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# Pricing Policy for Tourism in Protected Areas: Lessons from Komodo National Park, Indonesia

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**Abstract:** *Protected areas are under increasing pressure to provide economic justification for their existence, particularly in developing countries where demand for land and natural resources is high. Nature-based tourism offers a mechanism to generate substantial benefits from protected areas for both governments and local communities, and ecotourism is increasingly promoted as a sustainable use of protected areas. The extent to which ecotourism offsets the costs of a protected area has rarely been examined. We used financial data from Komodo National Park, Indonesia, and a willingness-to-pay questionnaire of independent visitors to (1) examine the financial contribution of tourism in offsetting the costs of tourism and wider management and (2) assess the effect of hypothetical fee increases on park revenues, visitation patterns, and local economies. Although only 6.9% of park management costs were recovered, visitors were willing to pay over 10 times the current entrance fee, indicating a substantial potential for increased revenue. The potential negative effect of large fee increases on visitor numbers and the resultant effect on local economic benefits from tourism may limit the extent to which greater financial benefits from Komodo National Park (KNP) can be realized. Our results suggest that a moderate, tiered increase in entrance fees is most appropriate, and that partial revenue retention by KNP would help demonstrate the conservation value of tourism to both visitors and managers and has the potential to increase visitors' willingness to pay.*

Política Tarifaria para el Turismo en Areas Protegidas: Lecciones del Parque Nacional Komodo, Indonesia

**Resumen:** *Las áreas protegidas se encuentran bajo una creciente presión para proveer una justificación económica para su existencia, particularmente en países en desarrollo donde la demanda por tierra y recursos naturales es alta. El turismo basado en la naturaleza ofrece un mecanismo para generar beneficios substanciales en las áreas protegidas tanto para los gobiernos como para las comunidades locales y el ecoturismo es promovido como un uso sustentable de las áreas protegidas. La medida en la cual el ecoturismo compensa los costos de las áreas protegidas ha sido poco examinado. Nosotros utilizamos datos del Parque Nacional Komodo de Indonesia y un cuestionario sobre la voluntad para pagar de visitantes independientes para (1) examinar la contribución financiera del turismo en la compensación de los costos del turismo y del manejo general (2) evaluar el efecto de incrementos hipotéticos en tarifas sobre los ingresos del parque, los patrones de visitas y las economías locales. A pesar de que solo un 6.9 % de los costos de manejo del parque fueron recobrados, los visitantes estaban dispuestos a pagar más de 10 veces la tarifa actual de entrada, indicando un potencial considerable para una mayor generación de ingresos. El efecto negativo potencial de incrementos grandes en las tarifas sobre el número de visitantes y el efecto resultante en los beneficios de la economía local del turismo puede limitar la magnitud con la que los beneficios financieros del Parque Nacional de Komodo puedan implementarse. Nuestros resultados sugieren que un incremento moderado y escalonado de las tarifas de entrada es más apropiado y que la retención parcial de ingresos por el Parque Nacional Komodo podría ayudar a demostrar el valor de conservación del turismo tanto a los visitantes como a los manejadores y tiene el potencial para incrementar la voluntad de los visitantes para pagar.*

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## Introduction

Protected areas are the cornerstone of in situ biological conservation efforts. From the earliest national parks in the United States, protected areas were established as areas set aside from exploitation to preserve our natural heritage for its scenic, and later biological, value (Nash 1982; Runte 1987; Leader-Williams et al. 1990). Such preservation was maintained mostly for the purpose of public enjoyment through visitation. As such, access was generally provided at minimal cost to the visitor. As freely available public goods, and in the absence of commercial exploitation, protected areas did not generate significant direct revenues. When economic rationales became necessary, they were usually expressed in terms of the wider, indirect benefits that foreign visitation to protected areas had for the economy of the host country (Runte 1987; MacKenzie 1988). The costs of protection and maintenance of protected areas were, and continue to be, borne in large part by sovereign governments.

In recent years the role of protected areas in society has been re-evaluated (World Conservation Union et al. 1980; McNeely & Miller 1984; McNeely 1993; Ghimire & Pimbert 1997). Biocentric preservationist attitudes have proved difficult to put into practice in much of the world, given the political and economic realities facing many developing countries. The cost of preservation versus competing public needs (Inamdar et al. 1999) and an increasing demand for land and resources place pressure on governments in developing countries to choose land-use policies in favor of exploitation. As a result, the economic performance of protected areas is increasingly scrutinized by critics and governments (Goodwin et al. 1997), and conservationists are being forced to identify explicit economic rationales for protected areas (McNeely 1988; Edwards & Abivardi 1998).

Protected areas are difficult to justify on economic grounds in comparison with competing forms of land use (Inamdar et al. 1999). This is a result of market failure; few of the benefits of protected areas to society, including ecological processes, biodiversity, and ethical, cultural, and future existence values, can be exchanged in markets. Hence, they rarely have a financial value ascribed to them and are either underestimated or ignored in economic analyses. At the same time, many of the costs of protected areas are more immediate and quantifiable and hence appear sizeable in comparison to their quantifiable benefits (Dixon & Sherman 1990, 1991). Although the benefits of protected areas are diffuse and bestowed mainly upon society in general, their costs are generally acute and borne by governments or individuals, in particular surrounding local communities that suffer the greatest costs of annexation, such as loss of access to land and natural resources (Ghimire & Pimbert 1997; Goodwin et al. 1998; Getz et al. 1999).

Tourism is one of the few permitted uses of protected

areas which generates financial benefits, and ecotourism, or sustainable nature-based tourism, has emerged as a potential solution to the dilemmas facing managers of protected areas in developing countries (Boo 1992; Giannecchini 1993; Orams 1995; Goodwin 1996). In theory, ecotourism provides a means of generating tangible economic benefits from protected areas to offset the often substantial costs of protection, without the environmental costs associated with extractive industries such as mining, forestry, and agriculture. In addition, ecotourism forms a link between protected areas and the livelihood of local people, "providing revenue to the local community sufficient for local people to value, and therefore protect, their wildlife heritage as a source of income" (Goodwin 1996:288).

