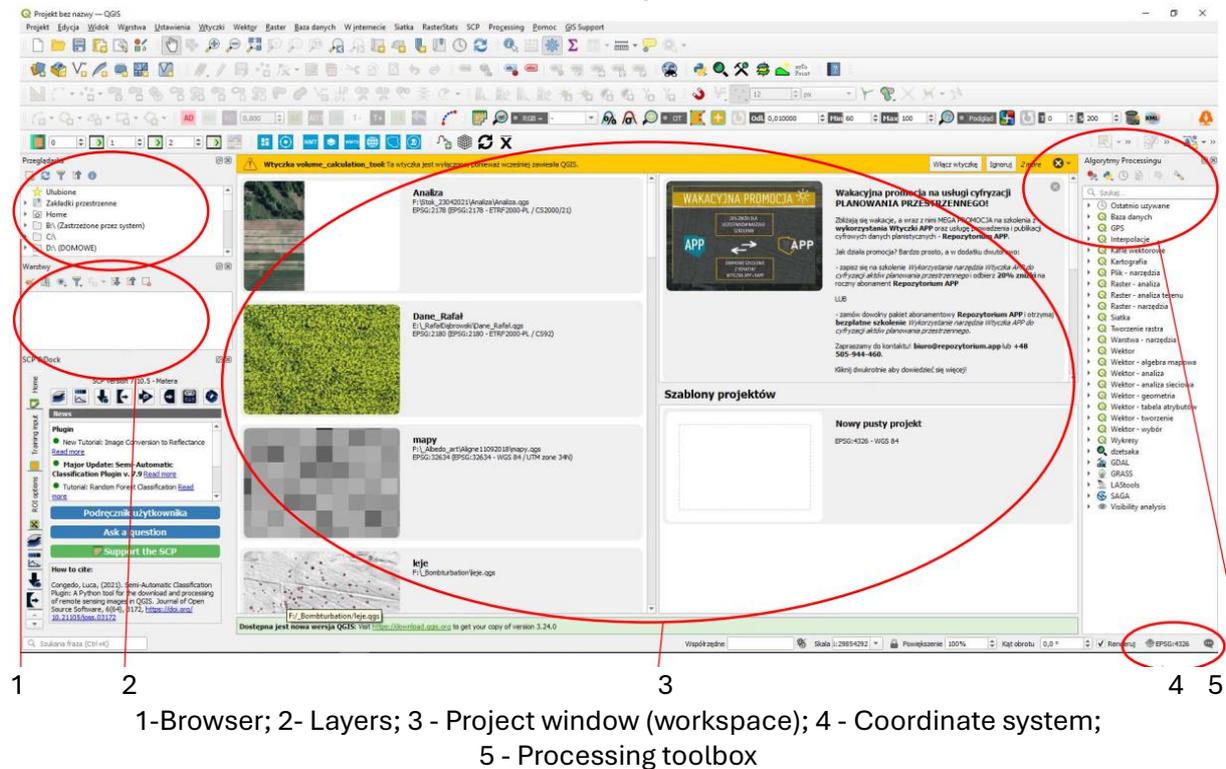


# Exercise 1

Topic: Creating and Managing Vector and Raster Data (QGIS, Loading and Saving Vector and Raster Data, Packing and Unpacking Data, 7-zip, Raster Properties and Its Features)

## 1. QGIS Interface

We turn on the QGIS application, and then the program window appears on the screen.

