



มหาวิทยาลัยราชภัฏนครปฐม



7202304

Fundamentals of Geographic Information System



Chapter 3 : Geographic Data – Vector & Raster

Fundamentals of Geographic Information System



Learning Outcomes

- Explain vector and raster data
- Identify data types
- Select appropriate data for GIS tasks



Geographic Data Concept

Spatial Data

Definition

Geographic information describing the location and shape of objects on Earth.

Main Types (Vector Model)

Point – single location (school, ATM)

Line – linear features (roads, rivers)

Polygon – area features (provinces, land parcels)

Key Idea: Spatial Data answers 'Where is it?'



Attribute Data

ID	Name	District	Population
01	Nakhon Pathom	Muang	216,000
02	Sam Phran	Sam Phran	120,000
03	Bang Len	Bang Len	65,000

Definition

Descriptive information about spatial features stored in tables.

Characteristics

Stored in rows and columns

Each row = one geographic feature

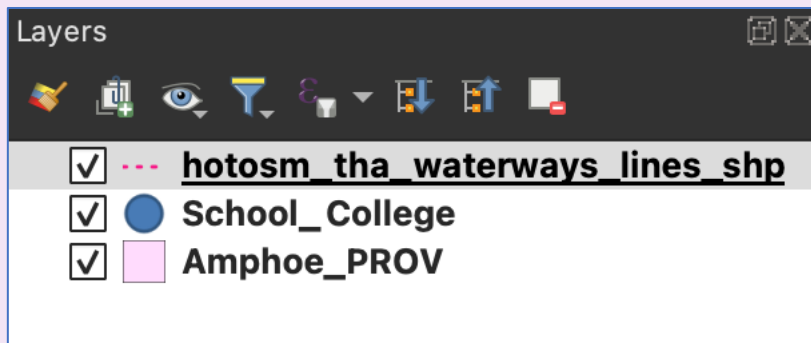
Each column = attribute (name, population, land use)

Key Idea: Attribute Data answers 'What is it?'