It is generally perceived, however, that due to a widespread adherence to consistently low entrance fees, protected-area tourism underperforms financially and does not provide substantial enough revenues to offset costs (Larman & Gregersen 1996). Few published international case studies exist that provide quantitative analyses of the contribution of tourism to park finances. In only a few cases have parks been shown to generate significant revenue above and beyond management costs. For example, the Galapagos National Park is reported to have recouped nine times its management costs, and tourism based on gorilla viewing in Rwanda generated significant profits prior to the civil war in that country (Lindberg & Enriquez 1994). In both cases uncommonly high entrance fees are charged.

Other results are mixed. An early report on Plitvice National Park, Yugoslavia, suggests that it is self-supporting (Movcan 1982), and the Bonaire Marine Park in the Caribbean is reported to be financially self-sustaining as of 1991 (Dixon et al. 1993). The Uluru (Ayers Rock) National Park in Australia recouped 83% of management costs from entrance-fee revenue prior to 1991 (Lindberg & Enriquez 1994). In the 1991-1992 financial year, however, user revenue equalled only 64% of management costs (Driml 1994). In the same year, Kosciusko National Park recouped 95% of management costs through user fees, although other Australian and Tasmanian parks and reserves included in the survey recouped considerably less. Total user revenue over eight protected areas amounted to <25% of the annual budgetary outlay for these areas (Driml 1994). Similarly, annual revenue from protected areas in Nepal amounted to only 18% of expenditure on management and protection (Wells 1993), whereas Keoladeo National Park in India recouped 24% of total park management costs in 1995-1996 (Goodwin et al. 1997, 1998).

As a result of below-cost pricing policies, many of the benefits of tourism are not monetary and accrue to users rather than to governments or other funding agencies. Economic estimation techniques have been used to value the nonmonetary benefits of tourism and have revealed

that the value visitors, or society in general, place on protected areas is often much higher than traditional pricing structures reflect (Brown & Henry 1989; Dixon & Sherman 1990; Tobias & Mendelsohn 1991; Dixon et al. 1993; Maille & Mendelsohn 1993; Shafer et al. 1993; Moran 1994). Such studies are often used to defend protected areas as a form of land use in which the total economic value to society outweighs the costs of protection and the opportunity costs of foregone land-use options. Nonmarket values cannot be used to meet real costs, however. As a result, some countries, such as Kenya and Zimbabwe, have begun to adjust their pricing policies for protected areas and now charge comparatively high entrance fees in an effort to generate greater revenues and achieve some element of cost recovery. Some authorities have considered "privatization," whereby protected areas would become responsible for generating their own revenues for management and protection without government subsidy (Goodwin et al. 1997, 1998).

The extent to which increased revenue generation can be achieved and the wider implications of price increases have received little attention. The modern, multifaceted mission of protected areas includes a social responsibility to surrounding communities (McNeely & Miller 1984; McNeely 1993). Equally, ecotourism is defined as contributing toward both conservation and (local) development objectives (Boo 1992; Goodwin 1996). Furthermore, protected areas may be considered important recreational and educational components of society that should not be restricted to the affluent. Under these circumstances, strategies for increasing revenue generation must be assessed in light of the potential implications for visitors and local communities.

We present the results of a study of the economic benefits of tourism to Komodo National Park (KNP), Indonesia. Using a combination of methods, we examined pricing structure, revenues, and visitors' willingness to pay. We measured both direct costs and benefits and the uncaptured value placed on visiting KNP by visitors. We examined the potential for increased revenue and to what extent this could be achieved without compromising the interests of other stakeholder groups, and we evaluated the implications of alternative pricing strategies for park revenues, visitation patterns, and local benefits.

## Methods

### Study Area

Komodo National Park (KNP; lat 119°30' E, long 8°35' S) is located in the Lesser Sunda Islands of Indonesia in the province of East Nusa Tenggara. Lying in the Sape Straits between Flores and Sumbawa, KNP comprises the three islands of Komodo, Rinca, and Padar; smaller surrounding islands; the straits between the main islands; and all

waters within 1000 m of shore (Fig. 1). The total area of KNP is 1730 km<sup>2</sup>, of which 35% is terrestrial and 65% is marine (Goodwin et al. 1997).

The rugged topography of the islands reflects their position in the volcanic belt between Australia and the Sundas shelf. Annual rainfall is 800–1000 mm, falling mostly during the monsoon season between December and March. The islands have little perennial surface water. The predominant vegetation type is open grass-woodland savannah, mainly of anthropogenic origin, which covers some 70% of the terrestrial area of the park. Tropical lowland deciduous forest survives in valleys and on some upper hill slopes. Terrestrial biodiversity, although moderate, is notable for containing both Asian and Australasian representatives, due to the location of KNP in the Wallacean transition zone (Blower et al. 1977; Sumardja 1981; Robinson & Bari 1982).

Komodo National Park is best known for the Komodo monitor (*Varanus komodoensis*), known locally as *ora* and colloquially called the Komodo dragon. Discovered in 1910, its total population is not more than 3000 individuals and has a limited distribution. It is found only on the islands of Komodo, Rinca, Gili Motong, and in certain coastal regions of western and northern Flores. The species is probably extinct on Padar, where it was last seen in 1975. It is the world's largest living lizard, with males sometimes weighing over 90 kg and exceeding 3 m in length (Auffenberg 1981). The Komodo dragon is listed as vulnerable by the World Conservation Union (1996).

