# Module 2:

## Getting Started with QGIS

# Section 1. Introduction to QGIS

## Definition

- GIS (Geographic Information System) is an information system designed to efficiently utilize geographic information necessary for human life by converting it into computer data.
- An information system refers to a system that collects, observes, measures, inputs, stores, manages, and analyzes information to generate information necessary for decision-making.
- GIS integrates and manages spatial data and attribute data to provide various forms of information such as maps, charts, and diagrams.
- In broad terms, GIS refers to an information system that supports human decision-making abilities, from observing and collecting geographic information to preserving, analyzing, and outputting it.
- Since GIS handles all data closely related to human real life, it has a wide range of applications. The applications of GIS are rapidly expanding across various industries including land, resources, cities, environment, transportation, agriculture, marine, and defense.

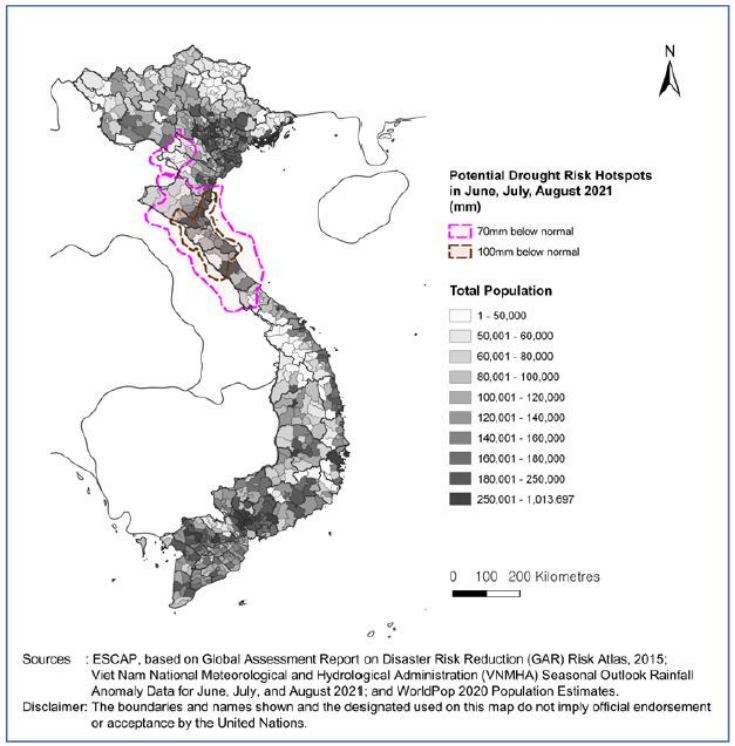
# Section 1. Introduction to QGIS

## Key Functions

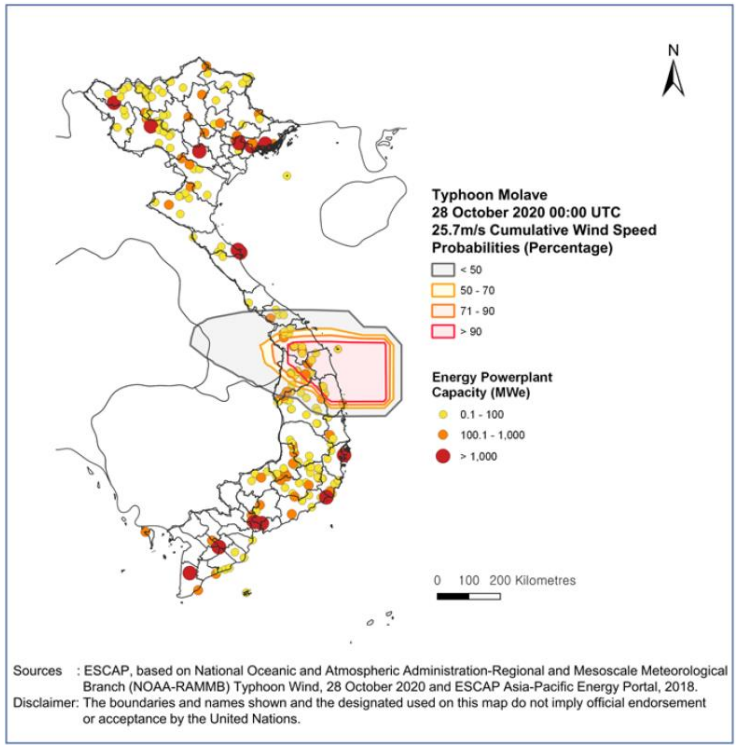
- GIS represents all information in numerical form. All geographic information is stored in numerical data format, allowing users to select and output desired information in the required format.
- GIS quickly retrieves large amounts of data built on a computer-based system, easily combines geometric and attribute data, and provides an integrated analysis environment.
- Through the process of spatial analysis, GIS is utilized for analyzing scenarios for various plans or policy-making, operating decision-making models, and detecting & analyzing changes.
- The core function of GIS is to provide an environment where diverse geometric and attribute data can be extracted and combined from numerous data files, enabling comprehensive information analysis and processing.

