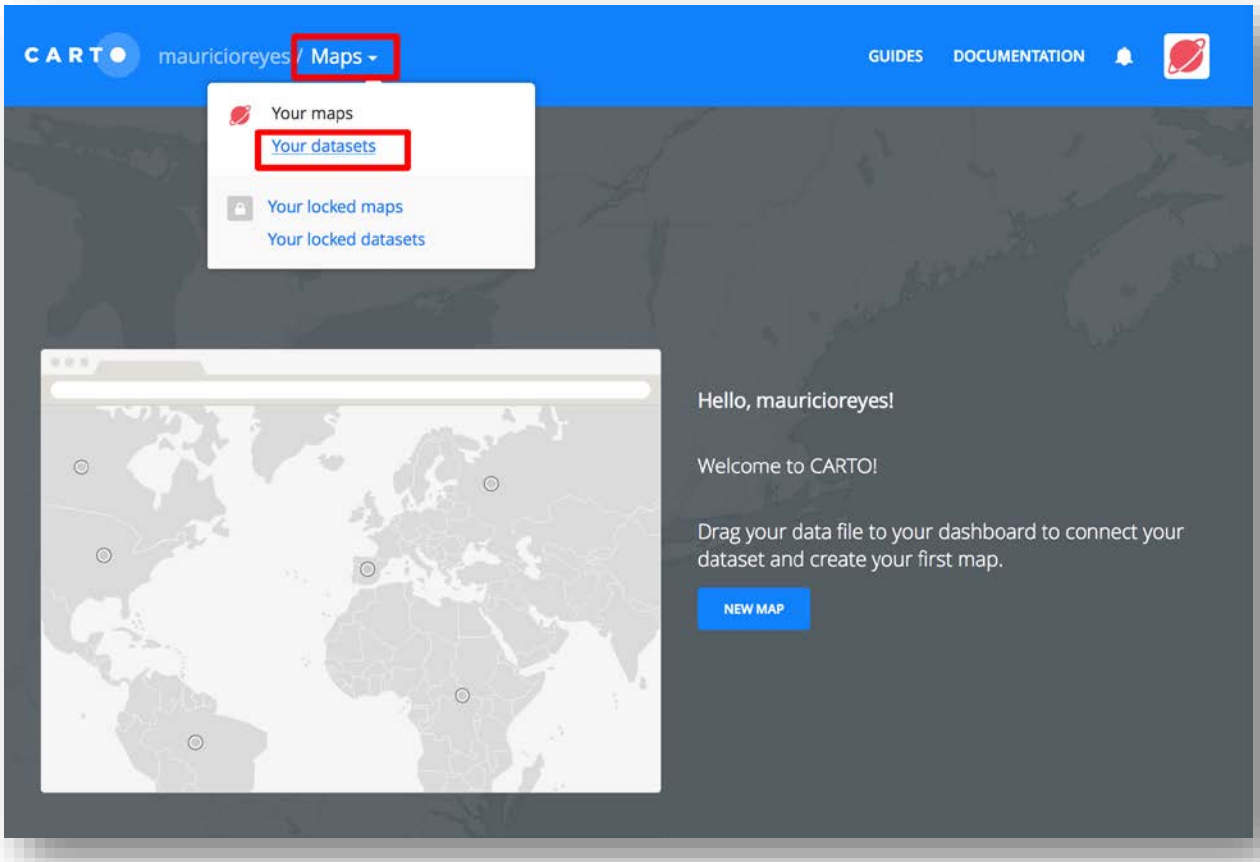
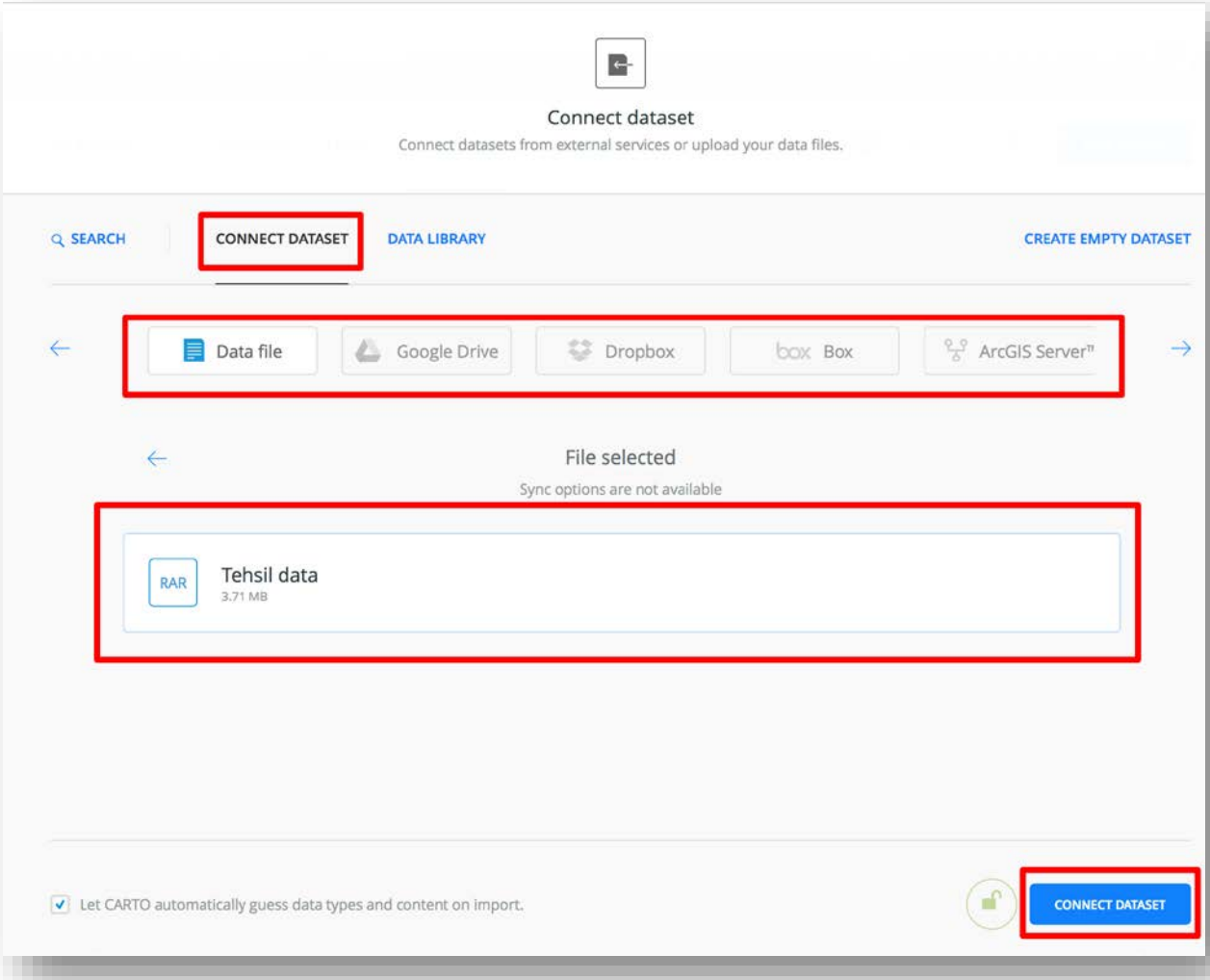
MAKING MAPS – CARTO

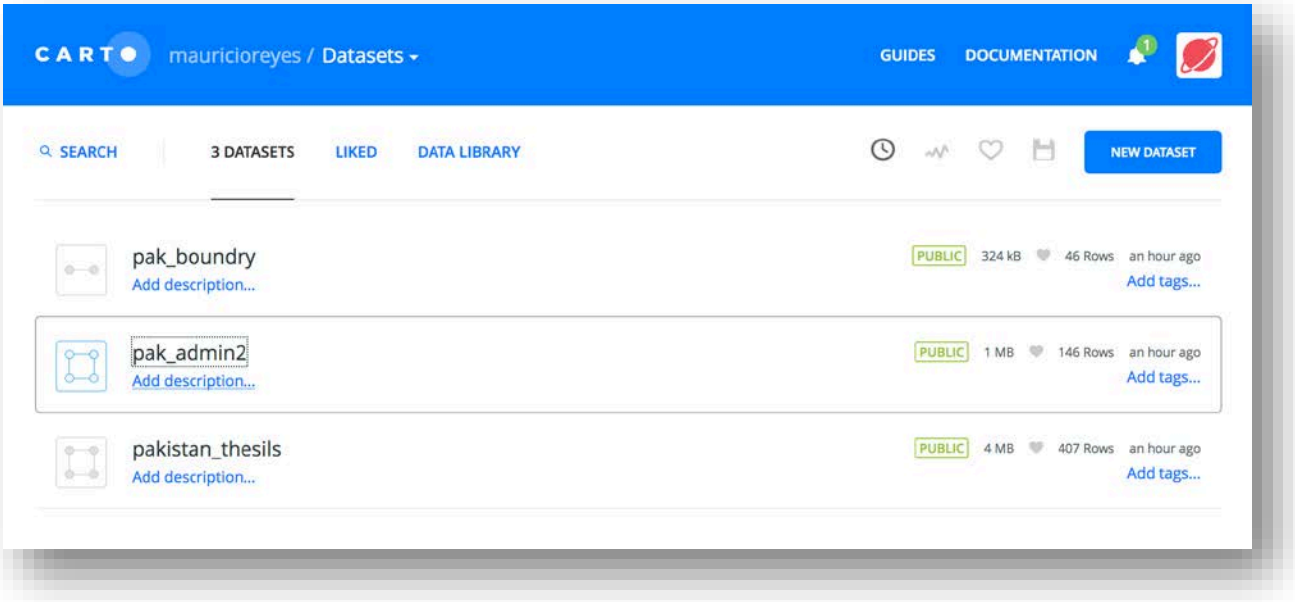
1. Open https://carto.com/
2. Click on Sign up and create an account if you don't have one.
3. Carto has two main interfaces for creating maps. After your name, click on Maps and swith to Your datasets.