Tourists have traveled to the islands since the discovery of the Komodo dragon, which remains the principal attraction. Tourism has grown steadily since KNP was formally established in 1980. There were almost 30,000 visitors in the 1995–1996 financial year, of which 93% were foreign. Of these, 73% were European, 20% were American, and 7% were Australian and other nationalities. Almost 80% of arrivals were day visitors who each spent 2–3 hours in the park to view and photograph dragons (Walpole 1997).

All visitors to Komodo National Park arrive by boat. Currently there are three means of transport: the government ferry, a charter boat, or a cruise ship from Bali or further afield. Independent tourists (48.2% in 1995–1996) have access to the ferry or can charter boats, and package tourists (51.8%) arrive either in cruise ships or in local boats chartered by their tour company.

All visitors pay an entrance fee upon arrival in KNP, which in common with most Indonesian protected areas is very low (Kinnaird & O'Brien 1996). At the time of this study (1995–1996), the entrance fee was 2000 rupiah (approximately US\$0.87) per person. This revenue is returned to the government, which in turn provides an annual operating budget to the park.

Komodo National Park is funded entirely from government sources. A "routine" budget is provided for staff wages, equipment, maintenance, and transport. Two

“development” budgets are also provided for construction and community activities. Only revenues from visitor entrance fees are returned to the government. Other tourist expenditure within KNP on guides, accommodation, food, and souvenirs accrues to a local cooperative organization that provides visitor accommodation and restaurant facilities in KNP and gateway towns to the east and west.

### Comparing Revenues and Costs of Tourism in Komodo National Park

Data on entrance fee revenues and the total annual KNP budget from 1990–1991 to 1994–1995 were obtained from KNP accounts and were compared to assess the extent to which tourism offsets park management costs. Because many of the wider benefits of protected areas accrue to society as a whole and not just to users, it has been argued that users should not be expected to bear the total park costs alone (Lindberg & Enriquez 1994; Laarman & Gregersen 1996; Goodwin et al. 1997). Therefore, we compared revenues with total park costs and with a subset of only the estimated tourism-related costs.

Separating the financial costs of tourism from total park costs is problematic, even with detailed park accounts (Lindberg & Enriquez 1994). In this case, however, recurrent tourism expenditure occurred only from

the routine budget. Of the components of the routine budget, the simplest to calculate in terms of tourism-related expenditure was salaries (91% of the routine budget). We interviewed KNP staff to identify which staff members undertook tourism duties and for what proportion of their time. We then used salary data from KNP accounts to estimate the proportion of salaries consumed by tourism-related staff. Other components of the routine budget besides salaries were equipment (6%), maintenance (3%), and transport (1%). In the absence of more accurate information, we assumed that the proportion of each of these budgets used in support of tourism staff was equal to the proportion of the total salary budget used for tourism staff. Total recurrent tourism-related costs were therefore estimated by extrapolation from the salary proportion to the total routine budget. This may be an underestimate of total tourism-related costs, because it may be appropriate to include a discounted element of infrastructure costs in each annual estimate. Data are lacking on this aspect of park costs, however. Environmental costs of tourism are equally difficult to quantify and so have been excluded.

Where conversions to U.S. dollars have been made, we used the annual end-of-period exchange rates published by the International Monetary Fund (IMF). We adjusted annual totals to a 1995–1996 U.S. dollar equivalent to account for inflation using IMF real effective

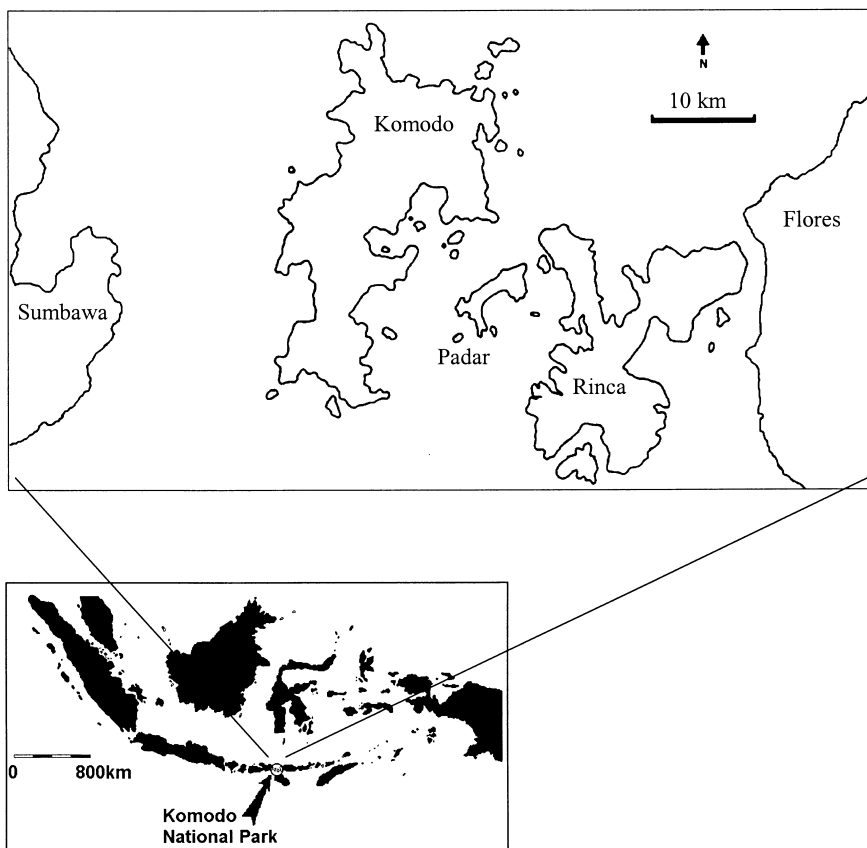


Figure 1. Komodo National Park, Indonesia.

exchange-rate indices based on relative wholesale prices. The 1995 end-of-period exchange rate was US\$1 equals 2308 rupiah (IMF 1997).

