

**BIODIVERSITY CONSERVATION:
STUDIES IN ITS ECONOMICS AND
MANAGEMENT, MAINLY IN YUNNAN,
CHINA**

Working Paper No. 18

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Assessing its Economics**

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Rural nature reserves can have negative as well as positive spillovers to the local region and policies need to be implemented to maximise the net economic benefits obtained locally. Thus an 'open' approach to the management and development of nature conservation (biodiversity) programmes is needed. The purpose of this study is to concentrate on these economic interconnections for Xishuangbanna National Nature Reserve and their implications for its management, and for rural economic development in the Xishuangbanna Dai Prefecture but with some comparative analysis for other parts of Yunnan

The Project will involve the following:

1. A relevant review relating to China and developing countries generally.
2. Cost-benefit evaluation of protection of the Reserve and/or assessment by other social evaluation techniques.
3. An examination of the growth and characteristics of tourism in and nearby the Reserve and economic opportunities generated by this will be examined.
4. The economics of pest control involving the Reserve will be considered. This involves the problem of pests straying from and into the Reserve, e.g., elephants.
5. The possibilities for limited commercial or subsistence use of the Reserve will be researched.
6. Financing the management of the Reserve will be examined. This will involve considering current sources of finance and patterns of outlays, by management of the Reserve, economic methods for increasing income from the Reserve and financial problems and issues such as degree of dependence on central funding.
7. Pressure to use the resources of the Reserve comes from nearby populations, and from villagers settled in the Reserve. Ways of coping with this problem will be considered.
8. The political economy of decision-making affecting the Reserve will be outlined.

Commissioned Organization: University of Queensland

Collaborator: Southwest Forestry College, Kunming, Yunnan, China

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Investment in Ecotourism: Assessing its Economics

ABSTRACT

After briefly defining ecotourism, factors affecting the demand for it, its relative growth and its value for nature conservation are discussed. There has been an upsurge in interest in ecotourism as a possible profitable means to ensure sustainable ecological development. However, investment in ecotourism does not always have the favourable consequences claimed for it. Investment in ecotourism may fail to give a favourable private return for reasons outlined. Factors to be taken into account in assessing private profitability of investment in ecotourism and the likely demands for it at a site are examined. Assessment of social returns from investment in ecotourism is made on a wider basis than the determination of private returns. All investment for the development of ecotourism, whether privately incurred or not, is taken into account along with any external benefits or costs generated. It may also be necessary in calculating social return to include an allowance for increased consumers' surplus obtained by ecotourists from investment in ecotourism. The user-pays principle is discussed because social return is not necessarily dependent on payments. Nevertheless tourism development has to be financed and one source of finance is payments by tourists. The transaction costs involved in imposing fees affects the economics of charging and means to reduce such costs are considered. In conclusion, it is pointed out that investment in ecotourism is liable to cause damage to natural environments and offset policies are proposed as a way to compensate for this.

Investment in Ecotourism: Assessing its Economics

1. Introduction and Background

There is little doubt that nature-based tourism is a significant segment of the tourism market (Lindberg, 1991; McNeely *et al.*, 1992, pp. 7-8) and that much of the tourism is or ought to be ecotourism in the sense of being careful of its environmental impact. This raises the question of what is ecotourism? The problem is that a number of definitions of ecotourism exist (Tisdell, 1994; Horneman, 1994; Wen and Tisdell, 1995). Here the definition of McNeely *et al.* (1992) will be used. They use the term nature-tourism and ecotourism interchangeably and state that "it is defined as tourism that involves travelling to relatively undisturbed natural areas with the specific object of studying, admiring and enjoying the scenery and its wild plants and animals as well as any existing cultural aspects (both past and present) found in those areas" (McNeely *et al.*, 1992, p.2).

Demand for ecotourism appears to be positively related to income levels, educational attainment and the availability of leisure-time, if for example one judges this from estimates of demand to use national parks (Ranken and Sinden, 1971). This implies that demand from residents of developed countries for ecotourism is likely to be much greater than from residents of less developed countries but that as the latter develop their demand for ecotourism can be expected to grow.

