

6-3-2  
PN-AAQ-806  
1571=36130

# CONSERVING LIVING RESOURCES IN THIRD WORLD COUNTRIES: ECONOMIC AND SOCIAL ISSUES

CLEMENT ALLAN TISDELL

*Department of Economics, University of Newcastle,  
N.S.W. 2308 (Australia)*

*(Received June 6, 1983)*

The author examines socio-economic factors as elements in conservation problems and policies in the Third World, taking into account population growth and income aspirations in LDCs, expansion of the market system, introduction of new technology, discounting of the future and difficulties of policy enforcement. The case of the Dugong or Sea Cow (*Dugong dugon*) is used as an illustration. On the policy side, matters such as the role of national self interest (including possible gains from international tourism as in the case of Tanzania), the distribution of gains and losses from conservation and the provision of information and education are discussed to give a general overview. Implications of international aid and assistance for conservation in LDCs are also discussed.

## INTRODUCTION

Living resources in Third World countries are an especially important source of direct sustenance for their populations, and in many cases are actually or potentially a significant source of foreign income through exports of goods, such as timber and fish, and may generate "invisible" trade such as tourist trade. However, Third World countries only appropriate a small proportion of the world benefits from the existence of their living resources and this, combined with their particular economic, social and demographic pressures, means that the world as a whole needs to address itself to the issues outlined in *The World Conservation Strategy*,<sup>1</sup> as drawn up by IUCN, UNEP and WWF.

By concentrating on the particular conservation problems of Third World countries, it is not implied that conservation problems in developed countries are unimportant. However, by far the largest proportion of the world's species exist only in Third World countries. Most of the developed countries of the world lie outside tropical and semi-tropical areas, that is the areas containing the majority of the world's species.<sup>2</sup> Economic change in Third World countries threatens the existence of many species—some will inevitably disappear but others can be saved by changed policies and by international aid or assistance.<sup>3</sup>

The purpose of this paper is to outline economic and social factors that are inimical to conservation in less developed countries and to consider policies that might encourage greater conservation in these countries. Proposed policies and current practices raise ethical questions both for the Third World and for the world as a whole.

## CONSERVATION PROBLEMS AND THEIR SOCIO-ECONOMIC ORIGINS

### 1. *Some of the Problems*

Species are increasingly endangered or are disappearing in the Third World due to the activities of man. Increasingly, (a) their habitat is being destroyed by man and

consequently wildlife loses food or shelter or other means of life-support; (b) man is harvesting the population of many species at a faster rate than ever before, in many cases at unsustainable rates; and (c) in some cases, even though the species itself may not be harvested nor its habitat threatened, man is competing more intensely with the species for a resource (such as a food-source) vital to the species. These trends are well documented and there is no need to go into the details here.

However, habitat destruction is an insidious threat to nature. It is occurring in the Third World as forests and trees are removed, as wetlands are drained, as urban and rural settlements expand, and as land areas are transformed to meet the immediate demands of man.<sup>4</sup> Loss of forests and tree cover is coming about, for instance, because of logging (very often for sales of exported commercial timber, as in the case of rainforests), the cutting of timber for fuel, the clearing of land for agricultural use, and because of overgrazing (by domesticated animals) which hampers the regeneration of trees. Land is being more extensively and intensively used for agriculture. In areas of nomadic and of shifting agriculture, permanent settlement is becoming more common and in the case of shifting agriculture, cycles of use are speeding up so that there is less time for natural regeneration of areas to occur between shifts. Agriculture is also encroaching increasingly onto arid and semi-arid lands and marginal agricultural ones. Such changes in land-use, apart from hastening the disappearance of species, are causing environmental changes such as desertification, erosion, siltation, hydrological disturbances and possibly weather changes. Considerable doubt has been expressed about whether economic development can be sustained in these circumstances.<sup>5</sup>

These environmental consequences follow from a number of socio-economic factors—rising human populations, heightened income aspirations, the expansion of the market system, the availability of new technology, high effective rates of interest, constraints on the enforcement of conservation measures in Third World countries and, in some cases, the nature of political and power structures within these countries. Many of these matters have been well canvassed but it is appropriate to emphasize their significance by looking briefly at each factor in turn.

## 2. Population Growth and Income Aspirations

One of the most important factors contributing to the deterioration of the natural environment at present is the growth of human population and rising aggregate levels of consumption of goods. Even though incomes per head are not rising significantly in many LDCs, their levels of population growth are such that even with relatively constant levels of consumption per capita, aggregate consumption and production is rising and placing mounting pressure on natural resources.<sup>6</sup> Demand from developed countries to import natural resources from LDCs puts further strain on the natural environment of the Third World.

No major reversal of these influences is likely to occur in the next few years. Even though rates of population increase may now be declining overall in the Third World<sup>7</sup> and rates of population increase are close to zero in many developed countries, substantial absolute increases in the levels of population in the Third World can still be expected to occur and pressures for rising levels of material consumption are likely to continue throughout the world. Indeed, they may intensify in LDCs able to make economic gains, as casual observation of the recent experience of some previously less developed oil-exporting nations indicates.

It might be thought that the population drift to urban centres in LDCs will reduce environmental pressures on the countryside.<sup>8</sup> However, this is by no means certain

to occur. The drift raise income aspirations more, the link between

Issues about des consumption and t objectives, cannot tion of nature. Are for steady-state eco global scale? Shou belts" as suggested tion efforts in the

## 3. Expansion of the

With the advent of the world (subject into a (modified) m increasingly drawn completely integrat

While expansion tages, it can also res tion of nature, as p natural resources p some common-prop population increase with more distant co unsustainable and/e effects can be illust discussed below, or

The growth of th ships. For example, the neglect of social tendency is reinforce greater mobility of short-term attitude t control) because an economic possibilities or her present locati also become relative

As the socio-econ the control of absent the community in w include absentee-lar panies, effectively co to sever the link bet ment.

## 4. New Technology

New technology imp tion of natural resour

to occur. The drift to cities may encourage commercial agricultures and fisheries and raise income aspirations thereby adding to pressures on the countryside. Furthermore, the link between man and nature may be weakened.

