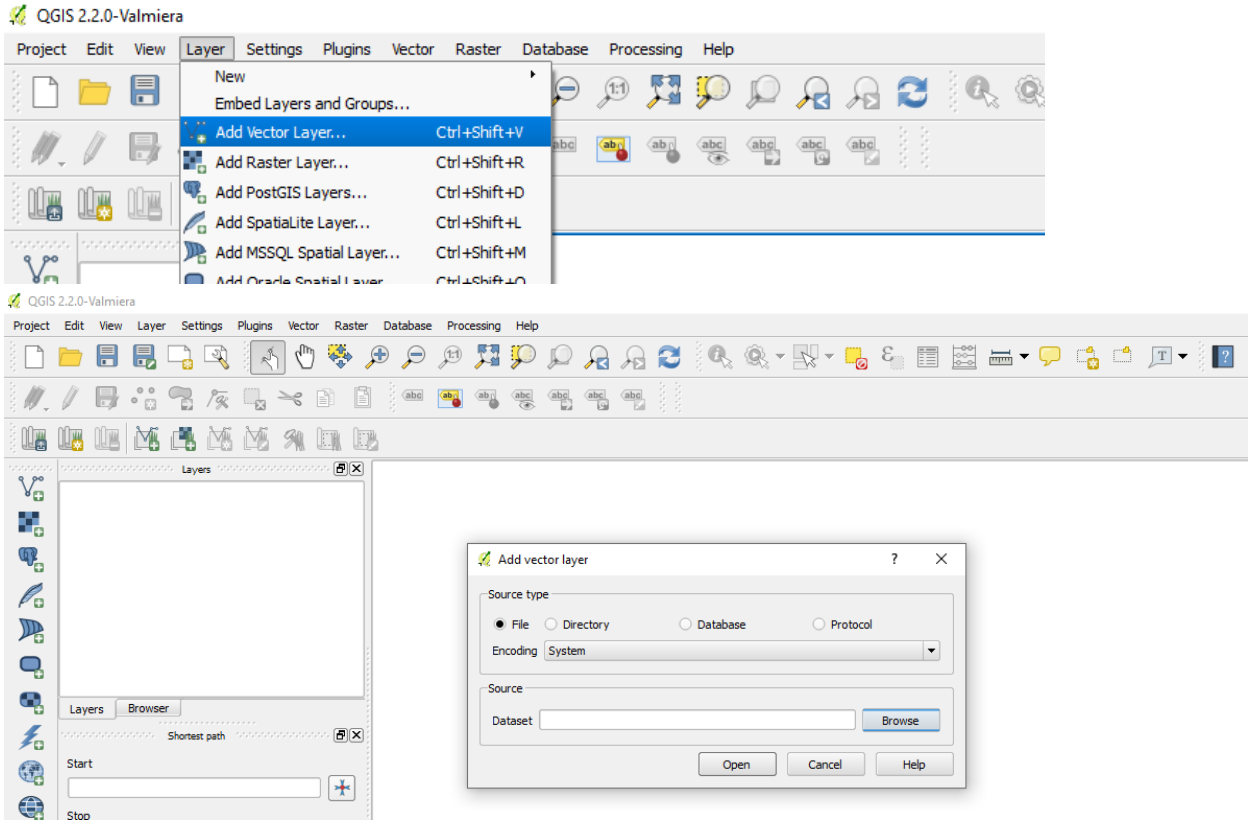
Practical No. 4:

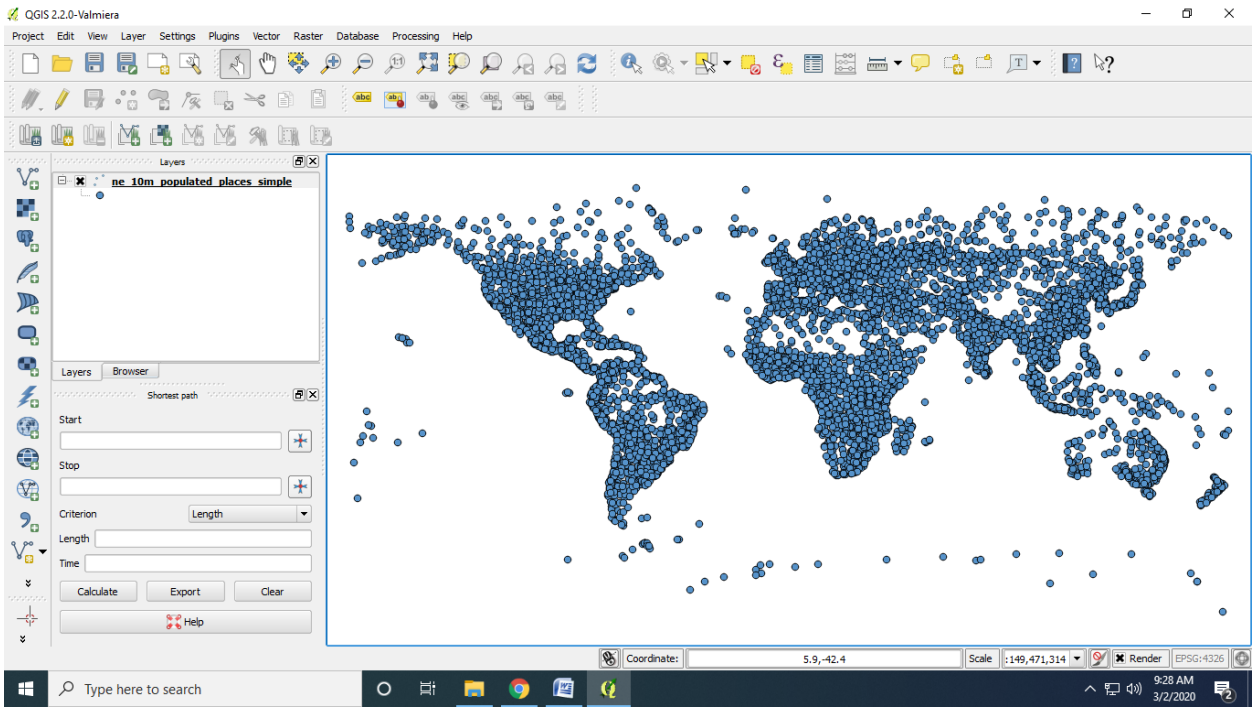
Aim: A) Working with attributes.

B) Working with Terrain data

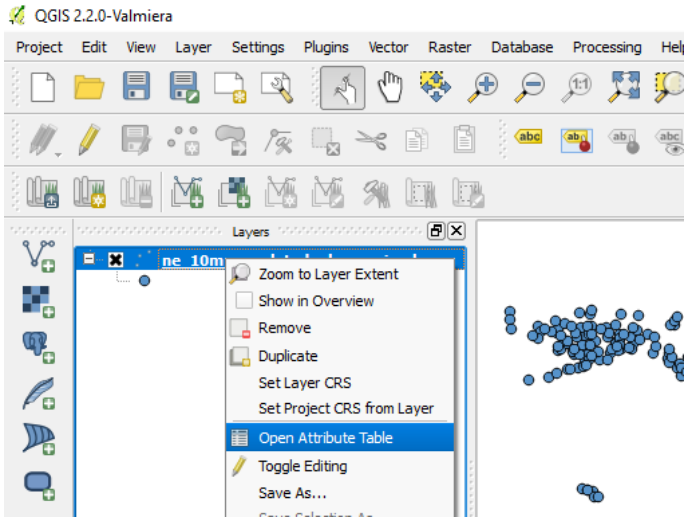
1. Add vector layer “ne_10m_populated_places_simple.zip” from Practical_No_4 folder.



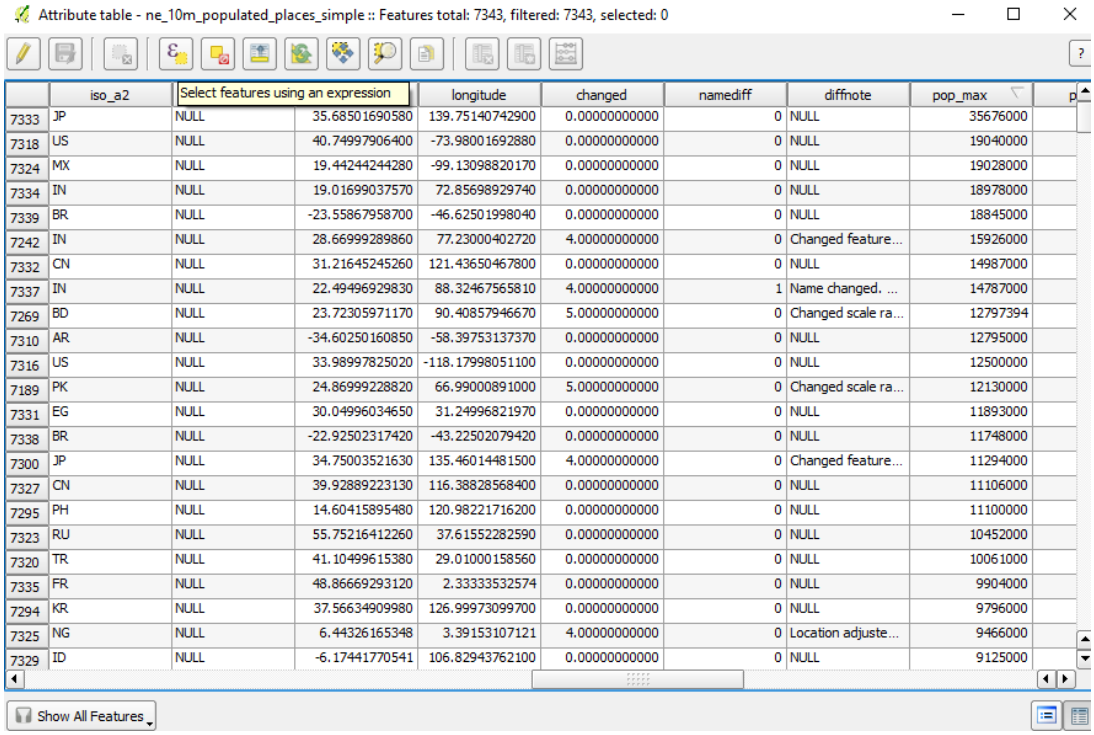
2. The selected layer is loaded in QGIS and we can see many points representing the populated places of the world.



3. Right-click on the layer and select Open Attribute Table.

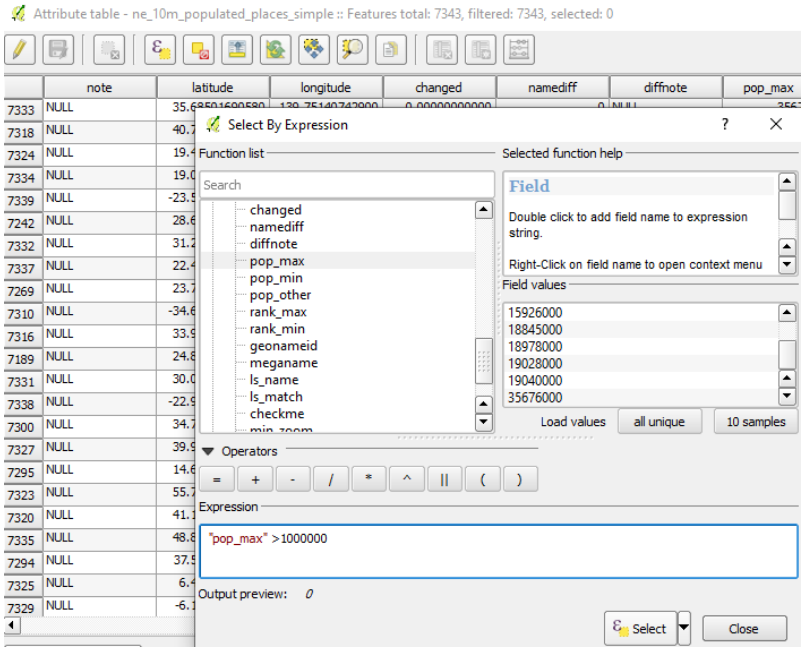


4. Observe the table carefully. We are interested in the pop_max, click twice on the field header to sort the column in descending order.
5. Now we are ready to perform our query on these attributes. Click Select features using an expression.