# Section 1. Introduction to QGIS

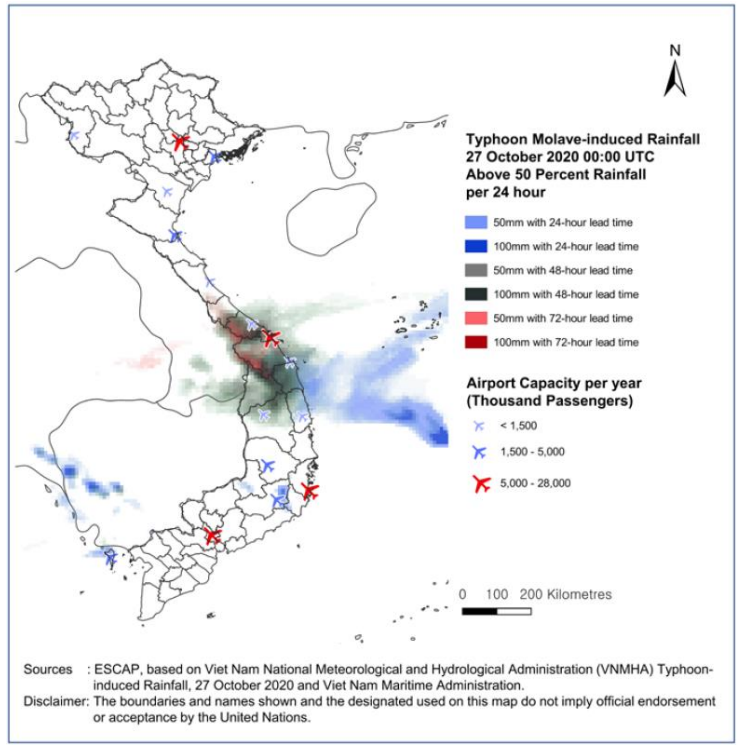
## How does GIS support IBF Warning Services?




