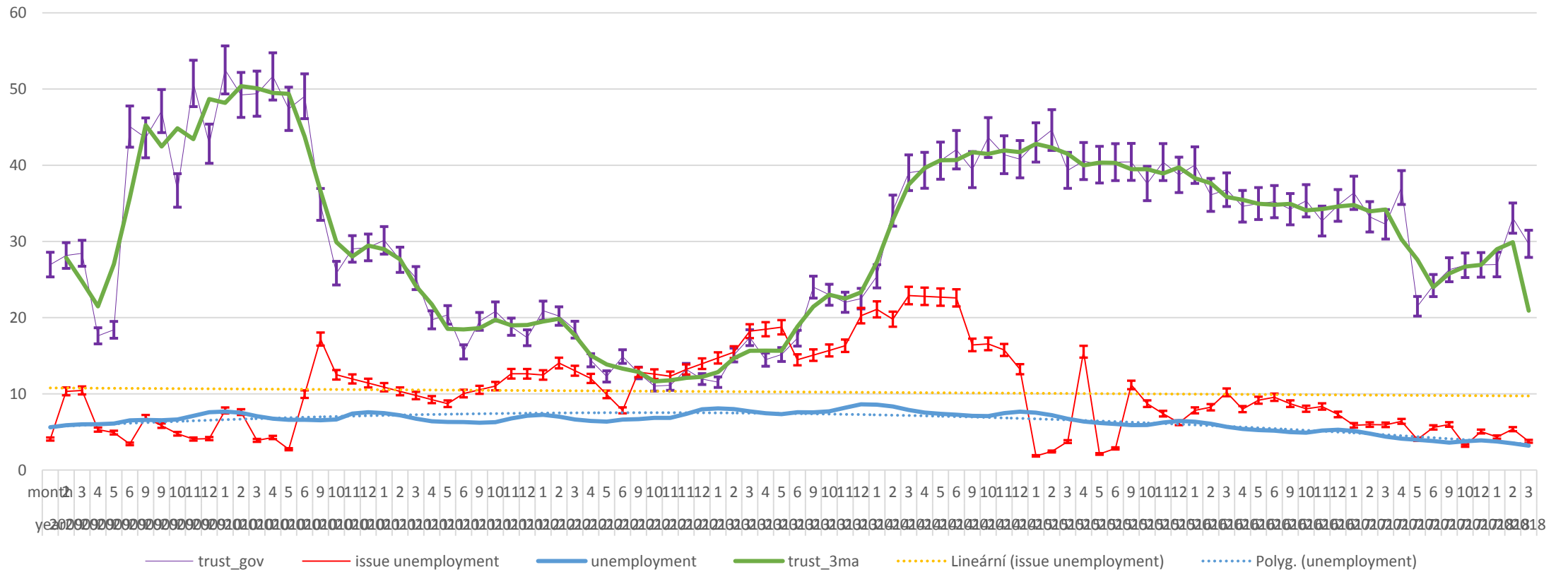
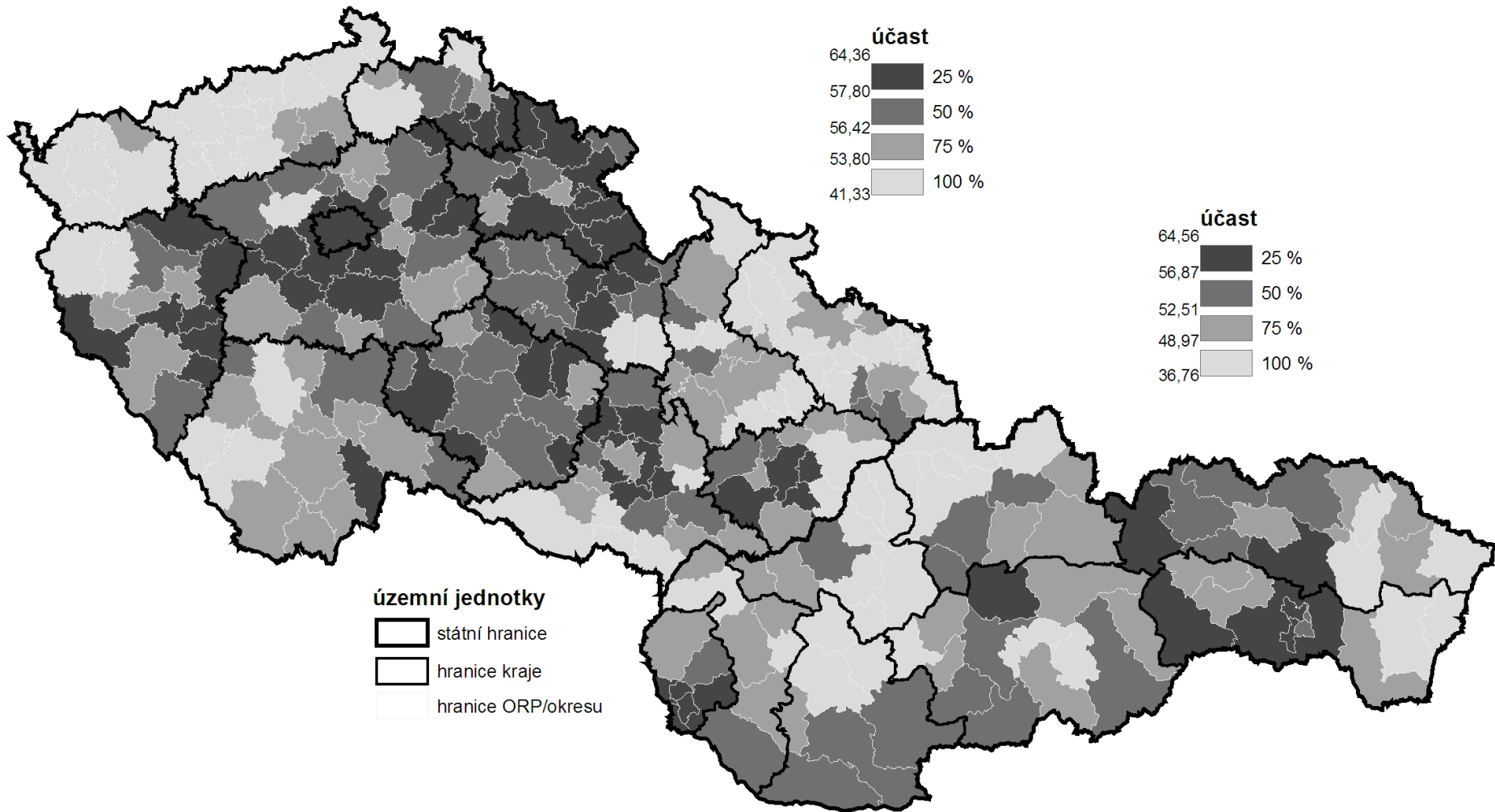


