GIS Curriculum for PMGSY

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Intended Audience:

NRIDA YCEs

GIS Nodal Officers (State)

GIS Analysts (State)

Module 1	Module 2	Module 3	Module 4	Module 5
Introduction to GIS and Load your CSV Data in Qgis	Georeferencing and Create Layers	Creating GIS Maps and Reports	Functions in QGIS	Working with Google Earth

Module 3 – Creating GIS Maps and Reports

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Learning Objectives

Filtering the data

Symbolic Representation of Facilities

Module 1	Module 2	Module 3	Module 4	Module 5
Introduction to GIS and Installation of QGIS	Georeferencing and Create Layers	Creating GIS Maps and Reports	Functions in QGIS	Working with Google Earth

Module 3 – Exercise 1

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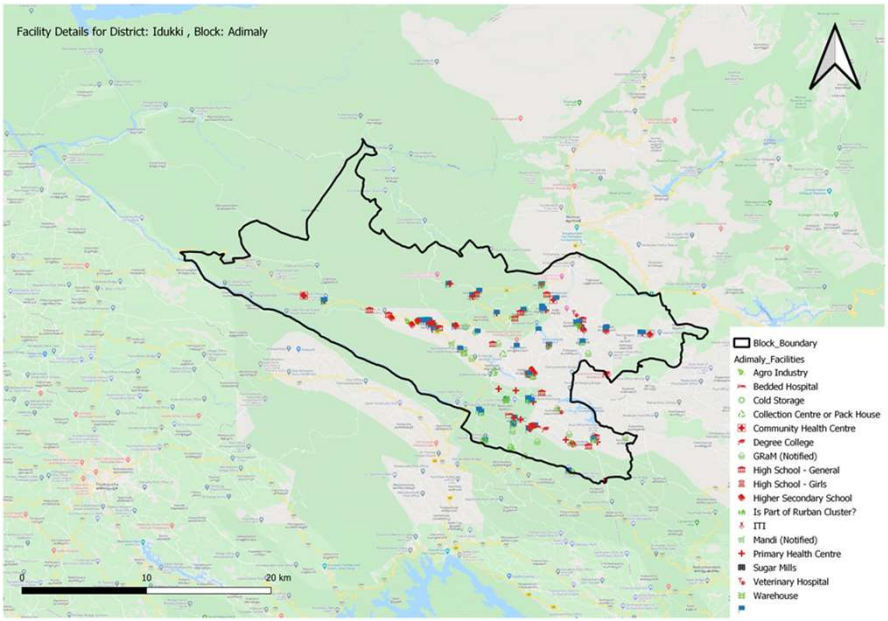
In M1 Exercise 1, we have just created a shapefile from the CSV file and we have applied symbology.
In this exercise, we will learn to:

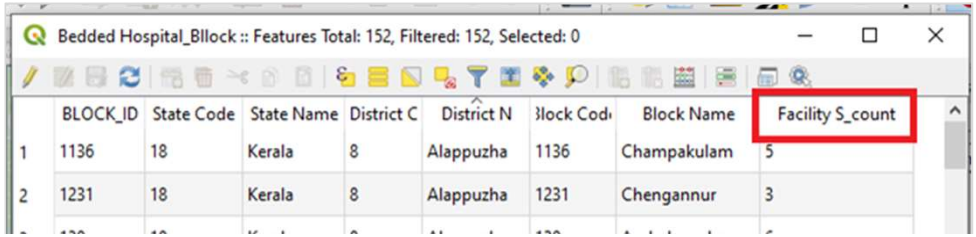
A. Perform spatial query to create a subset data of facility for a particular block
B. Overlay a block boundary to clearly represent the limit of the block
C. Generate a map, printable on A3 Paper size in the JPEG file format
D. Generate a report on the available bedded hospitals per block



The file is redistributable and can be shared with the block administrative agencies. This map will be useful to proposed a road at block level or village level. The final output map will look something like below consisting of North Arrow, Scale Bar and Legend.

Data Resources you will require:

All the required Excel, layers, project files, Icon etc. are supplied in the file M3 Exercise1 Producing final map.zip



	BLOCK_ID	State Code	State Name	District C	District N	Block Cod	Block Name	Facility S_count
1	1136	18	Kerala	8	Alappuzha	1136	Champakulam	5
2	1231	18	Kerala	8	Alappuzha	1231	Chengannur	3

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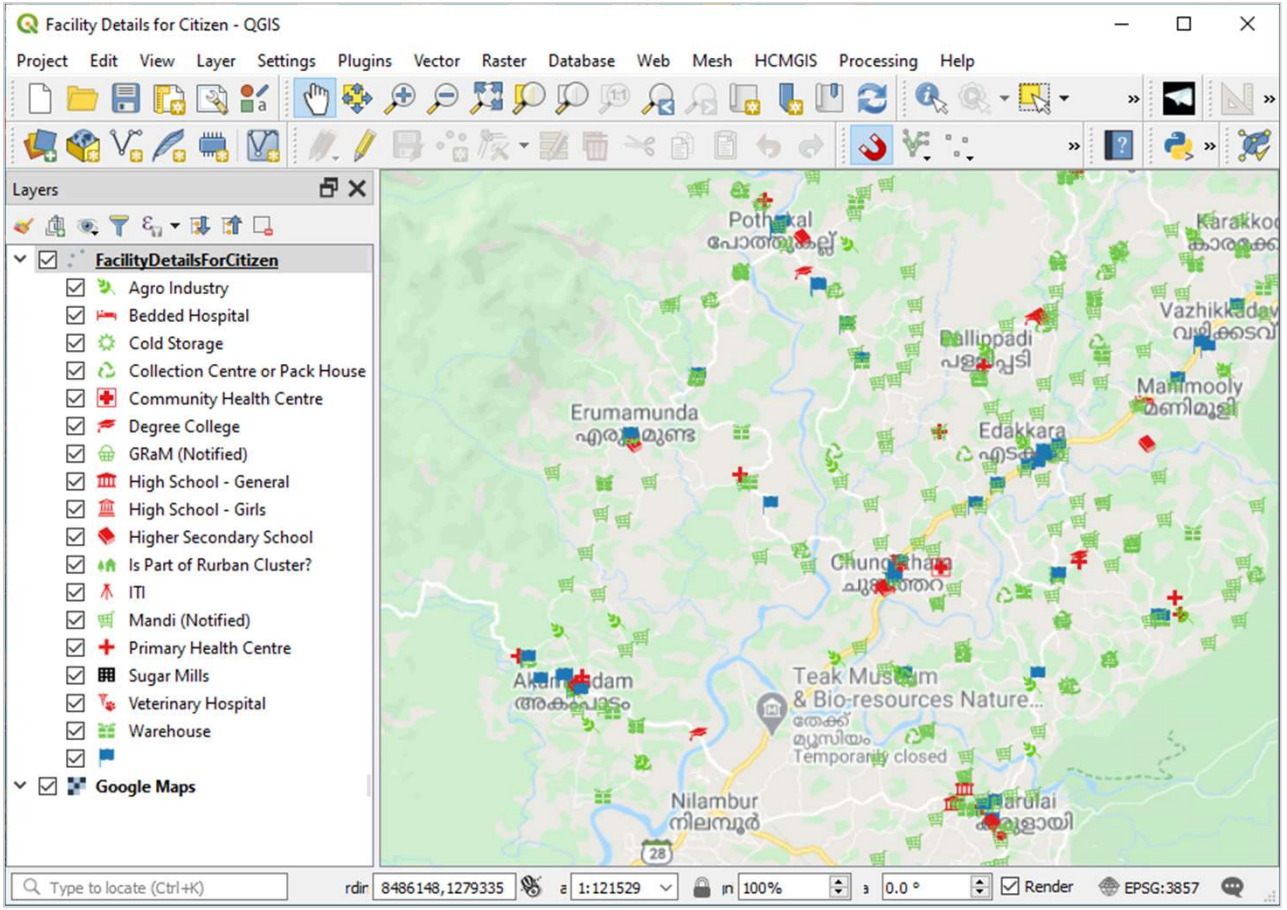
1. Open Project file: We are going to use Exercise 1 (Facility Details for Citizen. qgz) project file which is also available in the resource file of the exercise directory.
Just Double click on the **Facility Details for Citizen. qgz** from the repository
This project file will upload all the layers along with the symbology style which we have applied in exercise 1.



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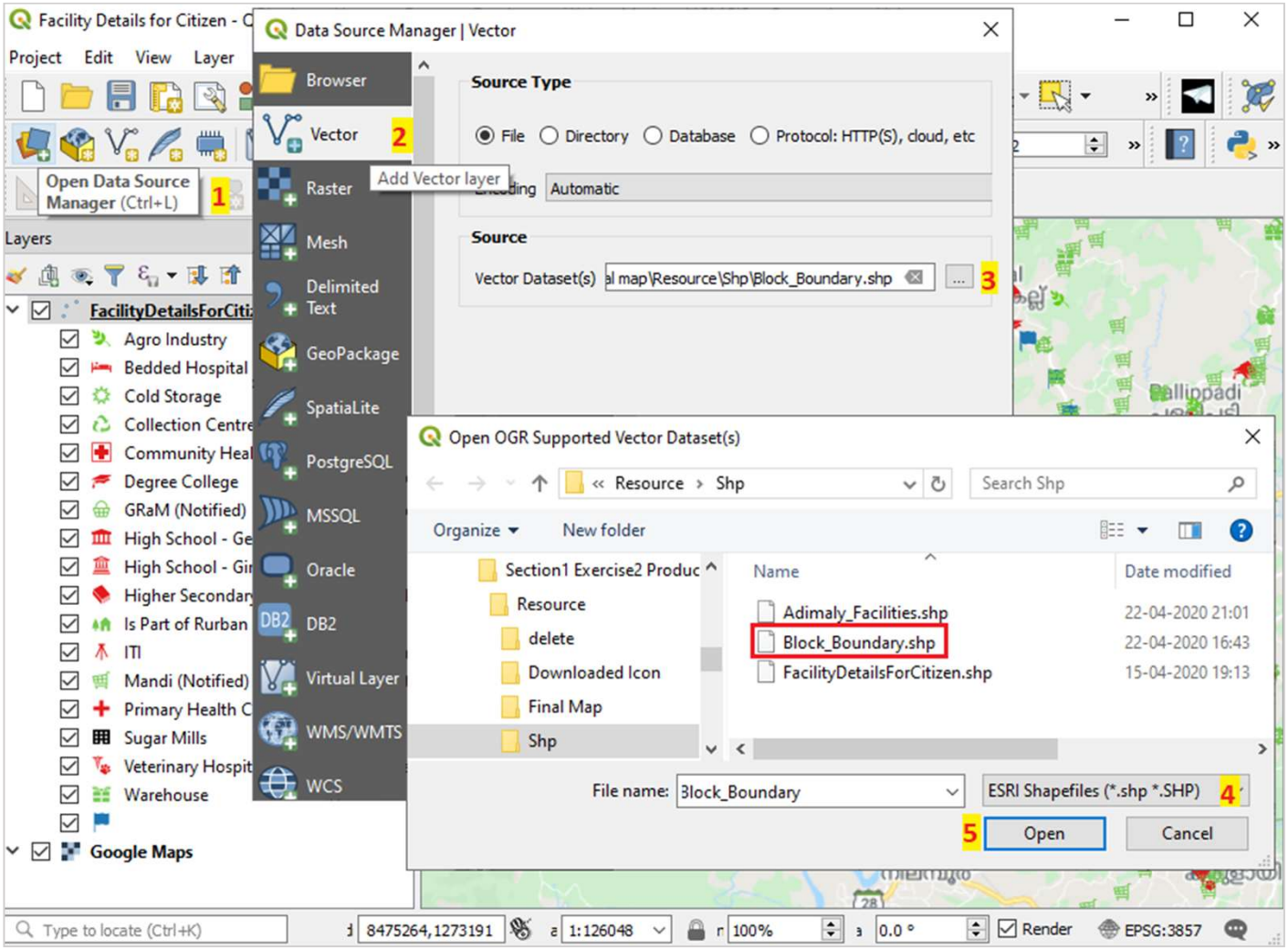
2. Load Block Boundary: All states have a block boundary at the state level in the form of a single / mosaic layer. We are going to use this layer and will filter the data to get a single block boundary. The same boundary can further be used to select the facilities which are inside this boundary.

a. Click on the 'Open Data Source Manager'.
b. Select 'Vector' Layer. In Source, browse to the available Block Boundary shape file (for this exercise user can use the file available in the Resource folder)**.**
Please select ESRI Shape files (*.shp *.SHP) from the lower left drop down menu.
c. Select Open > Add

Please notice that a new layer (Block Boundary) has been added now in the canvas.
Exit from the data source manager.



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3. Filtering Block Boundary

a. Right click on the ‘Block boundary’ layer.

b. Click on “Filter…”. A Query Builder will open.

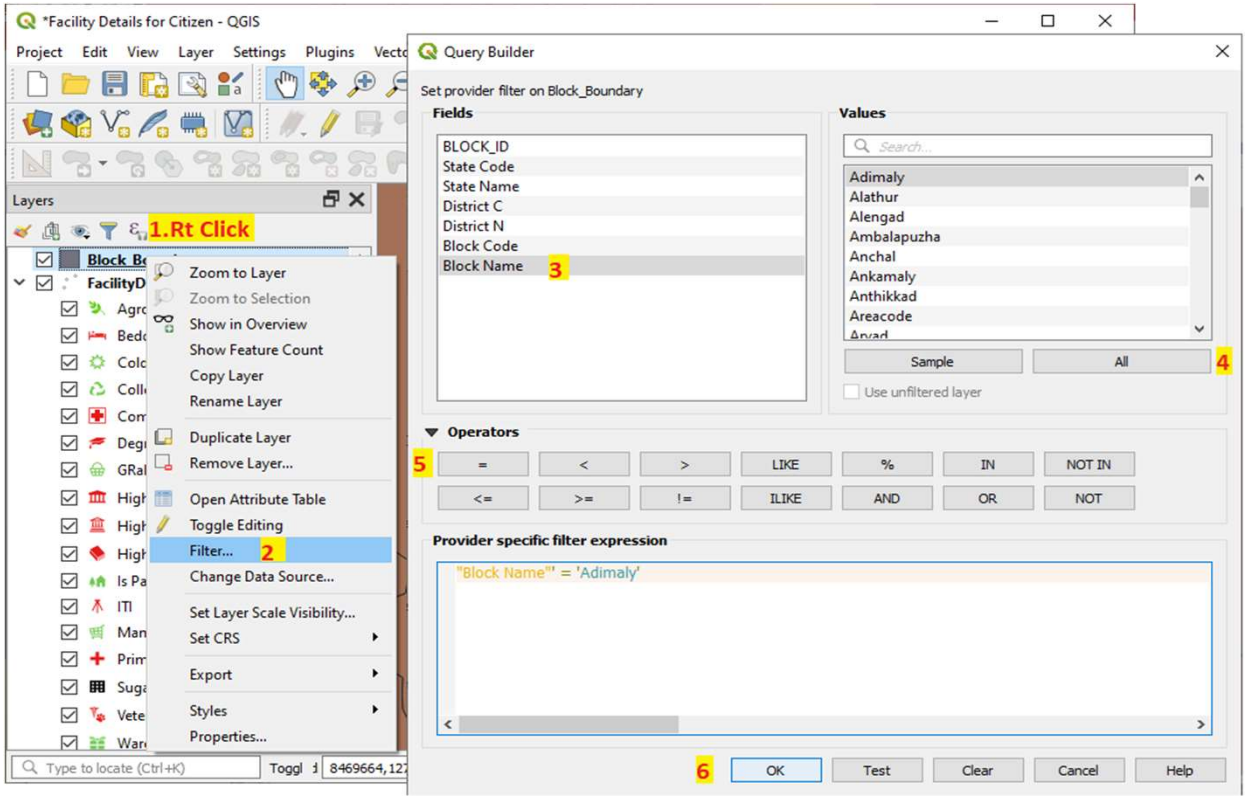
c. In Fields list, double click on “Block Name” .

