

OpenStreetMap -- Data Preparation

EE464: Urban Economics

EE562: Selected Topics in Development Economics 2

Semester 1 / 2020

Faculty of Economics, Thammasat University

Download OpenStreetMap data

<https://download.geofabrik.de/asia.html>

Sub Regions

Click on the region name to see the overview page for that region, or select one of the file extension links for quick access.

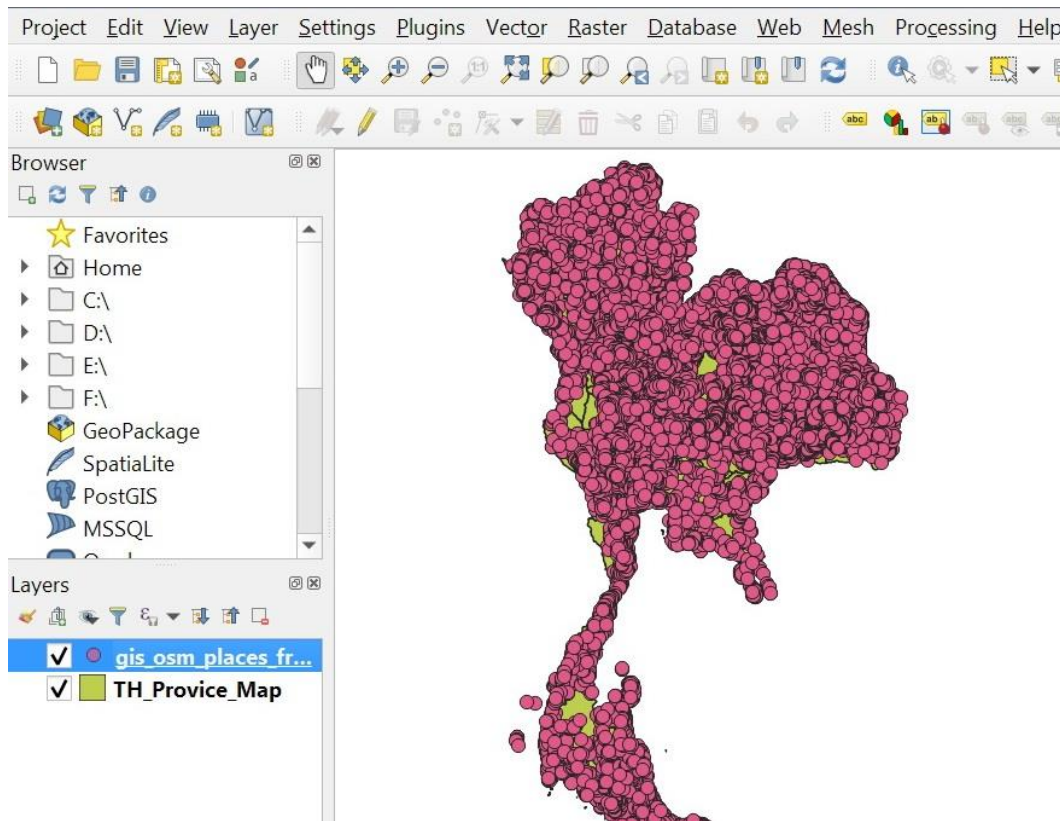
Sub Region	Quick Links		
	.osm.pbf	.shp.zip	.osm.bz2
Afghanistan	[.osm.pbf] (40.6 MB)	[.shp.zip]	[.osm.bz2]
Armenia	[.osm.pbf] (28.2 MB)	[.shp.zip]	[.osm.bz2]
Azerbaijan	[.osm.pbf] (23.9 MB)	[.shp.zip]	[.osm.bz2]
Bangladesh	[.osm.pbf] (226 MB)	[.shp.zip]	[.osm.bz2]
Bhutan	[.osm.pbf] (7.4 MB)	[.shp.zip]	[.osm.bz2]
Cambodia	[.osm.pbf] (25.2 MB)	[.shp.zip]	[.osm.bz2]
China	[.osm.pbf] (640 MB)	[.shp.zip]	[.osm.bz2]
GCC States	[.osm.pbf] (108 MB)	[.shp.zip]	[.osm.bz2]
India	[.osm.pbf] (826 MB)	[.shp.zip]	[.osm.bz2]
Indonesia	[.osm.pbf] (1.1 GB)	[.shp.zip]	[.osm.bz2]
Iran	[.osm.pbf] (148 MB)	[.shp.zip]	[.osm.bz2]
Iraq	[.osm.pbf] (47.3 MB)	[.shp.zip]	[.osm.bz2]
Israel and Palestine	[.osm.pbf] (79 MB)	[.shp.zip]	[.osm.bz2]
Japan	[.osm.pbf] (1.5 GB)	✘	[.osm.bz2]
Jordan	[.osm.pbf] (26.3 MB)	[.shp.zip]	[.osm.bz2]
Kazakhstan	[.osm.pbf] (110 MB)	[.shp.zip]	[.osm.bz2]
Kyrgyzstan	[.osm.pbf] (27.6 MB)	[.shp.zip]	[.osm.bz2]
Laos	[.osm.pbf] (32.6 MB)	[.shp.zip]	[.osm.bz2]
Lebanon	[.osm.pbf] (25.4 MB)	[.shp.zip]	[.osm.bz2]
Malaysia, Singapore, and Brunei	[.osm.pbf] (157 MB)	[.shp.zip]	[.osm.bz2]
Maldives	[.osm.pbf] (3.1 MB)	[.shp.zip]	[.osm.bz2]
Mongolia	[.osm.pbf] (31.4 MB)	[.shp.zip]	[.osm.bz2]
Myanmar (a.k.a. Burma)	[.osm.pbf] (123 MB)	[.shp.zip]	[.osm.bz2]
Nepal	[.osm.pbf] (252 MB)	[.shp.zip]	[.osm.bz2]
North Korea	[.osm.pbf] (34.0 MB)	[.shp.zip]	[.osm.bz2]
Pakistan	[.osm.pbf] (53 MB)	[.shp.zip]	[.osm.bz2]
Philippines	[.osm.pbf] (368 MB)	[.shp.zip]	[.osm.bz2]
Russian Federation	[.osm.pbf] (2.7 GB)	✘	[.osm.bz2]
South Korea	[.osm.pbf] (119 MB)	[.shp.zip]	[.osm.bz2]
Sri Lanka	[.osm.pbf] (99 MB)	[.shp.zip]	[.osm.bz2]
Syria	[.osm.pbf] (28.6 MB)	[.shp.zip]	[.osm.bz2]
Taiwan	[.osm.pbf] (78 MB)	[.shp.zip]	[.osm.bz2]
Tajikistan	[.osm.pbf] (26.7 MB)	[.shp.zip]	[.osm.bz2]
Thailand	[.osm.pbf] (186 MB)	[.shp.zip]	[.osm.bz2]
Turkmenistan	[.osm.pbf] (11.2 MB)	[.shp.zip]	[.osm.bz2]
Uzbekistan	[.osm.pbf] (48.2 MB)	[.shp.zip]	[.osm.bz2]
Vietnam	[.osm.pbf] (154 MB)	[.shp.zip]	[.osm.bz2]
Yemen	[.osm.pbf] (26.9 MB)	[.shp.zip]	[.osm.bz2]

Main contents

- (1) Summation of points
- (2) Summation of road lengths
- (3) Summation of built-up areas
- (4) Select by Expression or Select by Attribute

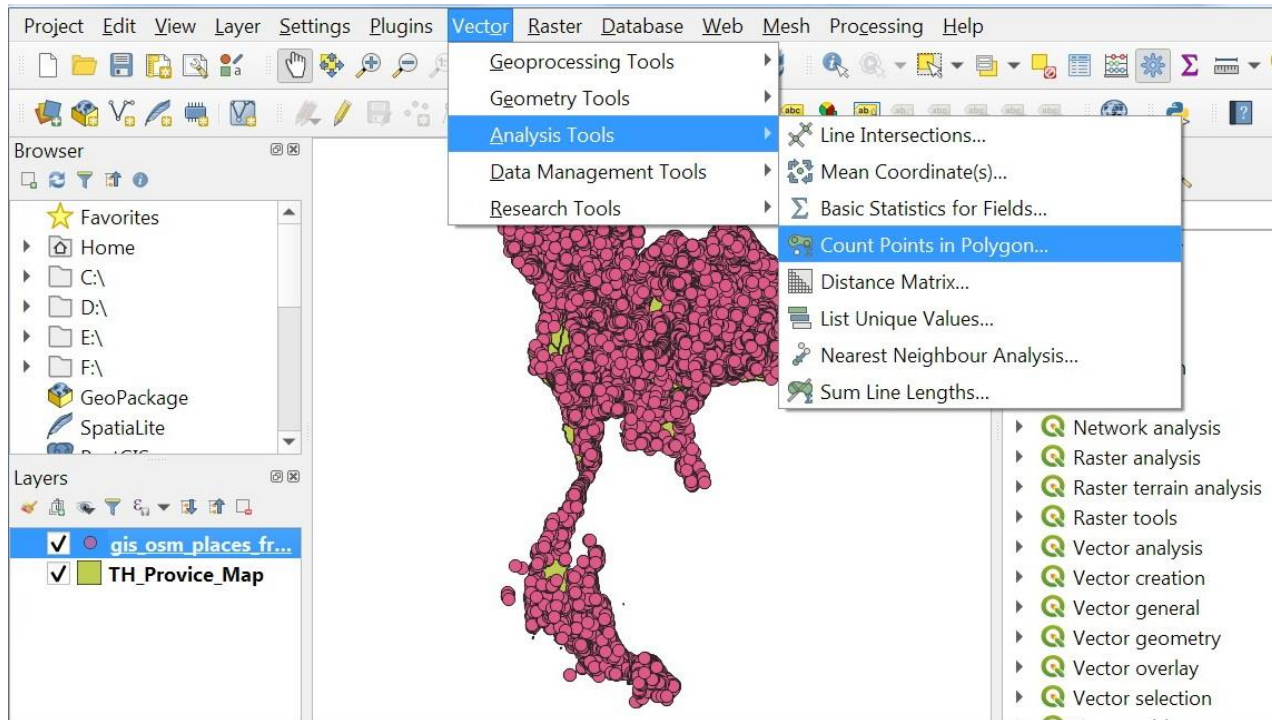
(1) Summation of points

(1) Summation of points



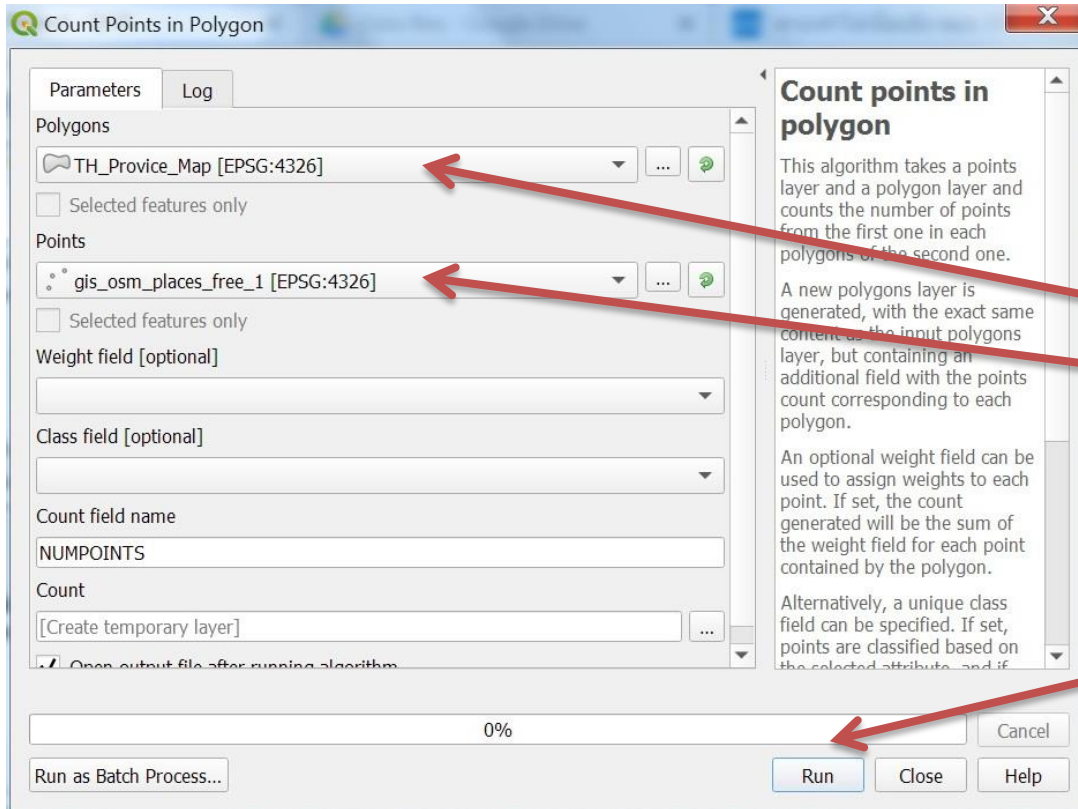
Step 1: Open both the administrative map (TH_Province_Map.shp) and OSM's POI map (gis_osm_pois_free_1.shp)

(1) Summation of points (cont'd)



Step 2: Use the tool listed on the menu of 'Vector → Analysis Tools → Count Points in Polygon'.