Visualization of spatial data

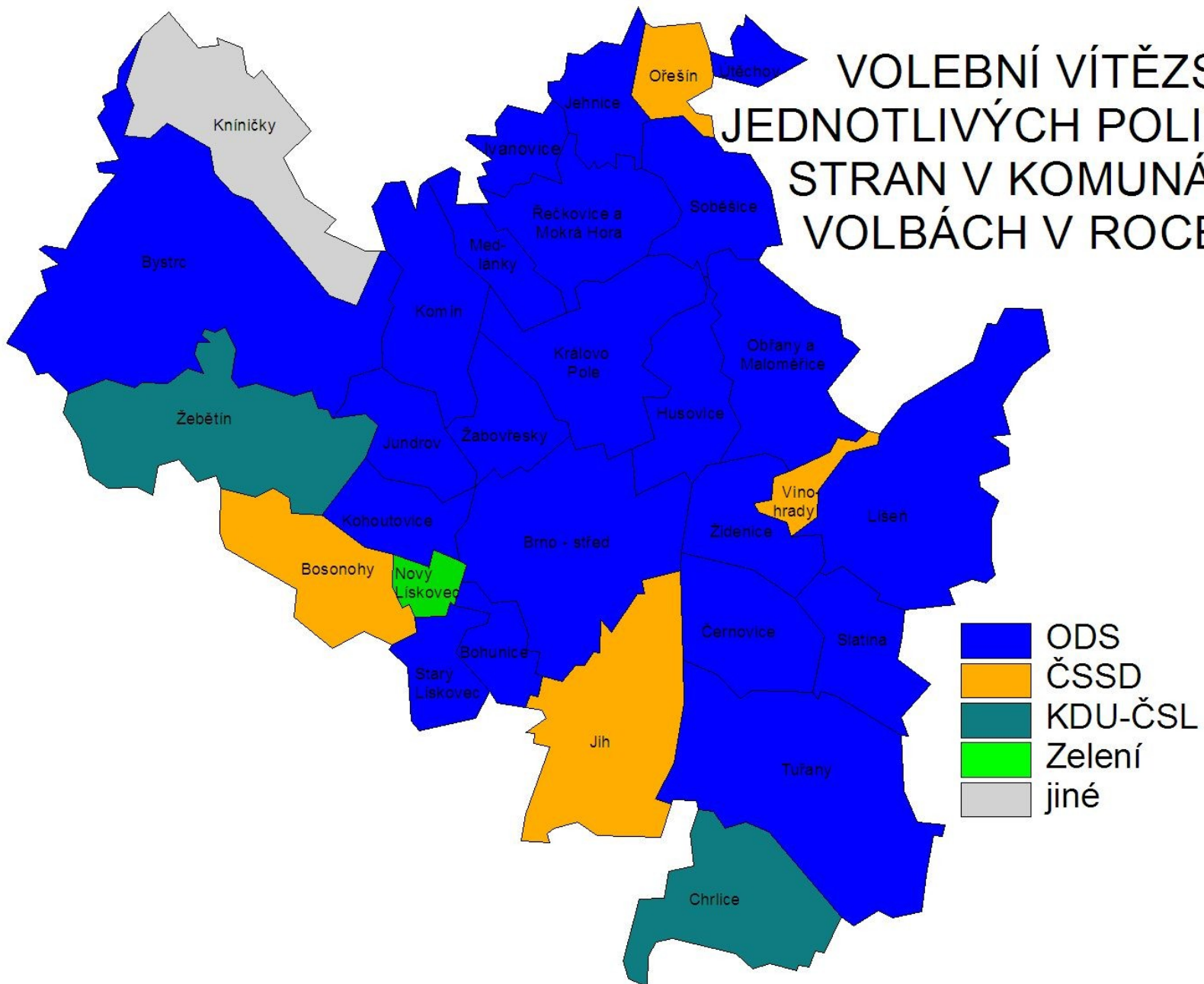
Název grafu



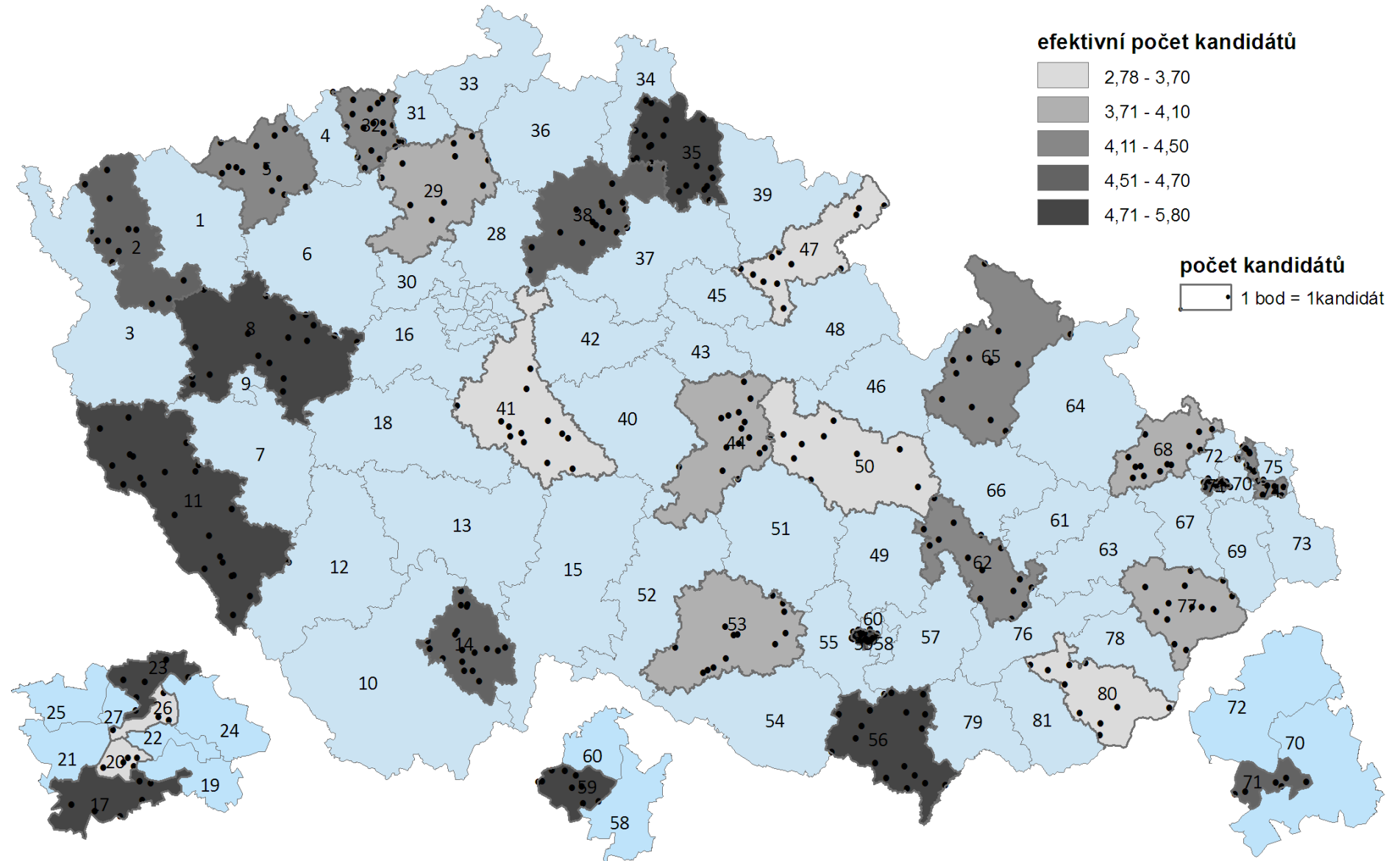
VOLEBNÍ ÚČAST V REFERENDU V ROCE 2004



VOLEBNÍ VÍTĚZSTVÍ JEDNOTLIVÝCH POLITICKÝCH STRAN V KOMUNÁLNÍCH VOLBÁCH V ROCE 2006



POČET A EFEKTIVNÍ POČET KANDIDÁTŮ V 1. KOLE VE VOLBÁCH DO SENÁTU V ROCE 2000



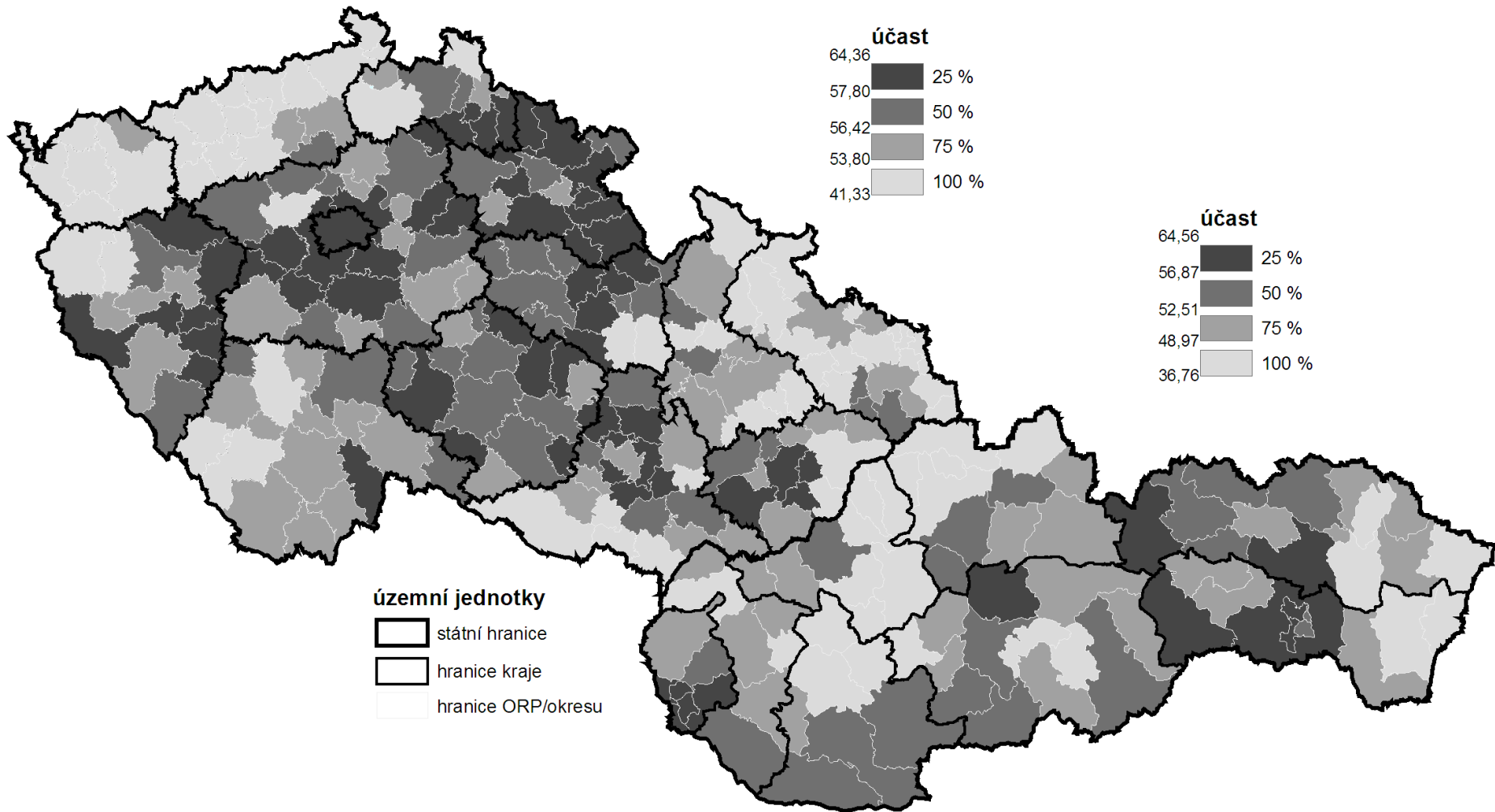
Two types of variables (spatially)

- Just related to some space
 - GDP by country - it is not equally produced on whole territory
 - It is just related to territory
 - Choropleth maps
- Truly spatial
 - The data are describing some exact location
 - Dot maps
- The difference between categorical and cardinal variables are also important

Rules of using colors

- Different categories (e.g. Winnig party)
 - Different colors (e.g. blue, red, green, etc.)
- Different quantity (e.g. Electoral turnout)
 - Different shades of the same color (e.g from light blue to dark blue)
 - The higher intensity of variable, the darker the color is

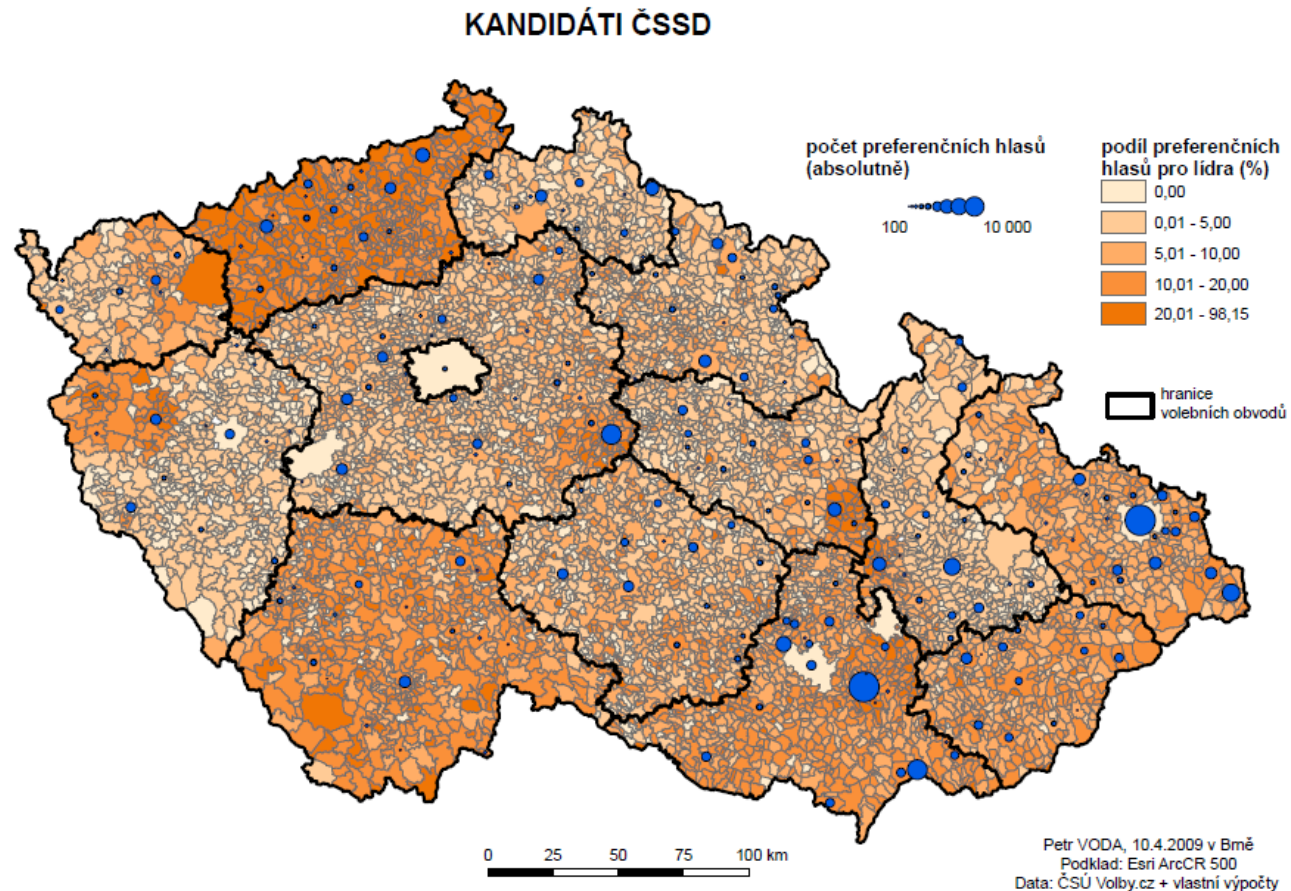
VOLEBNÍ ÚČAST V REFERENDU V ROCE 2004



Rules of creating intervals

- Equal interval (eg. 0-10,10-20, 20-30,...)
- Quantile – in all intervals, number of cases is the same
- Natural breaks – unclear meaning

It is possible to combine cartographic visualization with piechart or barchart



What is needed

- Data related to some spatial structure
 - Level of democracy in countries
 - Unemployment in municipalities
 - Number of parking places in streets
- Or to places itself
 - Location of candidates homes
 - Location of armed clashes during conflict
 - Location of powerplants
 - How tall trees growing on their exact places are?
 - ...

An empty map

- The cartographic feature representing given spatial structure
 - Shapefiles
 - Contain information about coordinates
 - Contain information related to coordinates
 - Contain information about how the map should look
-
- Practically: it consists of about 6 different files, all of them must remain in the same folder

Where to find empty maps?

- <https://www.diva-gis.org/Data>
- <https://geodata.lib.utexas.edu/>
- <https://datacatalog.worldbank.org/search/dataset/0039368>

- Open street map

Important things about empty maps

- Geographic projection
- The same country looks very differently in different projections
- The proper projection has to be selected
- It is possible to set it in software

A key between map and data

- Something which tells us that the data belongs to units drawn in map
- It has to be exactly the same in map and in data
- Full names are not best options (e.g. United Kingdom x Great Britain, Czech Republic x Czechia)
- Standardized Ids
- Usually available for any level of administrative units
- Municipalities, counties, regions, states
- Often available in official statistics

Spatial key

- The data can be connected by the location
- The coordinates of data has to be available
 - Or it must be data already in form of shapefile
- How many candidates live in certain area

- The map of mentions of places within book (check dubliners by james joyce)

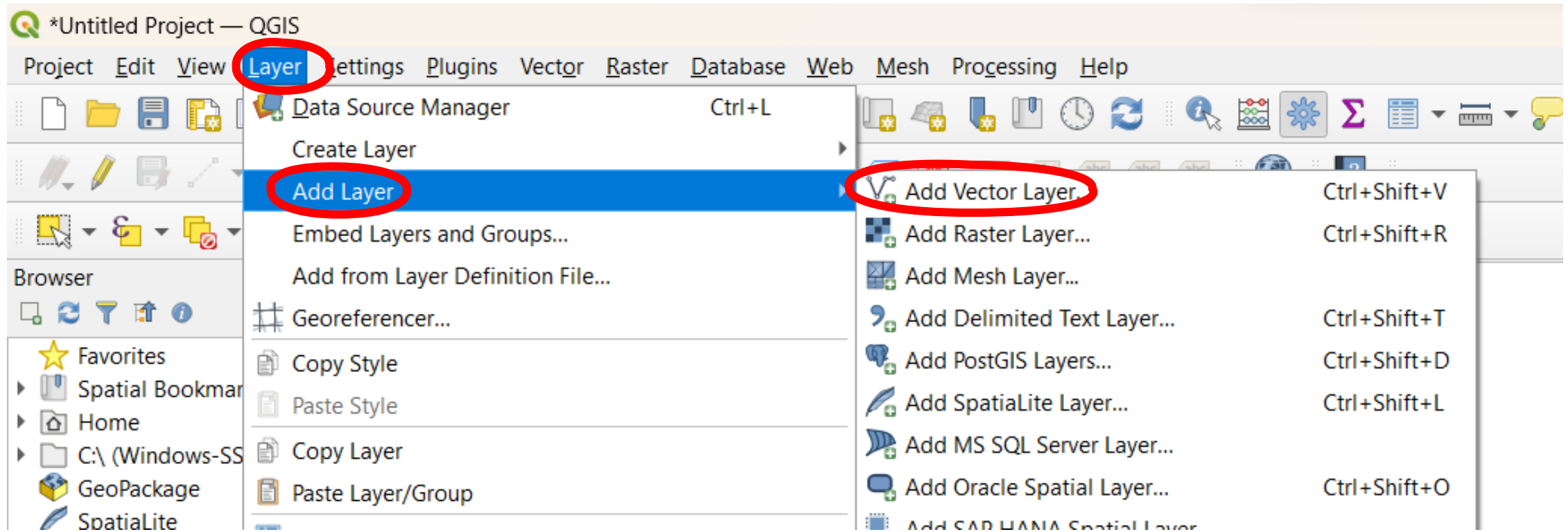
Example of pledges from local electoral manifesto