### Willingness of Visitors to Pay Increased Fees

We conducted a contingent valuation (CVM) survey of visitors to examine the effect of hypothetical rises in entrance fee on visitation and revenue generation. Protected areas usually have low entrance fees that are not set by market forces and thus may fail to capture much of the value visitors place on protected areas. The CVM method attempts to measure this uncaptured value by asking a sample of respondents to state their willingness to pay to prevent a specified change in an environmental asset (Mitchell & Carson 1989; Moran 1994; Jakobsson & Dragun 1996). In this case, the change was access to KNP, so CVM provides a means of estimating how much additional value would be captured by a specified increase in entrance fee.

Between August and November 1995, a questionnaire survey of KNP visitors was conducted at the cafeteria in the visitor camp on Komodo Island. Questionnaires were distributed by a KNP staff member to each consenting group of visitors in the cafeteria throughout the day. An individual from each group was asked to read and complete the questionnaire and return it before leaving the park. The survey employed an upper- and lower-bounded dichotomous-choice form of question (cf. Moran 1994). Respondents were first asked how a specified increase in entrance fee would affect their decision to visit KNP; depending on their answer, they were then asked how higher or lower increases would affect them. Three variations of the questionnaire, with different suggested increases in entrance fee, were distributed randomly among the sample of respondents.

Initial suggested increases to US\$4, US\$8, and US\$16 were followed up with suggestions of half and double the original increase, ranging from US\$2 to US\$32 (Table 1).

A hypothetical demand curve was constructed from willingness-to-pay results. A regression model was fitted to the curve by means of the negative exponential function  $q = ce^{-kp}$ , where  $p$  is the entrance fee,  $q$  is the percentage of the sample respondents willing to pay  $p$ , and  $c$  and  $k$  are constants. This function provided the best fit to the observed data. The model was used to calculate the mean and median amount respondents were willing to pay. The median is the value of  $p$  at which  $q = 50\%$ . The mean was calculated by integrating the demand function truncated between the bid limits of the survey (Jakobsson & Dragun 1996). We used differentiation to calculate the fee at which the maximum revenue would be generated.

### Limitations of the Contingent Valuation Survey

There are a number of well-known limitations to CVM (Mitchell & Carson 1989), principally the assumptions that respondents know the surplus they derive from an environmental asset and that they will state this surplus truthfully (Jakobsson & Dragun 1996). Stated preferences will be affected by aspects of survey design (design biases), cognitive function (strategic bias), and hypothetical bias (hypothetical questions yield hypothetical answers). Many of these can be minimized by sensitive survey design.

To minimize hypothetical bias, we designed the CVM survey to simulate as closely as possible a real market situation. First, discrete-choice questions are more realistic than open-ended continuous ones, because they more closely simulate a take-it-or-leave-it market situation. Second, the use of a familiar payment mechanism, the en-

Table 1. Willingness to pay (WTP) questionnaires used in a survey of tourists visiting Komodo National Park.\*

Questionnaire category	Dichotomous-choice WTP bidding format			
	first suggested fee (US\$)	response	second suggested fee (US\$)	response
Questionnaire A	4	no	8	yes
		yes	2	no
Questionnaire B	8	no	16	yes
		yes	4	no
Questionnaire C	16	no	32	yes
		yes	8	no

\*Three versions (A, B, and C) were distributed randomly among respondents. Respondents were asked whether a certain entrance fee (first suggested fee) would prevent their visit. Depending on their response, they were then asked whether a second suggested fee would prevent their visit.

trance fee, also enhances the approximation to reality in the constructed market scenario. Finally, the use of access as the contingent factor, rather than a more abstract change in environmental quality, constructs a more realistic scenario that is easier for respondents to interpret. Although the discrete-choice method is more realistic, it risks not capturing the full range of willingness-to-pay responses. It has been suggested that if 10% of the sample answers "yes" to the highest bid amount, then the survey has well indicated the range of willingness to pay (Bostedt 1995). We tested this for our survey.

The comparatively realistic nature of the hypothetical market constructed in this study increased the risk of strategic bias, whereby stated willingness to pay was compromised by unrevealed motivations of respondents. Strategic bias could be a problem if respondents perceived that their answers would influence park pricing policy and is most likely to result in a lower stated willingness to pay. This is particularly so if respondents are likely to revisit the park. Although strategic bias has rarely been found empirically (Jakobsson & Dragun 1996), it is probably wise to consider willingness to pay as a conservative estimate of potential revenue generation.

Only independent tourists were asked to participate in the survey; package tourists on charter boats and cruise ships were not included. Package tourists do not pay their own entrance fee (it is included in the price of the package), and a pilot survey revealed that most did not know the current price of entrance to KNP. By comparison, over 90% of respondents to the independent visitor survey correctly identified the entrance fee as approximately US\$1. These results suggest that it would have been invalid to examine the responses of package tourists to hypothetical fee increases without reference to the effect of fee increases on their tour price. (See Moran 1994 for a CVM survey of tourists which uses tour price instead of entrance fee as the payment mechanism.)

### Effects of Hypothetical Fee Increases on the Local Economy

An increase in the entrance fee of a protected area could result in a decrease in visitation, which has implications for the generation of tourism revenues in the local economy. Although the decision not to visit KNP does not necessarily mean an individual will not visit the surrounding area, it is likely to have a negative effect on the spending of that individual within the local economy. A survey of tourism-related spending in the local economy surrounding KNP was conducted by Walpole and Goodwin (2000), who found that 40% of local expenditure by tourists accrues to transport operators offering passage to and from KNP. It is reasonable to assume that, were a visitor to decide not to visit KNP, the minimum loss to the local economy would be the amount the visitor would have spent on transport to and from KNP plus

the amount spent on accommodation and guiding by the visitor within KNP.

