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# **ECONOMICS, ECOLOGY AND THE ENVIRONMENT**

**Working Paper No. 104**

**Nature-Based Tourism and the Valuation  
of its Environmental Resources:  
Economic and Other Aspects**

**by**

**Clem Tisdell**

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## **NATURE-BASED TOURISM AND THE VALUATION OF ITS ENVIRONMENTAL RESOURCES: ECONOMIC AND OTHER ASPECTS**

### **Abstract**

Nature-based tourism has grown in importance in recent decades, and strong links have been established between it and ecotourism. This reflects rising incomes, greater levels of educational attainment and changing values, especially in the Western world. Nature-based tourism is quite varied. Different types of such tourism are identified and their consequences for sustainability of their resource-base are briefly considered. The development and management of nature-based tourism involves many economic aspects, several of which are discussed. For example, one must consider the economics of reserving or protecting land for this type of tourism. What economic factors should be taken into account? Economists stress the importance of taking into account the opportunity costs involved in such a decision. This concept is explained. However, determining the net economic value of an area used for tourism is not straightforward. Techniques for doing this, such as the travel cost method and stated value methods, are introduced. Natural areas reserved for tourism may have economic value not only for tourism but also jointly for other purposes, such as conserving wildlife, maintaining hydrological cycles and so on. These other purposes, should be taken into account when considering the use of land for nature-based tourism. According to one economic point of view, land should be used in a way that maximises its total economic value. While this approach has its merits, it does not take into account the distribution of benefits from land use and its local impacts on income and employment. These can be quite important politically and for nature conservation, and are discussed. Finally, there is some discussion of whether fees charged to tourists for access to environmental resources should discriminate between domestic tourists and foreigners.

# **NATURE-BASED TOURISM AND THE VALUATION OF ITS ENVIRONMENTAL RESOURCES: ECONOMIC AND OTHER ASPECTS**

## **1. Introduction**

Nature-based tourism and recreation have grown substantially in recent times as incomes have risen globally and as more individuals have become better educated. Many studies show that those who have more education and higher incomes are more likely to engage in nature-based tourism than those with less education and lower incomes (see for example, Sinden, 1977). Furthermore, changing environmental values and ethical attitudes to wildlife, particularly in Western countries (Passmore, 1974), have increased interest in the conservation of biodiversity and in the type of tourism (ecotourism) that relies on nature and which may help to conserve nature. There are hopes that such tourism may be economically successful and provide economic benefits that will help to sustain it and at the same time, conserve the environmental assets in which it relies, including the living resources that it often depends on. However, not all forms of nature-based tourism are favourable to the conservation of environmental assets. Much depends on the type of this tourism, its intensity and how well it is managed.

Types of nature-based tourism and their environmental implications vary considerably. After this aspect is discussed, this article considers the economics of reserving land for nature-based tourism rather than allowing it to be utilised for incompatible purposes. In turn, this requires the economic value of nature-based tourism using such land to be estimated, and methods of doing this are outlined. However, land reserved and used for nature-based tourism may satisfy jointly additional demands of society, for example it may conserve biodiversity and maintain water cycles. Nowadays, economists try to take such additional economic values into account by employing the concept of total economic valuation. This concept is introduced and applied. Although such economic valuation techniques have their merit when applied to the development of tourism, they have the limitation that they usually ignore the distributional consequences of decisions about resource allocation and economic impact analyses. Politically it is unwise to ignore such factors because of reasons outlined in this article. Finally, before concluding, the question is discussed of whether higher fees should be charged to foreigners than to and domestic tourists for their access to nature-based tourist attractions.