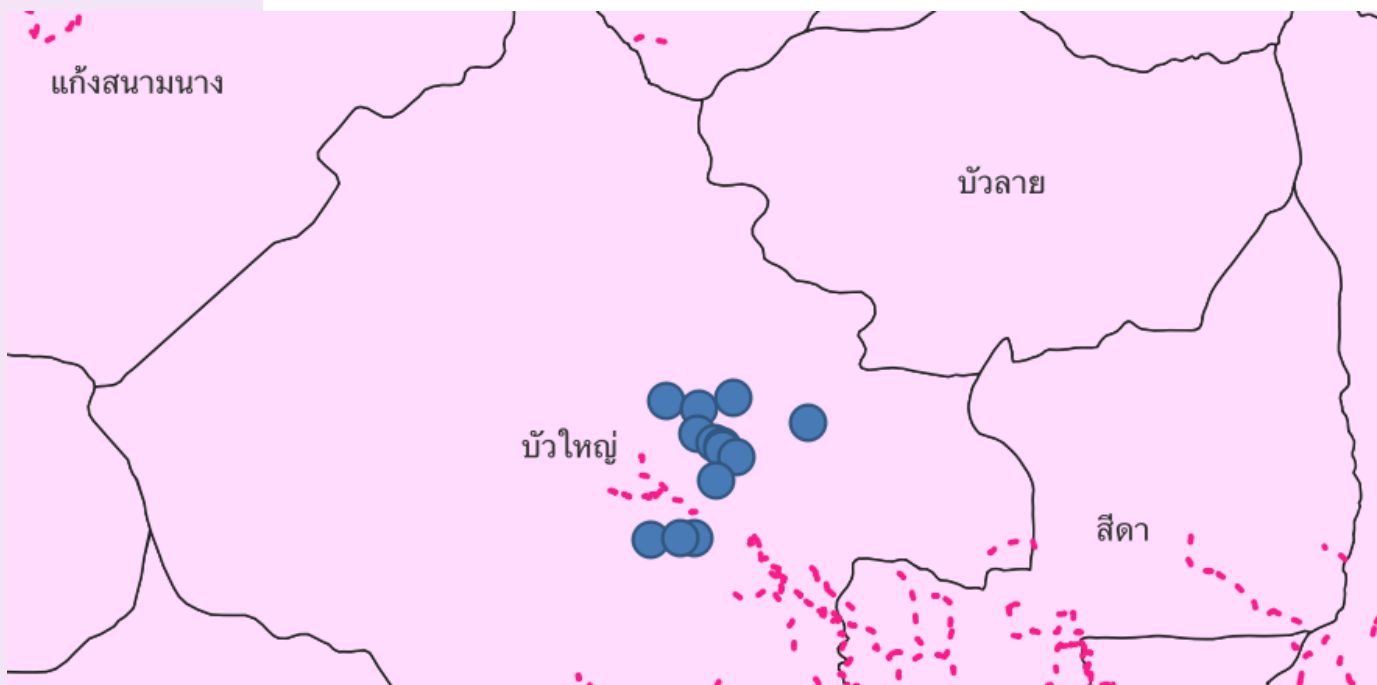


Vector Data

- Point
- Line
- Polygon



Examples: schools, roads, land parcels



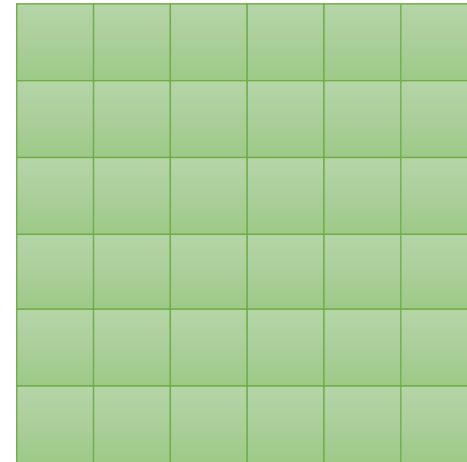


Raster Data

Cell-based data

Definition

Raster data represents geographic information as a grid of cells (pixels).



Examples

Satellite imagery

Digital Elevation Model (DEM)

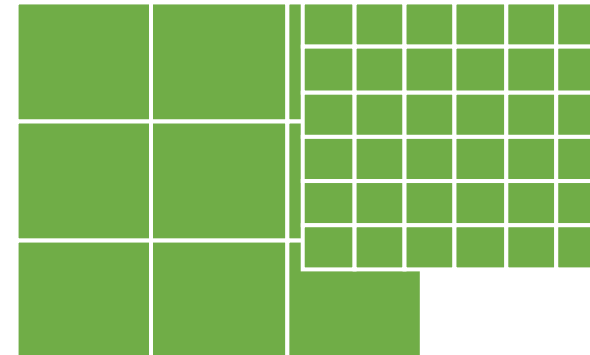
Temperature map

Rainfall distribution



Raster Data

Raster Resolution



Resolution Definition

Resolution is the size of each raster cell on the ground.

Small cell size → High resolution (more detail)

Large cell size → Low resolution

High resolution requires more storage and processing



Vector vs Raster

	Vector Data	Raster Data
Structure	Points, Lines, Polygons	Grid of cells (pixels)
Accuracy	High positional accuracy Best for discrete objects	Best for continuous surfaces Examples: DEM, satellite imagery
File size	Usually smaller	Larger (high resolution)
Analysis capability	Network, topology, boundaries	Surface, terrain, environmental models
File Formats	SHP, GeoJSON	TIFF, IMG



