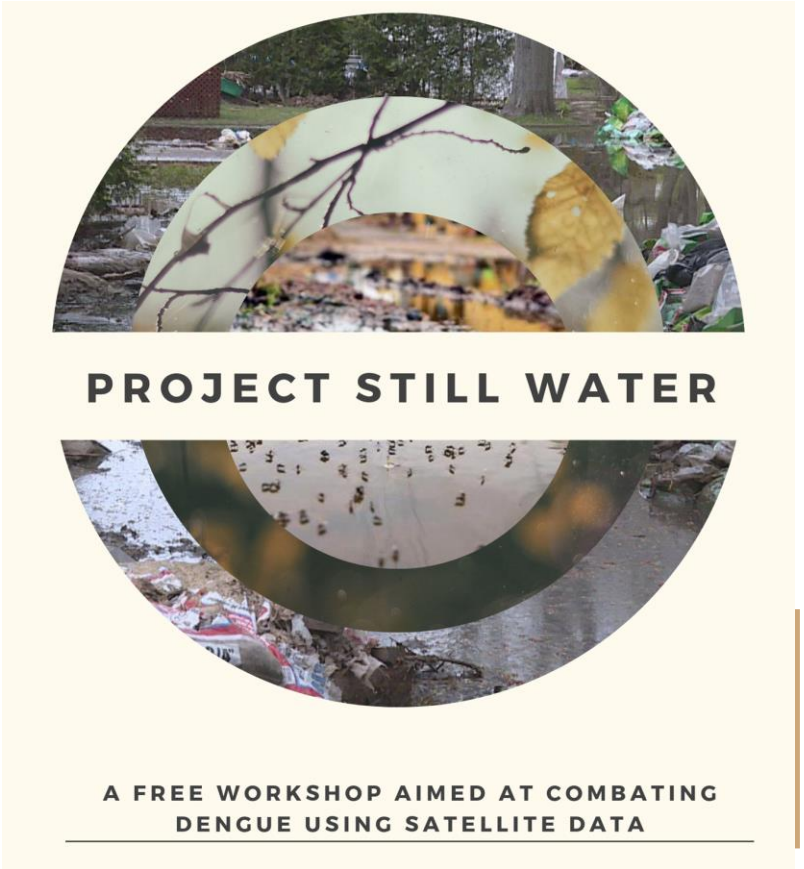


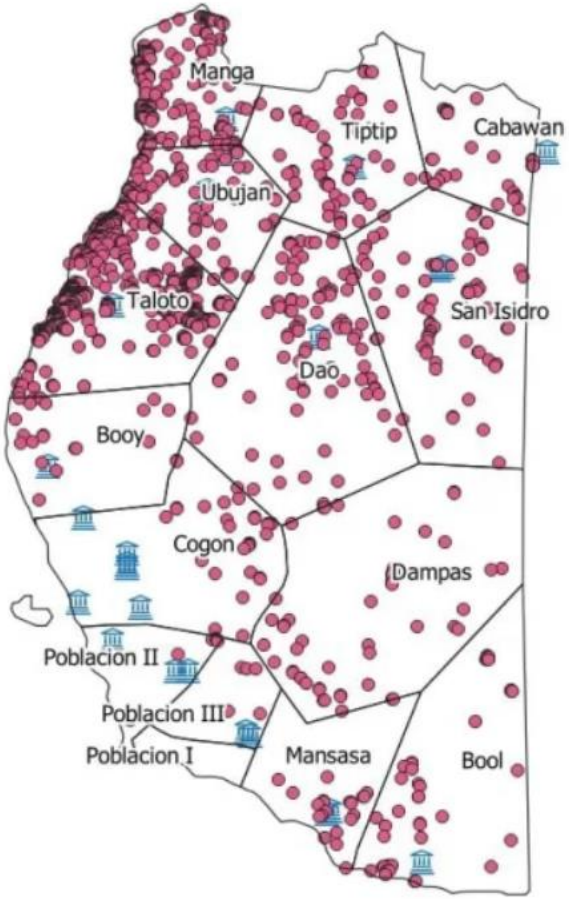
DIY workshop Rev 4.8

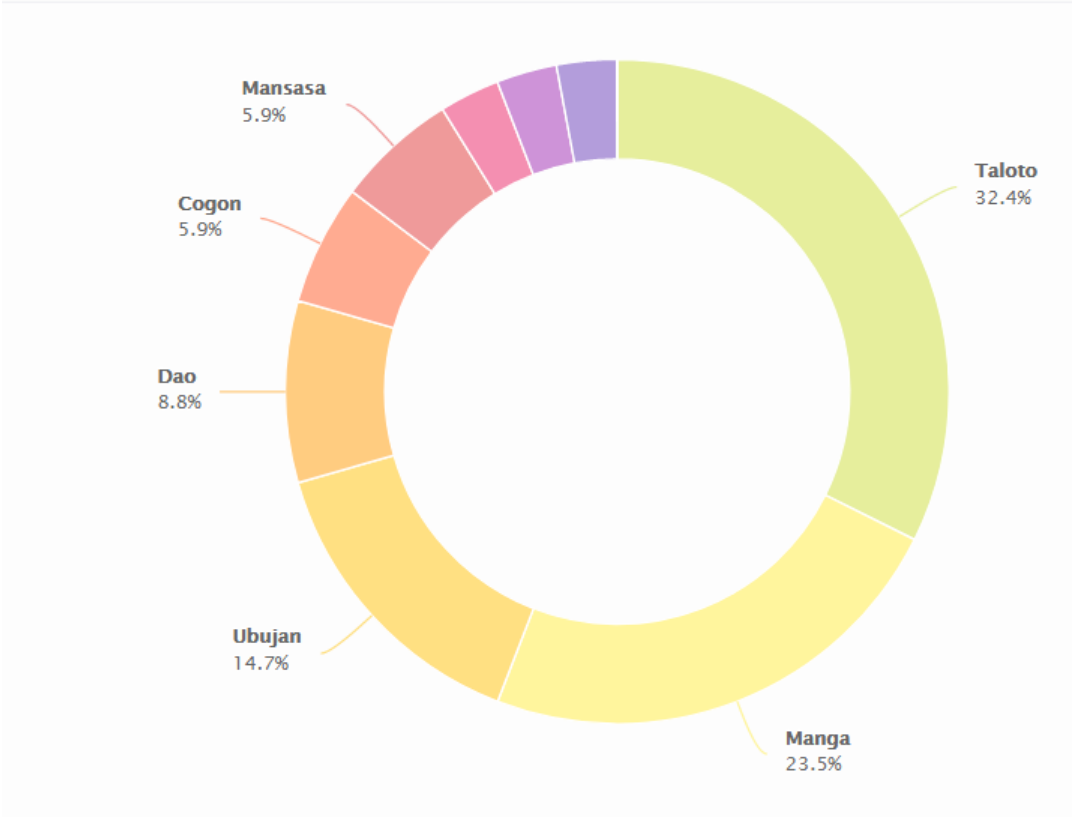
Why Do This?

"If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle."

— Sun Tzu, The Art of War

tags: strategy





* Given that the Satellite data on August 13, 2019 shows potential stagnant waters in red dots and DEPED public schools in Blue building icons. Kindly guess the top 3 areas that you think will have the highest dengue infections.

TOWN

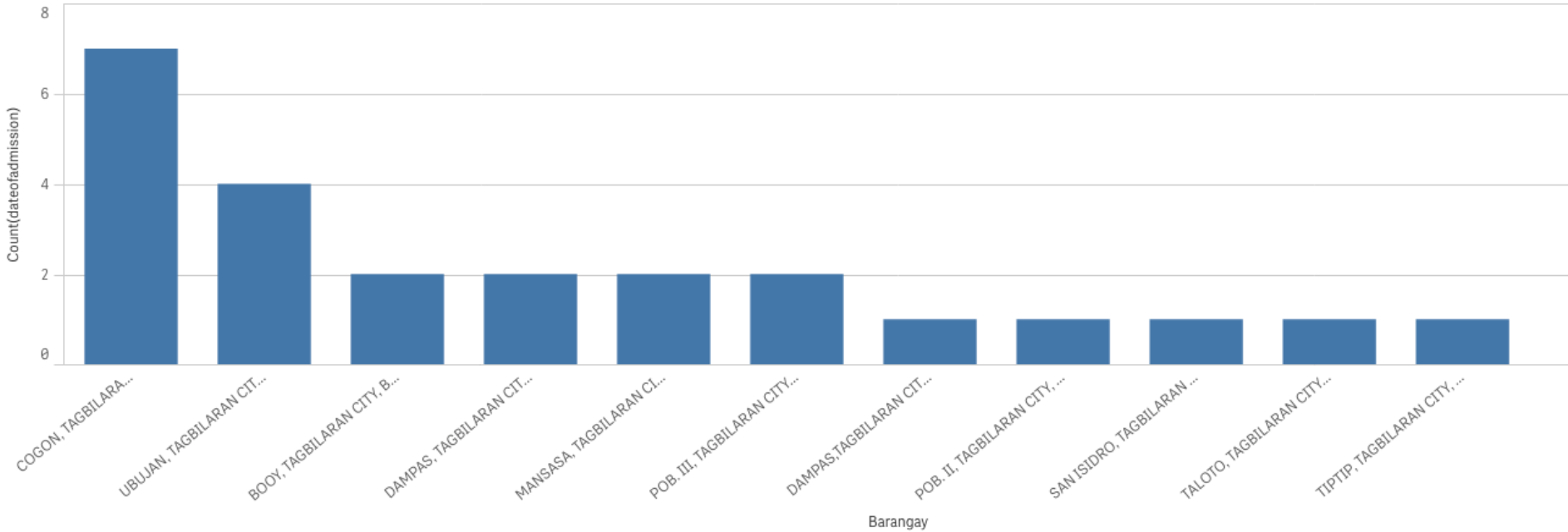
TAGBILARAN
ALBUR
ALBURQUERQUE
ALICIA
ANDA
ANTE

dateofadmission.a... 2019

dateofadmission.a... Aug

dateofadmission.a... Q3

My new sheet



Phases

Setting UP your ‘rig’

Operating

Generating

Reporting

Did you know about BTI?

1. Setting UP

Install QGIS 3.6 or later

Install SCP Plugins

Apply for Satellite Accounts

You do need GOOD internet to be able to access the massive satellite data sets.

