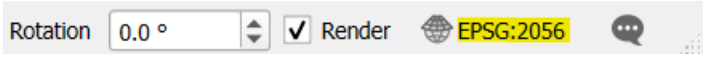
The aim of the exercise is to identify the priority areas for intervention in stormwater management in the communes of Ecublens, Chavanne-près-Renens and St-Sulpice.

To do this, we are going to divide the territory of the three municipalities into a 50x50m grid and calculate the percentage of vegetation in each cell.

The procedure is as follows:

1. Open QGIS and create a new project in the CRS CH1903+ /LV95 (EPSG:2056)

   The coordinate system can be selected at the bottom right of the screen:

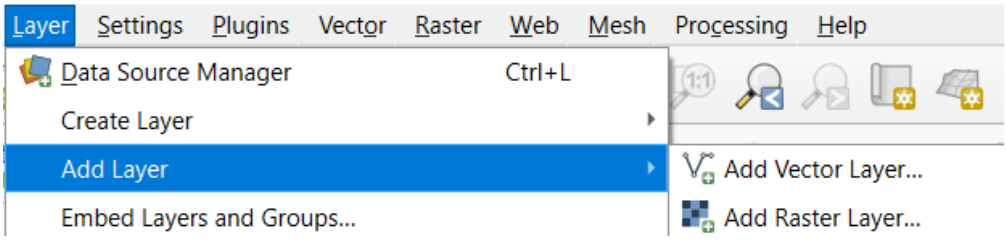


2. Import the layers ‘lac et cours d’eau’, ‘batiments’ and ‘routes’ used for exercise

   (for a better visualisation of the project) as well as those provided on moodle :

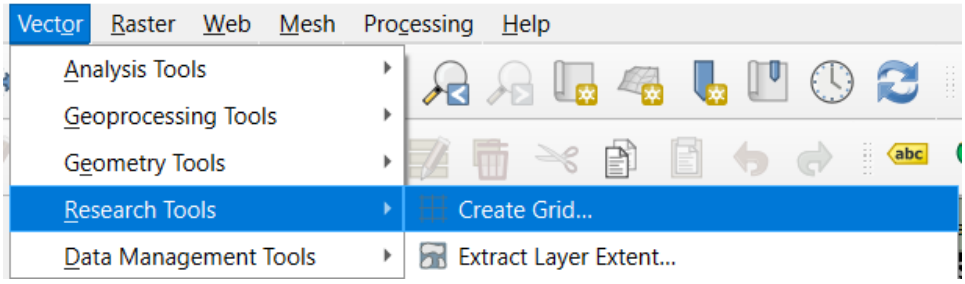
   - Communes_ex2.gpkg : vector for the 3 municipalities considered
   - Permeability_map_LiDAR2019.tif : raster of permeable surfaces with a value of 1 for impermeable surfaces and 0 for the permeable ones

   They can be added via Layer>Add Vector/Raster Layer or dragged directly to the layer tree from your exercise folder

