

## Summary

1. Study of phytoplankton nutrient status, biomass, productivity and species composition was carried out between March 2005 and March 2006, along a transect between north-eastern open Lake Victoria and the large, shallow Nyanza Gulf in order to examine how the terrestrial run-off can influence phytoplankton community and nutrient status and determine whether nutrient management of catchment run-off has the potential to control the algal blooms in the gulf.
2. Hydrological and nutrient differences between the open lake and the gulf create a transition from P deficiency for phytoplankton within the gulf to nitrogen deficiency in open lake. The shallow and turbid gulf was continuously dominated by non-nitrogen-fixing filamentous and chroococcale colonial cyanobacteria, but seasonal stratification and deeper mixing depth in the open lake favoured diazotrophic cyanobacteria and diatoms.
3. Seston ratios and metabolic nutrient assays indicated the gulf to be sufficiently phosphorus deficient to impose P limitation on phytoplankton growth and biomass. In contrast, the open lake is not P deficient and is more likely to experience N deficiency that favours diazotrophic cyanobacteria. Because of high turbidity in the gulf, the euphotic zone is very shallow, limiting integral primary productivity compared to the less turbid open lake; high PAR extinction may also favour *Microcystis* blooms in the gulf.
4. Increased P loading into the gulf may translate to higher algal biomass, mainly of the bloom-forming and potentially toxic cyanobacteria, and therefore, reduction in P loading into the gulf should be a management priority. However, a review of historical data indicates that the greatest change in water quality in the gulf is increased turbidity that reduces light availability and may limit algal growth more than P deficiency in years of high rainfall and river discharge.