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Rural Community Water Systems: Update 1978

Cooperative Extension South Dakota State University

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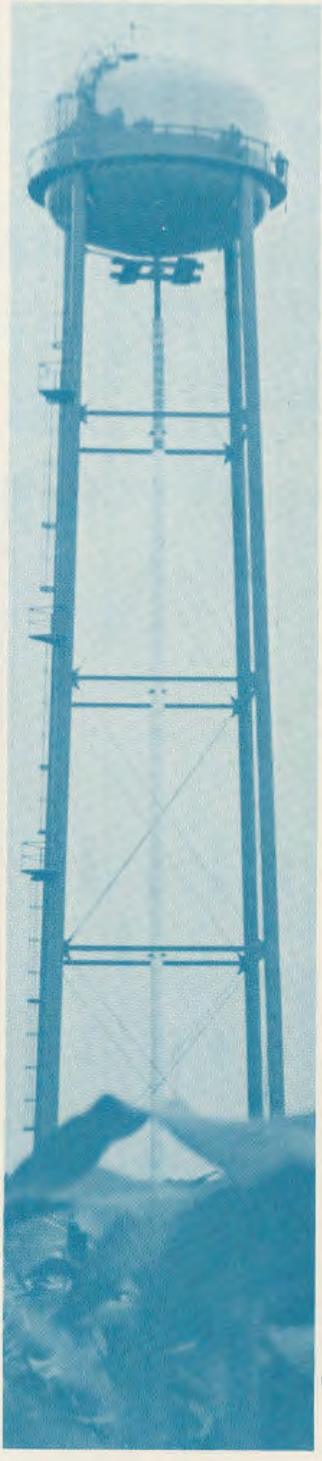

Rural Community Water Systems:

Update 1978

Cooperative Extension Service
South Dakota State University
U.S. Department of Agriculture

Rural Community Water Systems: Update 1978

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Water is a vital resource important to every citizen of South Dakota. Without an adequate, dependable supply of quality water the health and economic well-being of people is severly impaired.

Unfortunately many rural areas do not have adequate water supplies to meet the needs of their citizens. The problem is twofold: 1) often it is not possible to locate or economically develop local surface or ground water to provide an adequate quantity, and 2) when water is located it is often of such poor quality, because of dissolved solids or other factors, that it is not recommended or suited for domestic or even livestock use. Both problems are prevalent throughout the state; however, the problem of water quality is more pressing.

The magnitude and extent of the water supply problem in rural South Dakota was documented in a 1975 survey, conducted by the Water Resources Institute of SDSU, of about 10% of the 44,000 farmsteads in the state. Water was hauled from external sources to 9.5% of these farmsteads for domestic uses and to 3.7% of the farmsteads for livestock uses in an average year.

Although the cost of hauling water is substantial, it does not begin to indicate the overall impact of inadequate water. The economic losses caused by reduced livestock productivity or reduction of livestock numbers are certainly significant, even though they are poorly documented.

Beginning in the 1950's, South Dakotans realized a way for providing adequate water to farmsteads and rural communities had to be found. Rural community water systems were one answer, and several small systems were organized. In 1962 the first large community rural water system (Rapid Valley Water) was organized to service 700 farmsteads and residential homes near Rapid City.

Since then, many additional communities throughout the state have developed or have made plans to develop rural community water systems. As of November 1977, 50 systems are either operational, under construction, or in some stage of organization or planning.

The objectives of this report are 1) to present information about existing and proposed rural community water systems in South Dakota, and 2) to comment about problems which larger systems have had to overcome as they became operational.

Existing Systems

The names plus selected information on the 30 existing systems (operational or under construction) are presented in Tables 1 and 2. The location and approximate geographic area served are shown in Figure 1.

