Assessment Of Groundwater Quality In Parts Of Bayelsa State, Eastern Niger Delta, Nigeria

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Physical, Chemical and aesthetic groundwater quality characteristics as well as heavy metals concentrations from twenty five (25) locations in various parts of Bayelsa States of Nigeria, was carried out in order to evaluate and determine the suitability of the water for domestic and other uses. The pH which was measured in the field has value ranging from 5.32 to 7.70. Turbidity value range from 1.46 NTU – 184 NTU with Total Suspended Solids (TSS) ranging from 40 mg/l – 597 mg/l. Total hardness concentrations range from 1.06 mg/l – 97.64 mg/l. Chloride (Cl\(_2\)) values ranged from 5.32 mg/l – 41.75 mg/l while the Nitrate (NO\(_3\)) ranges from 0.35 mg/l – 8.16 mg/l. The recorded manganese concentrations ranged from 0.01 – 2.24 with a mean value of 0.40mg/l. Results also show that there was 100% compliance for Arsenic in all the water samples. The high concentrations of some heavy metals in the groundwater could be due to the intensive oil production activities with extensive gas flaring. The Sodium Absorption Ratio (SAR) of the water ranges from 0.30 – 0.78 milleq/l while total hardness (CaCO\(_3\)) values indicate that the water is predominantly soft to moderately hard. These results show that groundwater in the area is not highly mineralized, hence all the parameters listed, except pH and iron in some locations area within acceptable limits. The acidity can be treated using base-exchange method with dolomite hence PVC materials should be used for borehole construction in the area since acidic waters are aggressive to iron pipes while the level of iron can be reduced by aeration and filtration. Treatment for these parameters will make the water potable for domestic uses. For agricultural purposes, the water is suitable on the basis of SAR values. Also, low chloride concentration indicates absence of saltwater encroachment in the area at the depths investigated. The slight variations in the concentration levels of the ions at different locations could be explained by the fact that the boreholes tap from different depths.