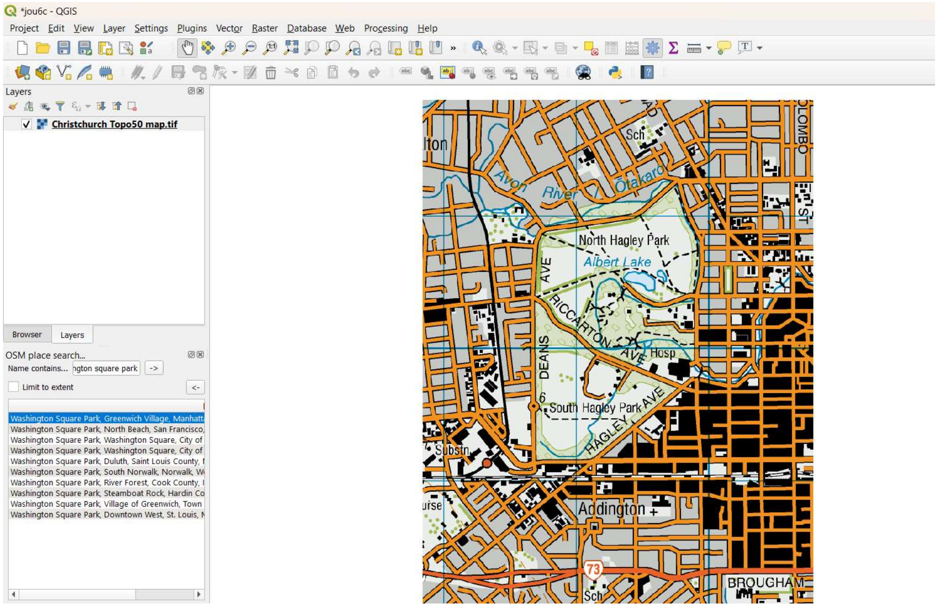
Close the window ->save-> save

Output:

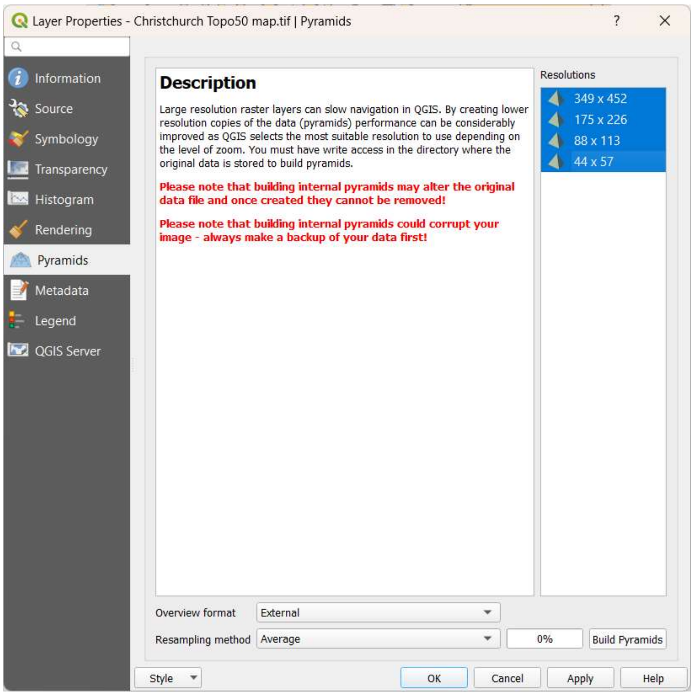


C) Digitizing Map Data

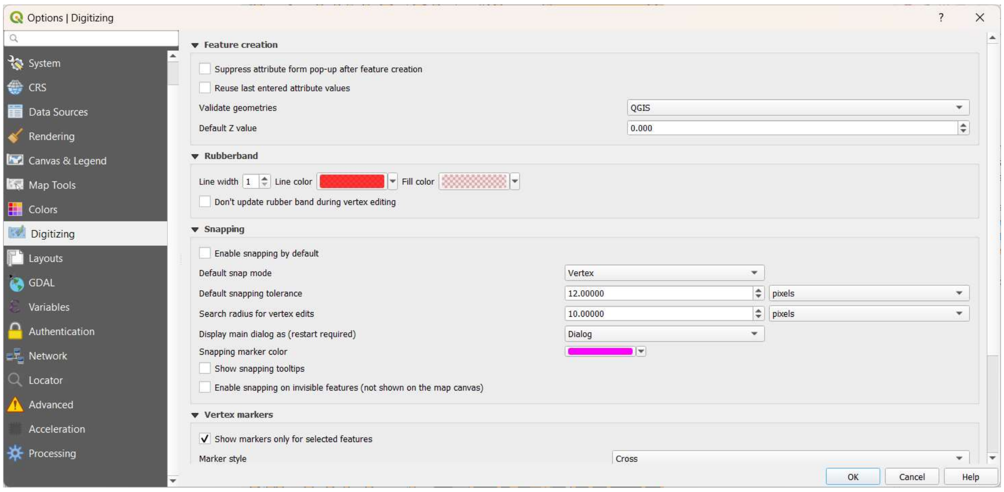
Step 1: layer ->add layer-> add raster layer->
(Practical_6c -> Christchurch topo50 map.tif)-> add-> ok



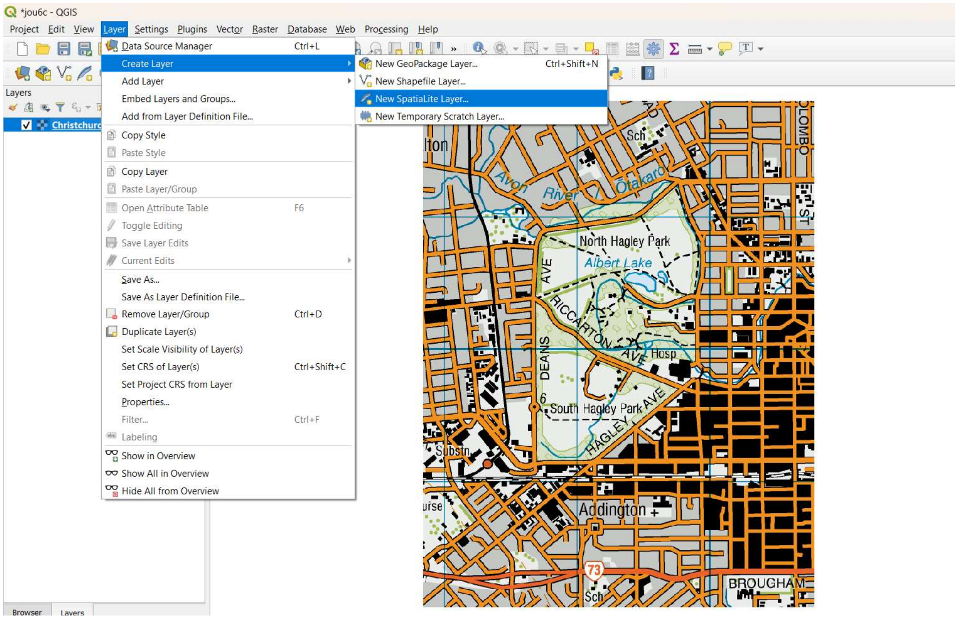
Step 2: right click on the layer ->properties ->pyramids ->select all the resolution from right hand side.-> Build pyramid ->ok



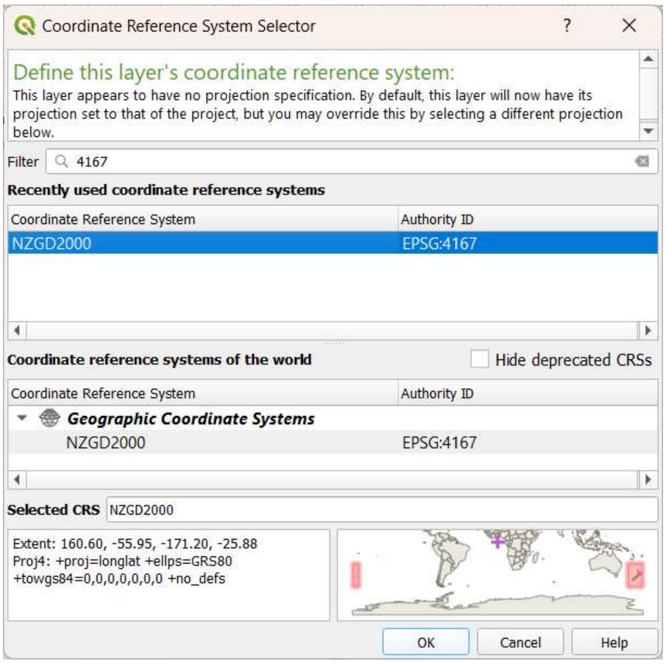
Step 3: settings-> options ->digitizing-> snapping ->deselect the enable snapping by default ->ok



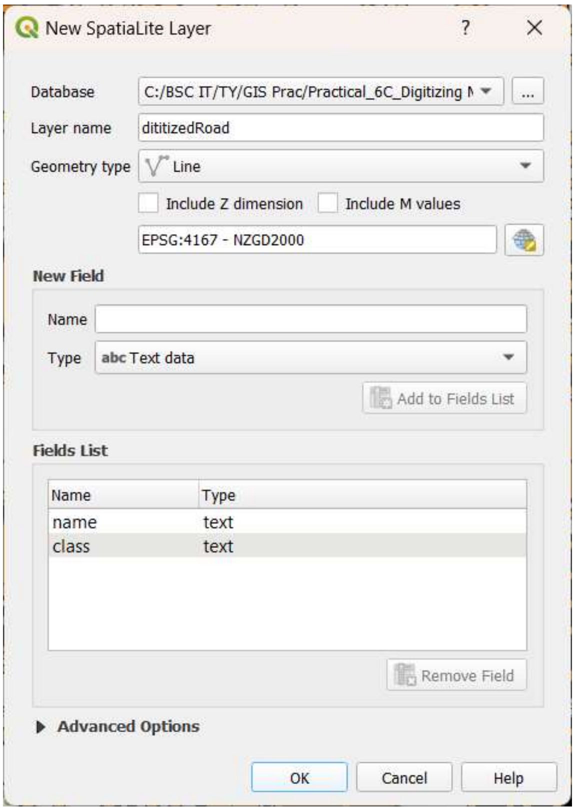
Step 4: layer ->create layer ->new spatialite layer



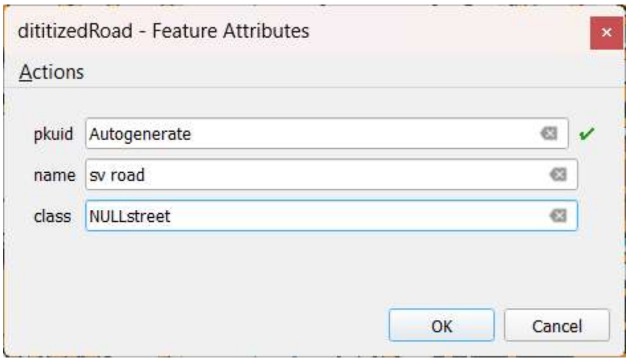
Database (digitization sqlite) layer name (digitized road) Geometry type (line string) EPSG:4167-NZGD2000



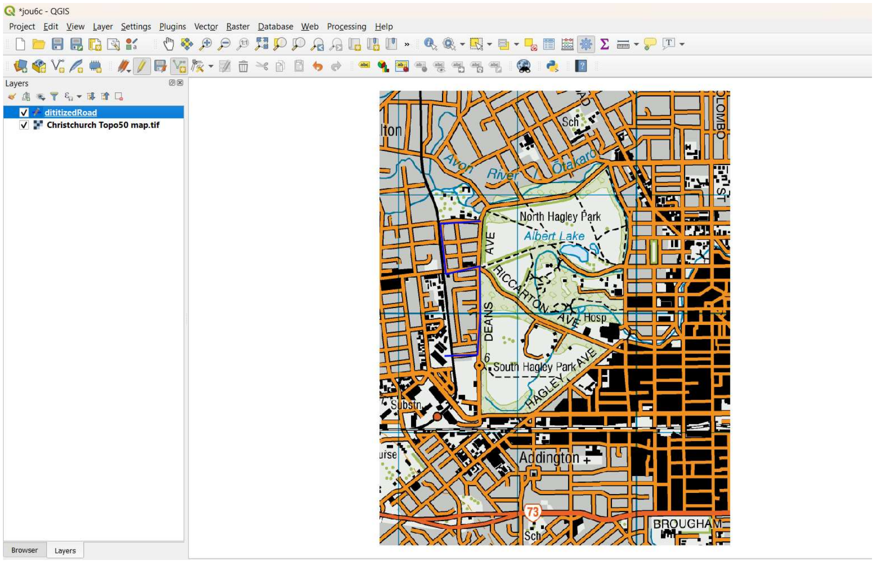
Name(name) text -> Add to field list
Name(class) text -> Add to field list
Ok



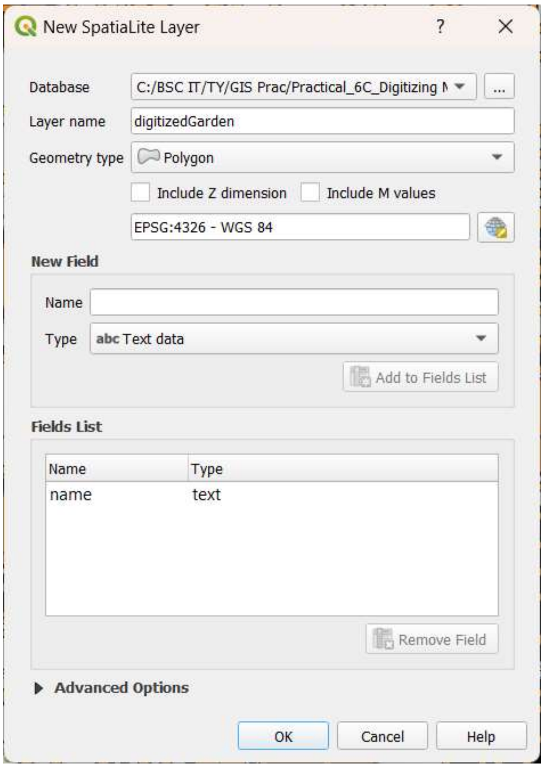
<u>Step 5</u>: toggle(draw the line) Name -sv road.
Class- street



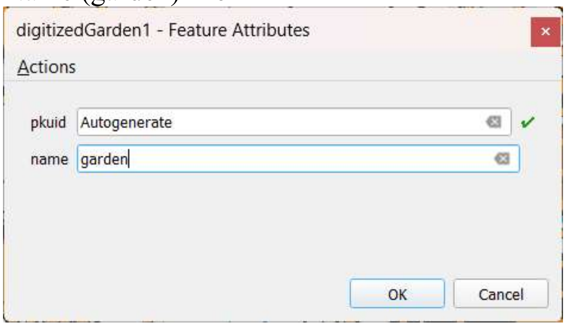
Step 6: right click on digitized road ->properties ->symbology-> colour red (we can clearly see the road)



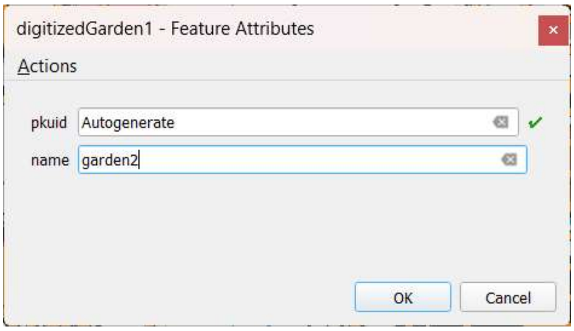
Step 7: layer->create layer-> new spatialite layer -> database (digitization sqlite) (save name) layer name (digitized_garden) geometry type(polygon)
EPSG:4326-WSG 84
Name(name) ->add to field list ->ok



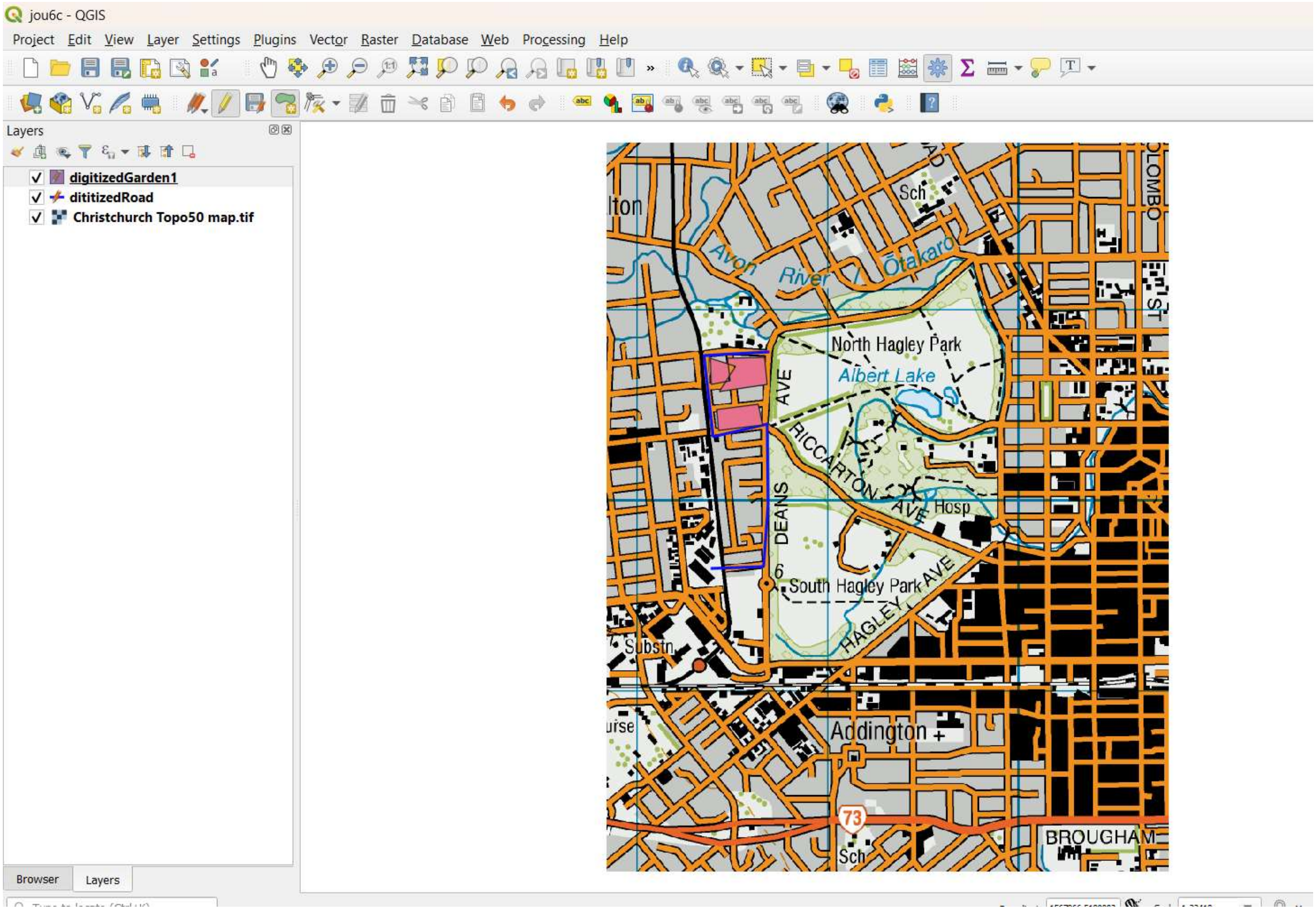
8: toggle-> draw the polygon inside red road
Name (garden)-> ok



Toggle-> " "
Name (garden2)-> ok



OUTPUT:



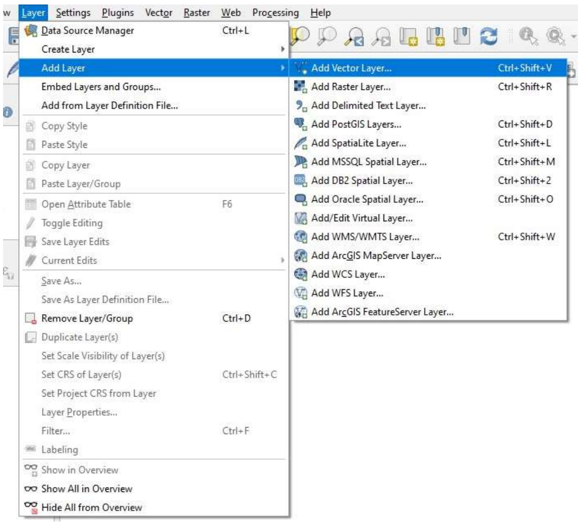
jou6c - QGIS
Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help
Layers
digitizedGarden1
dititizedRoad
Christchurch Topo50 map.tif
Browser
Layers
North Hagley Park
Albert Lake
Avon River
Otakaro
RICCARTON AVE
DEANS AVE
South Hagley Park
HAGLEY AVE
Hosp
Addington
Substn
BROUGHAM
Sch
73

Practical no:- 7

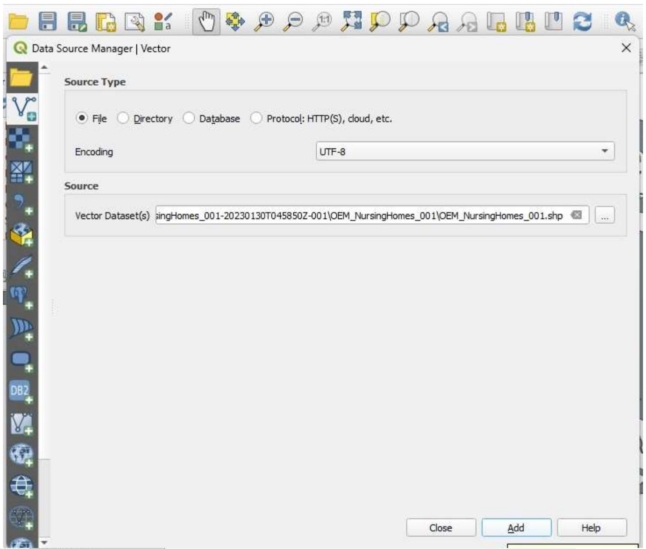
Aim: Managing Data Tables and Spatial data Sets: Table joins, spatial joins, points in polygon analysis, performing spatial queries.

A) Table joins

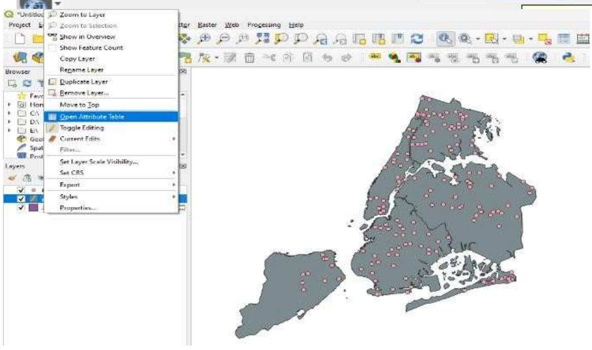
Step-1: Layer→ Add layers→ Add vector layer→ […] → (A→ nybb.shp →Add →close.



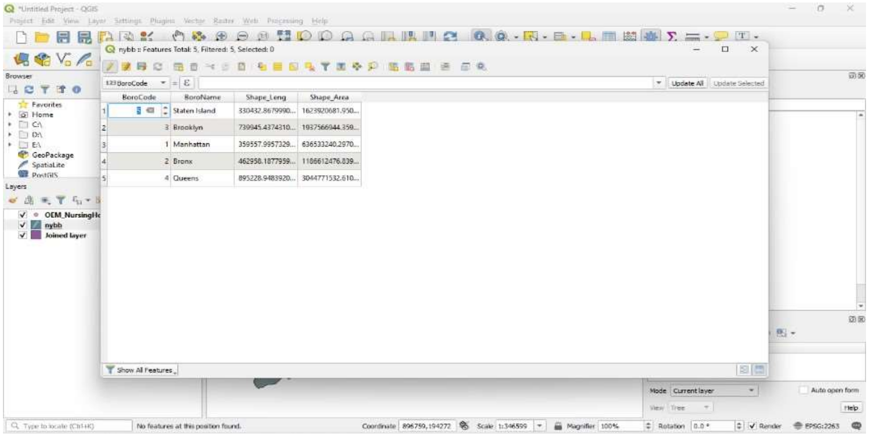
Step-2: Layer→ Add layers→ Add vector layer→ […]→(A→OEM_NursingHomes_001.shp→Add→close.

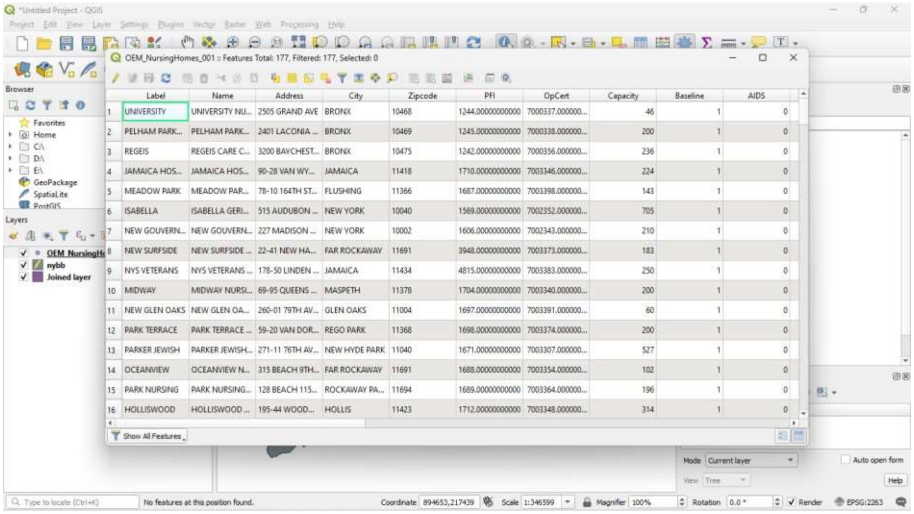


Step-3:(Check the attributes of both the layers) right click on layer❼properties❼

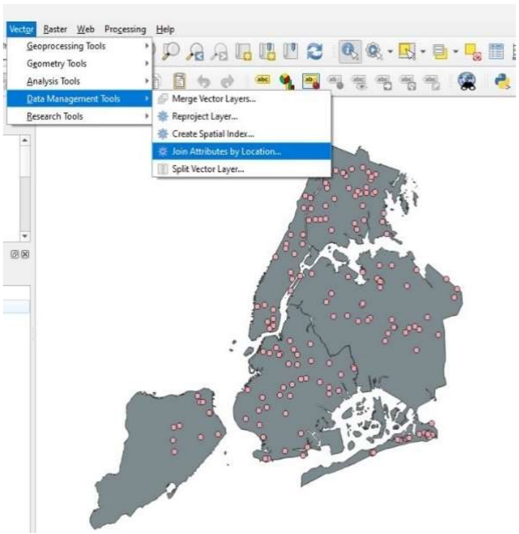


open attributers table (check for another layer)

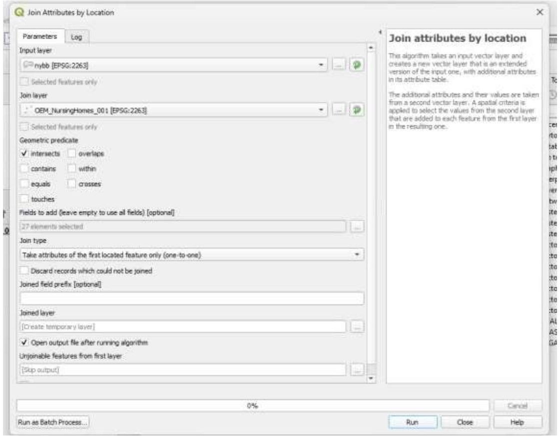




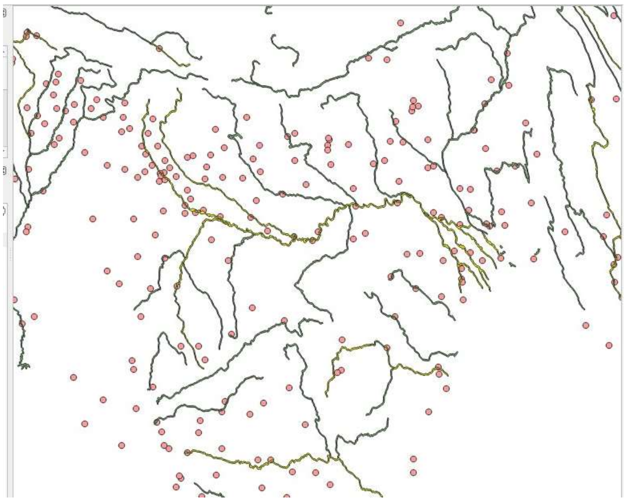
Step-4: vector❼Data management Tools❼join attributes by location



Base layers (nybb [EPSG 2263])❼Join layer (OEM-NursingHomes-001[EPSG:2263])❼Geometric predicate [select intersects]❼Fields to add (click on […])❼Parameters (Select All)❼[click on select all)❼Ok❼Join type (Table attributers of the first matching feature only [one-to one])❼Open output file after running algorithm [select] (should be check)❼



Run❼ →❼close



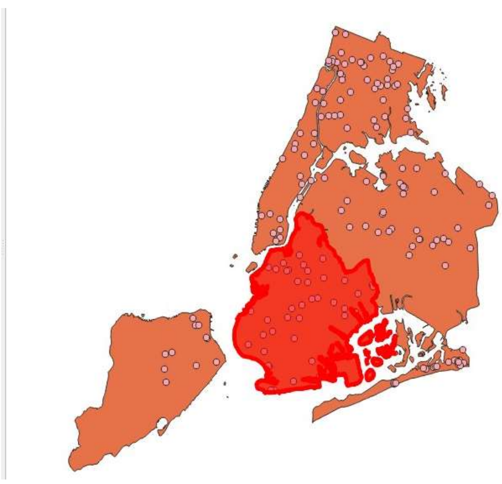
Step-5: Deselect the nybb and OEM layer from layer panel

Step-6: click on [i] from menu bar

select OEM layer from layer panel [select]❼

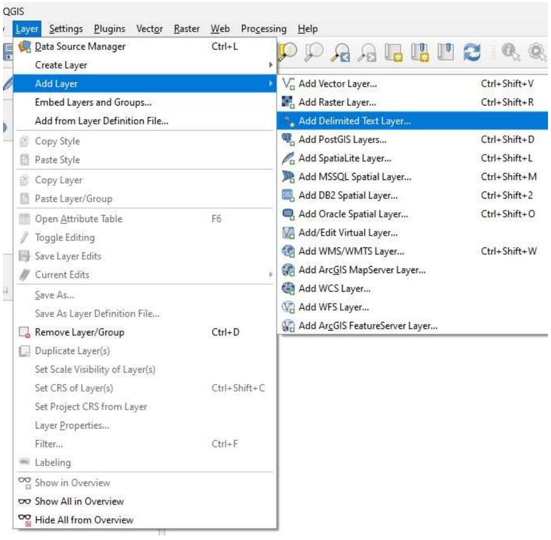
Click on map and see the identity result ❼We have added one attribute in polygon to find out earthquake prone area.

