

Technical document

Topic: Change Detection of water bodies in Chennai

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Introduction:

As the years roll on, the changes in the environment have brought significant impact and attention to the public. The coastal city of Chennai has a metropolitan population of 10.6 million as the city lacks a perennial water source, catering to the water requirements of the population has remained an arduous task.

Location: 13°04'57.7"N 80°16'14.5"E

Area of Water Bodies: 12.6 square kilometres in the late '20s, 3.2 square kilometres at present.

Length of the sea line: 19 km comprising the world's second-longest beach - Marina beach.

Total no of lakes: 39 of which the Chembarambakkam Lake 25 km away from Chennai is the largest one with a surface area of 3,800 acres (15 km²).

No of rivers: Total no of the rivers flowing in the city is 3 namely Adyar River, Cooum River, Kosasthalaiyar River running for about 42, 64, and 126 respectively.

Objective

To detect the changes in water bodies, river course, lakes, etc in Chennai city
This information is hosted on Bhuvan and for visualization and analysis for the assessment of water availability and hydrological drought in the city.

Methodology/ ISRO data/ GIS steps used:

- Data from Resourcesat-1/ Resourcesat-2:LISS-III was used for surface analysis of all water bodies.
- District data from Bhuvan was used for the district boundary classification.

These data were employed and analysed in the QGIS an open-source platform to bring an outcome as a thematic map that implies the changes in water bodies in the target district using the following steps:

- The first step in the overlay analysis is to convert each data layer to raster.
- We created an output raster where pixel values are 1 where there is a water surface and 0 where there are not.
- Rather than running the rasterize algorithm one-by-one, we used the built-in batch-processing functionality to convert all the categories of water bodies all at once.

Complexity

- This GIS operation is performed in the raster space using a grid-based approach.
- The typical workflow for performing a Water bodies change analysis - converting source vector data to appropriate rasters, re-classify them.

Potential Application of the map

- The comparative changes in water bodies for a decade in the metropolitan city can be observed
- The change in the river flow can be detected
- The public is acknowledged about the various water resource in the city
- An overview of the land and urban occupying the wetland can be studied