

Summaries

Irrigation water pricing: policy implications based on international comparison

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Population growth compounded with rising standards of living have led to a rapid increase in the demand for water. Irrigation projects often require large initial investments in infrastructure, exhibit increasing returns to scale, and involve spatial and temporal externalities, all of which factors lead to market failure and call for some form of regulation. Consequently, a plethora of mechanisms to allocate irrigation water have emerged; many involve water pricing mechanisms of one sort or another. In developing countries, where subsistence farmers rely on irrigation water for basic needs, irrigation water pricing is a sensitive policy intervention. In this work we study efficient pricing of irrigation water and investigate the extent to which the different pricing schemes affect income distribution within the irrigation sector. We discuss the main concepts underlying efficient water use and demonstrate how available data can be used to design a pricing scheme that promotes efficient use of water. By affecting farmers' income, water prices also affect income distribution within the farming sector. Our empirical findings, however, reveal that water prices have rather negligible effects on income distribution within the farming sector. This finding is consistent with other works and has an important policy implication: water pricing should be designed in order to promote efficiency, leaving equity considerations to other policy tools.

International support for environmental protection

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The empirical relationship between the support for environmental protection and per capita national income is examined in this paper using

household-level survey data from twelve developing and three developed countries. Economic theory suggests that if environmental quality is a normal good, all else constant, higher-income households will be more willing to pay for environmental protection than lower-income households. By extension, the willingness to pay for environmental protection in developing countries is often assumed to be lower than in developed ones. However, empirical research to either support or refute this claim is scarce. This issue has important ramifications for economic development and the timing of environmental protection. When pollutants have both domestic and global effects, these choices may be of worldwide concern.

Results from ordered probit estimation show that as per capita real gross domestic product (RGDP) rises, controlling for other household characteristics, the strength of the support for somewhat higher taxes for environmental protection is falling for low-income countries and rising for high-income countries, although the magnitude of the effect is small. A possible explanation for this pattern is if the marginal qualitative willingness to pay (WTP) is falling as per capita RGDP is increasing, even while total qualitative WTP is increasing, perhaps in reaction to already high taxes or environmental expenditures. Support for environmental protection is also greater for those households reporting a higher relative income, those with more education, and respondents from the African nations. The evidence suggests that environmental protection may already be important to people in developing countries during the process of economic growth, as seen by the high percentages of respondents in a broad range of countries who express a willingness to pay at least somewhat higher taxes for environmental protection.

Considerations for targeting soil conservation investments in southern Honduras

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A case study was conducted of the Land Use and Productivity Enhancement (LUPE) project (1990–1998) in Honduras to estimate the costs of extension programming to promote three steep-land soil conservation technologies – mulching, vetiver grass barriers, and rock walls – and assess their efficacy (i.e., cost per ton of soil saved). Case study evidence indicated that sequential learning was important for Honduran steep-land farmers making investments in soil conservation: first, they became convinced of the

disadvantages associated with burning to clear cropland and adopted mulching, then later they installed quasi-permanent conservation practices. The LUPE project was jointly sponsored by the Honduran Ministry of the Environment and the US Agency for International Development. In addition to a gradual decline in crop productivity, soil erosion in Honduras makes steeplands vulnerable to catastrophic events (i.e., landslides and flooding) in the aftermath of hurricanes (Fifi in 1974 and Mitch in 1998, most recently). Hurricane Mitch caused losses of \$3.7 billion (70 per cent of the nation's annual gross domestic product) and at least 11,000 people died. Watershed-scale planning and management approaches would help steepland farmers to mitigate against risks associated with hurricanes. In accordance with watershed-scale policies, conservation investments would be encouraged first on the cropped steeplands in rural southern Honduras, which are most vulnerable to landslide and flooding risks. This targeting scheme would increase the public's return on investments in technical assistance to encourage farmers to conserve by prioritizing conservation on steeplands where there are export-earning industries and infrastructure immediately downstream. Watershed maps are produced using the Geographic Information System, which suggest which steepland sites in the watershed studied are the most prone to landslides, in order to both maximize the soil saved per hectare protected and minimize downstream damages.

Environmental values and resource management options: a choice modelling experience in Malaysia

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The Malaysian Department of Forestry is required to review the plan of management for the Matang mangrove wetland every ten years. Estimates of all the costs and benefits arising from alternative management plans would assist in this process. Estimating the non-marketed benefits of the protection of the wetland requires the use of stated preference valuation techniques. In this paper, an application of one such technique, Choice modelling (otherwise known as choice experiment), to the estimation of values derived by residents of Larut Matang and Selama district in Perak state from increasing the level of protection provided for the Matang mangroves is detailed.

