PEOPLE AND PROTECTED AREAS IN THE HINDU KUSH-HIMALAYA

PROCEEDINGS OF THE INTERNATIONAL WORKSHOP ON THE MANAGEMENT OF NATIONAL PARKS AND PROTECTED AREAS IN THE HINDU KUSH - HIMALAYA, 6 - 11 MAY 1985, KATHMANDU

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THE KING MAHENDRA TRUST FOR NATURE CONSERVATION
AND
INTERNATIONAL CENTRE FOR INTEGRATED MOUNTAIN DEVELOPMENT

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Proceedings of the International Workshop on the Management of National Parks and Protected Areas

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Proceedings of the International Workshop on the Management of National Parks and Protected Areas in the Hindu Kush-Himalaya, May 6-11, 1985, Kathmandu.

King Mahendra Trust for Nature Conservation, and International Centre for Integrated Mountain Development

In co-operation with

Department of National Parks and Wildlife Conservation, HMG, Nepal

International Union for Conservation of Nature and Natural Resources

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Edited by : Jeffrey A. McNeely, James W. Thorsell, IUCN and
Suresh R. Chalise, ICIMOD.

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His Majesty, King Birendra Bir Bikram Shah Dev, inaugurating the Workshop.

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Their Majesties, the King and Queen of Nepal grace the inauguration.

FOREWORD

The King Mahendra Trust for Nature Conservation and The International Centre for Integrated Mountain Development – both newly-established organisations based in Kathmandu, and both in their first year of active operations – came together at the beginning of this year to organise an International Workshop on the Management of National Parks and Protected Areas in the Hindu Kush-Himalaya Region: the first professional gathering of international experts on this subject ever held for this spectacular but highly vulnerable mountain region. The basic purpose of this Workshop was to assess and share the practical experiences of National Park Management throughout the whole of this vast mountain eco-system extending for some 2,500 kilometres from the Hindu Kush and Karakoram ranges at its western extremity through the Great Himalaya to the Tibetan Plateau in the north and to the Hengduan Mountains of Sichuan and Yunnan in the far east. With the relentless annual increases in population throughout the Hindu Kush-Himalaya exerting an increasingly intolerable pressure on the fragile mountain habitats, the great challenges of conservation and environmental protection of this irreplaceable habitat becomes increasingly more difficult.

The Workshop was convened with the specific intention of examining methods of increasing the growing understanding by the hill communities themselves of the nature of the problems they face, and the growing participation by these communities at the grass roots level in sustained local action in nature conservation and resource management. The whole-hearted involvement of the people in both development efforts and related environmental management is the key to sustainable progress for all. This is the central theme of these Proceedings now being published jointly by the King Mahendra Trust and ICIMOD.

In presenting the results of the Workshop discussions, we express our deepest and most loyal gratitude to His Majesty King Birendra Bir Bikram Shah Dev for inaugurating the Workshop, and to Her Majesty the Queen for gracing this splendid occasion with her presence. The great honour of Their Majesties' personal presence at the Inauguration – together with other members of the Royal Family, the Prime Minister and Cabinet, the most senior officials of His Majesty's Government, members of the Diplomatic Corps, and many distinguished guests – is ample evidence of the great importance given in this mountain Kingdom to the subject of 'development with conservation'. The highly instructive Keynote Address, on this occasion, delivered with such vigour and commitment by His Royal Highness Prince Gyanendra Bir Bikram Shah, Chairman of the King Mahendra Trust for Nature Conservation, was greatly appreciated by all present – and most ably set the tone of practical professional concern which thereafter characterised the Workshop discussions. We are all most grateful to His Royal Highness.

We should also express the joint thanks of the King Mahendra Trust and ICIMOD for the substantial help, both financial and professional, that we received from a number of participating organisations: the Director-General of National Parks and Wildlife Conservation of HMG Nepal; The Man and the Biosphere Programme of UNESCO; The World Wildlife Fund - US; The International Union for the Conservation of Nature and Natural Resources; and to the Governments of the countries of the Region (India, Nepal, China, Pakistan, Bhutan) who facilitated the participation of senior officials and professional experts. We are also extremely thankful to IUCN and particularly Dr. Jeffrey A. McNeely and Dr. James W. Thorsell both of IUCN and Prof. Suresh R. Chalise of ICIMOD for editing this volume of the proceedings.

We must thank all the members of the Organising Committee – and most particularly Prof. Suresh R. Chalise of ICIMOD and Dr. Hemanta R. Mishra of KMTNC who acted as joint member-secretaries – for their exceptional efforts throughout the months of preparation for this unique and highly important venture in regional professional co-operation. The success of the Workshop rested heavily on these efforts – but also, of course, on the expert contributions of distinguished participants from all over the world who joined with us in furthering the cause, which ICIMOD and the King Mahendra Trust jointly share, of promoting the welfare of the mountain communities of the Hindu Kush-Himalaya through the development and conservation of their spectacular but fragile mountain habitat.

Prabhakar S.J.B. Rana
Member, Governing Board
of Trustees, King Mahendra
Trust for Nature Conservation;
and Chairman, Organising
Committee

Colin Rosser
Director
International Centre
for Integrated
Mountain Development

EDITORIAL NOTE

Mountains tower over the lowlands, both literally and figuratively. For the people living in the plains below the Hindu Kush-Himalaya, the mountains have long been places of pilgrimage, sources of medicinal plants, and the abode of the gods. They have also provided that most important of resources in a monsoon climate: water. Fed by the high-altitude glaciers and snow-fields and absorbed by the lush forests, the streams are givers of life during the long dry season in the Gangetic Plain, the Indus Valley, and the plains of Sichuan.

But as modern technology has made the mountains more accessible and tied them into the global economy, they have lost some of their mystery as well as a good deal of their forests and wildlife. In order to ensure that the forests can still serve their functions of watershed protection, wildlife habitat, and sources of timber, firewood, and medicinal plants, the countries of the Hindu Kush-Himalaya are establishing systems of specially protected areas covering some of the major critical habitats.

But the protected areas that have been established to date are faced with a number of management challenges. How should managers incorporate and maintain traditional lifestyles of villagers resident in parks? How can management programmes be designed to ensure that local populations achieve maximum benefits from the protected areas, without threatening the conservation values of the areas? How can protected areas be more effectively integrated into regional and national development plans?

To address such questions, the International Centre for Integrated Mountain Development (ICIMOD), in partnership with the King Mahendra Trust for Nature Conservation and with the support of a number of international organisations, convened an International Workshop on the Management of National Parks and Protected Areas in the Hindu Kush-Himalaya, 6-11 May 1985 in Kathmandu, Nepal. The Workshop brought together over 40 of the leading protected area specialists from within the region and abroad to share experiences and make recommendations to governments about how to involve the local people more effectively in mountain conservation. This volume represents one product of that workshop.

However, the most important result of any workshop is not the proceedings volume, but delivering the message to those who need to act upon it. Therefore, it was extremely encouraging to the participants in the Workshop to see the support provided from the very highest levels of the Government of Nepal. It is clear that His Majesty, King Birendra Bir Bikram Shah Dev, is intensely interested in ensuring that the benefits of protected areas reach the people of Nepal in even the most remote areas.

It is our hope, and one that is shared by all Workshop participants, that the results of this gathering will be carefully considered and acted upon by all government of the Hindu Kush-Himalaya Region.

On request from the King Mahendra Trust for Nature Conservation and ICIMOD, IUCN has provided major editorial services for this proceedings volume. The final editing was done at ICIMOD. In editing these papers, we tried to reduce repetition to the minimum, though it was encouraging to see that almost all authors were in broad agreement about the principles of protected areas and people. We also put all papers into the same format, and condensed the purely descriptive material. Latin binomials and trinomials are included in an annex rather than in the body of a paper, except where no common name exists for the species. And in order to have the most useful references, all cited literature is combined at the end of the book.

The Workshop was designed to be free-ranging and frank, so the participants represented their personal views as experts rather than presenting institutional views; all papers should be seen in that light. We are confident that this volume will mark a watershed in the history of protecting the Hindu Kush-Himalaya, and that the next such workshop will reveal considerable progress in the intervening years.

Jeffrey A. McNeely and
James W. Thorsell, IUCN, Gland, Switzerland
Suresh R. Chalise, ICIMOD, Kathmandu

CHAPTER 1

OPENING ADDRESSES

Welcoming Address

Ratna S.J.B. Rana*

As Chairman of the Workshop on the Management of National Parks and Protected Areas in the Hindu Kush-Himalaya and of the ICIMOD Board of Governors, I feel very much privileged indeed to say a few words of welcome on this historic occasion. First and foremost, in this capacity may I extend my warmest welcome to your Majesties the King and Queen and express my most loyal gratitude to your Majesties for so singly gracing this occasion with Your Majesties' august presence which has been a source of inspiration to all of us. May I also extend my warmest welcome to Your Royal Highnesses whose presence here has been a source of encouragement. I also have great pleasure in welcoming all our distinguished guests and workshop participants, particularly those who have travelled here from a long distance.

As a new International Centre, concerned with the promotion of the welfare of the mountain communities throughout the Hindu Kush-Himalaya, we at ICIMOD have experienced great pleasure in collaborating with the King Mahendra Trust for Nature Conservation in organising this Workshop. For both our institutions this has been a testing experience in the promotion of professional and scientific collaboration across national frontiers. In this endeavour, our two organisations have much appreciated the ready and active co-operation of the Department of National Parks and Wildlife Conservation of His Majesty's Government of Nepal, the International Union for Conservation of Nature and Natural Resources, the UNESCO Man and the Biosphere Programme and the World Wildlife Fund.

The main theme of this Workshop may be summed up as the parks-people relationship. Unlike the usual concern with the scientific aspects of conservation and preservation of flora and fauna in other professional and scientific gatherings, this Workshop is primarily concerned with the benefits to the local people while managing the national parks and protected areas. And this Workshop includes not only the presentation of papers but also a two-day field trip to the Royal Chitwan National Park so that the discussions can lead to a more practical useful outcome.

* Chairman, Board of Governors, ICIMOD and Vice-Chancellor, Royal Nepal Academy of Science and Technology, Nepal.

It is expected that the Workshop will not only become a forum for paper reading but also a forum for stimulating the imaginations and energies of both academics and practitioners who may be on the front line to launch new and concerted efforts towards better management of the national parks and protected areas of the region.

It may be noted that responses to this Workshop from the countries of the region have been extremely good, and we have here with us distinguished participants from Bhutan, China, India, Pakistan and, of course, Nepal. The international communities have also responded well, some of them joining us as co-sponsors, and we have representation in this workshop from several leading international agencies and societies engaged in environment and nature conservation (viz IUCN, IIED, UNU, WWF, UNESCO).

The fact that Your Majesty will soon be graciously inaugurating this Workshop has been a great source of inspiration and encouragement to all the participating organisations, most particularly The King Mahendra Trust for Nature Conservation and ICIMOD. Your Majesty's gracious presence here today gives ample evidence of the importance attached in the Kingdom to the subjects which will be discussed here over the next few days. For us this is also a source of reassurance that we are engaged in a worthy task.

As we are well aware, the Chairman of the King Mahendra Trust for Nature Conservation HRH Prince Gyanendra Bir Bikram Shah will be graciously delivering the Keynote address in a few moments and all of us here are eagerly looking forward to this address for inspiration, practical wisdom and guidance. As such, what I say here will be something like carrying coals to Newcastle. So I shall be brief and limit myself to the essential broad issues which I consider important.

As I see it, the whole spectrum of problems associated with national parks and protected areas are essentially problems of resource management and perceptions which cannot be isolated from the problems of overall development of the hill and mountain areas. This has come about because today we have become more conscious of our environment and ecology than ever before.

One of the key elements in this regard has been the population pressure in these areas. Rapid population growth in the hills and mountains has meant increased competition for limited resources. Its net result is that the hill and mountain people are not only among the world's poorest people but are getting poorer all the time.

As it is, the problems of resource management and use in these hills and mountains appear urgent enough, warranting immediate attention. When we consider the current rate of population growth, the problems appear even more acute, and the need for intervention is clearly quite urgent. Unless we do something now, there will be fewer options left for the future. With the increase in population, there will be less per person, less choice, less room for diversification and less room for manoeuvering. As such, we must be realistic about the choice that confronts us. The options may not be easy. But to relax our efforts, to lose momentum, to allow problems to grow worse would benefit neither us nor our future generations.

We must recognise that poverty and lack of technology and development are at the root of the problems in the hill and mountain areas. Thus, our approach should not be guided by a desire to discard modern technology but to utilise its enormous potential in responsible conservation-oriented ways. In doing so, we should understand that there is no such thing as a complete or absolute check against environmental damage. Therefore, if we are to make use of the resources of the environment, there is also a price to be paid. That is the trade-off which we should be careful of.

If our efforts to develop the hills and mountains are to succeed, we should realise that the full participation of the local people in their own development must be a guiding principle in all that we do in these areas. But it is here that we face the most difficult task.

As we are all aware, the majority of the hill and mountain people eke out a bare subsistence living. The fulfillment of their needs for food, fuel and shelter from the existing resource base has already strained the supporting capacity of the local environment.

Overgrazing has led to deterioration of the food base, lack of water or its misuse to desertification, terracing for additonal cropland to soil erosion and landslides, and the need for fuelwood to deforestation and thus to erosion, siltation and flooding. Even though the hill and mountain people may not be able to express these things in our terminology, I think they perceive the changing situation around them. Under the circumstances, they have little option but to continue what they have been doing for generations and to move out to other areas if they cannot make a living despite their earnest efforts for adjustment.

What I am driving at is that at the individual or family level the main concern of the hill and mountain people is to meet their immediate basic needs. Naturally, they will emphasise the short-term solutions to improve their everyday situation. Is it not true that in all walks of human life, short-term needs tend to win over long-term benefits? If they do not consider the long-term situation, this is precisely because they have no protective cushion between the short and the long term. This is a fact of life which we cannot ignore.

It is precisely for this reason that national parks and protected areas often create a situation of competition and conflict among the local people in resource-poor and densely populated areas. Furthermore, the resource-use concepts which names such as national parks and wildlife sanctuaries embody, are alien to the local cultures, and in their perception this may simply be the takeover by the government of the land and denial of the use of resources to which they were traditionally entitled.

Generally, management of the national parks and protected areas involves long-term considerations in the rational use of their resources. This may be, however, inconsistent with the immediate or short-run needs of the local people who have remained traditionally dependent upon the resource base of these areas. Consequently, for the short run, more direct attacks on problems of poverty and ecological damage in these areas will be needed. As such, it is very important to convince the local people as to what would be best for their short and long-term interests. Indeed the heart of the matter lies in the growing understanding by the local communities themselves of the nature of the problems they face and in their effective participation at the grass roots level in attacking these problems.

In this process, perhaps there is not anything which can subsitute for self-reliance. People who are ill-fed and in ill-health, without shelter and without jobs, do not need paternalistic verbal concern. They need tools and trades, education and opportunities, and help to help themselves.

The concerned organisations which have come together here in Nepal have done so, I believe, because they share a common concern in finding a way out of this dilemma. We have to forge new forms of co-operation and seek new ways and means of exchanging the lessons of experience, if we are to tackle this situation.

During the workshop this week, we will no doubt be examining the whole complex issue of community participation in the management of national parks and protected areas. The task here, I think, will not be limited to restating the errors of the past but to weave the available knowledge and experience into the fabric of the future. The question here is not whether we should do something but how we can accomplish it.

As we shall witness in a short while, His Majesty the King will graciously light a lamp to signal that the Workshop is formally open. I hope this light will inspire all participants to produce concrete ideas that can be planted as new seedlings to take root, to add branches, to blossom forth, and to bear fruit in the years ahead.

Keynote Address

His Royal Highness Prince Gyanendra Bir Bikram Shah
Chairman
King Mahendra Trust for Nature Conservation

His Royal Highness, Prince Gyanendra Bir Bikram Shah delivers the keynote address.

It is indeed a great pleasure for me to deliver this keynote address to the International Workshop on the Management of National Parks and Protected Areas in the Hindu Kush-Himalaya, organised by the King Mahendra Trust for Nature Conservation and the International Centre for Integrated Mountain Development in collaboration with various agencies of His Majesty's Government as well as international organisations dedicated to the enhancement of man and his environment.

To begin with, Your Majesty, I feel it my humble duty to express on behalf of the sponsors, the participants and all those who have worked so tirelessly to make this Workshop possible, as well as on my own behalf our loyal gratitude, to you Sir, for your graciousness in inaugurating the Workshop and to Her Majesty the Queen for gracing the function this morning. We are all well aware of Your Majesties' interest in conservation and the guidance we receive periodically is a great source of encouragement and inspiration for us all who are engaged in this field.

Mr. Chairman, the subject that the Workshop has chosen for discussion, namely the consequences of national parks and protected areas on the social, economic and cultural life of the people, and the inter-relationship between the local people and the managers of such areas, the battle with issues of natural resources, its rapid depletion and its best use in the Hindu Kush-Himalaya, is indeed very important, challenging and topical. What are our parameters, our ethics and most importantly our actions regarding such issues? The Workshop has sought to address itself to a burning problem that has long eluded easy and effective solutions, often placing planners and conservationists in something of a dilemma.

Your Majesty, there are a number of theme papers that experts from participating countries and international organisations will be contributing to the Workshop in the course of their deliberations. Together, they cover a wide range of subjects. In addition, several supplementary papers relevant to the main theme with case studies for the Hindu Kush-Himalaya region will also be presented. Therefore there will be no dearth of material to strain the ears of the distinguished participants for the next few days, and I hope they excuse me for initiating the process this morning. However, I am sure their visit to the Royal Chitwan National Park for a field exercise will be a welcome diversion for them. There, forgiving and forgetting the heat, I am confident they will see for themselves an example of living conservation, not only from the point of view of Chitwan's magnificent flora and fauna, but also as a project acclaimed for the success it has been able to achieve in blending its activities with those of the people dwelling on its periphery.

Few people understood the significance of a national park when the first one was established at Yellowstone in a remote corner of the United States of America in 1872. Little did the world realise then that this was not to be an isolated event but the harbinger of a conservation movement of global dimensions. In the industrialised northern hemisphere, public demand for recreational areas with peace and tranquility paramount in their minds, resulted in the establishment and development of national parks. But it was the potential of such protected areas for resource generation, mainly in the form of tourism, and the passion for the exotic flora and fauna as well as the need for soil and water conservation that promoted the creation of national parks in developing countries. While East Africa provides a model of the former, examples of the latter can be found in many places from New Zealand to Nepal.

Despite the fact that the Hindu Kush-Himalaya region is the earth's largest mountain area, and is endowed with natural phenomena of exceptional variety, forest cover in the countries of the region averages less than thirty per cent of the land surface. Moreover, the areas devoted to national parks and sanctuaries represent less than a meagre five per cent of the 400 million hectares of protected areas throughout the world. As such, they are no more than a small oasis in a vast desert. Nevertheless, the Hindu Kush-Himalaya region can boast an excellent system of national parks, yet many of them are, as described by the Third World Congress on National Parks in Bali in 1982, "mere islands in a human sea" whose future is at best uncertain when resources for food, fodder and fuel outside such sanctuaries become depleted.

Experience has shown that in the long term, the protection and proper management of national parks is not viable without making adequate provisions for the basic needs of the rural communities that reside on the fringes of such protected areas. Firewood is a basic need common to all the people of this region. In Nepal alone, some ninety per cent of the people depend on forests for fuelwood. Alternate sources of energy have been tried. But we are still far short of discovering mediums that are not only economical but also simple, practical, and readily acceptable to the rural people of the region. It is ironic that we have not bothered to give serious thought to known resources. If the Hindu Kush-Himalaya region can be proud of its large land mass, surely its long term success lies in harnessing the potential perennial source of energy in the form of measureless masses of snow. It is here that we are convinced, that our ability to tap the tremendous hydro-electric capacity that nature has endowed upon this region will ensure a sustained resource for generations to come.

The rivers of Nepal alone are estimated to have the theoretical potential to generate 83,000 megawatts of power. With your permission, Your Majesty, I recall here the offer you made for joint efforts in sharing Nepal's water resources with the countries of the region, and I quote, "Given genuine friendship and mutual co-operation, I declare in the name of my people and my government that Nepal is willing to co-operate in such a joint venture, a venture that will lead not only to 'Planning Prosperity Together' but also emphasise our independence through interdependence." It seems to me that it will be only appropriate for this Workshop to examine this offer in earnestness. The significance of such an endeavour to the countries of the Hindu Kush-Himalaya region, which not only is affected by the same ecosystem but also faces common ecological and economic problems, hardly needs to be explained to this gathering. To be realistic, let it be noted that any skeptic can critically analyse prospects such as these and break down the varied structures that go into the making of such ideas. However, what we need most today are not skeptics who destruct and destroy but architects and craftsman who can skillfully create avenues to further the resolution of the problems facing us.

No programme, however ambitious, however well-put or however promising, can succeed unless it identifies itself with and seeks the support and co-operation of those who are to be the real beneficiaries. We often talk of people's participation in conservation, and make use of conservation education and public relations to enlist people's co-operation. But such methods have their own limitations, for until and unless we address and commit ourselves to

transform the negatives into positives, resolving to bring into realisation the much needed hope that the region must secure, our efforts will at best be half-hearted.

Moreover, if on the one hand, we have to be able to face convincingly a tirade of lobbies against our struggle, on the other we must ensure that the people who are involved in conservation activities are able to reap the benefits directly. Guided by this rationale, though not strictly in the context of national parks, we in Nepal have taken measures in the management of forests by allocating lands to local individuals and institutions to manage and derive the fruits of their labour from woodlands they themselves nurture through a programme of Community Forest Development. The distinguished delegates will also be pleased to know that we are now developing a National Conservation Strategy. While being action-oriented, it will define and implement pragmatic policies and plans whereby the sustainability and use of natural resources will be fully integrated with every aspect of our country's social and economic development. I am sure that the participants from Nepal will deal with this subject in greater depth in the course of your discussions.

I need hardly remind this learned gathering that conservation essentially means an environment whereby wisdom is applied to knowledge with the desire that the combination of both these qualities is translated into real action that will benefit mankind. It calls for an approach which would regard man as the focal point of every conservation effort starting from the initial stage of planning. After all, what is conservation – if not for people? It must be viewed only as a means, the end being the improvement of the quality of our very existence.

You are all well aware of the establishment of the King Mahendra Trust for Nature Conservation. Blessed with the patronage of Our August Sovereign His Majesty King Birendra Bir Bikram Shah Dev, the Trust is an autonomous, non-governmental, non-profit organisation whose main objective is to demonstrate through various programmes that the relationship between nature conservation and basic human needs need not be antagonistic but is symbiotic. Not only does the Trust identify itself with the realities of the people, but it has chosen a path of hope, compassion, professionalism, integrity, wisdom and most importantly, action while dealing with their problems.

As Chairman of the Trust, may I state that it has been our pleasure to co-sponsor this International Workshop with ICIMOD in collaboration with several other agencies.

At this juncture, I find it appropriate to draw the attention of the distinguished participants, as also of others concerned with conservation in the region as well as in the world, to the frightening forecasts that scientists have made on the consequences of ecological degradation. The harrowing account of the happenings in Africa recently has tragically proven that the warning of ecologists may be dismissed only at one's own peril. Since Nature has no frontier and given the bonds of friendship that bind us together, it will be prudent on our part to have a common approach to prevent any catastrophe from taking place in the Hindu Kush-Himalaya region. We would be preserving a common and proud heritage that we all share.

While man has acquired sufficient knowledge about the causes and effects of environmental degradation, curses in the form of floods, landslides and other ravages are still commonplace in many of our countries. Solutions to these problems are not unknown to modern technology. What we really lack, it seems to me, is the comprehensive creativity as well as the will to translate this body of knowledge into realistic and practical solutions. How much longer must we view this region from a perspective of apathetic, unsympathetic negativism? It is time to make great strides to improve the quality of life of the human population. Just as the stagnant water of a reservoir can be put to productive use by turning it into a stream, so must we convert the already known remedial measures into productive implementation.

I sincerely hope that in your deliberations here this week, you will transcend the descriptive stage of categorising environmental decline and move towards more important steps to re-evaluate, re-educate and reconstruct practical strategies for preserving the Hindu Kush-Himalaya region. May this Workshop create such an exceptional environment in which you set the region on a new path, a path to less adversity and greater hope for resolutions to our problematic situations through the tremendous resources possible in this magnificent endeavour.

In conclusion, with all the advancement that science and technology has made in modern times, if we, the present generation, fail in our responsibility to protect ourselves, and more importantly the ones yet to come, through effective conservation, we can well imagine how posterity will judge us. May all of us be guided by this spirit in our respective roles.

Inaugural Address of the International Workshop on Management of National Parks and Protected Areas in the Hindu Kush - Himalaya

Russel E. Train*

I have the honour to be here not just as a concerned and interested outsider, but also as an active participant in an exciting new initiative in the Hindu Kush-Himalaya region, the King Mahendra Trust for Nature Conservation, of which I am a Trustee and for which your Majesty has graciously consented to be Patron.

Two and a half years ago, leading park professionals from throughout the world gathered on the Indonesian island of Bali to discuss the state of the world's parks. This World Congress on National Parks is now considered a watershed event. Its congress on location was of great symbolic importance. The previous two gatherings, which are held every ten years, had taken place in the United States, where the modern concept of national parks had first emerged in 1872. Over the next 112 years some 2,600 protected areas covering over 400 million hectares have been established. The growth in the decade before the Bali Congress had been especially dramatic, most remarkably in the developing countries of the world. At Bali, park professionals from these countries stepped forward to define, or rather redefine, the role of protected areas in the socio-economic setting of the developing world. Park professionals from the Hindu Kush-Himalaya nations played a prominent role at the Bali congress. The workshop which we inaugurate today is a further demonstation of the leadership role this region is taking in the redefinition of Third World parks.

The task you have set for yourselves is truly challenging. Simply to establish protected areas representative of the remarkable diversity of the Hindu Kush-Himalaya would be no small undertaking. The Hindu Kush-Himalaya is the crossroads of five major biogeographic sub-regions. Protection of the wide diversity of natural areas in this region, that extends over 3000 km from Afghanistan to China and covers some one million sq km, is paramount. Alpine areas such as Mt. Everest, the earth's highest point, in Sagarmatha National Park in Nepal, and Chitral Gol in northern Pakistan, sub-tropical forests of many of the protected areas in India, Bhutan, Burma, and China, and the isolated and cold arid regions of the Tibetan Plateau, all need to be taken into consideration by this workshop.

As conservationists, we seek the survival of Marco Polo sheep in the Pamirs, the red deer of Kashmir, the snow leopard of Dolpo, the rhinoceros of Kaziranga and Chitwan, the takin of Bhutan and Burma, both the resident and the migratory birds of all these areas, and the giant panda of China, the animal that World Wildlife Fund has chosen to symbolise the World's endangered wildlife. And equally important, we seek also the protection of the botanical riches of these mountain areas. If the natural diversity to be husbanded in national parks of the region seems unmatchable, it can be argued that it may even be surpassed by the region's cultural diversity and extraordinary man-made heritage. The Hindu Kush-Himalaya is the cradle of philosophies, religions, and cultures which have fascinated and changed the world. This region reflects both traditional continuity and societies constantly in flux.

In their struggle to preserve this heritage of man and nature, park professionals of the region have been among the first to appreciate that this process simply cannot be separated from the human and economic environment of which it is a part. The deforestation of the Himalaya leads inexorably to the floods on the Gangetic Plain; the struggle for human survival in a marginal mountain setting cannot be ignored while we seek to halt the disappearance of the region's spectacular wild creatures. Limits on human use must be coupled with viable alternatives. Soil, water and forest management must be joined to traditional concerns for wildlife conservation. It is this important insight which this region contributed to the Bali Congress. This recognition also inspired the establishment of the International Centre for Integrated Mountain Development, our co-host for this workshop.