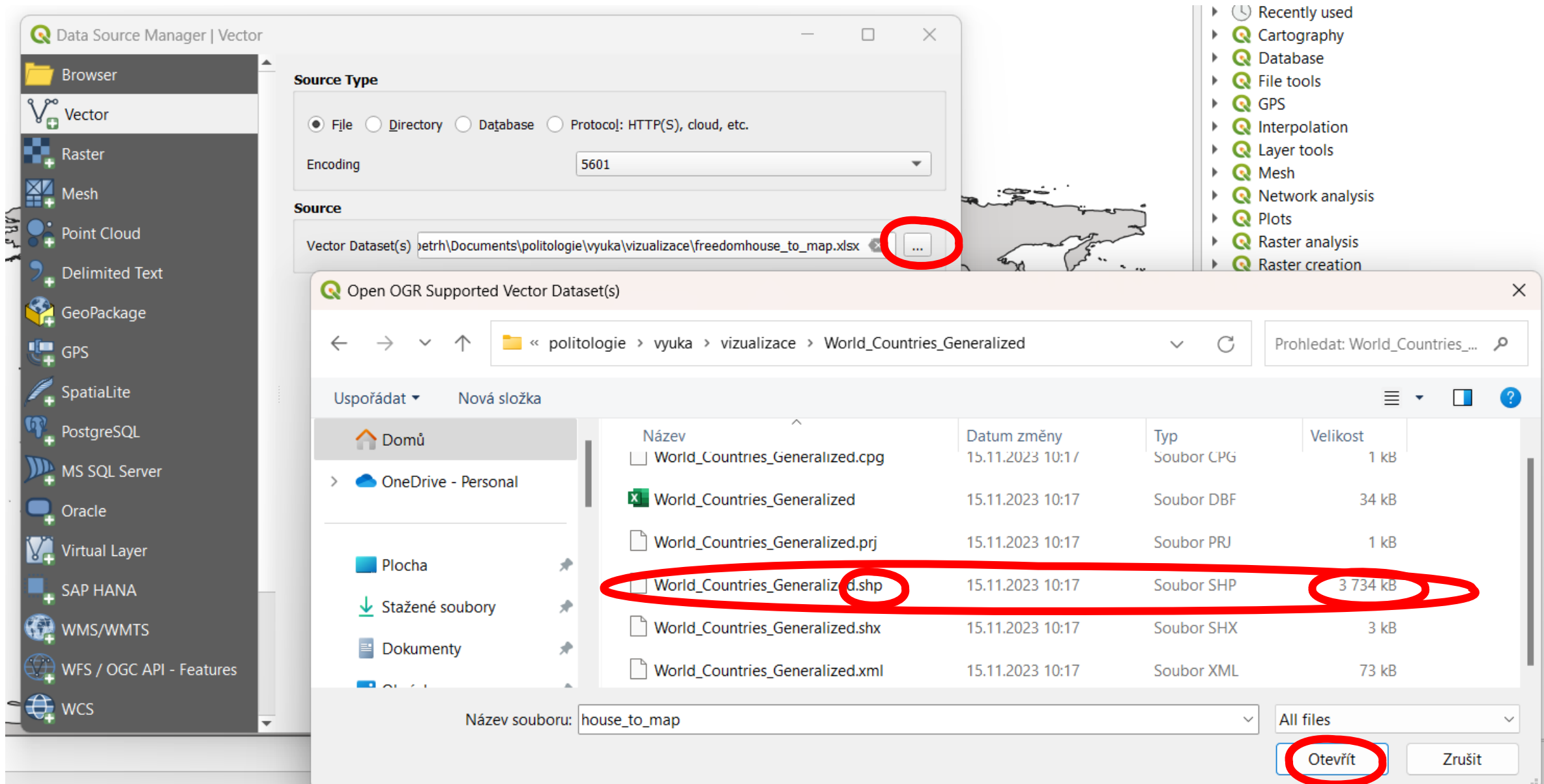
- Parties in local elections often promise the change of ceratain locations
- repair of streets or pawments
- Building of playgrounds
- Reconstructions of public buildings
- These locations can be drawn in map

software

- ArcMap
- QGis

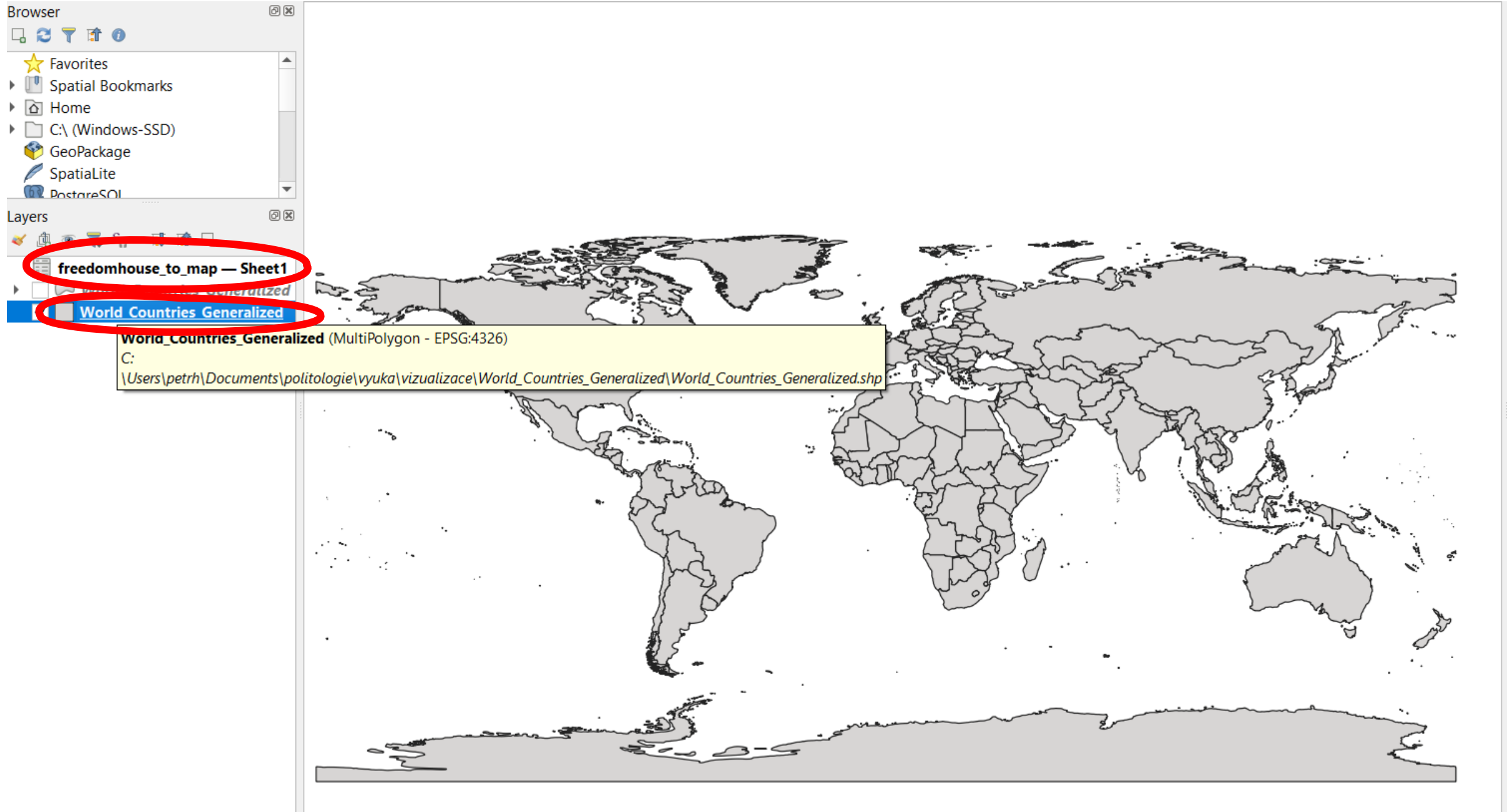
What to do in software – add empty map



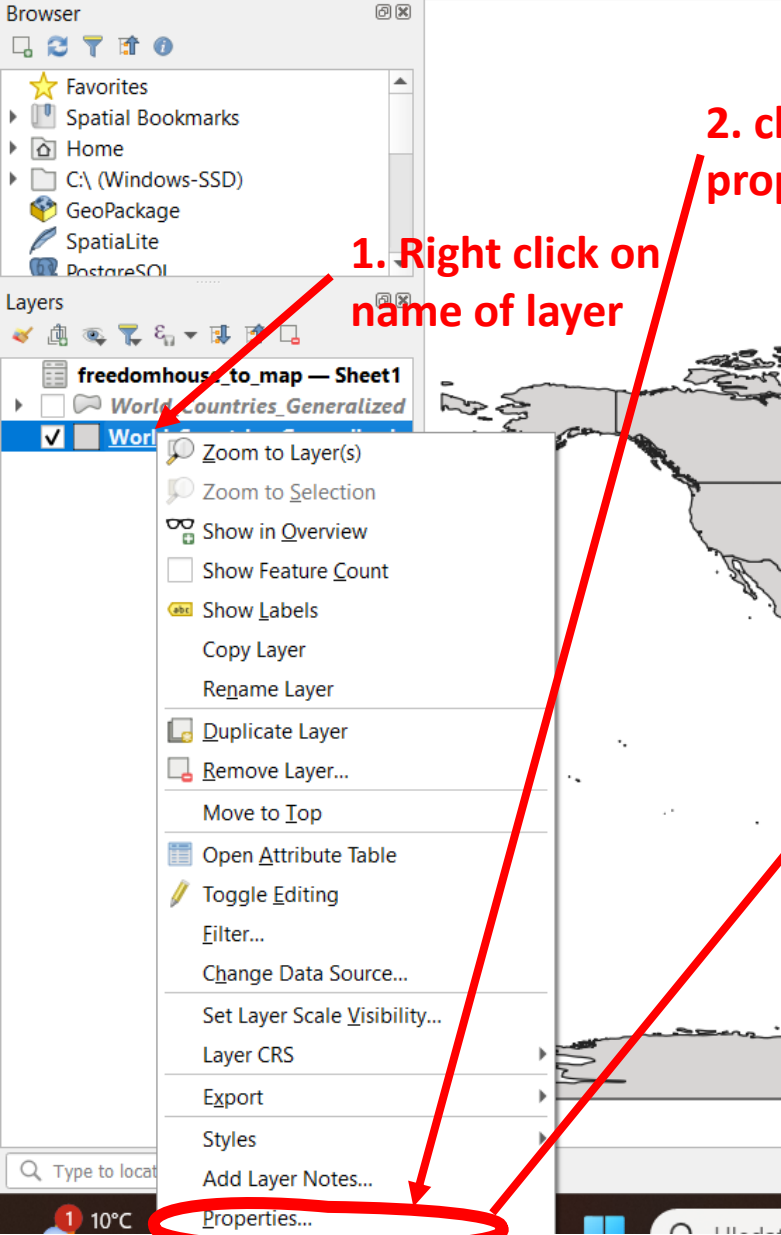
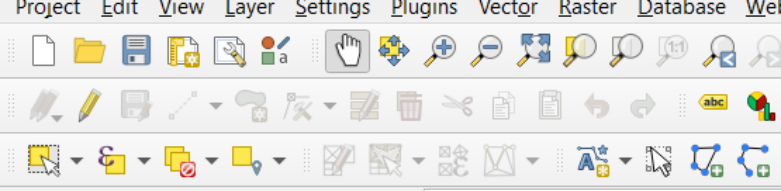


- The same procedure to add excel table with data
- (Layer - > Add layer -> Add vector layer
in row „Source“ click on three dots at the end of row and find the table in computer)