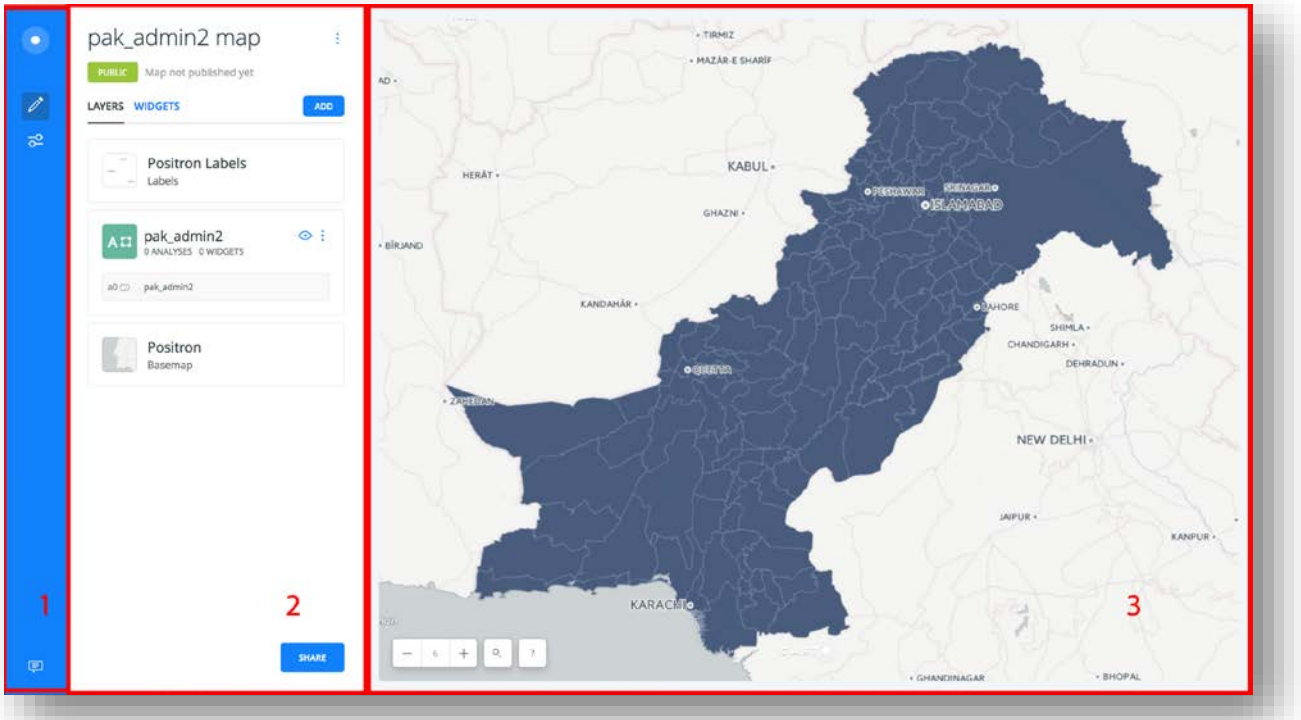
4. Click on NEW DATASET on the upper-right corner
5. There are different options to connect a dataset to Carto: browse to the file, link to Google Drive, Dropbox, Box, etc. Click on Data File, Browse and look for the file *Tehsil data.rar* and click on CONNECT DATA.



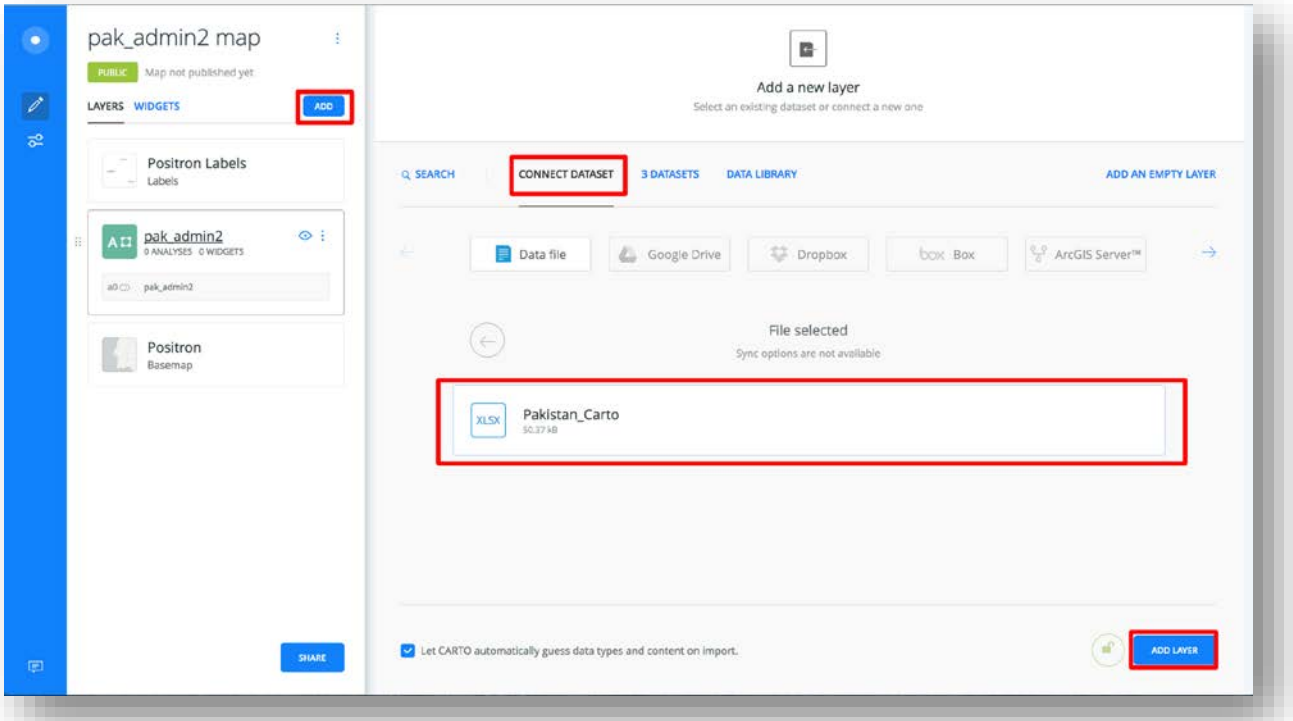
6. After the file is upload Carto will show you three new datasets. If you open Tehsils, you see that all the Tehsil names are written in capital letters. If they are written in lowercase in our dataset, we will have a problem. If you go to boundaries, you see there is no geographic data. If you click on pak_admin2, you see it has Tehsils in lowercase as well as coordinates so this is the one we want to use.