There is some debate about whether the ecotourism market is expanding faster than tourism as a whole. While this is believed generally to be the case, Horneman (1994) and Beeton (1995, pers. comm.) have questioned this view. They suggest that ecotourism is growing at about the same rate as the tourism market as a whole. Nevertheless, it is clear that the ecotourism market has grown considerably and that ecotourism is an important subject given its relevance to the goal of attaining ecologically sustainable development, a goal endorsed by the United Nations Conference on the Environment and Development (1992) in its Agenda 21 which calls on all nations to draw up strategies to achieve ecologically sustainable development in the 21st century. China has for example drawn up such an agenda and has included the development of 'green' tourism as part of it (The State Council, 1994).

Ecotourism may be one of the least environmentally damaging forms of land-use and if carefully planned can be compatible with the conservation of biodiversity and provide an

economic incentive for such conservation. If profitable, it may add to political support for nature conservation.

In Australia, there has been considerable interest in ecotourism which has been reflected in the drawing up of a National Ecotourism Strategy (Commonwealth Department of Tourism, 1994) as well as ecotourism strategies by a number of the states. The National Ecotourism Strategy defines ecotourism as "nature-based tourism that involves education and interpretation of the natural environment and is managed to be ecologically sustainable" (p.3). This strategy document states that "effective environmental planning and management ensures that ecotourism and the environment can successfully coexist" (p.19). It goes on to claim that the environment can gain benefits from ecotourism and is in general supportive of the development of ecotourism.

Ecotourism has also been recommended to less developed countries as a means to earn income and foreign exchange and at the same time .conserve nature (IUCN, 1980). In some cases, it undoubtedly constitutes the most economic and most profitable land-use (Western, 1982) and should be encouraged. However, it has not been without its critics (Tisdell, 1994). Criticisms and qualifications include:

- a) Ecotourism in low income countries is a development that favours higher income groups and mostly foreigners. Thus it could have negative income distribution consequences.
- b) Travel to an ecotourism site can add to environmental deterioration. It usually involves the burning of fossil fuels e.g. in international airline flights, and thereby adds to greenhouse gas emissions.
- c) The side-benefits for nature-conservation as a result of ecotourism may mostly be enjoyed by foreigners e.g. through existence value and option value, and the country in which the ecotourism occurs may be unable to appropriate any economic gains from these spillover benefits.
- d) From a national point of view, ecotourism (or, tourism generally) may be less profitable than it appears to be at first sight. In evaluating ecotourism, account should be taken of the cost of any supporting infrastructure provided by public funds and of advertising and promotion using public funds (Tisdell, 1984).

- e) Private ecotourism enterprises face many business risks and difficulties. Profit is by no means assured.
- f) National strategies for ecotourism development need to be well planned from an economic point of view, otherwise economic losses may be incurred and these might reduce rather than increase resources available for nature conservation. For instance, if a body managing a natural park invests in ecotourism and makes a loss, it may be forced to reduce its expenditure on wildlife protection to cover this loss.
- g) Some critics of ecotourism point to possible negative effects of ecotourism on nature conservation e.g. destruction of natural areas by buildings associated with tourism, roads and access paths as well as human disturbance of animals and the trampling of vegetation.

Given this background, let us consider factors that are likely to influence the private profitability of investment in ecotourism and then examine the social economic gain to be expected from investment in ecotourism before taking up some special issues.

2. Private Profitability of Investment in Ecotourism

The profitability of investment in ecotourism is of interest to private firms considering investing in the industry and to public authorities or bodies hoping to make a profit or surplus from investment in ecotourism development. Normally, one would expect private firms investing in ecotourism to be primarily interested in its profitability and to wish to maximise the long-term profitability of their investment. This means that nature conservation is only likely to be practised by private firms as long as it supports long-term profitability, unless of course the firm is otherwise constrained, for example by the law, to take care of the environment. There is always a risk that the private development of ecotourism will conflict with social objectives for conservation.

