

1-1-1998

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Recommended Citation

Osterberg D. The future of rural water supplies: Health and infrastructure policy issues workshop. *Iowa Groundwater Quarterly* 8:4, Winter 1997/1998, pp. 8-9

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The Future of Rural Water Supplies: Health and Infrastructure Policy Issues Workshop

by David Osterberg, Adjunct Assistant Professor of Geography, University of Iowa, Iowa City, Iowa, and former legislator

What is the quality of rural water and how can it be improved? This question was addressed at a workshop held at the University of Iowa in September 1997. In the past, when rural water needed improving, the answer was often to organize a regional water system. In Iowa such entities are codified in Chapter 357A of the Iowa Code. Iowa's twenty regional water systems with tall water towers and hundreds of miles of pipe throughout the countryside supply water in places where other sources are not adequate. The systems have been very successful in serving rural homes and farms as well as small cities. Regional water systems have done a good job in southern and western Iowa as well as other areas in the Midwest. It remains to be seen if such systems should replace private wells and small community water systems elsewhere. The workshop investigated the water quality implications of this potential replacement.

What is COEP?

The group posing questions on rural water and seeking answers was the Community Outreach and Education Program (COEP) of the University of Iowa's Environmental Health Sciences Research Center (EHSRC). The COEP was formed to address the environmental concerns of Iowans and others living in the Midwest. The COEP advisory committee is drawn from academe, agribusiness, state legislative bodies, and grassroots rural and environmental groups. The COEP serves to channel the diverse environmental health capabilities of the EHSRC and its affiliated research units at The University of Iowa toward meeting the needs of the broader community.

The COEP has resources as well as a mission to serve the upper Midwest as a technical resource to assist in environmental health policy making. Thus, the question about Midwest water quality became an invited workshop on

September 21st and 22nd of 1997. The workshop was a two part process: (1) invited papers on important aspects of the subject; and (2) a day-long discussion and problem solving by a group of two dozen persons knowledgeable about rural water.

Report on the invited papers for the workshop

Invited papers were given by three University of Iowa researchers: George Hallberg, then Associate Director, University Hygienic Laboratory; Burt Kross, Director, Center for International Rural & Environmental Health; and Chuck Lynch, Associate Professor, Preventive Medicine and Environmental Health. Papers were also given by Rebecca Calderon, Chief, Epidemiology & Biomarkers Branch at the US EPA facility in Research Triangle Park, NC; and by Tim Borich, Associate Professor, Department of Regional and Community Planning, Iowa State University.

Three of the papers presented information on water contaminants. Rebecca Calderon presented information on the 678 waterborne disease outbreaks reported in the U.S. and its territories between 1971-96. The outbreak in Milwaukee in 1993 caused by cryptosporidium is the largest to date. Burt Kross posed and answered this question, "Is the current drinking water standard for nitrate adequate? I think not!" Kross called for including a safety factor of two in determining the federal maximum contaminant level MCL. This action would reduce the current MCL for nitrate to 5.0 mg/L NO₃-N, from the current 10.0 mg/l.

The third water contamination issue addressed was health effects from disinfection by-products (DBPs). Chuck Lynch explained that chlorine has been used to control waterborne infectious diseases for a century and is considered a most effective public health tool. On the other hand research over the last 30 years has begun to show that

chlorine reacts with natural organic material in source water to form DBPs that have been implicated in liver, kidney, and large intestine tumors in lab animals as well as with human health effects.

George Hallberg presented a paper he authored with David G. Riley and Peter J. Weyer comparing the quality of public and private water supplies in Iowa. The paper compared rural well-water data gathered in the 1988/89 Iowa State-Wide Rural Well-Water Survey (SWRL) with assessments of public water supplies mandated by the Safe Drinking Water Act (SDWA). The water quality parameters included nitrate, atrazine, other pesticides, volatile organic compounds (VOCs), chlorination by-products, and coliform bacteria.

Since this paper was designed to answer the major question to be addressed by the workshop, a comparison of domestic well-water supplies (DWS) with public water supplies (PWS), I quote much of the first and all of the last paragraph of the Hallberg et. al. conclusion section:

"The differences in quality of public and private water-supplies are not as different as sometimes assumed, particularly in the midwest. The comparison of statewide data illustrate that one is not clearly superior to the other; the differences might better be viewed as trade-offs of various quality concerns. Both private and public water supplies, when developed properly, provide high-quality water for consumption. But both are subject to the same vulnerabilities to contamination.

