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Policy Brief

GREEN FINANCE: VALUATION AND FINANCING OF KHAO YAI NATIONAL PARK IN THAILAND

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With advancing deforestation and growing environmental awareness, governments around the world have been expanding their protected areas and national parks

in an effort to preserve a representative part of their natural endowment and its biological diversity. Thailand has been in the forefront of conservation efforts, expanding its national park area by over 40 percent between 1987 and 1992. At present, protected areas account for about 15 percent of the country's total land area, and there are efforts underway to increase the protected area to 25 percent. As in other countries, the budget allocated to protection of the national parks and other "protected areas" does not increase proportionately. The result is that the expansion of protected areas is accomplished at the expense of effectiveness of protection. Even where protection budgets are increased proportionately, resources might still be inadequate because protected areas and even national parks in the developing world have been historically underfunded and underprotected. Encroachment, logging, and wildlife poaching in national parks in developing countries are not uncommon.

Governments are generally reluctant to allocate more funds to conservation and forest protection because the benefits are not very obvious, and are often underappreciated, while the opportunity costs are generally high because of other pressing development priorities. It is therefore of critical importance that the benefits from nature conservation and protection be estimated in order to determine the level of public expenditure that is justified by the public-goods aspect of conservation. Furthermore, some of the benefits of conservation, such as recreation and tourism, are of a private-good nature or can be priced despite their public-good aspects. Hence, part of the costs of conservation and protection can be financed through the appropriate pricing of access or entitlement to benefits.

Khao Yai National Park, Thailand's oldest and most popular park, was used as a case study of how the benefits from nature conservation can be estimated and used as a basis for developing financing mechanisms for effective protection and improvement. The first objective was to determine the total economic value of the Park, which consists of both direct and indirect use values as well as option and existence values. The second objective was to propose revenue-increasing measures to appropriate part of the Park's economic value to finance the Park's protection and service provision. The third objective was to identify management options and Park improvements that would increase the benefits from the Park and could be self-financed.

The direct use values of the Park include ecotourism, biodiversity prospecting, and educational and scientific tourism. The indirect use values include watershed protection, carbon sequestration, and micro-climatic benefits. The values of these benefits are measured by the beneficiaries' willingness to pay to ensure the continuation of these benefits. In addition, both users and non-users of Park services may be willing to pay for preserving the option to use the Park in the future (option value) or even for its mere existence (existence value).

Ideally, one estimates all these values and sums them up to arrive at the total economic value of a natural asset such as the Khao Yai Park. Unfortunately, time, budget, and data constraints limited our detailed investigation to the direct use value of the Park, primarily as a source of ecotourism services and secondarily as a source of educational and scientific services. The value of the Park as a watershed, its favorable micro-climatic effects, its carbon sink function, and its potential for biodiversity prospecting have not been assessed, but are believed to be considerable. We did, however, assess both the option and existence values of Park visitors as well as those of non-visitors.

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Main Findings

Our main findings, based on interviews with Park officials and a survey of 948 users and 1057 non-users, employing the travel cost and contingent valuation methods, are as follows

- The cost of Park *maintenance and protection* has risen by 25 to 30 percent annually during recent years, while cost-recovery over the same period has dropped from 51 to 30 percent

- If we break the cost of Park maintenance into its two parts, tourist services and park protection, we see that tourism entrance fees do not cover the cost imposed by tourists The current direct cost of *providing services* to tourists, 6 baht per head, exceeded the entrance fee, 5 baht per head When the indirect cost of providing tourism services (i e , cost of protection of wilderness) is included, the total cost of providing services to tourists amounts to 9 baht per head

- Using the travel cost method, which provides an estimate of direct benefits to Park users, we found that visitors' total willingness to pay per visit was 1,420 baht, of which 240 baht was travel cost, 310 baht was expenditure for accommodations, food, and tour guides, and 870 baht was consumer surplus The consumer surplus estimate, based on the travel cost method, is probably biased upward due to sampling error.

- Thai visitors to Khao Yai are on average willing to pay 22 baht per head per trip to enter the Park, compared with a current entrance fee of 5 baht per head per trip. A visitor's willingness to pay a higher entrance fee is probably biased downward by an anchoring effect Theoretically, a visitor's maximum willingness to pay to enter the Park should approximate his consumer surplus estimate from the travel cost method.

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- Thai visitors to Khao Yai are further willing to pay an average of 730 baht per head per year to ensure the continued existence of Khao Yai and to preserve their option to use it in the future.