Population exposure to drought hotspot



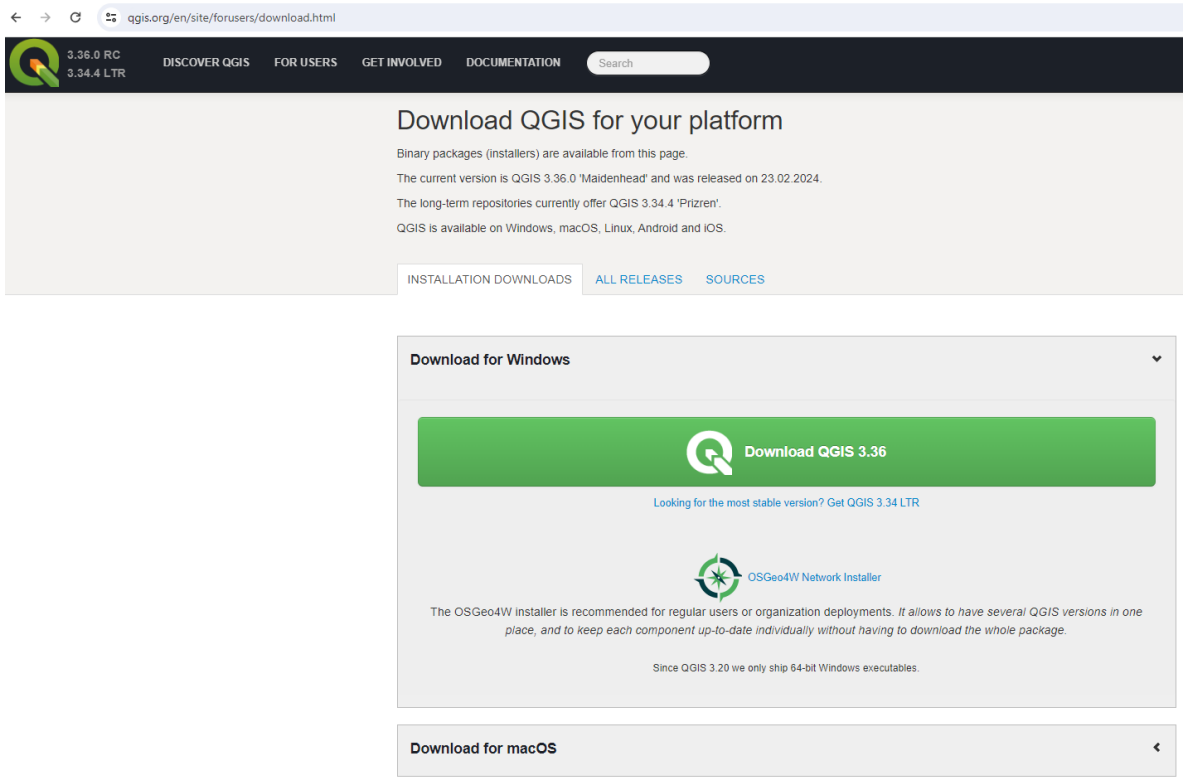

Hydro powerplant exposure to Typhoon




Airport exposure to typhoon-induced rainfall

# Section 2. Getting Started with QGIS

## Installation

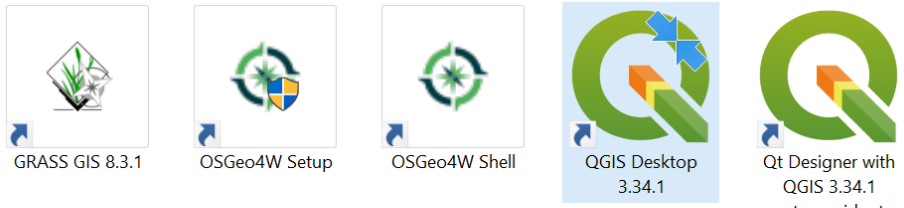



1) Visit the QGIS website: https://www.qgis.org/en/site/forusers/download.html
2) Download the software according to user Operating System.