## **2. Different Types of Nature-based Tourism and Their Implications for Environmental Conservation**

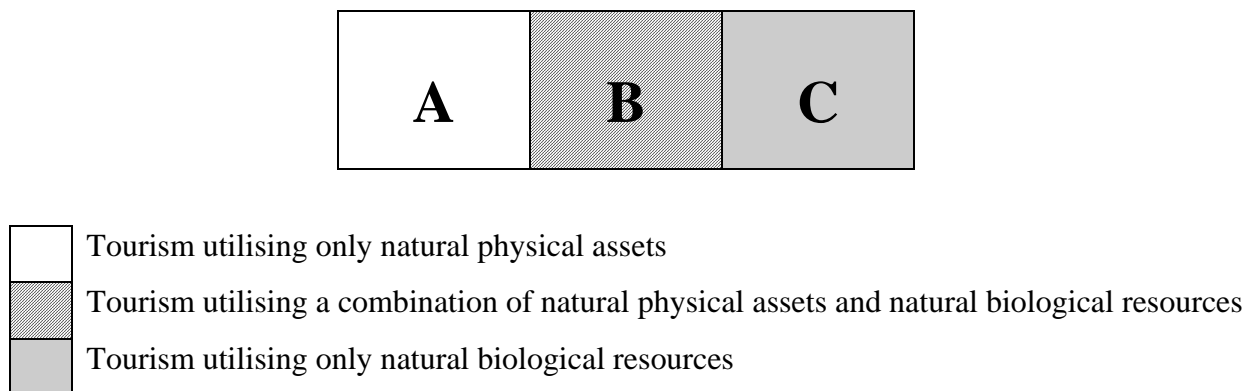
Classification of types of nature-based tourism is still in its infancy but is important when considering the environmental implications of such tourism. First we can distinguish between nature tourism based primarily on non-living resources (such as attractions like the Grand Canyon, the Himalayas and seaside areas used mainly for activities like surfing) and tourism and recreation that depends mainly on living or biological resources as an attraction. The latter includes tourism and recreation that relies on captive wildlife as an attraction such as zoos, aquaria fishing parks, botanical gardens, and those that utilise non-captive wildlife and nature as their prime asset, such as many national parks. It includes areas of open-water where fishing may occur for recreational purposes.

This article will mostly concentrate on tourism that uses non-captive wildlife or biological resources. Nevertheless, it should be recognised that tourism and recreation based on the use of captive wildlife (such as zoos) attracts more visitors in most countries than that based on non-captive wildlife.

Attractions involving captive wildlife also has important implications for nature conservation. Depending on the way in which such attractions are managed, they can have positive or negative effects on nature conservation. For example, elephant orphanages, such as the one at Pinnawala in Sri Lanka, based on captive elephants rescued from the wild, can help to make visitors more aware of the plight of the Asian elephant and increase political support for its protection (Tisdell and Bandara,2003). Much, however, depends on how the attraction is presented. Some zoos, such as the San Diego Zoo, have captive breeding programmes that may be instrumental in saving some species facing extinction in the wild. On the other hand, there are zoos that have no such redeeming features and which encourage capture of endangered animals from the wild to serve their needs, thereby adding to the likelihood of their extinction.

In classifying tourism based purely on natural environmental resources, one should probably not rely entirely on the dichotomous classification introduced above. While physical landscape features are virtually the sole attractions of some sites and wildlife of others, in many cases, both natural physical features and natural living organisms (in varying degrees)

attract tourists and recreationists. Hence, the pattern of natural tourist attractions is like that shown in Figure 1.



**Figure 1: Nature-based tourism in natural areas can be classified into three types depending on its dependence on biophysical resources**

In wildlife tourism, a distinction is often made between tourism that is consumptive and that which is non-consumptive. Consumptive forms include recreational fishing and hunting. They involve the destruction or consumption of their main resource. They are an important part of outdoor recreation in North America for example. Non-consumptive wildlife tourism is a passive form that does not destroy (at least directly) wildlife. It involves viewing, photographing and enjoying nature passively. It is much more acceptable than consumptive wildlife tourism in those societies opposed to the killing of animals, and to animal rights activists. However, it would be false to conclude that consumptive wildlife tourism is unsustainable whereas non-consumptive wildlife tourism is sustainable.

Recreational hunting and fishing can be sustainable if they do not reduce the population of targeted species to levels where their extinction becomes highly likely. Furthermore, individuals involved in this activity can become an effective lobby group for policy measures to sustain their targeted species. These measures include those to protect the habitat of the targeted wildlife or, as in the case of Ducks Unlimited in America, to add to this habitat by construction of ponds and planting of supplementary crops for food of the targeted species, in this case waterfowl. This may incidentally conserve other wildlife species that benefit from a similar habitat.