- Thai non-visitors, on the other hand, are willing to pay an average of 183 baht per head per year for the option and existence values provided by the Park. The average option value for those expecting to visit the Park in the future was estimated at 196 baht/year

- The total economic value of Khao Yai Park to Thai visitors and non-visitors taken together exceeds 3 billion baht (about US$120 million) per year or a present value of 30 billion baht assuming a 10 percent discount rate This is clearly a lower bound since many other significant benefits have been left out and the population surveyed included only urban residents Based on projected GNP growth of 8 percent per annum and income elasticity of 0 3, the total economic value of the Park is expected to grow over time at the rate of 2 4 percent per annum (in real terms)

- The services that visitors reported to be inadequate and in need of improvement included road maintenance, the number and cleanliness of toilets, the availability of waste receptacles, and the availability of information on park trails, flora, and fauna.

- The users' average willingness to pay for access to Khao Yai rises from 22 baht to 44 baht per head per trip for improved services such as road improvements, increased cleanliness, and upgraded information.

- Two-thirds of the Park visitors express demand for more animal observation towers, suspension bridges, bird watching sites and the development of new attractions About half of Park visitors surveyed expressed demand for transport services from the entrance to the service centers and expansion and improvement of camp sites, contrary to general government attitude, Park visitors were willing to pay for individual and incremental, man-made services provided by the Park.

- Income from vehicle entrance fees (about 3 million baht) accounts for 80 percent of the Park's revenues and suffices to finance the maintenance of roads for traffic using Khao Yai as a thorough-fare. However, through-traffic generates little net economic benefit (0.5 to 0 6 million baht), the 3,000 trucks that use Khao Yai as a thorough-fare each year are responsible for much of the road damage, noise, and air pollution in the Park, yet they contribute only 90,000 baht, or 3 percent of the total entrance fee revenues.

- The opportunity cost of Khao Yai Park's 1 36 million rai of forest, in terms of net present value of foregone harvests of forest products, is estimated to lie between 1,650 and 3,300 million baht The opportunity cost of the land, given the current land price of 20,000 baht per rai (for the least accessible and untitled land in the vicinity of the Park), is at least 28,000 million baht It is worth noting that the estimated economic value of the Park (in net present value terms) compares favorably to these opportunity costs despite the omission of substantial additional benefits from conservation

- While only a few foreigners (non-Thai citizens) visit Khao Yai, accounting for only 1 5 percent of the total number of visitors, their willingness to pay to access Khao Yai (50 to 125 baht per/person/trip) is two to five times as high as that of Thai users for the current level of service For an improved level of service they are willing to pay 100 to 143 baht/ person/trip. The non-use values of both users and non-users are respectively 551 baht/person/year and 121 baht/person/year

- The creation and protection of the Park, while beneficial to the society at large, has resulted in a significant loss of income and employment opportunities, due to reduced access to forest resources (for agriculture, timber and other forest products) worth about 165 - 330 million baht annually. Only limited employment opportunities were created by the Park for local people, mainly as trekking porters and as employees in hotels, golf courses, and restaurants in areas adjacent to the Park's entrance

Conclusions

A number of conclusions may be derived from the above findings First, the Park is clearly underpriced and underutilized Second, Government subsidization of about two-thirds of the Khao Yai budget is inadequate to offset capital and operating costs not covered by Park revenues, thus resulting in poor maintenance and gradual deterioration of facilities. Furthermore, scientific research on the biodiversity and forest ecology of the Park is grossly underfunded.

Third, Park encroachment and poaching, while declining because of stricter enforcement and increased dependence on commercial agriculture and urban employment, is clearly a response to the substantial welfare loss suffered by the 224 villages in the proximity of the Park, their loss was not offset by the meager employment opportunities for local people created by the Park In this sense, the creation of the Park was regressive, as it transferred wealth from low-income villagers to resort-owners, tour-operators, and better-off tourists

Policy Recommendations

The above findings and conclusions have several important policy implications for pricing services of the Khao Yai Park and financing its protection and management. After careful consideration of each policy implication in light of the political, economic, and social realities of Thailand, we advance the following policy recommendations:

- The entrance fee for Thai visitors to the Park should be raised from the current 5 baht to 20 baht per person per visit in line with the visitors' average willingness to pay (WTP) Based on an average of 1 million visitors each year and an estimated 27 percent drop in visits due to the rate increase, we project fee revenues at the level of 15 million baht, an amount sufficient to cover the cost of Park protection and current levels of service provision, including maintenance of facilities The revenues can be further increased (without a drop in visitors) by differentiating the entrance fee according to the number of nights of stay those who stayed longer than a day were found to be willing to pay 4 baht more per person per trip

Significant expenditures up to 2.2 million baht per year are justified for improving Park protection and tourist facilities and they can be financed by the higher entrance fees that visitors are willing to pay.