Use Projectbass.org speedtest to check your bandwidth

UP DREAM Program
Disaster Risk and Exposure Assessment for Mitigation

PhilGIS

MANILA BULLETIN

Globe

愛媛大学
EHIME UNIVERSITY

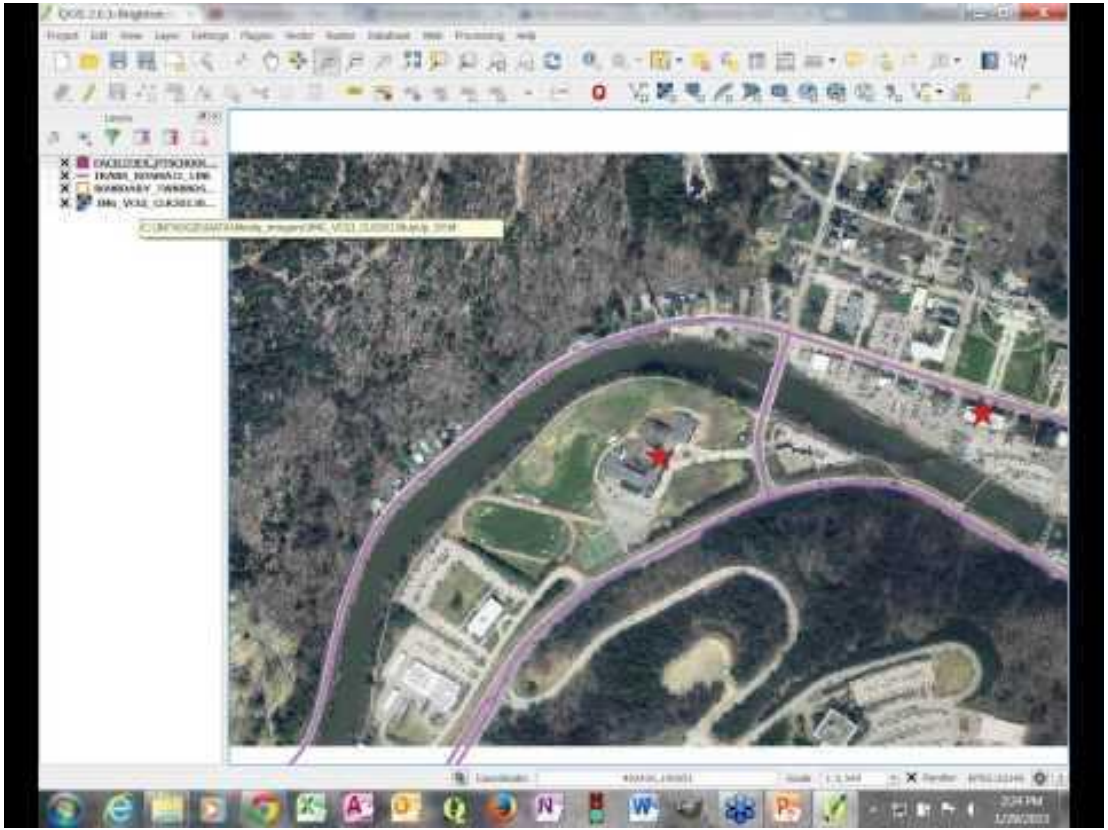
University of
New Hampshire

PROJECT
AMIHAN

Environment
Agency

1 Setting UP QGIS Primer Video

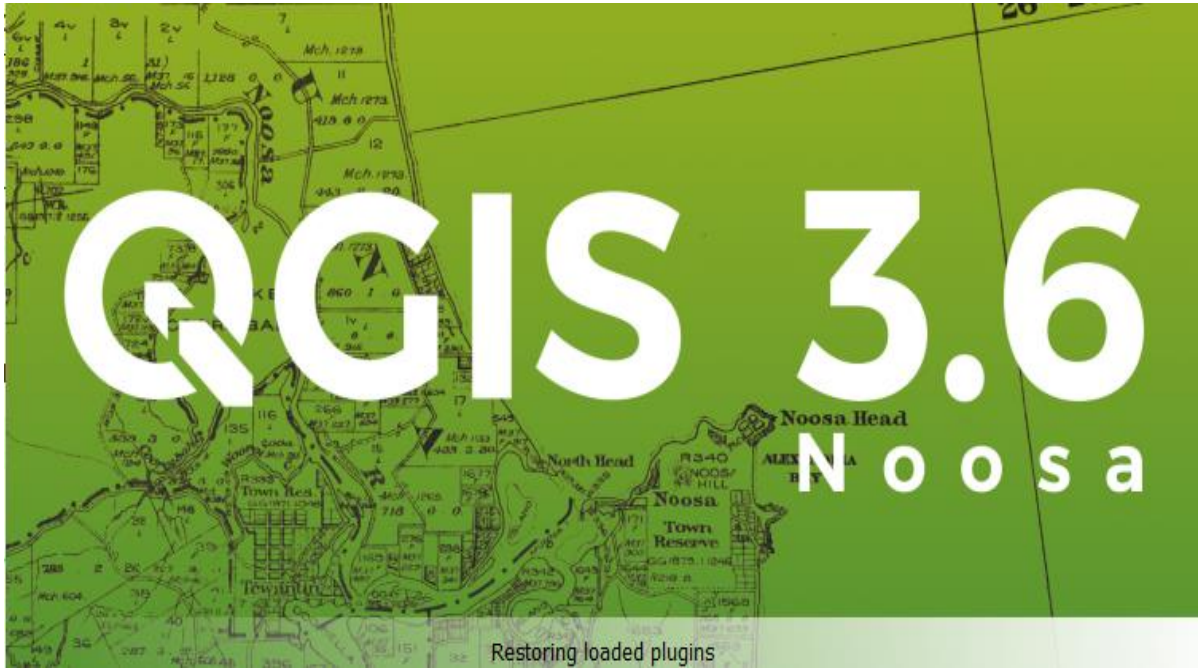
QGIS Intro Video



1. Setting UP - Installing QGIS 3.6 or later

Installing QGIS

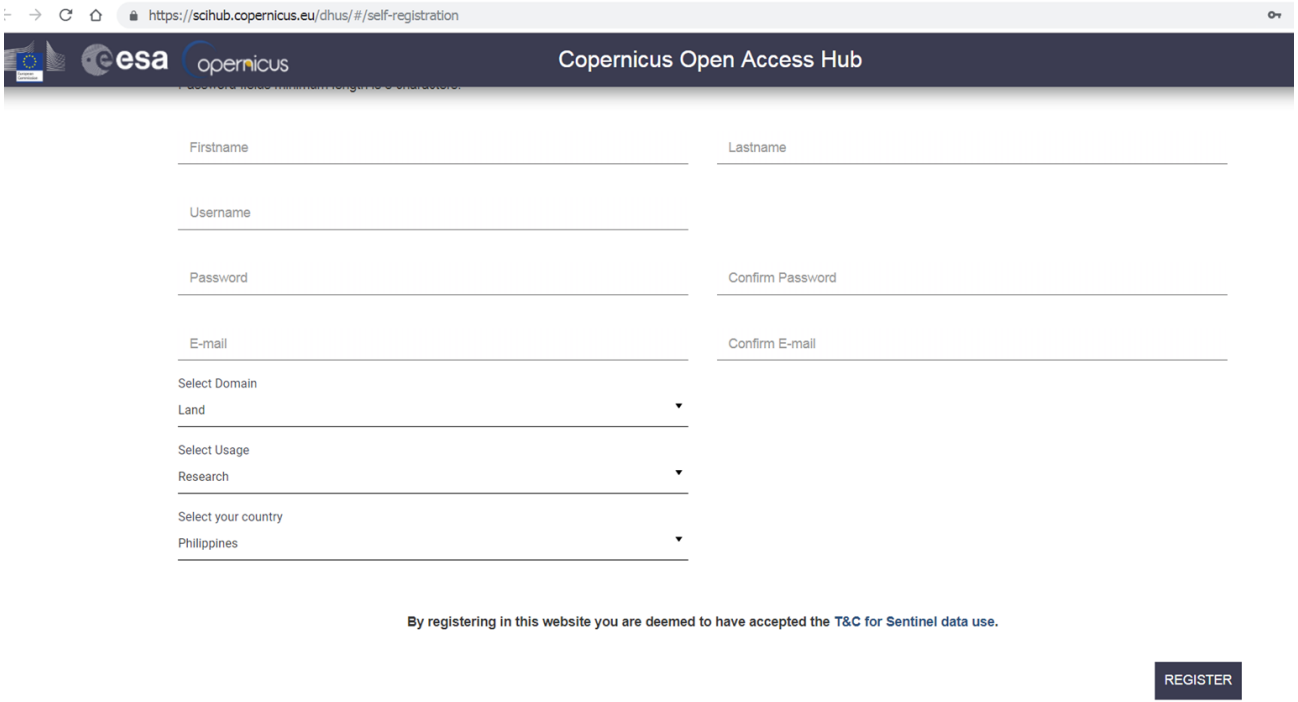
https://qgis.org/en/site/forusers/download.html



1. Setting UP- Applying for Satellite Accounts

Click here to register your account at **scihub.copernicus.eu**

Select "**Land**" for Domain, "**Research**" for Usage and "**Philippines**" for the Country



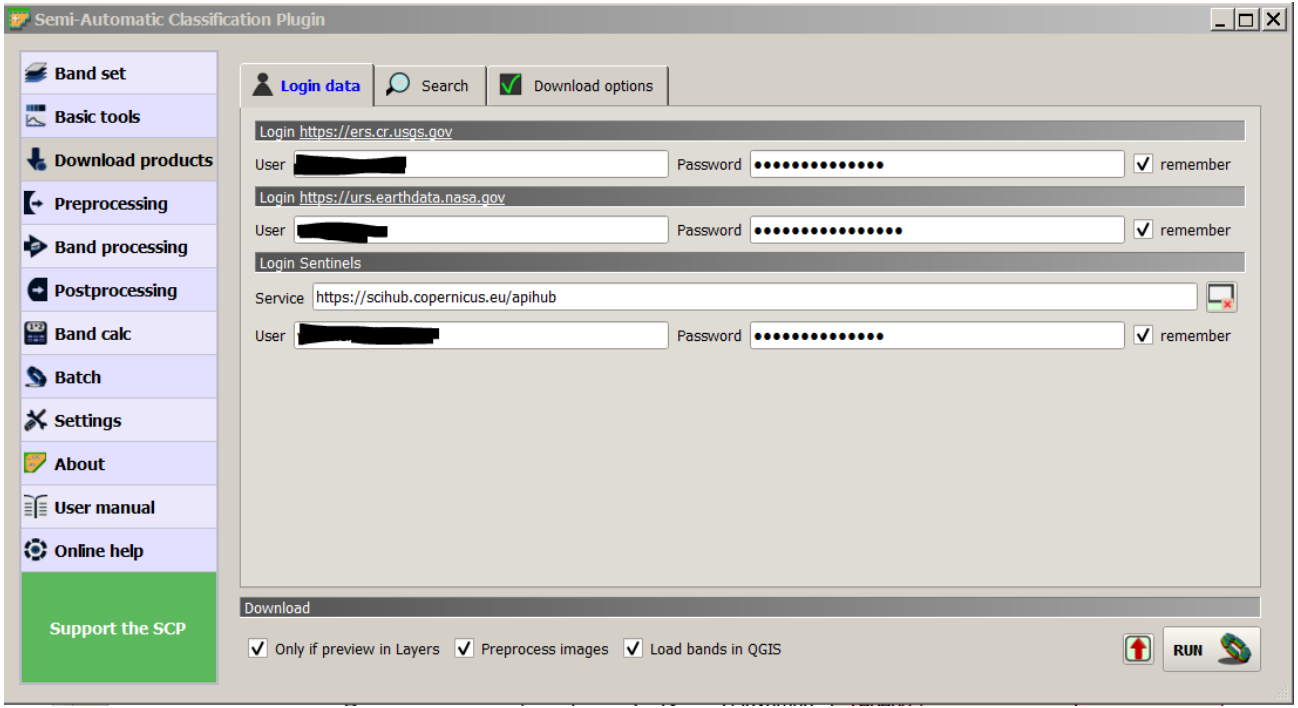
1. Setting UP- Applying for Satellite Accounts

We will input the account details later in the process to be used to automatically download satellite data.

For now, we only need the Sentinnel-2

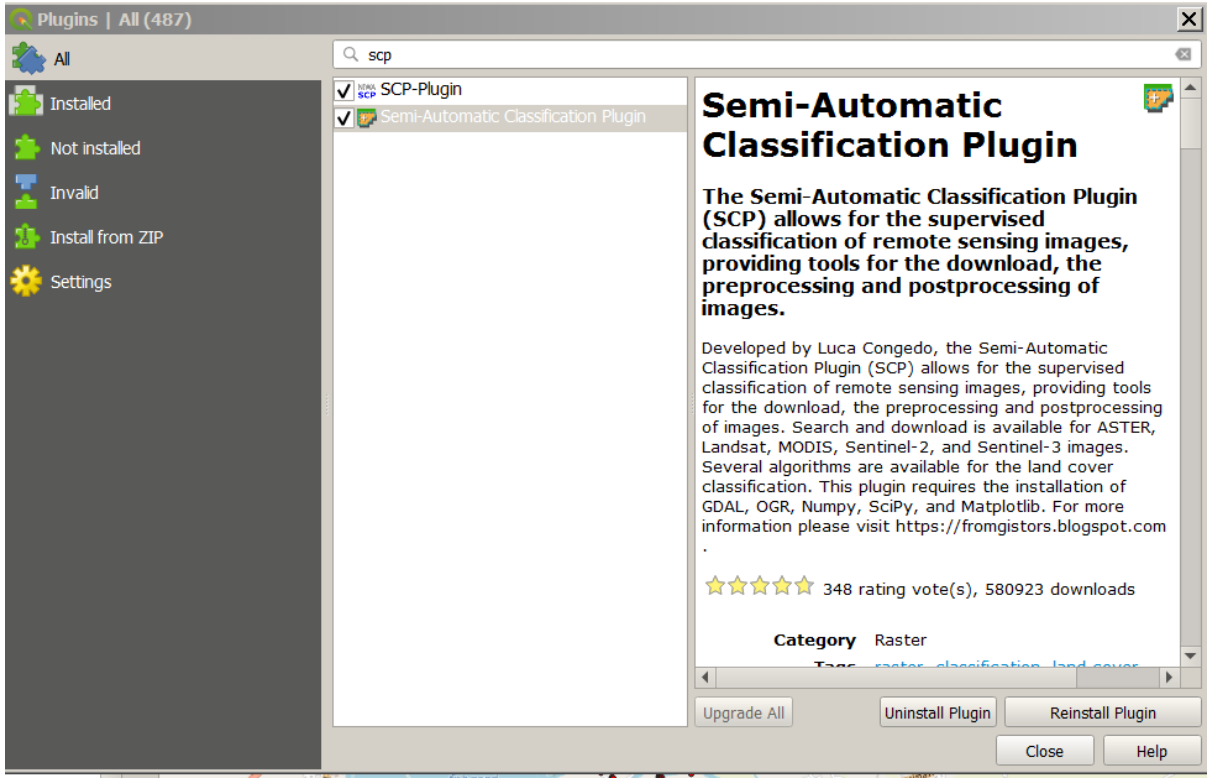
Note:

If you get error, try this:
https://scihub.copernicus.eu/dhus/
or
https://finhub.nsdc.fmi.fi/ or
https://data.sentinel.zamg.ac.at/



1. Setting UP

Start the Plugin Installation from the “Plugins” -> Manage and Install Plugin on the top menu bar and search for “SCP”



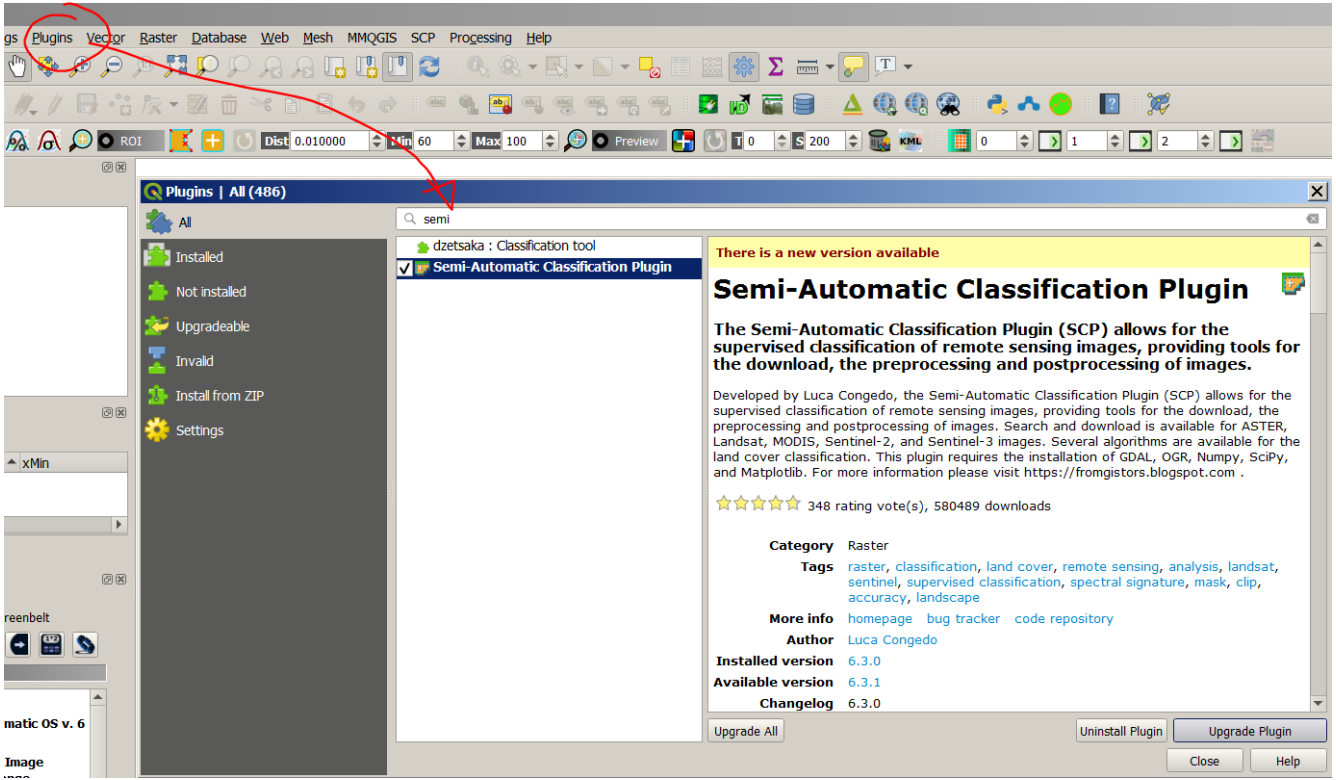
1. Setting UP - Installing SCP Plugin

Install Semi-Automatic Classification Plugin

Note extra steps ONLY for MAC users:

ruby -e "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/master/install)" < /dev/null 2> /dev/null

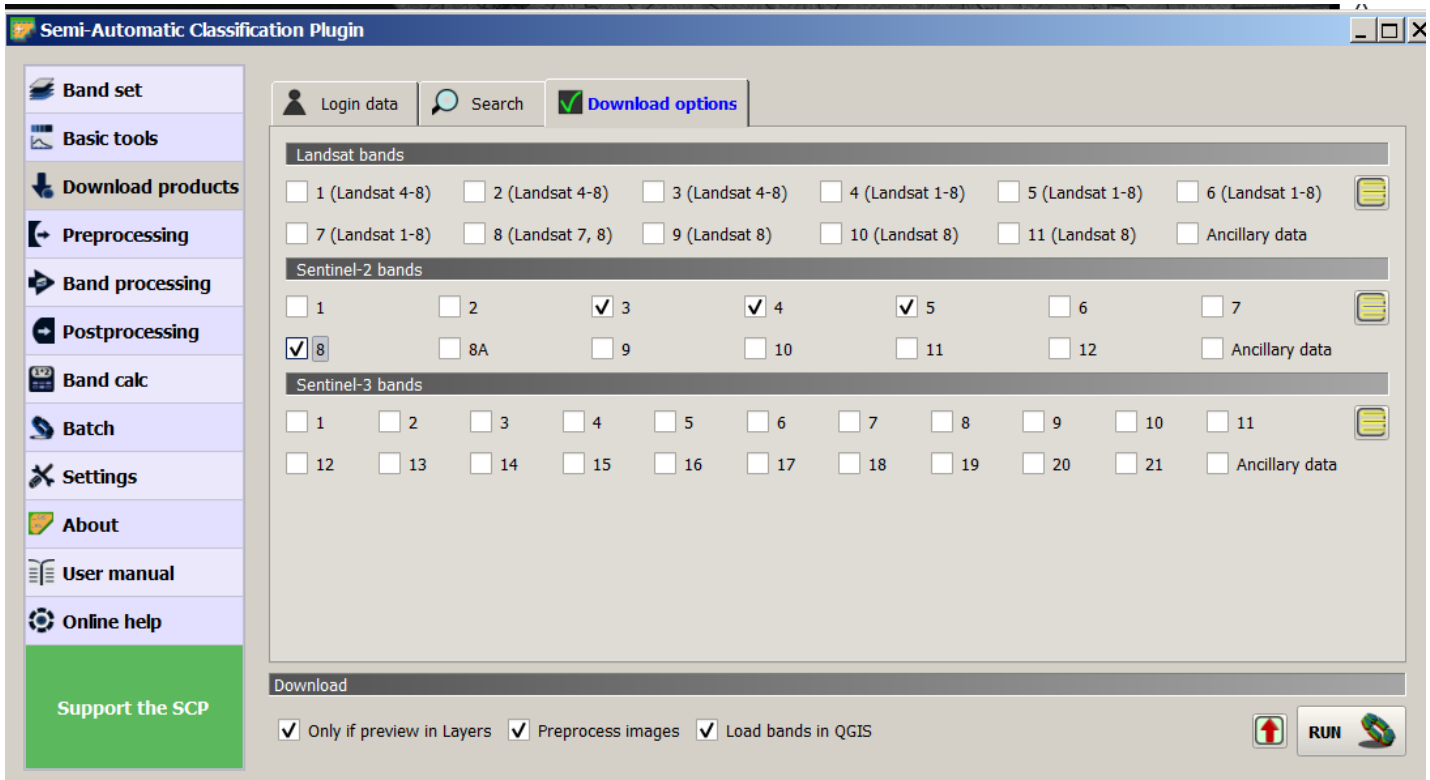
brew install lftp



1. Setting UP - SCP Configuration

We will use only 4 bands from Sentinel-2 Satellite: 3, 4, 5 and 8

You are all set for this phase.