OUTPUT:

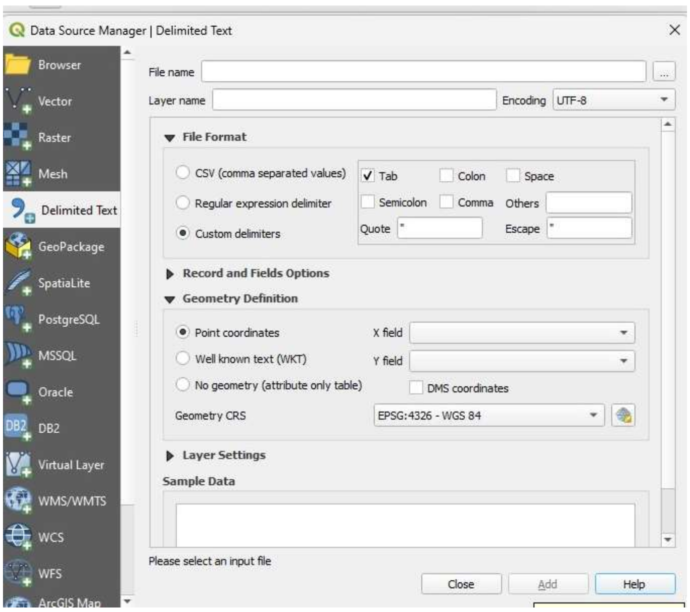


C) points in polygon analysis

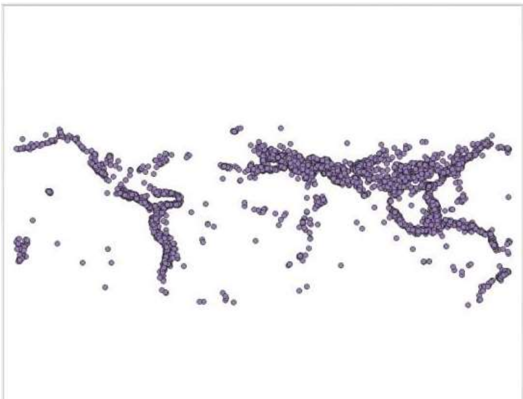
Step-1: Layer❼Add layer❼ Add Delimited Text Layer



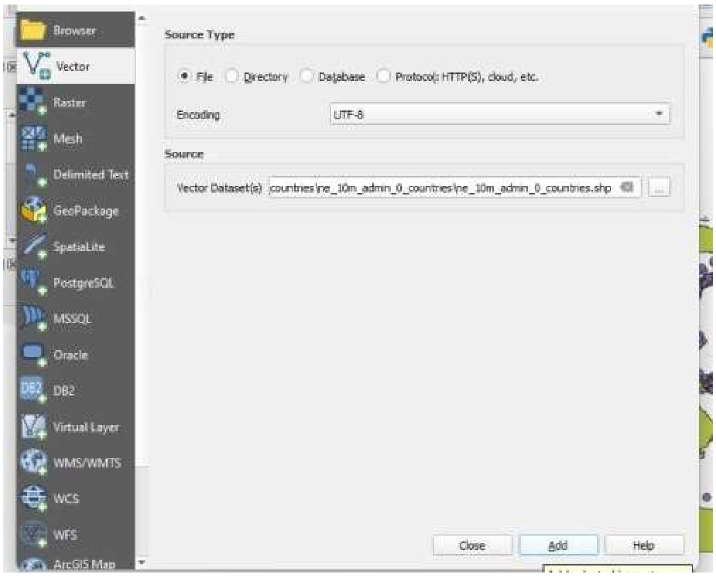
❼File Name (-----EarthQuakeDatabase.txt)❼Layer Name (Earthquake Database) Encoding (UTF-8) File format [select]Table choose custom delimiters❼Reload and Fields options [select] First record has field names❼ [select]Detect field types❼Geometry definition X Field (Longitude) Y Field (Latitude)❼Geometry CRS (EPSG: 4326.WGS 84)❼Add



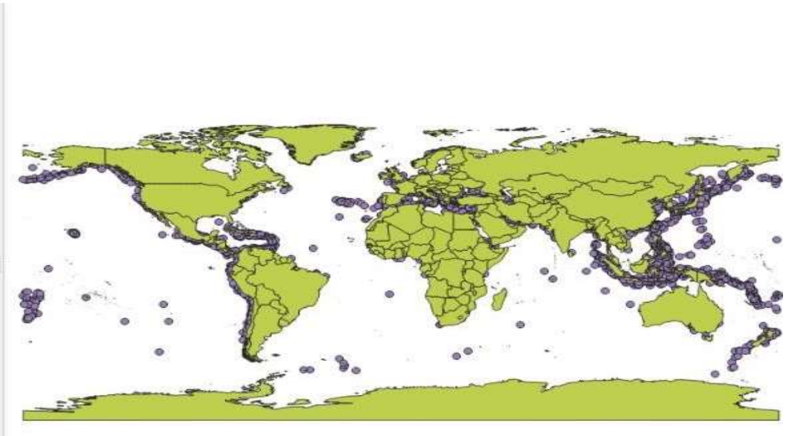
❼close (we can see the layer in layer panel)



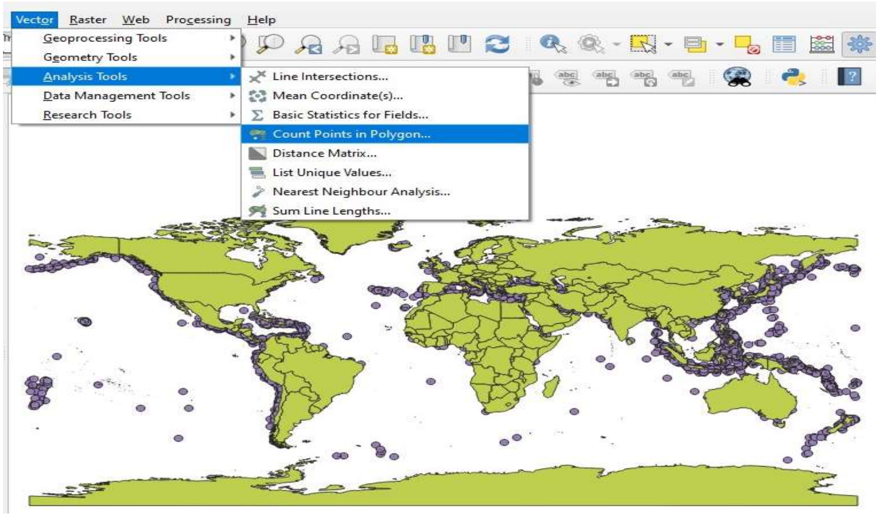
Step-2: Layer ❼ Add Layer ❼Add vector layer […] ❼(ne_10m_admin_0_contries.zip) ❼



Add❼close

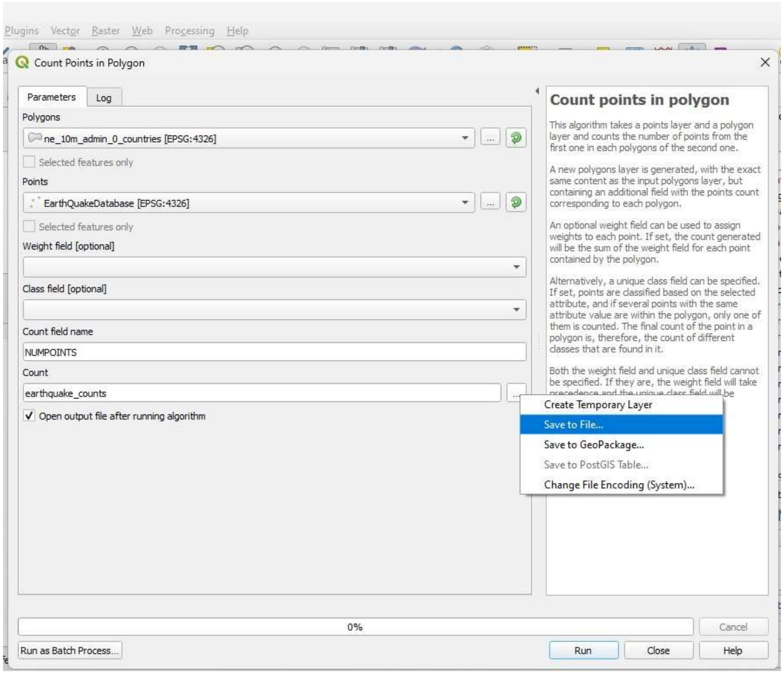


Step-3: Vector ❼Analysis Tools❼Count point in polygons



❼polygon(ne_10m_admin_0_contries)❼Points (EartyhQuakeDatabase [Earthquake Database [EPSG:432)

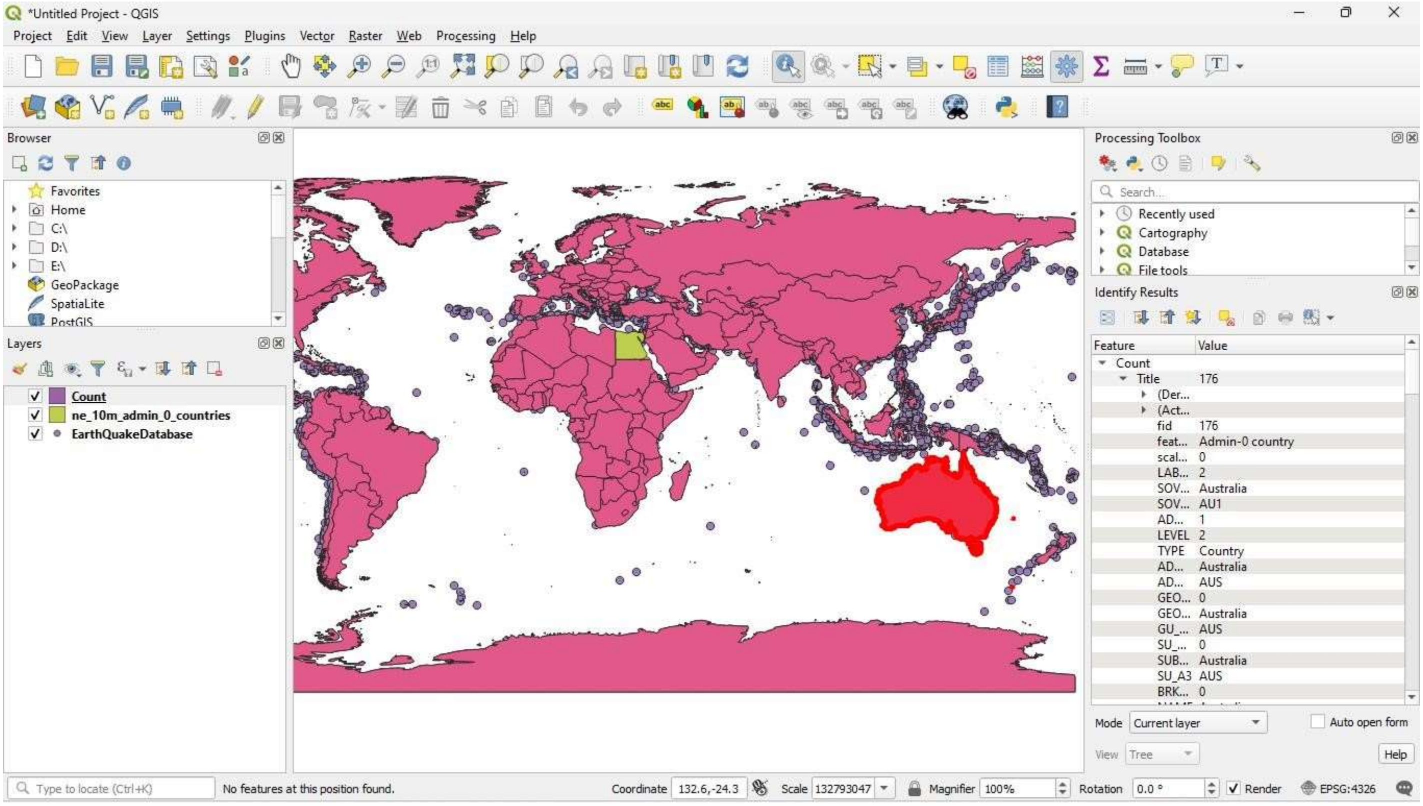
❼Count field name (Nonpoint)❼Count (earthquak_count) [..] click on three dots❼ save to file (practical_07❼ c(eathquak_count)❼(check extension should be gpkg)❼Open output file after running algorithm [select]❼



Run (it takes time)❼ →close (zoom original image, focus on map)

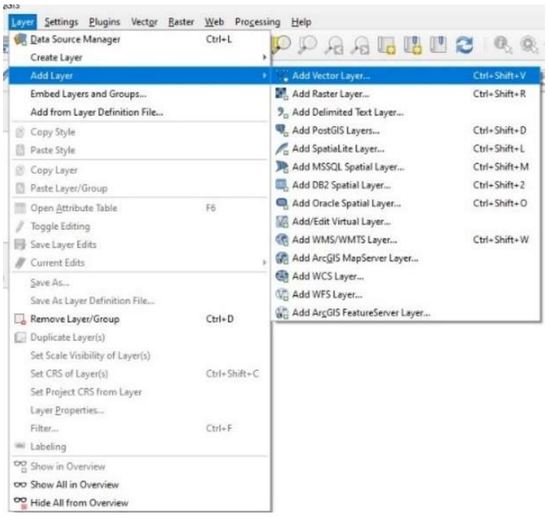
Step-4: -Select [i]❼select from map (we can see the earthquake points in every country we can see numpoint from identify result on right hand side)

OUTPUT:

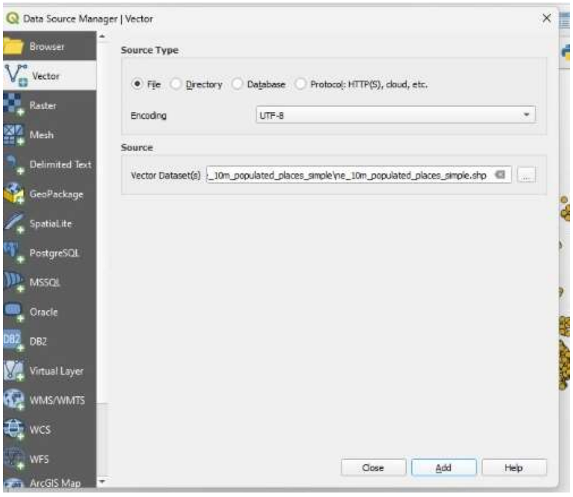

*Untitled Project - QGIS
Project Edit View Layer Settings Plugins Vector Raster Web Processing Help
Browser
Favorites
Home
C:\
D:\
E:\
GeoPackage
SpatiaLite
Layers
Count
ne_10m_admin_0_countries
EarthQuakeDatabase
Processing Toolbox
Recently used
Cartography
Database
File tools
Identify Results
Feature
Value
Count
Title 176
fid 176
feat... Admin-0 country
scal... 0
LAB... 2
SOV... Australia
SOV... AU1
AD... 1
LEVEL 2
TYPE Country
AD... Australia
AD... AUS
GEO... 0
GEO... Australia
GU_... AUS
SU_... 0
SUB... Australia
SU_A3 AUS
BRK... 0
Mode Current layer
Auto open form
View Tree
Help
Type to locate (Ctrl+K)
No features at this position found.
Coordinate 132.6,-24.3
Scale 132793047
Magnifier 100%
Rotation 0.0 °
Render
EPSG:4326

D) preforming spatial queries

Step-1: -Layer❼Add Layer❼Add vector Layer❼

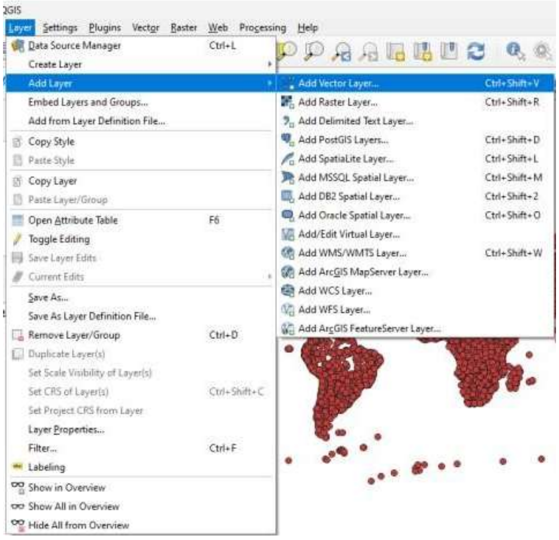


ne_10m_populated_place_simple_shp❼

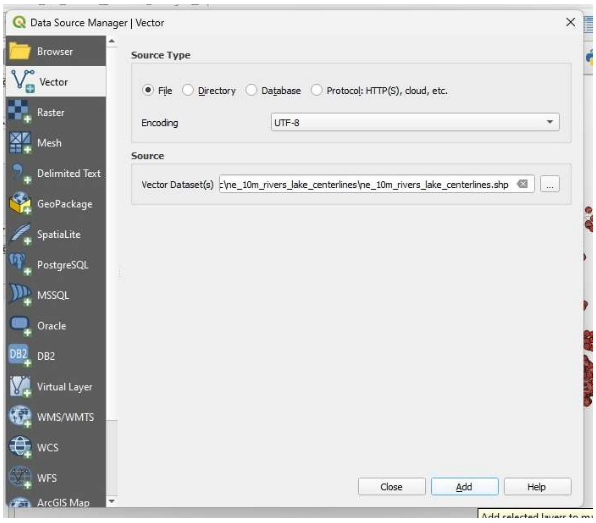


Add❼ close

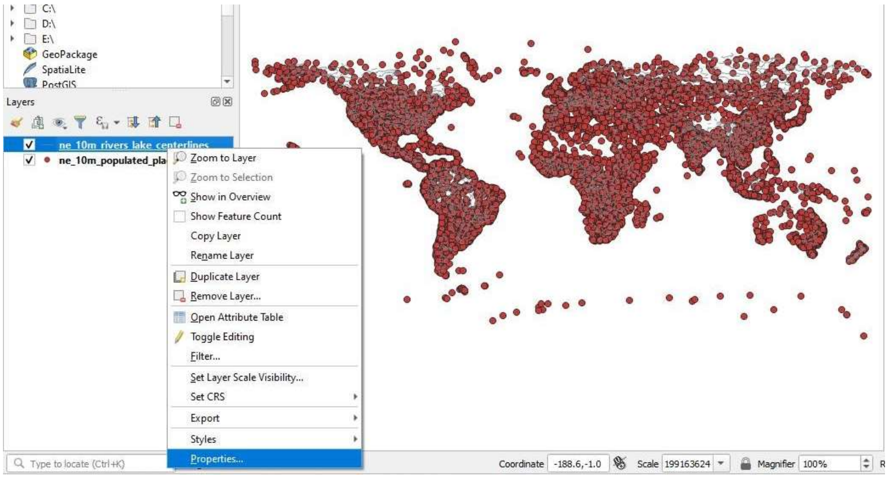
Step-2: -Layer❼Add Layer❼Add vector layer❼



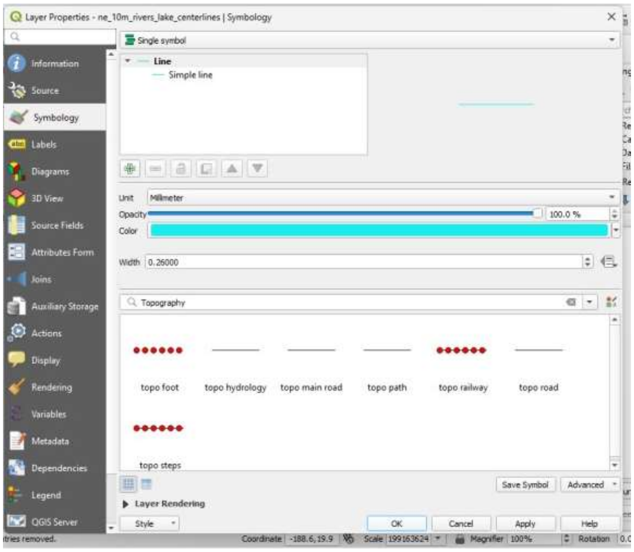
ne_tom_rivers_lake_conterilines_shp❼Add❼ close

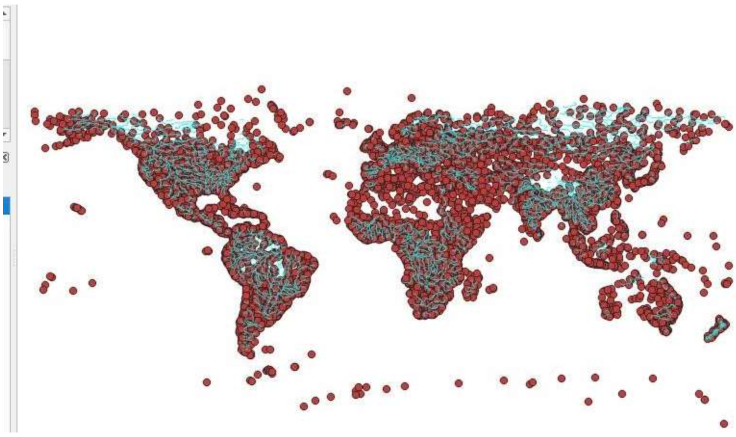


Step-3: -Right click on ne_10m_rivers_lake_contlines.shp❼properties❼

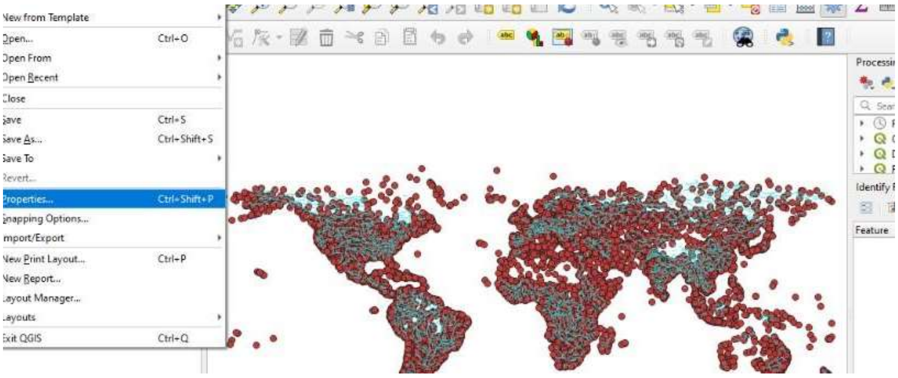


symbology❼Labels (single labels)❼Label with (name)❼ Apply❼OK

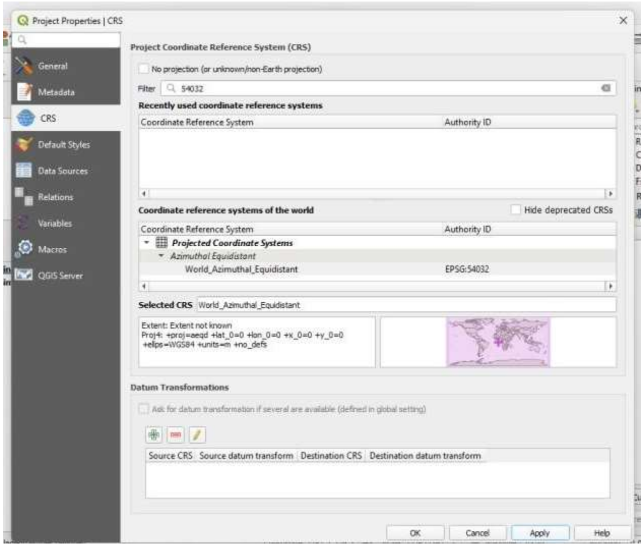




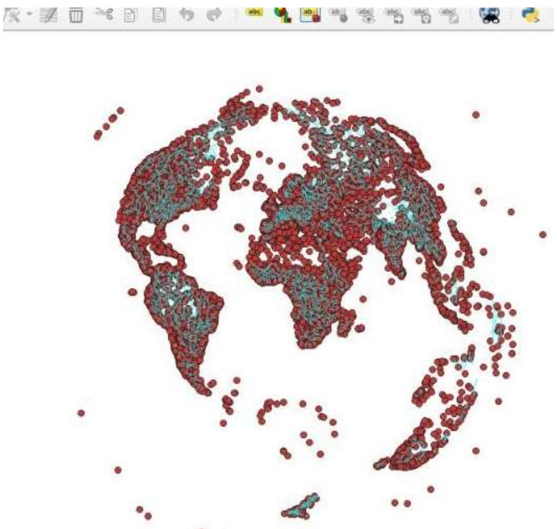
Step-4: -we need to change its CRS (coordinate reference system) project❼properties❼



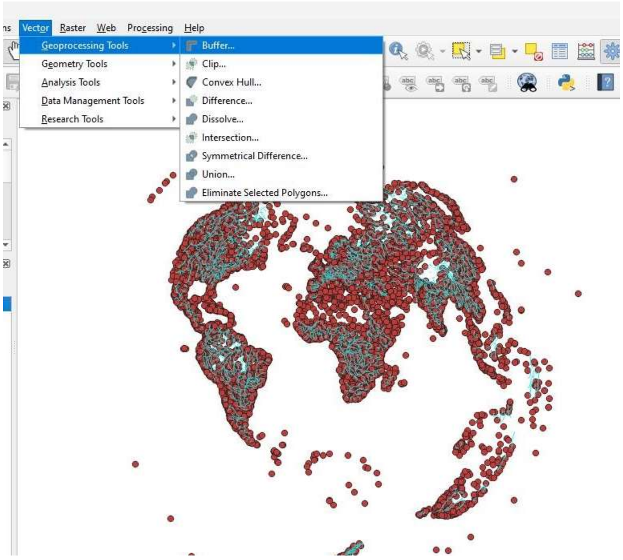
CRS❼secret for 54032(world_Azimuthal_Equidistant [ESRI 54032])



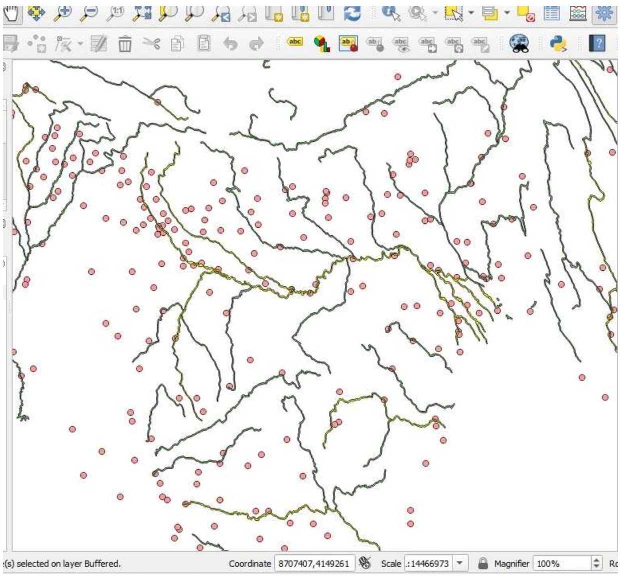
❼OK (we can see 3D Globe map we have converted 2D into 3D format)



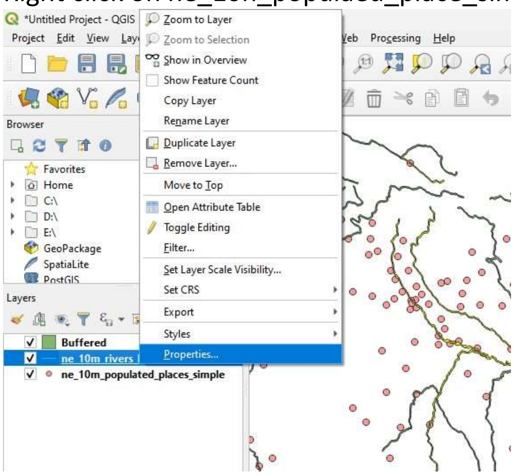
Step-5: -Vector❼Geoprocessing Tools❼Buffer



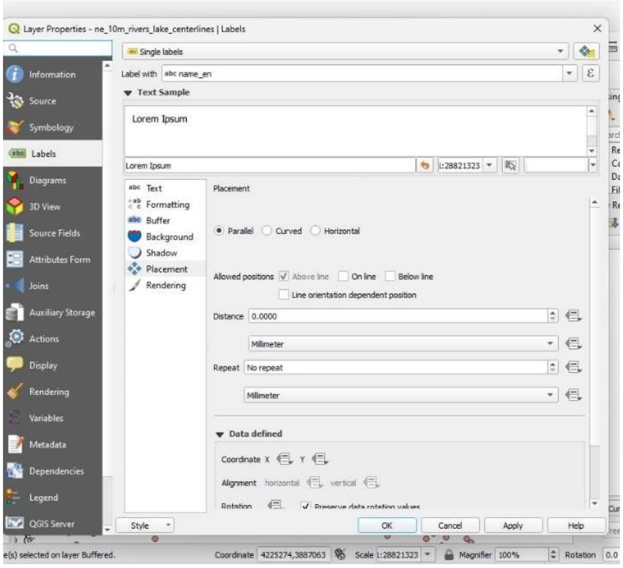
input layer(ne_10n_rivers_lake_centerlines)❼Distance [0.020000] (we are concentrating on rivers which are in 2km distanced)❼segment (5)❼End cap style (Round)❼Join style (Round)❼Milter limit (2.000000)❼[Select] open output file after running algorithm (we are not saving this file we are creating temporary file)❼ Run❼ ❼close



Step-6: -Rivers are not clearly seen so we will change the color of population places
Right click on ne_10n_populaed_place_simple❼properties❼

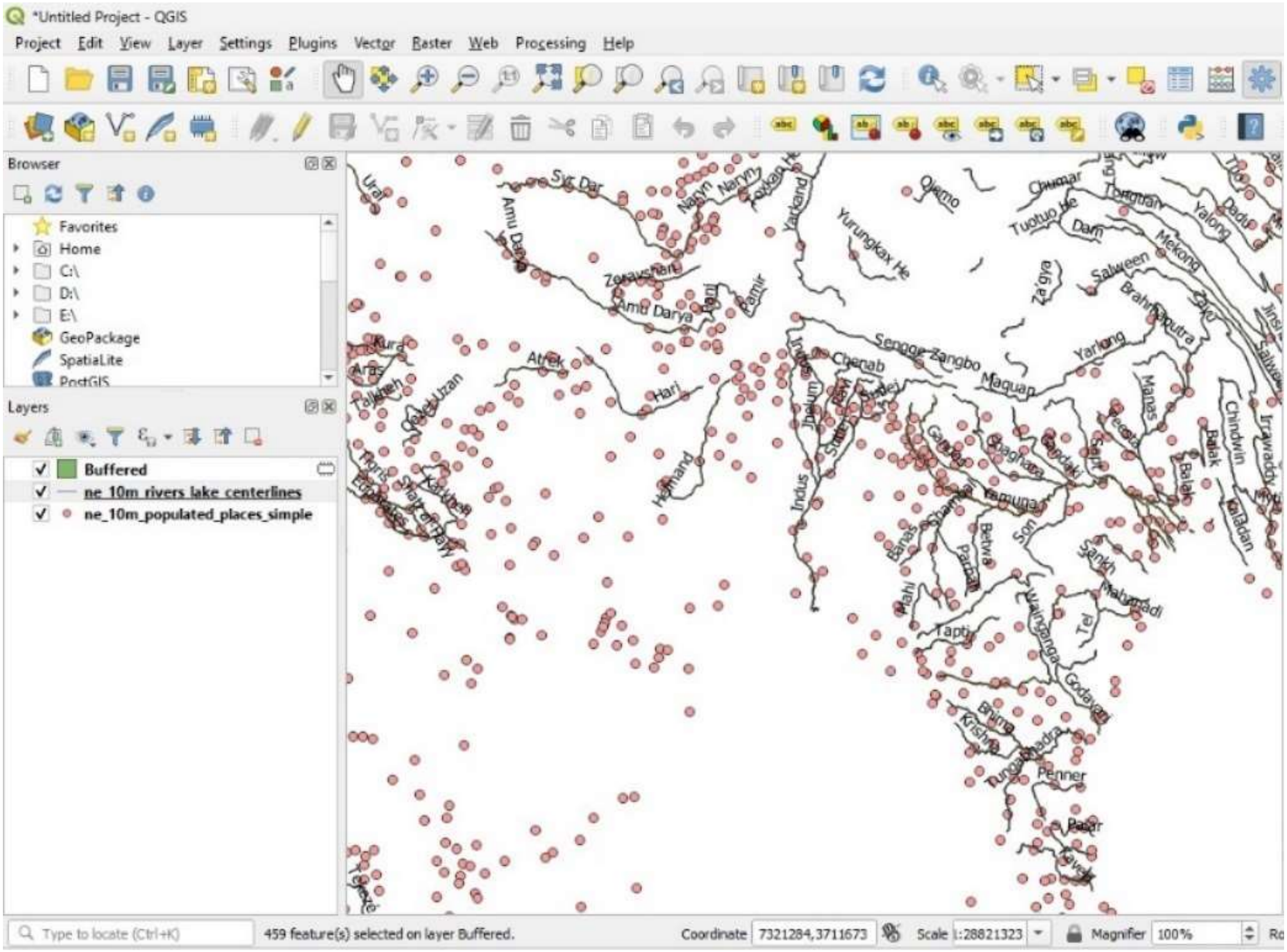


Labels (single labels)❼Labels with (name)❼Apply



❼OK (we have highlighted those rivers which area near to the populated areas in 2 kms)

OUTPUT:-



Practical no:- 8

Aim: Advanced GIS Operations 1: Nearest Neighbor Analysis, Sampling Raster.

Data using Points or Polygons, Interpolating Point Data

A)Nearest Neighbor Analysis

GIS is very useful in analyzing spatial relationship between features one such analysis is finding out which features are closest to a given feature.

