Water supply management in an urban utility

A prototype decision support framework

FRANK KIZITO

Academic Dissertation which, with due permission of the KTH Royal Institute of Technology, is submitted for public defence for the degree of Doctor of Technology on Friday the 5th February 2010, at 10:00 a.m. in Conference Room, Department of Food Science and Technology, Makerere University, Kampala, Uganda.
Abstract

In this study, four real-life problem situations were used to explore the challenges of developing and implementing decision support tools for planning and management within an urban water utility. The study sought to explore how the degree of adoption of formal decision support tools in practice, generally perceived to be low, could be improved. In the study, an Action Research (AR) approach was used. AR is an inquiry process that involves partnership between researchers and practitioners for the purpose of addressing a real-life problem issue, while simultaneously generating scientific knowledge. Unlike other research methods where the researcher seeks to study organizational phenomena but not to change them, the action researcher attempts to create organizational change and simultaneously to study the process.

During the study, a number of prototype data management tools were developed. GIS-based spatial analysis and visualisation tools were extensively used to inform and enhance the processes of participatory problem identification and structuring, while a number of modelling tools were applied in the generation and evaluation of alternative solutions. As an outcome of the study, a prototype framework for the application of decision support tools within an urban water supply planning and management context was proposed.

The study highlighted the challenges of embedding formal decision support processes within existing work systems in organizations, and recommendations were made on how best to achieve this. The AR approach was found to be useful in bridging the gap between academic research and technological practice, supporting the development of computerised planning and decision support tools of practical benefit to organizations.

Key Words

Decision support systems; Geographic information systems; Participatory planning; Urban water supply management; Decision support framework; Action research