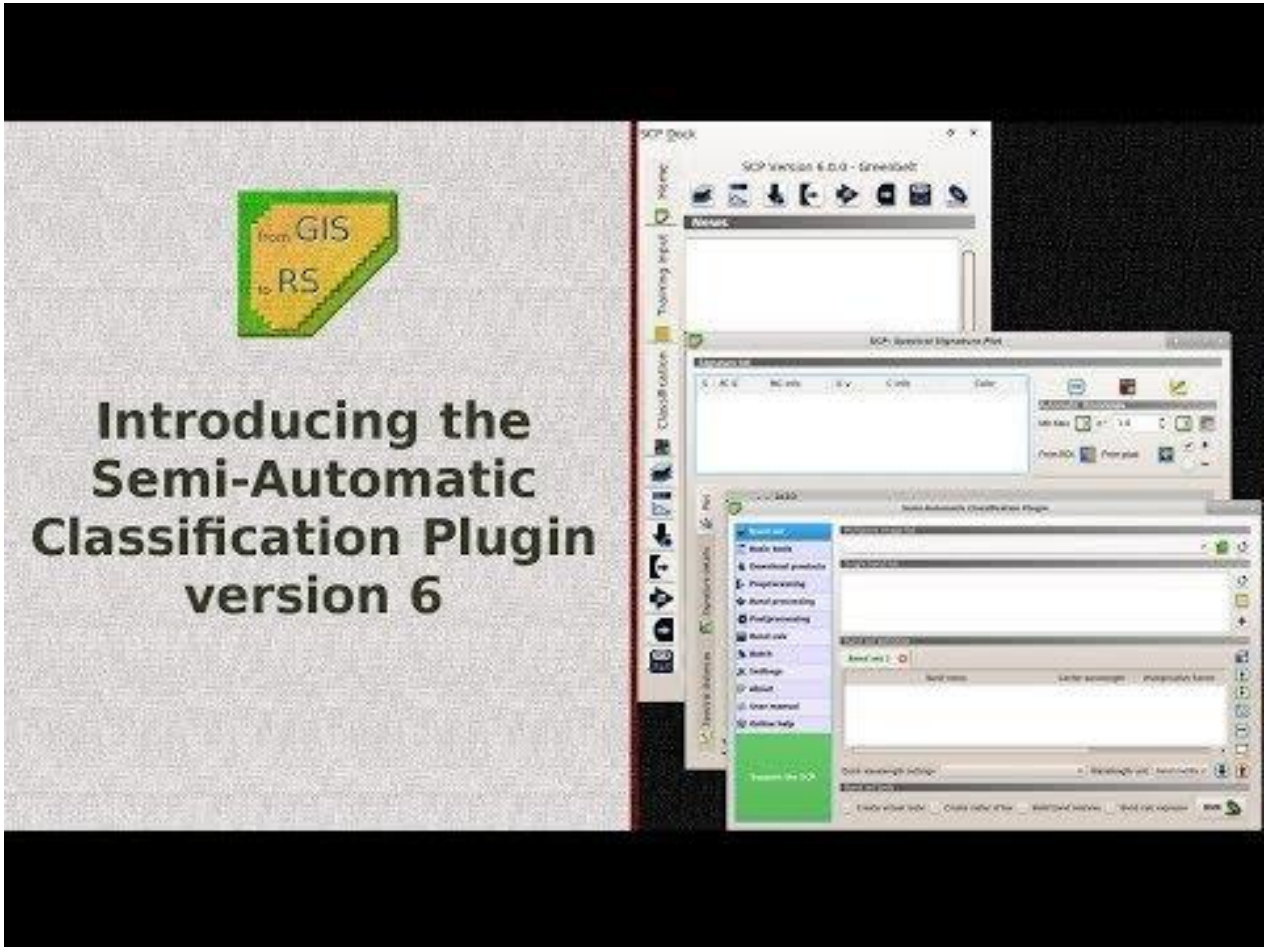


1. Setting UP

Optional:
Video on SCP

This tool enables us to download satellite data quickly without the need to visit several satellite websites.

It can also autofilter based on cloud cover %



2. Operating

Load Satellite Data

Compute FAPAR For Areas with Vegetation

Compute NDWI for Water Areas

I suggest we use “WGS 84” as our CRS

Now that we have our subset, we can move on to the main part of the project. Mapping water based on its reflectivity. To do this we have to calculate the NDWI using the formula:

$$NDWI = \frac{(Xgreen - Xnir)}{(Xgreen + Xnir)}$$

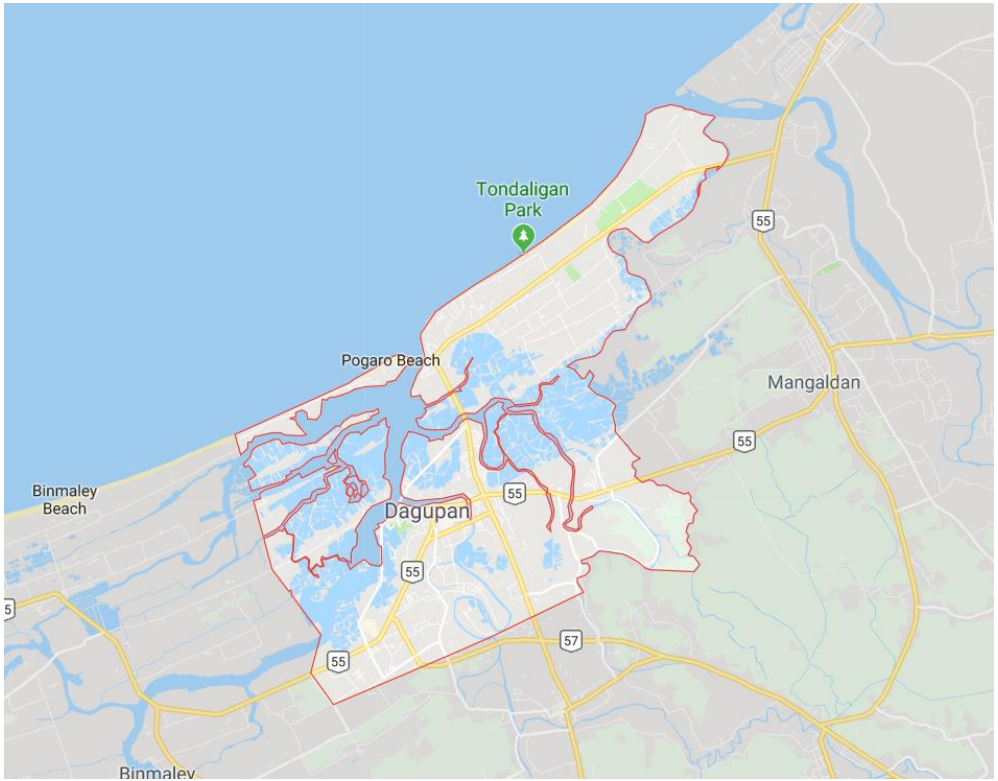
```
fapar= ((B8-B4)/(B8+B4) * (1.25-0.025))
```

2. Operating - Load Satellite Data

Imagine drawing a rectangle around the area, then get the Upper Left(UL) and Lower right(LR) corners of that rectangle.

Here,we pick dagupan and use maps.google.com and get the Upper Left and lower Right Coordinates (right click, What's here?)

Upper Left 16.110642, 120.277002
Lower Right 16.000581, 120.301448



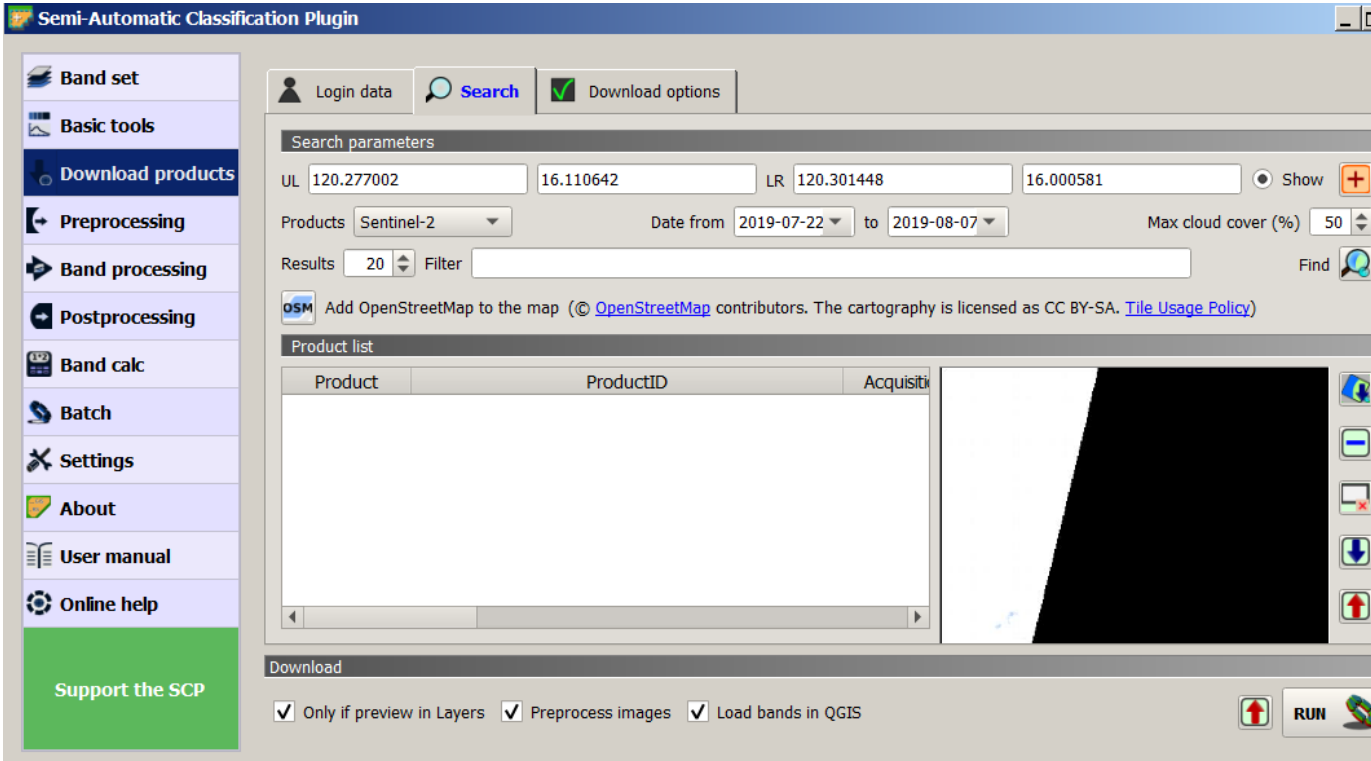
2. Operating - Load Satellite Data

On the top menu, select [SCP] then [Download Products].

Enter the Coordinates into the SEARCH parameters, including the date range and Max cloud cover (40-50%)

Upper Left 16.110642, 120.277002
Lower Right 16.000581, 120.301448

Then hit **FIND** to list the available satellite feeds that match your criteria.

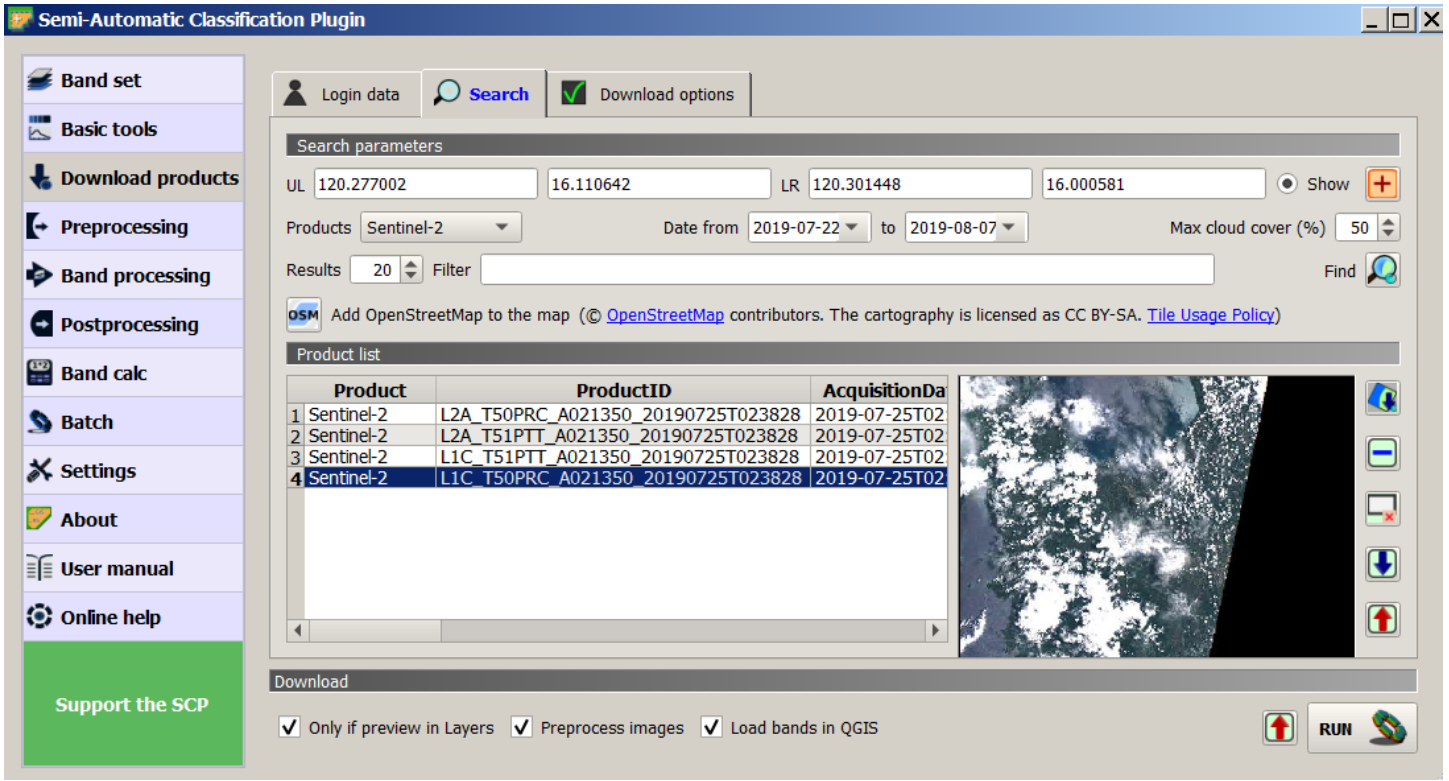


2. Operating - Load Satellite Data

Choose the BEST satellite image from the batch of data made available.

Take note that the **less cloud cover, the better**.

Note: *You may need to [Display Preview First], **BEFORE** you click on [RUN]*

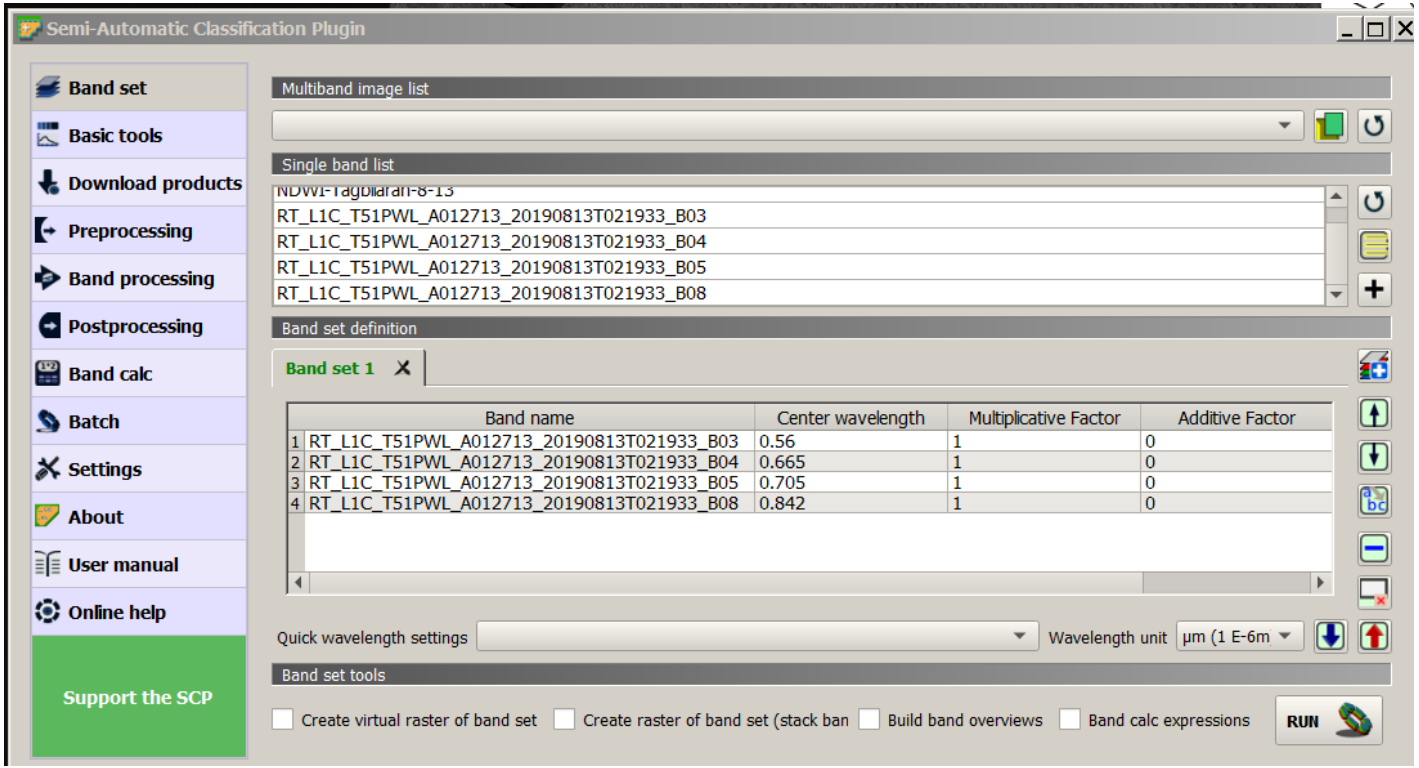


2. Operating - Load Satellite Data

Click on RUN to save the satellite data to a chosen folder.