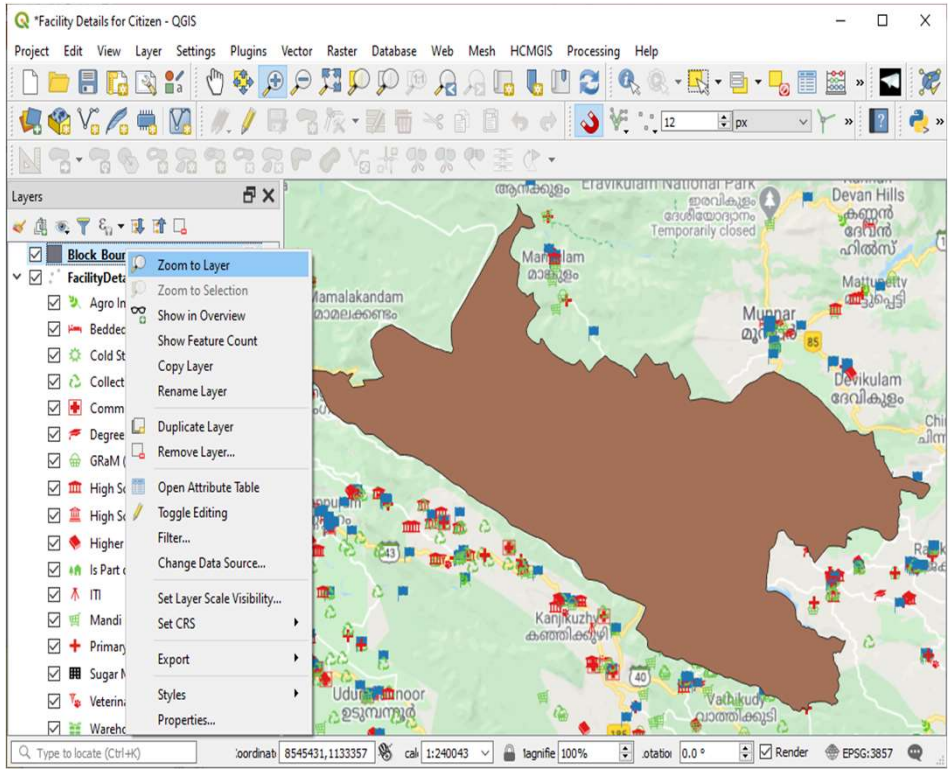
d. Click on the “=” operator, then double click on the Block Name which is displayed in the Value list. To get all block name click on All .

e. Click Ok

OR After step 2 User can type expression and click ok.

To see the Block boundary on canvas, user needs to right click on the Block Boundary layer and click on the “Zoom to Layer”. A Block boundary as shown in the image below will be visible.





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4. Applying Simple symbology to Block Boundary Level

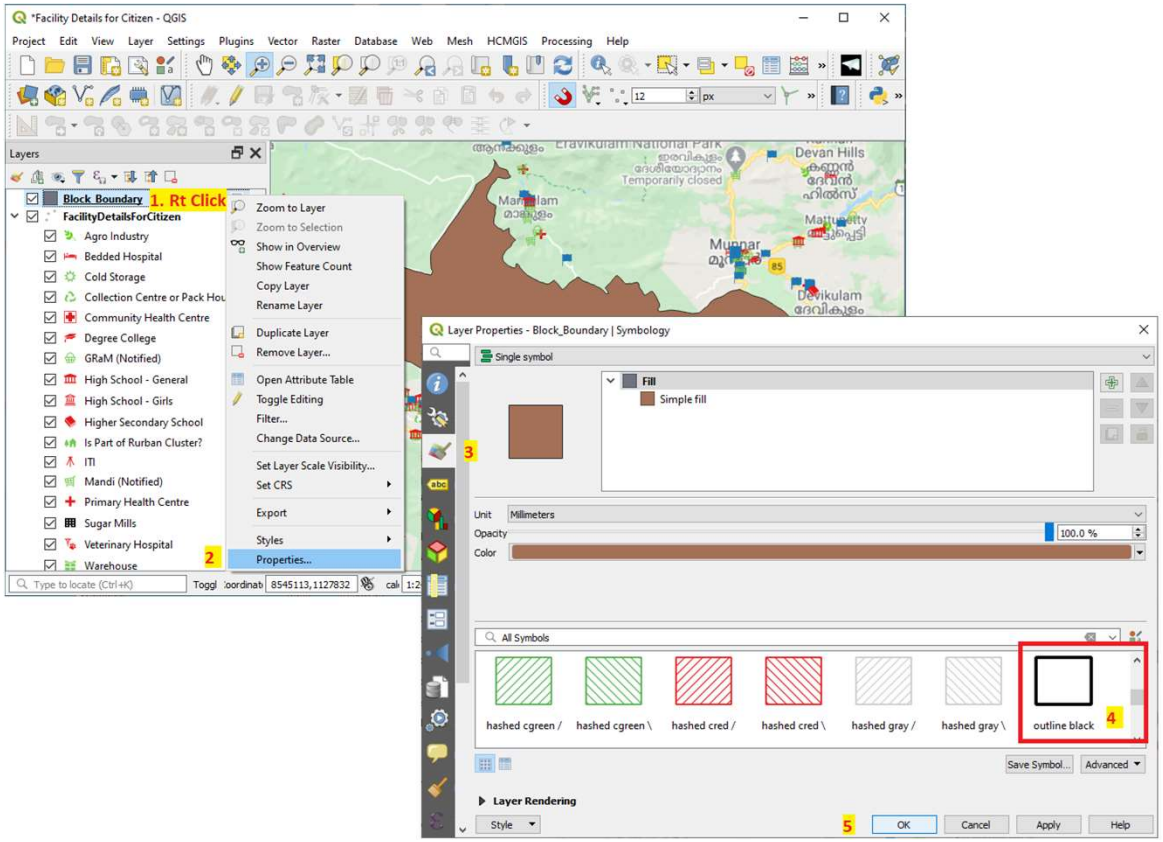
a. Right Click on the **Block Boundary Layer** in the Layer panel.

b. Click on the Properties

c. Click on ‘Symbology’

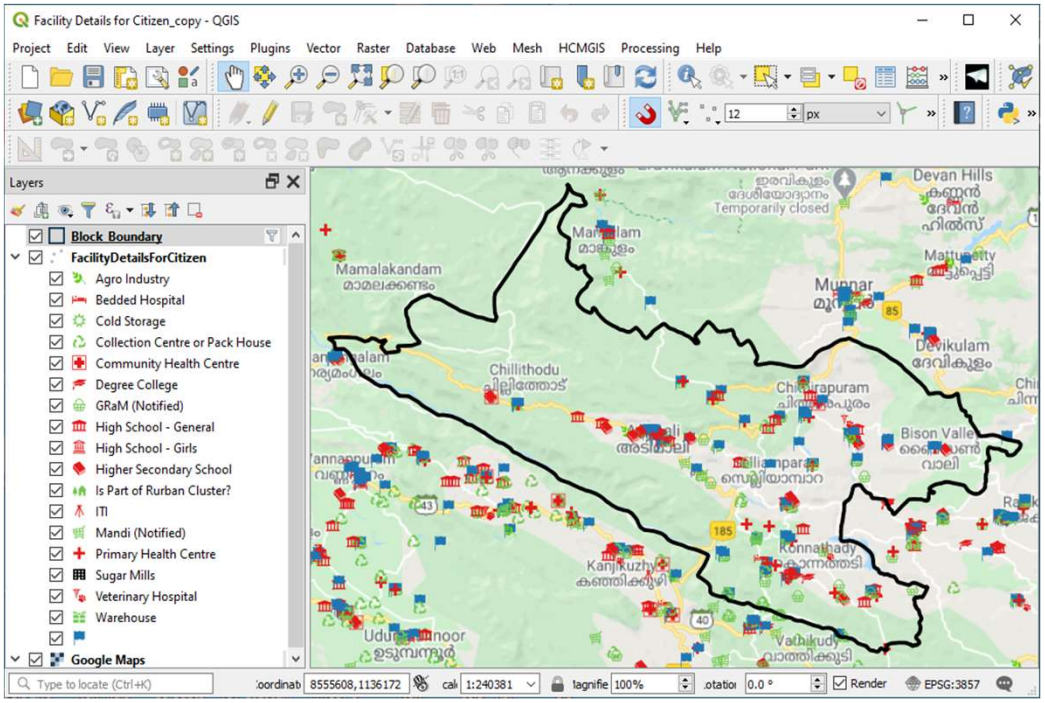
d. Then Select “outline black” from the available symbols.

e. Click OK



Notice the map visualization in the canvas will change accordingly. The layer legend will also be changed.

Note: Symbology of all features should be based on GRISS’s Standard symbol to standardize the map.



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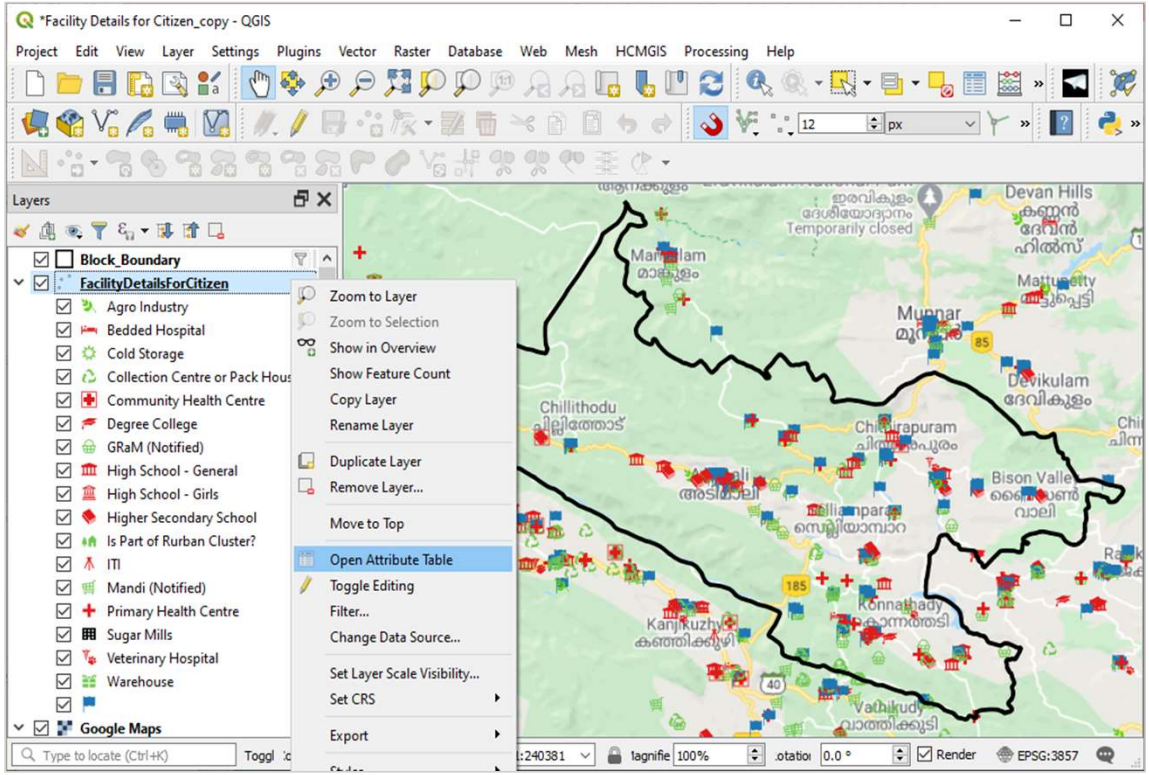
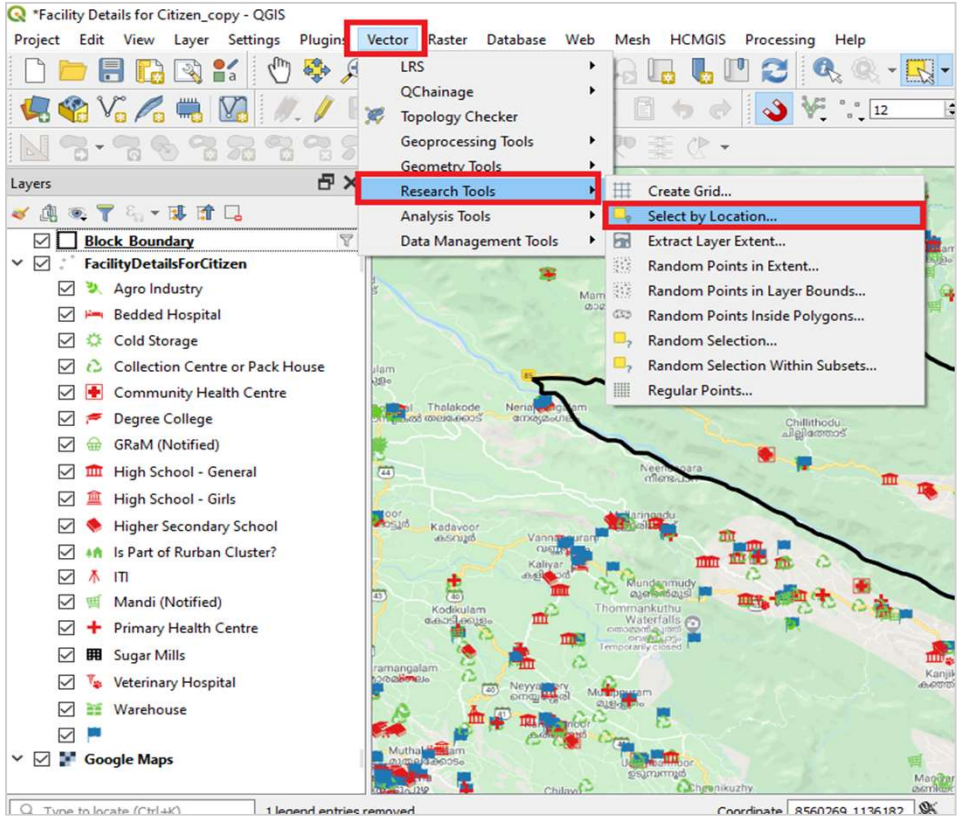
5. Creating a Subset of the Facility Layer: Open the Attribute table by right clicking on the 'FacilityDetailsForCitizen' Layer and then selecting 'Open Attribute Table'.
Examine the Attribute Table. In the attribute table, we don't have any field which represents the block or district, so we are going to use the GIS tool "Select By Location" to select facilities which fall within the block only.
Go to Main Menu > Click Vector > Research Tools> Select by Location…

Note: There are some other tools also that we can use to subset the layer. We will explore some of them in our subsequent exercises.