The qgis environment with added layers

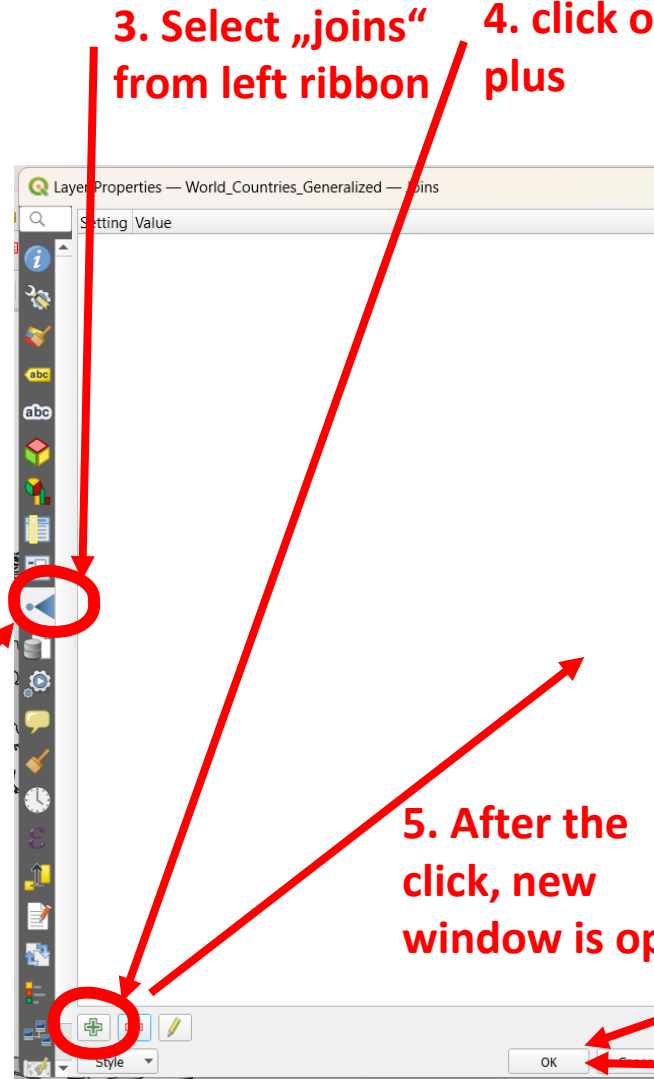


Join data from table to map



1. Right click on name of layer

2. click on properties



3. Select „joins“ from left ribbon

4. click on green plus

6. Select layer to join to map (table)

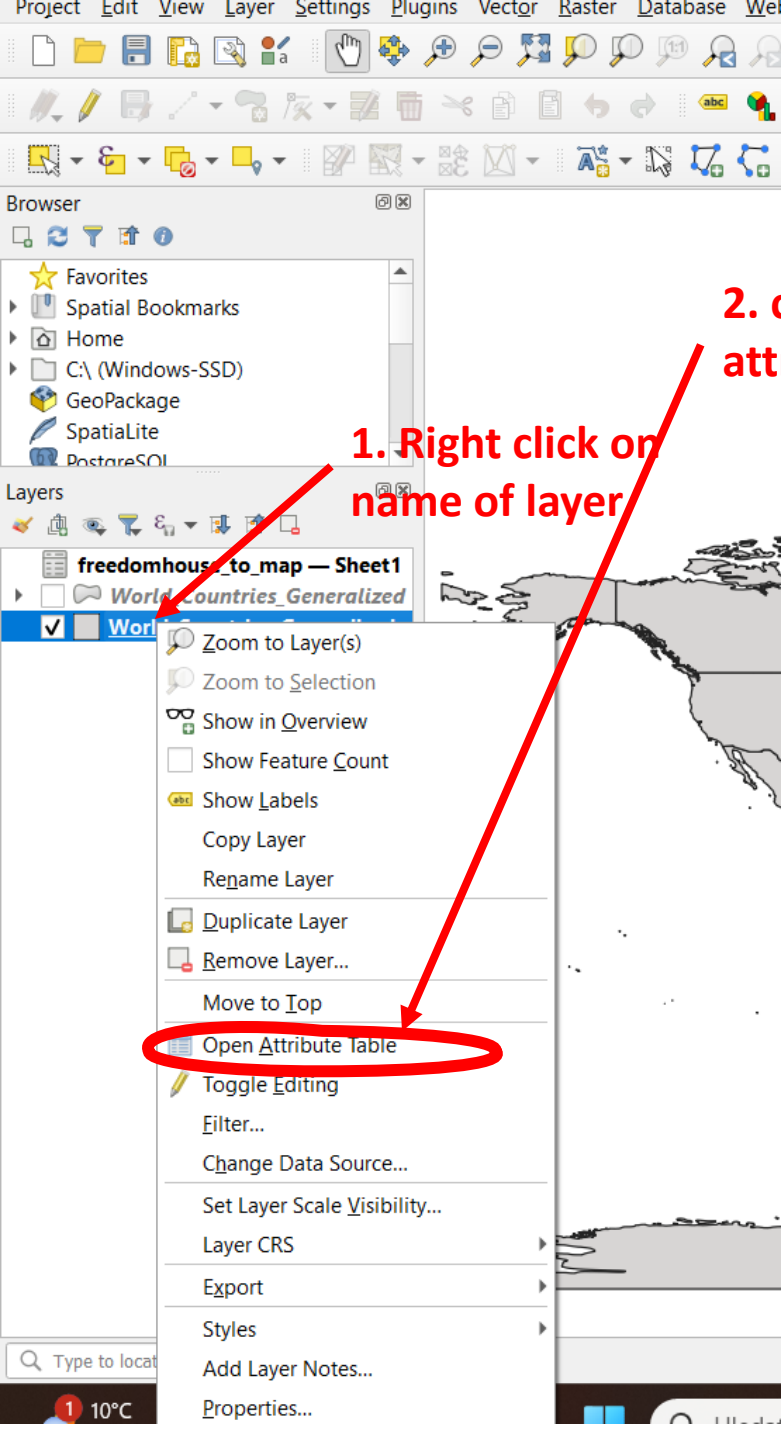
7. Select column in table serving as key

5. After the click, new window is open

7. Select column in map serving as key, names can be different but the map and table has to contain same codes for same territories (but their number can differ)

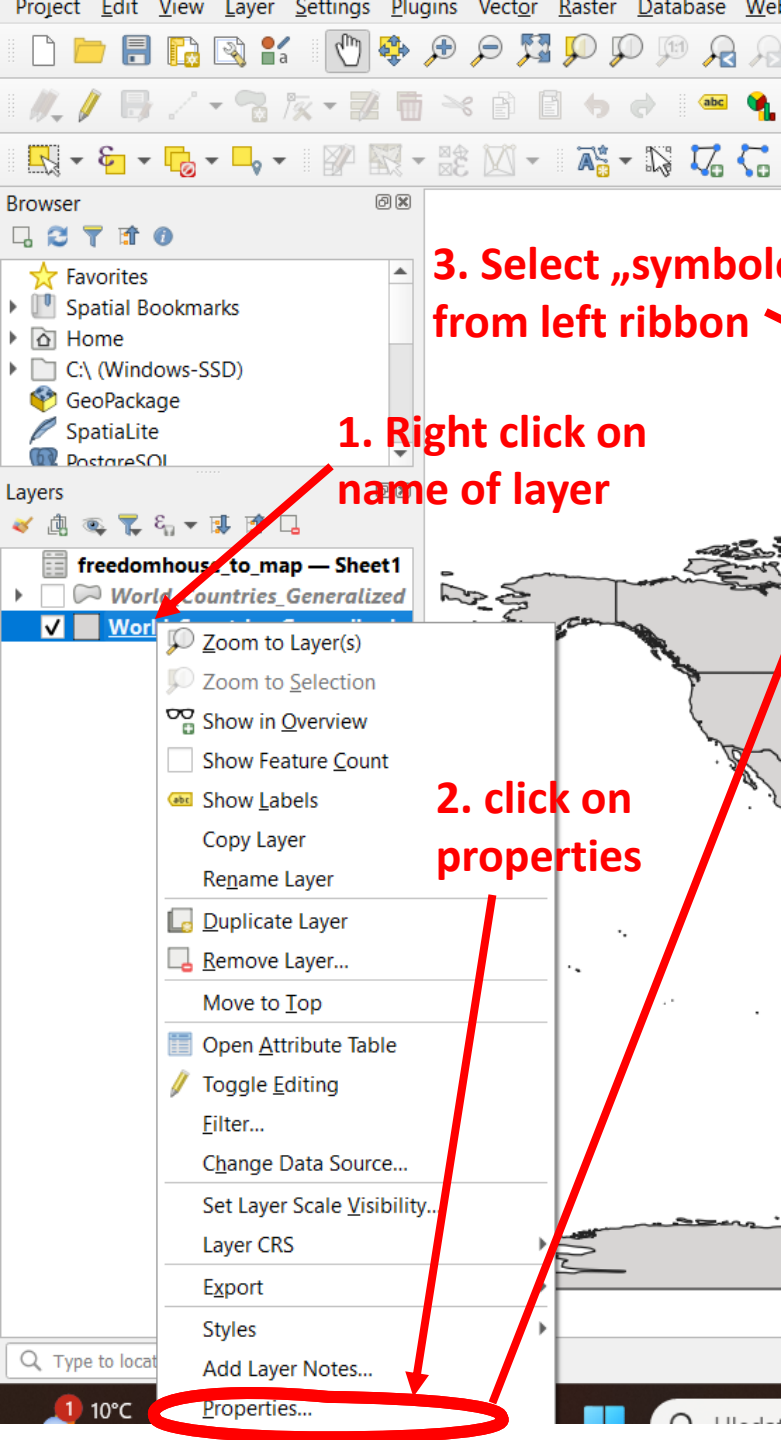
9. Click on OK

8. Click on OK



- You can check the join by checking attribute table
- New columns are at the end of table
- Their names contains name of table (in this case *freedomhouse_to_map - sheet1* and original names of columns
- There is no new layer, everything is in current map

