Assignment 7:

Assignment: Understanding Spatial Reference, Georeferencing, and Projection

Aim: To understand the theory behind assigning a spatial reference (georeference) and projection to a given Toposheet or map.

Georeferencing

1. Spatial Reference System (SRS)

An SRS is a framework that defines spatial relationships and coordinates, ensuring data aligns correctly with real-world locations.

2. What is Georeferencing?

Georeferencing is the process of assigning spatial coordinates to a raster image or map, aligning it with an established coordinate system.

3. Ground Control Points (GCPs)

GCPs are specific, known locations on the map that help establish a relationship between the map and the chosen SRS, ensuring accuracy.

4. Transformation

Transformation involves converting coordinates from one SRS to another, allowing for the integration of spatial data from different sources.

Projection

1. What is a Map Projection?

A map projection is a mathematical method for transforming the Earth's spherical coordinates (latitude and longitude) into planar coordinates (x and y) for mapping purposes.

2. Types of Map Projections

Different projection types serve different mapping needs:

- **Cylindrical Projections** – Common for world maps, useful for navigation.
- **Conic Projections** – Best for regional mapping with minimal distortion.
- **Azimuthal Projections** – Ideal for mapping polar regions.

3. Coordinate Reference System (CRS)

A CRS consists of:

- A **map projection**
- A **datum** (a reference model of Earth’s shape)
- A **unit of measurement** This system ensures that spatial data is accurately aligned for analysis and visualization.

Key Concepts

1. Datum

A datum is a reference point or model that defines the relationship between the Earth's surface and a map projection, ensuring consistency in spatial data.

2. Ellipsoid

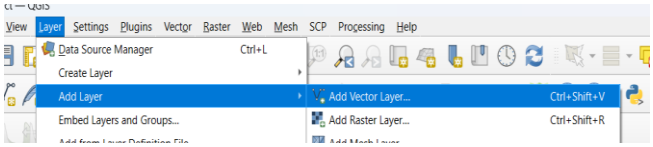
An ellipsoid is a mathematical representation of the Earth's shape used as a reference for different projections.

3. Geographic Coordinate System (GCS)

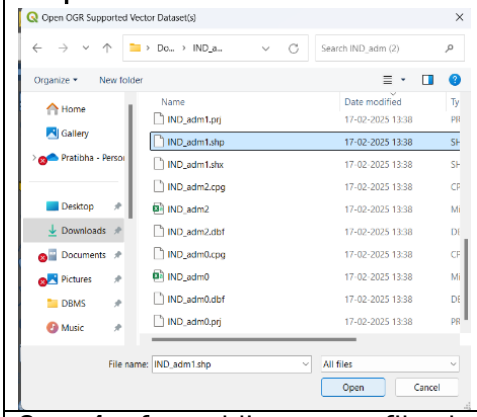
The GCS is a system that defines locations on the Earth using latitude and longitude, providing a universal framework for geospatial mapping.

Result :

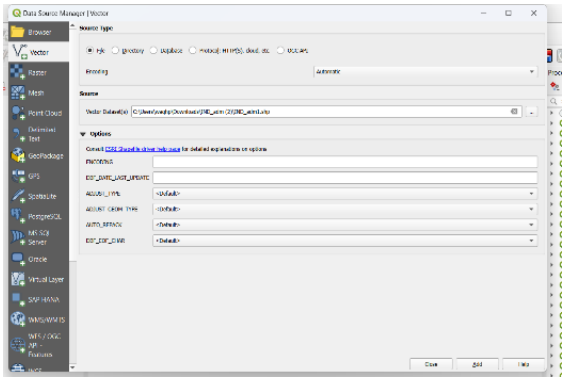
Step 1: Select add layer and vector layer



