Effect of Inorganic and Organic Fertilizer Application on Nitrate Leaching in Wetland Soil Under Field Tomato (Lycopersicon esculentum) and Leaf Rape (Brassica napus)

Abstract

The implications of increased application of N inputs to agricultural systems in Africa for nitrate leaching are still only partially understood in Africa. A lysimeter experiment was carried out on a loamy sandy soil in central Zimbabwe in order to determine the effect of cattle manure and mineral N application on nitrate leaching. A cluster of zero-tension (free flowing) lysimeters was established, and leachates and soil samples were analyzed for nitrate N concentration and mineral N content, respectively. Increasing the application rates from 100 kg N fertilizer + 15 Mg manure to 200 kg N fertilizer + 30 Mg manure ha−1 increased NO3–N leaching by 60 %. Applied N lost in leachate increased by 6 and 19 % for the tomato and rape crops, respectively, when N fertilizer and manure application rate was doubled. Higher mineral N fertilizer and cattle manure applications increase total N lost in leachate. The pollution of groundwater with nitrate in leaf rape cropping in Zimbabwe is potentially higher than that found in the production of tomato for the crop rotation in the current study.