Issues about desirable levels of human population, desirable limits on human consumption and the efficacy and acceptability of possible methods to achieve these objectives, cannot be ignored by individuals interested in supporting the conservation of nature. Are, for example, the type of policies for zero-population growth and for steady-state economies proposed by Hermann Daly<sup>9</sup> desirable and workable on a global scale? Should the developed countries be the first ones to "pull in their belts" as suggested by Ehrlich<sup>10</sup> and would this be effective in influencing conservation efforts in the Third World?

### 3. *Expansion of the Market System*

With the advent of relatively low cost transport and communication systems, most of the world (subject to some qualifications for socialist countries) is now integrated into a (modified) market system. Remaining isolated pockets of the world are being increasingly drawn into this system and partially integrated ones are becoming more completely integrated.

While expansion of the market system and of markets can bring economic advantages, it can also result in greater exploitation of natural resources and less conservation of nature, as previously isolated communities find that they have markets for natural resources previously unexploited or used on a limited scale. In particular, some common-property resources of a community (apart from being strained by population increases), may be more heavily exploited to provide means of exchange with more distant communities. Harvesting of a species, for instance, may become unsustainable and/or the community may alter its system of property-rights. The effects can be illustrated, for example, by the case of the dugong (or sea cow), discussed below, or by the use of the Dal Lake in the Kashmir Valley.<sup>11</sup>

The growth of the market also fosters the development of impersonal relationships. For example, it encourages the growth of private self-interest in behaviour to the neglect of social considerations necessary for environmental preservation. This tendency is reinforced by an expansion in private-property rights and, in particular, greater mobility of individuals. Increased mobility of individuals encourages a short-term attitude towards conservation (even where conservation is within private control) because an individual always has the prospect of moving away to *other* economic possibilities once a natural resource has been exhausted or degraded in his or her present location. Localized forms of social control, e.g. social criticism, may also become relatively ineffective with greater social mobility.

As the socio-economic system changes, resources may increasingly come under the control of absentee-owners, with little or no interest in the general well-being of the community in which such resources are located.<sup>12</sup> The absentee-owners can include absentee-landlords, and large companies, including multinational companies, effectively controlled by individuals resident in distant areas. This also helps to sever the link between nature and man, that is, alienate man from his environment.

### 4. *New Technology*

New technology imported from abroad can provide means for accelerated exploitation of natural resources in the Third World. Any previous social restrictions on the

use of common-property resources, such as closed seasons or areas, may prove ineffective in ensuring the preservation of living resources once, for instance, advanced hunting technology is introduced.

The rate of harvesting of a wildlife species can be pushed beyond the rate of growth of its population because a new hunting or harvesting technology is introduced, and consequently the exploited species may be driven to extinction. Hence, if the species is common-property (or effectively so), stricter social regulations on hunting or harvesting may be needed to forestall extinction of the species when new technology is introduced. However, the necessary changes in regulations may be slow in coming. The community may be slow to perceive the danger to the existence of a species, to formulate alternative courses of action to deal with the danger and to obtain social support for a particular policy.

One method sometimes used in the Third World is to ban new hunting or harvesting technologies or to limit their use to specific locations or time-periods. Provision has been made for this in the wildlife management areas of Papua New Guinea.<sup>13</sup> While this policy may be effective on conserving the species under threat, it does mean that the cost involved in making the actual harvest or catch is greater than necessary.

But it is not only harvesting or hunting technologies that can threaten the existence of a species. Other new technologies used in different economic activities may result in the habitat of endangered species being destroyed at a faster rate<sup>14</sup> or may give rise to unfavourable spillovers for the species, for instance, chemicals and metal wastes that poison the species or affect its reproduction.

### 5. Problems Illustrated by the Case of the Dugong or Sea Cow

The Dugong or Sea Cow (*Dugong dugon*) is a saltwater-dwelling mammal of the order *Sirenia* (which also includes the manatees of America). The geographical range of this mammal is from the Red Sea through the Indian Ocean and into the waters bordering northern Australia and those surrounding New Guinea.<sup>15</sup> Due to localized hunting pressures and its extremely slow rate of reproduction, (it is a K-selected species), the dugong has been virtually eliminated from all of its range except that in northern Australia and surrounding New Guinea. However, it is also endangered in those areas.

The dugong lives in shallow bays and similar areas where it feeds on marine grasses that are not utilized to any great extent by other species. The meat is tasty and eagerly sought after by Papuan and other original people, and the animal helps provide protein from a resource that otherwise would be virtually unutilized.

For a number of reasons, the dugong is now endangered in the Torres Strait and it may be necessary for Australia and Papua New Guinea to cooperate in safeguarding this shared natural resource. For example, Brydget Hudson, who has extensively studied the dugong in Papua New Guinea,<sup>16</sup> has pointed out:

With the introduction of new technology and greater wish to participate in the cash economy, the dugong taken by the Kiwai people of the northern Torres Strait increased by more than 100 percent in 20 years, the largest increase in hunting level taking place in the mid-to-late 1970s. In 1981 the dugong catch fell dramatically and analysis of the structure of the population of animals killed in the previous three years caused grave concern over the viability of the exploited population.<sup>17</sup>

Traditionally, dugongs were hunted along the Papuan coast from canoes using hand-thrown harpoons, though even more limited methods were used earlier.<sup>18</sup> Although some barter trading of dugong occurred (for example, for sago), most

dugongs were dugong seem

i) The addi  
it has little ch

ii) The incre  
for cash. The  
sale.

iii) The inc  
added to the h  
educational fe  
the Kiwai peo

With the introduc  
now needed mon  
within the village

The social re  
1976 the dugo  
that it could o  
Nevertheless,  
the Western B  
though the spe  
extensive educ  
Management  
their own Con  
were allowed t

The populati  
hunting pressu  
Conservation (C  
its Conservatio  
of dugong in th  
gazetting them

In many are  
continues, e.g.  
dugong appear  
for the Maza  
species, includi

The dugong p  
illustrates varie  
These include  
collective action  
a policy from  
now, many villa  
recently said,

Dugong-hunting ha  
aware of the danger  
suddenly being rest  
studies, their pride  
dugong.<sup>26</sup>

Other exampl  
could, for instar

4

dugongs were consumed by the village catching them. Harvesting pressure on the dugong seems to have increased because of the following factors:

i) The addition of outboard motors to traditional canoes—once a dugong is sighted it has little chance of escaping—and the use of nylon nets.<sup>19</sup>

ii) The increased trade in dugong meat between villages and in Daru, for example, for cash. The outboard motor has made it easier to bring dugong meat to Daru for sale.