Using data on local transport revenues from Walpole and Goodwin (2000), data on accommodation and guiding revenues in KNP from Walpole (1997), and the results of our CVM surveys, we estimated the amount of local revenue lost as a result of a specified increase in entrance fee. We made estimates for two specified increases: a reasonable fee and a fee that would maximize entrance fee revenue.

## Results

### Revenues and Costs of Tourism in Komodo National Park

The mean annual budget for KNP between 1990–1991 and 1994–1995 was US\$218,000, whereas the mean annual tourism revenue from entrance fees during this period was US\$15,060. Thus, tourism revenues amounted to only 6.9% of total expenditure during this period.

Comparing entrance-fee revenues with estimated tourism-related costs suggests a more balanced cost-benefit relationship. Of the 90 staff employed by the park in 1995–1996, 21 had full-time tourism-related duties. Their total salaries and benefits were 20.7% of the total salary budget. If it is assumed that 20.7% of the total routine budget was used for tourism-related purposes, then estimated mean annual tourism-related costs for the period from 1990–1991 to 1994–1995 were US\$18,250. Entrance-fee revenues of US\$15,060 therefore represented 82.6% of tourism-related costs. Given the limitations of how we estimated tourism-related costs, however, caution should be applied in concluding that KNP has achieved virtual cost recovery with regard to tourism.

### Visitor Willingness to Pay Increased Fees

Of 524 questionnaires collected, 465 (88.7%) provided usable responses. Respondents were 55.6% male and 44.4% female. The nationality breakdown of the sample of respondents (80.1% European, 11.2% North American, 6.2% Australasian, and 3.4% other) was slightly biased toward European respondents when compared with the visitor population as a whole. Of those asked, 10.3% were willing to pay the highest bid amount of \$32, suggesting that our survey captured most of the willingness to pay (Bostedt 1995).

Our results suggest that the current entrance fee is not a limiting factor in terms of visitation (Table 2; Fig. 2). Demand is relatively insensitive to price for even five-fold hypothetical increases in entrance fee, because a hypothetical raise to US\$4 would result in only a 20% decline in independent visitation ( $n = 465$ ).

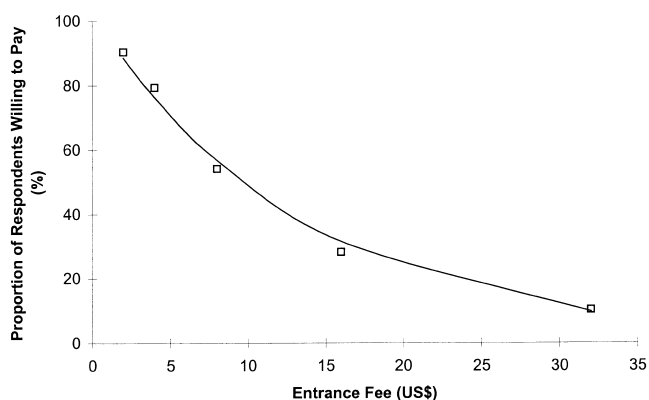
The regression model ( $c = 102.6$ ,  $k = 0.0738$ ,  $r^2 = 0.994$ ) revealed a median willingness to pay of US\$9.73,

**Table 2.** Visitors' willingness to pay (WTP) hypothetical increases in the entrance fee to visit Komodo National Park.

Entrance fee (US\$)	Proportional WTP (%)
2	90.37
4	79.31
8	54.19
16	28.18
32	10.26

whereas the mean willingness to pay was US\$11.70. Revenue would be maximized at a fee of US\$13.54, over 15 times the current (1996) fee (Fig. 3). At this fee, an estimated 587% of the current revenue from independent visitors (40.6% of the value of the total park budget) would be raised, and visitor levels would drop by 62.2%. Caution should be placed on the interpretation of results for such large hypothetical fee increases, however, because CVM results become less reliable the higher they are above the actual fee.

A number of respondents ( $n = 28$ ) qualified their answers to the willingness-to-pay question with additional comments. The largest proportion (35.7%) were willing to pay higher fees if revenues were used for the upkeep of KNP and if information was made available on the way such revenue was used. (Similarly, at workshops held in Bali and Labuan Bajo in April 1996, Indonesian tour operators made clear that they would be prepared to accept a rise in entrance fee to approximately US\$4.50, provided the additional revenue was reinvested in the management of KNP.) Several respondents (28.6%) wanted to see improved visitor services, facilities, and attractions associated with higher fees, whereas others (17.9%) were concerned with the effect that price increases would have on low-income groups such as domestic visitors and backpackers. One respondent suggested that incremental increases in price would be less disruptive than a single large increase.

**Figure 2.** Visitors' willingness to pay increases in the entrance fee to Komodo National Park.

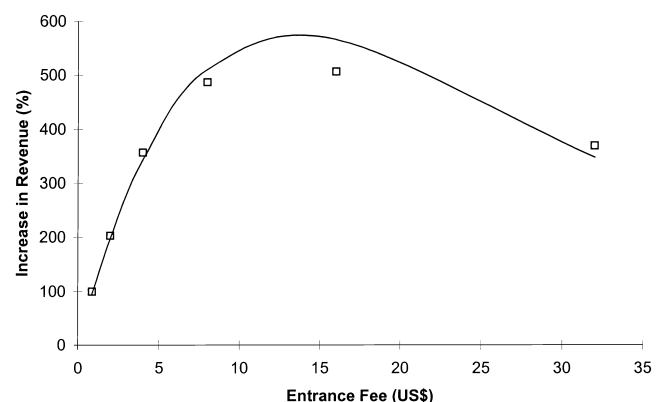
## Effects of Fee Increases on the Local Economy

During 1995-1996, visitors to KNP spent approximately US\$1.1 million in the surrounding local economy on transport, accommodation, guiding, meals, and retail purchases (Walpole 1997; Walpole & Goodwin 2000). Of this, approximately US\$425,000 was spent on transport to and from KNP and a further US\$40,000 on guiding and accommodation in KNP.