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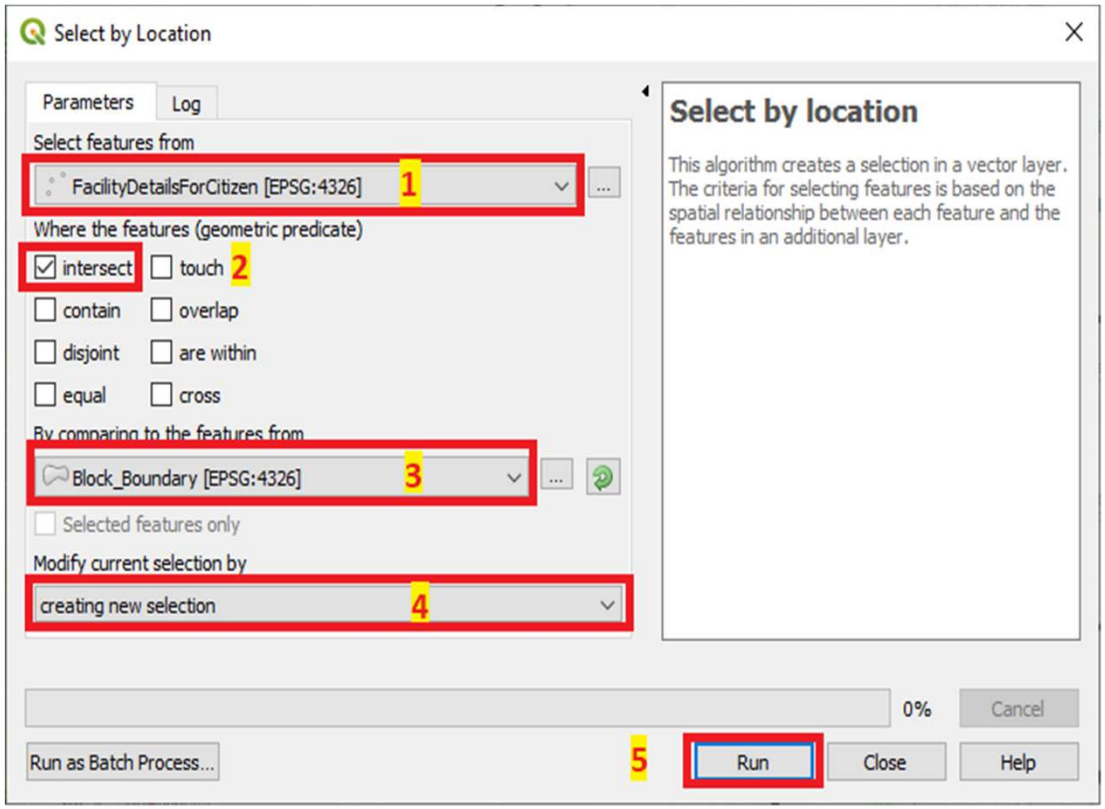
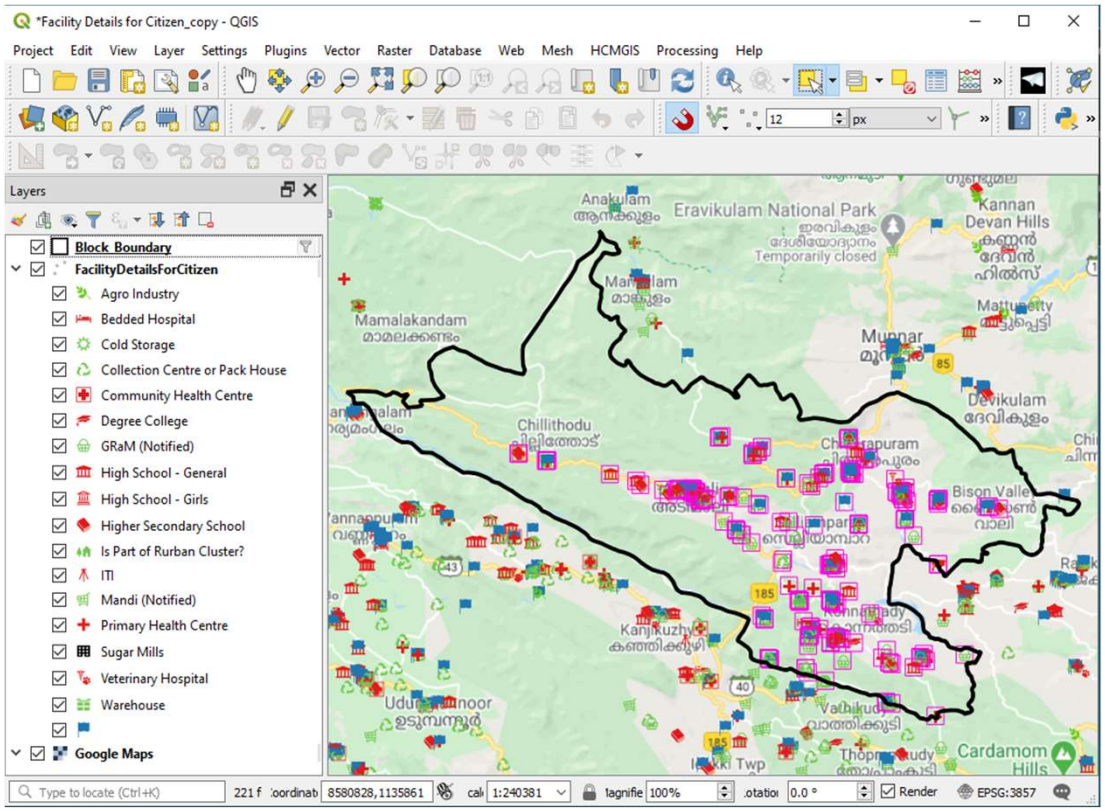
6. In the 'Select by location' dialog box,

a. Select 'FacilityDetailsForCitizen' in the 'Select features from'
b. Check 'Intersect' as the geometric predicate.
c. Set 'Block_Boundary' in 'By comparing to the features from'.
d. Keep Default value in 'Modify current selection by'.
e. Click Run.

After the process is finished, user will see some highlighted facilities from "FacilityDetailsForCitizen" layer , which falls within the "Block_Boundary" polygon .





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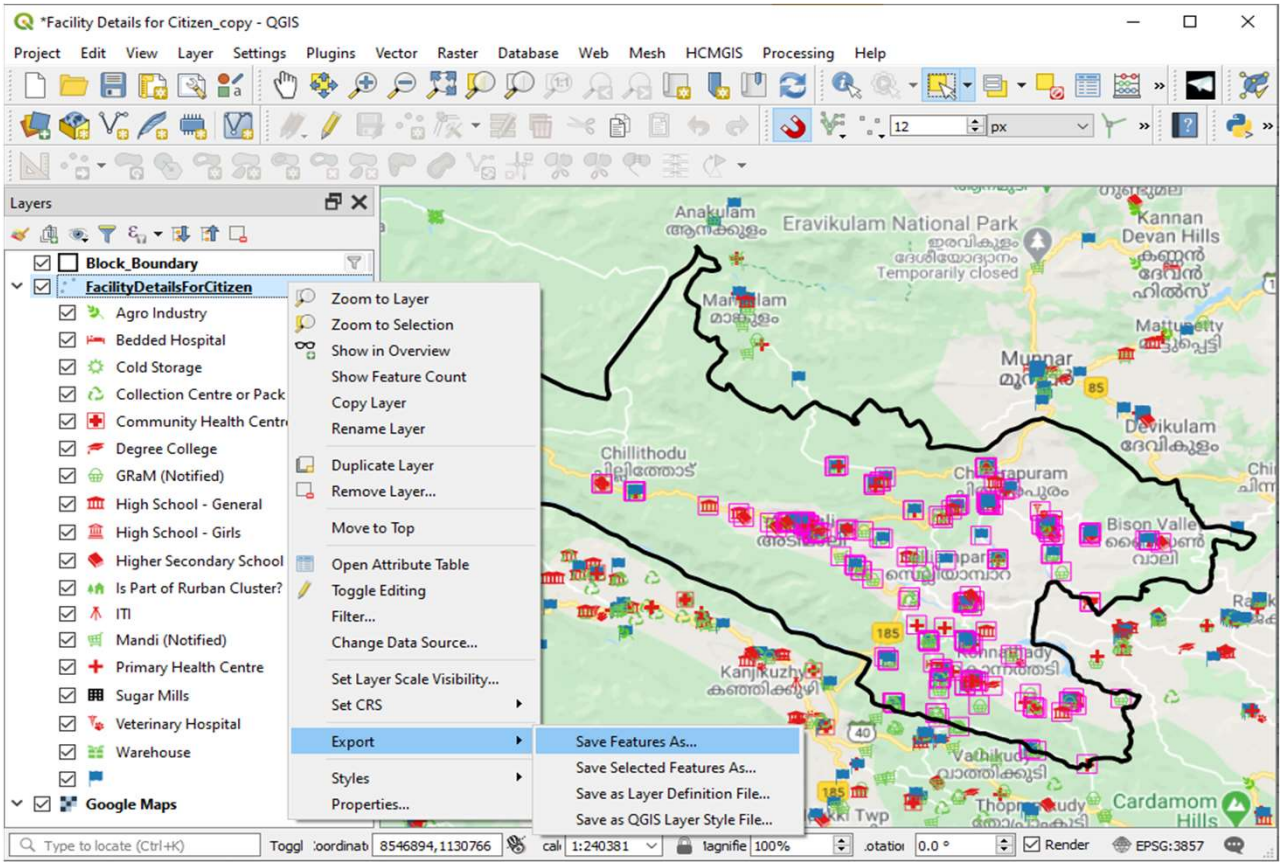
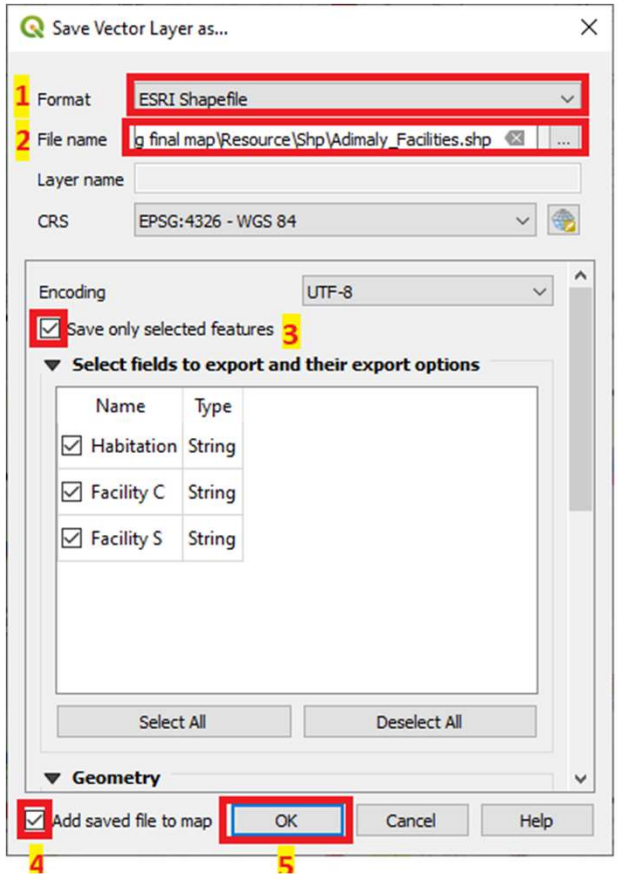
7. User can save only highlighted features by right clicking on the ”FacilityDetailsForCitizen” layer > Export > click on Save Features As..

In the Save Vector Layer as... dialog,

a. Select ESRI Shapefile as the format.
b. Save the output “Adimaly_Facilities.shp” to the resource directory.
c. ‘Save only selected features’ should be checked.
d. Keep ‘Add saved file to map’ checked to add file in the canvas > OK





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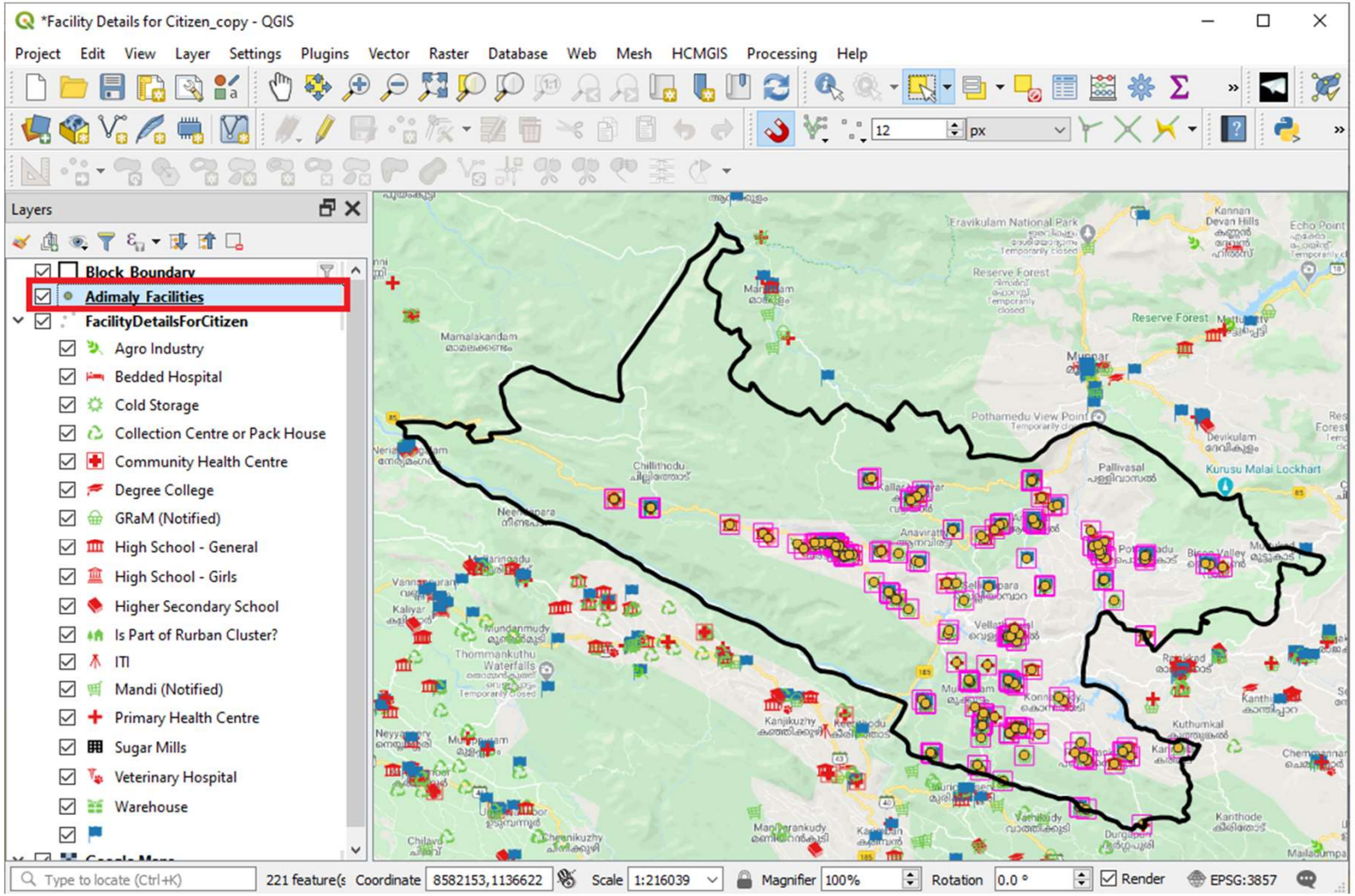
A new layer “Adimaly_Facilities” is added to the Layers panel with features falling within the “Block_Boundary” polygon



