

## **Applying GIS and Remote Sensing Techniques As Monitoring Tools In Multinational Watershed Conservation: The Case of Senegal River Basin In West Africa**

Dr Edmund Merem and Dr Yaw Twumasi

Department of Urban and Regional Planning Jackson State University Mississippi, 3825  
Ridgewood Road Jackson Mississippi, MS 39211

### **ABSTRACT**

In this paper, we present a need for an integrated Geographic Information Systems (GIS) and remote sensing approach in the multinational conservation and monitoring of river basins particularly by analyzing ecological, physical, hydrological information and socio-economic issues on the environment of 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 the 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 a GIS and Remote sensing approach by generating spatially referenced data to supplement the existing ones for the management of the Senegal basin. GIS and remote sensing techniques are indispensable in the development of the appropriate resource management tools for effective policy making in the monitoring of the river basin for posterity.

### **KEYWORDS**

GIS and remote sensing, multinational watershed, conservation of river basin, monitoring