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Tutorial Guide on Corona Outbreak Mapping with GIS

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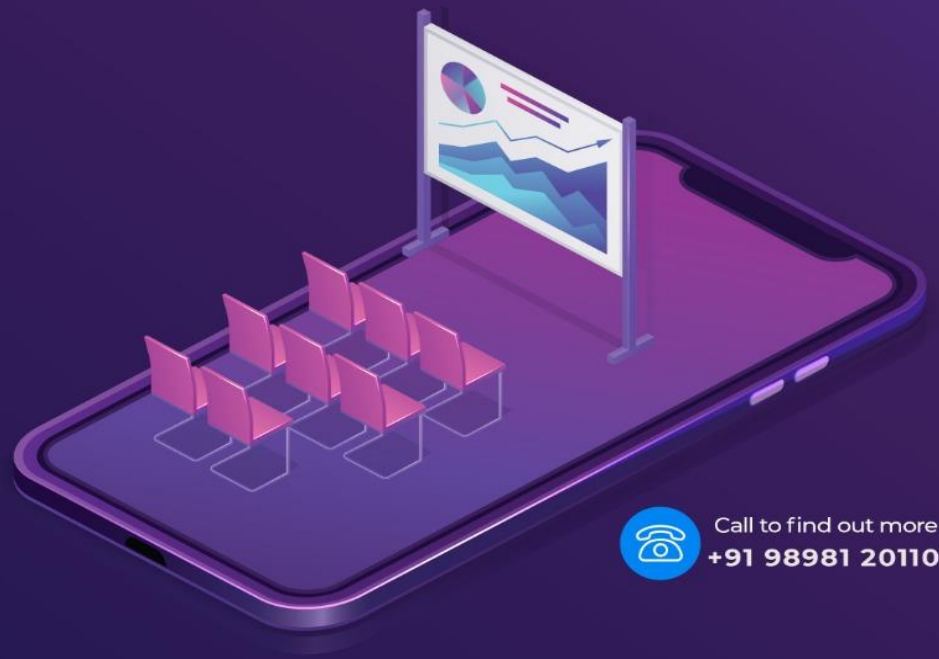
MAPPING ONLINE



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Map of Coronavirus (COVID-19) Cases in India

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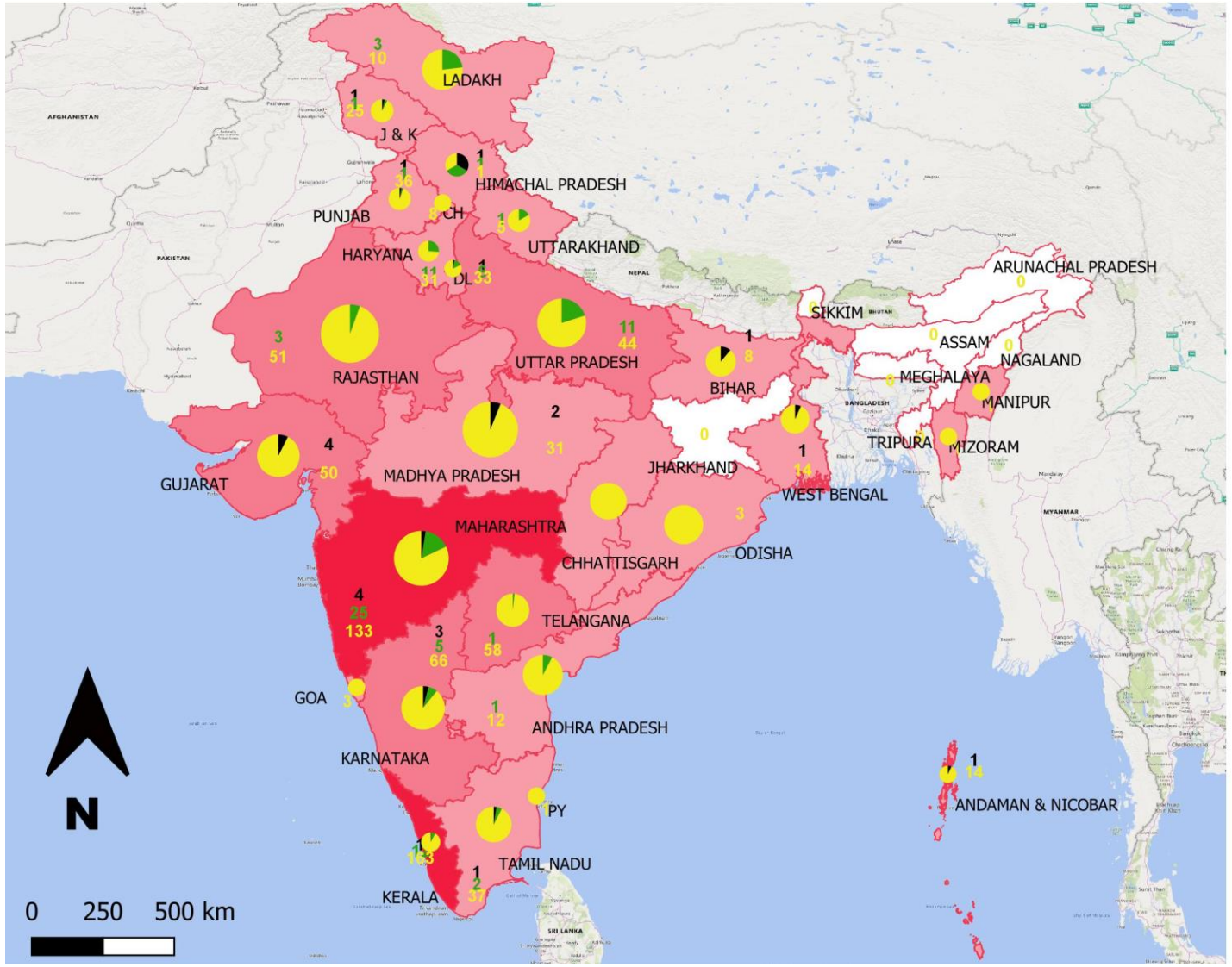
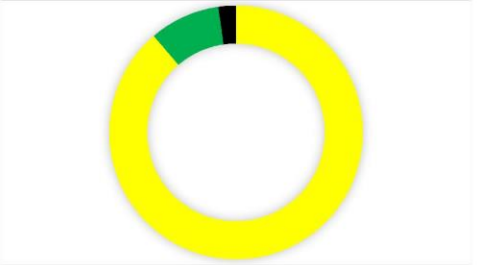




Active → 828

Recovered → 84

Deceased → 21

Legend

Covid-19 Cases
- 0
- 0 - 40
- 40 - 80
- 80 - 120
- 120 and above
- Active
- Recovered
- Deceased

Basemap: Bing Map

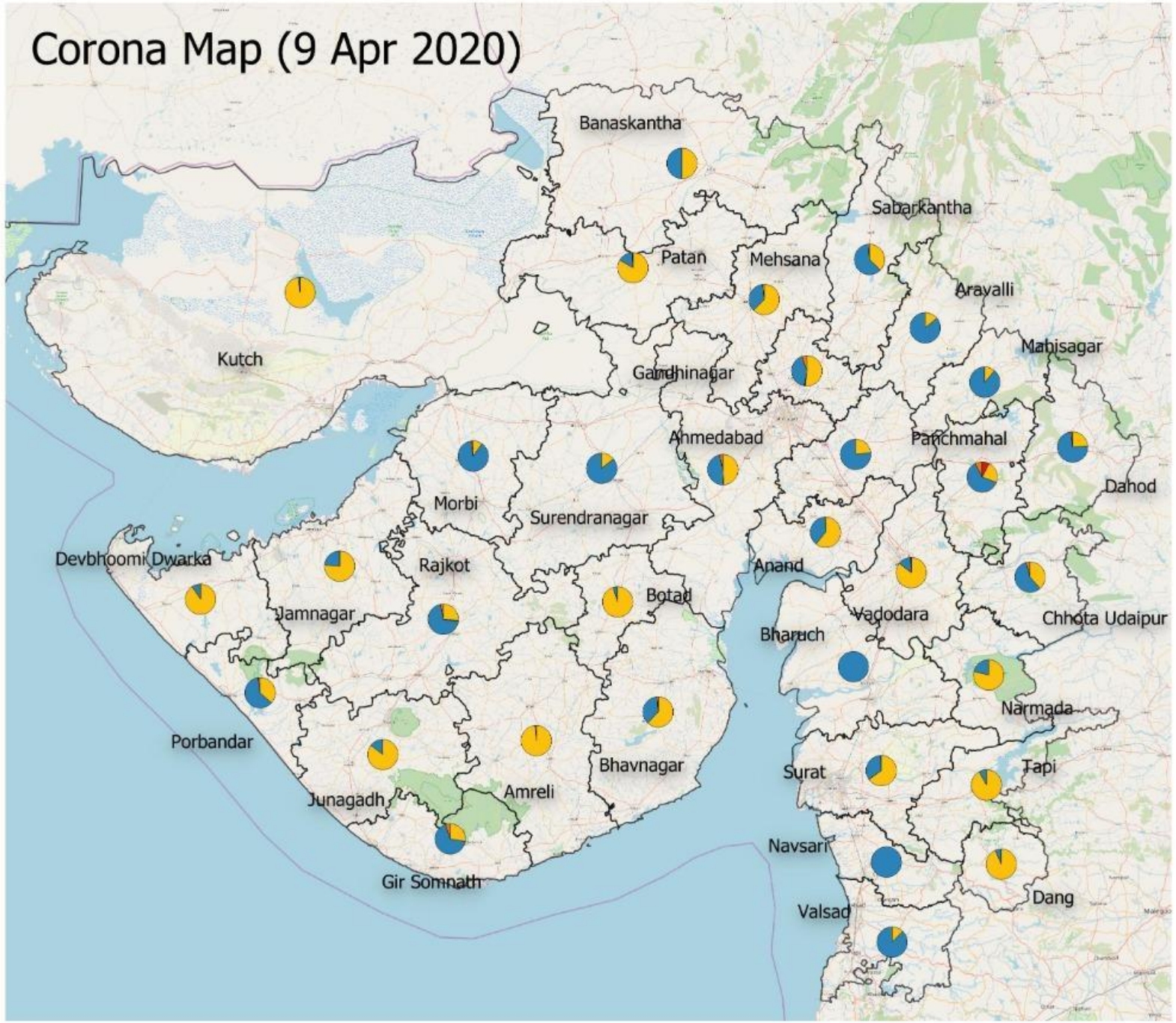
Abbreviations:
DL - Delhi
CH - Chandigarh (UT)
J & K - Jammu & Kashmir (UT)
PY - Puducherry (UT)

- **Check out our blog at** https://www.tgis.co.in/blog/

Map Author: Shrey Rakholia

Map based on Data from www.covid19india.org as of Mar 28, 5 PM IST.

Covid-19 Cases Data from https://www.covid19india.org/



0 250 500 km

Districts
Positive
Tested
Recovered
Quarantine
Deaths

Source: Covid19 Gujarat

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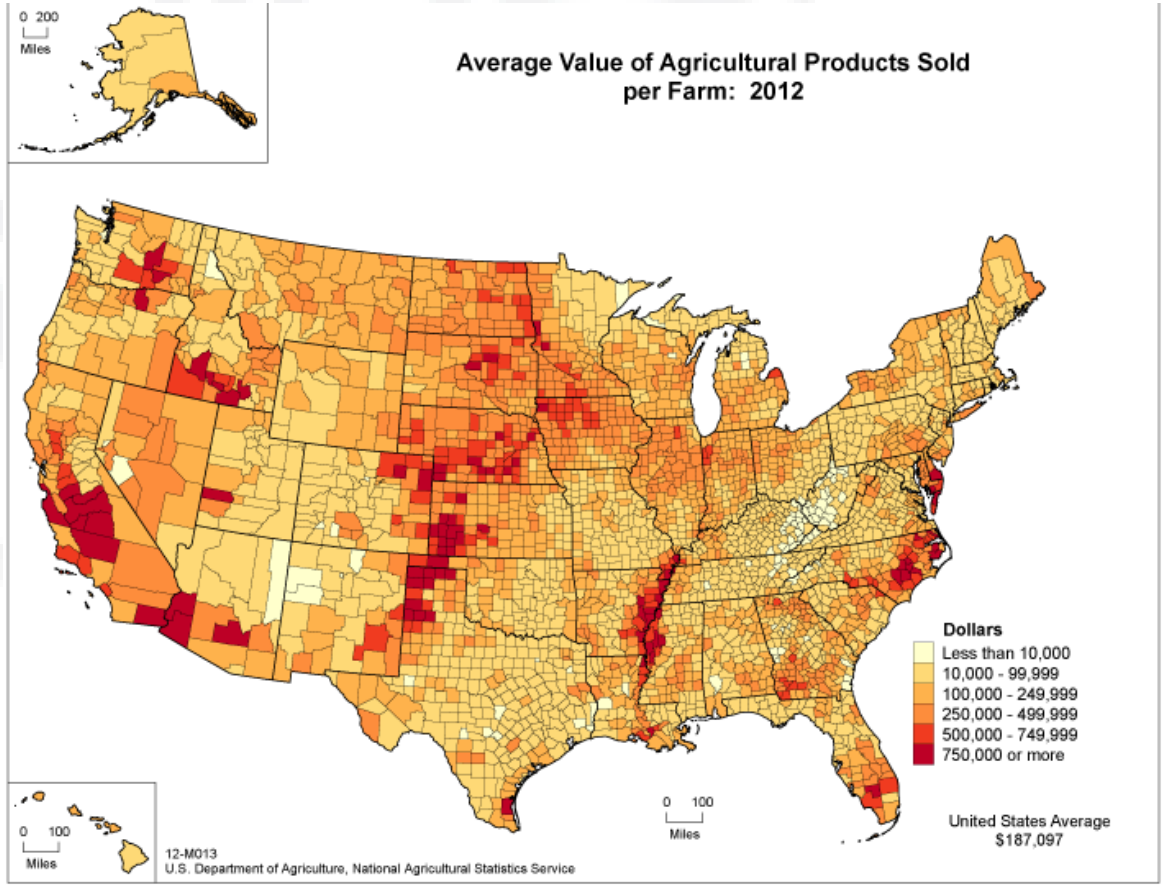
- **Gujarat(India) Coronavirus Cases map as of April 2020**
- **Few highlights of our current mapping project with local media and government**