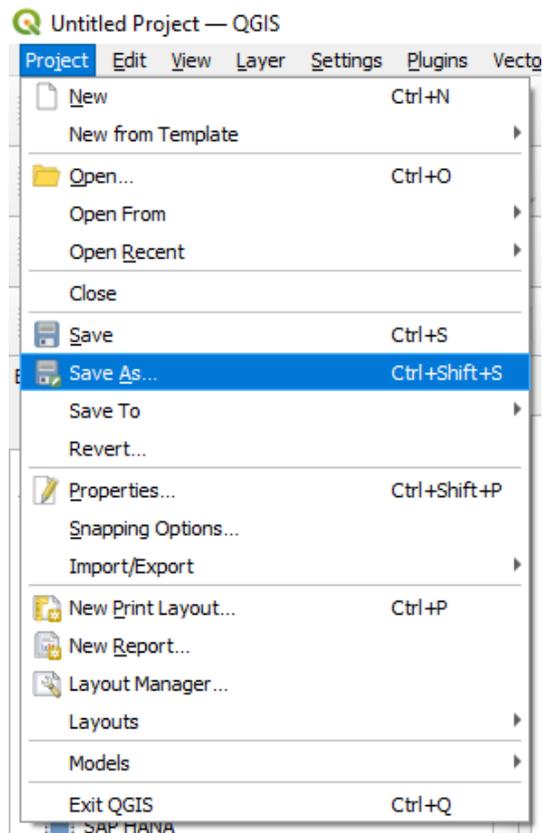


QGIS can be installed from <https://qgis.org/pl/site/forusers/download.html>  
Project property settings.  
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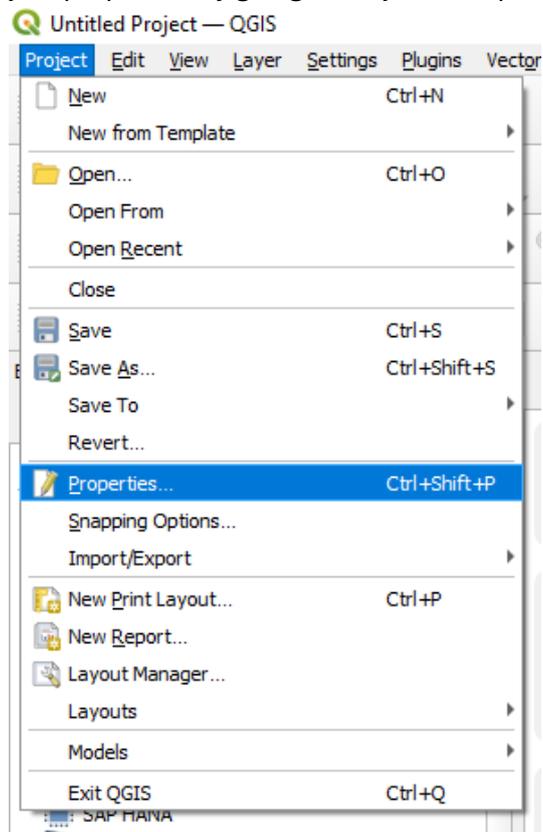
When working with QGIS software, you should pay attention to 3 facts:

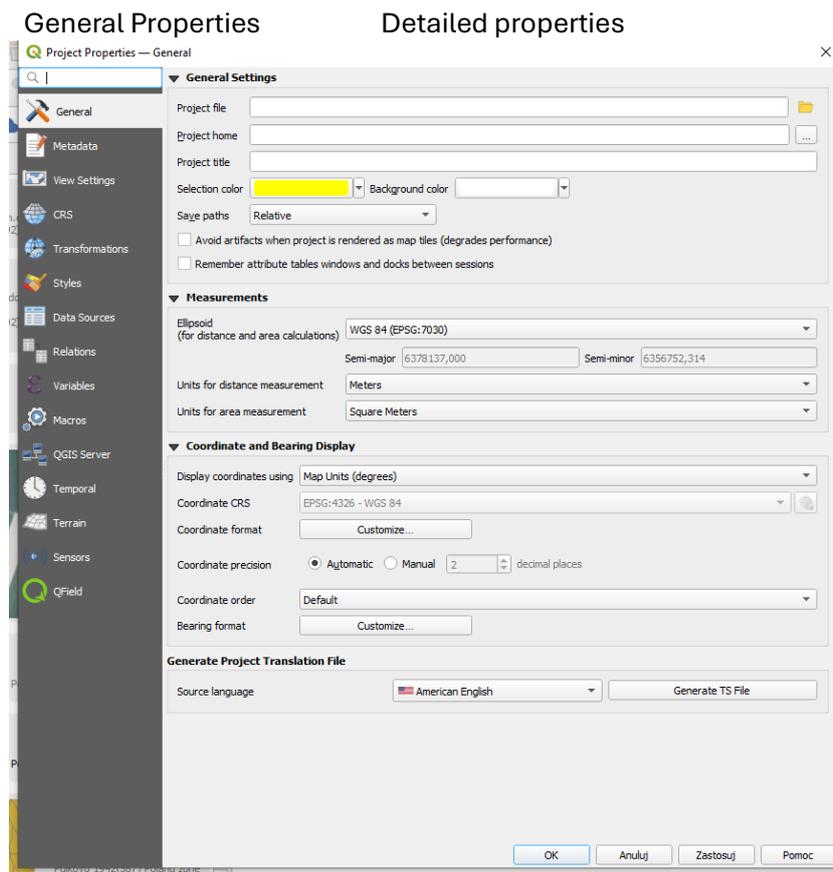
1. All data processed during the session is saved in the project. The project is a visualization of information contained in layers.
2. When saving the project, we save the location where the layers existing in this project are located, not the layers themselves.
3. We do not use Polish letters and names, or Polish names of directories.

