

An Integrated Assessment (IA) of Water Resources in the Speightstown Catchment, Barbados Using a GIS-Based Decision Support System

Authors : Anuradha Maharaj, Adrian Cashman

Abstract : The cross-cutting nature of water as a resource translates into the need for a better understanding of its movement, storage and loss at all points in the hydro-socioeconomic cycle. An integrated approach to addressing the issue of sustainability means quantitatively understanding: the linkages within this cycle, the role of water managers in resource allocation, and the critical factors influencing its scarcity. The Water Evaluation and Planning Tool (WEAP) is an integrative model that combines the catchment-scale hydrologic processes with a water management model, driven by environmental requirements and socioeconomic demands. The concept of demand priorities is included to represent the areas of greatest use within a given catchment. Located on Barbados' West Coast, Speightstown and the surrounding areas encompass a well-developed tourist, residential and agricultural area. The main water resource for this area, and the rest of the island, is that of groundwater. The availability of groundwater in Barbados may be adversely affected by the projected changes in climate, such as reduced wet season rainfall. Economic development and changing sector priorities together with climate related changes have the potential to affect water resource abundance and by extension the allocation of resources for example in the Speightstown area. In order to investigate the potential impacts on the Speightstown area specifically, a WEAP Model of the study area was developed to estimate the present available water (baseline reference scenario 2000-2010). From this baseline scenario, it is envisioned that an exploration into projected changes in availability in the near term (2035-2045) and medium/long term (2065-2075) time frames will be undertaken. The generated estimations can assist water managers to better evaluate the status of and identify trends in water use and formulate adaptation measures to offset future deficits.

Keywords : water evaluation and planning system (WEAP), water availability, demand and supply, water allocation

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