Introduction

Introduction | Thematic Maps

Normal Reference Map vs Thematic Map



- **Reference Maps emphasize on objects and location**

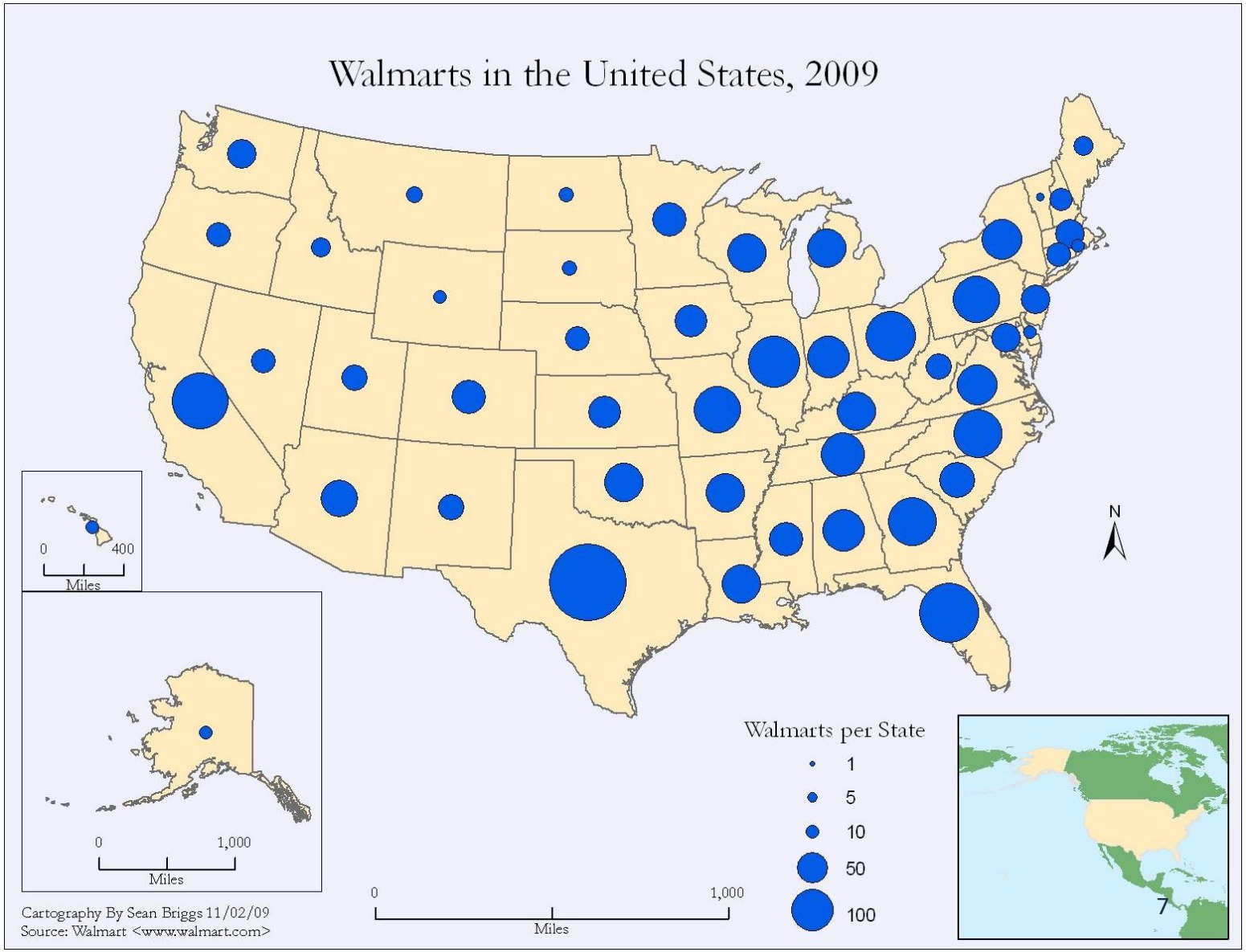
https://prd-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/s3fs-public/styles/full_width/public/printable2.png

- **Thematic Maps emphasize on a specific theme or subject**

https://cdn3.vox-cdn.com/assets/4565299/average_value__1_.gif

Proportional Symbols map

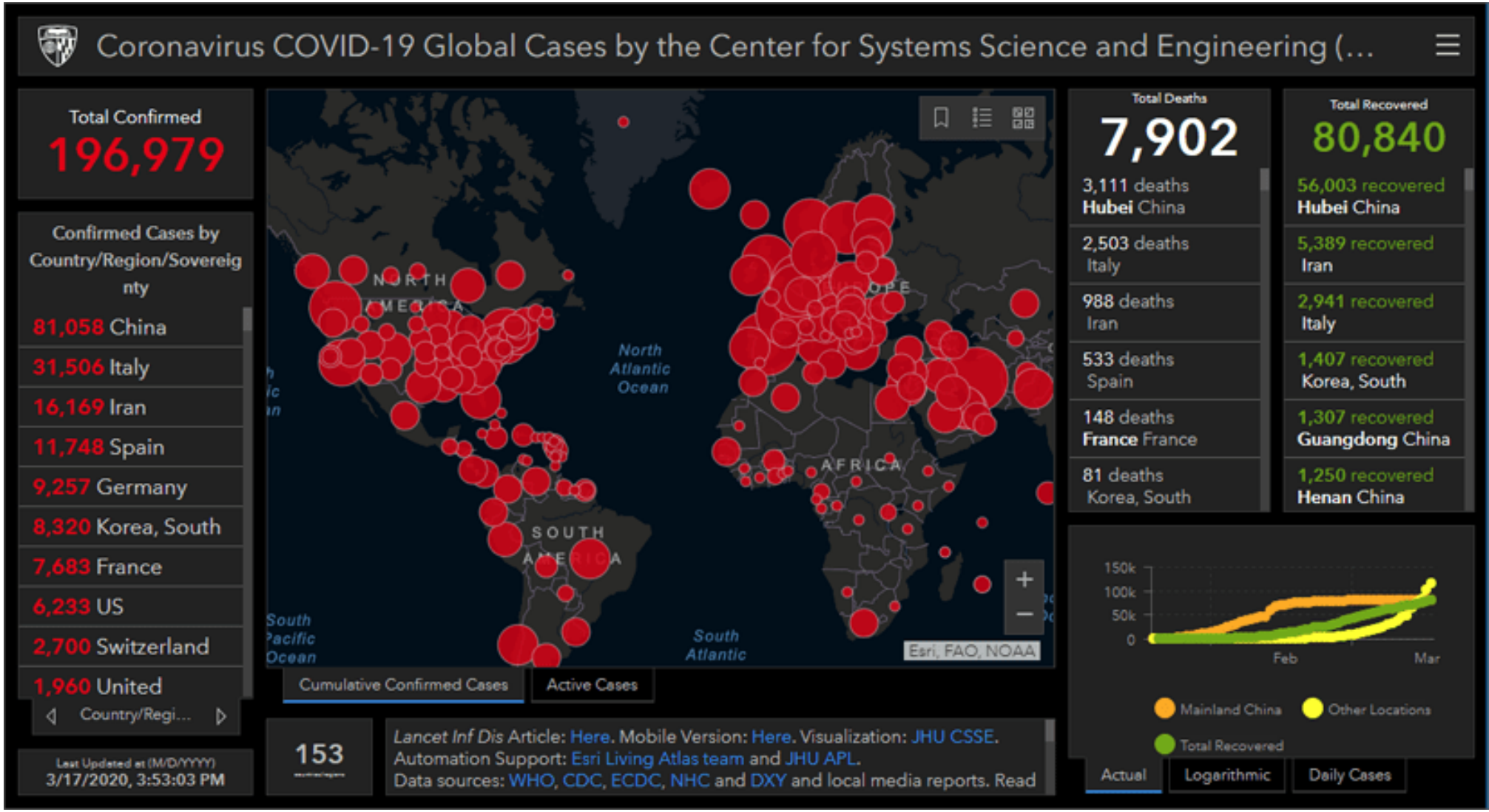
- **The proportion circles represent the values.**
- **Higher the value bigger the circle.**
- **The circles are scaled according to their data values.**



https://www.pinterest.ie/pin/325455510543808993/

Proportional Symbols map

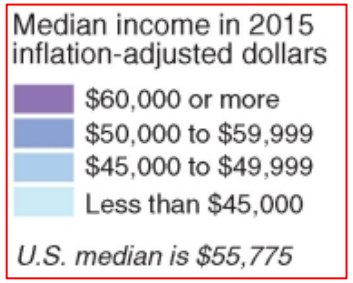
Johns Hopkins University (JHU) and ESRI's joint global dashboard



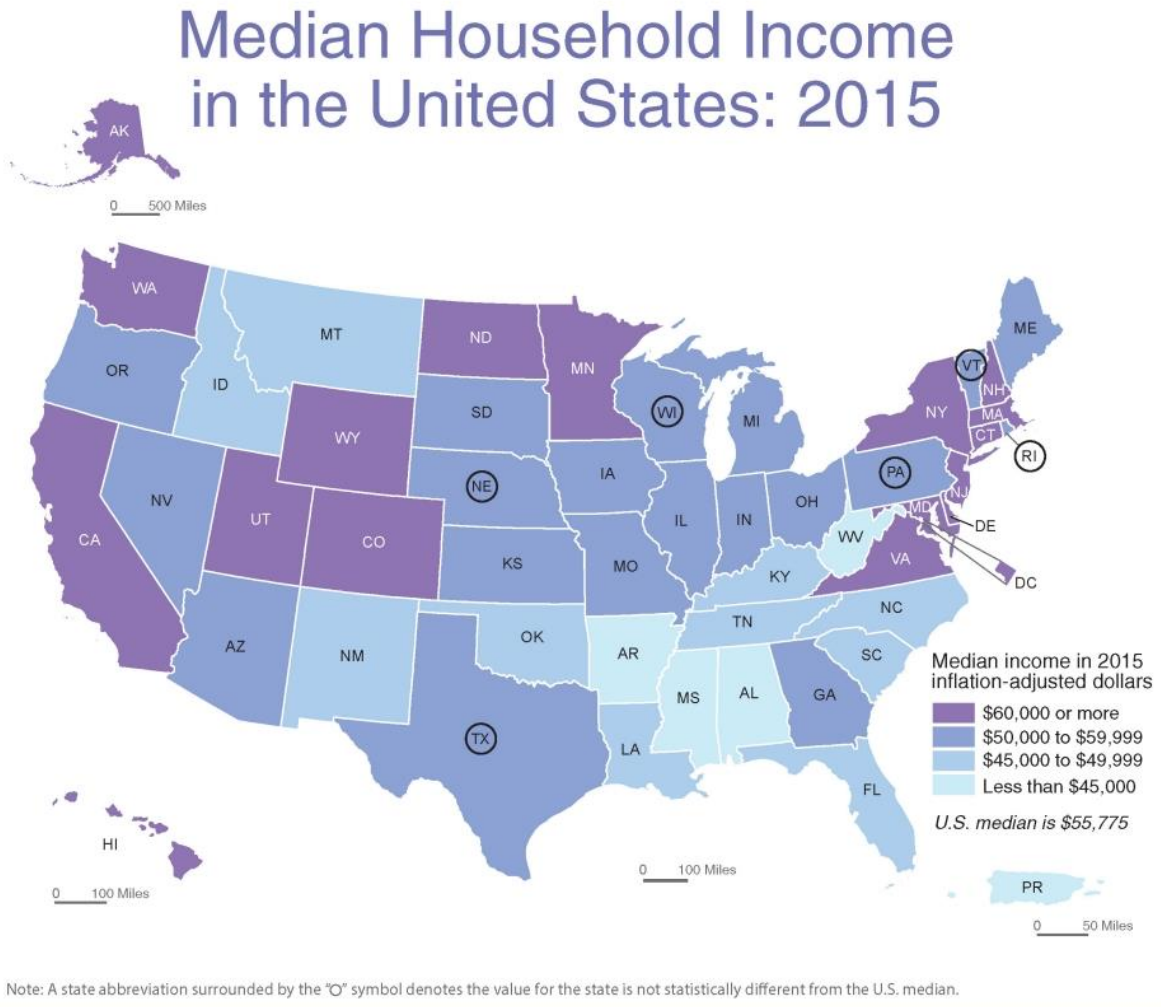
https://www.esri.com/arcgis-blog/wp-content/uploads/2020/03/march-21.png

Choropleth Maps

- **Areas are shaded accordingly to their respective values (in categories).**
- **Different shades corresponds to categories of income levels**



