

QGIS Practical 6: Population Baseline Map

In this practical exercise, you will build on the learning from the previous practicals and create a Population Baseline Map.

Population data often comes in two different formats:

- A table with population values by administrative divisions, in which case you would make a choropleth map, with polygons of different colors representing different population values (the darker the color, the higher the number)
- A raster, in which, as you will see tomorrow, the land is divided into a grid, into pixels, and each pixel holds a number representing how many people live in that little parcel. A raster dataset is often very good at showing how the population is distributed on the land - a level of detail that cannot be included in a choropleth map

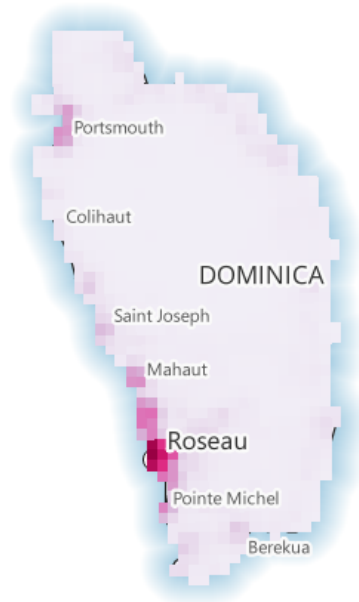
Once again, the choice will depend on the scale of work. You will often need both! You will want to know at a glance which regions are most populous, and that can be done very effectively with a clean choropleth polygon map, but once you work at a large scale, you will probably need more information about exactly how the population is distributed on the land.

Have a look at these examples!

Choropleth Map



Population distribution



1.0 Planning your map project

As you start working on your product, it is a good idea to take a step back and reflect on what you want the final product to look like. Also remember, that map projects are often iterative in nature. You may start with a simple product, that you can then use as a base for the next versions, or other products altogether.

Here are some points to take into consideration as you start your work:

- Who is this product for?
- What data do I need?
- What is the status of those datasets? Are they fit for purpose? Is any cleaning necessary?
 - Always open the datasets and inspect them to make sure they are indeed fit for purpose. You can start by opening them to do a visual check, but it is also always a good idea to open the attribute table and have a sense of how the information they contain is organized.

- Is there anything I should warn my final user about? Anything about how to read the map, any caveats regarding the data, its use, and its shareability?


2.0 Getting Started

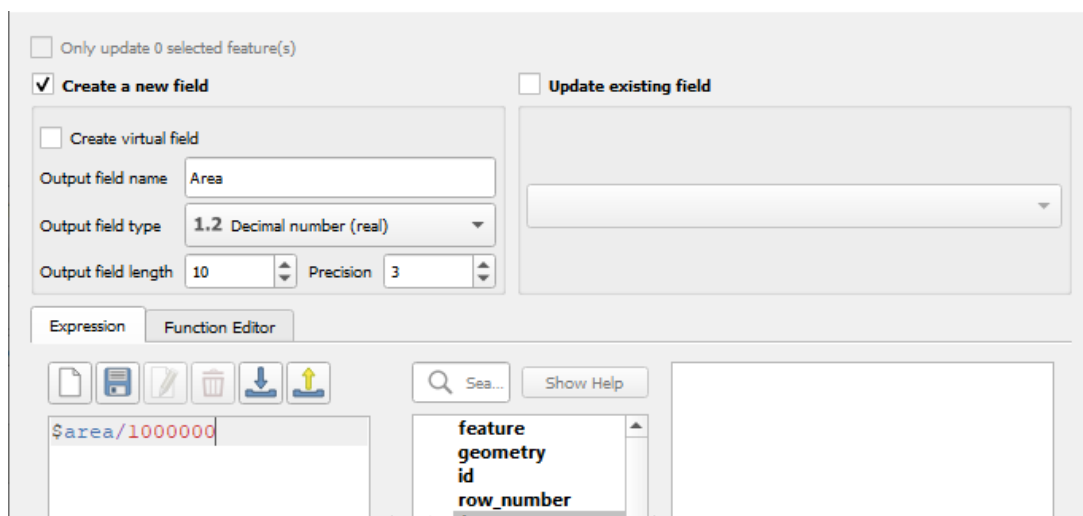
1. Let's hope you saved your work after Practical #3! Go to your **Population_Baseline_Map** in 3_Mapping\33_Map_Projects and open it up!
 - o Add the Admin 0 layer: wrl_admn_ad0_py_s0_un_pp_worldcountries in GIS\2_Active_Data\201_admn - it is always nice to have neighboring countries in a final product
2. **OR** Start a new project and add the following datasets:
 - o The Admin 0 layer for the world:
wrl_admn_ad0_py_s0_un_pp_worldcountries in GIS\2_Active_Data\201_admn - it is always nice to have neighboring countries in a final product
 - o The Admin 1 layer for the country:
dma_admn_ad0_py_s1_unocha_pp_parish in GIS\2_Active_Data\201_admn
 - o The Settlements layer: dma_stle_stl_pt_s3_osm_pp_settlements in GIS\2_Active_Data\213_stle
 - o The population values in the csv file: dma_popu_pop_tab_s1_wpp_2022.csv in GIS\2_Active_Data\212_popu
3. Go ahead and join the table to the Admin 1 dataset.
4. Spend some time choosing the appropriate symbology for the various datasets you added. You can refer to Practical 2 for symbology methods for the settlement data, such as filtering out settlements that are too small and choosing different symbology according to the size of the settlement.
5. Take a final moment to look at all of your symbology.
 - o Are you completely happy with how everything looks? Is the information clearly displayed? Can you differentiate between different items on the map?
 - o Make your final adjustments now. Remember to check and adjust the order of the layers. Should a layer be on top of another?
6. Before you move on to the next step, take a moment to save your project as **"Population_Baseline_Map"** in GIS\3_Mapping\33_Map_Projects.