In the BAND SET, you will now see B03, B04 and B08 corresponding to bandset 3,4 and 8

If you see NOTHING, hit the Refresh ICON

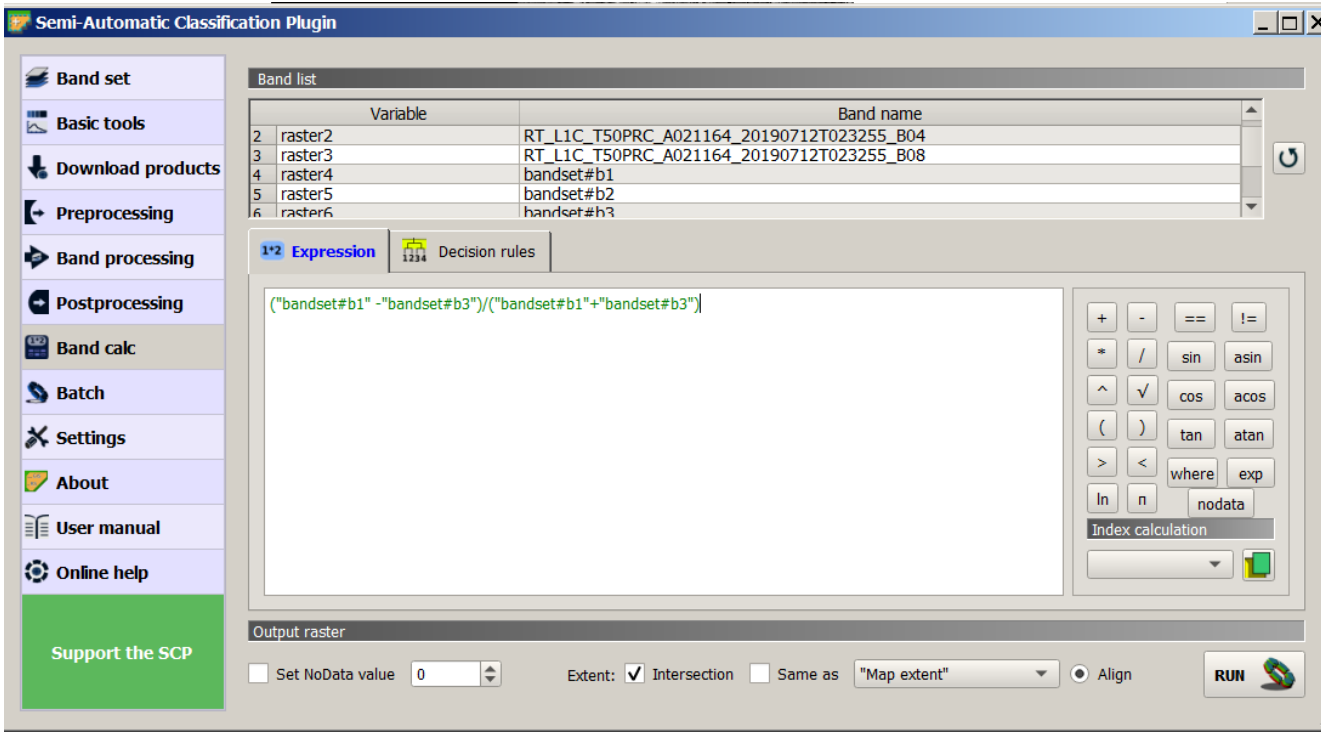


2. Operating - Compute for Water Areas

Go to [Band Calc] and in the [Expression] tab, Compute NDWI by pasting the formula below:

For Rural Areas:
("bandset#b1" - "bandset#b4")/("bandset#b1"+" bandset#b4")

For Urbanized Areas:
("bandset#b1" - "bandset#b3")/("bandset#b1"+" bandset#b3")

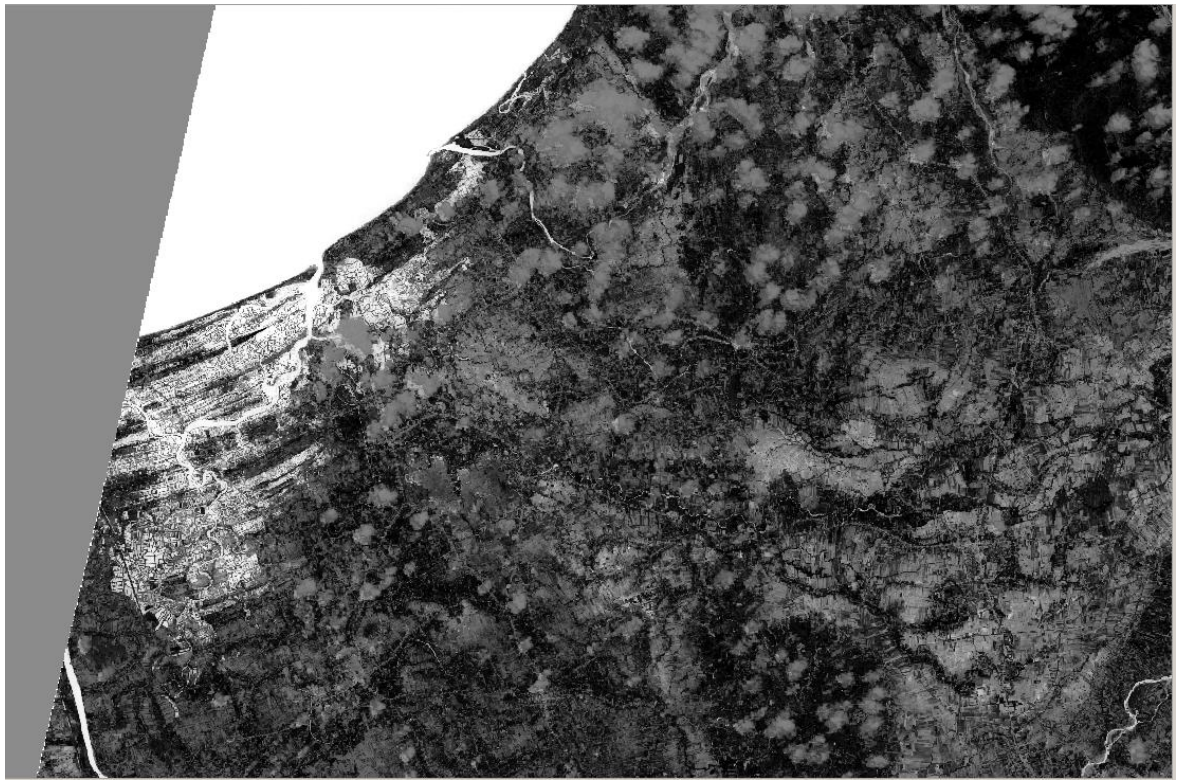


2. Operating - Display Water Areas

Save the file as NDWI.tif

Your output will look something similar to this:

Areas in White are water areas due to their high reflectance.

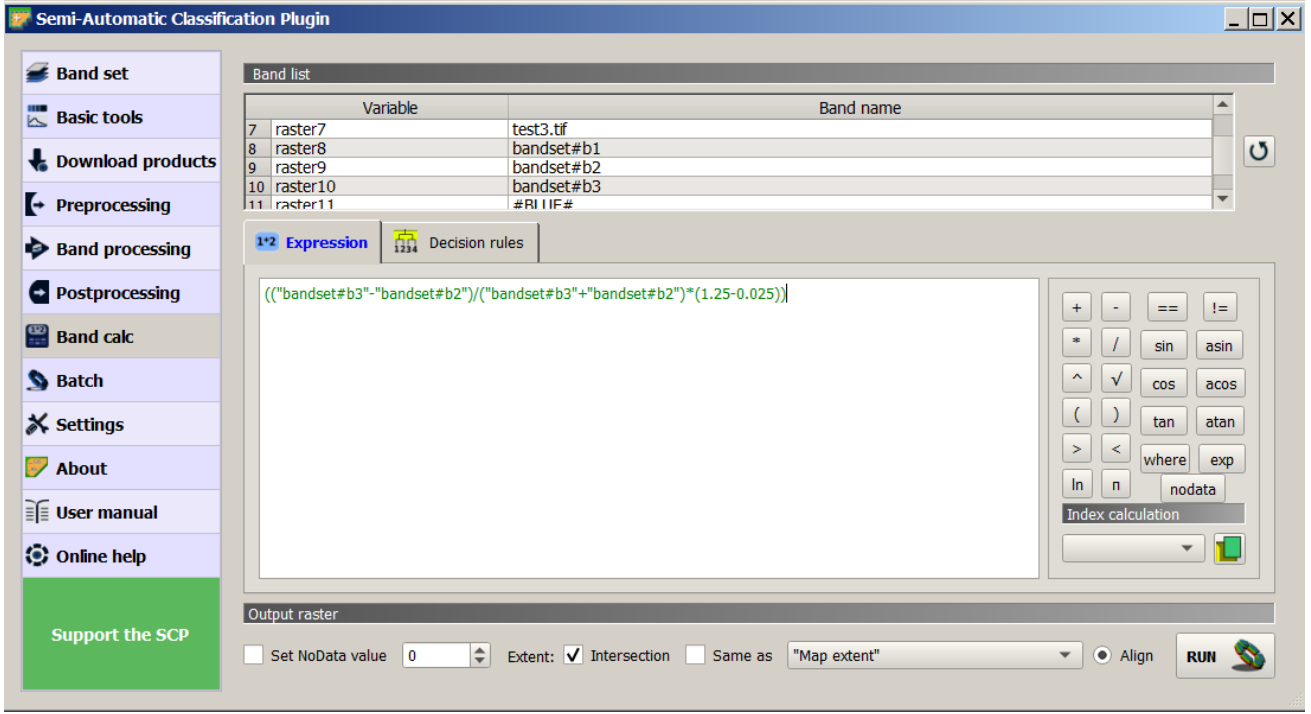


2. Operating - Computer for Areas with Vegetation

Do the same for FAPAR Computation (please paste the formula below)

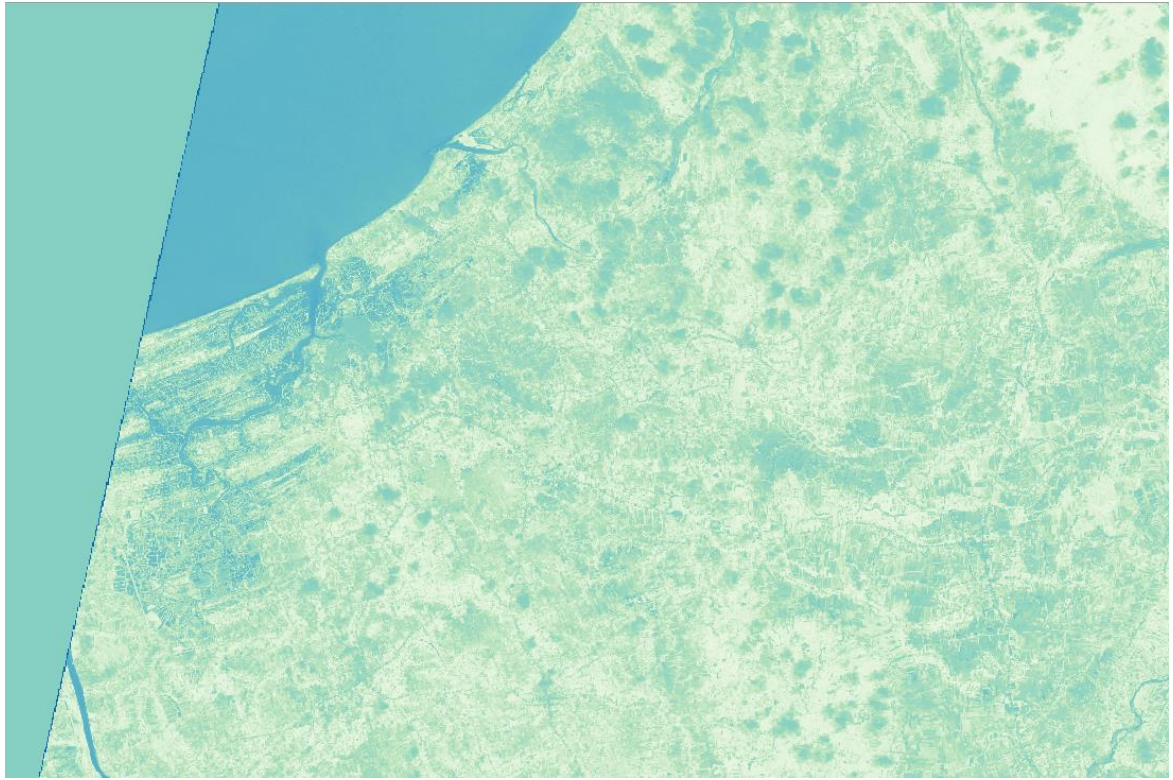
(("bandset#b3"-"bandset#b2")/("bandset#b3"+"bandset#b2")*(1.25-0.025))

Then click [RUN]



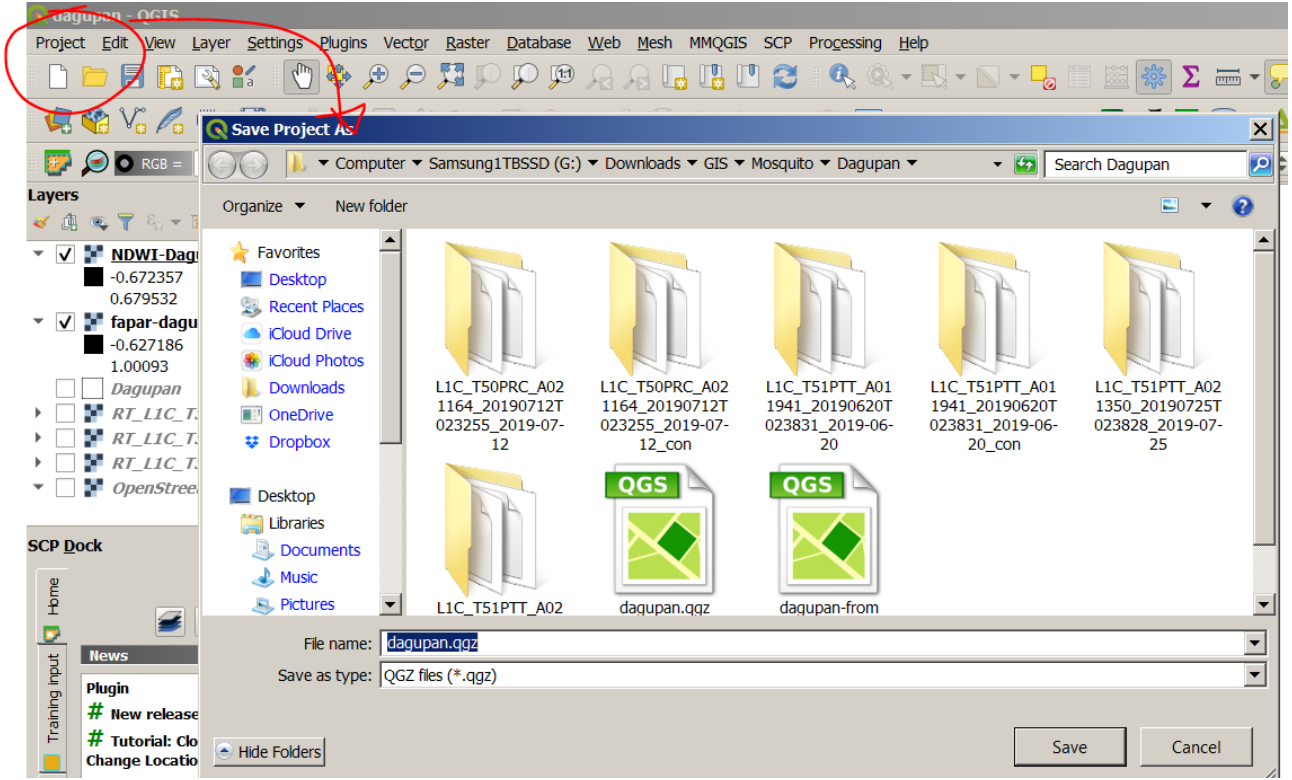
2. Operating - Display Areas with Vegetation

FAPAR Compute results should look something like the one on the right



2. Operating - Saving the Project

At this point, please SAVE your work.



