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## SOUTH DAKOTA IRRIGATION WHAT'S SPECIAL ABOUT IT?

by  
Donald C. Taylor  
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South Dakota is a relative late-comer to irrigation. During the 1970's, however, the State's privately-developed irrigated acreage expanded rapidly. About 450,000 acres are estimated to be currently irrigated in South Dakota.

In this issue of the Newsletter, the growth in South Dakota's irrigation is described. Five special features of South Dakota's irrigation are also highlighted. Comparisons are made between South Dakota and nine other Great Plains states -- Colorado, Kansas, Nebraska, Montana, New Mexico, North Dakota, Oklahoma, Texas and Wyoming.

### A RAPID RATE OF DEVELOPMENT

Between 1969 and 1978, the area irrigated in South Dakota increased by over 2.3 times. This was a faster relative rate of development than that in any other Great Plains state, and was second only to that in Georgia nationally. Nevertheless, South Dakota ranks only 20th in the nation in its total irrigated acreage.

The vast majority (over 82%) of South Dakota's irrigation has been developed by individuals and groups using private financing. This contrasts with much of the irrigated West which was developed earlier in the century with the aid of federal irrigation monies.

### A HIGH PROPORTION OF SURFACE WATER

During the 1970's in South Dakota, the rate of expansion in the area irrigated from groundwater sources was 50% greater than that from surface sources.

Nevertheless, only about 55% of the State's irrigated area now is based on groundwater sources. This is a much lower percentage than the average for the various Great Plains states (85%).

A factor limiting future development of surface water sources in South Dakota is the relatively high lift -- and hence large pumping cost -- required for surface water irrigation. In 1980, the average lift of pumped surface water in South Dakota--130 feet--was 3.7 times the average for the various Great Plains states. The average lift for pumped groundwater in South Dakota (120 feet), on the other hand, is below-average for the region.

### A HEAVY EMPHASIS ON SPRINKLER SYSTEMS

In 1982, irrigation water was distributed by sprinkler systems on about 87% of South Dakota's total irrigated acreage. This percentage far exceeds the 31% average for the Great Plains states.

Center pivot systems dominate South Dakota and North Dakota irrigation to an extent that no other irrigation method dominates in any other Great Plains state. In 1982, about 70% of the irrigated area in each state involved center pivot systems. In no other Great Plains state was the percentage greater than 35.

Two features of the 1970's undoubtedly help to explain the dominance of center pivot irrigation in the Dakota's. This was a time when (a) the relative rate of expansion of irrigation in the Dakota's exceeded that in the other Great Plains states and (b) the center pivot technology became well-developed and was readily available on the market.

### ELECTRICITY--THE PRINCIPAL ENERGY SOURCE

In 1970, electricity energized pumps for about one-third of South Dakota's total privately-developed irri-

gated acreage. Propane and diesel were each responsible for about one-fourth of the State's total irrigation. By 1982, the relative role of electricity expanded greatly, and today about 80 percent of the State's privately-developed irrigated area has sprinklers energized by electricity.

One reason for this shift toward a greater reliance on electricity is lower rates of price increase during the 1970's for electricity than for other energy sources. Between 1973 and 1980, the percentage increases in energy prices were: electricity-139, LPG-210, gasoline-254, diesel-335, and natural gas-400. In very recent years, however, electricity prices have increased more rapidly than other energy sources. Whether this will retard the use of electricity in future irrigation development, of course, remains to be seen.

#### LOW IRRIGATION WATER APPLICATIONS

In 1982, the average seasonal irrigation application in South Dakota was 15 inches. This is less than the average of 21 inches for the Great Plains states, and less than one-half the amount applied in either New Mexico or Montana. Apart from differences in natural precipitation and climate, a probable explanation for differences in these water application rates involves the mechanism by which the payment for irrigation water is made.

In states like South Dakota where the vast majority of irrigation water is distributed under pressure provided by privately-owned pumps, the cost of irrigation water is directly related to the amount of water applied. The more water applied, the greater is the charge to an irrigator for his water. In states like New Mexico or Montana which have mainly publicly-supported surface irrigation and fixed per acre charges for water, on the other hand, irrigators do not have the same type of economic incentive to monitor carefully the amounts of irrigation water applied.

#### CORN—THE DOMINANT IRRIGATED CROP

The principal crop grown under irrigation in the Dakota's—corn—covers about one-half the total irrigated area in each state. Of the Great Plains states, the ratio is higher only in Nebraska (two-thirds). Corn accounts for slightly less than one-third of the irrigated areas in fourth and fifth ranking Colorado and Kansas and for only 2 to 4% of the irrigated areas in Wyoming and Montana.

#### A NEW PUBLICATION

Readers who would like more detailed information concerning this topic should write the author requesting a copy of "The 1970's: A Decade of Growth in South Dakota Irrigation," Research Report 83-4, Econ. Dept., SDSU, Sep. 1983.

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