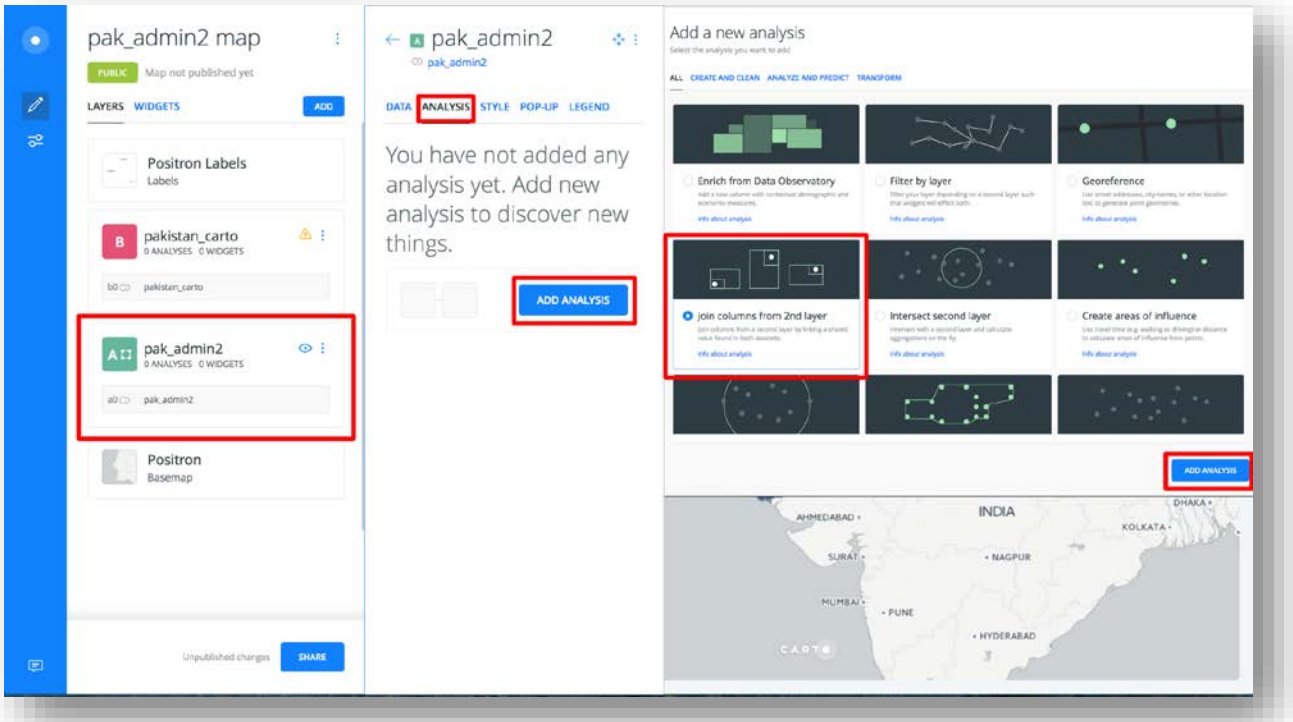
7. The district2 dataset is the shapefile of Pakistan's districts. Click on the bottom-right corner CREATE MAP. Carto automatically takes the data from the shapefile and creates a map with default settings. Basically Carto has 3 main panels:
   a. Panel 1: Back button to return to the Maps or Datasets and basic map options
   b. Panel 2: This is the panel that you are going to use to configure the map. It contains the map name, functions for the map, layers in the map, and share options.
   c. Panel 3: A preview of the map shows the different customizations you have made on the map.



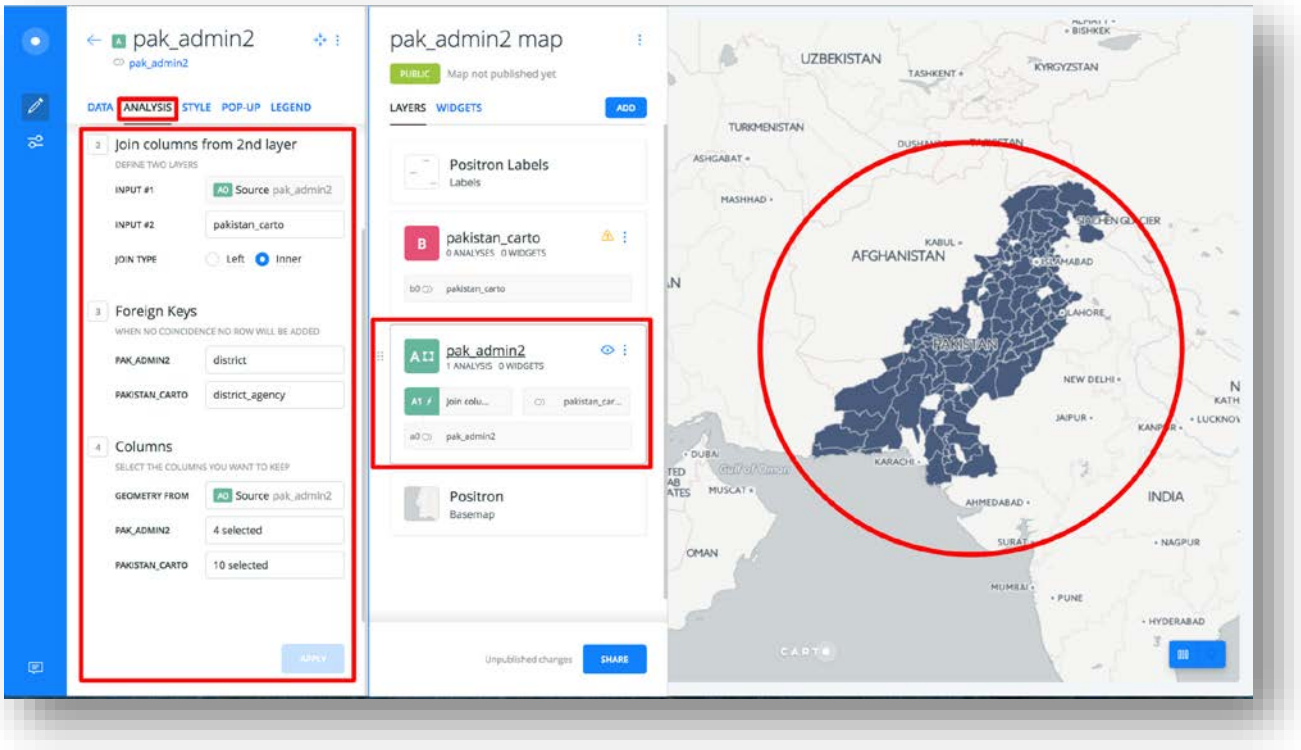
8. We are going to include data from Pakistan District Education Ranking 2016 (the same data we were working in lab 7) with the School Infrastructure Score. I already make an Excel file with just the infrastructure data because Carto require you to upload a clean dataset with the specific data that is going to analyze. Open the Excel file to look at the data. To add a new layer click ADD in panel 2, CONNECT DATASET and add the file *Pakistan_Carto.xlsx*, click on ADD LAYER.



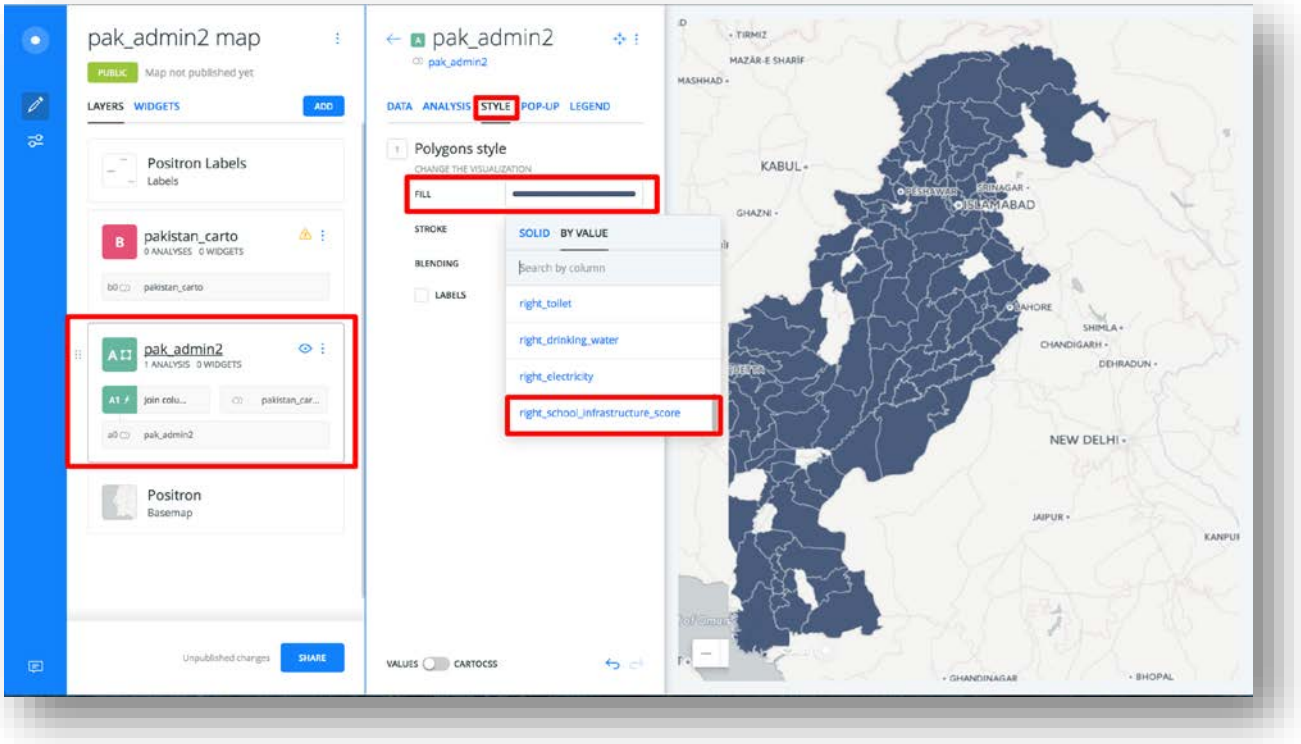
9. To combine or merge both data sets, click in the pak-admin2 in panel 2 it will give you options for this layer. Go to ANALYSIS and ADD ANALYSIS and Join columns from 2nd layer