Public bodies sometimes invest or encourage investment in ecotourism. For example, national park authorities, or their equivalents, invest in some countries directly in ecotourism or provide concessions to private firms to do so in protected areas. There may be a variety of reasons for this. These include the following:

- a) The authority may wish to make a profit or surplus from ecotourism to supplement its funds for conservation management.
- b) The investment may be seen as a means of adding to political support for the conservation body or it may be a defensive political measure; a concession to avert political hostility or loss of political support.
- c) The authority may see the surplus or benefit from ecotourism as a way of adding to its income and as a means to improve the working conditions and salaries of its employees.

However, investment in ecotourism need not have these desired consequences. If the conservation body makes a loss from its ecotourism investments, it may be forced to draw on other funds to cover this loss and this can reduce its available funds for conservation management. Thus its conservation effort may be reduced rather than increased by its ecotourism initiative. While in some quarters, the encouragement of ecotourism by a park body could increase political support for it e.g. from those gaining business concessions for ecotourism, visiting ecotourists and those in the travel industry likely to benefit, this must be balanced against possible increased opposition from dyed-in-the-wool conservationists who see tourism as a threat to wilderness and nature conservation. In addition, if investment in ecotourism proves to be unprofitable, developers of ecotourism may be tempted to sacrifice nature conservation to cover economic losses or they may have insufficient funds available to continue to protect nature.

Again if the motive of a park body for investing in ecotourism to obtain discretionary funds to assist employees with prerequisites, this motive will be thwarted if ecotourism operates at a loss. In that case, the benefits and conditions enjoyed by park employees are likely to deteriorate as a result of losses on its tourism investment.

How should one determine the profitability of investing in ecotourism from a private point of view? Private profitability should only relate to the resources supplied by the investor and the benefits appropriated by the investor. In certain circumstances, an ecotourism enterprise may for example not pay for the land on which it is located or pay less than the market value for its use.

For instance the enterprise may be involved in building and operating a hotel or lodge in a

protected area belonging to the public (or the state). The investor may be the public body managing the protected area or a private entity. Nothing or very little may be paid for the use of the land on which the buildings are located, not to mention ready access by guests to the surrounding or nearby natural protected area. It is the actual payment for resources that counts in estimating the private profitability of the enterprise. Note that if a tourist developer had to buy not only the site for the tourist hotel but the surrounding natural area, then his/her required investment would be much higher.

On the other hand, most of the investment in buildings and fittings is likely to be the financial responsibility of the developer. However it is possible that the developer may not pay for all required investment e.g. the full cost of access roads. The investment has an opportunity cost (the highest alternative return foregone) and in the planning or early stages before final commitment funds, all investible funds are perfectly transferable to other uses.

Once investment in the tourist project takes place, much of the investment is likely to become a sunk cost. The economics of continuing operations will then depend on making a surplus on operating costs sufficient to yield a satisfactory return on realizable capital value, satisfactory being, for example, interpreted as the highest alternative return available on the realizable capital value of the assets of the tourist enterprise.

However, the possibility of additional profitable investment in an ecotourism enterprise should not be ruled out even though much of the previous investment is sunk. If the additional investment is very profitable, because for example it generates considerable additional demand to use the possibilities of the tourist enterprise, then it is justified even if the return on the total investment (including the sunk component) remains below that available elsewhere.

More precisely let A be the initial investment in an ecotourism enterprise and let the rate of return on the initial investment be r_1 . At the planning stage the expected value of r_1 should equal or exceed the highest return available elsewhere by investing the funds assuming that profitability is the prime motive of the investor. After the initial investment, suppose that the realizable value of the enterprise's assets are R and let the return in relation to R be r_2 . Then it is necessary for $r_2 \geq r_m$, when r_m represents the highest alternative return available by realizing the business's assets and investing these elsewhere. Otherwise, it will pay to realize the assets of the ecotourism business and invest these elsewhere. Note that $A-R$ represents the

sunk costs of the business.

An alternative to continuing with current operations or the current business plan may be to undertake additional investment, K , with a view to raising returns. If the increase in the surplus as a result of the investment of K is such as to give a return on K in excess of r_m and if the return on $R + K$ combined also exceeds r_m , the additional investment is profitable from a commercial point of view. The level of return on $A + K$ is immaterial if sunk costs are involved. The difficulty, however, when new investment is being undertaken is to predict its likely return accurately.