- The entrance fee for foreign visitors should be set at least at 50 baht per person per visit and possibly higher (the mean WTP justifies a 125 baht fee, but the median was only 50 baht). A differential entrance fee between local residents and foreigners is common in countries with significant ecotourism such as Kenya and Costa Rica, as both the WTP and the demand elasticity vary significantly because of different income levels and preferences

- In addition to raising the entrance fee, the Park Authority may attempt to capture a larger share of the visitors' expenditures during the stay in the Park by providing additional services such as low-impact lodging, improved food services, and transit between the entrance and the Park center. The Park Authority could also attempt to capture a part of the visitors' substantial consumer surplus (870 baht per visit) through a differentiated yet simple fee structure.

- Significant expenditures, up to 2 2 million baht per year, are justified for improving Park protection and tourist facilities and they can be financed by the higher entrance fees that visitors are willing to pay. In particular, road improvements, proper waste disposal, improved sanitation, increased information services, and Park rule enforcement will increase visitors' willingness to pay and justify a second increase of entrance fees (for Thais) to at least 40 baht per person per trip . All food, drink, souvenir and other concessions could be awarded through a competitive bidding process, subject to specified rules of operation, to maximize Park revenues.

- A refundable deposit for bottles, cans, plastic bags, and packages of food and drink sold by the concessionaires is recommended to encourage return after use and reduction of littering. The concessionaire should agree as part of the bidding price to accept and refund the deposit on similar items found within the Park regardless of their origin. Simultaneously, the Park Authority should institute a heavy fine for littering within the Park.

- We strongly recommend the establishment of a Khao Yai Protection Fund which would solicit contributions from Park users and non-users, both local and foreign, for the specific purpose of protecting the Park from poaching, encroachment, and forest fires. Our study suggests that up to 3 billion baht per year can be raised from domestic sources alone. Another option is to issue transferable conservation rights and to market them widely at home and abroad to foundations, NGOs, corporations, nature lovers, and the general public. The proceeds from such a fund should be earmarked for the protection and expansion of the Khao Yai Park as well as the support of scientific research on its forest ecology and biodiversity.

- In light of the limited economic benefits from through-traffic and the likely disturbance to wildlife, the option of closing the road to through-traffic should be considered. Alternatively, the road could remain open to all through-traffic except six-wheel trucks, with all vehicles being charged both a vehicle toll (at the current rate) and an entrance fee per person (including the driver) at the proposed higher rate. This policy would discourage through-traffic except for persons with a high opportunity cost of time or a high appreciation for the scenic route through the Park.

- The Park Authority may want to undertake further studies of the feasibility and financial viability of investments in animal observation towers, suspension bridges, bird watching sites, transport services from the Park entrance, new camp sites, and other attractions. Our study suggests that visitors would be willing to pay the cost of using such facilities as a user charge. We have not, however, estimated the rate of the charge and the level of use that would justify these investments. Further study in this regard is needed and can be most appropriately undertaken or sponsored by the Park Authority.

- Further research is needed to estimate the watershed and micro-climatic benefits of the Khao Yai Park and to explore the scope for a possible watershed charge on the beneficiaries in order to augment the Khao Yai Protection Fund. Similar watershed charges have been implemented in Indonesia and Costa Rica, among other places.

- We recommend investigation of the potential market demand for bioprospecting in Khao Yai, including willingness to pay, potentially interested parties, and the experience of other countries (e.g., Costa Rica) with bioprospecting arrangements and their implementation.

- Finally, further research is needed to investigate how a larger share of the economic benefits of ecotourism could be distributed to the populations of the 224 villages around the Park, especially in those villages in which the opportunities for commercial agriculture and urban employment are limited and the incentives for poaching and encroachment are consequently high. One possibility is to use a part of the Khao Yai Protection Fund to finance the development of new income and employment opportunities in villages with intense forest use, such as the sampled villages in Prachinburi, Saraburi, and Nakhon Nayok. Given the findings that 1) the value of the land as a national park is in the competitive range with other land uses, and 2) significant additional benefits from carbon sequestration exist, we recommend that the Park Authority explore opportunities for jointly implementing carbon offset projects financed by developed country utilities in degraded areas of the Park and in surrounding lands of low opportunity cost. Already there is a pilot-project of this kind in the area, sponsored by the United States Agency for International Development. Such projects promise to generate employment opportunities and other local development benefits as well as global environmental benefits.

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