

GIS Based Source Water Vulnerability Assessment of Otamiri River, Owerri South East Nigeria.

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SUMMARY

Source water protection of any surface and/or underground water is crucial for the sustainability of drinking water quality and quantity of any community. The inadequacy of this knowledge based on the extent of vulnerability of the watershed to the surface water contamination has led to little concern towards a preventive approach of protecting the source water. Also, the assumption by people mostly in developing countries like ours that water pollution is mainly from point sources with little or no knowledge of non-point source which are mainly as a result of land uses and other environmental factors is a major issue to be addressed in the study. The study was aimed at assessing the potential vulnerability of Otamiri river watershed to pollution sources using geographic information system techniques. ArcGIS 9.3 was employed in the delineation and characterisation of the Otamiri River watershed using a Digital Elevation Model as an input layer in HEC-GeoHMS extension. Other layers that were created for the datasets were land use/land cover classification, slope, drainage density, level of imperviousness, and distances. Weighted overlay tool in ArcGIS environment was used to integrate the thematic layers and assessment of the degree of vulnerability of Otamiri River to pollution sources. The result of the assessment showed that the land use distribution of the watershed was most dominated by built up areas which constituted 45.5% of the total area and least dominated by waste dump site which cover 0.56% of the study area. The watershed was dominated by medium level of imperviousness which implies a fair water quality standard. The study also observed that the encroachments of human activities into 150m watershed management zone were mainly dominated by farming activities which consists of 18.2% of the entire management zone, followed by sand excavations (14.2%), built up areas (7.8%) and waste dump sites (2.3%). Otamiri River is the only surface water that provides domestic and industrial water needs for the inhabitants of Owerri capital territory and environs in Imo State Nigeria. The vulnerability assessment of the Otamiri River can serve as a learning paradigm first for the Imo State Water Corporation- the Agency responsible for drinking water supply, also for the State Ministry of Environment, the ministry responsible for protecting the watershed other environmental policy makers, planners, stakeholders and researchers interested in sustainability of Otamiri river watershed.