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The Cost of Reducing Irrigation

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For several decades Nebraska has proudly and appropriately regarded irrigation development as an important source of economic growth. However, in some parts of the state we now have too much of a good thing! To meet our Compact obligations to Kansas and Colorado in the Republican Basin and to comply with the proposed Cooperative Agreement for the Platte Basin we must find a way to consume less irrigation water. The cost of reducing irrigation and the equity implications will depend on what methods the state uses to achieve this objective.

We recently estimated the costs to irrigators and to the state budget of using different policies to reduce consumptive use (CU) of irrigation water in the Platte and Republican Basins (Supalla, 2006). The policy methods considered were: leased retirement of irrigated land using a willing buyer-willing seller approach; required land retirement with lease payments equal to actual producer losses; retirement of irrigated land by purchasing water rights using a willing buyer-willing seller approach; forced permanent retirement of irrigated land with compensation equal to actual market value; allocation with 100 percent producer compensation; and allocation with 50 percent producer compensation. Both long and short-term programs were considered with the reduced consumptive use occurring at different locations within each basin.

On-Farm Economic Costs

The on-farm cost of reducing consumptive use depends on the per acre value of irrigation water and on the level of consumptive use per acre. A comparison of irrigated and dryland cash rental rates suggests that irrigation water has an average annual lease value of \$74 per acre per year in the Platte Basin and \$82 per acre per year in the Republican Basin, based on the difference in rental rates between dry and irrigated cropland. The sales value of the right to irrigate was found to average \$639 per acre in the Platte Basin and \$725 in the Republican Basin, based on land sales data for irrigated land compared to non-irrigated cropland with irrigation potential (Johnson, 2006).

These per acre irrigation water values were divided by an estimate of consumptive use per acre to determine the on-farm cost of decreasing the consumptive use of irrigation water. The estimated average on-farm cost of reducing CU by decreasing irrigated acres was \$81 per acre-foot for the Platte Basin west of HW 183 and \$98 per acre-foot for the Republican Basin. If CU was reduced a comparable amount by limiting the amount of water that could be pumped (allocation), instead of by reducing irrigated acres, then the on-farm costs would be much higher. How much higher depends on how much reduction is needed, because the per acre-foot cost of reducing CU through allocation increases as allocation levels are progressively reduced to achieve increased reductions in CU.

The on-farm economic costs reflect how the net income of irrigators would be affected if irrigation was reduced without incentive payments or compensation of any kind. If Nebraska chooses to reduce consumptive use from irrigation by regulating water applied and/or the number of irrigated acres without compensation, then these costs

accrue entirely to irrigators. Alternatively Nebraska could choose to compensate irrigators for reducing CU, thus transferring all or part of this economic cost to taxpayers through increases in the state budget.

Off-Farm Costs

Nebraskan's who are not irrigators will also be impacted by irrigation reductions. How much they are impacted will depend on how closely their economic well-being is linked to irrigation, on how much, if any, of the on-farm costs are paid by taxpayers, and on what alternatives exist for the labor and other resources which are displaced when irrigation is reduced. The aggregate economic effects at the state level may be substantial for the first one or two years after the reductions occur, but will dissipate over the long term as the displaced resources find alternative employment. Rural communities, however, may suffer at the expense of enhanced growth in Lincoln and Omaha as some of the displaced rural resources migrate to urban centers.

State Budget Costs

The costs to the state budget for meeting our obligations to Kansas in the Republican Basin or our proposed commitments under the Cooperative Agreement for the Platte Basin were estimated for several policy options (Table 1). We found that if Nebraska implements a long-term program and wants to fully compensate irrigators using the least cost approach, they should: (1) use land retirement instead of allocation; (2) use a land purchase instead of a land leasing approach; and (3) use a regulatory with compensation policy for retiring land, instead of a voluntary willing buyer and willing seller approach. Land retirement is cheaper than allocation because it allows for more reduction in on-farm capital costs. Purchasing instead of leasing land is cheaper because with a lease you essentially "purchase" the land multiple times over the 50-year period that was analyzed. Regulated reduction in acres, with compensation equal to the estimated change in farm income, is cheaper than a voluntary willing buyer and willing seller approach because it eliminates the need to pay a premium price to induce the voluntary sale or lease.

Which policy is the best option can only be decided by the Unicameral and the Governor as they balance economic cost and equity considerations. How much compensation, if any, should irrigators receive for reducing water use? Should irrigation reductions be implemented using voluntary incentive based programs, by using regulations, or perhaps by a combination of regulations and incentives? Answers to these questions will determine both the total cost of irrigation water conservation and the distribution of this cost between irrigators and state taxpayers.

Table 1. Costs of Reducing Consumptive Use from Irrigation			
	State Budget Cost		Irrigator Cost
	Annual Cost	Total Cost (50 yrs)	Annual
	\$/Acre-Foot	\$/Acre-Foot	\$/Acre-Foot
Platte Basin			
Land Retirement, Voluntary Lease	\$122	\$2,610	Gain \$41
Land Retirement, Lease with Compensation			
Equal to On-Farm Cost	\$81	\$1,740	Break-Even
Land Retirement, Voluntary Seller	\$75	1038	Gain \$25
Land Retirement, Required with Compensation			
Equal to Market Value	\$50	692	Break-Even
Allocation with Compensation Equal			
to 50% of On-Farm Cost	\$65	\$1,396	Lose \$65
Allocation, with Compensation Equal to			
100% of On-Farm Cost	\$130	\$2,793	Break-Even
Republican Basin			
Land Retirement, Voluntary Lease	\$147	\$3,158	Gain \$49
Land Retirement, Lease with Compensation			
Equal to On-Farm Cost	\$98	\$2,105	Break-Even
Land Retirement, Voluntary Seller	\$79	1089	Gain \$26
Land Retirement, Required with Compensation			
Equal to Market Value	\$53	726	Break-Even
Allocation with Compensation Equal			
to 50% of On-Farm Cost	\$80	\$1,719	Lose \$80
Allocation, with Compensation Equal to			
100% of On-Farm Cost	\$160	\$3,437	Break-Even

References:

Johnson, Bruce. 2006. "Nebraska Farm Real Estate Market Developments 2005-2006." University of Nebraska-Lincoln Extension EC 06-809-S.

Supalla, Raymond, T. Buell and B. McMullen. 2006. "Economic and State Budget Cost of Reducing the consumptive Use of Irrigation Water in the Platte and Republican Basins", Draft Working Paper, Department of Agricultural Economics, UNL.