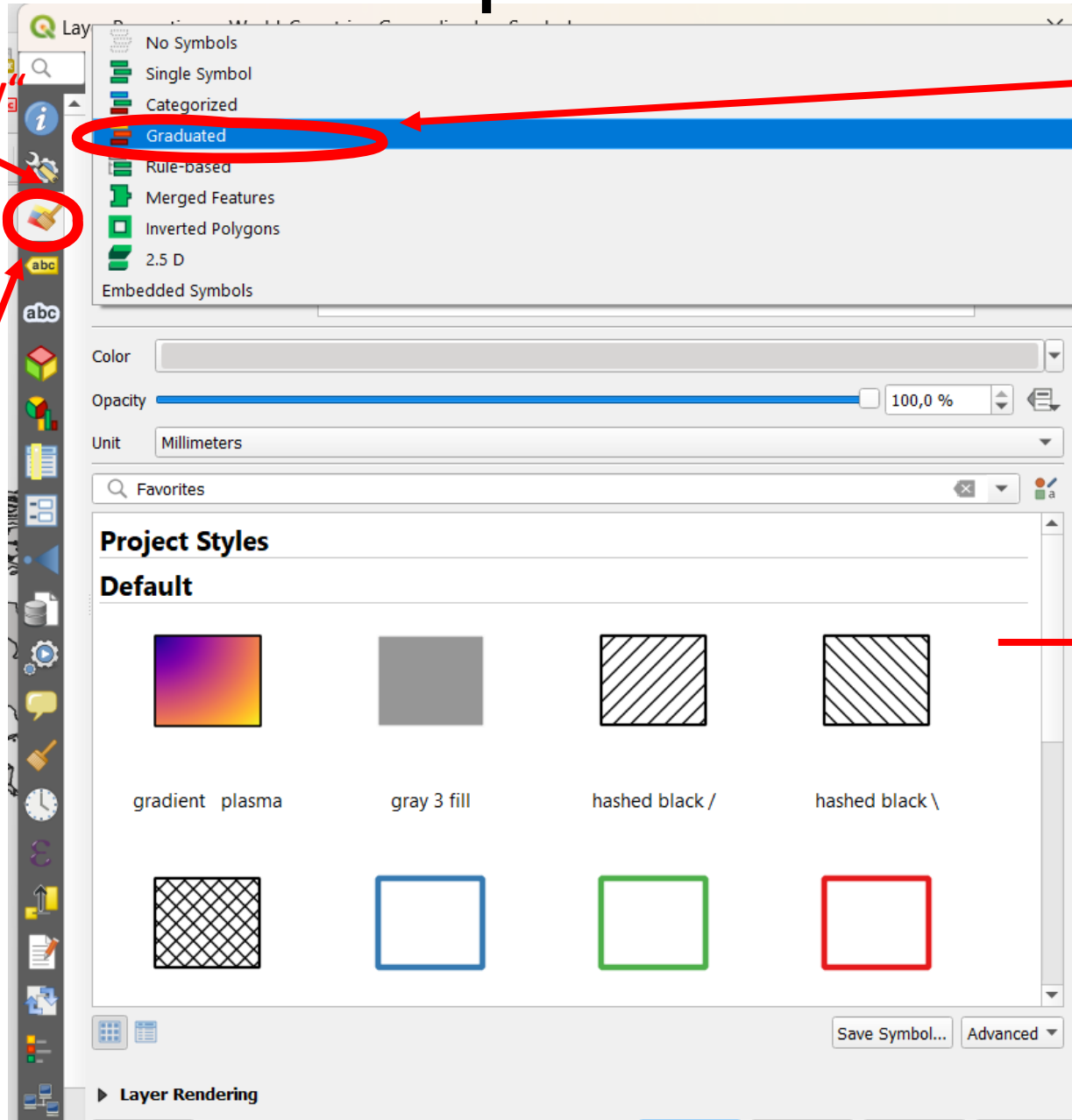
Make a map



1. Right click on name of layer

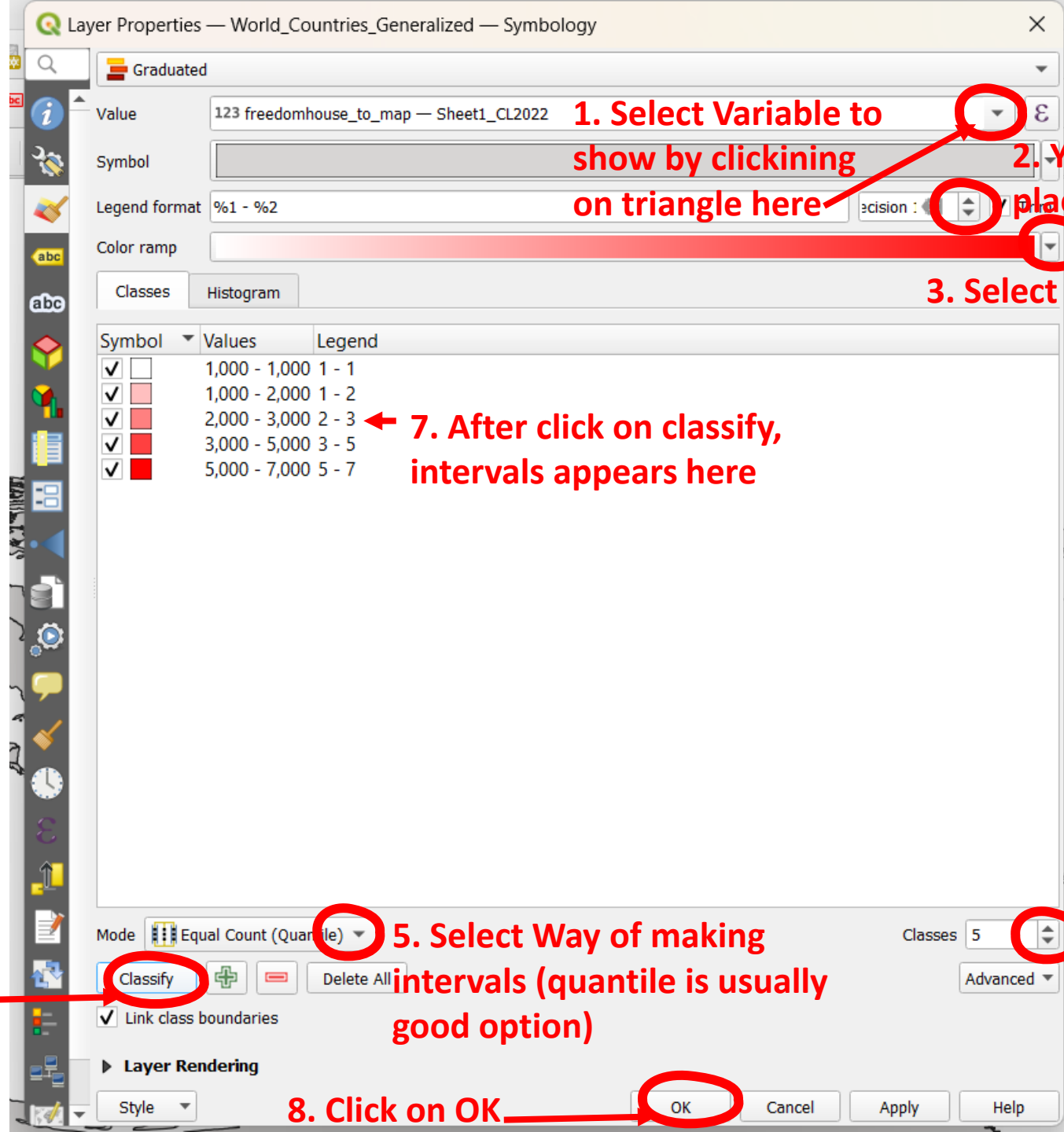
3. Select „symbology“ from left ribbon

2. click on properties



4. Click on row where is currently written „single symbol“ and select „graduated“

5. Continue on next slide



1. Select Variable to show by clicking on triangle here

2. You can set number of decimal places in numbers here

3. Select Color scale

7. After click on classify, intervals appears here

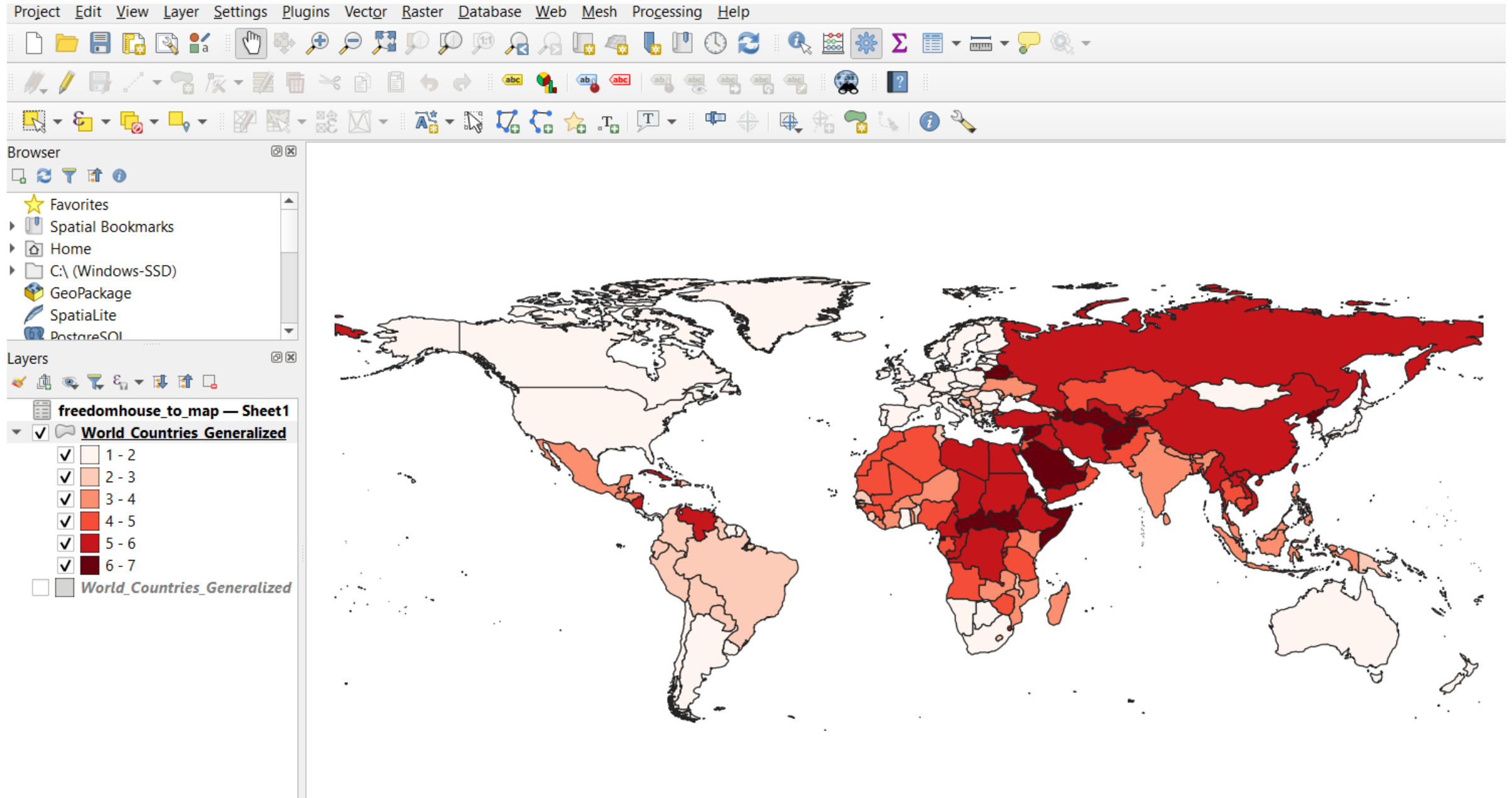
5. Select Way of making intervals (quantile is usually good option)

4. Select Number of intervals

6. Click on classify

8. Click on OK

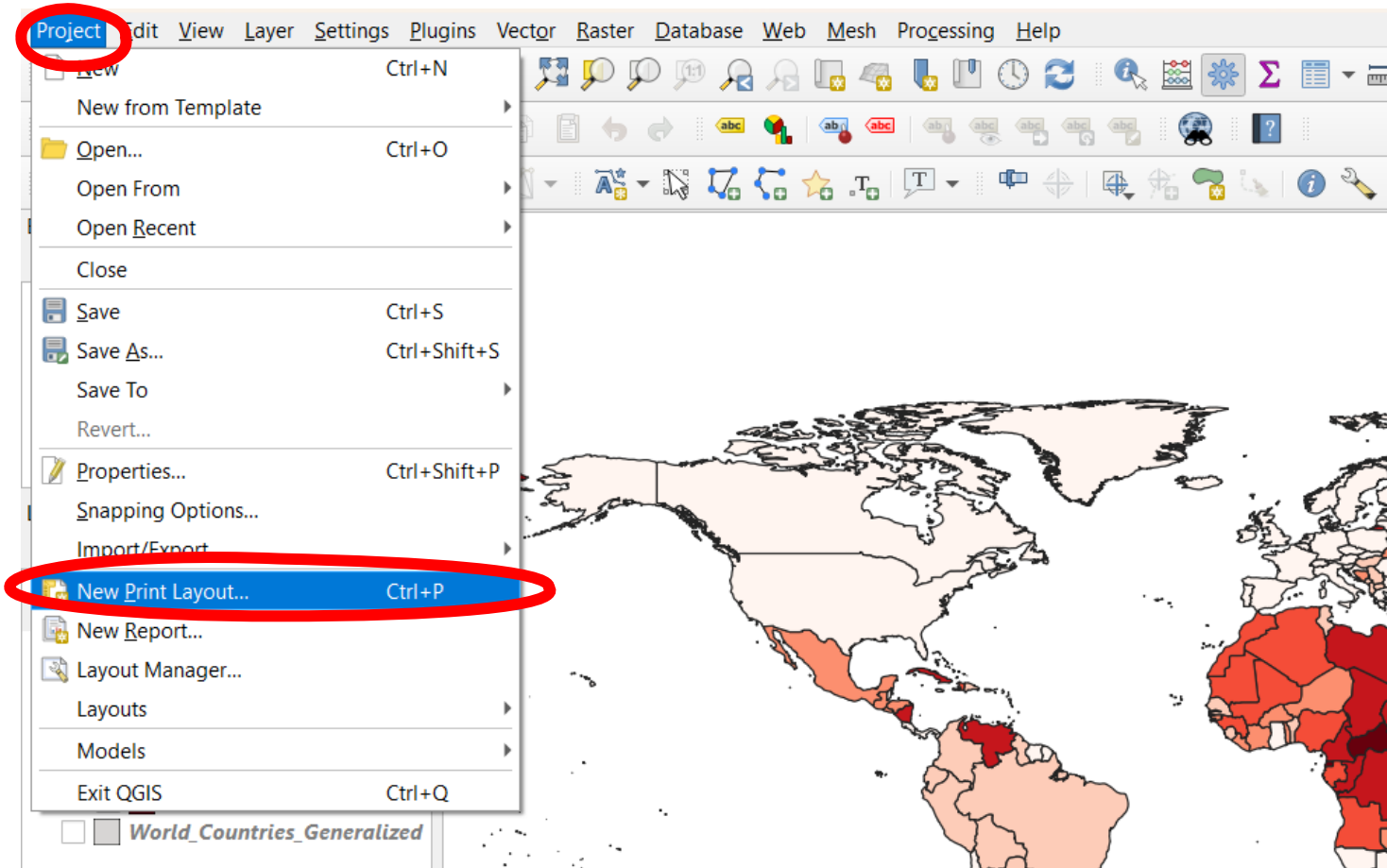
Almost final map

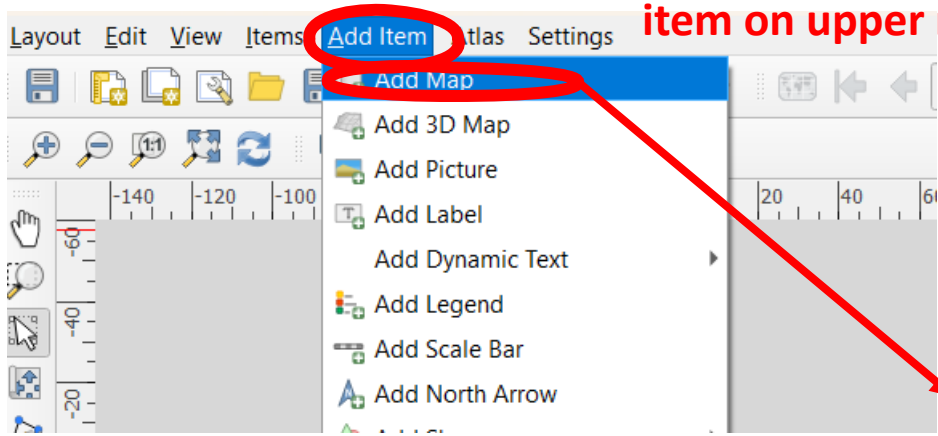


Add map elements (legend, scale, title, etc)

- it is done in New Print Layout

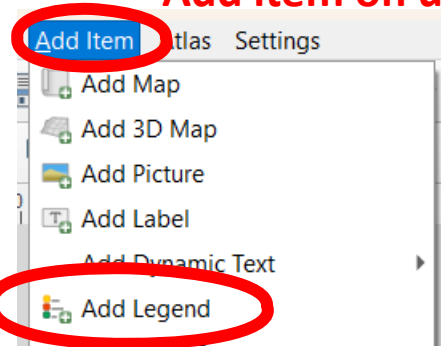
-after the clic it asks for name, it can be anything