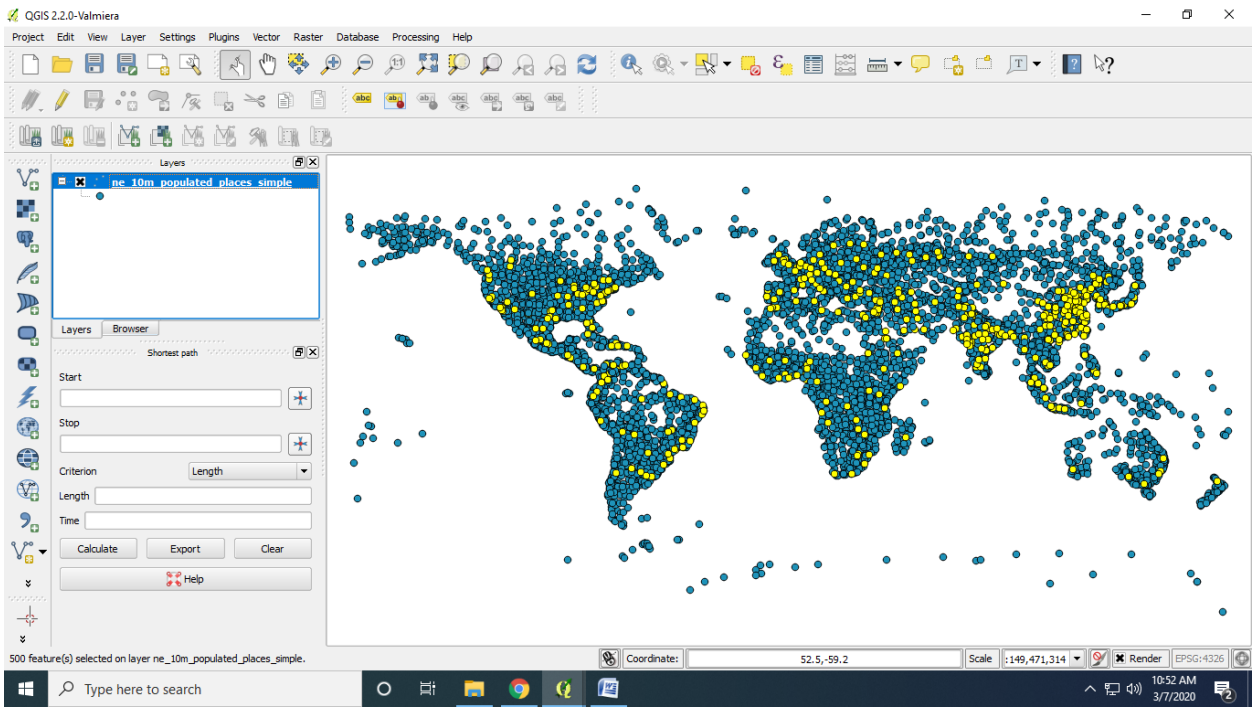


	iso_a2			longitude	changed	namediff	diffnote	pop_max
7333	JP	NULL	35.68501690580	139.75140742900	0.00000000000	0	NULL	35676000
7318	US	NULL	40.74997906400	-73.98001692880	0.00000000000	0	NULL	19040000
7324	MX	NULL	19.44244244280	-99.13098820170	0.00000000000	0	NULL	19028000
7334	IN	NULL	19.01699037570	72.85698929740	0.00000000000	0	NULL	18978000
7339	BR	NULL	-23.55867958700	-46.62501998040	0.00000000000	0	NULL	18845000
7242	IN	NULL	28.66999289860	77.23000402720	4.00000000000	0	Changed feature...	15926000
7332	CN	NULL	31.21645245260	121.43650467800	0.00000000000	0	NULL	14987000
7337	IN	NULL	22.49496929830	88.32467565810	4.00000000000	1	Name changed. ...	14787000
7269	BD	NULL	23.72305971170	90.40857946670	5.00000000000	0	Changed scale ra...	12797394
7310	AR	NULL	-34.60250160850	-58.39753137370	0.00000000000	0	NULL	12795000
7316	US	NULL	33.98997825020	-118.17998051100	0.00000000000	0	NULL	12500000
7189	PK	NULL	24.86999228820	66.99000891000	5.00000000000	0	Changed scale ra...	12130000
7331	EG	NULL	30.04996034650	31.24996821970	0.00000000000	0	NULL	11893000
7338	BR	NULL	-22.92502317420	-43.22502079420	0.00000000000	0	NULL	11748000
7300	JP	NULL	34.75003521630	135.46014481500	4.00000000000	0	Changed feature...	11294000
7327	CN	NULL	39.92889223130	116.38828568400	0.00000000000	0	NULL	11106000
7295	PH	NULL	14.60415895480	120.98221716200	0.00000000000	0	NULL	11100000
7323	RU	NULL	55.75216412260	37.61552282590	0.00000000000	0	NULL	10452000
7320	TR	NULL	41.10499615380	29.01000158560	0.00000000000	0	NULL	10061000
7335	FR	NULL	48.86669293120	2.33333532574	0.00000000000	0	NULL	9904000
7294	KR	NULL	37.56634909980	126.99973099700	0.00000000000	0	NULL	9796000
7325	NG	NULL	6.44326165348	3.39153107121	4.00000000000	0	Location adjuste...	9466000
7329	ID	NULL	-6.17441770541	106.82943762100	0.00000000000	0	NULL	9125000

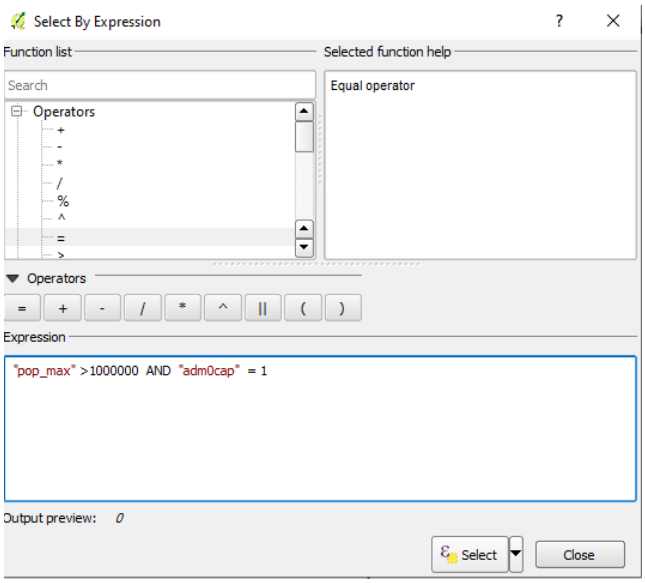
6. In the “Select By Expression” window, expand the Fields and Values section and double-click the pop_max label. This field name is added to the expression section at the bottom. If we don’t have idea about the field values, we can click the Load all unique values to see what the attribute values. For this exercise, we are looking for all features that have a population greater than 1,000,000. So complete the expression as given below.



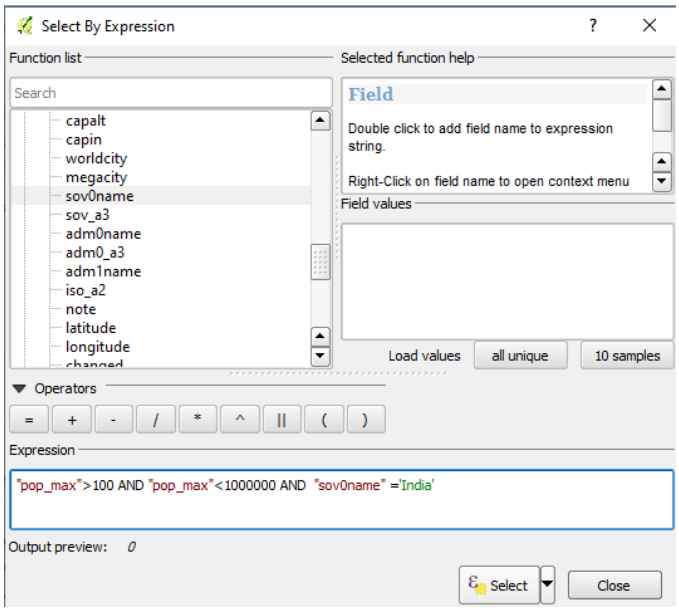
7. A subset of points is now rendered in yellow. This is the result of query representing all places from the dataset that have the pop_max attribute value greater than 1,000,000.

