Survey of Uruguayan Freshwater Water Quality for Crop Irrigation

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Abstract

The increase in global demand for food and biofuels, has led to an high demand for agricultural products. That situation implies an intensification of production systems, and develop strategies to ensure stability against drought, and moreover a better levels of productivity. Objectives that could be achieved with the irrigation of crops; however, it can promote negative impacts due to cumulative effects on soil quality, which depend on the chemical composition of the water used. This paper show the results of a national study of freshwater quality, on 100 river watersheds (up to 100,000 ha), which correspond to a cumulative drainage area of 70% of country surface. In these freshwaters the following parameters was evaluated: electrical conductivity, concentration of major cations (Na, K, Ca, Mg), alkalinity, and pH. The results showed Ca, Mg, K, and Na concentrations in ranges of 0.0-45.1, 0.0-14.1, 0.019-16.8, and 0.78 -139 mg L^{-1}, respectively. The alkalinity was in range of 32 to 420 $CaCO_3$ mg L^{-1}, and this variable was the most important contribution to get the different values of electrical conductivity of water, which had values between 71.6 and 1047 micro Siemens cm^{-1}. These features allow propose at least 3 freshwater ecoregions (coastal and central-south; basalt; Northeast and southeast) at Uruguay, based on the chemical composition of studied freshwaters. Moreover, SAR values (([Na] / [(Ca + Mg) / 2] 1/2) of these waters shown a 99% of them has good quality characteristics for the development of irrigation, because they have a SAR below 10.

Keywords: water quality, major cations, ECw, SAR