

## Publications

### TR- 54

#### Decision Analysis on Water Resources Planning and Management for an Arid Metropolitan Center in West Texas

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The demand by consumers for public-owned low-priced natural resources is essentially insatiable. When natural resources become scarce the public is agonized by the problem of making an optimum choice or choices from feasible alternatives, preferably from a large number of feasible alternatives. In order to determine the best solutions in terms of satisfying constrained requirements, systematic procedures must be adopted for resources planning and management processes.

#### The Need for a Comprehensive Systems Approach to Urban Water Resources Planning

In the past, management and planning programs for water resources have been based primarily on one attribute--money. Sharp criticism has been directed to this type of

single-minded planning approach as exemplified in the following speech by Senator Stephen Youngs[38],

For a large segment of our water resources program, both the Executive Branch and Congress now scrutinize each project as though it were a narrow commercial undertaking. We concentrate attention on those direct prospective benefits which are strictly measurable in dollars and cents such as the dollar value of property saved from floods, or the amount by which river navigation saves freight charges. We then compare these narrowly construed monetary benefits to cost. In almost every instance, the benefits, human and social values, and vital objectives of national policy which cannot be measured in direct monetary terms often receive only supplementary attention, or none at all.

It has become the policy, as stated by Clayton[11], of the National Water Commission, that water resource projects should not be evaluated merely on a pure benefit-cost ratio, but that intangible benefits should also be considered. This prevailing attitude has catalyzed the application of decision analysis embedded with multiattribute characteristics for water resources development decision-making procedures.

Decision analysis is a systematic solution procedure which can be used to crystalize a complicated decision problem into manageable subproblems by ranking the decision alternatives in accordance with cardinal values attached to their consequences based on the principles outlines in utility theory. Recent advances in multiattribute utility theory allow the decision maker to assess utilities over intangible benefits such as social acceptance or recreation potential.

The relative importance of both intangible and tangible benefits such as cost or quality will all be weighted accordingly in the total utility evaluation. In this manner, the intangible benefits will receive due consideration in the final decision making process.

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