"These factors, and the trade-offs in water quality should be clearly described for policy makers and for the public to enable thoughtful debate or consideration about alternative water supply options. Private wells can exhibit many water quality problems, but they often can be remedied relatively easily, as well. While rural water distribution systems can improve the availability of larger quantities of water and better quality water in some areas,

such systems require large water withdrawal capacity. Hence, most use surface water or relatively shallow groundwater systems which are also very vulnerable to contamination, and are the primary source of public exposure to various disinfection by-products. Surface water systems are also a greater concern for many waterborne pathogens; some of which are not controlled by disinfection. While rural water distribution systems can provide benefits in many regions, such efforts and expenditures should not be considered in lieu of needed efforts to protect water quality and reduce pollution of our water sources." (Hallberg, Riley, and Weyer, 1997.)

The final paper presented to the workshop was on an entirely different topic. Timothy O. Borich provided an overview of the long-term infrastructure and economic issues for developing and maintaining regional, low-population water systems. Borich reported that most major expansions of the Iowa Rural Water Association will happen in rural areas. However, some will take place in areas that are growing because of urban sprawl. Borich finds that beneficiaries of federally subsidized rural water might be "exurban and suburban residents as land use patterns change."

Findings of the day-long dialogue

Workshop attendees included: three legislators from midwest states, federal government officials, state officials, and academics. Also in attendance were representatives of private well drillers, the Iowa Rural Water Association and the Iowa Municipal Utility Association. Informed by several provocative presentations, the invited workshop members began their deliberations:

1. First, an issue that received nearly unanimous support among the participants was the need for more water quality monitoring. The group endorsed the following:
 - Better monitoring is required of present conditions of source water & finished drinking water. Well data should include age, yield, depth, and type of

construction. Analysis of wells and source water should include biological, chemical, and aesthetic data. With these additions, a state-wide survey similar to the SWRL survey should be repeated.

- Better coordination of existing data as well as designing protocols to make all data produce comparable information is required. Data coming from the existing Grants to Counties Program in Iowa should be modified to bring a statistically valid picture of the groundwater resource. Both CHEEC and the Hygienic Laboratory should be part of the data gathering system.
- Better monitoring related to livestock lagoons is needed. Groundwater quality surrounding such structures should be correlated with the type of construction and depth to the water table.

2. There was also much agreement on issues related to planning for water and sewer systems in rural areas. Some of these are:

- Both private systems and public systems should be part of water resources planning effort. Good rural water supplies will include individual wells and regional water systems.
- Wastewater management should be promoted along with providing potable water to rural areas. Controlling wastewater helps ensure the quality of source water.
- Financing water and sewer systems together may be an advantage. More monitoring of individual human waste handling systems is necessary.
- Counties should consider the use of revenue bonds to finance water and sewer systems.
- The public should have input into the process of planning for infrastructure and health of rural water supplies. It was suggested that the Cooperative Extension service be used to explain the water supply and waste disposal options to rural residents. Specific stakeholders to bring into the planning process included: well contractors, county sanitarians, point-of-use treatment providers, and planners. Specific associations that should be involved in such planning are the League of Iowa Municipalities, the Iowa Association of Counties, the Iowa Rural Water Association, and the Iowa Association of Municipal Utilities. These are the stakeholders who should

confer with state and federal agencies involved in system financing.

While there was agreement on the overarching issues of providing safe rural water, there was not time to reach consensus on important implementation questions. How to integrate private water wells in areas where regional water systems are considering expansions was not agreed upon. How to avoid making regional water systems unintentionally lead to urban sprawl was also not thoroughly discussed.

Many of the workshop participants believe that if federal and state grants are available for laying pipe to individual farmsteads, grants should be available to monitor the safety of private wells and perhaps to put in wells. However, others are concerned about liability issues. For instance, who is responsible if people become sick from well water that has been monitored with funds provided by government?

3. A beginning conversation took place but no consensus was found on the following:

- State government should consider additional subsidies for testing private wells. Drinking water and waste water should be planned and financed together, both when county size rural systems are being designed and for rural subdivisions.
- An existing state agency should be responsible for coordination of funding sources and providing options for remediation of both public and private water problems.

How this becomes policy

The goal of the workshop was to begin a discussion on rural water quality. Three workshop participants are sitting state legislators who perhaps can initiate legislative discussion on some of the workshop findings. In addition several members of the workshop have received an invitation to appear before a committee in the Iowa General Assembly during the next legislative session to discuss issues brought up during the workshop.

Universities are very good places for discovering. We hope that with this university workshop, we have begun the next step of bringing the scientific discoveries to the decision-makers. ▼