# Summaries

## The island and small-country effects on fertility

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Fertility is lower in island nations than in non-island nations, and this has been true for at least the past three decades. Fertility is also lower for small land-area countries than for large land-area countries. In this paper we offer two possible behavioral explanations for how these geographic features influence fertility. Our measure of fertility is the number of children a woman who is just entering her child-bearing years is expected to bear over her lifetime.

First, members of 'constrained' societies—those that have clear and immutable boundaries—may be better able to recognize the impact that their behavior has on the resources in the society. For example, societies that are smaller in size have physical characteristics that make it more likely that environmental problems and resource constraints will be recognized. Small countries may therefore better see the potential negative impact of population growth and, as a result, be more effective at controlling fertility. Islands face unmistakable boundaries and therefore their societies may be particularly attuned to the effects of high population growth. We call this influence the 'commons' effect.

A second explanation for lower fertility on islands and in small countries can be drawn from recent theories of economic growth; thus we dub it the 'growth' effect. Island nations and small countries have characteristics that tend to lead them to be more active in international trade. This likely leads to a greater exchange of ideas across countries which in turn increases economic growth. Lower fertility rates follow from the effects of economic growth, including higher incomes, lower infant mortality, and better access to contraceptive knowledge and technology.

We use simple aggregate data from standard sources to demonstrate the island and small-country effects. At the median land area in our sample (11 million hectares), predicted island fertility is 74 per cent of the predicted non-island fertility.

We then try to determine whether these are the result of the commons or growth explanations. The small-country effect appears to occur because small countries have higher incomes, a result that is consistent with our growth explanation. The island effect, however, appears more likely to be a commons effect.

We further explore the commons effect—i.e., the recognition of the common good—by analyzing homicide and deforestation rates on islands versus non-islands. We find that islands have lower homicide rates than non-islands. However, we find no significant difference in deforestation between islands and non-islands.

Further research is needed to explain why islands seem to respond more effectively to the common good, at least in some cases. We propose three questions for future work. First, what geographic typology contributes most to the differential behavior of islands (e.g., coastline, arable land)? Second, does the island effect exist for other goods whose consumption has social implications? Finally, how do the physical characteristics of a nation ultimately affect per capita incomes?

# Determinants and impact of local institutions for common resource management

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The subject of this paper is local institutions for common resource management in the developing countries. The role of local natural resource management institutions has been much debated in recent years, and it has become fashionable to trumpet the virtues of local peoples' own management initiatives and to blame resource destruction on misguided government interventions. Another idea that is sometimes advanced is that poverty is a major cause of environmental problems.

In this paper it is argued that there are multiple factors causing resource degradation, and that design of conservation policies will have to acknowledge this. The analysis is based on data for 37 villages and 180 households randomly sampled from the periphery of a Protected Area in Rajasthan. Use pressure in the form of animal grazing, fuelwood collection, and land conversion contribute to rapid forest degradation in the area, with adverse consequences for wildlife and tourism. The article sets out to describe and analyse all the key actors, institutions, and resources affecting natural resource management in the Protected Area and its periphery.

There is a low level of collective action—only a minority of villages in the area actively attempt to manage their commons. Logit regression analysis reveals that the most important explanatory variables for the likelihood of collective action are village population size (surprisingly with a positive effect), infrastructure development (negative effect), and the presence of a *Temple Land* (a negative effect).

When exploring patterns of resource use pressure across households it is found that the poor are not the major agents of forest degradation. In fact, the larger farmers tend to graze more animals inside the protected area, sell more milk, and are more involved in land conversions. Instrumental variable regression analysis demonstrates that the extent of local management institutions can play a role in reducing household's dependency on commons, especially for fuelwood resources. Institutions are also associated with differences in forest degradation across villages.

It is concluded that, although local institutions can play a positive role in promoting private biomass production, reducing biomass dependency on the commons, and improving forest outcomes, their impact appears too small for such institutions to be relied upon exclusively to prevent large-scale degradation of forests and commons. Complementary measures are needed, and indeed there is no easy fix for improved common resource management. Cooperation between Forest Departments and villagers needs to be improved, and policies should target win–win options through interventions aimed at improving technologies for private and common lands as well as institutional changes for the commons.

# Access to natural resources and the fertility decision of women: the case of South Africa

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In many developing countries, rural households lack access to basic amenities, such as piped water and electricity, and thus spend a significant amount of time in collecting resources like water and wood for daily household needs. For instance, data collected in 1993 by the South African Integrated Household Survey (SAIHS) reveals that around 80 per cent of the rural households collected water from non-private sources. The average daily time spent by these households on water collection was about two hours. Data from the same source also shows that around 57 per cent of rural households collected wood and spent close to ten hours per week in collecting it. Given this heavy dependence on the local resource base, it is natural to inquire how, if at all, households respond to any degradation of this resource base.

Some previous studies have documented how increasing degradation of the local resource base has led households to travel larger distances, consume less or consume inferior substitutes, spend less time on other income-generating activities, or to migrate. In addition, over the long run,

it is also possible that households respond to resource degradation through their fertility decisions. This possibility follows from the observation that in most developing countries children have a comparative advantage relative to adults in resource collection activities and spend a significant amount of their time in these collection activities thus creating an incentive for higher fertility.