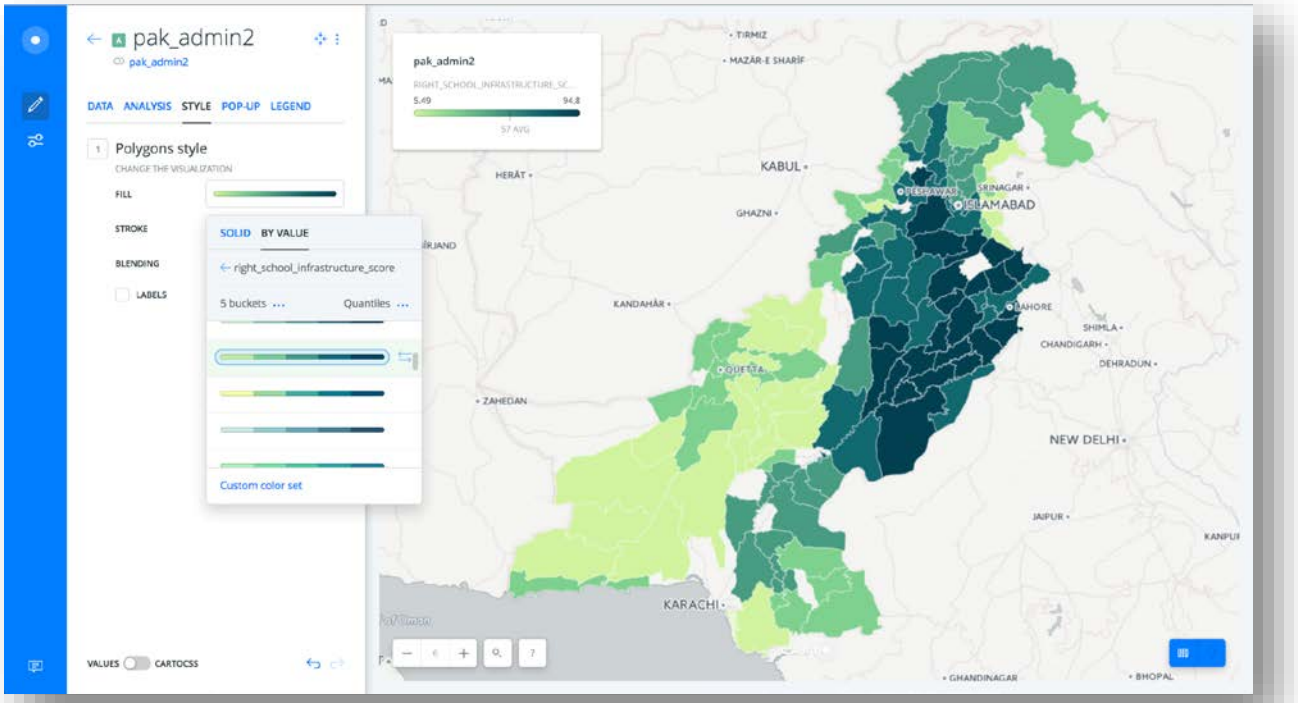
10. In ANALYSIS
    a. In 2. Join Columns from second layer: INPUT #1 Leave it as it is.
    b. INPUT #2 Select pakistan_carto. It is the data set we uploaded with the School Infrastructure Score. Leave inner join because our matching columns are in the middle columns.
    c. In 3 Foreign Keys: we have to tell it which columns in the two datasets to match up. In PAK_ADMIN2 chose district. It has the column with the districts in the shape file that we uploaded in the beginning.
    d. In 3 Foreign Keys: PAKISTAN_CARTO choose district_agency. It is the column with the districts from the upload Excel file with the School Infrastructure Score. They have to match: both columns have to have districts names.
    e. In 4 Columns: choose PAK_ADMIN2 select district, province, shape_len, and shape_area. These are all the columns to include in the merge from the shapefile.
    f. In 4 Columns: PAKISTAN_CARTO select all of them. These are also all the columns to include in the merge from the excel file
    g. Click on APPLY
    h. See the pak_admin2 layer and map have change with the merge.



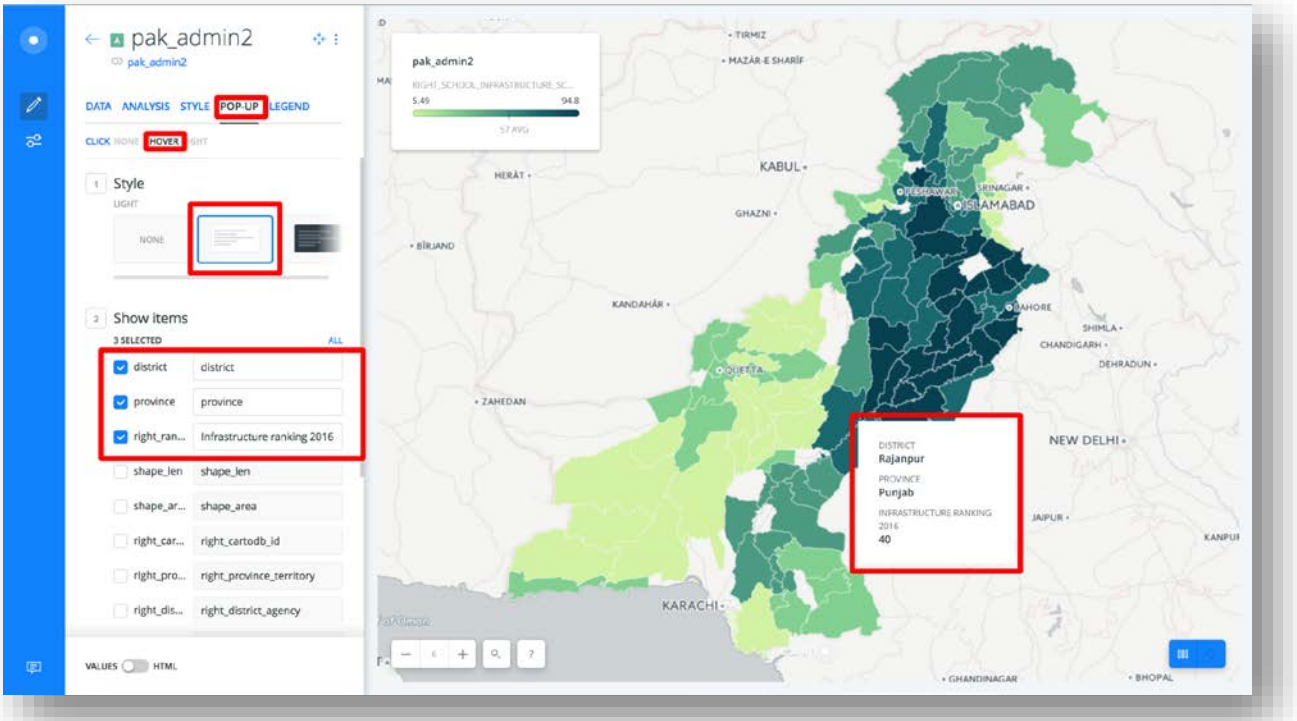
11. Click on the pak_admin2 layer and go to STYLE. In Polygon style – Fill select BY VALUE and select right_school_infrastructure_score



