



## Estimation and Mapping Chlorophyll-a Concentration in Pulicat Lagoon, South India Using Sentinel 2A

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**Abstract:** Pulicat Lagoon located in the states of Andhra Pradesh and Tamilnadu, India is one of the second largest and diverse brackish ecosystems in India. Agricultural runoff and industrial effluents are being discharged into the lagoon resulting in polluted water. This leads to the increase in nutrient content of the lagoon. Therefore, the lagoon receives excessive nutrients that promote algal blooms decreasing dissolved oxygen availability, water quality, and ecosystem stability. This results in the growth of algae that affects the ecosystem of the lake. In the present study, performance of band math algorithm in estimating chlorophyll-a concentrations in the Pulicat Lagoon from the Multi-Spectral Instrument on board Sentinel-2A (MSI/Sentinel-2A) was assessed. The algorithm was calibrated and validated using *in-situ* measurements carried out at eight sampling locations. The chlorophyll-a concentration values as estimated by standard tests and varied from 0.79 mg/m<sup>3</sup> (top of the lake) to 1.63 mg/m<sup>3</sup> (bottom right of the lake). These variations in the chlorophyll values provide a significant pattern starting with low chlorophyll values in the top of the lake and it proceeds forward to the centre, there is an increase in chlorophyll values. Further down the lake and near the mouth of the lake, chlorophyll values tend to decrease due to the increase in pollution caused by the discharge of effluents from nearby industries and sea water intrusion. The values obtained by field measurement were validated against the data derived from remote sensing algorithm and a high correlation coefficient of 0.7779 was established. Hence, this study demarcates the regions with high Chlorophyll-a concentration in order to improve aquaculture in the study area.

**Keywords:** Pulicat lagoon, Chlorophyll-a, Sentinel 2A

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