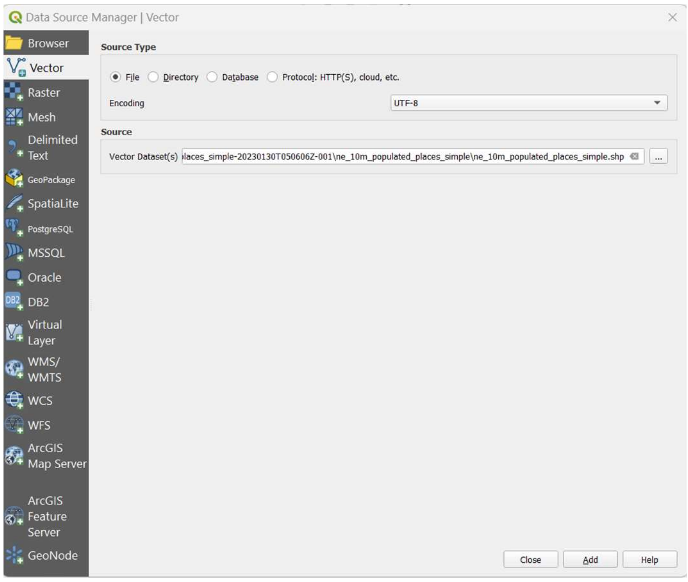
QGIS has a tool called Distance Matrix which helps with such analysis.

In this practical, our goal is to find out the nearest point from the populated places layer for each of the points in the earthquake layers.

We will explorer a tool 'Distance' to nearest hub from the processing toolbox that are not only not only to find the distance to the closest feature but join it with a line to it for visualizing the results.

Step I:

Layer →Add Layer →Add Vector layer(ne_10m_populated_places-simple.shp) →Add → Close



Step II:

Layer →Add Layer →Add Delimited text layer

File name: [earthquakes_2021_11_25_14_31_59_+0530.tsv]

Layer name: earthquakes _2021_11_25_14_31_59_+0530

Encoding: UTF-8

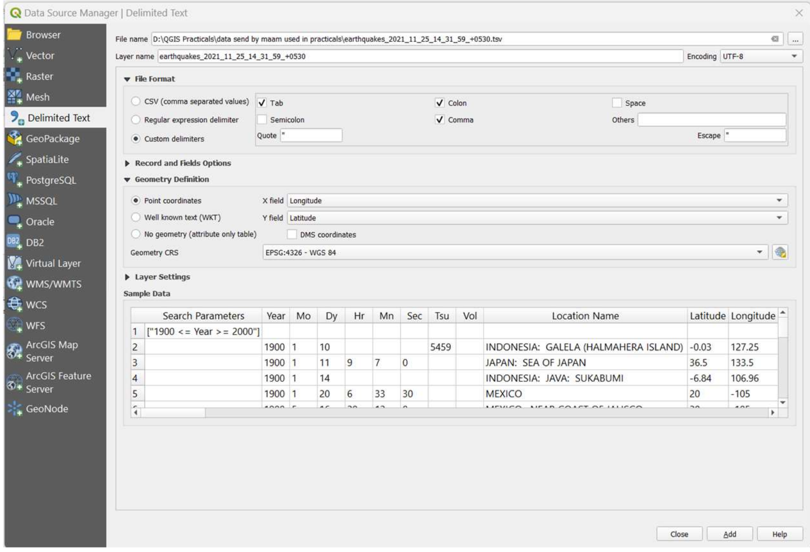
File format: Custom delimiters[checked] tab

Point co-ordinates x longitude

y latitude

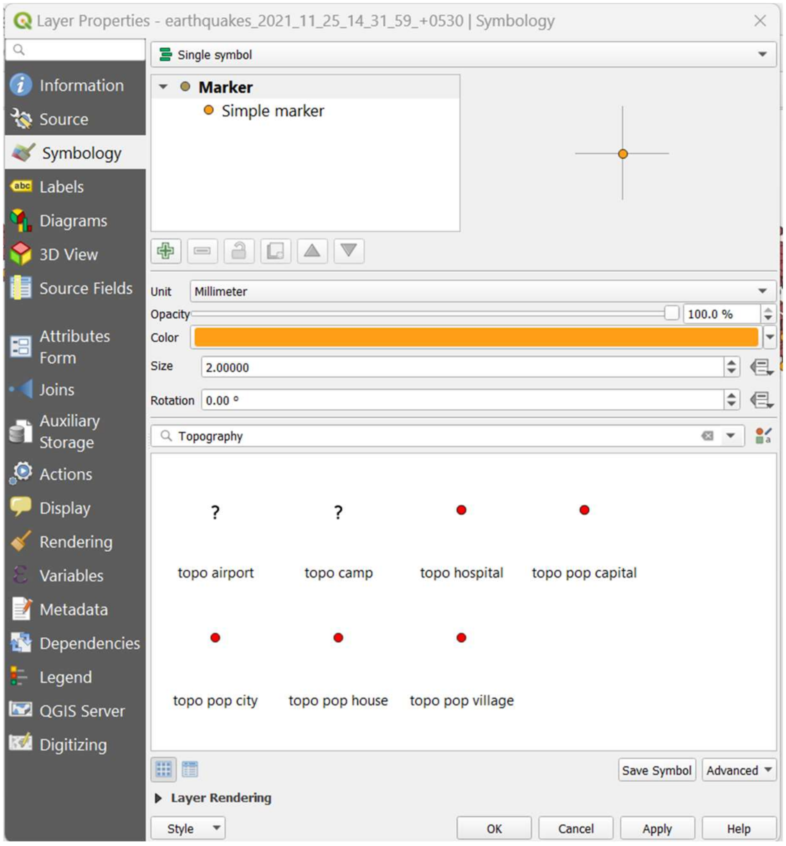
CRS: EPSG:4326-WGS-84

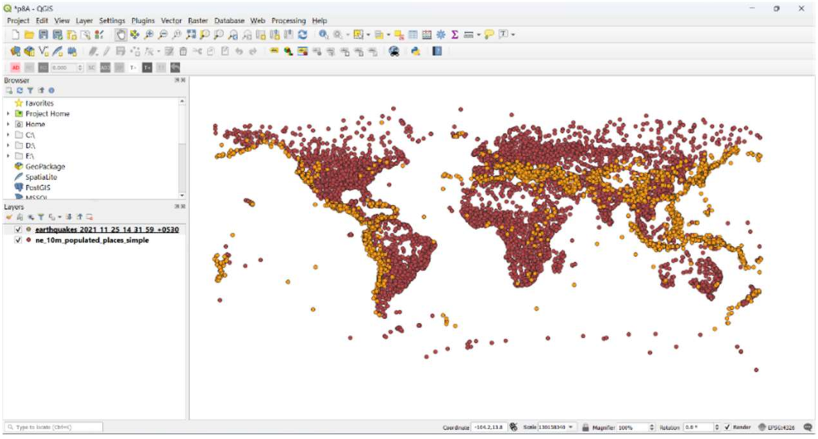
→Add → Close



Step III:

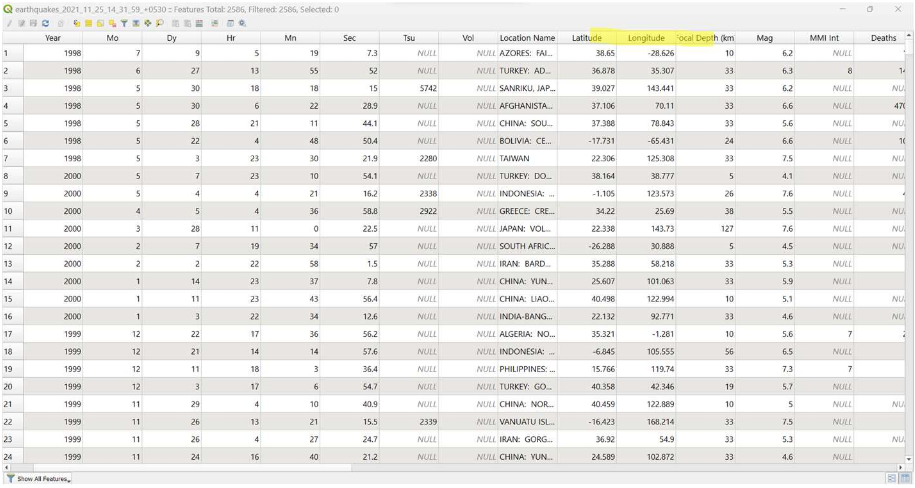
We can change the color using symbology





Step IV:

Right click on earthquakes_2021 → open attributes table(we can see multiple null values & longitude & latitude values are missing) we have to remove null values



earthquakes_2021_11_25_14_31_59_+0530 :: Features Total: 2586, Filtered: 2586, Selected: 0

	Year	Mo	Dy	Hr	Mn	Sec	Tsu	Vol	Location Name	Latitude	Longitude	Focal Depth (km	Mag	MMI Int	Deaths
1	1998	7	9	5	19	7.3	NULL	NULL	AZORES: FAI...	38.65	-28.626	10	6.2	NULL	
2	1998	6	27	13	55	52	NULL	NULL	TURKEY: AD...	36.878	35.307	33	6.3	8	1
3	1998	5	30	18	18	15	5742	NULL	SANRIKU, JAP...	39.027	143.441	33	6.2	NULL	NU
4	1998	5	30	6	22	28.9	NULL	NULL	AFGHANISTA...	37.106	70.11	33	6.6	NULL	47
5	1998	5	28	21	11	44.1	NULL	NULL	CHINA: SOU...	37.388	78.843	33	5.6	NULL	NU
6	1998	5	22	4	48	50.4	NULL	NULL	BOLIVIA: CE...	-17.731	-65.431	24	6.6	NULL	1
7	1998	5	3	23	30	21.9	2280	NULL	TAIWAN	22.306	125.308	33	7.5	NULL	NU
8	2000	5	7	23	10	54.1	NULL	NULL	TURKEY: DO...	38.164	38.777	5	4.1	NULL	NU
9	2000	5	4	4	21	16.2	2338	NULL	INDONESIA: ...	-1.105	123.573	26	7.6	NULL	
10	2000	4	5	4	36	58.8	2922	NULL	GREECE: CRE...	34.22	25.69	38	5.5	NULL	NU
11	2000	3	28	11	0	22.5	NULL	NULL	JAPAN: VOL...	22.338	143.73	127	7.6	NULL	NU
12	2000	2	7	19	34	57	NULL	NULL	SOUTH AFRIC...	-26.288	30.888	5	4.5	NULL	NU
13	2000	2	2	22	58	1.5	NULL	NULL	IRAN: BARD...	35.288	58.218	33	5.3	NULL	
14	2000	1	14	23	37	7.8	NULL	NULL	CHINA: YUN...	25.607	101.063	33	5.9	NULL	
15	2000	1	11	23	43	56.4	NULL	NULL	CHINA: LIAO...	40.498	122.994	10	5.1	NULL	NU
16	2000	1	3	22	34	12.6	NULL	NULL	INDIA-BANG...	22.132	92.771	33	4.6	NULL	NU
17	1999	12	22	17	36	56.2	NULL	NULL	ALGERIA: NO...	35.321	-1.281	10	5.6	7	
18	1999	12	21	14	14	57.6	NULL	NULL	INDONESIA: ...	-6.845	105.555	56	6.5	NULL	
19	1999	12	11	18	3	36.4	NULL	NULL	PHILIPPINES: ...	15.766	119.74	33	7.3	7	
20	1999	12	3	17	6	54.7	NULL	NULL	TURKEY: GO...	40.358	42.346	19	5.7	NULL	
21	1999	11	29	4	10	40.9	NULL	NULL	CHINA: NOR...	40.459	122.889	10	5	NULL	NU
22	1999	11	26	13	21	15.5	2339	NULL	VANUATU ISL...	-16.423	168.214	33	7.5	NULL	
23	1999	11	26	4	27	24.7	NULL	NULL	IRAN: GORG...	36.92	54.9	33	5.3	NULL	NU
24	1999	11	24	16	40	21.2	NULL	NULL	CHINA: YUN...	24.589	102.872	33	4.6	NULL	

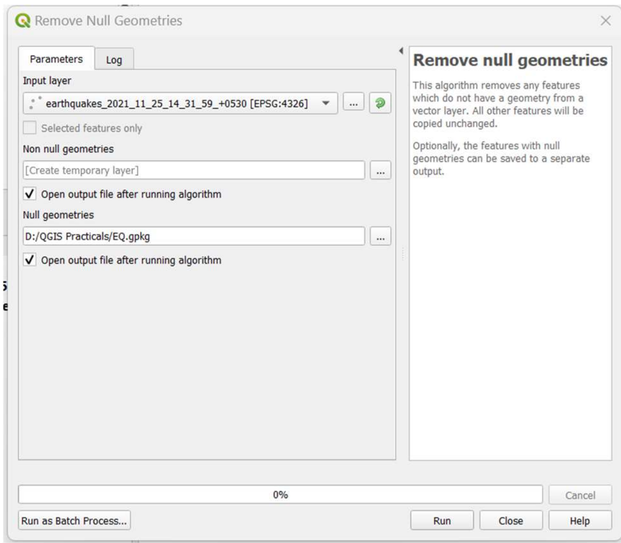
Show All Features

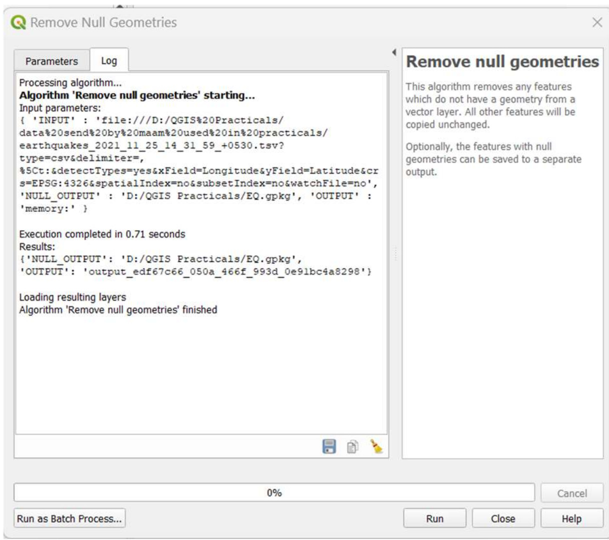
Step V:

Processing → Toolbox → Vector Geometry → Remove null geometrics input layer [earthquakes _2021_11_25_14_31_59_+0530]

Also remove empty geometrics

Open output file after running algorithm → Run → Close.



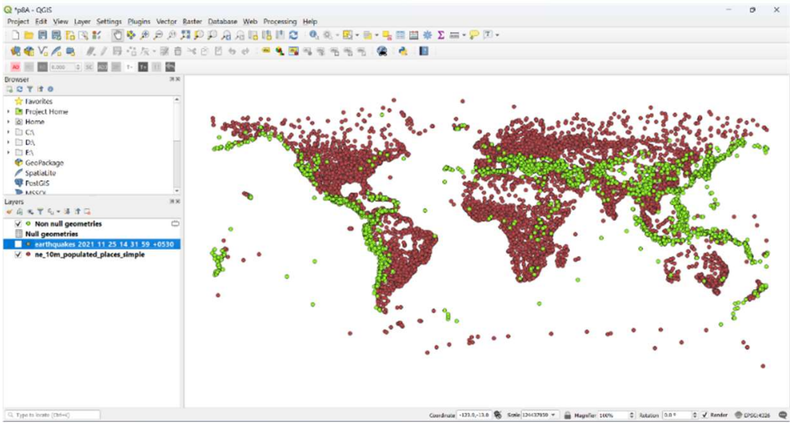


Step VI:

Disselect earthquake _2021_11_25_14_31_59_+0530 from layer panel.

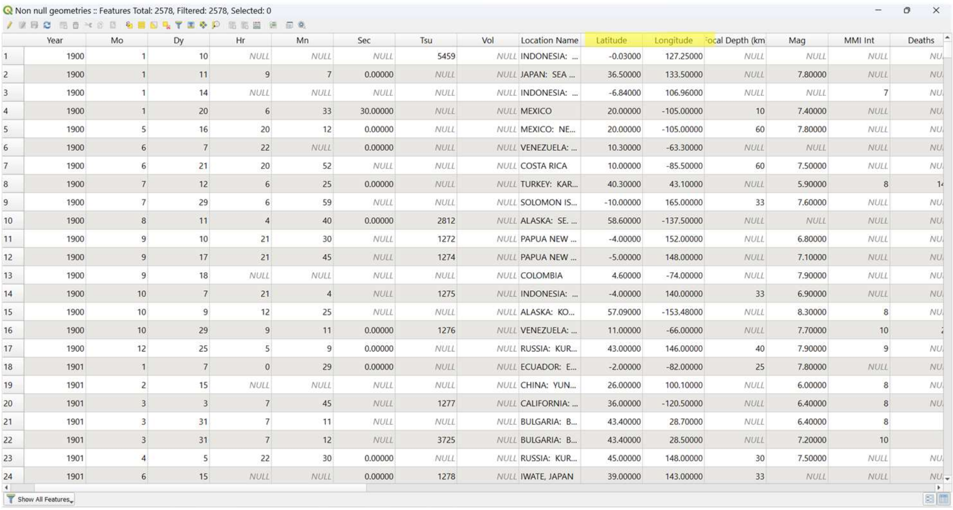
Step VII:

Right click on not null geometrics → properties → symbology -> color: [Green]



Step VIII:

Right click on not null geometrics →open attribute table(check for latitude & longitude columns are filled with values)



Non null geometries :: Features Total: 2578, Filtered: 2578, Selected: 0

	Year	Mo	Dy	Hr	Mn	Sec	Tsu	Vol	Location Name	Latitude	Longitude	ocal Depth (km	Mag	MMI Int	Deaths
1	1900	1	10	NULL	NULL	NULL	5459	NULL	INDONESIA: ...	-0.03000	127.25000	NULL	NULL	NULL	NU
2	1900	1	11	9	7	0.00000	NULL	NULL	JAPAN: SEA ...	36.50000	133.50000	NULL	7.80000	NULL	NU
3	1900	1	14	NULL	NULL	NULL	NULL	NULL	INDONESIA: ...	-6.84000	106.96000	NULL	NULL	7	NU
4	1900	1	20	6	33	30.00000	NULL	NULL	MEXICO	20.00000	-105.00000	10	7.40000	NULL	NU
5	1900	5	16	20	12	0.00000	NULL	NULL	MEXICO: NE...	20.00000	-105.00000	60	7.80000	NULL	NU
6	1900	6	7	22	NULL	0.00000	NULL	NULL	VENEZUELA: ...	10.30000	-63.30000	NULL	NULL	NULL	NU
7	1900	6	21	20	52	NULL	NULL	NULL	COSTA RICA	10.00000	-85.50000	60	7.50000	NULL	NU
8	1900	7	12	6	25	0.00000	NULL	NULL	TURKEY: KAR...	40.30000	43.10000	NULL	5.90000	8	14
9	1900	7	29	6	59	NULL	NULL	NULL	SOLOMON IS...	-10.00000	165.00000	33	7.60000	NULL	NU
10	1900	8	11	4	40	0.00000	2812	NULL	ALASKA: SE. ...	58.60000	-137.50000	NULL	NULL	NULL	NU
11	1900	9	10	21	30	NULL	1272	NULL	PAPUA NEW ...	-4.00000	152.00000	NULL	6.80000	NULL	NU
12	1900	9	17	21	45	NULL	1274	NULL	PAPUA NEW ...	-5.00000	148.00000	NULL	7.10000	NULL	NU
13	1900	9	18	NULL	NULL	NULL	NULL	NULL	COLOMBIA	4.60000	-74.00000	NULL	7.90000	NULL	NU
14	1900	10	7	21	4	NULL	1275	NULL	INDONESIA: ...	-4.00000	140.00000	33	6.90000	NULL	NU
15	1900	10	9	12	25	NULL	NULL	NULL	ALASKA: KO...	57.09000	-153.48000	NULL	8.30000	8	NU
16	1900	10	29	9	11	0.00000	1276	NULL	VENEZUELA: ...	11.00000	-66.00000	NULL	7.70000	10	2
17	1900	12	25	5	9	0.00000	NULL	NULL	RUSSIA: KUR...	43.00000	146.00000	40	7.90000	9	NU
18	1901	1	7	0	29	0.00000	NULL	NULL	ECUADOR: E...	-2.00000	-82.00000	25	7.80000	NULL	NU
19	1901	2	15	NULL	NULL	NULL	NULL	NULL	CHINA: YUN...	26.00000	100.10000	NULL	6.00000	8	NU
20	1901	3	3	7	45	NULL	1277	NULL	CALIFORNIA: ...	36.00000	-120.50000	NULL	6.40000	8	NU
21	1901	3	31	7	11	NULL	NULL	NULL	BULGARIA: B...	43.40000	28.70000	NULL	6.40000	8	
22	1901	3	31	7	12	NULL	3725	NULL	BULGARIA: B...	43.40000	28.50000	NULL	7.20000	10	
23	1901	4	5	22	30	0.00000	NULL	NULL	RUSSIA: KUR...	45.00000	148.00000	30	7.50000	NULL	NU
24	1901	6	15	NULL	NULL	0.00000	1278	NULL	IWATE, JAPAN	39.00000	143.00000	33	NULL	NULL	NU

Show All Features

Step IX:

Processing → toolbox → vector Analysis → Distance to nearest hub(line to hub)

Source points layer:- [not null geometries EPSG:4326]

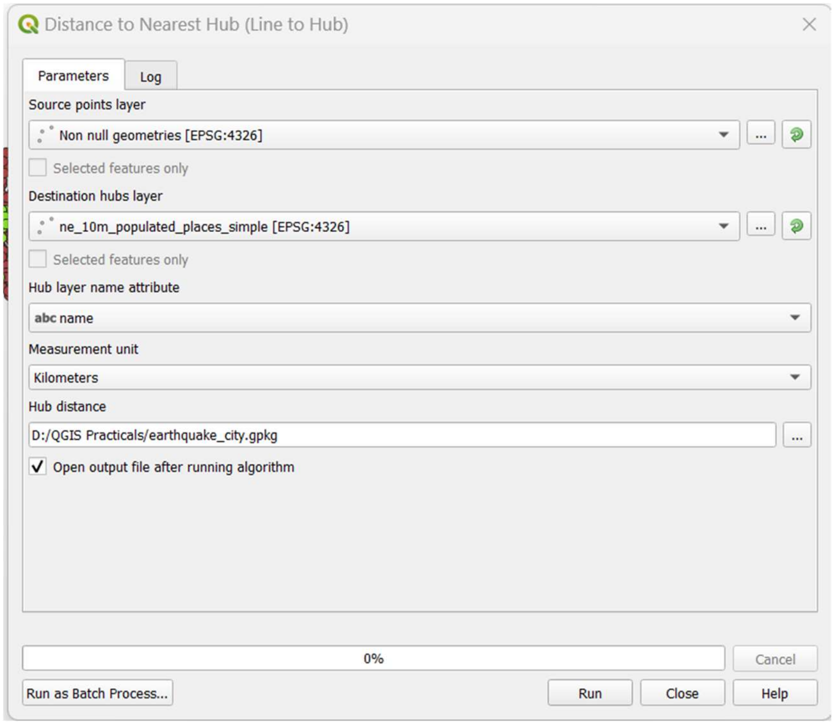
Destination -- layer:- ne_10m_population_place_simple [EPSG:4326]

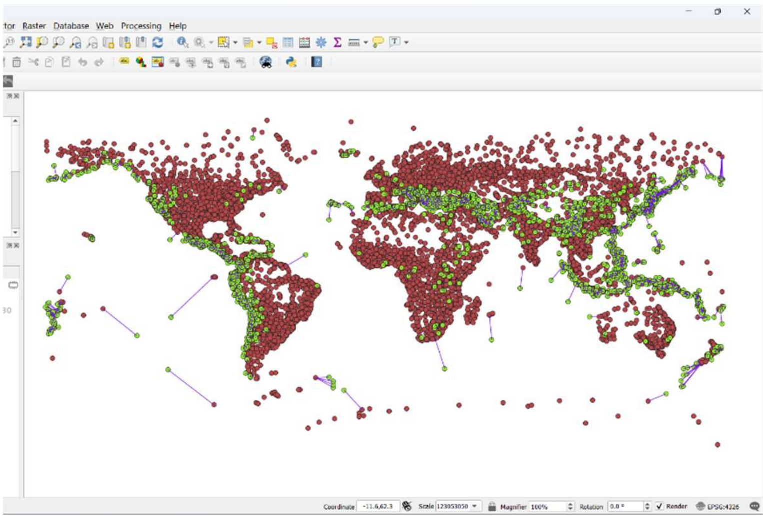
Hub layer name attribute:- [abc name]

Measurement unit: [kilometer]

Hub distance[Save to file] → earthquake_city.gpkg

Open output file after running → Run → close

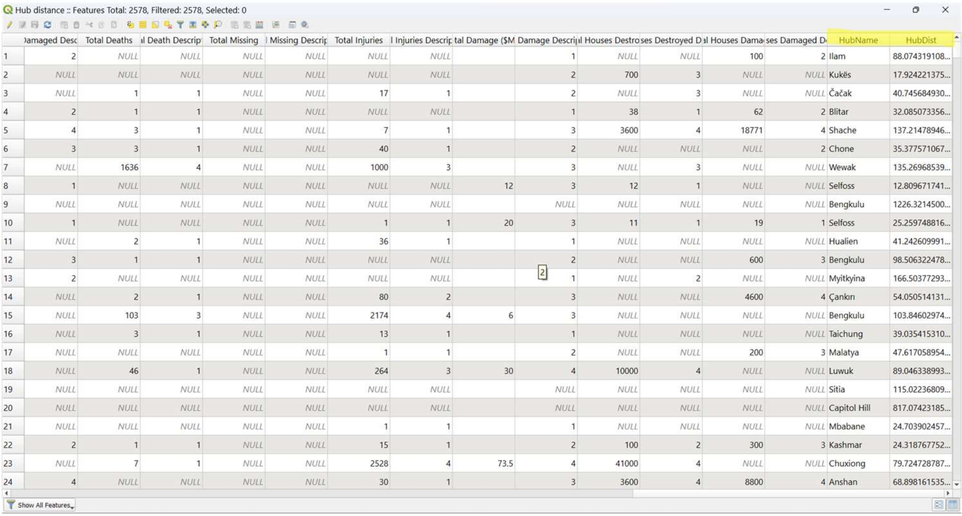




(red dots → populated place, green dots → earthquake , lines → connection between earthquake & populated place & populated place)

Step X:

Right click on Hub distance →open attribute table (Check for Hub_name, HubDist, columns we have added with these two extra columns.

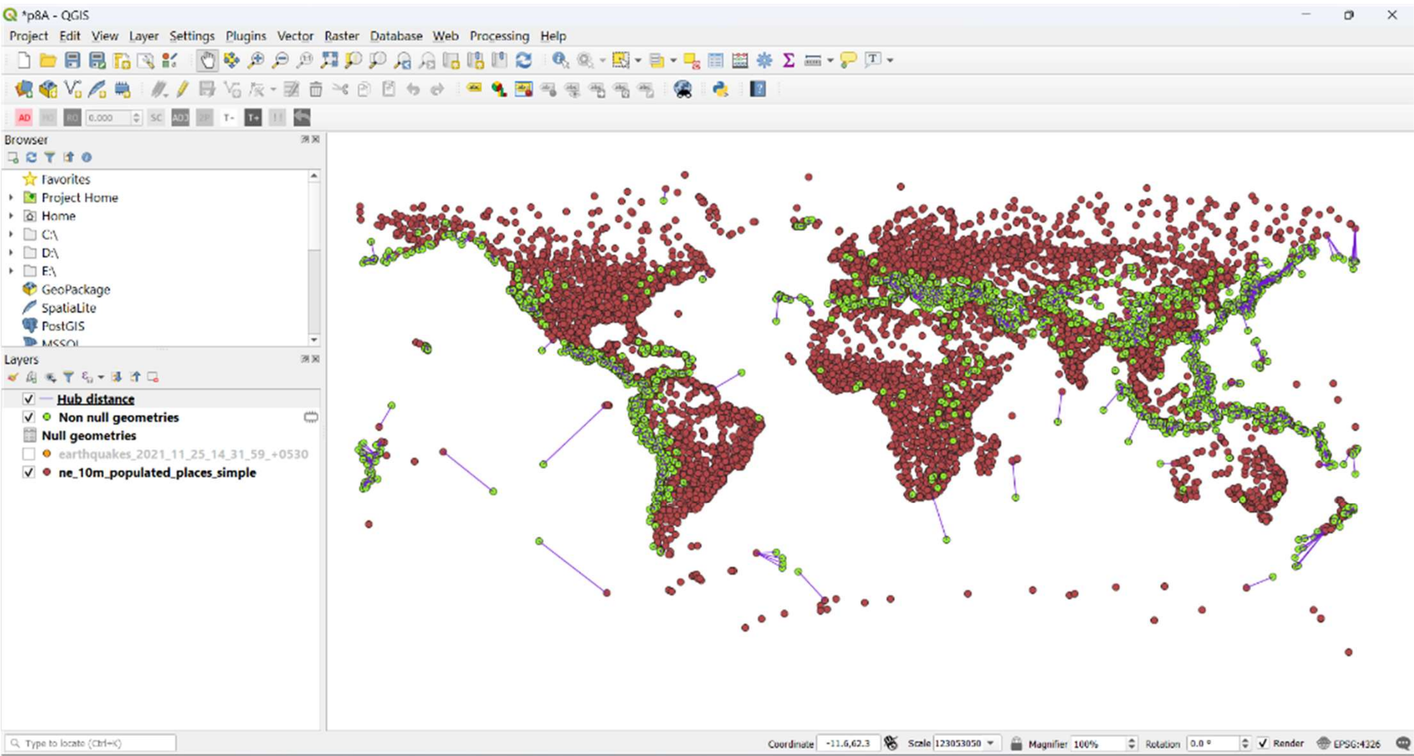


Hub distance :: Features Total: 2578, Filtered: 2578, Selected: 0

	)amaged Desc	Total Deaths	l Death Descrip	Total Missing	l Missing Descrip	Total Injuries	l Injuries Descrip	tal Damage ($M	Damage Descrip	l Houses Destro	ses Destroyed D	l Houses Dama	ses Damaged D	HubName	HubDist
1	2	NULL	NULL	NULL	NULL	NULL	NULL		1	NULL	NULL	100	2	Ilam	88.074319108...
2	NULL	NULL	NULL	NULL	NULL	NULL	NULL		2	700	3	NULL	NULL	Kukës	17.924221375...
3	NULL	1	1	NULL	NULL	17	1		2	NULL	3	NULL	NULL	Čačak	40.745684930...
4	2	1	1	NULL	NULL	NULL	NULL		1	38	1	62	2	Blitar	32.085073356...
5	4	3	1	NULL	NULL	7	1		3	3600	4	18771	4	Shache	137.21478946...
6	3	3	1	NULL	NULL	40	1		2	NULL	NULL	NULL	2	Chone	35.377571067...
7	NULL	1636	4	NULL	NULL	1000	3		3	NULL	3	NULL	NULL	Wewak	135.26968539...
8	1	NULL	NULL	NULL	NULL	NULL	NULL	12	3	12	1	NULL	NULL	Selfoss	12.809671741...
9	NULL	NULL	NULL	NULL	NULL	NULL	NULL		NULL	NULL	NULL	NULL	NULL	Bengkulu	1226.3214500...
10	1	NULL	NULL	NULL	NULL	1	1	20	3	11	1	19	1	Selfoss	25.259748816...
11	NULL	2	1	NULL	NULL	36	1		1	NULL	NULL	NULL	NULL	Hualien	41.242609991...
12	3	1	1	NULL	NULL	NULL	NULL		2	NULL	NULL	600	3	Bengkulu	98.506322478...
13	2	NULL	NULL	NULL	NULL	NULL	NULL		1	NULL	2	NULL	NULL	Myitkyina	166.50377293...
14	NULL	2	1	NULL	NULL	80	2		3	NULL	NULL	4600	4	Çankırı	54.050514131...
15	NULL	103	3	NULL	NULL	2174	4	6	3	NULL	NULL	NULL	NULL	Bengkulu	103.84602974...
16	NULL	3	1	NULL	NULL	13	1		1	NULL	NULL	NULL	NULL	Taichung	39.035415310...
17	NULL	NULL	NULL	NULL	NULL	1	1		2	NULL	NULL	200	3	Malatya	47.617058954...
18	NULL	46	1	NULL	NULL	264	3	30	4	10000	4	NULL	NULL	Luwuk	89.046338993...
19	NULL	NULL	NULL	NULL	NULL	NULL	NULL		NULL	NULL	NULL	NULL	NULL	Sitia	115.02236809...
20	NULL	NULL	NULL	NULL	NULL	NULL	NULL		NULL	NULL	NULL	NULL	NULL	Capitol Hill	817.07423185...
21	NULL	NULL	NULL	NULL	NULL	1	1		1	NULL	NULL	NULL	NULL	Mbabane	24.703902457...
22	2	1	1	NULL	NULL	15	1		2	100	2	300	3	Kashmar	24.318767752...
23	NULL	7	1	NULL	NULL	2528	4	73.5	4	41000	4	NULL	NULL	Chuxiong	79.724728787...
24	4	NULL	NULL	NULL	NULL	30	1		3	3600	4	8800	4	Anshan	68.898161535...