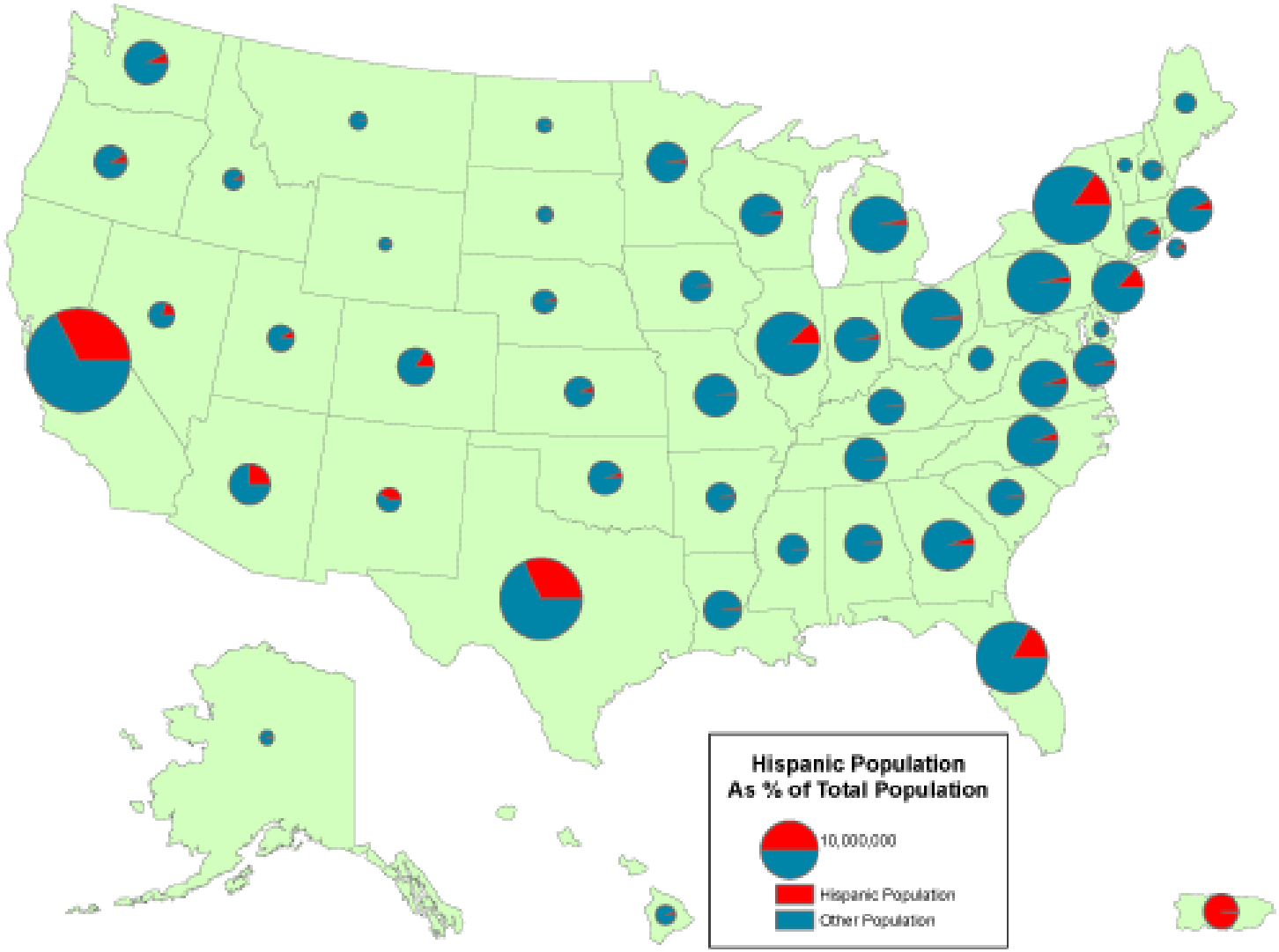
Progressing Income Levels (Darker shades)



https://www.census.gov/content/census/en/library/visualizations/2016/comm/cb16-158_median_hh_income_map/jcr:content/map.detailitem.950.high.jpg/1473973551390.jpg

Graphical Maps

- **Maps showing Pie charts**
- **Shows categorical difference**
- **The Pie-charts scaled to size depending on their values and showing proportion of ethnic groups (i.e. Hispanic and non-Hispanic)**



https://www.e-education.psu.edu/natureofgeoinfo/sites/www.e-education.psu.edu.natureofgeoinfo/files/image/hisp_pies.gif

What are we using in our Webinar exercise?

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Graphical Map

Pie-chart for showing values by three attributes:

- **Active cases**
- **Recovered cases**
- **Deceased cases**

+

Choropleth Map

Graduated colors for showing the value and assigning different shades for different categories of:

- **Confirmed cases**

Why are we using this?

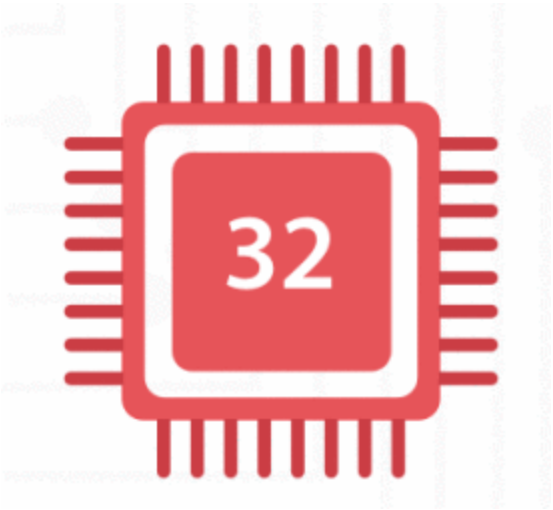
- **Because Proportional Plots which are currently being used does not show the status of recovery and deaths of Covid – 19 Patients.**
- **Combination of Choropleth and Charts will show all 4 attributes of Covid-19 Cases numbers together in a single map**

Tutorial Guide

Starting QGIS

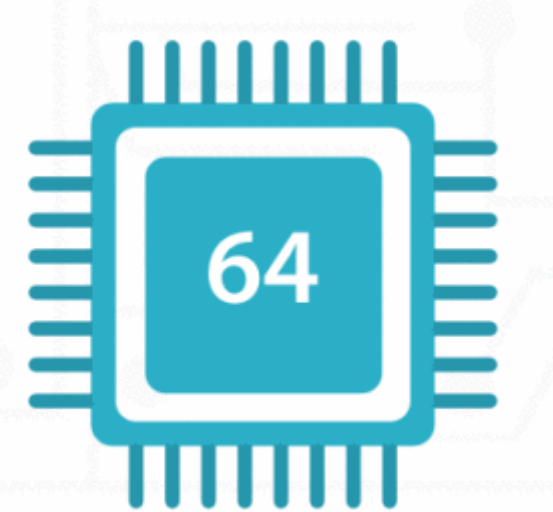
- **To Download latest QGIS stable version (QGIS 3.10 A Coruña) click the link below suitable to your computer requirements :**

32-bit



https://qgis.org/downloads/QGIS-OSGeo4W-3.10.5-1-Setup-x86.exe

64-bit



https://qgis.org/downloads/QGIS-OSGeo4W-3.10.5-1-Setup-x86_64.exe

Data requirements for this Exercise

- **You will need a Shapefile (for administrative boundaries Polygons) and a CSV file for Covid-19 Cases data.**

ESRI Shapefile format (.shp)

India_Southern_States.cpg	24-04-2020 21:21	CPG File	1 KB
India_Southern_States.dbf	24-04-2020 21:21	OpenOffice.org X...	3 KB
India_Southern_States.prj	24-04-2020 21:21	PRJ File	1 KB
India_Southern_States.shp	24-04-2020 21:21	SHP File	2,788 KB
India_Southern_States.shx	24-04-2020 21:21	SHX File	1 KB

Your shapefile must be with all the supporting files in your working folder as shown above

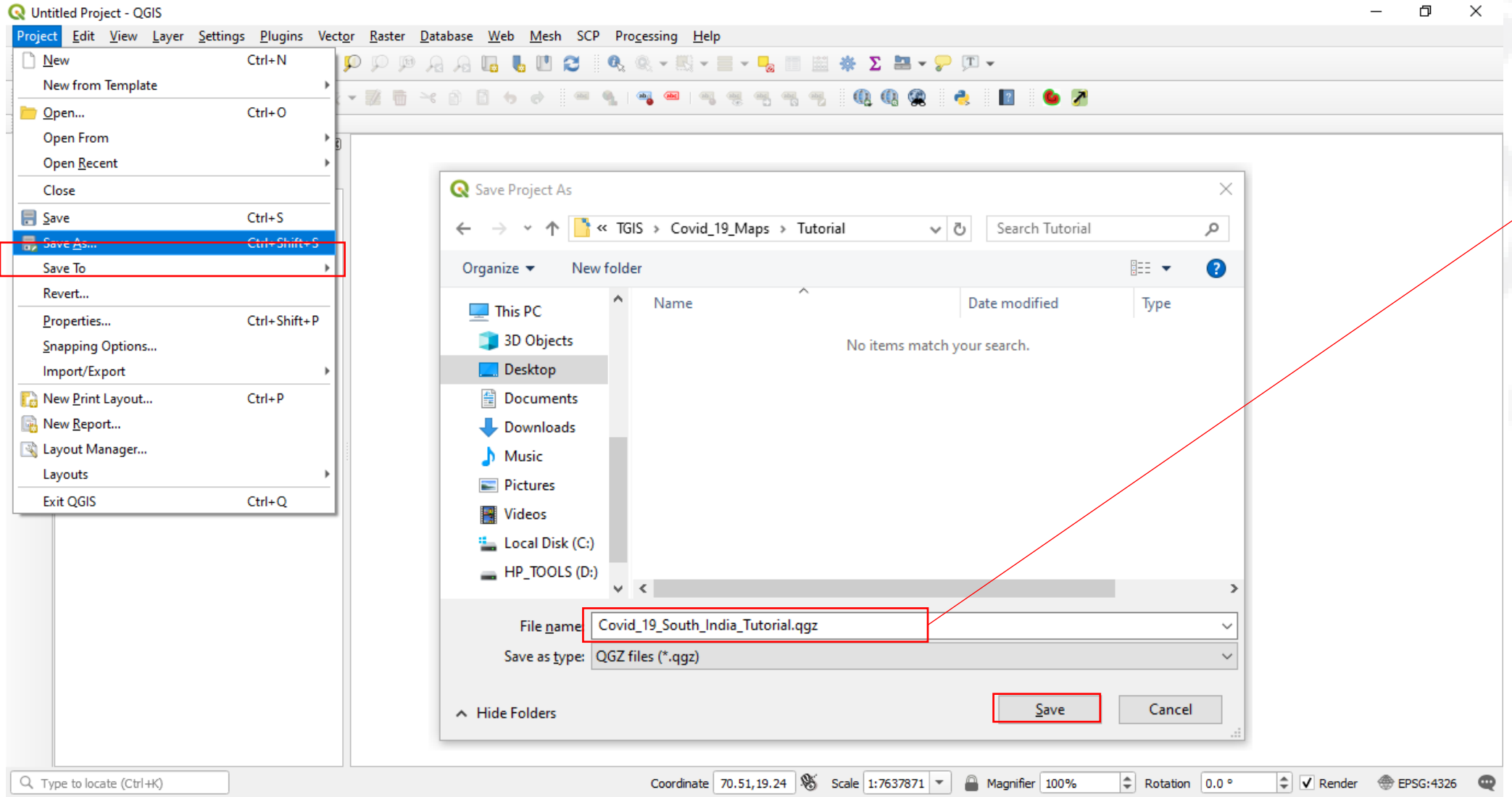
Comma Separated Values format (.csv)

	A	B	C	D	E	F
1	S_CODE	STATE/UT	CONFIRMED	ACTIVE	RECOVERED	DECEASED
2	37	ANDHRA PRADESH	266	258	5	3
3	20	KARNATAKA	163	147	12	4
4	32	KERALA	314	256	56	2
5	33	TAMIL NADU	571	558	8	5
6	36	TELANGANA	334	290	33	11

(Sample) Your CSV file must contain data for Covid-19 Cases in the format as shown above

Creating New Project

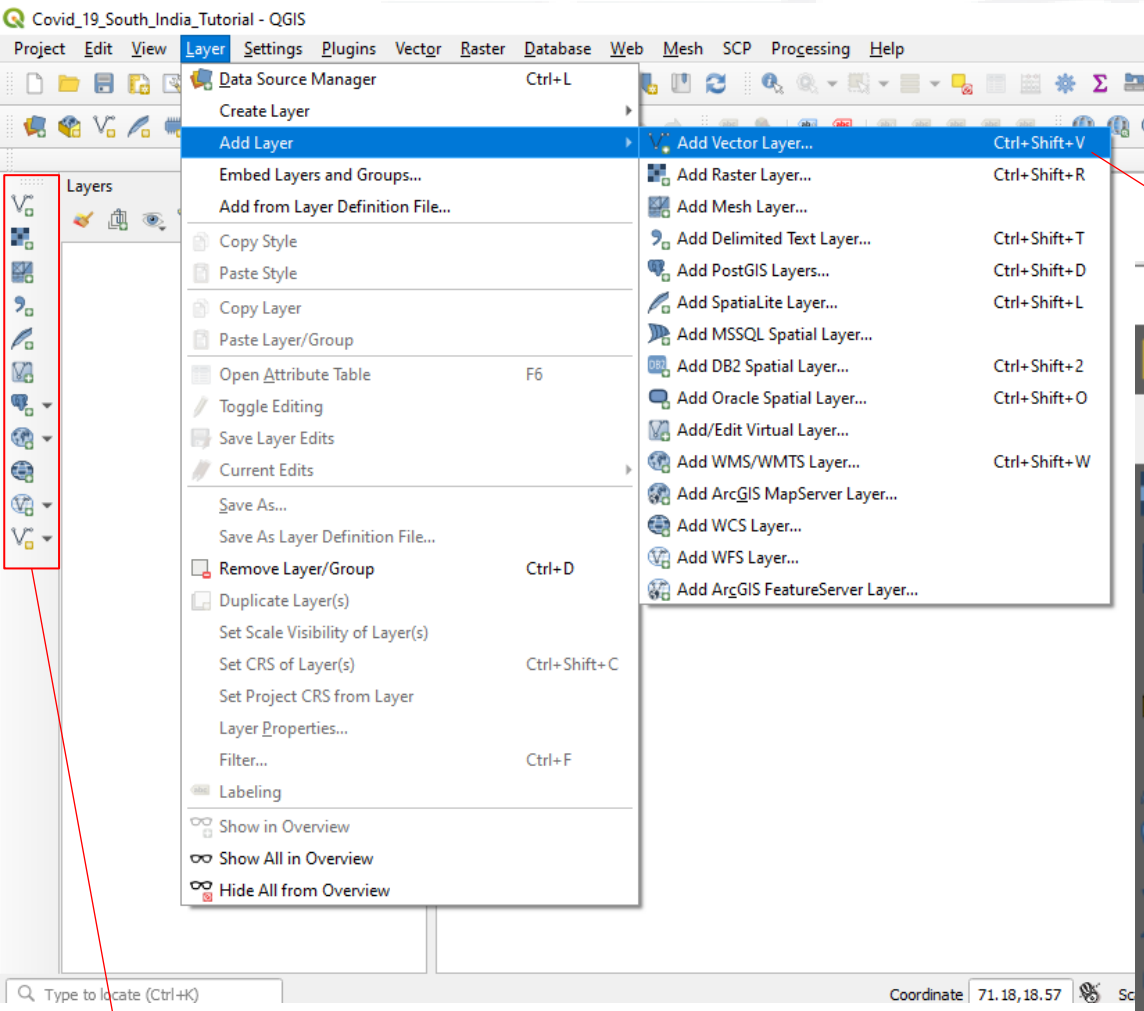
- **Open QGIS ⟶ Go to Project in the top Menu Toolbar ⟶ Save As**