As for non-consumptive tourism, it would be wrong to assume that it can have no adverse impact on the natural environments used by it. As the number of tourists become large they may for example increasingly disturb wildlife. This can effect their breeding (particularly in the case of felines) and feeding patterns. Where access within a protected area is by road, road kills may increase. Degradation of vegetation and erosion may occur as a result of trampling by tourists. Tourist impacts in coral areas may destroy much of these once visitor numbers become very high. Hence, sustainability of natural resources used for tourism is an issue both in the case of consumptive and non-consumptive wildlife tourism.

Figure 2 can be used to highlight this matter. It makes it clear that both consumptive and non-consumptive wildlife tourism may be sustainable or unsustainable depending on the circumstances and the way in which it is managed. Lack of sustainability in this case is associated with the degrading or disappearance of environmental resources on which this tourism depends as a consequence of tourism activity. Complex sustainability issues are involved (see Tisdell, 2001).

<b>Type of wildlife tourism</b>	<b>Sustainable</b>	<b>Non-sustainable</b>
<b>Consumptive</b>	<b>1</b>	<b>2</b>
<b>Non-consumptive</b>	<b>3</b>	<b>4</b>

**Figure 2: A two by two classification of wildlife tourism in terms of whether it is consumptive and whether it is sustainable. The set of this type of tourism can be divided into four subsets identified by the numbered rectangles**

### **3. The Economics of Reserving Natural Areas for Nature-based Tourism**

In practice, the economics of deciding whether a natural land area should be reserved for nature-based tourism rather than used for incompatible alternative purposes is quite complicated, although the economic rule or principle is straightforward. According to economic principles, land should be allocated to that use or set of uses that gives the highest economic return. If the economic benefit or return from using it for nature-based tourism is

greater than in the next best alternative use, then it ought to be conserved and used for tourism.

If the net economic benefit from developing a natural area for agriculture is likely to be 10 million rupees annually but 25 million rupees annually if used for nature tourism, a net extra economic benefit of 15 million rupees per year can be obtained by ensuring that it is retained for the latter purpose. The economic opportunity cost of utilising this land for nature tourism is 10 million rupees annually, the highest economic benefit forgone as a result of this decision.

In a market economy, net returns from agriculture would in many cases, give a reasonable measure of the social economic benefits from alternative activity. Estimating the net benefit is, however, be more difficult in subsistence and semi-subsistence economies. It is, however, often even more difficult to estimate the economic benefits obtained from nature-based tourism and recreation. One reason is that access to such resources may not be priced or may not be competitively priced, for example, because different natural tourism areas are usually very poor substitutes, for one another, and, in effect, 'localised' monopolies exist in the supply of areas used for such tourism. Furthermore, in some countries (such as in some states of Australia), most natural areas are national parks and government policies are to allow free access by the public to such areas. Thus, tourism to such areas is often not marketed or it is imperfectly marketed. How in such cases can one estimate the economic benefit from tourism in these areas? The travel cost method and stated willingness to pay techniques are some of the economic methods that have been employed for this purpose. Let us briefly consider the nature of these approaches.