McNeely *et al.* (1992, p. 17) present a checklist of factors that can be expected to influence the tourism potential of a protected area. The factors mentioned as likely to influence the demand of tourists to visit a protected area are in summary:

- 1) Proximity of the area to .an international airport or tourist centre and ease of access to it generally
- 2) Special wildlife attractions and likely successful viewing of these.
- 3) Vicinity of features of interest.
- 4) Proximity to other areas of tourist interest.
- 5) Cultural attractions.
- 6) Variety of recreational possibilities.
- 7) Uniqueness of the protected area.
- 8) Attractiveness of the surrounding area.
- 9) Standard of food and accommodation available.

All of these factors (some of which overlap) need to be taken into account. They imply for example that a remote area that has no unique attractions is unlikely to have a high tourist potential. A high standard of accommodation and food in such localities is unlikely to compensate for natural disadvantages of the site.

Naturally the tourist potential of a site may change. For example, the potential of Cape York

for ecotourism has increased due to the growth of Cairns as a tourist centre and the development of a major international airport there. But Cape York Peninsula is still relatively remote from Cairns, roads are in poor condition and access to many parts of the Peninsula is difficult, becoming almost impossible in the wet season (Hohl and Tisdell, 1995). Some unique (or relatively unique) wildlife exists there but the sighting of it is uncertain. Thus demand for 'ecotourism' closer to Cairns outstrips that on Cape York Peninsula.

Cape York Peninsula suffers from extreme seasonality in tourism, as do many other areas under consideration for ecotourism. For example, many tropical areas are subject to summer monsoons and during that period unsuitable for tourism. Such large seasonal fluctuations in tourism add considerably to the cost of tourist operations and must be taken into account when planning ecotourism development.

3. The Social Return from Investment in Ecotourism

In estimating the social returns from investment in ecotourism, all investment related to the ecotourism enterprise ought to be accounted for irrespective of whether it is incurred by the enterprise or not. For example, if the government upgrades or invests in an access road or pathways mainly to serve the ecotourism enterprise, this cost should be included in the investment. This means that any government subsidy or support via complementary investment would be included in social return estimates. From this point of view, the exercise is similar to estimating the social return to investment in education (Psacharopoulos, 1994).

Whether or not offsite favourable externalities should be included in the social benefits generated by an ecotourism enterprise would depend upon whether a natural site was acquired or retained specifically for the purpose of this tourism. If the site is acquired or retained primarily for ecotourism, external benefits from the natural site would be included in the calculation of the social returns. If on the other hand, ecotourism happened to be a consequence of conservation of a site rather than a reason for the conservation of a natural area, it would not be appropriate to attribute the favourable externalities from the site to ecotourism. But, there are some cases where the possibility of ecotourism is partially a consideration for the conservation of a natural site. In these cases, the extent to which favourable externalities should be attributed to ecotourism can be unclear.

The construction of facilities for ecotourism can provide a means for increasing the consumers' surplus obtained from a natural site and thus raise the utility obtained from it. For example, suppose that a natural site contains virtually no facilities for tourists. The demand for visits might be as indicated by line D_1D_1 in Figure 1. If there is no charge for use of this site, the consumers' surplus generated is equivalent to the area of dotted ΔOBC . Suppose that tourism facilities are built. To operate these costs OE per visitor but raises the demand for visits to the level indicated by line HF . If a charge of OE per visit is introduced, consumers' surplus becomes equivalent to the area of hatched ΔEFH . In this case, there is a considerable increase in consumers' surplus. This increase can be regarded as an economic benefit from ecotourism and so would be included in the estimate of its social net benefits.