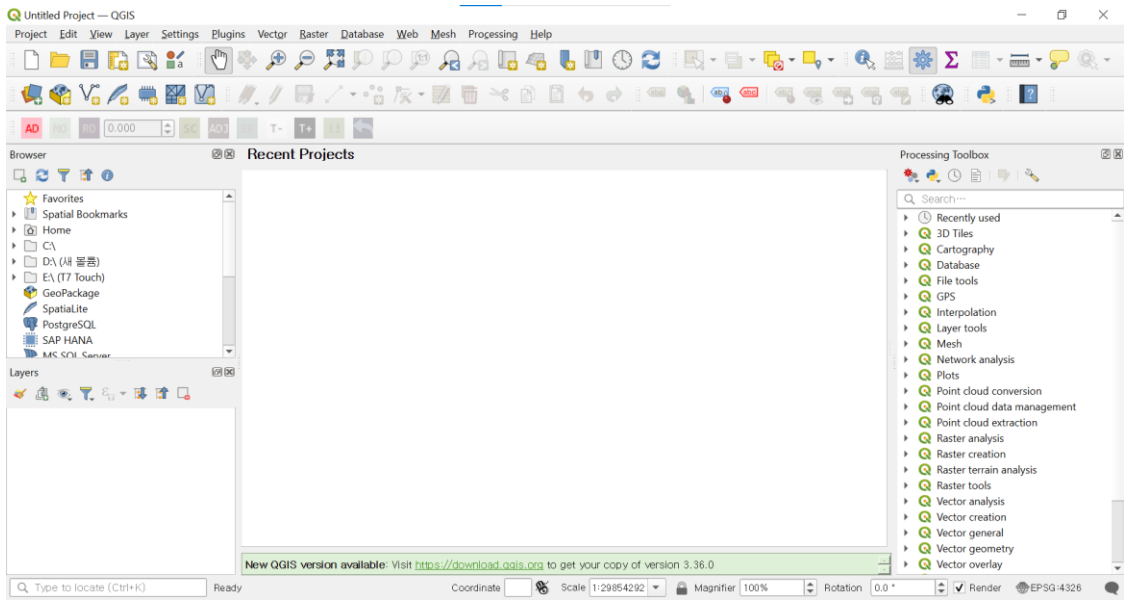
# Section 2. Getting Started with QGIS

## Installation

1) Double-click the icon named “QGIS Desktop x.xx.x (version)” under the folder created as you designated.




2) You will see the interface as below.

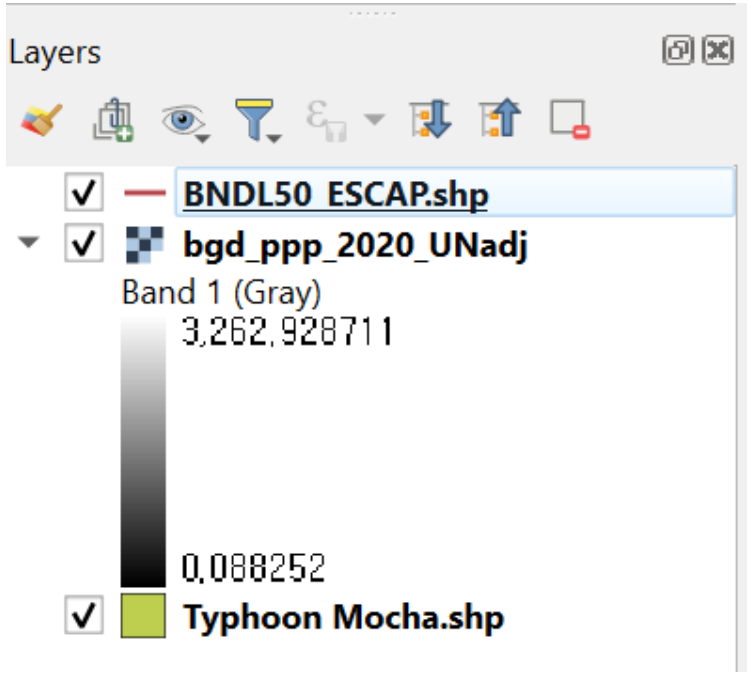


# Section 2. Getting Started with QGIS

## Basic Concept of GIS Components

### Layer

- Layers are collections of geographic data.
- The data's properties and attributes specify how the layer draws on a map, scene, or layout. Data gathered in a layer is represented with points, lines, shapes (polygons), or surfaces.
- The layers are displayed in an order, called the drawing order, which is shown in the Layer's pane.
- Once the layers are added to a map or scene, it is possible to change how a layer is symbolized, labeled, scaled, and arranged.

