Impact of agricultural practices on ecosystem health of lagoons: a case study of the Keta Lagoon Complex in Ghana, West Africa.

Abstract

The paper reports on the current ecological health of the Keta Lagoon Complex by analyzing a suite of physical, chemical, and biological environmental conditions prevailing within it. Results are discussed in relation to the main human activity (i.e., agriculture) prevailing in its catchment. The current water quality of the lagoon has declined compared to data collected 20 years ago with elevated levels in parameters such as nitrate, phosphate, turbidity, and temperature. Secchi disk depth, salinity, and dissolved oxygen levels in the lagoon have decreased. More than 60% of the total area of the lagoon is predicted to be currently unsuitable to support aquatic life. The Carlson's TSI estimated for the various zones of the lagoon ranged between 72.40 and 80.61 depicting a highly eutrophic lagoon, with about 90% of the total area studied confirmed to be experiencing some degree of eutrophication. The plankton index of biotic integrity also yielded high values of between 3 and 6 in most areas of the lagoon, thereby affirming the poor health of the lagoon. The diversity of phytoplankton and benthic macroinvertebrate species in the lagoon has reduced significantly in the last two decades with about 11 genera of phytoplankton missing in the present study. Benthic macroinvertebrate assemblage richness, evenness, and diversity have decreased from 3.6, 2.0, and 5.8 in 2008 to 1.2, 0.8, and 1.7 respectively, in the present study. Overall, the health of the Keta Lagoon remains poorer and continues to decline with no signs of recovery.