Estimates of the loss to the local economy as a result of fee increases in KNP causing decreased visitation were made for a fee of US\$4, deemed reasonable by visitors and tour operators alike, and for a fee of US\$13.54, at which entrance fee revenue from independent visitors would be maximized. Either rise in entrance fee would have a negative effect on the local economy of a magnitude similar to that of the additional entrance-fee revenue raised. At a fee of US\$4, additional revenue of US\$77,600 to KNP would be offset by a loss of US\$65,000 from the local economy, whereas at a fee of US\$13.54, revenue of US\$203,500 would be offset by a loss of US\$231,100. At the lower fee the benefits of increased entrance-fee revenues outweighs the loss to the local economy by approximately US\$12,000, whereas at the higher fee the loss to the local economy outweighs the increase in fee revenues by almost US\$28,000. Although ours is a simplistic model based in part on hypothetical scenarios, it demonstrates the potential for increases in entrance fee to decrease local benefits from tourism.

## Discussion

Our results suggest that annual revenues to KNP from tourism do not significantly offset annual management costs, although estimated recurrent tourism-related costs are mostly offset. Furthermore, our results reveal considerable willingness to pay, some of which could be captured through higher entrance fees. These results reflect

**Figure 3.** Proportional increase in entrance fee revenue at different entrance fees for Komodo National Park.

those from empirical studies elsewhere (e.g., Lindberg & Enriquez 1994; Goodwin et al. 1997, 1998). We also demonstrated that (1) the extent to which increased revenue can be generated is limited by visitor responses to increased fees, such that total cost recovery is unlikely, and (2) there is a negative effect of increased fees on local economies as a result of the linkage between local benefits and volume of visitation.

The question remains as to what the most appropriate pricing strategy should be for KNP or other protected areas. According to Laarman and Gregersen (1996), pricing strategy should be based on a combination of policy objectives and information about visitors' willingness to pay. Pricing can be used as a tool to achieve certain objectives, and the analysis based on willingness to pay that we have presented provides information on the implications of adopting particular strategies. We assessed three alternatives: (1) continuing a policy of low pricing, (2) pursuing a policy of revenue maximization, and (3) adopting a policy of tourism-related cost recovery.

To retain the current policy of low pricing is socially acceptable in that it does not discriminate between visitors on the basis of economic well-being. Moreover, because it maximizes visitation it also generates the greatest local benefits from tourism, thereby stimulating local development. But it is economically inefficient in that it fails to capture much of the value ascribed to KNP by visitors. It may also be politically unacceptable because it does not demonstrate significant value from KNP and results in the domestic population effectively subsidizing the visits of foreign tourists. This suggests that, for protected areas in many developing countries (Child & Heath 1990), low entrance fees are inappropriate where international tourists are the primary beneficiaries.

The opposite approach to low pricing is a policy of revenue maximization. Although results suggest that total cost recovery is unlikely in KNP, the greatly increased financial returns to government from a revenue-maximization strategy would nevertheless demonstrate the significant direct value of KNP, thereby helping to politically justify conservation policy. With a change in government financial structure to allow some revenue retention by KNP, a policy of revenue maximization might also generate direct benefits for KNP itself.

Such a policy would necessitate large increases in entrance fees; in the case of KNP, revenue maximization would necessitate a 15-fold increase in the current fee. Sudden large increases in entrance fee have proved difficult to implement elsewhere. Protests occurred in response to large price increases in Costa Rica in 1994 (Laarman & Gregersen 1996) and in Zimbabwe in 1997 (Goodwin et al. 1997). In the latter case, public criticism rapidly forced the authorities to reduce the increased prices by half. Such problems might be avoided by introducing price increases incrementally over a period of time.

Nevertheless, our results suggest a potentially marked

decline in visitor numbers in response to large price increases. This has two important implications. Lower income classes such as domestic visitors and independent travelers would be discriminated against, such that clientele would become restricted to cruise and package charter passengers. Consequently, economic benefits for surrounding local communities would decline. The majority of spending in the local economy is done by independent travelers (Walpole & Goodwin 2000), and the disproportionate effect of large price increases on this group would translate into significant losses for the local economy. Given the importance of local development in both international and Indonesian conservation and development strategies (BAPPENAS 1993; McNeely 1993; P. Djuwantoko, Park management for community participation in Komodo National Park, paper presented at a workshop on sustainable tourism and biodiversity, Labuan Bajo, Indonesia, April 1996), this is a politically unacceptable side effect that weighs against large increases in entrance fees.

A politically defensible policy (Laarman & Gregersen 1996) is one of recovering the direct costs of supplying the tourism product. The difficulty lies in fully identifying the costs to be recovered, particularly environmental costs, and hence in setting the appropriate fee. As a result, a more practical policy may be one based on a reasonable fee level that comfortably offsets best estimates of tourism-related costs and reflects willingness to pay so as not to discriminate against certain user groups. Results of our willingness-to-pay surveys suggest that a five-fold increase to US\$4–5 would not significantly affect the number of visitors to KNP and would add substantially to government revenue from tourism. This revenue would adequately cover estimated tourism-related costs, including some element of capital costs. Moreover, local benefits from tourism would not be greatly affected. Such an intermediate policy may not maximize financial returns from KNP, but it would balance competing needs and address the various perspectives on the role that protected areas are required to play.