3. Generating

Import Barangays.shp for PhilGIS.org

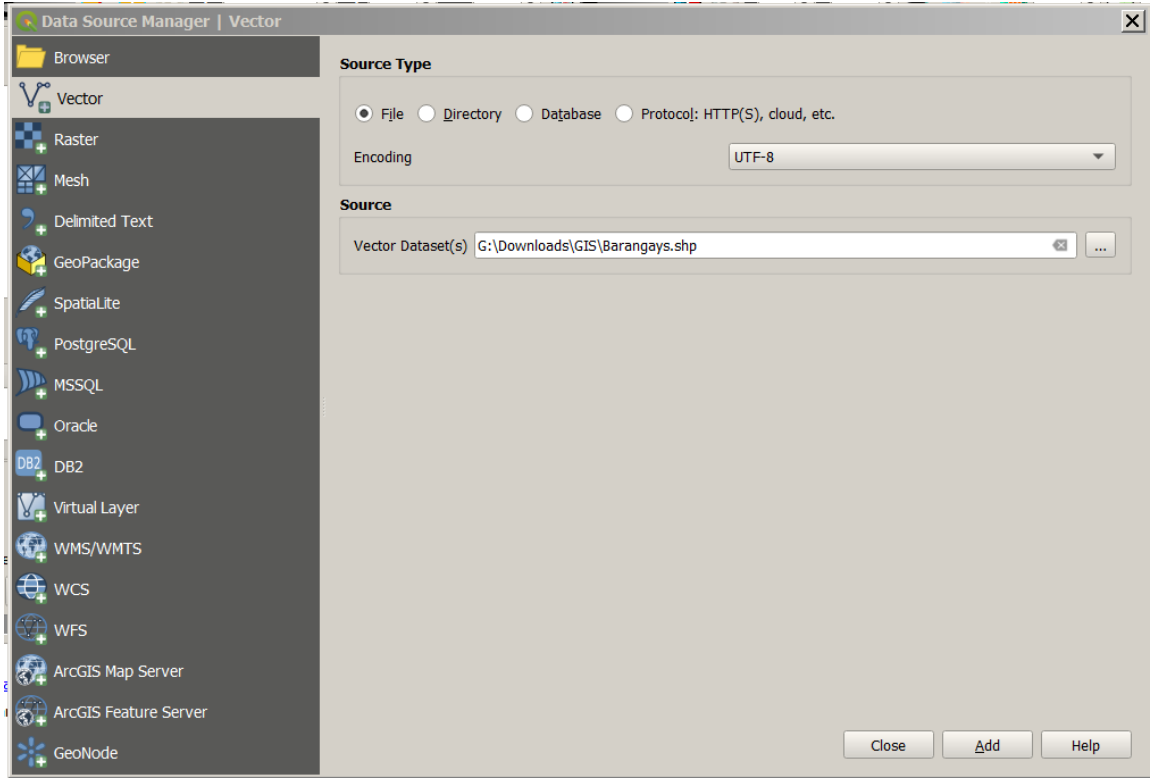
Compute For Stagnant Water

Biological control using Gambusia Affinis (mosquito fish)

3. Generating - Importing Barangay Shape File

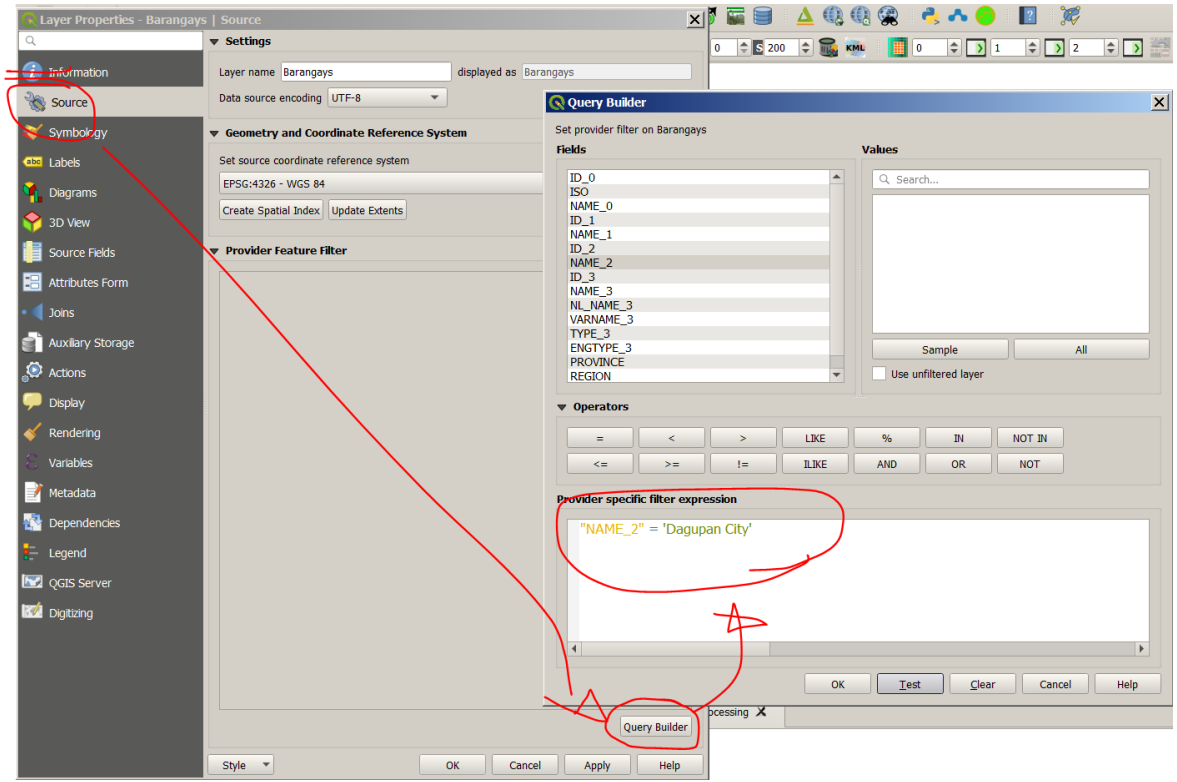
The Barangays.shp helps us define the geo-political boundaries and later, we will use it to ‘clip the edges’ of our satellite images

Note: we have a special shp file with DepED Public Schools in them.



3. Generating - Importing Barangay Shape File

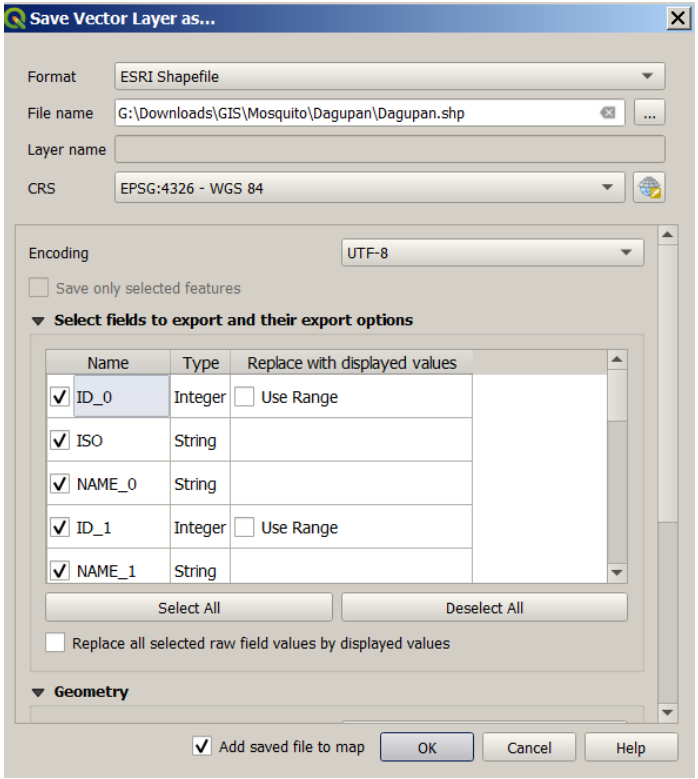
We only need Dagupan. So in the properties we filter so only Name2 matches “Dagupan City”



3. Generating - Export as Dagupan.shp File

Right Click on Barangays and select

‘Export Save Features as”

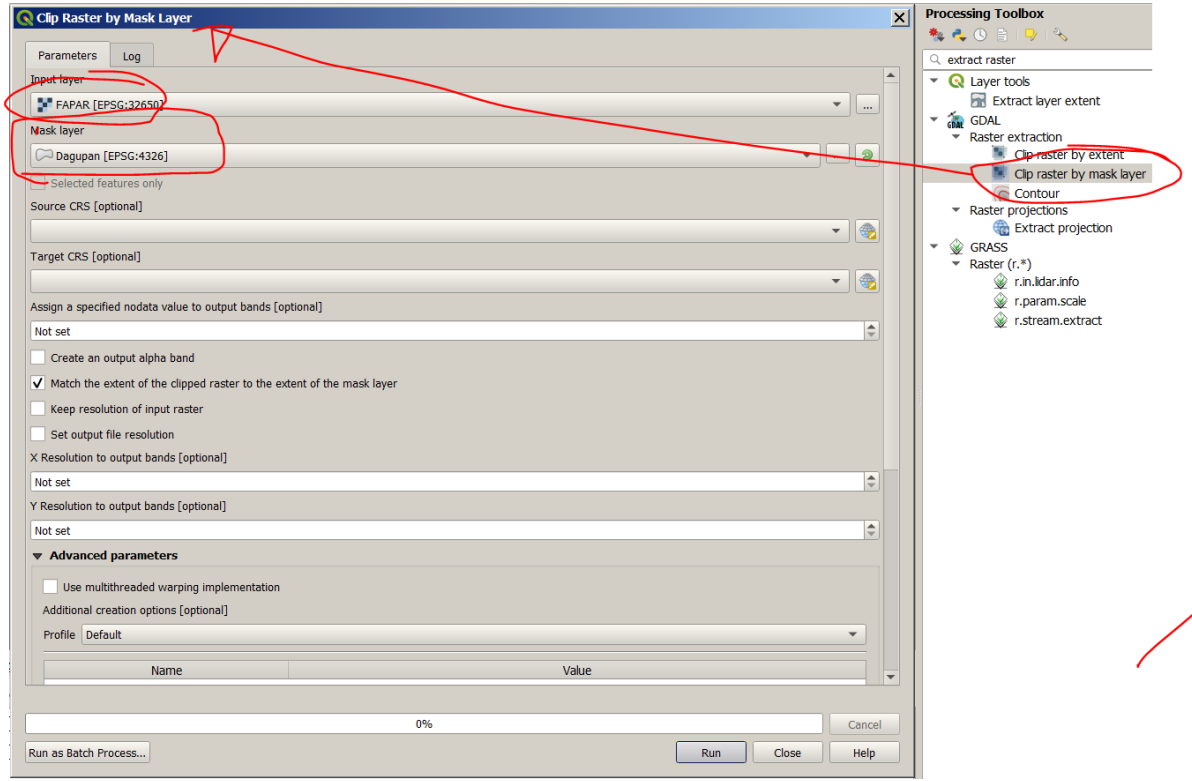


3. Generating - Using Dagupan.shp to Trim TIF

In the Processing Toolbox, find and use the “Clip Raster by mask layer”

Use the Dagupan.shp as the MASK on both Fapar and NDWI

The result will be a smaller file for both

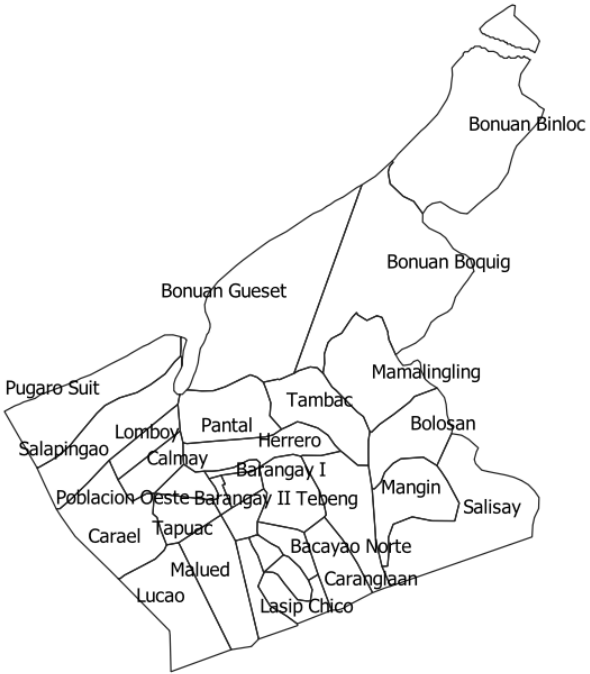


3. Generating - Compute Stagnant Water Areas

You should get something that looks like this:

(i used transparent fill on barangays.shp file)

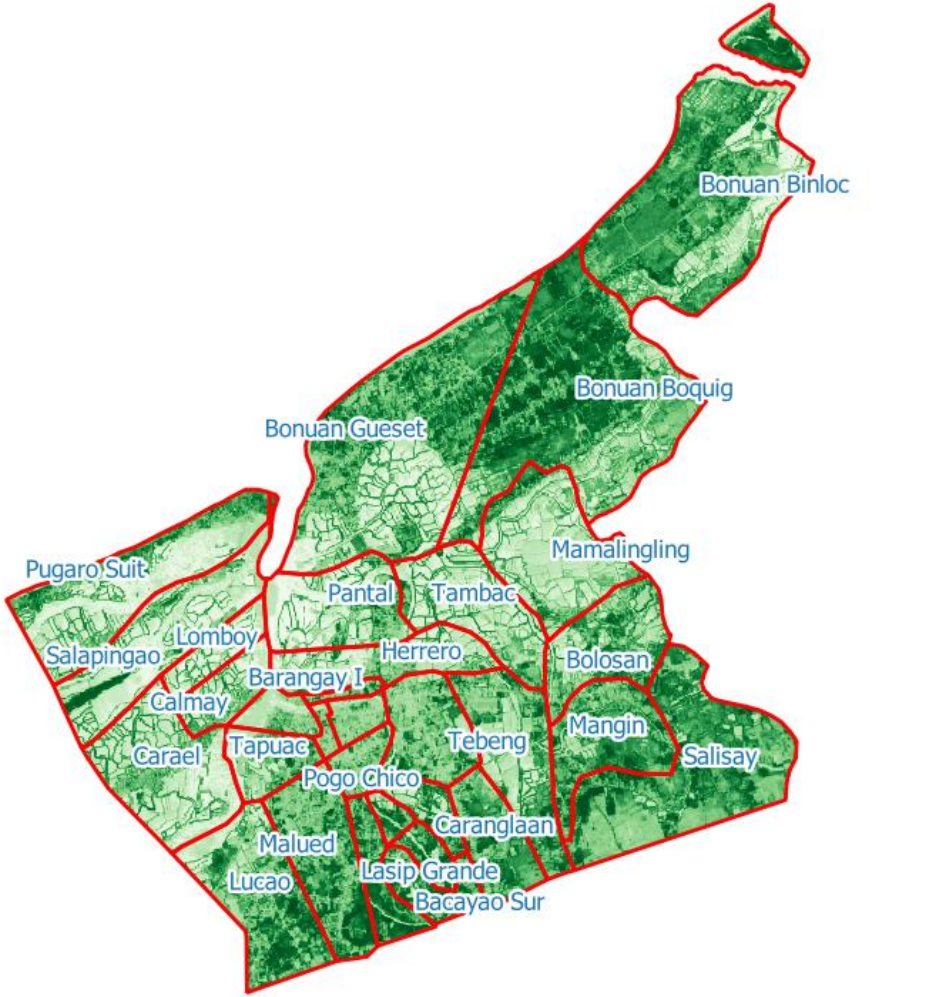
(I also added Labels, so we can see each barangay name)