(1) Summation of points (cont'd)

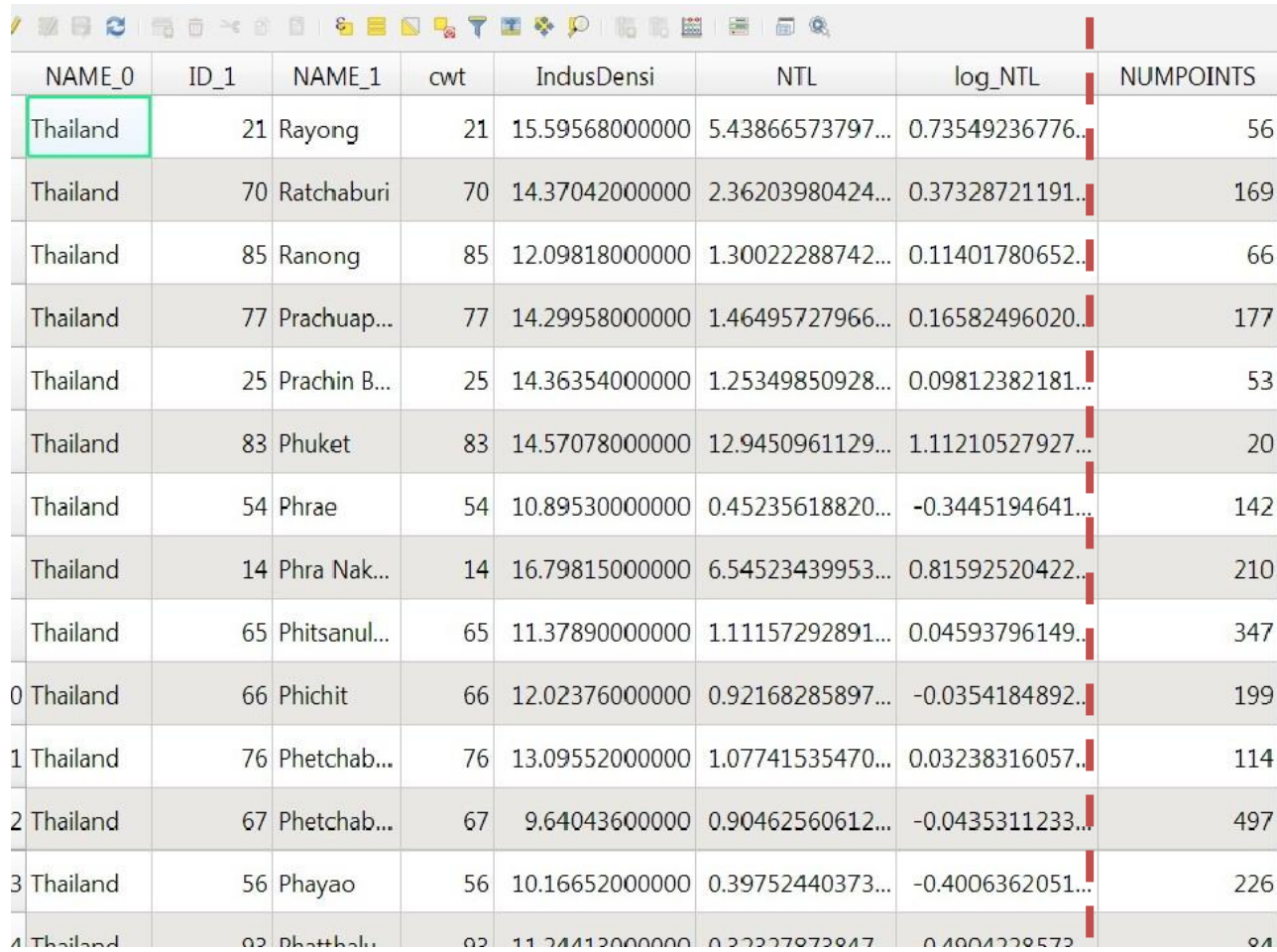


Step 3: Identify both sources of data for computation, which are:

- (1) Polygons
- (2) Points

Then, click 'Run' button.

(1) Summation of points (cont'd)

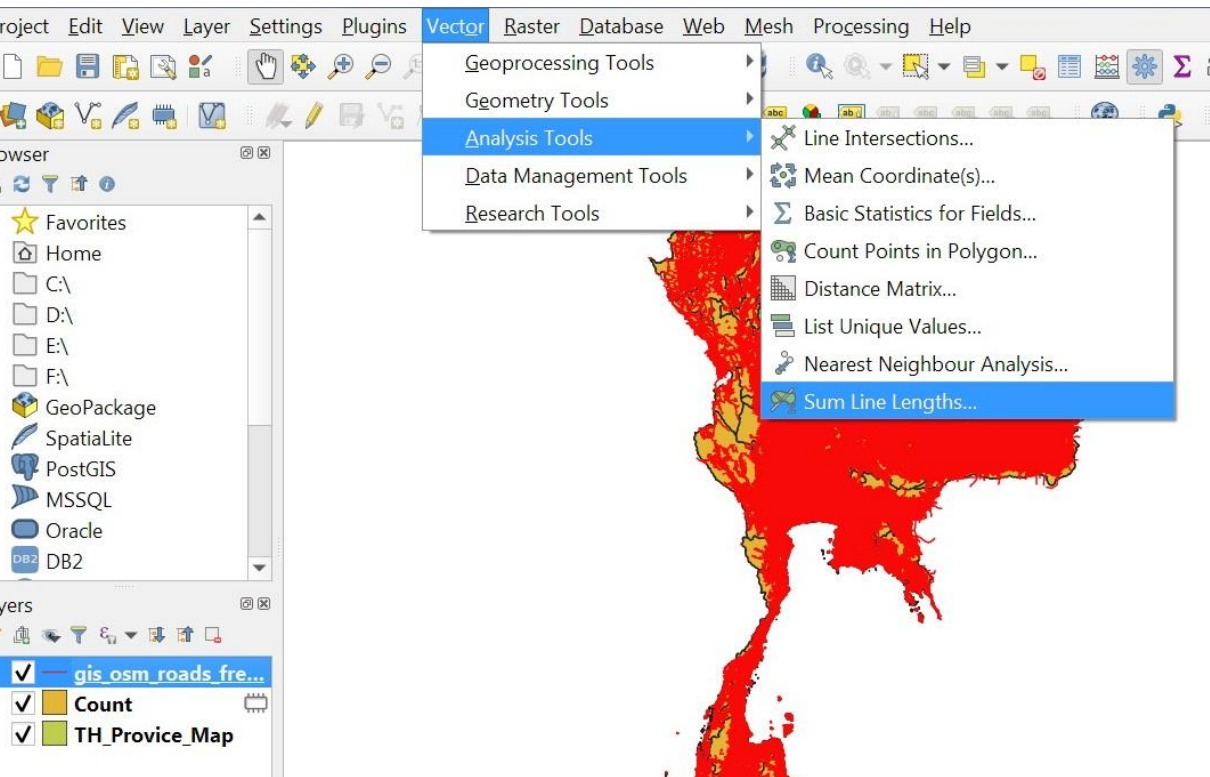


A screenshot of a data table with a red dashed box highlighting the NUMPOINTS column. The table has 8 columns: NAME_0, ID_1, NAME_1, cwt, IndusDensi, NTL, log_NTL, and NUMPOINTS. The first row is highlighted in green, and the NUMPOINTS column is highlighted with a red dashed box.

NAME_0	ID_1	NAME_1	cwt	IndusDensi	NTL	log_NTL	NUMPOINTS
Thailand	21	Rayong	21	15.59568000000	5.43866573797...	0.73549236776...	56
Thailand	70	Ratchaburi	70	14.37042000000	2.36203980424...	0.37328721191...	169
Thailand	85	Ranong	85	12.09818000000	1.30022288742...	0.11401780652...	66
Thailand	77	Prachuap...	77	14.29958000000	1.46495727966...	0.16582496020...	177
Thailand	25	Prachin B...	25	14.36354000000	1.25349850928...	0.09812382181...	53
Thailand	83	Phuket	83	14.57078000000	12.9450961129...	1.11210527927...	20
Thailand	54	Phrae	54	10.89530000000	0.45235618820...	-0.3445194641...	142
Thailand	14	Phra Nak...	14	16.79815000000	6.54523439953...	0.81592520422...	210
Thailand	65	Phitsanul...	65	11.37890000000	1.11157292891...	0.04593796149...	347
Thailand	66	Phichit	66	12.02376000000	0.92168285897...	-0.0354184892...	199
Thailand	76	Phetchab...	76	13.09552000000	1.07741535470...	0.03238316057...	114
Thailand	67	Phetchab...	67	9.64043600000	0.90462560612...	-0.0435311233...	497
Thailand	56	Phayao	56	10.16652000000	0.39752440373...	-0.4006362051...	226
Thailand	82	Phatthal...	82	11.24412000000	0.22227872847...	0.4904228572...	84

The result is the new column in the attribute table.

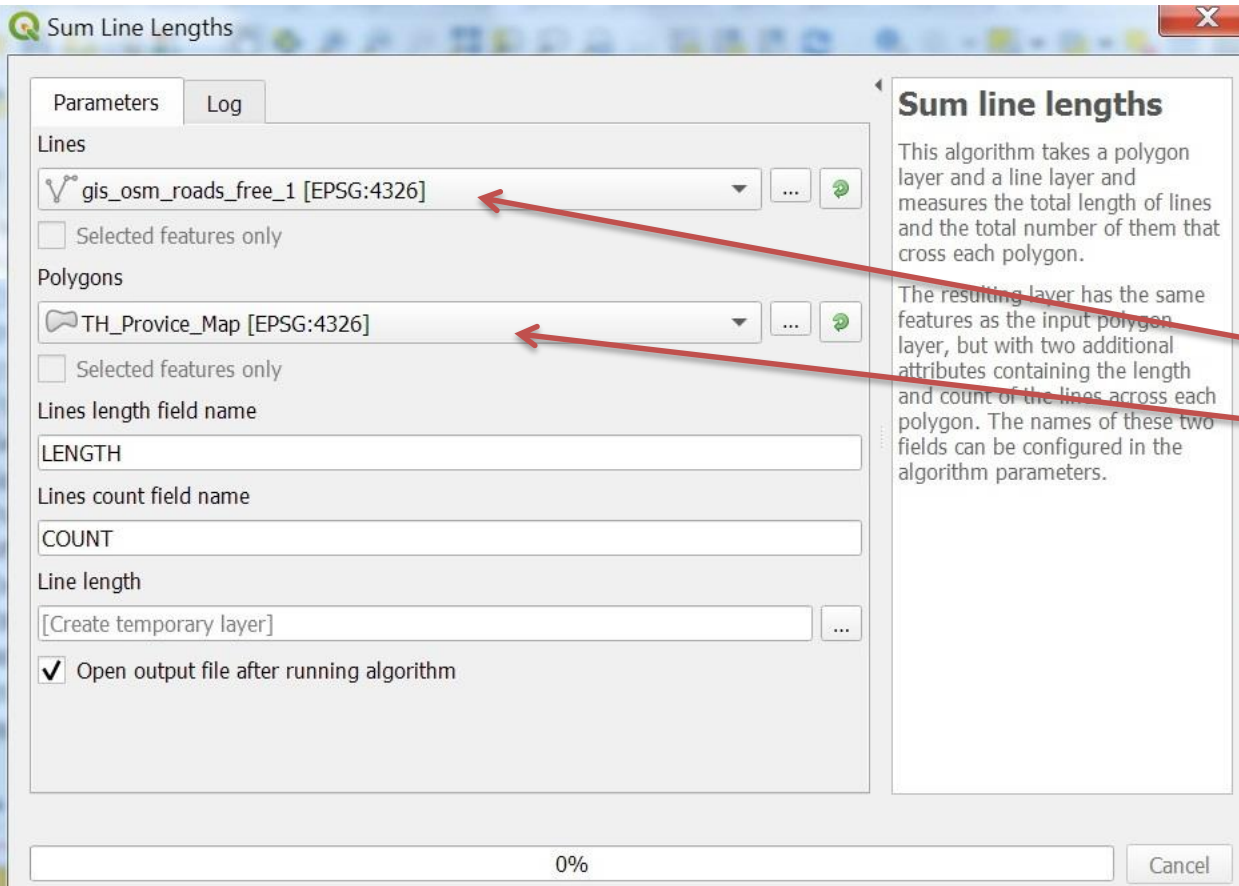
(2) Summation of road lengths



Step 1: Open both the administrative map (TH_Province_Map.shp) and OSM's road map (gis_osm_roads_free_1.shp)

Step 2: Use the tool listed on the menu of 'Vector → Analysis Tools → Sum Line Lengths'.