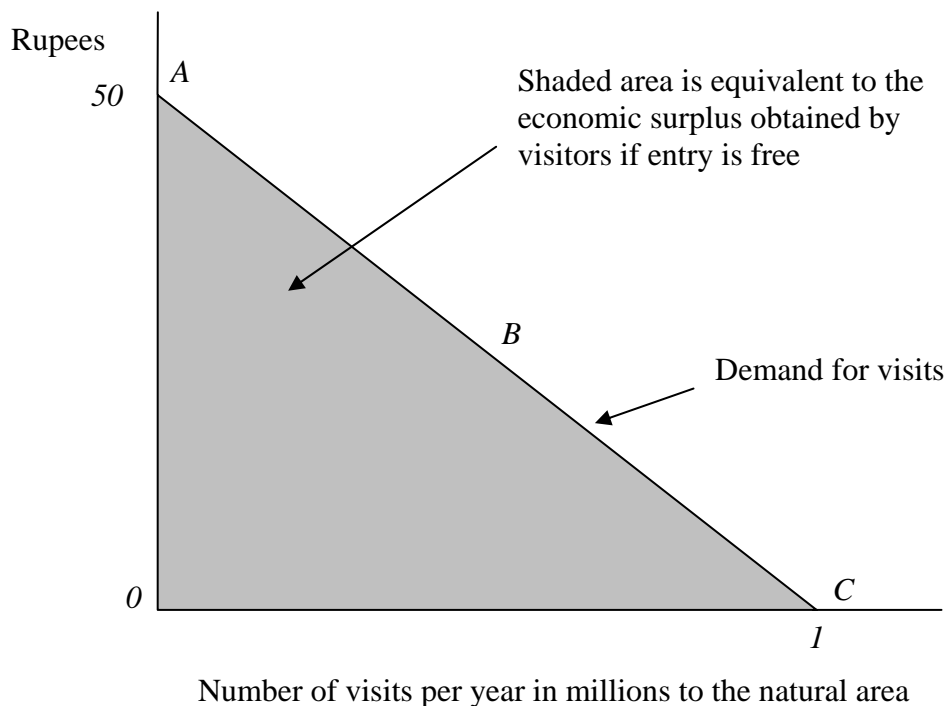
#### **4. The Travel Cost Method and other Economic Techniques for Estimating the Economic Value of Nature-based Tourism Utilising a Natural Area**

The travel cost method was originally suggested by Harold Hotelling (1949) as a method for estimating the tourist value of national parks in the United States. It was 'rediscovered' and developed by Clawson (1959) and Clawson and Knetsch (1966) as a method of valuing sites used for outdoor recreation (such as those associated with some reservoir sites) that required visitors to travel to enjoy these. It has been widely used in recent years to provide estimates of the tourist and recreational value of natural areas

In order to indicate the nature of the method, assume that entry to a natural area, such as a national park, is free for visitors. The park earns no income. However, this does not mean that it is without economic value for tourism purposes.

One method used to calculate this tourism value is the travel cost method. This method uses the cost of travel to a site as an indicator of the price of visiting it when entry is free. Usually, those who travel further to visit a site incur a higher cost than those who live closer to the site. The effective price of visiting it is higher for those who must travel further to visit the site. Given the normal demand relationship, one would, therefore, expect those who come from areas further away from the site to visit it with lower relative frequency than those who live nearer to it. By finding out the origin of journeys by visitors to a site (for example, by interviewing them at the entrance to the site) one can determine the frequency with which visitors are arriving from different locations. If the populations in those locations are known, the relative frequency of visits can from each area be related to the cost of travel from each location. This relationship is called the trip generation function. Given a few assumptions, this function can be used to estimate the demand curve for visits to the natural site. This method is, for example, outlined in Tisdell (1991, Sec. 7.3).

The estimated demand curve might, for instance be as shown by the line *ABC* in Figure 3. This indicates that nobody is prepared to pay 50 rupees or more to enter the park. However, if entry is free, 1 million visits annually will be made to the park. The visitors' or consumers' surplus, representing maximum amounts that visitors would pay to visit the park, is equivalent to the area of triangle *OAB* in Figure 3. It amounts to 25 million rupees annually. This is an estimate of the tourist/recreational economic value of the park if entry is free and visitors impose no costs for park maintenance. This is one possible way of obtaining the economic surplus estimate considered in the previous section.



**Figure 3: The travel cost method can be used in some cases to estimate the demand by tourists to visit a natural site. This can give rise to a demand curve like that marked ABC. This can in turn be used to estimate the economic surplus obtained by visitors to a natural area and the economic value of the site for tourism**

This approach is sometimes called a revealed valuation method. It merely relies on the observed behaviour of visitors. It does, however, have some limitations. For example, it is liable to be misleading if tourists visit several different attractions (sites) during the same journey. Furthermore, it can only be used to value sites that already cater for visitors not potential new tourist sites. Stated valuation methods are an alternative possibility. They rely on statements by tourists or potential tourists about their willingness to pay for visits to actual or potential tourist sites. For instance, visitors to a site may be asked: how much more than it actually cost you would you be prepared to pay (at a maximum) to visit this site? This sum should represent their surplus. If calculated for all visitors, it will represent the economic value of a site for tourism if entry is free.