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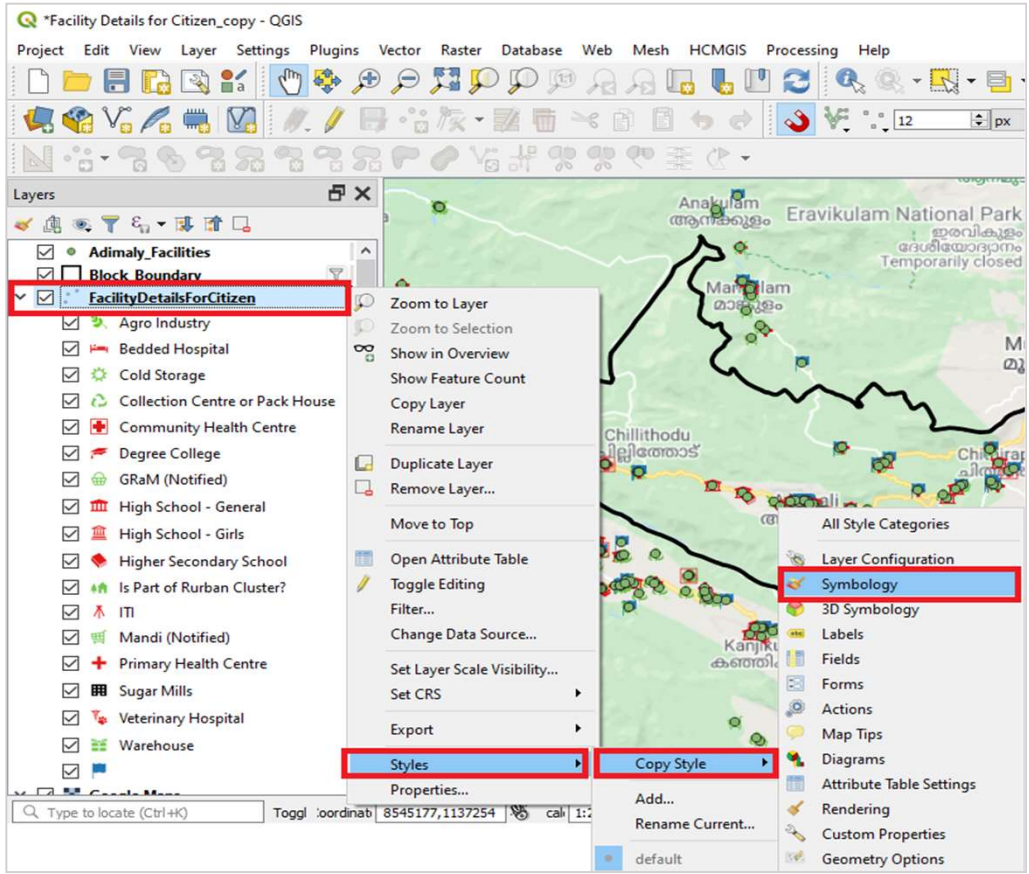
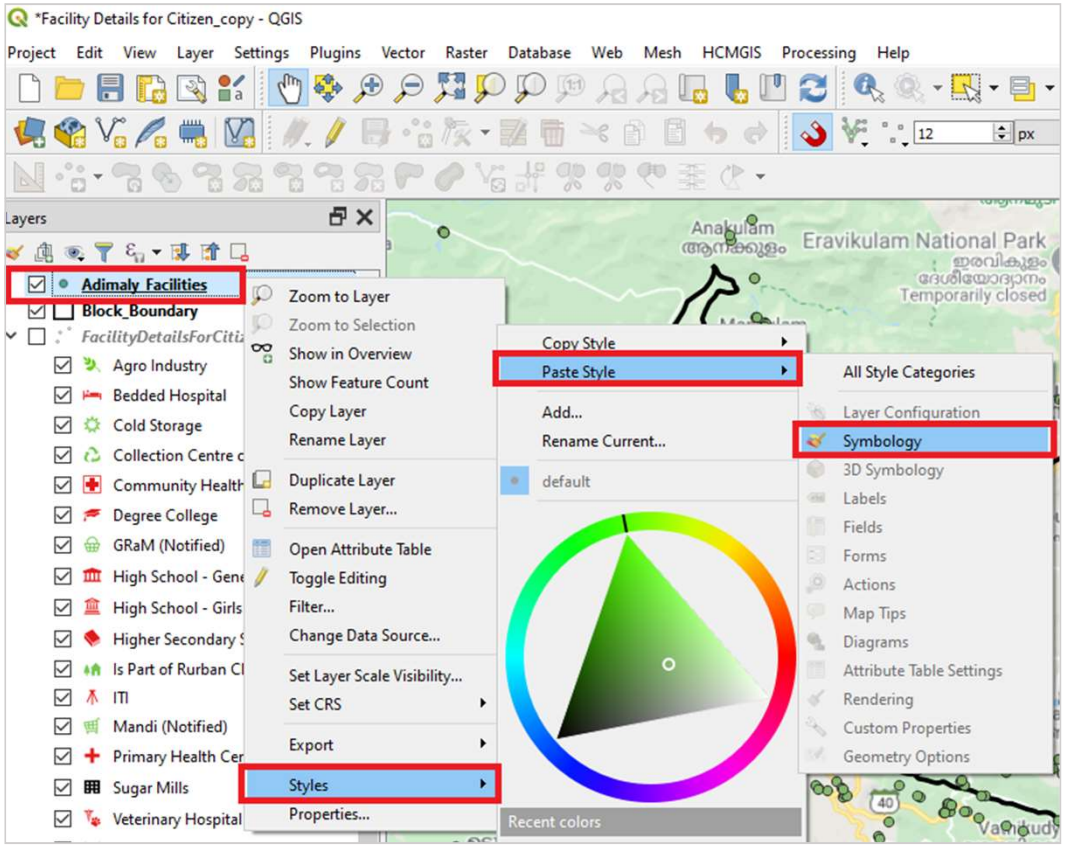
8. Copy the Symbology: We will now use a copy and paste method to symbolize each point according to the "Facility S" value. Right Click on the Source Layer (FacilityDetailsForCitizen)> Styles > Copy Style > click on Symbology to copy the symbology.



Now we can simply paste the symbology to (Adimaly Facilities) layer as shown in the image below.

Note: Copy and Paste method only work when the layers attribute fields and values are same.



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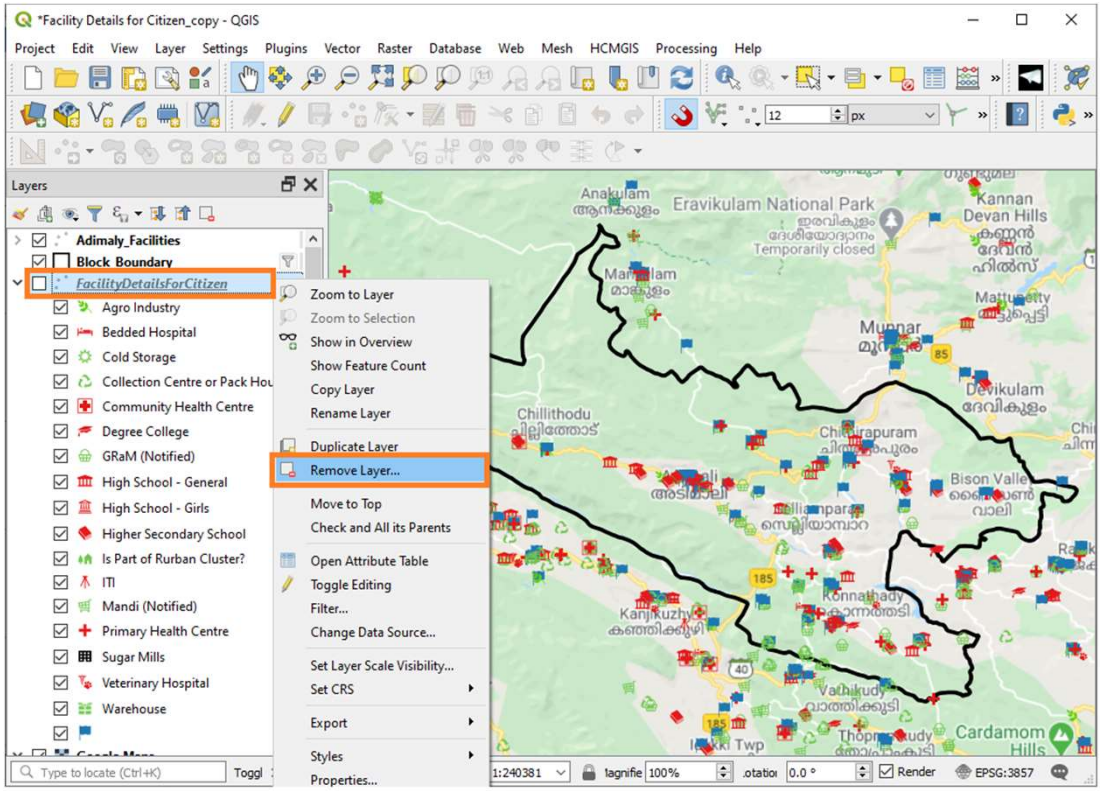
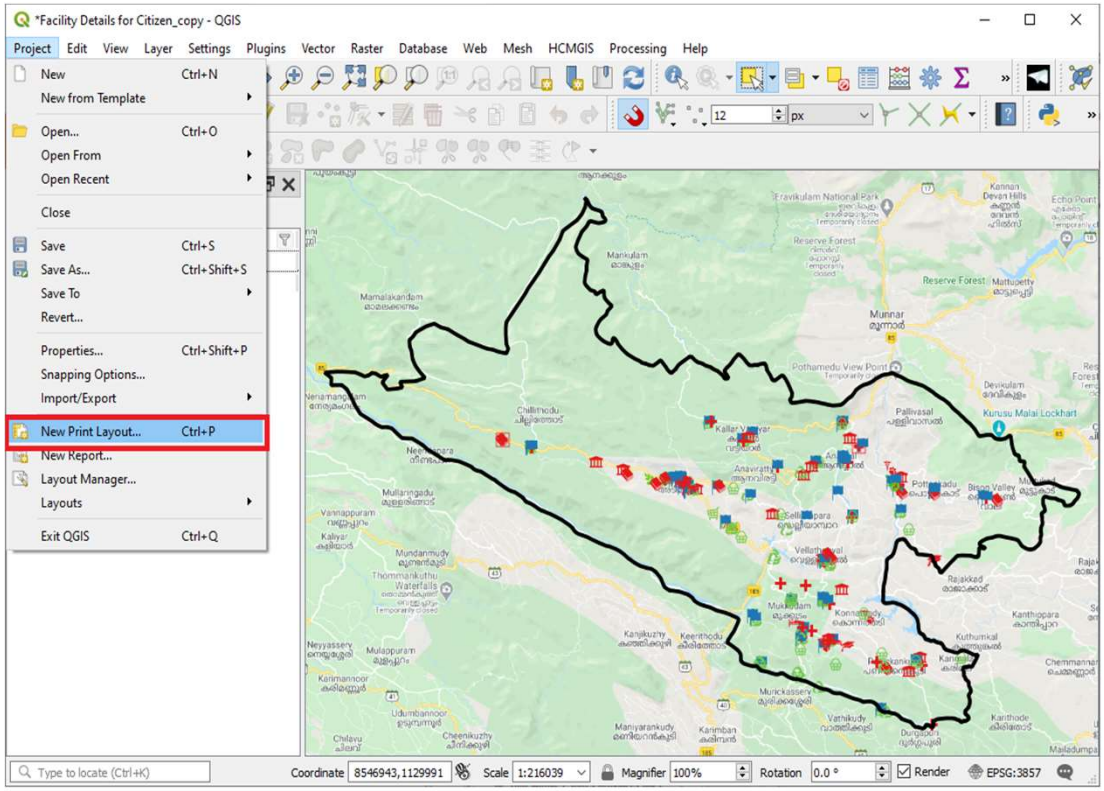
9. We can now remove the ”FacilityDetailsForCitizen” layer by right clicking on the layer and then clicking on Remove Layer... to remove the current Layer.



10. Export the map: ‘Print Layout’ can be used to create maps.
Go to Project > New Print Layout.



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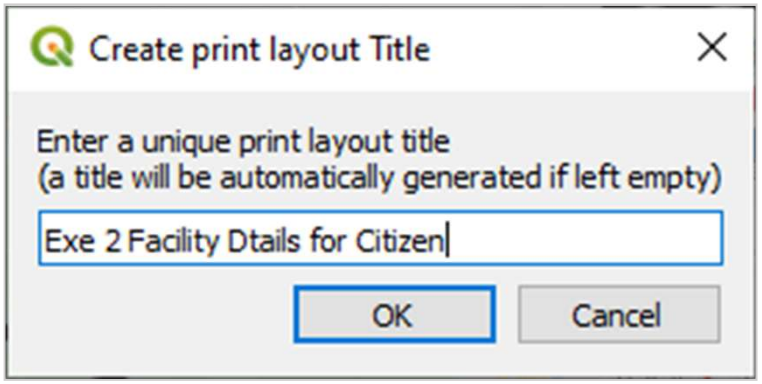
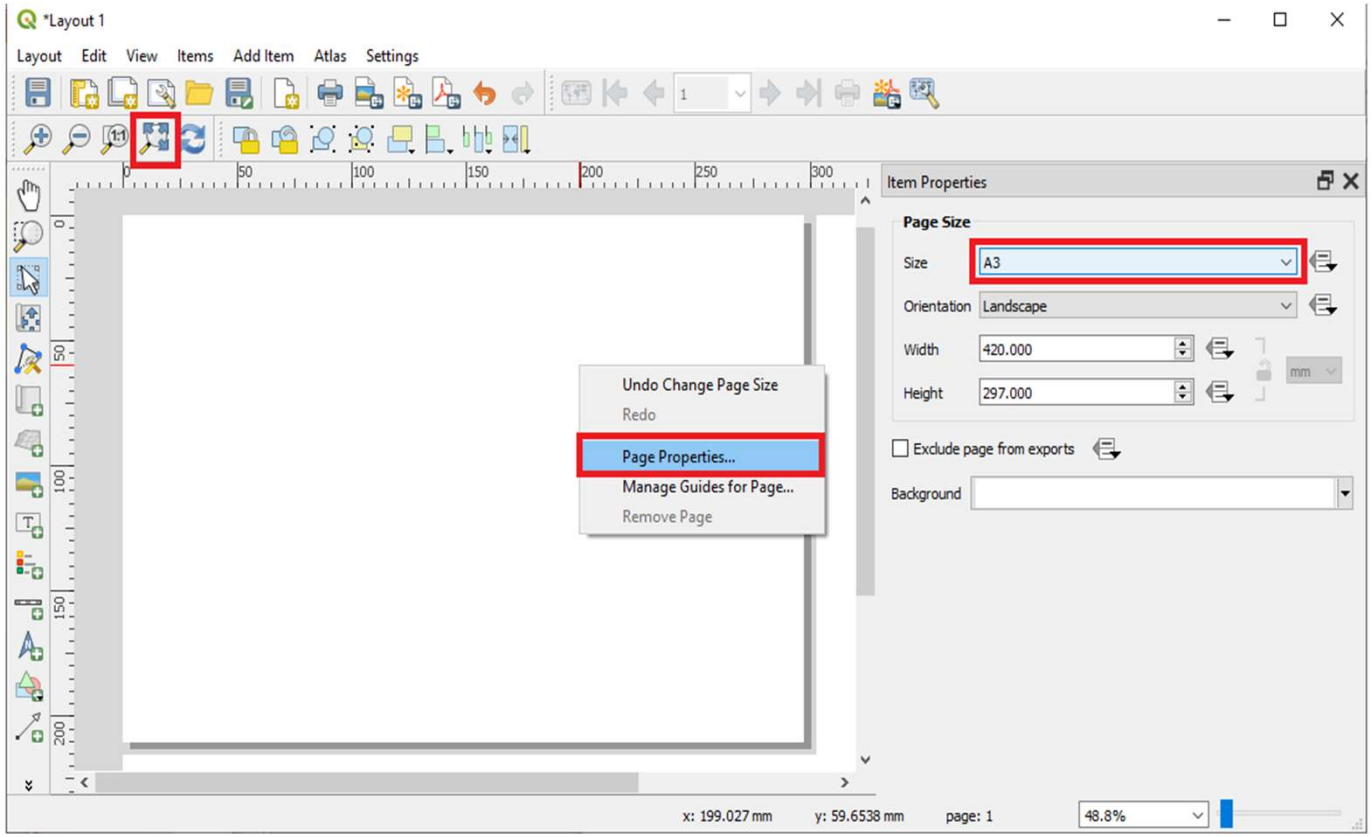
11. User will be prompted to enter a title for the layout. user can leave it empty or provide a name for future reference and click Ok.



12. We will change the default A4 paper size to A3 ,
Right Click on the white portion on the paper > Page Properties..
Change the size A4 to A3 in the item property panel and notice change in the paper size. Click on Zoom full button to display the full extent of the Layout .



