

## **ABSTRACT**

This study focuses on assessing the revised storage capacity of the Srisaillam Dam Reservoir in Andhra Pradesh using satellite remote sensing survey (SRSS) techniques between the lowest observed water Level (LWL) and the highest observed water level (HWL). The assessment used images from Landsat-5 & 7, LISS-III, Sentinel-1, and Sentinel-2A satellites. The water surface extraction indices like Modified Normalized Difference Water Index (MNDWI) and Normalized Difference Water Index (NDWI) were used to extract the open water surface features from optical images, and the histogram was used in the case of Synthetic Aperture Radar (SAR) Ground Range Detected (GRD) images. The publicly available Global Surface Water Data (GSWD) set was used with MNDWI/NDWI to extract the water surface area from images with a cloud cover of up to 60% of the area of the reservoir. The area elevation curves generated from the SRSS were validated with area-elevation curves produced from field data. The Inverse Distance Weighted (IDW) tool available in Q-GIS was used to generate the digital elevation models (DEMs) for 1997 and 2024, and a DEM of Difference (DoD) was used to locate the critical deposition zones within the reservoir. Zones of larger sediment deposition were prioritized for desiltation and an open excavation plan was proposed to remove the deposited sediments from such zones. This study concludes with fresh ideas on where and how to dump the excavated sediment, an estimate of likely expenditure, and the potential monetisation of the excavated soil from the reservoir in brick manufacturing. The technique was found to be viable and very cost and time effective in the case of the Srisaillam dam reservoir because of a wide range of fluctuations (i.e., from FRL to MDDL) in the reservoir levels each year. Since such is the case in most of the reservoirs, this technique is adoptable for worldwide dams, which solves the global issue of water resource management in a proactive way and makes the water resources sustainable in a cost-effective way.

**Keywords:** Satellite Remote Sensing, GSWD, QGIS, Cloud cover, Revised storage capacity, IDW, DEM of Difference, Sediment Excavation, Sediment Management.