Lab: Exploring Vector and Raster in QGIS

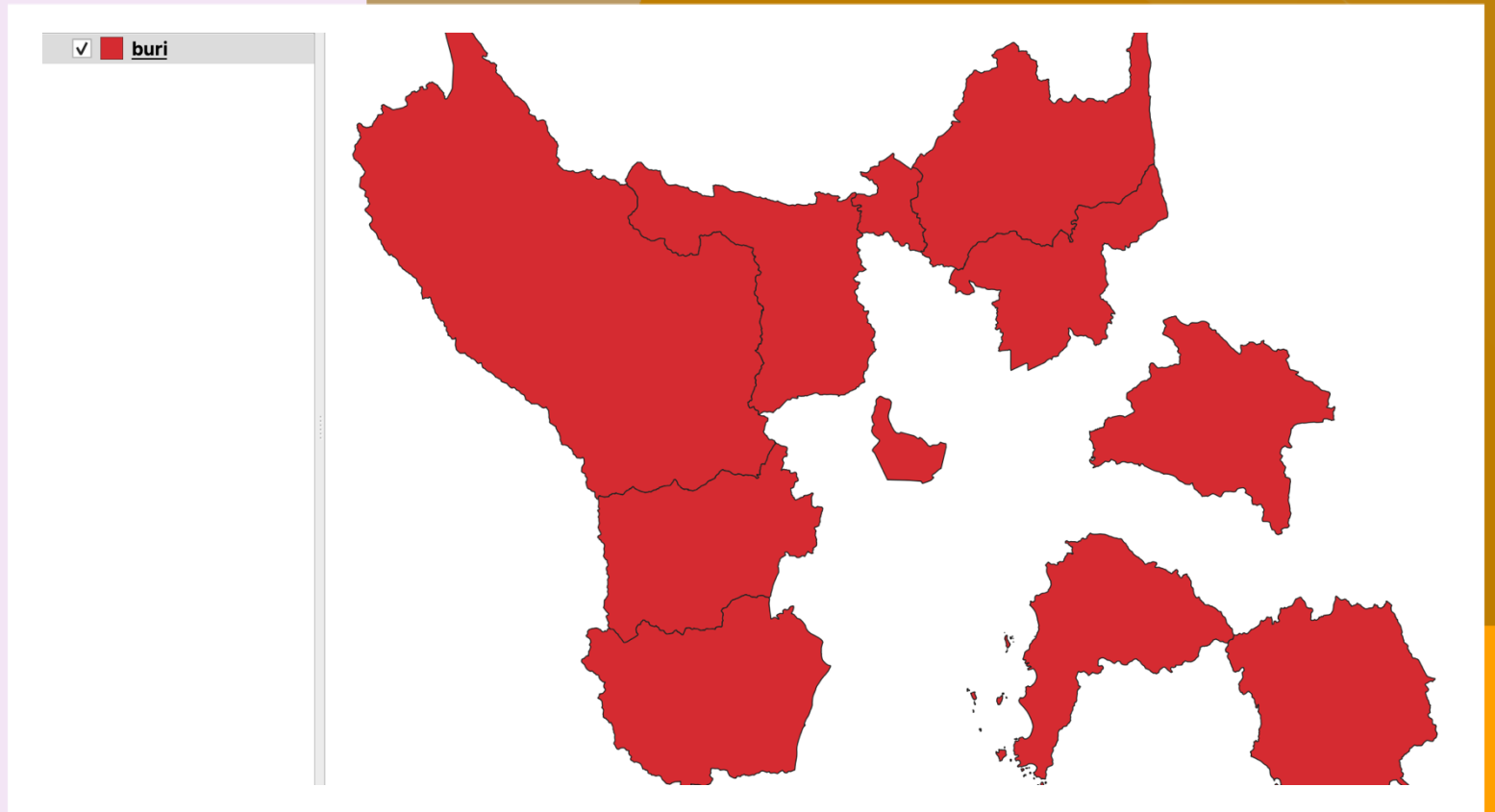
Hands-on Practice

To understand the differences between **vector data** and **raster data** by loading, visualizing, and exploring them in **QGIS**.