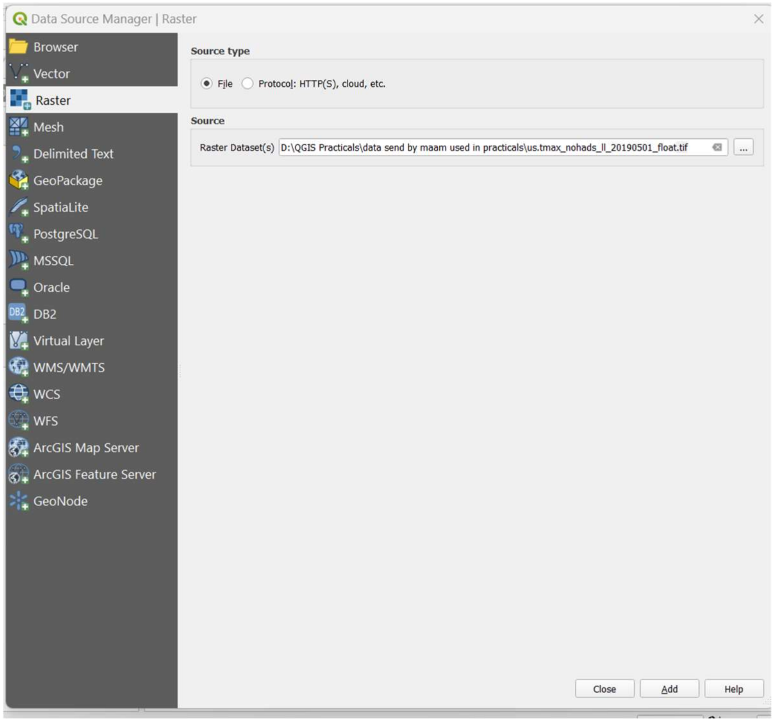
Show All Features

Output:-

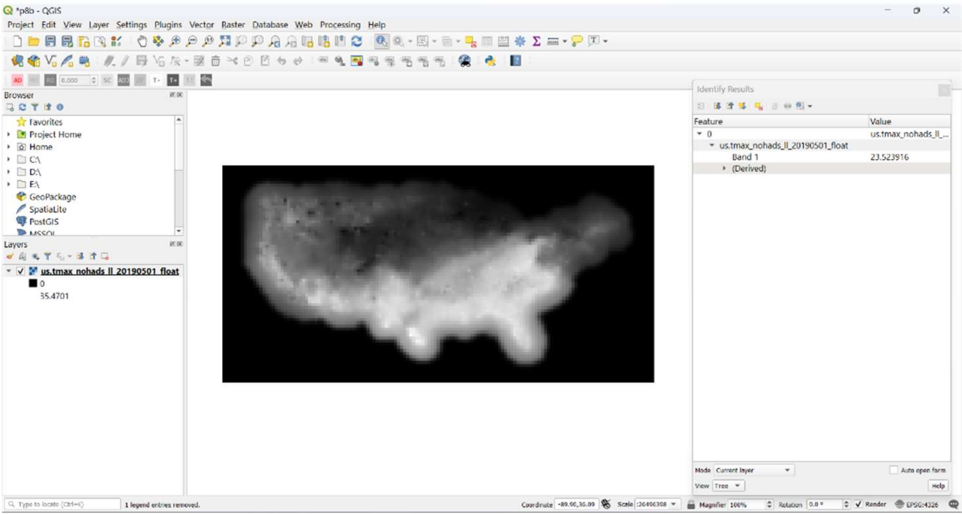


(B):- Sampling Raster Data using Points & Polygon.

Step I: Layer → Add Layer - Add Raster layer →us.tmax_nohads-II-20140525-float.tif



Step II: Click on [i] from the menu bar ,check coordinates. It keeps changing while moving the cursor



Step III: Layer - Add Layer - Add Delimited text Layer

Layer name /2018-Gaz_ua_national)

Encoding [-UTF-8

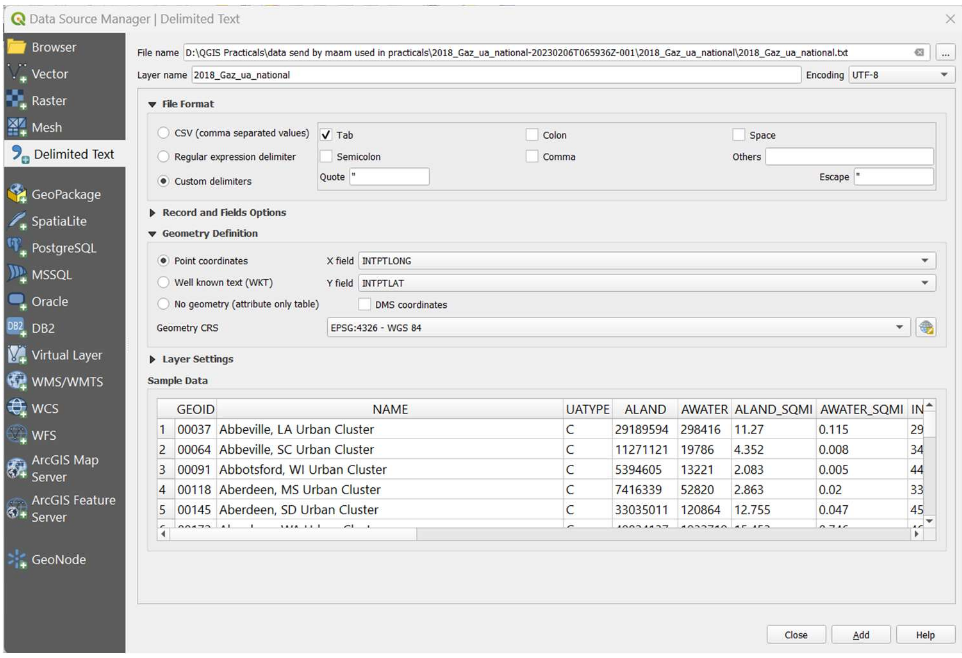
Custom delimiters [v] Tab

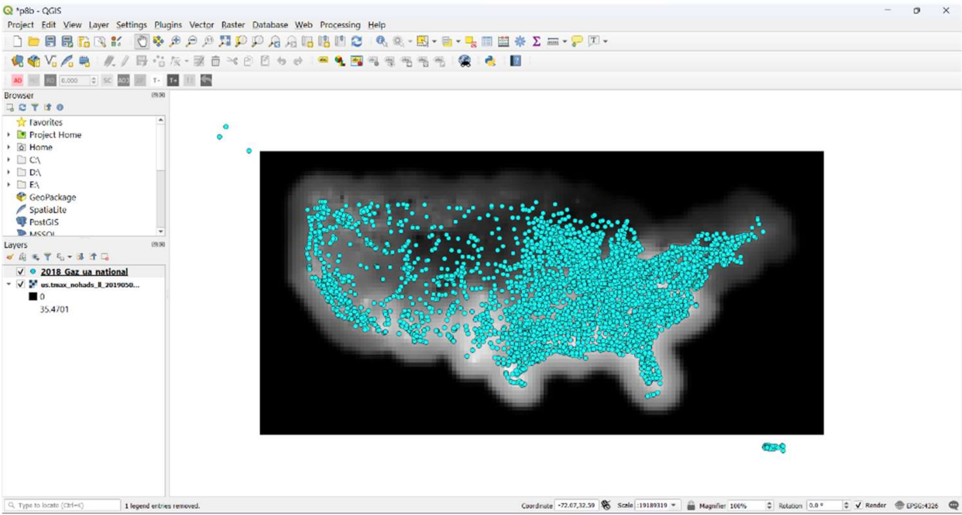
Point coordinates x field Longitude

y field Latitude

CRS :-EPSG 4326 WGS 84

Add -> Close



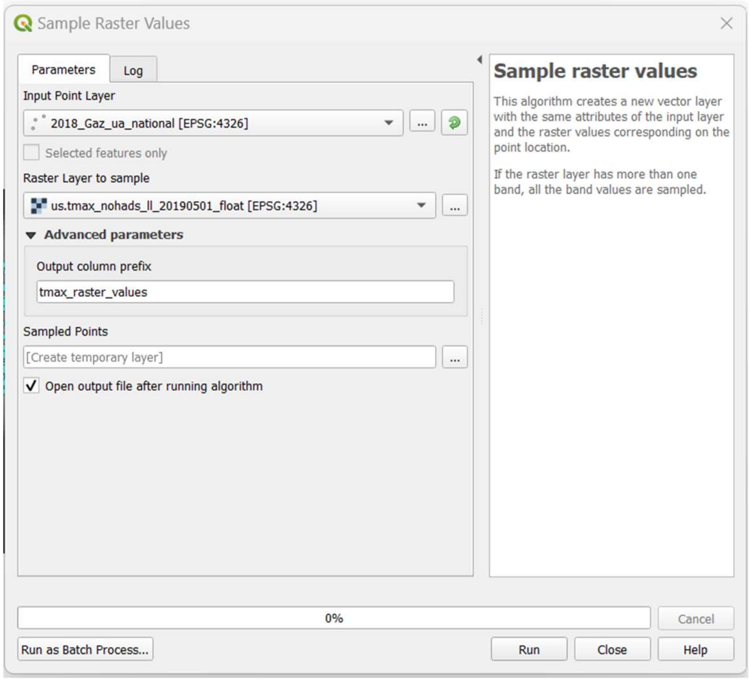


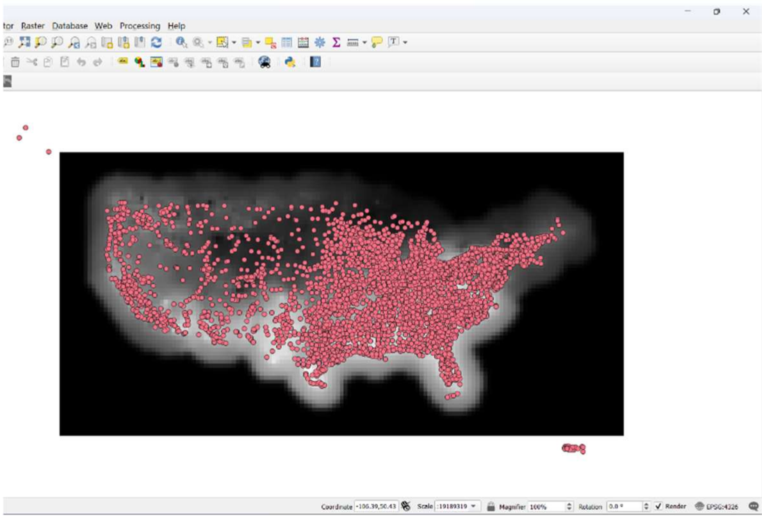
Step IV: Processing→ tool box → Raster Analyse -> Sample raster values.

Input layer [2018 Gaz-ua-national [EPSG:4326]

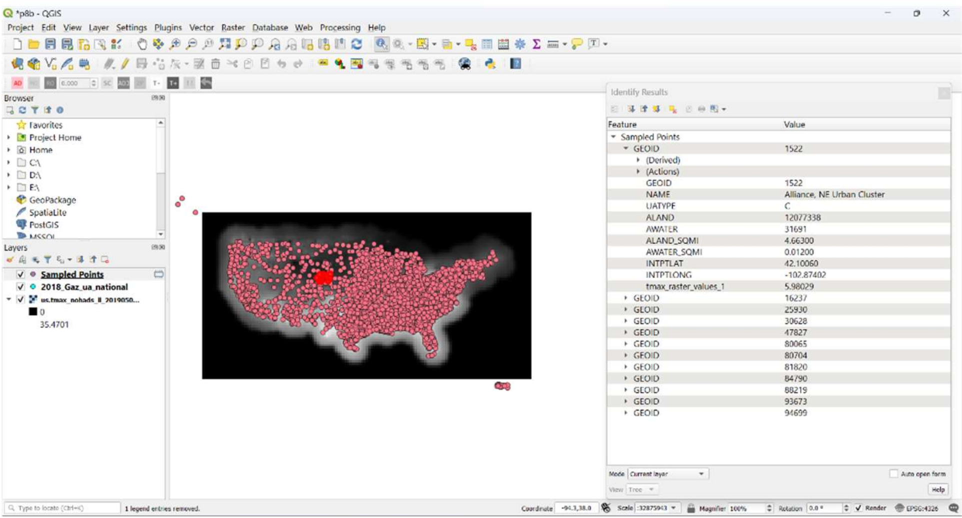
Raster layer [us-tmax-nohads-II-20140525-float [EPSG:4326]

Output column prefix tmax_, tik the option - output file after running algorithm. Run->Close

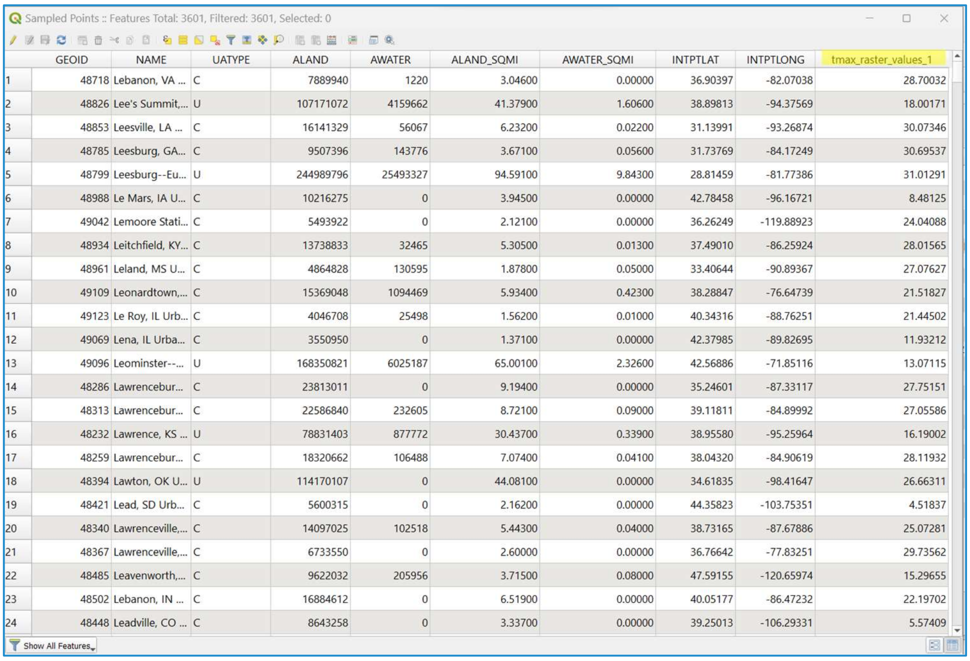




Step V: select [i] from menubar -> click on the window (we can see tmax values right side of identify result)



Step VI: Right-click on Sampled points -> Open attribute table (We can see tmax column which we added)

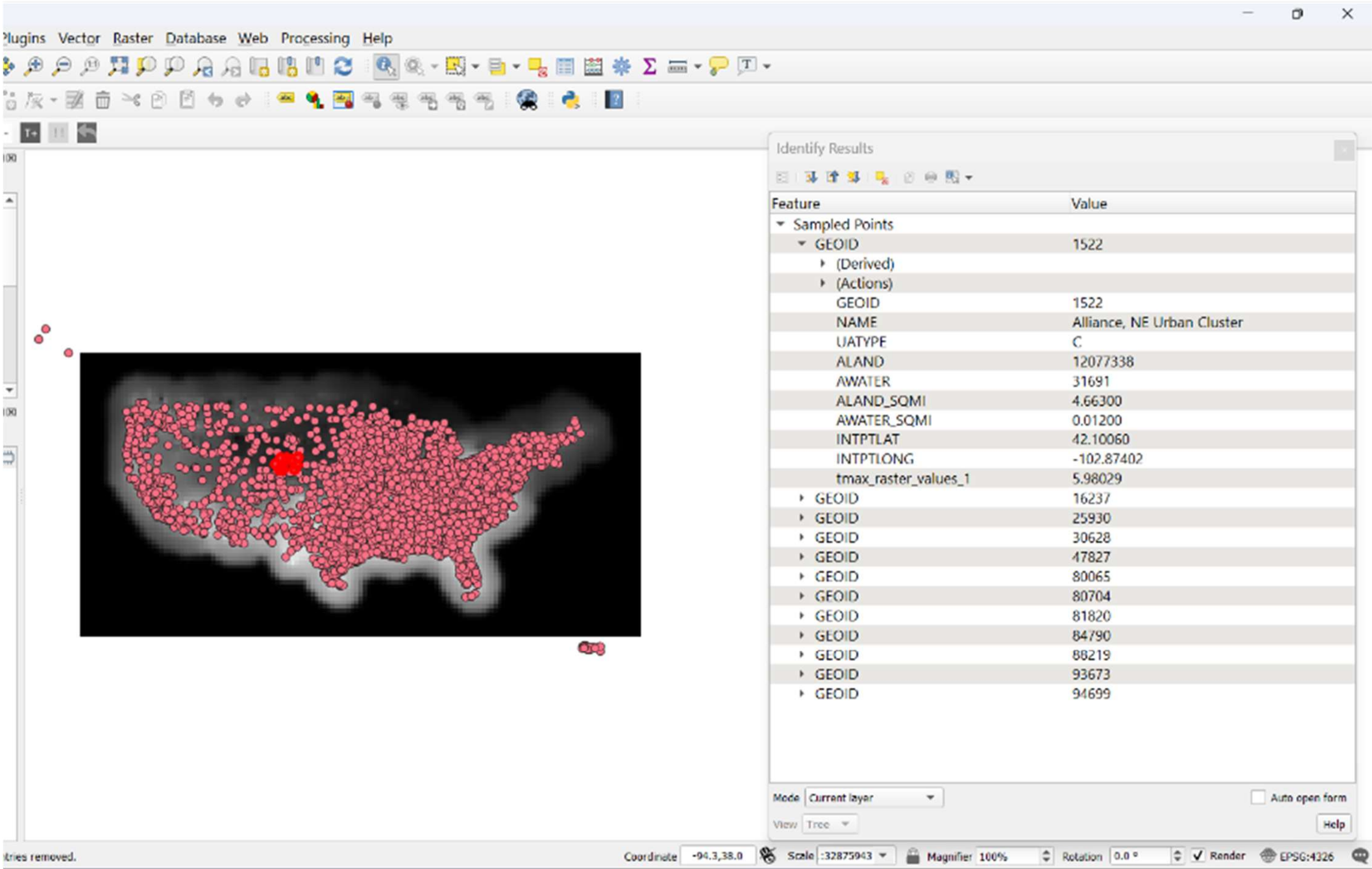


Sampled Points :: Features Total: 3601, Filtered: 3601, Selected: 0

	GEOID	NAME	UATYPE	ALAND	AWATER	ALAND_SQMI	AWATER_SQMI	INTPTLAT	INTPTLONG	tmax_raster_values_1
1	48718	Lebanon, VA ...	C	7889940	1220	3.04600	0.00000	36.90397	-82.07038	28.70032
2	48826	Lee's Summit,...	U	107171072	4159662	41.37900	1.60600	38.89813	-94.37569	18.00171
3	48853	Leesville, LA ...	C	16141329	56067	6.23200	0.02200	31.13991	-93.26874	30.07346
4	48785	Leesburg, GA...	C	9507396	143776	3.67100	0.05600	31.73769	-84.17249	30.69537
5	48799	Leesburg--Eu...	U	244989796	25493327	94.59100	9.84300	28.81459	-81.77386	31.01291
6	48988	Le Mars, IA U...	C	10216275	0	3.94500	0.00000	42.78458	-96.16721	8.48125
7	49042	Lemoore Stati...	C	5493922	0	2.12100	0.00000	36.26249	-119.88923	24.04088
8	48934	Leitchfield, KY...	C	13738833	32465	5.30500	0.01300	37.49010	-86.25924	28.01565
9	48961	Leland, MS U...	C	4864828	130595	1.87800	0.05000	33.40644	-90.89367	27.07627
10	49109	Leonardtown,...	C	15369048	1094469	5.93400	0.42300	38.28847	-76.64739	21.51827
11	49123	Le Roy, IL Urb...	C	4046708	25498	1.56200	0.01000	40.34316	-88.76251	21.44502
12	49069	Lena, IL Urba...	C	3550950	0	1.37100	0.00000	42.37985	-89.82695	11.93212
13	49096	Leominster--...	U	168350821	6025187	65.00100	2.32600	42.56886	-71.85116	13.07115
14	48286	Lawrencebur...	C	23813011	0	9.19400	0.00000	35.24601	-87.33117	27.75151
15	48313	Lawrencebur...	C	22586840	232605	8.72100	0.09000	39.11811	-84.89992	27.05586
16	48232	Lawrence, KS ...	U	78831403	877772	30.43700	0.33900	38.95580	-95.25964	16.19002
17	48259	Lawrencebur...	C	18320662	106488	7.07400	0.04100	38.04320	-84.90619	28.11932
18	48394	Lawton, OK U...	U	114170107	0	44.08100	0.00000	34.61835	-98.41647	26.66311
19	48421	Lead, SD Urb...	C	5600315	0	2.16200	0.00000	44.35823	-103.75351	4.51837
20	48340	Lawrenceville,...	C	14097025	102518	5.44300	0.04000	38.73165	-87.67886	25.07281
21	48367	Lawrenceville,...	C	6733550	0	2.60000	0.00000	36.76642	-77.83251	29.73562
22	48485	Leavenworth,...	C	9622032	205956	3.71500	0.08000	47.59155	-120.65974	15.29655
23	48502	Lebanon, IN ...	C	16884612	0	6.51900	0.00000	40.05177	-86.47232	22.19702
24	48448	Leadville, CO ...	C	8643258	0	3.33700	0.00000	39.25013	-106.29331	5.57409

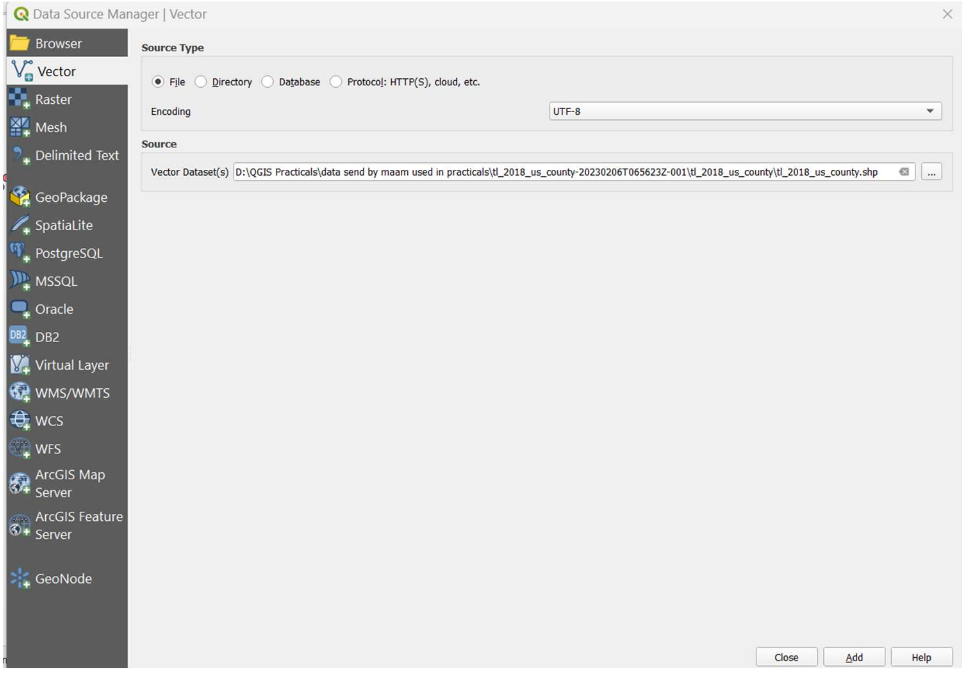
Show All Features

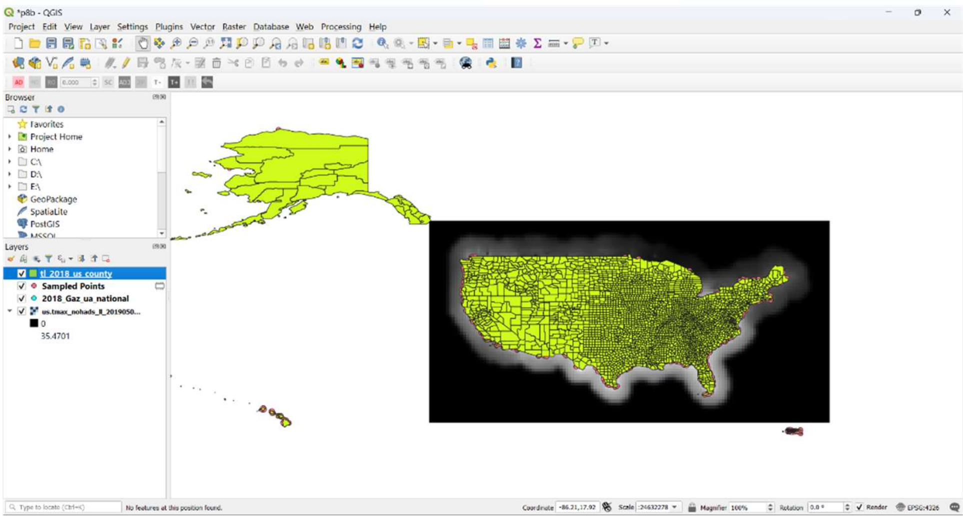
Output:-



Part 2:- Remove Sample & 2013_Gz layer from layer panel so that we can do the second part.

Step I: Layer -> Add layer -> Add vector layer ->tl_2018_us_country. shp -> Add-> ok-> Close





Processing -> toolbox -> Raster analysis ->zonal statistics->

Input layer: - [tl-2018-us-county]

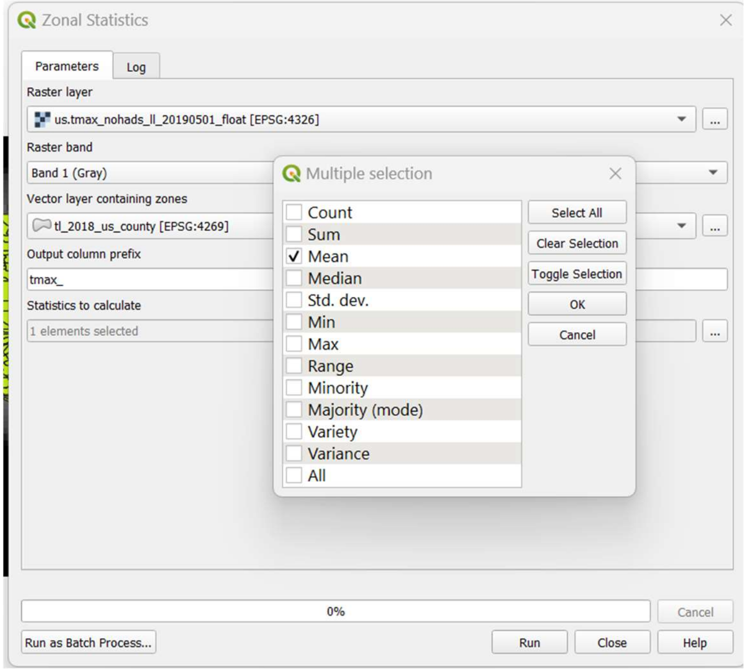
Raster Layer: - us_tmax-hohads_11_20__ [EPSG:4326]

Raster band: -Band 1 (Gray)

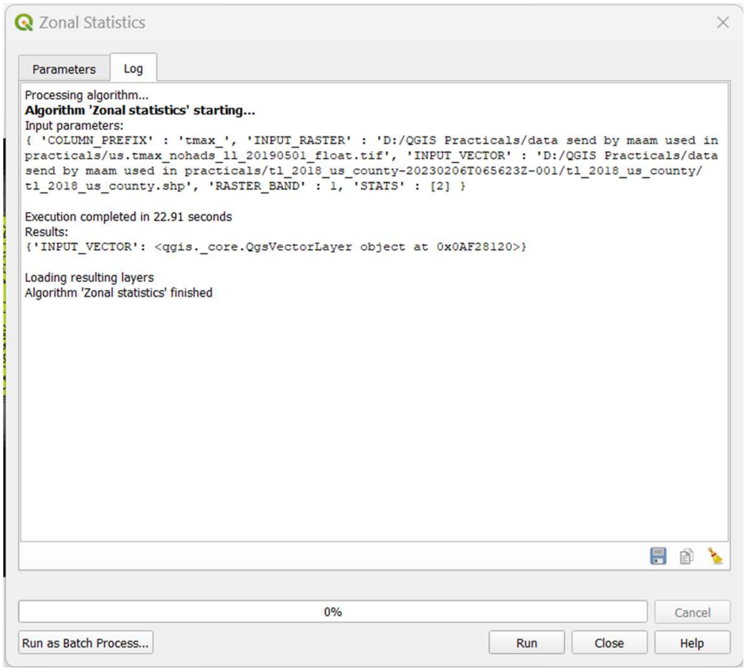
Output column prefix :- tmax_

Statistics to calculate […] click on it

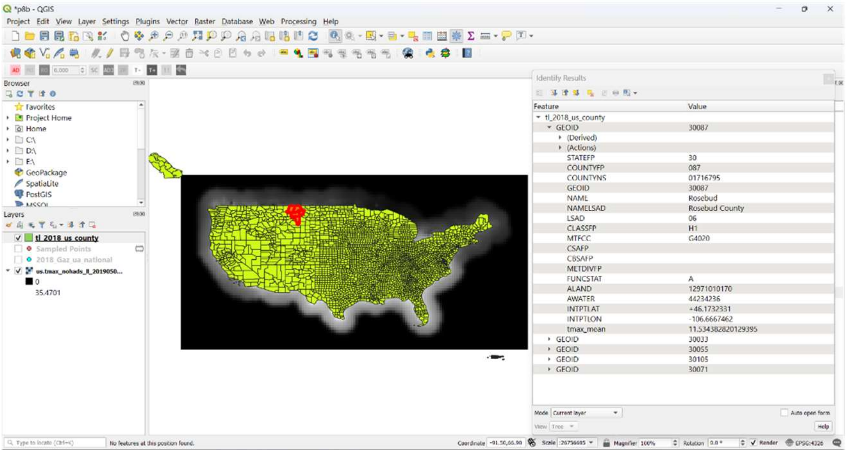
Select only mean -> ok

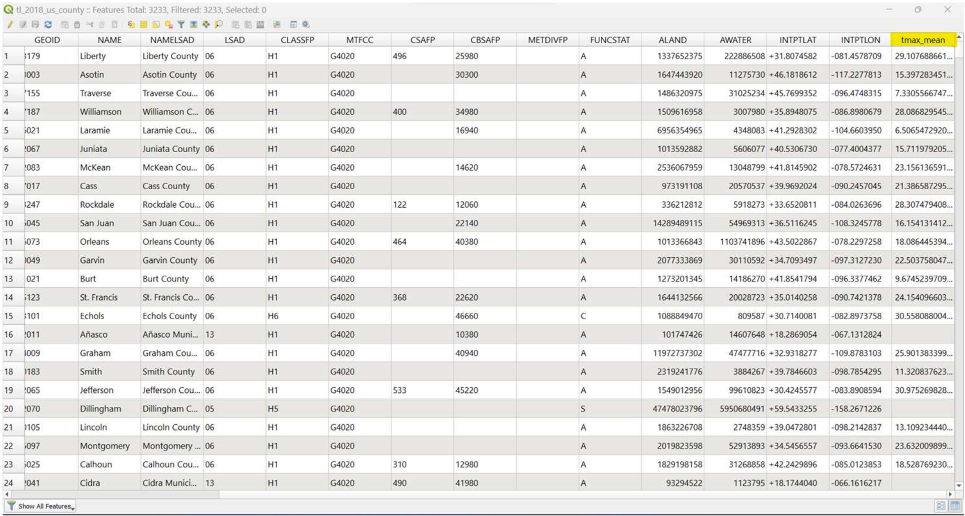


Open output file after running algorithm → run → close.