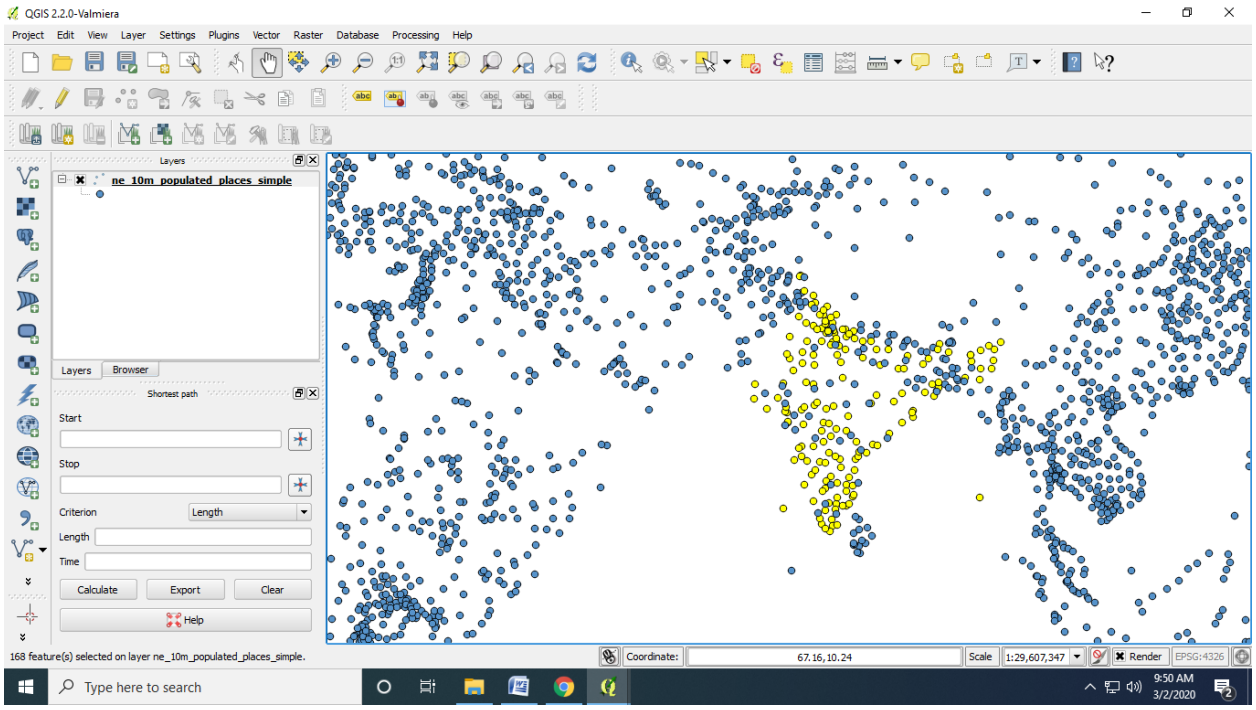


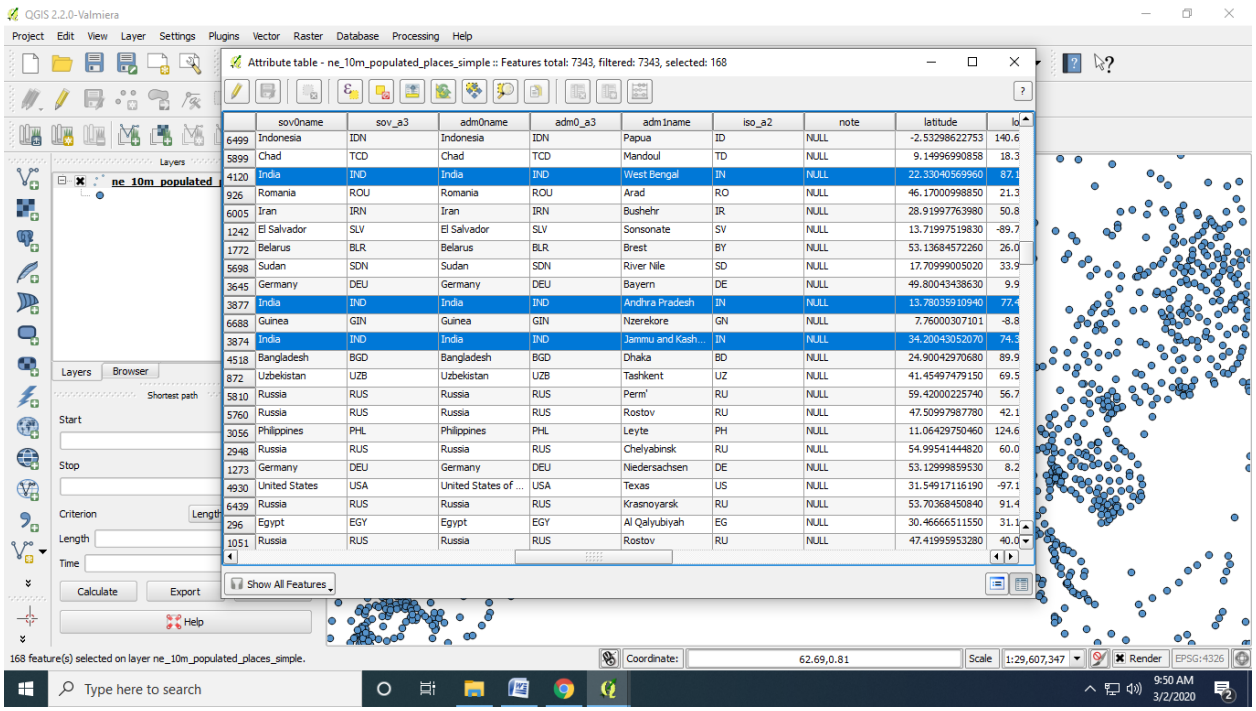
8. To find the places that are country capitals and pop_max is greater than 1000000. Country capital column is adm0cap and 1 represents country capital.



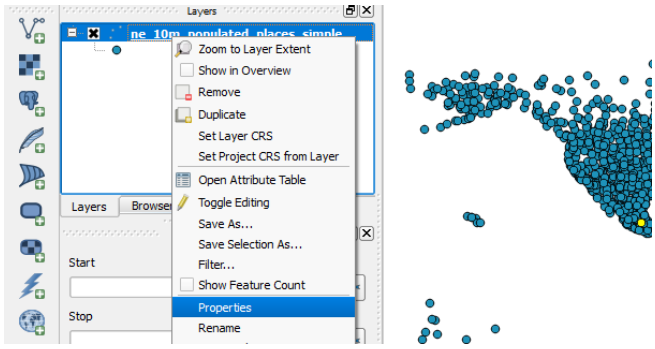
Similarly, to find Indian location where pop_max greater than 100 and less than 1000000.


Select By Expression
Function list
Selected function help
Search
capalt
capin
worldcity
megacity
sov0name
sov_a3
adm0name
adm0_a3
adm1name
iso_a2
note
latitude
longitude
Field
Double click to add field name to expression string.
Right-Click on field name to open context menu
Field values
Load values
all unique
10 samples
Operators
= + - / * ^ || ( )
Expression
"pop_max">100 AND "pop_max"<1000000 AND "sov0name" ='India'
Output preview: 0
Select
Close

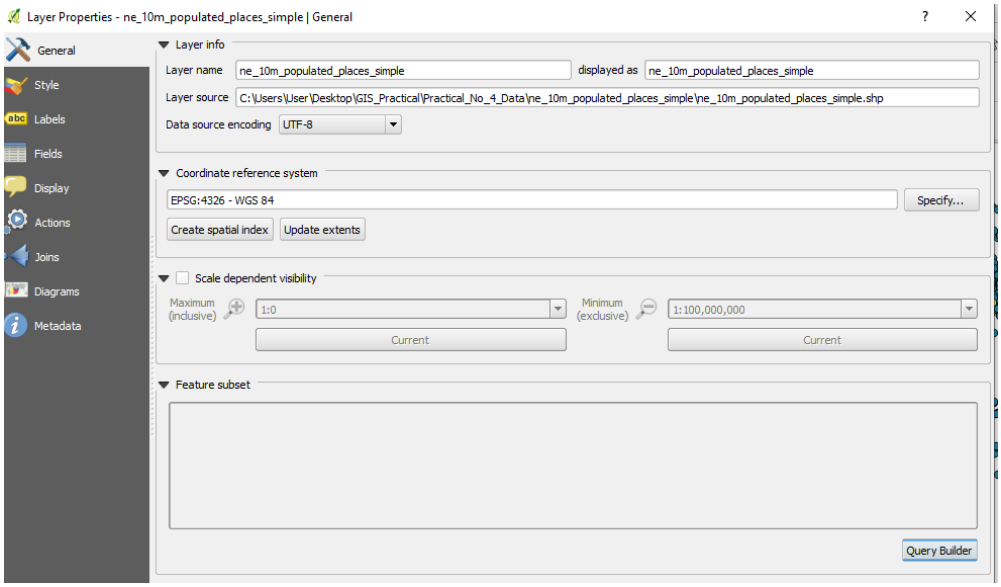

QGIS 2.2.0-Valmiera
Project Edit View Layer Settings Plugins Vector Raster Database Processing Help
Layers
ne_10m_populated_places_simple
Layers Browser
Shortest path
Start
Stop
Criterion Length
Length
Time
Calculate Export Clear
Help
168 feature(s) selected on layer ne_10m_populated_places_simple.
Coordinate: 67.16,10.24
Scale 1:29,607,347
Render
EPSG:4326
Type here to search
9:50 AM
3/2/2020



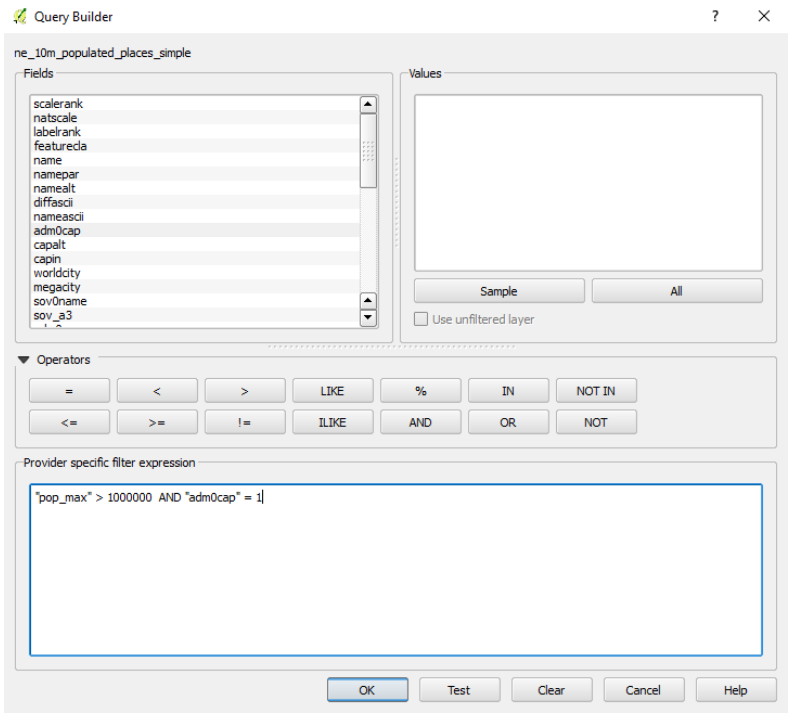
9. Return to main QGIS window, to do some further analysis on this subset of data right-click on the ne_10m_populated_places_simple layer and select Properties.



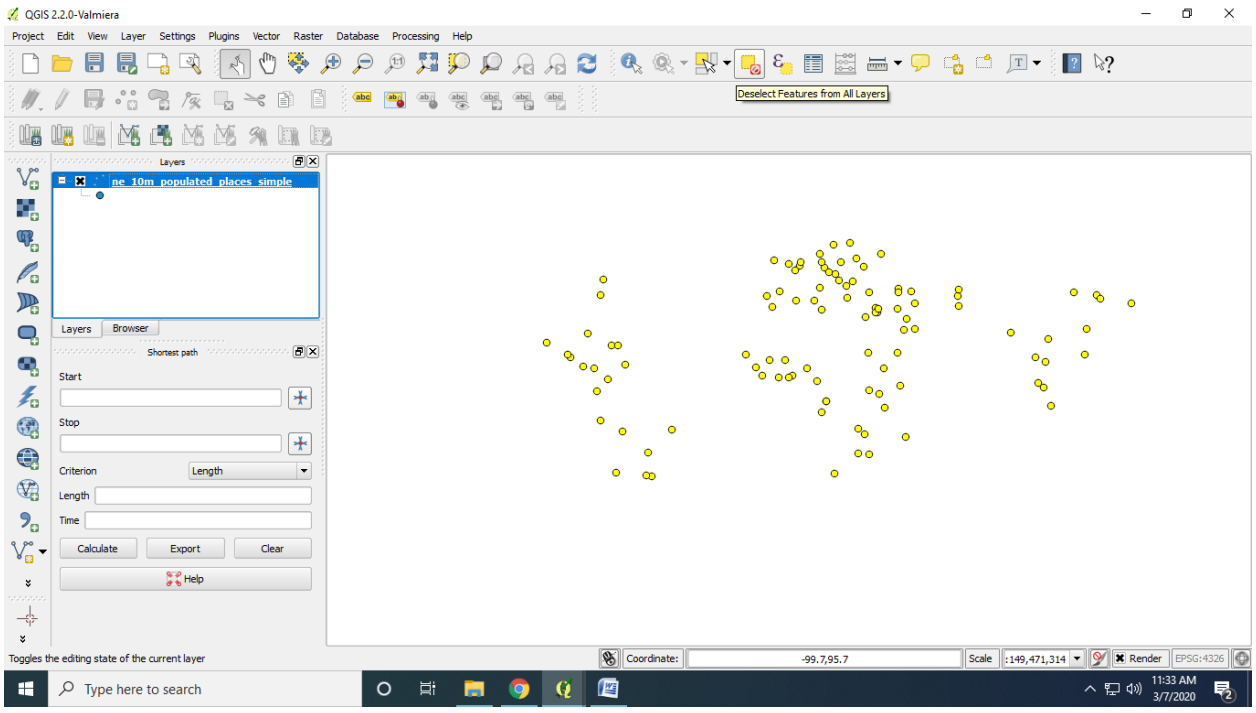
10. Click on General tab, scroll down to the Feature subset section and click on Query Builder button.

