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# Cooperative Infrastructures for Small Water Systems: A Case Study

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Water is one of our most basic human needs. Perhaps surprisingly, many locations in the United States do not have affordable, accessible, safe drinking water.

Small water systems (SWS) can serve as many as 3,200 people and as few as twenty-five people, compared to large waterworks that serve thousands of people in metropolitan areas. In Virginia, more than ninety percent of water suppliers fall into this category of public "rural" SWS. In 1996 the Safe Drinking Water Act (SDWA) was amended to protect Americans from unsafe drinking water and to prevent contamination of drinking water sources. Specifically, Section 1420 of the SDWA focuses on developing the financial, managerial, and technical capacities of SWS where violation of drinking water standards are prevalent. In 1997, 304 Virginia waterworks reported violations of drinking water standards, fifty-three percent of which were rural SWS.

The SDWA has authorized the United States Environmental Protection Agency (U.S. EPA) to set National Primary Drinking Water Standards (NPDWS). Larger water systems, serving over 3,200 people, have a tendency to possess the financial resources and technical skills to meet the NPDWS due to economies of scale. However, smaller water systems are not meeting SDWA standards because they lack available capital, do not retain a large volume of business, and are limited by their dispersed geographic locations. Often SWS are an auxiliary operation to another business with limited available capital, which results in the operation's inability to comply with the NPDWS. The overall goal of this project was to develop a conceptual cooperative structure for rural SWS and

demonstrate the validity of this structure in Carroll County, Virginia. It is hypothesized that, by organizing as a cooperative, SWS in Virginia can obtain operational efficiency and meet the NPDWS through economies of scale. Specifically, the research involves a market analysis of cooperative structures which are proposed to reduce costs, optimize operational efficiency, increase revenue, increase the exchange of technical information, aid in obtaining suitable operational capacities, and therefore decrease the amount of NPDWS violations in those participating SWS, thus distributing a safe water supply to citizens in a more economical way.

To test this hypothesis, twelve SWS in the study area were selected, based on certain criteria including number of NPDWS violations, geographic proximity, population served, physical condition of facilities, and owner/operator interest. Data were collected on each operation's management practices, personnel resources, and technical efficiencies. Personal interviews were conducted with each SWS operator using questions from a four-part survey. The survey covered water-system characteristics; operations, management, and maintenance; cooperative management; and financial management. The data from the survey were analyzed to determine where and how these SWS can improve efficiency via economies of scale and business structure.

Results of this research reveal the effects of a cooperative structure on a group of participating SWS in terms of business management and meeting drinking water standards. Results have been used to develop guidelines for a conceptual cooperative structure, which can be applied to SWS across rural Virginia and nationwide.

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