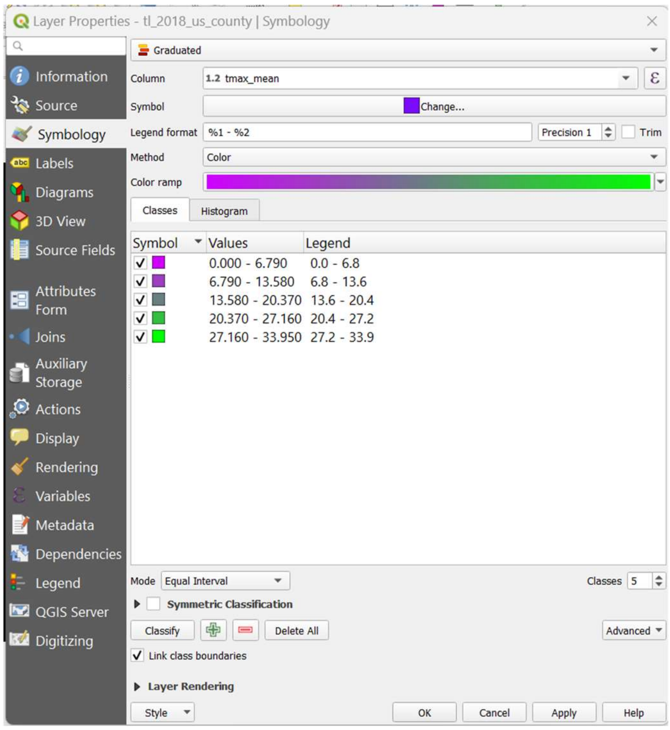


Step II: Select [i] from the menu bar click on the window & check. Open **attribute table & check Column** tmax in**.**

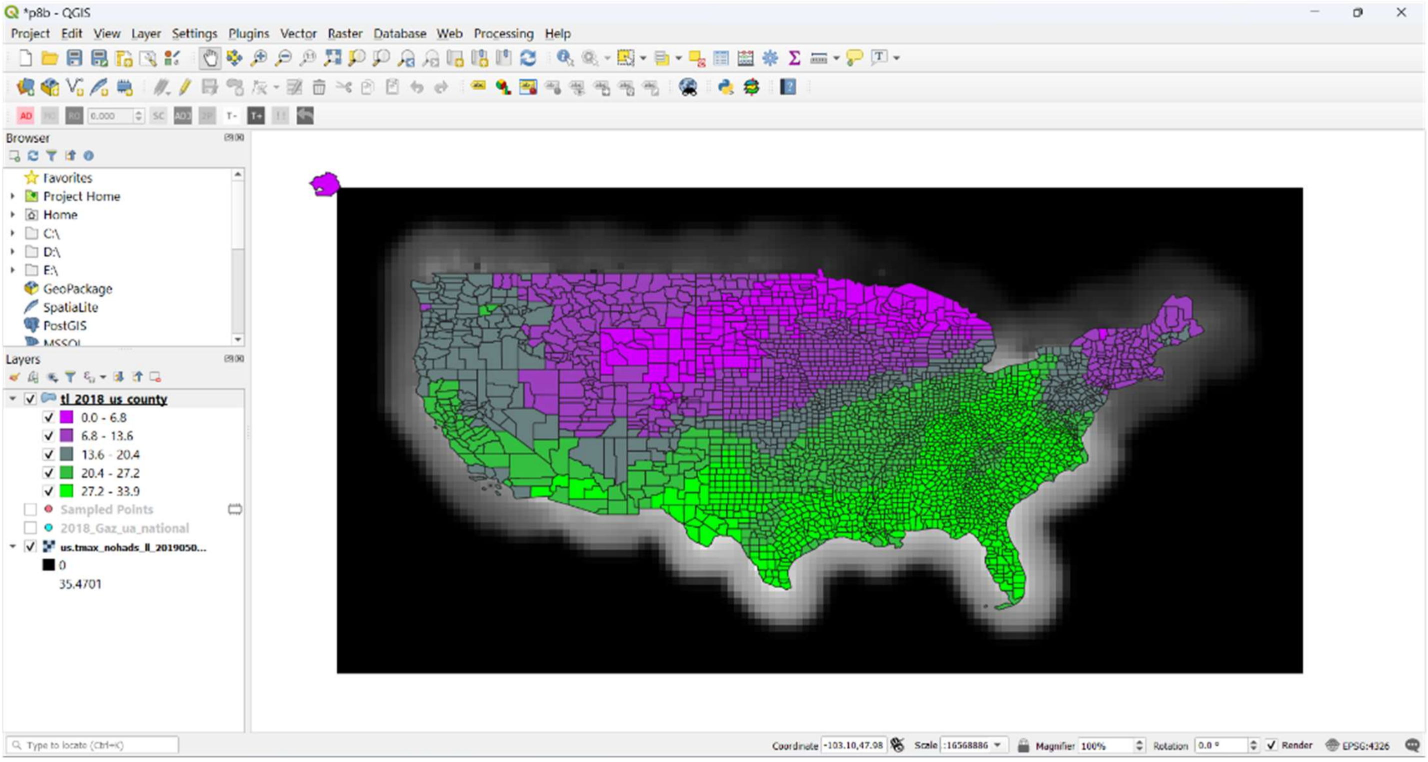




Step III: Right-click on Zonal Statistics → properties → Symbology →graduated. Values: tmax-mean, Symbol: purple. Classify → Apply → ok



Output:-


*p8b - QGIS
Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help
Browser
Favorites
Project Home
Home
C:\
D:\
E:\
GeoPackage
SpatiaLite
PostGIS
Layers
tl 2018 us county
0.0 - 6.8
6.8 - 13.6
13.6 - 20.4
20.4 - 27.2
27.2 - 33.9
Sampled Points
2018_Gaz_ua_national
us.tmax_nohads_ll_2019050...
0
35.4701
Type to locate (Ctrl+K)
Coordinate -103.10,47.98
Scale 1:16568886
Magnifier 100%
Rotation 0.0 °
Render
EPSG:4326

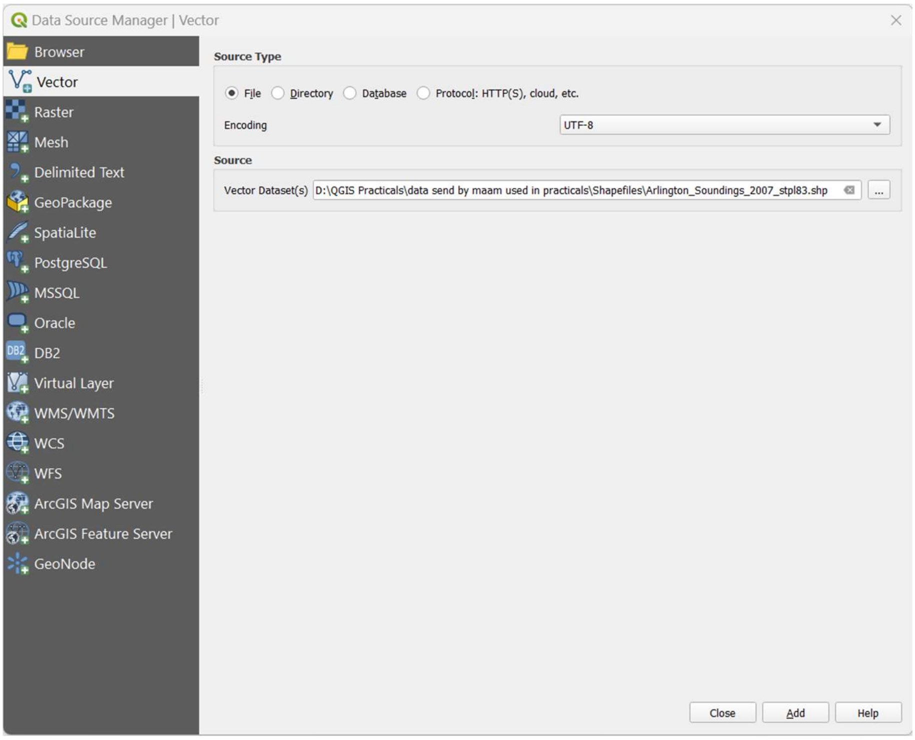
(C) Interpolating Point Data

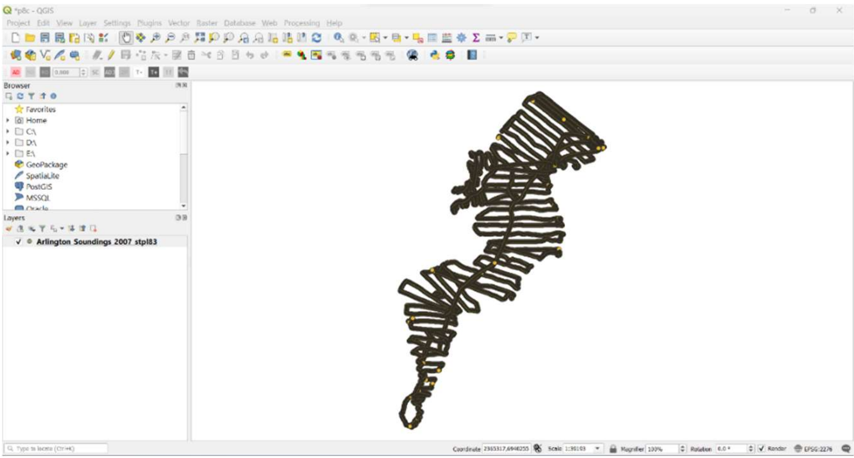
Interpolation is a commonly used GIS technique to create a continuous. surface from discrete points. In QGIS, Interpolation is achieved using the built in Interpolation tools from the processing toolbox.

In this practical we will take field depth measurements for Lake Arlington in Texas. & create an elevation relief map & contours from these measurements

Step I:

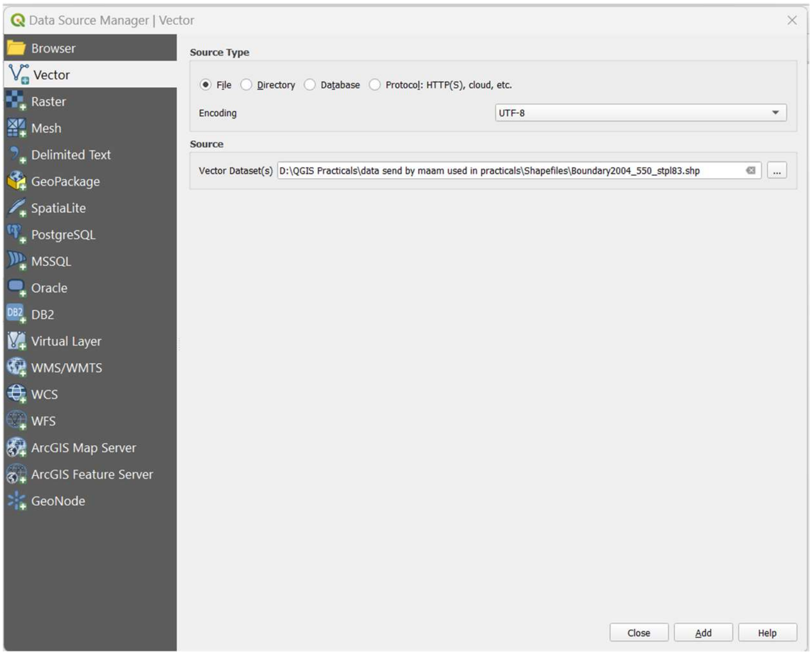
Layer → Add Layer → Add Vector Layer → Arlington_Soundings _2007_Stpl 83.shp → Add → close.

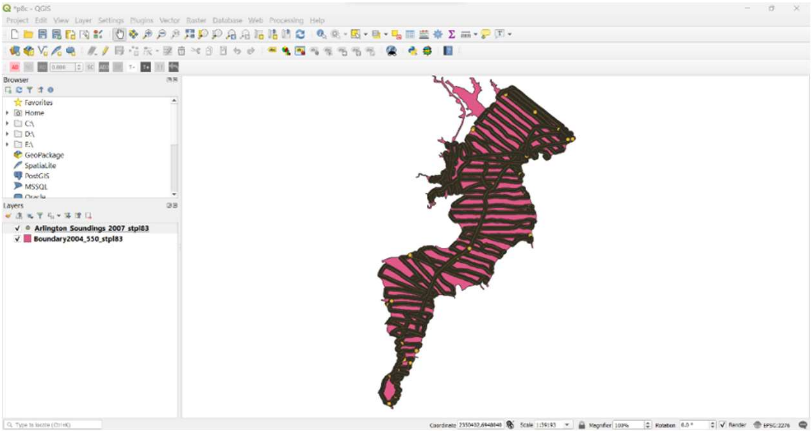




Step II:

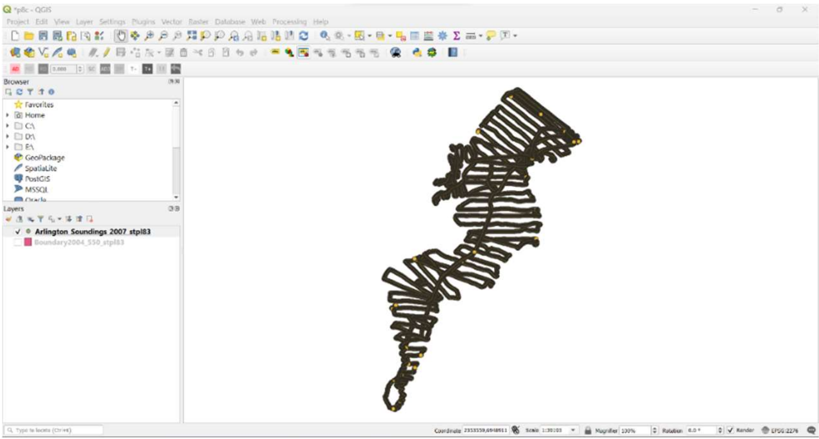
Layer → Add Layer → Add Vector Layer → Boundary2004_550_stp183.shp → Add → Close





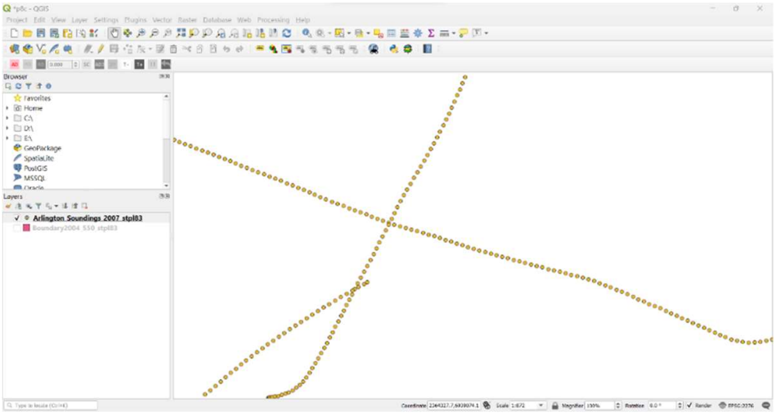
Step III:

Disselect Boundary.shp layer from layer panel



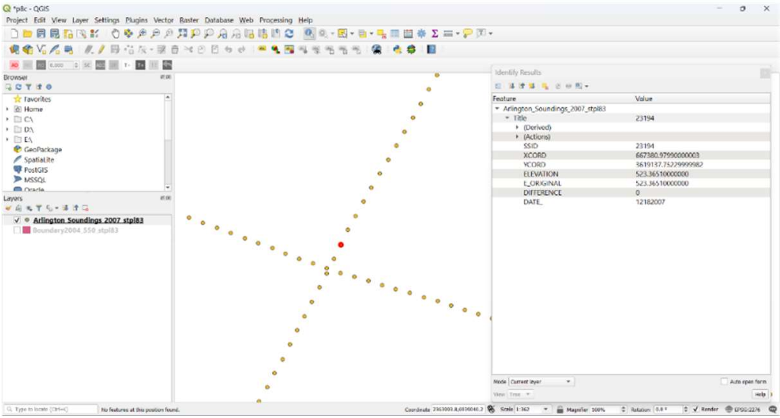
Step IV:

Zoom the window & take the dotted lines



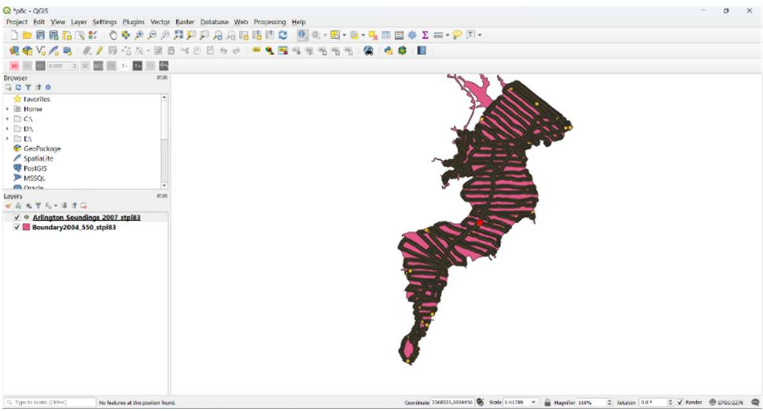
Step V:

Click on identify feature & click on window one dotted.



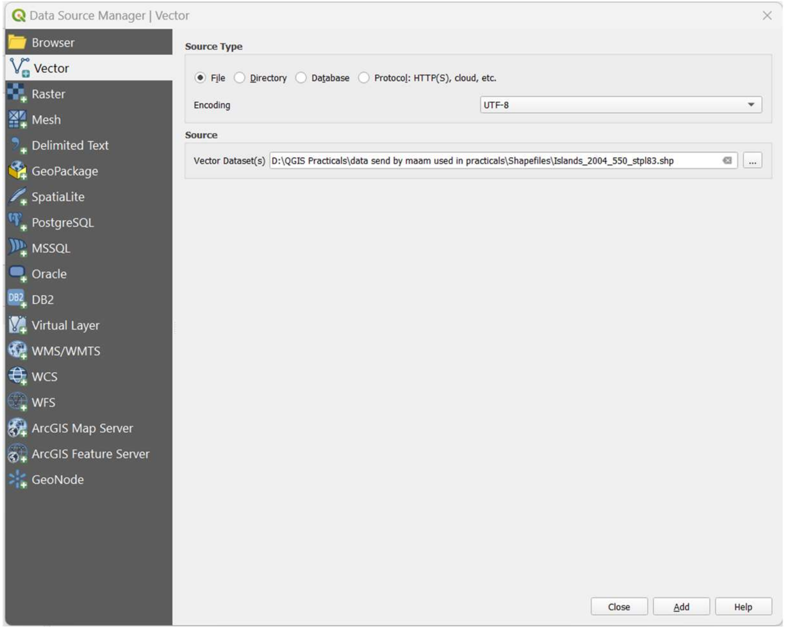
Step VI:

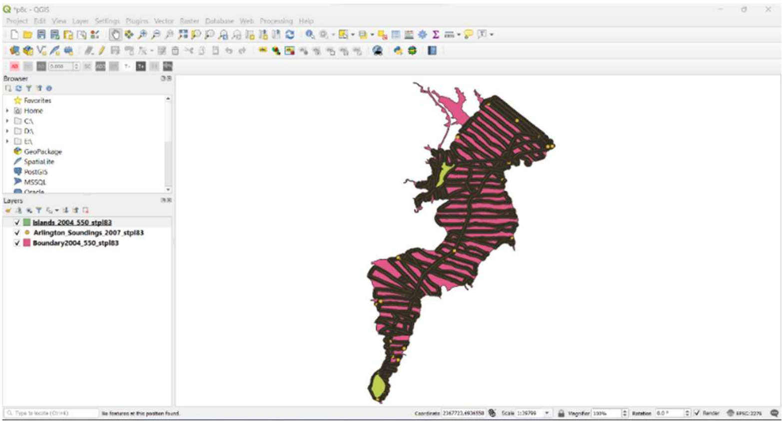
Zoom out click on ✋ (hand emoji) will come to original image. & select the boundary.shp



Step VII:

Add layer → Add vector layer → Islands_2004_550_stp183.shp





Processing → ToolBox → Interpolation -> TIN interpolation
Vector layer: Arlington_Soundings_2007_stp183
Interpolation attribute: Elevation
Click on [+] → set Type :- [Points]

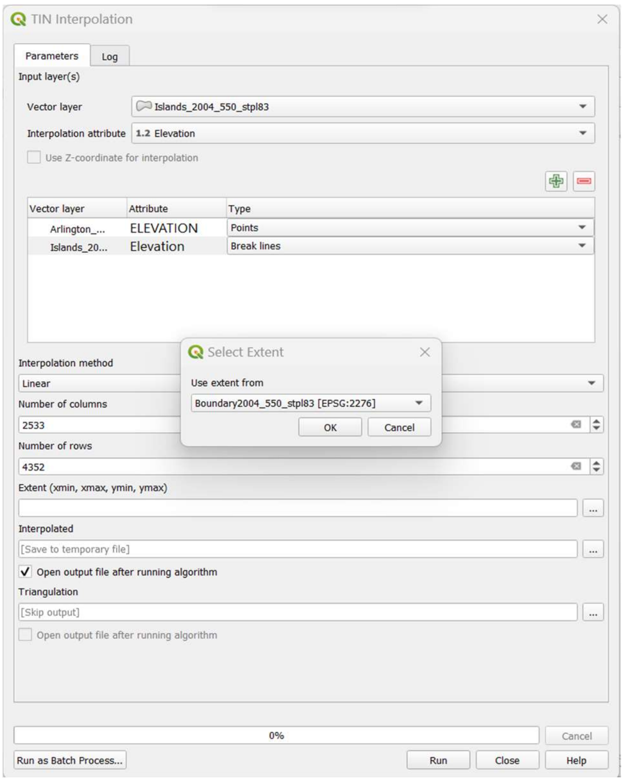
Vector layer: Islands_2004_550_stp183
Interpolation attribute: Elevation
Click on [+] → set Type:- [Break lines]

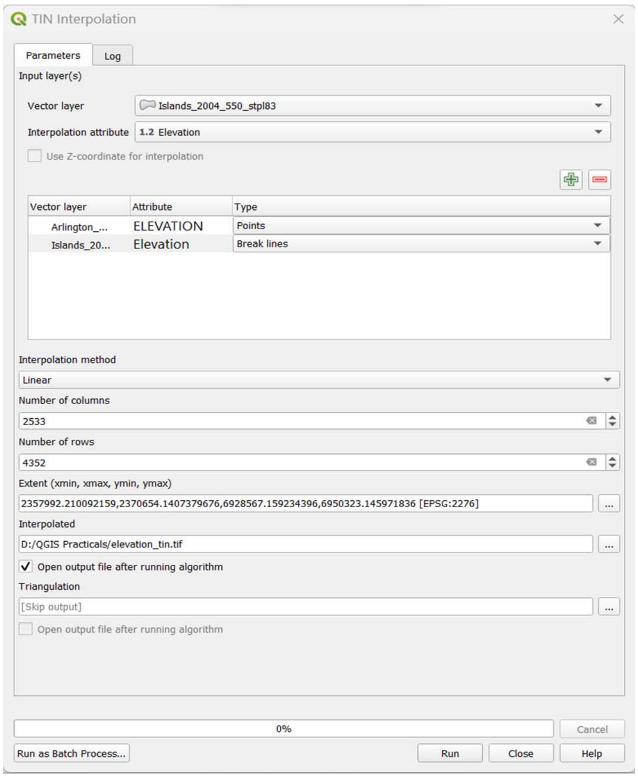
Interpolation method [Linear]
Extent[...] → Calculate from layer → Boundary 2004_550_stp183

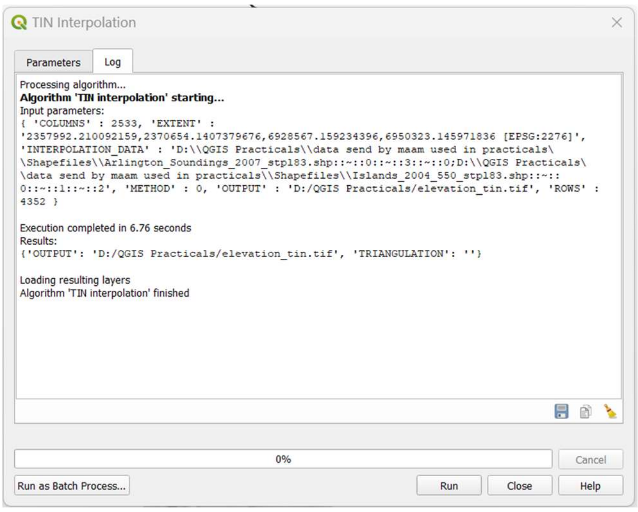
Output Raster Data
Rows [4352] Columns[2533]
Pixel Size X [5] Pixel Size Y[5]

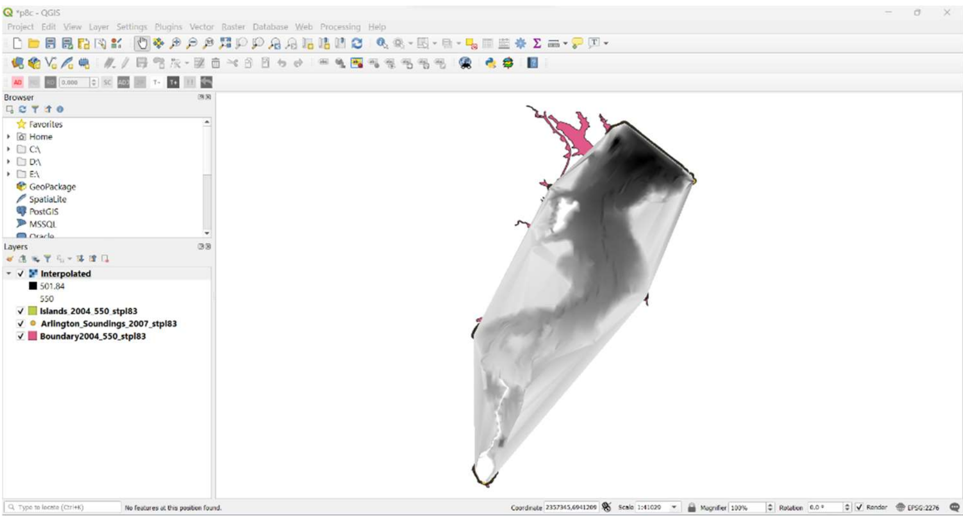
Interpolated [...] Save to file

File name [elevation_tin.tif]→ Save
Tic the option:- Open output file after running algorithm → Run → Close


TIN Interpolation
Parameters
Log
Input layer(s)
Vector layer
Islands_2004_550_stpl83
Interpolation attribute
1.2 Elevation
Use Z-coordinate for interpolation
Vector layer
Attribute
Type
Arlington_...
ELEVATION
Points
Islands_20...
Elevation
Break lines
Interpolation method
Linear
Number of columns
2533
Number of rows
4352
Extent (xmin, xmax, ymin, ymax)
Interpolated
[Save to temporary file]
Open output file after running algorithm
Triangulation
[Skip output]
Open output file after running algorithm
Select Extent
Use extent from
Boundary2004_550_stpl83 [EPSG:2276]
OK
Cancel
0%
Run as Batch Process...
Run
Close
Help

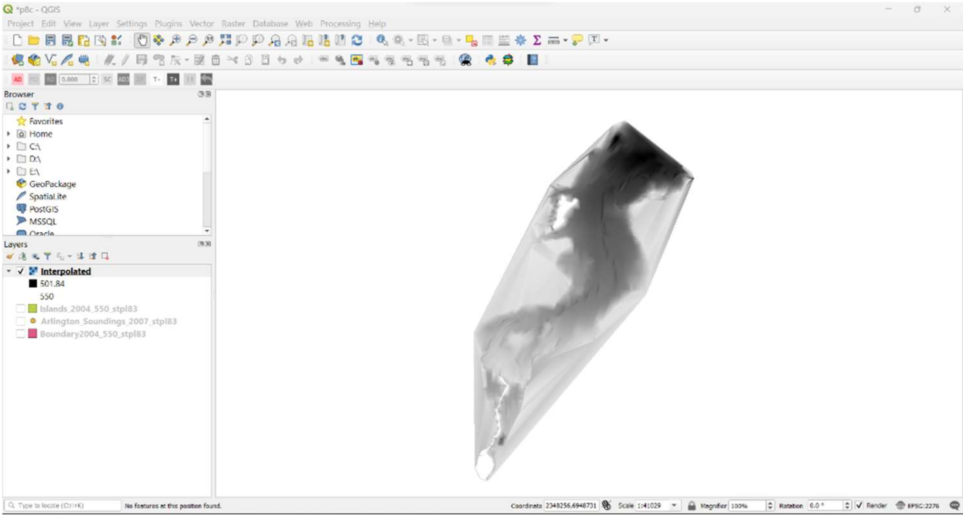

TIN Interpolation
Parameters
Log
Input layer(s)
Vector layer
Islands_2004_550_stpl83
Interpolation attribute
1.2 Elevation
Use Z-coordinate for interpolation
Vector layer
Attribute
Type
Arlington_...
ELEVATION
Points
Islands_20...
Elevation
Break lines
Interpolation method
Linear
Number of columns
2533
Number of rows
4352
Extent (xmin, xmax, ymin, ymax)
2357992.210092159,2370654.1407379676,6928567.159234396,6950323.145971836 [EPSG:2276]
Interpolated
D:/QGIS Practicals/elevation_tin.tif
Open output file after running algorithm
Triangulation
[Skip output]
Open output file after running algorithm
0%
Cancel
Run as Batch Process...
Run
Close
Help


TIN Interpolation
Parameters
Log
Processing algorithm...
Algorithm 'TIN interpolation' starting...
Input parameters:
{ 'COLUMNS' : 2533, 'EXTENT' :
'2357992.210092159,2370654.1407379676,6928567.159234396,6950323.145971836 [EPSG:2276]',
'INTERPOLATION_DATA' : 'D:\\QGIS Practicals\\data send by maam used in practicals\
\Shapefiles\\Arlington_Soundings_2007_stpl83.shp::~::0::~::3::~::0;D:\\QGIS Practicals\
\data send by maam used in practicals\\Shapefiles\\Islands_2004_550_stpl83.shp::~::
0::~::1::~::2', 'METHOD' : 0, 'OUTPUT' : 'D:/QGIS Practicals/elevation_tin.tif', 'ROWS' :
4352 }
Execution completed in 6.76 seconds
Results:
{'OUTPUT': 'D:/QGIS Practicals/elevation_tin.tif', 'TRIANGULATION': ''}
Loading resulting layers
Algorithm 'TIN interpolation' finished
0%
Cancel
Run as Batch Process...
Run
Close
Help

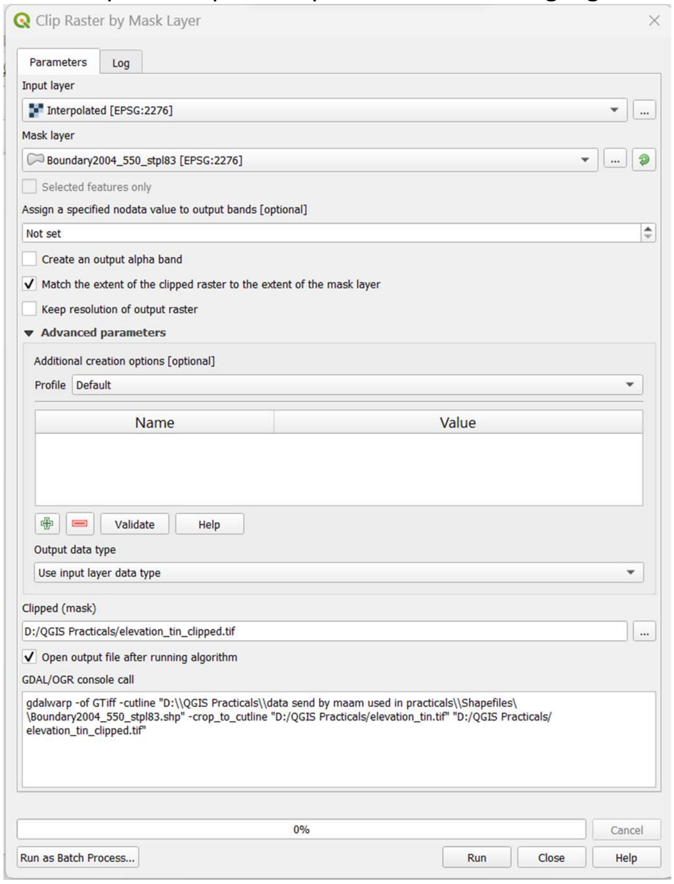

Browser
Favorites
Home
C:\
D:\
E:\
GeoPackage
SpatiaLite
PostGIS
MSSQL
Layers
Interpolated
501.84
550
Islands_2004_550_stpl83
Arlington_Soundings_2007_stpl83
Boundary2004_550_stpl83