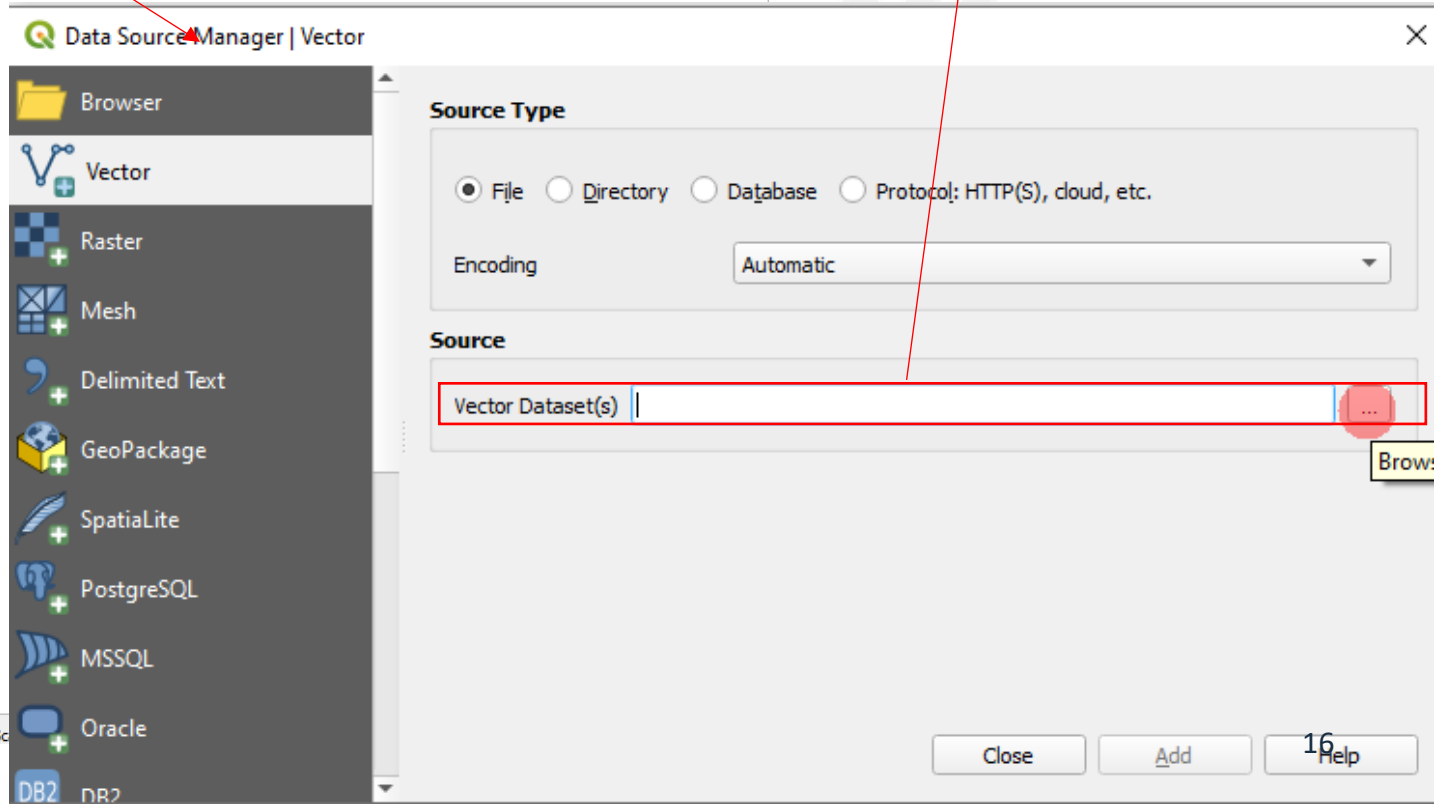


Give an Intuitive name and click Save in your chosen folder

Loading the Shapefile

- **Go to Layer in the top Menu Toolbar ⟶ Add vector Layer ⟶ Add the shapefile (.shp) from your folder and Close**

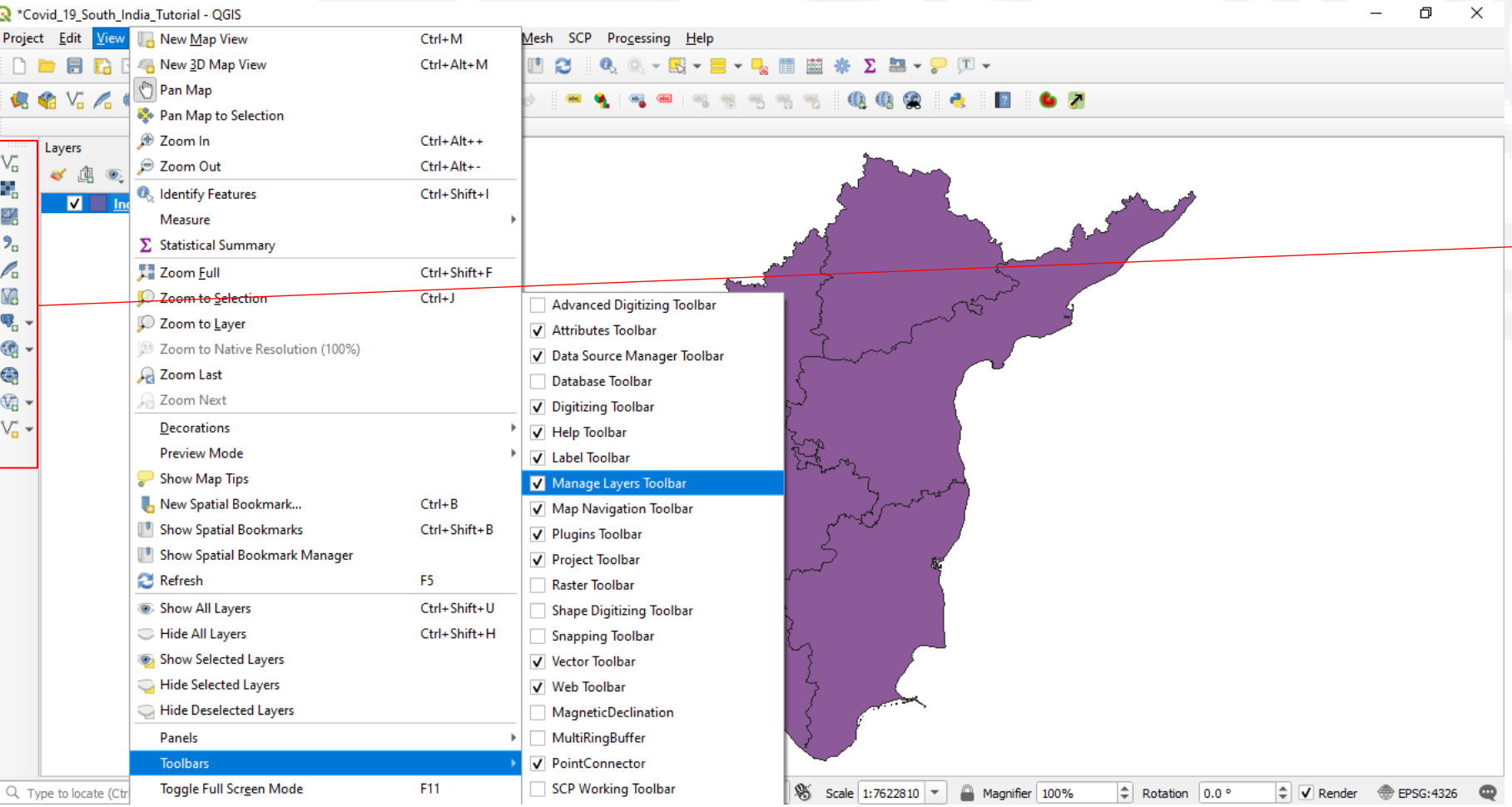




To turn this sidebar on if you don't have it by default follow next slide

Turning on the Manage layers side bar

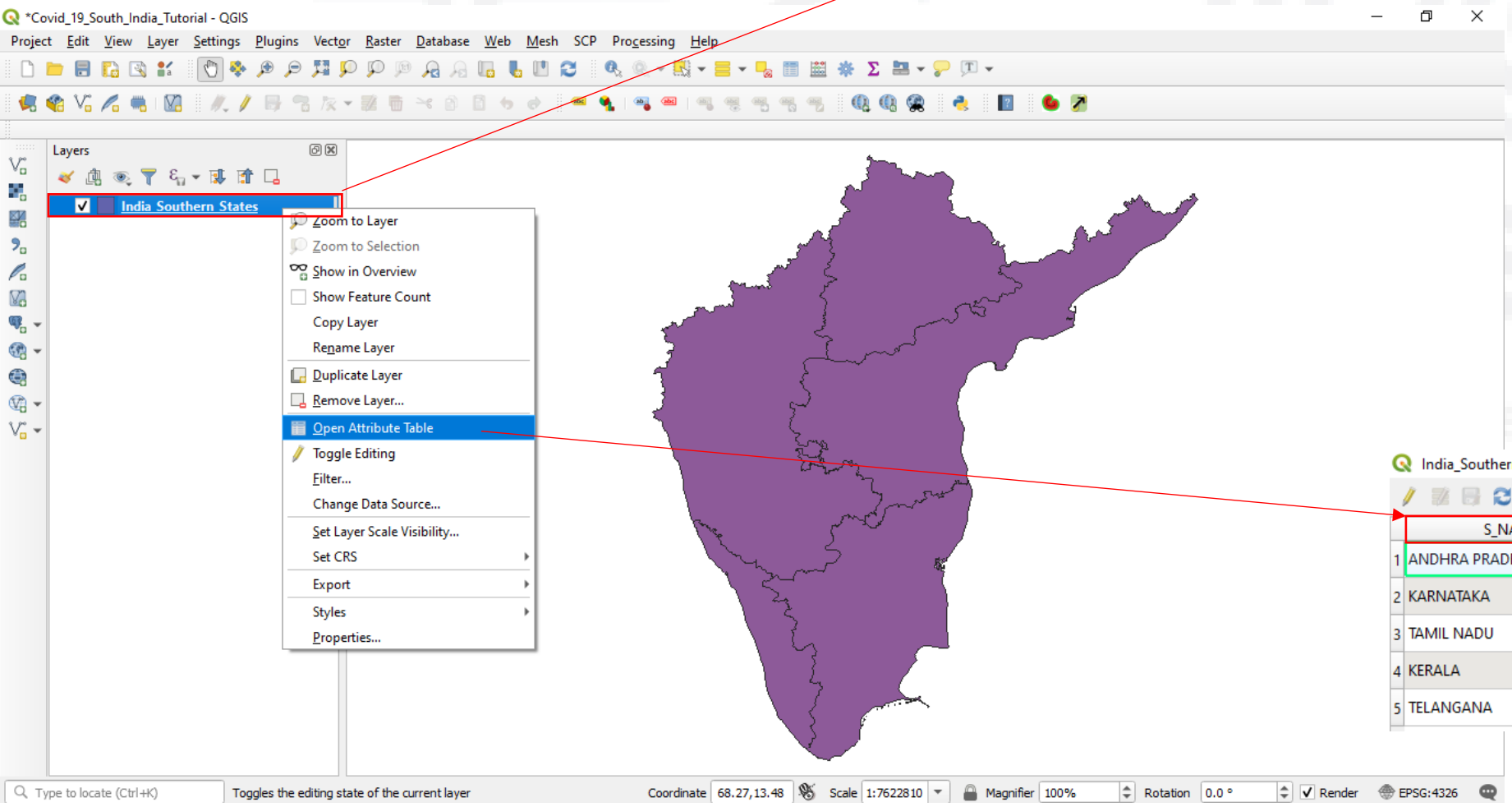
- **Go to View in the top Menu Toolbar ⟶ Toolbars ⟶ Check the box of manage Layers Toolbar**