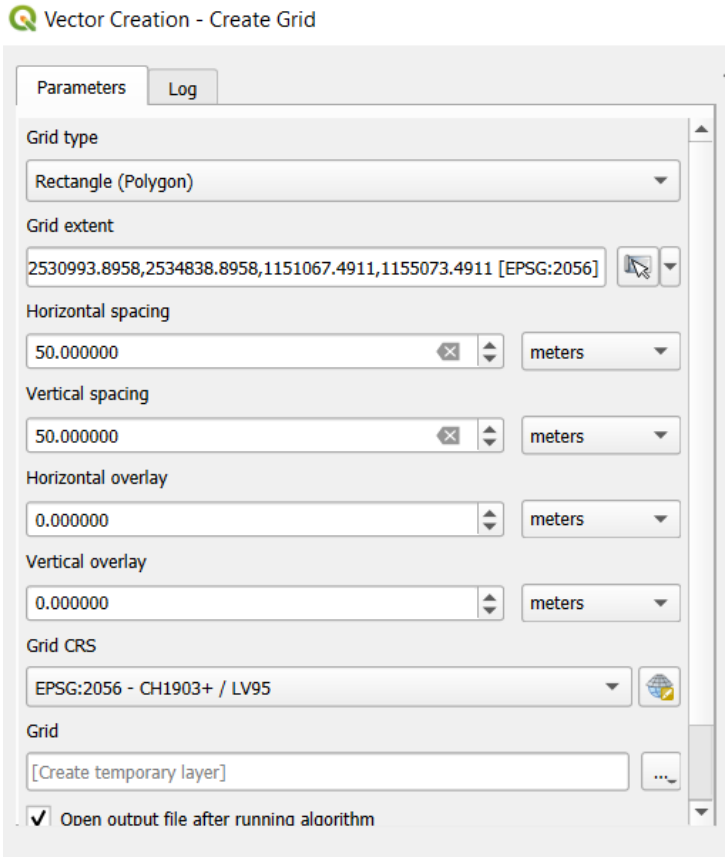


3. Generate the grid to identify permeable areas: Go to Vector>Research

   Tools>Create Grid

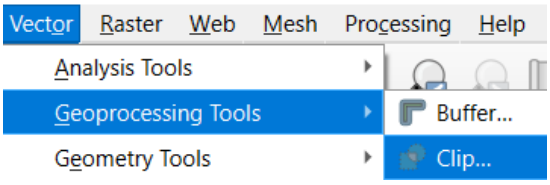


Enter the following parameters in the algorithm window:

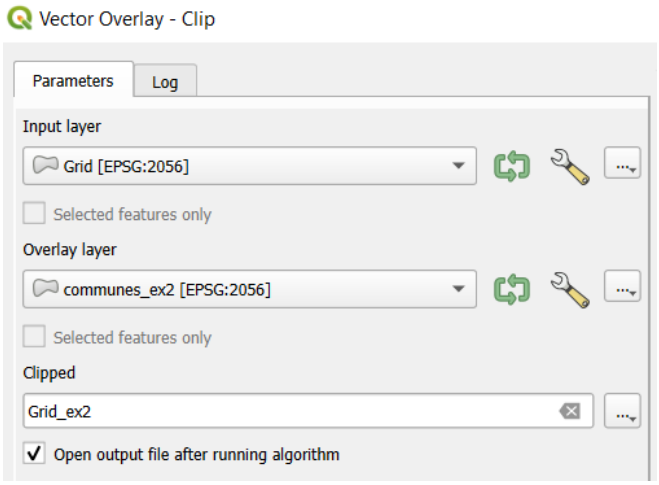


Make sure you select the communes_ex2 layer for the Grid extent parameter and the correct coordinate system for the Grid CRS.

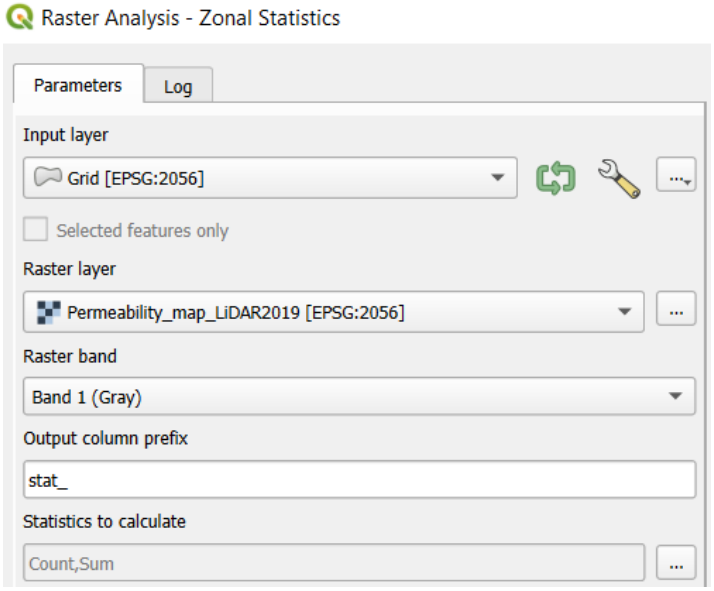
This will add a new layer called ‘Grid’ to the list of layers. It has the same size as the permeability raster but is rectangular, so you need to clip it to keep only the cells we are interested in.



This will open the algorithm window in which you need to enter the grid as input, the municipalities layer as overlay and (optionally) choose a location for the output file:



4. You can then use the Zonal Statistics algorithm as in exercise 1 to calculate the sum of the pixel values in each grid cell.