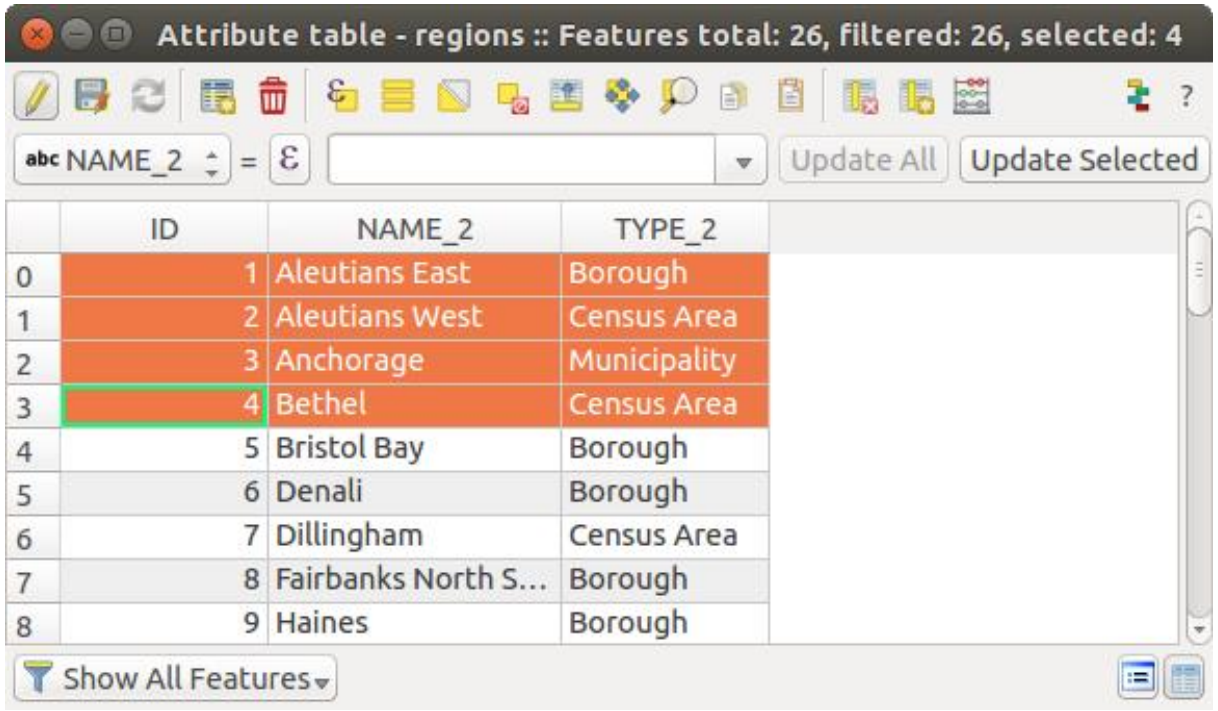


# Section 2. Getting Started with QGIS

## Basic Concept of GIS Components

### Attribute Table

- The attribute table displays information on features of a selected layer.
- Each row in the table represents a feature (with or without geometry), and each column contains a particular piece of information about the feature.
- Features in the table can be searched, selected, moved and edited.

