

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Cornhusker Economics

Agricultural Economics Department

---

2010

## If Irrigation Needs to be Reduced, How Should We Do It?

Raymond J. Supalla

*University of Nebraska-Lincoln*

Follow this and additional works at: [https://digitalcommons.unl.edu/agecon\\_cornhusker](https://digitalcommons.unl.edu/agecon_cornhusker)



Part of the [Agricultural and Resource Economics Commons](#)

---

Supalla, Raymond J., "If Irrigation Needs to be Reduced, How Should We Do It?" (2010). *Cornhusker Economics*. 499.

[https://digitalcommons.unl.edu/agecon\\_cornhusker/499](https://digitalcommons.unl.edu/agecon_cornhusker/499)

This Article is brought to you for free and open access by the Agricultural Economics Department at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Cornhusker Economics by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

# CORNHUSKER ECONOMICS

## If Irrigation Needs to be Reduced, How Should We Do It?

Market Report	Yr Ago	4 Wks Ago	9/10/10
<b><u>Livestock and Products,</u></b>			
<b><u>Weekly Average</u></b>			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight. . . . .	\$83.81	\$93.78	\$96.99
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb. . . . .	102.41	134.61	124.82
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb. . . . .	102.80	117.00	116.36
Choice Boxed Beef, 600-750 lb. Carcass. . . . .	142.12	153.59	160.84
Western Corn Belt Base Hog Price Carcass, Negotiated. . . . .	49.76	78.13	80.77
Feeder Pigs, National Direct 50 lbs, FOB. . . . .	40.00	*	*
Pork Carcass Cutout, 185 lb. Carcass, 51-52% Lean. . . . .	54.51	89.33	90.56
Slaughter Lambs, Ch. & Pr., Heavy, Wooled, South Dakota, Direct. . . . .	91.87	132.50	146.25
National Carcass Lamb Cutout, FOB. . . . .	246.97	303.11	321.20
<b><u>Crops,</u></b>			
<b><u>Daily Spot Prices</u></b>			
Wheat, No. 1, H.W. Imperial, bu. . . . .	3.51	5.43	5.86
Corn, No. 2, Yellow Omaha, bu. . . . .	3.10	3.68	4.24
Soybeans, No. 1, Yellow Omaha, bu. . . . .	9.68	10.44	10.06
Grain Sorghum, No. 2, Yellow Dorchester, cwt. . . . .	4.88	6.55	7.50
Oats, No. 2, Heavy Minneapolis, MN, bu. . . . .	1.95	2.73	3.22
<b><u>Feed</u></b>			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton. . . . .	*	135.00	137.50
Alfalfa, Large Rounds, Good Platte Valley, ton. . . . .	82.50	77.50	72.50
Grass Hay, Large Rounds, Premium Nebraska, ton. . . . .	*	95.00	*
Dried Distillers Grains, 10% Moisture, Nebraska Average. . . . .	81.00	94.00	115.00
Wet Distillers Grains, 65-70% Moisture, Nebraska Average. . . . .	33.00	35.00	41.75
<b>*No Market</b>			

Nebraska's obligations under the terms of the Republican Basin Compact and the Cooperative Agreement for the Platte River, as well as our continuing commitment to future generations, require reductions in the consumptive use of water in irrigation. Reducing irrigation in a cost effective and equitable way is perhaps the most important water policy challenge which Nebraska must address. Determining how to meet this challenge involves the following questions: how will irrigators be affected by irrigation reduction programs such as allocation or forced reductions in irrigated acres; how will the Nebraska economy and local communities be affected; what is the least cost method of reducing irrigation consumptive use (CU), and; who should bear the cost of irrigation reduction programs: irrigators, Natural Resources Districts (NRD's) or the State of Nebraska?

This article summarizes what we now know about these questions. Although the numbers cited are a constantly moving target as crop prices, grain yields and input prices change, the related policy conclusions are not likely to change much over time.

### How will irrigators be affected by irrigation reduction programs?

The economic cost of reducing irrigation depends on the policies used to achieve it and on the profitability of irrigation at the time the reductions occur. There are two general policy choices; regulate the amount of water applied, usually called allocation, or reduce the number of irrigated acres. Irrigated acres could be reduced using regulations, or by leasing or purchasing irrigation rights. What these options cost depends on the profitability of irrigation, which in turn depends on rainfall, crop prices, irrigation costs, other production costs and on crop water requirements.

