Universities Council on Water Resources
Journal of Contemporary Water Research & Education
Issue 128, Pages 1-5, June 2004

Economic and Financial Management of Small Water Supply Systems: Issue Introduction

John B. Braden* and Philip C. Mankin**

*Dept. of Agricultural and Consumer Economics and Midwest Technology Assistance Center, University of Illinois
**Illinois Water Resouces Center, University of Illinois

The Importance of Water System Management

The 1996 Safe Drinking Water Act amendments set aggressive targets for ensuring safe, secure, and reliable community water supplies. In raising the bar for system performance, Congress also recognized that small communities, as a group, would have greater difficulty in meeting the new requirements than larger communities.

According to the most recent available data (U.S. Environmental Protection Agency 2003) nearly 50,000 community water systems serve populations of 10,000 or less; almost 60% of these serve 500 or fewer people. Nearly 52 million people–20% of the U.S. population–depend on these systems. The 2001 Drinking Water Infrastructure Needs Survey found that the smallest of these systems–those serving 3,000 or fewer people–have maintenance and upgrade needs totaling $31 billion.

Many small communities are hard-pressed to evaluate needed improvements, raise the funds, and manage the more sophisticated systems required to meet the new drinking water standards. Their income and revenue bases are limited. Some aging communities are not retaining their younger citizens, leaving a declining pool of talent available to master the new requirements; others are bedroom communities with little cohesion; most have part-time officials and few if any staff members able to plan, oversee, and manage infrastructure improvements.

The challenges associated with small systems have been apparent for some time (e.g., National Research Council 1997). The 1996 Amendments stressed the need to build the technical, managerial, and financial (TMF) capacity of public water systems. The multifaceted nature of the concept of "capacity" is represented in Figure 1. In carrying out the TMF provisions, the U.S. Environmental Protection Agency (EPA) and its state counterparts support a variety of assistance programs. The National Drinking Water Advisory Council (NDWAC) advises the EPA on matters important to small community systems. The Rural Water Association is active in most states providing direct technical assistance to small communities. Six regional Environmental Finance Centers provide technical support for a variety of environmental infrastructure and management needs. Eight university-based Technology Assistance Centers develop new technologies and management tools appropriate to small systems. The National Drinking Water Clearinghouse (http://www.nesc.wvu.edu/ndwc/) serves as a nexus for technical information. There is also ongoing review of the regulatory environment for small systems. In 2003, the National Drinking Water Advisory Council's (2003) affordability report commented on variance policies and affordability criteria.

While these review and assistance efforts continue, it is not clear how they all fit together and whether gaps remain in the support system for economic and management needs. In an effort to assess progress and needs, the Midwest Technology

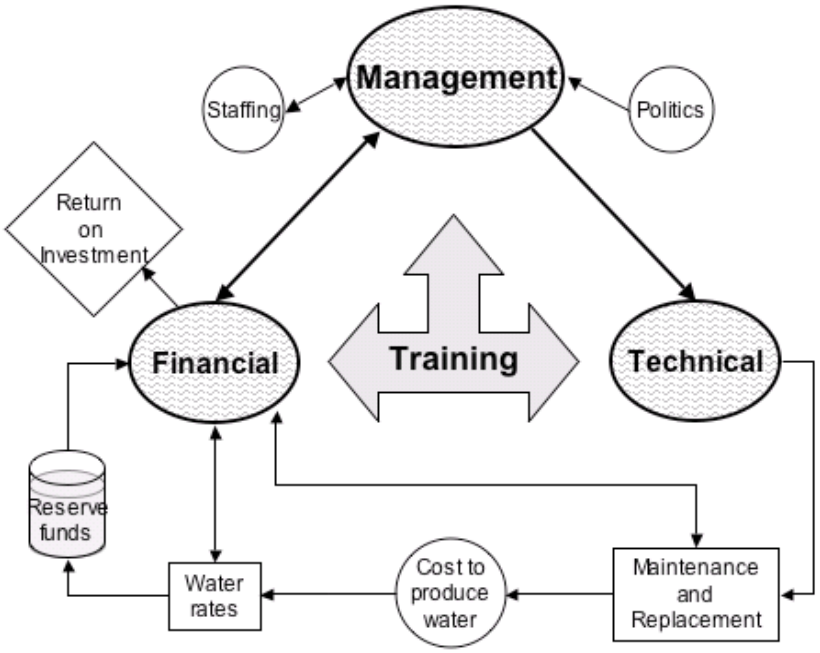

Figure 1. Simplified overview of a small water system.

Assistance Center (MTAC) for Small Drinking Water Systems assembled a panel of experts in November 2003 to assess progress and needs. (MTAC is administered by the Illinois Water Resources Center, the University of Illinois, and the Illinois State Water Survey with financial support from the U.S. Environmental Protection Agency.) The papers in this volume reflect the views of these experts.