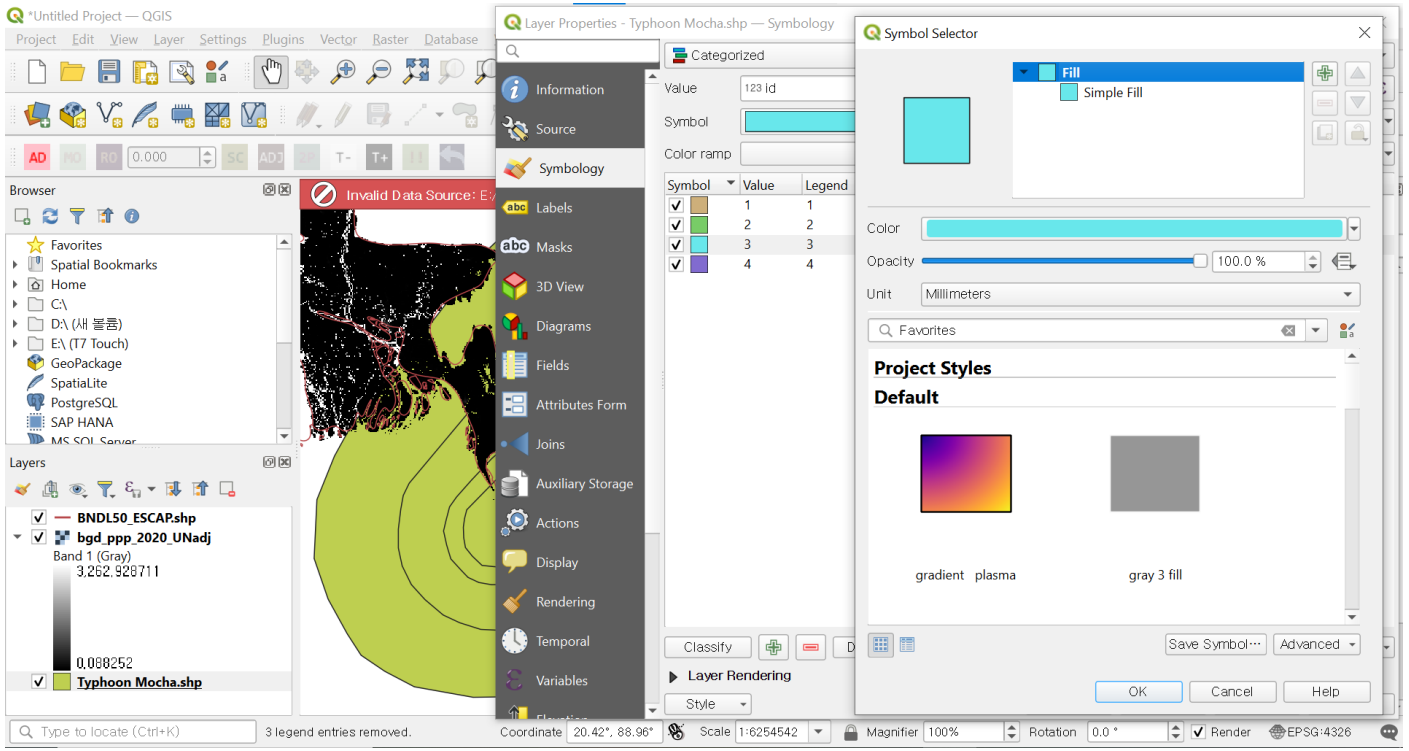


# Section 2. Getting Started with QGIS

## Basic Concept of GIS Components

### Symbology

- Symbology is the use of symbols to represent the features and attributes of a map layer.
- Through adjustments in the Symbology tool, it is possible to customize display of point, line, and polygon features; customize symbols and edit visibility ranges of a layer.



# Section 2. Getting Started with QGIS

## Basic Concept of GIS Components

### File Types

- **Vector:** An image constructed by dots and lines composed of mathematical formulas.
- A vector is formed by hundreds of thousands of small lines and curves.
- It is possible to zoom in indefinitely on a vector layer without resulting in pixelation and blocking out as it is for a raster image.
- Shapefile is the most common file extension used in GIS as vector files. There are 3 types of shapefiles: point, line, and polygon.

Source: What are Vector Images? - VectorStock

# Section 2. Getting Started with QGIS

## Basic Concept of GIS Components

### File Types

- **Raster:** A two-dimensional picture as a rectangular matrix or grid of pixels. As its pixel number is fixed, a raster image can become distorted or blurry when resized.
- The resolution increases as the size of the cell decreases.
- Examples of raster files include digital aerial photographs, imagery from satellites, digital pictures, and scanned maps.
- Tif, Tiff, and GeoTiff are the most common file extensions used in GIS for raster files.

Source: What are Vector Images? - VectorStock

# Section 2. Getting Started with QGIS

## Basic Concept of GIS Components

### File Types

- **CSV:** Comma-separated Values is a format for structuring text within a file that uses a comma to mark where one value ends and the next begins.
- A CSV file containing geospatial data (e.g., longitude and latitude coordinates, etc.) can also be visualized by GIS.

C1 | Latitude

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Name | Alias | **Latitude** | **Longitud** | Country | Partner cc | ISO_alpha | ISO_nume | Design Ca |
| 2 | Basavanna | N/A | 16.31667 | 76.55 | India | N/A | IND | 356 | 24.75 |
| 3 | Bhilangan | N/A | 30.41667 | 78.56667 | India | N/A | IND | 356 | 22.5 |
| 4 | Chayadevi | N/A | 16.52169 | 76.76105 | India | N/A | IND | 356 | 24 |
| 5 | Dandela N | N/A | 12.95 | 75.35 | India | N/A | IND | 356 | 13.05 |
| 6 | Dummagu | N/A | 17.87 | 80.9 | India | N/A | IND | 356 | 24 |
| 7 | Dunali Sm | N/A | 32.28 | 76.185 | India | N/A | IND | 356 | 5 |
| 8 | Kemphole | N/A | 12.83333 | 75.66667 | India | N/A | IND | 356 | 18 |
| 9 | Bhavani B | N/A | 11.28333 | 76.88333 | India | N/A | IND | 356 | 10 |
| 10 | Bhavani B | N/A | 11.28333 | 76.88333 | India | N/A | IND | 356 | 10 |
| 11 | Manjanadl | N/A | 12.43333 | 75.41667 | India | N/A | IND | 356 | 10 |
| 12 | Chunchi D | N/A | 12.35 | 77.45 | India | N/A | IND | 356 | 10.2 |
| 13 | Munirabac | N/A | 15.5 | 76.4 | India | N/A | IND | 356 | 10 |
| 14 | 12 MW hy | N/A | 19.55 | 73.75 | India | N/A | IND | 356 | 12 |
| 15 | Neerukatt | N/A | 12.85 | 75.33 | India | N/A | IND | 356 | 15 |
| 16 | Sainj Hydr | N/A | 30.8 | 77.66 | India | N/A | IND | 356 | 5 |