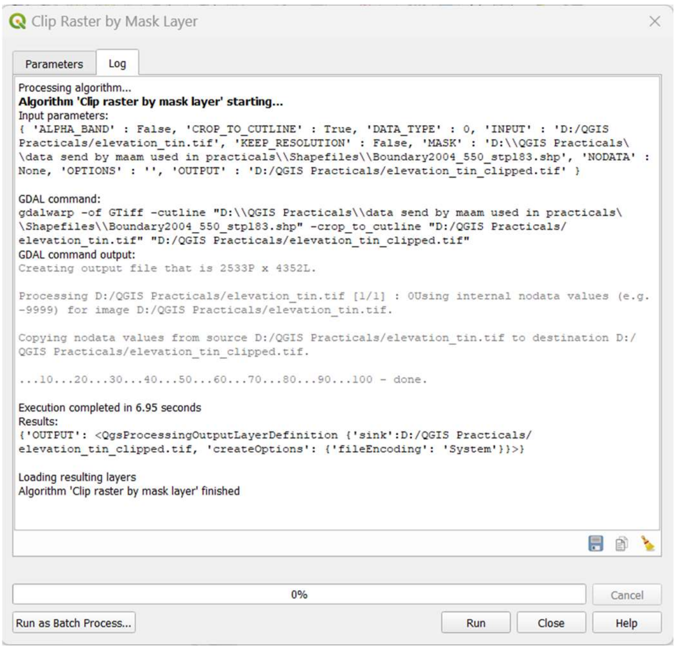
Step VIII:

Disselect all layer. Only keep elevation_tin



Processing → toolbox → GDAL → Raster extraction → clip raster by mask layer
Input layer [Interpolated EPSG:2276]
Mask Layer [Boundary 2004_550_stp183(EPSG:2276)]
Clipped […] save to file
elevation_tin_clipped.tif
Tic the option:- Open output file after running algorithm → Run → close

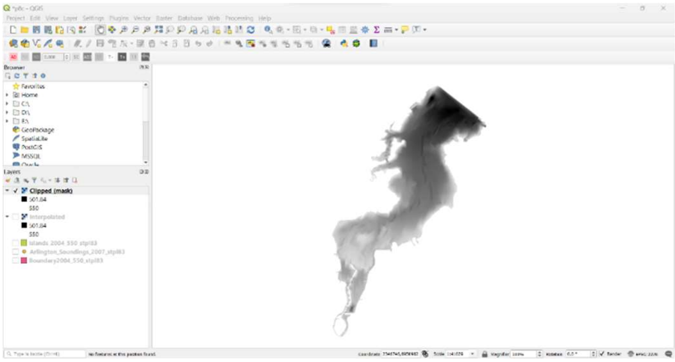




Step IX:

Disselect the elevation_tin

Only keep elevation_tin_clipped



Step X:

Right click on elevation_tin_clipped → Properties → Symbology

Render type :- Singleband pseudocolor

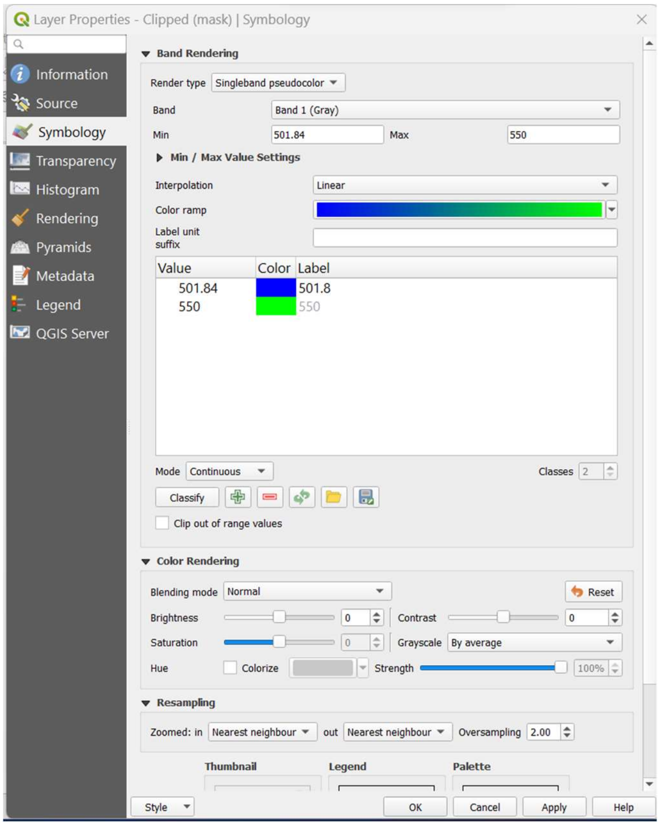
Band Min[501.84] Max[550]

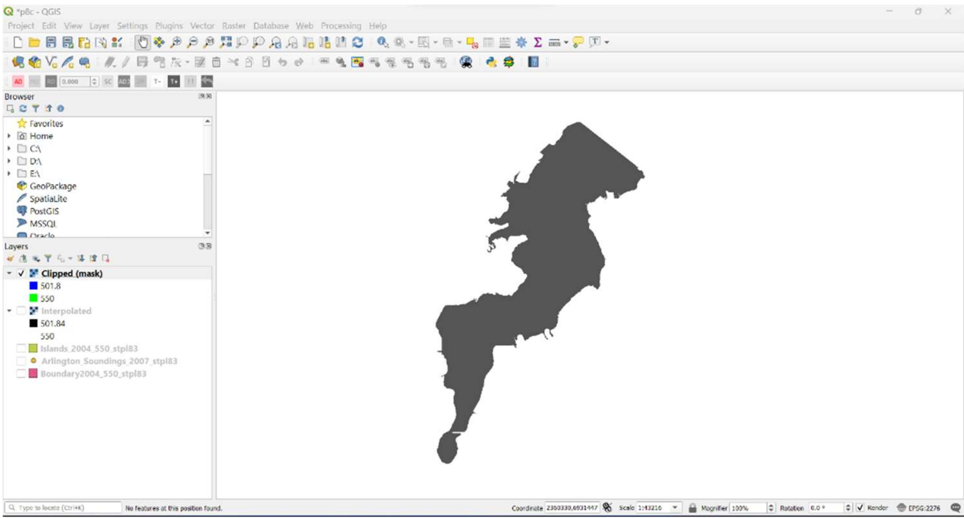
Interpolation[Linear] Label unit static: blank

Color Ramp [Invert color Ramp]

//[maam se puchna padega]Label precision 4

Click on classify → OK





Step XI:

Processing → tool → GDAl -> Raster extraction → contour

Input layer: [clipped (mask) [EPSG:2276]

Band number: [Band 1 (Gray)]

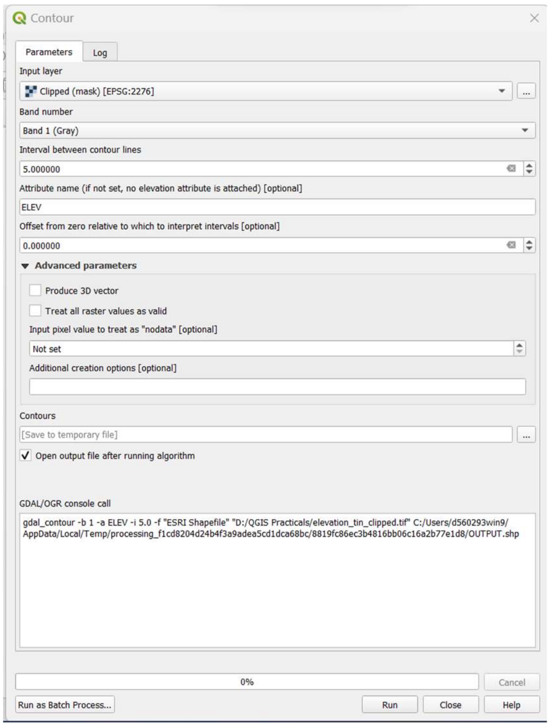
Interval between contour_lines: [5,000,000]

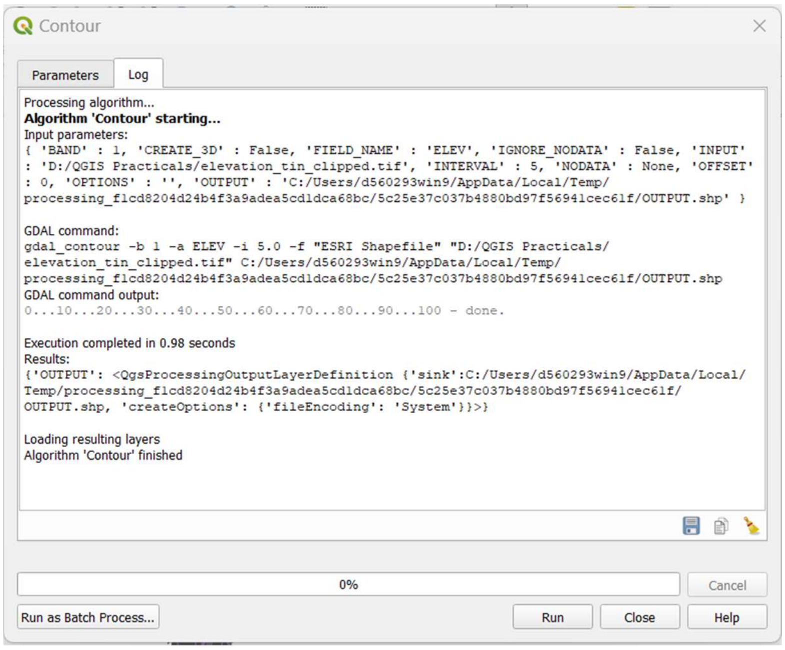
attribute name: [ELEV]

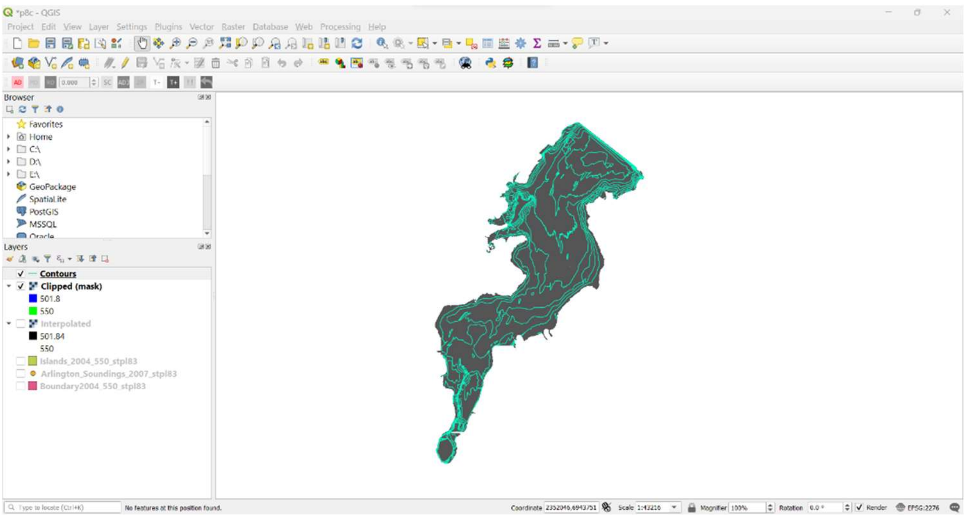
offset from zero 0.000000

Contours[…] save to file →Contour.gpkg

Tic the option :- Open output file ->Run → Close


Contour
Parameters
Log
Input layer
Clipped (mask) [EPSG:2276]
Band number
Band 1 (Gray)
Interval between contour lines
5.000000
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
Produce 3D vector
Treat all raster values as valid
Input pixel value to treat as "nodata" [optional]
Not set
Additional creation options [optional]
Contours
[Save to temporary file]
Open output file after running algorithm
GDAL/OGR console call
gdal_contour -b 1 -a ELEV -i 5.0 -f "ESRI Shapefile" "D:/QGIS Practicals/elevation_tin_clipped.tif" C:/Users/d560293win9/AppData/Local/Temp/processing_f1cd8204d24b4f3a9adea5cd1dca68bc/8819fc86ec3b4816bb06c16a2b77e1d8/OUTPUT.shp
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' : 'D:/QGIS Practicals/elevation_tin_clipped.tif', 'INTERVAL' : 5, 'NODATA' : None, 'OFFSET' : 0, 'OPTIONS' : '', 'OUTPUT' : 'C:/Users/d560293win9/AppData/Local/Temp/processing_f1cd8204d24b4f3a9adea5cd1dca68bc/5c25e37c037b4880bd97f56941cec61f/OUTPUT.shp' }
GDAL command:
gdal_contour -b 1 -a ELEV -i 5.0 -f "ESRI Shapefile" "D:/QGIS Practicals/elevation_tin_clipped.tif" C:/Users/d560293win9/AppData/Local/Temp/processing_f1cd8204d24b4f3a9adea5cd1dca68bc/5c25e37c037b4880bd97f56941cec61f/OUTPUT.shp
GDAL command output:
0...10...20...30...40...50...60...70...80...90...100 - done.
Execution completed in 0.98 seconds
Results:
{'OUTPUT': <QgsProcessingOutputLayerDefinition {'sink':C:/Users/d560293win9/AppData/Local/Temp/processing_f1cd8204d24b4f3a9adea5cd1dca68bc/5c25e37c037b4880bd97f56941cec61f/OUTPUT.shp, 'createOptions': {'fileEncoding': 'System'}}>}
Loading resulting layers
Algorithm 'Contour' finished
0%
Cancel
Run as Batch Process...
Run
Close
Help


Browser
Favorites
Home
C:\
D:\
E:\
GeoPackage
SpatiaLite
PostGIS
MSSQL
Layers
Contours
Clipped (mask)
501.8
550
Interpolated
501.84
550
Islands_2004_550_stpl83
Arlington_Soundings_2007_stpl83
Boundary2004_550_stpl83

Step XII:

Right click on contour → properties -> labels → choose single labels

Label with :- value [ELEV]

Select Placement

Mode: [Curved]

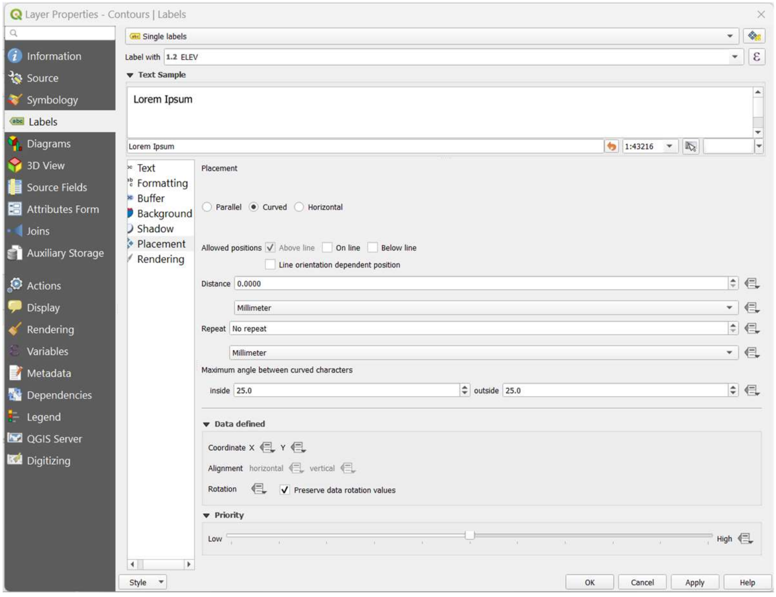
Distance: 0.0000

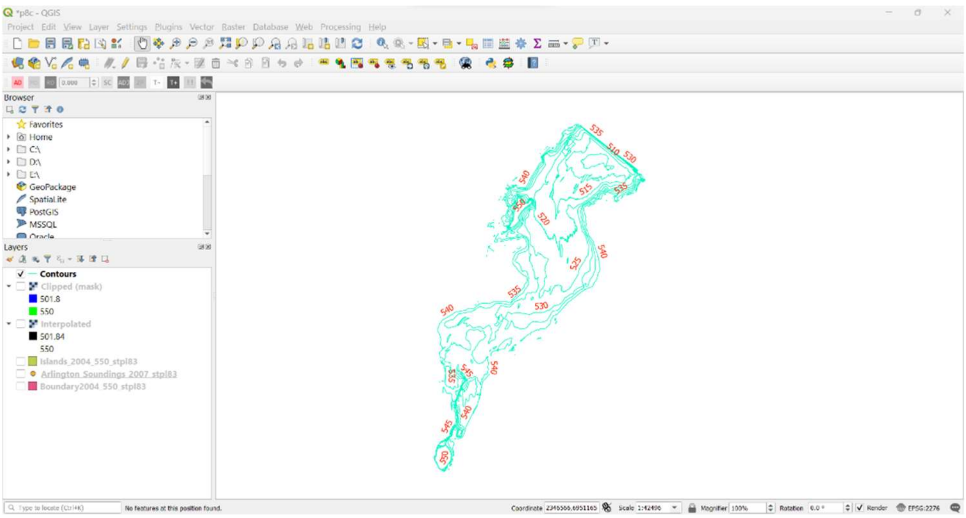
Millimeter

Repeat :- No repeat

Millimeter

Apply → OK

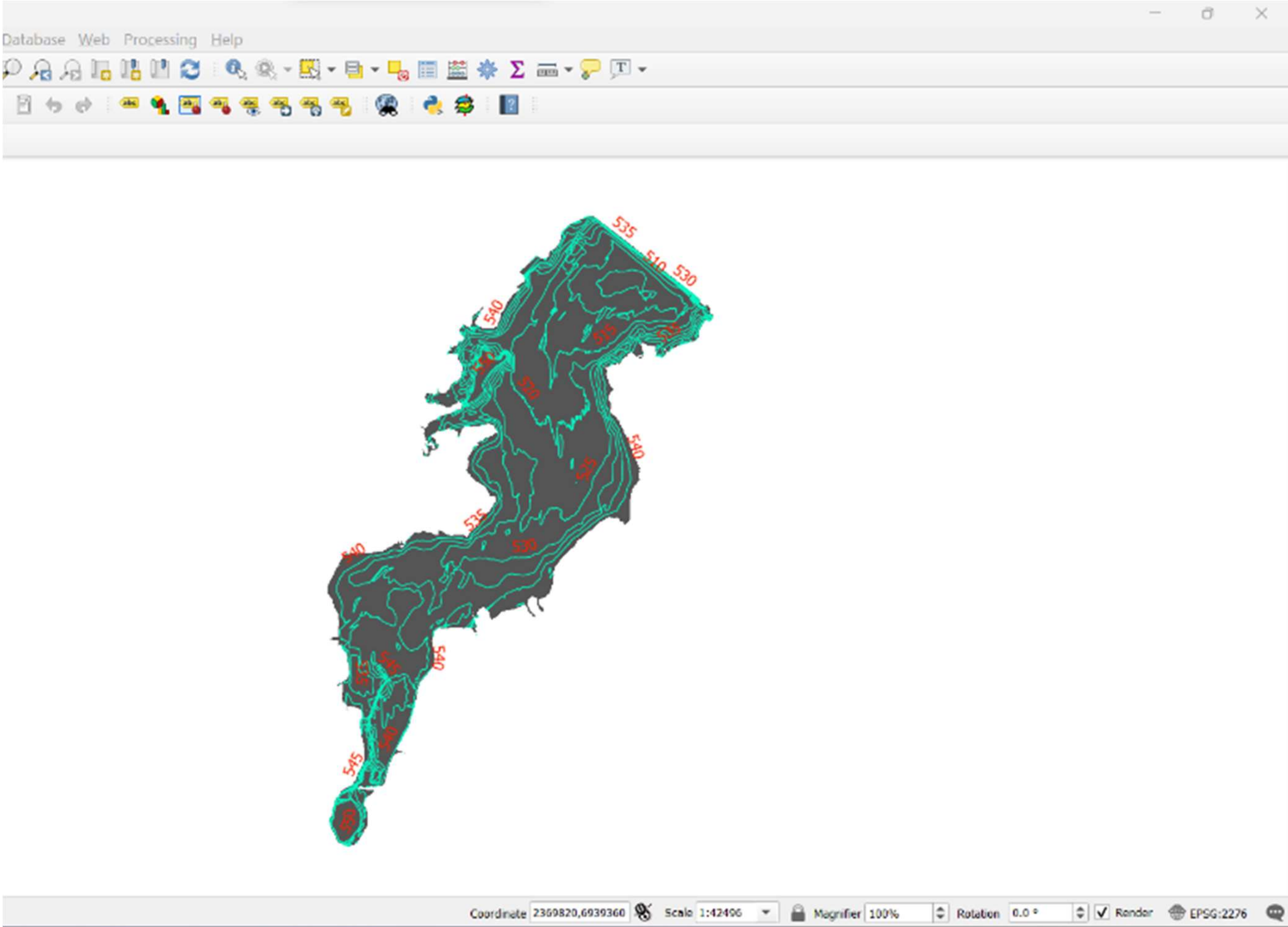




Step XIII:

Select contour & elevation_tin_clipped from layer panel

Output;-



Database Web Processing Help
535
510
530
540
535
530
540
535
535
530
540
540
540
545
Coordinate 2369820,6939360
Scale 1:42406
Magnifier 100%
Rotation 0.0 °
Render
EPSG:2276

Practical no :-9

Aim: Advance GIS Operations 2: Batch Processing using Processing Framework
Automating Complex Workflows using Processing Modeler
Automating Map Creation with Print Composer Atlas

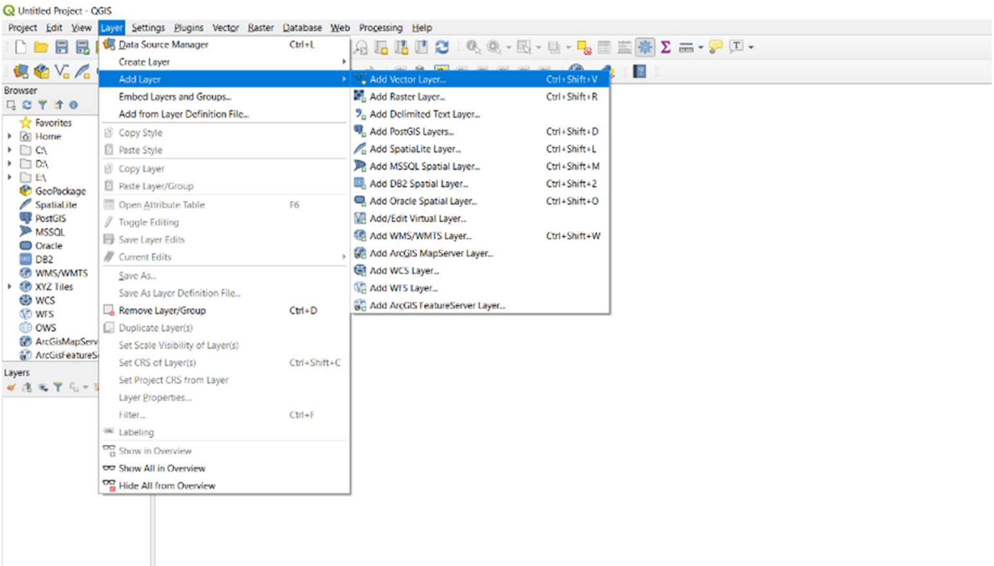
A)Batch processing using processing framework

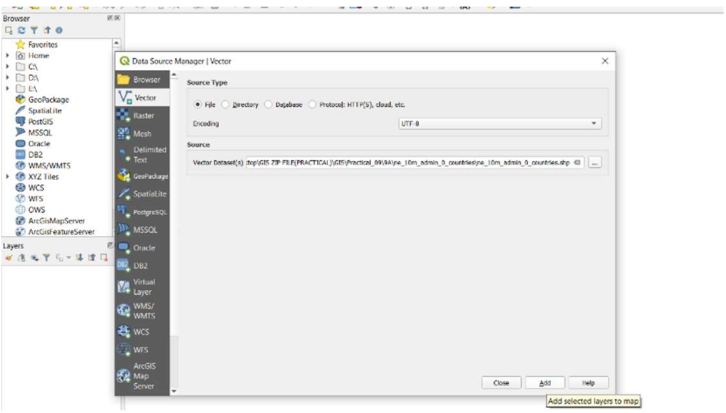
Batch processing means to execute a single tool multiple times with different inputs with your intervention.

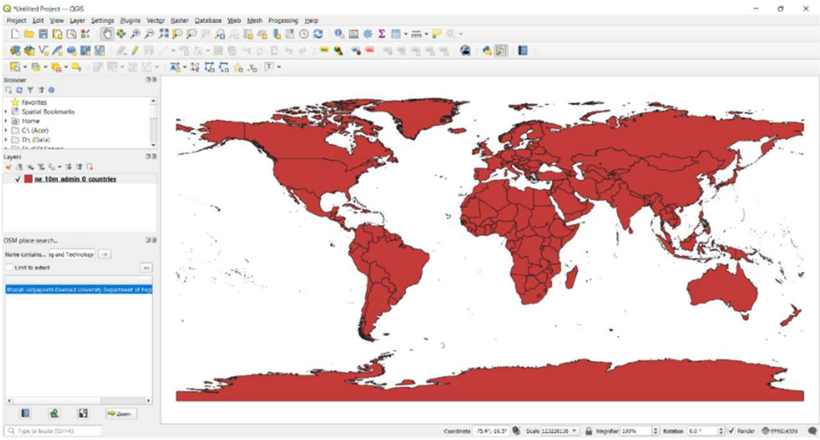
- The processing framework in QGIS contains a batch processing interface that allows one to execute an algorithm on several layers easily. Batch processing is a useful tool that can save manual effort and help you automatic repetitive tasks.
- In this practical we will take several global vector layers & clip them to the extent of Africa in a single batch command.

Step I:

Layer → Add Layer → Add Vector Layer → […] (ne_10m_admin_0_countries.shp) → Add → Close

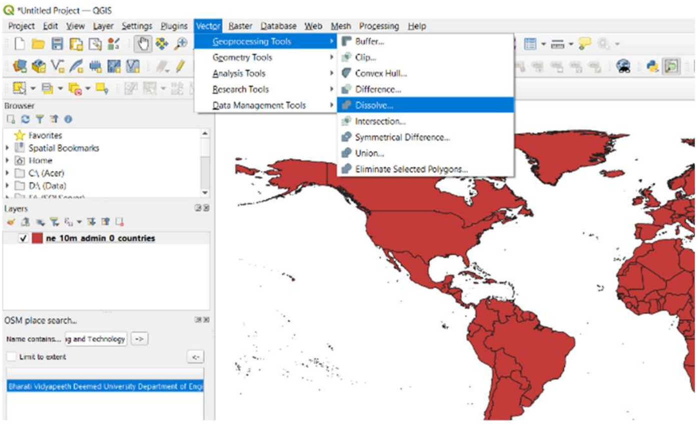






Step II:

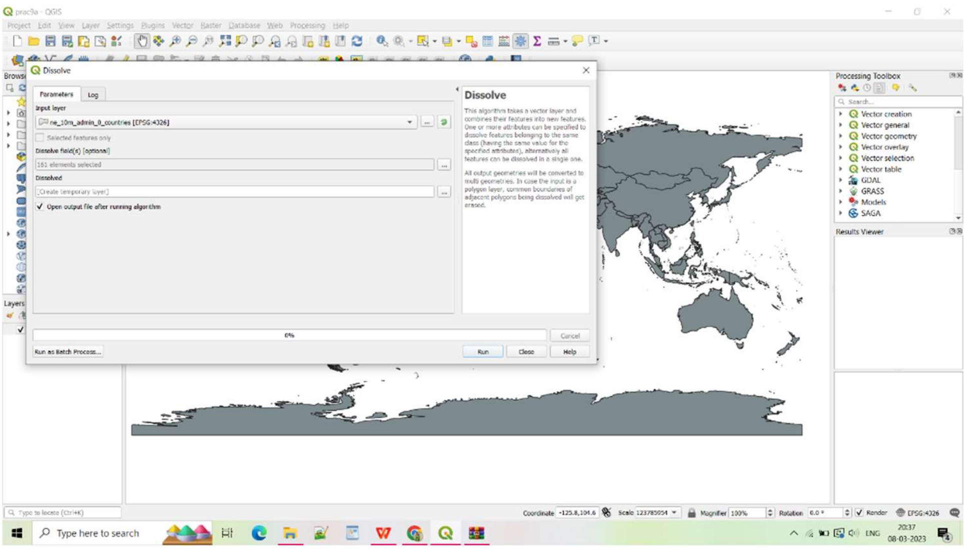
Vector → Geoprocessing tools → Dissolve



Input Layer: [ne_10m_admin_0_countries[EPSG:4326]]

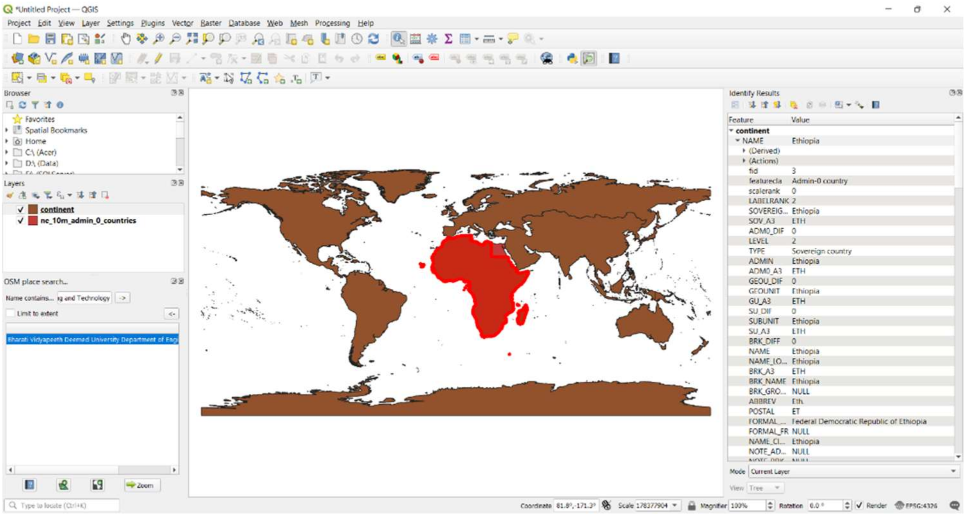
Dissolve field: Continent (checked) → OK

Dissolved: [Save to file] → continent.shp

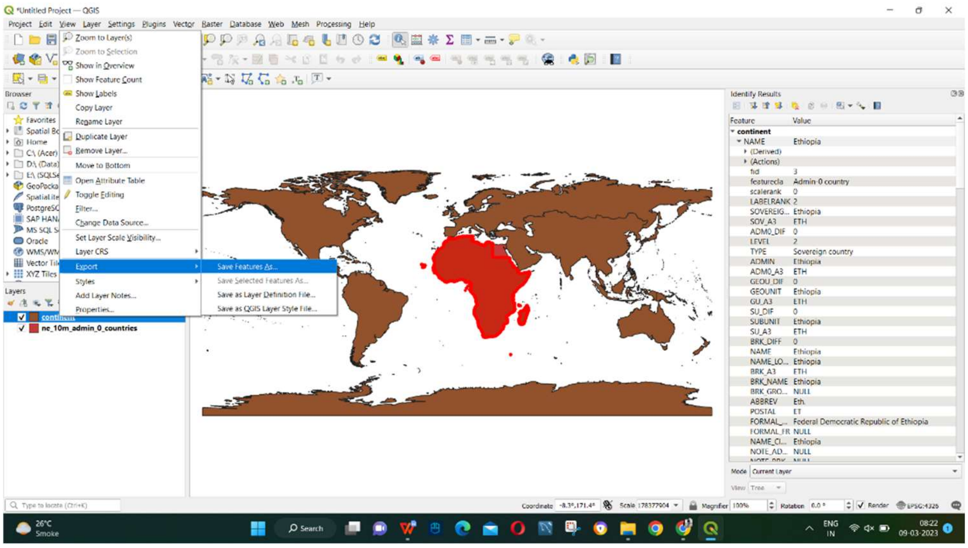


(Note: we are merging all the countries continent wise) → Run → Close

Step III: →Select selection tool from toolbar → Click on any continent (we are selecting africa)



