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Comparison of Methods to Economically Value Irrigation Water in the Qazvin Irrigation Network (Iran)

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Abstract

Physical availability as well as an adequate allocation of irrigation water are two of the most pressing resource management issues globally. From an economic efficiency perspective, the economic value of irrigation water supplied by public irrigation infrastructure should be a central aspect in water pricing and allocation. Likewise, it is widespread engineering practice to justify plans for new irrigation infrastructure with cost-benefit analyses which, in turn, require data on the economic value of irrigation water. In absence of water markets, market prices are not available in many tropical and sub tropical areas in need of irrigation water, and low efficiency is a widespread problem. We report on the results of a comparative study using three different methods to determine the irrigation water value in the Qazvin irrigation network in northern Iran. Current water fees do, by far, not cover water production costs/not even cover operation costs. This fee was 42.8 Iranian Rials per cubic metre of irrigation water for 2005. A field survey was conducted in 2005–2006 in part of Qazvin irrigation network area. Via the contingent valuation method (bidding game), farmers' willingness to pay for additional units of irrigation water was assessed as 197 Iranian Rials m^{-3} of irrigation water from canals. The hypothetical nature of the method and some strategic responses may have resulted in understatements of true water values. Thus, a stochastic frontier analysis was used to correct for undervaluation bias. The value marginal product method resulted in a value of 430 Iranian Rials m^{-3} of irrigation water. Cobb Douglas and Translog functional form were used to estimate household production function. The change in net rent method is the most commonly used in the *ex ante* assessment of irrigation projects. Theoretically, the method is known to compromise accuracy for ease of application. It indicated a value of 1076 Rials m^{-3} . We conclude that results differ substantially, and that the net rent probably yielded the most unreliable estimate. Our results suggest that higher water prices in Qazvin irrigation network would be justified.

Keywords: Change in net rent method, contingent valuation, economic value, irrigation water, stochastic frontier, value marginal product