Choice modelling involves a sample of respondents being asked, in a questionnaire, to choose their preferred management option from a range of alternatives. Each alternative is described using a common set of attributes or characteristics of the management outcomes. The alternatives differ in terms of the level at which these attributes occur. By observing the choices made by respondents, the values of each attribute and of management outcomes can be estimated in monetary terms, so long as one of the attributes used is money.

It is shown in this paper that choice modelling can be successfully applied in a developing country setting with careful construction of the range of management alternatives and effective survey data collection. Close consultation with the stakeholder (the Malaysian Forestry Department) and focus groups are critical to understanding the nature of the resource problem and consequently the appropriate design of choice modelling questionnaires.

For the Matang application, the attributes used to describe alternative management outcomes were:

- the area of the wetland dedicated to environmental protection;
- the number of migratory bird species present;
- the recreational visitation rate;
- the number of people directly employed; and,
- a contribution to a trust fund dedicated to the protection of the Matang Wetlands.

A sample of 600 households from the Larut Matang and Selama district in Perak state was questioned. Multi-nomial logit and nested multi-nomial logit models were fitted to the choice data collected. Based on the latter model, it was found that, on average, respondents were willing to pay around:

- 0.81RM for a 1 per cent increase in the area of protected wetland;
- 0.92RM for a 1 per cent increase in the number of migratory bird species present;
- 0.06RM for a 1 per cent increase in visitation rate to the wetlands; and,
- 1.36RM for a 1 per cent increase in the number of people directly employed in wetland forest related industries.

To assess alternative management strategies, the choice models derived from the data were used to estimate the change in welfare caused by changes from the current management outcomes to three alternatives. This process demonstrates the flexibility of choice modelling to produce estimates of value for an array of alternative policies. The three alternatives investigated involved differing levels of area under protection, species diversity, visitation and employment and yielded values ranging, on average, from 13RM to -12RM per annum per respondent household.

The values estimated can be included in a benefit-cost assessment of the alternatives to the current management plan. Their inclusion, along with the market-based values estimates familiar to the Department of Forestry, provides a more complete assessment of potential strategies for the Matang mangrove wetlands.

Rights transfers in Madagascar biodiversity policies: achievements and significance

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Since the 1990s, decentralization and people's participation in management has been a key part of government policy in Madagascar. Goals and measures for decentralization of environmental policy have been taken through the National Environmental Actions Plans. Before implementation of these Plans and the recent decentralization process, a state property regime officially governed the management of natural resources in Madagascar. In actual fact, the management of community natural resources was mainly governed by rules based on customary law. The second Environment National Plan led to the setting up of a new policy framework through the so-called 'GELOSE' act. This law provides for the signature of contracts between central government, local communities, and municipal governments for the transfer of management rights over identified natural resources.

When analysing these contracts, two main questions arise: (i) What is the nature of the rights actually transferred through the GELOSE contracts? (ii) How can we characterize the nature of these contracts, and what is the nature of the incentives?

On the first point, it can be shown that, following the well-known standard Schlager and Ostrom categorization (1992), it is mainly exclusion rights and neither full property nor management rights that are transferred to the local community, with the consent of the municipal governments. The answer to the second point is much less clear, since there are many kinds of advantage in the current contracts, none of them being straightforward incentives for biodiversity conservation: users may get a better share of the income from the resource and they may obtain greater security of tenure.

Even though the government's objectives are not explicit in the legal texts, it is widely recognized that these contracts aim to comply with supranational commitments such as the demands imposed by certain funding agencies and the requirements of the UN Convention on Biological Diversity. The review of the GELOSE contracts included in the study showed that they are quite different from a standard bilateral contract. They reflect unilateral decisions by which the central government transfers to local communities' rights that it cannot enforce by itself, within a framework of rules that seek to guarantee congruence between the objectives of resource users and those of the government.

The theoretical framework developed by P. Aghion and J. Tirole is used to analyse the mechanisms behind contract definition. They analyse the

interests of the party that holds formal authority to transfer decision rights to an agent who has better access to information or exercises more effective control over a resource.

Several characteristics of the GELOSE contracts are analysed in the light of this model. The real benefits of rights transfers through the GELOSE contracts may reside in the social control that local communities are able to exert to ensure that their exclusion right is fully respected, in order to secure agricultural production and other land uses.