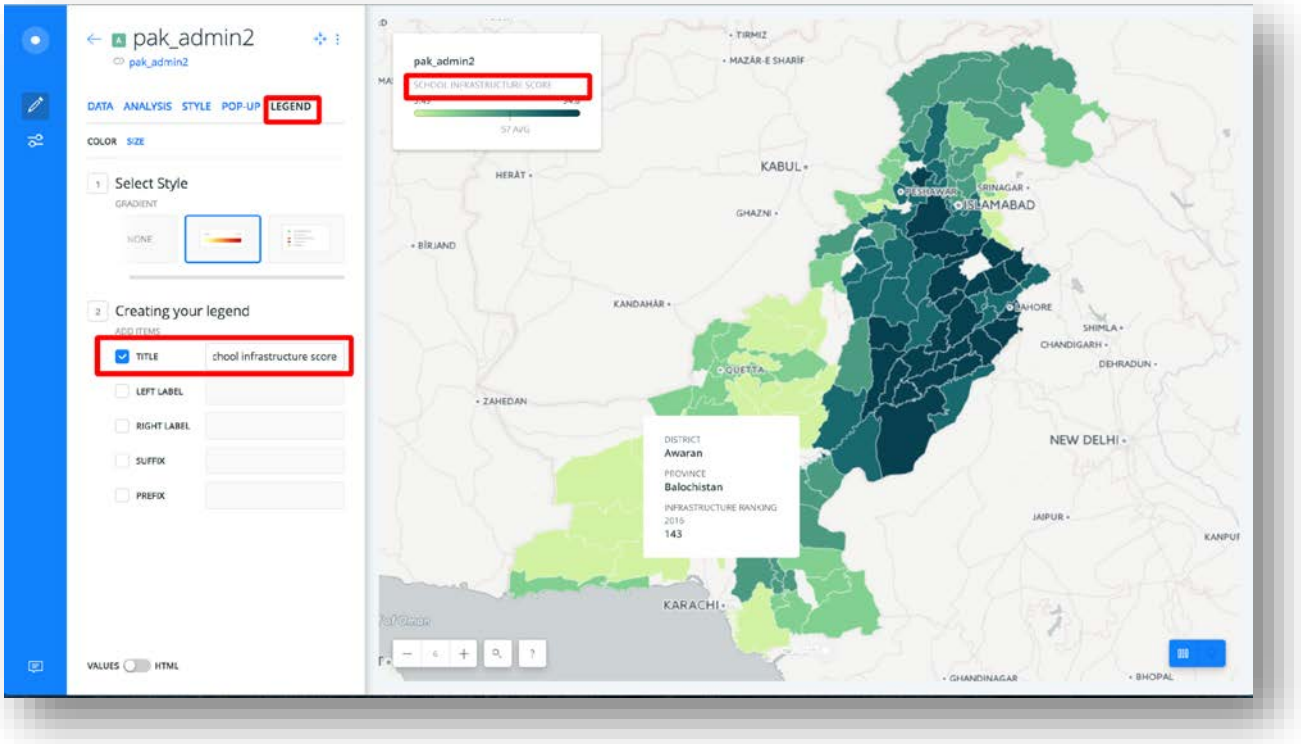
12. Pick a color scheme that matches with the rest of the graphics for your choropleth map. Stroke function add thickens and color to the borders of the districts, and Labels puts labels on the map according to the data column selected. You can try to add the label with the ranking of the schools column but it may look cluttered.



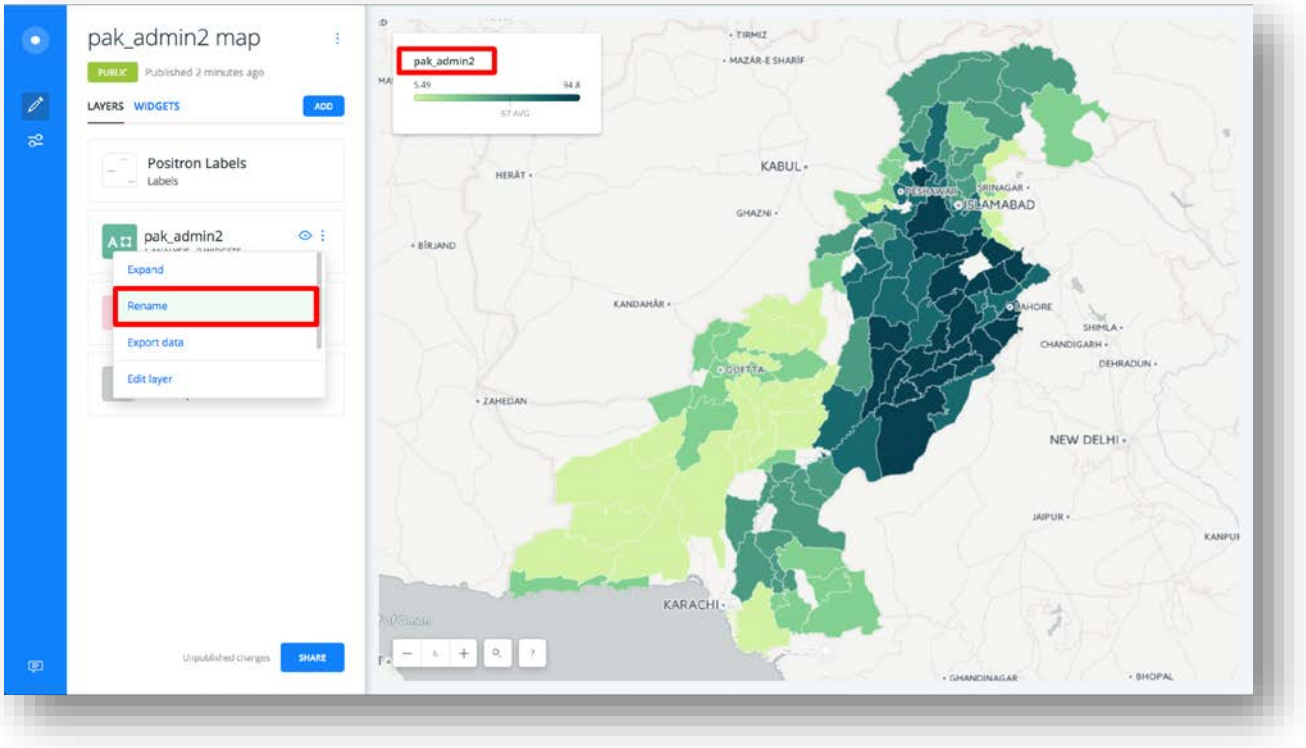
13. Go to the POP-UP menu to add an infowindow. You can choose to display the infowindow by clicking on the district or hovering over the district. Let's select hover. Select district, province, and right_rank_2016. By clicking inside the box in the selection youcan change the title of the information shown in the infowindow. Change right_rank_2016 to Infrastructure ranking 2016.



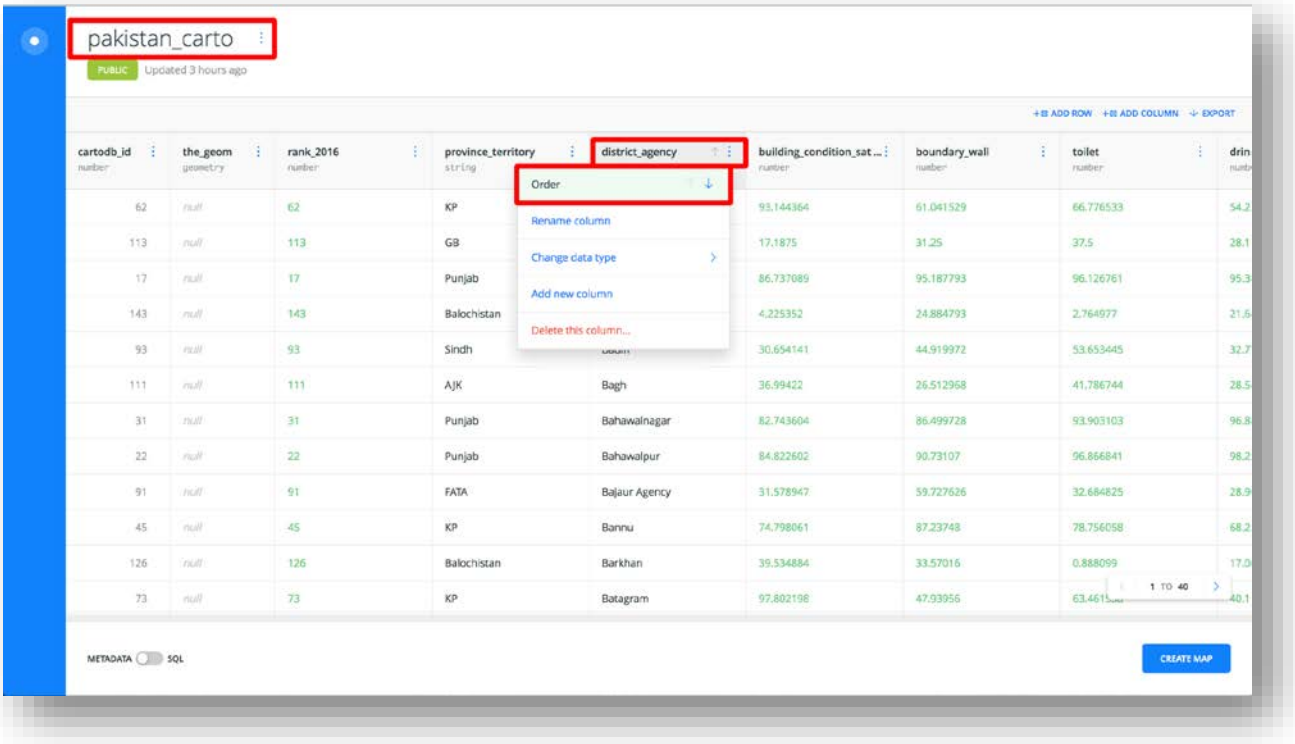
14. Carto automatically puts a legend on the map but the title is confusing. To change it go to LEGEND – TITLE and type School infrastructure score in 2016 or just unselect TITLE. You can also change the scale from zero to 100 by changing left label and right label.