3.0 Population by Administrative Divisions: Adjust by Area

With count data like population or households, it is advisable to adjust for the area. We will therefore adjust for the size of the **admin 1** area.


In order to calculate the area, it is best to work with a **projected coordinate system**, so we will set one for the project.

1. From the Project menu select **Properties**
2. In the Project Properties window click on **CRS** on the right-hand side. CRS stands for Coordinate Reference System. In the filter box enter “**UTM zone 20N**”. Select from the window displaying **Predefined Coordinate Reference Systems** the coordinate system that says **WGS84 / UTM zone 20N**
3. Click **Apply**
4. Click OK to close the Project Properties window
5. Open the attribute table for dma_admn_ad1_py_s1_unocha_pp_parish.shp (or the new dataset created with the Refactor fields tool) and click on  **Open field calculator** and select **Create a new field**. Set the **Output field name** to **Area** and **Output field type** to **Decimal number (real)** and the precision to 1
6. In the expression window type $\$area / 1000000$ - this is the command for calculating the area, in square kilometers.

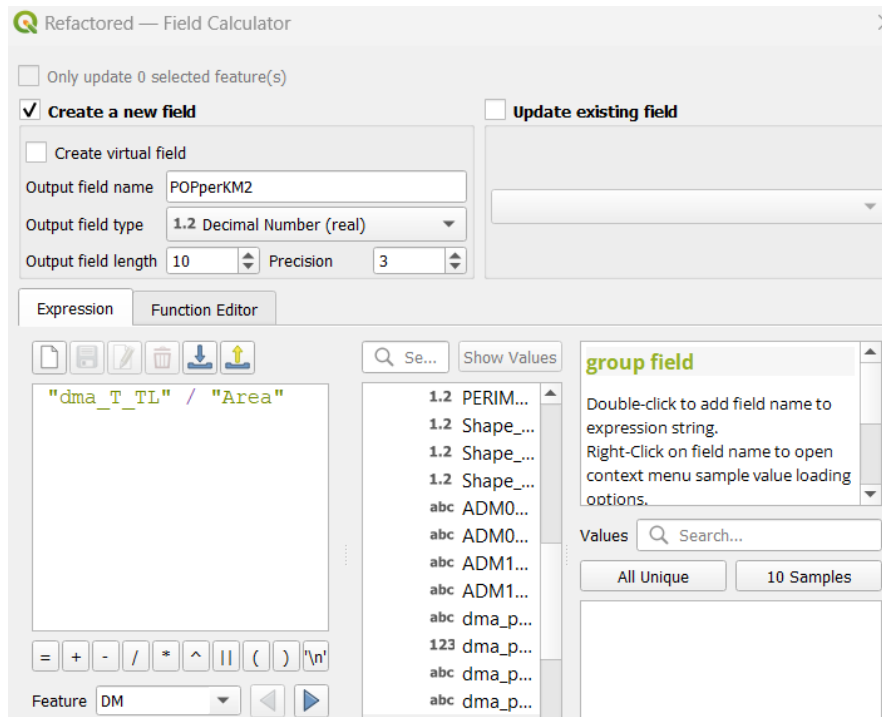


7. Click **OK**

Now that we have calculated the **area** we can create another new field into which we will calculate a new variable for **population per km²**.

8. Select **Create new field**, enter **POPperKM2** in **Output field name**, and select **Decimal number (real)** as **Output field type**.
9. Expand the options under **Fields and Values**
 - o Double-click '**dmaT_TL**' to add this to the expression
 - o Click 

- Double-click on **Area** to add this to the expression
- The expression should now read:
“**dmaT_TL**” / “**Area**”

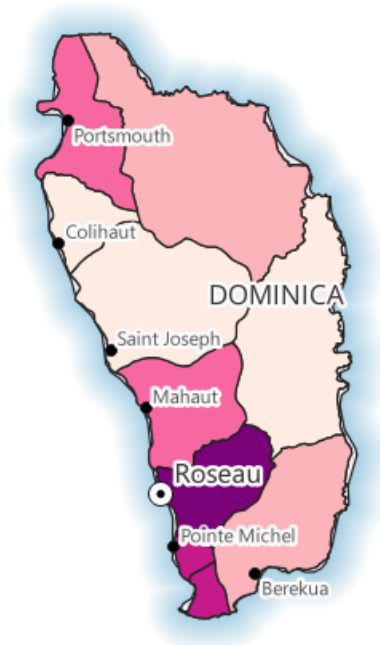


- Click **OK**
- Toggle Editing and Save edits

We will now change the symbology for the **admin 1** areas to show the population per square km.