Lab Step 1: Add Vector Layer

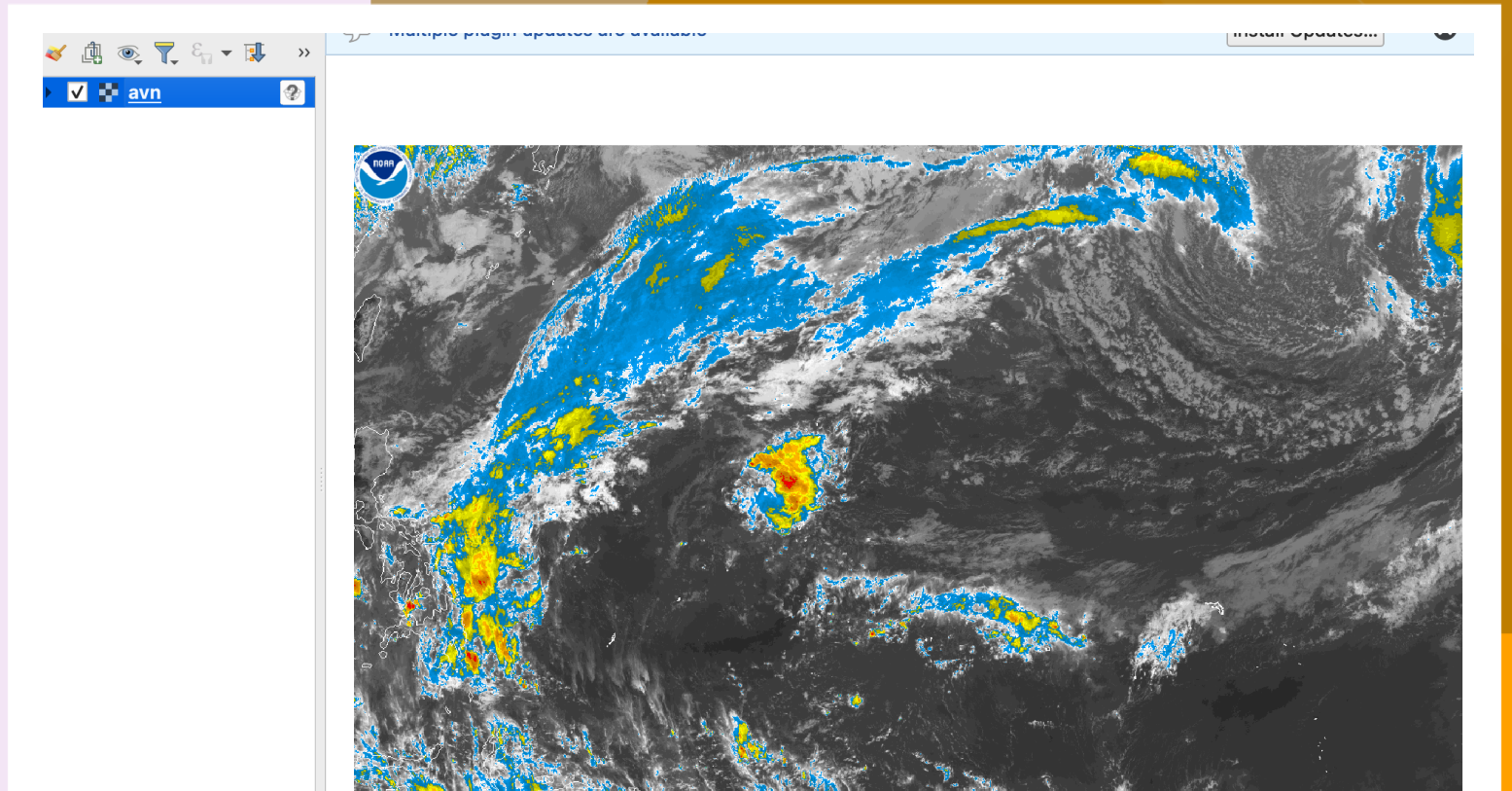
Layer > Add Layer > Add Vector Layer





Lab Step 2: Add Raster Layer

Layer > Add Layer > Add Raster Layer

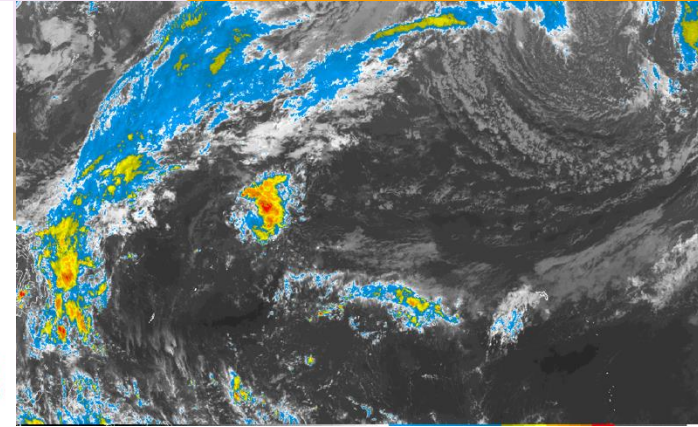
