



## **USDA-CSREES 2006 National Water Quality Conference**

### **IDENTIFICATION OF LINKS TO INTEGRATE PRIMARY PRODUCTION SYSTEMS AND ENVIRONMENTAL PROTECTION WITHIN THE CLOSED ZAPOTLAN WATERSHED USING NITROGEN AND PHOSPHORUS BUDGETS**

Nitrogen and phosphorus budgets were developed for the closed Zapotlán basin. Lake Zapotlán (1,400 ha), dominated by nutrient inputs from partially-treated urban sewage and from agricultural areas, is becoming eutrophic. Preliminary results show that urban outputs contribute significant amounts of nitrogen ( $>125 \text{ ton yr}^{-1}$ ) and phosphorus ( $>50 \text{ ton yr}^{-1}$ ), although efforts are underway to a more complete and efficient treatment of the sewage. However, concerns are rising regarding the impact of excess nitrogen and phosphorus from diffuse, agricultural sources on the water quality of Lake Zapotlán. Soils within the basin, mostly acidic (pH 5.8), test low for both nitrogen and phosphorus. This soil condition demands an increasing application of those fertilizers to support agricultural production, that together with prevalent, inefficient management practices appear to contribute significantly to lake pollution. Manure nutrient output – calculated from inventories of cattle, pigs and poultry – also adds to the lake nutrient enrichment. When analyzing the problems of deteriorating water quality due to nutrients it is important to assess their potential utilization before they reach Lake Zapotlan. The nutrient budget identifies potentially productive links among agriculture, aquaculture and urban sewage through the use of excess nutrients. The budget also helps to a balanced analysis of the impact of nutrient additions, as the appropriate level of nutrient input depends on the lake's intended uses, and the trade-offs involved. The lake supports a tilapia fishery ( $>1 \text{ ton day}^{-1}$ ) and cattail populations utilised by locals for artisanal work, versus a growing sectorial interest to develop a recreational water body. An in-depth analysis of nutrient fluxes is expected to contribute to the development of policies intended to maintain productive agriculture within the Zapotlán basin while protecting the water quality of Lake Zapotlán.

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