iii) The increasing Papuan population and their rising income aspirations have added to the hunting pressures as have demands for cash to pay taxes, to provide for educational fees, and to purchase Western goods such as beer and tobacco. Two of the Kiwai people suggest that,

With the introduction of the local councils, village people were asked to pay head tax. This meant that they now needed money. So instead of trading the money economy has grown to the stage where now, even within the village, people want to sell dugong meat.<sup>20</sup>

The social response to the changed circumstances of the dugong have been slow. In 1976 the dugong was made a National Animal of Papua New Guinea, which meant that it could only be legally hunted by traditional methods for traditional purposes. Nevertheless, the take continued at high level. In 1976, for example, the Kiwais of the Western Province remained opposed to any regulation of dugong hunting, even though the species is culturally most important for them.<sup>21</sup> However, in 1978, after extensive education by the Wildlife Division of PNG, they create the Maza Wildlife Management Area for the conservation and management of dugongs and appointed their own Committee to manage it. Nevertheless, the people of the coastal villages were allowed to continue to supply meat to the market at Daru.<sup>22</sup>

The population of dugong in the North Torres Strait continued to decline because hunting pressures remained the same. In 1981 the Minister for Environment and Conservation (PNG) wrote to the Maza Committee urging it to strengthen its rules in its Conservation Area. The Committee has suggested rules to ban totally the hunting of dugong in the Maza Wildlife Management Area, but there has been slowness in gazetting them.<sup>23</sup>

In many areas, however, the hunting (and incidental take in nets) of dugong continues, e.g., around the Daru and Australian islands of the Torres Strait. Since the dugong appears to move between reef areas, it can be seen that this poses a problem for the Maza Management Area.<sup>24</sup> Much more needs to be done to protect this species, including some international co-operation.<sup>25</sup>

The dugong problem, apart from illustrating the impact of a market cash economy, illustrates various social/administrative lags in implementing conservation policies. These include a perception lag, a lag in convincing individuals of the need for collective action, a lag in devising alternative possible policies and a delay in selecting a policy from amongst the alternatives and obtaining its social acceptance. Even now, many village people are not aware of the danger to the dugong. Two Kiwai have recently said,

Dugong-hunting has been our livelihood—our traditional way of living. Village people are not clearly aware of the danger of extinction of this species. They can still find and catch plenty—they ask, why are we suddenly being restricted by the government? But if they were consulted and involved in the various studies, their pride in dugong will grow. People will understand that it is our responsibility to protect the dugong.<sup>26</sup>

Other examples from the Third World can be used to illustrate these points. One could, for instance, take the disappearance of or severe reduction in populations of

5

reef-dwelling species, such as clams and bêche-de-mer, from many island areas in the Pacific depleted as a result of introduced technology, extended marketing possibilities, economic growth and population pressures.

#### 6. High Effective Rates of Discount

Discount rates in less developed countries are often very high or effectively so. Under those conditions there is, as pointed out by Clark,<sup>27</sup> a tendency to realize slow-growing populations of living resources, such as slow-growing tree species like teak. The costs of realizing such assets being the same, one might expect them to be more frequently used up in countries with high discount rates.

Taking a narrow economic point of view, it is likely to be more economic to drive a species to extinction in a less developed country than in a developed one, if the rate of interest is the only material consideration. However, constraints on the availability of capital required for the harvesting process may slow up this process in LDCs.<sup>28</sup> Direct investment by multinational companies such as those involved in logging may, on the other hand, help to overcome capital limitations in particular cases. Nevertheless, such companies may apply a high rate of discount to their operations in LDCs to allow for political risks and to take account of insecurity of tenure over resources. In addition, they may be relatively insensitive to local environmental considerations.

#### 7. Problems in Enforcing Conservation Measures and Questions of Social Structure

It is, of course, one thing for central governments to pass regulations designed to encourage wildlife conservation, and another thing to ensure that these regulations are respected and enforced. Sometimes there are stringent laws covering the hunting of wildlife in LDCs but these are not enforced—the resources for policing the regulations may not be available, there may not be a will to enforce them, and it may be easy to bribe low-paid officials.<sup>29</sup>

When individuals are being damaged by wildlife conservation measures, they are likely to resist them. For example, residents near national parks suffering damages from marauding animals or losing traditional rights to areas covered by parks cannot be expected to be sympathetic to conservation of wildlife unless they are compensated in some way for their losses.

Again, considerable moral conflict is involved in preventing those in dire economic circumstances from using conserved resources, even when it is known that the benefits to the poverty-stricken are likely to be short-term and their action may result in long-term deterioration of their environment.<sup>30</sup> One may basically have to come to grips with the problem of increasing population in order to act "humanely" in such cases. Although it is clear that encroachment onto lands bordering the Sahara and their more intensive agricultural use will lead to environmental degradation, such encroachment is difficult to prevent when individuals have no alternative means of support.

## POLICIES FOR INFLUENCING AND IMPROVING CONSERVATION PRACTICES IN THE THIRD WORLD

### 1. Broad Strategies

Attempts to achieve greater conservation of living resources in the Third World can take many forms. This includes the approach taken in the World Conservation

Strategy which basically argues that in many cases conservation is in the self-interest. Such conservation requires adequate rewards to be given this view, appropriate actions are: (a) to ensure that the public is adequately informed about the social and economic benefits of conservation and rewarded for conservation efforts; (b) to ensure that LDCs receive adequate rewards to pay (for example, for) conservation effort.

Opinions of conservationists vary as to how effective in promoting conservation are sales (appropriation of resources) and development along market lines in LDCs and to conservation efforts by multinational operating in a free market system leads to conservation, partially because of the introduction of inappropriate incentives, the ideal solution or in some cases, conservation goals may be consistent with the market system of the world.<sup>33</sup>

The World Conservation Strategy, mentioned, sees economic development and conservation as seen as complementary. In contact between the developed world as played out in the World. Its approach is not to change human behavior (on forms of life other than those suggested) but to take the steps (as suggested) to increase conservation within existing socio-economic conditions. To others, it involves addressing the issues—the possibility of "legitimizing" conservation as a "down-dressing," or being seen as exploitation for their own benefit.