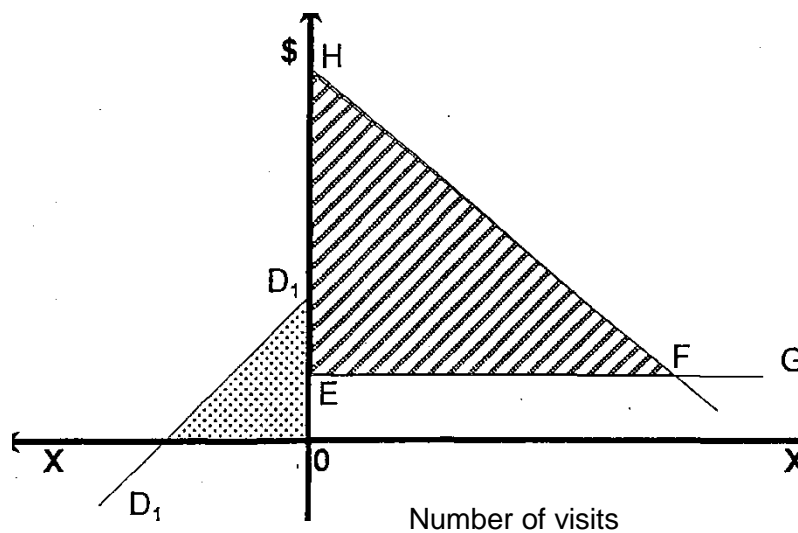


Figure 1 The provision of facilities for ecotourism may raise the consumers' surplus obtained from a natural site.

Because ecotourists tend to appropriate a high proportion of the benefits obtained from investment in ecotourism, it is generally argued that they should pay. Indeed, support for the user-pays principle has grown in relation to the provision of environmental resources including protected areas. The management, if not the provision, of protected areas has to be financed. The alternative to financing these by visitors' fees is to do so from the public purse and this means that all taxpayers must pay, irrespective of whether they use or see merit in the protected areas. Particularly in less developed countries, the public financing of protected

areas can be a considerable burden. Because of this burden, public funding in such countries is likely to be inadequate when judged from a global perspective. Nevertheless, few countries fund their protected areas to any large degree from user fees.

Traditionally economists have argued that fees for the use of facilities should be set equal to marginal costs, at the margin of use. If price discrimination is impossible, this implies that price should equal marginal cost. To charge a price in excess of marginal cost in such cases, e.g. a monopoly-price, is to reduce social welfare as is illustrated in Figure 2.

In the case shown in Figure 2, given that line D_1D_1 represents the demand for visits by tourists to a protected area and the line number MR is the corresponding marginal revenue curve, total profit would be maximized by charging each ecotourist a price of P_1 per visit. However compared to marginal cost pricing, this would result, in a deadweight social loss equal to the area of hatched triangle FBG. It is assumed that line AFC r presents the marginal cost of supply of facilities to tourists for each visit. Economic theory certainly does not support the proposition that charges should be as much as the traffic will bear.

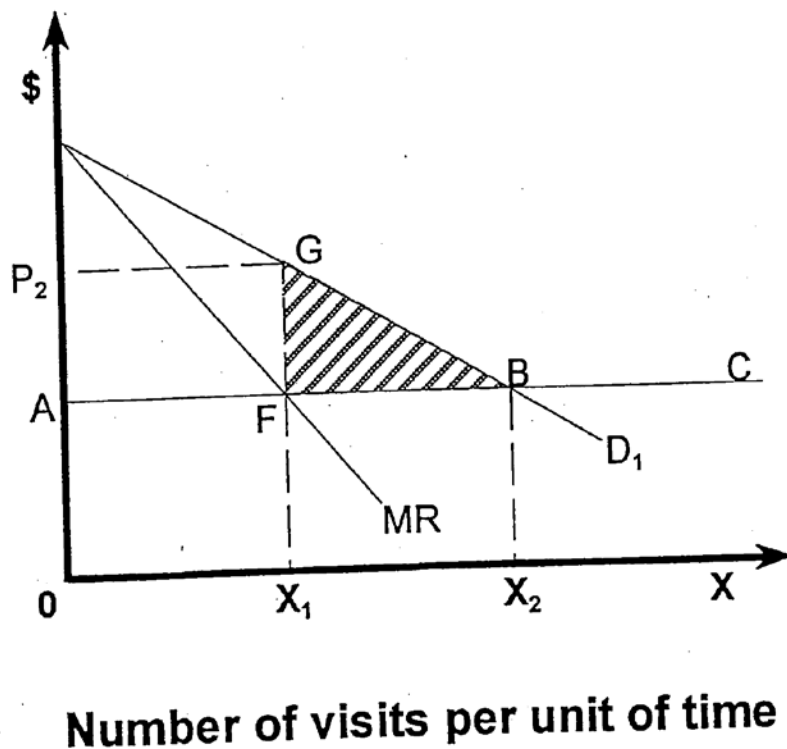


Figure 2 If not appropriately applied, the user pays principle can result in deadweight social loss

