

# Changes in the Chemistry of the Weija Dam Reservoir in Ghana, Twenty Years after Impoundment

O. D. Ansa-Asare\* and K. A. Asante

*CSIR-Water Research Institute, P. O. Box 38, Achimota-Accra, Ghana*

\* Corresponding author

## Abstract

The studies of the changes in Weija lake waters after 20 years of impoundment, were aimed at examining the status in the chemical characteristics of the Weija lake, by analysing available data collected over a 5-year period (1993–1997), and comparing them with the first 5 years of impoundment between 1977 and 1982. The study showed supersaturated dissolved oxygen concentrations, indicating the lake waters had recovered from the initial low oxygen saturation during the first few years of impoundment. The lake waters had high oxygen demand from the high phytoplankton levels and organic matter in the dry season. Chlorophyll 'a', which is an indication of algal biomass content, correlated with total inorganic carbon (alkalinity), giving a correlation coefficient of 0.61 at 95% confidence limit, reflecting the fact that both parameters decreased in the rainy season, and were higher in the dry season. The initial high concentration of nutrients also decreased after 20 years with the exception of nitrate, which concentration increased at the rate of  $1.07 \text{ mg l}^{-1} \text{ year}^{-1}$  over the last 5 years, a condition that could mainly be attributed to nitrogen input from domestic and agricultural origin. The high seasonal trend of nitrate in the months of March and May was due to the fact that the period is the main farming season in the Weija catchment area when most fertilizers are applied. With respect to the major ions, slight increases in their concentrations occurred. Ionic concentration patterns were found to be  $\text{Na} > \text{Ca} > \text{Mg} > \text{K}$  and  $\text{HCO}_3 > \text{Cl} > \text{SO}_4$ . The cationic pattern was in contrast to the previously reported pattern of  $\text{Na} > \text{Mg} > \text{Ca} > \text{K}$ , showing complete mixing of the lake waters with moderate rock weathering rate but a strong influence of maritime-derived salts.