### 2. Provision of Information

The World Conservation Strategy sees conservation/development as complementary. There has been progress in many areas, suggests particular targets. Great emphasis is placed on communication.

Strategy which basically assumes that most men want to act in their own self-interest and argues that in many cases, greater conservation of resources would be in their self-interest. Such conservation does not occur either because of ignorance about the value of conservation or because of social or other impediments to the payment of adequate rewards to individuals for their conservational efforts. Consequently, given this view, appropriate strategies for influencing conservation effort in LDCs are: (a) to ensure that decision-makers in the Third World (and elsewhere) are adequately informed about the benefits to them of conservation, and (b) to promote social and economic reforms so as to ensure that relevant decision-makers are rewarded for conservational effort. In the latter case, this may involve measures to ensure that LDCs receive greater sums from benefits for which foreigners are willing to pay (for example, tourism) or changes in foreign aid so that account is taken of conservational effort.

Opinions of conservationists vary widely as to social measures that may be most effective in promoting conservational aims. Some pin their faith in greater marketing or sales (appropriation) of benefits provided by conservation,<sup>31</sup> whereas others see development along market lines as contrary to the interest of most individuals in LDCs and to conservation.<sup>32</sup> In their view, especially when reinforced by the multinational operations of business enterprises and international agencies, the market system leads to exploitation of both human and natural resources in LDCs, partially because of the myopic self-seeking behaviour which it encourages and the introduction of inappropriate technology. Not all members of this group agree on the ideal solution or indeed suggest one. However, the writings of some suggest that conservational goals might be best achieved by minimal contact of the Third World with the market system and with the socio-economic system of the developed world.<sup>33</sup>

The World Conservation Strategy, in contrast to the more radical view just mentioned, sees economic development and conservation as compatible, indeed conservation is seen as a prerequisite for economic development. It envisages contact between the developed and the Third World as increasing, and the developed world as playing a significant role in fostering conservation in the Third World. Its approach is a man-centered one, conservation is for people.<sup>34</sup> Its strategy is not to change human values so that man, for example, places greater intrinsic value on forms of life other than human life (that is, to create a reverence for life in all of its forms) but to take the selfish inclinations of man as given and (by means already suggested) to increase conservational effort. In practice, it involves working with and within existing socio-economic systems. To some this is the only realistic approach. To others, it involves the possibility of undue compromise on conservational issues—the possibility, for example, that by association, conservation groups will “legitimize” conservation efforts which are only minimal or which are only window-dressing, or be “captured” by self-interest groups in favour of economic exploitation for their own gain.

## 2. *Provision of Information and Education*

*The World Conservation Strategy* (1980) claims: (1) “Public participation in conservation/development decisions is seldom adequate,” and (2) “although there has been progress, there is insufficient environmental education,” and suggests particular target groups to which educational campaigns should be directed. Great emphasis is placed on the importance of environmental education and communication.

1

However, advice and education needs to have a realistic basis in LDCs. In many instances, no doubt traditional knowledge is more helpful than introduced Western ideas, but not always. Furthermore, ideas need to be communicated within a social and cultural context, and propaganda that fails to take this into account is likely not to achieve its purpose.<sup>35</sup> Sometimes well-meaning Western-based conservation bodies and natural scientists are out of contact with local realities in providing aid and advice—their own information is lacking. For example, WWF is reported to have given the Papua New Guinea government a large sum of money to purchase land for a national park to preserve birds-of-paradise without realizing the existence of inalienable tribal or clan lands, ruling out the option of purchasing land for a national park.

It is also important to realize that even if individuals see conservation as being in their collective self-interest, this does not ensure that individuals will conserve wildlife. Here one needs to bear in mind the prisoners' dilemma—a case in which individuals are perfectly informed but action in accordance with their narrow self-interest leads to the welfare of all being adversely affected; that is, to a suboptimal collective outcome.<sup>36</sup> However, knowledge about a social problem may help to increase the social acceptability of any regulations designed to control individual actions based on narrow self-interest.

### 3. *Appropriating Greater Gains Nationally from Conservation*

This is not to deny that self-interest can be a powerful force for conservation. Indeed, the willingness of LDCs (or of their governments) to undertake conservation is likely to be lessened by their failure to appropriate a sufficient share of world gains from conservational activity. In some cases it may be possible for them to adopt policy measures which will increase their share in gains, but in some instances no such measure is available given the international type of public good involved. In the latter case, the best that they can hope for is support from foreign aid.

An LDC may fail to appropriate benefits or substantial benefits from:

i) Its preservation of a gene pool. The preservation of a gene pool is important for maintaining the vitality of many species of domesticated animals and cultivated plants. It is uncertain which wild cultivars will be used and determining a price for their sale and use outside a country involves many bargaining difficulties and uncertainties. The same applies to the preservation of species that are not yet of commercial value but could become of use in the future.<sup>37</sup>

ii) An LDC may fail to crop or harvest its conserved living resources on a sustainable basis and adequately develop markets for their produce. The controlled cropping of conservation areas can be consistent with their sustainable conservation and sometimes is the most economic use of a land area. Overharvesting as well as underharvesting and inadequate marketing back-up of wildlife produce can result in a reduction of national gains from conservation.

iii) An LDC may similarly not succeed in appropriating maximum gains from tourism (especially international tourism) generated by the existence of natural resources. The tourism option for appropriation is considered below.

iv) Nevertheless, even after all avenues for appropriation have been fully exhausted, residual public good benefits from conservation of living resources will continue to exist on an international scale. These include, (a) option benefits—the possible values of being able to use a resource in the future if it exists; (b) existence

benefits—the value of global spillovers of slowing of rises in reduced siltation of most sophisticated effort are adopted residual unappropriated

### 4. *Tourism as a Means*

The role of tourism destroys tourism and cultural effects. For developing countries it is part of the dual economy is also entered imposes a large drain on foreign tourists.<sup>41</sup> It means, of appropriate government for the conservation government policies in fact married with conservation factors because the and, in fact, it cannot living resources are

The scope of LDC infrastructure of major utilities), health and from the developed modernness in the world foreign tourists visit number of foreign tourists problems. Let us consider

Indonesian policy to concentrate tourism Java and in Bali. Further Report or "Master Plan Peninsula to minimize Balinese cultural life have emerged in Bali growing as a third force confine tourism to overall environmental that strong international eventually likely to

Tanzania also ill appropriating gains largest proportionate scenery. It encouraged devised a number of accommodation in

4

benefits—the value of knowing that a species exists or continues to do so, and (c) global spillovers or transnational spillovers of benefit—for example, the possible slowing of rises in carbon dioxide levels, maintenance of weather conditions, or reduced siltation of internationally-shared river systems, and so on.<sup>38</sup> Even if the most sophisticated available techniques for appropriating gains from conservational effort are adopted by LDCs (and some of these may be impractical in LDCs), residual unappropriated benefits from conservation can be expected to continue.

