

Abstract

This study sought to characterise sediments in the unlined canal in Chókwè Irrigation Scheme (CIS), during dry (DS) and wet (WS) seasons. Laboratory analysis were performed on the sediment's soluble extracts for pH, turbidity, total dissolved solids (TDS), sodium, calcium, magnesium, and potassium concentrations. Atterberg tests and particle size distribution (PSD) were also investigated for all sediment samples collected in the CIS main canal. Results suggest acceptable water pH and turbidity in both seasons. The concentration of TDS was found to be 250 and 300 ppm for the DS and WS, respectively. Sodium was the most predominant element in water and sediment samples, followed by potassium and calcium. The Liquid Limit, Plasticity Limit and Plasticity Index were 52%, 20% and 32%, respectively. A mean of 2.960 N/m² was obtained for the critical shear stress of erosion. The main particle size in bedload sediments which were classified as saline were silt, fine sand, and clay. Overall, CIS is characterized by the occurrence of cohesive and varied degrees of uniformity in the sediments grain size. Considering the physicochemical properties of the canal bed sediments as an accurate representation of the surrounding farmer's fields, sustainable agriculture practices may be at stake in the site. Therefore, some measures may be required to revert sediment accumulation to ensure long-term canal functionality and sustainability.