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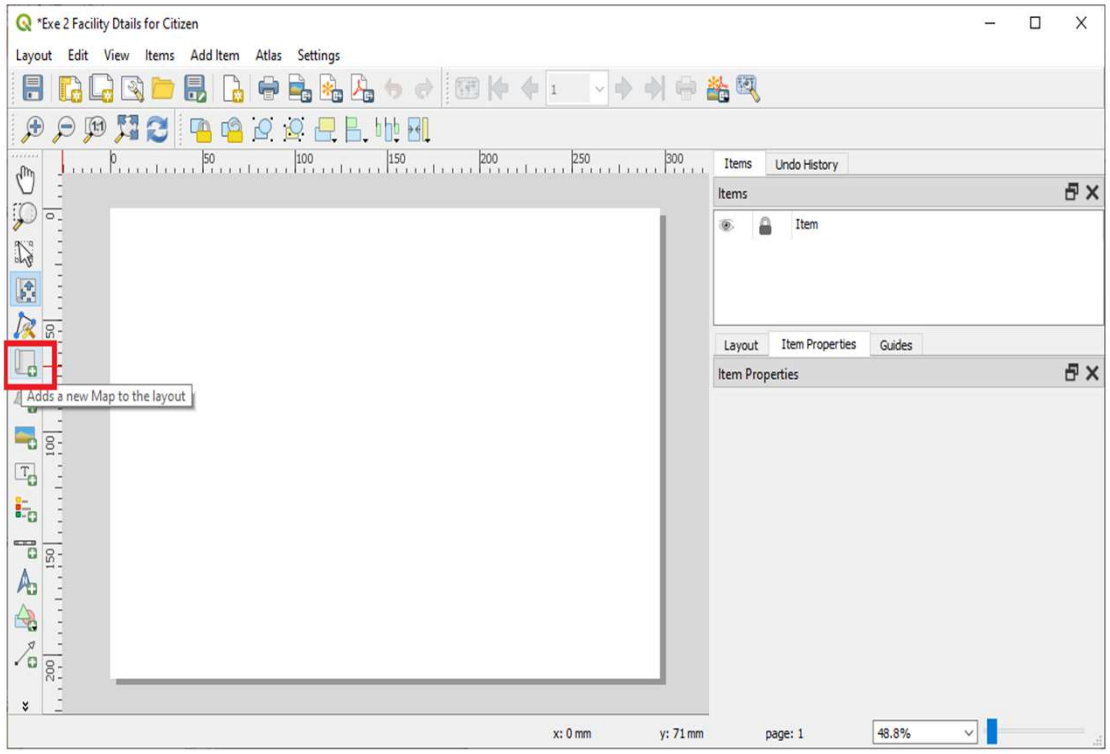
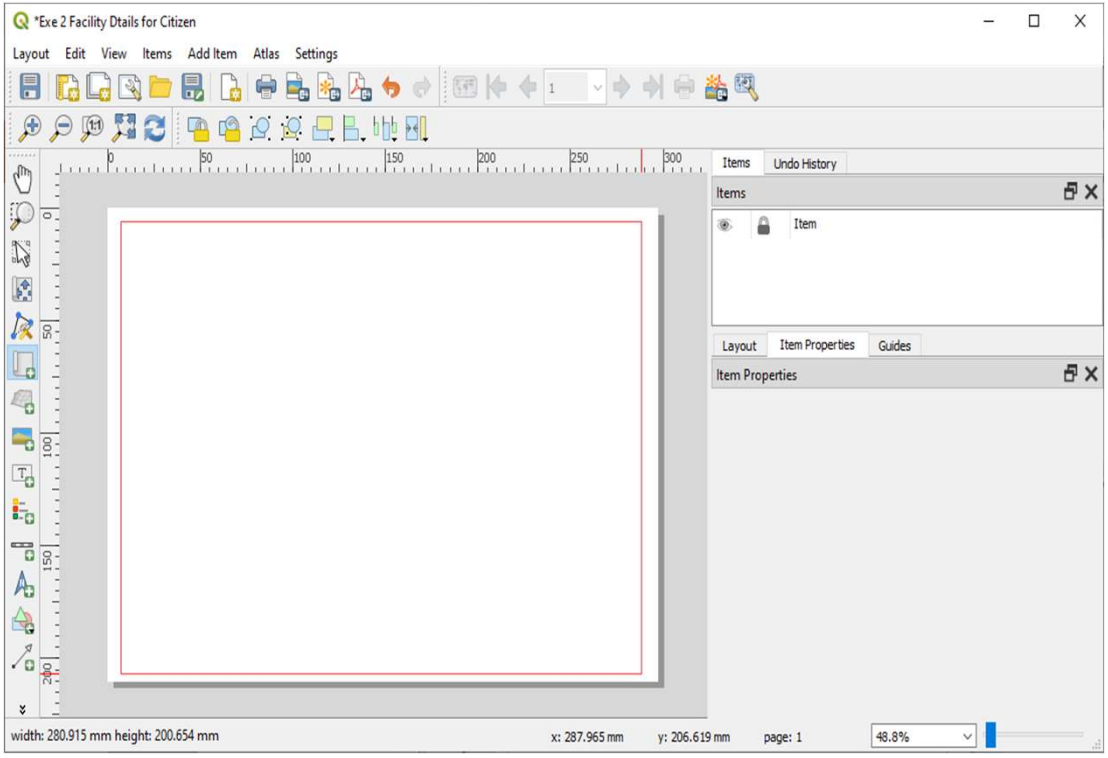
13. We now have to bring the QGIS Canvas data with symbology to the layout.
Select > Add Map
After clicking on the Add Map, hold the left mouse button and drag a rectangle (From Upper left corner to Lower Right Corner then release mouse button) where you want to insert the map.





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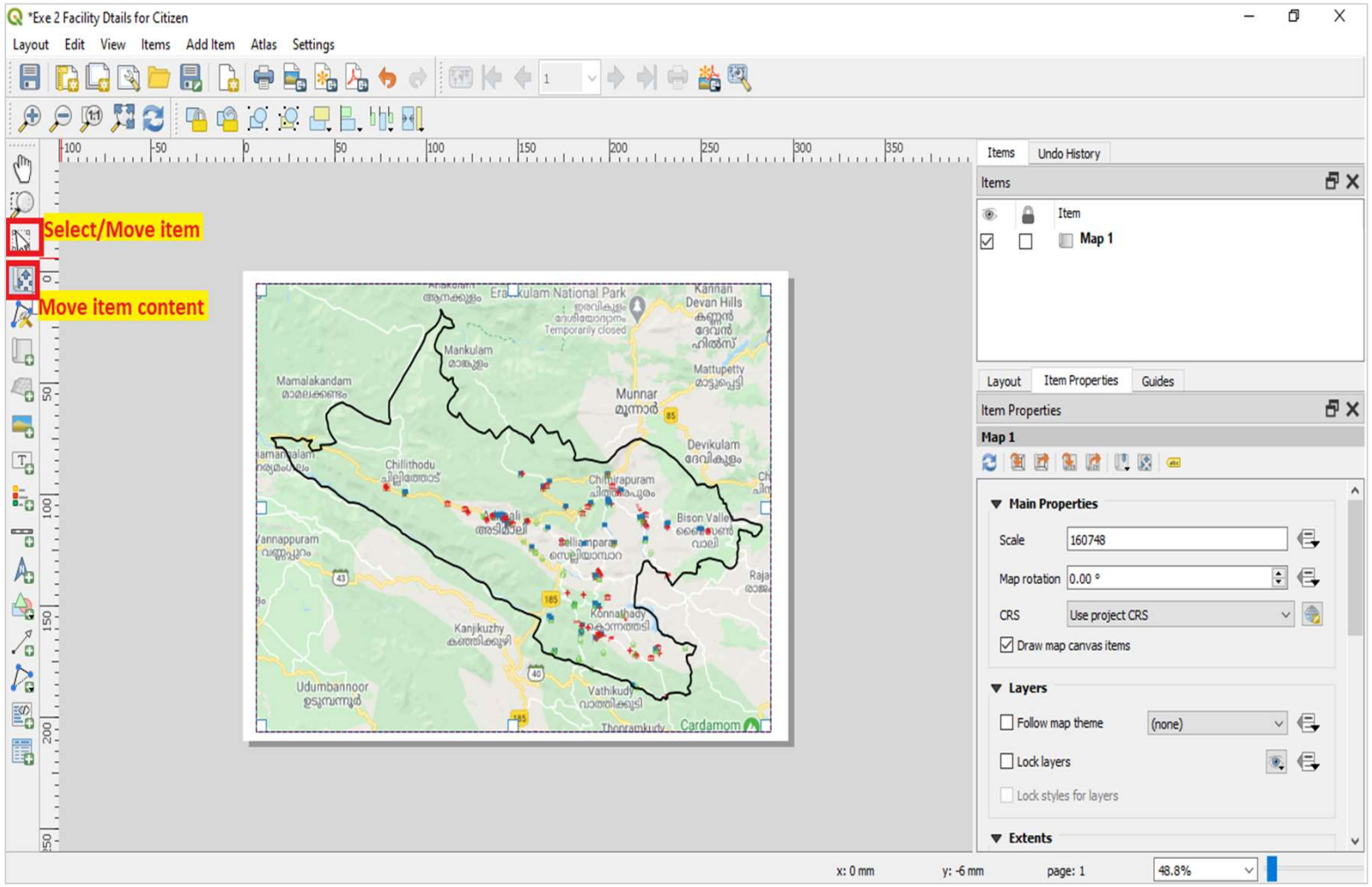
Notice the rectangle window will be rendered with all the layers from the main canvas. This window may not be covering the full extent of block boundary.
Use Select/Move item and Move Content options to pan the map in the window and center it in the composer.



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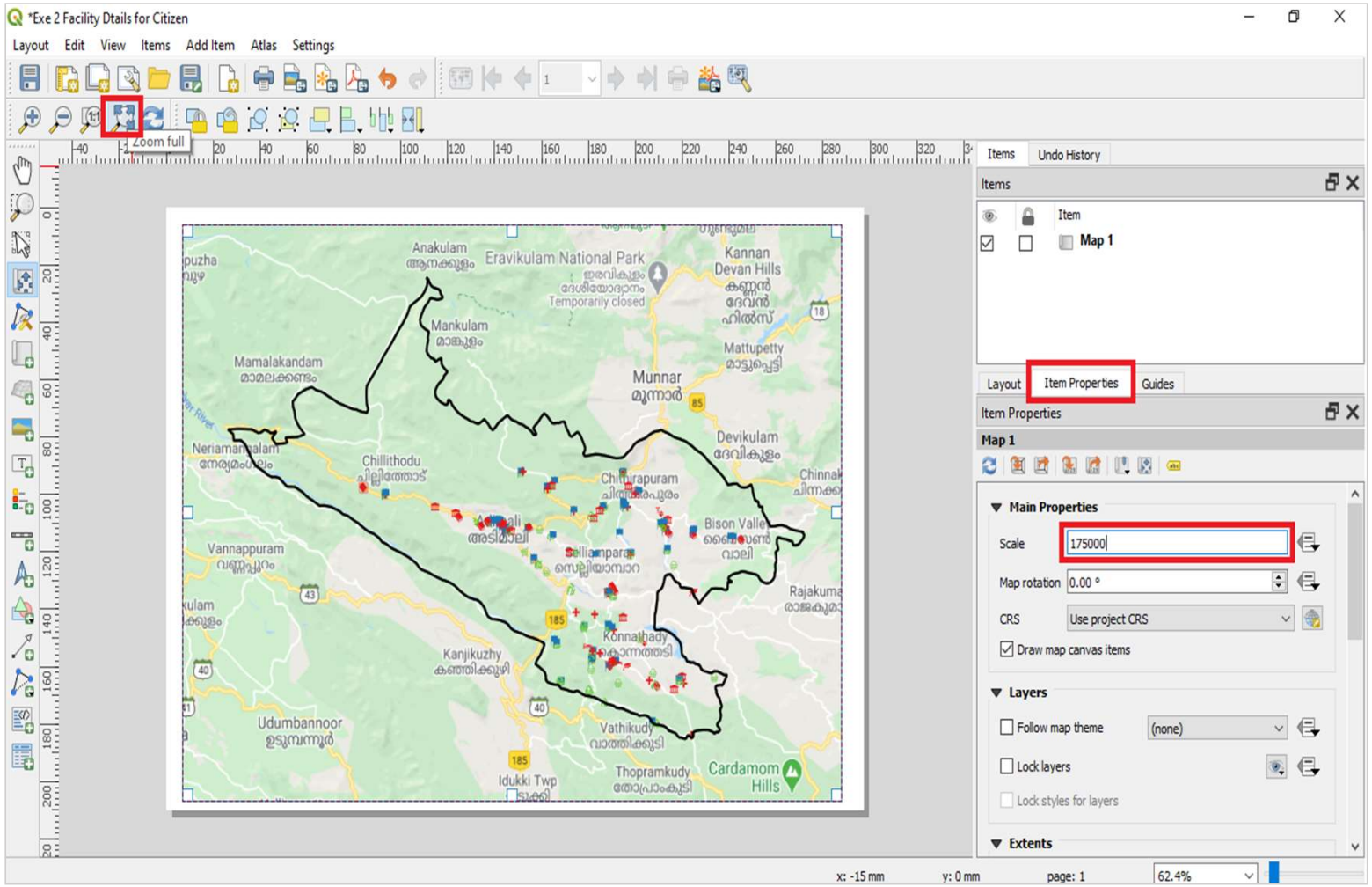
We can also click on Zoom full button to display the full extent of the Layout and adjust the zoom level for the map.
Click on the 'Item Properties' tab and enter 175000 as the Scale value.