We go to Project → save as my project.qgis



We will start setting the project properties by going to Project → Properties

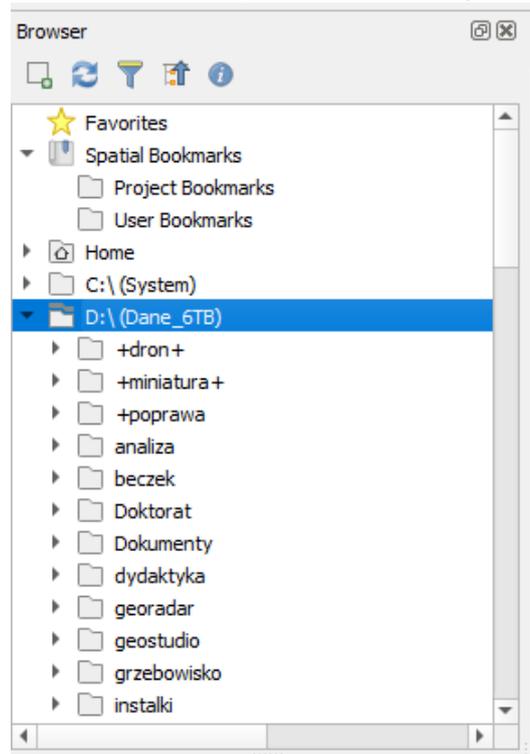




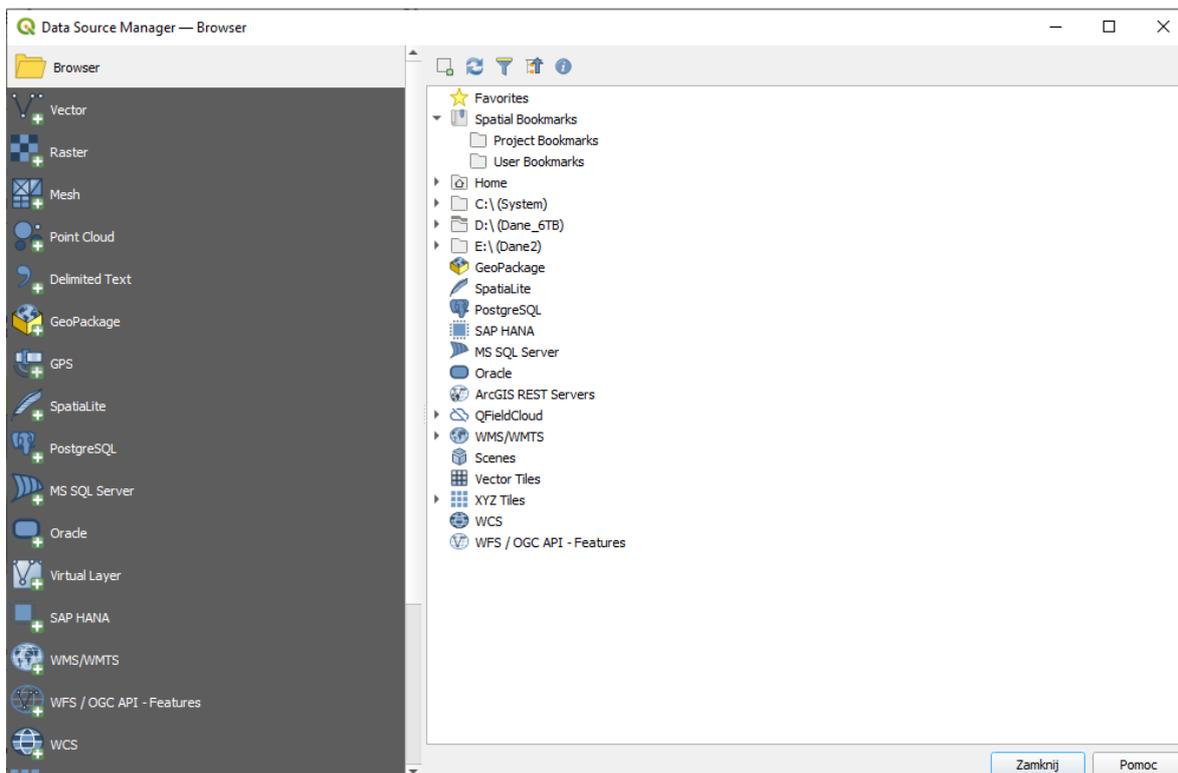
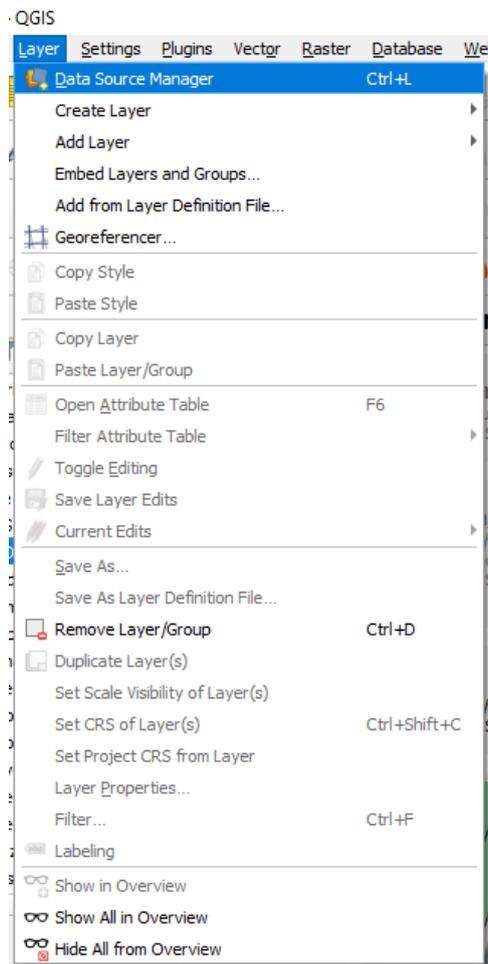
## 2. Loading vector data

Loading vector data can be done in several ways:

