World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:8, No:05, 2014

Assessment of Drainage Water Quality in South Africa: Case Study of Vaal-Harts Irrigation Scheme

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Abstract : South Africa is water-stressed being a semi-arid country with limited annual rainfall supply and a lack of perennial streams. The future implications of population growth combined with the uncertainty of climate change are likely to have significant financial, human and ecological impacts on already scarce water resources. The waste water from the drainage canals of the Vaal-Harts irrigation scheme (VHS) located in Jan Kempdorp, a farming community in South Africa, were investigated for possible irrigation re-use and their effects on the immediate environment. Three major drains within the scheme were identified and sampled. Drainage water samples were analysed to determine its characteristics. The water samples analyzed had pH values in the range of 5.5 and 6.4 which is below the normal range for irrigation water and very low to moderate salinity (electrical conductivity 0.09-0.82 dS/m). The adjusted sodium adsorption ratio values in all the samples were also very low (<0.2), indicating very low sodicity hazards. The nitrate concentration in most of the samples was high, ranging from 4.8 to 53 mg/l. The reuse of the drainage water for irrigation is possible, but with further treatment. Some suggestions were offered in the safe management of drainage water in VHS.

Keywords : drainage canal, water quality, irrigation, pollutants, environment
Conference Title : ICEEA 2014 : International Conference on Environmental Engineering and Applications
Conference Location : London, United Kingdom
Conference Dates : May 26-27, 2014