Now you can use the sidebar for managing layers

Observe the Shapefile

- **Once Shapefile is loaded ⟶ Right-Click on it and Open Attribute Table**



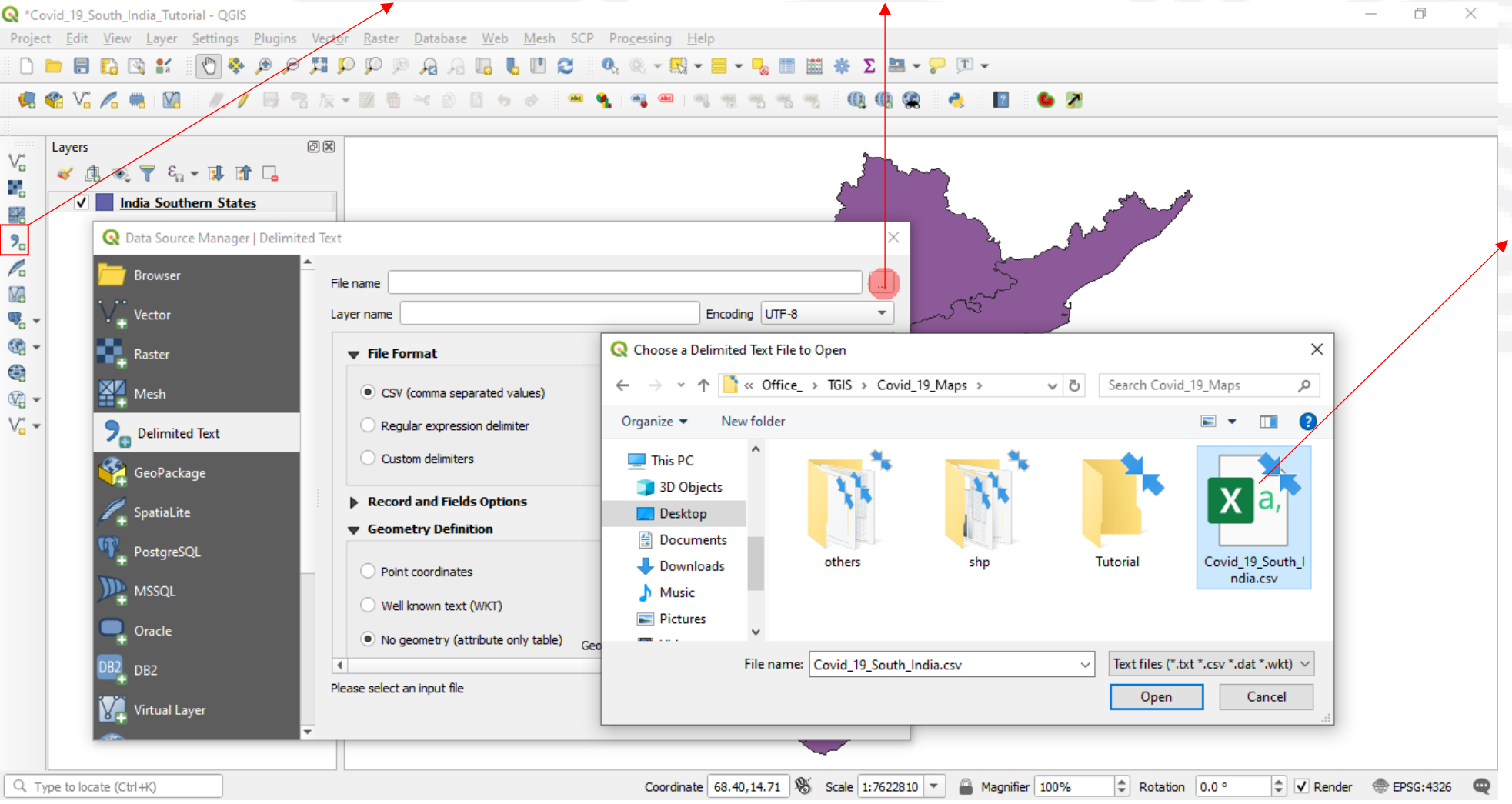
Observe the attribute table and make sure there is atleast one field which is of the same as the CSV (e.g. here 'S_Name' field is similar to CSV)

India_Southern_States :: Features Total: 5, Filtered: 5, Selected: 0

	S_NAME	S_CODE	layer	path
1	ANDHRA PRADESH	37	States	C:/Users/Janha...
2	KARNATAKA	20	States	C:/Users/Janha...
3	TAMIL NADU	33	States	C:/Users/Janha...
4	KERALA	32	States	C:/Users/Janha...
5	TELANGANA	36	States	C:/Users/Janha...

Loading the CSV file

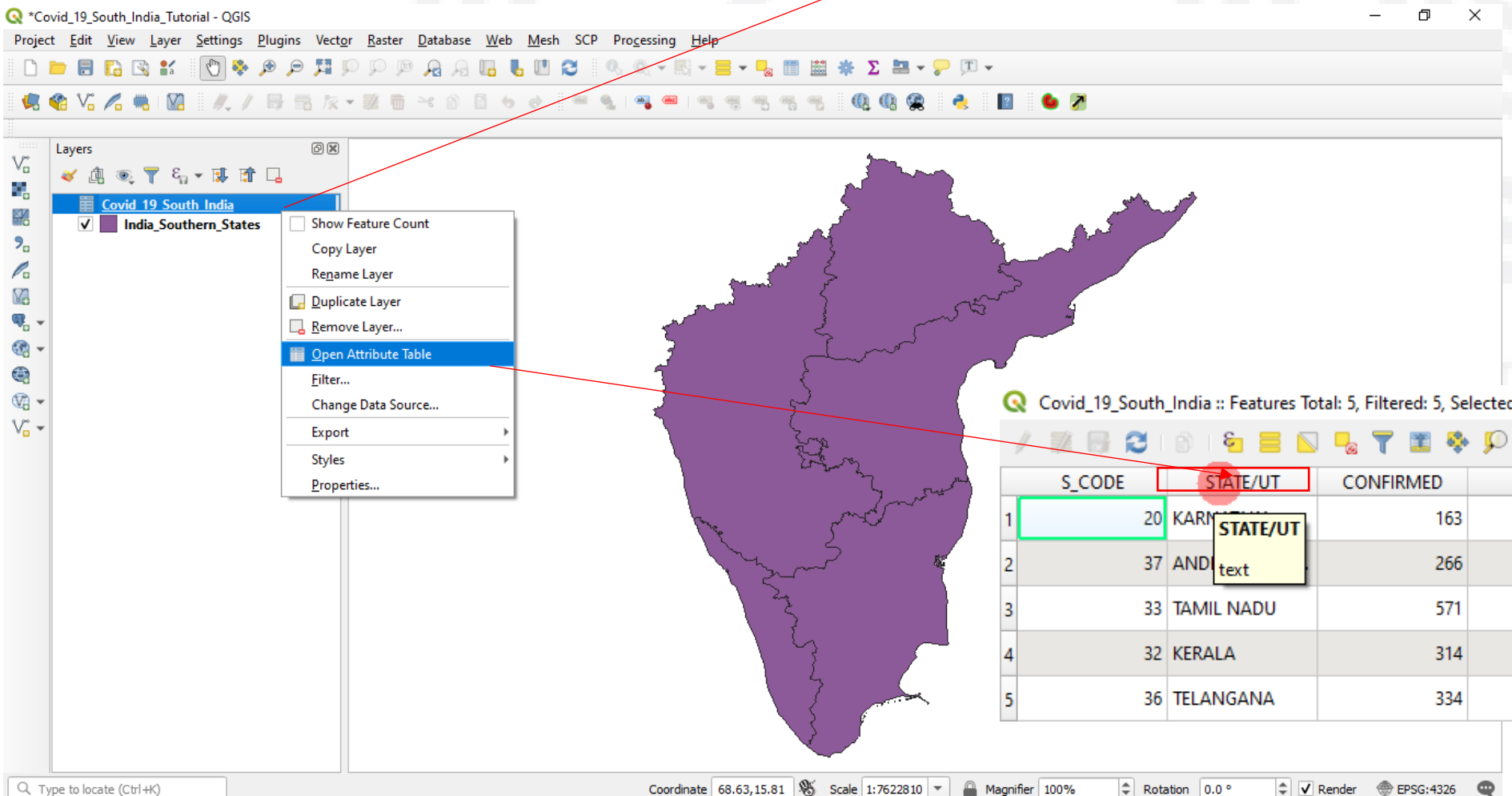
- **Add Delimited Text Layer ⟶ Open the folder where CSV is present**

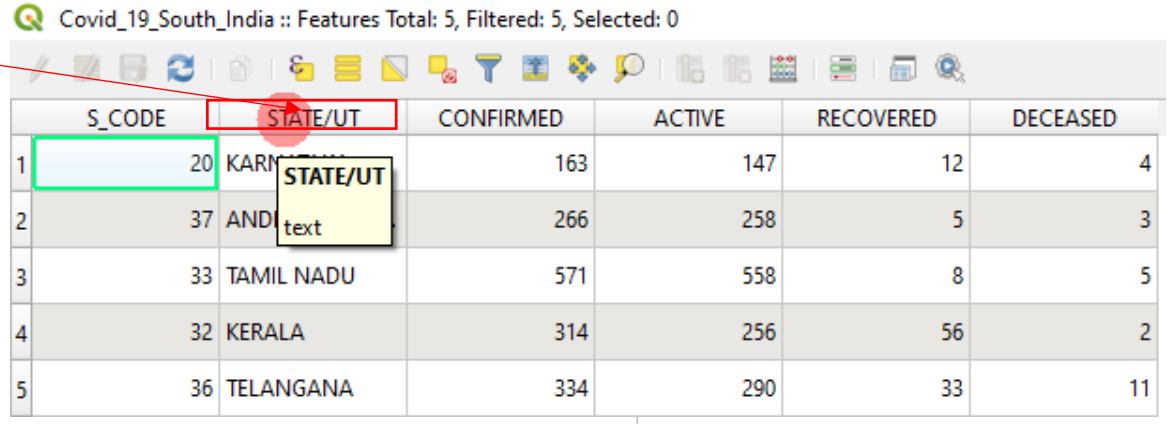


Select the file click Open and once loaded Add and Close

Observe the CSV file

- **Once CSV is loaded ⟶ Right-Click on it and Open Attribute Table**

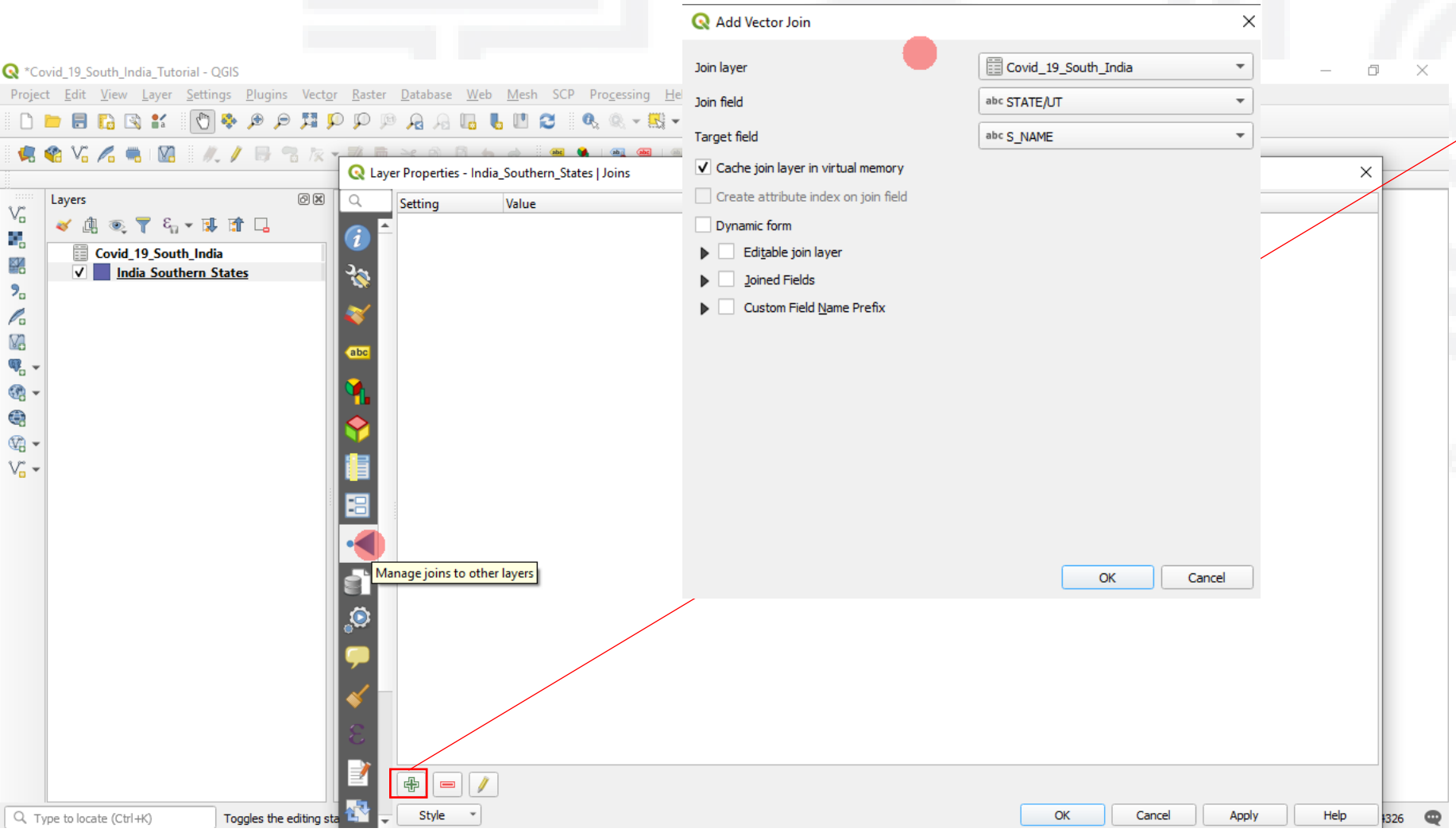




Observe the attribute table and check which field is matching with the attribute table (here we can see 'STATE/UT' field is matching with 'S_NAME' in the shapefile

Joining the CSV data with the Shapfile

- **Right Click on the Shapefile ⟶ Go to Manage joins button ⟶ Add new join**



Then,
Join layer = your CSV table
Join field = field with similar entries (in the shapefile)
Target field = field with similar entries (in the CSV)