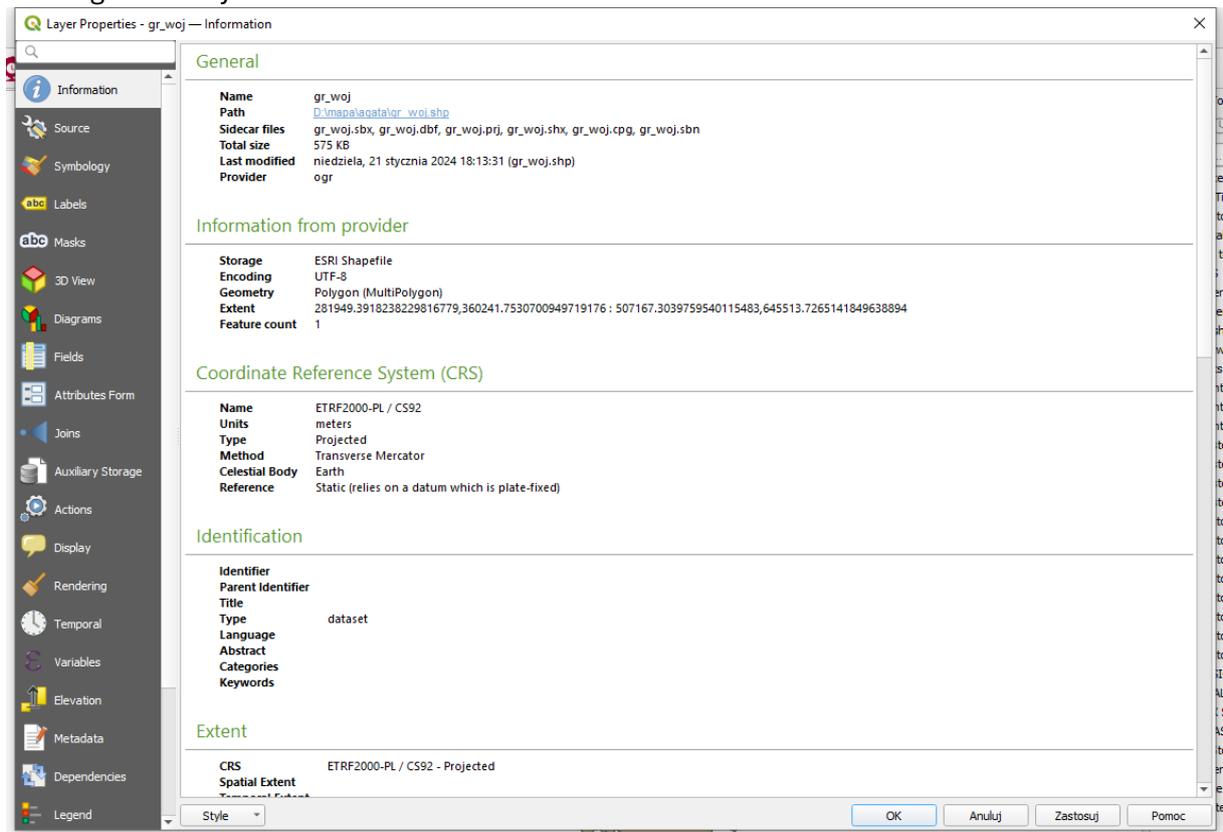
1. Drag method: involves dragging the \*.shp file onto the workspace
2. Finding the appropriate layer in the directory tree and opening the appropriate file



### 3. Open the data management window and select the appropriate option



Once the vector data is loaded, we can view its properties using the properties option by right-clicking on the layer.



## Task:

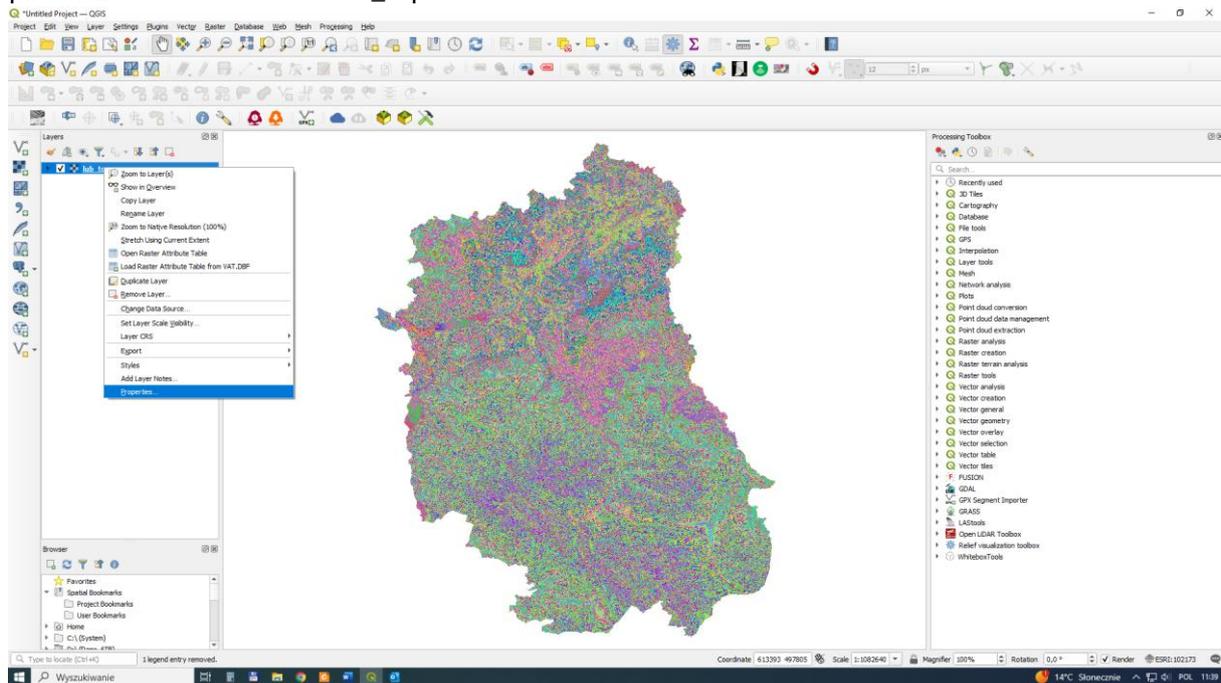
Load and read the properties of the vector layer granica\_lubelskie.

