

South Dakota State University
**Open PRAIRIE: Open Public Research Access Institutional
Repository and Information Exchange**

Economics Commentator

Economics

8-6-1981

Impact of Irrigation Development on Regional Economics

Richard Shane
South Dakota State University

Follow this and additional works at: http://openprairie.sdstate.edu/econ_comm

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

Recommended Citation

Shane, Richard, "Impact of Irrigation Development on Regional Economics" (1981). *Economics Commentator*. Paper 164.
http://openprairie.sdstate.edu/econ_comm/164

This Newsletter is brought to you for free and open access by the Economics at Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in Economics Commentator by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact michael.biondo@sdstate.edu.



Editor: Donald C. Taylor

Economics Department SDSU, Box 504A Brookings, SD 57007

Tele: (605) 688-4141

No. 168

August 6, 1981

Impact of Irrigation Development on Regional Economies

by
Richard Shane
Assistant Professor
of Economics



Irrigation development and the value of water in alternative uses have received much attention in South Dakota and will continue to be of definite interest to the people of the state. As irrigation development expands, benefits usually accrue to the irrigator. An irrigator's income-earning potential increases and his income variability due to yield changes from year to year becomes less. In addition, the livestock producer is assured a more stable and larger feed supply.

But what about benefits which accrue to the non-farm economy of a region undergoing irrigation development? As irrigators purchase more inputs such as seed and fertilizer, feed more livestock and buy more consumption goods, what is the impact on the regional economy? It is generally accepted that as irrigators increase purchases, turn-over or multiplier effects on the regional economy are positive. However, the magnitude of the turn-over effects on the regional economy is not agreed upon.

A study to address these questions was conducted jointly by the author at SDSU and Ralph Brown of the Business Research Bureau at USD. An econometric model was used to simulate what would happen to irrigators' incomes and non-irrigators' incomes when large scale irrigation development occurs in a particular region of the state, namely, South Dakota's Third Planning District. Dryland and irrigated crop enterprise budgets were compared to determine the differences in

farmers' expenses and incomes as irrigation technology is adopted. The computer model was then used to estimate the impact that the increased purchases and incomes of the irrigators would have on the regional economy.

To illustrate, corn raised under irrigation requires more seed than corn raised under dryland conditions. So, the farmer spends more on seed, part of which goes to hire people to sell and produce seed. These people in turn use some of their incomes to buy groceries, clothing and cars. The people who sell these items hire people and so it goes. These impacts are turn-over or multiplier impacts of the irrigators' increased expenditures. The same reasoning applies to other inputs farmers buy like credit at banks, insurance, machinery and fertilizer.

Several scenarios (sets of conditions) were simulated with the computer model. Two which show considerable contrast are in Figure 1. In both, irrigation development occurs in 1977 and the turn-over impacts through 1983 are determined. The scenario depicted in Part A was derived while allowing energy costs to rise at current rapid rates, with no technological progress to increase yields or reduce production costs. The simulation model with this scenario shows Farmers' Personal Income (FPI) change to become negative after a few years but Non-Farmers' Income (NFI) to increase and to stay very stable as farmers each year add successively to their purchase of inputs. The Total Personal Income (TPI = FPI + NFI) for the region initially increased, but then approached zero as farmers' losses negated non-farmer gains. Thus, under these conditions, irrigation development is associated with farmers becoming worse off but non farmers becoming better off.

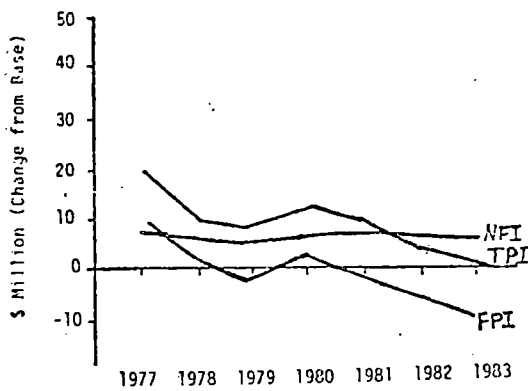
The second scenario was the same as the first except that technological innovations which increased irrigated

crop yields per acre were assumed to occur. With these conditions, as shown in Part B, both farmers and non-farmers benefit from the irrigation development. Non-farmers' income increases and stays quite stable and the farmers' income continues to rise as long as technological advance continues. The total personal income of the whole region is made substantially better off as the irrigation development occurs.

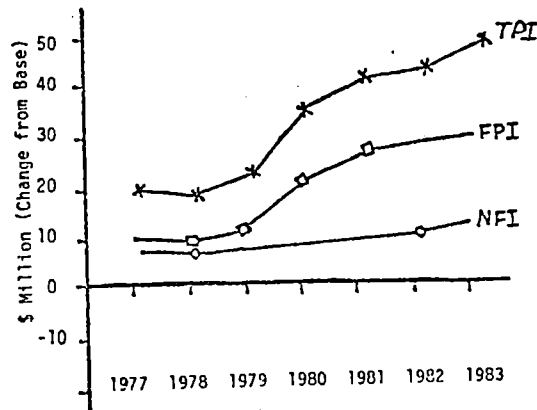
Thus, the results of this study indicate that irrigation development can, but need not necessarily, benefit both the farm and non-farm economies of a region. Under both sets of assumed

conditions, non-farm income is enhanced and remains stabilized at a higher level than before the development. Farm income, on the other hand, increases only when technological advances are great enough to offset rapidly rising input costs.

These findings should be viewed as illustrative. Similar studies in other regions of the state and using different assumptions could conceivably show irrigation development to be associated with other patterns of relationship among farmer, non-farmer and total personal income.



A. Assuming Energy Cost Increases Only



B. Assuming Energy Cost Increases and Technological Advance

Figure 1. The Impacts of Irrigation Development on Farmers' Personal Income (FPI), Non-Farmers' Income (NFI), and Total Personal Income (TPI) in the S.D.'s Third Planning District, 1977-1983

2500 printed for educational purposes at an estimated cost of 2¢ each

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the USDA, Hollis D. Hall, Director of Cooperative Extension Service, SDSU, Brookings. Educational programs and materials offered without regard to age, race, color, religion, sex, handicap or national origin. An Equal Opportunity Employer.

Cooperative Extension Service
U. S. Department of Agriculture
South Dakota State University
Brookings, South Dakota 57007

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE \$300

Postage and Fees Paid
U. S. Department of
Agriculture
AGR 101.



Third class mail
(Bulk Mail)