**base\_layers/**

* **Administrative Boundaries (Country/State/District/Settlement):**
  + OpenStreetMap (OSM-Boundaries): <https://osm-boundaries.com/map>
  + Geofabrik OSM Shapefiles: <https://download.geofabrik.de/> (select India/Asia, roads, boundaries, settlements)
  + GADM Global Boundaries: <https://gadm.org/download_country_v4.html> (global, also state/district for India)
  + Natural Earth Admin Boundaries: <https://www.naturalearthdata.com/downloads/10m-cultural-vectors/10m-admin-1-states-provinces/> , <https://www.naturalearthdata.com/downloads/10m-cultural-vectors/10m-admin-0-boundary-lines/>
* **Roads, Rivers, Settlements:**
  + OSM main data: [https://www.openstreetmap.org](https://www.openstreetmap.org/) (Export tool or use Geofabrik for Shapefiles)
  + Natural Earth Rivers, Urban Areas: <https://www.naturalearthdata.com/downloads/10m-physical-vectors/10m-rivers-lake-centerlines/>

**satellite\_imagery/**

* **USGS Earth Explorer (Landsat, MODIS, others):**
  + <https://earthexplorer.usgs.gov/> (free login required, select AOI and sensor, use GeoTIFF downloads)
* **Sentinel-2/Copernicus:**
  + Copernicus Data Space Ecosystem: <https://dataspace.copernicus.eu/> (Sentinel, Level-2A, select tile and area, free login)
* **Google Earth Engine public datasets** can be browsed at: <https://developers.google.com/earth-engine/datasets/tags/landcover> (download via Export)

**land\_use\_cover/**

* **ESA WorldCover 2021 (10 m):**
  + ESA WorldCover Portal: <https://worldcover2021.esa.int/> (select area to download, GeoTIFF, EPSG:4326)
  + Zenodo ESA WorldCover: <https://zenodo.org/records/7254221> (entire world or by tile)
* **India-specific LULC classified rasters:**
  + ORNL DAAC Decadal LULC India: <https://daac.ornl.gov/VEGETATION/guides/Decadal_LULC_India.html> (100m, GeoTIFF, several decades)

**fra\_layers/**

* **No universal national download – consult state/NGO portals or digitized collections:**
  + Open spatial data India (FRA, villages): <https://igismap.com/download-india-administrative-boundary-shapefiles-states-districts-sub-districts-pincodes-constituencies/> (requires login)
  + Use [https://data.gov.in](https://data.gov.in/) or state government GIS portals for specific FRA or community asset datasets.

**socio\_economic/**

* **India Socio-economic, Census/Village Data:**
  + Census India Open Data: <https://censusindia.gov.in/census.website/data/census-tables> (download CSV; link to spatial units) [not directly cited, but standard source]
  + India WRIS for water resource/village mapping: <https://indiawris.gov.in/wiki/doku.php?id=river_basins>
  + Data.gov.in for rural schemes, water, assets: <https://data.gov.in/catalogs> (search “village amenities”, “socio-economic”, download as CSV)
  + Combine with GADM/IGISMAP village polygons for spatial joins