# Analisis Exploratorio de Datos Espaciales

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**Viewing Spatial Data**

Geografía económica

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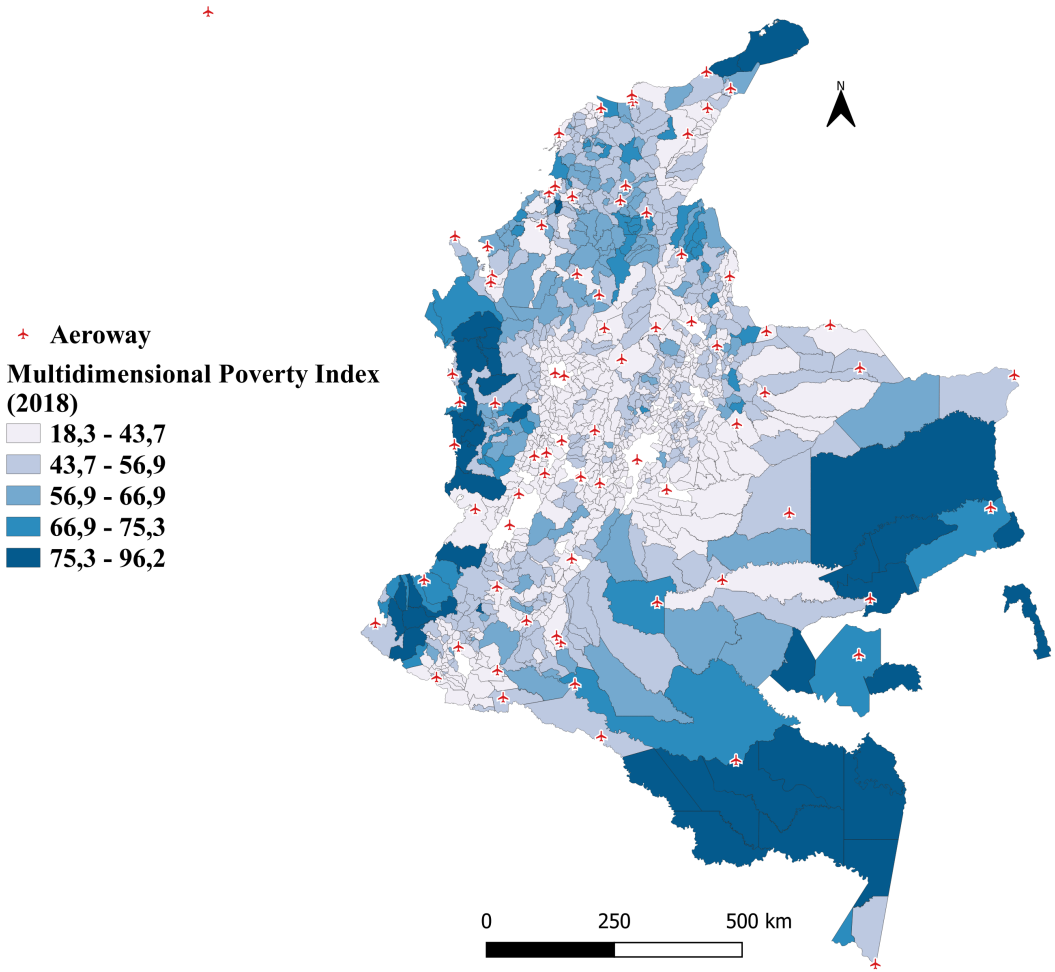
# Introduction

We will cover how to view spatial data from different data sources. QGIS supports many file and database formats as well as OGC Web Services. We will first see how we can load layers from these different data sources. We will then look into the basics of styling both vector and raster layers and will create our first map, **which you can see in the following screenshot**.



# Motivation

* Approximately 70 % of the information we handle in any type of discipline it is georeferenced. That is, it is information to which a geographical position, and is therefore information that is accompanied by other information additional information regarding your location.
* The Geography has gone from being a particular field with a certain relationship with other fields to being a fundamental element incorporated into most of the disciplines. **And not only in the scientific field, but in the very field of daily life**, where all this information plays a role of great importance.
* **The first law of geography**, or principle of spatial autocorrelation.
  - All things are related to each other, but things closer in space have a greater relationship than things that are distant.