#### 4. *Tourism as a Means of Appropriating Gains from Conservation*

The role of tourism in conservation is complicated because in some cases tourism destroys tourism and conserved resources as well.<sup>39</sup> It can also have undesirable cultural effects. Furthermore, some would argue that international tourism in developing countries is frequently controlled by multinational companies and becomes a part of the dual economy with little benefit to the indigenous people.<sup>40</sup> The possibility is also entertained that although tourism may bring in foreign exchange, it imposes a large drain on reserves of foreign exchange—imports are needed to satisfy foreign tourists.<sup>41</sup> Nevertheless, tourism still provides a means, but not a costless means, of appropriating gains nationally from conservation, and it can be an inducement for the conservation of living resources in the Third World.<sup>42</sup> However, government policies are definitely needed to ensure that benefits from tourism are in fact married with conservation. There is no automatic connection between these two factors because the prisoners' dilemma problem seems to apply with a vengeance and, in fact, it can happen that the greater the gains from tourism the more quickly living resources are destroyed.

The scope of LDCs in encouraging foreign tourists is limited by the poor social infrastructure of many (for example, poor communication systems and inadequate utilities), health and similar risks in some countries and the distance of some LDCs from the developed countries of the world. Nevertheless, as the amount of wilderness in the world dwindles and in the long pull, it is expected that the number of foreign tourists visiting LDCs will increase. In some LDCs substantial rises in the number of foreign tourists has already occurred and have posed serious management problems. Let us consider some examples.

Indonesian policy on foreign tourism appears, at least in recent times, to have been to concentrate tourism in a limited part of the country. It has been concentrated in Java and in Bali. Furthermore, the original intention in accordance with the SCETO Report or "Master" Plan was to confine tourist development in Bali to the Bukit Peninsula to minimize its adverse impact on the physical environment and on Balinese cultural life.<sup>43</sup> Gradually, however, nodal centres of tourist development have emerged in Bali. Furthermore, the area around Medan in Sumatra seems to be growing as a third focus for tourists to Indonesia.<sup>44</sup> In practice, a policy of trying to confine tourism to a particular area or region in a country (in order to minimize overall environmental impact) is likely to be difficult to enforce in the long-run, given that strong internal pressures for economic gains and their wider distribution are eventually likely to find expression through the political process.

Tanzania also illustrates some of the general problems which LDCs face in appropriating gains from tourism based on conservation. Tanzania possibly has the largest proportionate conservation area of any LDC, and some of the most attractive scenery. It encourages foreign tourists so as to generate foreign exchange and has devised a number of means for making tourists pay for using its natural assets.<sup>45</sup> Most accommodation in conservation areas is provided by the government-owned Tan-

zania Tourist Corporation. Monopoly-type prices can therefore be charged to appropriate gains and complications about foreign ownership are absent. There are fees for hunting of wildlife, photography, and so on. The government-owned Tanzania Wildlife Corporation is active, within the general scheme of conservation arrangements, in selling benefits from the presence of wildlife. Its activities include, "cropping, catching of live animals, trapping of birds, photographic safaris and tourist hunting . . . The Corporation is a specialised manufacturer, dealer and exporter of all types of game skins, head mounts, full mounts, ladies handbags . . ." and other items.<sup>46</sup>

The number of tourists to Tanzania per year rose rapidly from its 1967 level of 37,700 to a peak in 1976 of 231,000. Since then, the numbers have fallen substantially and the number was 128,000 in 1981. Several factors have undoubtedly contributed to the decline which has created excess capacity in the Tanzanian tourist industry. Bearing in mind the distance of Tanzania from most developed countries, rising air fares following the oil-price hikes would have been a contributing factor and the world recession would have had an effect. Tanzania's foreign exchange earnings from sources other than tourism also fell dramatically in this period and this, combined with the rising price of imported oil and related products, and the cost of the war in Uganda,<sup>47</sup> resulted in a severe shortage of foreign exchange, which further added to the difficulty of the tourist industry maintaining itself since some imports are a prerequisite for its success. It certainly added to the problem of ensuring supplies for the tourist industry—without adequate supplies tourists are unlikely to come. Tourist facilities and supplies suffered and this, in turn, meant fewer tourists. For example, Tanzania's Tourist Representative in the U.K. stated that in recent years, some tour operators have been put off selling Tanzania because of the standard of service in hotels and lodges and problems of supplies.<sup>48</sup> Because of these difficulties, the World Bank recently gave Tanzania a substantial loan to rehabilitate its tourist facilities. Clearly, an LDC can experience many economic problems in seeking to appropriate gains from conservation-based tourist industry.

### 5. Improving Internal Distribution of Gains from Conservation

The World Conservation Strategy suggests that individuals directly affected by conservation measures should benefit first-hand from them. While pointing out that local people may benefit from a protected area by being assured of a regular supply of water or of wildlife which can be hunted outside a reserve, it stresses,

However, the community should also be able to share in the new benefits, such as income from recreation and tourism. Although local communities may benefit indirectly from tourism if receipts by the national treasury are spent on such services as roads, water supply and health facilities, local commitment to a protected area can only be assured through provision of local advantages such as increased opportunities for employment and commerce.<sup>49</sup>

One can find examples where the local community has been given a substantial share in gains from conservation areas, to their own benefit and to the benefit of wildlife preservation. The case of the Masai in the Amboseli National Park in Kenya is a well-documented example.<sup>50</sup> In contrast, local villages in the neighbourhood of the Royal Chitwan National Park (where wildlife conservation has also been successful) have not been able to share in the tourist benefits of the Park and have suffered loss of life, livestock and crops from marauding animals from the Park, and loss of grazing and timber-gathering areas in the Park.<sup>51</sup> Mishra points out that,

Tourism is a service-oriented industry. Only a few locals are employed, and the tourist industry's promises of benefits from outside Nepal . . .<sup>52</sup>

Indeed, Mishra observes that tourism has expanded rapidly in the Chitwan National Park "except for a few trade parks which are losing instead of gaining."<sup>53</sup>

In the Sagarmatha (Everest) region, made to train local Sherpas, but has benefited, Jeffries<sup>54</sup> considers the situation from relative to the area, food prices and fuel. Serious degradation of the environment by expeditions and trekking is noted.