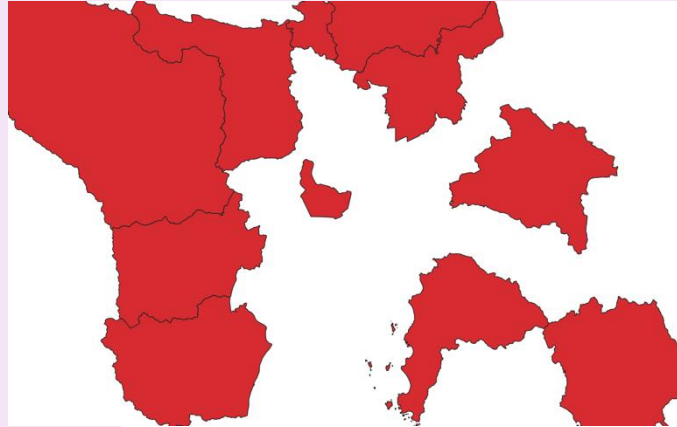




Lab Step 3: Compare Data Types

Zoom in / Zoom out

Check attribute table

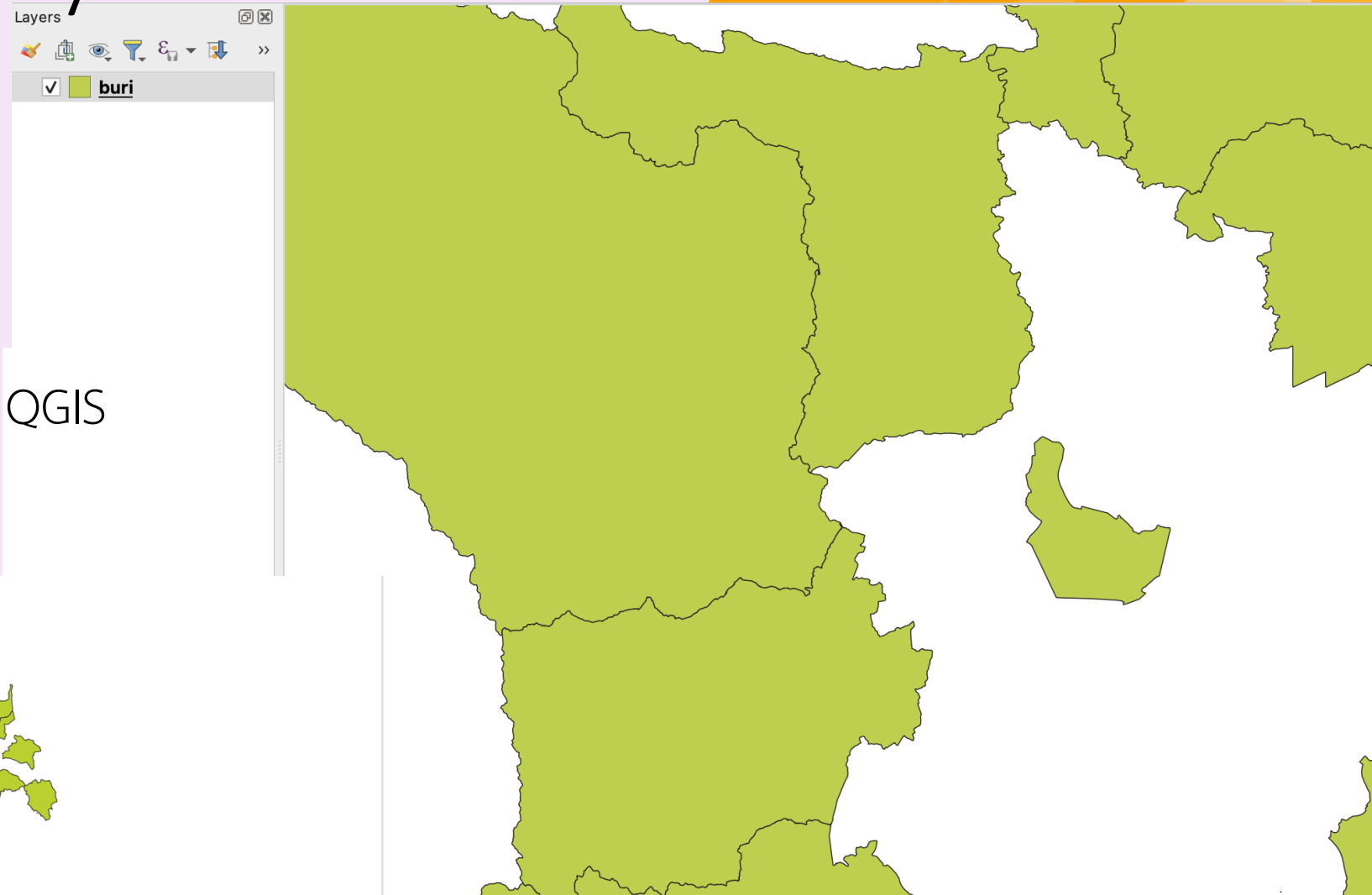
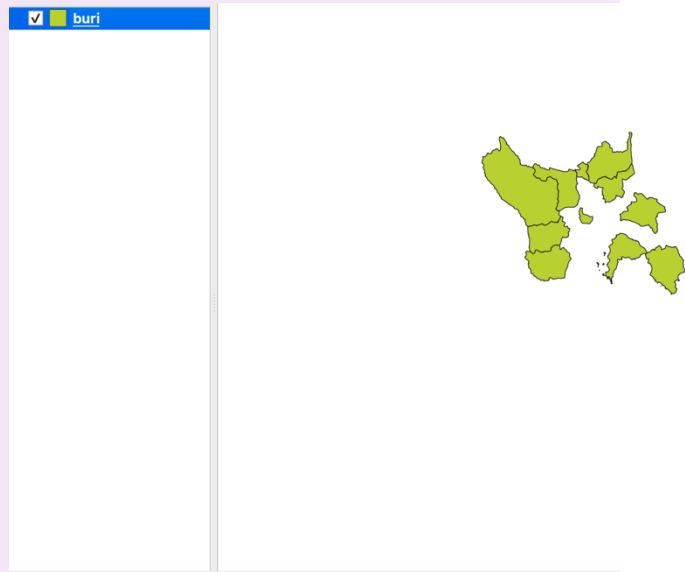