The on-farm cost of reduced irrigation is usually expressed as a change in net economic returns to land. On-farm costs are computed as a change in net returns rather than a change in



profits, to avoid confusion associated with who pays this cost. If there is no effect on tax liability and there is no public subsidy, then the entire on-farm cost is paid for by the producer and “change in net returns” is equivalent to “change in after tax profits.” On-farm costs can be estimated based on generalized cost and return budgets, or in the case of land retirement, the estimates can be based on the cash rent and the land sales markets. Conceptually, the difference in cash rents for irrigated land compared to similar land without irrigation, adjusted for taxes, is a reasonable approximation of the annual net returns associated with irrigation. The difference between the sales value of irrigated land and the sales value of dryland reflects the present value of the net returns to irrigation over the long-term.

Current estimates of on-farm costs based on land market data suggest that irrigated land retirement would reduce annual net returns by about \$85 per acre, which translates to about \$110 per acre-foot of consumptive use. If allocation programs are used to achieve a similar result, the estimated annual costs would be 20 to 40 percent higher, depending on the amount of reduction needed. This difference occurs primarily because irrigation cost savings are larger with land retirement. All on-farm costs accrue to irrigators unless subsidies are paid or there is a change in tax liability.

#### **How will the Nebraska economy and local communities be affected?**

When irrigation is reduced there are off-farm as well as on-farm costs; fewer inputs are needed for agricultural production and less income is available for all purposes. A common measure of this effect is the change in household income for all households in the state or region. This measure captures the economy wide multiplier effects, assuming that the resources involved cannot or do not move to alternative uses. When irrigation reductions occur the immediate off-farm costs are relatively large, estimated to average \$130 per acre-foot of consumptive use for a moderately aggressive allocation program, and \$310 per acre foot for a comparable land reduction program. These costs have been found to be very transitory, however, usually dissipating to very low levels within a year or two. Why does this happen?

When irrigation is reduced there is less need for the people and other resources which supply the farm inputs, market and process farm outputs and provide consumer goods. If these resources become unemployed and remain unemployed, the costs in terms of foregone household income are quite high. However, if the general economy is strong and there is a need for these resources to produce other things, then this cost is likely to be small and temporary. The evidence from recent years suggests that the Nebraska economy has been strong and diverse enough for other economic activity to quickly emerge as an offset to irrigation changes. It is nevertheless important to keep in mind that if very large changes in irrigation occurred quickly, and the general economy was weak, it could take several years before the statewide economic effects are fully offset.

Community level income, employment and property tax effects are often areas of popular concern, but research evidence shows quite clearly that reductions similar to those currently in place, or being seriously considered, would have only minimal community level effects. We have found, for example, that even a relatively aggressive irrigation reduction program is unlikely to reduce property tax revenues by more than two or three percent, and that this effect would be quickly offset by continually rising land values.

#### **What is the least cost method of reducing consumptive use from irrigation?**

Irrigated land retirement programs appear to be the most cost effective method of reducing irrigation consumptive use in most cases, providing that the general economy is strong enough to quickly provide offsetting economic development, and assuming appropriately designed allocation and retirement programs. When administrative procedures as well as cost issues are considered, however, the best approach is less apparent. It is more difficult to administer land retirement options, because either compensation must be paid or the reductions must be widely distributed using a regulatory approach. However, regulation and enforcement of the number of acres irrigated is much more difficult than regulating the amount of water pumped.

Irrespective of whether allocation of land retirement techniques are used, it is important to consider using some type of water rights market to minimize aggregate costs. Establishing markets to facilitate the transfer of pumping rights to the most productive land will produce the desired hydrologic impact at least cost. This is especially true if a voluntary land retirement program is used. Auction markets in this case could be used to retire the least productive land and minimize the public cost of water right acquisition.

#### **Who should bear the cost of irrigation reduction programs?**

Irrigation reduction programs which result in all irrigators reducing irrigation by 20 or 30 percent, for example, are clearly affordable by individual irrigators. At current prices we estimate that reducing water applied by 30 percent in Southwest Nebraska would cost irrigators \$33 per acre in net returns. Although not insignificant, this reduction is much smaller than the income changes associated with normal year to year variations in prices and yields. It is equivalent to a corn price change of about 15 cents a bushel, or a yield change of 10 bushels per acre. This implies that unless some irrigators are asked to incur much larger reductions, subsidies are unnecessary. However, who should pay for irrigation reductions remains an equity issue which must ultimately be decided by the political process.

Raymond J. Supalla, (402) 472-1792  
Professor, Dept. of Agricultural Economics  
University of Nebraska-Lincoln  
[rsupalla1@unl.edu](mailto:rsupalla1@unl.edu)