It is difficult to control this activity and to encourage villagers to finance the cost of conservation because of the change in the

Changed methods of decision-making in the Sagarmatha region. Nationalized and in 1990, decision-making was placed in Kathmandu. Before that, decision-making was on a village-by-village basis but local people were not replaced by outsiders. Remote from the Khumbu region, deforestation.

### 6. International Aid and Conservation

Conservation in the Third World is a spillover for the rest of the world. He-who-benefits should be the one to pay for conservation in the Third World. A subsidy from the rest of the world to the benefit of the Third World on the basis of the subsidy or grant. Donors may believe that the aid, even though little, is worth it. Some believe that man has a self-interest or self-centred interest in conservation can be motivated by the possibilities represented by conservation to the rest of the world and to man from conservation. Thus the first entry (B, E) is as a benefit to man in the

Tourism is a service-oriented industry, but because of the local shortage of educational opportunities, only a few locals are employed, and then only in menial jobs. Tourism has not generated local jobs, despite the tourist industry's promises. Most of the well-paying jobs are taken by qualified and experienced people from outside Nepal . . .<sup>52</sup>

Indeed, Mishra observes that the price of products such as foodstuffs have increased rapidly in the Chitwan area as a result of tourism, and he goes so far as to say that, "except for a few traders and merchants most people in the vicinity of the national park are losing instead of gaining from tourism."<sup>53</sup>

In the Sagarmatha (Mount Everest) National Park in Nepal an attempt has been made to train local Sherpas for participation in management of the Park. While this has benefits, Jeffries<sup>54</sup> points out, "they are subject to pressure for special consideration from relatives and friends in the local community." In the Sagarmatha area, food prices and fuel prices have also risen under the pressure of tourist demand. Serious degradation of the Park is now threatened by the cutting of wood for sales to expeditions and trekkers. Jeffries<sup>54</sup> suggests that,

It is difficult to control this cutting, in part because selling firewood has probably become essential to the villagers to finance the cost of high-cost foodstuffs on which, in turn, they have become dependent in part because of the change in their lifestyle fomented by increasing tourism.

Changed methods of government have also played a role in reduced conservation effort in the Sagarmatha area. In 1957, common forest and pasture lands were nationalized and in 1963 democratic government was introduced. Consequently, decision-making was placed in the hands of the central government and gravitated to Kathmandu. Before this, the use of forest products had been regulated on a village-by-village basis by local forest guardians. However, control taken away from locals was not replaced by effective control over forests from Kathmandu, which is remote from the Khumbu region. Lack of social control has therefore contributed to deforestation.

#### 6. *International Aid and Assistance*

Conservation in the Third World can give rise, as pointed out above, to favourable spillovers for the rest of the world, and global benefits. On the principle that he-who-benefits should pay, this provides one ground for the rest of the world aiding conservation in the Third World. Apart from this equity-type of consideration, a subsidy from the rest of the world might foster increased conservation in the Third World to the benefit of the former. Pure self-interest of the rest of the world is the basis of the subsidy or grant in this case. Again, altruism may form the basis of the grant. Donors may believe that increased conservation will benefit the recipients of the aid, even though little or not benefit is expected to themselves. It is also possible that some aid for conservation is not motivated by anthropocentric considerations—some believe that man has a responsibility for nature which extends beyond his own self-interest or self-centred consideration.<sup>55</sup> Grants to the Third World for conservation can be motivated by a wide range of factors. They are compatible with the four possibilities represented in the matrix in Table I. The first element in each cell refers to the rest of the world and the second to the Third World, and B represents a benefit to man from conservation in the Third World, and N represents no benefit to man. Thus the first entry (B, B) represents a benefit to man in the rest of the world as well as a benefit to man in the Third World from conservation in LDCs.

11

TABLE I

Four possible constellations of benefits from conservation of living resources in the Third World

		Third World	
		Beneficial	Non-beneficial
Rest of World	Beneficial	(B, B)	(B, N)
	Non-beneficial	(N, B)	(N, N)

The rest of the world can also influence conservation in the Third World through aid and financial assistance given for projects other than direct conservational projects. Environmental factors can be taken into account in providing support. Progress in this regard has been slow but as Myers<sup>56</sup> points out, the World Bank and U.S. AID now undertake environmental assessments in supporting Third World projects. However, many international aid and finance agencies do not, and government support for private overseas investment (very often by multinational companies) rarely takes environmental factors into account.<sup>57</sup>

There is the further matter that irrespective of the motives for giving aid for conservation, it has to be channelled through existing communities in the Third World. Their social structures (elites, power relationships and attitudes) can interfere with the effective deployment and use of such aid. These difficulties cannot always be easily and quickly overcome and may result in a good deal of frustration for conservationists.

### CONCLUDING COMMENTS

The world undoubtedly faces a problem due to the continuing destruction of its species as a result of the activities of man. This process can be expected to accelerate rather than subside in the foreseeable future if present trends continue, particularly in the Third World. It has been pointed out in *The Global 2000 Report to the President of the U.S.* that,

Extinction, of course, is the normal fate of virtually all species. The gradual process of natural extinction will continue in the years ahead, but the extinctions projected for the coming decades will be largely human-generated and on a scale that renders natural extinction trivial by comparison. Efforts to meet basic human needs and rising expectations are likely to lead to the extinction of between one-fifth and one-seventh of all species over the next two decades. A substantial fraction of the extinctions are expected to occur in the tropics.<sup>58</sup>

It is by no means clear that socio-economic arrangements in the Third World can be altered at a sufficient pace to avert the large scale disappearance of species there. Yet, if the tide of extinction is to be held back to take advantage of any leeway, we must obtain a better understanding of the socio-economic issues underlying the disappearance of species in the Third World. Conservation policies must be based on relevant economic and social considerations as well as natural scientific principles.