Without in any sense diminishing the remarkable progress in park creation over the previous decades, we

* President, World Wildlife Fund- US, and Member, Governing Board of Trustees, King Mahendra Trust for Nature Conservation,

must now exercise our greatest creativity if new forms are to be found which link conservation directly to the needs of man. We must not be naive in thinking that the development and conservation needs of the region can be easily reconciled. For example, hydro-electric and flood protection schemes threaten the very existence of Manas Wildlife Sanctuary in Bhutan and India. It is likely that Nepal's East-West highway will bisect the Royal Bardia Wildlife Reserve. Grazing is placing severe demands on the parks and reserves in Chitral District of Pakistan. These are the kinds of challenges that participants in this workshop must address.

To launch your deliberations, I wish to briefly mention two innovative approaches currently underway here in Nepal.

The first is a new concept for protected area management being proposed for the Annapurna region. Still very much in an exploratory phase, the goal is to make the rural communities of the area participants in and beneficiaries of the management of the area. Can sustainable use of resources by local peoples, recreational trekking by outsiders, and the national imperative to preserve this remarkable ecosystem be brought into harmonious balance? Finding a satisfactory answer to that question will not be a simple or a short-term task. Too much must not be tried too fast. But I am optimistic that effective solutions will evolve and will provide a model for protected area management elsewhere under similar circumstances.

The second innovation is the establishment of the King Mahendra Trust for Nature Conservation. The goal of this private, non-governmental organisation is to demonstrate through specific projects the relationship between nature conservation and basic human needs. The excitement generated by this initiative is reflected in the agreement by World Wildlife Fund to act as the Trust's partner in the United States and the creation of a supporting organisation in the United Kingdom. At the meeting of the Board of Trustees on 5 May 1985, the Trust agreed as one of its first projects to explore how people and protected areas can be joined for the benefit of both, using the Annapurna Himal as an example.

The mountains of the Hindu Kush-Himalaya form a barrier between the two greatest concentrations of people on the earth. Here, if man is to find a balance with the earth's natural resources, it will not be enough to develop techniques for sustainable use. We must also consider the other side of the equation: the region's growing human population. This is an issue that the Bali congress did not fully address and it is one that conservation organisations simply cannot continue to ignore. Continued population growth threatens the natural systems of the earth, the quality of human life, and indeed, the very survival of the human species. It is time for all of us to face up to these realities.

Although the examples I have used reflect our location in Nepal, elsewhere in the region and the world, park professionals are undergoing a similar creative process. Non-governmental organisations are becoming a vital and growing conservation force. In some areas, concern with over-centralisation has resulted in proposals for regional authority or even private management of protected areas. I hope this workshop will explore all these new ways to address the human-centred approach to park establishment and management while at the same time preserving our existing legacy of national parks.

There are two contradictory expressions used in the United States and perhaps appropriate to our setting. The first admonishes one to "come down off the mountain top" in order to face reality, while the second observes that one who has "been to the mountain top" has found enlightenment. With the magnificent yet fragile mountain ecosystems of the Hindu Kush-Himalaya, with great human needs and extraordinary cultural and natural wealth, your challenge is to simultaneously join enlightenment with reality. It is a challenge that I am convinced we must and will be able to meet. I wish you well in your deliberations.

Vote of Thanks

Prabhakar S.J.B. Rana

Your Majesties,

I deem it a privilege and an honour to place before this distinguished gathering our most humble and grateful vote of thanks, on behalf of the sponsors, the Organising Committee and the Delegates, to you, Your Majesty, for so kindly consenting to inaugurate this International Workshop. We also submit our humble and loyal greetings to Her Majesty the Queen, for gracing the occasion by her serene presence here this morning. The very fact that His Majesty the King has graciously accepted our invitation to inaugurate this professional Workshop speaks volumes for our August Sovereign's deep commitment to conservation and its impact upon the land and the communities that dwell upon it.

It is also my bounden duty to submit before His Royal Highness, Prince Gyanendra Bir Bikram Shah, Chairman of the King Mahendra Trust for Nature Conservation, our deep appreciation for not only delivering the keynote speech but also for setting the course firmly for the Workshop's deliberations.

Your Royal Highness, Mr. Chairman, Right Honourable Prime Minister, Ladies and Gentlemen, it gives me immense pleasure to thank you with all humility and sincerity for your presence here at the Inaugural Session of this International Workshop, which could be successfully held due to the moral and material support extended so generously by the King Mahendra Trust for Nature Conservation, the International Centre for Integrated Mountain Development, the Department of National Parks and Wildlife Conservation of His Majesty's Government of Nepal, the International Union for Conservation of Nature and Natural Resources, the UNESCO/MAB, and the World Wildlife Fund. This event has also received encouragement and practical advice and help from the various agencies of His Majesty's Government of Nepal, as well as from commited conservationists both from within and outside this Kingdom.

To you, distinguished Delegates, may I wish all success at your working sessions and field excursion in the next few days that you are here with us, under the protective shadow of the gigantic and ever-present Himalaya. While devising practical ways and solutions to find a marriage between conservation and the requirements of the communities that dwell side by side, it is my earnest submission that you bear in mind an inevitable truth: Man demands to be the centre of this universe and that accolade must be rendered to him. As such, it is not only his genuine wants which we must fulfill, but we must also see that his ego, as the self-proclaimed highest of the earthly creatures, is kept within reasonable bounds. After all, the art of leadership is either to inspire by example, or less dramatically to seek a consensus by debate and then to exercise a balanced judgement which brings reconciliation. Let me recommend the second course to you today.

Thank you.

The Workshop in session.

CHAPTER II

PEOPLE AND PROTECTED AREAS: DEFINING THE PROBLEMS AND SUGGESTING SOME SOLUTIONS

The Search for a Reasonable Balance: Managing of Protected Mountain Areas for Sustainable Development

Sir Arthur Norman, KBE, DFC*

I welcome this opportunity to present the perspective of a non-expert observer on the relationship between national parks and the communities amidst which they exist. The points I want to make are not of a technical nature, yet I believe they are important to developing widespread support for the very idea of protected areas.

Too often, those who wish to protect nature are still falsely depicted as being anti-development and anti-people. In my view this is nonsense. Everybody knows that you cannot have a "hands off" zone of protected land or water in the midst of a sea of poverty and human misery. Quite apart from the morality of the proposition, it is impractical. Poaching, shifting cultivation, removal of firewood and so on will occur no matter how much policing of the perimeter is organised. Furthermore, where policing is successful, social resentment will develop, causing an unfortunate mismatch between the best intentions of the conservation authorities and the aspirations of the local people.

We have seen this with our "National Parks" in the United Kingdom. Initially planning controls in national parks were widely misunderstood and disliked. But gradually, a real alliance between the local income and employment generators – the farmers – and the "consumers" of the parks' benefits has developed. A partnership has been forged for the conservation of a unique part of our British heritage.

But in the developing world matters are more complicated. How does one safeguard the unique genetic pool of the forest – allow for scientific study, protect wildlife, promote tourism *and* look after the increasing numbers of indigenous people, simultaneously? The answer must lie in partnership between the park authorities and the local community.

This points towards a pattern of fully integrated land-use planning and management, whose purpose is to generate economic and social development which is sustainable over time, and does not seek, as so much past development has done – and regrettably so much continues to do – to maximise immediate profit in the hope that the future, posterity, can look after itself.

Before getting on to the guiding principles of such development, I would first observe that what we are about here is nothing less than a re-write of the ground rules of conventional, or so-called "neo-classical", economics.

We are all, like it or not, under the sway of some economic theory or other. It was John Maynard Keynes, now almost 40 years deceased, who made the oft-quoted observation that "Practical men, who believe themselves to be free of any intellectual influence, are usually the slaves of some defunct economist." The decades since Keynes's death certainly seem to have proved him right.

From economists long before Keynes, we inherited the notion that accumulated surplus wealth could be assumed to be available for the solutions of tomorrow's social and economic problems. If you maximise short-term gain, the increment, invested at compound interest, is bound – on this theory – to produce such wealth as can harness science and technology to mitigate or find ways around tomorrow's scarcities.

This theory appeared to serve us well in the past. In my own country, energy from the timber wealth of what we now call the home counties, smelted iron, tanned leather, made glass and generally helped generate an economic momentum which then harnessed coal – the fossilised timber of long-sunk northern forests. And coal, with iron, wool and the imported cotton and other raw materials that also became newly available through previous investment, began that complex, headlong process of industrialisation and "modernisation" which has gone on finding and creating new resources ever since.

In recent times, however, we have learned that the resource-creating property of capital when applied to technology and steered by science cannot always be counted

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upon to pave the way forward like the circulating steel links of a bulldozer's tracks. In rich countries as well as poor, soils themselves are easily exhausted or eroded away, the wellsprings of groundwater become poisoned, and the very climate can be altered so as to throw in doubt many assumptions as to future patterns of growth, but in particular to cast doubt upon this classical economic assumption.

Thus, rather than counting upon maximising every possible immediate return, and assuming that the yield of its reinvestment will "see us through", we have been forced to reconsider. We have had to look again at earlier ideas of husbanding resources: setting limits, and steering investment so as to conserve our most basic resources, energy, soils, air and water – in fact the fundamental elements, "air, earth, fire and water" of the medieval alchemist – and of course the vegetative cover that they make possible and useful. For these are the resources that remain fundamental to us all, yet which cannot rapidly or readily be replaced, however much money is poured into them.

Today, our sense of survival is again steering our economic thinking or at least it is beginning to, rather than the other way round. Yet the wealth to do that steering has still to be produced. So we are searching for a new balance.

The International Institute for Environment and Development, under the inspiration of that remarkable economic and environmental thinker, the late Barbara Ward, has in particular been dedicated to this search. The target: an elusive, yet readily conceivable concept that we call *sustainable development.*

The IIED, together with other like-minded bodies, some of which are represented here, is studying steps towards this goal, and is evolving some simple principles. It has produced five, in particular, which I commend for your consideration.

- development must be aimed at the basic needs of the poor, so that they do not destroy their environment in order to survive;
- it must be sensitive to the culture and traditions of the indigenous people;
- it must involve proper consideration of the carrying capacity of the natural resource base;
- the technology employed must be appropriate to the place in which it is applied and;
- the result must be income-generating for *all* those involved.

Unhappily, much development comes nowhere near meeting these simple criteria. The results are all-to-often disastrous, because of inappropriate scale, lack of education and motivation, corruption or bad planning.

Turning now to the more specific issue of protected areas, I believe that the Declaration of the World Congress on National Parks, held in Bali in 1982, not only spelled out the reasons for having a worldwide mosaic of protected areas, but it also recognised the social, economic and cultural context in which parks must exist. The Bali Declaration was quite clear on all these points. It also laid stress on educational programmes, revenue sharing, participation and complimentary development schemes adjacent to protected zones for the people who live on the perimeter of them. We would all do well to remember this clause of the Bali Declaration.

I feel sure that your deliberations at this Workshop will help advance integrated thinking, planning and project execution. I hope too, that they will advance the understanding that parks and protected areas can make an important contribution to creating wealth through tourism, both national and international.

Tourism, as we are all well aware, has its pluses and its minuses in the balance sheet of a country's social and economic development. Nations need the revenue that it brings and the employment that it can generate. But they do not need the pollution that it can propagate, nor increased inequality of income it so often encourages.

In the case of each of the developing countries here represented, scenery, cultural features and treasures and wildlife, both fauna and flora, represent a major national asset that can be squandered or managed on a sustainable-yield basis, so that they remain available as sources of income and inspiration for the indigenous population now and in the future, as well as to the foreign visitor.

Moreover, tourist potential can be a *growing* asset for developing countries as the wealth and mobility of populations of other countries increases, and as their own tourist attractions become over-crowded or commonplace to people fed an increasingly exotic diet of television feature films on the wild places and cultural heritage of other lands.

To close the doors to this tide is to miss a major opportunity for economic benefit and better international understanding, an understanding which may, I suspect, link back to a better recognition among taxpayers as to why they should support and care about economic aid. On the other hand, to open the flood gates, failing to integrate tourism with the needs of national parks, protected areas, and above all the needs of the local people, is to pursue an unsuitable path.

Beyond the calculus of social and economic gain and loss, what we are all, I believe, searching for, is a new, all-embracing ethic. We need this ethic to guide us to a wider and fuller set of values. In the last analysis, sustainable development means taking our places amidst our surroundings with greater awareness of what it means to be both a part of them, and yet, to some degree, an objective outside observer: to be at once a part of, and apart from nature.

Only when we all start to face the dilemmas, which this ambivalence must produce in us, will we recognise that just as we are interdependent one upon another, so we are with the flora and fauna, with our traditions of culture, even with the inanimate resources which make up our total environment.

The great biologist and humanist Rene Dubos summed it up well in his book *So Human an Animal,* when he wrote, "It is impossible to speak of an environment optimum to man, if one has only man in mind."

The Park - People Interface in Nepal: Problems and New Directions

B.N. Upreti

ABSTRACT. *This paper outlines some of the perennial problems Nepal has faced in conserving its natural heritage, including conflicts between park management and local people, conflicts between local people and wildlife, control of the impact of tourism, and antipathy toward protected areas. The paper also offers some new directions in addressing and alleviating park-people conflicts in the region, including aspects of access to park resources, facility of movement through protected areas, economic incentives, local participation in decision making, conservation education, and management of protected areas as part of the total landscape.*

1. INTRODUCTION

Endowed with unparalleled natural beauties, Nepal reigns as a centre of attraction for all mankind who consider natural areas as a common heritage. The contrasting topography, a wide variety of climates and a diversity of flora and fauna have all enchanted naturalists who seek inspiration from clean water, refreshing air and the serene beauty of the high Himalaya. The elevation rises rapidly from less than 100 m from the flat alluvial south to the various Himalayan peaks, eventually reaching 8,848 m at Mount Sagarmatha in the north. A wide range of ecological conditions, including the glaciers of the Himalaya, verdant landscapes of the mid-mountains, tropical forests and the fertile plains of the south, exist within a short span of about 200 km.

Biogeographically, Nepal lies in the transitional zone between the Indomalayan and Palaearctic realms. While very few endemic animal species have evolved in the Himalaya, more than 100 species of mammals and 850 birds have been recorded in Nepal. There are about 10,000 indigenous plants in Nepal of which over 6,000 species have been identified.

Forests cover approximately 31 per cent of the hilly and mountainous regions of the country but these are receeding under the combined pressure of population growth and increasing demand for fuelwood and timber; about a decade ago the forest area of Nepal was estimated at 6.4 million ha. but at present it is only 4.4 million ha. Over 87 per cent of the nation's energy is met by forest products and each person consumes one cubic meter of wood per year for this purpose. Nepal's 16 million people depend heavily on its natural resources as 93 per cent of the people derive their livelihood from agricultural and allied activities. The cattle population is estimated at 15 million, requiring 5.6 million tons of fodder.

The destruction of forest ecosystems is especially tragic when it results in the disappearance of species which have a small geographic range and are adapted to a narrow range of habitats. In the steppe of the trans-Himalayan region wild yak and Hodgson's wild sheep have not been sighted for several years and four-horned antelope and pigmy hog are probably extinct in southern Nepal. Blackbuck, once thought to be extinct, are now precariously surviving in one herd of about 100 on a cultivated patch of land in Bardiya. Equally endangered is the snow leopard, which has suffered a dramatic decline in population in just a few decades primarily due to poaching for skins and killing by shepherds. At present the surviving rhino population is estimated at about 400. The number of tigers is estimated at slightly more than 200 and wild elephants are fewer than 30 in Nepal.

Some time ago a World Bank report suggested that if the present trend of destruction continues, all forests of Nepal would disappear from the hills in about 15 years and from the Terai in about 25 years. If the indigenous forests cease to exist all the genetic resources of known and unknown plants and animals will disappear also.

Faced with such a grim situation, declaring national parks and other protected areas offers the best possible opportunity to save at least some representative samples of those ecosystems.

In 1970, His Late Majesty King Mahendra approved a conservation programme which initiated the establishment of national parks and wildlife reserves in areas of Nepal chosen specifically to represent the country's unique habitats. Nepal now has six national parks, four wildlife reserves and one hunting reserve encompassing about 11,000 sq km or 7 per cent of the total area of the country.

2. SOURCES OF CONFLICT

2.1 *Park-people interface*

In the Himalayan National Parks of Nepal, indigenous human settlements, originally few in number, have been allowed to remain, although the villages proper are excluded from the park boundaries. In the parks of the Terai there is technically no human settlement within the boundaries.

However, the park-people interface is omnipresent.

Prior to the establishment of parks and reserves, local people were free to collect fuelwood, timber, fodder and thatch grass from the forest. Local people were dependent upon it for grazing and fodder for their livestock, bamboo and medicinal herbs for their livelihood and fishing and hunting for a major source of protein.

With the declaration of parks and reserves in such areas many people have been legally restrained from using their traditional rights to these resources. Those people living outside the boundaries have no legal recourse to procure compensation for their lost benefits. They ask themselves why they have been deprived of this inexhaustible natural resource which is a common property of the community. They think that it is unjust that "outsiders" impose these restrictions and they express their feelings of discontent in various ways. Their reactions are revealed by not obeying the park regulations and by engaging themselves in prohibited activities such as grazing animals and smuggling firewood, timber and grass from within the boundaries, particularly in Terai areas. To demonstrate their anger they sometimes vandalise park property by damaging bridges, signposts and boundary pillars.

In the Himalayan parks, requirements such as firewood, timber and grazing have to be met from within the protected areas. A firewood consumption survey conducted in Sagarmatha National Park has estimated about 350 metric tons of firewood are consumed per annum. Another survey has shown that about 3,000 domestic animals graze in the park areas all year round. Here the management faces a challenge of maintaining high standards with adequate protection of its natural resources while meeting the requirements of local populations. Requirements of natural resources should be made available through appropriate forestry practices in "facility zones" set aside for this specific purpose. More fuelwood plantations and reforestation in degraded areas will improve the natural environment and lessen the conflicts between the parks and the people.

2.2 *Human-wildlife interactions*

Crop damage – Agricultural crop raiding by wildlife just outside the parks and reserves is very common in the Terai area. When the park staff catch grazing domestic animals the first question locals ask is why wild ungulates are set free to raid their crops.

A study conducted in Chitwan identified three zones of crop damage by wildlife and the zone of highest damage suffers from 50 to 100 per cent loss. A large number of people from such zones either wish to resettle or are deeply concerned that His Majesty's Government take other effective actions such as fencing or crop loss compensation (Milton and Binney, 1980).

Crop damage by rhinoceros in Chitwan is very heavy. However, most damage occurs within 750 m of the forest (Laurie, 1978). Crop raiding by spotted deer is most frequent; some damage is done by elephants as well. The parakeet is notorious for destroying crops such as rice, wheat and maize. Langur and Macaques monkeys are troublesome, causing considerable damage to the crops. As there are villages well inside the mountain parks the depredation of crops by wildlife is inevitable and causes hardships to subsistence farmers. Wild pig damage is frequent in the mountains as well as the plains. The slow-growing high altitude crops such as barley and buckwheat are repeatedly destroyed by them particularly in Rara and Langtang National Parks. The black bear and Himalayan thar also destroy crops in areas such as Sagarmatha National Park. The management authorities are considering introducing some system of authorised killing of persistent marauders such as wild pigs.

Encounters between man and wildlife. – Encounters with wild animals around the national parks and reserves have become a source of legend. Should any animal from a park kill or molest somebody a furor is created and all the blame falls on the park authority. The incidents of being knocked down by wild animals in Chitwan and other places are often in the news.

In Chitwan the most notorious animal is the great one-horned rhino which when approached closely has killed or knocked down a few persons annually, including careless tourists. Killing of people by wild elephants occurs more frequently in Royal Sukla Phanta and Royal Bardiya wildlife reserves. In the mountains, we often hear about leopard, bear and wild boar attaking human beings. A few years ago in Langtang National Park, a local leader was attacked by a wild boar, and when his father tried to rescue him the rescuer himself was killed. If such incidents involve local politicians, the park management authority then has a particularly tough time. In Chitwan when a tiger killed one school teacher in the bush by accident the local politicians got spice for their individual political interests. I witnessed a rude mob this winter when an old tigress caused panic in Madi, south of Chitwan National Park. Eventually, we were forced to dispose of that tigress. Surprisingly, most of these killings by tigers have occured inside the park boundaries. In Chitwan one tigress killed four persons when all of them were cutting grass stealthily inside the park. The management cannot ignore such incidents without giving due attention to the suffering of

the local population or the means of pacifying the disgruntled villagers. In fact, talking about conservation without giving adequate importance to human life and property is futile, as far as maintaining the stability of the parks and reserves is concerned.

Loss of livestock to predators. – Cattle-lifting by tigers is a very widespread phenomenon along the border of parks and reserves. Out of a total of 156 large mammals killed by tigers in Chitwan, two-thirds were wild animals and one-third livestock (Tamang, 1982). Leopard, snow leopard, black bear and wolf also kill yak and sheep in the mountains. This has serious repercussions on the local economy.

If a water buffalo or a bullock representing a high investment is killed by a tiger, the owner naturally holds a grudge against the park for a long time. At present there is no mechanism to compensate for this loss. Therefore, such incidents are a major source of conflict between the park and the people.

Fishing and hunting. – The ethnic groups of the Terai, especially the Tharu, Bhote and Barai, traditionally rely on fish and other aquatic animals for an important source of protein. The Narayani River system, including the Rapti and the Reu in Chitwan, is heavily fished by the locals and some of them depend entirely on fish for their livelihood. (Refer to Annex VI) Realising the significant role of fish in the socio-economic system of these areas, subsistence fishing with permits has been granted by the park management. However, for the survival of the endangered gharial, crocodile and dolphin, fish are essential, so no commercial fishing is permitted in the waters of parks and reserves. Even traditional fishing in Karnali River in Royal Bardiya Wildlife Reserve has directly affected the food supply of the dolphin. Often DDT is spilled into the water or dynamiting is done to catch fish and this has adversely affected the population of fish.

In high-altitude national parks, occasional poaching of wild animals such as musk deer, blue sheep, and Himalayan thar is of much concern. Poaching for the musk business is a great threat to the survival of this species. I have personally encountered many snare lines set to trap these animals in Sagarmatha National Park. The musk deer population has been drastically reduced throughout Langtang National Park and poaching is still rife in remote areas (Green, 1981). Unless effective measures are taken the species may be extinct not only in the parks, but throughout the Himalaya.

In Chitwan, poaching of rhinos was prevalent when the park was first established. At present, however, except for a few stray cases it has been completely controlled.

Animals such as spotted deer and wild pig, which come out to raid the crops at night are occasionally shot by poachers, who even try to enter park boundaries in pursuit of wounded animals. There are many legal cases in the records against such offenders.

Poaching, whether inside or outside the boundaries, is not the work of the general public. It is mostly done by a few professionals or by the well-to-do village folks. Very few people in stark poverty indulge in these illegal activities with commercial motives.

Antipathy towards parks and reserves – Activities such as control of movement and right-of-way, penalties for the illegal grazing of animals, and restrictions on the collection of firewood are the main causes of resentment among the local people, at least in Royal Chitwan National Park. One assessment of the perception of the local people towards park and wildlife surmises that the major concern is the hardship imposed on them by park regulations, and the crop losses due to marauding wildlife. It is very difficult for villagers to understand why wildlife can damage their crops but they cannot kill in return. They often ask why the rhino is more important than the people, and whether this park is established to entertain tourists at their cost. They are not convinced by the rationale of protecting forest and wildlife which they have been using for many years.

Another main complaint is way the park staff behave with them in handling cases. To win goodwill and the support of the general public special skills are needed for which the staff should be trained. A comprehensive programme of public relations could help the tensions arising through conflict of interests.

Tourism – One of the objectives of management is to promote tourism in parks and reserves so long as it is not detrimental to conservation programmes. However, tourism is slowly putting pressure on the scarce natural resources of the Himalaya. Sagarmatha National Park, being a paradise for trekkers and a Mecca for mountaineers, is faced with an array of environmental problems which affect its basic goal of conservation.

The tourism industry is a major source of foreign exchange earnings for Nepal. A keen interest from all corners has been shown for its development. But whenever tourism has developed, its ill effects have started surfacing. In a cold place such as the Himalaya a huge quantity of firewood is needed for tourists and for mountaineering expeditions. In the last five years it has been estimated that about 25,000 to 30,000 kg of firewood was consumed in Sagarmatha National Park by three major expeditions. More houses and tea shops have come up in the park areas to serve the increasing flow of tourists, consequently exploiting more forests for timber and firewood. Due to such heavy pressure on slow-growing temperate forests, deforestation is taking place on an unprecedented scale.

Sanitation along the trekking route is getting worse and litter is increasing day by day. Tin cans and plastic bags brought by trekkers and expeditions have desecrated the environment.

Traditional life styles and local cultures are becoming influenced by the imitation of exotic ways of life. Villagers

around many parks are facing price inflation, expecially of food such as rice, chickens, eggs and goats due to tourism. They complain that inflation is one of the unwanted sufferings bestowed on them by the park development.

On the other hand the tourist industry is so important in the local economy that almost every household in Namche Bazaar in Sagarmatha relies on tourism for their income. In other parks too, tourism is providing job opportunities for guides, porters and lodge staff. National Park Offices employ a number of locals as park staff and engage them as labourers in development works.

The impact of tourism in Royal Chitwan National Park is not of the same intensity as in the Himalayan national parks. The deforestation problem and other environmental problems are also much less, but job opportunities are fewer than in the mountains.

3. NEW DIRECTIONS

I would like to stress the fact that our beloved Sovereign His Majesty King Birendra Bir Bikram Shah Dev is extremely concerned about the conservation of natural resources. He is equally conscious about the well-being of his subjects and has given directives to park planners to invite local people and listen to their reactions about park management.

It is a challenging job for a developing country such as Nepal to protect its natural resources and to meet the requirements of the people on a sustainable basis. However, to maintain the environment for a better quality of life we must bring into balance resource use and conservation. For this we must see the problems in a bigger perspective and focus our attention on improving the economic standard in the surrounding communities and on managing all the available natural resources in the adjacent areas of the parks. If the local communities do not embrace the conservation ethic and if they always remain hostile to parks and reserves, it is senseless to think that law enforcement alone can protect natural resources. To win their support a mechanism should be developed for compensating losses, and fostering a feeling that parks and reserves belong to the people. In addition, we must extend our help beyond the park boundaries to community development work. Here I outline several opportunities to link conservation with local development.

3.1 *Access to park resources*

At present people residing inside the Himalayan parks have easy access to firewood collection and grazing their cattle. They can get construction timber with permits from the park warden. In the future to meet the different requirements of management, the parks should be managed under a zoning system where Strict Natural Zones, Tourist Zones, Facility Zones and Cultivated Landscapes will be sub-divided with appropriate management policies. The local demands for natural resources will be fulfilled from the Facility Zones.

In Rara National Park gathering of pine needles from the park has been permitted for a period of 15 days in a year. Perhaps we can even issue permits to collect dry branches and dead wood for fuel on a controlled basis. Collecting thatch grass, reed and sabai grass (for rope making) has been permitted in all the parks and reserves in the Terai. In Chitwan alone between 30,000 and 50,000 permits per annum have been issued over the past years and over 66,830 tons of grass on average have been removed annually (Mishra, 1982).

Together with grass, hidden in bundles, tons of dry sticks and dead branches go out of the park as firewood during grass-cutting season. The total value of the grass and reed taken out from Chitwan alone has been estimated at more than US$ 891,985 per annum. The only problem caused to the park management is a sudden migration of thousands of people roaming in the parks and setting fire whenever they like. For 15 days the parks look like fairgrounds. However, the park must sacrifice this much to the local people in order to establish good relations.

3.2 *Facility of movement through parks and reserves*

The Park Regulations stipulate that for the convenience of the public, right-of-ways can be granted on specific routes. Movement through the park, especially in the Himalaya, by the local residents or persons whose access to their village is only through the park is unrestricted and they are free to move in the evening as well as in the early morning hours. In the Terai the use of the right-of-way is restricted between the period of sunset and sunrise. The main aim of this provision is not to create hardship for the locals, but to keep strict vigilance for possible offences.