### 3. Wczytywanie warstwy rastrowej i jej właściwości.

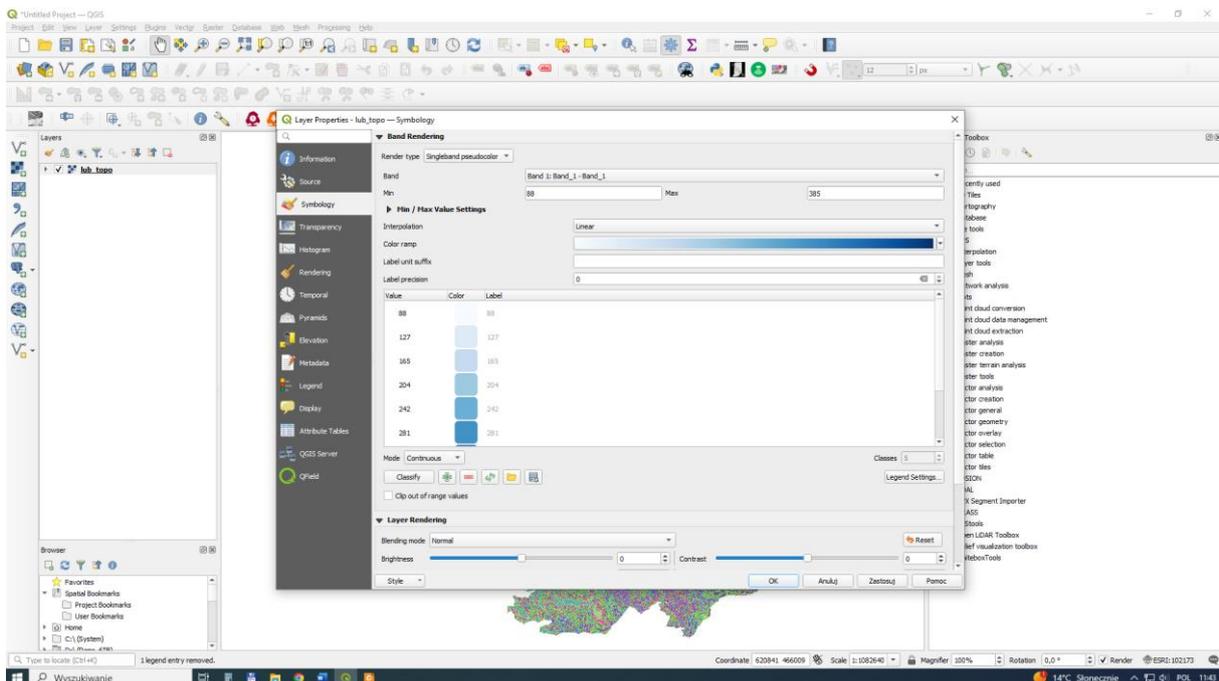
As with vector data, we can use three methods to import raster layers. Please load raster data from the raster directory file lub\_topo.tif.



Task: read the properties of the lub\_topo layer. Using the measure line , please set the pixel size in the raster file lub\_topo.

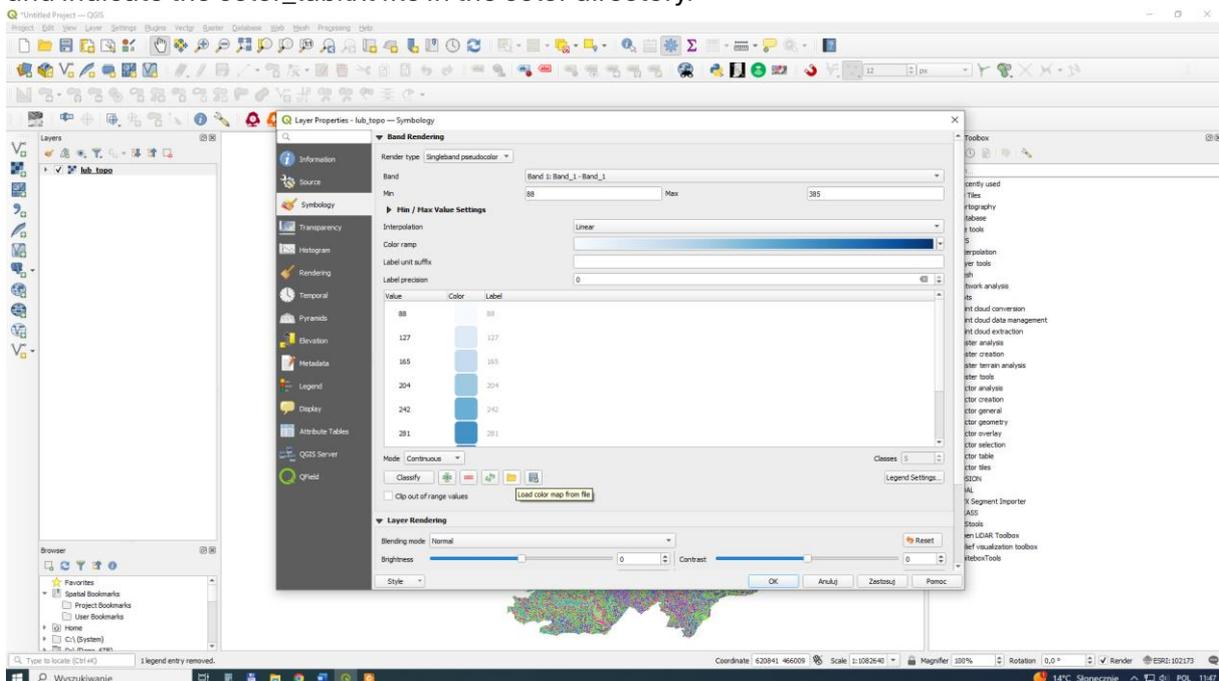


Go to layer properties → symbology and then set render type (the display method value) to singleband pseudocolor.