### ACKNOWLEDGEMENTS

This article is based upon a paper prepared for the Third World Congress of Social Economics, 17-19 August, 1983, held at Fresno, California. I wish to thank Professor A. Cullen, Brydget Hudson, Max Downes, Alex Magai and N. T. M. H. De Silva for comments and/or for supplying information of use in preparing the paper. The usual *caveat* applies.

### REFERENCES

1. *World Conservation Strategy*
2. N. Myers, *The Sinking Ark* (Oxford, 1979) pp. 21-22.
3. R. Allen, *How to Save the World*
4. Myers, *op. cit.* (1979).
5. Allen, *op. cit.* (1980); *World Conservation Strategy Report to the President*
6. Barney, *op. cit.* (1980).
7. N. N. Eberstadt, "Fertile Ground for Environmental Conservation"
8. Barney, *op. cit.* (1980).
9. H. Daly, *Economics, Ecology and the Environment*
10. P. R. Ehrlich, *The Population Bomb*
11. C. Elliott, "The political ecology of the tropics" 44-46 (1982).
12. C. A. Gregory, "A conservation strategy for Papua New Guinea" *Conservation Biology*
13. F. Parker, *The Wildlife of Papua New Guinea* (Papua New Guinea Press, Port Moresby, 1979)
14. Cf. J. E. Harting, *British Birds* (London, 1880).
15. R. Sadleir, *Animals of the World*
16. B. E. T. Hudson, *Dugongs of the World* (Division, Department of Conservation, Wellington)
17. B. E. T. Hudson, "Dugongs of the world: a tagging project, catch and release" *Pacific Science Association* p. 108.
18. E. Olewale and D. Sedu, *Conservation in Papua New Guinea* (Applied Social and Economic Studies)
19. P. Eaton and P. Sinclair, *Conservation and Environment*, (Koninklijke Nederlandse Akademie van Wetenschappen)
20. Olewale and Sedu, *op. cit.*
21. Hudson, *op. cit.*; B. E. T. Hudson presented to XIth International Conference on Conservation, B.C., Canada (20-25 August 1982)
22. Eaton and Sinclair, *op. cit.*
23. Olewale and Sedu, *op. cit.*
24. *Ibid.*, p. 255.
25. Eaton and Sinclair, *op. cit.*
26. Olewale and Sedu, *op. cit.*
27. C. W. Clark, *Mathematical Economics* (Wiley, New York, 1979)
28. C. A. Tisdell, *On the Economics of Conservation* (Department of Economics, University of British Columbia, Paper No. 48)
29. K. Momin Khan, "Problems of conservation in the 80s" edited by T. M. H. De Silva
30. H. R. Mishra, "Balancing the books" *Ambio* 11, No. 3
31. Allen, *op. cit.* (1980).
32. Cf. V. Plumwood and I. D. Stewart, *Conservation Biology* 12, No. 1, 4-22 (1982) Nos. 1/2, 6-54 (1980).

## REFERENCES

1. *World Conservation Strategy* (IUCN, Glands, Switzerland, 1980).
2. N. Myers, *The Sinking Ark: A New Look at the Problem of Disappearing Species* (Pergamon Press, Oxford, 1979) pp. 21-24.
3. R. Allen, *How to Save the World: Strategy for World Conservation* (Kogan Page, London, 1980).
4. Myers, *op. cit.* (1979).
5. Allen, *op. cit.* (1980); *World Conservation Strategy, op. cit.* (1980), G. O. Barney, *The Global 2000 Report to the President of the U.S. Vol. 1* (Pergamon Press, New York, 1980).
6. Barney, *op. cit.* (1980).
7. N. N. Eberstadt, "Fertility declines in less-developed countries: components and implications" *Environmental Conservation* 8, No. 3, 187-190 (1980).
8. Barney, *op. cit.* (1980) p. 12.
9. H. Daly, *Economics, Ecology, Ethics* (Freeman, San Francisco, 1980).
10. P. R. Ehrlich, *The Population Bomb* (Ballantine Books, New York, 1970).
11. C. Elliott, "The political economy of sewage: a case study from the Himalayas" *Mazingire* 6, No. 4, 44-46 (1982).
12. C. A. Gregory, "A conceptual analysis of a non-capitalist gift economy with particular reference to Papua New Guinea" *Cambridge J. Econ.* 5, 119-135 (1981).
13. F. Parker, *The Wildlife Management Area in Papua New Guinea* (Wildlife Division, Department of Natural Resources, Konedobu, P.N.G., 1977); G. Kula, *The Siwi-Utame Wildlife Management Area* (Papua New Guinea Printer, Port Moresby, 1979); M. Downes, "The development of wildlife management in Papua New Guinea." In *Wildlife Management in the 80s* edited by T. Riney (Monash University, Clayton, 1981), pp. 63-67.
14. Cf. J. E. Harting, *British Animals Extinct Within Historic Times* (Trübner and Co., Ludgate Hill, London, 1880).
15. R. Sadleir, *Animals of Australia and New Zealand* (Hamlyn, London, 1970).
16. B. E. T. Hudson, *Dugong Conservation, Management and Public Education Programme* (Wildlife Division, Department of Natural Resources, Konedobu, P.N.G., 1980); B. E. T. Hudson, "Dugong myth and management in Papua New Guinea." In *Traditional Conservation in New Guinea: Implications for Today* edited by L. Morauta *et al.* (Institute of Applied Social and Economic Research, Boroka, P. N. G., 1980) pp. 311-315.
17. B. E. T. Hudson, "Dugongs of the northern Torres Strait: aerial surveys, observations during a tagging project, catch statistics, with recommendations for conservation and management." In *Pacific Science Association 15th Congress Abstracts, Vol. 1* (University of Otago, Dunedin, 1981) p. 108.
18. E. Olewale and D. Sedu, "Momoro (the dugong) in the Western Province." In *Traditional Conservation in Papua New Guinea: Implications for Today* edited by L. Morauta *et al.* (Institute of Applied Social and Economic Research, Boroka, P.N.G., 1980) pp. 251-255.
19. P. Eaton and P. Sinclair, *Wildlife in Papua New Guinea* (Division of Wildlife, Department of Lands and Environment, Konedobu, P.N.G., 1981) p. 16.
20. Olewale and Sedu, *op. cit.* (1980) p. 254.
21. Hudson, *op. cit.*: B. E. T. Hudson, "Dugongs: can the Kiwai survive without them?" paper presented to XIth International Congress of Anthropological and Ethnological Sciences, Vancouver, B.C., Canada (20-25 August, 1983).
22. Eaton and Sinclair, *op. cit.* (1981).
23. Olewale and Sedu, *op. cit.* (1980).
24. *Ibid.*, p. 255.
25. Eaton and Sinclair, *op. cit.* (1981) p. 17.
26. Olewale and Sedu, *op. cit.* (1980) p. 255.
27. C. W. Clark, *Mathematical Bioeconomics: The Optimal Management of a Renewable Resource* (John Wiley, New York, 1979).
28. C. A. Tisdell, *On the Economics of Saving Wildlife from Extinction*. Research Report or Occasional Paper No. 48 (Department of Economics, University of Newcastle, 1979).
29. K. Momin Khan, "Problems of Wildlife Management in Southeast Asia." In *Wildlife Management in the 80s* edited by T. Riney (Monash University, Clayton, 1981); Allen, *op. cit.* (1980) p. 114.
30. H. R. Mishra, "Balancing human needs and conservation in Nepal's Royal Chitwan National Park" *Ambio* 11, No. 5, 246-251 (1982).
31. Allen, *op. cit.* (1980).
32. Cf. V. Plumwood and R. Routley, "World rainforest destruction—the social factors" *The Ecologist* 12, No. 1, 4-22 (1982). A Grainger, "The state of the world's tropical forests" *The Ecologist* 10, Nos. 1/2, 6-5A (1980).