3.3 *Economic incentives*

Why do local people continue to risk severe punishment in order to exploit park resources? The subsistence farmers with little purchasing power have few other alternatives for grass and firewood essential to their livelihood. Their lifestyle should be slowly changed by other income sources such as tourism. For example, Sherpas in the Sagarmatha area were doing a barter type of business in Tibet prior to the development of tourism in that region. Once expeditions and trekking tourism started, their whole lifestyle changed and a better economic standard has been achieved. For that reason alone we must develop tourism programmes in the villages adjacent to the parks with the bulk of tourism proceeds going to the villagers. The local people should be trained to organise trekking for community-oriented business and to run the community lodges. There could be handicrafts and gift shops run by the community by collecting articles from the villages.

Business similar to Chitwan's "Tharu Village Lodge" can be handled by local communities in many other areas.

Development of community funds: a revenue sharing scheme – If parks and reserves can help rural development programmes in neighbouring areas, there will be convincing points in favour of conservation. The idea of collecting funds from park users for community development has been considered for a long time. However, in the absence of an appropriate mechanism for collecting the funds and using them for development, the idea has not been put into practise. Recently, the King Mahendra Trust for Nature Conservation has started collecting funds from park users for conservation works. Development funds from tourist contributions and revenue-sharing with the government will directly help community development.

Complementary development schemes – When we had a discussion with local leaders in Chitwan about the park's contribution to the neighbouring communities, they suggested a network of permanent roads in adjacent villages with an electricity line along it. Local people also want an uninterrupted supply of irrigation water from parks and reserves where sources are mostly located. Other programmes which can be assisted by the scheme are supplies of drinking water and sanitation, building of schools, medical dispensaries and veterinary clinics. These development works can be implemented with international support or with community development funds as mentioned above.

3.4 *Local participation in decision making*

The local people should have a voice in the management of the parks, provided the voice does not conflict with the main objectives of sustainable conservation of natural resources. One of the essential elements of successful management is to create a proprietary interest of the local people in the park.

A local council comprised of people directly affected by the park, District Administrators and the Park Warden can discuss and solve the problems arising from management as well as from local people. An advisory committee headed by the High Lama of Thyangboche was set up in Sagarmatha National Park some time ago, and it is quite helpful in fostering local involvement. A programme of annual meetings of the local panchayat leaders, school teachers and influential ladies and gentlemen of the adjoining area is conducted regularly in all the parks and reserves of Nepal. The Park Warden explains to them the aims and objectives of management and takes them on the spot to see the development and success of conservation. The complaints and suggestions from them are heard and actions are taken if possible.

I hope this concept of annual meetings and local advisory council programmes will be adopted and followed strictly in all the parks and reserves. This will definitely promote appropriate linkages between the management authorities and the local people.

3.5 *Conservation Education*

Among the general public, there is little understanding of the value of the unique flora and fauna of the country and they are also unware of the need for environmental conservation. This ignorance is a major source of conflict between park planners and resource users. I feel that the success of the conservation of resources and protection of parks and reserves as a whole largely depends upon the understanding of the people and their acceptance of the concept of conservation.

The Department of National Parks and Wildlife Conservation has initiated comprehensive programmes in the past to provide information to the general public about our natural resources and their conservation. They included press releases, feature articles, news bulletins and information supplied to the local columnists. The value of such material in terms of conservation is somewhat limited, due to circulation difficulties. The most effective medium we have found is radio, which is heard by many people in the mountains as well as in the plains. Radio Nepal broadcasts a regular 15-minute bi-weekly programme under the auspices of the Ministry of Forests and Soil Conservation. We feel that greater use should be made of broadcasting. Audio-visual programmes also have greater audiences and leave lasting impacts on the simple minds of the village people, who should be our main targets. A documentary film such as "A Fragile Mountain" has a straight-forward message to the people who misuse the lands. A similar message in a slide programme could be quite useful to create awareness among the people. The awareness of proper management of the resources will definitely convince the neighbours of parks and reserves to live in harmony with the high ideals of nature conservation.

3.6 *Management of the total landscapes in the region*

While protecting national parks and reserves, it is equally important to manage all the natural resources of the regions in larger perspective. "Protected areas cannot be seen as islands which exist in isolation from their surroundings. They are an important part of the region in which they are situated, and the mutual relationships and linkages between them and adjacent land must be understood and applied to management" (Garret, 1982).

To lessen the pressure on parks and reserves and to meet the local requirements, development of the surrounding buffer zones is essential. Development of agro-forestry schemes, reforestation of marginal lands, reclamation of the river banks by plantations and management of forest patches adjacent to the parks could help in the maintenance of the buffer zones. And this concept of buffer zone management may in some cases minimise the conflicts and help save the parks and reserves.

The activities conducted elsewhere in the region may also cause damage to the resources of the park. In Royal Chitwan National Park, in particular, a successful gharial

crocodile breeding programme may be threatened by the construction of two large pulp mills which will dump effluent into their riverine habitat.

The boulder extraction downstream and motor boat operation upstream in Geruwa River in Bardiya Wildlife Reserve is causing disturbances to the river habitat of many endangered species. Such uncoordinated actions need immediate attention and a regional concept of total landscape management should be considered.

4. CONCLUSIONS

While highlighting the complexity of conservation issues, HRH Prince Gyanendra (1984), emphasised that the rational use of resources requires a realistic approach in order to strike a balance between the needs of the growing population and those of nature conservation. In the Third World Congress on National Parks, Assistant Director-General of FAO, Marco Flores Rodas expressed his views that "Until the rural people are ensured adequate food and shelter and a dignified standard of living, all efforts to establish and manage national parks and protected areas will be futile". International conservationists are becoming more inclined towards the human aspects of nature conservation. However, in a developing country such as Nepal the problem has been so complex, with more people and less resources, that without providing an alternative resource, park planners will face difficulties in maintaining the parks and reserves in the long term.

As discussed above the stress on natural environment is mainly due to our socio-economic conditions, intrinsic behaviour, cultural traits and ignorance of consequences. Our approach to redress the ill effects of environmental misuse should be in multiple directions, from improving the economic standard to changing the attitudes of the people. We now have to ignite a spark of awareness, and hopefully wait to see that all the debris of environmental misuse will be burned by our rational actions. We have to work together to preserve our common natural heritage so that our country will remain a better place to live in the future.

Man and Nature in the Himalaya: What Can Be Done To Ensure That Both Can Prosper

Jeffrey A. McNeely

ABSTRACT. *This paper reviews what can be done to ensure that development is carried out in such a way that both man and nature can prosper. It is apparent that conservation – "the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations" (IUCN, 1980) – is necessary for development, just as development is necessary for modern forms of conservation to take place. Principles of conservation for development include building upon the foundation of the local culture, linking development programmes with conservation action, giving priority to small-scale local developments, fully involving local people in the development process, examining options for protection of species and ecosystems and provide viable alternatives, enforcing restrictions where these are necessary, building conservation into the evolving new national cultures, and going with diversity.*

1. INTRODUCTION

A small sign nestled among the pines by the side of a road in central Bhutan quotes the Lord Buddha: "The forest is a peculiar organisation of nature that makes no demands for its sustenance and extends protection to all beings, offering shade even to the axeman who destroys it."

This quotation encapsulates the relationship between man and nature in the Himalaya. There is broad appreciation of the values of the forest, water, wildlife, and soils that support human society in this often inhospitable environment. But at the same time, nature's productivity is being threatened as people attempt to wrest more from the environment than can be sustained.

In mountain areas close to the tree-line, and in a climate where wood is required for house-building, as fuel for cooking and heating, and as trees to protect villages from avalanches and landslides, deforestation is a danger to the very existence of many village communities. Most mountain peoples have responded to this danger by developing ways and means of conserving the forests. One of the best known is the Sherpa custom of *shing-i-nawa*, or forest guards, where several men from a village are elected to protect the forest which protects the village. They also have the power to prevent cutting of protection forests, determine where trees may be cut, inspect firewood stocks in people's houses, and levy appropriate fines for transgressions. Their power is reinforced by annual celebrations where the fines are paid and the perpetrators are subjected to good-natured ridicule by their peers.

This mechanism worked for many years in Khumbu to prevent unrestricted fellings which would threaten the community. Writing in 1964, von Furer-Haimendorf concluded, "Compared with the forests of lower and climatically more favoured regions where peasants of Chettri, Brahman, and Newar stock have in recent generations wrought enormous devastation, the forests of Khumbu are on the whole in good condition. This is mainly due to an efficient system of checks and controls developed and administered by a society which combines strong civic sense with a system of investing individuals with authority without enabling them to tyrannise their fellow-villagers."

But times have changed in Khumbu since von Furer-Haimendorf wrote over twenty years ago, and the forests of Khumbu have now been seriously depleted by rapid economic development, as the central government assumed responsibility for the forests. Once the local Sherpa villages lost direct control over the forests, their strong cultural controls against over-exploitation were lost (Jeffries, 1984).

In the western Himalaya, where tree growth is limited by low rainfall, the situation may be even worse. George Schaller pointed out the irony of the situation in Pakistan: There are large forest departments but few forests, and no range management departments even though much of the terrain was rangeland.

"Many treeless slopes, now useless wastes of rock, as those around Chitral and Gilgit towns, were forested until recent times," says Schaller (1977). "About 22 million kg of firewood were used by the military in the Gilgit Agency during 1973. Herds of sheep and goats have denuded most uplands. With a predilection for certain grasses and forbs,

livestock have eliminated much of the palatable forage, leaving behind primarily those plants which can somehow protect themselves . . . Asian ranges consist not just of pristine peaks untrodden by man, an impression left by the books of mountain climbers, but also of populated areas where man is an enduring presence whose activities have had a devastating effect."

In conclusion, Himalayan villages need forests, and in traditional times forests were conserved by strong social controls which constrained individual behaviour for the benefit of the larger society. But in the face of change, traditions are fast fading into memories and are no longer able to control over-exploitation of the forests. If people are to again live in harmony with their environment, then new means of conservation are needed to balance the new forces of exploitation. Building on traditional common property regimes, the new means should be based on assigning direct responsibility for resource management to the local community.

Mountains have always provided isolation, encouraging cultural diversity as peoples sought refuge in the mountains and developed local adaptations to locally available natural resources. For example, in eastern Nepal, the various groups of the Rai stock historically had mutually unintelligible dialects from one valley to the next, and had their most important trade relations not with their Rai neighbours but with certain villages in the Indian lowlands.

Himalayan life is often based on exploitation of a wide range of environmental conditions; farmers have a series of small fields at different elevations, and take their animals to higher elevations during the rainy season, when the short growing season provides plentiful grass above the timber line. There is also great diversity in breeds of plants and animals. Farmers may have their rice fields distributed over 1,000 meters in elevation, growing as many as twenty varieties of rice, each planted in a specific microclimate, depending on temperature of irrigation water, resistence to pests or other environmental stress, and ripening time. Their strategy is to provide an assured minimum yield to their families, with any surplus being a bonus which could be traded or given to the local temple.

2. CHANGES COME TO THE HIMALAYA

With growing mountains, eroding soils, variable climate, and shifting human cultures, change is the only constant in the Himalaya. Nature has always been strong enough to adapt to these changes. But a number of recent changes have been remarkable in their power to affect human societies and in their impact on the natural environment. I will briefly highlight just a few of these interrelated changes.

2.1 *Food*

The introduction of maize and potatoes in the 19th century led to a great increase in the amount of food which could be grown in mountain conditions, along with corresponding increases in the human population. The potato, adopted by the Sherpas as their staple in the late 19th century, now constitutes nearly half the adult diet (Weitz, 1981).

While the green revolution is unquestionably bringing real benefits to many parts of the Himalaya, there are a few problems:

- Increased yield often requires capital inputs (fertilisers, pesticides) which only the wealthiest farmers can afford without mortgaging their land to urban moneylenders;
- The genetic diversity of crops is being reduced, as the "miracle crops" are not so narrowly adapted to microclimatic conditions;
- The variety of crops grown by each farmer is being reduced, leading to a gradual impoverishment of the local soils and cuisine and increases of nutrition-related diseases.

Game has always provided a bit of extra protein to the local people, but recently it has been greatly overexploited, especially in Tibet, where the rich grasslands once supported vast herds of grazing animals. The introduction of modern firearms and modern transport, coupled with a break-down in local traditions, have filled local bellies for a few years, but have led to a disastrous decline in the Tibetan fauna and a virtual loss of a potentially renewable food resource.

2.2 *Tourism*

Tourism, in the sense of travel away from home for whatever reason, has long been a feature of the Himalayas. Anyemaqen, a sacred mountain for Buddists in Qinghai, draws thousands of pilgrims each year; the most devoted spend several months measuring the 180-km circumference around the mountain with their bodies by prostrating themselves inchworm-style on the ground (Schell, 1982). Mount Kailas in Tibet is worshipped by Hindus and Buddhists alike as home of their gods and the navel of the world; it also serves as the source of four mighty rivers: the Ganges, the Indus, the Sutlej, and the Tsangpo-Brahmaputra. Many other pilgrim destinations are spread throughout the Himalaya.

In recent times, modern air travel and disposable income have brought increasing numbers of foreign tourists to the Himalaya. Tourism is now the leading foreign exchange earner in Nepal, and brings significant income to Jammu and Kashmir as well as certain other parts of the Himalaya. In Nepal, for example, the number of trekking permits issued increased from 40 in 1965 to 27,400 in 1980. Trekking trourism has the advantage of spreading the benefits fairly broadly, through use of local guides and porters and purchase of local crafts, fuel and food.

In some Himalayan countries, mountaineering expeditions are very big business. But they also have a very big impact on the environment. The 1981 Hiunchuli expedition in Nepal, for example, "hired two porters as woodcutters, and they made repeated trips over difficult terrain down 3,000 feet to Modi Khola gorge to collect wood". They were sanguine about their impact: "The forests of the upper Khumbu Valley in east Nepal were stripped years ago by the numerous expeditions to Everest; the same fate undoubtedly awaits the Modi Khola" (Cummings, 1983).

But, in an environment which has just enough food and fuel to provide a bare subsistence for the local people, tourism has its disadvantages:

- The lure of cash encourages villagers to sell their best food – such as eggs and chickens – to tourists, thereby reducing the supply of protein for the village; perhaps worse, farmers may sell their surplus productivity to tourists rather than donating it to the village temple where it used to be redistributed to other villagers in need.
- Unequal distribution of income from tourism can lead to social instability at both national and village levels.
- Tourists tend to need more fuel per capita than farmers, for cooking their food and warming their hands around a campfire; where forests are already severely degraded, this can be a very serious problem.
- Sanitation can also be a major problem, especially for the larger expeditions (some of which have hundreds of porters and dozens of climbers), and water supplies for some Himalayan villages are no longer safe to drink.

Other problems, such as outrageous tourist behaviour, increased materialism, and visual pollution tend to be more moral and aesthetic than ecological, though nonetheless important.

2.3 *Access*

The human back has always been the most important means of transport in most of the Himalaya, though pack animals – especially yak – are also important in some of the higher areas. This has limited the expansion of the economy to that which could be carried by a porter, so export goods have tended to be of high value for their weight: ghee, ganja; salt, wool, musk deer pods, and handicrafts.

But roads and airstrips have suddenly opened up new economic possibilities, both bringing in tourists and providing the opportunity for export of food, wood, and other goods. The village economies are transformed from a locally independent subsistence level to a more dependent and more productive part of a nation, but the temptation to over-exploit local resources for export earnings is difficult to resist, especially when the over-exploitation is officially encouraged by the central government.

2.4 *Nation-building*

The past few centuries have been politically tumultuous for much of the Himalaya, as boundaries have changed and great nations have been formed. Even today, national sovereignty is far from secure and many of the remote areas of the Himalaya remain in dispute; in some of these areas, wildlife and forests have suffered greatly.

In the process of nation-building, villagers in remote areas were influenced by development projects designed by the central government. Surpluses, if produced, used to be redistributed locally; are used instead to pay taxes or otherwise contribute to the central economy. Local self-sufficiency at a subsistence level has been replaced by national interdependence at a somewhat higher level of productivity, which has often required that resources – including forests, wildlife, and soils – be used at an increased rate and that higher inputs of energy be consumed.

Schools, improved medical care, transport, radio, a common language, hydro-electricity, and other influences have brought even the most remote areas into the nation, in both an economic and an ecological sense. What were once locally self-sufficient and sustainable human ecosystems have become part of much larger national and global human ecosystems whose productivity is impressive but whose long-term sustainability is far from proven.

2.5 *Conclusions*

Traditional ways of life allowed the village people to live in reasonable equilibrium with their environment, and to earn a reasonable living in doing so, though not without great hardship. Modern influences are undeniably making them wealthier and enabling the population to increase through improved medical care, security, food supply, and opportunities for migration. However, these influences are also encouraging land-use practices which are unsustainable, especially deforestation, use of unsuitable land for agriculture, and over-hunting.

The mid-20th century period of nation-building necessarily involved strengthening central governments. But the late-20th century period of building ecologically and economically viable nations will require more sensitive and productive relations with local people and local ecosystems.

In short, the need is for new cultural means of controlling over-exploitation of forests, land and wildlife. These cultural means need to be based on ecological, political and economic reality.

3. CONSERVATION FOR DEVELOPMENT

This Workshop is about the management of protected areas. But I hope that my paper has shown that any conservation measure in the Himalaya must be part of the cultural fabric if it is to make its necessary contribution to human welfare. Protected areas cannot exist in isolation.

Numerous definitions of Himalayan problems exist, along with sufficient guidelines for improving environmental management (see, for example, Eckholm, 1975; Negi, 1982; Cool, 1978; Jest, 1978; Lall, 1981; IUCN, 1980; Schaller, 1977; Dasmann and Poore, 1979; Dasmann, Milton, and Freeman, 1973; plus dozens of reports from governments, UN agencies, and bilateral development agencies). Adequate information exists to enable a far more harmonious balance between man and nature in the Himalaya.

What has been lacking has been the political will of many governments to mobilise the resources – human, financial, cultural, and moral – to ensure the integration of ecological principles with economic development. The more powerful government departments tend to be those which are producing income for the national coffers, and they have a vested interest in maximising short-term gains even at the cost of long-term environmental degradation. (It should be pointed out that this problem is not unique to the Himalayan region, but that the environmental conditions in these mountains are so critical that urgent, even radical, action is especially required here.)

The following principles are designed to help convince governments that integrating conservation with development in Himalayan cultures is both relatively painless and likely to lead to enhanced benefits to the community, the nation, and the world:

1. *Build upon the foundations of the local culture.*

Very often, cultural elements are already available for contributing to conservation. Any laws or regulations emanating from central governments should be adapted to take advantage of local predispositions, as in the case of the Sherpa *shing-i-nawa.* Make use of traditional cultural approaches to species conservation, and try to rekindle these where possible. Cultural diversity parallels ecological diversity, and local traditional adaptations are often the most environmentally sound.

2. *Link government development programmes with conservation.*

First priority for providing schools, health centres, family planning programmes, agricultural development, small hydro-electric facilities, improved communications, and other desired developments should go to villages which are closest to protected areas and other landscapes with species important for conservation. Make sure that the local villagers know that these benefits are flowing to them because of their proximity to a protected area or species of particular value to the nation, and because of their support for the conservation of the living resources in the area.

3. *Give priority to small-scale local development.*

Mega-projects, such as major dams, may be attractive to donor agencies but they are unlikely to bring widely-dispersed benefits. The geological conditions in the Himalaya are in any case generally unsuitable for most mega-projects. It is far better to concentrate at the village level, with customised development projects which can enhance productivity of the best soils and provide local sources of energy; such development can be coupled with strong regulations to reduce human impact on steep slopes and wildlife.

4. *Give local people responsibility.*

As in Bhutan, local development priorities should be debated in village and district councils, and development projects should be at least partially funded locally. Long-term cultural stability in the past has shown that local people are fully able and competent to enforce regulations for the benefit of their community. In some areas it would be possible to establish management units under the control of local village councils; and local people should serve on the advisory board of each protected area. A key point is that local responsibility should follow local institutional patterns, and that it is better to strengthen local institutions than to create new ones.

5. *Hire local people.*

While some civil services may have educational requirements that mountain villagers have difficulty in meeting, local people should nonetheless be hired for work in protected areas in their region; Nepal's Sagarmatha National Park, where many of the staff are Sherpas, is an excellent example of this principle.

6. *Involve local people in preparing management plans.*

The preparation of management plans need not be a specialised task requiring major outside expertise; but each protected area should have a management plan, and the plan is most likely to be effective if it is developed in close collaboration with the local people (see Thorsell, this volume).

7. *Examine the options for protection of species and ecosystems.*

In some cases, species can be best protected by simply providing a game guard in the highest village, without any declaration of a protected area. And even when a protected area is required, there are many levels of protection and permissible human uses (see McNeely, this volume, for further discussion of this point).

8. *Have the courage to enforce restrictions.*

Once it has been agreed with the local people that certain restrictions (which may be those which existed when the local culture was still intact) are desirable, the regulations need to be strictly and equitably enforced. There is no need to apologise for any restrictions that may

be necessary; people have always had to live with restrictions on their behaviour, and letting people destroy a protection forest because "they have always been able to cut trees" is destructive to the community at large. Enforcement should, whenever possible, be administered by local people, and at least a portion of any fines should go back to the village.

9. *Provide viable alternatives.*

If basic changes in the pattern of living of traditional subsistence farming and grazing communities in the hills are to be facilitated, attractive and meaningful economic alternatives must be made available to hill people. Tourism, if carefully planned and controlled, can provide one such alternative and has already led to a great increase in Sherpa income (though this is not without problems, as discussed above).

10. *Launch a major soil and forest conservation campaign.*

Based on the above general principles, and a detailed examination of current land tenure and use, central and provincial governments should provide all possible support to local soil and forest conservation efforts. Only by removing human pressure from marginal lands can such areas be expected to contribute to watershed protection, forest production, wildlife and the other goods and services of conservation.

11. *Build conservation into the evolving new national cultures.*

Traditional people throughout the world have developed ways and means of conservation which are interwoven into their cultural fabric (see McNeely and Pitt, 1984, for a series of case studies). As nations are built, literacy becomes widespread, mass media become more effective, and new cultures are formed; conservation needs to become part of every possible section of the national development process and thereby become part of the new national culture rather than just a discrete responsibility of a wildlife or national parks department. It is worthy of note that the Himalayan country with the best forest cover is a kingdom with a long independent history and a culture which is deeply conservation-oriented: Bhutan.

12. *Go with diversity.*

Himalayan peoples have long recognised that diversity is the key to their survival, using a wide range of means to wrest a living from a reluctant environment. Mixed systems, transhumance, terraces, agroforestry, local varieties, hunting and fishing, and the forestry/agriculture/wilderness interface are essential to Himalayan cultures. This diversity needs to be maintained as a matter of highest importance. What works in one place won't necessarily work in the next valley, and small countries have different imperatives than large ones. A series of local adaptations based on local cultural diversity is required, not a "universal elixir" to solve all conservation problems.

In order to put these broad principles into action, I would like to conclude by making a few specific recommendations for integrating human concerns into protected area management. I realise that I am speaking in some ignorance of recent developments in the Himalaya, so I hope that many of these have already been considered, if not implemented.

Recommended action at the national level:

- Each nation should review its protected area and species management policies and legislation to ensure that human concerns are being appropriately dealt with, and that conservation is integrated into other development concerns. National conservation strategies, such as those being prepared in Nepal and Pakistan, can be an effective means of coming to grips with the problems of integrating people, conservation, and development.

- Research on traditional means of conservation needs to be carried out as a very high priority, before these cultural elements are washed away with the tide of modernism. Universities could be enlisted in this effort, and ICIMOD would be an entirely appropriate repository of this knowledge. The traditional means of conservation also need to be put into forms which would be useful to development planners and to protected area managers; workshops should be held to train resource managers to be sensitive to cultural means of conservation and to collaborate productively with local people.

- Develop national tourism policies which promote appropriate behaviour by tourists, promote equitable distribution of the benefits of tourism, and control the negative aspects of tourism. Trekkers and expedition members should be made aware of acceptable norms of behaviour, following the example of "The Kathmandu Declaration" of the International Union of Alpine Associations. Organise training workshops on development and management of wildlife recreation for tourism development corporations, national parks, and tourist offices.

- Promote awareness on the part of the urban public and government officials that what is happening in the remote mountains is of direct interest to their own well-being. Such awareness may well be a prerequisite for mobilising the resources needed to address the environmental problems of the mountains.

- Develop and package sound and convincing arguments which demonstrate that protecting critical natural areas helps support food production outside these areas, through such means as watershed

protection, soil formation, micro-climate amelioration, genetic resources, and animal husbandry on marginal lands.

Recommended action at the local level:

- Develop a management planning process which includes workshops held in the protected area concerned and involves both the local people and the local protected area manager. This workshop might nominate a few areas which would be suitable for such treatment.
- Develop a demonstration protected area which shows how benefits can flow from the area to the local people; the Annapurna National Park project proposed by the King Mahendra Trust would be ideal for this purpose as the institutional structure is sufficiently flexible to incorporate innovative management techniques.

There are of course many more detailed recommendations which could be made. The Corbett Action Plan, prepared by the members of IUCN's Commission on National Parks and Protected Areas earlier this year, is a good example of the kind of recommendations which can help guide those responsible for managing protected areas, and provide guidance for the international agencies whose mandate includes support for conservation. I hope and expect that this Workshop will also come up with a number of specific recommendations on what is required in order to ensure that conservation yields sustainable benefits for human society.

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Population Changes in the Hindu Kush - Himalaya with Reference to National Parks and Protected Areas

Corneille Jest

ABSTRACT. *In the last three decades the Hindu Kush-Himalaya region has suffered changes of unprecedented magnitude. The doubling of the region's population was matched by greatly increased demand for agricultural land, firewood and pasture. The introduction of development schemes, such as the expansion of roads into hitherto trackless areas or hydro-electric projects, has added its load to the ecological imbalance. As the population of the region is likely to double in less than another twenty-five years, the only hope for protecting the remaining natural and cultural resources of the Hindu Kush-Himalaya is to firmly orient any further development programmes toward resource and population conservation. This paper illustrates the need for this imperative by examining population growth pressure in relation to the protected areas.*

1. INTRODUCTION

There is worldwide concern over the unprecedented pace of alteration of natural environments. Agricultural development, urban and industrial growth and water management projects have destroyed extensive natural areas and have jeopardised the survival of many species.

During the past four years, two major conferences, the World Congress on National Parks in Bali (Indonesia), in October 1982, and the Biosphere Reserves Congress in Minsk (USSR) in September 1983, have stressed the urgent need for the expansion of conservation on a worldwide basis.

It is not up to us to present "new" ideas or to reinvent the wheel of Nature and Culture, but once more to summarise the facts and explore this problem from within the Hindu Kush-Himalaya region. This is a region that is unique in both its splendid beauty and its daunting challenges. In addition, it is a region where there is still potential for the development of protected areas.

Protected areas, as defined by IUCN, were designed to contribute to life support systems, and consequently to preserve genetic diversity, to promote the sustainable utilisation of species and ecosystems, to conserve the natural heritage, and to allow for recreation and tourism. We gather here, fifty years after the formal establishment of the first protected area in the region, to evaluate our proximity to these goals and to identify innovative strategies for reaching them.

2. SETTING THE SCENE

The Hindu Kush-Himalaya region is the world's largest mountain system, covering an area of more than 4 million sq km. It extends over 2,700 km in length (66 to 102 degree longitude east). The region can be divided roughly into four latitudinal or parallel zones from north to south:

- the high Tibetan Plateau at an altitude of more than 4,000 m which hosts the upper reaches of the Indus, Brahmaputra, Salween and Mekong rivers;
- the great Hindu Kush-Himalaya range with an average altitude of 5,000 to 8,000 m, most of which is under perpetual snow;
- the lower Himalaya with peaks rising up to 5,000 m and valleys as low as 600 m; this is approximately seventy km wide; and
- the outer Himalaya, a belt ten to fifty km wide descending from 1,500 m into flat valleys which are now densely populated.