Additional adaptations may increase benefits. First, to avoid discrimination against domestic visitors, a dual pricing structure may be adopted whereby domestic visitors pay less than foreign visitors. Although such a strategy is never entirely equitable, being based on broad assumptions about the relative economic well-being of different groups (Laarman & Gregersen 1996), it is nevertheless gaining credence in a number of developing countries (Jansen 1993; Laarman & Gregersen 1996) and is accepted as an appropriate strategy by many foreign visitors (Goodwin et al. 1998; this study). Because KNP currently has few domestic visitors, dual pricing may seem unnecessary. Given the unpredictability of the international market, however, the domestic market may become a valuable and important target group for KNP as a buffer for such fluctuations. A form of dual pricing may



also be considered between independent and package visitors, in the form of a "cruise levy" that recognizes the increased local economic input of independent visitors.

Second, visitors would be more willing to pay a higher fee if the revenue generated was used for the benefit of the visited area. In the case of KNP, this would necessitate a change in government financial structure to allow KNP to retain some of the revenues generated from tourism. Revenues that are earmarked for and returned to KNP may act as an incentive to managers to promote and efficiently manage tourism (Lindberg & Huber 1993; Laarman & Gregersen 1996). A lack of revenue retention in Hwange National Park, Zimbabwe, combined with government underfunding, has resulted in a decline in staff morale and park infrastructure (Potts et al. 1996). A proportion of retained revenues could be used to assist the local community to become more involved in tourism development. Such activities are currently the domain of nongovernmental organizations and donor agencies. The greatest limitation to participation by local people in the tourism sector is access to the market, due to lack of necessary skills or resources (Walpole & Goodwin 2000); at a workshop in 1996, local stakeholders requested further training opportunities for local people.

Third, in conjunction with partial revenue retention, greater information dissemination to visitors to increase their awareness of fee structures and highlight the ways fees are used may also increase willingness to pay. Similarly, it is vital that information be gathered by managers through regular monitoring of park revenues, visitation patterns, local benefits, and periodic evaluations of willingness to pay to assess the performance of pricing strategies against clearly defined policy objectives.

The most appropriate pricing strategy would be a moderate increase in entrance fee, combined with dual pricing and a partial retention of revenues. This would satisfy three principal policy objectives: tourism-related cost recovery, equitable visitor access, and maximized local development opportunities. This approach embodies much of the current thinking on pricing policy for protected areas (Lindberg & Huber 1993; Laarman & Gregersen 1996; Goodwin et al. 1998). For implementation of these policies, some decentralization in financial management and more efficient monitoring of visitor opinions are needed.

In scenarios where different conditions apply, different solutions may be appropriate. For example, some protected areas may generate high enough visitor demand to be able to recover total costs. In some cases, charging higher fees may not limit local opportunities. In others, where conservation efforts depend on direct revenue generation, the need to generate as much revenue as possible may outweigh social policy objectives. A strategy of complete financial autonomy that permits protected areas to become self-funding is unlikely for most protected areas. At the time of this study there was

much debate about KNP retaining revenues. We consider this a dangerous course because even with high price increases it seems unlikely that management costs could be completely recovered. Tourism is an unstable source of revenue, particularly when it is based on foreign visitation. Destinations are vulnerable to unpredictable events such as natural disasters, health scares, and political upheaval, which all negatively affect visitor numbers (Goodwin et al. 1998). Without the guaranteed support of government funding, such events would spell disaster for protected areas. Furthermore, there may be nonmarket benefits of protected areas such as biodiversity values, watershed values, and existence values for future generations that justify government funding even in the absence of full cost recovery. Unquestionably, core funding for protected areas should not be entirely replaced by less predictable revenue-generating activities (whether such funding should be supplied by domestic governments or the international community is a separate debate).

We have incorporated financial records and survey data based on a hypothetical scenario into a decision-making framework for a single case study. What is now required is translation of the results of such economic analyses into actual policy changes so that real rather than hypothetical scenarios can be evaluated.

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## Literature Cited

- Auffenberg, W. 1981. *The behavioral ecology of the Komodo monitor*. University of Florida Press, Gainesville.
- BAPPENAS. (Ministry of National Development Planning). 1993. *Biodiversity action plan for Indonesia*. Jakarta, Indonesia.
- Blower, J. H., A. P. M. van der Zon, and Y. Mulyana. 1977. *Proposed Komodo National Park management plan, 1978-1982*. United Nations Development Program and Food and Agriculture Organization, Bogor, Indonesia.
- Boo, E. 1992. *The ecotourism boom: planning for development and management*. Technical paper series 2. World Wildlife Fund, Washington, D.C.
- Bostedt, G., editor. 1995. *Benefits of amenities in the forest environment: four papers based on contingent valuation*. Department of Forest Economics, Swedish University of Agricultural Sciences, Umea.
- Brown, G., and W. Henry. 1989. *The economic value of elephants*. Discussion paper 89-12. London Environmental Economics Centre, London.
- Child, G. F. T., and R. A. Heath. 1990. *Underselling national parks in*

