Report for 2005CA127B: Imperial Valley Agriculture and Water: A Regional Economic Analysis

Publications

- There are no reported publications resulting from this project.

Report Follows

1. Update the basic project information summary.

   It is the objective of this research to evaluate the ability of growers in the Imperial Valley to meet both impending reductions in allowable Colorado River water usage and possible restrictions on drainage effluent necessary for inflow into the Salton Sea. Also evaluated will be the impact of changes in agricultural labor and income, arising from these reductions and restrictions, on regional economic income and productivity using a regional multiplier model. To date, the crop-water production functions have been estimated for the five major crops and irrigation systems in the Imperial Valley. Additionally, drainage-water production functions for each crop-irrigation system have also been estimated. Price and cost data for each cropping system (crop type and irrigation system) have been calculated. Finally, a regional economic multiplier model has been investigated—IMPLAN- and various links between the regional agricultural production model and the regional economic multiplier model have been identified (labor and income).

2. Include Problem and Research Objectives, Methodology and Principal Findings and Significance for your project.

   The objectives of this research, we intend to evaluate issues associated with potential reductions in the quantity or quality of the drainage water entering the Salton Sea from agriculture in the Imperial Valley by building a regional agricultural production model that accurately represents regional cropping activities, irrigation choices, and water issues. The conceptual and theoretical model behind these efforts was presented by the graduate student I have working on this project as his Ph.D. proposal (of which he passed and now has advanced to candidacy). By developing a detailed regional mathematical programming model of Imperial Valley agricultural production, we can evaluate the impacts associated with alternative strategies that meet these commitments on agricultural productivity and sustainability. Furthermore, by linking this agricultural production model to a comprehensive regional model of economic activity (using what is referred to as social accounting matrix multiplier analysis, or SAM), the impacts on regional economic activity can also be explored and highlighted. Given that agriculture is the largest industry within the region, including the impacts of alternative agricultural management strategies on the region as a whole can provide a more comprehensive analysis than agricultural production models alone, and can better identify more efficient alternatives and their distributional consequences. Finally, through establishing a relationship between agricultural runoff from the Valley and inflows into the Salton Sea, the implications of these various strategies on characteristics of the Salton Sea can be explored. We are currently refining our estimation of the evapotranspiration, yield, deep percolation and runoff as functions of applied water. We have also obtained the IMPLAIN software and data on Imperial County to be used in the SAM analysis. Efforts include investigating how one might go about replacing the generic “agricultural industries” estimates in the current IMPLAN model with what will be are more accurate and useful estimates from our regional agricultural production model. Development of these models will allow us to evaluate the impacts of alternative management strategies on regional agriculture, employment, income, and the environment.

3. Provide publication citations associated with the research project.

   n.a.

4. You have the option of providing introductory text regarding your overall research program.

Under the 1922 Colorado River Compact, 7.5 million acre-feet (ac-ft) of Colorado River water was allocated to the lower basin states of Nevada (300,000 ac-ft), Arizona (2.8 million ac-ft), and California (4.4 million ac-ft). Until the mid-1990s, though, California's average use was more in the neighborhood of 5.2 million ac-ft. Increased demands for water in Nevada and Arizona resulted in California being mandated to reduce its share down to its legally designated amount. While California's appropriative water use rights indicate that Southern California urban suppliers and users could be required to bear the brunt of these reductions, attention shifted towards "enticing" the agricultural sector, mostly in the Imperial Valley, to accept responsibility. The current agreement, referred to as the Quantification Settlement Agreement and signed by representatives from local, state, and federal agencies,[1] consists of commitments associated with water conservation measures, water transfers, and groundwater banking and conjunctive use measures. The state of California was given 15 years to achieve these commitments, many of which rely upon agricultural growers in the region reducing their long-term historical average water use by nearly 30% (Western Water 2001, p. 8), and one that includes a controversial 200,000 ac-ft transfer of water from the Imperial Irrigation District to the San Diego County Water Authority.

It is the objective of this research to evaluate the ability of growers in the Imperial Valley to meet these commitments. By developing a detailed regional mathematical programming model of Imperial Valley agricultural production, we can evaluate the impacts associated with alternative strategies that meet these commitments on agricultural productivity and sustainability. Furthermore, by linking this agricultural production model to a comprehensive regional model of economic activity (using what is referred to as social accounting matrix multiplier analysis, or SAM), the impacts on regional economic activity (e.g., employment, income, profits) can also be explored and highlighted. Given that agriculture is perhaps the largest industry within the region, including the impacts of alternative agricultural management strategies on the region as a whole can provide a more comprehensive analysis than agricultural production models alone, and can better identify more efficient alternatives and their distributional consequences. Finally, through establishing a relationship between agricultural runoff from the Valley and inflows into the Salton Sea, the implications of these various management strategies on the volume, surface area, and depth of the Salton Sea can be explored. Indeed, particular constraints on required inflows into the Salton Sea can be included in the model so as to mimic conditions associated various proposed restoration plans for preserving the Salton Sea. Alternatively, the economic impacts from such restoration plan alternatives (from inflow requirements) on both agricultural productivity and regional economic activity can be evaluated.

[1] These groups include the Imperial Irrigation District (IID), the Coachella Valley Irrigation District (CVID), San Diego County Water Authority (SDCWA), the Metropolitan Water District (MWD), the U.S. Department of Interior (DOI), and the State of California.