The mountain range protects the plains in the south from the cold northern winds and at the same time deflects the northwest monsoon moving along the southern face. Its snow and glaciers provide abundant water resources.

Each of these zones has its own pattern of flora and fauna. Extensive steppe-like pastures are found in the Tibetan Plateau and dense alpine and sub-alpine forests occupy the slopes of the great Himalaya below 4,000 m. The lesser Himalaya has a climate which is somewhat more conducive to agriculture and human habitation.

The outer Himalaya which is partly forested used to be an inhospitable area. With the control of malaria (in Nepal eradication dates from 1954) large numbers of

migrants from both the south and the hills settled in this zone.

The Hindu Kush-Himalaya can also be divided into a series of transverse longitudinal zones. The eastern part of the Himalaya has a prolonged rainy season from June to October, with copious rainfall which produces between 2,500 and 5,000 mm of precipitation in one year. The western part of the region on the other hand has a short summer rainy season from July to August and a fairly long winter wet season from November to April. In the central part, the average yearly precipitation is between 2,000 and 2,500 mm.

The Brahmaputra flows from the Tibetan Plateau, to the Bay of Bengal draining some 580,000 sq km. The Ganga drains away from the Himalaya to the southeast, with a total catchment area of 861,000 sq km. The Indus rises in Tibet, northwest of Nepal, and breaks through the Himalayan range and flows into the Arabian Sea (catchment area 1,165,000 sq km). Each of these river systems has moved a huge quantity of material to create the Indo-Gangetic Plains, which include some of the most heavily populated areas in the world.

3. THE POPULATIONS OF THE HINDU KUSH-HIMALAYA REGION

3.1 *An historical overview*

The Hindu Kush-Himalaya region is a social and cultural interface. The northernmost high altitude regions are predominantly Tibetan throughout their length from Ladakh to Bhutan, Arunachal Pradesh, Western Yunnan and Sichuan. The southernmost low altitude regions are predominantly south Asian/Indian. As one goes further east the influence of Southeast Asian traditions and populations increase. The farther west one goes the more conspicuous is the influence of Southwestern Asian cultures and people. Evidence of these cultural variations is to be found in a rainbow of languages, social customs, religions and economies.

There are significant cultural variations too within each sector perpetuated by the difficulty of communication in a rugged mountain terrain. On the other hand there is a notable degree of cultural continuity throughout the region between comparable ecological zones. Above all, every sector in the region has to live with its basic natural resources and their growing shortages. Therefore, the separate problems faced by each part of the Hindu Kush-Himalaya are but different facets of the same core issues of resource mangement.

The region is also populated by a mosaic of ethnic groups within the context of larger political structures. Some are cultural minorities on the economic and political fringe of a dominant national society, and it happens that most of the protected areas are located in their neighbourhoods.

These cultural minorities live in small-scale societies with a common territory, and their subsistence livelihood is based on kinship and customary rights and obligations. Sharing ancestral property, members of these traditional societies maintain strong cultural ties with their land and claim exclusive rights to it and its resources. Language, religious beliefs, culture and history are often different from those of the nations within which they reside, especially in remote areas of Bhutan, Arunachal Pradesh and Burma.

Over the centuries the mountain regions have also experienced the vicissitudes of population inflow and outflow, as people of the plains have sought refuge in the hills from invaders, exploiters, competitors, famine and epidemics and those in the hills have also fled from occasional conflicts. People have more recently emigrated to pursue the presumed rewards of the cities in the plains. The political history of the mountain regions has been primarily one of feudal states, petty kingdoms and occasional incorporation of local entities into larger political units. Thus regional and temporal disparities, in political and economic organisation, in prosperity, in population density and in resource utilisation has ample precedent.

3.2 *Uneven population distribution and density*

The geographical analysis of population brings out the important relationships between man and habitat. Vertical stratification of the environment is the chief characteristic of the region, and distribution of population varies within these strata. Altitude, slope, ecology and availability of water are factors of the physical environment which have also influenced the distribution of population. Using the density factor one can distinguish two major zones:

- Above the 300 m contour line from east to west, there are a series of districts of Sichuan and Yunnan, Arunachal Pradesh, Bhutan, Sikkim, the high valleys of Nepal, Uttar Pradesh, Himachal Pradesh, Kashmir and the N.W.F.P., in which the density does not exceed 10 to 20 inhabitants per sq km. The settlements are often of an oasis type, especially where water is the limiting factor.
- Below 2,000 m (approximately the upper limit of rice-cultivation) the population density is high; it can reach 1,000 inhabitants per sq km. of cultivated land in the case of Nepal, and 700 inhabitants per sq km in the hill districts of Uttar Pradesh, India (Tejwani, 1982). On the other hand, there is occasionally even an absence of pressure which can be due to political decisions, such as in Arunachal Pradesh where the "Inner Line" protects the region from encroachment.

In some instances resettlement of people has been used as a solution to the uneven distribution of population and resources. It is inevitable that such uprooting has

caused great stress and even destruction of traditional societies.

3.3 *Resources available to the mountain populations*

Soil is the basis of agricultural enterprise and the need for conserving soil cannot be over-emphasised. As a result of erosion, valuable top soil is lost, and fertility is depleted, resulting in poorer yields. In the higher valleys where water is scarce, most of the human settlements are established on alluvial terraces. Forests play an important role in the supply of necessary raw material to support life.

"Traditional agriculture" is characterised by a diversity of cultural adaptations to local conditions. The labour input is high, the family is the production unit; there is very low capital investment. Energy is provided by man and animals and there is a little dependence on the community. In the agricultural lands of most parts of the region people live at subsistence level.

In the case of the upper midlands of the Himalaya, a number of distinct ethnic groups still live on a subsistence economy basis practising buckwheat and dry rice cultivation and hunting. Land, water and forests were thought of as common property husbanded by a community or a clan (for example, among the Tamang of Nepal). In addition, elaborate systems permitted multiple use of resource systems by different groups. The management of the systems has been disrupted by the gradual privatisation of the land.

Cattle are not usually considered as either a population or a natural resource, but they are such a major factor in the region that they must be considered as an intermediate resource. Cattle are the main source of power for cultivation and transport, and their contribution to the food supply is not negligible either.

Cattle are very unevenly distributed between the four major latitudinal physical divisions of the regions. Pastoralism is practised extensively. In the higher zone and the Tibetan Plateau small groups of shepherds move their herds to the most suitable pasture grounds from the lowlands to the highlands in a yearly cycle. The pressure of cattle is by far the highest in the hills; figures supplied by the Uttar Pradesh Department of Forests show that "in Kumaon . . . about 20,000 sq km are actually available for grazing by about 4 million cattle. This huge number of half-starved and stunted cattle gives a pasture loading that is at least ten times greater than hill pastures can sustain without deterioration".

4. THREE DECADES OF CHANGE

The natural systems worked for millenia with very limited interference from man. This minimal pace of change increased dramatically after World War II, as the relationship between man and his mountain environment was transformed from "natural" or "within a given equilibrium" to "artificial" or "forced". This was primarily due to geopolitical reasons and related rapid growth of human and animal populations.

Enormous physical transformation has taken place during the past three decades. More than 10,000 km of roads have been built in the Central Himalayan sector. Mule trails and airstrips have appeared which have expanded the goods transfer and communication networks. Dams have been built for the supply of energy.

4.1 *Change in population*

In the last thirty years Asia has doubled its population. The effects of that doubling on the environment are easy to see but the implications are complex and not fully understood. The changing economics and social arrangements have made it difficult for rural people to have access to the basic agricultural resources upon which they depended. The growth of the cities is, of course, an integral part of the population problem of the region, but we address here not the internal city populations but rather the effect of the urban areas on the majority (85 per cent) of the population which is still rural.

It must be underlined that the population continues to *grow at a rate of 2.5 per cent per annum.* The population size of Asia is expected to double again by the year 2010 – only another twenty-five years! In the case of Nepal the total population doubled from 8.4 million in 1952/1954 to 15 million in 1981. A modest projection of the total population by the year 2001 is estimated at 25 million (H. Gurung, 1984).

The hill region has seen a large absolute increase over the three-decade period, but the Terai population doubled during the last two decades (1961-1981) and the percentage of total population increased from 36.3 per cent in 1961 to 48.8 per cent in 1981. Only the mountain districts show a declining growth rate. In the case of the Indian mountain region, there were 11.9 million inhabitants in the western part of the Himalaya (Census of India 1971), with an average of 78 inhabitants per sq km. From 1901 to 1961 the rate of increase was 1.1 per cent per year in Himachal Pradesh, but from 1961 to 1971 the rate of increase rose to 2.4 per cent per year in the same state; in Uttar Pradesh this rate was 3.5 per cent for the same period (G. Singh 1978). The population remains predominantly rural, including summer resorts and army cantonments. The population of cattle is four times that of humans and is increasing fast. This population growth has led to a sometimes drastic over-exploitation of natural resources.

Population pressure is difficult to define but most of the region, by any conceivable definition, can be seen to be suffering from it. An average family that a generation ago had a hectare to live on now has only half a hectare. It might have been conceivable that the region could have been either a centre for invention of new adaptive

technologies or at least very receptive to new ideas coming from outside (family planning being one of them). However, this is not the case, and it would seem that the inhabitants of the Hindu Kush-Himalaya region have often "adapted" culturally rather than technologically.

The deterioration of living conditions in the mountain region caused by population growth is causing emigration. Since the more enterprising members of the community often leave first, the aged and less active population is left behind. Another consequence is that in the lowlands illegal squatting causes an additional threat to the land.

Tourism in its modern sense (the Himalaya have been for centuries a place of pilgrimage) is an addition to the population movement. On the positive side it brings income and in fact encourages preservation of both natural and cultural heritage. But it must also be seen in light of the negative impacts that it can have on populations, including encouraging the trends towards commercialisation of culture; competition for the use of scarce resources (as in the case of fuelwood in the national parks); and introduction of alien values.

4.2 *More pressure on the resource base*

Overpopulation of an area starts an insidious spiral of diminishing returns from the resource base. With increasing population the farmers must turn to previously uncultivated lands which are more susceptible to erosion. As they erode, their fertility decreases, which adds to the pressure to bring more marginal land under cultivation. Marginal lands were traditionally assigned to livestock grazing. The growth of the human population is accompanied by a growth in livestock, at the same time that fodder resources are disappearing. More people need more housing and they turn to the forests for construction materials and fuel. All this leads to an over-exploitation of forests resulting in deforestation which increases the likelihood of erosion. With the increase of population and industrialisation, the water supply, although made more easily available, diminishes. In deforested areas, surface water infiltrates poorly and runoff increases in amount and speed. Streams become polluted; badly controlled flows have created eutrophication of the lakes (such as the lakes in Srinagar, Kashmir); siltation increases and even the water-tables are being affected.

The consequence is a more erratic water regime because the total water storing capacity of the mountain region is reduced, floods become more frequent and the siltation of reservoirs becomes the norm. For the people in the highlands, this process threatens the most dramatic consequences since their very subsistence is endangered as the resource base drains away. These people either have to migrate (and this always results in hardship) or it will become increasingly difficult for them to eke out a living. The levels of poverty and malnutrition in the highlands are very high.

Elaborated farming systems had traditionally evolved which permitted multiple use of the resource base by groups with different needs at different times during the agricultural cycle. Cattle breeders spending the summer at high altitude would winter on the lowland fields and fertilise them. Less winter grazing areas are available as second cropping has been introduced to meet the immediate food shortage.

The pressure on the flora and fauna is also a consequence of the increase in population. Some medicinal plants have been gathered almost to the point of extinction. The same could be said for the poaching of certain animals for fur or medicinal products, e.g. musk deer, bear and rhinoceros.

4.3 *The socio-political dimension in change*

All the countries of the region have experienced great changes in their social and political structure, economic life and cultural values during the past three decades. Nations were born and discovered their identities. The mosaic of ethnic groups of different origins, cultures and religions which comprised the traditional societies were to a large extent hierarchical. They were not "democratic" in the modern sense, but they did give to each individual a role with status and rights – whether positive or negative – of participation.

Although there were social constraints limiting the exercise of power, the concept of reciprocity imposed responsibility on those who controlled resources to share the products of those resources at regular intervals (for example, through rituals, sacrifices, and ceremonies).

Furthermore the past administration was organised in small territorial units with dispersed leadership and roles for young people to aspire to. With the advent of centralisation these positions were lost or diminished and many people who were the original intellectual resources migrated to the decision-making centres in the cities.

With this specific attribution and general population increase during the past three decades we have seen the destruction of traditional social organisation and the emergence of a "new" class of people who have not been assured stable social and economic roles in rural society. The number of "landless" people is growing rapidly and this certainly will affect the economic and political stability in the near future.

The reaction of different ethnic groups to political and economic events impinging on their traditional social and political structure suggests the great variety of adjustments to change. These adjustments may bring about a disintegration of the social order or they may induce a population to pull together and overcome difficulties by a heightened sense of co-operation and identity.

4.4 *The concept of protected areas*

In thinking of protected areas one should recall a larger perspective where for centuries, religious tradition

protected nature. In the case of Nepal, forests such as the ones in Pashupati, Surya Vinayak or Vajra Varahi were considered sacred; animals dedicated to divinities were not slaughtered.

Some of the protected areas in the Indian subcontinent were originally hunting reserves. The first national park in the region (Corbett) was established in 1935 in the foothills of the Himalaya; except for a few parks on the edge of the mountainous areas all the other protected areas have been established after 1950.

The creation of the early protected areas was a bold experimental step made in reaction to critically felt needs. These needs are now being understood as much more complex and it is time for more bold experiments aimed at integrating protected areas with local communities. In 1975 it was realised that without immediate action some of Nepal's most valuable natural resources would not survive. A scheme of conservation areas was drawn up and put into operation, based on information already available. Three large and ecologically representative areas were selected and designated as national parks in the Western (Lake Rara), Central (Langtang) and Eastern Himalaya (Sagarmatha).

5. THE NEXT THREE DECADES

Given the example of the past thirty years can one expect reform or fundamental changes? If there is a hope it lies in the direction of community control of resources. This concept has been sanctioned by the Nepal Decentralisation Act (1984).

One must extrapolate from the experience of the past three decades and conclude that unless decisive actions are taken the ecological system of the highlands and lowlands will reach the stage of irreversible collapse by the end of the next thirty years.

Important questions arise from the fact that one is hard pressed to make specific recommendations for controlling the process of change. There is little good or complete documentation concerning the problems of mountain development or about the quantitative impacts of "negative" actions.

What can we do about this? How can we expand our information base? At what level can protected areas play a role? What role can local communities play in the gathering of information?

In an average of 20 to 25 years the population will double in all the countries of the region, except China. It is imperative to think about the consequences of such a second doubling of population in order to foresee the possible solutions and not to wait. Our challenge is now to relate a larger population to "inelastic" resource systems in ways which assure access to productive resources by poor and eventually landless people.

The power and control over resources internally has been taken out of the hands of traditional groups and settled on the bureaucrats in the lowlands. It can be assumed that they do not see or understand the problems of the highlands.

What structural changes are possible? Can we, as committed decision makers, devise alternative patterns which permit increasing numbers of people to participate in the management of the productive resources as well as the conservation resources such as the Protected Areas? There is a strong growing desire to maintain economic and ecological stability and to preserve cultural tradition, so we should try to relate these facts to our concern for the development of protected areas. Conservation and return to traditional social organisation in co-ordination with appropriate new technologies is the challenge that the region has a unique opportunity to meet.

5.1 *The future of protected areas*

The Indian Board for Wildlife included an insightful clause in its definition of National Parks: "an area dedicated by statute for all time to come, to conserve wildlife therein and to provide for the enjoyment of future generations with such modification as local conditions may demand." We are now at that point of refining the understanding of the various local conditions. In the recent working session of IUCN's Commission on National Parks and Protected Areas in Corbett (India) in February 1985 it was stated that "the major threats to the continuation of the protected areas of the nation come not from within the areas but from human pressures outside. It is to these threats that conservationists must increasingly address themselves. Conservation must no longer be an alienation of rights of the rural people but a positive factor in the long-term development of their environment."

We have here a valuable opportunity for the countries with established protected areas and the countries about to establish them (Bangladesh, Burma, China) at the mountain perimeter to learn from each other. This workshop should help to place the region's socio-economic development within a global conservation strategy.

The World Congress on National Parks in Bali provided guidelines that should enable protected areas to meet the needs of the 1980s. Among them, objective 5 is to "promote the linkage between protected area management and sustainable development; investigate and utilise the traditional wisdom of communities affected by conservation measures, including implementation of joint management arrangements between protected area authorities and societies which have traditionally managed resources."

Protected area managers must be fully conscious that these areas are not isolated zones, but they are part of a larger ecosystem and they are part of local people's lives albeit in restricted ways. The birth of the protected areas was in some cases painful. No doubt some of our

participants bear the scars. But at least because of their shared experiences park management and local communities have become familiar with each other, so perhaps now constructive co-operation can proceed.

In practice, very few measures have been taken to involve the local populations or to positively link their activities and needs with conservation. One has to recognise the difficulty of changing the present protectionist approach into one which effectively involves the local communities from the inception of a given project. Rural conservation will require communication, education and management of the traditional techno-economy (taking into account the social organisation and the culture of a given region). Successful conservation will mean improving the welfare of those who are ultimately the wardens of Nature.

Assumptions which a development strategy should consider include:

- the Hindu Kush-Himalaya region is ecologically fragile and biologically not very productive;
- the exploration of energy resources has not yet been completed and the cost of potential energy resources may be high;
- the population exceeds, in most cases, the natural carrying capacity of the region;
- precise data is needed to increase awareness at policy making and decision making levels;
- there must be recognition of environmental destabilisation as an international problem which requires co-ordination and planning between all involved parties.

An important step can be taken to develop research planning and action so as to prevent the further destruction of natural resources. Since the growth of the population is the major source of this destruction, control of population growth and the planning of settlements in size and location constitute the base of this programme. Family planning programmes have not yet had a significant effect on the region.

6. CONCLUSIONS

"The challenge is to ensure the prudent management and conservation of the Himalayan mountain environment so that not only the endangered flora and fauna but an increasingly larger human population may continue to live in compatibility with the mountains." This caution has been expressed by John Cool, an eminent specialist in population studies (Cool 1978).

The Hindu Kush-Himalaya ecosystems are very fragile and the maintenance of their character is necessary for the welfare of the generations to come. People and decision makers must develop an awareness of their natural resources and of the dangers which threaten them.

The problems of population pressure in the region are too important to allow for a sectorial approach to their solution. An integrated approach should promote both development and environmental protection. In the whole region the most crucial economic problems lie in the hills (500 to 2,500 m). It is there that the problem of poverty has to be tackled and this will require development inputs and economic incentives.

The Hindu Kush-Himalaya environmental problem is *transnational in character* and can only be solved with active participation and collaboration at regional as well as national levels.

Any plan or programme of protected area development must involve the management of change, and the most crucial, albeit difficult type of change is that of human behaviour. This consideration has been lacking in the current management process. It is time that it be included.

The concern of conservation is that of the relationship between population, resources and environment. This can be studied by concentrating either upon the relationships between population, resources and technology or upon the relationships between social organisation, values and associated lifestyles. Whatever theme is explored, the framework should help us to see how individuals and groups perceive their surroundings and hence, within the limits of their technical tools, what their options are.

The institutions responsible for planning must actively test innovative programmes. Examples of socially based conflicts over natural resources should be analysed. Social structural reforms might be considered. The concerns of the mountain people must be better understood, their consciousness about the protected areas raised and their educational levels and organisational skills enhanced. The aim must be that the local community control the resource systems.

Major challenges confront the planners and decision-makers because government goals may not always coincide with the interests of the inhabitants of the region.

Communities may not be socially receptive to the plans, however much they may be for their own good. A major problem is that the community may know what they do not like and what they want, but they are very seldom organised to the extent that they can participate in co-ordinated stategy and priority formation, much less compromise.

Past experience shows that too much harm has been done because advice has come from the outside. For protected area management to struggle with the local communities effectively may first mean helping them to organise themselves for the struggle.

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Some Principles for Resolving Conflicts About Protected Areas

Chandra P. Gorkhali

ABSTRACT. *Protected areas by their very nature proscribe certain uses of the resources being protected, and such restrictions can often cause conflicts with the people who would like to use – and abuse – the protected resources. This paper outlines some of the principles of conflict, including conflicts about facts, values, and relationships. It concludes with a few thoughts about how conflict resolution can help to improve relations between local people and protected areas.*

1. INTRODUCTION

The establishment and administration of national parks and wildlife reserves is an important part of conserving the natural environment. As in many other spheres of development, it is found that there often exists a genuine conflict of interest between the various parties involved. Whereas, on the one hand, these parks and reserves are expected to serve the aesthetic, ecological and long-term economic goals of environmental conservation, the local people might perceive that protected areas threaten their own short-term economic progress and socio-cultural well-being. While there is a need to protect the area against any further damage, the interests of the local people should never be neglected. Such conflicts of interest are, moreover, often amenable to resolution. It should not always be necessary for government to intervene by enforcing heavy-handed laws. Instead we should try to bring about a conscious change in lifestyle through proper education. Hence, it is necessary that the government acquire and adopt the necessary skills to resolve these conflicts.

2. THE ROLE OF CONFLICT IN SOCIETY

Political scientists believe that any genuine conflict of interest acts as a necessary "escape valve", which can lead to evolutionary change in the society itself. Conflicts help us to perceive accurately the interests of diverse parties and thus, to establish group identity. Kenneth Boulding has identified conflict resolution as a "learning process" since it gives us an opportunity to learn the skills of negotiation and agreement. We also often learn the real self-interest of the respective parties.

We should also be aware that some conflicts can become so exaggerated that a situation becomes dysfunctional. Decision-makers can play an important role in determining the outcome of any conflict, but all too often the decision-maker sees a conflict as an impediment to progress. It is easy to imagine a conflict situation getting out of control and thus beyond any individual intervention. Since any decision-maker would like to feel himself in adequate control of events, conflicts can become a threat to this adequacy. In such a case, one tends to avoid conflict situations or, if they cannot be avoided, attempts to "keep the lid on". Both these responses tend to encourage dysfunctional conflict. Neither response leads to resolution and consequently there is either an increased urgency for the parties to press their demands or the conflict goes "underground". Hence, the answer lies not in avoiding conflict, but in acquiring the necessry skills to make a significant contribution to conflict resolution.

3. CATEGORIES OF CONFLICT

3.1 *Cognitive conflict*

The government and the people may have different perspectives regarding the facts of the case. Arguments concerning facts are often put forward as conflicts of values or interest. Therefore, actual cognitive elements or facts are not always distinguishable from values or interest.

3.2 *Conflict in values or goals*

Parties with different values have fundamentally different perspectives from which they evaluate a proposed action. Sometimes value conflicts are difficult to distinguish from cognitive or interest conflicts. People tend to support their values and they also tend to adopt values which are consistent with their interests. In short, values and interests are inter-related so far as human behaviour is concerned. An interest conflict arises mainly because of the economic costs and benefits arising from the action. Since these are rarely distributed equally, some parties will have a greater interest than others in the proposed action.

Others may have an interest in assuring that it does not occur. Thus, whereas both parties might agree about facts and values, they may still have conflicts that are based on their interests. A national park or wildlife reserve project may be ardently supported by the government, as it will protect the biota and land from further damage or deterioration, but the local people may oppose it, if they feel the park is not in their self-interest.

3.3 *Relationship conflicts*

These conflicts arise from emotional motivations, concerning the personality factors involved in conflicts. One group may feel insulted or challenged by another one. A group may feel resentful that it was not consulted. When a decision favours only those groups which are well-financed and organised, to present scientific data, and neglects those who primarily argue from a value base, conflicts of relationship arise. When emotional reactions emerge on the scene, dysfunctional conflict is often inevitable. For example, when a group emotionally defines itself as "revolutionary" it will have extreme difficulty in accepting a compromise even if its apparent self-interest would dictate it. Many groups react to government actions simply on the grounds of a reaction pattern internalised during youth.

Environmental conflicts are known to have arisen from all of the above sources of conflict. In the absence of an effective managerial and educational programme, fundamental value differences have occurred between local people and the State concerning the national parks and wildlife reserve programme. The local people have opposed the environmental programme, as they do not agree with the "facts" of most environmental issues. Hence, there is a full range of potential bases for conflict.

4. CONFLICT RESOLUTION

Paul Weber describes five basic steps which a conflict follows, if allowed to persist without any intervention from outside. Initially the conflict is precipitated when public attention is aroused. Next, what originally began as opposition, based on ignorance of facts, subsequently becomes an issue concerning the quality of life and growth of the economy. The issue is thereby transformed and proliferated. In the third phase, the groups tend to define their positions more sharply. They will aim for internal consistency. Leaders emerge inside them and they consolidate their position by declaring a firm organisational setup. Then, as the issues change and positions become firmer, there is a tendency for the level of conflict to escalate. At this stage it becomes evident that the intervention of a third party is essential, if the conflict is to reach the last stage, resolution.

The role of an arbiter varies with the nature of the conflict. The arbiter's approach must be appropriate to the issue and the groups in question. Thus, if a conflict exists because of a difference in perspective concerning a fact, i.e.the effects of the programme, the arbiter may work with the parties to find out the "facts". Appraisal of the impacts of an action is based on this strategy. Second, if there are conflicts of values (i.e. when people disagree over goals) the very source of information will also be challenged. Each side will credit solely those sources that favour its position. The major task of a third party in such a case is to encourage the perception of long-term interest, create conditions for reciprocal farsightedness between conflicting groups and help establish processes leading to successful resolution.

Aims and Methods of Nature Conservation in the Himalayan Region

M. Numata

ABSTRACT. *This paper starts with a review of the state of natural vegetation in Eastern Nepal in the mid-sixties. It then describes various types of protected areas in Japan and the general principles and objectives of nature conservation. The relevancy of such general principles for Nepal is discussed along with the author's endeavour for the establishment of national parks in Nepal in the initial stage.*

1. INTRODUCTION

While in eastern Nepal for an ecological study in 1963, I found the destruction of the natural landscape greater than I had expected. Along the caravan route from Kathmandu to Junbesi, I found extensive areas of pasture, paddy fields, upland terraces and secondary forests. I saw cattle grazing after the paddy fields had been harvested, slash and burn agriculture, the cutting of twigs and tree leaves as fodder and grazing in the undergrowth of forests, etc. Coppices of rhododendron with beautiful flowers were remnants of forests after the first layer timbers and the third layer of dwarf bamboo had been used. Fields of primula were the result of the overgrazing of pastures. Even the alpine scrub of juniper and rhododendron was burnt to obtain tender grasses for the transhumance of yak and dzo.

After surveying and observing this kind of destruction in eastern Nepal in 1963, I submitted a report and recommendations to the Nepalese Government on the aims and methods of nature conservation. At that time, I particularly recommended the establishment of national parks and nature reserves. A paper on the vegetation and conservation of eastern Nepal was subsequently published (Numata 1966). Since then, some national parks and wildlife reserves have been established which have been introduced twice in a Japanese journal (Numata 1977, 1981). The International Workshop on the Management of National Parks and Protected Areas in the Hindu Kush-Himalaya being held in Kathmandu is a unique opportunity to discuss conservation issues.

2. PROTECTED AREAS IN JAPAN

Japan is also a mountainous country, 70 per cent of which is covered with forests. There are several types of reserved areas in Japan on national, quasi-national, prefectural and municipal levels. They range from natural monuments to nature conservation and wildlife – wilderness areas (See Table 1). These are designated and protected under law. In addition, protected forests for scientific reference are designated by regional forestry offices. Within the framework of natural monuments, big and old trees are designated initially at the individual or species level. As a rule, there are three types of protection from the standpoint of the biological levels of (1) the individual, (2) species and population, and (3) community and ecosystem.