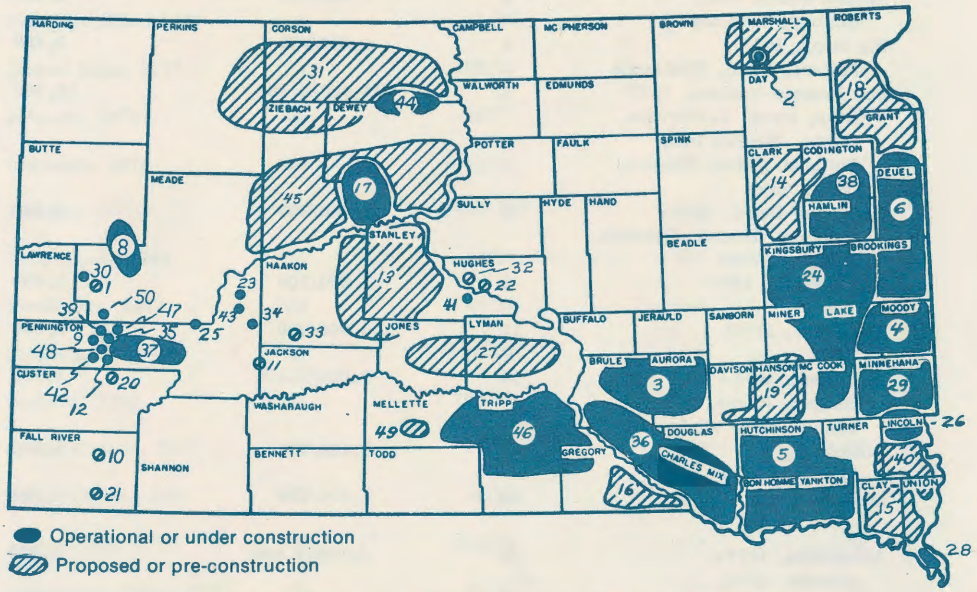


Fig. 1. Rural community water systems in South Dakota.[1]

Large Systems

Fifteen systems are large and have 100 hookups or more. The actual number of hookups has limited significance; but it does reflect size, complexity, and capital cost of the system. As the number of hookups increases, generally more people and greater technical skills are needed to operate and manage the system.

Large rural community water system development is relatively new to South Dakota. Only two systems, Rapid Valley and Butte-Meade, have been distributing water for more than 5 years. The rest have become operational since 1973 or will become operational in 1978. The rapid expansion clearly indicates communities believe large systems will solve their water supply problems.

The larger system averages 951 hookups and provides domestic water for 4,485 people. Most hookups are residential houses and farmsteads; however, some are pasture taps (especially in West River). Most systems also distribute water to small towns through either individual residential hookups or as bulk service to the town.

The total capital investment for a large system averages $4.5 million, or an investment of $4,700 per hookup. Average monthly user charge must exceed $20 for the system to be financially self supporting.

It should be noted that investment and monthly user costs are significantly greater for the newer systems because of higher material, construction, and operating costs.

Large systems obtain most of their financing for construction from U.S. Farmers Home Administration (FmHA) as grants and long-term loans. Users of the systems, and in some instances the South Dakota Department of Natural Resource Development, provide much of the money for organizational costs or feasibility studies. Budgets are set up to keep average monthly user charges to $25 or less.

Small Systems

Of the 15 small community water systems in South Dakota, most were organized to distribute water to a small number of residential users (normally a housing development) located near a large municipality. Several, however, were established to distribute water to farms and ranches. The small system averages 31 hookups which distribute water to 130 people.

Total capital investment averages $81,000, and the average monthly user charge must exceed $21 for the system to be financially solvent. Size, investment per hookups, and monthly user charge vary widely among the systems, however.

Small systems are generally operated and managed by volunteers or part-time

[1]See Tables 1-3 for names of systems.

Table 1. Selected data about existing large (100 hookups or more) rural community water systems in South Dakota, Nov 1977.

System, Year Operational, Towns Served	Location Code	Population Served / Hookups	Total Capital Cost**	Average Monthly User Charge: Engineering Estimate / Actual 1977
--	---	number/number	dollars, thousand	dollars/dollars
Aurora-Brule, 1977* Kimball, Pukwana	3	1,480/370	2,500	28/---
Big Sioux, 1975+ Rutland, Ward, Wentworth	4	4,000/975	3,300	25/20
Bon Homme-Yankton, 1977* Avon, Irene, Lesterville, Menno, Mission Hill, Scotland, Tabor, Tyndall, Utica, Volin	5	15,000/3,000	16,000	25/---
Brookings-Deuel, 1976+ Altamont, Brandt, Goodwin, Toronto, White	6	4,560/950	4,100	25/20
Butte-Meade, 1968+	8	1,200/300	1,600	30/32
Fox Ridge, 1975* Eagle Butte	17	3,000/760	2,600	15/15
Kingbrook, 1978+ Badger, Junius, Lake Norden, Winfred	24	9,000/2,100	8,500	25/--
Lincoln, 1973+ Tea	26	2,300/500	1,500	22/22
McCook Lake, 1968+	28	1,000/250	1,000	12/12
Minnehaha, 1977+ Crooks, Ellis, Hartford, Lyons, Renner, Rowena, Sherman	29	6,600/1,600	5,750	26/--
Randall, 1977* Armour, Dante, Geddes, Greenwood, Marty, New Holland, Platte, Wagner	36	9,900/1,260	9,930	18/--
Rapid Valley, 1962+	37	3,000/750	900	13/13
Sioux, 1975+ Bemis, Bryant, Glover, Hazel, Kranzburg, Naples, Vienna	38	3,030/680	4,500	28/21
TC&G, 1974+ Glencross, Trail City	44	400/100	295	26/27
Tripp, 1977+ Carter, Dixon, Hamill, Witten	46	2,800/675	4,250	33/--
Total	--	67,270/14,270	66,725	---
Average	--	4,485/951	4,450	23/20