Step IV: Right click on continent layer → Export → Save selected feature as



Format: ESRI shapefile

File Name: […] → Africa.shp → Save

Layer name : → blank

CRS: EPSG.4326-WGS 84

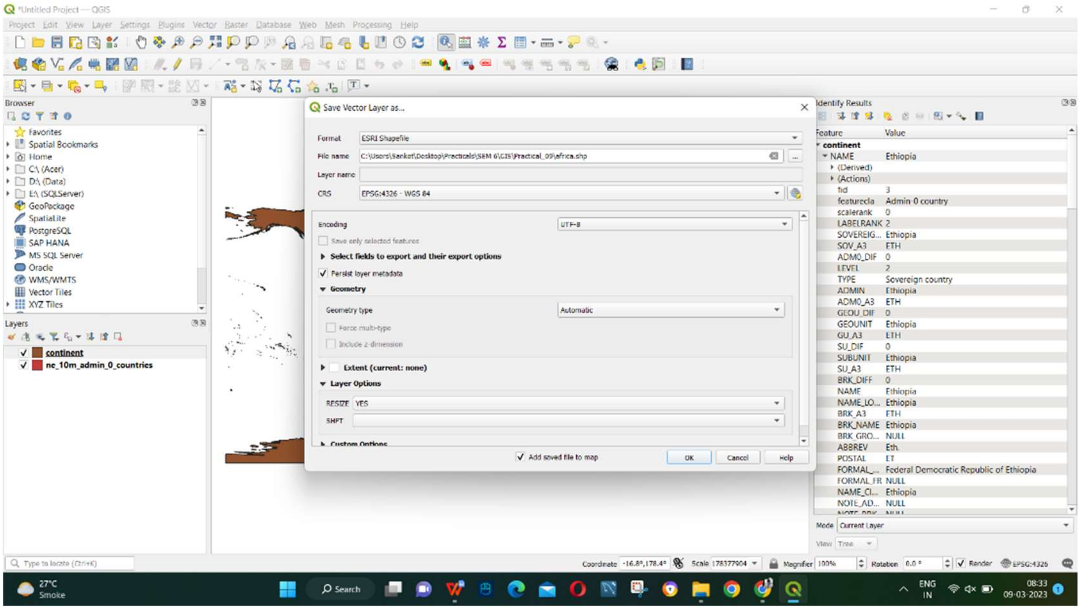
Encoding: UTF-8

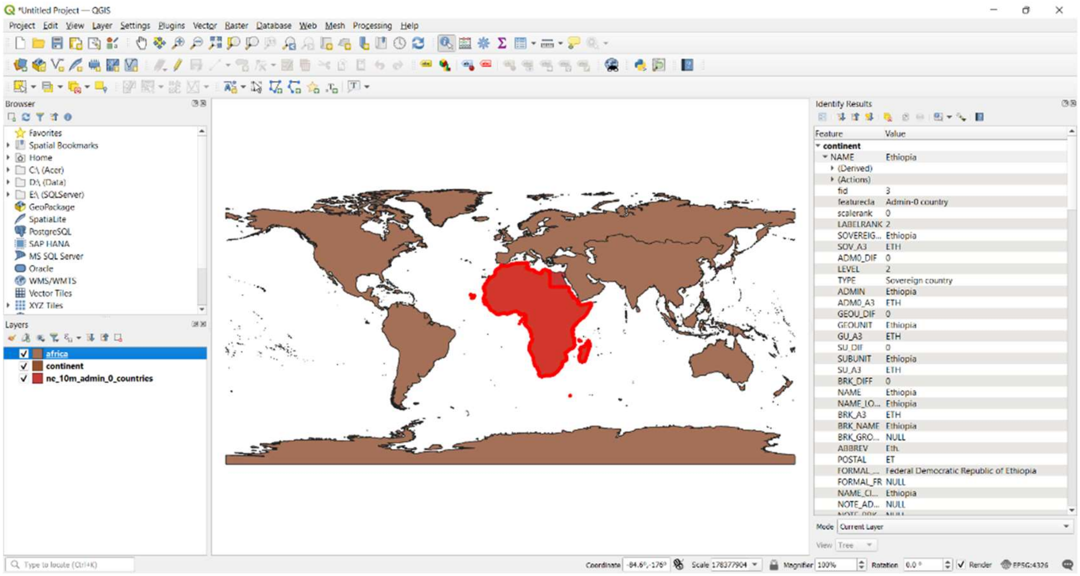
(checked) Save only selected features

(checked) Persist layer metadata

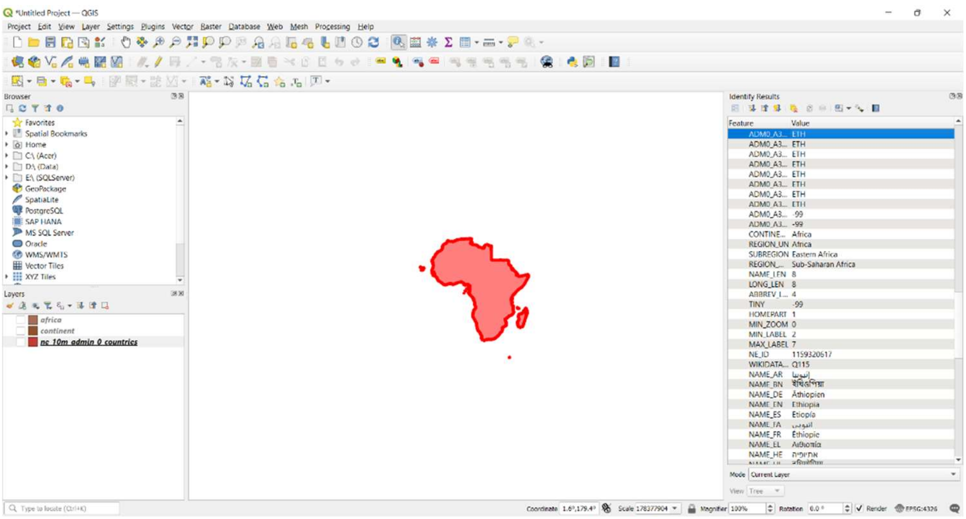
Geometry type Automatic (checked)

(checked) Add saved file to map → OK

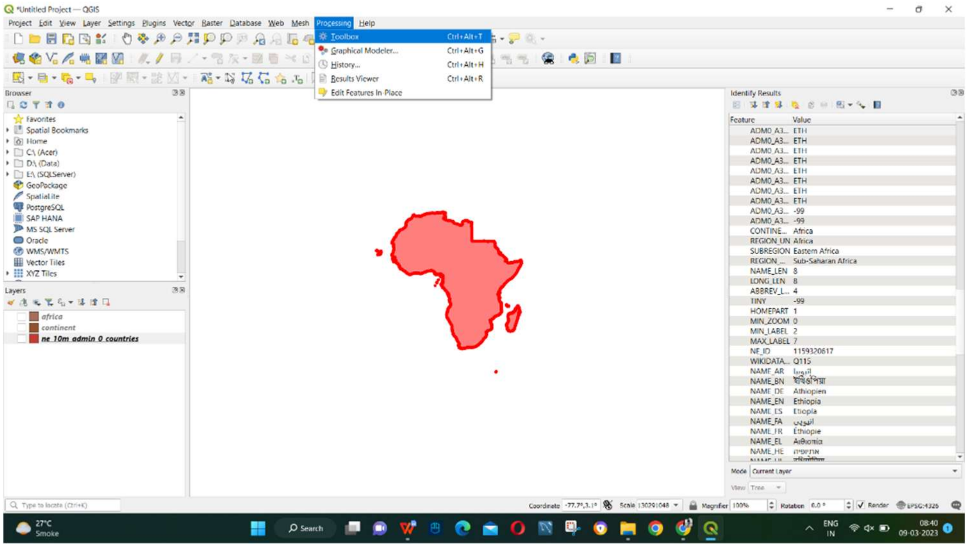


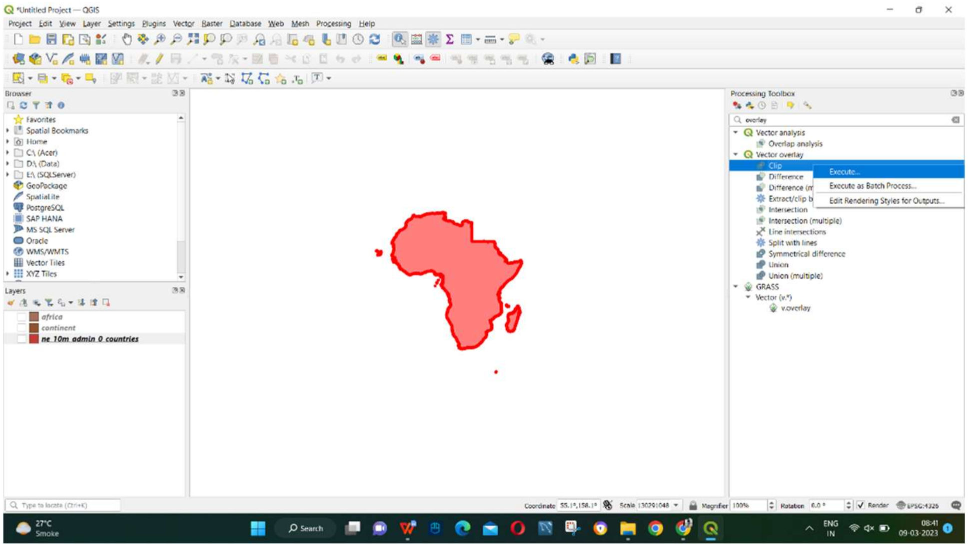


Step V: Disselect both the previous layers & keep only Africa layer



Step VI: Processing toolbox → vector overlay → clip → Right Click on clip → Execute as Batch processing → Input layer: [.] → ne_10m_airports.shp [+] →Click on it.





Input layer: [.] → ne_10m_ports.shp → Click on it

Input layer: [.] → ne_10m_railroads.shp

Overlay layer: [select file] → Africa.shp

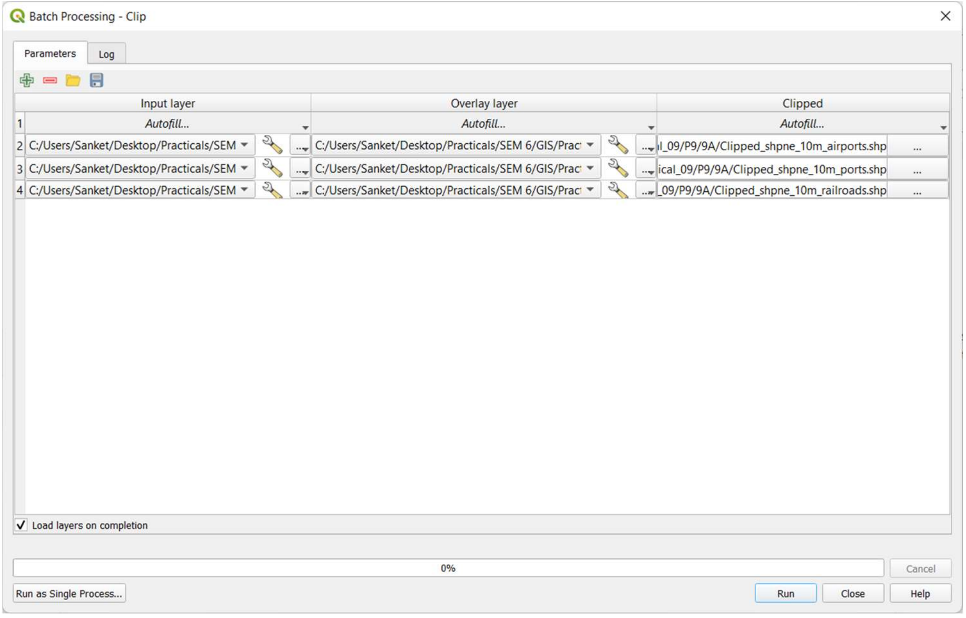
Overlay layer: [select file] → Africa.shp

Overlay layer: [select file] → Africa.shp

Clipped layer: […] → **clipped_shp

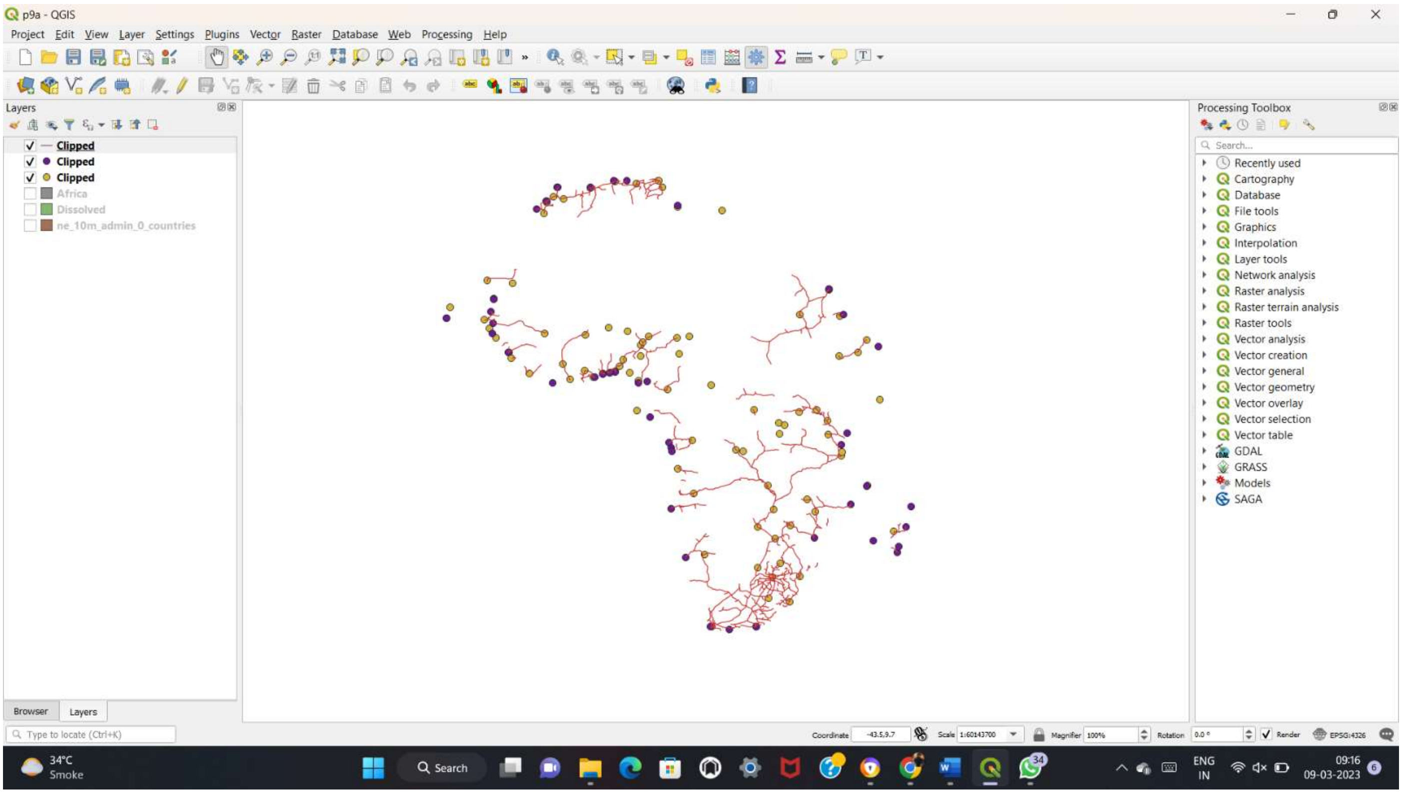
→ OK

(checked) Load layers on completion.

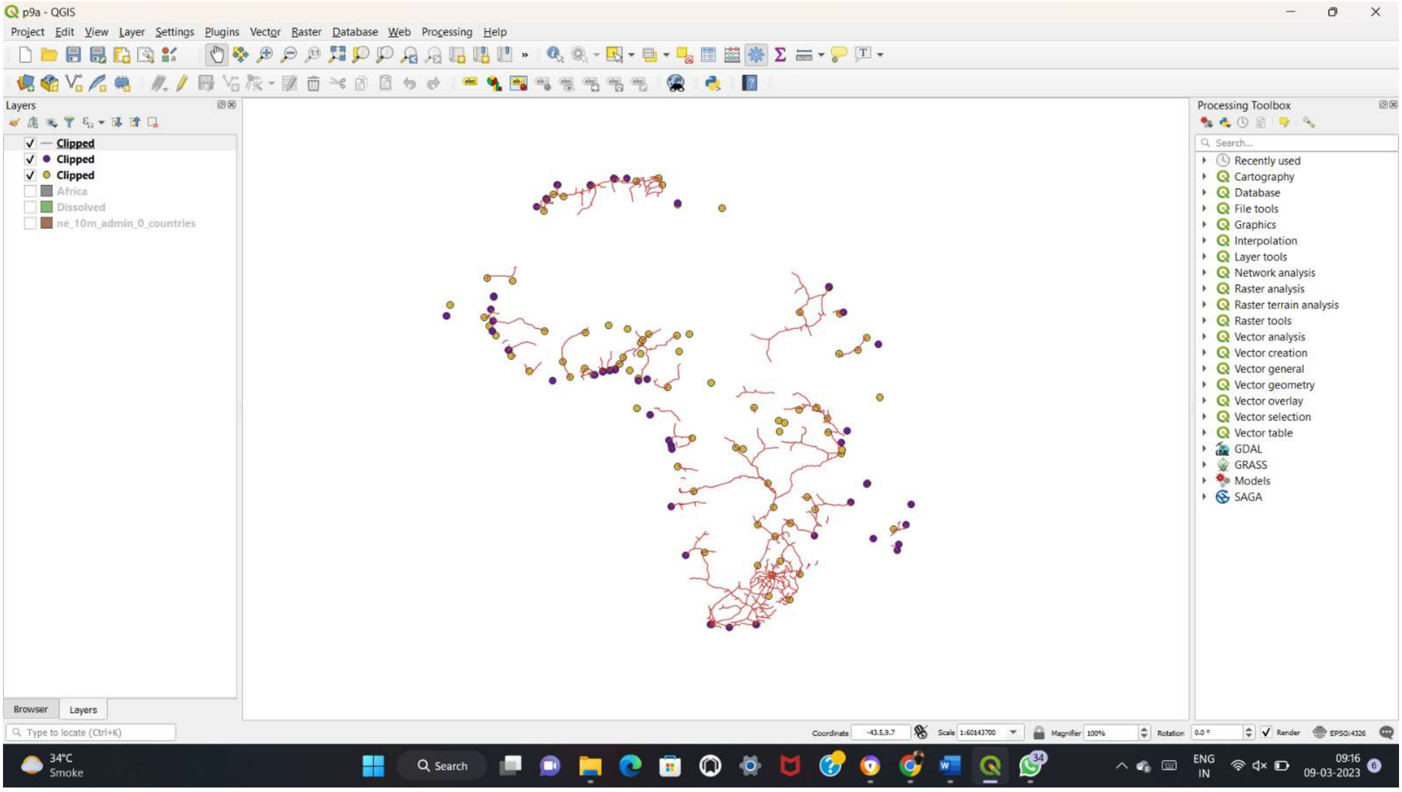


Step VII: Disselect the Africa layer and Check the output

Zoom it & check the three layers we created



OUTPUT:


p9a - QGIS
Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help
Layers
Clipped
Clipped
Clipped
Africa
Dissolved
ne_10m_admin_0_countries
Processing Toolbox
Recently used
Cartography
Database
File tools
Graphics
Interpolation
Layer tools
Network analysis
Raster analysis
Raster terrain analysis
Raster tools
Vector analysis
Vector creation
Vector general
Vector geometry
Vector overlay
Vector selection
Vector table
GDAL
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Models
SAGA
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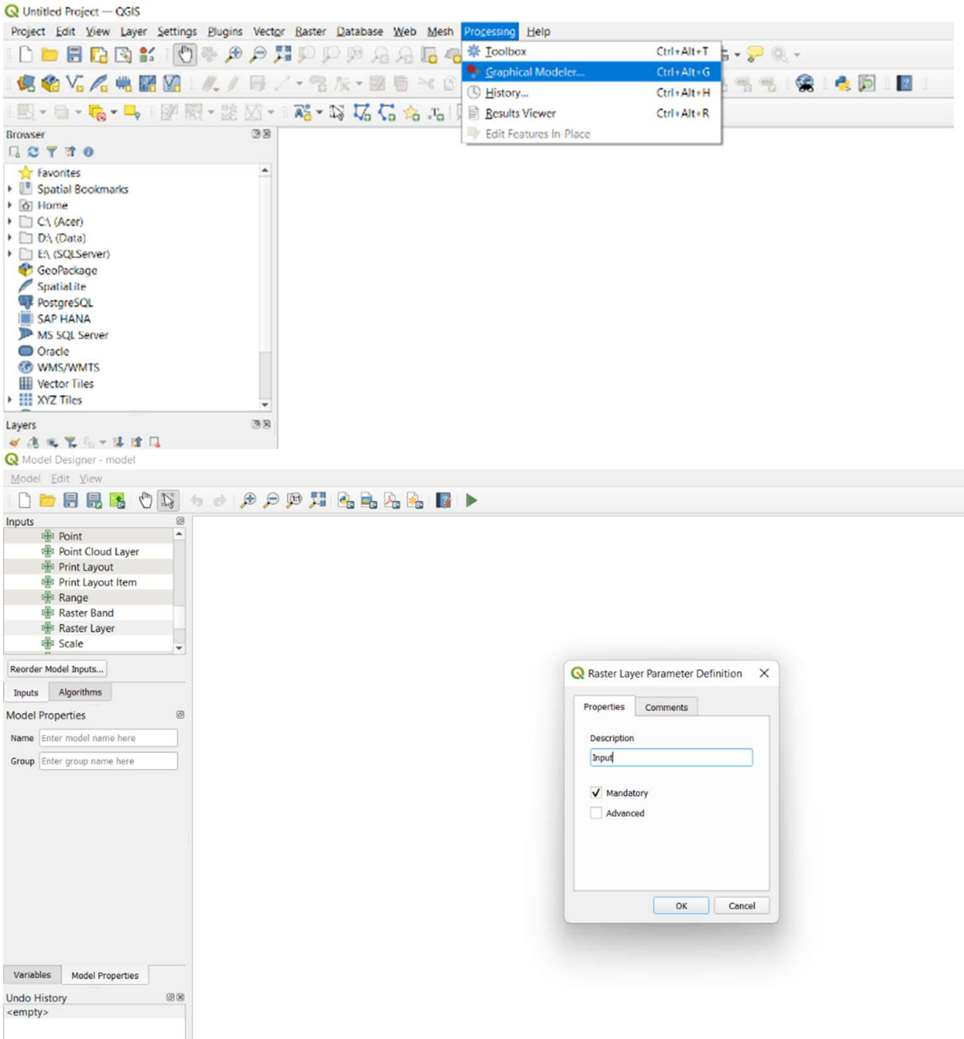
(B) A**utomating complex workflows using Processing Modeler**

GIS workflows typically involve many steps - with each step generating intermediate output that is used by the next step. QGIS has a graphical modeler built-in that can help you defined your workflow and run it with a single invocation.

Our workflow for this practical will have the following steps:

- ➢ Apply a majority filter algorithm to the input landover raster .This will reduce noise in our output by eliminating isolated pixels.
- ➢ Convert the resulting raster to a polygon Layer
- ➢ Query for a class value from the attribute table of the polygon layer and create a vector layer for that class.

Step I: Processing → Graphical Modeler → Input [Raster Layer] (Drag & Drop into window)
Description [Input]
(checkbox) Mandatory → OK



Step II: Algorithms [Majority/ Minority filter) (Drag & Drop)

Description [Majority / Minority Filter]

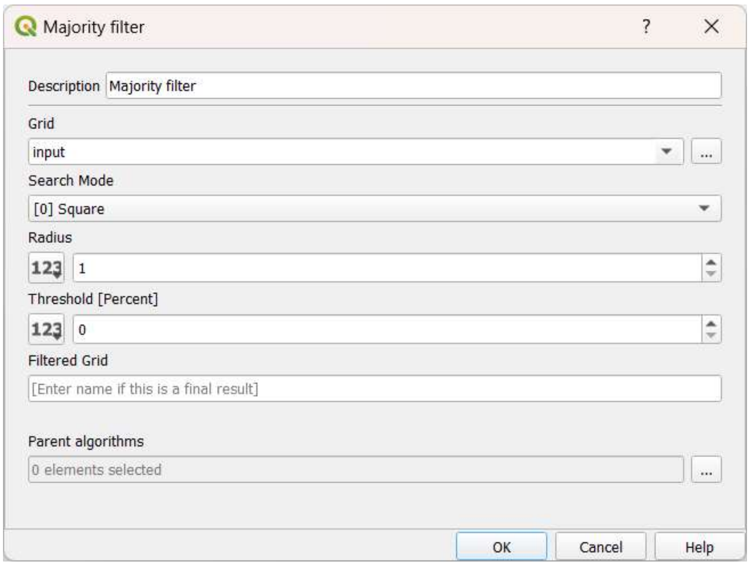
Grid: [123] → click on it & select [Model Input]

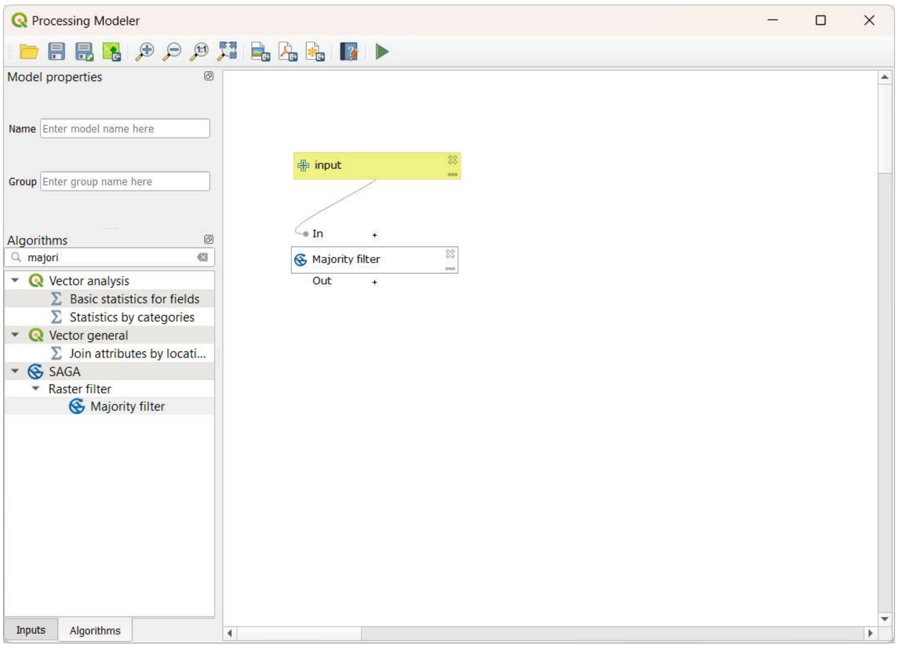
Type: [Majority]

Threshold [0.000000]

Kernel Type: [[O] Square]

Radius: [1] → OK.





Step III: Algorithms [Polygonize (raster to vector)] **(Drag & Drop- er to vector).

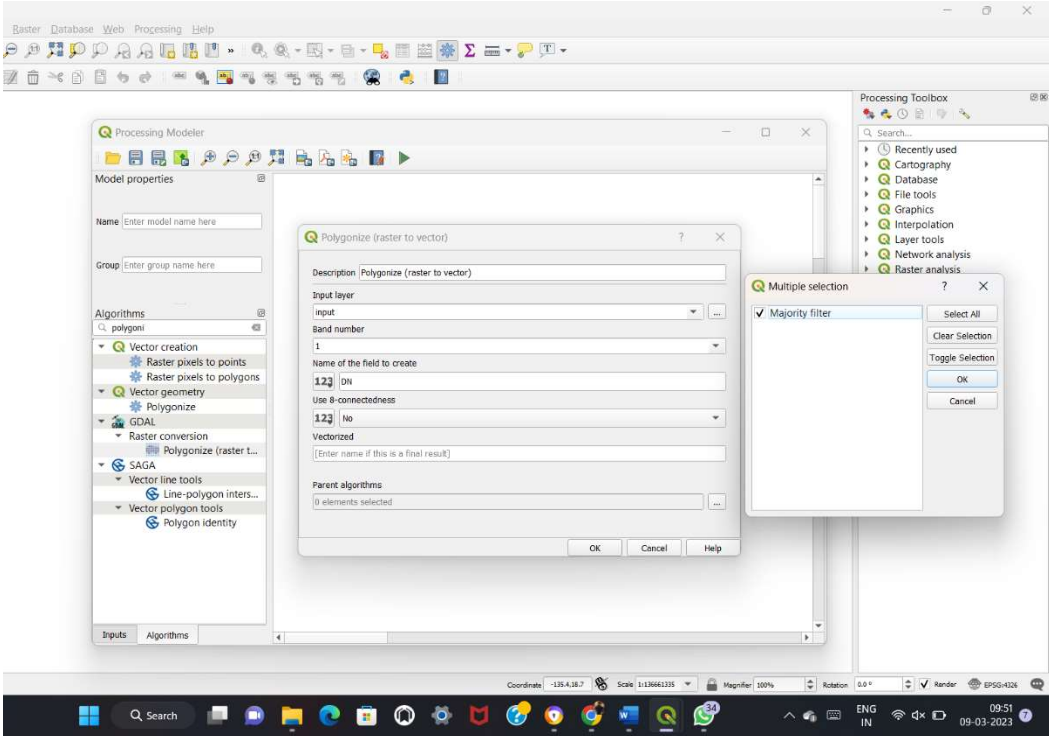
Description Polygonize (raster to vector) [**show Adv. Paran]

Input layer [123] ← click on it & select [Algorithm Output)

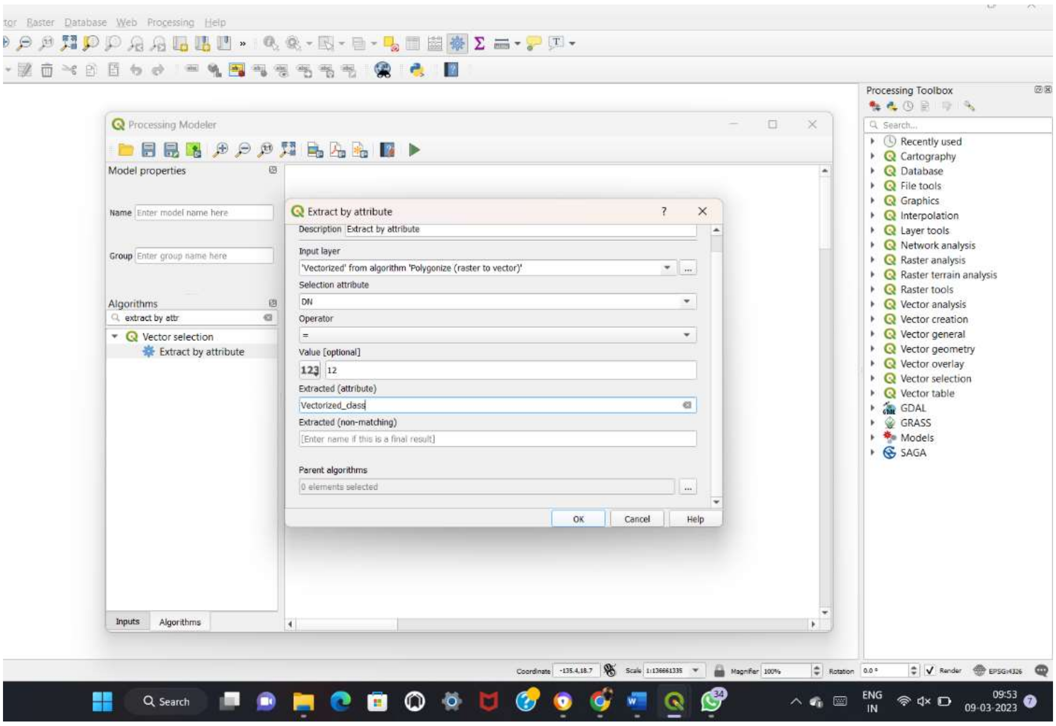
Band number [1]

Name of the field to create [IN]