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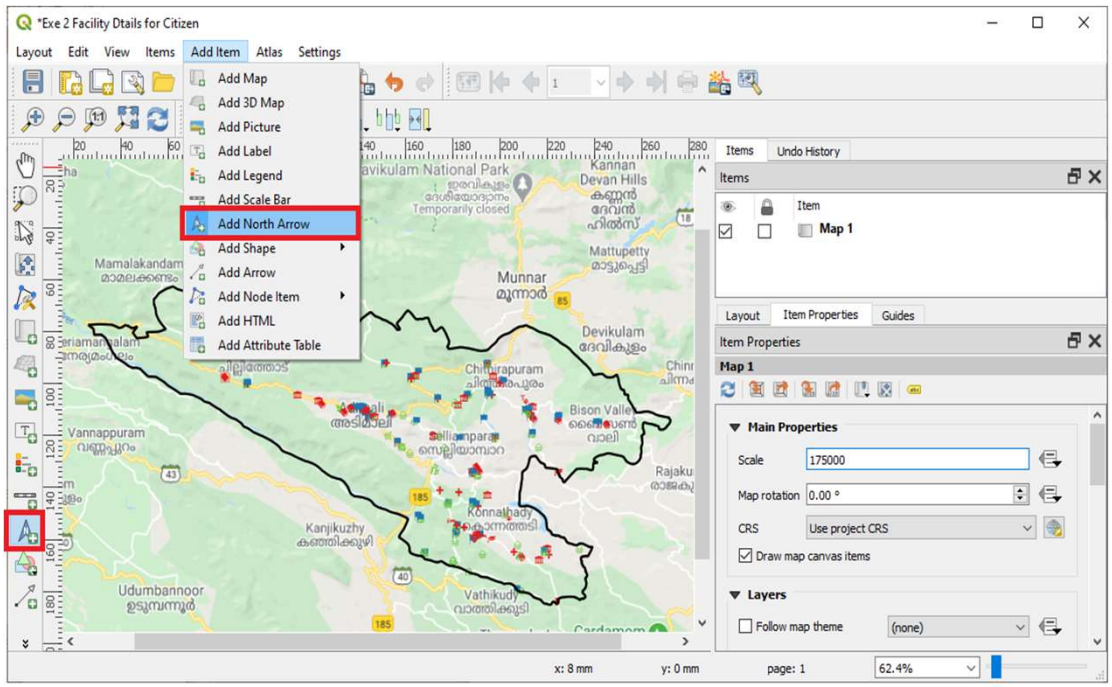
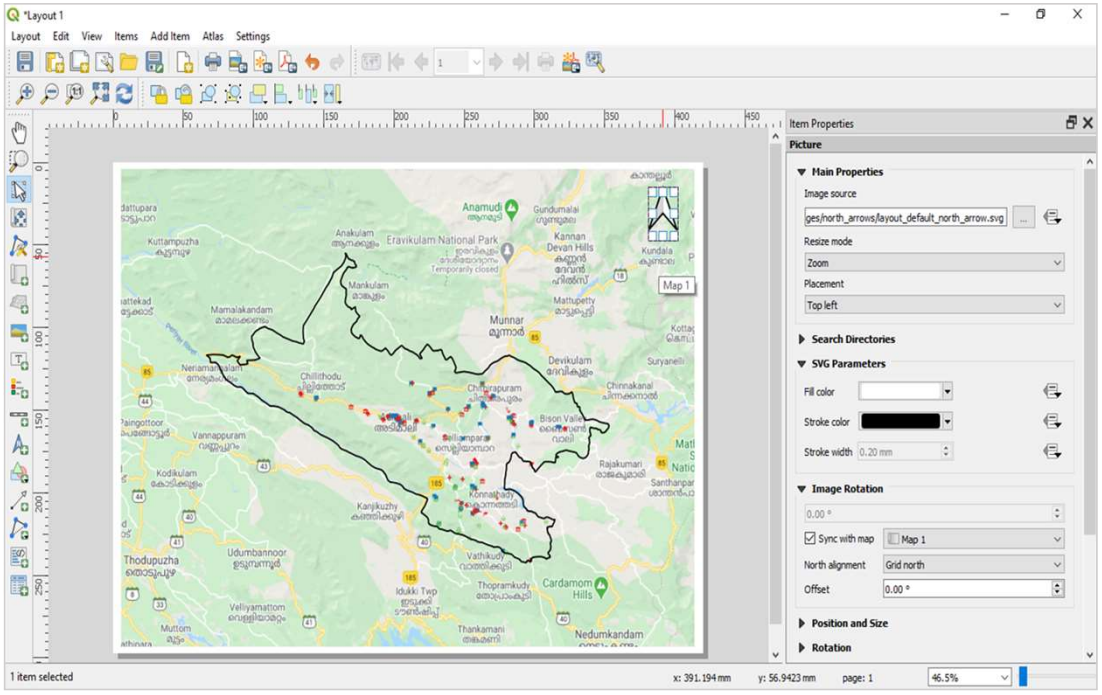
14. Now we are going to add some standard map elements like North Arrow, Legend and Scale Bar to the map.
Click Add Item > Add North Arrow
You can also choose from the standard tool bar.

Click on the layout where you want the North Arrow to appear.





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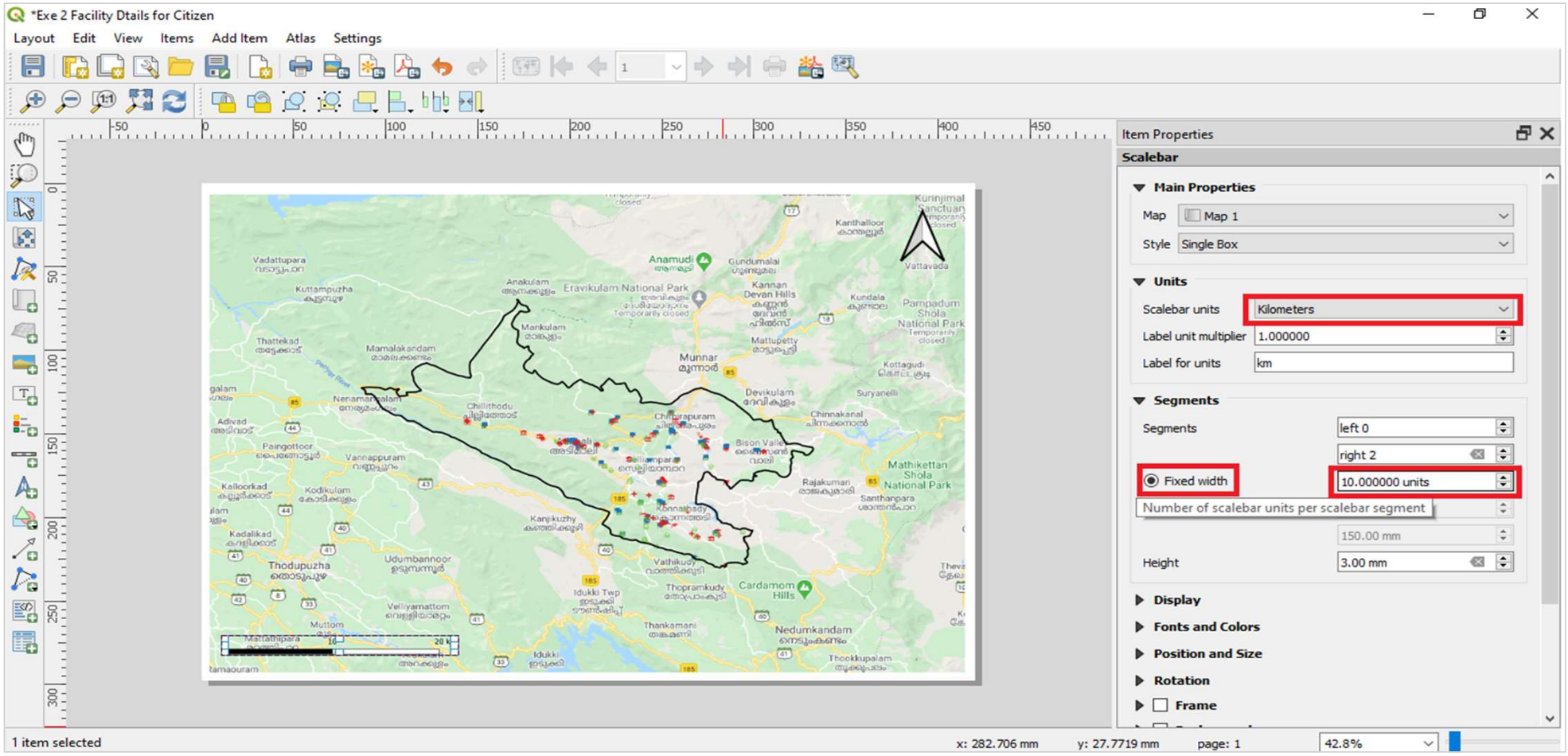
15. Click on the layout where you want the scalebar to appear. In the 'Item Properties' tab > In the Segments panel > change the 'Fixed width' to 20 units and adjust the segments to your liking.



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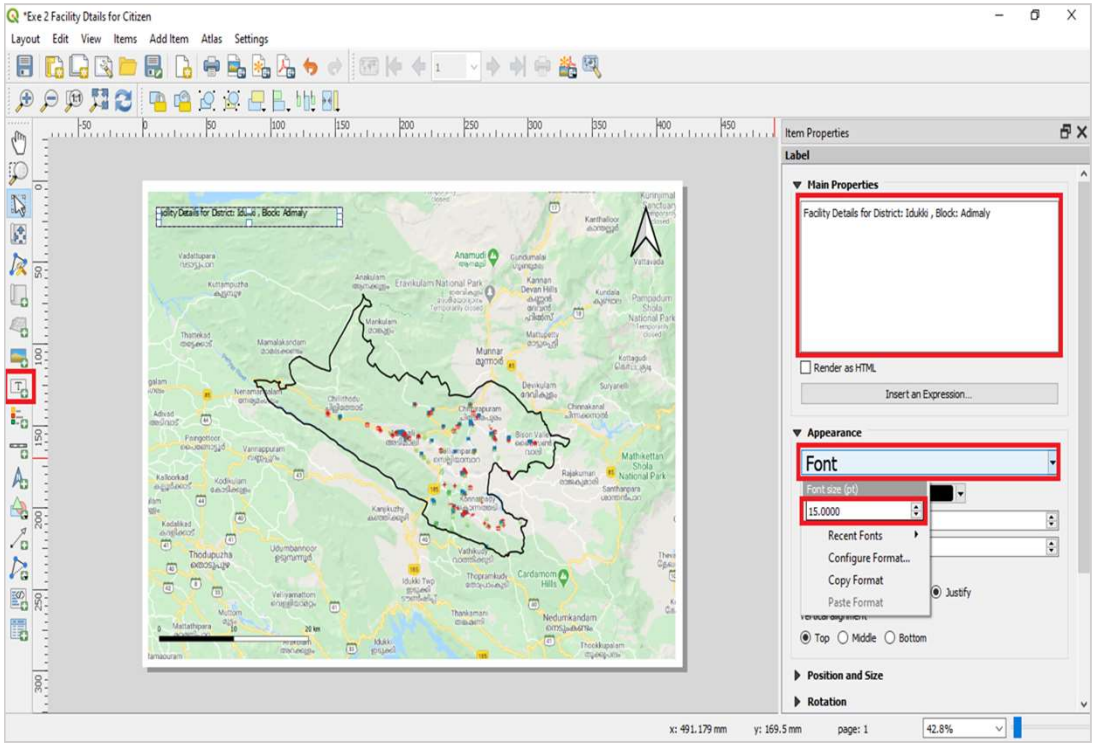
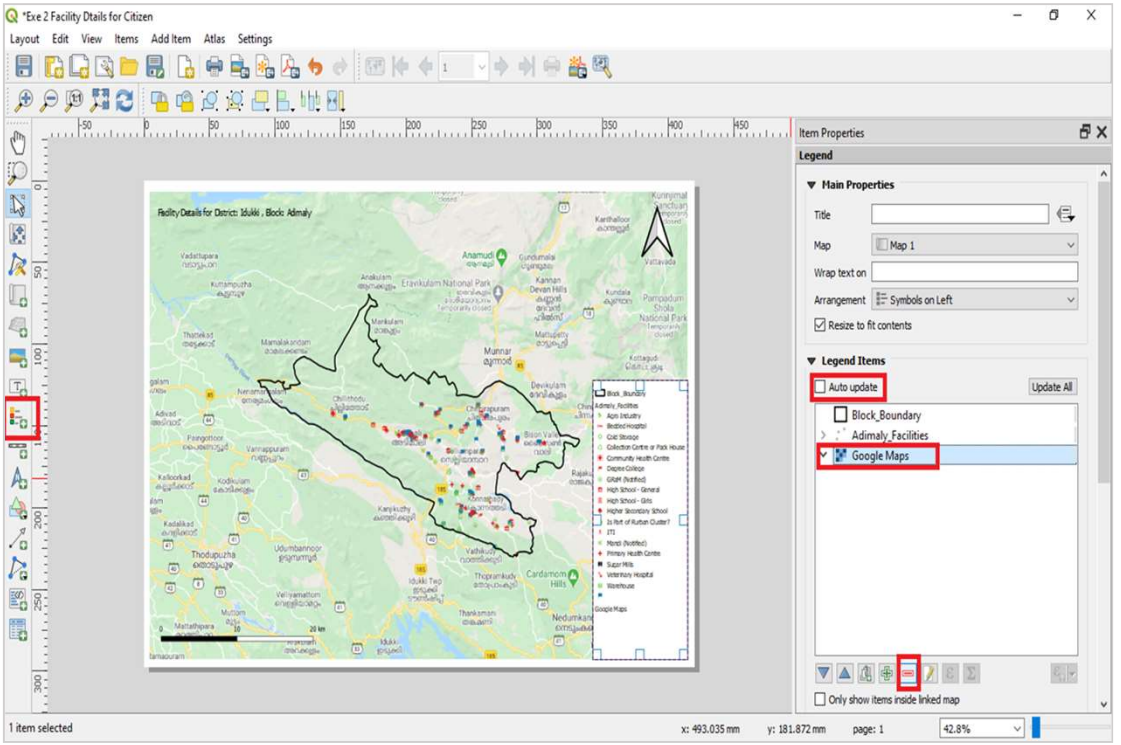
16. Click on Add Item > Add Label -to add title of the map, you can increase the size of the font by clicking on the font here we are using 15 size.



17. To add legend, click on Add Item > Add Legend, then click on the map and draw a box where the legend should be and adjust the box.
In the 'Item Property' tab, Uncheck 'Auto update' , select 'Google map' to remove from the legend.



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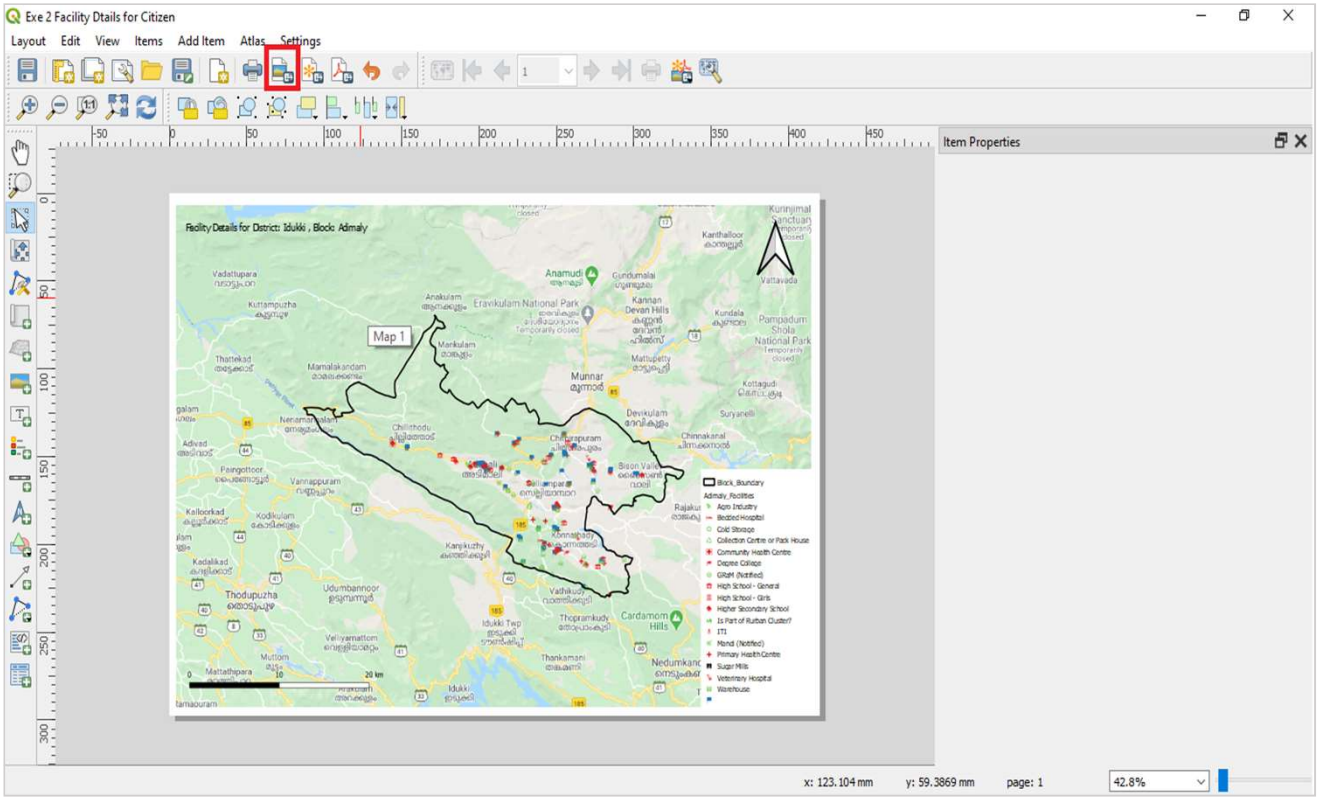
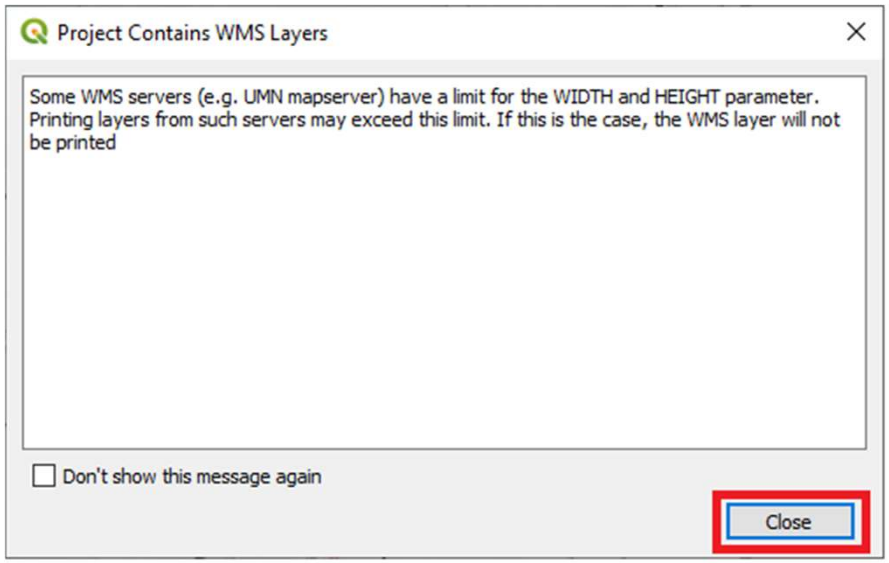
18. After putting all the elements, user can now export map as an Image, PDF or SVG. For this Exercise, Click Layout > Export as Image to save map in Jpeg format.