Click OK and Apply

Observe the attribute table in the Shapefile

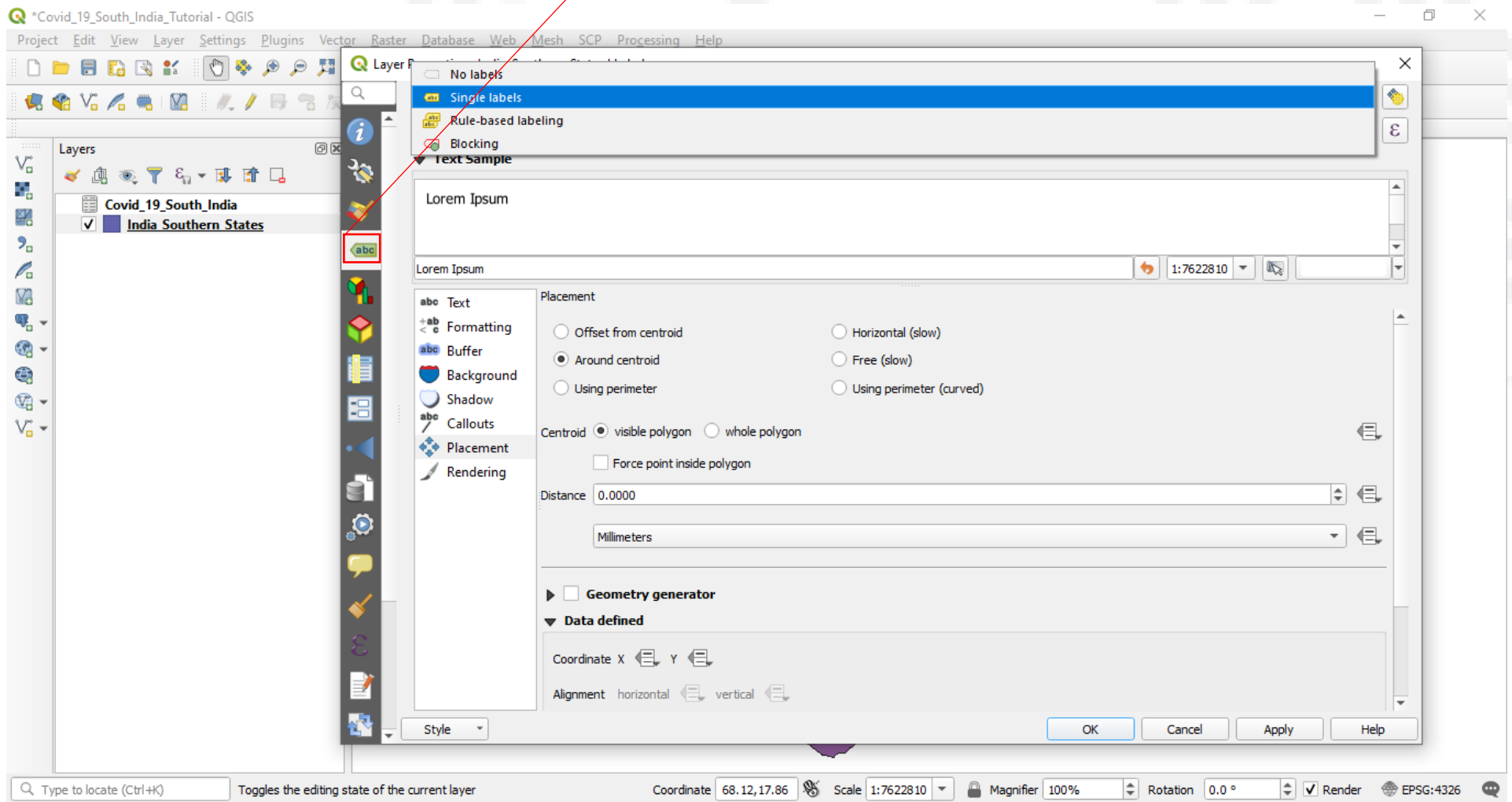
- **Right Click on the Shapefile ⟶ Open Attribute Table ⟶ See that all your required data fields have now been joined to the shapefile**

India_Southern_States :: Features Total: 5, Filtered: 5, Selected: 0

	S_NAME	S_CODE	layer	path	Covid_19_South_India_S_COD	id_19_South_India_CONFIRM	Covid_19_South_India_ACTIVE	ovid_19_South_India_RECOVERE	Covid_19_South_India_DECEASED
1	KERALA	32	States	C:/Users/Janha...	32	314	256	56	2
2	ANDHRA PRADESH	37	States	C:/Users/Janha...	37	266	258	5	3
3	KARNATAKA	20	States	C:/Users/Janha...	20	163	147	12	4
4	TAMIL NADU	33	States	C:/Users/Janha...	33	571	558	8	5
5	TELANGANA	36	States	C:/Users/Janha...	36	334	290	33	11

Labelling the Polygons (States)

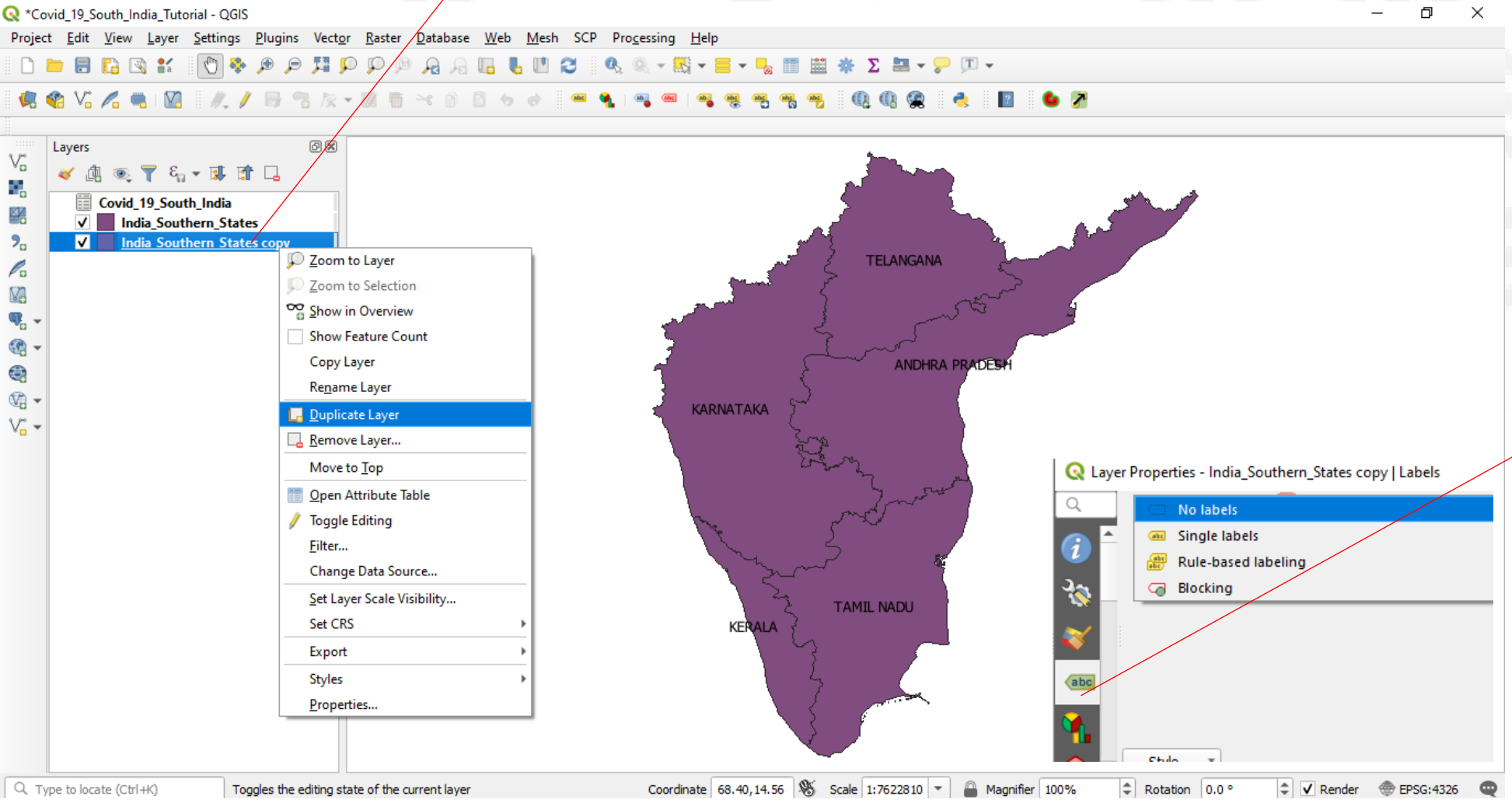
- **Open properties ⟶ Click on abc labeling button ⟶ Single Labels ⟶ In Placement**



Select any placement style you want e.g. Around Centroid

Duplicating for Overlay

- **Right click on Shapefile ⟶ Duplicate layer (Must be below the original one)**



Select the duplicated file

Open Properties

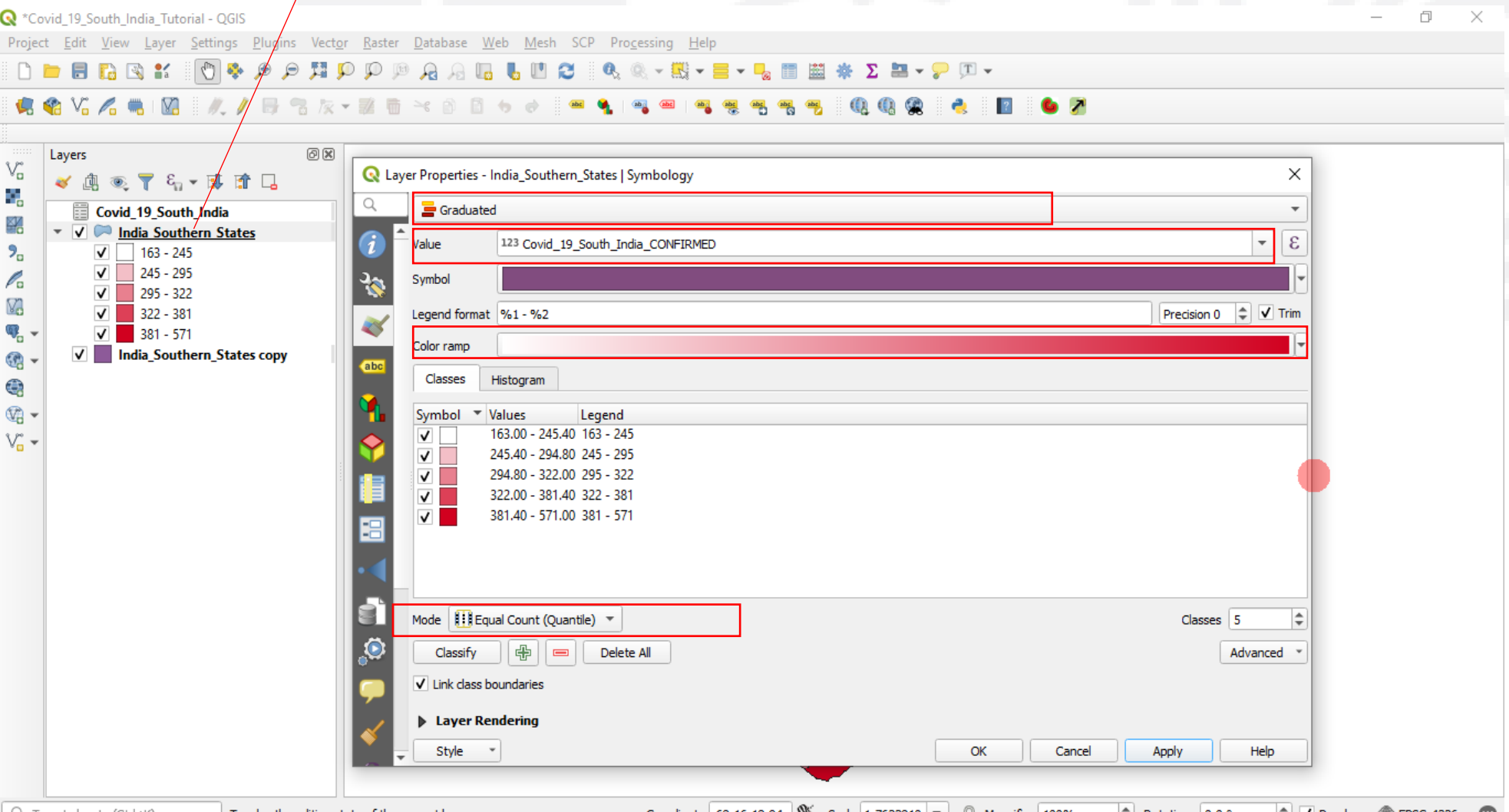
Again on Labels

Select 'No Labels'

Apply and OK

Creating Choropleth Map

- **Right click on the original shapefile (shp1) ⟶ Properties ⟶ Go to Symbology**