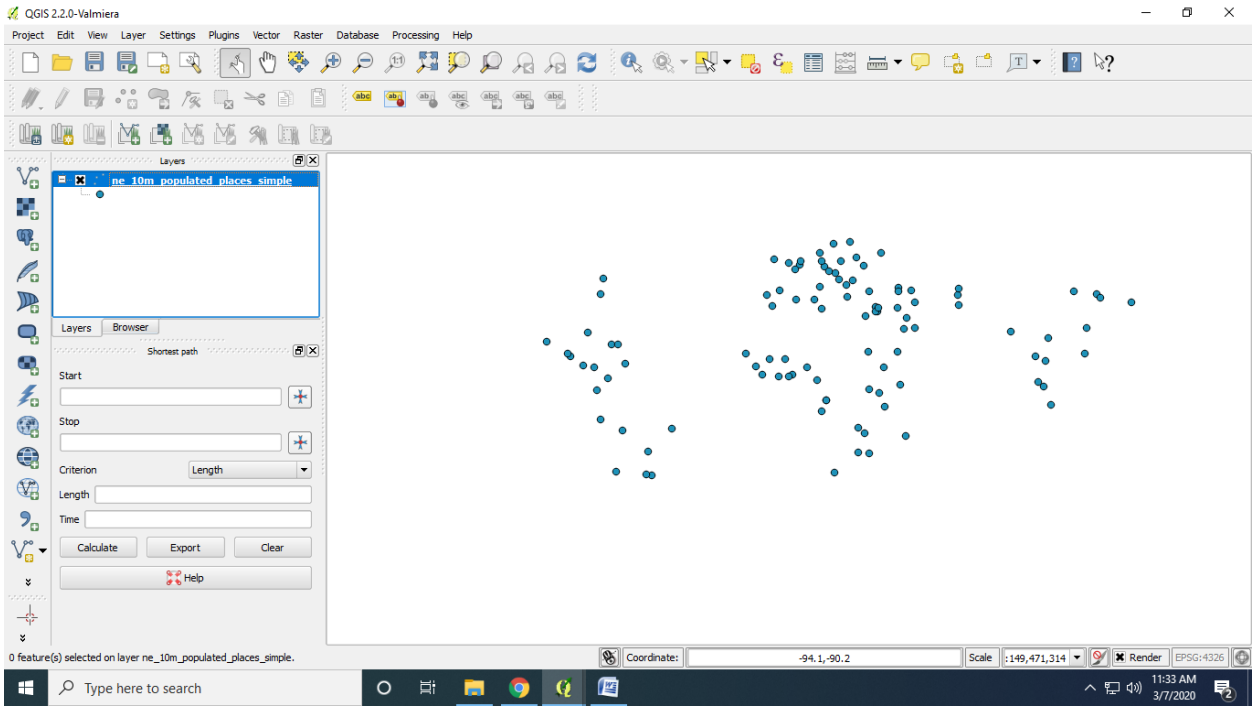


11. Enter the same expression which we had entered earlier and click OK.



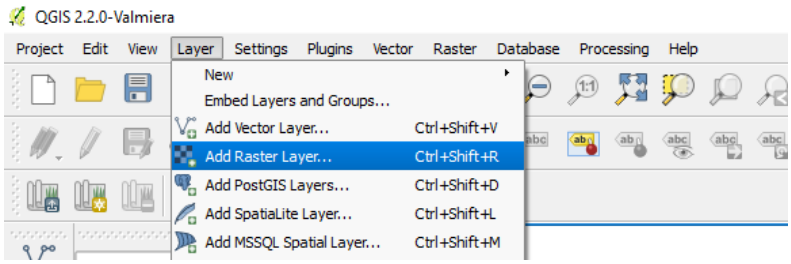
12. Return in the main QGIS window, we can see all the points disappear except those which satisfy the condition. This is because they are still selected. Click on the Deselect Features from All Layers button under the Attributes toolbar and click on it.


QGIS 2.2.0-Valmiera
Project Edit View Layer Settings Plugins Vector Raster Database Processing Help
Deselect Features from All Layers
Layers
ne_10m_populated_places_simple
Layers Browser
Shortest path
Start
Stop
Criterion Length
Length
Time
Calculate Export Clear
Help
Toggles the editing state of the current layer
Coordinate: -99.7,95.7
Scale :149,471,314
Render EPSG:4326
Type here to search
11:33 AM
3/7/2020

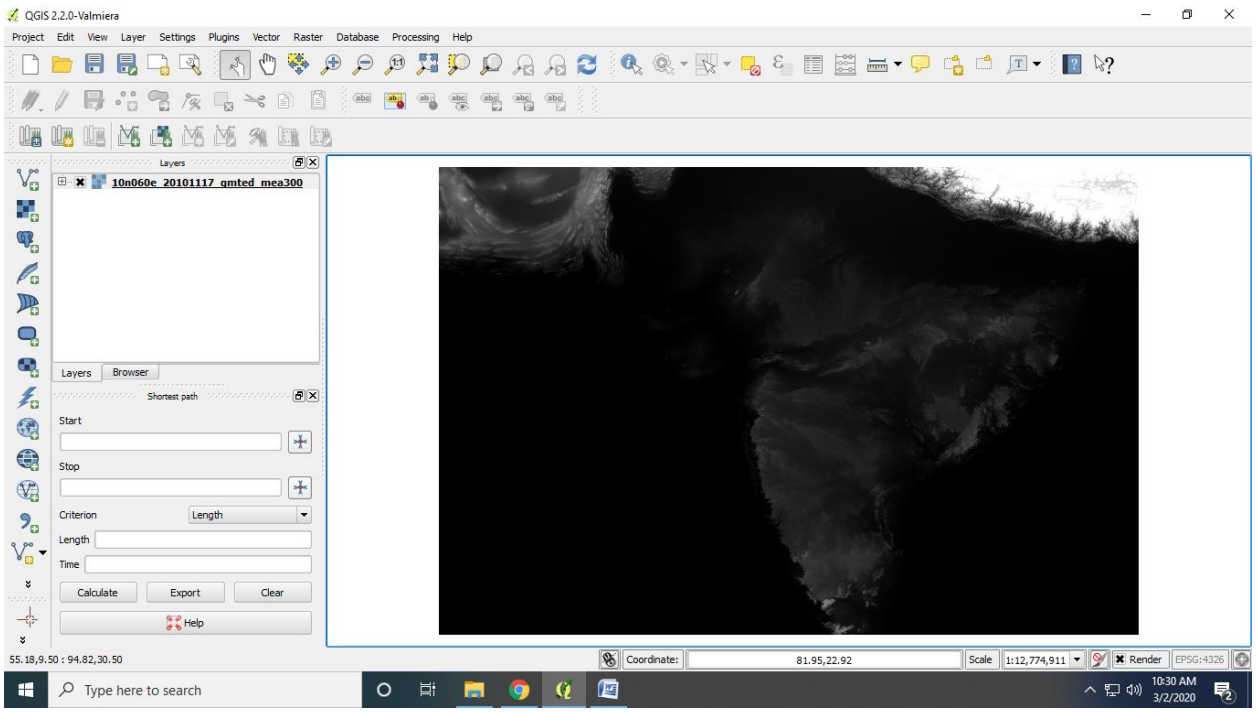

QGIS 2.2.0-Valmiera
Project Edit View Layer Settings Plugins Vector Raster Database Processing Help
Layers
ne_10m_populated_places_simple
Layers Browser
Shortest path
Start
Stop
Criterion Length
Length
Time
Calculate Export Clear
Help
0 feature(s) selected on layer ne_10m_populated_places_simple.
Coordinate: -94.1,-90.2
Scale :149,471,314
Render EPSG:4326
Type here to search
11:33 AM
3/7/2020

B) Working with Terrain data.

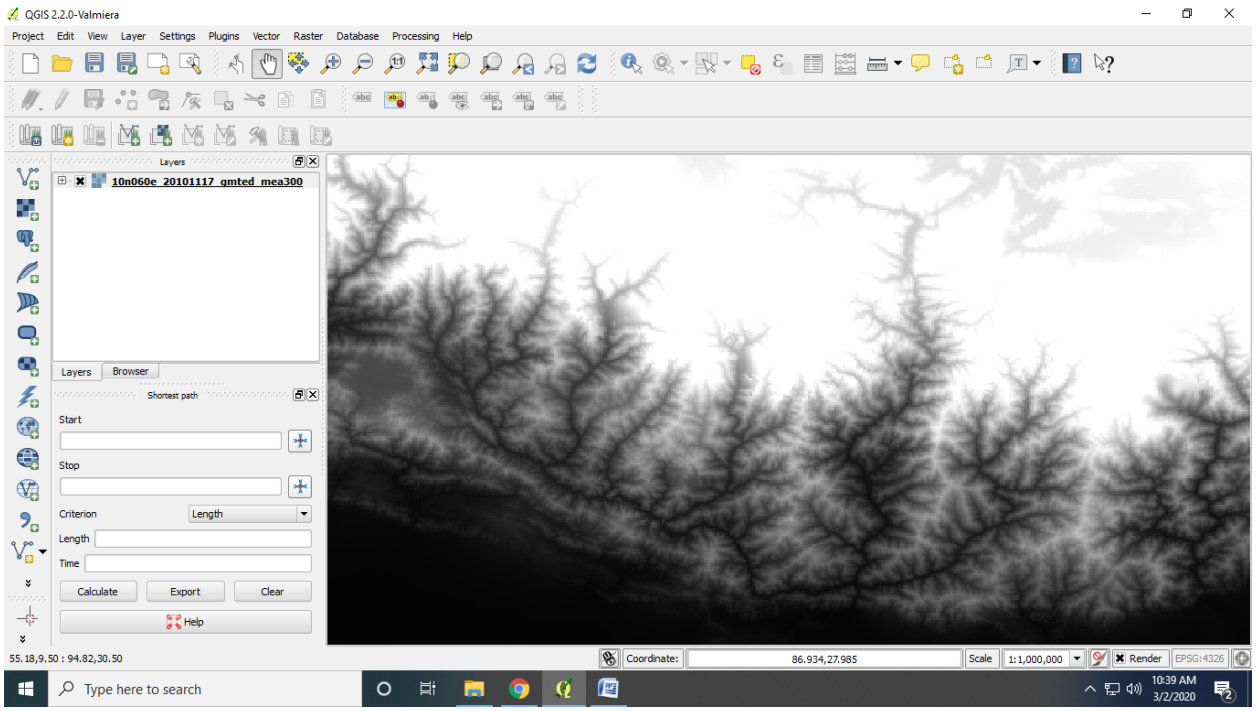
13. To add Raster Layer browse to the “10n060e_20101117_gmted_mea300.tif” file in Practical_no_4_data folder.



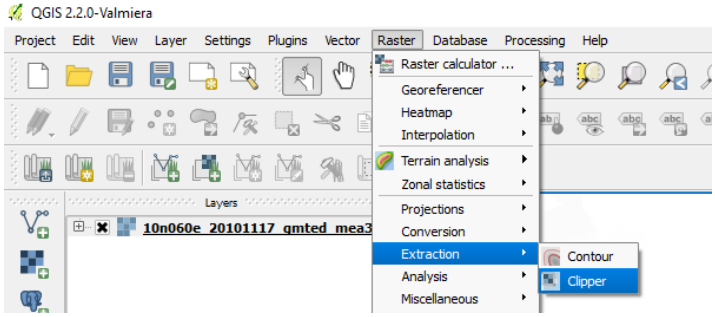
14. The terrain data is rendered in the QGIS Canvas. Each pixel in the terrain raster represents the average elevation in meters at each location. Dark pixels represent areas with low altitude and lighter pixels represent areas with high altitude.