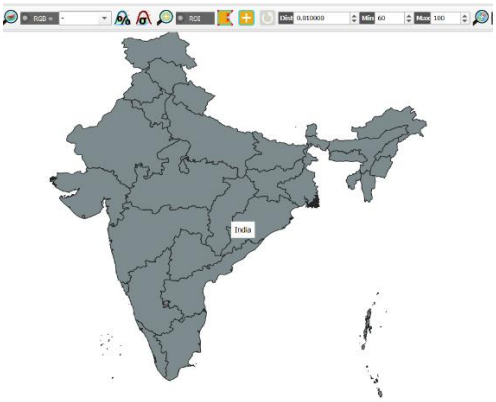
Step 2: Select vector file



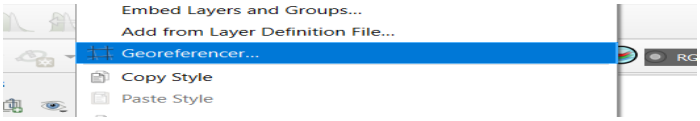
Step 3 : Add the vector file



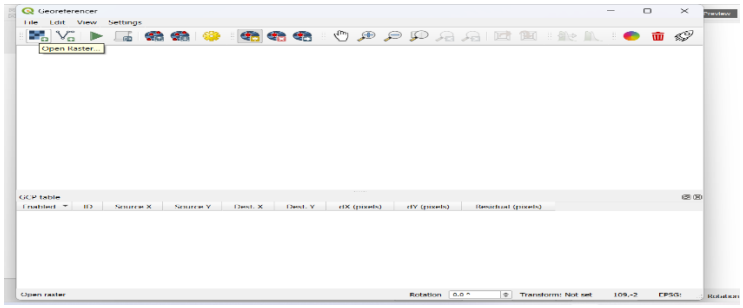
Step 4: after adding vector file show this map



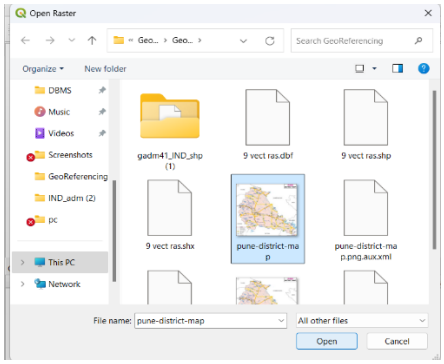
Step 5: select georeferencing



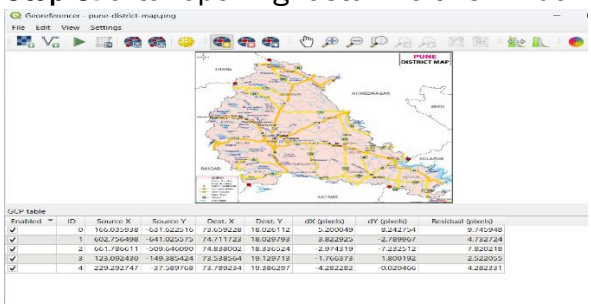
Step 6: after opening georeferencing select the vector file



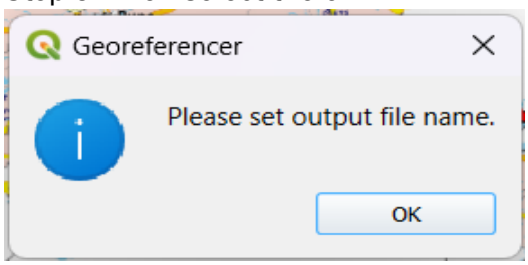
Step 7: select the raster file



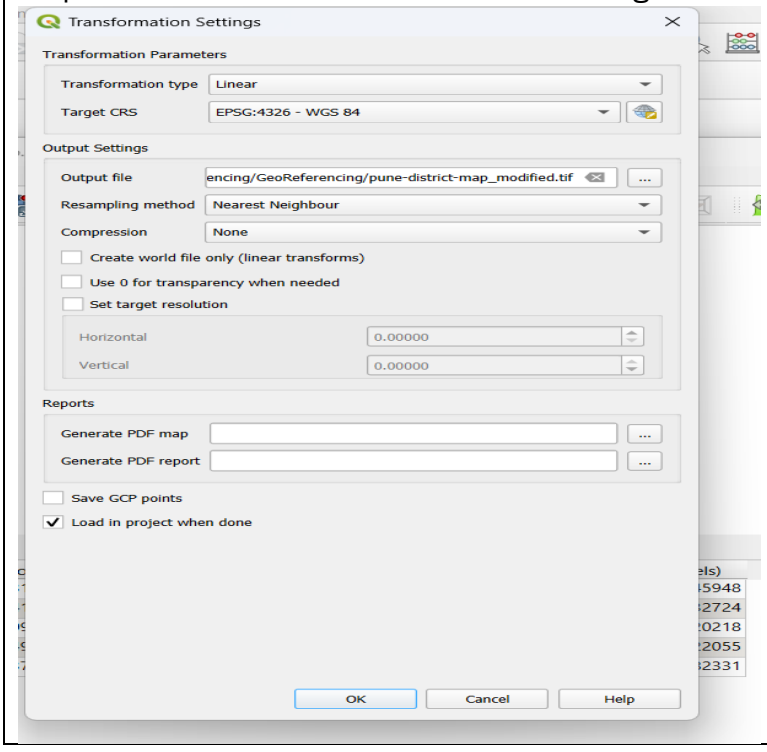
Step 8: after opening raster file this window will show.