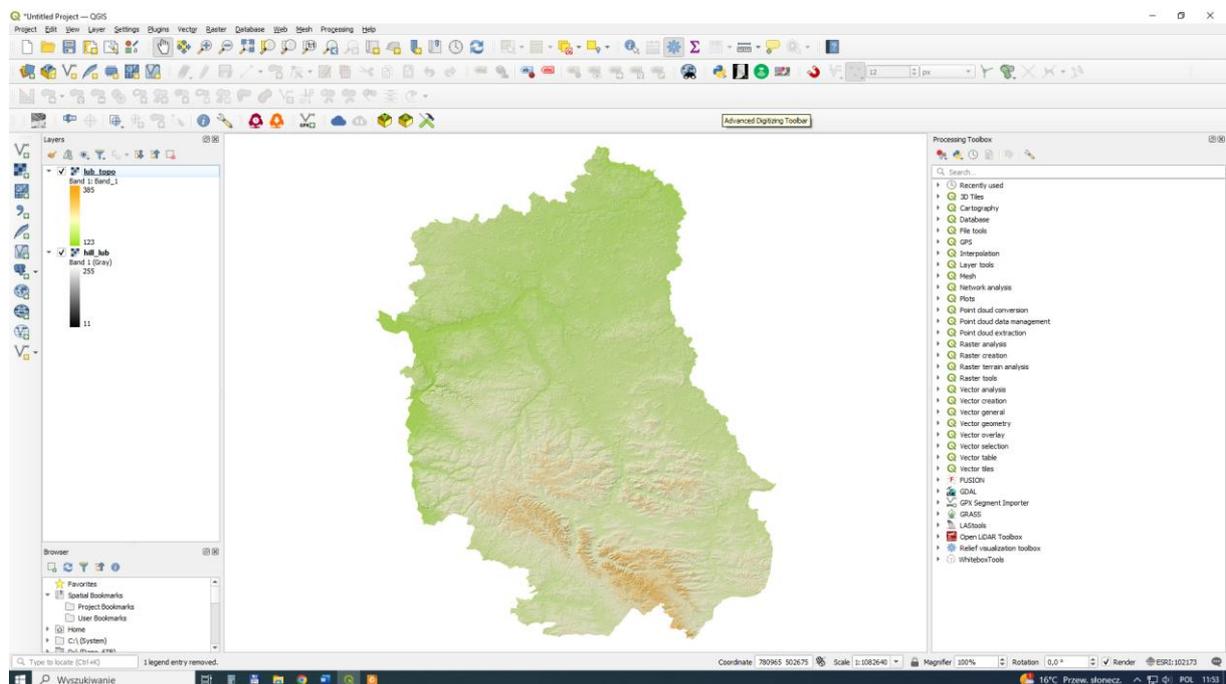
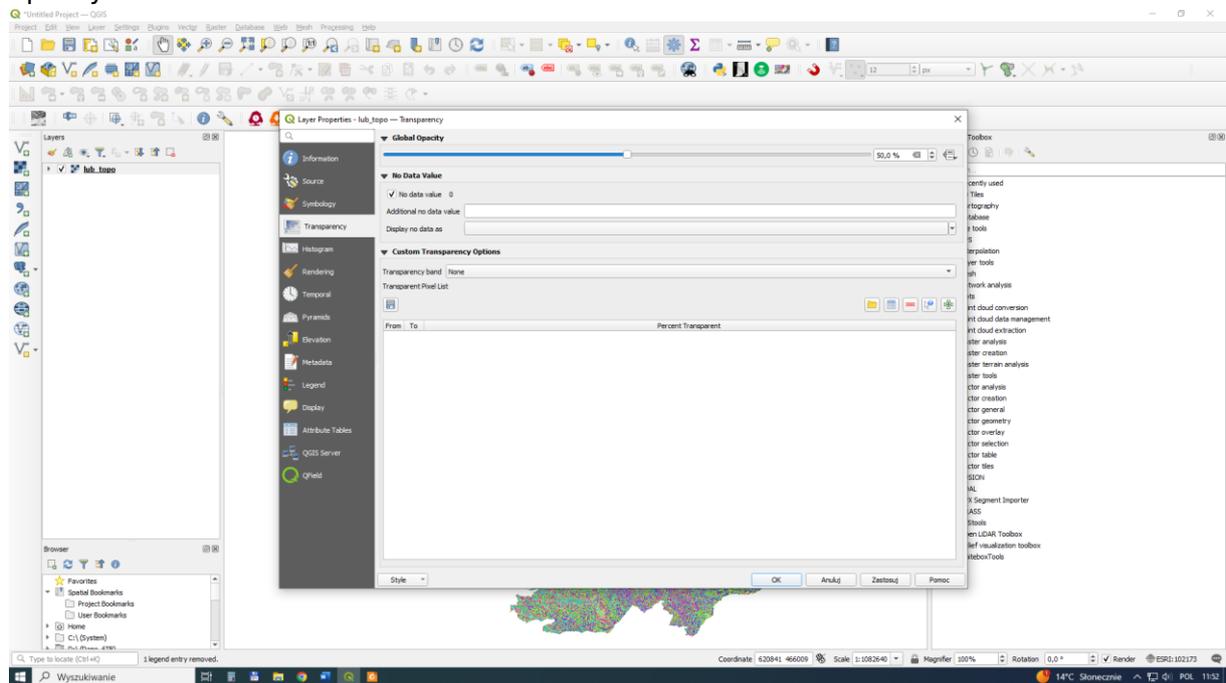


A color ramp appears at the bottom, which can be set to different color styles depending on your needs.