Table 1. Categories of protected areas in Japan

Protected Areas	*Status and Number*
1. National Parks	National – 27 Quasi-National – 54 Prefectural – 227
2. Wilderness Areas	National – 5
3. Nature Conservation Areas	National – 9 Prefectural – 482
4. Wildlife Protection Areas	National, Prefectural
5. National Monuments	National, Prefectural, Municipal

In 1965, ten primeval forest areas in Japan were selected by the Ecological Society of Japan and were recommended as protected areas to the Government through the Science Council of Japan. This work was urgently needed as part of the rapid enforcement of controls on clear-cutting of natural forests after World War II. Recommendations on primeval forests were implemented in the form of wilderness areas by the Environmental Agency.

To identify important biota and vegetation, an urgent survey of possible natural monuments and vegetation mapping was done by the Cultural Agency. Vegetation maps at 1/200,000 scale have now been completed for all prefectures. This is the basis of the *triage* approach to the selection of important biota and vegetation. The term

triage (from the French *trier* – to sort) was once applied to war-wounded soldiers in field hospitals, in which limited medical care had to be rationed between cases in a range of severity, passing over those for whom it was considered to be too late and those who could wait. Now this macabre term has reappeared again in the very different context of plant conservation (IUCN 1984).

During the IBP (International Biological Programme) period, the CT (Conservation of Terrestrial Communities) Committee, for which the author served as the convener, selected nature reserve candidates and made a list of endangered plants and animals. The check sheets of the candidate reserves were sent to the Biological Records Centre, Monkswood, UK.

The Ecological Society of Japan next adopted the designation of secondary forests and grasslands. The secondary forests and grasslands are seral communities, and they are maintained under proper management. Even in a national park, the grassland landscape is maintained by burning, grazing, or mowing as in Aso National Park in Kyushu. Some people do not recognise the importance of such semi-natural grasslands when compared with primeval forest of *Cryptomeria japonica* on Yaku island (Yaku-Kirishima National Park). The primeval forest constitutes a special protection (strict reserve) area, but grassland is also a conservation area deserving proper use. In the latter, the grazing intensity, period and season, frequency and time of mowing, etc., should be controlled to maintain good grassland conditions. In a natural monument of insectivorous plant communities, lowering of the water table and unmowing prompted progressive plant succession, and the floristic composition of hygorphytic plants changed to that of mesophytic plants. In natural parks and/or natural monuments at seral stages, vegetation and habitat management are essential.

3. AIMS AND OBJECTIVES OF NATURE CONSERVATION

The objectives of nature conservation are largely divided into biotic and abiotic. In a broad sense, the air, water and soil as the abiotic environment of living things are also the objectives of nature conservation. However, they are mainly considered from the viewpoint of environmental pollution and degradation. Thus, the main objectives of nature conservation are plants and animals, excluding the abiotic environment. One reason for this is the preservation of species. According to a recent report (Squire 1984), 26 million ha of tropical rain forests are disappearing annually, and 15,000 to 20,000 species will disappear by 2020 A.D. in South America alone. Two-thirds of higher plants (240,000 species) are found in the tropics, and more than 10 species of animals and micro-organisms depend on just one species of plant. Therefore, the extinction of many plant species would have a great influence on the earth's ecosystem.

In Japan, the Japanese serow is designated as a special natural monument. Shortly, however, it will be changed to an aerial designation instead of a species designation because of forestry damage. If the system of species designation continues, the serow cannot be shot anywhere, but it will be shot outside of the designated area under the system of aerial designation of plant communities and ecosystems rather than individual (the designation of the plane rather than point and line becomes more important not only for climaxes but also for the seral stages).

Nature conservation is first done on the basis of a laissez-faire (non-interference) policy. Primeval forests, real climax forest and wilderness areas should be maintained without any interference. Pine forest on the volcanic lava (a seral stage of primary succession) gradually develop into a climax without interference. The coniferous forests of Hokkaido were severely destroyed by a typhoon and there were a lot of fallen trees. When we expect the natural recovery of forests after a typhoon, we should establish a principle of non-interference even if there is an outbreak of noxious insects.

Second, there is the semi-natural or semi-artificial policy. In the lowland of eastern Nepal, there is a characteristic pasture dominated by *Cynodon dactylon* and *Imperata cylindrica.* This is a so-called semi-natural pasture in accordance with Tansley's terminology. This is a naturally grown, not sown, pasture the productivity of which is not so high. However, if it is used for grazing by cattle within the carrying capacity, it maintains a sustainable yield. We must continuously apply a biotic pressure of proper use to a pasture. Such use might be grazing, mowing and/or burning. Proper use of naturally grown pasture means using a semi-natural or semi-artificial technique.

An extensive stand of *Cypripedium japonicum* was designated as a natural monument. This orchid is frequently found in the undergrowth of bamboo brakes; light condition under the canopy is suitable for the growth of the orchid. However, a stand under the canopy of *Chamaecyparis obtusa* was designated, and it gradually disappeared as the forest floor became dark. If it is desired to maintain a good growth of the orchid under the canopy of a conifer, we must conduct pruning and thinning of coniferous trees and cutting of the dwarf bamboo undergrowth. Thus, the most suitable state for orchids on the soil surface is maintained under semi-natural and semi-artificial conditions.

Third, a completely man-made policy is adopted for the conservation of street trees, man-made lakes, etc. In Japan, historical monuments of street trees consisting of old and big *Cryptomeria japonica,* planted during the Tokugawa period (1603-1867), are objects of nature conservation. Old style gardens, some consisting of beautiful man-made forests and lakes, have been designated as parts of national parks.

Fourth, the change in nature due to natural disasters should also be considered. The extension of savanna is

said to be caused by biotic factors, such as burning and overgrazing. However, the same phenomenon has occurred due to lightning, a natural disaster. A beech forest on a steep slope in the montane zone sometimes changes to a grassland due to frequent avalanches. Landslides and sheet and gully erosion denude the vegetation cover. Also, natural forests and grasslands are sometimes damaged by the flooding of a river.

The four kinds of nature conservation discussed above are the bases of vegetation or ecosystem management. Potential natural vegetation maps and isograms of the degree of succession provide useful technology for conservation.

Nature conservation in a broad sense includes: (1) preservation of natural areas such as wilderness areas and climaxes to maintain the diversity of ecosystems, (2) maintenance and management of natural resources with sustainable utilisation, such as sustained yield forestry and fisheries, the proper use of pastures within the carrying capacity, (i.e. not to be overgrazed, etc.) and (3) prevention of air, water, soil, and radioactive pollution, etc. The abovementioned cases are all designed to maintain good environmental conditions. However, even the creation of green space with trees and grasses is included in nature conservation in the broad sense. Thus, nature conservation means protection, management, control and the promotion of nature and natural resources.

The aims and methods of conservation in general, described above, are related to the author's conclusion on nature conservation in Himalayan Nepal (Numata 1966). Interest in nature conservation can be seen as a symbol of cultural development. The aims of nature conservation are considered from various points of view such as:

3.1 *For scientific reasons*

3.1.1

We can learn the general principles of harmony, balance and/or equilibrium in nature by the study of nature reserves. For example, there are few noxious insects and fungus or virus diseases in natural mixed forests but many in purely man-made plantations.

3.1.2

We can also find models of the natural economy there. For example, the productivity process of primeval forests is more efficient than that of managed farmland.

3.1.3

It is necessary for science and education to maintain primeval nature, biota and life zones. In Japanese mountains, plantations of *Larix kaempferi* cover a large area, but students cannot understand vertical vegetation zones of a mountain from them. Particularly if a climax forest is destroyed, it will be difficult to restore it to its original composition and physiognomy in a short time.

3.2 *For aesthetic and bioethical reasons*

We have a great interest in the natural beauty of primary (primeval and climax) and secondary (biotically affected and successional) nature. The former consists of climax forests, alpine grasslands, etc. while the latter consists of semi-natural pastures, marshes and bogs, etc. It is our duty to maintain such natural beauty from aesthetic and bioethical standpoints. Natural beauty is a basic characteristic of national parks as well as of wilderness areas.

3.3 *For technical reasons:*

3.3.1

Land will be devastated by disrupting the balance of nature. For example, inundation and soil erosion are often caused by reckless and extensive deforestation, whereas soil fertility and ground water are well maintained by a climax forest.

3.3.2

Potential natural vegetation is the basis of sound mountain development, such as forestry, cattle-raising and agriculture. The preservation of remnant primeval vegetation is important since it serves as a key for the development of potential natural vegetation maps.

3.3.3

Primeval nature is a resource for tourism and recreation. On the other hand, highways, rope-ways, etc., destroy nature during their construction phase as do exhaust fumes from cars. Forest trees are felled for the fuel of mountain hotels and mountaineering. Such human impacts are most harmful to the maintenance of primeval nature.

A special symposium of the XIth Pacific Science Congress on "The ecological basis of nature conservation in alpine and sub-alpine zones" was held at Kamaikochi in the Central Alps National Park of Japan in September of 1966. It sent a resolution to the Government on special research areas in each climatic zone for observational and experimental studies for the purpose of achieving the following three main scientific objectives:

a) To study the processes that take place under natural conditions within such ecosystems for a better understanding, and to aid in future resource management,

b) To preserve their natural vegetation covers as gene pools for future use through technological advances, and as breeding stock for producing new combinations, and

c) To use these untouched ecosystem areas as controls against areas now under intensive management.

The methods of nature conservation related to the several aims mentioned above are as follows:

i) Strict reservation: the climax ecosystem must be reserved without any management or control.

ii) Management: a constant feature of a successional stage, such as semi-natural pastures, will be maintained by suitable management or control, i.e. constant biotic pressure.

iii) Size and shape of a reserve, strict or management reserve: a forest reserve area is said to require more than 1,000 ha, including the buffer zone around the core area. The size and shape of areas must be determined to maintain the flora and fauna, the original structure and composition of vegetation or ecosystem, and the life of large mammals. The scientific, particularly ecological, basis of these methods should be given by field surveys and theoretical considerations for various types of ecosystems.

CONCLUSION

These above-mentioned general principles for the aims and methods of nature conservation are applicable to all countries, including the Himalayan region of Nepal, when establishing national parks and nature reserves.

The Role of Environmental Education in Conserving the Himalaya

Karna Sakya

ABSTRACT. *Environmental degradation in the Himalaya has geographical, social, and political elements; the first is inevitable, but the second and third are both amenable to change through education of political leaders, students and the general public. This needs to include formal education, semi-formal education, informal education, professional education, and education for international understanding, leading to improved level of consciousness and awareness about the environment, development of improved attitudes about the environment, and finally, implementation of conservation measures. While education cannot itself solve the problems, it is a necessary part of all solutions.*

1. INTRODUCTION

The Washington Post reported that more landslides occur in Nepal than anywhere else in the world. This is not a journalistic exaggeration intended to cause a tempest in a tea cup; indeed, the reality of a harrowing abuse of nature can be observed on the Kathmandu-Pokhara road, where on one occasion more than four hundred landslides could be seen within a four-hour drive. Should such ecological disaster continue, Nepal can hardly survive. The fabric of the Himalaya, although it projects magnificent strength, is nothing more than a fragile web that has been woven delicately but is supported only by a few strands of thread, which when cut could cause the entire intricate system to fall apart. These strands of thread form our fragile mountain ecosystem.

2. SOME CAUSES OF ENVIRONMENTAL DEGRADATION

2.1 *Toothless tigers*

Ecological degradation in Nepal is not a result of a singular physical contretemps – it is an inexorable syndrome developed from socio-economical, biological and political factors. It was born of the constrained economy, triggered by myopic politics, perpetrated by a bureaucracy Byzantine in complexity and pampered by widespread illiteracy. In this sad story, human factors both social and political play a malignant role. Physical limitations such as weather, water and soil are only secondary constraints although they have a direct impact on environment. The physical limitations are handicaps to conservation strategies, but these handicaps are only challenges to the desired objective. The fundamental ecological nemesis, in fact, is the existing social and political system which has comatosed government institutions into merely toothless tigers. History witnesses many Machiavellian machinations at the lower political level. The greatest weapon of the authors of such machinations is to fan the flames of parochial sentiment. It is they who have forced forest technicians to compromise large areas of forest land for political and social manoeuvering. Forest areas are often used as safety valves to defuse the pressure for land reforms. This safety approach is misguided, causing staggering percentages of forest to be stripped from the face of our country. Fortunately, by gracious command of His Majesty the King, timber exportation was stopped three years ago. However, it is sad to note that the timber exportation programme is again in process.

2.2 *Land fever*

The land encroachment fever that destroyed the major Terai forest is now spreading like an epidemic disease over the sub-marginal mountain land. It is ironically a " no man's land " (or in other words, " every man's land ") because the Forest Department, one of the oldest institutions of His Majesty's Government, has not yet developed an administrative wing responsible for marking the forest boundaries in the mountains. A gnomic verse says "Great things are done when men and mountains meet." But here the chemistry of man and mountain is not working well. Because of man, our green mountains are metamorphising rapidly into something ugly and grotesque. People are in the hopeless grip of a land encroachment fever. They are desperate to extend their land holdings without realising the meagre amount of produce that will be earned after their hard and laborious work. The hungry villagers are understandably preoccupied with their impoverished life, and are consequently oblivious to the cumulative destruction going on around them.

3. THE RESPONSE TO ENVIRONMENTAL DEGRADATION

The alarming rate of forest destruction has stirred and alerted bureaucrats, administrators and policymakers. In 1967 when I joined the Forest Department, my boss preached to me sternly, " Look boy, you must work hard. Our forests are disappearing rapidly and our top soil is washing down to the Indian Ocean to form new islands." Almost two decades have passed since then, but we are still hearing the same old cries. Such idealogical conservationist cant has now become hackneyed philosophy.

Recently the Government seems to have become very concerned and has been spending lots of money from loans, which come from the World Bank or ADB, to launch various forest conservation projects. But skeptics feel anxiety: what is the use of spending millions of rupees on plantations when we cannot educate our villagers to refrain from grazing their cattle in plantation areas; what is the use of a greening campaign when we ruthlessly cut thousands of hectares of pristine forest overnight; and what is the use of constructing multi-million dollar dams and other engineering extravaganzas, when we cannot educate villagers to refrain from cutting forest in the catchment areas? Such projects may work as paliatives but fail as restoratives, and to preserve whatever our projects have achieved, we need public participation and co-operation. When I hear the bubbling plans of enthusiastic administrators and their counterparts, it reminds me of the sarcastic conversation between a publisher and a starry-eyed author, "I am sorry but we already have too many books on how to make a million. Do you think you could come up with something about how to make a living?"

3.1 *Pyramid of problems*

At the crossroads of this dilemma, an urgent need for the environmental education of politicians, the public and policymakers is strongly felt. Environmental education transforms politicians into pro-conservationists and helps them to understand the value as well as the cost of our natural heritage. It opens the eyes of the planners, policymakers and administrators to another side of the potential of natural resources, other than that of carrying out textbook patterns of resource exploitation through stereotype development, and it teaches the general public to understand how the whole essence of their life depends on the environment.

It is impossible to accord blanket protection to everything that ought to be protected, but we have to determine our priorities and cut our overall goal into "bite-size pieces". One of the biggest drawbacks to development in our country is the lack of clear priorities. Innumerable problems pile up like a colossal pyramid, and Nepal does not have the needed economic capacity to bulldoze this pyramid rapidly. Finance is always a constraint, but loans and aids are available for removing this pyramid of problems. The sad irony is that instead of pulling down the pyramid from the top, it is being dismantled haphazardly. When loans and aid are offered we are unable to scrutinise them properly. We use them sometimes either in low priority programmes, or, in programmes which create more problems than they solve. Sometimes we launch such a huge project that it becomes a white elephant as soon as it is handed over to the government. Education is indeed, essential for all planners.

3.2 *Concerted efforts*

When we look at the socio-economic and environmental battlefield, it seems relevant to draw an analogy to a game of soccer. In a crucial match, an individual player cannot control the ball for a long time. The score has to be made through a concerted effort. The ball will be passed skillfully from one player to another. Similarly, one single institution or a project cannot solve an ecological crisis alone; it requires a collaborative inter-disciplinary approach between various agencies. Moreover, education should be a vehicle to arouse awareness of nature and convey the importance of co-operative effort in fighting ecological problems. It should be borne in mind that education is not a panacea for environmental problems; it is a plan for survival. It should be taken as a means for the liberation of the people from the shackles of ignorance and poverty. Education highlights the basic "rule of thumb" of cost/benefit analysis in conservation and development. Human behaviour patterns that are harmful to the environment can be modified through education. It makes hill peoples and planners aware that the mountains provide only a limited life-support system if they are used solely for agriculture (in Nepal, even slopes of 45 degrees are cultivated), but with the preservation of nature they can provide unlimited scope for forestry, agroforesty, horticulture, orchards, poultry, medicinal herbs, and tourism. (This multi-use concept for mountain forest management is dealt with in the proposal for Annapurna Sanctuary, which this author prepared two years ago. It is now in the process of becoming a new "Model National Park").

Paradoxically, in Nepal, due importance has not yet been given to environmental education. Nevertheless, this country has shown a great interest in the overall conservation field. Nepal was one of the first countries to endorse the principles laid down in the World Conservation Strategy. However, at the moment, conservation measures are carried out in a "barbed-wire conservation" manner, or in other words "conservation at gunpoint". This is a temporary measure. The growing conflicts of park and people cannot be resolved for long by forest guards alone; we must educate people and make them feel that it is their own irreplaccable asset and that they have a vested interest in preserving it. This does not mean that we should dispense with all regulatory measures, but it does mean that the "barbed-wire concept" has to be replaced slowly by education.

The World Conservation Strategy states "School curricula should include environmental education, both as an intrinsic part of other subjects and as separate subjects. The government has to incorporate, as a matter of priority, environmental concerns into their national programme at all levels." Conservation education strategy has to consider a wide range of targets, since everyone is a part of the "Man/Environment system", and everyone should know something about it. Within this broad perspective, it is convenient to pursue the following specific approaches, in order to tackle various respective target groups:

- *Formal Education* to be given in the primary, secondary and other higher educational institutions.
- *Semi-formal Education* to be integrated in other allied technical institutions, such as in Engineering, Administrative Staff College, Guide and Scout Training etc.
- *Informal Education* designed for the general public from the tax payer to the bureaucrats and from voters to politicians.
- *Professional Education* for foresters, wildlife biologists and other professionals who are directly involved in the naturalist's field.
- *Education for International Understanding*

The above categories are all equally important and should be launched simultaneously to fulfill conservation objectives. Here, it is very necessary to observe three progressive stages in man's behaviour as it relates to conservation:

- *Level of consciousness and awareness:* Recognition of problems without any attempt to solve them.
- *Attitude development:* Prevents harm as long as there is no direct or indirect cost to himself.
- *Implementation of conservation measures:* The ultimate goal – prepared in heart and mind to care for his environment and to encourage others to do likewise.

The first phase of development is relatively easy and speedily attained through an effective informal education programme, but for the second and third phases we must look to a whole new generation. The education of the next generation is vital. Otherwise, consciousness without aptitude for action is just a hypocritical development. Talking of the next generation may give a pessimistic picture, since it sounds so long and tedious, but it is not exactly so. Back in 1967, when my boss was preaching to me, had he launched a massive educational programme instead of shedding crocodile tears lamenting at the loss of forest, the six-year old children of that time could have grown up into citizens capable of looking after their environment. It is an irony that ten or fifteen years seems like a long time for an individual, but in the history of a nation it is as ten or fifteen weeks.

In Nepal nearly 80 per cent of the children attend primary schools none of which include environmental education in the curriculum (90 per cent of this figure drop out after primary school, either because of financial constraints, or because there is no secondary school nearby). Most of these children are from poor, backward and relatively disadvantaged sections of society. Ironically they are the ones who live in the regions where environmental degradation is acute and conservation is most urgently needed.

A number of seminars, workshops and numerous cacaphonous colloquia have been conducted, by various agencies, on the subject of introducing environmental education into school curricula, but resolutions have been lost in an amorphous heap. A group of NGOs has also launched an active campaign with a task-force, comprising educators and environmentalists, who approach authorities in the Planning Commission, University and the Ministries of Forest and Education. The main objective of the task-force is to collect documentation, to evaluate problems and to prepare a curriculum at least at the Primary School Level. The idea was highly appreciated and supported, only to suffer from procrastination. The task-force is hiding in a jungle of bureaucratic red-tape.

3.3 *Custom-tailored programmes*

In the field of semi-formal and informal education, some of the NGO's endeavours are quite challenging, unique and action-oriented. Their main target is the teaching profession and their objective is to educate school teachers on the environment so that the multiplier effect through teacher to student will be speedier and more diverse. The group also took a promising and interested body of teachers to a national park and wildlife reserve, helping them to get a feeling and understanding for nature. In order to make teachers self-learning, they organised essay competitions throughout the country, offering attractive prizes to the winners. They also conducted frequent audio-visual programmes for them. The result was positive.

They found teachers teaching children conservation education in an integrated manner. Instead of teaching mathematics in a stereotyped lesson such as "Ram bought fifty mangoes, seven eaten, two lost, how many left?", they found teachers giving mathematics problems with a conservation message such as "Ram takes two minutes to fetch a bucketful of water because his village is near the forest, whereas Kari, who lives in a dry mountain village, takes thirty minutes. How many buckets can Ram and Hari carry in two hours?". Similar examples can be integrated into different subjects.

Another interesting programme of this group of NGOs was to launch a nationwide folk story competition. Each winner was to be announced monthly on Radio Nepal, which has more than 75 per cent coverage in the country. The story was to be simple, witty, humorous, sentimental and religious in order to cater to the illiterate masses. A smart teacher once wrote to me, "In my village, people cut forest unnecessarily. One night, I went to a nearby woodlot and decorated trees with vermillion powder and flowers, symbolising that God dwelt there, and since then no villager has dared to pluck even a leaf." It may sound like religious or emotional blackmail but sometimes it works.

Many national and international environmental and ancillary conservation agencies, having realised that education is a vital component in their projects, spend a fair amount of money and time printing posters, pamphlets and other material bearing slogans in high rhetoric. Stacks of those materials are left unused in dark storerooms. Some of the distributed materials, which cannot be read by the illiterate masses, will be used in villages as wrapping paper for petty groceries and merchandise. If it is colourful and decorative, they may use it to cover their "pigeon hole windows" to stop the wind from blowing in. Programmes are wasted when a quart is put into a pint pot.

Realising the technical drawback, one NGO came up a with the idea of organising a poster competition for artists throughout Nepal. It was stipulated that the poster carry an instant visual message on the subject of conservation, but without words. Twenty entries were received; two of these were given to one of the government agencies for printing and they were a success. This illustrates that a custom-tailored approach with a particular target group in mind is a suitable rein for harnessing a wild horse.

3.4 *"Not at home"*

There are certain principles which have to be adhered to in any educational programme and the first of these is a clear perception of both the purpose and target of a project. Launching a programme without assessing what it means to local people is merely a waste of time and resources. For a glaring example look at educational radio programmes. Originally designed for village education they have now become more or less a playground for big bosses to give speeches and interviews!

Some of the NGOs are quite active and imaginative in carrying out pioneering and yet pragmatic educational programmes. But, as is usual in many Third World countries, where NGO's are generally much weaker than in the developed countries, economic constraints choke them to a premature death. For example, the National Committee of IUCN's Commission on Education, which was formed three years ago, launched many ambitious projects to raise funds locally without any financial aid from government and international agencies, including the Commission's headquarters. The response was extremely good, but since every project costs money, for field excursions, prizes and awards etc., it eventually became a financial burden to the donors. Finally the time came when a member called on well wishers only to be told "not at home".

Understanding NGOs and how to utilise their knowledge and manpower is also a part of education and should be learned by bureaucrats. NGOs are usually run by educated, genuinely interested and experienced people. They are there, voluntarily, not because of any obligation, but because they are committed to a cause. In the field of nature conservation, public and private, government and NGOs, are simply two faces of the same coin; without one of them, the other is faceless and meaningless. Kenton Miller, Director General of IUCN, said "The balanced membership, consisting of governmental and non-governmental organisations, brings grassroot concerns into contact with the highest level of decision making".

3.5 *Grassroot concerns*

Since the very vital subject of "grassroot concerns" has come up, it will not be irrelevant or out of place to mention something which this author has been lobbying for on many occasions in education workshops and seminars. Eighty-five per cent of the total landmass in this country lies in the mountains and 92 per cent of the total population in rural areas. Out there, in the mountains and villages, we have environmental problems. We do not need "Dons" here to draw a master plan within the confines of their offices. We need someone to go out there and live in a village and show them what is wrong and how to correct it. One strongly urges that we bring religious leaders, teachers, and local panchas (politicians) to Kathmandu for a month, and organise orientation classes on environmental education. Field trips should be organised to national parks, watershed areas and to erosion-stricken places. They can also be shown what other countries are doing to preserve nature by the use of documentary films. The expenses for such a programme could be negligible. Accommodation can be arranged in inexpensive hotels and a basic food allowance provided. The cost of educating one Ph.D. (approximately $40,000), would be sufficient to train eight hundred nature-conscious grassroot level leaders who live in the villages, and whose words will have a lot of value and meaning for the villagers. Sending an officer abroad for higher education creates a technical vacuum for two or three years in his office, and when he returns, he brings dreams along together with his diploma or degree that tempt him to stay in Kathmandu either to get rapid promotion or to travel abroad again and again.

3.6 *Partnership*

Therefore, scholarship funds, whether bilateral or multilateral, should be utilised properly and carefully on a long-term basis, benefiting the country rather than an individual. This is also the kind of education that is required by aid programmers. In this crucial context,

another type of education is greatly needed. This is environmental education for regional and international understanding and co-operation. Ecological problems in Third World countries cannot be neglected, because it is impossible for an economically limited country such as Nepal to handle this colossal ecological problem. The many countries of the Hindu Kush-Himalaya Region, for that matter the whole subcontinent, are governed by one single world of "Nature", which cannot be divided by man-made political boundaries. In the natural world the ecological syndrome is not an isolated event, but a chain reaction that spreads from one nation to another. The disturbances of hill forests in Nepal create havoc in Bengal and Bihar in India, and importation of timber into India encourages deforestation in Nepal (75 per cent of timber harvested from the forests of Nepal goes to India). So an environmental education programme is not only essential at a grassroots administrative and political level, it is also necessary to design it to bring awareness to the various governments of both developed and developing countries.

Ecological understanding and philosophical and common concern must be generated among the people of industrialised countries, so that they develop patterns of production and consumption that will not be harmful to the environment of this planet. Awareness of shared natural resources should be promoted throughout the region; it should be made abundantly clear that the cost of correcting ecological problems should be shared. Mutual co-operation, especially in the field of environment, should be viewed both by donor and recipient countries as a "job-to-do", not charity or aid. The bilateral and multilateral aid agencies should continue to integrate ecological and other conservation values and to develop activities which affect the renewal of resources. If this positive attitude is developed and help is provided to countries such as Nepal, in order to tap its biggest natural resource i.e., hydro-electricity, and is concentrated towards conservation-oriented development, we could save the Himalaya and at the same time save the whole of the subcontinent. Otherwise, even with the best of intentions, if environmental values are not respected the contributions of donors will not be appreciated, and recipients will not benefit.

4. CONCLUSION: A GAME OF CHESS

All of the above problems and approaches are dealt with by citing Nepal as a case study. However, the overall picture is not too different from that of other countries of the Hindu Kush-Himalaya Region. We live in the same mountain world where impenetrable hostile terrain, harsh climate and physically landlocked positions have restricted economic growth and agricultural productivity, paralysed communication and transport, and strangled industrial prosperity. Mineral deposits have not matured here, and other natural resources are pressured into an ecological catastrophe by a rapidly growing population, while the GNP is one of the lowest in the world.