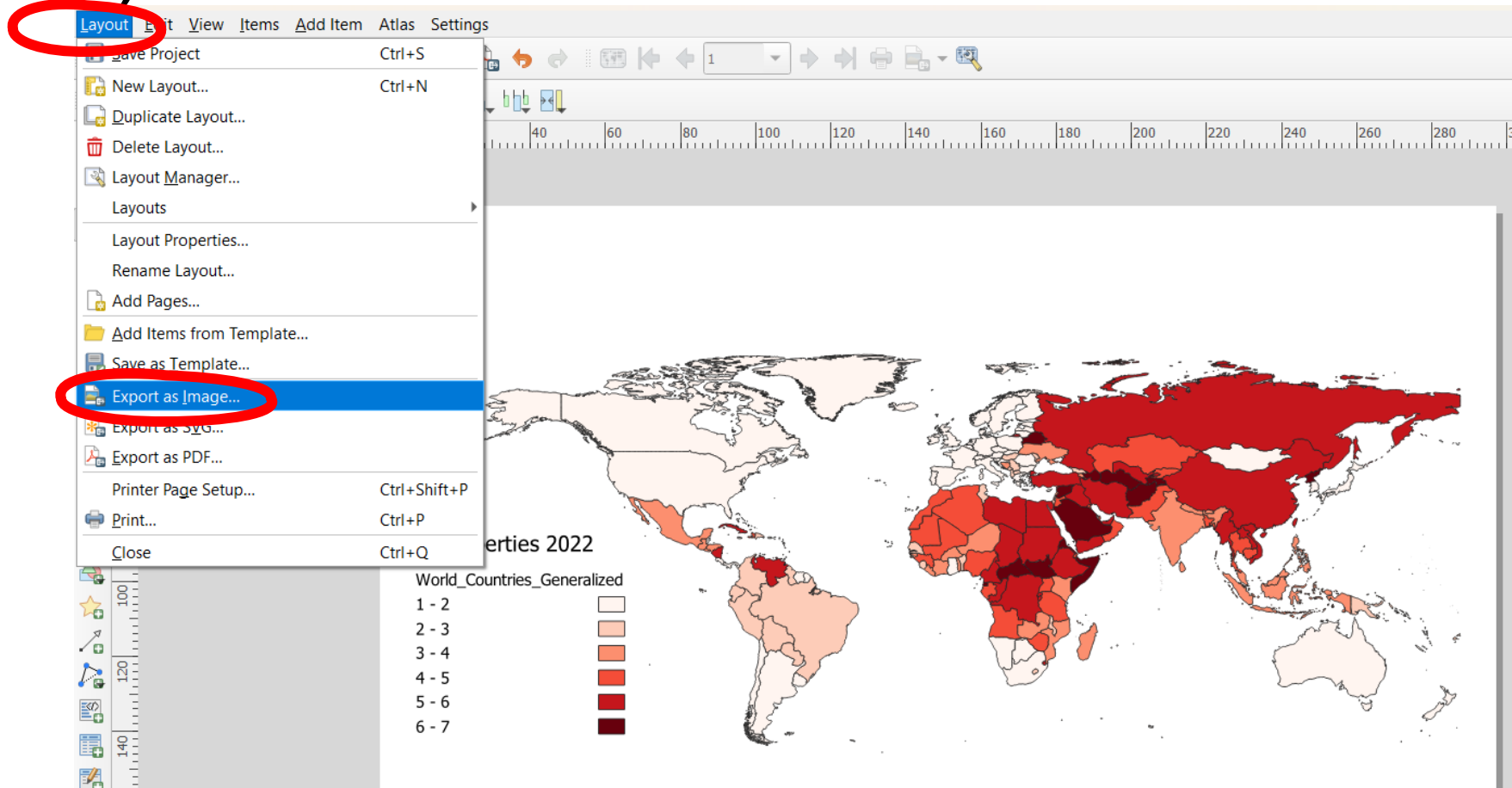
1. select Add Map from Add item on upper ribbon

2. and 4.
Draw with mouse over white board



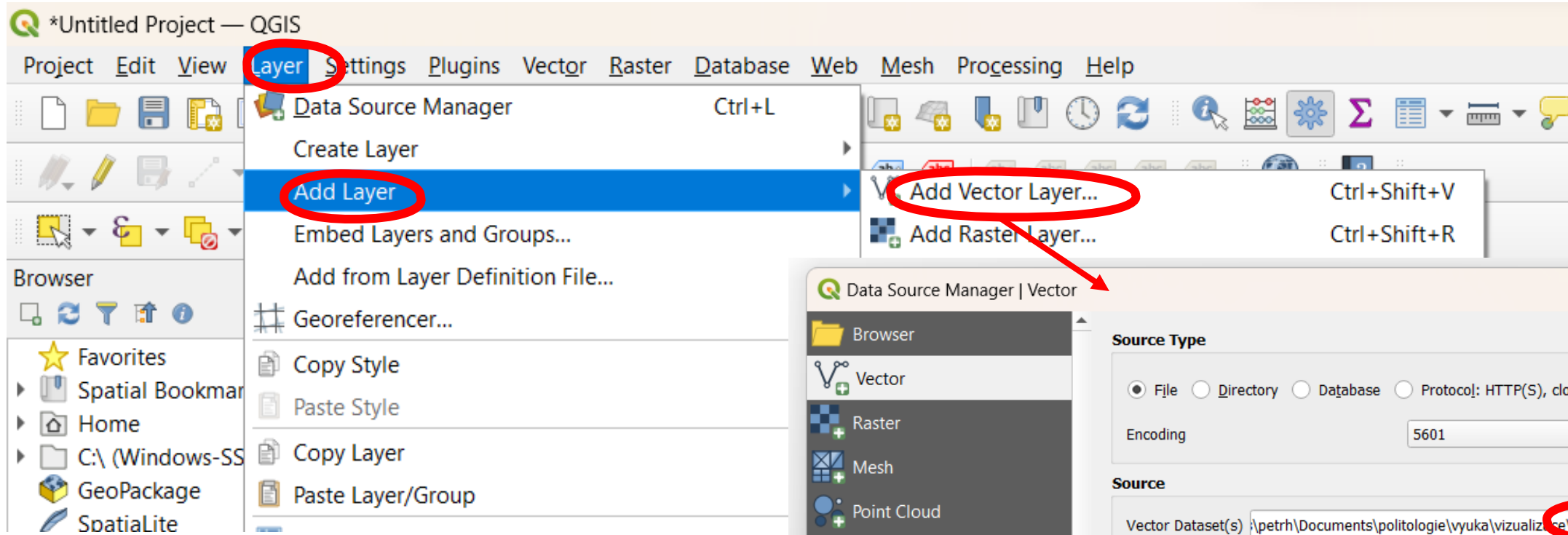
3. select Add Legend from Add item on upper ribbon

This is the final map, now it is possible to export it into pdf or image (PNG as best option)



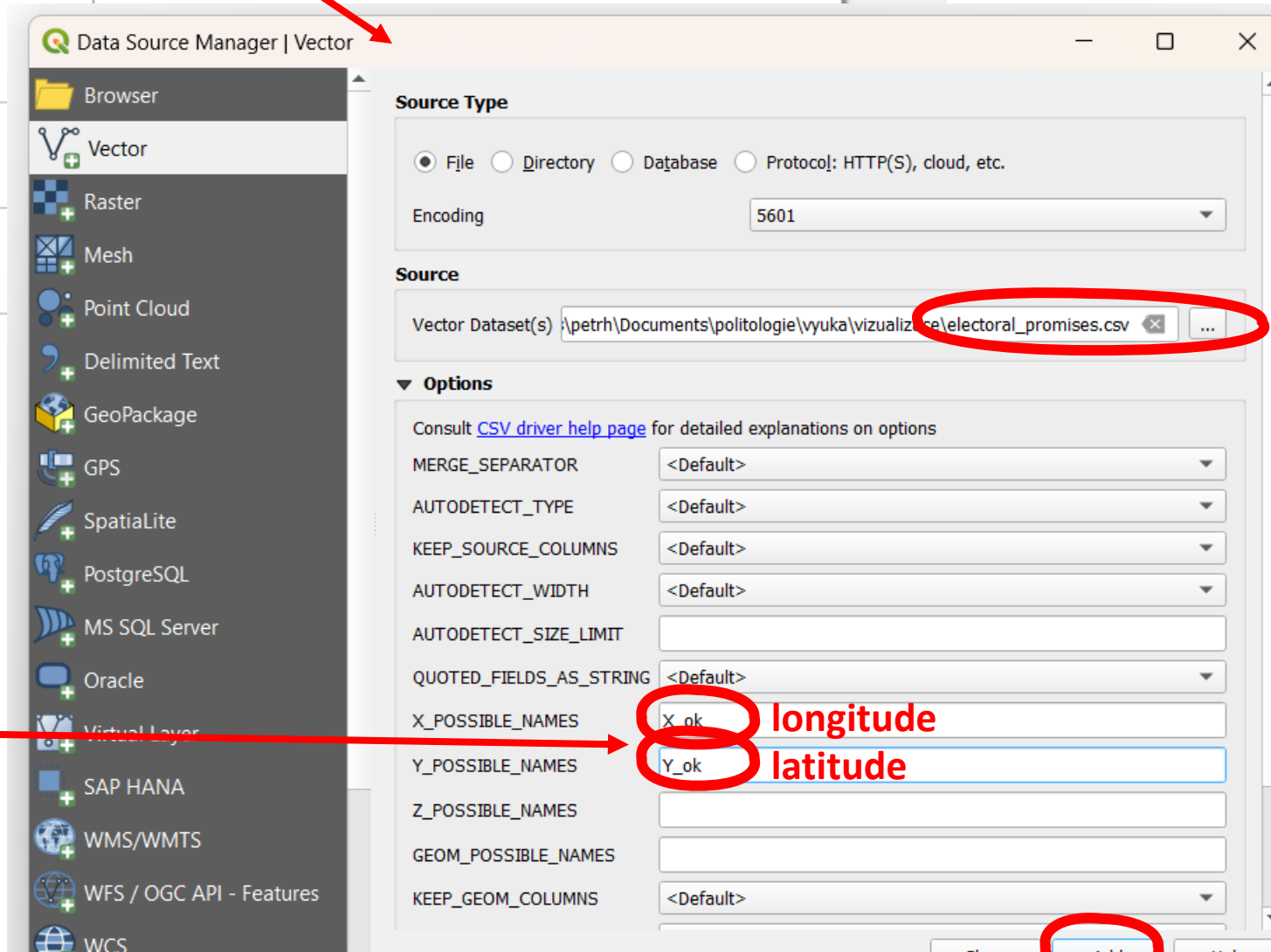
Another example

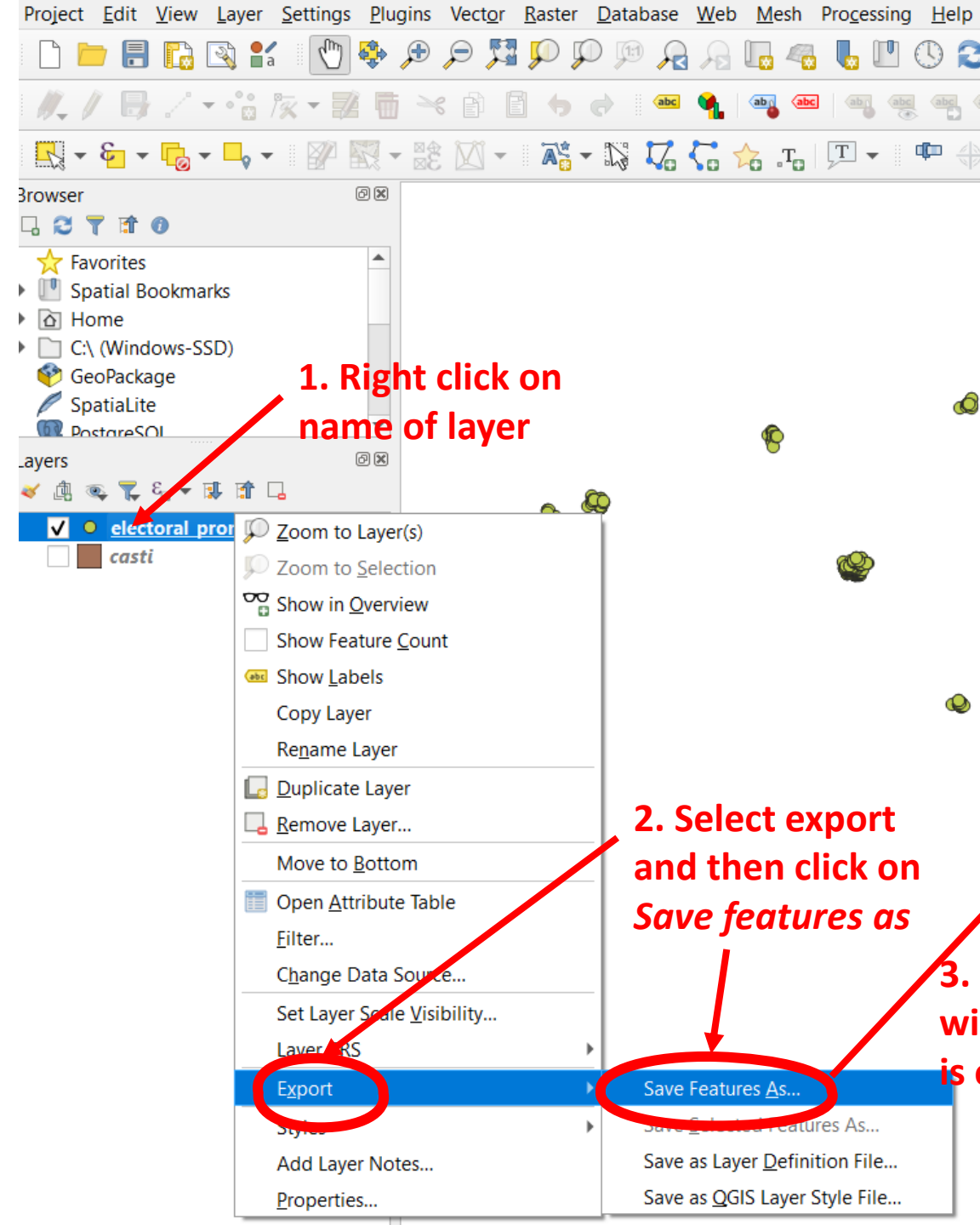
- Make a map from coordinates
- Coordinates have to be stored in csv table
 - You can make it in excel from any table by „Save as“
- It is good to add coordinates after adding map with already defined projection system