User will be prompted a WMS Layer message > close this





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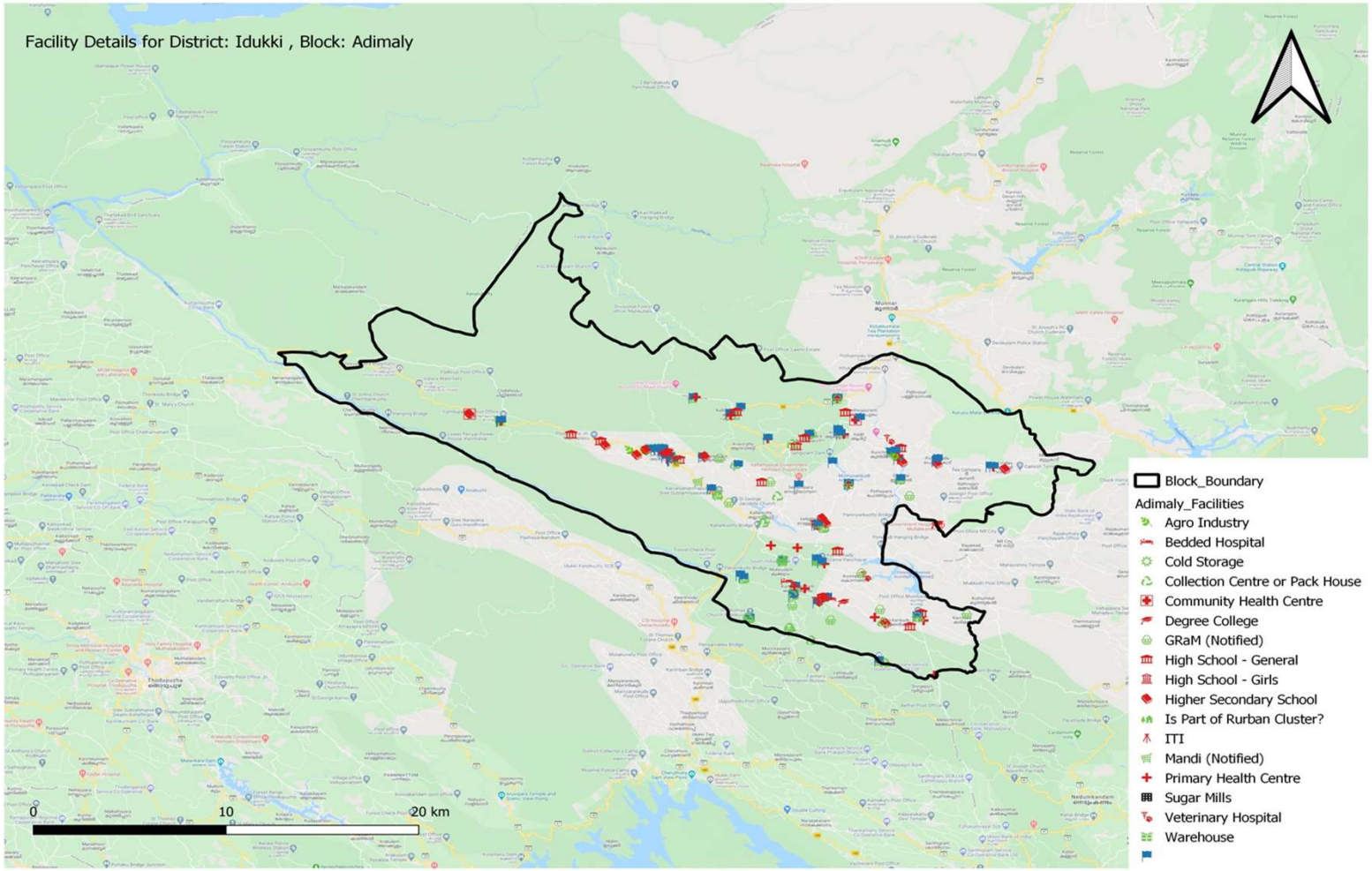

This is the exported Jpeg image of the block.

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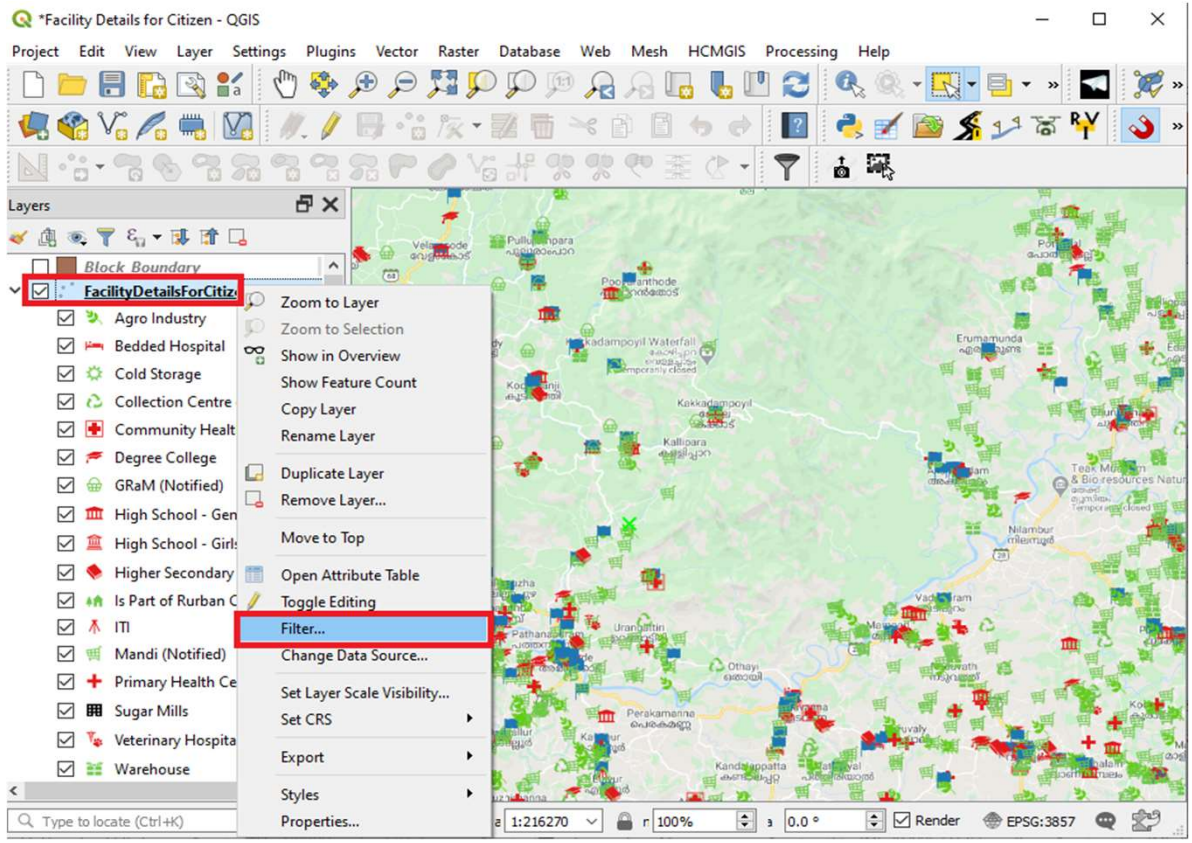
Bedded hospitals per block

Next, we will look at filtering only the bedded hospitals per block.. This can be produced easily in excel if we have the Block ID or Block Name against each facility. Unfortunately, block information is not available in the facility shapefile.

However, using the 'spatial join', we can transfer block Id and Block Name from one layer (Block Boundary) to another (FacilityDetailsForCitizen) based on their spatial relationship.

First we have to filter the facility data to exclude other facilities.

1. Right-click the 'FacilityDetailsForCitizen' layer and select Filter.



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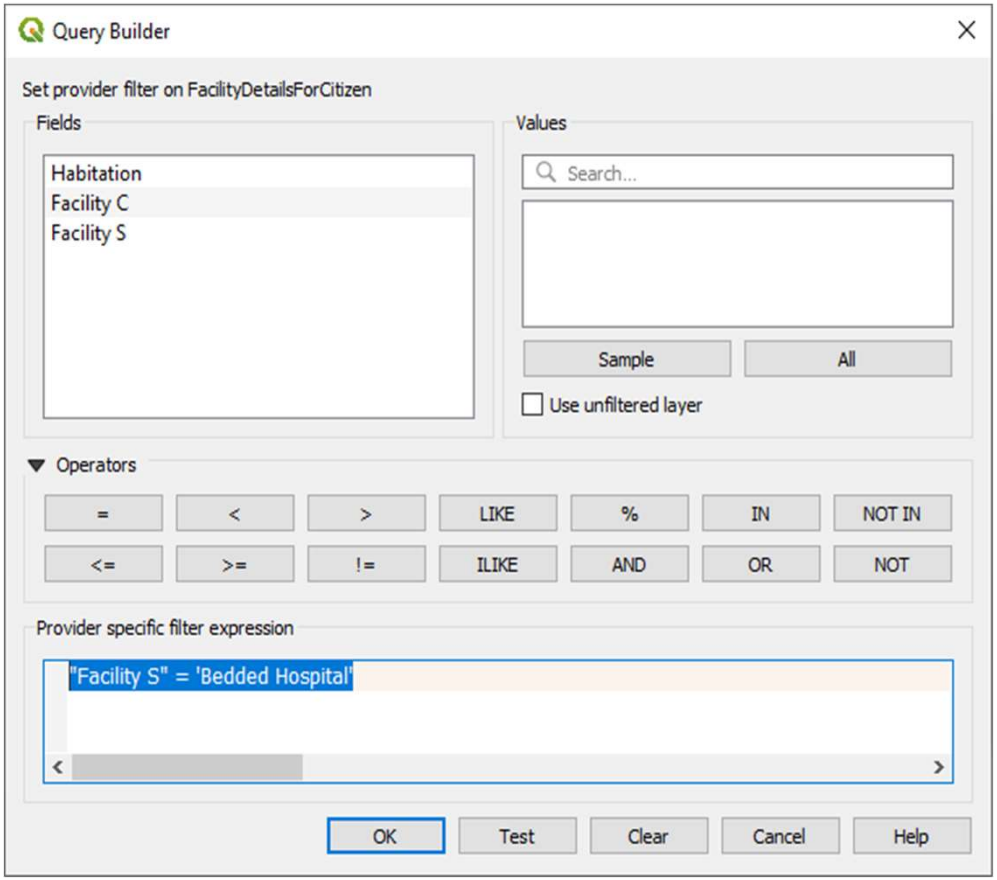
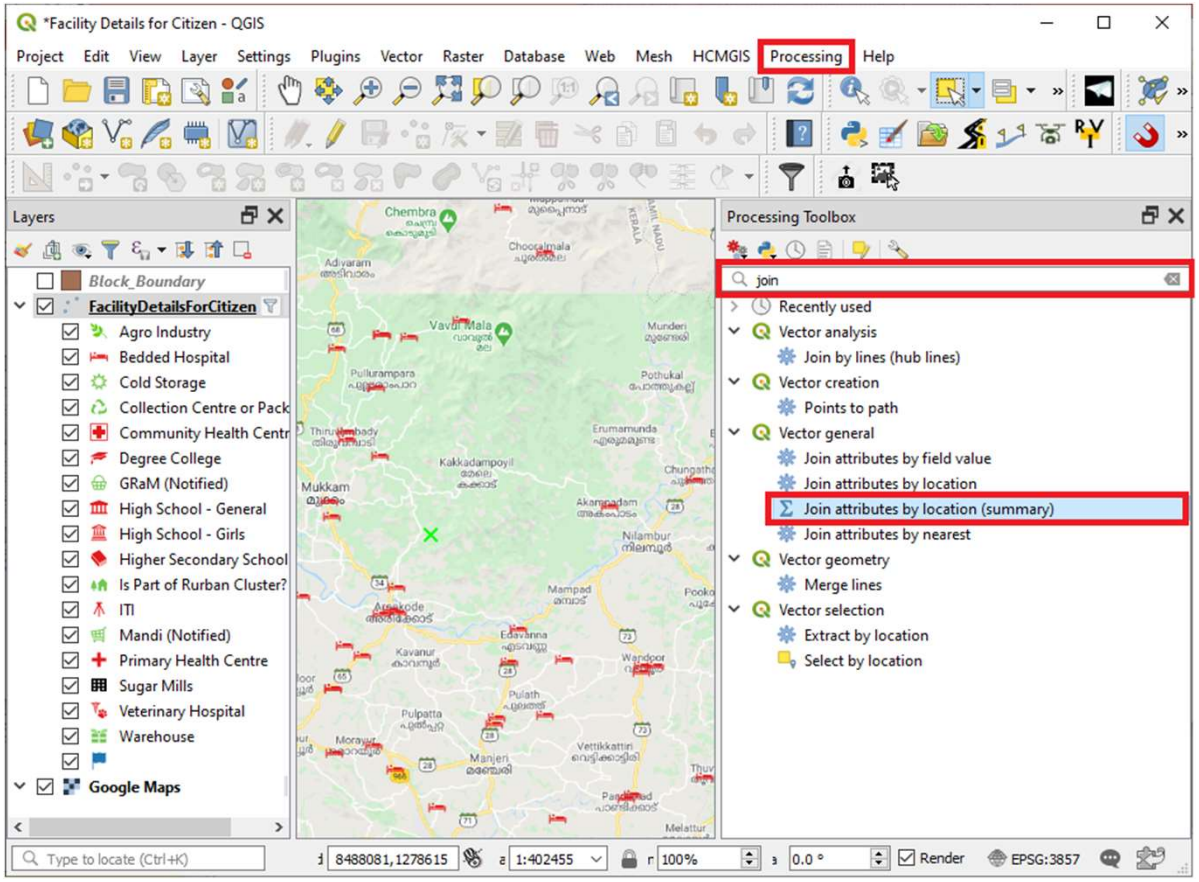
2. In the Query Builder, type the following expression to get all the records of the bedded hospitals.

"Facility S" = 'Bedded Hospital'

Click OK.