(2) Summation of road lengths (cont'd)

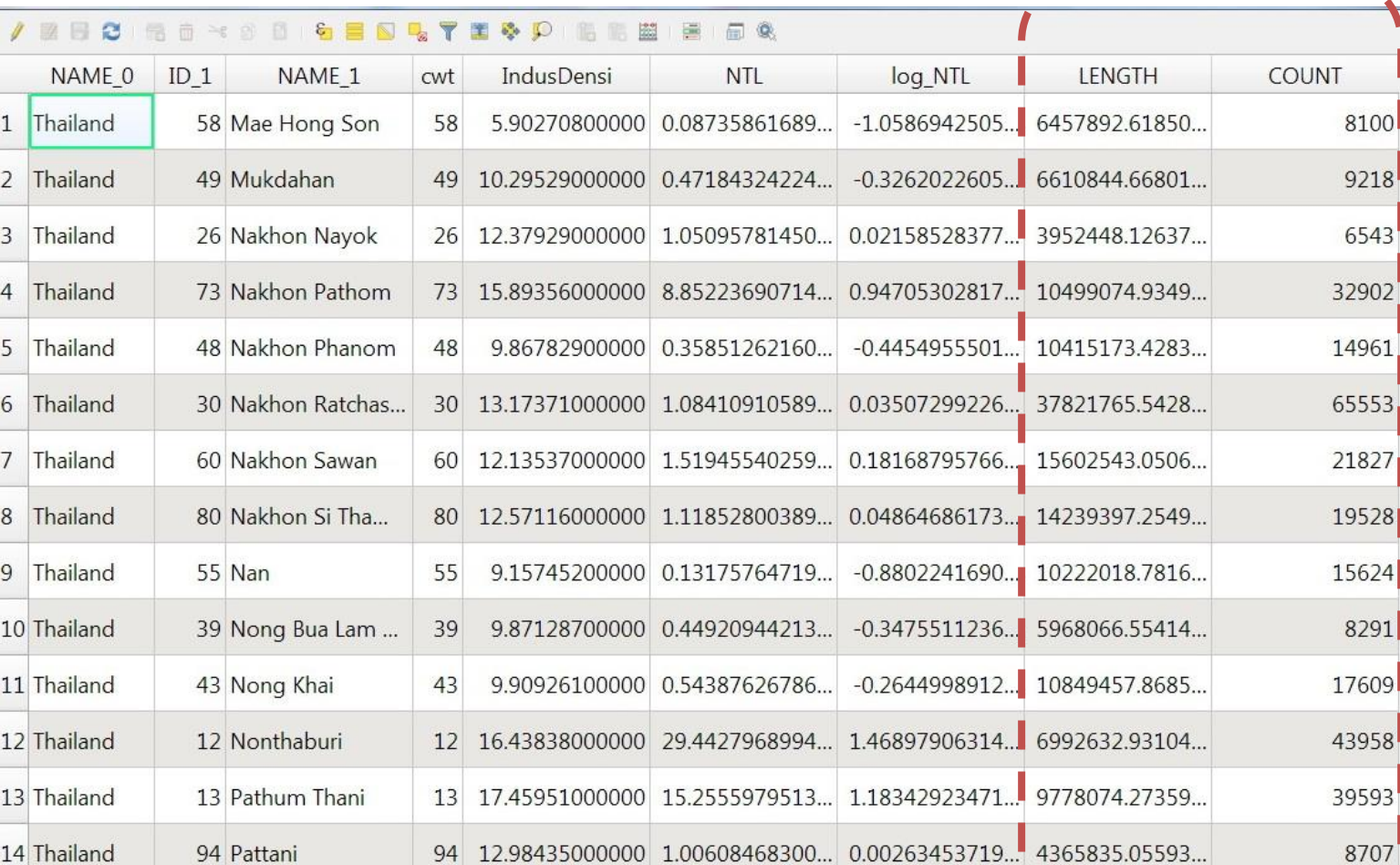


Step 3: Identify both sources of data for computation, which are:

- (1) Lines
- (2) Polygons

Then, click 'Run' button.

(2) Summation of road lengths (cont'd)

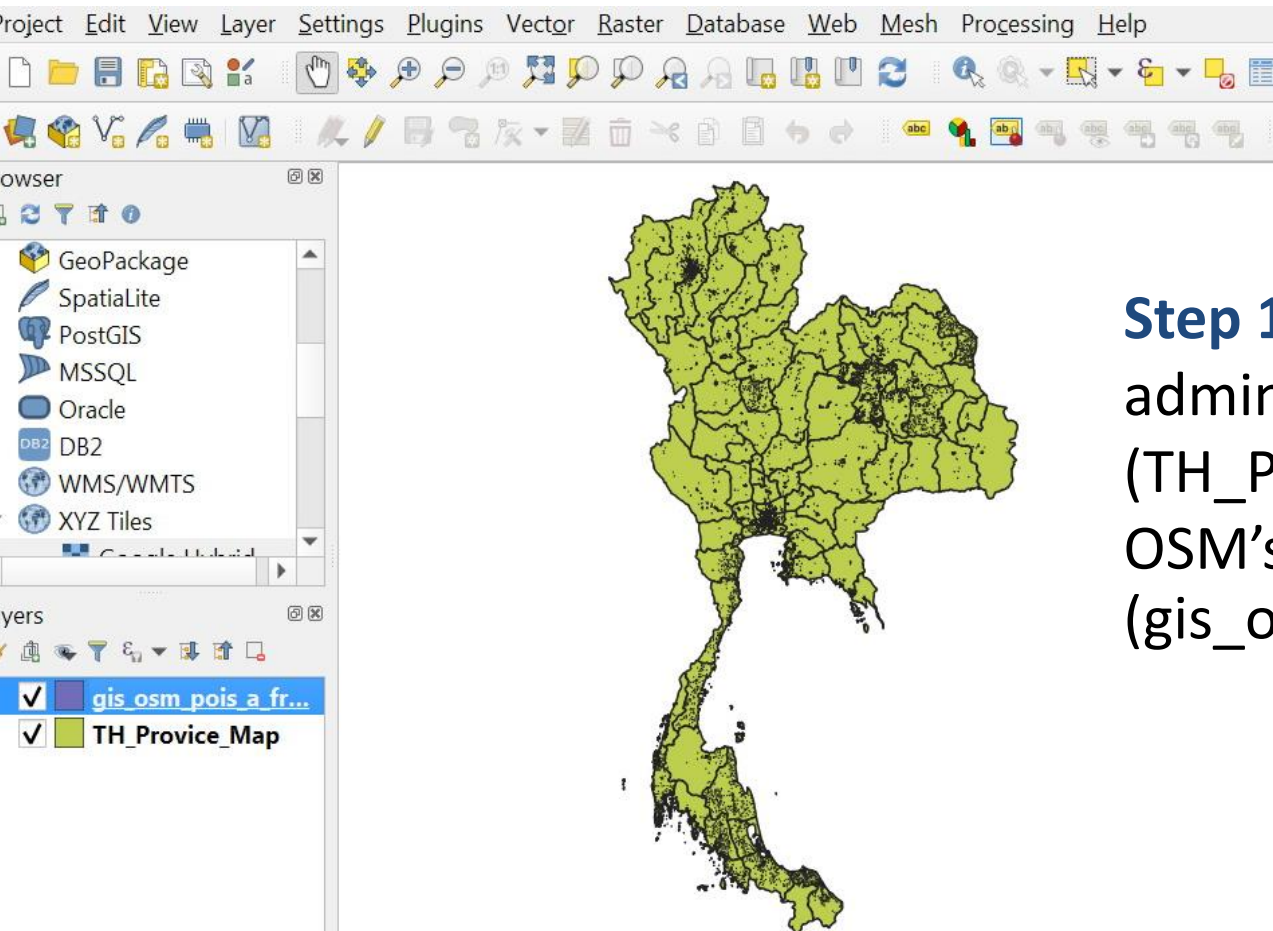


	NAME_0	ID_1	NAME_1	cwt	IndusDensi	NTL	log_NTL	LENGTH	COUNT
1	Thailand	58	Mae Hong Son	58	5.90270800000	0.08735861689...	-1.0586942505...	6457892.61850...	8100
2	Thailand	49	Mukdahan	49	10.29529000000	0.47184324224...	-0.3262022605...	6610844.66801...	9218
3	Thailand	26	Nakhon Nayok	26	12.37929000000	1.05095781450...	0.02158528377...	3952448.12637...	6543
4	Thailand	73	Nakhon Pathom	73	15.89356000000	8.85223690714...	0.94705302817...	10499074.9349...	32902
5	Thailand	48	Nakhon Phanom	48	9.86782900000	0.35851262160...	-0.4454955501...	10415173.4283...	14961
6	Thailand	30	Nakhon Ratchas...	30	13.17371000000	1.08410910589...	0.03507299226...	37821765.5428...	65553
7	Thailand	60	Nakhon Sawan	60	12.13537000000	1.51945540259...	0.18168795766...	15602543.0506...	21827
8	Thailand	80	Nakhon Si Tha...	80	12.57116000000	1.11852800389...	0.04864686173...	14239397.2549...	19528
9	Thailand	55	Nan	55	9.15745200000	0.13175764719...	-0.8802241690...	10222018.7816...	15624
10	Thailand	39	Nong Bua Lam ...	39	9.87128700000	0.44920944213...	-0.3475511236...	5968066.55414...	8291
11	Thailand	43	Nong Khai	43	9.90926100000	0.54387626786...	-0.2644998912...	10849457.8685...	17609
12	Thailand	12	Nonthaburi	12	16.43838000000	29.4427968994...	1.46897906314...	6992632.93104...	43958
13	Thailand	13	Pathum Thani	13	17.45951000000	15.2555979513...	1.18342923471...	9778074.27359...	39593
14	Thailand	94	Pattani	94	12.98435000000	1.00608468300...	0.00263453719...	4365835.05593...	8707

The results are shown in the two new columns in the attribute table.