An example of this approach is for instance available from research by Tisdell and Wilson into glow worms as a tourist attraction at the Natural Bridge site in Springbrook National Park in southeast Queensland, Australia. They asked 'walk-in' visitors how much it had cost them to travel to view these glow worms. Entry to the underground area where these glow worms can be viewed is free. Then they were asked how much more they would have been prepared personally to pay for this experience. The average travel costs of the visit were AUS\$9.00 per respondent per trip. On average, they said they would have been prepared to pay an additional AUS\$24.70 for a visit. This indicates their average consumer or economic surplus. It can be used to estimate the total economic surplus (economic value) obtained by walk in visitors to this site. This is obtained by multiplying the number of such visitors by this estimate of AUS\$24.80. Note that the economic surplus per walk-in visitor is considerable, on average more than twice their cost of travelling to this site. More information about this subject is available in Tisdell and Wilson (forthcoming).

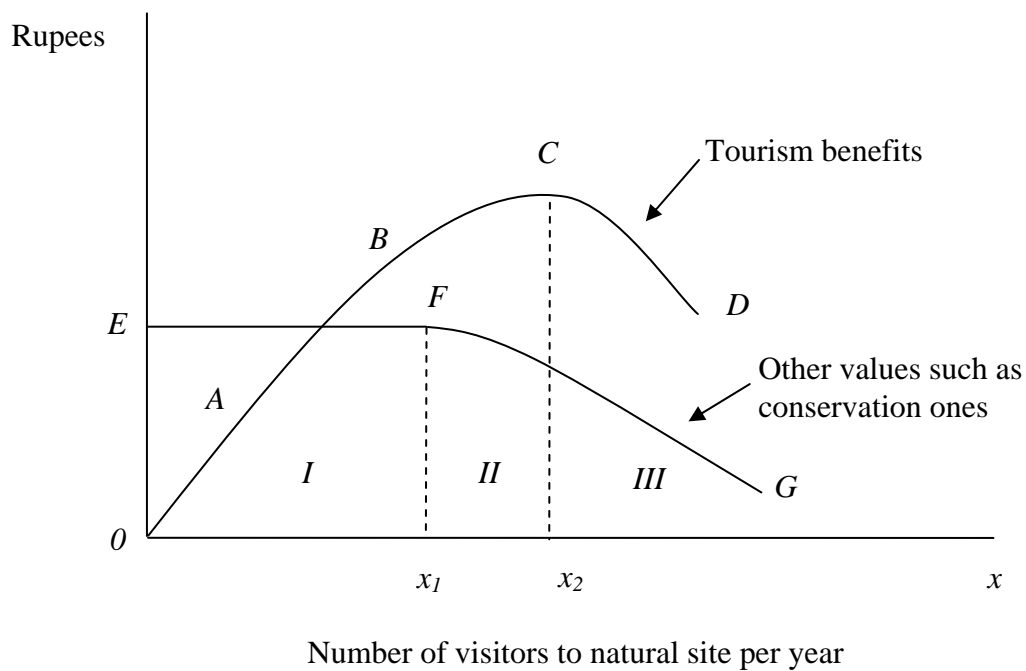
Nevertheless, stated value methods are not without their limitations. Individuals may not be truthful in their responses because of strategic bias. For example, if they fear the information will be used to charge entry fees, they may understate their willingness to pay. Or again, individuals may not be sure of how much they would pay. The question may appear hypothetical to them.

## **5. Total Economic Value, Joint Benefits and Carrying Capacity for Tourism**

A site used for nature-based tourism often jointly provides benefits additional to those for tourism. The total economic value (this concept is discussed by Pearce et al, 1994) of such a tourist area can consist of its economic value for tourism plus its economic value for conserving wild species, maintaining clean water supplies, and so on. Most of these other economic values are obtained offsite. For example, some individuals may value the fact that a particular species of wildlife continues to exist even if they do not view it or use it. The development of nature-based tourism can provide a bonus by helping satisfy these additional economic values. Therefore, in assessing the value of a natural site used for tourism, it can be important to take into account its total economic value.