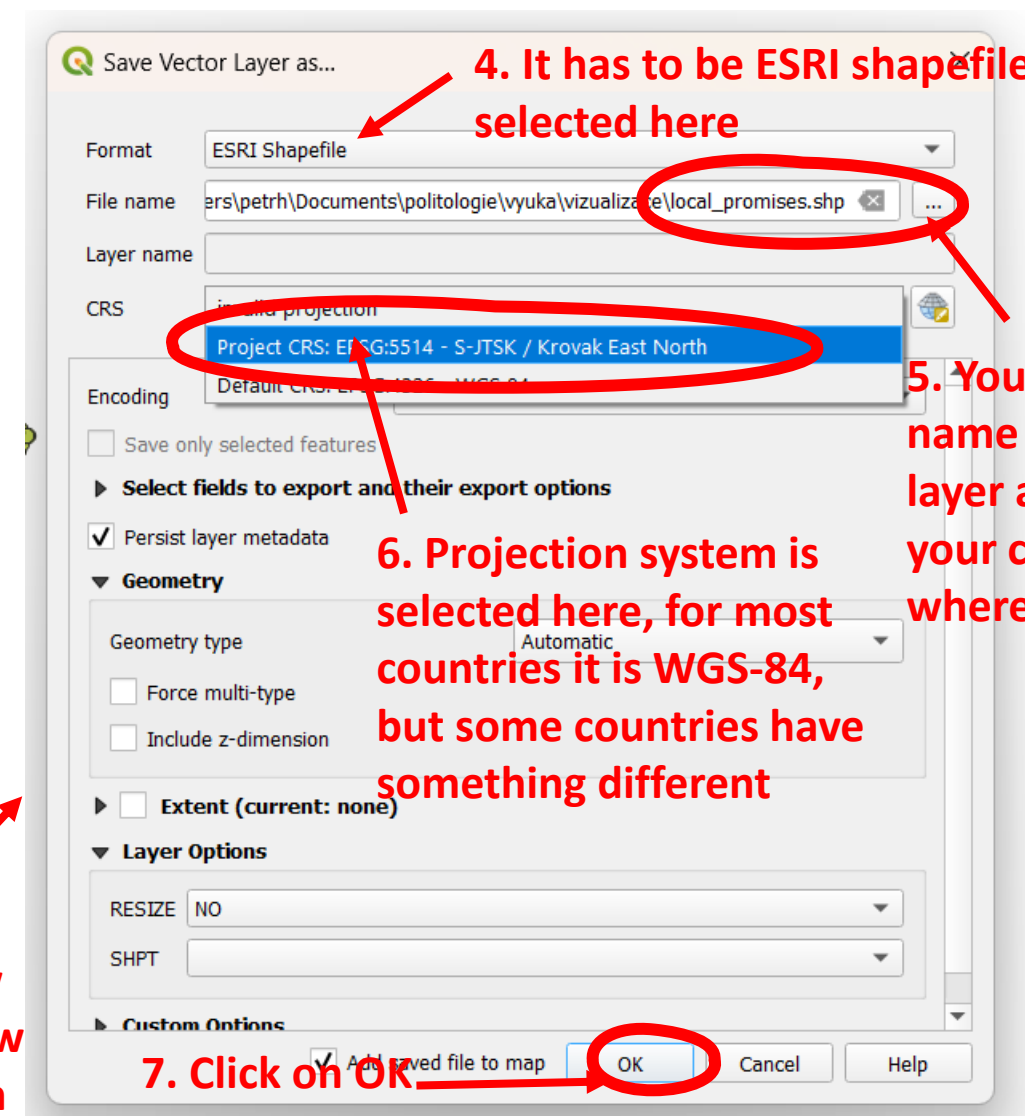
1. The procedure is almost the same as adding map or excel table

2. The only difference is in setting coordinates, the names are written as they are in our CSV file





The layer is only temporary file, to make it fully editable, it has to be exported into computer



1. Right click on name of layer

2. Select export and then click on Save features as

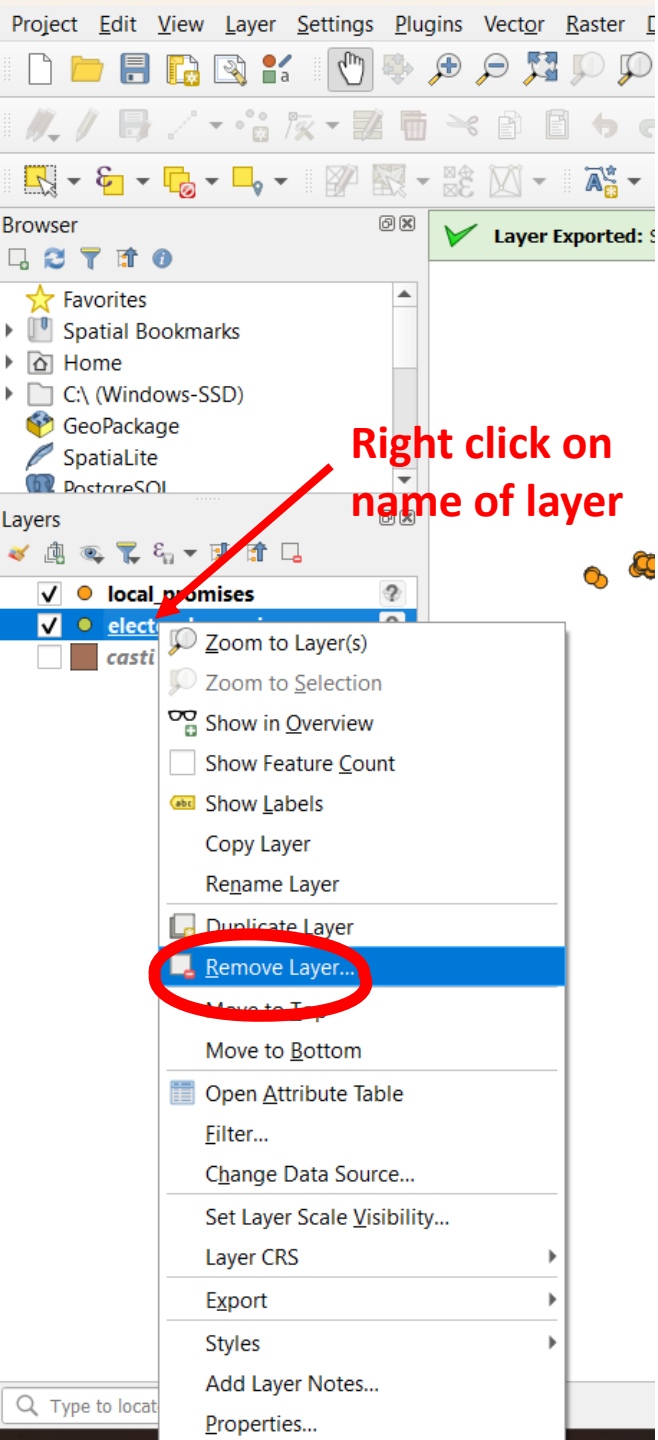
3. New window is open

4. It has to be ESRI shapefile selected here

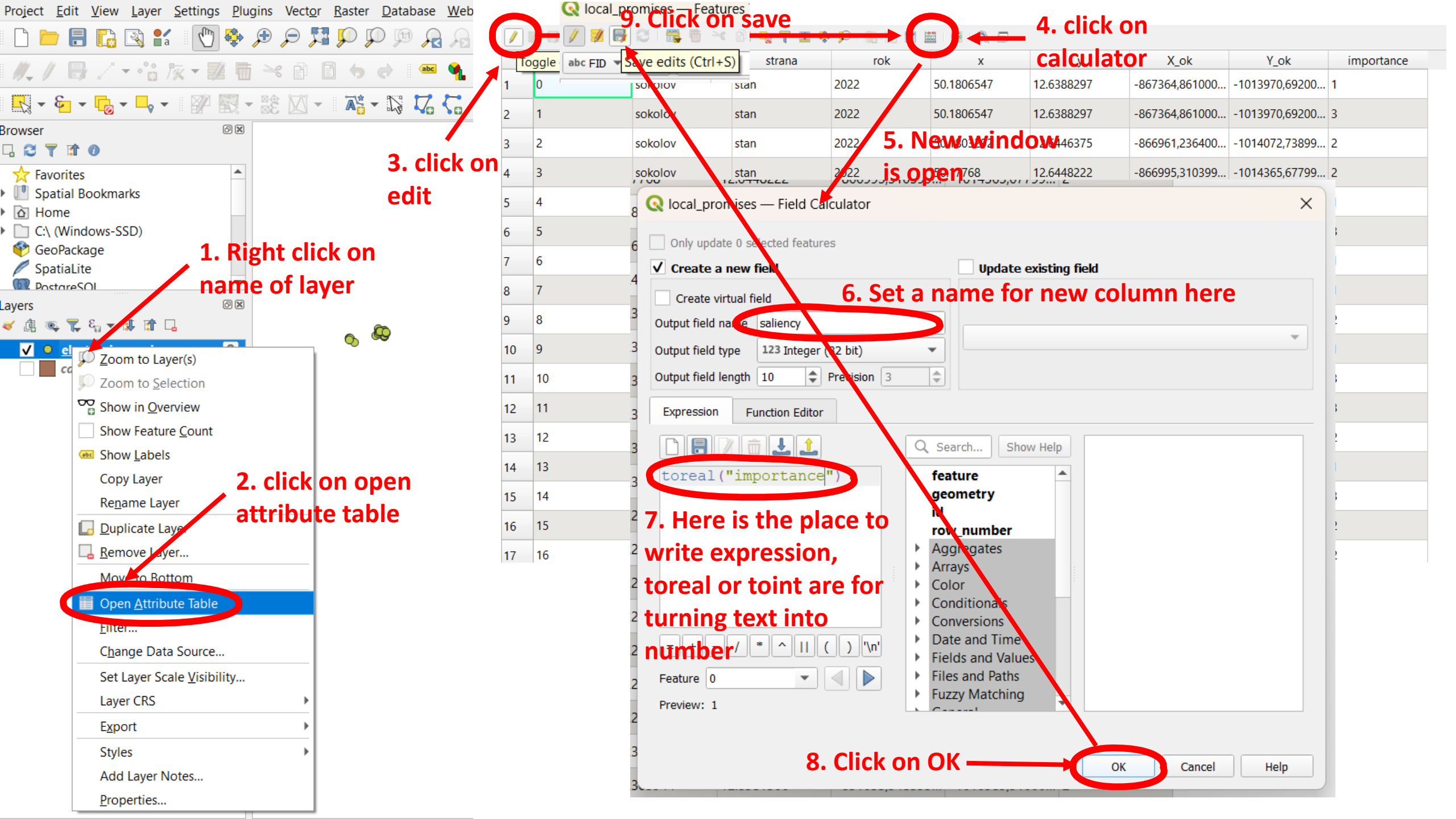
5. You set the name for exported layer and place in your computer where to store it