Application of the user-pays principle can also be limited by the cost of collecting charges. Given these costs, it is sometimes socially optimal (from an economic viewpoint) not to collect fees. This occurs when the net economic benefit after imposition of charges is less than economic benefit in the absence of charging. Such a case is illustrated in Figure 3. In this figure, line ABE represents the marginal cost of catering for visitors to a protected area and AG represents the marginal costs of collecting fees per visit so that the marginal cost curve with collection of the fees is as represented by line GJ. Suppose that the problem is whether to charge fees using marginal cost financing or not to charge at all. Line D_1D_1 represents the demand for visits.

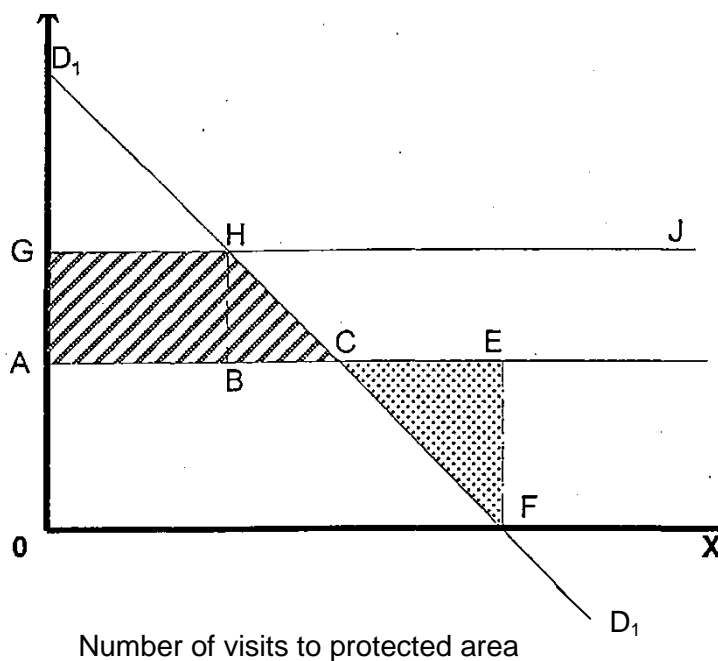


Figure 3 The transaction costs involved in applying the user-pays principle can result in social economic loss

In the case illustrated in Figure 3, in the absence of fees for visits to the protected area the social deadweight economic loss is equivalent to the area of dotted triangle CFE. The imposition of fees using marginal cost pricing results in a deadweight social loss equal to the area of quadrilateral ACHG. This consists of the cost of collection of fees equal to the area of rectangle ABHG and stemming losses equal to the area of triangle BCH. In this case, the deadweight social loss from fee collection (in terms of social benefits forgone) exceeds that

from not charging for access to the protected area. But this does not taken account of any adverse economic effect of a tax necessary to provide finance equivalent to the area of rectangle OFEA if user-pays is not adopted. On the other hand, alternative means to funding may exist other than taxation e.g. the use of subscriber fees. In the case of "subscriber fees" permit for visits for a period of time may be obtained in advance by an individual so reducing transaction costs involved in charging. Furthermore, it is usually economic to charge for use of a number of tourism facilities e.g. guided tours, accommodation even if the charging for access to a protected area is not economical.

Another aspect to consider in relation to the charging of fees is that it is capable of having adverse environmental consequences as pointed out by Clarke *et al.*, (1995). It may cause tourists in particular cases to spill over into more ecologically sensitive natural areas.