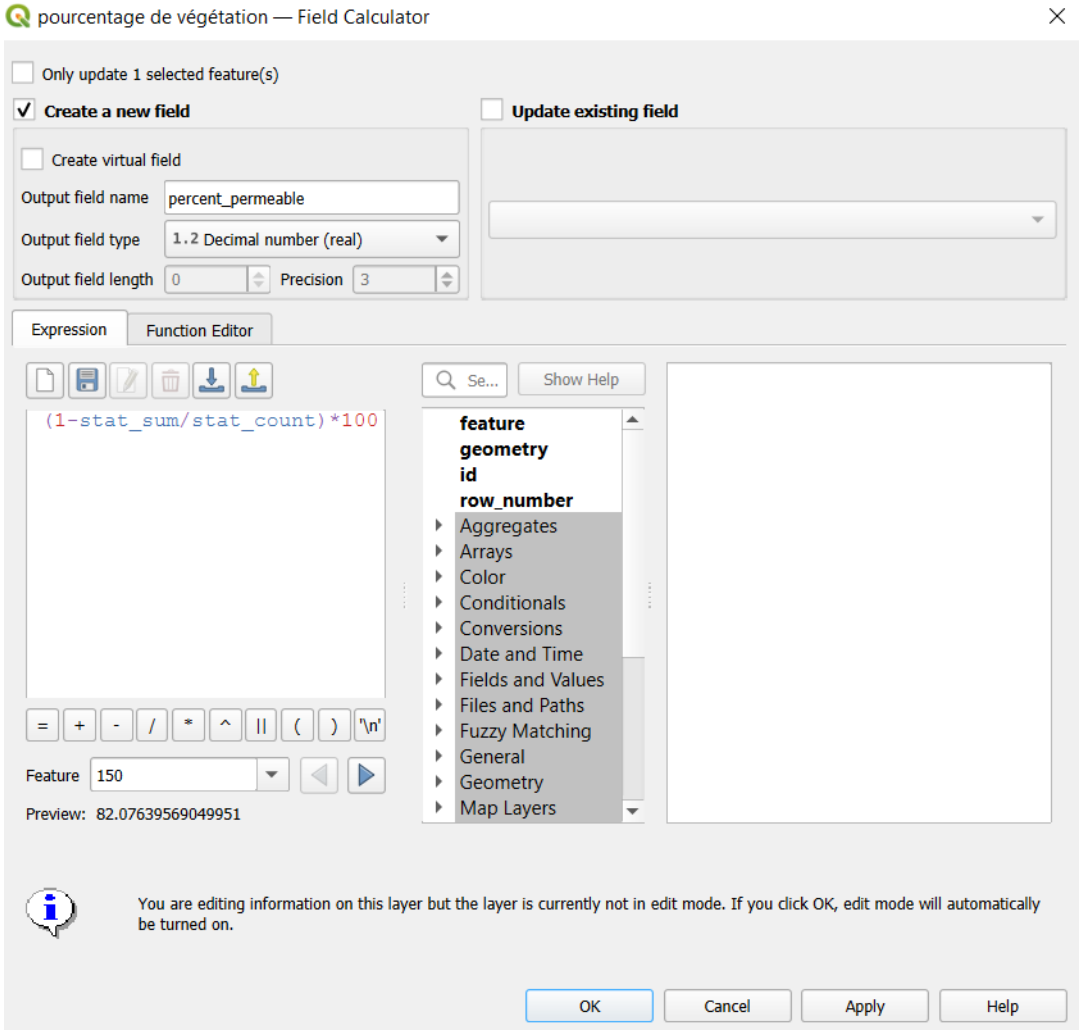
After execution, a new layer will be created, identical to the starting grid and containing new columns with the calculated statistics:

- stat_sum: The sum of the pixel values in each grid cell.
- stat_count: The total number of pixels in each polygon.

5. We then need to convert these statistics into a percentage of permeable surfaces.

   To do this, we're going to create a new attribute with the required value. In the attribute table of your grid, click on the field calculator:

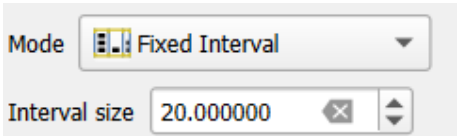
   A window will open:



   Select ‘Create a new field, uncheck ‘Only update x selected features’, choose a name for your output field and your output field type.

   You can then enter the expression for calculating the percentage of permeable surfaces: (1-stat_sum/stat_count)*100 (Note the 1- because permeable surfaces are represented by 0 and impermeable surfaces by 1 in the starting raster)

6. The last step is to modify the symbology of the grid to display the desired percentage in the same way as for exercise 1. We want to classify the surfaces according to their permeability by classes of 20%, to do this select the following parameters in the symbology tab:



Don't forget to save the temporary layers and your project. You should obtain the following result: