## 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 policymaking, 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



### Installation

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→ C 😋 qgis.org/en/site/forusers/download.html		
3.36.0 RC DISCOVER QGIS FOR USERS GET	INVOLVED DOCUMENTATION Search	1)
	Download QGIS for your platform	
	Binary packages (installers) are available from this page.	
	The current version is QGIS 3.36.0 'Maidenhead' and was released on 23.02.2024.	2)
	The long-term repositories currently offer QGIS 3.34.4 'Prizren'.	Z)
	QGIS is available on Windows, macOS, Linux, Android and IOS.	-
	INSTALLATION DOWNLOADS ALL RELEASES SOURCES	
	Download for Windows +	
	Download QGIS 3.36	
	Looking for the most stable version? Get QGIS 3.34 LTR	
	OSGeo4W Network Installer	
	The OSGeo4W installer is recommended for regular users or organization deployments. It allows to have several QGIS versions in one place, and to keep each component up-to-date individually without having to download the whole package.	
	Since QGIS 3.20 we only ship 64-bit Windows executables.	
	Download for macOS <	

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



### Installation

 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.

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### **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.





### **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.

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0	1	Aleutians East	Borough	
1	2	Aleutians West	Census Area	
2	3	Anchorage	Municipality	
3	4	Bethel	Census Area	
4	5	Bristol Bay	Borough	
5	6	Denali	Borough	
6	7	Dillingham	Census Area	
7	8	Fairbanks North S	Borough	
в	9	Haines	Borough	



#### **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.





### **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.
- <u>Shapefile</u> is the most common file extension used in GIS as vector files. There are 3 types of shapefiles: <u>point</u>, <u>line</u>, <u>and</u> <u>polygon</u>.



Source: What are Vector Images? - VectorStock



### **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.
- <u>Tif, Tiff, and GeoTiff</u> are the most common file extensions used in GIS for raster files.



Source: What are Vector Images? - VectorStock



#### **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.

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2	Basavanna	N/A	16.31667	76.55	India	N/A	IND	356	24.75
3	Bhilangana	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
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13	Munirabad	N/A	15.5	76.4	India	N/A	IND	356	10
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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



### **Loading Data**

#### How to Import Spatial Data?

- Vector: Drag and drop all files/zipped file
  - Typhoon Mocha.cpg
  - ] Typhoon Mocha.dbf
  - Typhoon Mocha.prj
  - Typhoon Mocha.shp
  - ] Typhoon Mocha.shx
  - 🖞 Typhoon Mocha

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





### **Loading Data**

#### How to Import Non-spatial Data?

- CSV
- 1) Open Data Source Manager (Ctrl + L)
  - 🔇 \*Untitled Project QGIS



Select "Delimited Text" > Browse the CSV file.
 Longitude/Latitude coordinates will be auto-populated.

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### **Adding Boundaries & Ordering the Layers**

How to Add Boundaries?	<b>Below potential</b>
sources:	

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





### Map Layout Setup

#### How to Export a Map Image?

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

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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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