Environmental Valuation Techniques: Madagascar's Rainforests

Parks and protected areas are valuable assets to developing nations, whether viewed as environmental, economic or social goods. Nevertheless, to date there are few examples where the full potential economic rent of protected areas has been captured efficiently or distributed effectively. This severely limits the capacity of developing nations to sustain their natural resources. In Sub-Saharan Africa the crisis is acute, characterized by the rapid pace of deforestation, soil erosion, destruction of flora and fauna, and the depletion of water supplies. Many African nations have completed National Environmental Assessments that call for an expansion and diversification of protected areas. Several areas have been designated as protected areas- national parks, game preserves, wildlife management areas- all with different levels of restrictions on their use by members of local communities.

The methods of valuation used to determine appropriate levels of compensation for local communities and for cost recovery through users’ fees to make natural resource management sustainable requires innovative approaches to valuing stakeholder opportunity costs, recreational demand, and existence value. The Contingent Valuation (CV) method is one way of determining levels of willingness-to-pay of visitors to protected areas and willingness to accept compensation by local residents. Once appropriate valuation techniques have been used, the key is to determine a viable benefit sharing scheme for shareholders to share rents and compensate local residents for foregone access to those natural resources found in the protected area.

The restrictions on access to these protected areas usually have a significant impact on the livelihood of the inhabitants of surrounding villages. These restrictions include access to fuelwood, use of the protected areas for planting, livestock grazing, and foraging as well as social and cultural activities. In order to assess the appropriate level of compensation for villagers, several valuation methods were used at Mantadia National Park in Madagascar to determine the appropriate level of user fees and possible mechanisms for benefit sharing. The study used the CV method to determine the willingness- to- pay of visitors to the parks to set an
appropriate level of users fees as well as the willingness-to-accept of local villagers, and the costs of foregone agro-pastoral activities on adjoining lands.

Mantadia National Park

In Mantadia, three types of impact were measured: impact on the villagers, impact on the environment, impact on tourism and existence value. Opportunity cost analysis, recreation demand analysis and productivity analysis were the methods used to measure the value of different stakeholders of the Mantadia Park.

Opportunity Cost Analysis. It was established that approximately 3,400 people in three sets of villages would be adversely affected by the park and that adequate compensation of approximately $100 per household would be appropriate. Such compensation could be made in the form of education, health facilities, income earning enterprises in the buffer zone of the park or other development activities.

Recreation Demand Analysis The CV method generated estimates of the value of the park under two different scenarios based on the willingness-to-pay if tourists were able to see the same number of birds and lemurs as they currently were able to view at the Perinet Park. This estimate, aggregated over all tourists, annually amounted to $253,000. Although the estimated tourism benefits were only one part of the total value of the new national park, the results show that tourism can be a significant source of benefits when parks are created in a tropical country, even one with a modest level of international visitors. Governments may wish to use tourism taxes, user fees, and similar revenues to capture some of this willingness to pay in order to finance conservation activities.

Productivity Analysis Because of the interest in measuring the benefits of the park, only crop losses from changed flooding patterns linked to deforestation in the vicinity of the park and buffer zones were analyzed. These estimates were modest ($547,176 net present value of total expected crop loss due to flooding without the park being designated as a protected area vs. $475,620 net present value of damage with the park as a protected area).

Implications of the Study

The results from such valuation efforts can be incorporated more fully into cost-benefit analysis of projects, including conservation components, to determine a project's economic viability. Such information can help governments decide how to (a) allocate scarce capital resources among competing land use activities, and (b) choose and implement investments for natural resource conservation and development.

Existence Value. The CV method was used to determine existence values of tropical rainforests through the application of a willingness-to-pay model based on a survey of US households. This study component represents one of the few applications to date of non-market valuation methods to a global environment good. The results revealed that US residents were able to respond to valuation questions about the value of tropical rainforests protection and to give consistent responses across two different CV formats. Two-thirds of the households said that industrial
countries should share the costs of tropical rainforest protection. For the study sample, tropical
deforestation ranked below most other environmental problems, perhaps reflecting a greater
priority for domestic environmental issues. Despite the low ranking, households were willing to
make a one-time contribution of between $24 and $31 on average to protect rainforests.
(Aggregated over 91 million households in the US, this would yield a total willingness-to-pay of
between $2.18 billion and $2.82 billion respectively - 1 billion = 1,000 million. This could create
a substantial global fund if households in other industrial countries were willing to make similar
contributions.)

The findings of the Mantadia Park study indicate that reliance on willingness-to-pay is
fundamental to the economic approach to valuation, but tends to highlight the value ascribed to
richer foreign visitors because their ability to pay is a key element. If conflicting claims to park
access were to be determined exclusively on this basis, local park users are likely to be excluded.
Therefore, other aspects of sustainable development, in particular, social elements like
distributional equity, would need to be considered to protect the basic rights of local residents.
Willingness-to-accept and opportunity costs analyses are useful tools to determine appropriate
levels of cash and non-cash compensation for local residents.

A nation's land use policy is established to conform with political and social objectives and is not
based simply on economic criteria. The institutional structure overrides the effects of market
signals and influences the tone of policies. Much of the development of valuation to date has
been done by economists from industrial countries, and most of the applications have been in
developed, temperate climate settings. A multiyear program of World Bank assistance to
governments in research and application could rapidly increase the use of environmental
valuation in developing countries and build needed indigenous expertise to value natural
resources.

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