**Task:** Use three different color palettes and check how the information contained in the raster layer changes. In order to obtain repeatability of color schemes, you can create your own color system, save it to an .xml file and then load it into bases with similar features. Let's load the prepared color distribution for the Lublin province, select the load color map from file icon and indicate the color\_lub.txt file in the color directory.



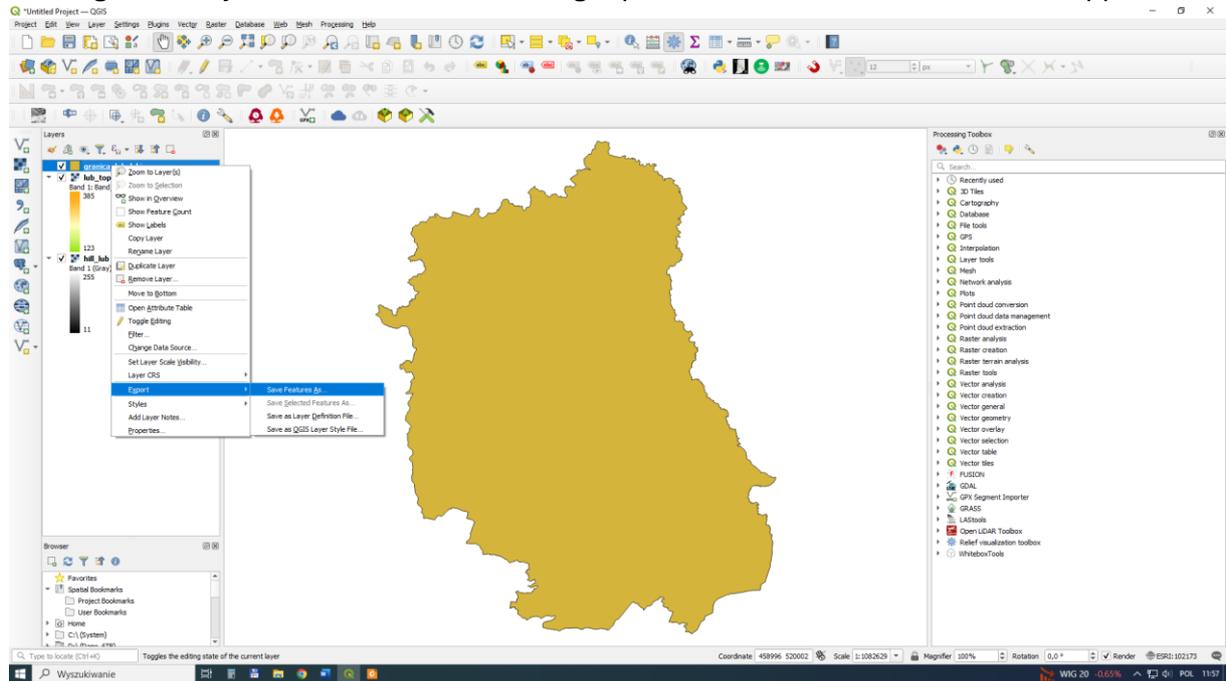
After placing the appropriate height ranges and adding the height ranges to them, we will obtain a hypsometric map of the Lublin province. In order to make the entire map more plastic, load the raster file `hil_lub.tif` from the raster directory. Place in order from the top: `lub_topo`, `hil_lub` and then set the transparency of the `lub_topo` layer to 50% in the transparency tab and the global opacity slider.