If we put all of these problems in a nutshell, we shall see that the game of conservation in this country is similar to that game called chess, in which opponents can seldom be knocked out in a single assault. Poverty is the rook or castle that crushes in a direct attack; bureaucracy is the knight whose moves are unpredictable; growing population is the bishop which attacks in an oblique manner yet straight and strong; and lack of education is the pawn which moves slowly but plays the most vital role of all.

Environmental Impact of Tourism on Mountain Ecosystems

Sushil Bhattarai

ABSTRACT. *Tourism is an important industry in Nepal and a number of other Himalayan countries, with the primary attraction being the spectacular and unspoiled mountain scenery. But while tourism earns important foreign exchange, it also can lead to environmental degradation which threatens the very attractions which bring tourists to the mountains. This paper outlines some of the problems of tourism and presents a strategy for improved tourism management in the mountain environment, including explicit policies on tourism, alternative energy sources, improved waste disposal , assessment of carrying capacity, expanded research, more appropriate training, improved facilities, and enhanced opportunities for rural people to benefit from tourism.*

1. INTRODUCTION

Tourism is an increasingly important sector of the economy of Nepal. Until the year 1965 the total number of tourists arriving in the country was less than 10,000. During the seventies the figure increased five-fold before leveling off in the eighties. Table 1, presents the distribution of annual total tourist arrivals between the period 1981 and 1984 by purpose of visit. In the past, most tourists came for pleasure and sightseeing. Now there is an increasing trend of trekking and mountaineering tourists every year.

The Himalaya attracts a large number of tourists, not only because of the thrill of climbing some of the highest peaks in the world but because of their sheer majestic natural beauty which is still unaffected by environmental pollution. The Nepal Himalaya has 1,310 peaks exceeding 6,000 meters (Table 2). Nine of the world's 14 highest peaks are in Nepal: Sagarmatha (8,848 m), Kanchanjunga (8,586 m), Lhotse (8,516 m), Makalu (8,463 m), Lhotse Tsar (8,400 m), Cho Oyu (8,201 m), Manaslu (8,153 m), Annapurna (8,091 m) and Dhaulagilri (8,081 m).

The country's altitudinal variation, from 100 meters at the southern plains (Terai) to over 8,000 meters towards the crest of the Himalaya, shows extreme topographical variations with a series of mountain ranges having complex land units and people of great cultural and ethnic diversity.

Table 1. Tourist Arrivals By Purpose Of Visit (1981-1984)

Purpose of Visit	*1981*	*1982*	*1983*	*1984*
Pleasure or sightseeing	127,709	136,693	132,350	140,592
Trekking & mountaineering	21,668	23,507	24,198	15,010
Business	6,379	7,374	9,801	8,137
Official	5,674	7,166	8,479	9,399
Others	239	709	4,477	3,496
	161,669	175,448	179,405	176,634

Source: Department of Tourism 1985.

Table 2. Number of Peaks By Height Category

	Category	*Number*
A.	Eight Thousanders (8,000 meters and above)	17
B.	Seven Thousanders (7,000 meters to 7,999 m)	127
C.	Six Thousanders (6,000 meters to 6,999 m)	1,166
	Total	1,310

The three major river systems – Karnali, Gandaki and Koshi – originating from the Nepal Himalaya form a rich natural resource for hydro-electric power and irrigation. It has been estimated that if all the water resources available in these rivers were utilised, the total energy (electricity) produced would be equal to the energy obtained jointly from all the rivers of North America and Mexico.

Four National Parks – the Sagarmatha National Park (1,243 sq. km) in the Solu Khumbu District, Lang Tang National Park (106 sq. km) in the Mugu district, and Phuksundo National Park (4,144 sq. km) in Dolpo District – play an important role in preserving not only the endangered flora and fauna, but also in protecting the natural environment of the Himalayan region.

2. PROBLEMS OF TOURISM

There is already a pressure on natural resources from local population growth, and the increasing number of tourists in such areas are further compounding the problem. His Majesty, King Birendra Bir Bikram Shah Dev, in his message to the 44th General Assembly of the International Union of Alpinist Associations (UIAA) organised by the Nepal Mountaineering Association (NMA) in Kathmandu in 1982, stated that, "Alpinists, while climbing our mountains, should maintain the sanctity and peace as Nature ordained them".

Similarly, Prof. Michio Yuasa of the Japan Alpine Club, in his message to the above meeting said, "The reason that the Himalaya still attract a large number of tourists is not only because of the thrill of climbing some of the highest peaks of the world but also for its bountiful nature, which is not found in the West any more because of environmental damage." Hence it can be justifiably said that tourists (trekkers and mountaineers) are attracted by the environmental excellence of the region.

Problems of environmental pollution such as leaving behind large quantities of litter, including non-decomposable solid wastes and destruction of natural resources by encouraging local people to cut trees to fuel tourist fires are serious threats causing the degradation of the mountain ecosystem.

The growing numbers of individual trekkers who mostly rely on the local availability of resources are putting extra pressure on the natural environment, as compared to group trekkers and montaineering expeditions.

The lack of knowledge on the carrying capacity of the area for tourists (especially trekkers and mountaineers) is a major obstacle to keeping the mountain ecosystem in balance. This is even affecting the social, cultural and economic environment of the people living in the mountains.

2.1 *Ecological impacts*

The increase in population, fragile mountain ecosystems, high altitude of the mountains with steep slopes and rugged topography along with the tourism activities, are all responsible for environmental degradation in Nepalese mountains.

The soaring number of trekkers and mountaineers in the high Himalayas over the last decade has not only created a boom in firewood sales by the local people, but also a dramatic depletion of the natural forest which takes years to regrow. This may even affect the marginal agricultural lands, thereby forcing the people to emigrate.

Wood is the principal fuel throughout the mountains, and everywhere the forests are being cut for firewood and construction; there are few alternatives which would enable people to survive in the mountains. One of the adverse impacts of tourism (mountaineering and trekking) in Nepal is the increased consumption of firewood in the already deforested hill-mountain regions. In Khumbu region, the present average daily consumption of firewood is 6.4 kg per tourist per day and is increasing by 10 per cent annually (Sharma, 1982). The most common species used for heating and cooking are rhododendron and birch. Other species used are blue pine, juniper, blue fir, hemlock, and so on.

In Khumbu, only organised trekking groups bring their own fuel from Kathmandu but, even they, often support their porters with local firewood. Unorganised trekkers generally stay in hotels or inns that accelerate the use of firewood thereby increasing the deforestation in the neighbouring areas. Hence more pressure on the forest is exerted through tourists as compared to the local people. Mountaineering groups are particularly heavy consumers of wood, especially for making bridges and firewood for cooking and heating at high elevations.

Deforestation is thus the most severe and best known environmental problem contributed to by the mountain tourist. Journalistic accounts have also dramatised soil erosion in the Himalayan region and consequent devastation of adjoining plains and even the creation of a new island in the Bay of Bengal (Gurung, 1982). Laban (1975), estimates 50 per cent of the landslides in Nepal's Himalaya are geologic in nature and the rest are initiated by man, making a major contribution to soil erosion.

Also, the annual rise of river beds in the Terai region by about 15-30 cm through siltation, demonstrates the accelerated soil erosion in the mountains, which if unchecked, may bring ecological collapse and disaster.

The unprotected non-irrigated terraces constitute the most extensively endangered areas; also threatened by erosion are pasture and idle areas, where vegetation cover has been overgrazed.

The Khumbu region, is not favourable for multiple and diversified cropping. Because of the cold climate, crops like potato, wheat and naked barley are generally grown, which may take up to one year to ripen. However, maize, wheat and potato are also grown at lower altitudes. Because of the gradual change in occupation from agriculture to tourism, pressure on land is declining; some lands are even kept fallow for camp sites to be rented to the tourists. The lack of bringing new lands under cultivation may also be due to the strict regulations of Sagarmatha National Park (SNP).

2.2 *Socio-economic impacts*

Each ethnic group in Nepal developed its own culture in response to nature. Tourism in the Khumbu region, for example, has exposed the Sherpa community to a new value system which creates classes in their society by changing their lifestyle. This may discourage them from

remaining with their family and some may even migrate to cities like Kathmandu for a better living.

Mountain tourism in Nepal, however, cannot be overlooked in consideration of the needs of Nepal's economic development. A large number of Sherpas have been employed in mountaineering and trekking some of them as professional high altitude climber-guides and porters. Mountain tourism contributes around 25 to 35 million rupees per year by way of wages and other services (assuming the total number of employees as 5 to 7 thousand with a per capita earning of Rs. 5,000 per year).

Earnings from trekking and mountaineering accounted for 14 per cent of the gross earnings from tourism in fiscal year (FY) 1980/81 and 19 per cent in FY 1981/82, which is a substantial foreign currency earning source. But, on the other hand, not more than 5 per cent of a tourist's expenditure may filter down to the rural economy.

2.3 *The pollution problem*

Solid waste disposal and sanitation-related problems are compounded as a result of the overcrowding in campsites. The Solukhumbu Trek Route is often referred to as the "garbage trail", and Sagarmatha Base Camp as "the highest garbage dump in the World".

Camp sites which are generally close to the settlement areas are usually public property, so are generally not attended to by the local people and remain neglected. This has resulted in the non-biodegradable materials such as tins, plastics, and bottles left by the trekkers and mountaineers, remaining on the site for a long time.

In the higher regions, the excrement of animals and man is generally used to manure the fields. But due to the increased number of trekkers and mountaineers the campsites generally have insufficient litter pits and the trekkers, mountaineers and their support personnel, may use open places and pollute river water. This can result in various parasitic diseases in the local people and in other tourists, thus producing a serious health hazard.

3. STRATEGY FOR MANAGEMENT

3.1 *The present conservation approach*

Various efforts have been made by His Majesty's Government to conserve and protect the mountain environment, such as the opening of national parks and wildlife reserves, watershed management projects, integrated rural development projects, etc. The Environmental Impact Study Project of His Majesty's Government is carrying out impact studies of various environmental development activities.

The Forest Act, the National Parks and Wildlife Preservation Act, the Soil Conservation and Watershed Management Act, the Tourism Act and the Mountaineering Expedition Regulations are important steps in minimising ecological damage in the mountains.

The National Park and Wildlife Conservation Act (1972), not only protects the endangered flora and fauna but prohibits cutting of grass and timber, fuelwood collection, medical herb collection, hunting and capture of any animal or bird, any kind of settlement or agricultural activities, burning and damaging of any kind of natural resources, etc. in areas established as national parks.

The Mountaineering Expedition Regulations 1977, of the Tourism Act 1978, provides for maintaining a clean environment. The same Act has also provision to punish breaches of the above Act, by prohibiting the party to enter Nepal for 5 years or undertaking any mountaineering expedition for 10 years.

The Mountaineering Expedition Regulation 1979, has various provisions to protect the environment, including protection of culture and religion, protection of nature and natural resources, and maintenance of clean environment through disposal of garbage, etc.

But in practise, keeping the environment clean is getting difficult. It may be due to the lack of a proper agency of the government to monitor and follow up the regulations, or lack of sufficient alternatives for fuelwood, or lack of education and awareness among Sherpa porters who accompany the groups.

The Sagarmatha National Park (SNP) was established in 1975, in order to conserve forests, wildlife and the landscape of that region. Before the enactment of the Forest Nationalisation Act of 1957, protection and management of the forest and pasture lands were done by the Sherpa community by appointing protectors "Shing-i-nawa", from each village who were paid by the community. After the Nationalisation Act, government ownership however could not effectively protect the forest. An increase in population was accompanied by increasing numbers of cattle; forest areas in the vicinity of the villages were cleared for agriculture and other accessible forest areas were also over used. The increasing tourist flow during the sixties, eased the pressure on land, but the pressure on forest for firewood and timber accelerated.

The opening of SNP was a timely step to protect the deteriorating environment of this region. Strict rules and regulations were imposed for the use of natural resources. People started using smokeless ovens which require much less wood than the traditional ones. The SNP managed Jorsalle Kerosene Depot on a trial basis, but it is not functioning well as yet. The increasing number of tourists who remain in local inns also forced local people to collect more firewood, often violating the regulations set by the SNP. The lodges operated by the SNP at Thangboche, Feriche and Lobuche do not have firewood problems, as compared to the local inns, and this has created some misunderstandings between the SNP staff and the local people.

Though the trek routes inside the Park area are fairly clean, the camp sites are still polluted with undecomposable wastes like tin cans, plastic bags, bottles and film containers. Such waste disposal also pollutes water in the nearby streams. However, cleaning of garbage and rubbish has been started slowly through volunteer efforts on the trail to Sagarmatha.

The authority to issue mountaineering permits through the Nepal Mountaineering Association (NMA) is another step in involving non-governmental organisations to promote mountain tourism through proper protection of the environment.

The existing hydro-plant in Namche Bazar is too small even to meet the demand for lighting. The need for alternatives to fuelwood is being felt now by the local people. Bio-gas production and composting plants are being planned, but need more technical skill since the climate it too cold for gas production under ordinary conditions.

3.2 *Future management*

For promoting mountain tourism, with due protection of the environment, the following recommendations for future management are presented:

1. Firm policies are needed on land-use planning in the mountains, with clearly defined zones.

2. While also seeking other alternate energy sources, use of efficient stoves should be promoted in order to reduce the firewood consumption.

3. Proper management of waste disposal and the enforcement of the existing rules and regulations could be more effective. Also, pollution control awareness on the part of the Sherpa porters is essential, since they are generally given charge of waste disposal by trekkers and mountaineers.

4. In order to avoid pressure on mountain ecosystems, expeditions and trekking permits should be given on the basis of the carrying capacity of the area. Opening of new areas can also complement the need.

5. Proper attention should be given to enforcing the various acts and regulations related to the protection of the mountain environment. Similarly, national policy should encourage mountain tourism in harmony with environmental protection.

6. The King Mahendra Nature Trust for Conservation should help to mobilise non-governmental organisations (NGOs) to undertake various activities especially environmental education and research, in order to promote and protect the mountain environment.

7. Management of mountain ecosystems needs sufficient research. The interrelationship between the people, resources, environment and development is very important in countries like Nepal where the mountainous region occupies two-thirds of its total area. I feel it appropriate to mention here the necessity of a joint effort between the International Centre for Integrated Mountain Development (ICIMOD), the United Nations Environment Programme (UNEP) and the concerned HMG agencies to carry out a detailed case study, in order to have an integrated approach for sustained development in the Hindu Kush-Himalaya region. This joint effort can also conduct research on:

- methods of rehabilitation of high altitude forest areas;
- preparation of ecological maps; and
- appropriate technology for alternate energy sources.

8. The Manang Mountaineering School and the proposed International Mountaineering Museum at Pokhara are timely efforts to promote mountaineering and effective environmental education. Hence these efforts also need proper support from all national and international levels.

9. In order to handle the increasing number of mountaineering and trekking tourists, trails and campsites need better facilities and alternatives to improve the hygiene and sanitation.

10. People living in mountainous regions should be encouraged to produce vegetables, fruits, poultry, dairy products and handicrafts by providing them soft financial loans, expertise and marketing facilities. This may divert people from traditional agriculture which will ultimately help to reduce pressure on forestland.

4. CONCLUSIONS

Mountain tourism should not only be limited to mountain climbing and sightseeing but should also include the protection and promotion of the natural environment and cultural heritage. If there were no resources there would be no tourists and so, no economic returns. Mountaineers and trekking tourists need more resources than the local people. There should be a trade-off between environmental damage and financial return, while promoting tourism in the mountains. National policy should therefore encourage mountain tourism in harmony with environmental protection.

CHAPTER III

PEOPLE AND PROTECTED AREAS: CASE STUDIES

Livestock Grazing in India's National Parks

Kailash Sankhala

ABSTRACT. *A major management problem in India's national parks is livestock grazing. In the early years, grazing was tacitly permitted, but as it became clear that livestock were having a detrimental impact on the natural habitats, the national park authorities began to take steps to exclude domestic animals from at least some of the country's protected areas. Project Tiger was an essential step, providing both a focus and support from the highest level. Case studies from Ranthambhore and Desert National Park are provided.*

1. INTRODUCTION

The initial problems between people and parks date back to 1872 when the first national park, Yellowstone, was established. At that time local wishes were over-ruled by the interests of the nation. The story of the conflict in India is different. It did not begin with the declaration of national parks and sanctuaries; park management had accepted cattle grazing, forestry operations and collection of minor forest produce as permissible operations and thus there was no cause for conflict. But in 1971, it was discovered that the parks and sanctuaries were deteriorating and many species were becoming rare. To set right the mistake of this style of management a comprehensive new law was proposed. It was also decided to base national park management on the concept of total environmental conservation. With the passing of the new Act in 1972, and the launching of Project Tiger, conflicts started surfacing because the people were not accustomed to restrictions on their use of the parks, considering that they had an inviolate right to graze their cattle in the parks.

2. INDIA'S NATIONAL PARKS

The history of the national park movement in India began in 1935, when, the first national park was established in the foothills of the Himalaya and named Hailey National Park (now Corbett National Park). Procedures for forming a national park were simple. Neither a public hearing nor any debate was necessary. One simple order of the Governor of the United Provinces, in 1935, was sufficient.

The Forest Department continued to exploit forests as part of regular commercial operations, and showed no concern for the presence of several livestock inside the park. Excessive cattle grazing and the reckless lopping of fodder trees on an extensive scale was part of the grazing licence. Construction of a large irrigation-cum-power dam, which further reduced the habitat diversity of the park, was approved unopposed. Until 1971, out of the park's 323 sq km less than 3 sq km were earmarked as *sanctum sanctorum* where tree felling was not allowed.

The story of Taroba, Shivpuri, Kanha and Bandhagarh – the other premier parks of India – is similar. The first two were parks only on paper. Since their declaration as national parks was not of any significance, their status was ignored. Conditions in wildlife sanctuaries, which were 130 in number by 1970, was much worse. Though it was easy to designate any area as a sanctuary by a simple administrative order, the provision was double-edged – it could also be redesignated by a simple administrative order. Except for commercial hunting (exceptions being made in exceptional circumstances for exceptional people) there were no restrictions placed on either local residents, forest contractors or the department's commercial operations. The glamorous title "National Park" or "Game Sanctuary" in the late fifties, however, started attracting the attention of a new industry – tourism – with the additional disturbing impact of lodges inside the parks.

It is difficult to comprehend this gross misunderstanding of foresters, conservationists, ecologists and wildlife experts of the era. The pity of it was that the foresters at times justified both felling of trees and grazing of cattle as essential prescriptions for management of a national park. This was primarily to avoid confrontation with the people and the politicians. Nearly forty years after the establishment of the first national park, the national park movement, if there was any, was a hopeless compromise.

3. THE WILDLIFE PROTECTION ACT, 1972

By 1971, it was apparent that wildlife areas were dwindling and animal populations were registering a sharp decline. Some species, such as the tiger, were vanishing. Distressed by the situation, Prime Minister Srimati Indira Gandhi called a specialist meeting. We had a free and frank

stock-taking of the condition of wildlife in the country. The Inspector-General of Forests gave the official version that all was as it should be according to the Forest Law. The Prime Minister, however, accepted our suggestion that formulating new legislation to protect the country's vanishing wildlife and the wild lands was needed. It was a coincidence that exactly one hundred years after the declaration of the formation of Yellowstone National Park, the Indian Parliament passed the Wildlife Protection Act in 1972. The national parks and sanctuaries which had been established under various state laws were regularised as national parks and sanctuaries under this act.

By now the human population had exploded. Vested interests and profits regarding the natural resources – forests, mining and grazing lands – had increased. Development activities for transforming India into a prosperous industrial country which was agriculturally self-sufficient were also in motion. Unfortunately these very activities, in some cases, were the cause of deforestation. The people too had become more conscious of their rights and privileges. It was too late to start a dialogue. Preventing the felling of forests and removal of dead wood, and eliminating cattle camps and grazing from the national parks meant direct and violent confrontation with the people. The choice was either to have or not have national parks.

4. PROJECT TIGER

At this stage, the author was asked to prepare a plan for the preservation of the Indian tiger. There was now an opportunity to begin afresh. Fortunately, Srimati Gandi's support was complete and her directions were clear that commercial forestry and cattle grazing must be stopped in our national parks and sanctuaries, especially in the tiger reserves.

Once more a beginning was made at Corbett National Park when, in April 1973, it was redesignated as a Tiger Reserve. Since no compromises were to be made in executing Project Tiger, confrontation with vested interests was inevitable. Setting right the management mistakes committed for nearly half a century was a challenge. By now, public opinion, international support and the nation's will were all in favour of establishing the nature reserves free from human disturbances. Corbett Park was "freed" from all forest fellings, cattle grazing and other forms of exploitation. Kanha (Madhya Pradesh) was slightly ahead of others in stopping grazing, but hunting of wild dogs and jackals and the baiting of tigers for tiger shows continued there. Others that followed this lead were Bandhipur (Karnataka), Manas (Assam), Sundarbans (West Bengal), Ranthambhore (Rajasthan), Melghat (Maharashtra) and Palamau (Bihar). The last two proved to be difficult and the only area to be freed from felling of forests and cattle grazing encompassed about 200 sq km – totally inadequate for any meaningful conservation project. Simlipal (Orissa) proved to be a hopeless unit. Nothing much could be achieved there since it was dotted with tribal settlements which depended upon agriculture and cattle grazing. The influential forest corporation proved to have too strong a lobby. The Field Director himself got involved in an unplanned research affair with a "glamorous" Elsa-like tigress, and had no time for the Project.

Inspired by what was being done in the Tiger Reserves, other national parks and sanctuaries also made attempts to free themselves from exploitation. Some success was achieved, notwithstanding tough opposition and confrontation. Examples of these conflicts are given here to illustrate and highlight the problems in retrospect and to understand them in perspective for future programmes.

5. ELIMINATION OF GRAZING IN RANTHAMBHORE NATIONAL PARK

Ranthambhore Tiger Reserve extends over 400 sq km of dry, deciduous, hilly terrain. It has high grazing potential and has always attracted cattle. Over 12 villages with more than 20,000 cattle were inside the park and grazing took place without any limitation. It was a grazing ground for over 40,000 livestock from the adjoining plains especially during the monsoon. In addition, during the agricultural off-season about 30,000 bullocks belonging to relatives of the villagers were accommodated in the reserve, involving secret marriage agreements made by the villagers. This grazing was excessive by any standard. The populations of sambar, chital, and nilgai were suffering due to this competition and they were harassed by the graziers and their cattle.

There was no use explaining to villagers the philosophy of nature conservation. After days of meetings the headman would conclude by saying that the scheme was good but should be implemented away from his village, preferably in some other district. A decision was made in 1971 to stop the entry of outside cattle. It was a tough decision since militant graziers were soon up in arms. Their force had to be met with force. This resulted in many clashes. Despite this, success was achieved: outside cattle grazing was stopped.

The second action was that of relocating the 12 villages situated inside the reserve. Long meetings with the people were required to gain their confidence. Hospitals, schools, better houses, cattle yards, village wells and temples plus adequate compensation and agricultural land were promised. New roads to market their produce were assured. A breakthrough was possible by making the Sarpanch a member of the family of the Field Director, by means of a simple religious ceremony of tying a sacred thread. Annantpur village was shifted physically and wholesale to a new site. The people were settled and all that was promised was given to the individuals and to the village community. It is now a prosperous village with the new name Kailashpuri.

The fair deal and the sincerity of the Project staff along with the welfare activities started in the village

prompted other villagers to follow suit and they too moved out to a new site, Gopalpura. The core area of the reserve was thus totally vacated by people, a historic act in the conservation history of the world.

This action, however, did not end hostilities. The lush green grass of Ranthambhore National Park proved to be too tempting for villagers. They invariably grazed their cattle inside whenever there was an opportunity. Detections resulted in confrontations. These were not economically backward people. Any number of meetings to convince them did not work. They preferred their own style, irrespective of what it might mean to others and to the country.

"Operation Shift" was easier in the case of Kanha National Park, primarily because the inhabitants were tribal Baigas who are not graziers and do not own large herds of cattle. In addition, they lived in forest labour villages, and had no title to the land. It mattered little for them to leave, especially if they were given better land and fair compensation for their houses. They built their new houses with their own labour but were paid by the Project. Their fields were levelled at Government cost and building material was supplied free. The only regret they had was that of leaving a game-rich reserve. Balgas are brutal in killing animals and known for eating animals killed by tigers and wild dogs.

6. ESTABLISHING DESERT NATIONAL PARK

The experience of establishing Desert National Park was equally interesting. One would imagine that in a vast treeless and uninhabited area it should be easy to demarcate and gazette a national park. That is not so. The seemingly sterile land of the Indian Thar Desert is highly productive, rich in grasses, grass-eating animals, seed-eating birds and their predators – eagles, hawks and falcons. Chinkara is the dominant antelope, occuring all over the desert even where surface water is unknown for months. Lizards, sand fish, sand toads, and predators such as the mongoose and desert fox are common. The bird population is rich in variety. Common sandgrouse flock in hundreds and thousands on waterholes each morning. Travelling over 50 to 60 km., clouds of imperial sandgrouse arrive in winter. A few hundred lesser bustards flock in pairs. Eagles and falcons also arrive at the same time. It is the last stronghold of the Great Indian bustard, a rare bird seen in flocks like the peafowl. Such is the richness of life in Thar Desert.

Out of over 160,000 sq km it was difficult to locate and demarcate even less than 1 per cent of the area which was free from human activity. There are three types of people who have interest in the desert tract: cattle owners, small farmers and nomadic hunters. Large herds of sheep, goats, cows and camels are owned by people and they graze them there wherever water is available, after which they migrate. The paucity of water acts as a limiting factor and a control over excessive grazing. This has been in effect for over a thousand years, and they have flourished in this way. The relics of the ruins of their forts, "havelies" and houses tell the tale of their prosperity. They did not consume more than their share and lived in tune with the ecosystem. Cutting of trees was unknown to them. On one occasion certain people, "Vishnois", laid down their lives before allowing the Maharaja's men to cut trees. Today, the community is rich.

The hunters are nomads. They have always hunted within the limits of their daily needs and moved from area to area to reduce their hunting pressure. All was well until development programmes came to the desert. Now the younger generation is being brought into the "mainstream" of fashion. Women now want lipstick and men wear Terylene bush-shirts. Both have to be imported from outside. This means exchange, so something has to be sold out of the ecosystem. The easiest thing to acquire is the fur of desert animals and thousands of animals were slaughtered for export markets. One dealer smuggled 75,000 skins of jungle cats, desert foxes, and jackals in one consignment.

To save the rich wildlife and beautiful landscape of the desert, Desert National Park was suggested. The work of establishing the park has been in process for the last five years but without much success. Even in the tract of land we call a desert, the interest of man is deep-rooted. These people are not prepared to spare even one per cent of the desert area from grazing, and the state government is hesitant to define a clear policy.

7. EXPERIENCE IN OTHER PARKS

The case of the bird sanctuary in Nal-Sarovar, Gujarat is also distressing. In a shallow lake of 100 sq km, the finest in the country, where over a hundred thousand flamingoes arrive, as well as migratory waterfowl, there are islands inhabited by cattle graziers. Their daily movements keep the entire sanctuary in a state of tension.

The confrontation of the Maldharis and the Asiatic lion is another well-known case. The Gir forests hold a small population of lions in a small area and they are always in danger of extinction. Construction of a stone wall to cordon off the Gir National Park has been a historic effort but the Maldhari, the local grazier community, continue to use poison bait when their buffalo are killed. Should this see-saw situation continue? For how long? To this author's way of thinking, relocating the Maldharis is the only answer.

