

MODELING WATER RESOURCES ALLOCATION IN ANAMBRA-IMO RIVER BASIN

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ABSTRACT

Data were obtained from Mmam River and Aboine River Sub-basins of the Anambra-Imo River Basin. The sub-basins were considered along four subareas and five usage areas of community use, ecological, industrial, energy and loss/leakage mitigation. The study involved a minimization and reduced cost, linear programming simplex method as an aid in evaluating and describing the water resources allocation. The problem was solved using software, implementing the Tora Optimization system and simplex algorithm written in visual basic language. The model uses optimality and equity in minimizing allocation to various subareas with a view to reducing wastages and setting allocation limits within the available scarce water resources in the river basins. The optimal solutions were obtained subject to twenty-six material balance and capacity constraint for each river sub-basin, as well as more than twenty transformations and five iterations. The sensitivity and post-optimality analysis of the study provided a direct link between the model input and its output by a certain percentage or rate. The study showed that when compared with the existing method of water allocation; the proposed system resulted in more than 90% efficiency in water resource allocation.

Keywords: Optimality, Scarcity; Allocation, Water Resources.