Source of Water: *Missouri River; +Wells.
Primary Funding Source: **FmHA.

employees who are users of the system. They do most maintenance, billing, and bookkeeping. Consequently, operating costs are low and consist mainly of supplies and electricity for pumping water. Monthly user costs primarily reflect money needed to pay off initial capital investment.

Small systems obtain financing from several sources. In many housing developments, the developer and/or the residents provide all capital needed for construction. In others FmHA provides grants and long-term loans. Systems serving primarily farms or ranches are financed generally by grants and long-term loans from FmHA.

Proposed Systems

Twenty new rural community water systems are currently proposed or in some stage of development (Table 3 and Figure 1). Governmental agencies involved in rural water development are continually receiving requests for information about systems from communities throughout the state.

The new systems are similar in most respects to the existing ones. They vary substantially in size, total capital investment, and estimated monthly user charge. Number of people served per system ranges from 30 to 6,600, while total capital investment runs from $118,000 to $17 million.

Average monthly user charges for the systems will be higher than for the existing systems and are estimated at $25 to

$30. Inflation and high construction and operating costs account for the high user charges.

Probably the primary factor which will determine whether the proposed systems are constructed (especially the ones going through initial organization) is the availability of relatively low-cost financing through FmHA or other sources. However, the development of pipelines such as WEB or West River Aqueduct for transporting Missouri River water will permit development of systems in some areas where they would not otherwise be feasible.

Problems of Existing Systems

The 30 existing rural community water systems will provide quality water to over 69,000 people in South Dakota when completed. One only need talk to a few farmers, ranchers, or other rural residents who receive water from one of the systems to determine how users appreciate their new source of water, in terms of convenience, saved money, and increased livestock productivity.

But there have been some problems associated with the systems. There are two types: 1) technical problems associated with making the system operational, and 2) balancing budgets.

Time and experience will help solve the technical problems. Particularly in the larger systems, directors and managers need time to become acquainted with operation and management. An efficient bookkeeping system for billing and other financial transactions will also evolve. Sometimes the solutions will require increased costs.

Budget problems have been more difficult to overcome. Unfortunately the cost of delivering water has often been higher than anticipated, especially in the larger systems. There are two reasons: 1) the variable costs of operation, particularly the labor requirements needed for operation and billing, have been much higher than anticipated and 2) revenue from the sale of water is less than expected.

Most of the information used to establish budgets for the large water systems in South Dakota was obtained from existing systems in other states that are similar. Many of these are operated with part-time or volunteer, non-technically trained people who are also users of the system.

In contrast, most of the large systems in South Dakota have not been able to operate with part-time or volunteer labor. Most system directors and operators contend the size and complexity of the large systems require more manpower as well as more technical training than was anticipated. Directors and managers of several systems are now considering the possibility of sharing equipment, manpower, and billing and accounting facilities to more efficiently utilize available resources and reduce operating expenditures.

Revenue from sale of water is low because too many of the farmsteads and residences are minimum users. Al-

Table 2. Selected data about existing small (fewer than 100 hookups) rural community water systems in South Dakota, Nov 1977.

System and Year Operational	Location Code	Population Served /Hookups	Total Capital Cost	Average Monthly User Charge
		number/number	dollars thousand	dollars
Amherst, 1963	2	150/25	7*	3
Carriage Hills, 1977	9	144/36	133*	18
Chapel Lane, 1977	12	260/65	160*	14
Johnson, 1976	23	30/7	96*	55
Lakeside, 1976	25	80/21	180*	49
Murray, --	30	400/100	---+	15
Peno Basin, 1964	34	20/5	42*	35
Ponderosa, 1967	35	40/10	---+	13
Siphon Hill, 1962	39	80/20	---+	6
Spencer, 1952	41	100/25	---+	8
Spring Canyon, 1975	42	60/15	36*	18
Squaw Creek, 1976	43	40/8	90*	40
Valley View, 1973	47	320/80	---+	13
Whispering Pines, 1966	48	70/16	32*	17
Woodland Hills, 1976	50	160/40	40*	12
Total		1,954/473	---	--
Average		130/31	81	21

Source of Water: Wells.
Primary Funding Source: *FmHA; +Private.