Consider a simple example. Suppose that the economic value obtained from a natural site consists of two components: (a) its economic value to tourists, and (b) its economic value for other purposes, for example, conserving wild species. In Figure 4, the aggregate economic

value obtained from the site by visitors is shown by curve  $OABCD$ . This indicates that the aggregate value of the area to visitors rises until up to  $x_2$  visitors per year come to the site and then, it declines for a larger number of visitors.  $OABCD$  may decline eventually because the presence of large numbers of visitors cause congestion and crowding and this may detract from the natural experience of visitors. Furthermore, the natural environment at the site may deteriorate, and there may be loss of some wild species, or they may become more difficult to observe as large numbers of tourists visit the site.



**Figure 4:** An illustration of the possible aggregate economic value of tourism at a natural site as a function of visitor numbers, shown by curve  $OABCD$ . Also the possible impact of visitor numbers on other values, for example conservation values, is shown by curve  $EFG$

The aggregate economic value of the natural area for other purposes, such as nature conservation, may be as indicated by the relationship  $EFG$ . This implies that up to  $x_1$  visitors per year, there is no conflict between tourism and nature conservation. Using the area for tourism adds to its economic value and results in a ‘win-win’ situation. For more than  $x_1$  visitors per year, the number of visitors has a negative impact on nature conservation (or other benefits) but aggregate economic benefits from tourism continue to rise until  $x_2$  visitors per year arrive. In Zone I in Figure 4, tourism and nature conservation are compatible. In

Zone II, they are in conflict. In Zone III, increased tourism is detrimental both to the interests of tourists and to conservationists. In Zone I, nature-based tourism (tourists) would be an ally of nature conservation. In Zone II, some conflict is present.

Assume that maximising total economic value is the goal in utilising the natural area. Then the number of tourists to the natural area should not be permitted to exceed the number for which the additional benefit obtained from tourism equals the additional loss in benefits from nature conservation caused by rising tourist visits. This will occur for a number of visitors between  $x_1$  and  $x_2$  annually. This economic outcome will not completely satisfy 'deep ecologists' or those with a very strong nature conservation stance. However, in the absence of the use of the area for tourism, there may be little or no political support for its conservation. It may, therefore, not be conserved at all if it is not used for tourism. That would entail an even worse outcome for conservationists (Tisdell and Broadus, 1989).

By way of digression, it might be observed that the concept of tourist carrying capacity is sometimes used in tourism management as a suggested means for regulating visitor numbers. But the concept is quite imprecise and subjective in practice (Tisdell, 2001, Ch. 10; Lindberg et al, 1997). In Figure 3, for example does the carrying capacity correspond to  $x_1$  or  $x_2$  or neither of these? Observe also that neither of these values maximises total economic value from the site. This occurs for an annual number of visitors between  $x_1$  and  $x_2$ .

## **6. Income Distribution and Economic Impacts as Considerations in Tourism based on Natural Areas**

Traditional economic approaches aimed at maximising the total economic value of resource use, do not take into account the way in which economic benefits are distributed. Nevertheless, income distribution is relevant ethically and politically. It can also have practical consequences for policies aimed at conserving nature.

For instance, there have been instances in the past where the inhabitants of areas intended for national parks and associated tourism development have been forcibly removed from the area and deprived of the livelihood they previously obtained from it. They have received little or no compensation in many cases and have not participated to any significant extent in the management of the national park and in the associated tourist development. For example, this occurred in the initial development phase of Royal Chitwan National Park in Nepal (Mishra, 1982).

Villagers on the edge of protected areas in which they have no economic stake are liable to poach such areas and otherwise exploit them illegally (Tisdell, 1999, Ch. 10).

In many countries, rural dwellers in remote areas are poor and have few economic opportunities. This is true of Inuits (Eskimos) in Northern Canada, Aborigines in remote parts of Australia, and so on. Nature-based tourism can be a useful avenue to supplement their income if this tourism is managed with their involvement. In Canada, regulated trophy hunting of large animals such as polar bears, provides a welcome addition to the incomes of remote Inuit communities. In Australia, there would also be scope for such hunting of saltwater crocodiles in the north. However, the Australian Government provides blanket protection to saltwater crocodiles, because CITES classified this species as endangered, thereby depriving some Aboriginal communities of potential income from trophy hunters.