4. Some Further Considerations

The question of obtaining income from resources used for ecotourism remains important, especially in less developed countries where governments find it extremely difficult to find finance to manage and provide protected natural areas. This means, amongst other things, that attention has to be given to ways to reduce the transaction costs involved in imposing charges

Collection of fees at the entrance to protected areas can be costly especially if there are few visitors and if the protected site is located in a remote area or if there are many entrances possible to the protected area.

Alternatives to charging fees at an entrance to a site are

- 1) To expect each visitor to a protected area to purchase a permit in advance from a central point e.g. the National Parks and Wildlife Service or Forestry Department in a large town. Enforcement is then by policing. Camping permits for National Parks in Queensland are issued in this way.
- 2) To require tourist operators to pay the visitor fees. The Great Barrier Reef Marine Park Authority for example operates such a system for cruise boats operating in the Great Barrier Reef Marine Park. This transfers the cost of collection to tour operators. However, tourists not in officially organized groups escape payment under this

method.

- 3) An alternative to (1) would be to have automatic ticket machines such as those used for some car parks to issue vouchers or to have agents e.g. some petrol stations, to issue permits. This would have the advantage of more flexibility than (1) from the tourists' point of view

The charging of fees for use of protected areas is sometimes criticized on income distribution grounds. In some less developed countries e.g. China, this has resulted in a different entrance fee being charged to foreigners to that charged to locals. Charges which in effect exclude the bulk of local people from the enjoyment of protected areas are likely to result in a political backlash which in the longer term may reduce support for protection of natural areas.

Those developing ecotourism enterprises often argue that the demand to use their services would be much greater if infrastructure were improved. Infrastructure includes facilities for transport e.g. roads and airports, for communication and the availability of utilities such as electricity. While this may be so, it may also be that such a relationship is exaggerated in order to place political pressure on government bodies to provide such facilities. Their provision provides indirect benefits to ecotourism enterprises at little or no cost to these enterprises. Furthermore, the value of this provision must be assessed from a social point of view rather than considered from the point of view of a special interest. Often those arguing for improved infrastructure combine this with a claimed threshold effect. It is for instance, sometimes argued that if infrastructure can be increased beyond some minimum threshold level that a quantum leap in demand for tourism in an area will occur. This suggests that the gradualistic approach to tourism policy of searching for an optimum by small changes is unrealistic and that a 'big-push' is needed. This however, unfortunately opens up the way to big economic mistakes in investing in tourism development.

5. Concluding Comments

The economics of investment in ecotourism is a complex subject both from a private and social point of view. Private profitability is by no means assured, and as indicated in the previous section it often depends on the provision of publicly provided infrastructure. In that regard the provision of adequate information by governments about the likely supply of such

infrastructure can be expected to reduce private uncertainty about investment. This can be regarded as a desirable form of indicative planning.

Whether or not investment in ecotourism is favourable to the conservation of nature remains debatable. Clearly it can be at the expense of nature. For example, a site in a protected area may be 'developed' to provide accommodation facilities. As a result, nature conservation is reduced in and around this site. It may be possible to compensate for this by requiring the ecotourism enterprise to purchase additional land, say on the perimeter of the protected area, to be added to the protected area. In effect, this involves instituting an offset policy for investment in ecotourism. While such an approach to policy is well worth exploring, and has been considered by Pearce *et al.*, (1989) in a general environmental context (see Tisdell, 1993 Ch. 8), one of the main difficulties of this approach is to determine whether proposed environmental offsets provide adequate compensation for environmental losses caused by investment in ecotourism in protected areas.

In the absence of an offset policy, there is a risk that existing protected areas could be whittled away by increasing intensity of their use for ecotourism. At least if offset is the normal practice, a special case would need to be made out for ecotourism investment in protected areas for which no offset is provided. McNeely *et al* (1992) suggest that facilities to cater for tourists such as hotels should be located outside protected areas presumably because of their adverse environmental impact if located within a protected area. This is a more restrictive approach than use of an offset. Location of facilities outside rather than within a protected area may also reduce the demand to use it for ecotourism purposes e.g. because the setting is of lower environmental value or inconvenient since cost is involved in travelling to the protected area from outside its borders.

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