_Area	ADM1_EN	ADM1_TH	ADM1_PCODE	ADM1_REF	ADM1ALT1EN	ADM1ALT2EN	ADM1ALT1TH	ADM1ALT2TH	ADM0_EN
1643...	Chanthaburi	จันทบุรี	TH22	NULL	NULL	NULL	NULL	NULL	Thailand
3008...	Chon Buri	ชลบุรี	TH20	NULL	NULL	NULL	NULL	NULL	Thailand
6387...	Kanchanaburi	กาญจนบุรี	TH71	NULL	NULL	NULL	NULL	NULL	Thailand
'8837...	Lop Buri	ลพบุรี	TH16	NULL	NULL	NULL	NULL	NULL	Thailand
3765...	Nonthaburi	นนทบุรี	TH12	NULL	NULL	NULL	NULL	NULL	Thailand
'1842...	Phetchaburi	เพชรบุรี	TH76	NULL	NULL	NULL	NULL	NULL	Thailand
83164...	Prachin Buri	ปราจีนบุรี	TH25	NULL	NULL	NULL	NULL	NULL	Thailand
'9216...	Ratchaburi	ราชบุรี	TH70	NULL	NULL	NULL	NULL	NULL	Thailand
871119	Saraburi	สระบุรี	TH19	NULL	NULL	NULL	NULL	NULL	Thailand
2654...	Sing Buri	สิงห์บุรี	TH17	NULL	NULL	NULL	NULL	NULL	Thailand
9138...	Suphan Buri	สุพรรณบุรี	TH72	NULL	NULL	NULL	NULL	NULL	Thailand



Week 3 Summary

- Vector Data
- Raster Data
- Practical understanding in QGIS





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