The Contributions

The authors come from a variety of perspectives and experience. Professor Cornelia Butler Flora of Iowa State University studies the structure and function of rural communities. Her paper outlines the social context of rural community assistance efforts. Professor Flora connects the concept of community capitals to the case of small water systems. This concept incorporates six forms of capital that communities may already have or should develop for sustainable development: natural, cultural, human, social, political, and financial/built. Natural, cultural, and human types of capital can be transformed into social, political, and financial/built capital. Professor Flora's basic message is that the best technologies, tools, or advice will be successful only if the community is prepared organizationally and culturally to benefit from it.

Professor Ben Dziegelewski and Mr. Tom Bik of Southern Illinois University conduct research on the economic and technical performance of water systems and the factors that seem to correlate with success in system management. Their paper reflects the results of a recent study that developed performance benchmarks for small public water systems in the Midwest. Information from a survey allows them to profile the infrastructure, finances, and management of small systems. We learn that 40% of the systems surveyed had no water treatment and another 10% reported chlorination only. Ground water was the major source of drinking water. Eighty percent of systems have some sort of supplemental water storage to maintain pressure and meet peak demands. Most systems (59%) reported an increase in the population served. Yet, 17% of systems reported total revenues that were less than total costs, and more than 35% of systems with less than 500 customers had no reserve fund. Additionally, 51% of these systems had not increased their water rates during the past five years. Dziegielewski and Bik recommend the development of case studies to demonstrate successful techniques for achieving sustainability including successful engagement of consumers, restructuring, and regionalization alternatives.

Bill Jarocki, Director of the Environmental Finance Center at Boise State University, develops

tools that communities can use to plan for system improvements, develop needed financing, and manage their systems. Mr. Jarocki's paper emphasizes the advances made in the 1996 SDWA Amendments in conceptualizing the viability of water systems. The new concept, "capacity," attempted to capture a number of the dimensions identified by Flora as well as Dziegielewski and Bik. Importantly, the concept was applied not in a binary fashion—pass/fail—but along a multidimensional continuum. This innovation changed the game for small systems. The new approach focuses on continuous improvement rather than just being satisfactory. Mr. Jarocki focuses especially on the maintenance of capital facilities and related capital budgeting as an important component of long-term success of small water systems. He notes that many systems fail to distinguish capital from operating budgets and to prepare financially for expenses of replacing equipment or meeting new requirements. New public accounting standards that went into force in 2003 may increase awareness and attention to capital budgeting, but it is not yet clear how small communities will respond.

Carl Brown serves as a consultant to small communities, advising on water rate analysis and setting water charges. Picking up on themes emphasized by Mr. Jarocki, Mr. Brown has found that many small communities are reluctant to engage in open discussion of the economic realities of water supply. His message is that realistic projection of the resources required to operate and maintain drinking water infrastructure are essential to assure reliable and safe water supplies. Furthermore, he emphasizes the need for continuous planning and improvement, because water systems and the needs they meet are never in static equilibrium. Mr. Brown argues that communities that recognize and respond to this reality will reap the rewards of a stronger financial future.

Dean Heneghan's consulting engineering firm provides contractual planning and management services for several small community water systems. In his paper, Mr. Heneghan describes various ways that communities and contract management services can work together to provide safe and reliable water. This flexibility allows individual systems to decide what to do in-house and what to obtain from outside sources. Contractors may be able to deploy personnel more efficiently, sustain better training, and spread the costs of management across more end-users than a small system, thereby improving services and reducing costs.

Jim Maras represents the Rural Utilities Service of the U.S. Department of Agriculture, a major provider of financing for rural infrastructure. Mr. Maras' paper stresses the need to treat smalls towns as small towns; that is, they should not be expected to achieve the level of sophistication or specialization on their own that larger communities can reach. A water system's ability to achieve and maintain compliance with federal and state drinking water standards is dependent on its technical, financial, and managerial capacity (TMF). One study has shown that communities with over 3,000 persons often have the capacity to self-finance more of their infrastructure needs than smaller communities. Besides the obvious challenges of funding, technology, and administering regulations in rural areas, staff turnover and difficulty of maintaining skills are important barriers for small systems. Mr. Maras emphasizes the need for flexibility in training and other aspects of compliance to tailor services to the needs of targeted groups.

Common Themes

A number of common themes are evident in this group of papers. One is that a great deal of progress has been made in expanding training programs, supplying tools and information for use by small communities, and encouraging innovation. Furthermore, the regulatory and funding agencies are paying close attention to the viability of these systems. The Safe Drinking Water Act Amendments of 1996 are credited with focusing on the financial and managerial viability of small systems, and there are encouraging signs. According to a community water system survey conducted in 2001 (U.S. Environmental Protection Agency 2002), approximately one-quarter of the publicly-owned small systems that were operating in the red in 1995 had eliminated their deficits by the year 2000.

Other successes include improved technical performance (violations of drinking water standards have decreased), acceptance of the need for developing technical, managerial, and financial (TMF) capacity, more collaboration between entities, and more regionalization due to capital investment. The "Sanitary Surveys," a form of self-assessment

that has been promoted in some regions and states, is recognized as a useful foundation for decision-making. One way that some systems have become more viable is essentially to go out of business and contract with another, better-equipped system for water delivery and distribution management. Not coincidentally, the overall number of small systems decreased by 8% between 1993 and 2002. For those that remain, better data from the assessments, better training for officials and operators, and the use of a variety of planning tools have supported an increase in the availability of financial support. In addition, communication and collaboration between systems has been fostered by the increased involvement of water system directors and operators in voluntary professional associations.

