Applying knowledge to improve water quality
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Planning model for rural water systems how to meet future drinking water demands

Rural water districts in Oklahoma's Wagoner and Rogers Counties adjacent to growing urban areas will experience challenges in the future concerning their optimal management of water supplies, treatment as well as the optimal rate of construction of new distribution systems. These rural water districts will experience increased drinking water demands and changing demand profiles due to urban/rural interface. The aging infrastructure of many rural water districts and more stringent water quality standards will put pressure on these rural water systems to minimize the cost of providing an adequate water supply. Rural water districts possess unique features in providing water to their customers. The long tradition of rural water districts of providing water to primarily rural customers is changing due to increasing population growth due to actual population growth, annexation, and housing developments in the adjacent rural service areas. Also, each rural water district is unique in how and where it gets its water. This project develops a decision support system (DSS) to address how to optimally (least cost) meet the increasing demands of drinking water and thus the anticipated infrastructural needs of rural water systems. The term DSS has become a common phrase used to describe multiple software products and systems that are linked together. The DSS structure of this project incorporates a user interface and simulation models. The user interface includes multiple data entries including identification of fastest growing areas and projections of future drinking water demands based on population growth, land-use profiles, population densities, and availabilities of sources of water. The simulation model includes the use of ArcView GIS and WaterCAD to incorporate water system infrastructure and service areas, cost estimates for energy, storage, transmission, distribution, treatment and construction. Future anticipated growth scenarios will be simulated. The output of the DSS will analyze individual vs. cooperative solutions to meet future drinking water demands. The DSS will be applied into two different scenarios: 1) Determine the projected feasibility and cost of meeting the demands if each rural water district acts alone, and 2) Determine the potential cost savings from centralized treatment plants. The DSS framework is applied to five rural water districts in Wagoner and Rogers Counties. The DSS can be applied to other systems and will benefit water use planners and rural and municipal water system managers.

Author: Anna Parviainen-Childers
University Affliation: Oklahoma State University
Co-Author(s): Art Stoecker