USING SPATIAL INFORMATION TECHNOLOGIES AS MONITORING DEVICES IN INTERNATIONAL WATERSHED CONSERVATION ALONG THE SENEGAL RIVER BASIN OF WEST AFRICA

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Abstract: In this paper, we present the applications of spatial technologies of Geographic Information Systems (GIS) and remote sensing approach in international monitoring of river basins particularly by analyzing the ecological, hydrological information and socio-economic issues along the Senegal River. The literature on multinational water crisis has for decades focused on mediation aspects of trans-boundary watershed management. This has resulted in limited emphasis on applying the latest advances in geo-spatial information technologies in multinational watershed conservation in the arid areas of West African sub-region within the Senegal River Basin for decision-making and monitoring. While the basin offers life support in a complex ecosystem stretching across different nations in a mostly desert region characterized by water scarcity and subsistence economies, there exists recurrent environmental stress induced by both socio-economic and physical factors. Part of the problems consists of flooding, drought and limited access to sufficient quantities of water. This remains a particularly sensitive issue that is crucial for the health of a rapidly growing population and the economy. The problems are further compounded due to the threats of climate change and the resultant degradation of almost the region’s entire natural resources base. While the pace at which the institutional framework for managing the waters offer opportunities for hydro electricity and irrigated agriculture through the proliferation of dams, it has raised other serious concerns in the region. Even where data exists for confronting these issues, some of them are incompatible and dispersed in different agencies. This not only widens the geo-spatial data gaps, but it hinders efforts in dealing with the monitoring of water problems of the basin. This study will fill that gap in research through mix scale methods built on descriptive statistics, GIS and remote sensing techniques by generating spatially referenced data to supplement the existing ones for the management of the Senegal basin. The results show the incidence of change predicated on pressures from demography, natural forces and the proliferation of river basin development which resulted in more irrigated areas to meet the needs of inhabitants of the basin. With the substantial increase in bare surface areas, the basin faces growing exposure to the threats of desertification.

Keywords: GIS, Remote sensing, International watershed, Monitoring, River basin