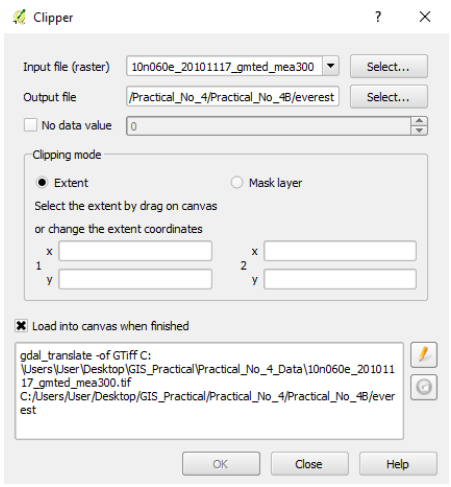
15. The coordinates for our area of interest i.e. Mt. Everest - is located at the coordinates 27.9881° N, 86.9253° E. As QGIS uses the coordinates in (X,Y) format , so enter the coordinates as (Longitude, Latitude) i.e. (86.9253,27.9881) at the bottom of QGIS window (Coordinate and press Enter). The viewport will be centered at this coordinate. Now to zoom in, Enter 1:1000000 in the Scale field and press Enter.



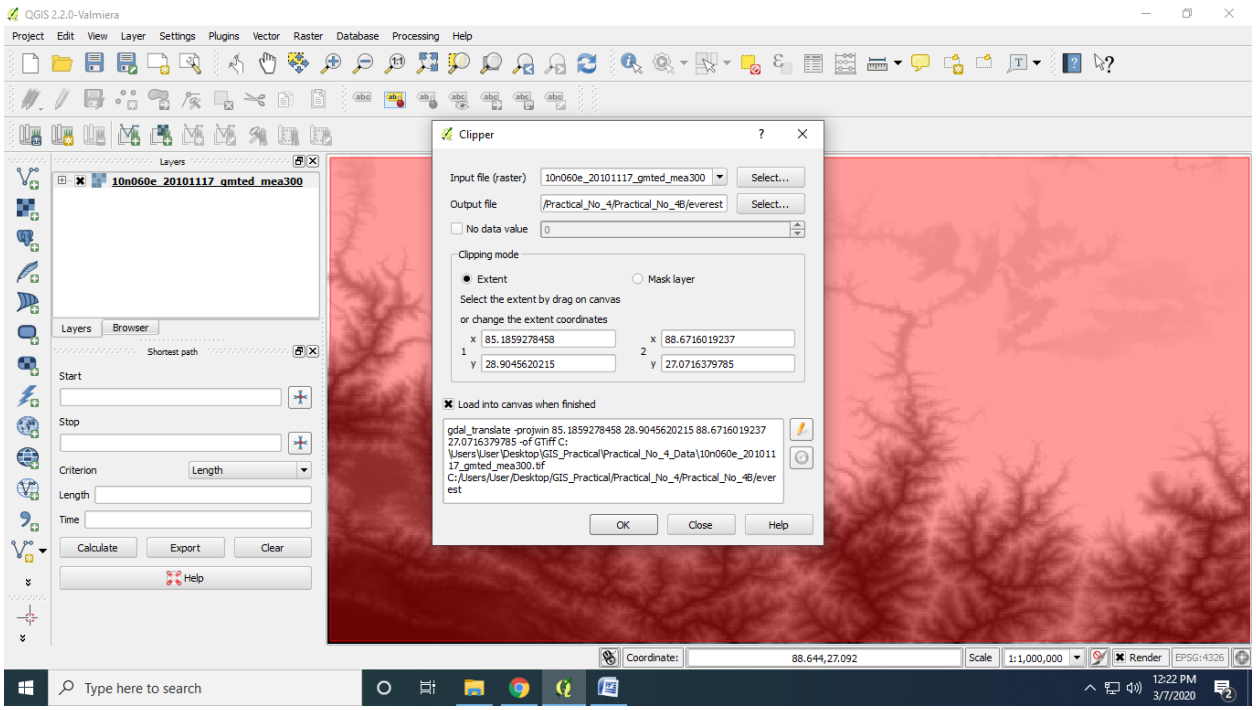
16. Now crop the raster to this area. Select the Clipper tool from Raster → Extraction → Clipper. (Required plugin- GdalTools)



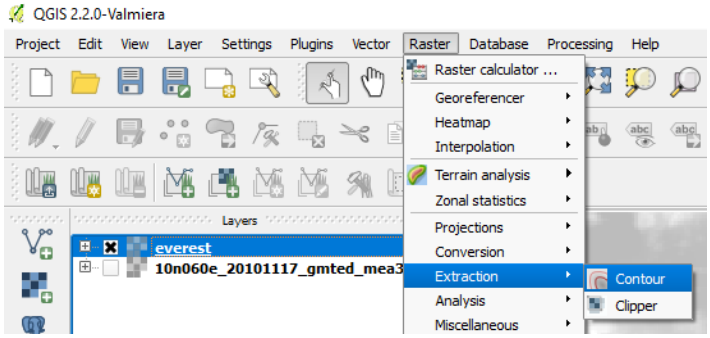
17. In the Clipper window, give name to output file as “everest”. Select the Clipping mode as Extent.



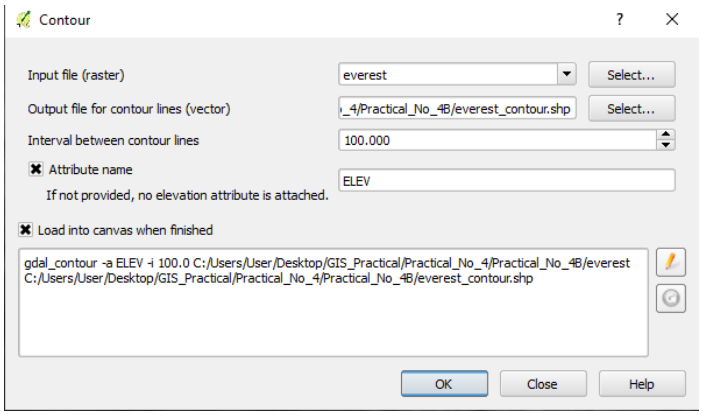
18. Keeping the Clipper window open switch to the main QGIS window. Hold left mouse button and draw a rectangle covering the full canvas.
19. Return back in the Clipper window, the coordinates are auto-populated from selection. Check Load into canvas when finished check box, and click on OK.



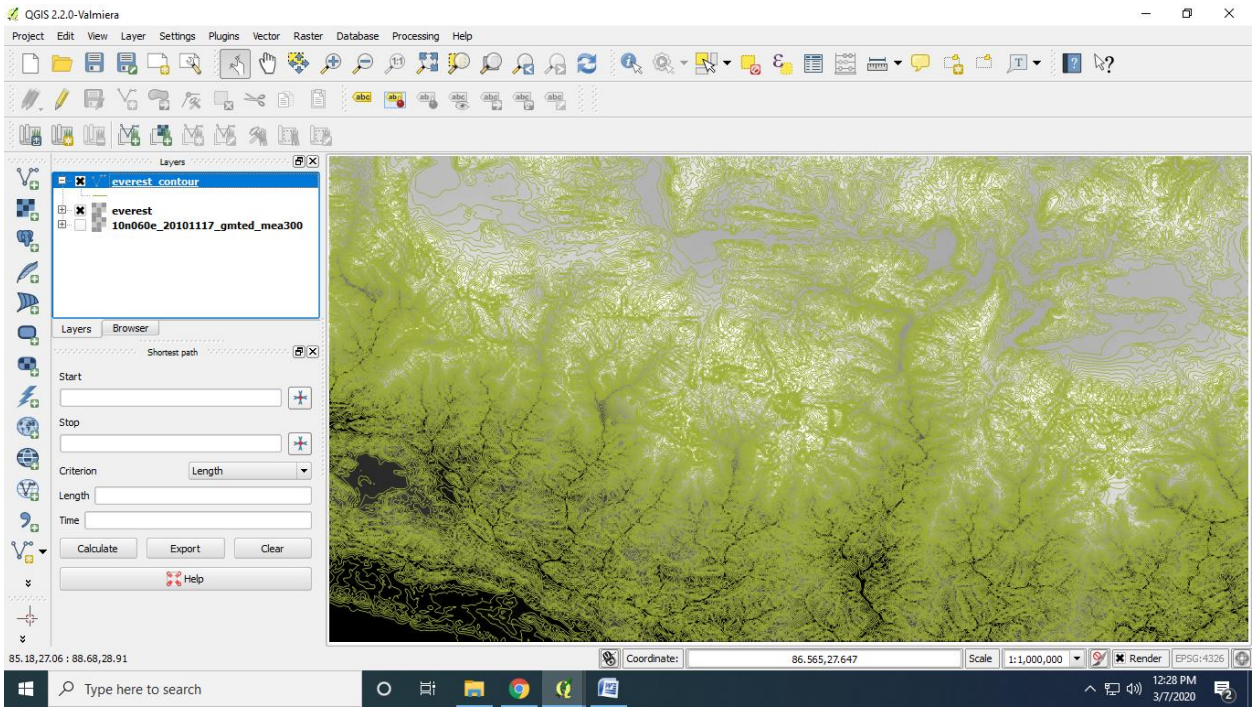
20. Deselect the original layer from layer pane. A new layer is loaded in QGIS. This layer covers only the area around Mt. Everest. To generate contour select the contour tool from Raster → Extraction → Contour.

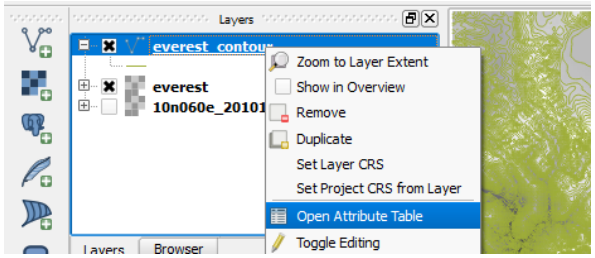


21. In the Contour dialog, select “everest” as the Input file. Give name to the Output file for contour lines as everest_countours.shp. Generate contour lines for 100m intervals. Check the “Attribute name” option so elevation value will be recorded as attribute of each contour line and check “Load into canvas when finished” then Click OK.

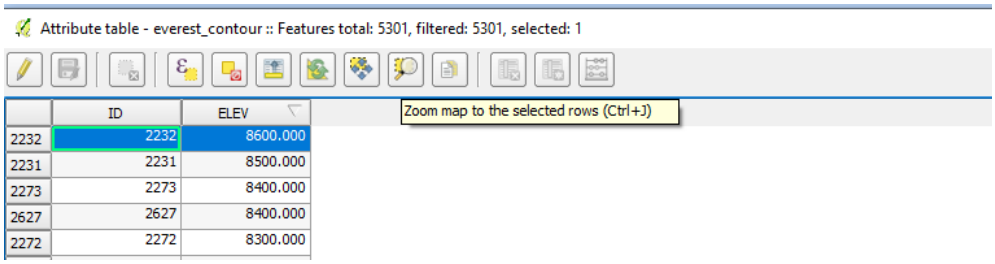


22. Contour lines are loaded into the canvas. Each line represents a particular elevation value. Closer the lines, the steeper the slope. Right click on the contours layer and choose “Open Attribute Table”.