Another example of a small wetland is Bharatpur, known for its resident and migratory birds. Over 10,000 birds nest and over a quarter million birds migrate in different seasons, especially in winter. Even rare birds such as Siberian cranes arrive to winter there. The area is a bare 30 sq km in a vast agricultural system. Over-grazing by 4,000-5,000 buffaloes, most of them unproductive, was destroying vegetation, toppling and trampling floating

ground nests and churning mud ponds and killing fish, destroying one of the finest national parks in the country. An attempt was made to stop their entry by law enforcement; a clash resulted in bloodshed. The people were not poor – some were in Government service and keeping dairy cattle meant extra income to them. Therefore, if we think that projects to improve the economic conditions of the people living in the adjoining areas of the parks will help in reducing pressure on the park, we are mistaken. Moreover, if such work is entrusted to the authorities of the national parks and reserves, the main responsibility and management of the park might be neglected. A conservationist's job is the welfare of the land, the habitat, its flora and fauna and not the social welfare of the people. He should, at the most, actively work towards good public relations with the people and conduct nature education camps to instruct the future generation. Examples of such work are the nature camps of the Gujarat State.

8. GRAZING IN PARKS: OTHER CONSEQUENCES

It is thus observed that cattle grazing is the major problem that Indian wildlife and the national parks and sanctuaries face today. Out of the 53 national parks and 247 sanctuaries mentioned in the directory, published by the Ministry of Environment (1985), almost all suffer from the problems of forest fellings and cattle grazing. The felling of trees for commercial purposes is easy to stop once the State Government makes a decision, but the prevention of cattle grazing is difficult. This is more acute in the Himalaya and the arid lands, both in the hot desert of Gujarat and Rajasthan and in the cold desert of Ladakh, Jammu, and Kashmir. Grazing is the one single factor that has delayed the final notification of more than half of the national parks of India.

There are no national parks in the states of Andhra Pradesh, Bihar, Meghalaya, Mizoram and Nagaland. States such as Arunachal, Assam, Himachal, Jammu and Kashmir, Maharashtra, Orissa and West Bengal could also afford to place more areas under conservation management. Remarkable progress appears to have been made from 1980-1984 by increasing the number of national parks from 19 to 53. However, the question is how many have been finally notified and freed from grazing? According to information received just two in Rajasthan, two in Madhya Pradesh, two in U.P., one each in Gujarat, Assam, Karnataka and Jammu and Kashmir are "real" national parks; the others are only in the process of becoming national parks. Unfortunately, in the sanctuaries, grazing and forestry operations have been accepted as a practice of management. With the increasing pressure of cattle and timber exploitation, the habitat of the sanctuaries will deteriorate and these conservation areas may remain only in name.

9. A NOTE ON TOURISM

The question then remains whether the 90,000 sq km of land can be freed from commercial exploitation and cattle grazing. If it can be done, should they remain inviolate? This is neither possible nor desirable. The first principle – "for the enjoyment of the people" – of the Yellowstone National Park should help and guide us. The strategy should be to invite a wider section of people to visit the parks – in modern terms, tourists. Since more and more people are showing concern for nature conservation, it is time to mobilise them. Tourism is only beginning in our sub-continent and therefore the advantage is that it can be regulated to become the least consumptive. Our parks are small compared to those of many other countries. Their capability to absorb human impact is much less. We need not follow the West to make our national parks into weekend campsites. The practice of limiting the number of vehicles and putting a ceiling on the number of visitors at a time will have to be fixed and rigidly controlled. The luxuries of five star accommodation and swift modes of travel need to be restricted. They encourage only the wealthy visitor who may not be especially interested in nature. If facilities are more modestly priced, this would attract also those who are keen nature lovers. This will help selective tourism to evolve.

This change in the use of the parks by encouraging a different type of people – travellers – is a lesser evil and will expedite the process of making the parks free from cattle grazing by producing a more extensive public opinion lobby. The national parks surely have a future in this subcontinent, but they need to be protected and preserved as forts and fortresses of our natural history.

Protected Areas and Local Populations in Kirthar National Park, Pakistan

W. A. Kermani and Khan M. Khan

ABSTRACT. *Kirthar National Park, one of Pakistan's most important protected areas, is an excellent example of how species can rebound from extreme over-exploitation to reach levels which are once again productive. The Kirthar region has been occupied by people for thousands of years, but only with the introduction of firearms did the wildlife begin to decline. In order to reverse this decline, the co-operation of local officials was sought through appealing to their self-interest. Interest from the highest officials in the central government has resulted in a new development plan for the park.*

1. INTRODUCTION

The Kirthar National Park (308,733 ha.) is in south-west Pakistan, comprising the southeast extension of the Kirthar Mountain range west of the Indus river. There are 93 villages within the Park area with a human population of 10,500. The domestic stock population is 11,228 cattle, 27,988 sheep, 44,441 goats and 3,046 camels. Karachi is 58 km by road from the park, while Hyderabad is 72 km away. The Park has just two stretches of metalled roads, namely 80 km from Karachi and 56 km from Hyderabad. Travel elsewhere within the Park requires 4-wheel-drive motor vehicles.

The vast majority of land area belongs to the Government, with 637.95 sq km being under cultivation. Some 440 sq km has the status of protected forest under the Forest Act whereby acts, such as felling of trees, are prohibited. The Park area is also a wildlife sanctuary under the Wildlife Protection Ordinance 1972 which prohibits killing, trapping and hunting of wildlife. Adjacent to the Park about 8 km to the east, is the Surjan, Sumbak, Eri and Hothiano Mountains Game Reserve where controlled hunting is permissible.

The Park consists of hill ranges separated by fairly wide undulating valleys. The highest altitude within the Park occurs at Karchat Mountain at 1,004 m above sea level and the lowest altitude at the Hub Dam at 70 m above sea level. There are no perennial rivers in the Park. However, drainage of rain water is provided by Baran Nadi via the Indus and Hab rivers into the sea.

There are four distinct climatic seasons: winter, December to March; hot, April to June; rainy, July to September; and autumn, October to November. The average annual rainfall is 15 cm. Mean annual temperature is 39 degrees C in summer and 5 degrees C in winter. The principal geological formations within the area are calcareous limestone. Sandy limestone, shale, sandy shale and grey sandstone occur throughout the range. Some stages of these formations are rich in fossils. The soils contain fragments of rocky material which is generally limestone. Surface soils contain 90 per cent sand and 10 per cent clay.

Underground water, which has been tapped in many places, is brackish under the limestone formations and fresh under sandstone formations.

There is geological and archaeological evidence that suggests this region carried tropical forest vegetation until about 500 B.C. The geophysical changes have, however, turned this zone into an arid region and dominant vegetation in the Park is composed of open communities of deciduous, xerophytic trees and shrubs. In the rainy season there is profuse regeneration of ephemeral vegetation and summer annual grasses. The characteristic vegetation communities depending on soil types are *Acacia nilotica, Indigofera oblongiflora, Ziziphus nummularia; Capparis aphylla, Prosopis spicigera, Commiphora mukul; or Euphorbia caudicifolia, Grewia tenax, Acacia senegal.*

The Park has 26 species of mammals, 58 species of birds, and 23 species of reptiles. The most interesting among the mammals are ibex, wild sheep or urial, gazelle, leopard, jungle cat, desert cat, wolf, desert fox, striped hyaena and the Cairo spiny mouse.

Among the birds the most interesting are the grey partridges, seesee partridge, three species of sandgrouse, Bonelli's hawk eagle and Egyptian vulture. And the most spectacular of all is the annual winter visitor, the houbara bustard which is heavily persecuted elsewhere in the country but is protected in this Park.

Kirthar National Park is also rich in archaeological and geological sites. The famed Rannikot Fort, at the northeastern tip of the Park, represents a remarkable example of the defense system of the late Muslim rulers of

Sind. The ancient carved stone tombs at Taungus are comparable in the mode of their construction and ornamentation to those at Makli hills in southern Sind. Prehistoric remains of habitation near Koh-Tarash cover a spectrum of our national history ranging from pre-Islamic to even the pre-historic period (3500 B.C.). The geological history of this area dates back at least 45 million years (Eocene Epoch).

2. HISTORY OF THE PARK

The distinction of being the first National Park in Pakistan to be recognised by IUCN in 1975, gives a benchmark of the first significant step taken in the country for scientific management in the field of wildlife conservation. This region is of particular interest because while it never suffered from over-population (though it has supported a permanent human population for at least 100 years), the area had always remained an attraction to hunters. Those who used bows and arrows left little mark but the gun-bearing civilised men exercised a tremendous influence over the area because as rulers they took pride in the number of animals bagged and the sizes of trophies. It is a story of an incessant pressure of hunting in the pre-independence days when an Englishman had the prized horn of a Sind Ibex setting the record of 133 cm. In the post-independence era, the people acquired more guns and it became another refrain of the familiar story of too many guns chasing too few animals inherited by an independent country. The local population, poor as they were, considered the hunters as welcome visitors who supplemented their income.

So after Guy Mountfort submitted his report to the Government of Pakistan, the dwindling status of wildlife in Pakistan was brought in focus and his book "The Vanishing Jungle" gave a shocking sense of awareness to the people. It was then thought how pressing and urgent was the need for wildlife conservation. The Kirthar area, containing interesting wildlife species and relatively sparsely populated by human beings, was considered the first priority and the pioneering work of conservation was started.

The first important step was to take the people in confidence, enlist their support, win their sympathies and arouse an interest and pride in their valuable heritage. Without the goodwill and active collaboration of the local population nothing could be achieved or accomplished. Initially the Chiefs of the dominant local tribes were approached, a programme of conservation was laid out before them, the benefits that were likely to accrue to their people were set forth and the importance that they would assume under the development project was highlighted. The name and fame the leaders would earn within the country and abroad proved to offer a great deal of attraction. The Chief was converted to the side of conservation, and with his commitment, support, and blessing mass contact was launched. The people awoke to the consciousness that there was indeed such a thing as conservation which, when correctly practised, will bring in its wake considerable opportunities of employment, jobs and economic benefits which hunters could not provide. That their area would one day become a popular holiday resort for visitors from home and abroad held out a promise of their own increasing importance.

The successful enlistment of the wholehearted support of the people and their leaders was reassuring for the representative Government, as the leader of the area was also a member of the National Parliament.

The next significant cornerstone laid was the legal umbrella spread over the wildlife; the Wildlife Protection Ordinance 1972 promulgated in Southern Pakistan became a model for the rest of the country to follow and the other three Provinces subsequently enforced their own wildlife laws.

Then came the essential phase of preparing a scientific management plan for the National Park. It was here that IUCN extended active help and support by assigning the work to their Staff Ecologist, Colin W. Holloway, who spent a considerable time in the country and together with Khan M. Khan prepared a comprehensive management plan.

According to the concepts set forth in the Management Plan, the development projects were formulated and funding provisions were made. The phased programmes of development are progressing apace.

In an area where Ibex had almost been hunted out (leaving only about 1200) and the Urial number had been reduced to a very low level, the Kirthar National Park now has over 4,000 Ibexes and about 1,000 Urials.

At the other side of the spectrum is the boom that the National Park has brought about. There are 108 employees drawn from the villages within the national park who are now serving with the Government. The complex built for the visitors and tourists has helped the people to market their dairy products, poultry, eggs and meat as well as the handicrafts they prepare. The visits from VIPs boost the morale of the people and fill them with pride. The law that permits no further extension of cultivation of land than the already existing rights, prevents encroachment from outsiders, which is a welcome change for the inhabitants.

There is also a provision for sportsmen in the nearby game reserve, where cropping of wildlife is allowed under specific regulations. The hunters try their luck in a lottery and those who succeed in the draw pay a fee of Rs. 10,000 (foreign nationals) or Rs. 5,000 (locals) for hunting one Ibex. In the 1985 season ten hunters came from foreign countries to hunt ten head and another ten were allowed to be hunted by nationals.

The President of Pakistan, during his visit to Kirthar National Park on April 20, 1983, was pleased to see the results of wildlife conservation in the park area. While recognising that effective steps have been taken for the preservation of wildlife in the park area, he emphasised

the need to develop this beautiful spot as a major tourist attraction and was pleased to issue a Presidential Directive for the development of this Park.

The plan prepared in pursuance of the President's Directive includes the development of archaeological/ geological sites and monuments, improvement of infra-structure, furnishing of the existing tourist cottages and dormitories, improvement of jeep trails and foot trails leading to the look-out points, improvement of existing water points and sinking of new wells, and electrification of Khar and Karchat Visitor Centres. The development plan as envisaged will cost Rs. 24,500,000.

Such then is briefly the success story of a national park in a country which is a latecomer, only recently joining the family of conservationists in the developing world.

Annapurna National Park: The Nepal Plan for Joining Human Values and Conservation of a Mountain Ecosystem

Bruce W. Bunting and R. Michael Wright

ABSTRACT. *The paper briefly describes the local context of the Annapurna area: its geology, natural resources, and human ecology. The Nepal Plan for conservation of the Annapurna area is presented. The unique proposal for the park to be managed under the King Mahendra Trust for Nature Conservation is introduced. The proposed management zones of the park are discussed together with some of the issues to be analysed in the future management plan for the park. The concept for the Nepal Plan is to have the Annapurna National Park demonstrate how a nationally established, but privately managed park can serve as a catalyst for socio-economic development and increased environmental awareness in nearby communities and the nation as a whole.*

1. INTRODUCTION

The Annapurna area

The Annapurna area is well-known internationally and in Nepal for its beautiful mountains and unique ecology. The area is bounded to the north by the dry alpine deserts of Dolpo and Mustang, to the west by the Dhaulagiri Himal, to the east by the Marsyandi Valley and to the south by valleys and foothills surrounding Pokhara. The southern slopes of this area receive some of the heaviest rainfall in Nepal (over 5,000 mm per year) which has created an ecology different from other regions of the Himalaya. This area supports mountain laurels, lush rhododendron forest, bamboo jungle, *Bambusa* spp.), diverse orchid flora, and a rich variety of birds and mammals including Himalayan Monal pheasant, Danfe – the national bird of Nepal, Himalayan tahr, barking deer, serow, ghoral, Himalayan bear, musk deer, blue sheep, red panda and snow leopard. In direct contrast to the southern slopes the northern slopes of the Annapurna area are mostly dry grassland steppe due to the rain shadow created by these majestic peaks. Here blue sheep and snow leopard can be found and possibly the rare Great Tibetan sheep.

The geology of the region exemplifies the uniqueness of the Annapurna Himal. Twenty-five million years ago India and Asia were separated by the Tethys Sea. The sea was transformed into land by the collision of these two land masses or plates, resulting in the formation of the Himalaya. One of the rivers that drained into the ancient Tethys Sea, the Kali Gandaki, was able to erode the mountains as fast as they arose, creating the world's deepest gorge, well over 6,000 vertical metres below the peaks of Annapurna and Dhaulagiri. The Kali Gandaki, therefore, predates the mountains through which it flows. Today signs of this ancient sea are seen in the small black stones collected by people of the region which are fossil ammonites dating from over 100 million years ago.

2. THE NEPAL PLAN

"The Nepal Plan" is put forward not as a final statement but as a means to encourage the establishment of this important park and to focus discussion on the creative management ideas of the King Mahendra Trust – a potential model for Third World park development. It summarises a series of concepts and approaches developed in Nepal to provide protection for the mix of human and natural systems of this area. The plan was inspired by the Tourism Master Plan of 1972, the work and writings of Karna Sakya, the King Mahendra Trust for Nature Conservation, the Department of National Parks and Wildlife Conservation, the Department of Forests and other agencies of HMG along with other individuals such as John Blower of FAO and Lt. Col. Jimmy Roberts and Hemanta Mishra. The Annapurna National Park would be a multi-use park, incorporating recreation and tourism along with forestry, agricultural and the needs of local people who will be participants in managing the park and the resources it protects. The park complex will also incorporate a wildlife refuge.

Creation and management of national parks has traditionally been the province of government agencies. However, the role of private organisations represents a parallel and growing segment in the world's protected areas. Unencumbered by legislation, private institutions have the advantage of being able to innovate with new approaches

to management and local participation (Cross, 1983). For example, a private agency has the ability to apply funds generated by a reserve into development of the area to establish self-sufficiency. In contrast, a government agency must deposit funds in the central treasury discouraging entrepreneural local management. On the other hand, private agencies cannot match the security of government creation and are potentially subject to government's power of eminent domain. For this reason, IUCN insists that to qualify for the UN List of National Parks and Equivalent Reserves the "highest competent authority in the country" must be involved in establishing the park designation (IUCN, 1978).

The Nepal Plan seeks to join the benefits of both institutions. (The legal structure of private management referred to in this paper must still be subjected to legal analysis and comment). As with other parks in the Kingdom, (See Fig. 1) Annapurna National Park would meet the international park standards, for the government would sanction trust management and ensure its security. It is proposed that actual management of the complex be the responsibility of the King Mahendra Trust for Nature Conservation which was legally established in 1982 under KMTNC Act 2039. Despite increasing interest in private approaches to conservation, no such organisation has undertaken responsibility for an area of such global importance as Annapurna. Although recently created, the King Mahendra Trust seems well qualified for the task.

3. ZONING AND MANAGEMENT ISSUES

How can the King Mahendra Trust protect the area's natural and cultural resources, allow continued local use of the natural resources, incorporate recreational use of the same resources and protect these resources for Nepal's future generations? This is the essence of the challenge which the Nepal Plan seeks to meet. Once a commitment has been made toward the establishment of the Annapurna National Park three major tasks must be addressed: research and production of a management plan; physical construction of park facilities; and training of personnel.

As Thorsell (this volume), has pointed out, one of the most essential steps in park establishment is preparation of a management plan. In a number of Latin American and Caribbean countries, rather than beginning with a full-fledged management plan, a more preliminary "Operational Plan" or interim guidelines serve as a practical guide during the first few years. Given the unique integration of uses and the private initiative of the Trust, such a preliminary planning approach has much to recommend it.

An excellent point of departure for management planning are the objectives identified by Karna Sakya in his proposal of December 1982 on "Annapurna National Recreational Area or Rashtriya Prakritik Manoranjan Sthall" (Sakya, 1982) which are:

a) To ensure the *sustainable utilisation of species and ecosystems* such as forests, wildlife and fish, and to yield the greatest sustainable benefit to the present generation, while maintaining its potential to meet the needs and aspirations of the future generations.

b) To exploit the *optimal tourism potential* and improve recreational facilities in order to open a new chapter of resort tourism, which enriches our foreign exchange receipts, strengthens the balance of payments and increases government revenue.

c) To preserve the *ethnological and cultural heritage of the region*, so that it would remain as a reminder to future generations of the historical achievements of their forefathers, which they left in trust for them.

d) To *help the local economy and to develop tourism ancillary* industries such as farms, orchards, poultry and handicrafts.

Noting that rainfall in this area is perhaps the highest in the whole Kingdom, Karna Sakya identifies the additional objective of prevention of deforestation to avoid downstream flooding and erosion.

Management objectives should also be established for the "zone of influence" – areas and communities which exert direct impact on the park and vice versa. As a private agency it may actually be easier for the Trust to be involved in human development and public participation in the surrounding region than other agencies of HMG.

In developing the plan for the park it is important to start small, with financial resources and personnel capable of being maintained from resources generated within the park. A key to local acceptance is selection and training of locals to manage the area (while retaining awareness of the pressure which can be exerted upon local guards for special favours to friends and relatives). The Trust, based in Kathmandu, must recognise the desirability of implementing action as close to the resource as possible. Like the Department of National Parks and Wildlife Conservation, the Trust must balance the value of local decision making, and responsiveness to local priorities against its own need for central control and national perspective – this will be especially difficult with the Trust's first major project.

4. ZONING ANNAPURNA

Based on preliminary resource analysis, in the Nepal Plan the national park complex is divided into six management zones (See Figure 2.)

The Protection Zone is centred on the Annapurna massif but extends at least to the peak of Dhaulagiri including the Kali Gandaki River (a major migratory route for birds moving between Tibet and India) to the west and

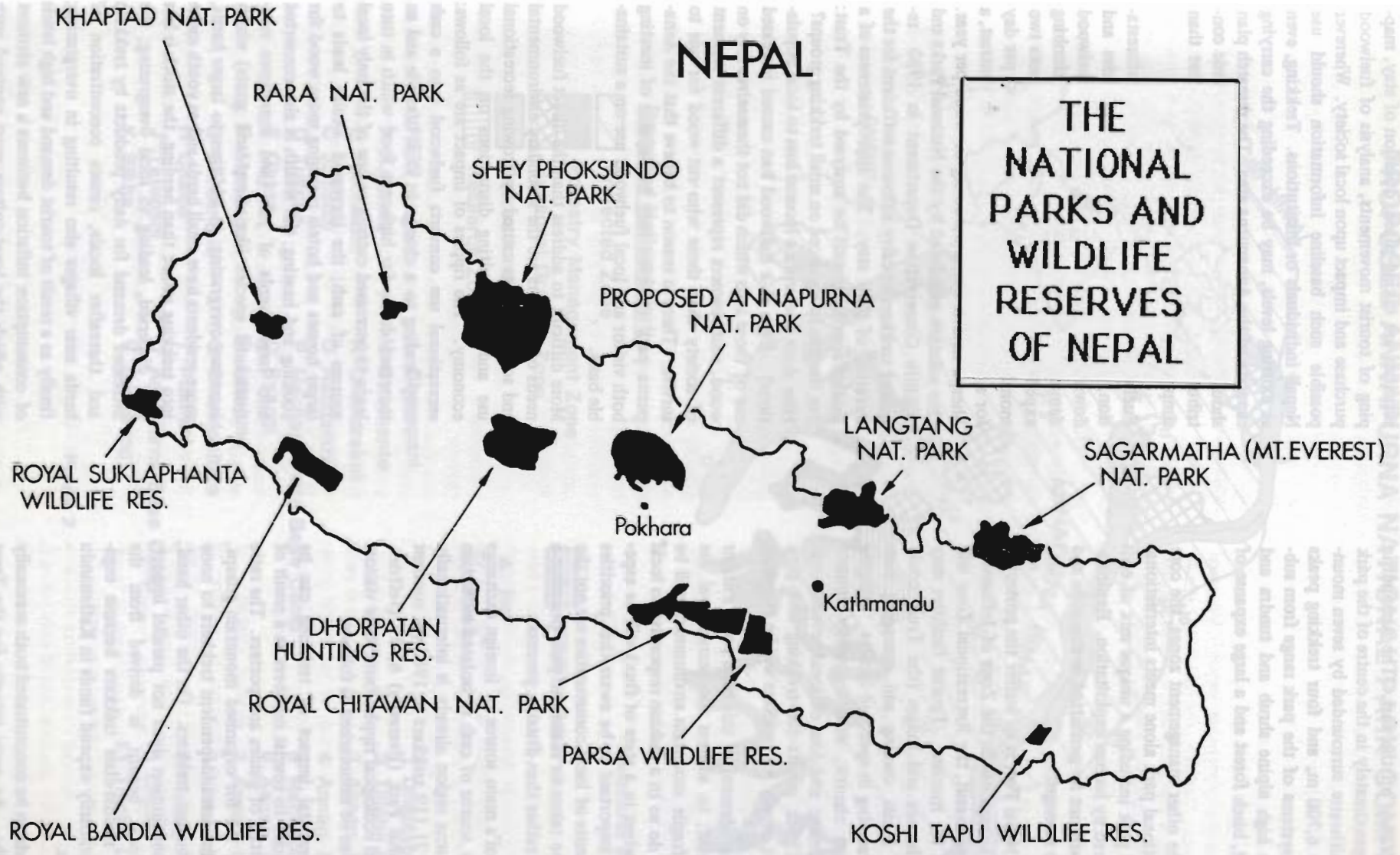

NEPAL
THE NATIONAL PARKS AND WILDLIFE RESERVES OF NEPAL
KHAPTAD NAT. PARK
RARA NAT. PARK
SHEY PHOKSUNDO NAT. PARK
PROPOSED ANNAPURNA NAT. PARK
LANGTANG NAT. PARK
SAGARMATHA (MT.EVEREST) NAT. PARK
ROYAL SUKLAPHANTA WILDLIFE RES.
Pokhara
Kathmandu
DHORPATAN HUNTING RES.
ROYAL CHITAWAN NAT. PARK
PARSA WILDLIFE RES.
ROYAL BARDIA WILDLIFE RES.
KOSHI TAPU WILDLIFE RES.

Figure 1.

the Marsyandi River Valley on the east. The Annapurna Sancturary located approximately in the centre of the park is a high alpine amphitheatre surrounded by seven mountaineering peaks over 6,700 m, and four trekking peaks under 6,000 m. Ecosystems of the park range from subtropical sal forest to high alpine shrub and tundra and include bamboo forest, birch forest and a large expanse of rhododendron forest.

Even without the other management zones, the core of the Annapurna National park alone meets international criteria for a national park including a unique mix of ecosystems mostly unaltered by human exploitation. Exploitation and occupation will not be permitted in this zone and visitor entrance will be managed.

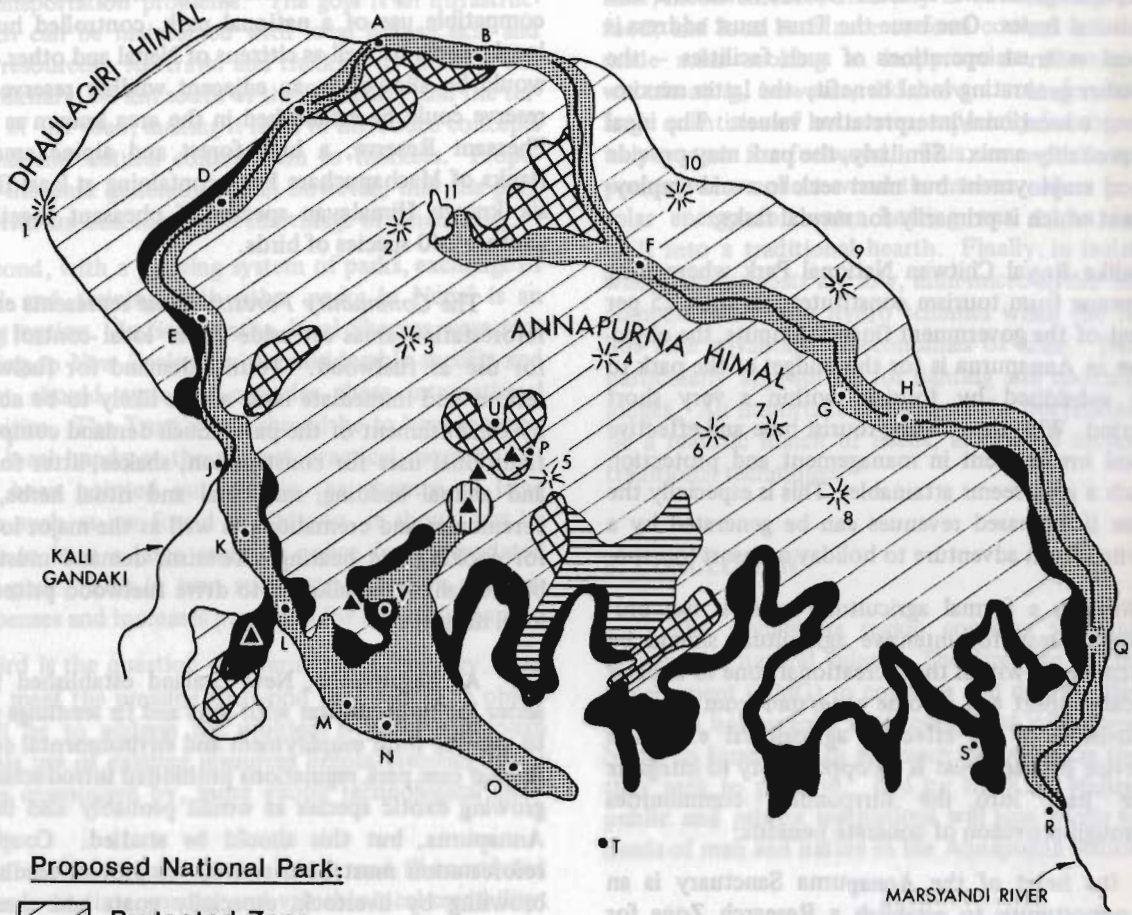
The key to the Nepal Plan is to buffer the protected core with sustainable human use in the Zone of Influence. Ringing the Annapurna massif, the Recreational Zone will be actively developed for tourism. Tourist facilities may include licensed tea houses and lodges (the Trust could provide training for locals owning and managing such facilities) as well as camping in specified locales. Bringing the existing, somewhat chaotic, situation under control with minimum resentment and loss of local revenue will require sensitivity. Check points for trekking and park entry permits and fuel supply for trekkers will be essential.

