

**APPLICATION OF DYNAMIC PROGRAMMING IN WATER RESOURCES
MANAGEMENT: A CASE STUDY OF UNIVERSITY OF BENIN WATER SUPPLY
SYSTEM, UGBOWO, EDO STATE NIGERIA**

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ABSTRACT

The paper evaluates the potentials for conjunctive use of surface water and groundwater resources to meet the present and future water demand of the University of Benin, Benin City, Edo state, Nigeria. A discrete dynamic model was developed and applied to predict the demand, consumption and net benefit of the conjunctive use of the two sources.

In the model, allocations each user was assumed to represent a stage in the sequence of decisions. Three decision variables (x_1 , x_2 and x_3), were used to maximize the Net Benefits achieved from assumed discrete quantities S_1 , S_2 and S_3 . Results from the study show that about 52,000m³ of water could be supplied per day by conjunctive use of surface and groundwater sources. This quantity is 32,500m³/day higher than the present daily demand and can satisfy the demand up to the year 2023. The Net Benefit for using the multi-stage approach was found to be approximately 1.7 times greater than using both sources as a single unit.

KEYWORDS: Discrete Dynamic Programming, Surface Water Resources, Groundwater Resources, Net Benefit