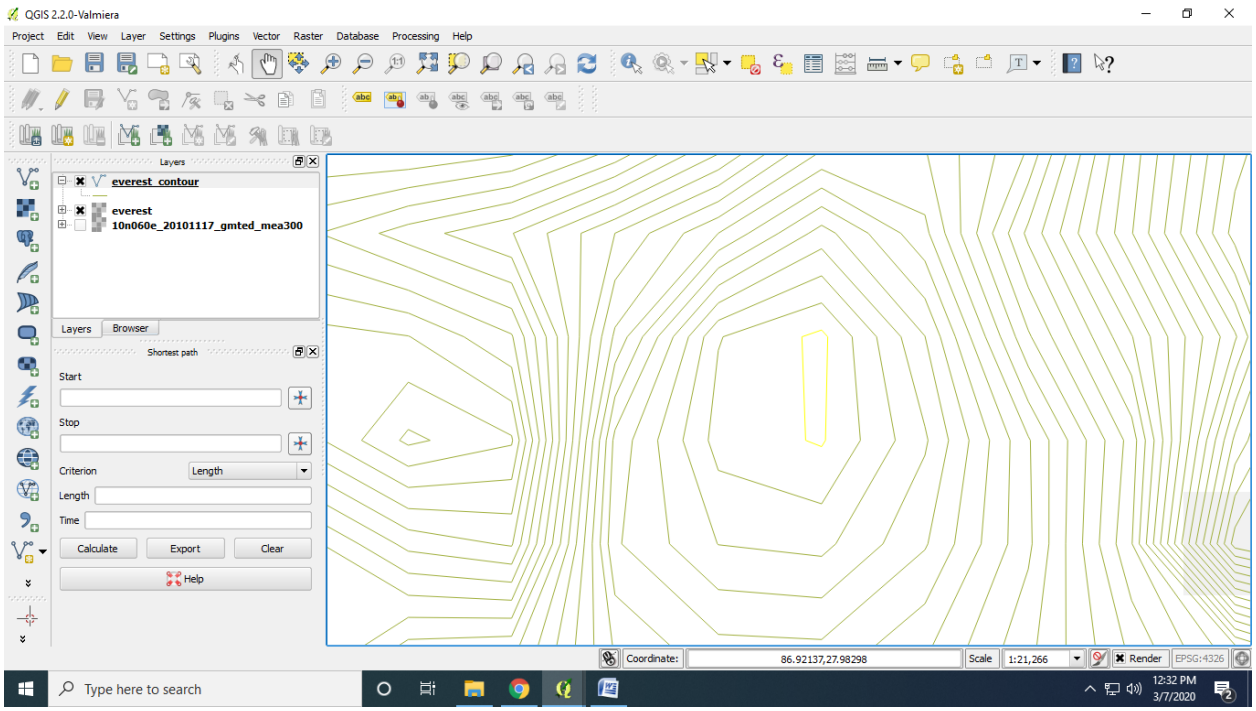


23. Each line feature has an attribute named ELEV. This is the height in meters that each line represents. Click on the column header a couple of times to sort the values in descending order. Here we can see the line representing the highest elevation in our data, i.e. Mt. Everest.
24. Select the first row, and click on the “Zoom map to the selected rows” button.



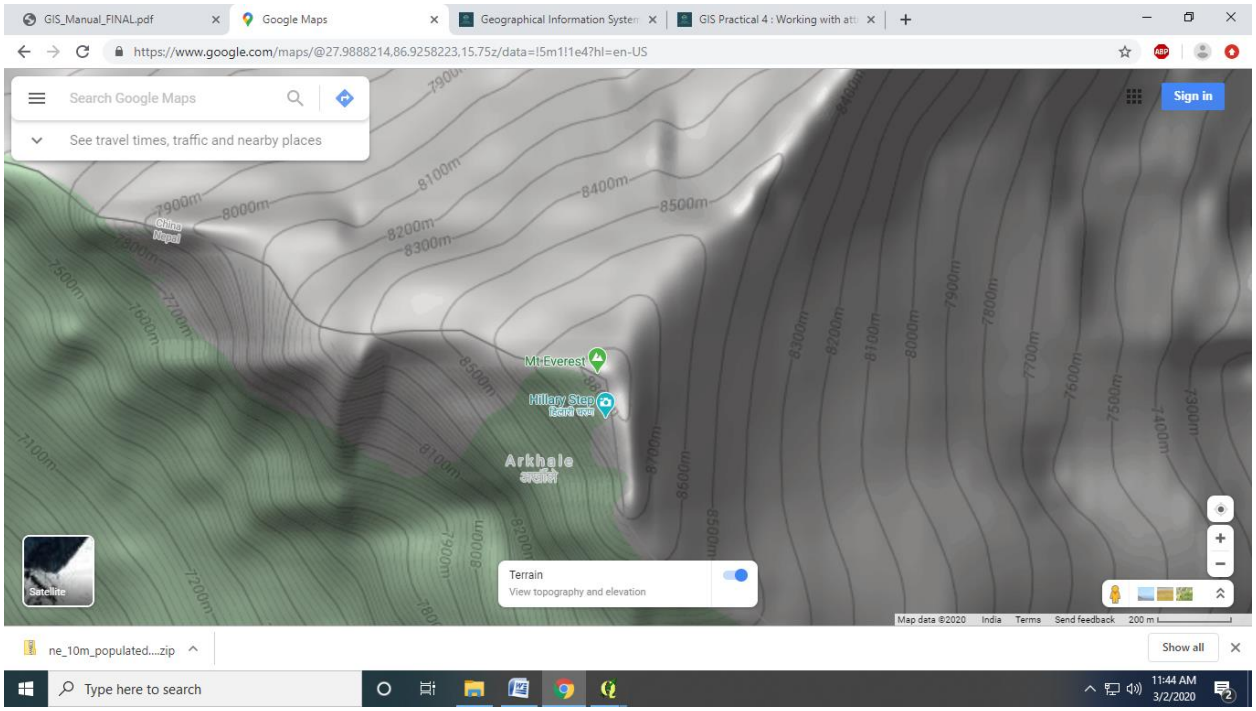
	ID	ELEV
2232	2232	8600.000
2231	2231	8500.000
2273	2273	8400.000
2627	2627	8400.000
2272	2272	8300.000

25. Return to the main QGIS window. We can see the selected contour line highlighted in yellow. This is the area of the highest elevation present in our dataset.

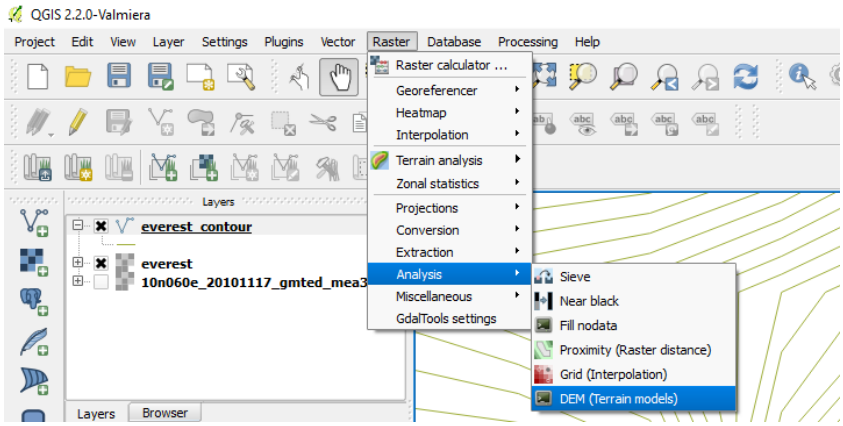


26. To display label with contour lines open property window for everest_contour layer and under labels tab check the checkbox Label with and from dropdown select ELEV. Now just for faster processing further we can hide the label again by unchecking the same checkbox.

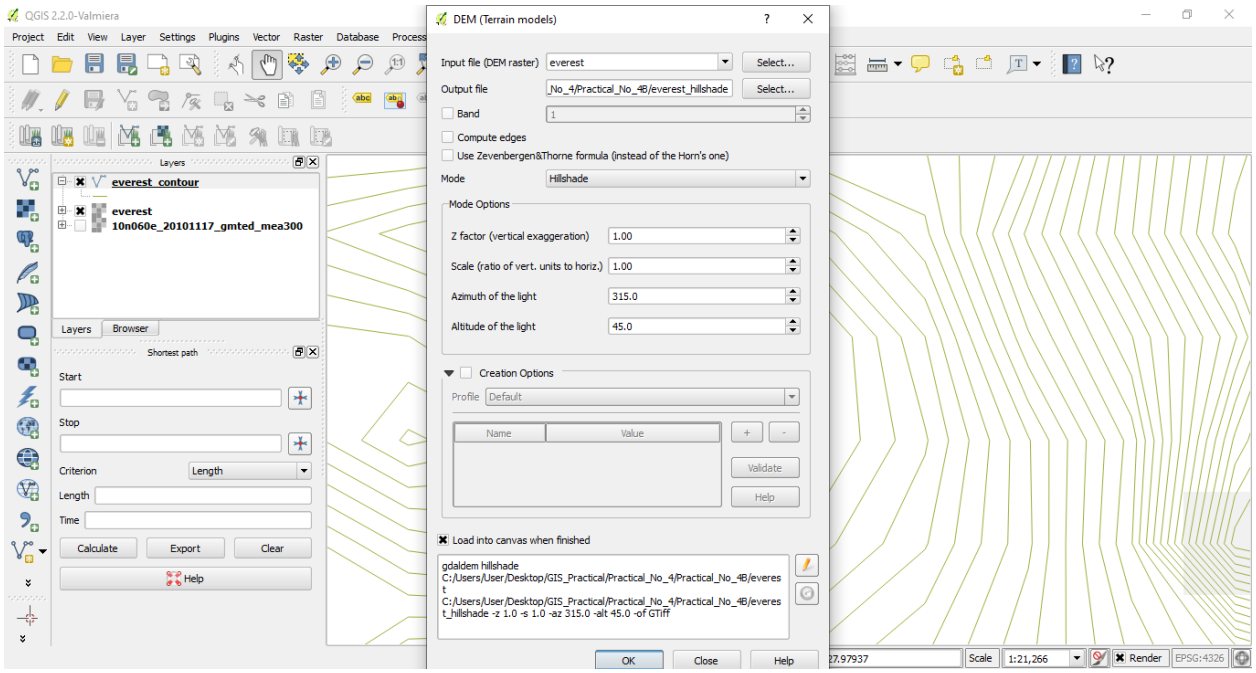
https://www.google.com/maps/@27.9857765,86.9285378,14.75z/data=!5m1!1e4?hl=en-US



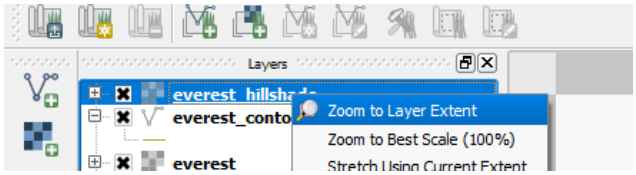
27. Now to create a hillshade map from the raster, select Raster → Analysis → DEM (Terrain Models).