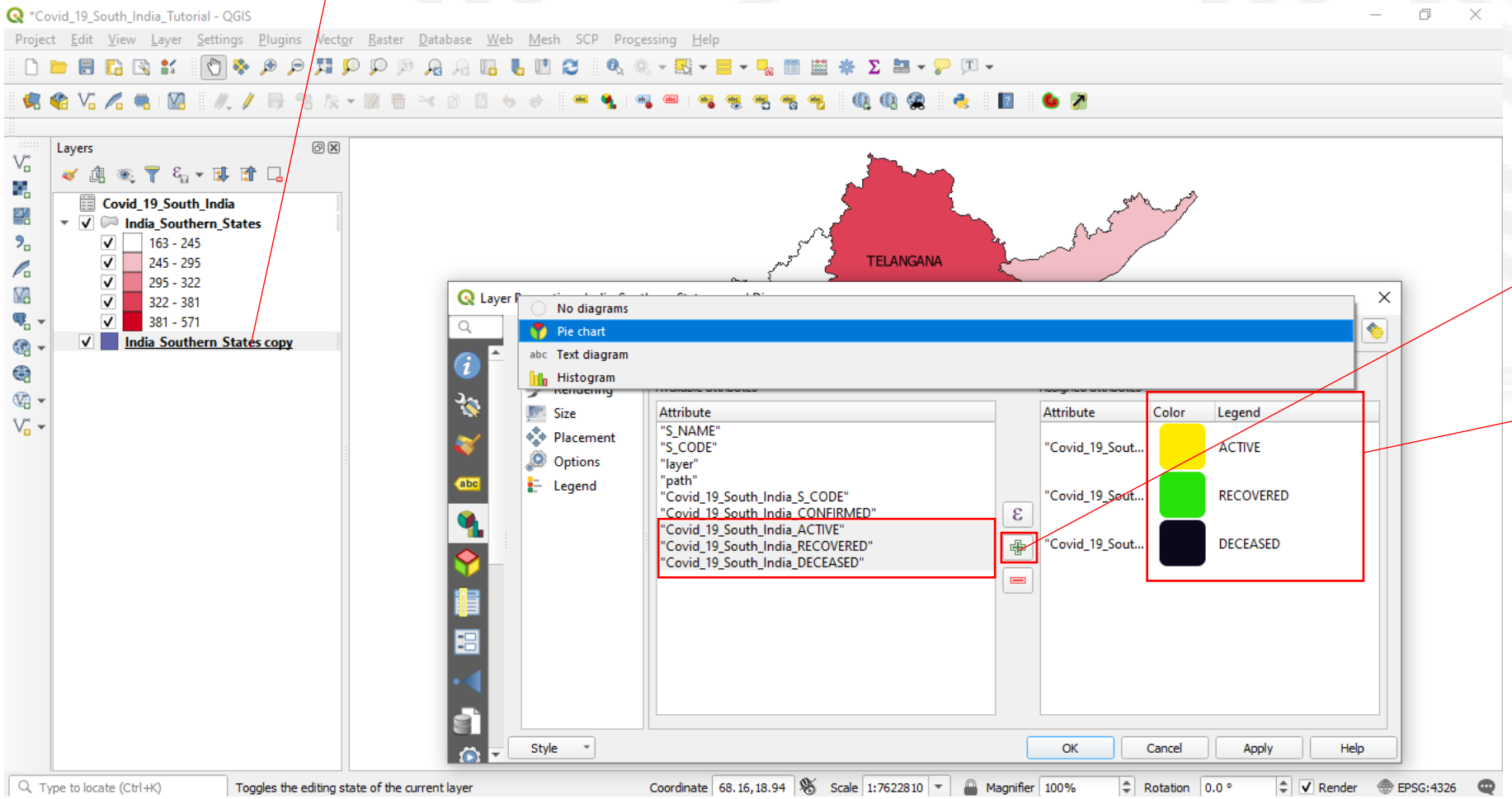
Then, Select graduated symbols, Value = Confirmed Cases, Color ramp = any but lighter to darker shade, Mode = Select one which is desirable here

Classify

Apply and OK

Creating Pie-Chart Map

- **Right click on the duplicate shapefile (shp2) ⟶ Properties ⟶ Go to Diagrams**



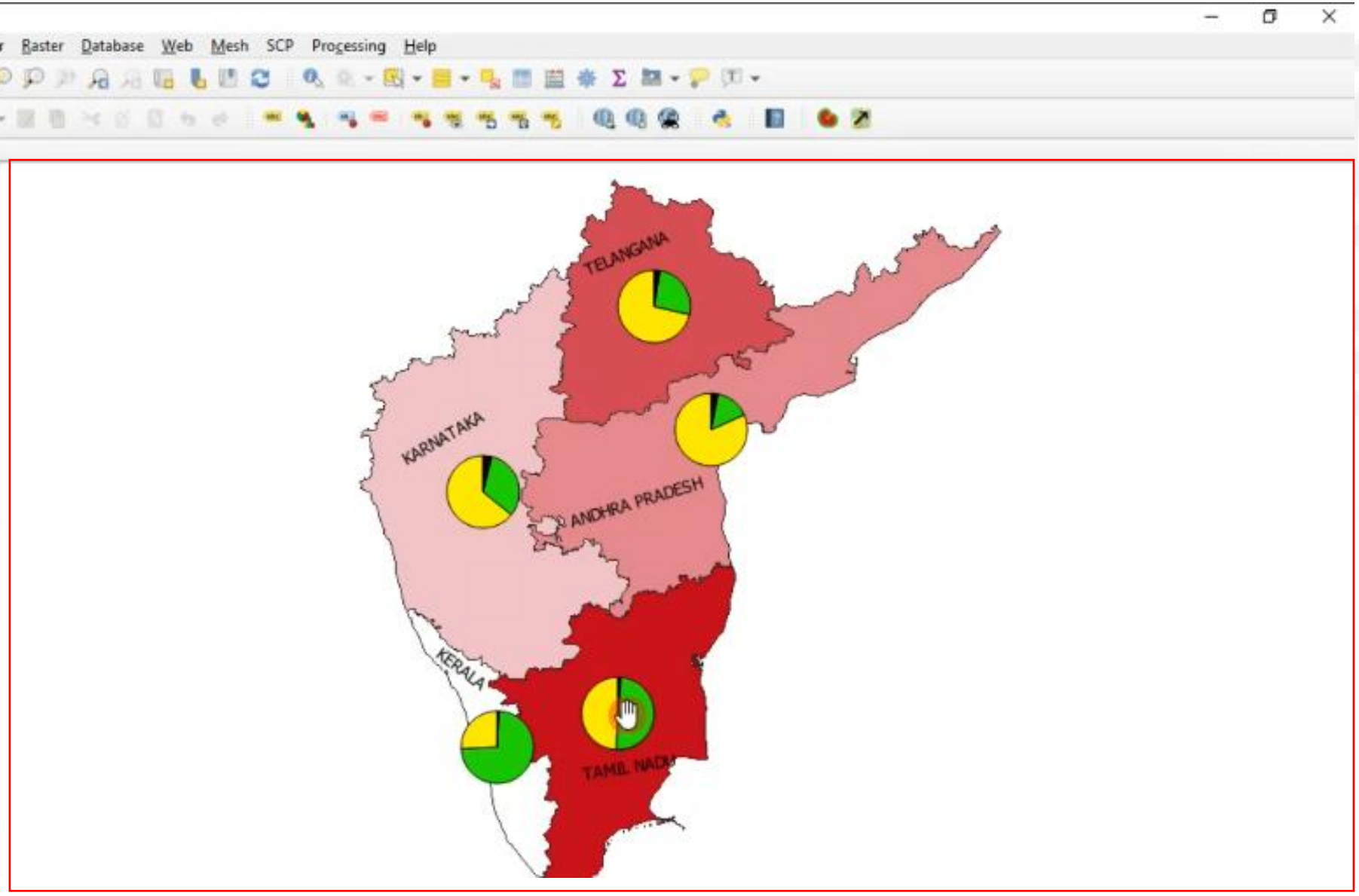
Select Pie Chart

Add those three attributes whose proportion we want to see in the Pie charts

Give intuitive Colors to each attribute and rename legends if you need

Apply and OK

Check the Map progress



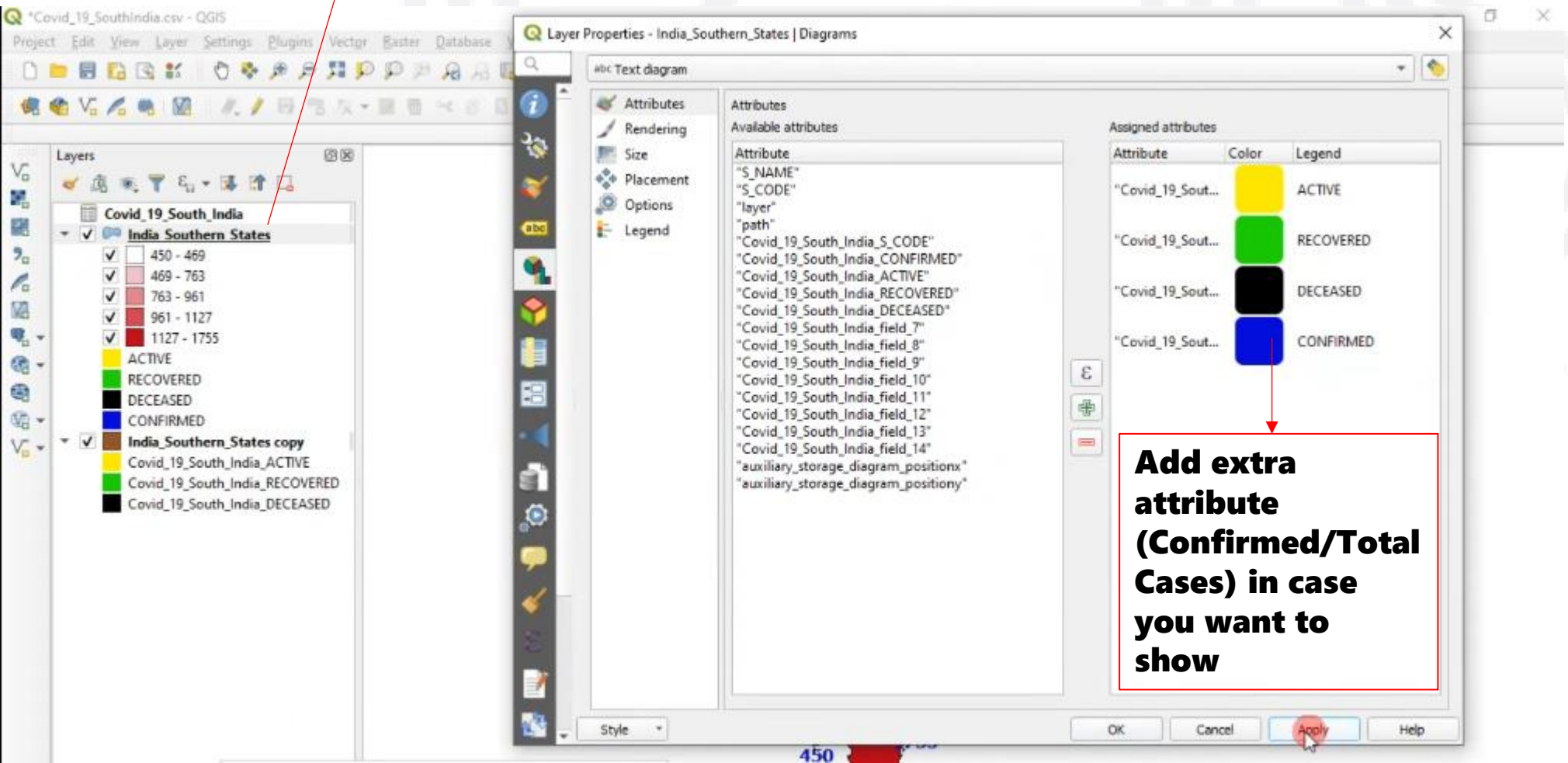
- **Until now the data frame should look something like this (sample data frame only)**

- **It should include :**
- **Labels (States) ✓**
- **Pie Charts ✓**

- **Still we require count labels to our Pie charts as we can't see the number of cases on the map yet so to show that we have to add Text Diagram**

Adding Text Diagram

- **Right click on the original shapefile (shp1) → Properties → Go to Diagrams**



Select Text Diagram

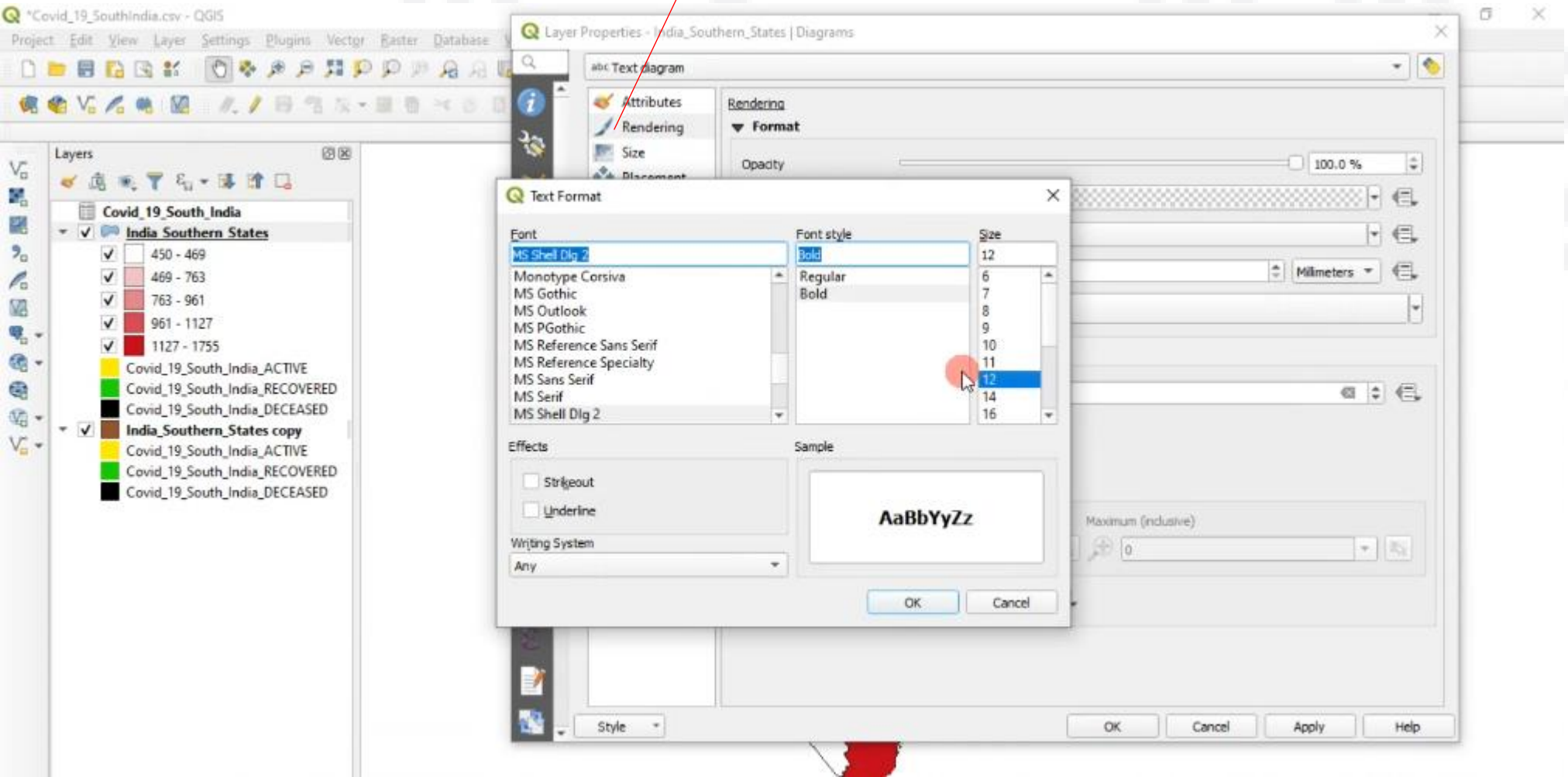
Add those same three attributes we added for Pie chart

