

A quality of life-based decision support model for the determination of water research priorities

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Abstract

A "value to the country and its peoples"-based decision support system for the assessment and funding of applied, low-risk water research is suggested, accentuating the fundamental quality of life and human needs of each individual citizen of the country. Appropriate research assessment models developed and in use, were investigated by means of literature surveys and personal communication. Multicriteria decision-making (MCDM) was selected, with the simple multi-attribute rating technique (SMART), as the specific method among the family of MCDM methods.

• A set of "values to the individual person"-based assessment criteria was generated from an in-house exercise; as used by other institutions; from interviews with water managers; from basic human needs and quality of life-concepts; and from issues raised by stakeholders in water and sanitation. Weights for these criteria were elicited from technical managers, and socio-political groups in the Country, and a scoring system added. Finally, some ancillary management elements were added to the core research assessment method to complete the decision support model.

Introduction

Water is an important national resource and in some countries, also a scarce resource. Being a national resource it could be argued that water should, therefore, be utilised to the benefit of all of a country and its inhabitants.

From the above argument, and because research funding is generally limited and inadequate, it follows that research performed on all aspects of water should be instrumental in achieving this goal. Whereas criteria such as "the potential increase in water quantities" or "the potential improvement in water quality" could be used to assess priorities in water research, it is really the eventual benefits that the increase in water quantities, or the improvement in water quality, might potentially have for the country and its people that matter (Fig. 1). Therefore, a "value to the country and its peoples"-based decision support system was created, for the assessment and funding of applied, low-risk water research, accentuating the fundamental quality of life and human needs of every person in a country. The decision support system was developed, using the South African Water Research Commission (WRC) as case study.

The WRC is a parastatal institution, funding mostly applied, (OECD, 1987) relatively low-risk, ensured-outcome, water research and technology transfer projects from levies on all water sales in the country. Fifteen so-called research fields (convenient groupings of projects) are being funded, i.e. agricultural water utilisation; drinking water; membrane technology; hydrometeorology; rainfall stimulation; surface hydrology; developing communities; groundwater; mine water; water pollution; municipal effluents; industrial water and effluents; aquatic ecosystems; water resource management; and general.

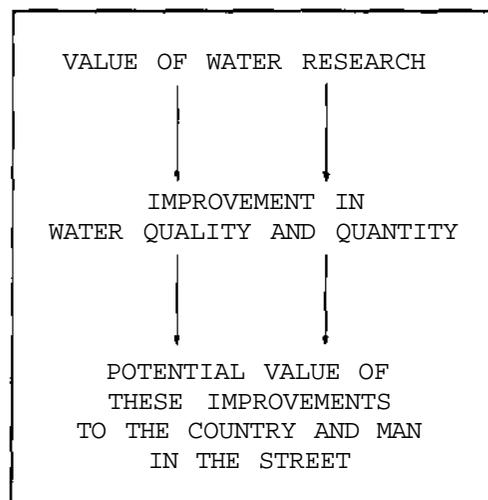


Figure 1

Extension of benefits from water research results to the fundamental elements of value

Review of research and development assessment methodology

General methods for the assessment of research and development (R&D)

Various researchers have summarised general R&D project selection and decision-making methodologies, such as Baker and Pound (1964); Gee (1971); Augood (1973); Souder (1978); Souder and Mandakovic (1986); Luukonen-Gronow (1987); and Danila (1989). Project selection methodology for the more "developmental" e.g. dam or process plant construction type of projects, may be found in works such as Dasgupta et al. (1972); Baum and Tolbert (1985); Lock (1987); and Sang (1988).

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