Table 3. Selected data about proposed rural community water systems in South Dakota, Nov 1977.

System	Location Code	Population Served /Hookups	Towns Served	Total Capital Cost**	Project Status
---	---	number/number	name	dollars, thousand	---
Alkali+	1	100/25	none	---	Feasibility study
Brown & Marshall+	7	2,800/700	Claremont Langford	5,500	Steering committee
Cascade+	10	120/30	none	118	Feasibility study
Cedar+	11	60/14	none	400	Feasibility study
Cheyenne*	13	2,350/125	Hayes Midland	6,300	Preliminary engineering
Clark+	14	2,830/650	Bradley Garden City Henry	3,000	Preliminary engineering
Clay+	15	4,000/1,000	Burbank Meckling Wakonda	4,400	Final design

though many factors account for the small usage, three are most important. First, many of the users continue to use their old sources of water for selected purposes. Second, many individuals are minimal users because of habit, lifestyle, or limited economic resources. Third, some users join the system because it is convenient, adds value to their property, or provides a backup system for an existing one.

Rate schedules were set up with a low minimum charge and a gradually decreasing charge per increment of water to encourage water consumption. Had average water use at all hookups approached the anticipated 6,000 to 8,000 gallons per month, revenue would not be a problem.

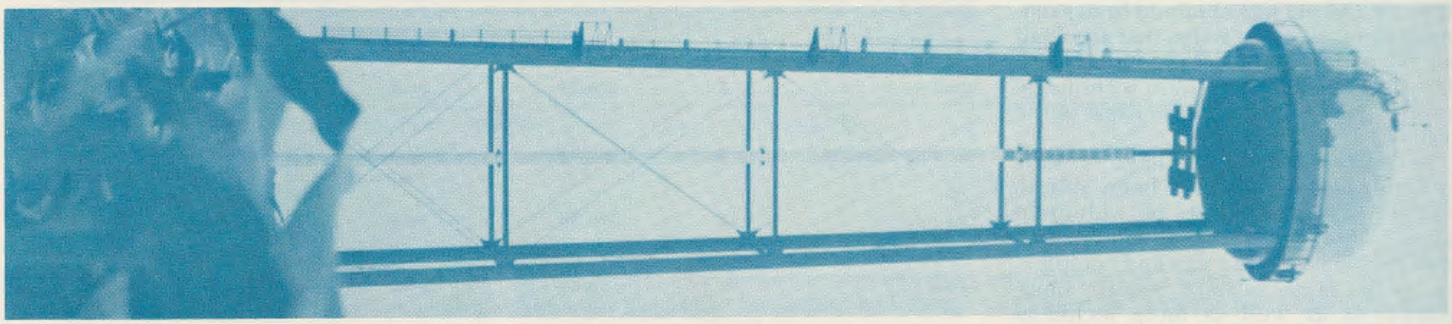
System directors have modified rate schedules to correct these problems. Minimum charges have been increased to assure that users fully pay the costs associated with amortizing their fixed hookup costs. In addition, some systems have found it necessary to increase the charges for increments of usage above the minimum.

Note: This fact sheet provides information on the current status of rural community water system development. For more information, write Bulletin Room, SDSU, Brookings, 57007, for ESS 19a, *New role for Extension: Serving the Rural Community Water Districts.*

Table 3 (continued)

System	Location Code	Population Served /Hookups	Towns Served	Total Capital Cost**	Project Status
East Gregory+	16	1,270/180	Bonesteel Fairfax	1,250	Final design
Grant-Roberts+	18	4,100/1,000	Marvin Strandburg Twin Brooks	5,500	Feasibility study
Hanson*	19	4,000/650	Alexandria Emery Ethan	4,000	Feasibility study
Hermosa+	20	200/34	none	500	Final design
Horsehead+	21	30/7	none	125	Inactive
Hughes*	22	400/50	none	---	Steering committee
Lyman-Jones*	27	5,000/1,250	Draper Kennebec Murdo Oacoma Oakaton Presho Reliance Vivian	17,000	Feasibility study
Northwestern+	31	5,000/---	---	12,000	Steering committee
Oahe Plains*	32	480/120	none	---	Steering committee
Old Trail+	33	60/15	none	250	Steering committee
South Lincoln+	40	6,600/900	Alcester Chancellor Hudson Lennox	4,200	Final engineering
Tri-County*	45	3,000/460	Cherry Creek Dupree Faith	12,000	Feasibility study
White River +	49	1,000/---	none	---	Steering committee
TOTAL		31,400/---	---	---	---

Source of Water: *Missouri River; +Wells.
Anticipated Primary Source of Funding: **FmHA. (Horsehead lists no source.)



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