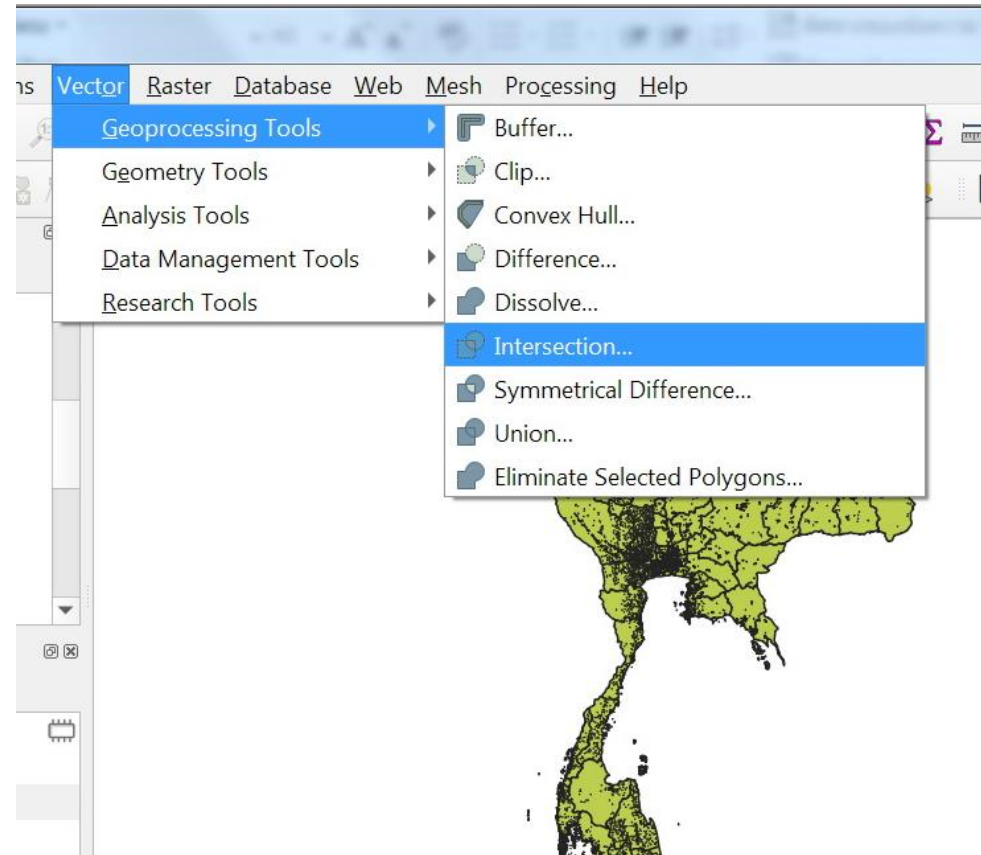
(3) Summation of built-up areas

(3) Summation of built-up areas



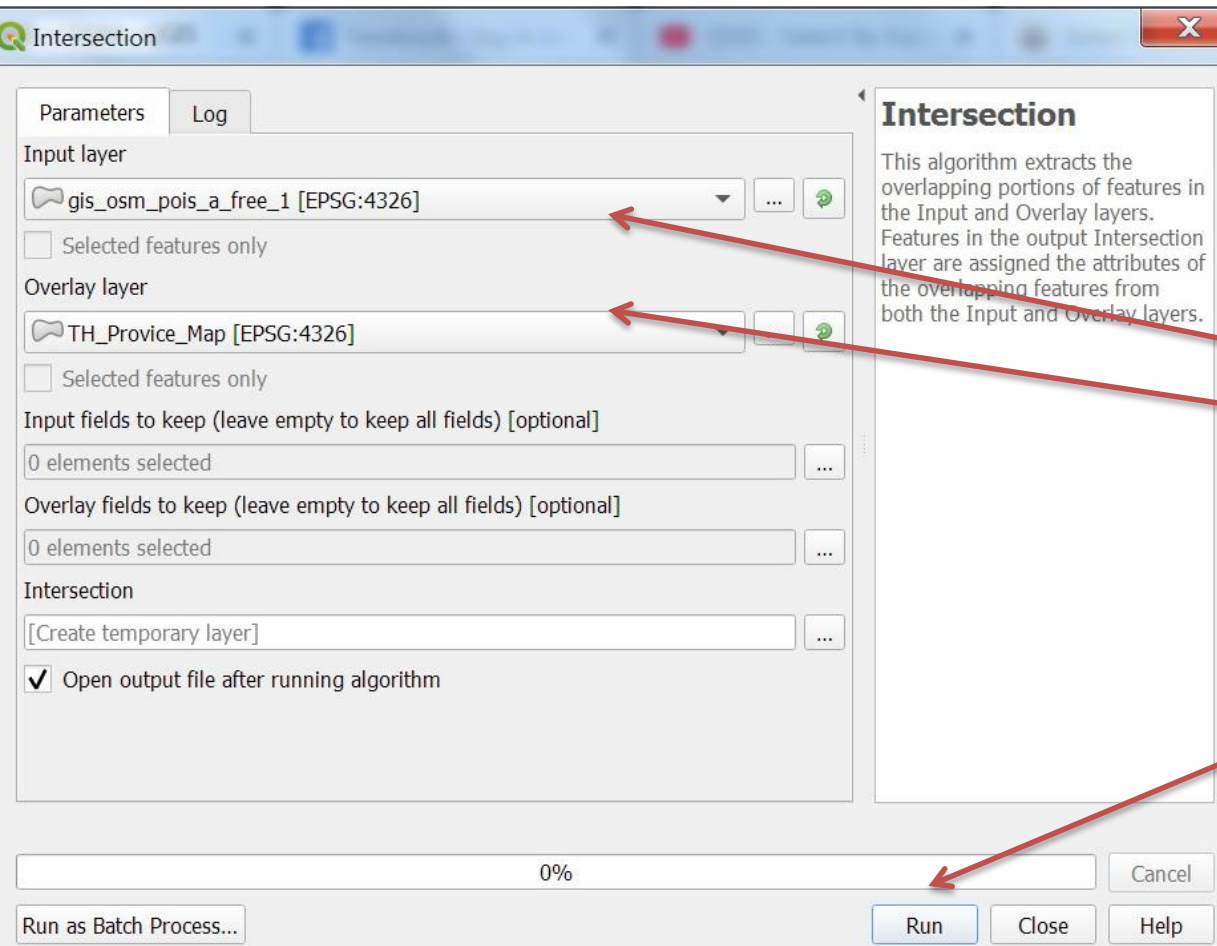
Step 1: Open both the administrative map (TH_Province_Map.shp) and OSM's POI area map (gis_osm_pois_a_free_1.shp)

(3) Summation of built-up areas (cont'd)



Step 2: Use the tool listed on the menu of 'Vector → Geoprocessing Tools → Intersection'.

(3) Summation of built-up areas (cont'd)



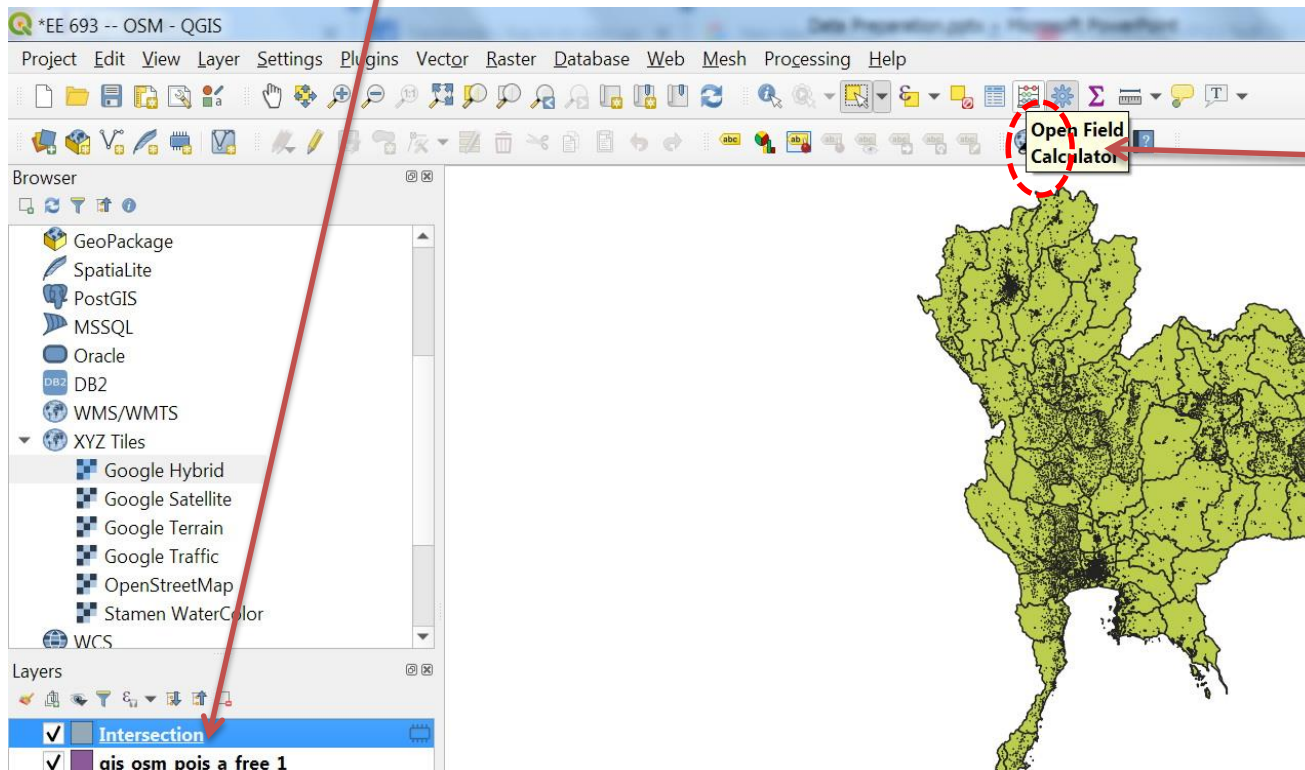
Step 3: Identify both sources of data for computation, which are:

- (1) Input layer
- (2) Overlay layer

Then, click 'Run' button.

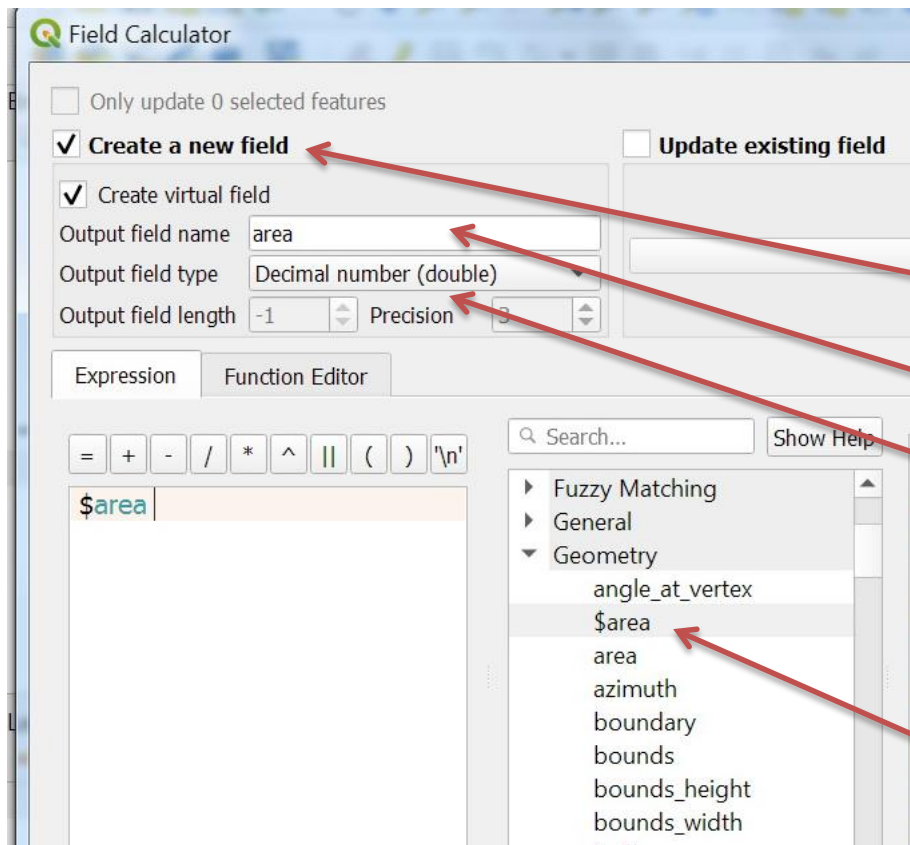
(3) Summation of built-up areas (cont'd)

The 'Intersection' function will generate the new layer titled 'Intersection' which has merged the POI areas and their provincial locations.



Step 4: Select 'Field Calculator' to compute the area of each polygon of POI area.

