

# **Influence of Land Use and Land Cover Change on the Morphological Evolution of Laguna de Bay, Philippines**

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## **Abstract**

Land use/land cover change (LULCC) has brought in several effects to natural processes in both terrestrial and aquatic ecosystems. Extensive LULCC has subjected water bodies to constant pressure through the alteration of hydrogeologic regimes, resulting to changes in the physical characteristics of the basin or otherwise known as morphology. Moreover, morphological evolution in lake ecosystems has important implications on biogeochemical cycles and ecological processes, which defines the extent of the ecosystem services it provides. Laguna de Bay, which is known as the largest freshwater lake in the Philippines and a major player in the local economy, has been confronted with different challenges over the past decades that caused its degradation. Therefore, it is essential to determine the contribution of LULCC to the changes in lake morphology. This study intends to determine the relationship of LULCC and lake morphology by (1) quantifying the morphological evolution of Laguna de Bay from 1972 to 2019, (2) documenting the land use and land cover change in decadal scales, (3) determining the significance of LULCC to morphological evolution, and (4) predicting the changes in lake morphology given the predicted LULCC for 2050 and 2100. Landsat data from 1972 to 2019 will be utilized in remote sensing and modeling techniques (i.e. Markov Chain Analysis, Soil and Water Assessment Tool) to conduct the study.

**Keywords:** *morphology, land use and land cover change, Landsat, Markov Chain analysis, Soil and Water Assessment Tool*