# What is GIS?

* **What is a Geographic Information System (GIS)?**
* **What is it for?**
* **How to work with a GIS**
* **What fundamental elements does it comprise?**
* **What is Information Science Geographical??**

- Reading, editing, storage and, in general terms, **management of spatial data**.
- Analysis of said data. This can include anything from simple queries to crafting complex models, and can be carried out both on the spatial component of the data (the location of each value or element) or the thematic component (the value or the element itself).
- **Generation of results such as maps, reports, graphs, etc.**

# What is GIS?

**Def. 1.**

**Burrough y McDonnell (1998, pp. 11)**, "... a powerful set of tools to collect, store, retrieve at will, transform, and display real-world spatial data for a particular set of purposes"

The data used by GIS has 2 properties:

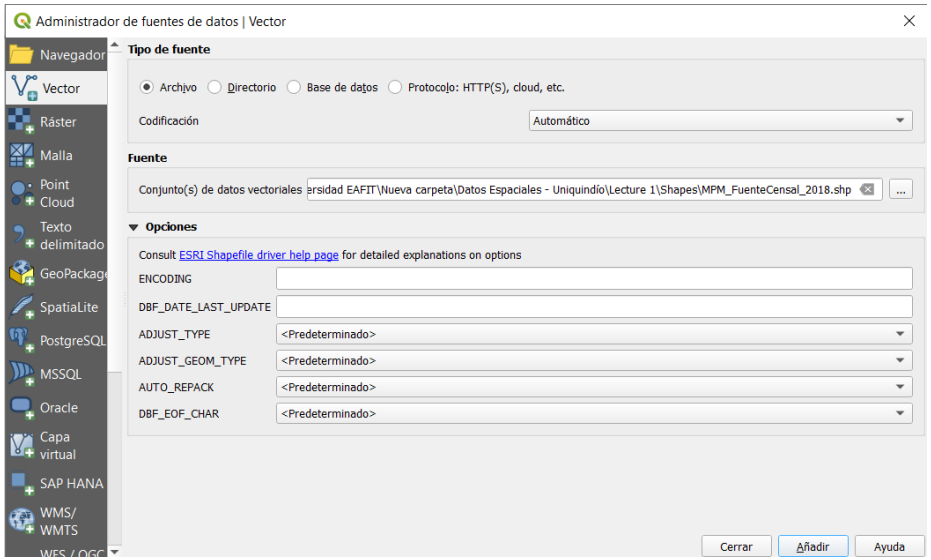
1. **Geometric**: Points, lines and polygons.
2. **Statistical information**: Data matrix.

# Applications of Geographic Information Systems

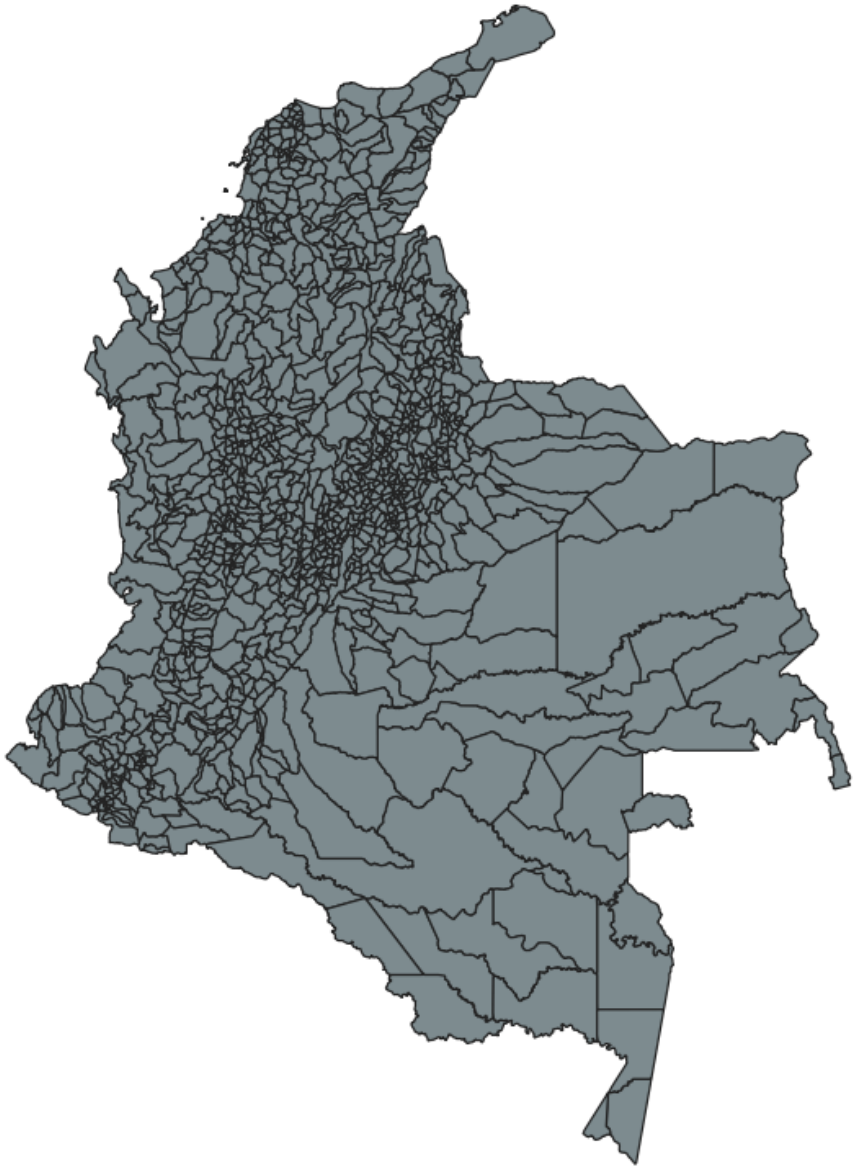
- **Planning of the territory**, such as infrastructure planning and management.
- **Companies**.
- **Environment, Ecology, Geology, Oceanography**.
- **Health**.
- **Sociodemographic studies**.
- **Establishment of emergency plans**.