(3) Summation of built-up areas (cont'd)

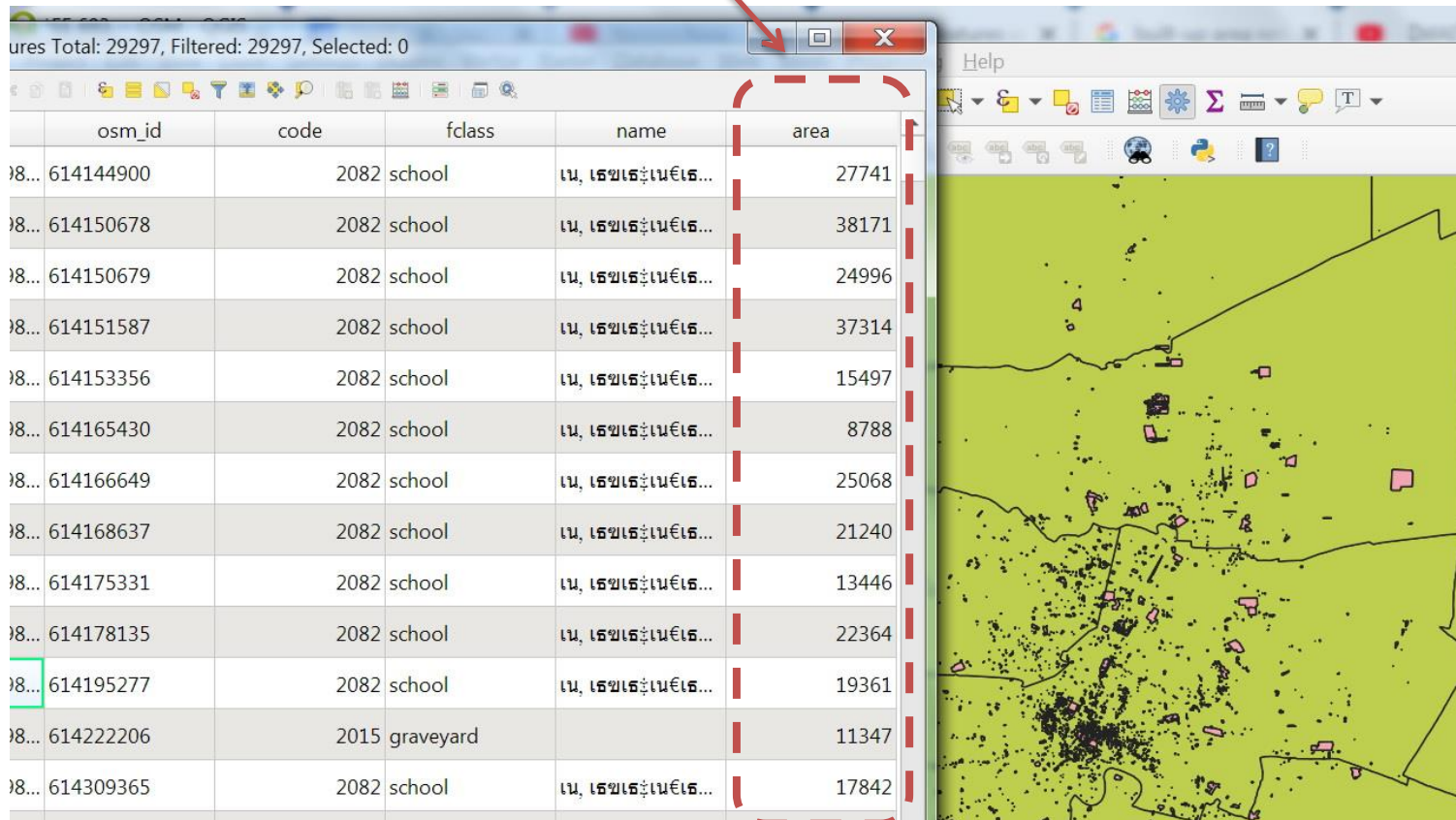


Step 5: Identify the options of computing the area of each polygon as follows.

- Create a new field
- Create a new virtual field titled 'area', which is the decimal number.
- Compute the area of each polygon by selecting 'Geometry -> \$area'.

(3) Summation of built-up areas (cont'd)

This process will generate the new column in the attribute table titled 'area', which indicates the area of each POI polygon.

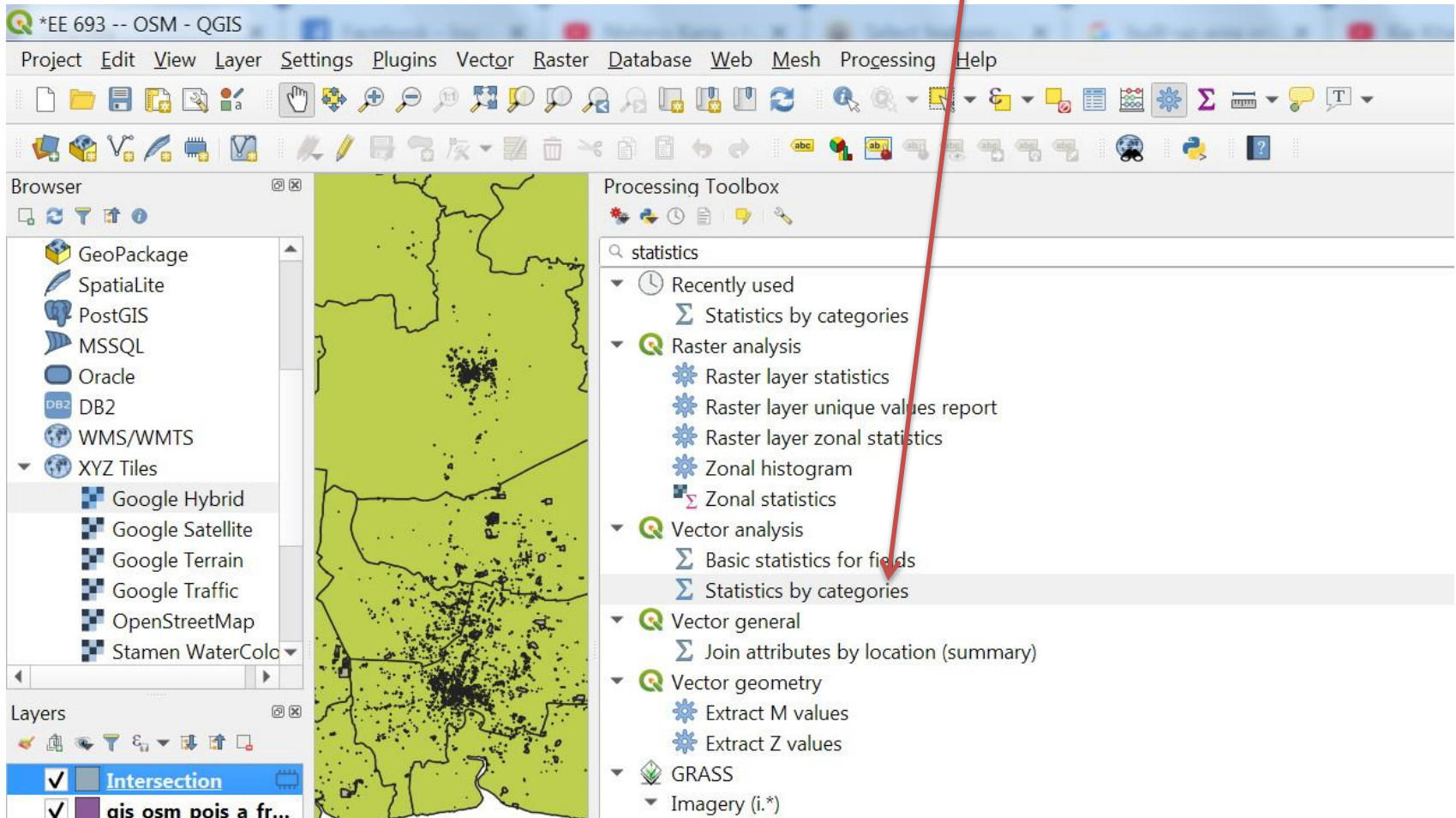


ures Total: 29297, Filtered: 29297, Selected: 0

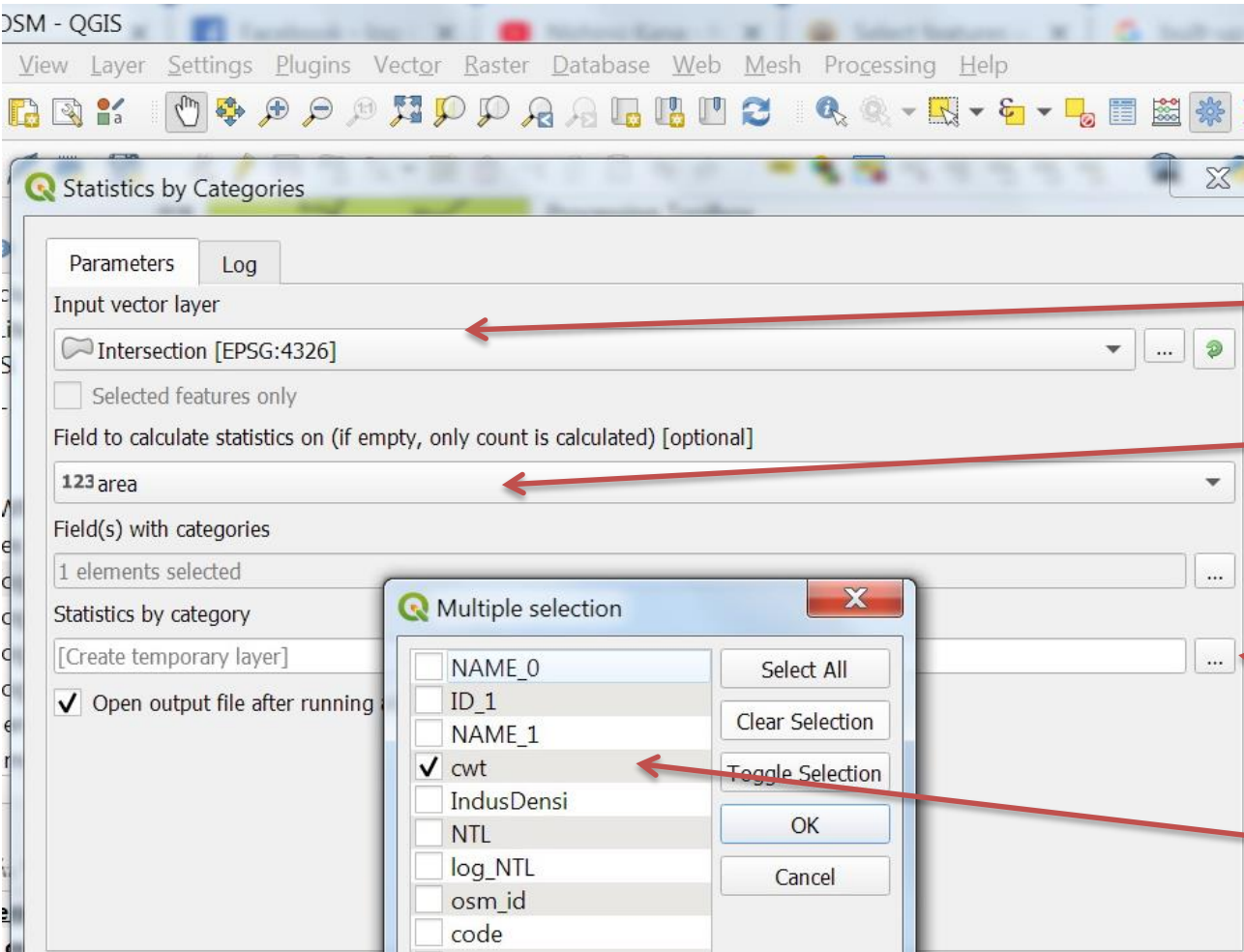
	osm_id	code	fclass	name	area
18...	614144900	2082	school	เน. เรขเร๓๓เน๓เร...	27741
18...	614150678	2082	school	เน. เรขเร๓๓เน๓เร...	38171
18...	614150679	2082	school	เน. เรขเร๓๓เน๓เร...	24996
18...	614151587	2082	school	เน. เรขเร๓๓เน๓เร...	37314
18...	614153356	2082	school	เน. เรขเร๓๓เน๓เร...	15497
18...	614165430	2082	school	เน. เรขเร๓๓เน๓เร...	8788
18...	614166649	2082	school	เน. เรขเร๓๓เน๓เร...	25068
18...	614168637	2082	school	เน. เรขเร๓๓เน๓เร...	21240
18...	614175331	2082	school	เน. เรขเร๓๓เน๓เร...	13446
18...	614178135	2082	school	เน. เรขเร๓๓เน๓เร...	22364
18...	614195277	2082	school	เน. เรขเร๓๓เน๓เร...	19361
18...	614222206	2015	graveyard		11347
18...	614309365	2082	school	เน. เรขเร๓๓เน๓เร...	17842

(3) Summation of built-up areas (cont'd)

Step 6: Compute the sum of all POI areas located within a particular province by using 'Statistics by categories'. Please search this tool from the Processing Toolbox.



