

INVESTIGATING HUMAN HEALTH IMPLICATIONS OF SURFACE AND GROUND WATER CONSUMPTION IN THE SOKOTO-RIMA FLOODPLAIN, SOKOTO, NORTH-WEST NIGERIA

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ABSTRACT

*This research investigated the surface and ground water quality in the Sokoto-Rima floodplain and determined the human health implications of consuming it. Five sample points were selected systematically, and at each sample point, three samples were taken each from ground (tube well), and surface (river) water. The surface water was taken from the river Rima at hundred meters interval, and the sampling was repeated after 20days. Thus a total of 30 samples (1st batch-15 and 2nd batch-15) were collected. Data obtained from laboratory were tested for correlation (Pearson correlation) and the difference (paired t-test) between surface and ground water. Results showed that positive correlation exist in pH, Biochemical Oxygen Demand (BOD), Total Dissolve Solid (TDS), Total Suspended Solid (TSS), Nitrate (NO_3^-), Sulphate (SO_4^{2-}), while negative correlation in Dissolved Oxygen (DO), Chloride (Cl^-), Phosphate (PO_4^{3-}) and Potassium (K^+). Result also showed that the mean difference of pH, BOD, PO_4^{3-} and K^+ are significant at $p < 0.01$ (2-tailed) and Cl^- is significant at $p < 0.05$ (2-tailed). TDS, Cl^- , PO_4 , NO_3 , SO_4 and K are within the WHO and NESREA standards, while, DO, BOD and TSS (in NESREA) are above the standards. The Most Probable Number (MPN) method was used to find the number of coliforms, and Isolate method was used to identify the name of the coliforms found in each sample area. Result showed that in surface water *Citrobacter freundii* was found in all the study area except in Boye and *Escherichia coli* were only found in Boye. While, in groundwater *Escherichia coli* was found in two sample areas. The study therefore, concludes that the quality of the surface and ground water in the area is a determinant of the soil characteristics and has a positive relationship with the health characteristics of the surrounding communities. The research also concludes that surface and groundwater in the study area are not safe for human consumption unless proper water treatment and sanitation is done.*

Keywords: Surface and Groundwater, Physicochemical Characteristics, Microbial, water quality, pollution