# Loading vector data from files

We can load vector files using the menu entry by going to Layer | Add vector layer and also by using the Add vector layer toolbar button. If you like shortcuts, use **Ctrl + Shift + V**. In the Add vector layer dialog, we find a drop-down list that allows us to specify the encoding of the input file. This option is important if we are dealing with files that contain special characters, such as German umlauts or letters from alphabets other than the default Latin one. **The following screenshot shows the Add vector layer dialog:**



# Loading vector data from files



# Loading vector data from files

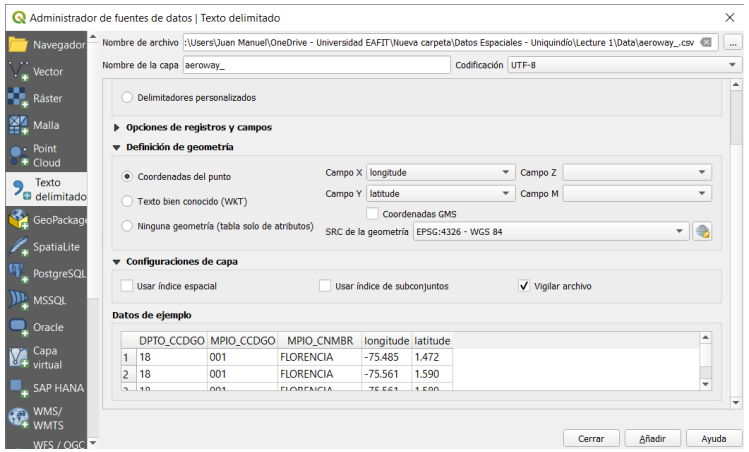
We can load more than one file in one go by selecting multiple files at once (holding down Ctrl on Windows/Ubuntu or Cmd on Mac). Let's give it a try.

1. We select **MPM_FuenteCensal_2018.shp** and **RegAnRiSE.shp**
2. Next, we confirm our selection by clicking on Open, and we are taken back to the Add vector layer dialog.
3. After clicking on Open once more, the selected files are loaded. You will notice that each vector layer is displayed in a random color. Don't worry about that now.

# Loading vector data from files

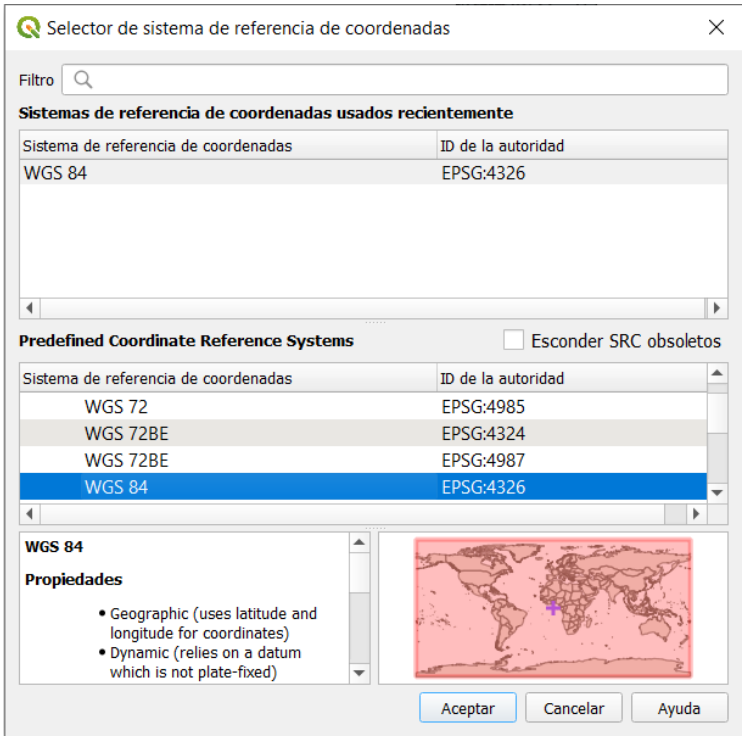
Another popular source of spatial data are **delimited text (CSV) files**. QGIS can load CSV files using the **Add Delimited Text Layer** option available via the menu entry by going to **Layers | Add Delimited Text Layer** or the corresponding toolbar button. Click on Browse and select **airway.csv** from the sample data. CSVs come with all kinds of delimiters.