In this paper we examine the effect of wood and water scarcity on fertility rates using cross-sectional household level data from rural South Africa. South Africa presents a particularly interesting setting for the purposes of this study because of the highly skewed pattern of fertility rates and access to basic amenities across different segments of the population. Our analysis is based on an individual choice-theoretic model of fertility in which children are demanded as both producer and consumer of goods. To measure resource scarcity, we use several alternative measures such as average distance traveled and time per trip for collecting water and fuelwood.

Our results show that the wood scarcity variables have a positive and significant effect on fertility. The elasticity of fertility with respect to fuelwood scarcity was found to be around 0.06, at the sample mean, for rural women. As compared to this, woman's education elasticity was almost four and a half times higher in absolute terms while the elasticity with respect to distance to nearest family planning clinic was smaller by an order of magnitude. These estimates suggest that reducing the time taken per trip to collect fuelwood by half, from its present level of around 93 minutes, would lower fertility from the mean level of 2.24 to about 2.17. As compared to this, a 11 per cent increase in years of schooling from the present average level of about 5.05 years would have the same effect on fertility. The results with respect to the water scarcity variables were found to be less robust. In the regressions where the water scarcity coefficient was found to be significant, it also had a positive sign.

# Contingent valuation in project planning and evaluation: the case of social forestry in Orissa, India

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Although the number of applications of the Contingent Valuation Method (CVM) to developing countries has increased substantially over the last years, there are still few that deal with plantation forestry. Furthermore, the potential to utilize CVM for development project implementation has

not been captured. This is unfortunate since the method needs to prove itself not only through its reliability but also through its relevance.

Large-scale social forestry projects have been carried out in many countries, notably India, as a response to deforestation and calls for basic needs. One such project is the Swedish supported Orissa Social Forestry Project (OSFP) that planted a hundred thousand hectares of village woodlots (VWL) in Orissa during the period 1984–1992. The survival rate of these plantations ranged from 30 to 70 per cent between districts. In some areas the plantations have became well-established and benefitted the villages greatly, especially by making fuel more accessible, since sweeping of leaves in the plantations is common. An analysis of underlying reasons for success, that could guide future plantation efforts, has great potential to increase the returns from social forestry projects.

In this paper an application of the CVM to the OSFP is reported. The purpose is to see how well CVM works in this context and what conclusions can be drawn regarding the use of CVM in project planning and evaluation. The survey is designed to reveal preferences for a new plantation using a discrete-continuous elicitation technique. The analysis of the discrete data and inconsistent answers lead to the conclusion that great caution should be given to training of enumerators and choice of elicitation method in a developing country context. With cash constrained respondents and imperfect credit markets the payment schedule also proved to be important.

The CVM results are aggregated, with and without welfare weights, and used to rank villages for implementation of plantation activities. The villages show great variation in aggregate WTP indicating the need for careful selection of sites for plantation. Such selection can be supported by an analysis of the bid function that focuses on accessibility of biomass, household characteristics and village variables that are easily accessible at the project planning phase. The policy implications of the analysis are to plant in large villages where natural forests are inaccessible, the reliance on plantations is already high, and where fuel consumption relies heavily on market purchases. This is supportive evidence of peri-urban plantations which is contrary to the present trend which focuses on management of natural forests.

# Contingent valuation of a Taiwanese wetland

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We estimate the economic value to local residents of protecting the Kuantu wetland. Kuantu wetland is located near Taipei, the capital of Taiwan. The

wetland is a popular bird-watching site and is one of 12 wetlands in Taiwan identified under the Ramsar Convention as being of international importance. The wetland and its surrounding area is an important habitat for egrets and heron and an important wintering ground for many duck species. The area is also an important feeding ground for birds migrating between the Philippines, Japan, and the Chinese mainland. Like other wetlands, the Kuantu wetland also provides a variety of environmental services at local, regional, and global scales.

Kuantu is threatened by the high population density and rapid economic development in Taiwan. Because they provide a wide range of environmental services, the value of protecting wetlands typically cannot be estimated using economic markets. As an alternative, we employ contingent valuation, which is a commonly used method for valuing environmental quality. We surveyed local residents to determine their willingness to contribute to a hypothetical 'Natural Resource Preservation Fund' to protect the wetland from conversion to industrial or other uses. Data were collected in December 1993, several years before the Taipei government decided to acquire the wetland. Estimates of willingness to pay (WTP) can be used to evaluate whether the benefits of public ownership exceed the cost of acquisition.

The estimated value of preserving the Kuantu wetland is substantial. As has been found in other studies, the estimated value is substantially larger if one asks respondents a yes–no question about whether they would contribute a stated amount to the fund than if one asks respondents to report the maximum amount they would contribute. Using the two approaches, the average household is estimated to be willing to contribute US$65 and US$21 per year to protect the wetland. Extrapolating these estimates to the Taipei city and county population suggests the present value to local residents of protecting the wetland is between about US$200 million and US$1.2 billion. These estimates bracket the US$500 million spent by the Taipei government to purchase the wetland. Within the limits of accuracy of our study, the government expenditure to purchase the wetland appears comparable to the benefits to the local population of public ownership. Future operation and maintenance expenses will increase the public costs of ownership but the benefits of preservation may be underestimated because we do not estimate benefits to Taiwan residents outside the local area or to residents of other countries.