Politically the economic importance of nature-based tourism in creating employment and providing cash incomes can be significant, especially at the regional level. For example, Tisdell and Bandara (forthcoming) found that Pinnawala Orphanage (located not too distant from Kandy in Sri Lanka) created considerable local employment and that a large proportion of supplies used and sold at this tourist attraction) came from outside the Colombo District. Therefore, this tourist facility tends to promote decentralisation of economic activity.

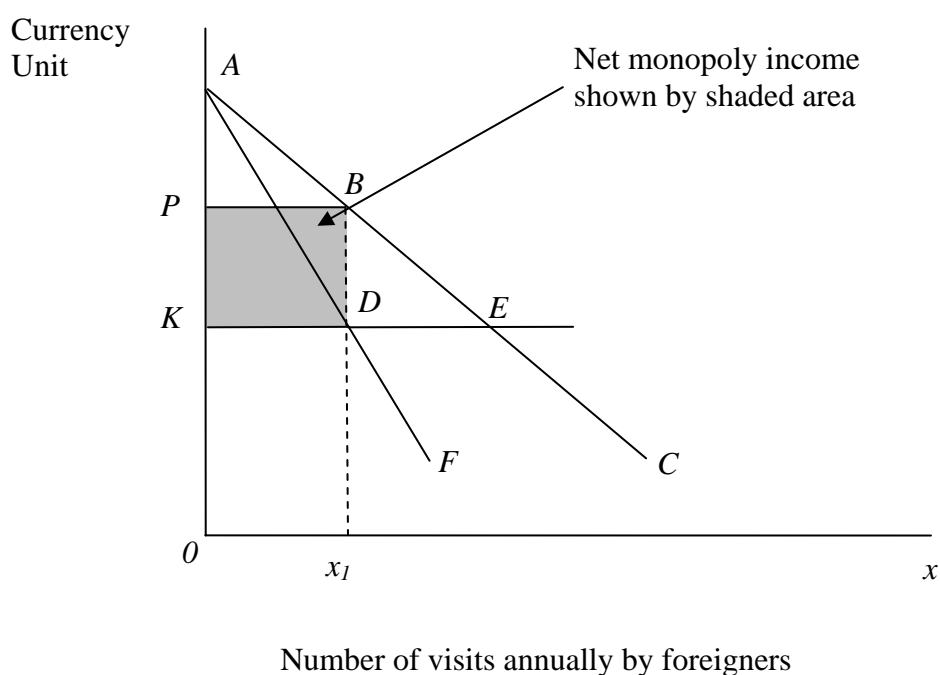
#### **7. The Practice of Charging Higher Fees to Foreign Tourists than to Domestic Tourists**

Many developing countries charge higher fees to foreign tourists than to domestic tourists, for access to nature-based tourist attractions. There may be several reasons for such price discrimination.

Most national governments may only wish to maximise the economic welfare of their own citizens. This they can do so by charging their own citizens an entry fee that represents the cost of catering for each additional visitor. If this is 5 rupees then this is the appropriate charge. If it is zero, then the country's citizens should be able to use the facility free. But a higher price can be charged for foreigners to extract income (economic rent) from them which can be used by the host country. The appropriate fee to do this corresponds to that for which the marginal revenue received from foreigners equals the marginal cost of catering for them.



This can be illustrated by using the traditional economic model of monopoly. If the host nation's nature-based tourist attraction is to some extent unique, it has at least a limited monopoly in catering for foreign tourism based on it. The demand curve for visits by foreigners would then be downward sloping and might be as indicated by  $ABC$  in Figure 5. The marginal revenue curve corresponding to this demand curve is the line  $ADF$ . Suppose that to cater for foreign tourist visits cost  $OK$  per visit. The marginal cost of foreign visits is then indicated by line  $KDE$ . The net income to the host country from foreign tourists is maximised when the marginal revenue obtained from them equals the marginal cost of catering for them. This is satisfied at point  $D$  in Figure 5. It occurs when a fee of  $P$  per visit is charged and results in  $x_1$  visits per year. The annual net income earned from foreigners is the equal to the area of rectangle  $KDBP$  and this is the maximum net income attainable from foreigners.