Give the same colors and legend as the Pie chart

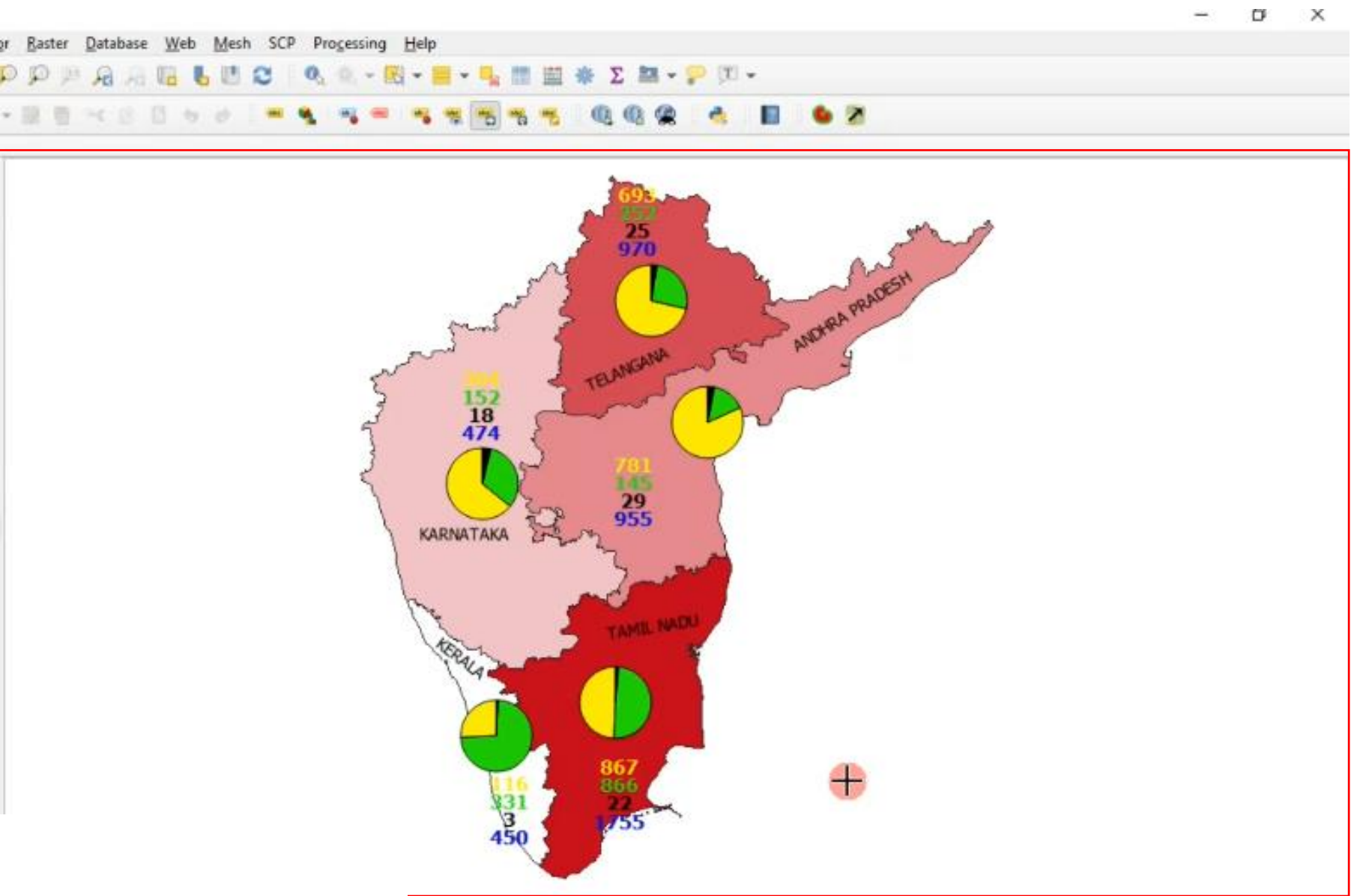
Apply and OK

Setting Font Size in Text Diagrams

- **Under Text Diagram ⟶ Go to Rendering ⟶ Font ⟶ You can change your Font type, Style and Size from here**



Check the Map progress



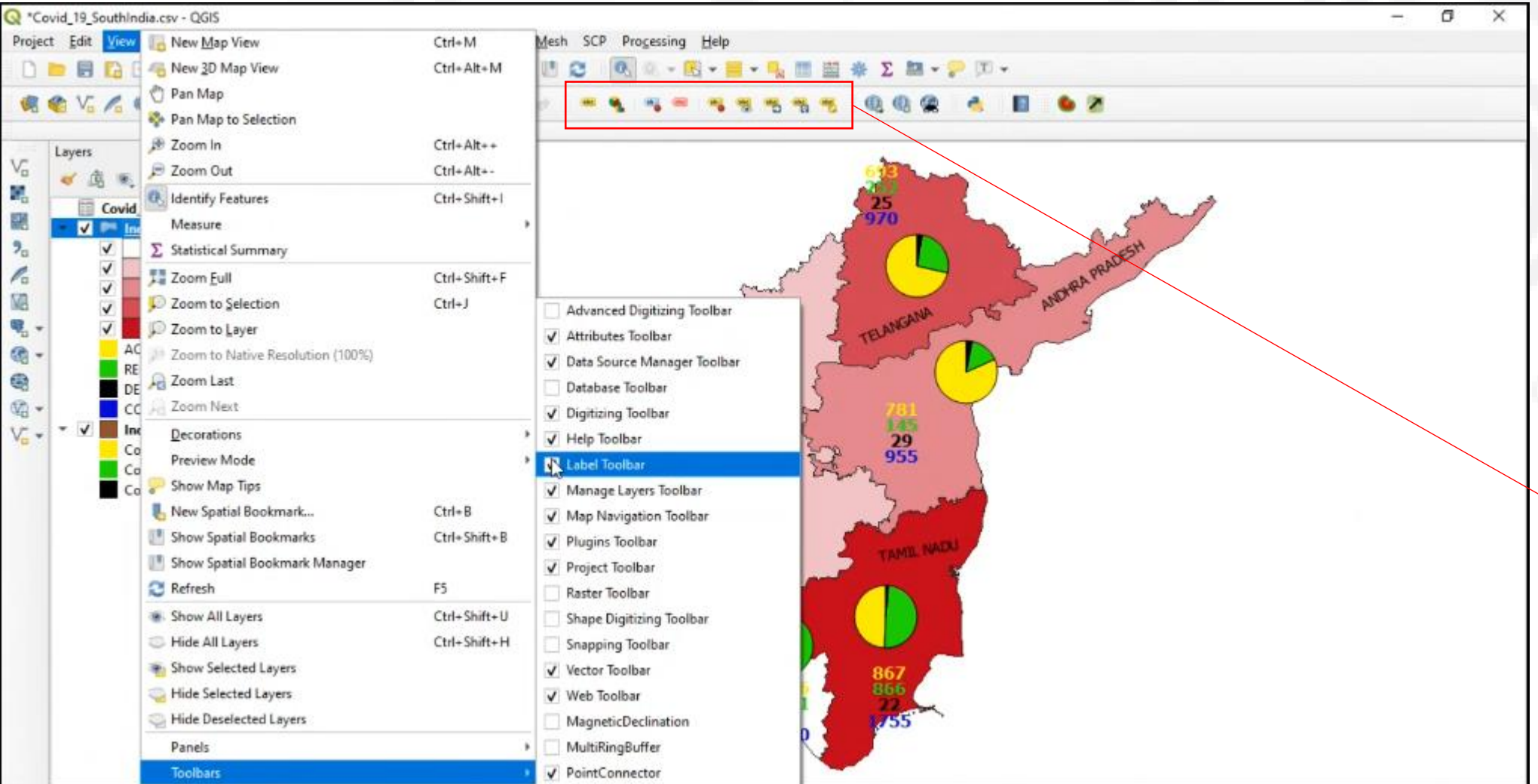
- **Now data frame should look something like this (sample data frame only)**

- **It should include :**
- **Labels (States) ✓**
- **Pie Charts ✓**
- **Text diagrams ✓**

Arranging Labels, Charts and Text Diagrams

- **(Turning on the Label Toolbar first)**

Go to View in the top Menu Toolbar



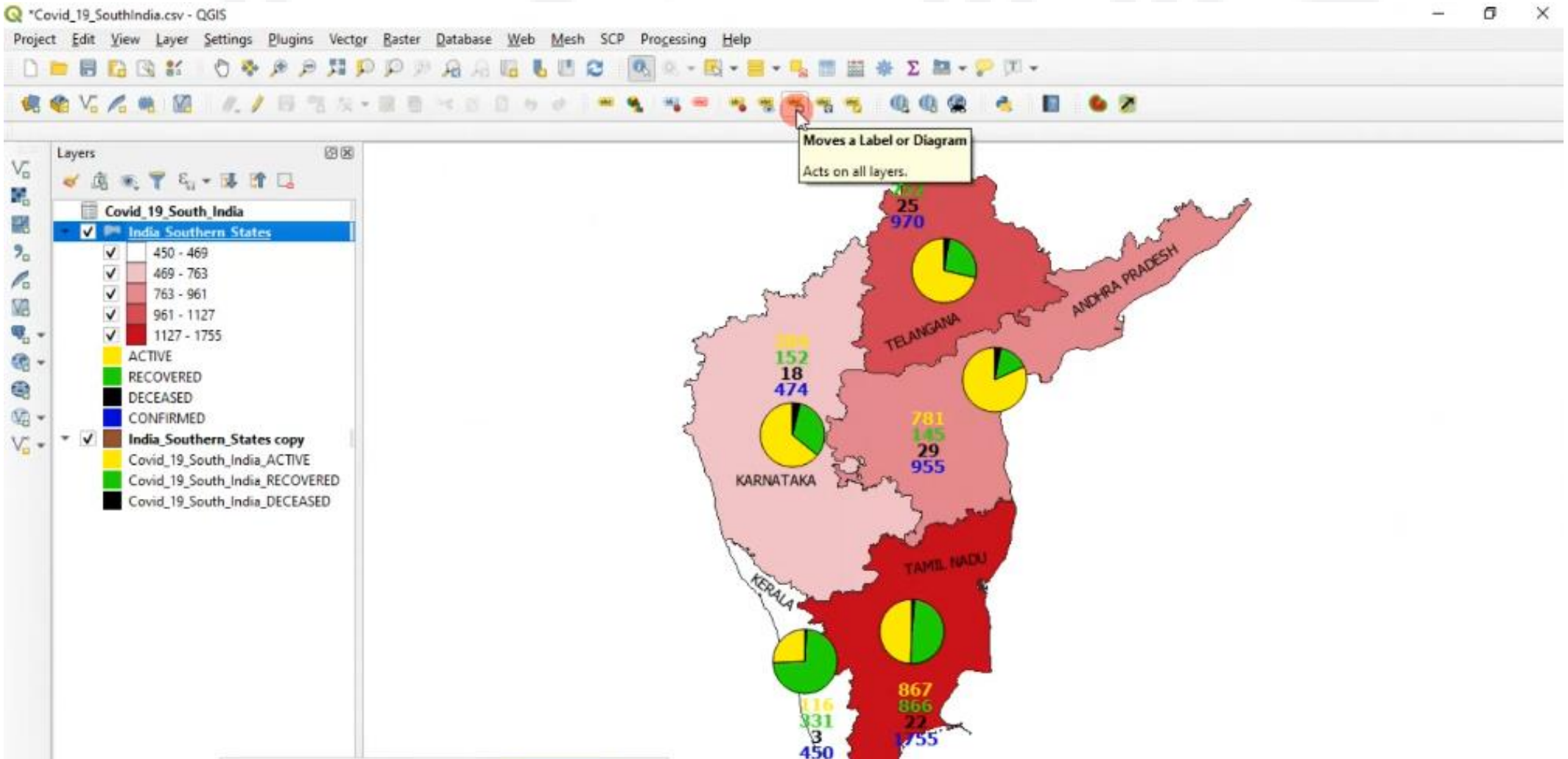
Toolbars

Check the box of manage Label Toolbar

Now you can use directly from the label bar

Arranging Labels, Charts and Text Diagrams

- **Now using the 'Move a Label or Diagram tool', you can arrange labels or charts or text diagrams manually**



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