(3) Summation of built-up areas (cont'd)

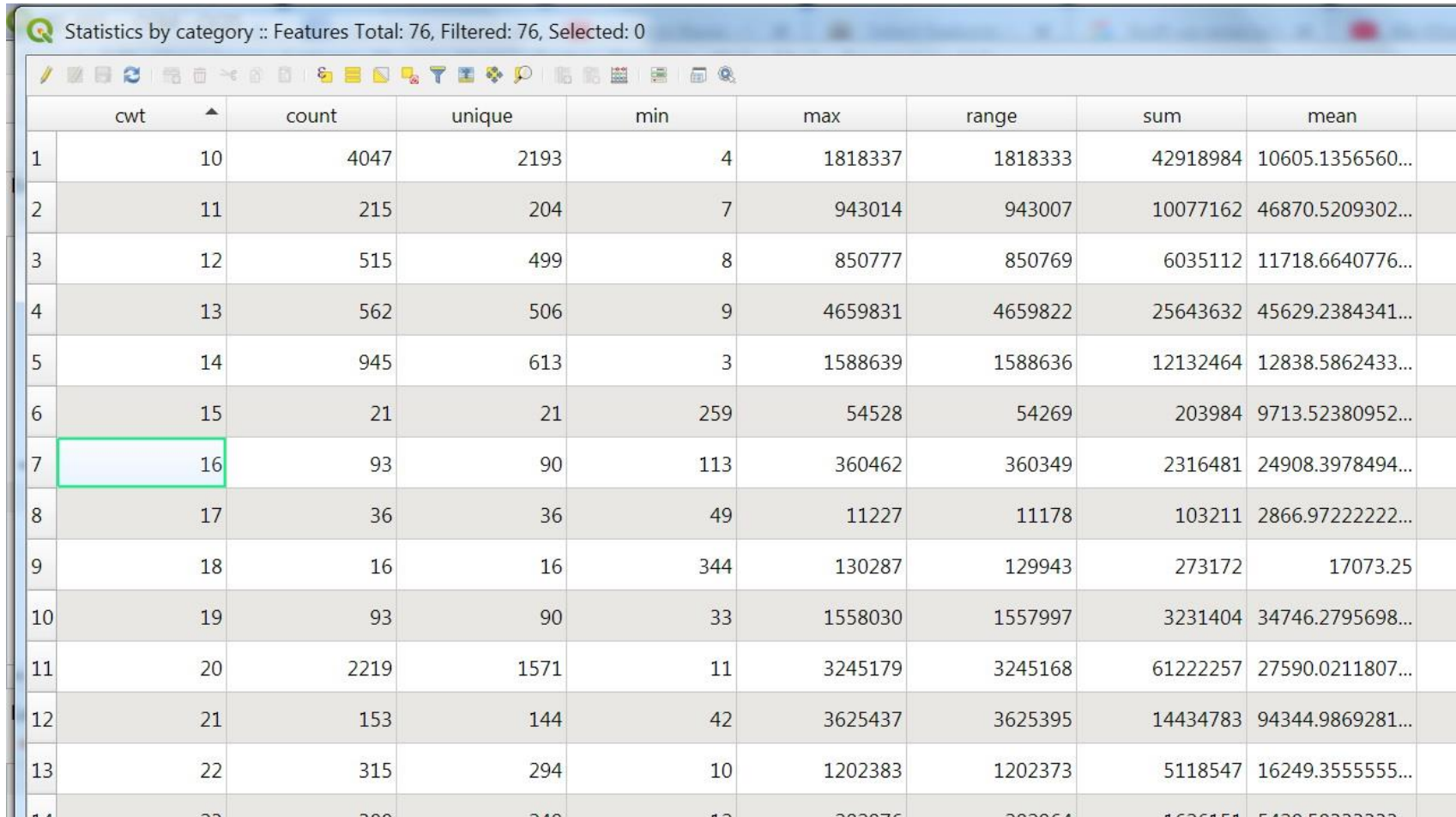


Step 7: Identify the options.

- 'Intersection' as Input vector layer
- 'area' as Field to calculate statistics on.
- Click on the '...' box of Statistics by category. Then, select 'cwt'.

(3) Summation of built-up areas (cont'd)

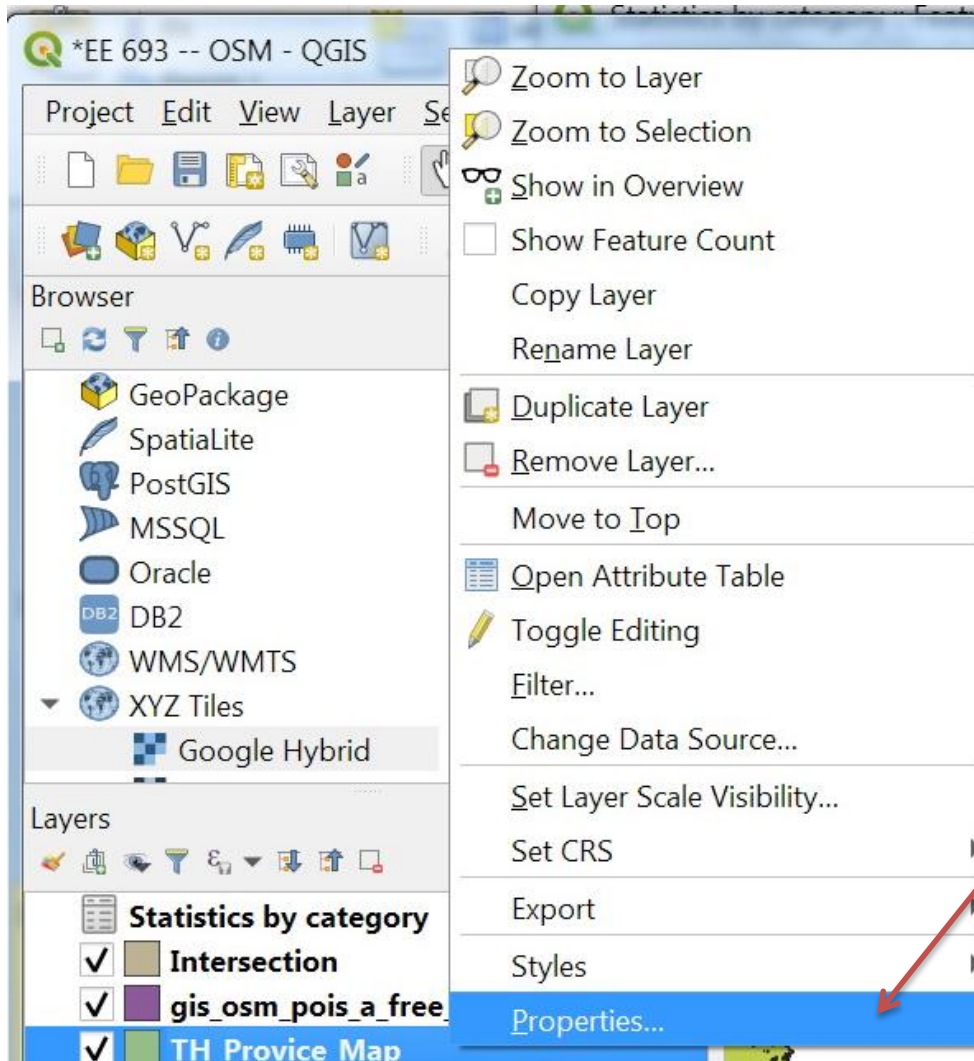
This calculation will create a new spreadsheet showing all statistical indicators of total polygon areas located in each province.



Statistics by category :: Features Total: 76, Filtered: 76, Selected: 0

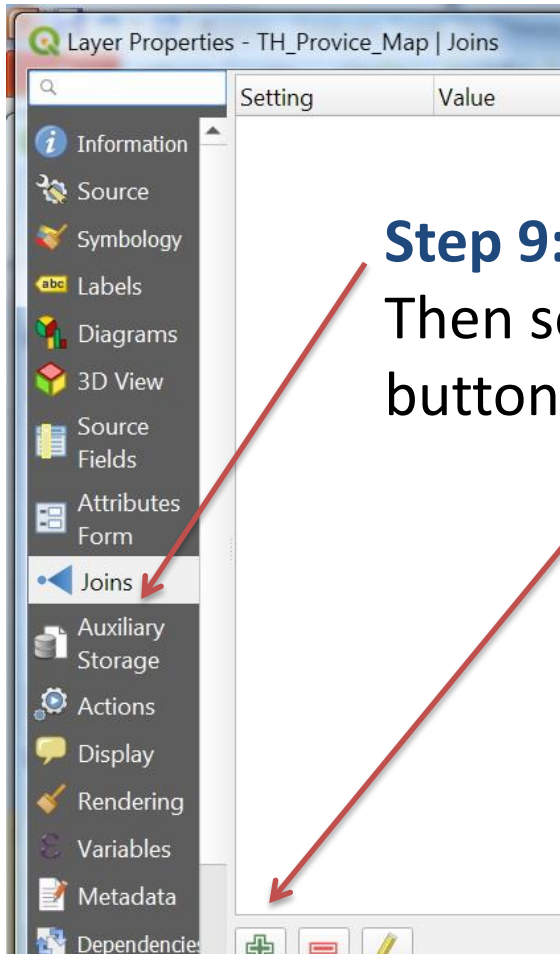
	cwt	count	unique	min	max	range	sum	mean
1	10	4047	2193	4	1818337	1818333	42918984	10605.1356560...
2	11	215	204	7	943014	943007	10077162	46870.5209302...
3	12	515	499	8	850777	850769	6035112	11718.6640776...
4	13	562	506	9	4659831	4659822	25643632	45629.2384341...
5	14	945	613	3	1588639	1588636	12132464	12838.5862433...
6	15	21	21	259	54528	54269	203984	9713.52380952...
7	16	93	90	113	360462	360349	2316481	24908.3978494...
8	17	36	36	49	11227	11178	103211	2866.97222222...
9	18	16	16	344	130287	129943	273172	17073.25
10	19	93	90	33	1558030	1557997	3231404	34746.2795698...
11	20	2219	1571	11	3245179	3245168	61222257	27590.0211807...
12	21	153	144	42	3625437	3625395	14434783	94344.9869281...
13	22	315	294	10	1202383	1202373	5118547	16249.3555555...
14	23	200	240	12	202076	202064	1020151	5420.50222222...

(3) Summation of built-up areas (cont'd)

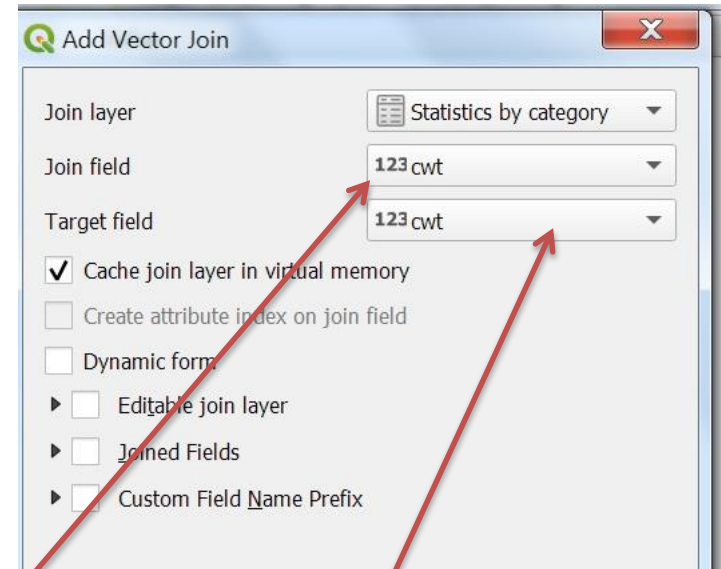


Step 8: This new spreadsheet can be merged with the provincial map. Do the right-button click and then select 'Properties'.

(3) Summation of built-up areas (cont'd)



Step 9: Select 'Joins'.
Then select '+'
button.

