

ABSTRACT

Access to quality drinking water is of major concern for sustainable development in developing countries with regard to physico-chemical properties. Groundwater from shallow wells is the main source of domestic water supply for the community of Ainabkoi Sub-County of Uasin Gishu County in Kenya. Seasonal agricultural production activities expose the water to possible pollution. In this regard the study aimed to assess the seasonal physico-chemical parameters in shallow wells among different farm sizes in three wards within Ainabkoi sub-county. Each ward was a homogenous stratum of same size-ranged farms classified as large, medium and small farm sizes in Ainabkoi, Olare and Kaptagat (Kipsinende) wards respectively. Within each ward farms were purposively and randomly selected such that only accessible farms that had access to either a privately owned or communal wells were selected. Wells were sampled during the wet and dry seasons of the year for a period of two years. The seasonal levels of physico-chemical parameters pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Dissolved Oxygen (DO), Total Suspended Solids (TSS), turbidity and temperature were determined. There were non-significant differences between the farm sizes in the groundwater pH, EC, DO, turbidity and temperature. The groundwater pH values were within the WHO standards range of 6.3 to 8.5. EC values were below the recommended limits of potable water of $250 \mu\text{ccm}^{-1}$. TDS and TSS differed significantly between farm sizes. Wells within the small mixed farm sizes had significantly high TDS levels ranging from 30-250 mgL^{-1} . The TDS values ranged from 32.20-203.30 mgL^{-1} hence the wells can be classified as fresh water wells. TSS values were significantly higher during the wet season by about 90% and highest in wells within the large sized farms. The turbidity levels were higher than the recommended limits by WHO of at least 5.0 NTU in areas with limited resource availability. In conclusion, the groundwater in Ainabkoi sub-county can conservatively be categorised as safe for domestic use with regard to physico-chemical parameters.