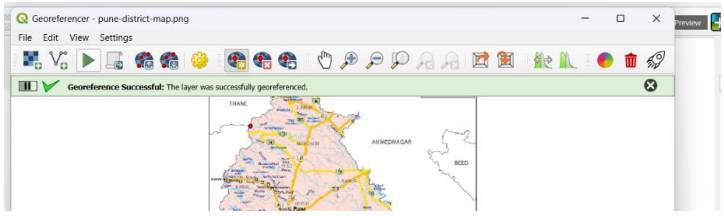
Step 9: Then select the ok



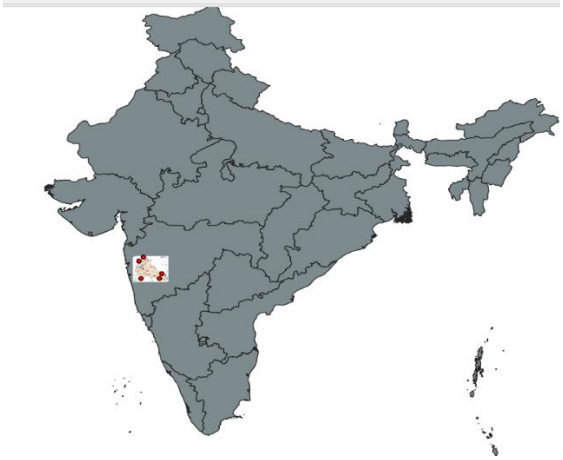
Step 10: then select the transformation setting.



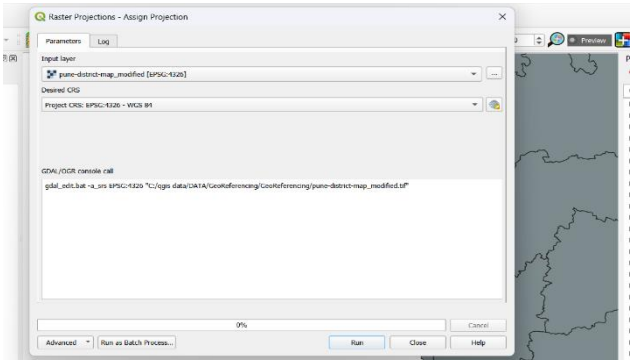
Step 11: Run it then show successfully msg



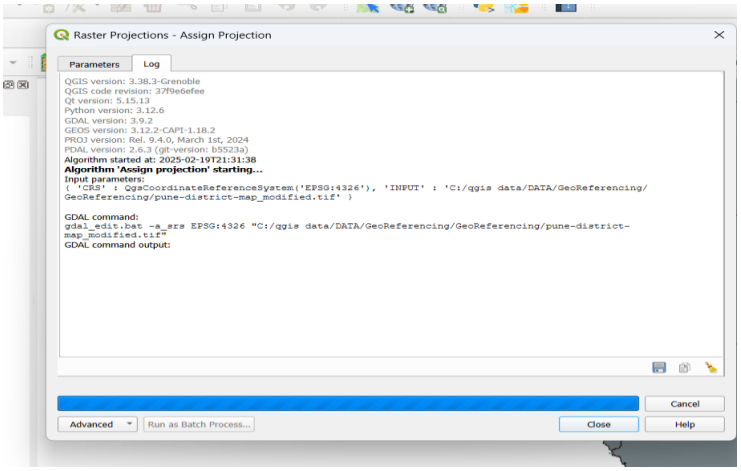
Step 12: After successfully georeferenceing this map will show



Step 13: open the projection and select run



Step 14: projection will be competed



Step 15: finally output