**Figure 5:** A host nation may have a partial monopoly in some of its nature-based tourist attractions. Hence, it may be able to earn monopoly profits from visits by foreigners as illustrated in this figure

If it costs the same to cater for visits by foreigners as for domestic tourists, national gains for domestic tourists are maximised by charging domestic tourists an entry fee of  $OK$ . By

contrast, to maximise national gains from foreigners, they are charged a higher fee of *OP* per visit.

While there may be some justification for poor nations to engage in such price discrimination, if all nations do this, global economic benefits from nature-based tourism are reduced. That is the negative side of exercising monopoly-power.

## **8. Concluding Comments**

Types of nature-based tourism are quite varied and there is scope to improve their classification. The division of wildlife-based tourism into that which is consumptive and non-consumptive of nature can be very misleading. For many, it suggest that the former is necessarily unsustainable whereas the latter is sustainable. However, as pointed out in this article, both types may be sustainable or unsustainable (may conserve or destroy their environmental or ecological resource-base) depending upon the way in which they are managed. Nevertheless, many individuals find consumptive wildlife tourism to be ethically repugnant.

Rational economic decisions about whether to reserve natural areas for nature-based tourism can be quite complex. This is so even though the economic rule for determining this allocation is simple; normally it is that the (social) economic benefit from using it for nature-based tourism should exceed the net economic benefit from its best alternative economic use, if the land is to be reserved for such tourism. In other words, the economic benefit of using the land for nature-based tourism should exceed its opportunity cost as measured by the best economic alternative forgone.

Determining the economic benefits available from nature-based tourism is not straightforward. This is because these benefits are often not marketed or are incompletely marketed, and many areas useful for nature-based tourism have no substitutes or poor substitutes. Lack of substitutability is one of the main reasons why consumers' or visitors' economic surplus must be taken into account when assessing the economic benefit obtained from nature-based tourism. Various economic methods for estimating the economic surplus or benefits of tourism from nature-based tourism in an area have been outlined. They are useful but also have their limitations.

The economic benefit obtained when natural areas are reserved and used for tourism are usually greater than the economic benefits from tourism alone. Other economic benefits are often obtained as well. These may, for example, include benefits obtained from the natural area because it helps to conserve biodiversity and helps to maintain water quality and stabilise water flows. These side (or joint) benefits from nature-based tourism should be taken into account in deciding whether to reserve land for the development of such tourism. In other words, the assessment should be based on a total economic valuation.

Nevertheless, it must be recognised that nature-based tourism does not always preserve environmental values. Wildlife tourism may, for example, come into conflict with nature conservation objectives if the number of tourists visiting an area reaches high levels. Furthermore, the quality of the experience of visitors may deteriorate if the number of visitors to a natural site becomes quite high, and their total economic benefits from such tourism may fall.

An important issue, frequently ignored in economic discussions of this subject, is the impact of nature-based tourism on the distribution of income. This should not be neglected because of its political and ethical dimensions. Furthermore, when local communities obtain little economic gain (or suffer economic loss) as a result of nature-based tourist developments, they may sabotage the environmental resources on which such tourism depends. An associated issue is the extent to which the tourist development generates cash flows and to what extent members of the local community share in those cash flows. A tourist development that generates large economic benefits to outsiders but results in little or no cash flows into the local community and virtually no added local employment will be resented by the local community. Thus, in assessing overall social benefits from a nature-based tourist development, it will be necessary to weigh up possibly large gains to the outside community against any economic detriment to the local community.

In some developing countries, higher fees are charged to foreigners than domestic tourist for access to the same tourist attractions. This is designed to increase the economic gains of the host country from its tourist assets. While this procedure may be defensible on income distribution grounds, it is a restrictive practice. Globally it results in economic benefits from tourist assets being less than they could otherwise be. Furthermore, if all nations were to adopt this practice, this would result in additional restrictions and reduce global benefits from

such assets even further. Yet in practice the international income distribution issue cannot be ignored, and a case exists for higher income countries to provide subsidies to lower income countries as a support for efforts in conserving nature (Tisdell, forthcoming; Tisdell, 1990, Ch. 4).

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