



Imperial Valley Agriculture and Water: A Regional Economic Analysis

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Imperial Valley agriculture confronts reductions in water supply due to its adherence to the interstate agreements regarding Colorado River water allocation and a recent agreement with the San Diego County Water Authority contained within the Quantification Settlement Agreement. Our results show that the economic impact on grower income and regional economic well-being can vary substantially depending on how the growers are regulated and if they are allowed flexibility in how they participate in a water market.

This study investigates the effects of increased water scarcity in Imperial County, California related to two recent changes that limit the amount of water available to agriculture. California no longer enjoys the surplus Colorado River water from Arizona and Nevada which in the past has exceeded 800,000 acre feet per year. Additionally, a historic water transfer agreement between the San Diego County Water Authority (SDCWA) and the Imperial Irrigation District (IID) was approved requiring a total of 150,000 acre feet to be transferred annually to the SDCWA by 2017 and as much as an additional 200,000 acre feet of water to be transferred annually thereafter. We investigate the effects of these reductions on agricultural production, water use, land use, potential drainage flows to the Salton Sea, and employment within Imperial County. It should be noted that Imperial County has extremely high rates of unemployment, and the agriculture sector is the 2nd largest employer in the local economy and the largest water user.

The analysis uses three programming tools to develop a model that links plant growth, net returns from agricultural production, and employment. A plant growth model is developed which models the relationship between water use, yield, and drainage; a programming model is used to calculate net returns to land and management in the

agricultural sector for five crops considered to be representative of the crops grown in the Imperial Valley; lastly, a link between the agricultural sector and the broader economy is analyzed to estimate the impacts on employment. These models are used to evaluate three different policy options, including the current water regulations where growers are constrained in how they free up water to transfer to the SDCWA (policy 1); water regulations that would allow growers flexibility in meeting the water transfer allowance to SDCWA (policy 2); and finally, water regulations that would allow growers flexibility in both the manner in which they free up water and in the amount they choose to free up (policy 3).

Our results suggest that under the current rigid water regulations (policy 1), the agricultural sector loses between \$27 (policy 2) to \$34 million (policy 3) annually relative to if growers were allowed more flexibility in terms of how they can free up water to sell and the amount of water they can free up to sell to the SDCWA. Unfortunately, under the more profitable regulations, growers sell substantially more water than under the current system; consequently, there would likely be a noticeable reduction in drainage water reaching the Salton Sea barring some mitigation activities.

From a regional economic perspective, the impacts on the local economy, both in terms of income and employment, is highly dependent upon whether the income from the sale of the water stays within the region. If so, the income (employment) impacts of any of these regulations varies from an annual loss of \$26 million (337 jobs) to a gain (loss) of \$12 million (41 jobs). Alternatively, if the income from the sale of the water goes to agents outside the local economy, the income (employment) impacts of any of these regulations varies from an annual loss of \$43 million (465 jobs) to a loss of \$45 million (485 jobs). Given that the actual amount of income staying within the local economy will be somewhere between these two extremes, the actual income and employment effects will be bounded by the above estimates.

In conclusion, allowing growers more flexibility in how they can participate in a water market can have strong positive impacts on agricultural and regional income and employment; there may be some adverse impacts on the quantity of drainage water generated that could negatively impact the quantity and quality of inflow water to the Salton Sea.

Publications

Schwabe, K., P. Schuhmann, K. Baerenklau, and N. Nergis. Fundamentals of Estimating the Net Benefits of Ecosystem Preservation: The Case of the Salton Sea, *Hydrobiologia*, accepted 7/1/2007.

Knapp, K.C. and K.A. Schwabe. Spatial Dynamics of Water and Nitrogen Management in Irrigated Agriculture. *American Journal of Agricultural Economics*. Accepted 8/10/2007.

Professional Presentations

K. Schwabe and N. Nergis. Fundamentals of Estimating the Net Benefits of Ecosystem Preservation: The Case of the Salton Sea. Salton Sea Centennial Symposium: A Salton Sea for the 21st Century: Science, Rehabilitation, and Management. San Diego, CA, April 1, 2005.

Collaborative Efforts

This project included significant interaction with other economists (K. Knapp and K. Baerenklau, UC Riverside), and an extension agent at the UC Davis Imperial County Desert Research Center (Dr. K. Bali). Retired Extension Agent Dr. K. Mayberry's research also contributed greatly to this research.

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