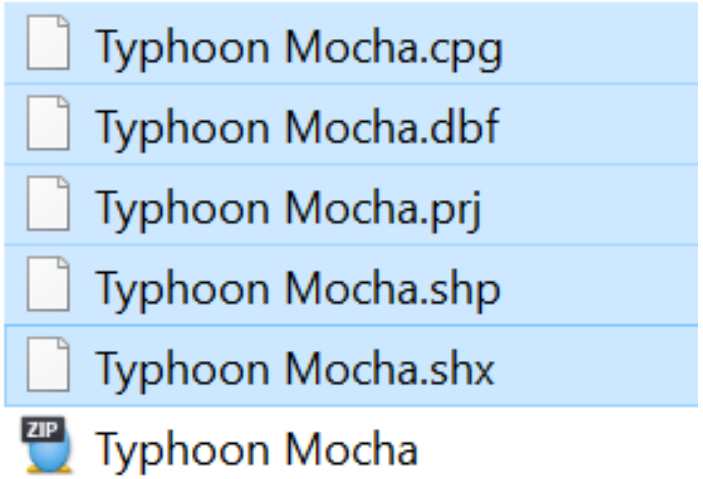
Source: ESCAP Energy Portal

# Section 3. Basic Operations in QGIS

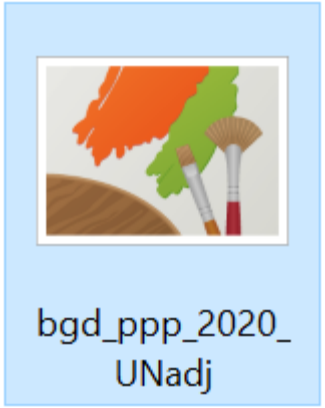
## Loading Data

**How to Import Spatial Data?**

- **Vector:** Drag and drop all files/zipped file




- **Raster:** Drag and drop a single file



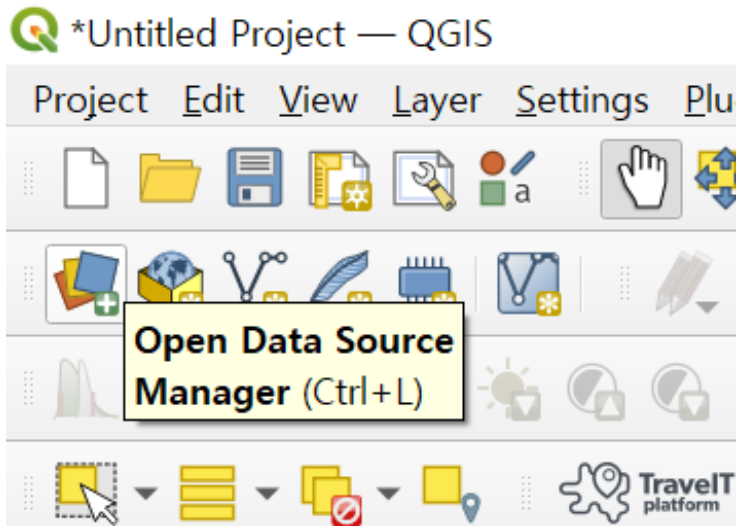
# Section 3. Basic Operations in QGIS

## Loading Data

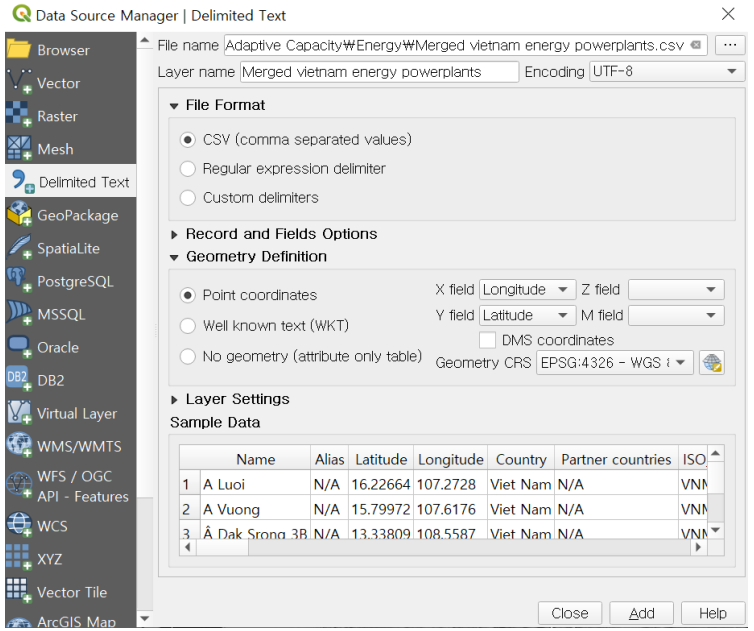
### How to Import Non-spatial Data?

- **CSV**

1) Open Data Source Manager (Ctrl + L)




2) Select “Delimited Text” > Browse the CSV file. Longitude/Latitude coordinates will be auto-populated.



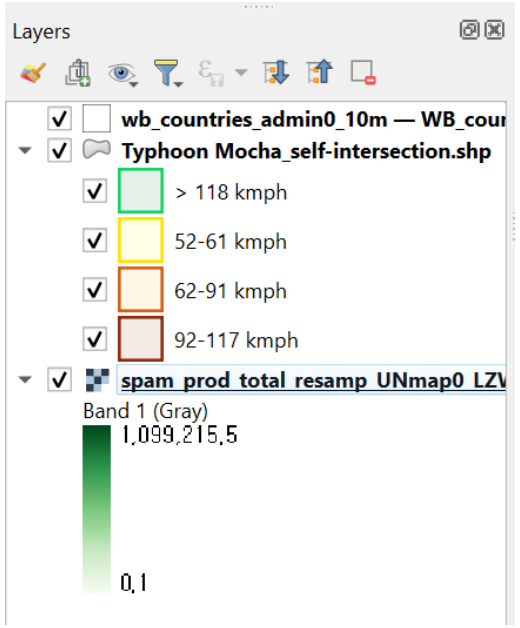