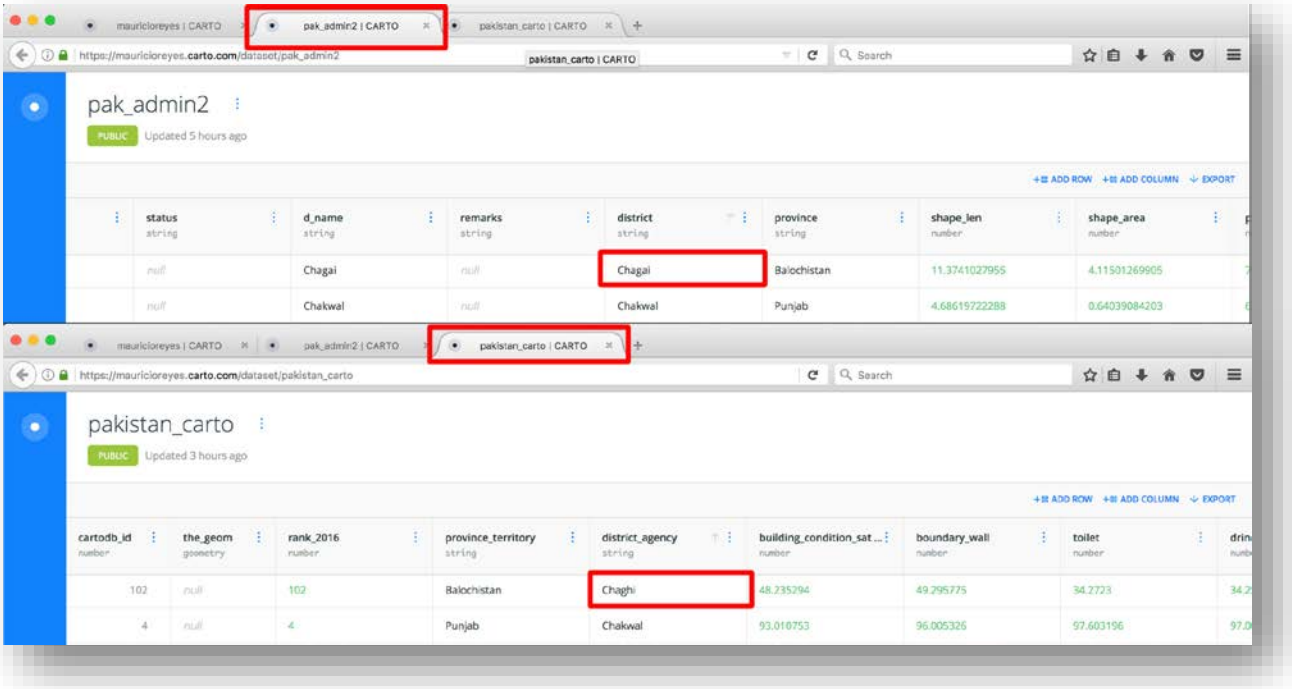
15. Still, the legend have a confusing title: pak_admin2. To change it go back to the panel 2 interface and inside the layer click on the three point (upper-right corner) and select Rename and type School Infrastructure Score 2016.



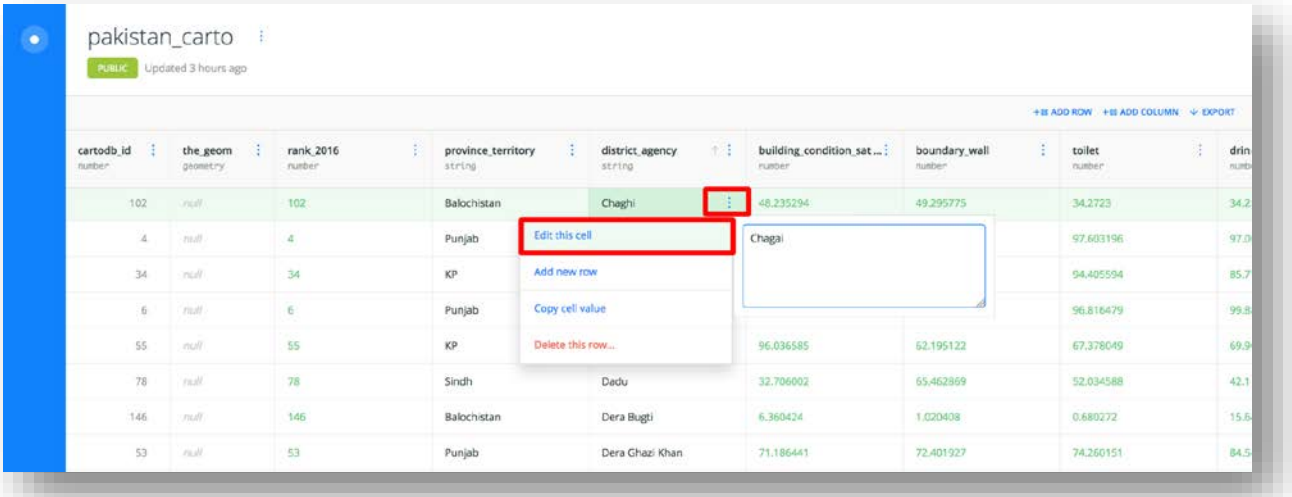
16. Now we have a choropleth map with the School Infrastructure Score 2016, infowindow and legends. But as you see there are some districts in white, which means that when we merged both datasets, the district names were spelled slightly differently and they were not joined. To solve this cleaning problem:
    a. Open two new tab in your browser and open carto with the dataset pak_admin2 and pakistan_carto
    b. To make it easier go to pakistan_carto tab and in the district_agency column, order it A to Z. Do the same with pak_admin2.



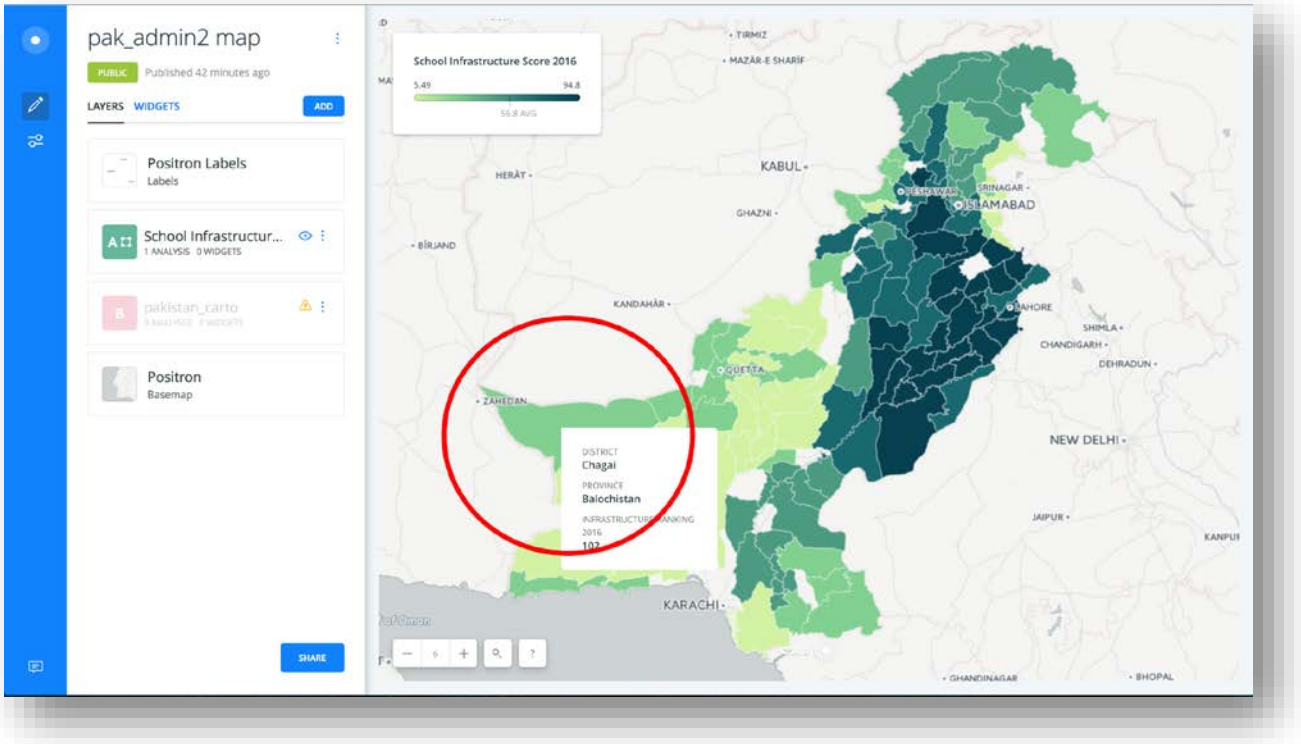
c. Ok we have three tab open in the browser and you probably know by looking at the map which districts are missing. Now we will fix Chagai or Chaghi district and you will fix the rest. By comparing pak_admin2 and pakistan_carto dataset you can identify the misspelling. You can also do a Vlookup in Excel.



d. Because both have to be written the same, make changes in the **pakistan_carto** dataset. Change Chaghi to Chagai. Click in Chaghi options – Edit this cell and type Chagai then click Enter.