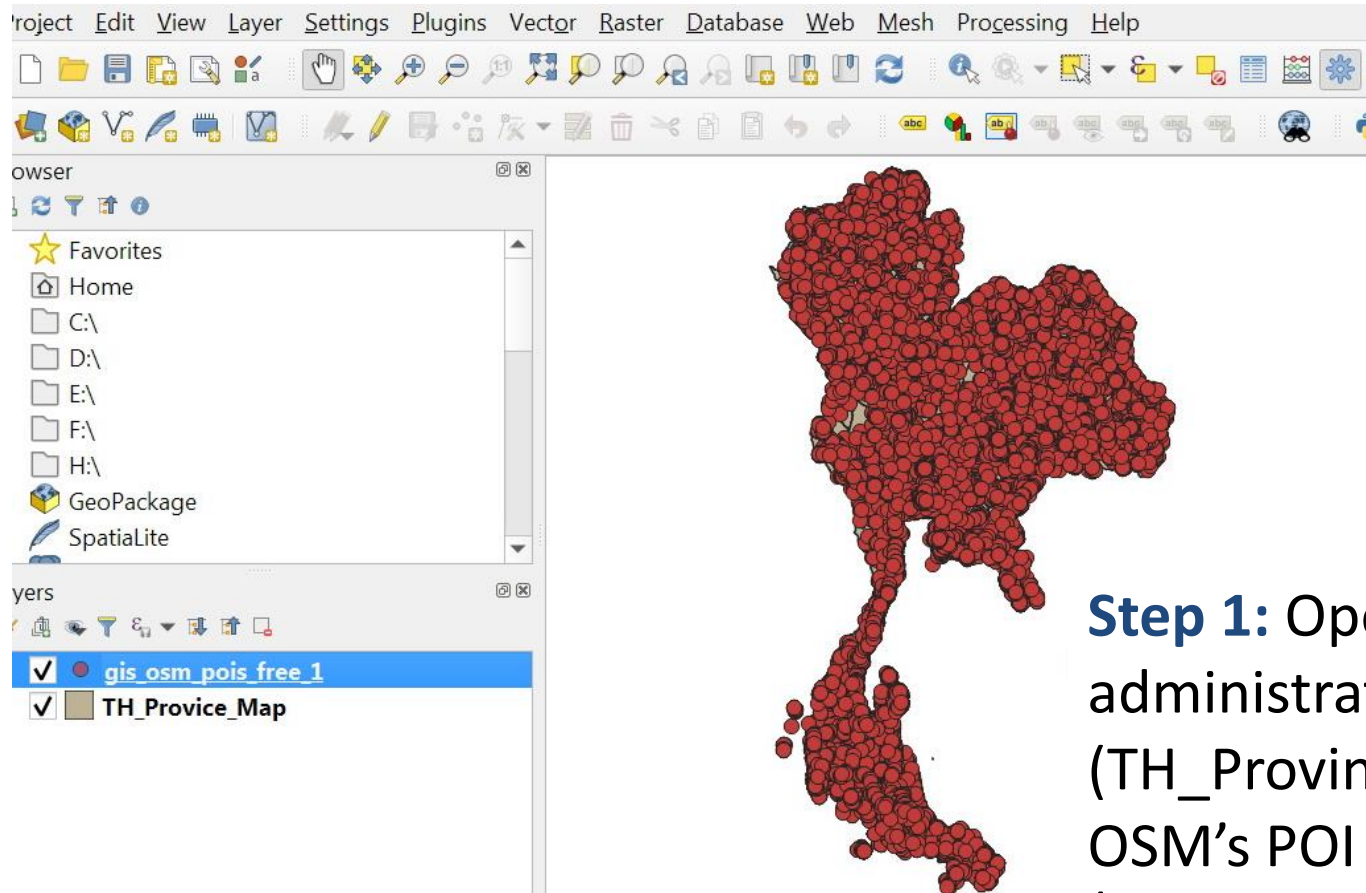


Step 10: Identify 'cwt' as the
Join field and the Target field.

This process will merge the statistical spreadsheet of area with the provincial map.

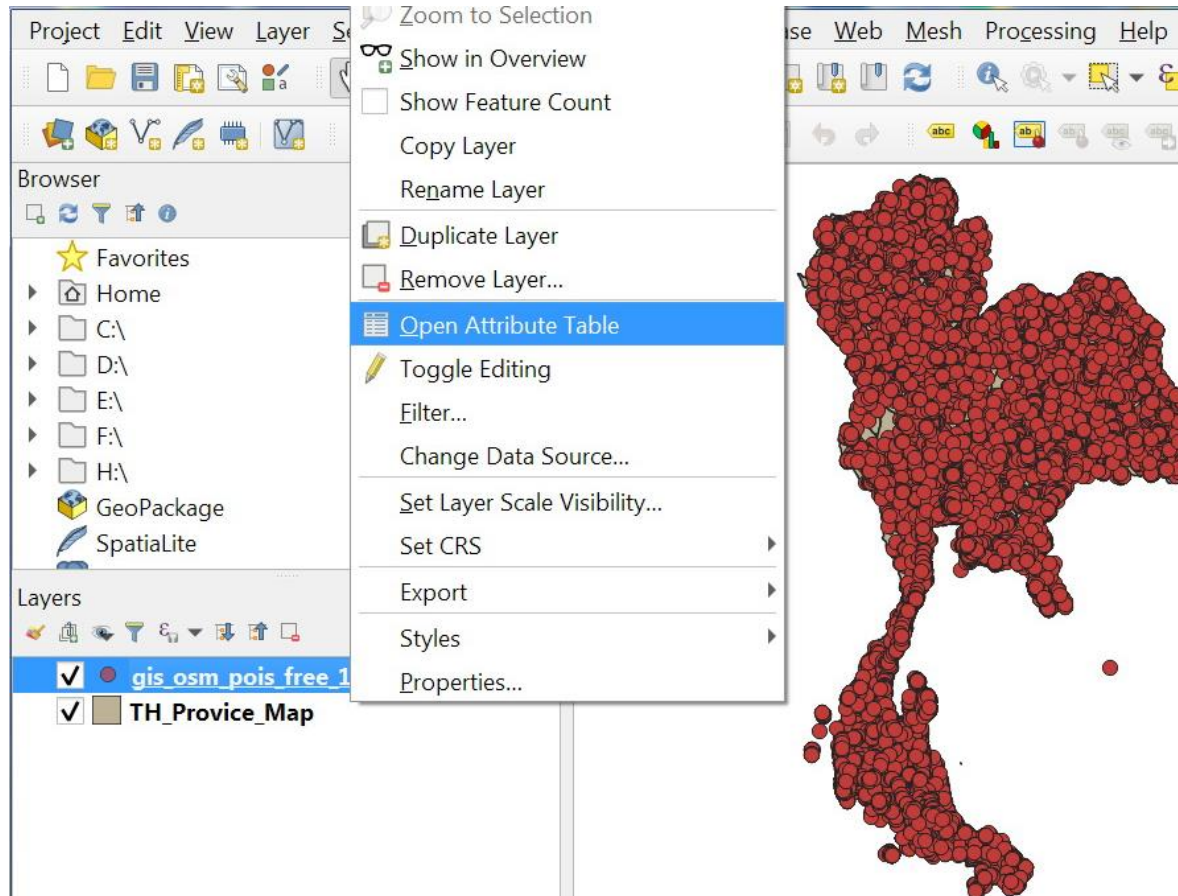
(4) Select by Expression (or Select by Attribute)

(4) Select by Expression



Step 1: Open both the administrative map (TH_Province_Map.shp) and OSM's POI map (gis_osm_pois_free_1.shp).

(4) Select by Expression (cont'd)



Step 2: Do the right-button click on OSM POI map. Then, select 'Open Attribute Table'.

(4) Select by Expression (cont'd)

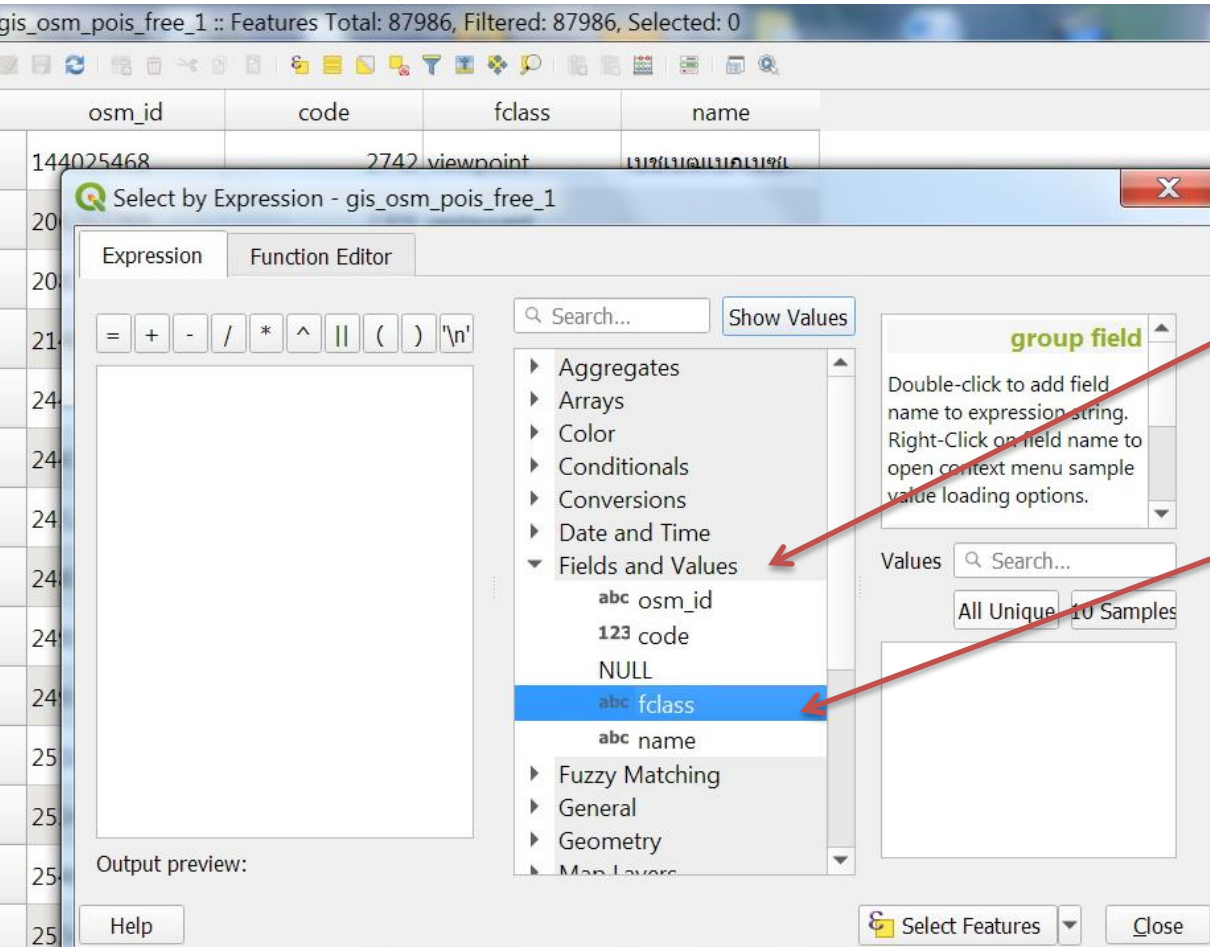


gis_osm_pois_free_1 :: Features Total: 87986, Filtered: 87986, Selecte

	osm_id			
1	144025468	2742	viewpoint	เวทเวท
2	206263765	2301	restaurant	
3	208372026	2005	post_office	EMS
4	214636798	2401	hotel	
5	244388707	2953	observation_to...	Watcht
6	244388707	2742	viewpoint	Watcht
7	245227907	2742	viewpoint	
8	248178364	2742	viewpoint	
9	249393224	2742	viewpoint	
10	249394593	2422	camp_site	Doi Pui
11	251870181	2721	attraction	
12	253471680	2001	police	๕๕๕-๕
13	254084506	2301	restaurant	๕๕-๕๕
14	255447451	2721	attraction	Sri Phar

Step 3: Click on the button of 'Select features using and expression'.

(4) Select by Expression (cont'd)



Step 4: Select the option of 'Fields and Values'. Then the classification of POI shown in the column of 'fclass' is used as the main criterion.