# Section 3. Basic Operations in QGIS

## Adding Boundaries & Ordering the Layers

**How to Add Boundaries? Below potential sources:**

1) Go to World Bank Official Boundaries | Data Catalog to download a global ADM 1 map boundaries
2) Go to Welcome - Humanitarian Data Exchange (humdata.org) to download subnational boundaries of each country.

**Why does the Layer Order Matter?**

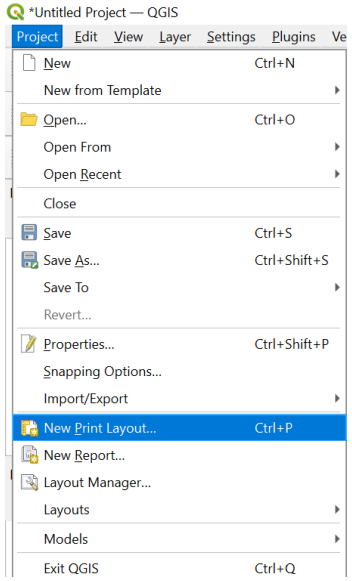


# Section 3. Basic Operations in QGIS

## Map Layout Setup

### How to Export a Map Image?

1) Open a New Print Layout (Ctrl + P)




2) Import a map

3) Add a north sign

4) Add a scale bar

5) Add a legend

5) Add disclaimer and notes

6) Export an image

# THANK YOU

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