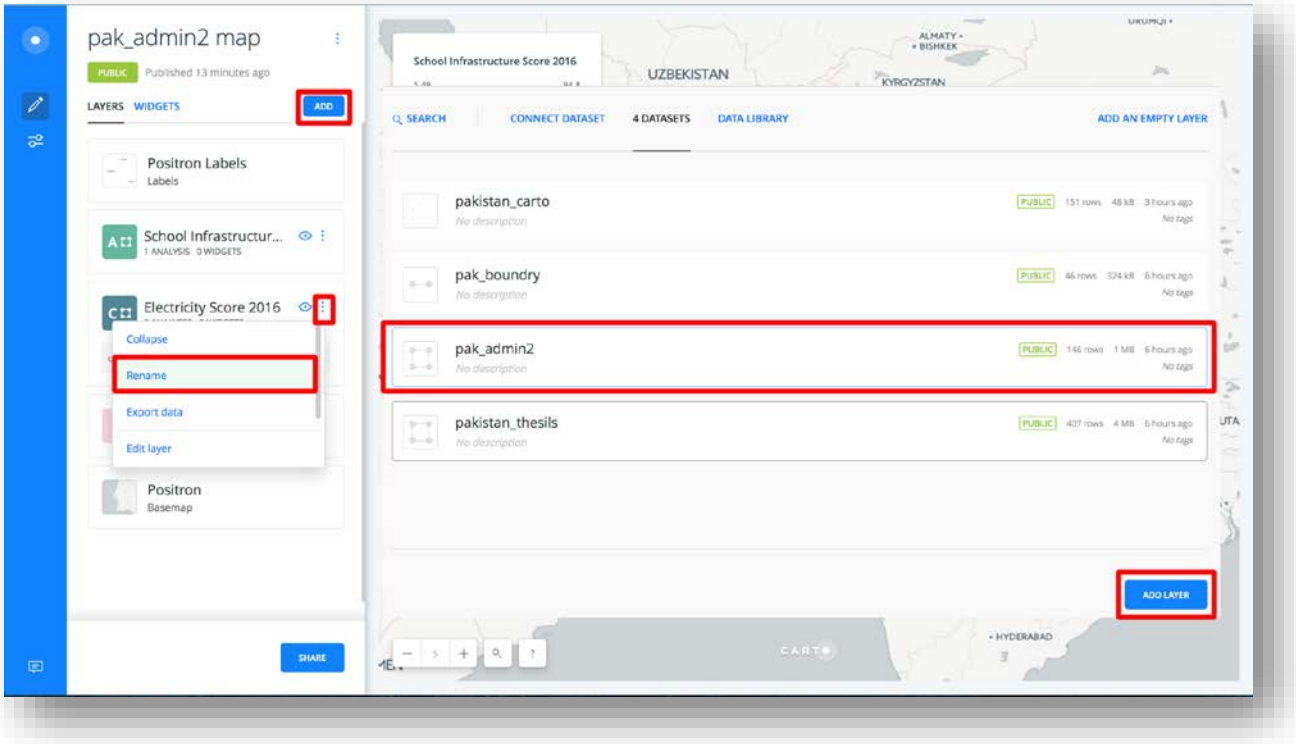


e. In the pak_admin2 map tab, reload the page and changes will display automatically.

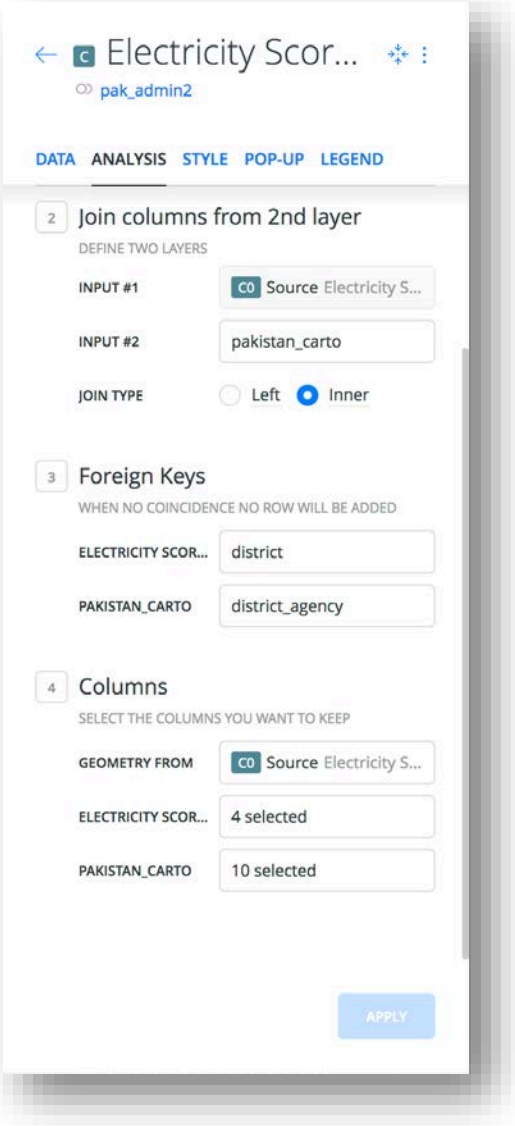


f. Fix and change the rest of the districts.

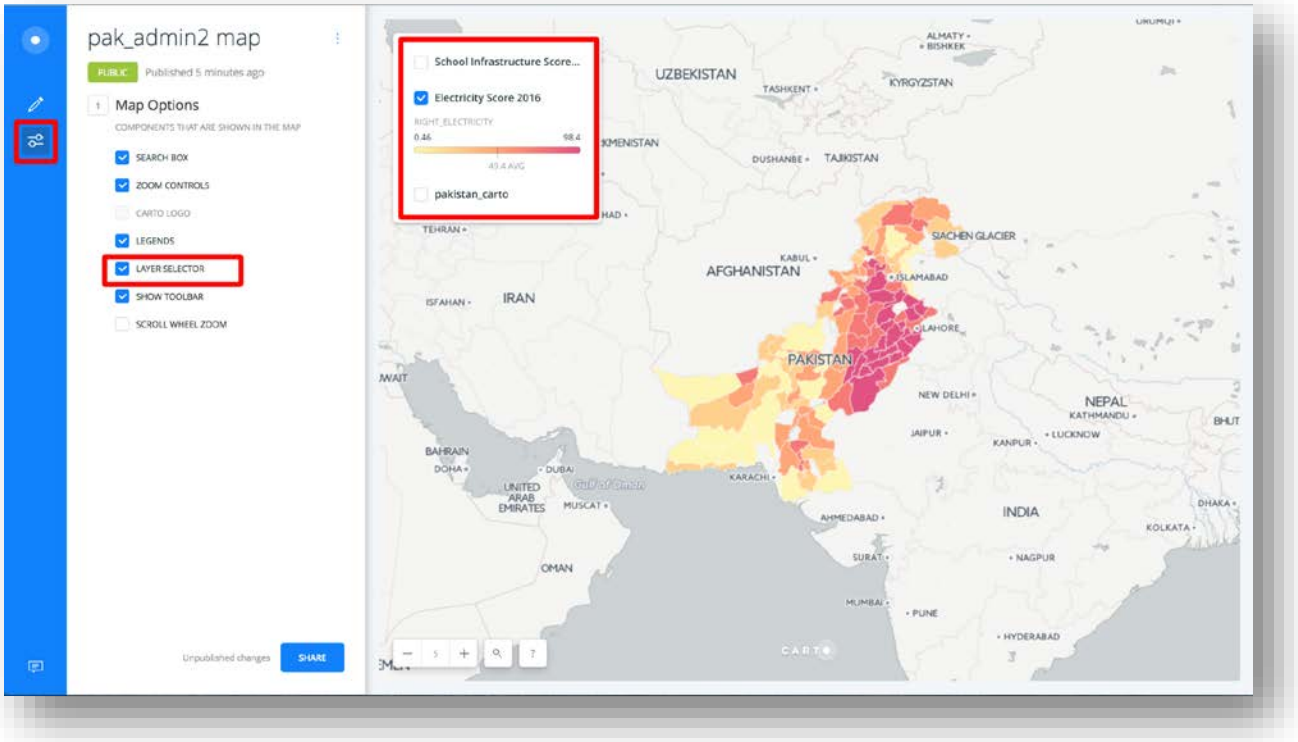
17. We have just created a map with the school infrastructure scores from the *Pakistan_Carto.xlsx* Excel file column D. But this dataset has more specific data on school infrastructure including Electricity, Drinking water, Toilet, Boundary wall, and Building condition. Let's say that we need to add Electricity as a new layer that allows the user to filter to the electricity score in the same map. Click on ADD to add a layer add pak_admin2, and rename it Electricity Score 2016.



