

Team: τέσσερα(téssera)

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Data Source:

Satellite images :LISS III (Resourcesat-1/Resourcesat 2) <https://bhuvan.nrsc.gov.in/>
Ludhiana District boundary :https://static.fossee.in/mapathon/Mapathon2020_Data/
Groundwater Data :<https://indiawris.gov.in/wris/#/>

Years compared: 2008 and 2017

Map Extent : 75.342 E,30.562 N : 76.337 E,31.021N

Ludhiana Builtup Change Map[MAPATHON4372_ChangeInBuiltupArea_Map]

LISS III data used :Corresponding to OSM Sheets H43-(D12, D16, E04, E08, K05, K1, J13, J09, J05, J06, J10, J14, K02, K06)

Steps:

- *Raw data (4 bands): Green (Band 2)-Red (Band 3)-NIR (Band 4)-SWIR (Band 5)→Merged into 1 layer (From Raster→Miscellaneous→Merge)
- *Installation of the SCP Plugin→ From Band Processing (under SCP)→ Clustering→Unsupervised classification (K-means)
- *Manual Identification of classes which included the Built-Up area by comparing with the base satellite map (XYZ Satellite Google Earth Imagery)
- *Vectorization of the Raster File→From Raster→Conversion→Polygonize (Raster to Vector)
- *Creating Buffer→From Vector→Geoprocessing Tools→Buffer
- *Clipping of the study area→From Vector→Geoprocessing Tools→Clip
- *Filtering of the "Built-up Area" classes and selecting only the manually identified classes
- *Adding the Area Field in the attribute table→Calculating Geometry using "\$Area" function
- *Merging the tiles: Vector→Data Management Tools→Merge Vector layers
- *After merging the vectors layers→Overlaying the two-year data set to check the growth in Built-up area

Groundwater Depth comparison[MAPATHON4372_ChangeInGroundwaterDepth_Map]:

Steps:

- *Filtering out the raw Excel data to collect: Lat, Long, Depth, Station information
- *Saving the excel file in 97-2003 format and creating .csv file
- *Importing the excel file in QGIS
- *From Processing Toolbox→IDW Interpolation→Calculating IDW
- *From Raster Extraction tool, selecting Contours→Generating contours based on the water depth values for comparison.

Map Applications

Ludhiana is one of the fastest growing regions, due to growing industrial hub and migration;is majorly prone to "Urban Sprawl":a phenomenon of outgrowth of urban areas,caused by uncontrolled,uncoordinated and unplanned growth.

Urban Sprawl of Ludhiana District hasn't been covered by VEDAS and nor has been the study area for any Research Paper yet, thus making this built up change map[MAPATHON4372_ChangeInBuiltupArea_Map] potential to serve the following applications:

To study the :

- a)Characteristics of Urban Sprawl,Quantifying the magnitude(Entropy Method of Buffer), location and type,causes,effect of sprawl
- b)Urban Economics
- c)Climatic Impacts of Urban Land use patterns(eg: urban floods,effect in land surface temperature,etc)
- d)Modelling spatial/temporal/spatiotemporal growth patterns

One such application has been performed for this Map.**We have mapped the change in groundwater depth[MAPATHON4372_ChangeInGroundwaterDepth_Map],** which can be used to study the possible impact of urban sprawl on groundwater depth. Since this map has been covered for the whole district, it also helps visualise the change in built up area of rural settlement pockets; and thus plans to convert few of them to semi-urban can be done.

Urban planners require information related to rate of growth,pattern and extent of sprawl to provide basic amenities,in absence of which the sprawl areas lack basic infrastructural facilities.Since, migration and industrialisation can't be the limiting factors of the present day society , thus accessing and modelling the urban sprawl growth patterns to ensure proper planned growth becomes the only powerful weapon to overcome this modern-day-evil.