

# HYDROCHEMICAL CHARACTERISTICS AND MACROPHYTES IN THE BETANA LAKE, EASTERN NEPAL.

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### Abstract

Aquatic ecosystems provide a variety of goods and services and thus highly valuable for the livelihoods of people and sustainable development. This study aims to examine hydrochemical variables and macrophytes in one of the important wetlands in eastern Nepal 'Betana Lake'. Water samples were collected in pre-monsoon and post-monsoon seasons and water temperature, pH, dissolved oxygen (DO), free CO<sup>2</sup>, and major ions including total hardness were analyzed to characterize the water quality of the lake. In addition, macrophytes found in the lake were also collected and identified. The results exhibited that the dominance order of chemical variables in terms of mean values (mg/ L) in the Betana Lake were Cl<sup>-</sup> > TA > NH<sub>4</sub><sup>+</sup> > PO<sub>4</sub><sup>3-</sup> > NO<sub>3</sub><sup>-</sup>, and TA > Cl<sup>-</sup> > NH<sub>4</sub><sup>+</sup> > NO<sub>3</sub><sup>-</sup> > PO<sub>4</sub><sup>3-</sup> during the pre-monsoon and post-monsoon seasons, respectively with relatively higher concentrations of NH<sub>4</sub><sup>+</sup> and NO<sub>3</sub><sup>-</sup> in post monsoon season. The low pH, alkalinity, and high value of dissolved oxygen (DO) in the post-monsoon season in the lake were related to the lower dominance of submerged and floating macrophytes. In the lake, altogether 42 species of macrophytes (emergent, submerged, free-floating, and rooted) were reported. An invasive species *Eichhornia crassipes*, submerged *Hydrilla verticillata* and *Ceratophyllum submersum* were the ecologically significant macrophytes in the lake. The abundance of these species with other

submerged and floating species in the lake is due to eutrophication, high silt load and sedimentation, and human encroachment. The higher dominance of emergent macrophytes in the post-monsoon season indicated that higher nutrients content ( $\text{PO}_4^{3-}$ ,  $\text{NO}_3^-$ , and  $\text{NH}_4^+$ ) and total dissolved solids (TDS). Due to the promotion of the lake site as an eco-touristic area, anthropic activities could further deteriorate the lake water quality and biodiversity. Therefore, periodic evaluations of hydrochemical parameters with macrophytes are required for the maintenance and long-term protection of the Betana wetland.

**Key words:** Hydrochemical parameter, Macrophytes, wetland conservation, water quality, Betana Lake.

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