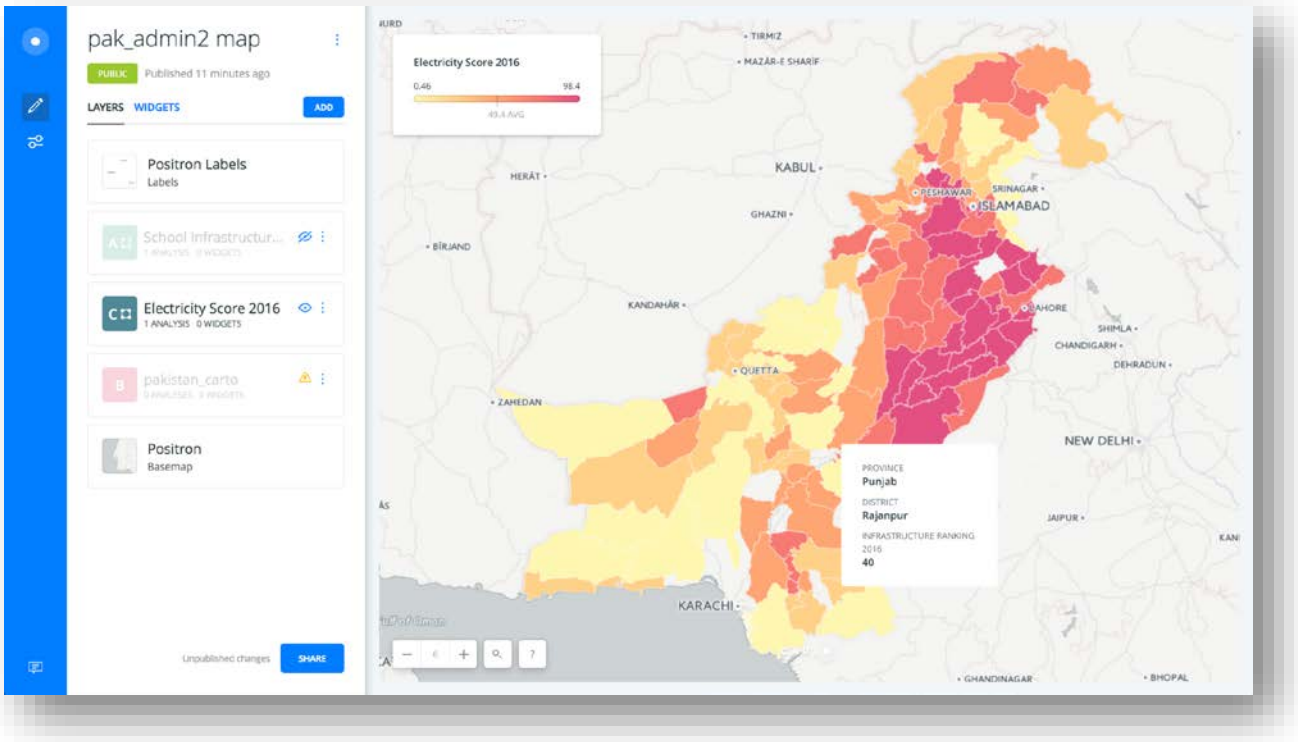
18. Click on Electricity Score 2016 layer – Analysis – Add analysis – Join columns from 2nd layer
19. In ANALYSIS:
    a. INPUT #1 Leave it as is it
    b. INPUT #2 Select pakistan_carto
    c. In ELECTRICITY SCORE 2016 chose district
    d. In PAKISTAN_CARTO chose district_agency
    e. In 4 Columns: choose PAK_ADMIN2 select district, province, shape_len, and shape_area. These are all the columns to include in the merge from the shapefile.
    f. In 4 Columns: PAKISTAN_CARTO select all of them. These are also all the columns to include in the merge from the excel file
    g. Click on APPLY



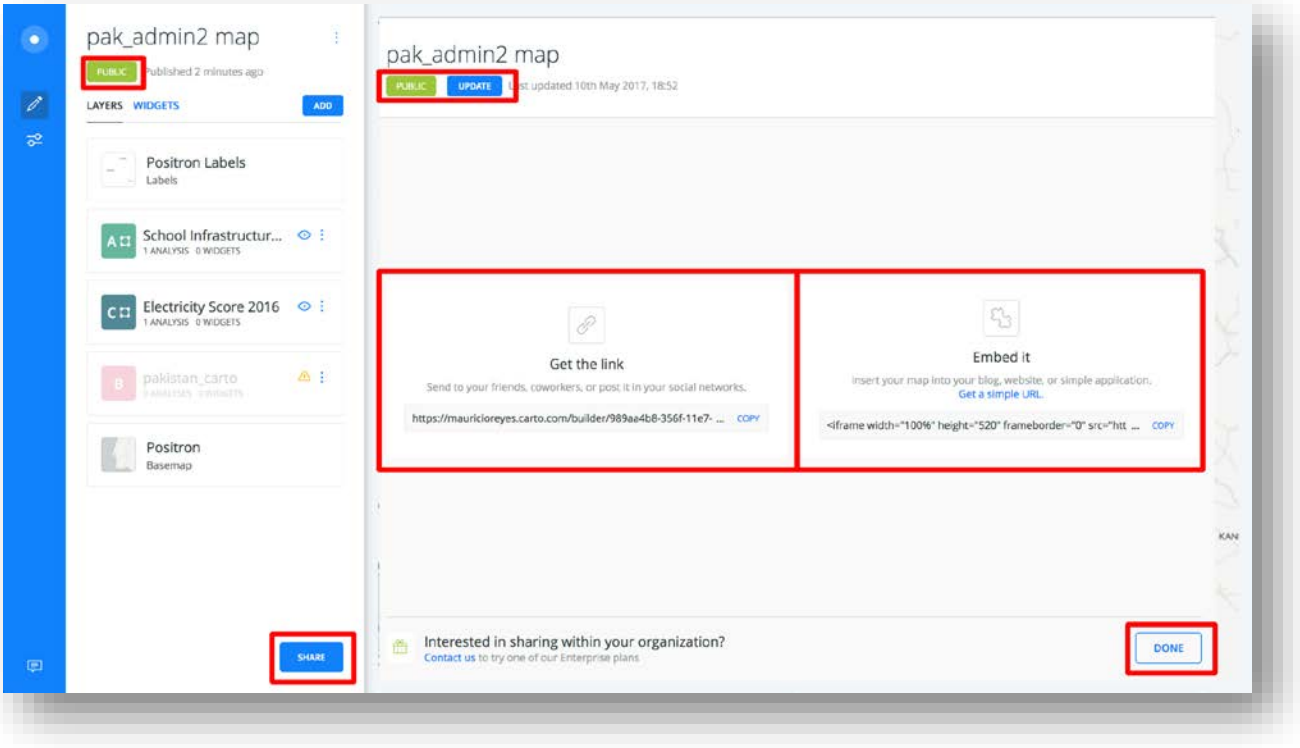
20. Go to STYLE – FILL – BY VALUE and select right_electricity, change color to something different from the last map.
21. The map does not change color or format. Go to Panel 1 on the left and in the third icon, select LAYER SELECTOR, and leave just Electricity Score 2016 in the Legend.



22. Change POP-UP (infowindow) and LEGEND as you did before.



23. Click on Share and the map will be public and shareable through a link or Embed Code.



24. https://mauricioreyes.carto.com/builder/989aa4b8-356f-11e7-ae9c-0e3ebc282e83/embed