Economic Impact and Policy Analysis Model

Phase 1: Concept Development

Prepared for:

Irrigation Association™
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Economic Impact and Policy Analysis Model for the Irrigation Association

Phase 1: Concept Development, Draft Report

Executive Summary

Introduction

This research study begins the development of a quantitative economic model, or a set of models, of the Irrigation Association's (IA) industry. Having the ability to estimate the impact of these changes prior to their implementation – to get "out front" of the issues, provides a valuable planning tool for all members. For purposes of model development, the industry is categorized into four commonly-recognized components, or segments:

1. Agricultural irrigation
2. Residential irrigation
3. Commercial irrigation
4. Golf course irrigation

The purpose of this study is determining what variables are the most important for each industry segment and using this information to develop predictive models that can be used for economic impact assessment for each.

A multi-phased approach was recommended in developing the Scope of Work for this project:

- Phase 1, focusing upon a literature review and available data, concluding with recommendations about the types of economic models that could be applied to the IA and the level of effort needed to achieve this. In addition, a conceptual model(s) of the industry would be developed to the degree necessary to reveal its data requirements.
- Phase 2 would develop the prototype working model(s).
- Phase 3 will develop the suite of economic models needed for IA's policy and impact analysis, based on the methods developed in Phases 1 and 2.

This summary focuses upon Phase 1.

Development of Sector Models

Based on the inherent difficulties associated with using a direct approach to estimate the value of the irrigation industry's output, an alternative end-use approach is recommended. In summarizing the rationale in deviating from the direct approach of totaling direct sales of various market segments, four shortcomings were identified:

1. The existing industrial classifications, whether represented by SIC or NAIC codes, do not adequately reflect common categories of irrigation equipment and services, requiring a high degree of primary data development.
2. A major, but unmeasured, proportion of irrigation equipment sales and services are by privately-held companies and are not publically recorded, introducing considerable uncertainty in any estimate of direct output.
3. Industry surveys intended to fill-in these data gaps are unlikely to improve model accuracy.
4. The available historical data is sparse and full of "noise" in the sense that it would be very challenging to tease-out a mathematical economic relationship useful for predictive purposes or policy analysis.

Estimated Size of Industry

This alternative approach is used in a very preliminary manner to develop estimates of the value of the industry's output. The estimates represent "best guesses" using the recommended approaches and readily available existing data.

Based on the best-guess estimates of each sector, a commonly-used economic input-output model, IMPLAN, is used to include the multiplier effects associated with the industry's output. The results are estimates of the total output, earnings, and employment impacts of the irrigation industry.

Adding-up the order-of-magnitude estimates for each irrigation sector yields an estimate of the industry's total economic impact. These sums are shown in Table ES-1.

- Direct impacts refer to those in the irrigation industry itself: for output it refers to the total contribution to the national economy as measured by the sales value of all finished goods and services. Direct employment impacts refer those jobs contributing to the industry's final goods and services, such as a job manufacturing irrigation equipment or an irrigation system installer. Direct earnings impacts refer to the wages and salaries paid to those working in the industry.
- Indirect and induced impacts refer to the secondary impacts to the all the supporting industries benefitting from the industry's spending on inputs and services.

Figures ES-1 and ES-2 graphically show the total value of output impacts and employment impacts by sector. It should be reiterated that the estimates are order-of-magnitude in nature, based on "best guesses" of critical variables where needed. Regardless, it is an interesting exercise and produces a target at which to shoot in the future. Phase 2 of the analysis would substantially refine these estimates and not dare describe them as order-of-magnitude.

Other industries with comparable levels of direct output include:

- Nitrogen-based fertilizer industry ($5.3 billion per year)
- Rolled steel manufacturing ($5.6 billion)

- Motorcycle and bicycle industries ($6.2 billion)

For perspective, casket manufacturing has an annual output of near $1.0 billion, automotive repair near $100 billion, and hospitals slightly under $540 billion.

Table ES-1. Summary of Total Economic Impacts

Output impact: contribution to GDP ($ millions)					
		Direct	Indirect	Induced	Total impact
	Agricultural	$ 1,324	$ 657	$ 1,297	$ 3,278
	Residential	$ 2,819	$ 1,902	$ 3,223	$ 7,943
	Commercial	$ 1,344	$ 862	$ 1,705	$ 3,911
	Golf Course	$ 1,604	$ 786	$ 1,681	$ 4,072
Totals		$ 7,091	$ 4,208	$ 7,906	$ 19,205
Earnings impact ($ millions)					
		Direct	Indirect	Induced	Total impact
	Agricultural	$ 488	$ 195	$ 348	$ 1,031
	Residential	$ 1,099	$ 533	$ 864	$ 2,496
	Commercial	$ 599	$ 234	$ 457	$ 1,289
	Golf Course	$ 609	$ 215	$ 432	$ 1,256
Totals		$ 2,794	$ 1,177	$ 2,102	$ 6,073
Employment impact (jobs)					
		Direct	Indirect	Induced	Total impact
	Agricultural	8,000	4,800	9,300	22,100
	Residential	31,500	12,000	23,600	67,100
	Commercial	16,300	5,300	12,500	34,100
	Golf Course	10,200	5,400	11,000	26,600
Totals		66,000	27,500	56,400	149,900