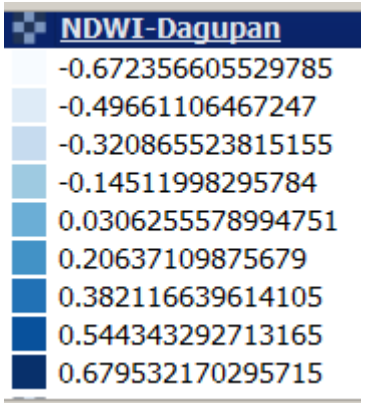
FAPAR (Vegetation) Map

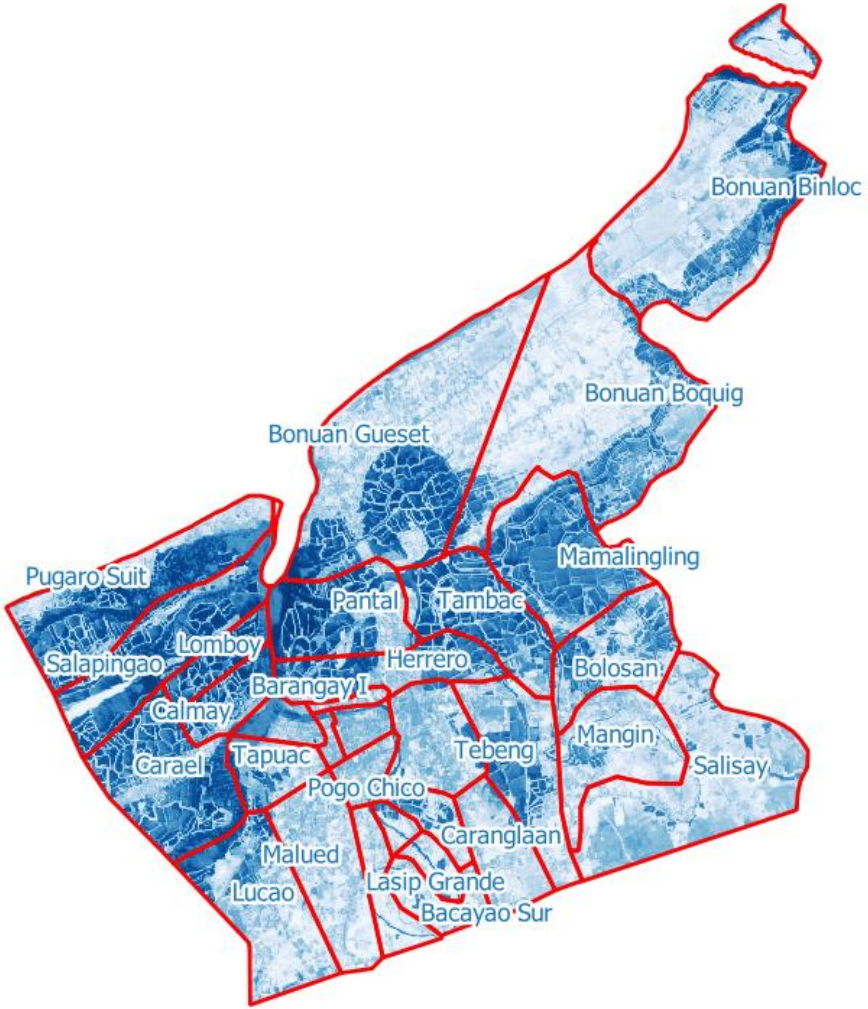
Fapar-Dagupan

-0.627186119556427
-0.415531588196754
-0.203877056837082
0.0077774745225907
0.219432005882263
0.431086537241936
0.642741068601608
0.838114482164383
1.00092566013336



NDWI Water Map





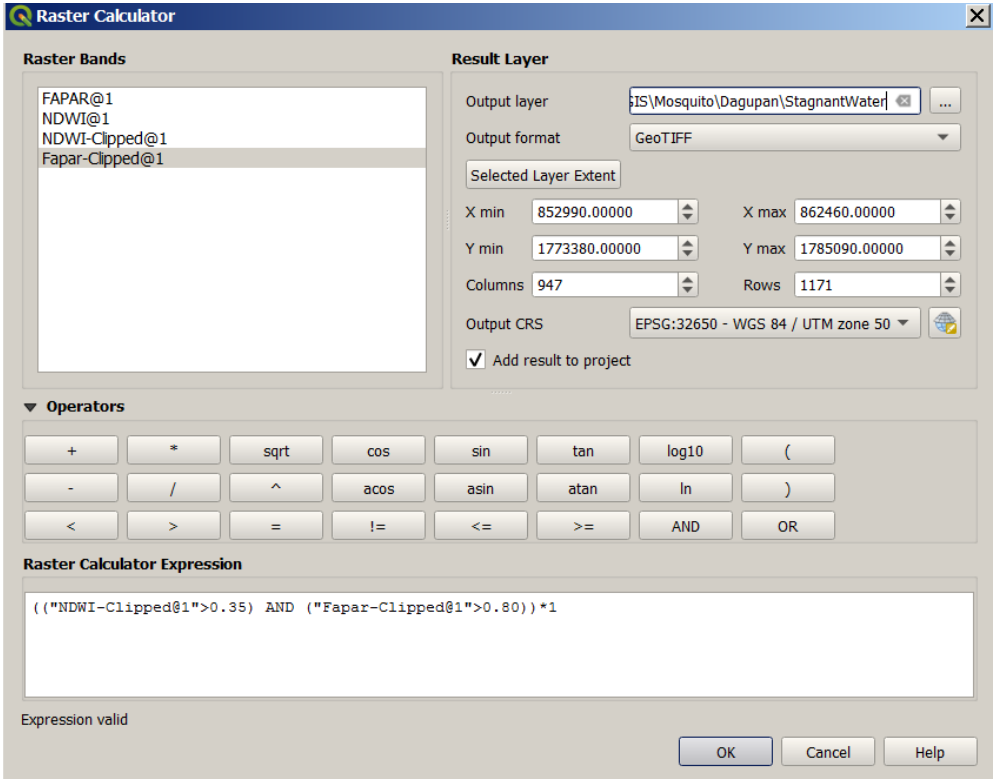
3. Generating - Compute Stagnant Water Areas

Use Raster Calculator to compute this:

WithWater =
(("NDWI.tif@1" > 0.xx)

WithVegetation =
("FAPAR.tif@1">0.xx))*1

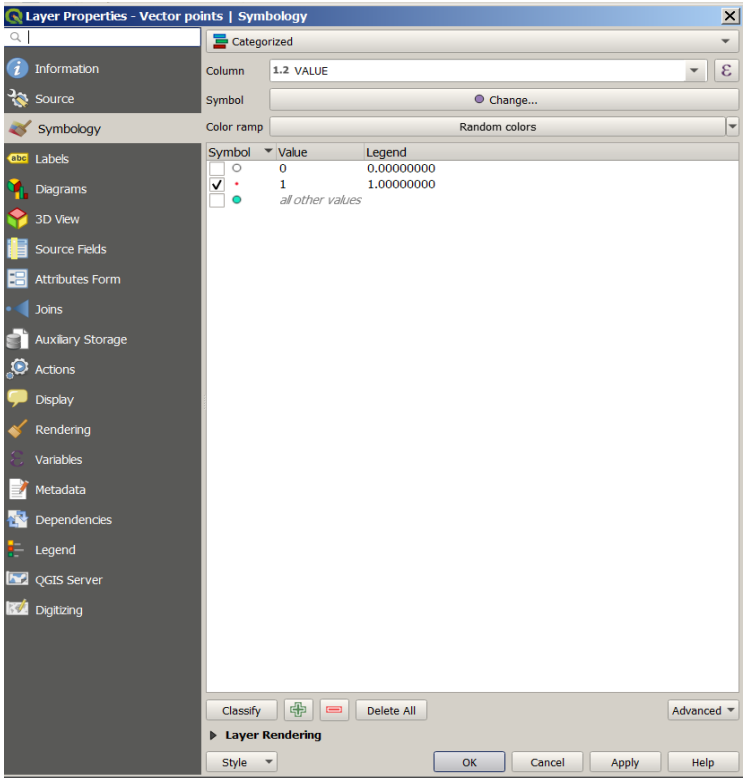
StagnantWater =
WithWater AND
withVegetation



3. Generating - Display Stagnant Water Areas

Use Raster to Points Tool to convert STAGWATER.tif to shape file (Vector_Points).

Then, we increase the size of the points to make them visible.



4. Reporting

Displaying the Map

Adding Barangay Data

Exporting the Map

Sorting on Excel

APRIL 26, 2016

Bacteria-breeding coconuts may control mosquitoes that transmit zika and malaria

CONTRIBUTOR: ROB GOODIER

Salitral is a breeding ground for mosquitoes. Photo courtesy of Palmira Ventosilla

Salitral is a fine place for mosquitoes to breed. Species that spread malaria thrive in its ponds, agricultural canals, year-round temperate weather and periodic monsoon-type rains.

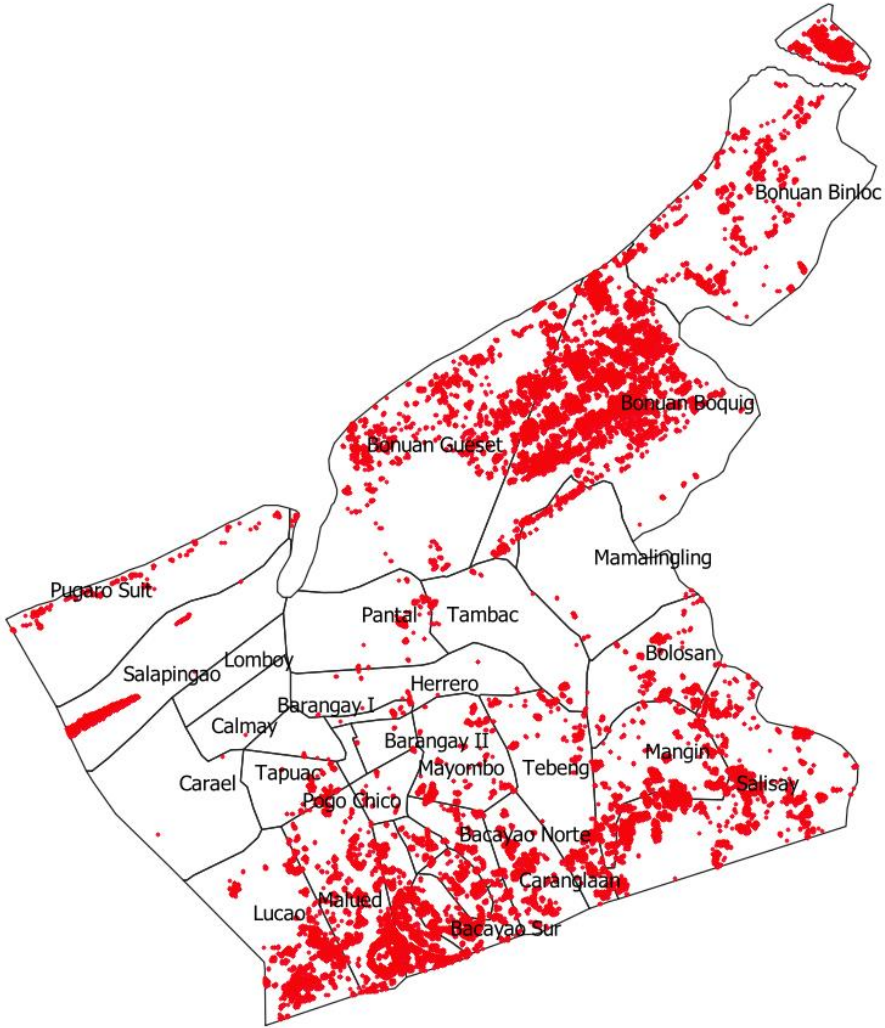
But for 12 days in 1995, eight ponds in Salitral were nearly free of mosquito larva. Their populations were decimated by a high concentration of *Bacillus thuringiensis israelensis*, or Bti. And the delivery system was coconuts.

The microbiologist Dr. Palmira Ventosilla developed the homegrown method for incubating Bti at the Experimental Microbiology Lab at the Universidad Peruana Cayetano Heredia in Lima, Peru. She put together a Bti kit. With it, anyone with basic know-how can inoculate a coconut, wait for the Bti population to grow suitably potent, and then crack the coconut and toss it in a pond.

These biological coconut bombs are apparently harmless to people and most other organisms. The World Health Organization issued a guideline saying that even in drinking water, Bti is not known to be harmful to people. But it is lethal to the mosquito species that spread disease in the world's tropics.

4. Reporting

Displaying the Map



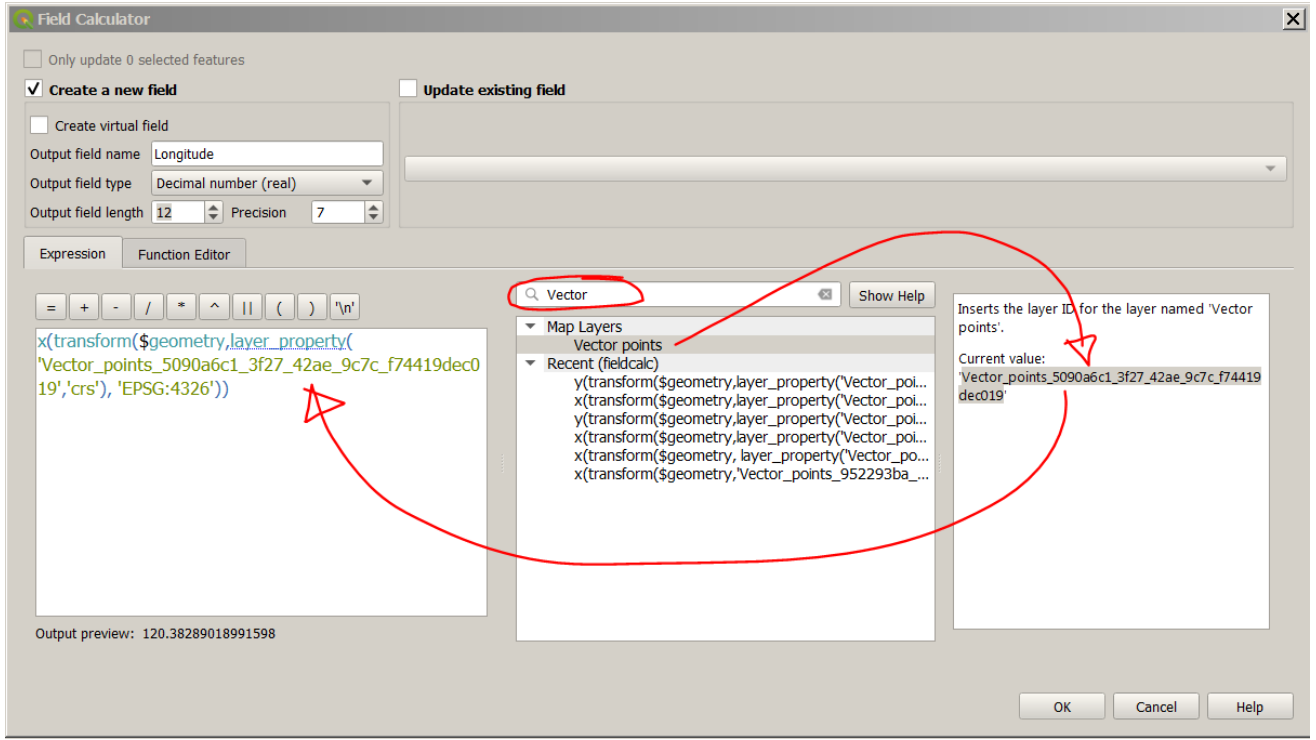
4. Reporting

Adding/converting X and Y coordinates to GPS

Toggle Edit Mode, then [Open Attribute Table] and [Field Calculator]

Create **Longitude** and **Latitude** field by using the formulas.