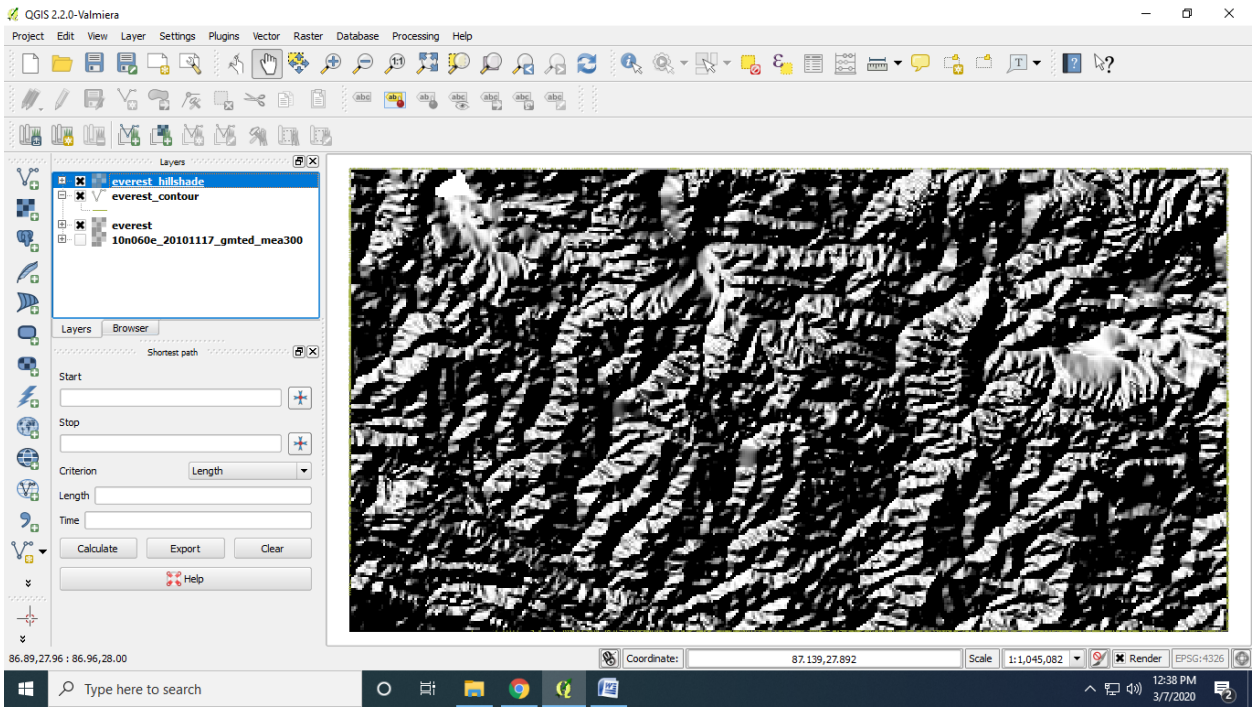
28. In the DEM (Terrain Models) dialog, choose “everest” as the Input file. Give name to the Output file as everest_hillshade.tif. Select Hillshade as the Mode. Check the “Load into canvas when finished” option and click OK.

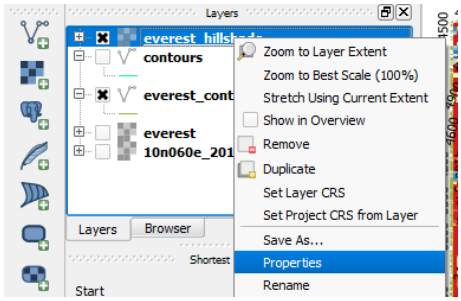


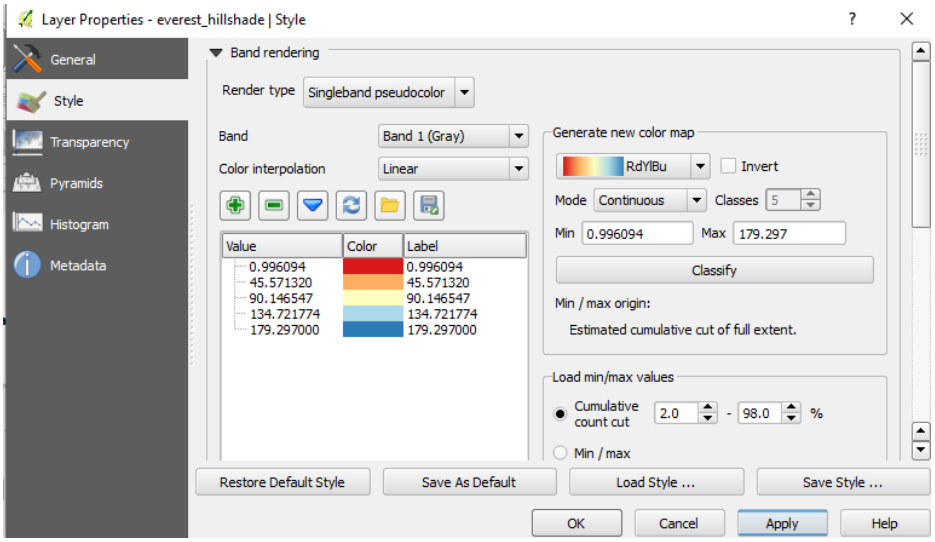
29. One more raster layer is loaded into QGIS canvas. To zoomed-in near the Mt.Everest region, right click on the everest_hillshade layer and choose Zoom to Layer Extent.

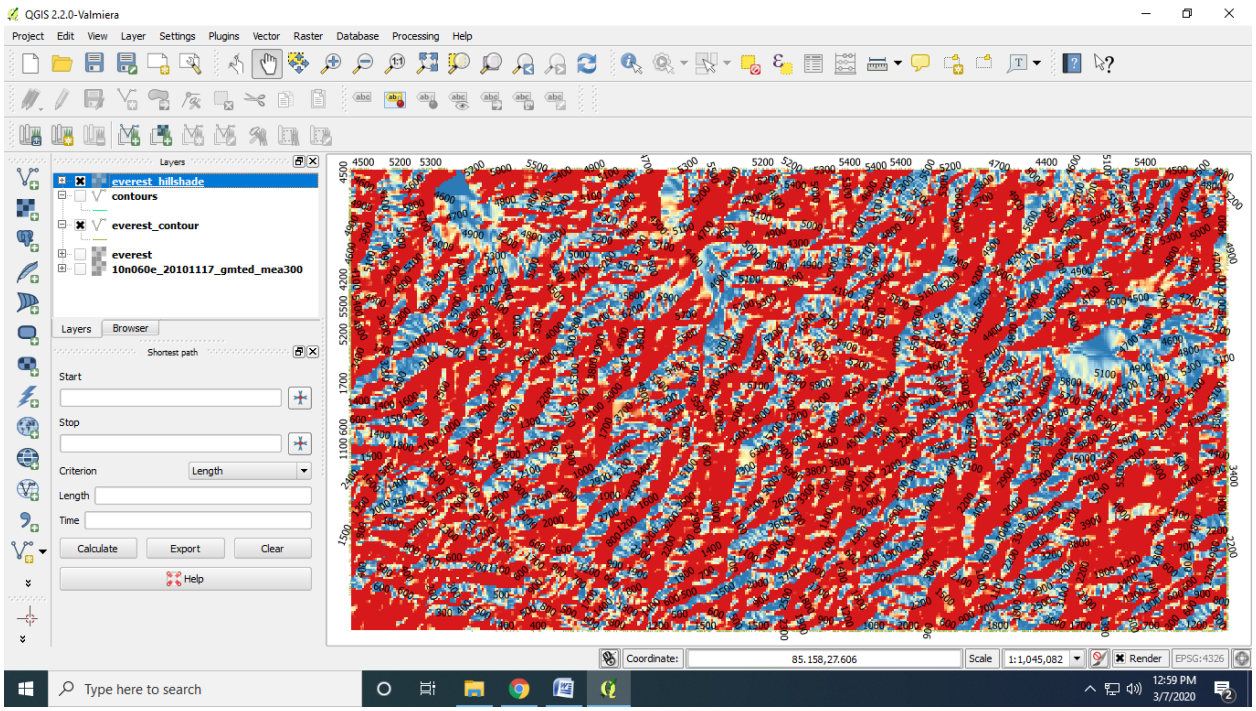


30. Now we can see the full extent of the hillshade raster.

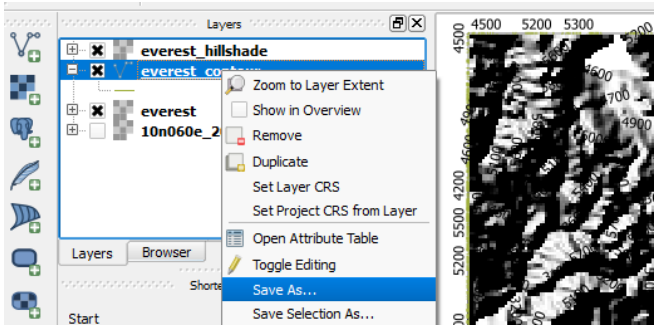

QGIS 2.2.0-Valmiera
Project Edit View Layer Settings Plugins Vector Raster Database Processing Help
Layers
everest_hillshade
everest_contour
everest
10n060e_20101117_gmted_mea300
Layers Browser
Shortest path
Start
Stop
Criterion Length
Length
Time
Calculate Export Clear
Help
86.89,27.96 : 86.96,28.00
Coordinate: 87.139,27.892
Scale 1:1,045,082
Render
EPSG:4326
Type here to search
12:38 PM
3/7/2020


Layers
contours
everest_cont
everest
10n060e_201
Layers Browser
Shortest
Start
Zoom to Layer Extent
Zoom to Best Scale (100%)
Stretch Using Current Extent
Show in Overview
Remove
Duplicate
Set Layer CRS
Set Project CRS from Layer
Save As...
Properties
Rename

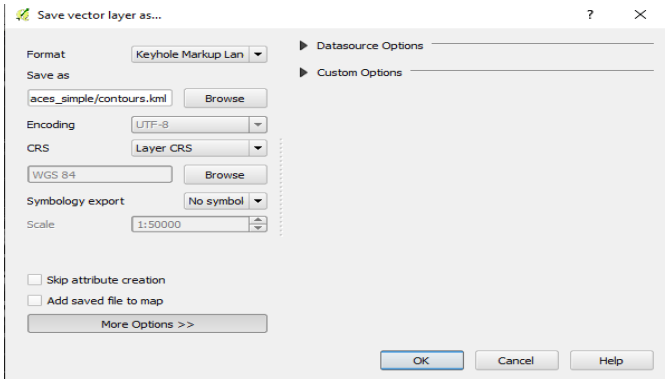

Layer Properties - everest_hillshade | Style
General
Style
Transparency
Pyramids
Histogram
Metadata
Band rendering
Render type Singleband pseudocolor
Band Band 1 (Gray)
Color interpolation Linear
Value Color Label
0.996094 0.996094
45.571320 45.571320
90.146547 90.146547
134.721774 134.721774
179.297000 179.297000
Generate new color map
RdYlBu
Invert
Mode Continuous
Classes 5
Min 0.996094
Max 179.297
Classify
Min / max origin:
Estimated cumulative cut of full extent.
Load min/max values
Cumulative count cut 2.0 - 98.0 %
Min / max
Restore Default Style
Save As Default
Load Style ...
Save Style ...
OK
Cancel
Apply
Help