(4) Select by Expression (cont'd)

gis_osm_pois_free_1 :: Features Total: 87986, Filtered: 87986, Selected: 0

Select by Expression - gis_osm_pois_free_1

Expression Function Editor

= + - / * ^ || () '\n'

"fclass" = 'atm' OR "fclass" = 'bank'

Search... Show Values

group field

Double-click to add field name to expression string. Right-Click on field name to open context menu sample value loading options.

Values Search...

All Unique 10 Samples

'baker'
'bank'
'bar'
'battlefield'
'beauty_shop'
'bed_and_breakfast'
'bank'

Output preview: 0

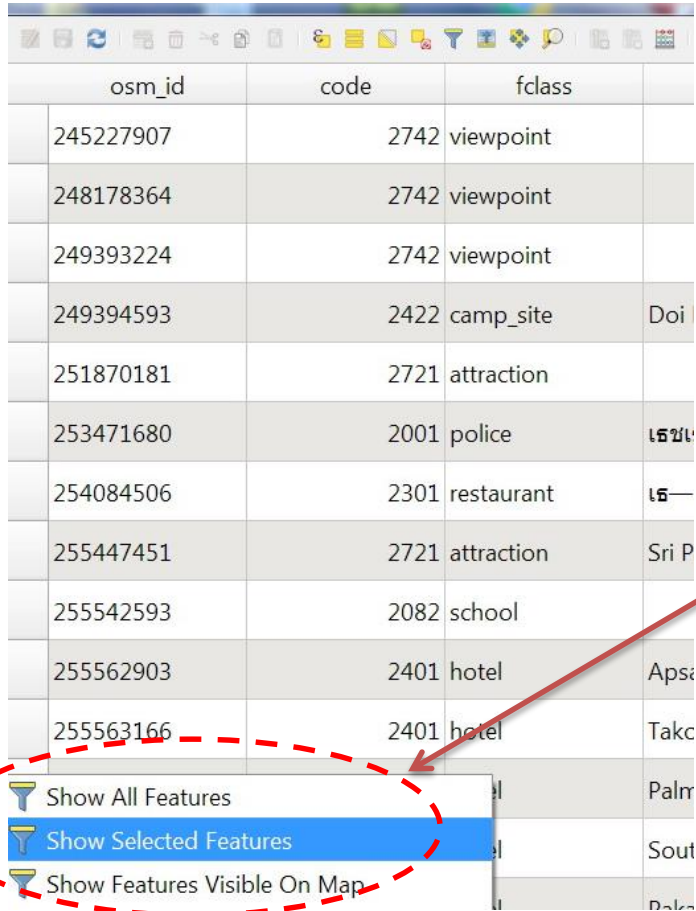
Help Select Features Close

13	254084506	2301	restaurant	๕๕-๓๓๕๓๓๓๓๓๓๓...
14	255447451	2721	attraction	Sri Phang Nga ...

Step 5: Click on the 'All Unique' button to show all classifications of locations available on OSM's map.

Step 6: Type the key words for selecting only the locations of 'atm' and 'bank'. Then click on 'Select Features' button.

(4) Select by Expression (cont'd)



osm_id	code	fclass	
245227907	2742	viewpoint	
248178364	2742	viewpoint	
249393224	2742	viewpoint	
249394593	2422	camp_site	Doi
251870181	2721	attraction	
253471680	2001	police	1520
254084506	2301	restaurant	15—
255447451	2721	attraction	Sri P
255542593	2082	school	
255562903	2401	hotel	Apsa
255563166	2401	hotel	Takc
			Palr
			Sout
			Dele

☰ Show All Features
☑ Show Selected Features
☒ Show Features Visible On Map

Step 7: Select 'Show Selected Features' in the bottom-left button.

(4) Select by Expression (cont'd)

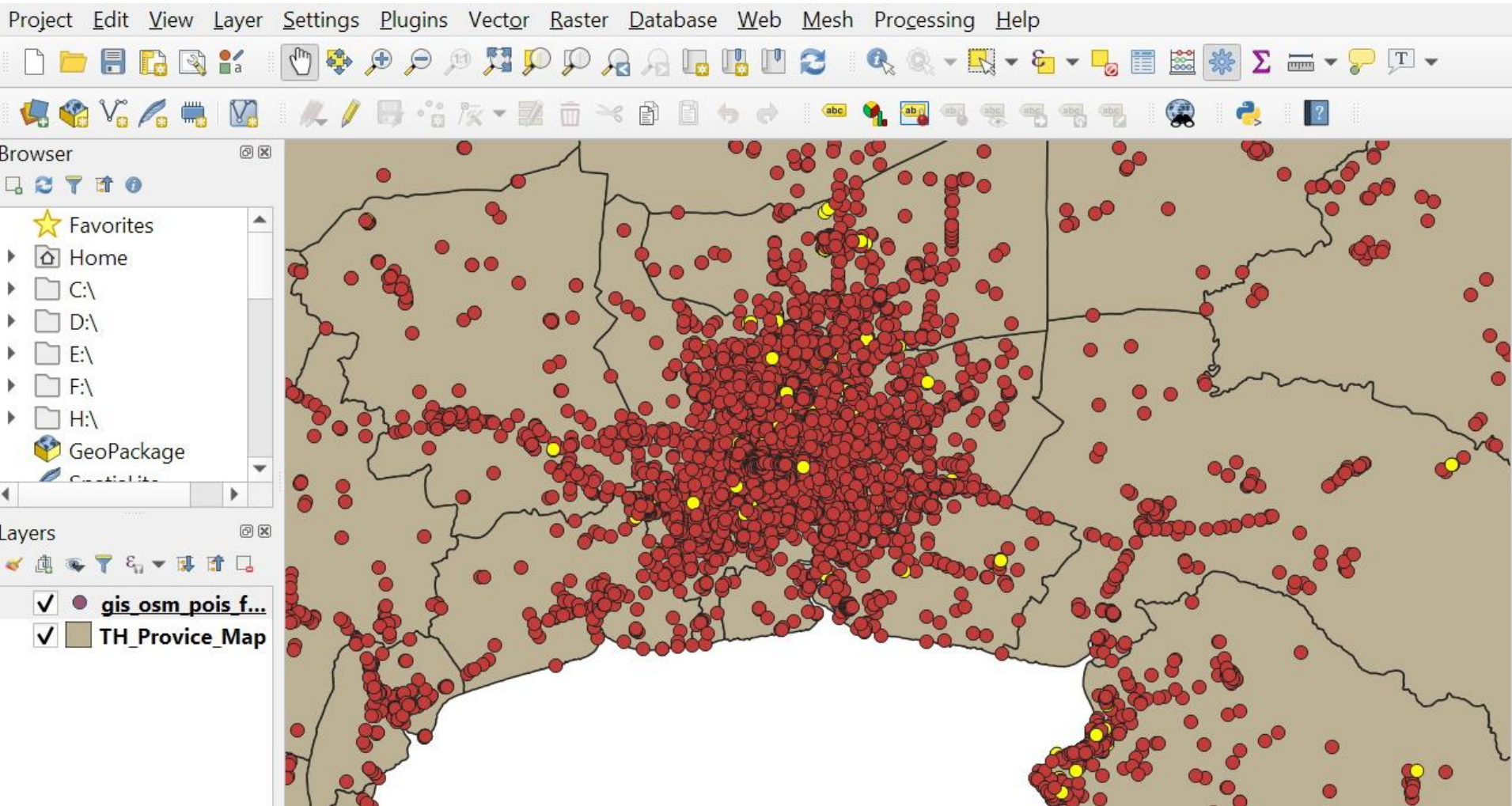
gis_osm_pois_free_1 :: Features Total: 87986, Filtered: 43

	osm_id	code	fclass
33	702970572	2602	atm
34	703520058	2602	atm
35	703520082	2601	bank
36	705719751	2601	bank
37	705800099	2601	bank
38	705800107	2601	bank
39	705800128	2601	bank
40	705800143	2601	bank
41	705800146	2601	bank
42	705800150	2601	bank
43	710088317	2601	bank
44	710088362	2601	bank
45	710088707	2601	bank
46	711681807	2601	bank

This option of selection will show only the selected POIs, which are banks and ATMs.

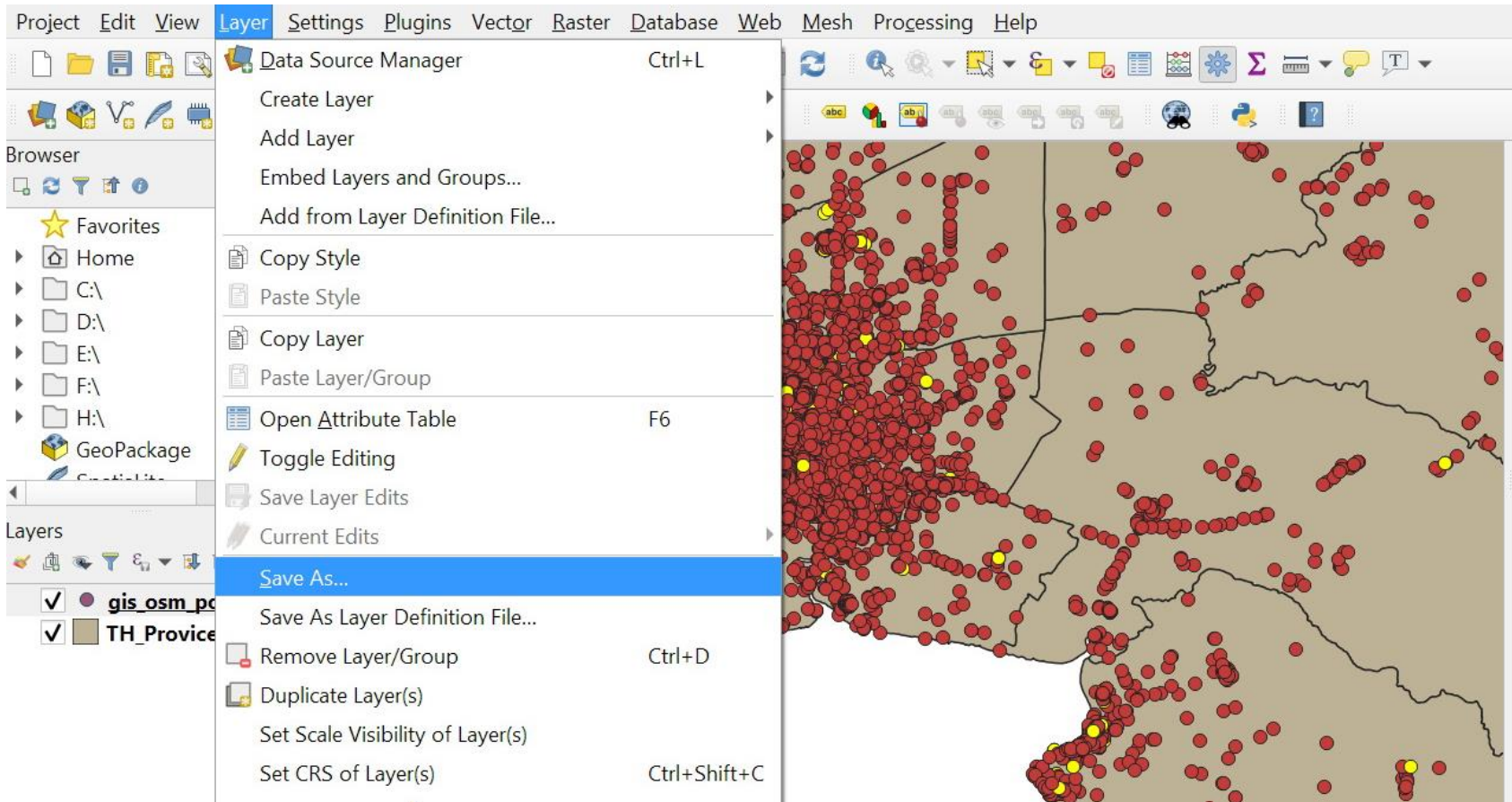
(4) Select by Expression (cont'd)

All selected locations are shown as the yellow dots.



(4) Select by Expression (cont'd)

Step 8: To save this selected outcome as the new file, select 'Layer → Save As..'



(4) Select by Expression (cont'd)

Specifically, select the option of 'Save only selected features'. Then, title the file's name.