3. Now we can do a spatial join using this layer. Go to Processing > Toolbox.
Search and locate the Vector general ▸ Join attribute by location (summary) algorithm. Double-click to launch it.



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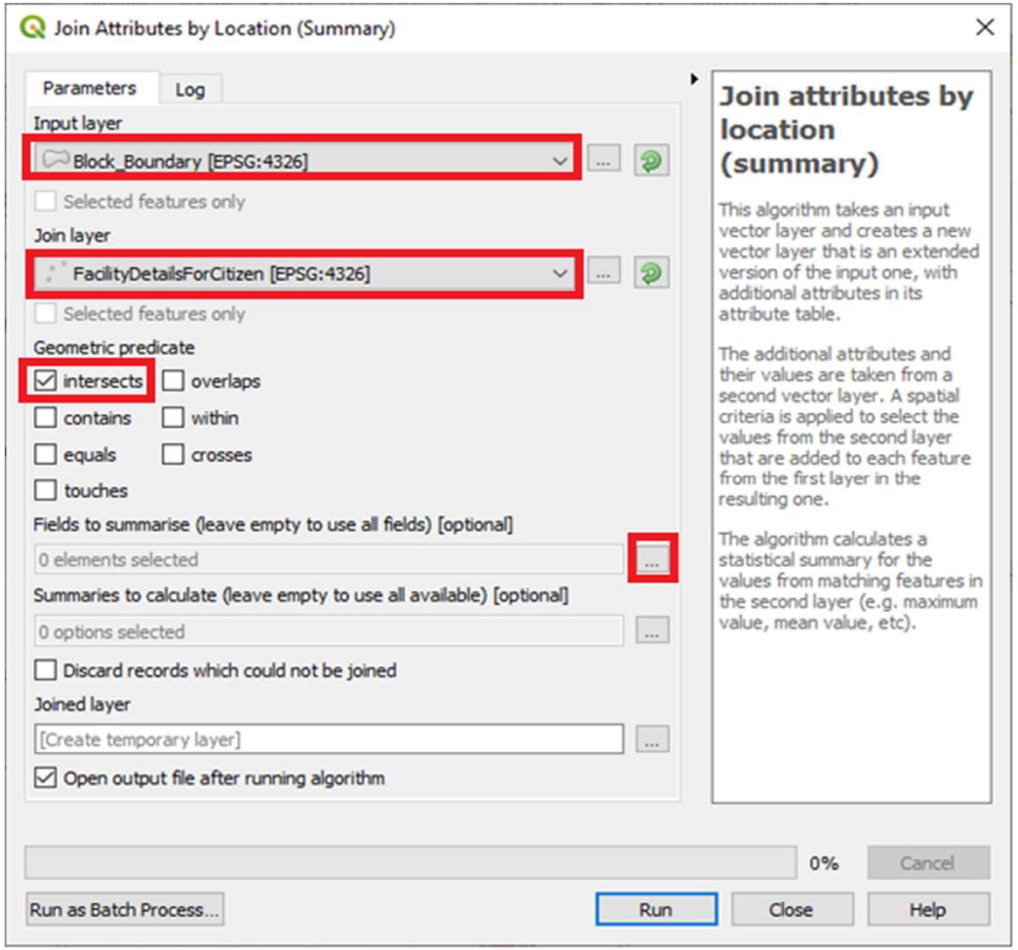
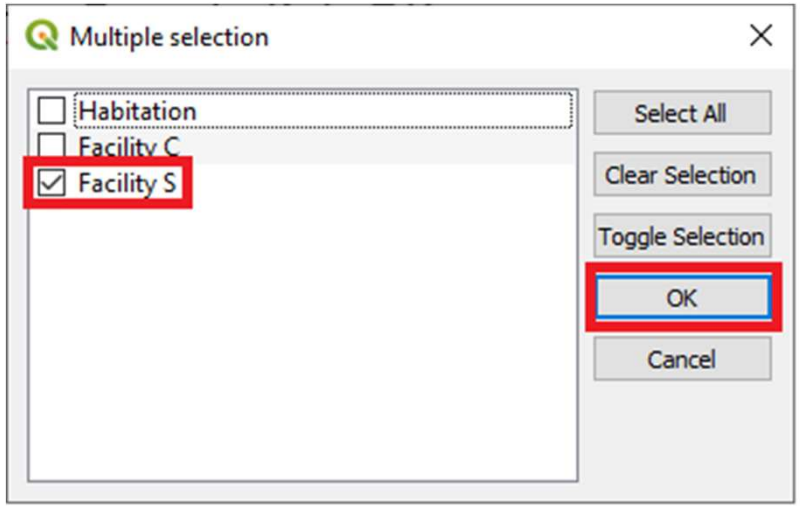
4. In the 'Join attribute by location (summary)' dialog, select Block_Boundary as the Input layer. The FacilityDetailsForCitizen will be the Join layer. You can leave the Geometry predicate to the default Intersects. Click the ... button next to Fields to sumarize.



5. Select Facility_S and click OK



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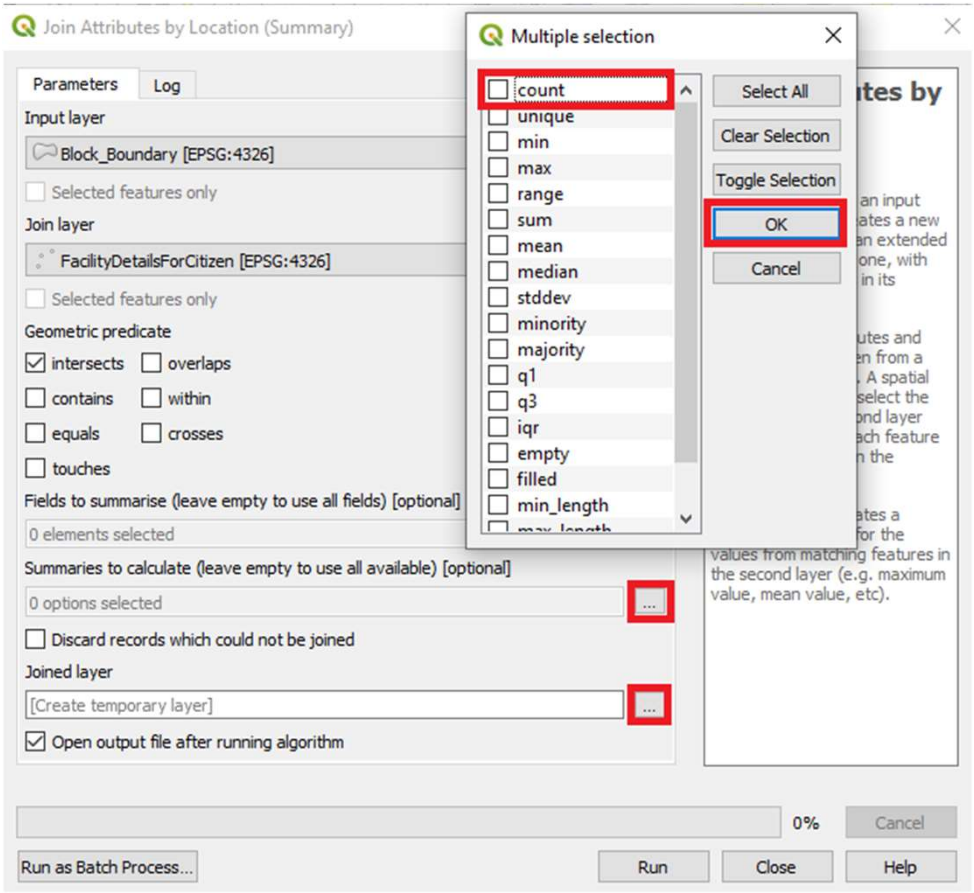
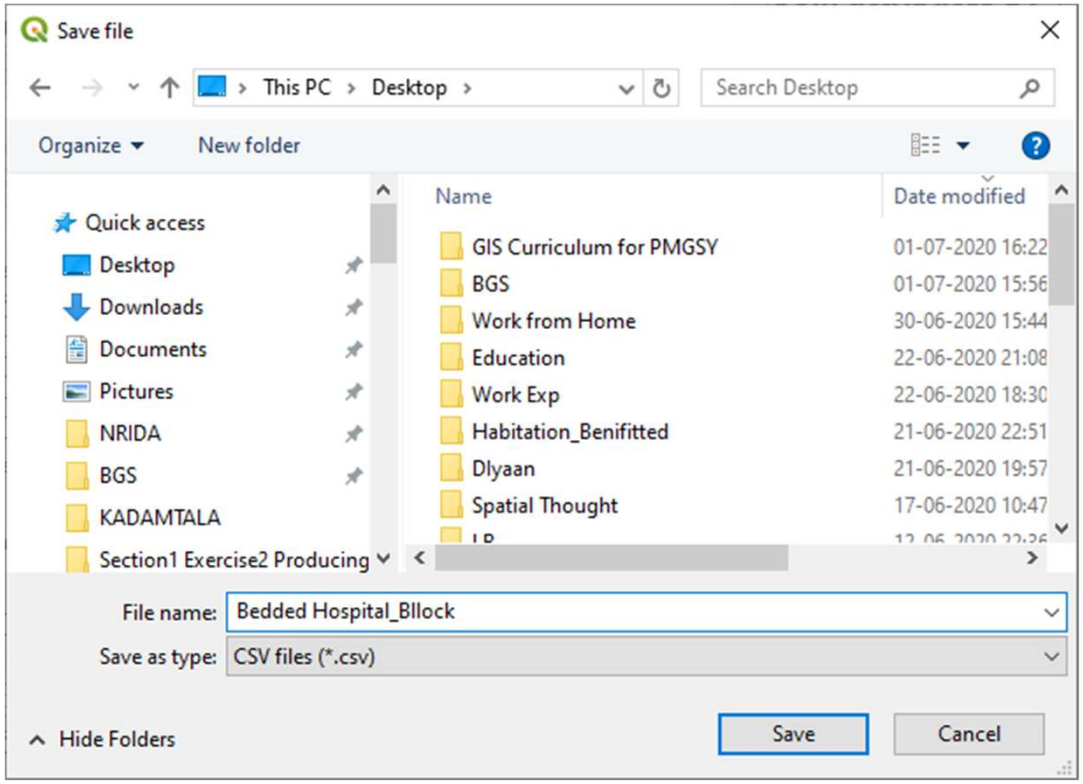
6. Similarly, click the ... button next to 'Summaries' to calculate.
Select count as the summary operator and click OK.

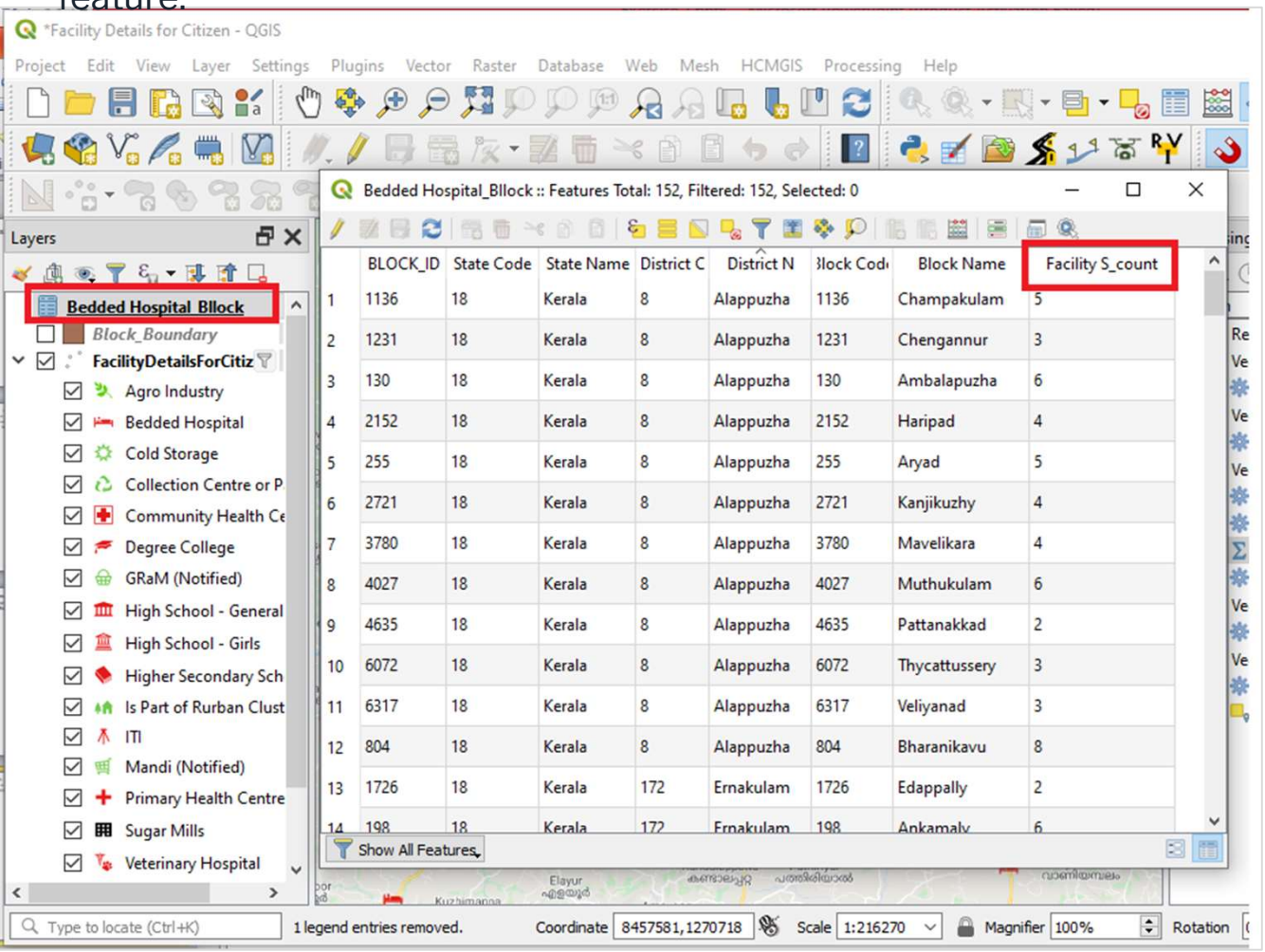


7. Browse the location to save the output and provide the name and filetype (CSV)
Now we are ready to start the processing. Click Run.
Close the window after process completion.



PRADHAN MANTRI
GRAM SADAK YOJANA

Notice now, in the main QGIS window, you will see a new Joined table (Bedded Hospital_Block) added to layer panel.
When you open the table, you will see a new column Facility S_count added to the input layer attribute (Block boundary). This contains the count of all bedded hospitals which are intersecting with that feature.



	BLOCK_ID	State Code	State Name	District C	District N	Block Cod	Block Name	Facility S_count
1	1136	18	Kerala	8	Alappuzha	1136	Champakulam	5
2	1231	18	Kerala	8	Alappuzha	1231	Chengannur	3
3	130	18	Kerala	8	Alappuzha	130	Ambalapuzha	6
4	2152	18	Kerala	8	Alappuzha	2152	Haripad	4
5	255	18	Kerala	8	Alappuzha	255	Aryad	5
6	2721	18	Kerala	8	Alappuzha	2721	Kanjikuzhy	4
7	3780	18	Kerala	8	Alappuzha	3780	Mavelikara	4
8	4027	18	Kerala	8	Alappuzha	4027	Muthukulam	6
9	4635	18	Kerala	8	Alappuzha	4635	Pattanakkad	2
10	6072	18	Kerala	8	Alappuzha	6072	Thycattussery	3
11	6317	18	Kerala	8	Alappuzha	6317	Veliyanad	3
12	804	18	Kerala	8	Alappuzha	804	Bharanikavu	8
13	1726	18	Kerala	172	Ernakulam	1726	Edappally	2
14	198	18	Kerala	172	Ernakulam	198	Ankamaly	6

Congratulations!

You have now completed Module 3.