Use 8-connectedness [no] → OK

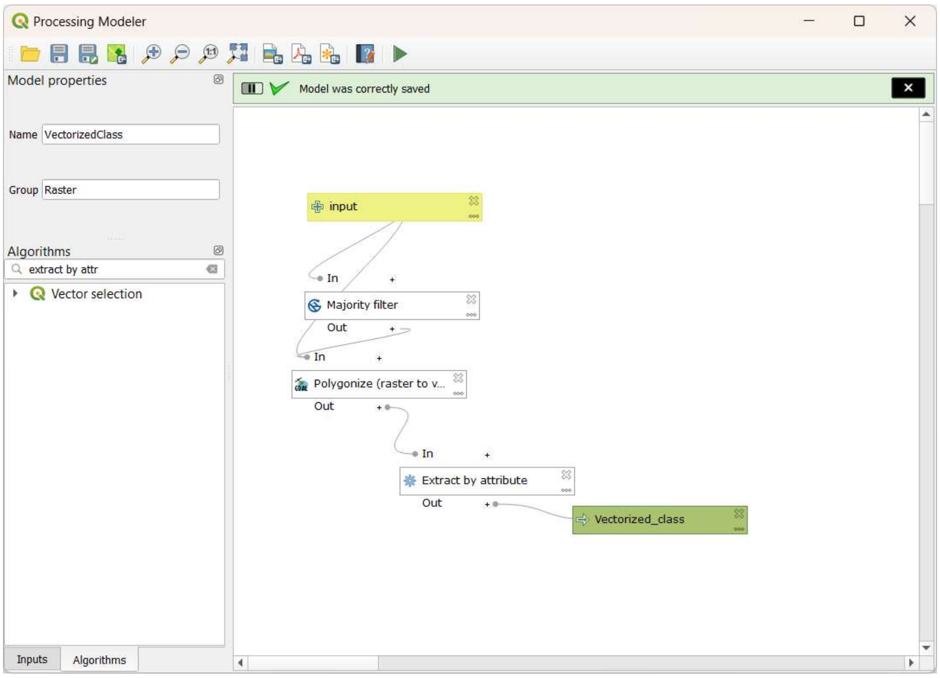


Step IV: Algorithms → Extract by attribute
Description [Extract by attribute]
Input layer [Algorithm output]
Selection attribute :[**DN]
Operator [=]
Value [optional]   [12]
Extracted (attribute) [Vectorized_class] → OK



Step V: Model properties → Name [vectorized]

Group[raster]

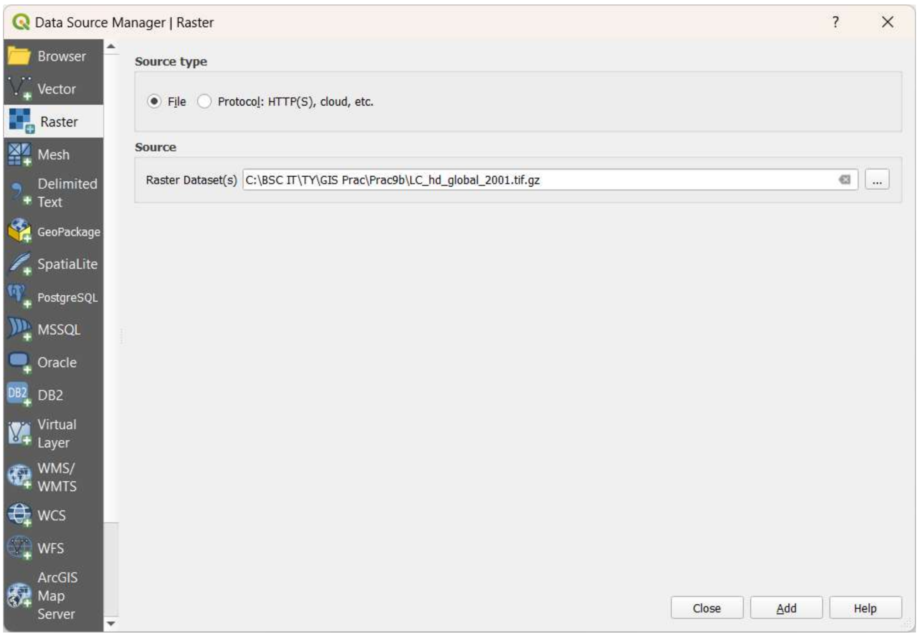


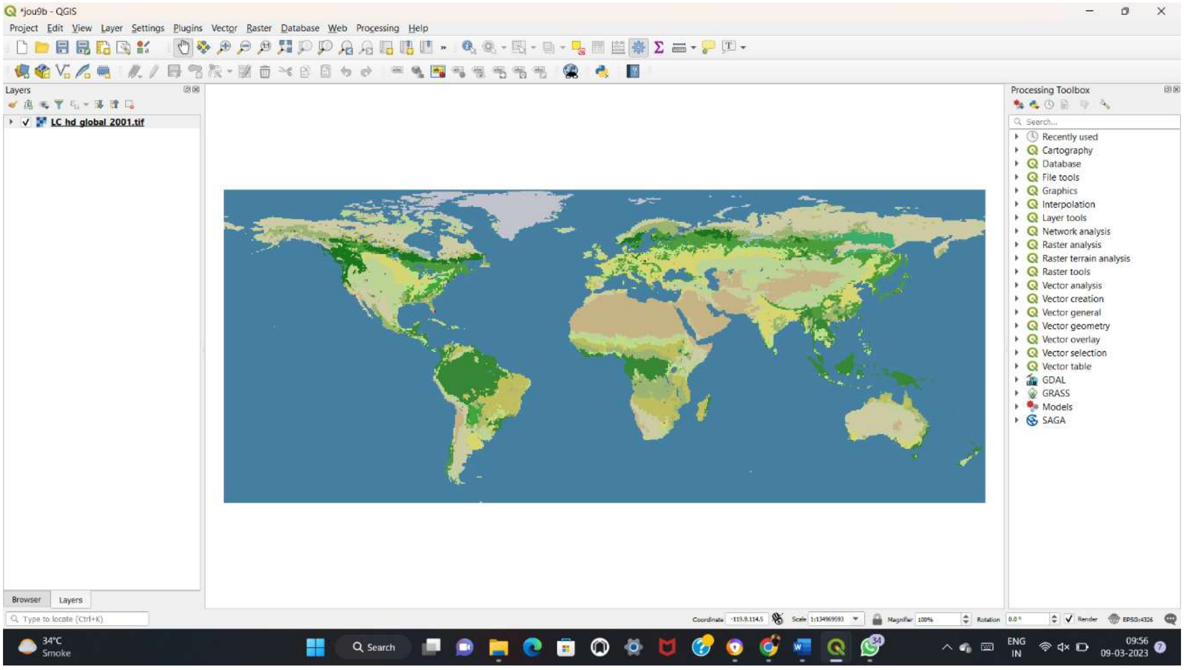
Step VI: Model → Save Model → [vectorize]

Save as type [Processing models (**)] → Save (Now we will test the model)

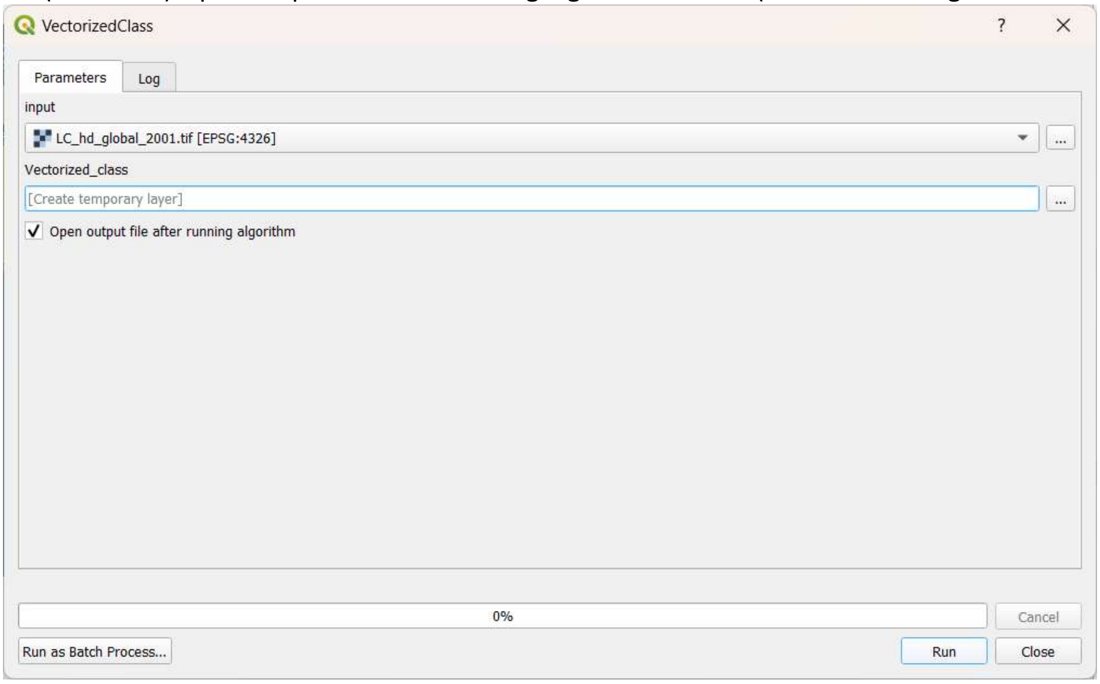
Step VII: Add Layer → Add Raster Layer → […]

[LC_hd_global _2001.tif]→ Add → Close

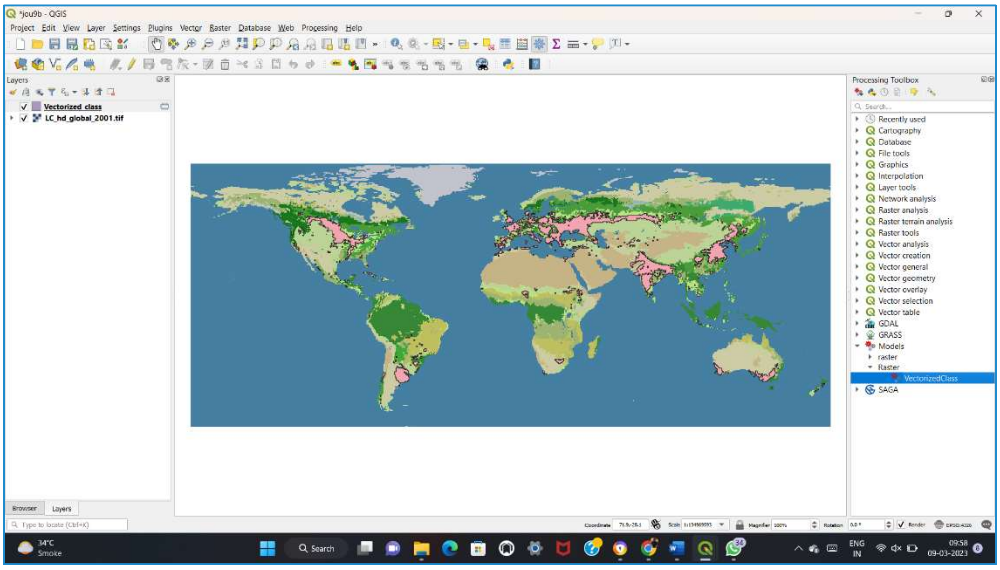




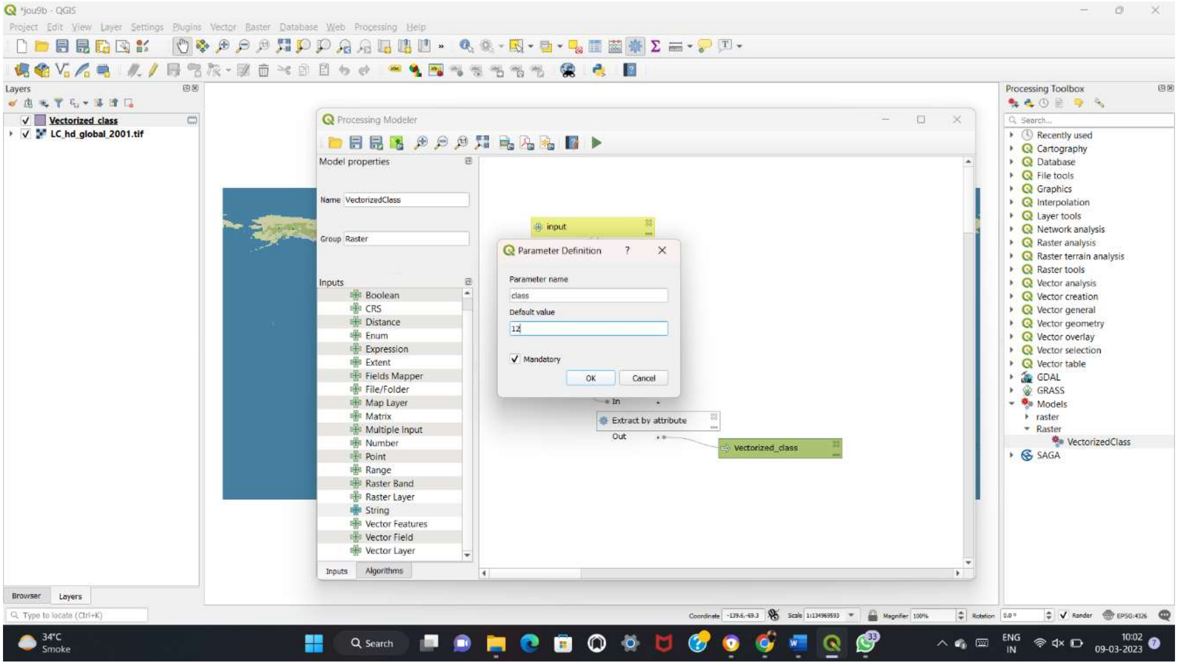
Step VIII: Processing → toolbox → Models → Raster → vectoriced(Double click on it.)
Input [LC_hd_global _2001.tif]
(checkbox) Open output file after running algorithm → Run (We are checking whether output model is corrected)



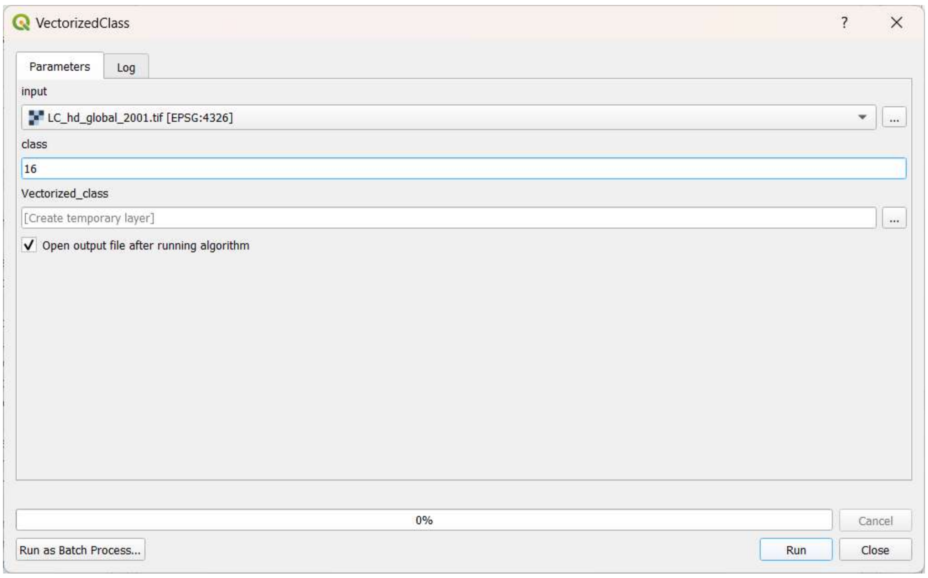
Step IX: processing→toolbox→raster→vectorized(right click on it) →edit model

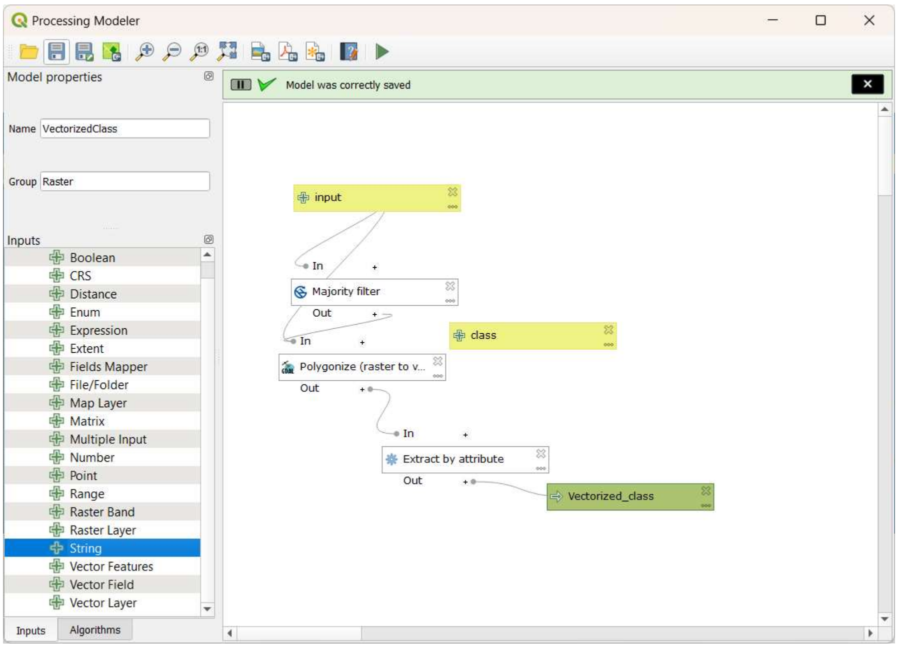


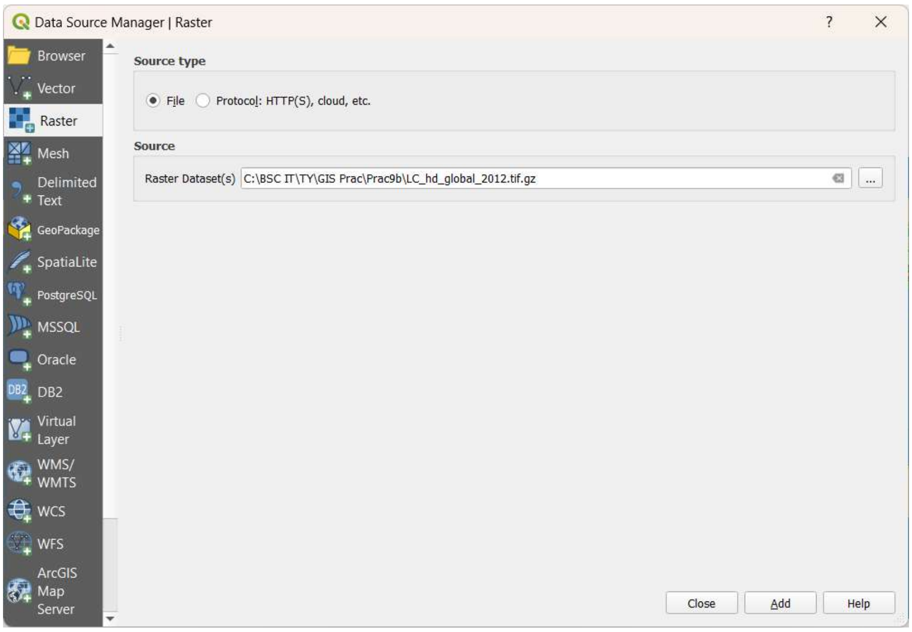
Step X:inputs→string→parameter name: class, value: 12→mandatory→ok



Step XI: Select Extract by attribute from Canvas → Value → [/] → Model Input → OK
(Now Extract by attribute will have two inputs)
Step XII: Click on [pause btn] → Run
Step XIII: Class [16]
Input [LC_hd_global_2001.tif] → Run → Close ->Save
Add layer → Add Raster layer (LC_hd_global_2001.tif.gz) → Add → Close





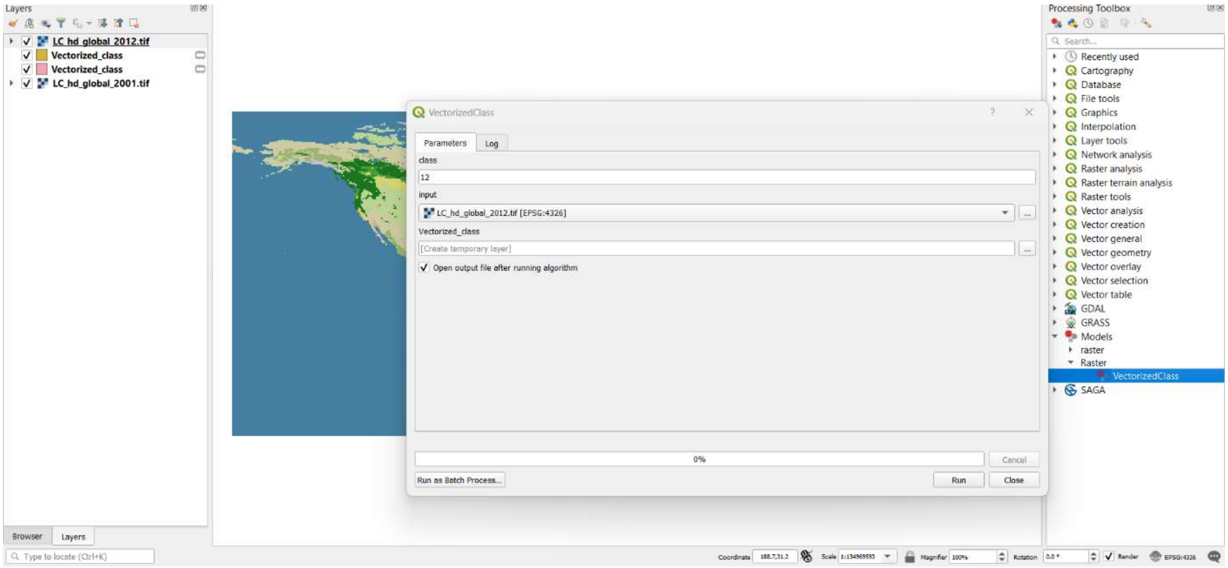


Step XIV: Processing toolbox → Models → raster →vectorized

Class[12]

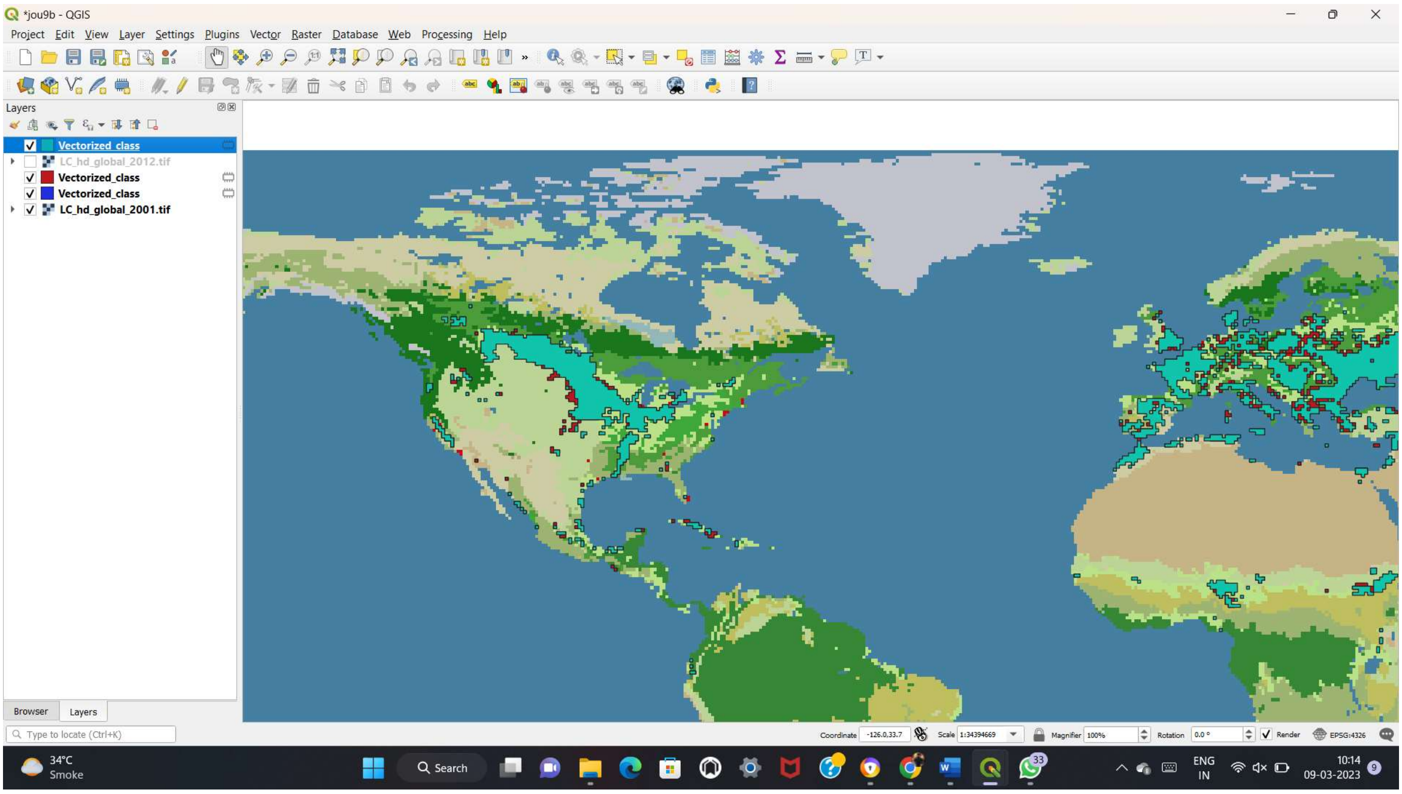
Input [LC_hd_global _2012.tif]

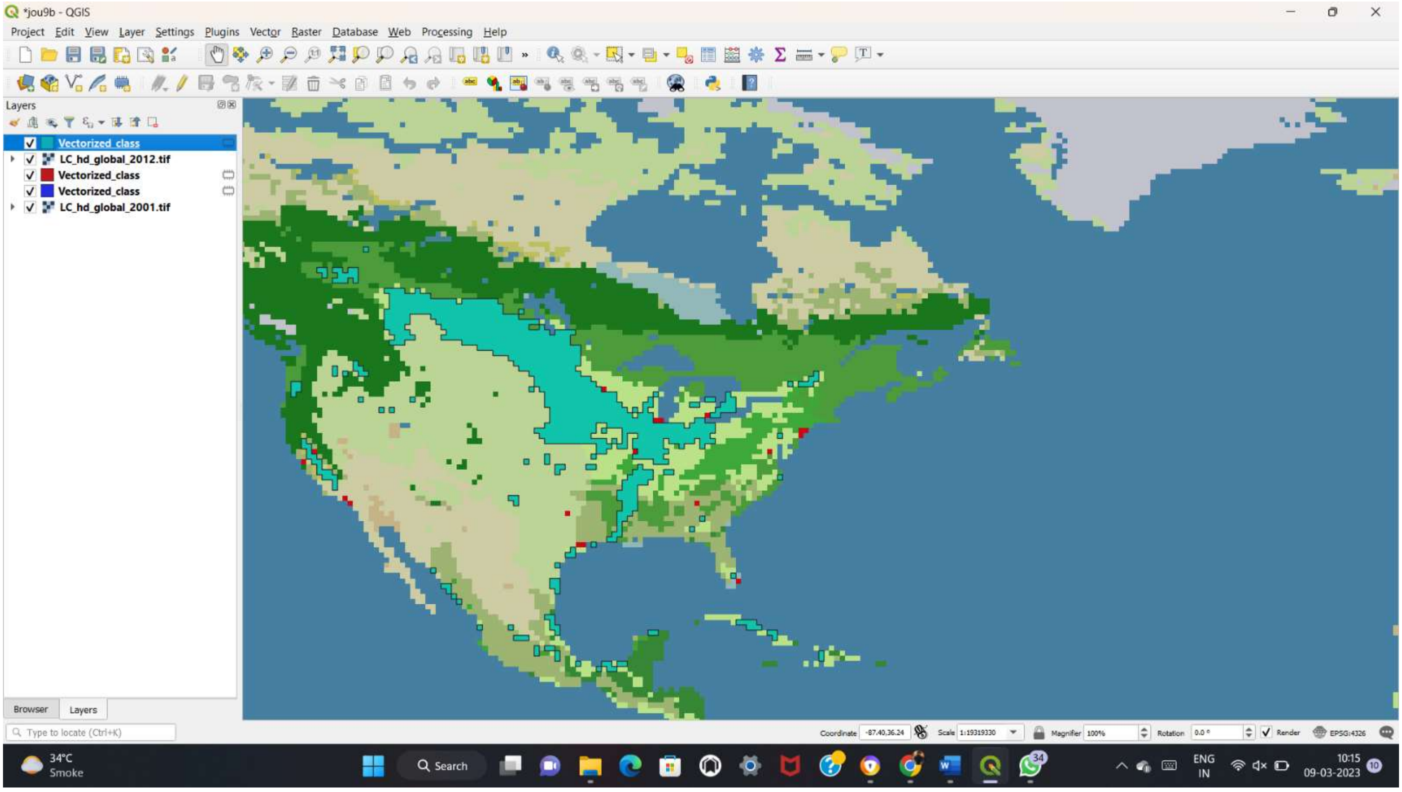
→ Run → Close



Step XV: Disselect vectoniced class & LC_hd_global. 2012.tif

OUTPUT:




*jou9b - QGIS
Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help
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LC_hd_global_2012.tif
Vectorized_class
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LC_hd_global_2001.tif
Browser
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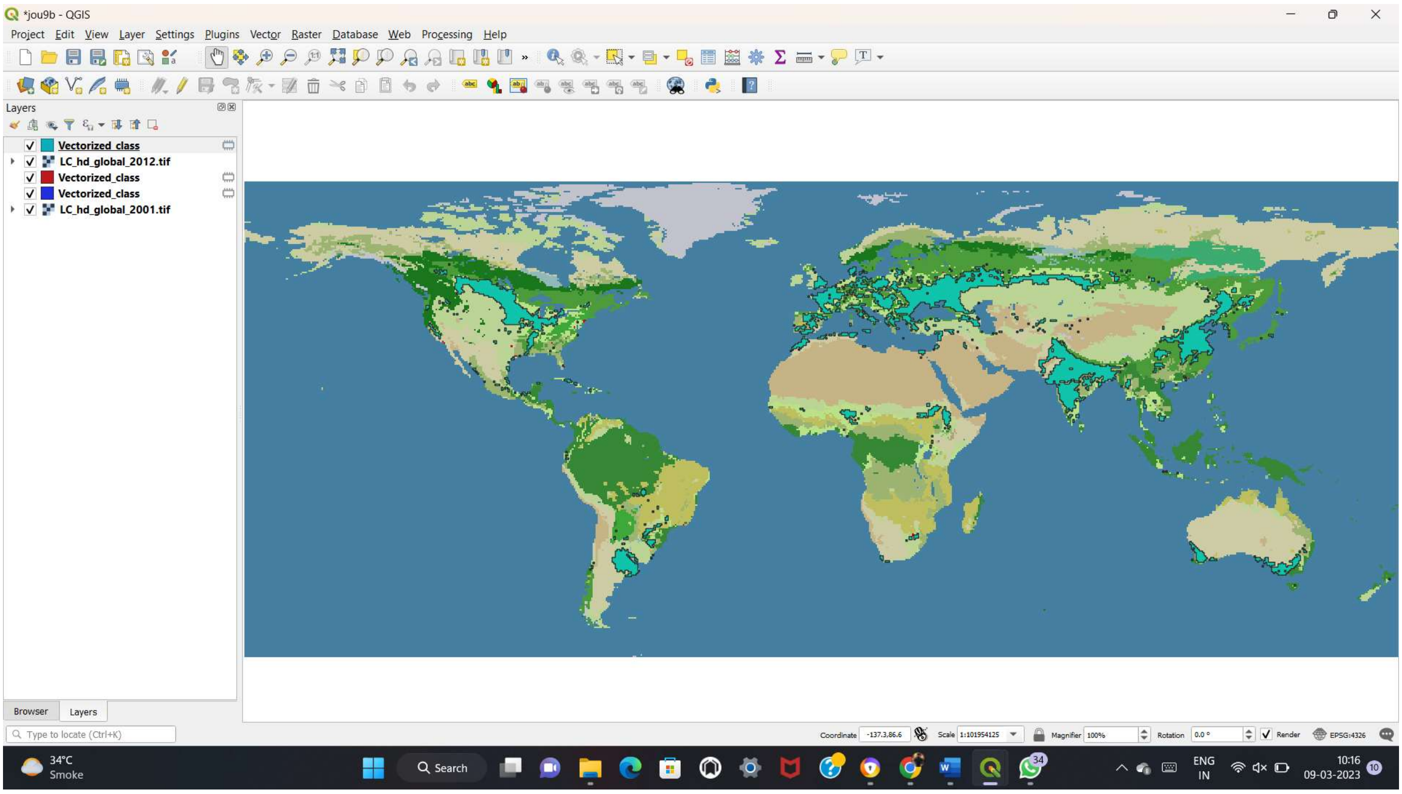
*jou9b - QGIS
Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help
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