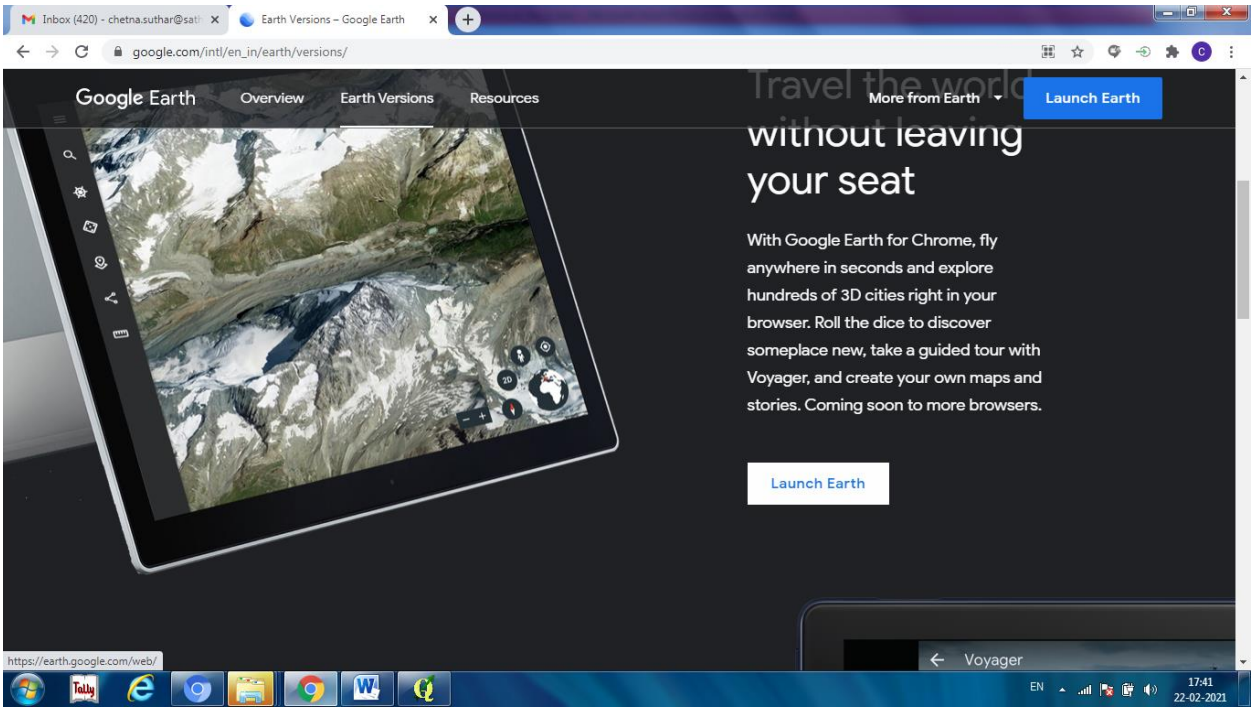
31. We can visualize contour layer and verify analysis by exporting the contours layer as KML and viewing it in Google Earth, right click on the everest_contours layer, select Save as...



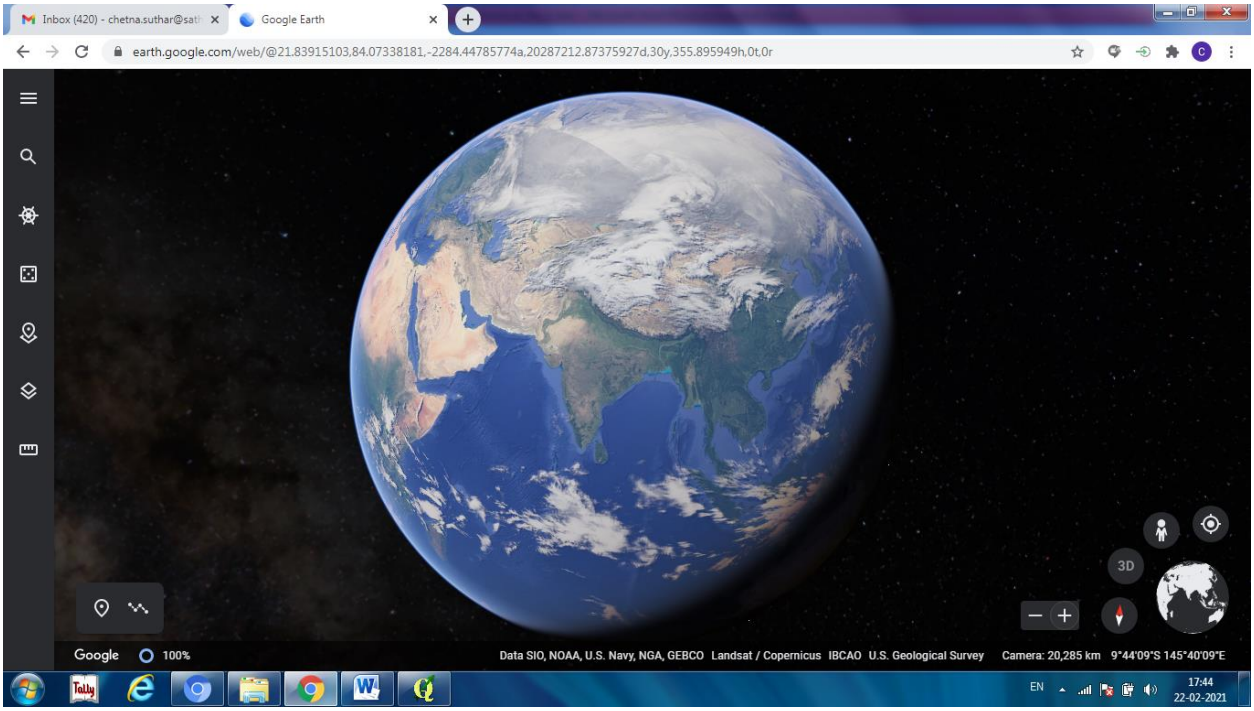
32. Select Keyhole Markup Language [KML] as the Format. Give name to output as contours.kml and click OK. (plugin required: georeference GDAL).



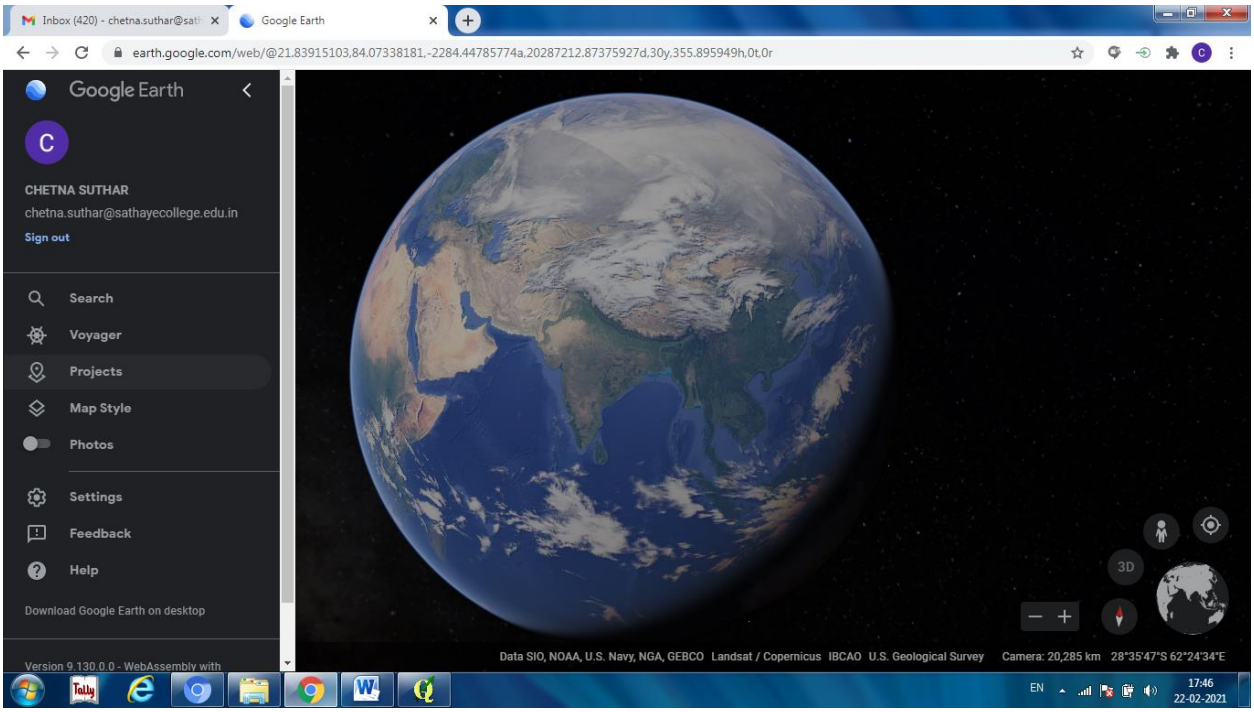
33. Search for Google Earth on browser or click on this link https://www.google.com/intl/en_in/earth/versions/ then click on Launch Earth button.



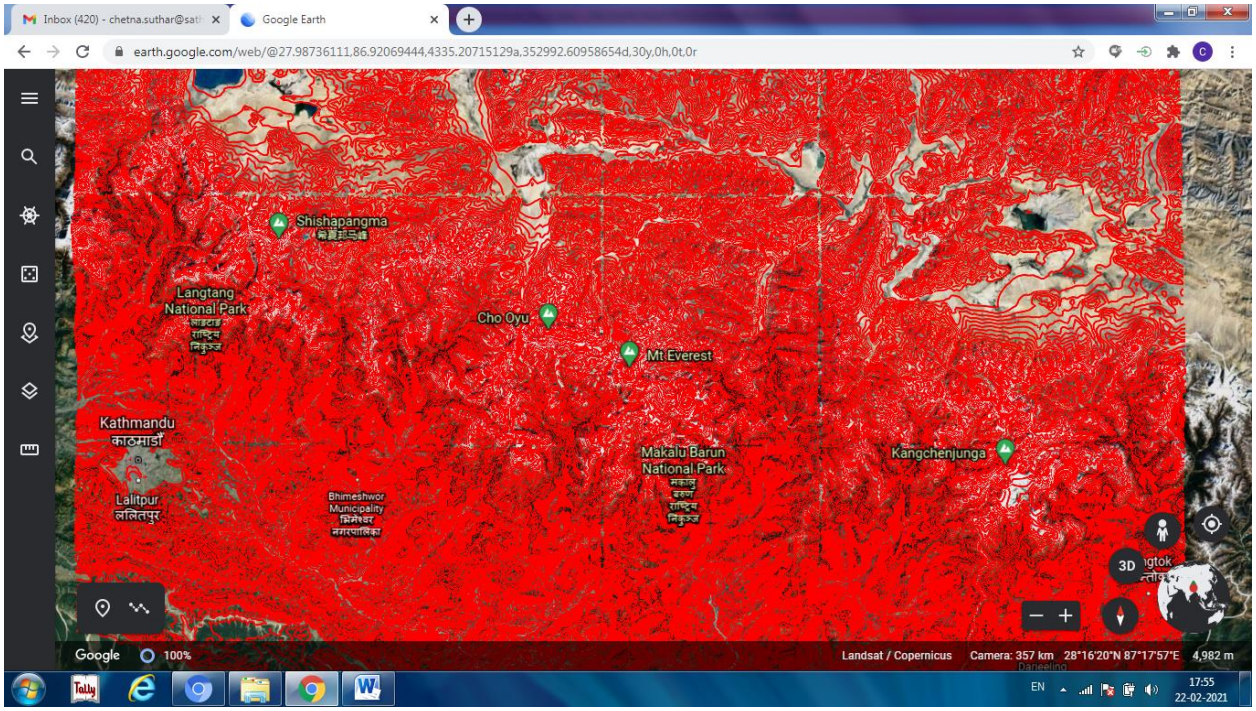
34. We can see the google earth on screen; just scroll it so that Asian region we can see on screen.



35. Click on menu button and then select “Projects” option.



36. Click on “Open” and then select “Import KML file from computer” and select the kml file and then click on open after this we can see out file is opened with google earth.



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