In spite of the successes, the papers in this issue identify gaps in knowledge, training, staffing, and financial resources. When it comes to small drinking water systems, few problems are due to pollution. Most of the problems result from poor planning and management.

First among the noted weaknesses is the ability to measure managerial capacity, especially for use in the creation and deployment of training programs. There is a need for more information on the behavior of managers. The perceptions, attitudes, and opinions of managers affect their behavior. Their concern for how their rates compare to communities nearby may be irrelevant to consultants and agencies, but the fact remains that managers will still want to know and may be influenced by that information. It may take extra effort to convince managers that each system is different.

While consolidation of systems has been an important trend, it is a phenomenon that needs to be better understood and encouraged. There is a need for additional consolidation and collaboration among vulnerable legacy systems. Some systems are reaching an age where replacement will become imperative. These older water systems may benefit from consolidation (physical linkage) with nearby newer water systems. The additional load on the system can be offset by the revenue generated by the consolidated system, enabling add-on treatment capacity at a cost less than what total replacement would be. However, consolidation can be difficult for communities to accept culturally and politically. Skilled, impartial negotiators, organizers, or facilitators can help in this regard.

There is a need to use information more effectively in managing and operating small water systems. There is too much variation in interpretation of regulations and a lack of broad understanding of the distinctive responsibilities of directors, managers, and operators. A greater consistency in Sanitary Surveys (as could be accomplished, for example, through a common template and minimum standards) would be helpful in assessing the current state of small systems.

Finally, there is a large gap between perceptions of the availability of financial assistance and the actual support that is available from a variety of public and private sources. In particular, set-aside funds in state revolving trust accounts available at low interest to public systems are often underutilized. At the same time, a large number of small systems and the politicians that represent them seek financial grants to solve their problems. Because they do not require repayment, grants shield the recipients from the true cost of the resources they are using and, in the long run, may not do as much as loans to help communities understand the true nature of their local services and to make wise decisions about their provision.

Conclusions

The Safe Drinking Water Act Amendments of 1996 cast a bright light on the challenges faced by small public water systems. In a period when Congress has determined that all water systems should meet increasingly demanding standards for quality and reliability, it has been important to recognize that some systems would have difficulty keeping pace.

The 1996 Amendments created a web of programs designed to help small systems meet the challenge, either on their own or with assistance. The training programs and requirements set forth in the act, the focus on capacity-building, and the mandate for states to develop capacity-building programs, have done much to improve the flow of information and the ability to act on it. Partner agencies, including the Rural Utility Service and technical service providers, add important strands to this web. Nevertheless, this problem will not be solved once and for all. It is important to anticipate the need to sustain training and managerial assistance programs and to remind responsible officials that

adjustments and investments will be required year after year as needs change, infrastructure grows old, and new officials and operators assume their responsibilities. The cycle of educating and training needs to be perpetual.

Author Bio and Contact Information

JOHN B. BRADEN is Professor of Environmental Economics in the Department of Agricultural and Consumer Economics at the University of Illinois. He also coordinates the research program for the Midwest Technology Assistance Center for Small Public Water Systems, based at the University of Illinois. Professor Braden's research addresses water quality and environmental policy issues. Dr. Braden can be contacted at Department of Agricultural and Consumer Economics, University of Illinois, 1301 W. Gregory Drive, Rm 431, Urbana, Illinois 61801, Phone: 217.333.5501, E-mail: jbb@uiuc.edu.

PHILIP MANKIN is Research Coordinator for Illinois Water Resources Center at the University of Illinois. He also coordinates the research program for the Illinois-Indiana Sea Grant College Program. Dr. Mankin can be contacted at Illinois-Indiana Sea Grant, University of Illinois, 1101 W. Peabody Drive, Urbana, Illinois 61801, Phone: 217.244-6916, E-mail: pmankin@uiuc.edu.

References:

National Drinking Water Advisory Council. 2003. *Recommendations of the National Drinking Water Advisory Council to U.S. EPA on Its National Small Systems Affordability Criteria*. Washington, DC. Available at: http://www.epa.gov/safewater/ndwac/pdfs/ndwac_affordabilitywg_finalreport.pdf

National Research Council. 1997. *Safe Water from Every Tap: Improving Water Service to Small Communities*. Committee on Small Water Supply Systems. National Academy Press. Washington DC.

U.S. Environmental Protection Agency. 2002. *Community Water System Survey 2000*. EPA 815-R-02-005A. U.S. Environmental Protection Agency, Office of Water. Washington DC. Available at: www.epa.gov/safewater

U.S. Environmental Protection Agency. 2003. *FACTOIDS: Drinking Water and Ground Water Statistics for 2002*. EPA 816-K-03-001. Office of Ground Water and Drinking Water. Washington, DC. Available at: http://www.epa.gov/safewater/data/pdfs/02factoids.pdf