- Zimbabwe: the implications for rural sustainability. *Society and Natural Resources* 3:215-227.
- Dixon, J. A., and P. B. Sherman. 1990. *Economics of protected areas: a new look at benefits and costs*. Island Press, Washington, D.C.
- Dixon, J. A., and P. B. Sherman. 1991. Economics of protected areas. *Ambio* 20(2):68-74.
- Dixon, J., L. F. Scura, and T. van't Hoft. 1993. Meeting ecological and economic goals: marine parks in the Caribbean. *Ambio* 22(2-3): 117-125.
- Driml, S. 1994. Protection for profit: economic and financial values of the Great Barrier Reef World Heritage Area and other protected areas. Research publication 35. Great Barrier Reef Marine Park Authority, Townsville, Queensland, Australia.
- Edwards, P. J., and C. Abivardi. 1998. The value of biodiversity: where ecology and economy blend. *Biological Conservation* 83:239-246.
- Getz, W. M., L. Fortmann, D. Cumming, J. du Toit, J. Hilty, R. Martin, M. Murphree, N. Owen-Smith, A. M. Starfield, and M. I. Westphal. 1999. Sustaining natural and human capital: villagers and scientists. *Science* 283:1855-1856.
- Ghimire, K. P., and M. P. Pimbert, editors. 1997. *Social change and conservation*. Earthscan, London.
- Giannecchini, J. 1993. Ecotourism: new partners, new relationships. *Conservation Biology* 7:429-432.
- Goodwin, H. 1996. In pursuit of ecotourism. *Biodiversity and Conservation* 5:277-292.
- Goodwin, H., I. J. Kent, K. T. Parker, and M. J. Walpole. 1997. *Tourism, conservation and sustainable development*. Department for International Development, London.
- Goodwin, H., I. J. Kent, K. T. Parker, and M. J. Walpole. 1998. *Tourism, conservation and sustainable development; case studies from Asia and Africa*. Wildlife and development series 12. International Institute for Environment and Development, London.
- Inamdar, A., H. de Jode, K. Lindsay, and S. Cobb. 1999. Capitalizing on nature: protected area management. *Science* 283:1856-1857.
- International Monetary Fund (IMF). 1997. *Financial statistics*. Washington, D.C.
- Jakobsson, K. M., and A. K. Dragun. 1996. Contingent valuation and endangered species: methodological issues and applications. Edward Elgar, Cheltenham, United Kingdom.
- Jansen, D. 1993. Investigation and recommendations on access, pricing and control over resources and services of Department of National Parks and Wild Life Management. DNPWLM, Harare, Zimbabwe.
- Kinnaird, M. F., and T. G. O'Brien. 1996. Ecotourism in the Tangkoko DuaSudara Nature Reserve: opening Pandora's box? *Oryx* 30:65-73.
- Laarman, J. G., and H. M. Gregersen. 1996. Pricing policy in nature-based tourism. *Tourism Management* 17:247-254.
- Leader-Williams, N., J. Harrison, and M. J. B. Green. 1990. Designing protected areas to conserve natural resources. *Science Progress* 74:189-204.
- Lindberg, K., and J. Enriquez. 1994. An analysis of ecotourism's economic contribution to conservation and development in Belize. World Wildlife Fund (U.S.) and the Ministry of Tourism and Environment, Belize City, Belize.
- Lindberg, K., and R. M. Huber. 1993. Economic issues in ecotourism management. Pages 82-115 in K. Lindberg and D. E. Hawkins, editors. *Ecotourism: a guide for planners and managers*. Ecotourism Society, North Bennington, Vermont.
- MacKenzie, J. M. 1988. *The empire of nature: hunting, conservation and British imperialism*. Studies in Imperialism. Manchester University Press, Manchester, United Kingdom.
- Maille, P., and R. Mendelsohn. 1993. Valuing ecotourism in Madagascar. *Journal of Environmental Management* 38:213-218.
- McNeely, J. A. 1988. *Economics and biological diversity: developing and using economic incentives to conserve biological resources*. World Conservation Union, Gland, Switzerland.
- McNeely, J. A., editor. 1993. *Parks for life: report of the IVth World Congress on National Parks and Protected Areas*. World Conservation Union, Gland, Switzerland.
- McNeely, J. A., and K. R. Miller, editors. 1984. *National parks, conservation and development: the role of protected areas in sustaining society*. Proceedings of the World Congress on National Parks, Bali, Indonesia. Smithsonian Institution Press, Washington, D.C.
- Mitchell, R. C., and R. T. Carson. 1989. *Using surveys to value public goods: the contingent valuation method*. Resources for the Future, Washington, D.C.
- Moran, D. 1994. Contingent valuation and biodiversity: measuring the user surplus of Kenyan protected areas. *Biodiversity and Conservation* 3:663-684.
- Movcan, J. 1982. Development and economics in Plitvice National Park. *Ambio* 11:282-285.
- Nash, R. 1982. *Wilderness and the American mind*. Yale University Press, New Haven, Connecticut.
- Orams, M. B. 1995. Towards a more desirable form of ecotourism. *Tourism Management* 16:3-8.
- Potts, F. C., H. J. Goodwin, and M. J. Walpole. 1996. People, wildlife and tourism in and around Hwange National Park, Zimbabwe. Pages 199-219 in M. F. Price, editor. *People and tourism in fragile environments*. Wiley, Chichester, United Kingdom.
- Robinson, A. H., and A. Bari. 1982. Komodo National Park: progress and problems. *Parks* 7(2):10-12.
- Runte, A. 1987. *National parks: the American experience*. University of Nebraska Press, Lincoln.
- Shafer, E. L., R. Carline, R. W. Guldin, and H. K. Cordell. 1993. Economic amenity values of wildlife: six case studies in Pennsylvania. *Environmental Management* 17:669-682.
- Sumardja, E. A. 1981. The first five national parks in Indonesia. *Parks* 6:4.
- Tobias, D., and R. Mendelsohn. 1991. Valuing ecotourism in a tropical rain-forest reserve. *Ambio* 20:91-93.
- Walpole, M. J. 1997. *Dragon tourism in Komodo National Park, Indonesia: its contribution to conservation and local development*. Ph.D. thesis. University of Kent, Canterbury, United Kingdom.
- Walpole, M. J., and H. J. Goodwin. 2000. Local economic impacts of dragon tourism in Indonesia. *Annals of Tourism Research* 27:559-576.
- Wells, M. P. 1993. Neglect of biological riches: the economics of nature tourism in Nepal. *Biodiversity and Conservation* 2:445-464.
- World Conservation Union, United Nations Environment Program, and World Wildlife Fund. 1980. *World conservation strategy: living resource conservation for sustainable development*. Gland, Switzerland.
- World Conservation Union. 1996. *Red list of threatened animals*. Gland, Switzerland.