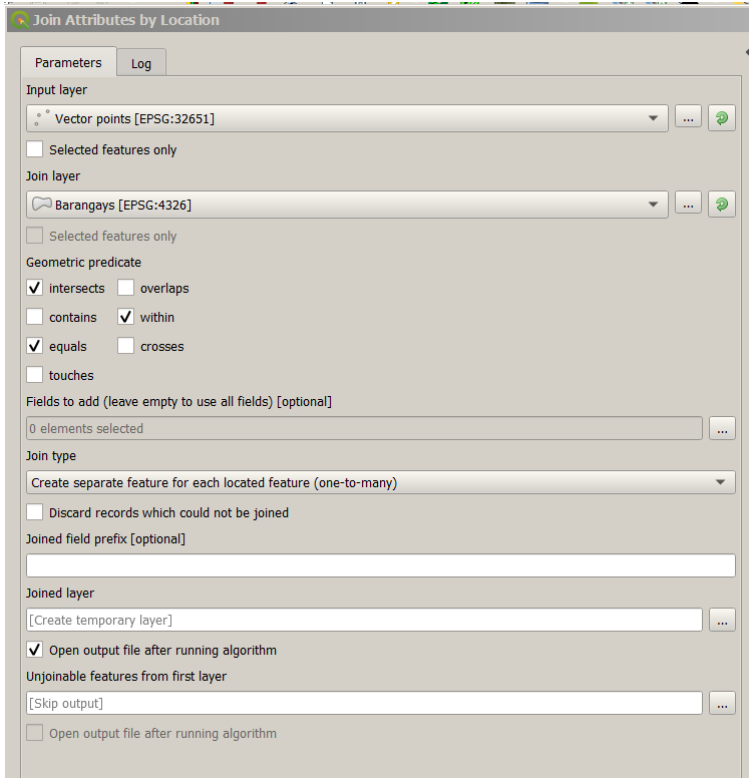
Note: Substitute the Vector Point.



4. Reporting

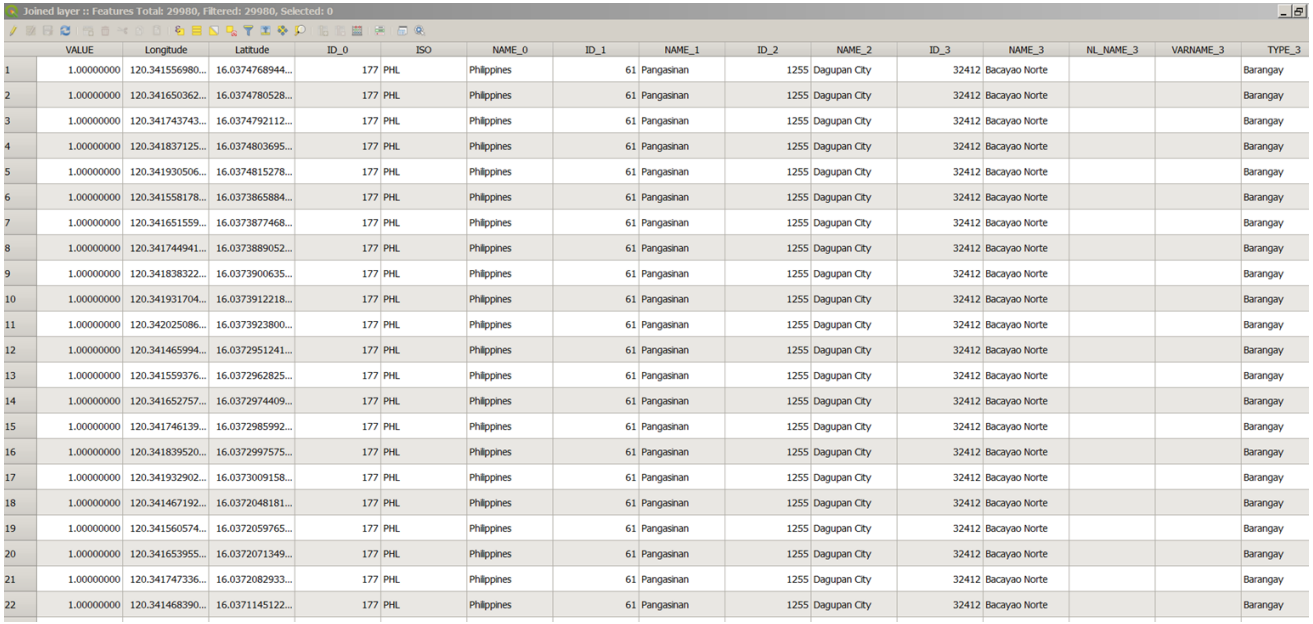
Adding Barangay Names to the table.

Use the “**Join Attribute by Location**” command



4. Reporting

The Joined Table now has Lat, Long, and Barangay Names, Municipal Names


Joined layer :: Features Total: 29980, Filtered: 29980, Selected: 0

	VALUE	Longitude	Latitude	ID_0	ISO	NAME_0	ID_1	NAME_1	ID_2	NAME_2	ID_3	NAME_3	NL_NAME_3	VARNAME_3	TYPE_3
1	1.00000000	120.341556980...	16.0374768944...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
2	1.00000000	120.341650362...	16.0374780528...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
3	1.00000000	120.341743743...	16.0374792112...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
4	1.00000000	120.341837125...	16.0374803695...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
5	1.00000000	120.341930506...	16.0374815278...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
6	1.00000000	120.341558178...	16.0373865884...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
7	1.00000000	120.341651559...	16.0373877468...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
8	1.00000000	120.341744941...	16.0373889052...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
9	1.00000000	120.341838322...	16.0373900635...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
10	1.00000000	120.341931704...	16.0373912218...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
11	1.00000000	120.342025086...	16.0373923800...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
12	1.00000000	120.341465994...	16.0372951241...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
13	1.00000000	120.341559376...	16.0372962825...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
14	1.00000000	120.341652757...	16.0372974409...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
15	1.00000000	120.341746139...	16.0372985992...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
16	1.00000000	120.341839520...	16.0372997575...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
17	1.00000000	120.341932902...	16.0373009158...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
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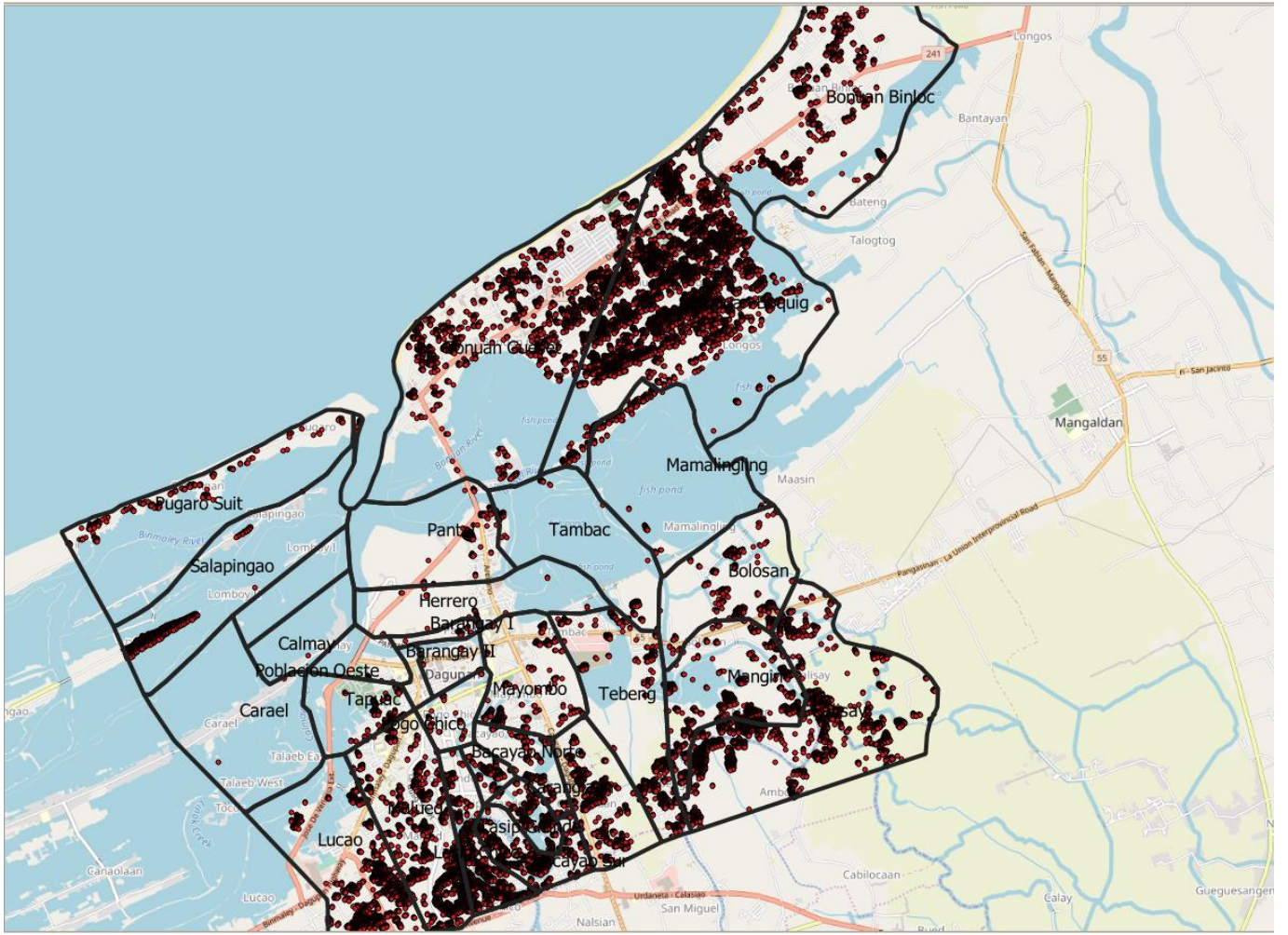
21	1.00000000	120.341747336...	16.0372082933...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay
22	1.00000000	120.341468390...	16.0371145122...	177	PHL	Philippines	61	Pangasinan	1255	Dagupan City	32412	Bacayao Norte			Barangay

