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COMMENT

Funds for biodiversity

A number of recent publications have pointed out the accelerating speed at which ecosystems and biodiversity are being lost (United Nations Development Programme/United Nations Environment Programme/The World Bank/The World Resources Institute 2000). The general view is that conservation can only be achieved in a global network of protected areas (see Pimm *et al.* 2001). To safeguard the most important ecosystems, Myers *et al.* (2000) have suggested that we primarily conserve 25 biodiversity hotspots, in particular forests, comprising 1.4% of the land surface of the Earth. The costs for the conservation of these hotspots have been estimated at US$ 500 million per year (Myers *et al.* 2000), while the costs of a global network of protected areas may even reach US$ 27.5 billion per year (James *et al.* 1999). Even though these costs may seem minor compared to, for example, the costs of global armament, governments in developing countries and environmental organizations are clearly not in the position to finance conservation. It is thus urgent to raise additional funds to safeguard biodiversity. In the following, I suggest a twofold strategy, based on tourism.

International tourism is growing rapidly, involving almost 700 million international arrivals in 2000 (WTO [World Tourism Organization] 2002). Obviously, a global activity of this scale has a significant impact on the physical environment, including the change of land cover and land use, the use of energy, the exchange of species over geographical barriers, the extinction of wild species, and the exchange and dispersion of diseases (Gössling 2002). According to models, land-use changes, climate change, biotic exchange and atmospheric CO_2-increase will be major factors causing the loss of biodiversity in the future (Sala *et al.* 2000). Tourism thus contributes to the loss of biodiversity in several ways. While most of the environmental change related to tourism is difficult to quantify and qualify (such as the exchange of species over geographical barriers and its consequences), some impacts are reasonably well documented. Land alteration is the most important driver of change in biodiversity, which interacts with other important components of global change such as global warming (Vitousek 1994). According to first-order assessments (Gössling 2002), tourism may contribute 0.5% to the alteration of biologically productive lands, mostly as a result of traffic infrastructure development. With respect to energy use, leisure-related human activities may contribute 3.2% (14 080 PJ) to global energy use and 5.3% (1400 Mt CO_2-equivalent) to CO_2-equivalent emissions. CO_2-equivalent emissions are proportionally larger as a result of the additional warming effect of other trace gases emitted at flight altitude by aircraft (such as NO_x and H_2O) (cf. Intergovernmental Panel On Climate Change 1999). Per unit of energy used, air travel has the greatest impact on global warming. Even though it accounts for only 15% of the leisure-related distances travelled globally, it is responsible for about 18% of the energy use and 37% of the contribution of leisure-travel to global warming (Gössling 2002; see also Gössling *et al.* 2002). This is problematic because air travel is beyond the scope of control of the Kyoto agreement (Olsthoorn 2001).

Overall, tourism's contribution to environmental change may seem minor, but it should be considered that this contribution is highly skewed: the industrialized countries, which constitute only 15% of the world's population, account for 82% of the global leisure-related transport distances and the associated impacts. Within the industrialized countries, a small group of long-distance travellers (possibly less than 5% of the world's population) seems to account for a major share of the leisure-related energy use (probably more than 40% on a global scale). In conclusion, a comparatively small group of tourists can in a sense be held responsible for most of the global environmental change occurring with tourism.

In view of its impact on the environment, it is somewhat paradoxical that tourism is largely based on the existence and persistence of 'natural', unsullied areas. Following the general principle that the full environmental costs of human activities need to be reflected in the price of goods and services, it is thus argued here that the environmental costs of tourism should be reflected in the price of travel. In order to achieve this, a 'conservation levy' for protected areas could be included

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in the retail price of vacations based on air travel, the most harmful form of travel. These much-needed financial resources could then be directed to biodiversity conservation. The implementation of such a policy would raise the price for a typical package tour by only 1–5% and make substantial amounts of money available globally. For example, collecting US$ 20 from each of the approximately 235.7 million leisure tourists carried in international aircraft in 1996 (WTO 1998) would generate more than US$ 4.7 billion annually. Simultaneously, such a policy could serve the goal of reducing excessive growth rates in air travel, even though there is some uncertainty about the price elasticity of air travellers (Becken 2002). However, it is likely that the tourist industry will strongly oppose any increase in prices because this would be understood to be detrimental to economic goals. It is thus important to seek the cooperation of the tourist industry and to emphasize the importance of ecosystem preservation, on which travel ultimately depends. In order to implement 'conservation tourism', the United Nations Environmental Programme and the World Bank could launch a Biodiversity and Tourism protocol. Once ratified by a sufficient number of large tour operators, the 'conservation levy' could be introduced. Funds could be distributed via the Global Environment Facility, which has already established a thousand projects across 160 nations and profound experience in working with governments, the private sector, non-governmental organizations and international institutions (El-Ashry 2002).

'Local money' for biodiversity conservation could be launched by an extension of tourism compatible with conservation goals (see Honey 1999). For example, visiting rainforests has become an important tourist attraction in many tropical countries, with up to US$ 670 earned per hectare per year (direct and indirect benefits) (Gössling 1999). However, in most protected areas, access fees have remained rather symbolic. On average, only 0.01–1.0% of the overall travel costs may be spent for entrance fees, even though the visitation of protected areas is among the main objectives for travelling. One way of capturing higher economic benefits may be to increase fees and charges. For example, it has been reported that Costa Rica was able to increase the receipts from entrance fees by 487% by raising prices for admission from US$ 1.5 to US$ 15 for non-resident visitors (Jurgschat 1997). Other studies suggest that even prices of US$ 20–70 seem to be well accepted by tourists (Strasdas & Behrens-Egge 1997; Vorlaufer 1997). Adjusted admission fees can help to maximize the economic benefits from tourism, but they also allow control of the number of visitors, or limitation of growth rates, so that planning, management and control measures are not outpaced by development (McNeely *et al.* 1990; for a review of pricing policies see Laarman & Gregersen 1996). Requests for voluntary donations could also increase income from tourism. Many tourists seem to feel it important for their visit to contribute to conservation and local development (Lindberg *et al.* 1998). Tour operators could also redistribute part of their income to the protected area they visit (Boo 1990; Lindberg 1991); this is already practised in some countries like Malaysia (Lindberg *et al.* 1998). Overall, there seems to be a huge potential to increase income for conservation activities from tourism. A combined global-local strategy to collect funds could generate an estimated 30% of the US$ 27.5 billion needed to finance a global network of protected areas and thus be an important step towards financing protected areas, safeguarding biodiversity and internalizing the environmental costs of tourism.

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