10. Open the **Layer properties** window for the **admin 1** boundaries
11. In the **Symbology** options change the Value to **POPperKM2**
12. Click **Classify** then click **OK**

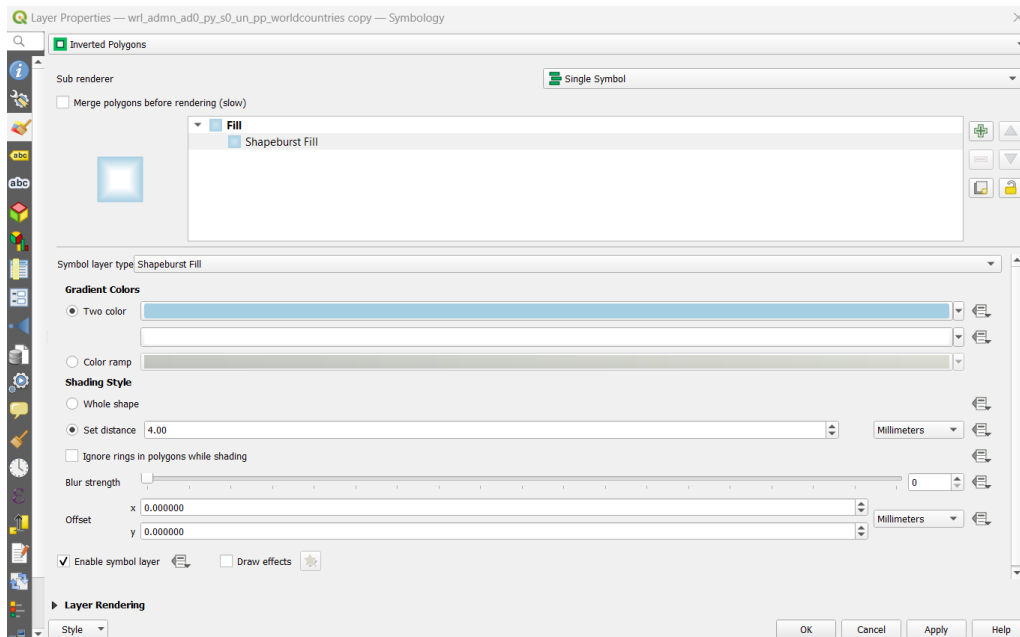
Notice that the pattern shown is now different. Smaller areas may now appear in a darker colour showing that they have a higher population density.



4.0 Reviewing and final aesthetics

You are almost done! Have a final look, and make sure all the information is clearly visible. Move the cities above the other layers, for example. One final, aesthetic option is to add a feather of water around the islands:

1. Right-click on the wrL_admn_ad0_py_s0_un_pp_worldcountries dataset and choose **Duplicate**. Make sure this copy is at the very bottom of the layers list.
2. Right-click on and find the **Symbology menu** for this duplicate layer in its **Properties** window.
3. At the very top, in the dropdown window, choose **Inverted Polygons**.
4. Click on **Simple Fill** under the **Fill option**, and find in the **Symbol layer type** dropdown the option **Shapeburst Fill**
5. As Gradient colors, choose light blue as the first color, and white as the second, and adjust the distance so that it is about 4 or 5 millimeters.



6. **Apply** and **SAVE!**

5.0 Population Baseline Map Layout

You are now ready to move onto the Map Layout workspace to create your map document.

1. If you previously saved a map document as a template - well done you! That saves a lot of time. You can find your template by clicking on **Project**, and then on **Layout Manager**. Under **New from Template**, choose your template!
 - You can now quickly edit the various map components, and complete the task!
2. If not, from the **Project** menu select **New Print Layout**. You will be prompted to enter a title. Click **OK**.

You can refer back to Practical # 4 to know how the Print Layout Workspace works and how to get to your final product.

6.0 Saving a project

Saving a project allows you to return to it later and continue working on it.

1. From the project menu select **Save**
2. If it is the first time saving the project, use the menu prompted by QGIS to save the project within the folder `..GIS\3_Mapping\33_Map_Projects` and change its name to call it "**Population_Baseline_Map.**"

7.0 Summary

In this session, you became familiar with how to work with population data and with different techniques you can apply to visualize it. You have also completed a full map project, that you can now share with colleagues and other responders, and that you can copy and use as a base for your next project.

Well done!