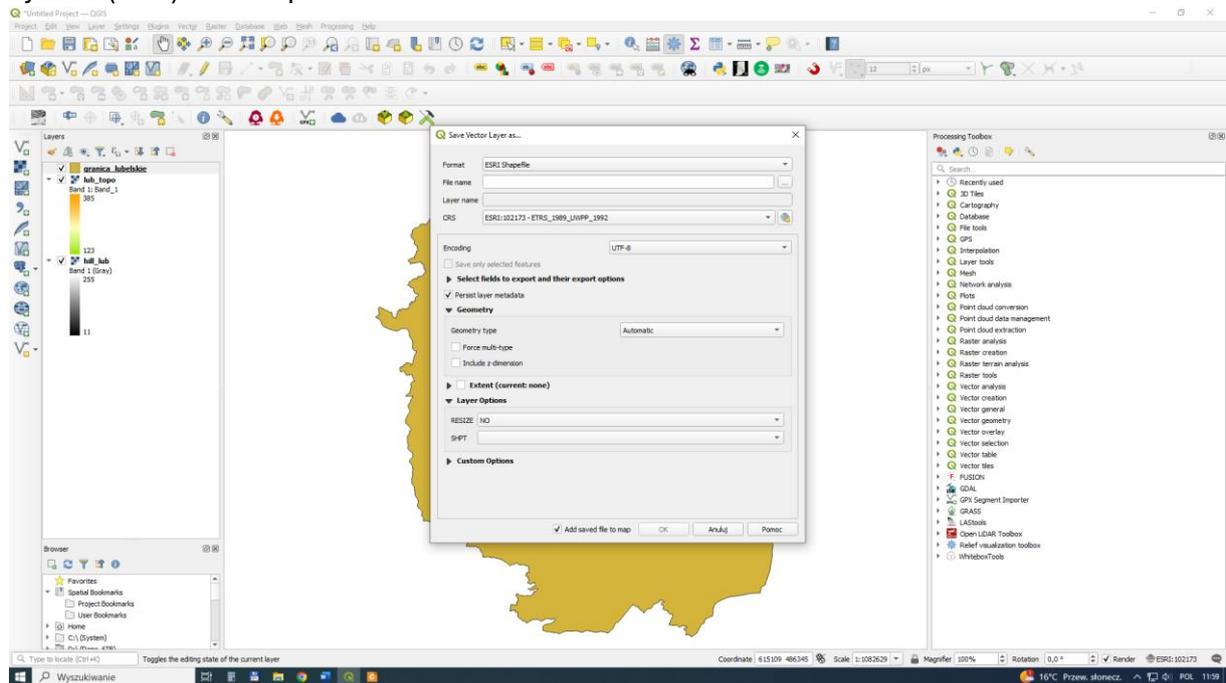
**Task:** Answer the question for what purpose can opacity settings be used and what optimal opacity level should be set when we want to read information from the layer below. Set the opacity value to 10, 30, 80 and 100% and compare the results in the viewport.

## 4. Saving vector and raster data

Saving data can be done in several ways. Vector data can be saved via layer → save as or right-clicking on the layer to be saved and selecting export → save features as and a menu appears,

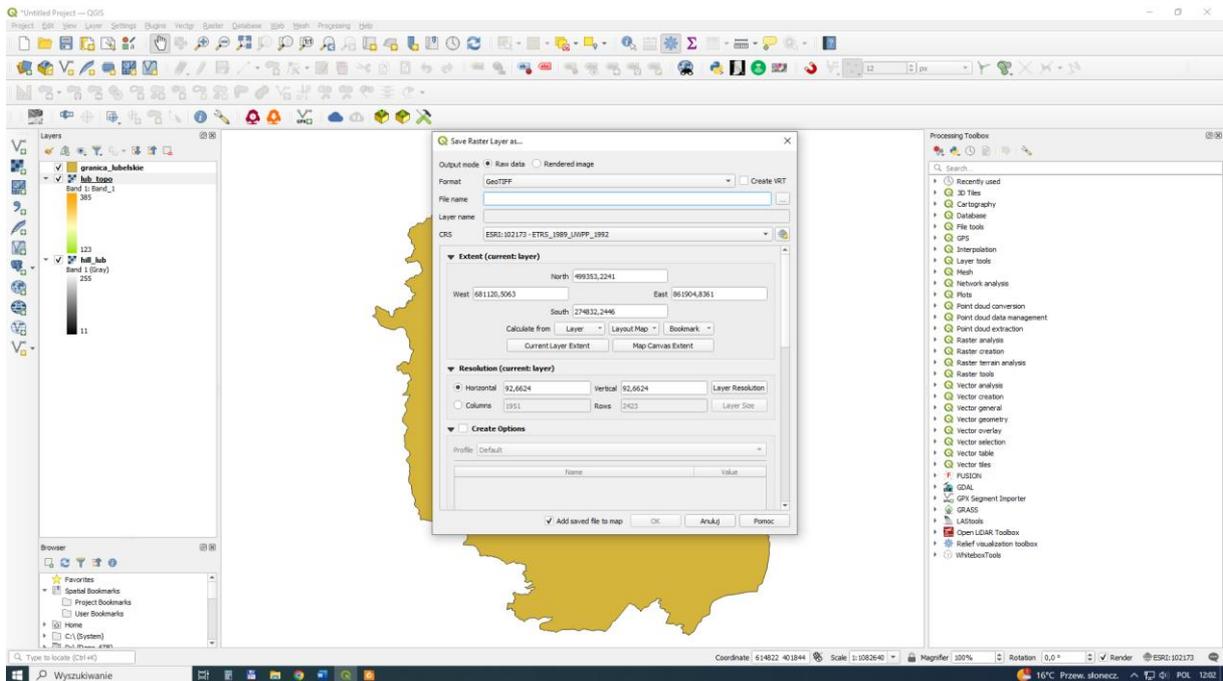


where you can set the most important features of the new layer: format, name, coordinate system (CRS) and the place where it will be saved.



After completing all the details and confirming, the new layer will be loaded into the view window and the layers window.

You can save a raster layer in a similar way: via layer→save as or by right-clicking.



In this case, however, in addition to the format, name and coordinate system, we can also set the imaging extent and resolution of the output image.

**Task:** Based on the border\_lubelskie layer, export data to the .shp format named last name\_GR\_lubelskie. Export the lub\_topo file to the layer named last name\_lubTopo in two formats: TIFF and Erdas Imagine (.img), then compare the amount of space they take up on the disk. Please save the lub\_topo layer in a "shortened" version in a TIFF file by zooming in to the part marked in red and selecting the map view range option in the window. Please name this layer Roztocze.tiff.