B

33. M. Sahlins, *Stone Age Economics* (Tavistock, London, 1974).
34. C. A. Tisdell, "An economist's critique of the World Conservation Strategy, with examples from Australian experience" *Environmental Conservation* 10, No. 1, 43-52 (1983).
35. Downes, *op. cit.* (1981).
36. R. D. Luce and H. Raiffa, *Games and Decisions* (John Wiley, New York, 1955).
37. C. A. Tisdell, "Provision of parks and preservation of nature—some economic factors" *Australian Economic Paper* 11, 154-162 (1972).
38. Cf. Myers, *op. cit.* (1979).
39. Group of Experts on Environment and Tourism, *The Impact of Tourism on the Environment: General Report* (Organisation for Economic Co-operation and Development, Paris, 1980).
40. S. G. Britton, "Tourism and economic vulnerability in small Pacific island states: the case of Fiji." In *The Island States of the Pacific and Indian Oceans: Anatomy of Development* edited by R. T. Shand (Australian National University, Canberra, 1980).
41. Cf. United Nations, *Transnational Corporations in International Tourism* (United Nations, New York, 1982).
42. C. A. Tisdell, "Natural and related resources in the generation of international tourism in Australian and ASEAN countries" *Report for ASEAN-Australia Joint Economic Research Project, Trade in Services Study*, mimeo (Department of Economics, University of Newcastle, 1982).
43. R. Daroesman, "An economic survey of Bali" *Bull. Indonesian Studies* 9, No. 3, 28-61 (1973).
44. Tisdell, *op. cit.* (1982).
45. United Republic of Tanzania, *The Tourists Agents (Licensing) Act, 1969* (Government Printer, Dar es Salaam, 1969); United Republic of Tanzania, *Wildlife Conservation Act, 1974* (Government Printer, Dar es Salaam, 1974).
46. *Karibu Tanzania* No. 7, 39 (Tanzania Tourist Corporation, Dar es Salaam, 1982).
47. Anon., "Tanzania Tourist Corporation at ITB—Berlin 1982" *Karibu Tanzania* No. 7, 5-8 (1982).
48. R. Prestige "A shot in the arm for tourism in Tanzania" *Karibu Tanzania* No. 8, 5-12 (1982).
49. *World Conservation Strategy, op. cit.* (1980) Sec. 4.8.
50. D. Western, "Amboseli National Park: enlisting landowners to conserve migratory wildlife" *Ambio* 11 No. 5, 302-308 (1982).
51. Mishra, *op. cit.* (1982).
52. *Ibid.*, p. 249.
53. *Ibid.*
54. B. E. Jeffries, "Sagarmatha National Park: the impact of tourism on the Himalayas" *Ambio* 11 No. 5, 246-251 (1982).
55. E. Ashby, *Reconciling Man with the Environment* (Oxford University Press, Oxford, 1978); J. Passmore, *Man's Responsibility for Nature: Ecological Problems and Western Tradition* (Duckworth, London, 1974).
56. Myers, *op. cit.* (1979).
57. *Ibid.*, pp. 214-215.
58. Barney, *op. cit.* 149-150 (1980).

## METAL ENV

### Departm

The importance of organic matter is increasingly recognized. As metal is precipitated in polluted environments. With increasing metal concentrations, methylated and volatilized organic matter is being intensely studied for a number of years. This article deals with the recent advances in the study of environmental pollution.

## INTRODUCTION

In order to understand the mechanisms of trace metal precipitation, the increasing importance of anthropogenic metal mechanisms are now being recognized under these conditions.<sup>1</sup> Gibbs,<sup>2</sup> who has studied them as: (i) dissolving of metals with organic molecules in solution; (ii) co-precipitation on solid materials; (iii) incorporation of metals into organic matter. From among these mechanisms, the precipitation of metal ions has recently been shown to constitute only two to three per cent of the natural waters rarely exceed the concentration and accumulation of metals in soils, sedimentary deposits, and other major part. The work of Gibbs and others on organic compounds in the environment. They found that, in the presence of organic matter, it is required to precipitate metals. This clearly indicates the role of organic matter and the high concentrations of metals to a certain extent be explained by the fact that they are complexed by humic acids. These complexes are not present in the natural waters, sulphides, hydroxides, carbonates, and other precipitations in solution.<sup>4</sup>

Tobschall *et al.*<sup>5</sup> emphasize