4. Reporting

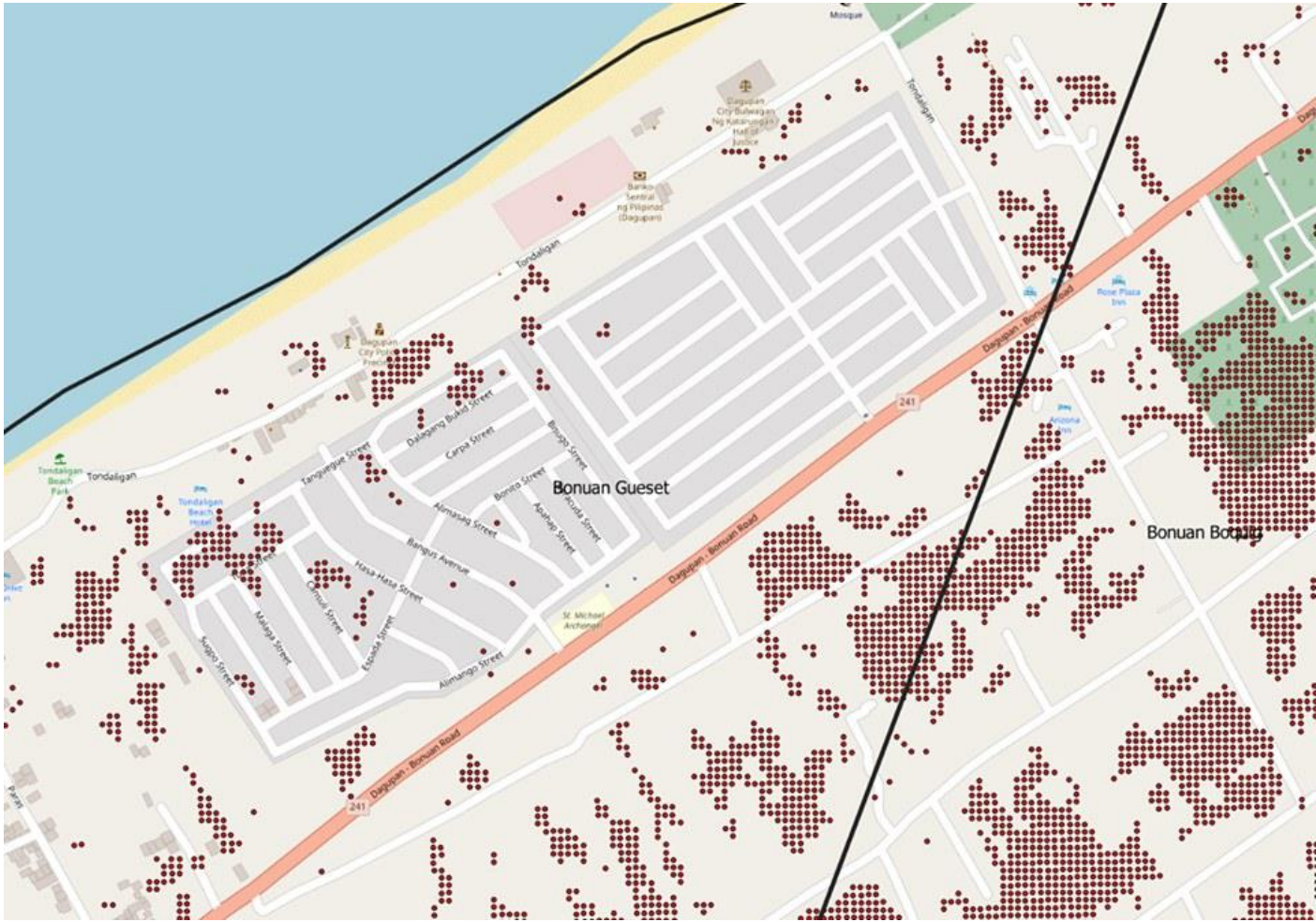
With OpenStreetMaps as background



4. Reporting

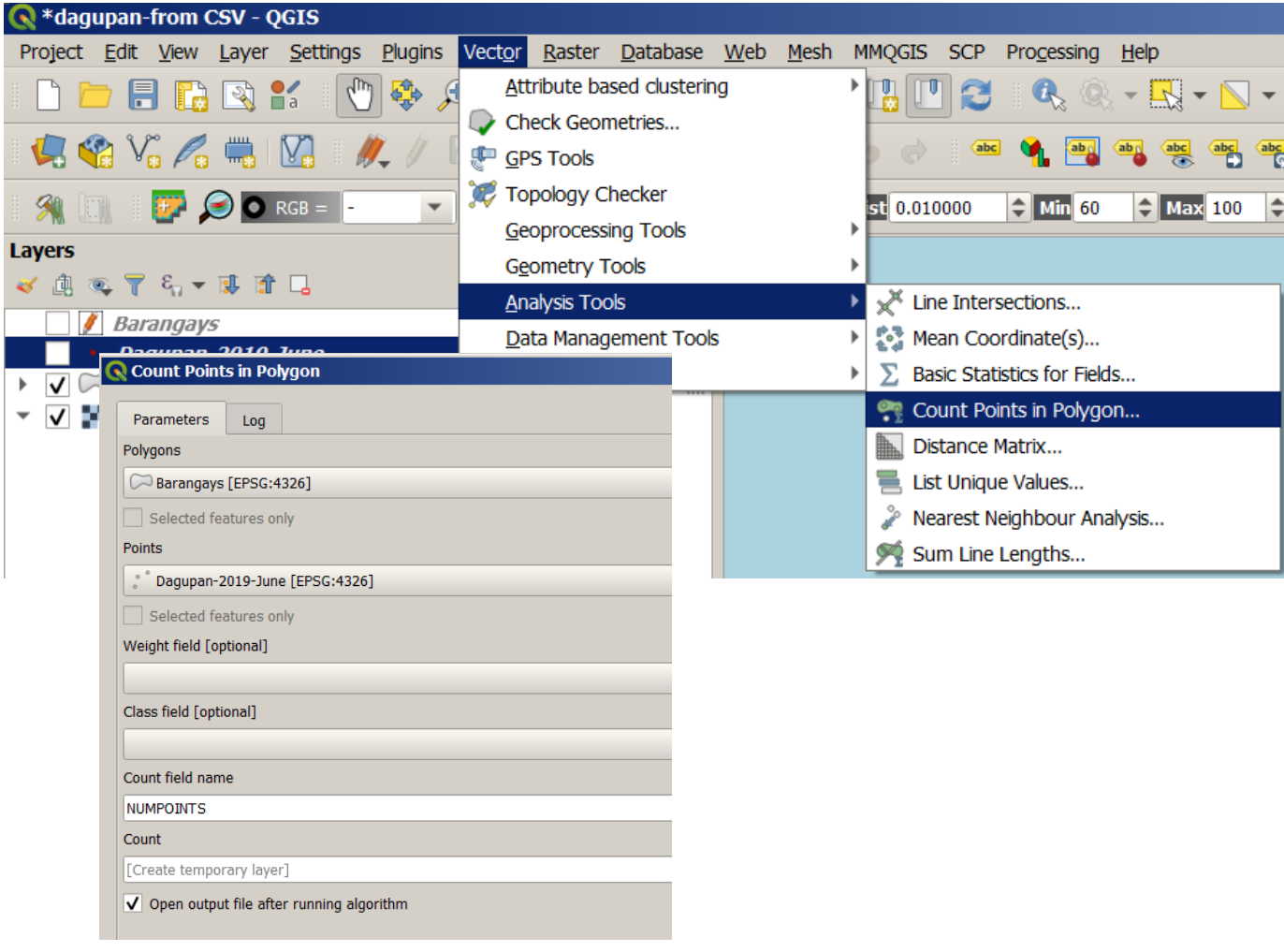
With OpenStreetMaps as background

Zoomed INTO a subdivision



4. Reporting

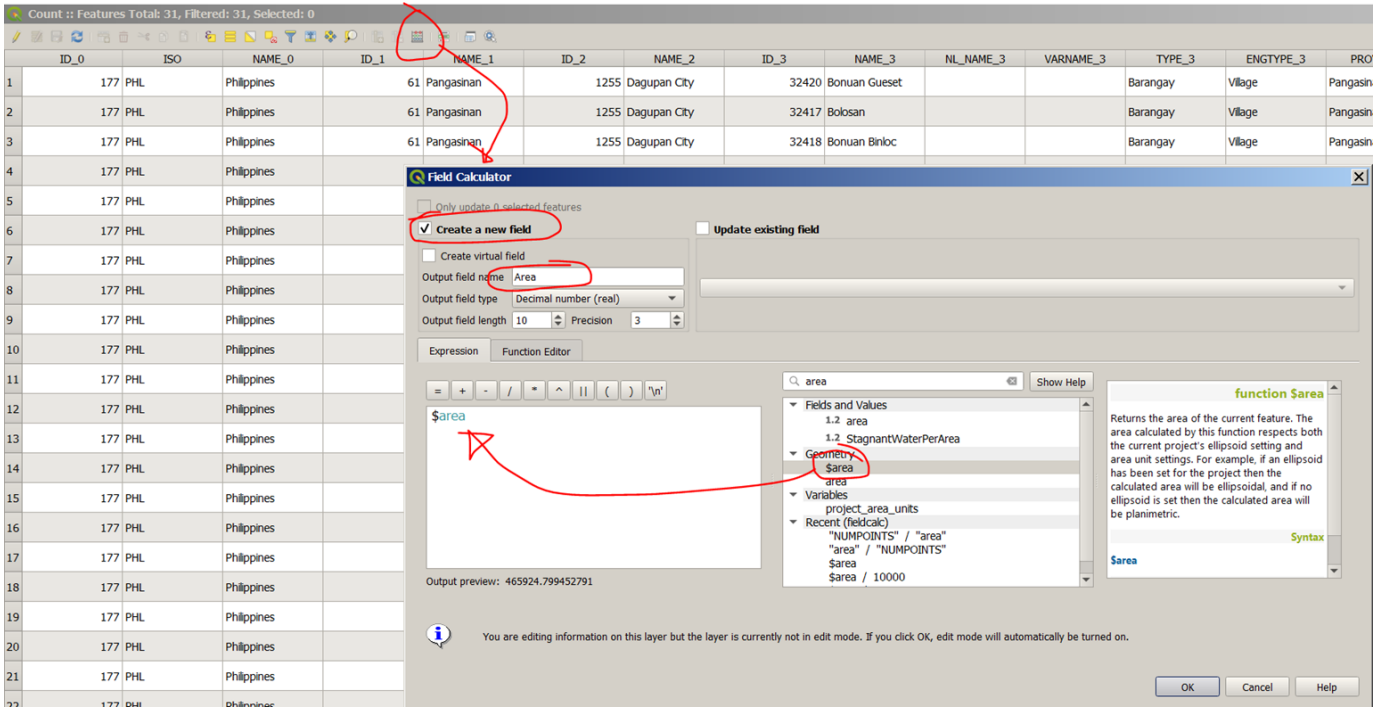
Counting the stagnant water Per barangay Using Vector **Analysis Tools- Count Points** in Polygon



4. Reporting

Calculating Area per geographic unit (barangay)

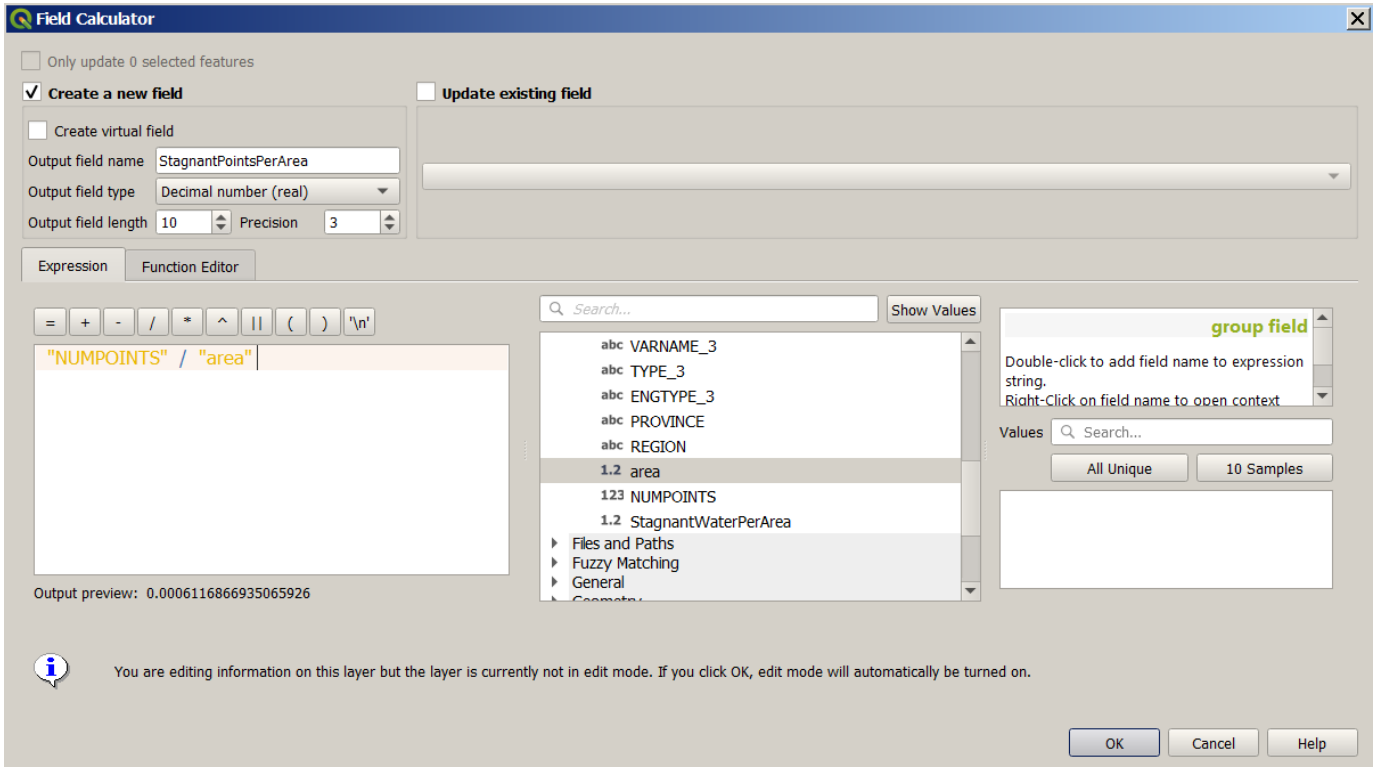
Toggle Editing
Field Calculator



4. Reporting

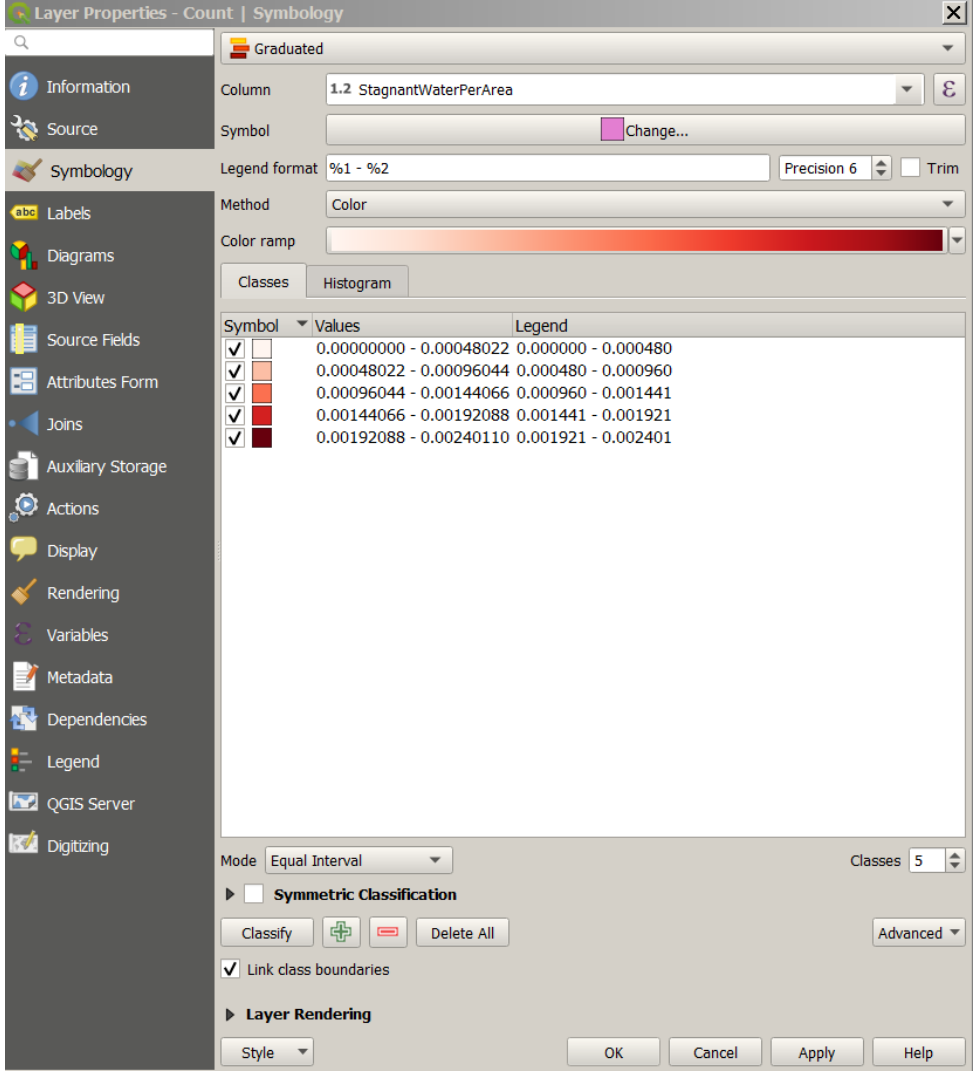
Calculating **StagnantWaterSpots per geographic unit** (barangay)

Toggle Editing
Field Calculator



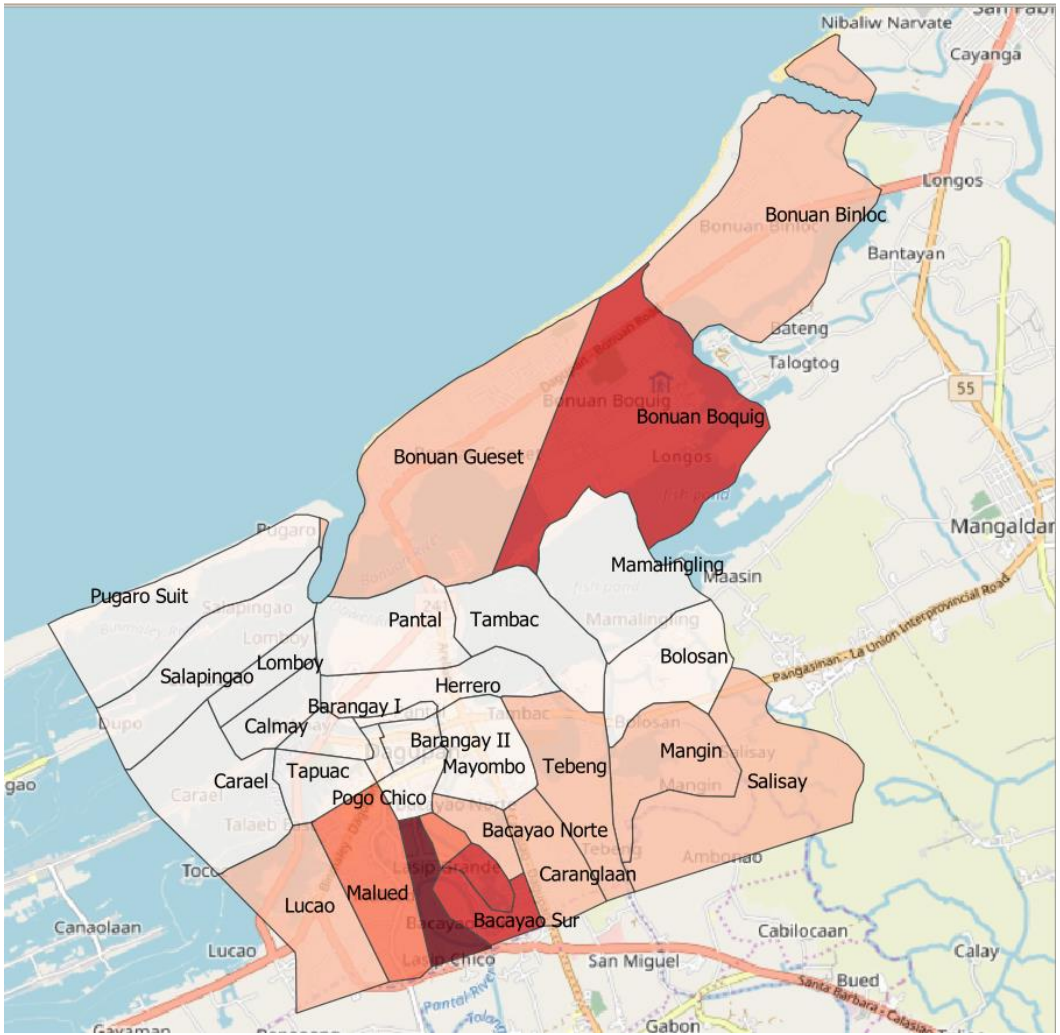
4. Reporting

Rending the Visual using StagnantWaterPer Area and Graduated



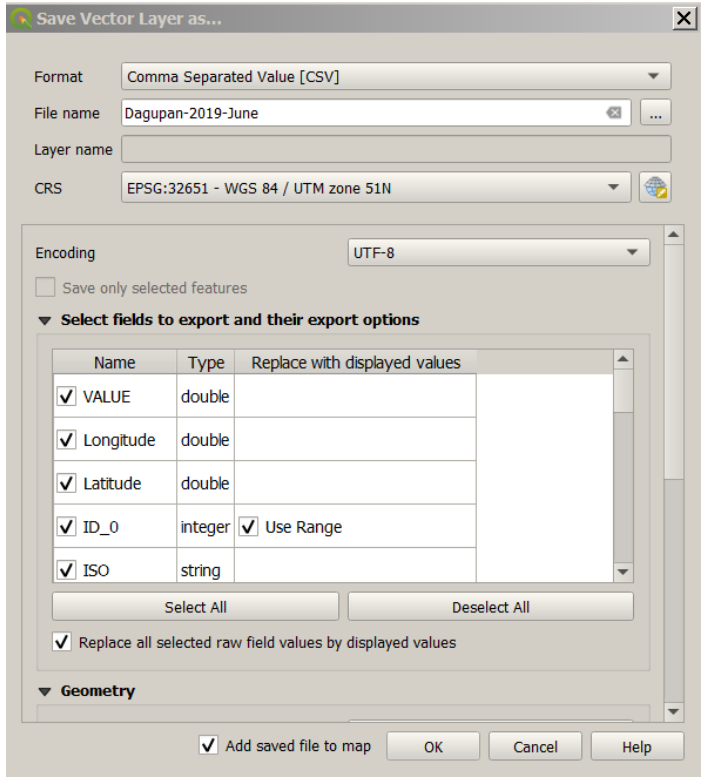
4. Reporting

To quickly show potential Dengue HotSpots



4. Reporting

Export the Joined File
in CSV format



What do we do now?

Overlay with Dengue Case Data?

Create Machine Learning models to predict disease outbreaks?

Use Stagnant and Dengue Maps to prioritise efforts

Share your Visualization with us

We would love to know about how you have taken this methodology forward and how it has helped your community.

Do drop us a note with your visuals and send over a copy of your CSV exports.

We will add them to our growing dataset for future project by data scientist.

Pay it Forward. Share this with others.

Or join us on Facebook

https://www.facebook.com/groups/1805237739779109