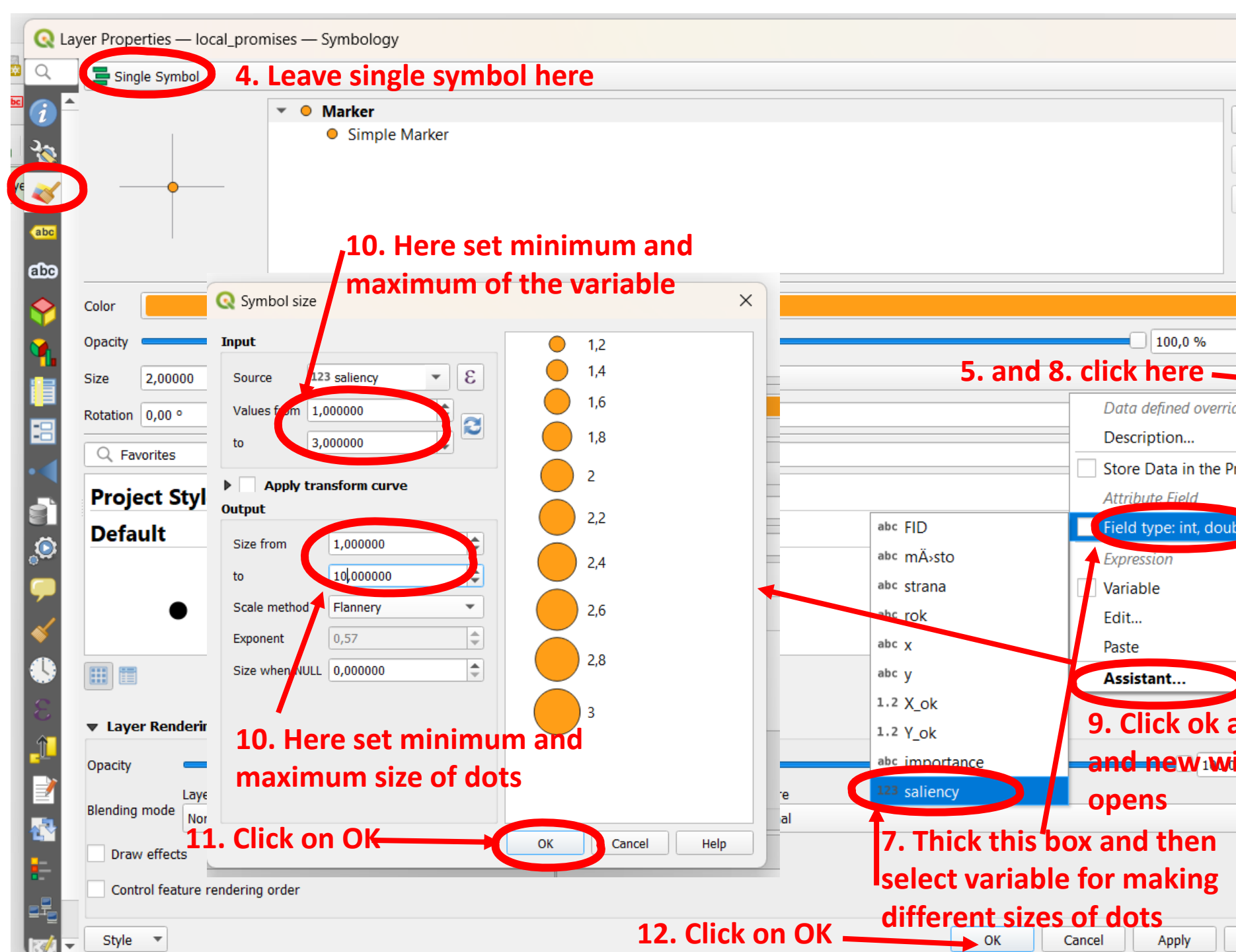
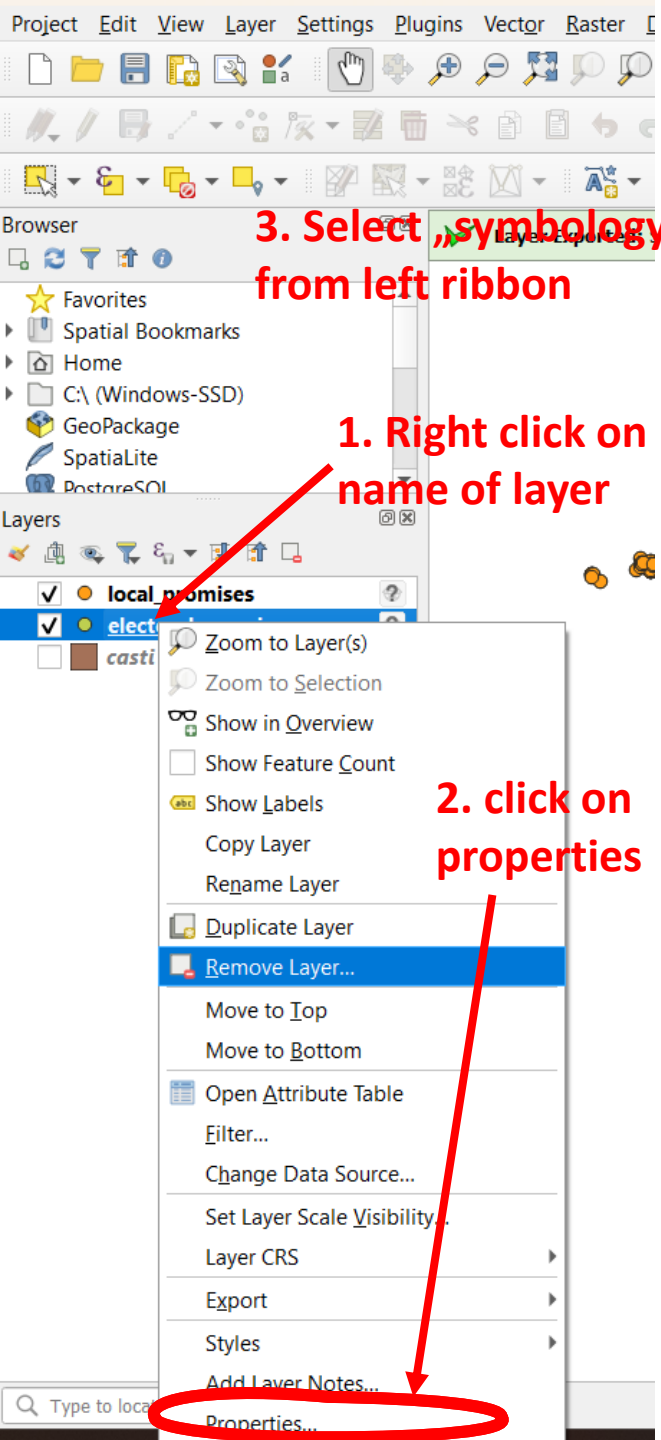
6. Projection system is selected here, for most countries it is WGS-84, but some countries have something different

7. Click on OK

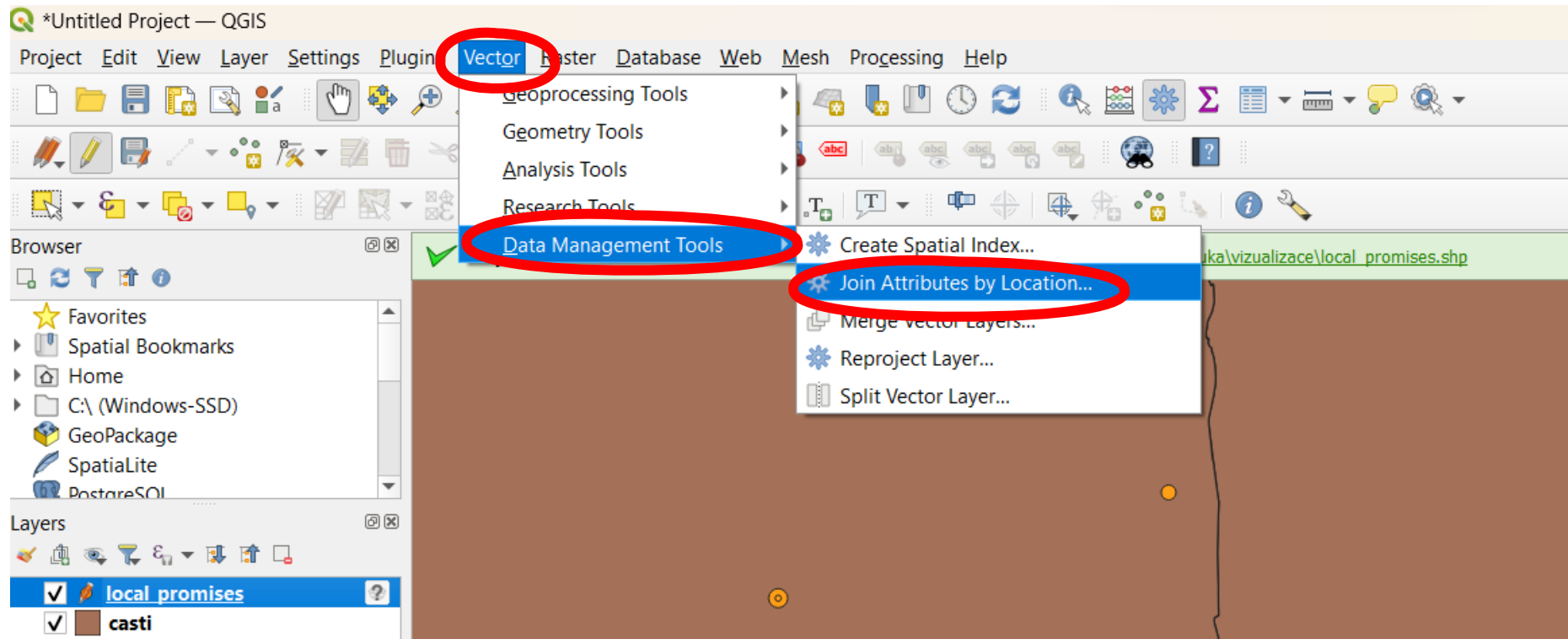


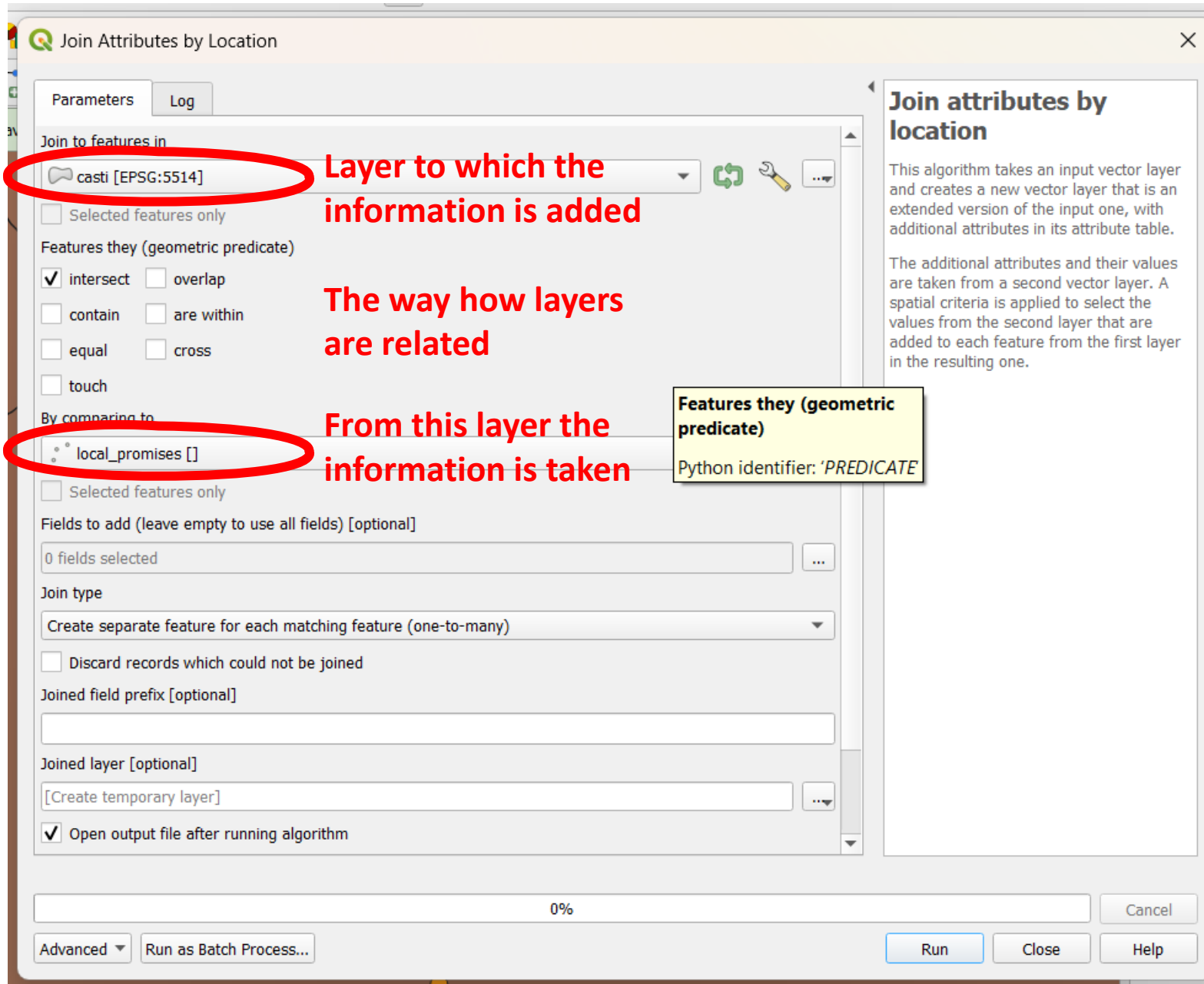
- Now the temporary layer can be removed
- Be cautious and do not remove the new one
- In new table, all numbers except coordinates are classified as text and it is good to make them numbers again, the procedure is on next slide





Spatial join – seves to add information from one layer to another layers





Layer to which the information is added

The way how layers are related

From this layer the information is taken

Features they (geometric predicate)
Python identifier: 'PREDICATE'

Join attributes by location

This algorithm takes an input vector layer and creates a new vector layer that is an extended version of the input one, with additional attributes in its attribute table.

The additional attributes and their values are taken from a second vector layer. A spatial criteria is applied to select the values from the second layer that are added to each feature from the first layer in the resulting one.