As you can see in the following screenshot, the plugin lets you choose from the most common ones (Comma, Tab, and so on), but you can also specify any other plain or regular expression delimiter.



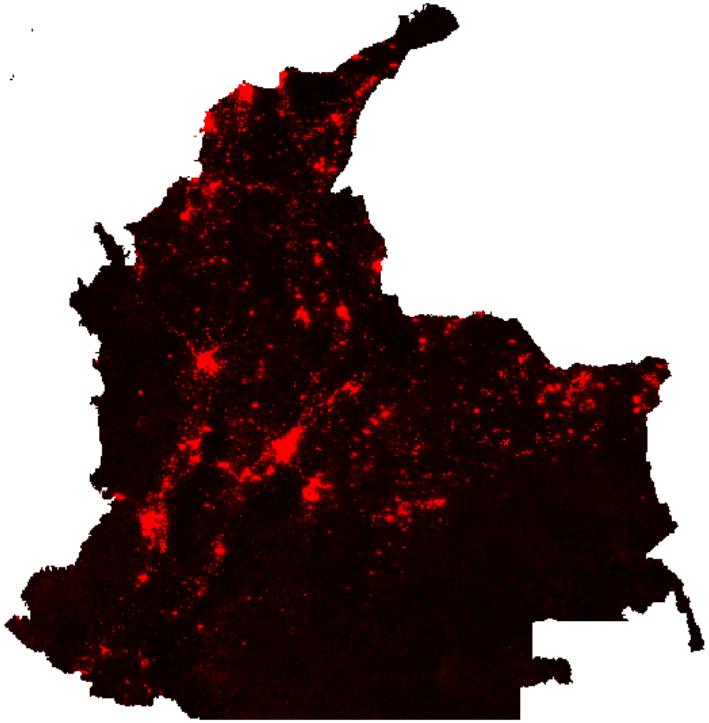
# Dealing with coordinate reference systems

Whenever we load a data source, QGIS looks for usable CRS information; for example, in the **Shapefile's.prj** file. If QGIS cannot find any usable information, it will by default ask you to specify the CRS manually. This behavior can be changed by going to **Settings** | **Options** | **CRS** to always use either the project CRS or a default CRS.



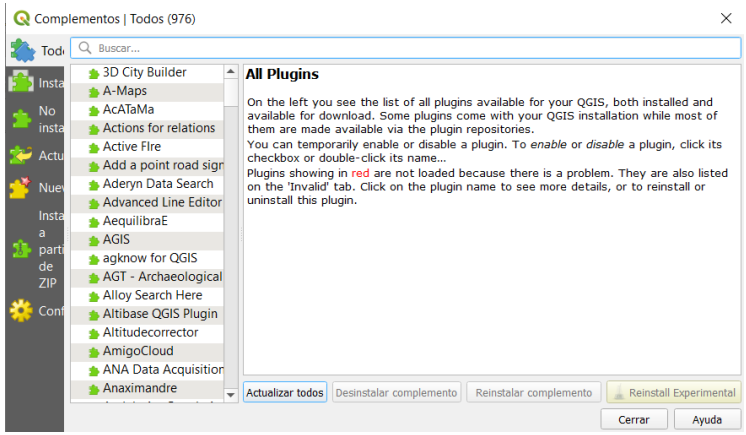
# Loading raster files

Selecting the menu entry **Layer** and then clicking on **Add Raster Layer**, clicking on the Add Raster Layer button, or pressing the **Ctrl** + **Shift** + **R** shortcut will take you directly to the file-opening dialog. Again, you can check the file type filter to see a list of supported file types.



# Loading data from web services

**More and more data providers** offer access to their datasets via OGC-compliant web services such as WMS, WCS, or WFS. QGIS supports these services out-of-the-box.




* **Install Plugins**
  - Open Layers Pluggin
  - Quick Map Service

# Spatial data sources

- Marco Geoestadístico Nacional - GeoPortal (Dane).
- GeoPortal - IGAC
- Comisión Colombiana del Espacio - CCE
- Departamento Nacional de Planeación - DNP
- Infraestructura de Datos Espaciales IDECA - Bogotá
- Infraestructura de Datos Espaciales de Santiago de Cali - IDESC
  - Observatorio Inmobiliario y Vivienda de Armenia OIVA

# Software for spatial analysis

- Qgis
- ArcGis
- GeoDa
- Stata
- R
- Phyton