The effective management of this zone poses a major challenge for the Trust; to address the recreational use while preserving the fragile mountain environment will be no small task, and to do so in a fashion responsive to local cultural needs (themselves in a state of flux) will be especially daunting. It is important to be aware that priorities among different segments of local communities are not the same and care must be taken to make the park planning a consensus – building, rather than divisive, process.

Tourism is Nepal's main source of foreign exchange and is often the only source of cash in isolated mountain regions. The Annapurna region already is internationally renowned, attracting 21,119 trekkers in 1983 (in contrast to Sagarmatha National Park (Everest's) 6,732 (Jeffries, 1982). The social and ecological ripples from these visitors are considerable and can be summarised as follows:

- The environmental impact of trekking can be disproportionate to tourist numbers as a result of the support staff of guides and porters. The ratio is commonly 2-1 for organised mountain groups, 0.5 for middle-class independent trekkers to none for the low-budget trekkers. On the other hand, economic contribution does not parallel impact; maximum local benefit is derived from the independent middle-class trekkers because organised treks primarily expend funds in Kathmandu or in Pokhara.
- Trekking tends to be concentrated both seasonally and physically. An early priority for the Trust must be research on existing trekking – what activities are taking place, duration of stay, mapping of tourist movements, analysis of fuelwood purchase and impact upon local society. Wherever possible such baseline information should use Nepali individuals or institutions. Trekking, even at existing levels, may be exceeding the carrying capacity of the Annapurna area. The research plan should seek means to increase the economic contribution of visitors at current levels rather than simply increasing their numbers.
- Fuelwood consumption can result in deforestation, soil destabilisation, erosion, landslides and downstream flooding. Tourist-generated fuelwood demand is growing rapidly. A typical climbing expedition in Sagarmatha, for example, lasts two months and requires four loads of wood per day for a total of 8,000 kg of firewood. In contrast, a Sherpa hearth burns 5,000 kg of wood per year. One solution mandated by the National Parks and Wildlife Conservation Department in 1980 required trekkers to carry kerosene sufficient for the duration of their stay. The appropriateness of a similar approach must be analysed by the Trust: can the ban be enforced on small trekking groups? How does one replace income loss to local populations? Even if a fuelwood ban caused increased use of those inns which did not themselves rely on wood, such owners represent a different segment of society than those who cut wood for sale to survive. There is reason to believe that the Annapurna park complex may be capable of meeting both visitor and local fuelwood use on a sustainable basis.
- More difficult to address than the direct fuelwood needs of trekkers are the secondary environmental and social impacts caused by growing recreational use and the resulting disruptions on the local economy. The ripples of impact are as follows: recreational use converts fuelwood into a cash crop leading to a change in local lifestyle and an increased desire for high-cost food which in turn leads to increased cutting as one of the only local sources of cash; the increased wealth leads to larger houses and hotels requiring more wood for cooking and heating; the wealth is also converted into larger herds of yak (and sometimes non-traditional species like sheep and goats) which increases overgrazing; in addition to larger herds, more residents have small herds and as youth move into trekking rather than herding, the stock is less well dispersed, leading to local overgrazing; the increased demand for dairy products by trekkers and thereafter locals, causes concentration of herds near villages also resulting in overgrazing; finally as a result of tourist demand and high levels of consumption inflation becomes a new element with which the local culture must contend with almost no appropriate tools.

PROPOSED ANNAPURNA NATIONAL PARK COMPLEX



Proposed National Park:

- Protected Zone
- Forestry Management Zone
- Seasonal Grazing Zone
- Recreational Zone
- Research Zone
- Wildlife Reserve
- ▲ Inn
- Peak

KEY:

A Kagbeni
B Muktinath
C Jomsom
D Tukche
E Ghasa
F Manang
G Bardang
H Chame
J Tatopani
K Sikha
L Ghorapani
M Birethante
N Chandrakot
O Naudanda
P Machapuchare Base Camp
Q Syangi
R Lamjung
S Ghandokhara
T Pokhara
U Annapurna Base Camp
V Gandrung

1 Dhaulagiri
2 Tilicho Peak
3 Annap. I
4 Annap. IV
5 Machapuchare
6 Annap. III
7 Annap. II
8 Lamjung
9 Pisang Peak
10 Chulu
11 Tilicho Lake

Figure 2.

– Development of park infrastructure such as trekking lodges provides an opportunity to demonstrate alternative sources of energy to the local population and to educate visitors to natural and cultural issues. One issue the Trust must address is local vs trust operations of such facilities – the former generating local benefit, the latter maximizing educational/interpretative values. The ideal is probably a mix. Similarly, the park may provide local employment but must seek to avoid employment which is primarily for menial tasks.

– Unlike Royal Chitwan National Park where park revenue from tourism constitutes less than 25 per cent of the government financial inputs, the objective in Annapurna is for the budget of the park to be subsidised by tourism within a very short period. With the existing tourist base and effective local involvement in management and protection such a goal seems attainable. This is especially the case if increased revenues can be generated by a switch from adventure to holiday or resort tourism.

– Although a formal agricultural zone is not proposed, areas for intensive agriculture should be encouraged within the recreational zone to expand local support and income generated from tourism. Provision of an effective agricultural extension service by the Trust is an opportunity to integrate the park into the surrounding communities through provision of concrete benefits.

Near the heart of the Annapurna Sanctuary is an important opportunity to establish a Research Zone for scientists focussing on study of mountain ecosystems and to monitor the dynamic systems of the Nepal Plan. Rehabilitation of the facility at Kuldi Ghar could provide a base for study of the park's diverse ecosystems and the impact on the nearby community forest and seasonal grazing zones. In a very real sense the research zone and adjacent areas add a biosphere reserve in the heart of the national park complex.

The Nepal Plan recognises the existence within the park of several Seasonal Grazing Zones. In a region of such limited land resources and where yak or yak/cattle crossbreeds are important symbols of wealth, the challenge is to ensure that grazing use is sustainable, not eliminated.

Traditionally the timing of seasonal migration of livestock from higher to lower elevation in response to available pasture was co-ordinated by elected village guardians. If a grazing management system is established it must be aware of such traditional regulating mechanisms. On the other hand, if the traditional approach is incorporated by the Trust to control management decisions it must be able to adapt to changes in ownership structure and mix of species caused by the new tourist-induced cash economy mentioned previously. Given the fundamental role of grazing in the local society, meaningful participation in designing a compatible grazing system could be the single most important objective of the Trust if its new park paradigm is to succeed.

Although sport hunting is generally not considered a compatible use of a national park, controlled hunting by local people as well as citizens of Nepal and other countries would be allowed in an adjacent wildlife reserve. Such a reserve could be established in the area known as the Pipar Pheasant Reserve, a high forest and alpine area on the flanks of Machapuchare Peak containing at least five of the six known Himalayan species of pheasant together with another 140 species of birds.

The *Community Forestry Zone* represents existing or reforestation areas set aside under local control primarily for use as fuelwood. Tourist demand for fuelwood is a serious and immediate issue and is likely to be accelerated by establishment of the park. Such demand competes with traditional uses for construction, shakes, litter for latrines and animal bedding, medicinal and ritual herbs, fuel for ceremonies and cremations as well as the major local needs for cooking and heating. Tourism demand must be met, but it cannot be allowed to drive fuelwood prices beyond local means.

At Sagarmatha, New Zealand established two nurseries for reforestation with pine and fir seedlings primarily to provide local employment and environmental education. In that case park regulations prohibited introduction of fast growing exotic species as would probably also be true at Annapurna, but this should be studied. Coupled with reforestation must be a strategy to protect seedlings from browsing by livestock, especially goats and sheep. The tempting solution by purchase of these animals must be carefully considered as the owners are often the poorest in an already poor part of the country.

When considering alternatives to effective forest management, the Trust should include an attempt to reintroduce the *shing-i-nawa,* the indigenous village firewood resource management committees which were discontinued after the forests were nationalised in 1957. However, such a reintroduction will not itself be easy; the Trust, based in Kathmandu, is likely to be seen as distant as the government whose nationalisation of the forest led to their demise in the first instance. In addition, we should not be naive in application of traditional forms, as the *shing-i-nawa* would be asked to regulate a different world, one heavily stressed by the influx of tourists and cash competing with local needs. The social organisation of any community forestry projects will have to balance income expectations of different segments of local society and the needs of the Trust to obtain self-sufficient management.

5. THREE CRITICAL NEEDS

Three other issues must be addressed: architectural compatibility of any new construction; training; and alternative technology.

First, the use of local-style construction takes advantage of existing experience on climate stability, availability of local materials, and limited available skilled labour and avoids transportation problems. The goal is an infrastructure which can be maintained with local human skill and financial resources. All travel and trekking to the Park will start in Pokhara, 30 km south of the Sanctuary and the termination of the road, making it ideal to introduce concepts of cultural and natural conservation to trekkers. Proponents of the park generally agree, however, that the park headquarters are best located at the village of Ghandrung.

Second, with a growing system of parks, exchange of personnel and training with other parks in Nepal is an increasing option. In Sagarmatha, local Sherpas were sent for training to New Zealand with considerable success and the Trust should seriously consider these international opportunities. The Trust's goal should be to have management in local hands at the earliest practical moment. It has also been pointed out that in the absence of large mammals such as are found in Chitwan, it should not be necessary to have a large army or police force associated with the park. This in turn substantially lessens management expenses and increases prospects for self-sufficiency.

Third is the question of alternative technology, especially to meet the pressing fuelwood problem. The objective must be to address the problem if possible through sustainable use of existing resources before resorting to, or becoming enamoured by, more exotic technological alternatives.

The fuelwood issue is not simple and ill-considered efforts can cost time, money and valuable local credibility. Attempts to improve use or efficiency of existing techniques may not be a good strategy. At least in Sagarmatha, Sherpas already use wood rather sparingly. Restraints of time, inconvenience, difficulty in cooking large amounts of food, and local resistance to food cooked out-of-doors, all made solar cooking an inappropriate alternative. Solar waterheating, however, did have a role for houses using large quantities of hot water, especially for those who have to pay cash for fuelwood. This was not the case for the poorest who collect wood themselves. More popular than solar energy for water heating was an auxiliary heater built into a traditional hearth. Finally, in isolated locales where labour costs are low, mini-micro hydro schemes can compete with large hydro schemes when the latter could not take advantage of economies of scale. These may be particularly appropriate for lighting and cooking in tourist lodges. An important element of the operational plan will be a realistic match of needs, alternative technology, and traditional techniques.

6. CONCLUSION

The Annapurna region contains a unique mix of human and natural values. The directive of His Majesty's Government (HMG) to conserve and develop the Annapurna Himal has inspired those concerned with conservation in Nepal to formulate an approach as unique as the resources they seek to preserve. Led by the King Mahendra Trust, public and private institutions will join hands to meet the needs of man and nature in the Annapurna National Park.

Energy Alternatives for Sagarmatha National Park

Broughton Coburn

ABSTRACT. *Several steps are being taken to help meet the energy needs of expanding numbers of tourists to Sagarmatha National Park, including regulations regarding firewood collection, reafforestation, and increased use of kerosene. But perhaps most interesting has been the Namche Micro-Hydroelectric Scheme, which provides 27 kilowatts of power to local houses and lodges. It involves underground electrical transmission and distribution, sealed fuse boxes, separate grids, and local management; it has proven to be quite cost-effective and might be useful elsewhere in the region where firewood scarcity limits its usefulness for meeting local energy needs.*

1. INTRODUCTION

Since 1976, when Sagarmatha National Park was officially gazetted by His Majesty's Government of Nepal, the number of trekkers visiting the park has increased almost tenfold. The increase in the number of visitors magnifies the local residents' traditional, albeit previously stable, demands on the park's alpine ecosystem. To mitigate the environmental pressure and threats to wildlife habitat caused directly or indirectly by man, the National Parks Administration has undertaken a broad range of conservation measures. In 1980, Sagarmatha National Park was designated a World Heritage Site by UNESCO. Since that time, with assistance from the World Heritage Fund and other sources, four nurseries for the propagation of indigenous fir, pine, birch, willow and rhododendron species have been established, and seedlings have been planted in many areas, particularly those near villages and where overgrazing and excessive firewood cutting has occurred. Nature conservation education programmes have been conducted in the local schools, and tourist pamphlets have been published stressing the scarcity of firewood and the fragility of the park environment. Regulations have been enforced controlling the collection of firewood and requiring trekking parties to be self-sufficient in fuel before entering the park. In 1983, the National Park Administration, with assistance from the Himalayan Trust, purchased all the domestic goats raised within the park, and has prohibited their future husbandry within park boundaries because even fir and pine seedlings will supplement a hungry goat's diet.

2. THE NAMCHE MICRO-HYDRO SCHEME

In addition to the above conservation measures, serious investigation has been made of alternate sources of energy particularly of domestic fuel, for Sagarmatha National Park. With assistance from the World Heritage Fund, a 27-kilowatt "micro" hydroelectric generating facility was completed in October 1983 in Namche Bazaar, a village of over 100 houses that includes the park headquarters. This facility features several unique, though not necessarily experimental, design aspects that can hopefully be incorporated in similar installations in the future.

The civil and mechanical works take advantage of water power, a resource that is abundant in the Himalayan national parks. Systems designed for high head can produce greater energy with smaller, more inexpensive equipment than that necessary for low-head systems.

The equipment is manufactured in Nepal. The Balaju Yantra Shala now produces inexpensive and reliable crossflow and "spitflow" turbines of improved efficiency. Only the generator for the Namche Project was ordered outside the Indian subcontinent. It is hoped that in the future other companies within Nepal will begin production of such equipment.

Because of the high head available, both the forebay (water collection) tank and the powerhouse are located in the stream itself, with the penstock (the pipe delivering water to the turbine) running parallel to the stream. This design feature has precluded the need for excessive excavation, alleviated the danger of landslides and rockfalls, and reduced the need for materials such as sand and cement. In the case of the Namche Project, the civil works are located directly along the stream bed and are not visible from any frequently used trail. Construction caused minimal environmental upheaval.

2.1 *Underground electrical transmission and distribution*

For national parks it is imperative that the visual aesthetics are not compromised by man's intervention. Micro-hydroelectric installations can often be installed in close proximity to villages, thereby reducing the transmission distance and the cost of underground armoured cable

which is a limiting factor for larger systems. The additional cost of placing the transmission and distribution lines underground at Namche is estimated to be less than 7 per cent of the total project cost. These lines will also lessen problems of safety, maintenance, and theft of electricity from exposed lines, making the underground lines cost-effective during their lifetime.

2.2 *Sealed fuse boxes*

All the distributional and household fuses are placed in locking fuse-switch boxes, and the size of each fuse wire is carefully gauged to burn out with the installation of an unauthorised load even if it is as small as a single light bulb. In this way we hope to reduce the potential problem of overload which is an occasional drawback of small rural installations. Only the manager of the facility will have the authority to replace burned fuse wires, an important safety as well as a control factor. In Namche to date there has been no theft of electricity, no faults in the transmission and distribution lines, and no electrical accidents.

2.3 *Separate grids*

All the houses in Namche receive current for lighting at night. During the daytime, the entire load for the system is distributed for cooking purposes to 6 lodges and staff quarters (2.5 kw each) on a trial basis. It is hoped that this will reduce firewood consumption since it is the above centres that have a virtually constant demand for cooking fuel in the day. The load factor, and therefore the functional capacity of the plant, is very high during hours of operation.

2.4 *Local operation and management*

Namche villagers, trained at the site, have wired the entire town, and selected individuals were trained as powerhouse operators. These local technicians are familiar with the layout of the entire grid, and have a vested personal interest in seeing that it functions smoothly. Officials are now discussing the possibility of transferring its management to the Namche Village Panchayat under the Decentralisation Act. Under the authority granted by this Act, the Panchayat will be able to form its own Electrical Management Committee, and to operate the plant and retain revenues within the Panchayat for maintenance and as principal for future development works.

2.5 *Cost-benefit*

The Namche Micro Hydel Project was completed for a cost of slightly more than $2,000 per installed kilowatt (exclusive of household wiring), which compares favourably with the cost of hydro-electric installations anywhere in the world. This is of special interest when considering the economies of scale, which normally work against such small rural installations. It is clear that mini and micro-hydel plants are particularly suitable for the Himalayan national parks where isolation, aesthetic integrity and ecological considerations obviate larger facilities.

3. OTHER ENERGY ALTERNATIVES

In view of the prodigious amount of sunlight falling on the park and the residents' demand for hot water for domestic use, the potential for solar water heating in the park has also been investigated. Because of cost, technical complexity and freezing temperatures, the standard thermosiphon system (where water circulates according to temperature differential through a grid of pipes) was discarded in favour of a simpler and cheaper installation. The flat tank solar water heater is simply a large, insulated, flat collection tank that doubles as a storage tank and has performed admirably. However, at a cost of more than Rs. 2,000 for delivery and installation, there will be only a limited demand for this item in the Khumbu region.

A small energy-conserving item which has the widest potential application in rural mountain areas is the "back boiler" auxiliary hot water heater – simply a flat tank that is installed at the side or at the back of the household hearth. It circulates water to a nearby tank using the same thermosiphon principle as a solar water heater, often approaching boiling temperatures. The lodges in Namche Bazaar that sell hot showers to trekkers have recovered the cost of these units within three weeks of their installation, and demand for them appears to be unlimited throughout the Khumbu region. It is hoped that their value will be recognised sufficiently to become an attractive business option for local entrepeneurs during the off-season months. One lodgeowner has already ordered, delivered and sold several complete units.

Solar photovoltaics is still regarded as an expensive technology in the West, but for isolated locations in Sagarmatha National Park, where kerosene can cost more than Rs. 19 (US$ 1.30) per litre, such installations are economical. For permanent structures that use a "mantle" pressure lantern more than 120 nights per year, the price of kerosene will eclipse the capital cost of an installed photovoltaic system in less than 7 years. Operation and maintenance is minimal since there are no moving parts, and manufacturers claim a lifespan of 20 years for solar arrays. Perhaps the most immediate and appropriate application for solar panels will be for solar-electric fences. There are many kilometres of restricted areas and reforestation enclosures within Sagarmatha National Park where electric fencing would be suitable. They are safe, invisible from a distance, and half the cost of stone or wood alternatives. The first solar-electric fence, for the reforestation plot surrounding the park headquarters, will be installed in May 1985.

4. CONCLUSION

Large-scale solutions that can be speedily realised do not appear feasible, at present, in the high mountain areas of Nepal. Smaller individual and village-initiated projects offer substantial hope for the eventual reduction of the dependence on firewood and kerosene, and this can be achieved with minimal impact upon fragile mountain environments.

Community Protection of Forest Areas: a Case Study from Chautara, Nepal

T.B.S. Mahat

ABSTRACT. *This paper outlines in historical terms, using a case study from the Chautara Forest Division in the Pahad (Hill) Region of Nepal, how community involvement can be effective in forest protection and management for providing needs of the local people, conservation of natural resources, and checking environmental degradation. The key to success was providing the local people with the responsibility over their own forests, a return to a situation which had existed in the past.*

1. INTRODUCTION

In Nepal, forests form an integral part of the life of village people, providing innumerable benefits, both as goods and services. These benefits include: clean and permanent water; fuel for cooking and heating; fodder for livestock which in turn provide about the only fertiliser to crop production; timber and poles for construction of houses and animal sheds; protection from erosion; and other environmental, aesthetic and spiritual values.

The economy of Nepal is dominated by the rural sector, based almost exclusively on subsistence agriculture. But there is only about 0.27 ha of forest land and 0.21 ha of cultivated land per capita in Nepal (Nelson *et al.*, 1980; HMGN, 1982) making it one of the most densely populated areas in the world in relation to its land resources (nearly half of the country in the high Himalaya is uninhabited, as it is of no use to human enterprise).

During the past few decades, various factors have markedly reduced the ability of forests to supply the basic needs of the local people. The area of forested land has been decreasing at an alarming rate, especially in the Terai (about 4 per cent annually) and the Siwaliks (a little more than 1 per cent annually), but forest loss has been negligible in the hill region where land use is relatively stable (HMGN, 1983). Hence there is a critical need to concentrate effort on protection and management of existing forest and reforestation of denuded areas.

Historically, administration and protection of forest was effective wherever local control existed; forest degradation was largely related to outside interference. The interest of the local people is clearly tied to the forest and trees of the locality. They have a deep understanding of the trees and forests in their areas, and have practical experience in growing plants. Therefore, the protection and improved management of the local forest has tremendous potential through the involvement of the village people and communities. Given suitable encouragement and guidance, they could be a key to successful protection and management of forests over a large area of Nepal.

The case study involves the Chautara Forest Division, consisting of the Sindhu Palchok and Kabhre Palanchok Districts, for which the author was the Divisional Forest Officer (DFO), from 1973 to 1980. Some sources of information used are secondary but much material is derived from the author's personal knowledge and experience. The village of Thokarpa, the centre of the case study, is in Sindhu Palchok District; it is one of the most heavily populated areas of the Hill Region, with a population density of 1.63 persons per ha of agricultural and forest land combined. The forested land is of low quality with the lowest volume of timber per unit area (8.61 cubic m/ha) recorded in Nepal. Much of the forest land is shrubland. Strongly held local views based on personal interviews suggested that:

- there is no significant change in areas of agricultural and forested land in the past 100 years or so;
- degeneration in forest quality has, however, led to shortage of fuelwood and fodder supply;
- fuelwood consumption (409 kg/person per year) is one of the lowest for Nepal and 60 per cent of it comes from forested land;
- inadequate supply of fodder generally constrains stall-feeding of livestock; and
- timber is normally available as free goods but local households use little timber for construction.

2. HISTORICAL CONTEXT OF DEFORESTATION IN THE HILL REGION OF NEPAL

2.1 *Government land use policies and deforestation*

The deforestation of the Hill Region has a long history and is necessarily associated with the land use policies of governments in the past. Since unification, the country has been ruled by a series of power groups, mostly belonging to a relatively small number of elitist *(bhardar)* families, supported by their client families numbering only a few hundred (Regmi, 1975: Stiller, 1975, 1976; Rose and Scholz, 1980). The vast majority of the country's population living predominantly in the villages remained totally unrepresented and took little interest in machinations of power – no matter who was in power they remained deprived.

The ruling classes perceived agricultural land and labour as the major resources of the country, conferred favours by means of land grants *(birta, or Jagirland)*, and generally followed administration policies aimed at converting as much land as possible to agricultural production in order to maximise the tax base. Reclamation of forest was generally open to anyone who undertook to bring it under cultivation. The introduction of maize and potatoes in the early 19th century led to much clearing of steeper and higher land for un-irrigated cultivation. By the late 18th century the pressure for land in the Pahad led to emigration of peasants to the Terai, Darjeeling, Kalimpong, Sikkim and onwards to Bhutan. The higher taxing measures after the 1814-16 war exacerbated this exodus. Labour (jhara rakam and other compulsory unpaid obligations) became a resource available directly to the state and the ruling classes as a source of wealth.

Many of the obligations were performed at cost to the forest cover, until 1950. When introduced up to the district level after the mid- 19th century, forest administration, as with all administration in Nepal, concentrated on revenue collection both during the Rana Period and subsequently, (Stiller, 1968, 1975; Regmi, 1971, 1976, 1978a, 1978b; Pradhan, 1976).

2.2 *Local responsibility for forest: belongingness between the village people and their local forests*

At the local level, however, the government, not long before the beginning of the Rana rule, gave enhanced authority in revenue collection to the local non-official functionaries *(talukdars)* (Regmi, 1978a, 1978b) on whom also evolved the direct responsibility for local forests (at least in the Pahad). Over time, these local functionaries came to administer fairly effectively the forest that still existed, and provided a reasonable amount of control and protection. The local population got what goods it needed from the local forest without paying any fees, although some sort of gift to the talukdars had become customary. Scope for the extension of arable agricultural land had, disappeared already, so that the local forests were used only for fuelwood, fodder, leaf litter, grazing, small timber and poles.

Thus in the case of the remaining forest of the Pahad, despite the government's indifference towards forest administration and management, and the continuation of the traditional policy of agricultural land extension, there developed gradually after the mid- 19th century a sense of local responsibility, and subsequently a tradition of it, under the charge of local talukdars for protection and conservation of the forest and for using the resources reasonably and judiciously. What is more interesting and important is the fact that even the local people themselves had developed a faith in such a system, which provided for their needs and maintained forest in their locality. Over a period of time, there developed a sense of "belongingness" between the village people of Pahad Nepal and their local forests and scattered trees that still existed were considered by the local farmers as necessary for the sustenance of their hill farming system. This protection and conservation of forest by the local people was certainly true in the case of Sindhupalchok and Kabhre, as long as there was no outside interference.

Examples of local community protection of forests and trees, although in the form of scattered patches and single stands, are to be found all over the Hill Region of Nepal. Documents seen by the author from within the Chautara Forest Division show that places of intense community interest such as the water sources, places of religious or spiritual significance, resting platforms, trail sides, areas at upper and lower extremities of cultivated land, etc., attracted government attention to a degree that Royal Orders were passed at least by 1837 banning tree fellings from such sites (Pradhan, 1982).

2.3 *Outside interference and loss of local interest*

Within the Districts of Sindhu Palchok and Kabhre which subsequently came to constitute the Chautara Forest Division, and particularly in the Thokarpa Region, the forest was administered and protected quite effectively under local supervision, but the steadily increasing interference from Kathmandu from about 1900 caused a deterioration. Most older persons remember seeing the exploitation of their forests, especially for sal *(Shorea robusta)* for use outside the local area. Examples of exploitation on orders from Kathmandu are many. From at least the beginning of the current century timber from these forests was used in buildings in the expanding towns of the Kathmandu valley. Timber from the Sun Kosi slopes below Thokarpa was used lavishly for the construction of Rana palaces in Kathmandu; timber from the area was used to build bridges on the Sun Kosi and Indrawati at Dolalghat and on the Tamba Kosi at Charange; and the great Kathmandu earthquake of 1933 also resulted in rebuilding using Sun Kosi sal forests. In all these operations the whole process of felling, conversion, and transportation was extremely wasteful and arduous.

Collapse of the Rana administration in 1950 was followed by a period of political instability throughout the country (Joshi and Rose, 1966), so from 1951 the effective control of forests by the local functionaries in the area under survey was rapidly lost. The district *badahakim's* increasing use of his overriding authority led to larger-scale exploitation of the forest resource for consumption outside the local area. The local people saw the resource disappearing for the benefit of others, leading to a free-for-all where no one had an interest in sustaining yield.

The Talukdari system of local forest control finally ceased with the Forest Nationalisation Act, 1957 and the introduction of a new forest administration in 1961. A professional forest officer, who headed the newly established Forest Division Office based at Chautara, took over the forestry responsibilities of the badahakim. Regrettably the function did not change, largely remaining the issuing of permits for harvesting timber. In theory, permits were to be issued only for timber from forest plantations but in practice anything merchantable was sold. The local people remained excluded from any effective control of the forest around them. Further, they found themselves subject to legal action for minor forest crimes, whereas more influential people often escaped such action even for serious breaches of the forest law. Moreover, post-Rana forest legislation, particularly the Forest Nationalisation Act 1957, was often misinterpreted by the local people as not being in their best interest.

Thus the sense of belongingness between the people of the region and their local forest and trees, developed over a period of more than 100 years, declined and was eventually lost. As a consequence the forest suffered and was not affected even by stricter laws introduced between 1957 and 1967.

With the institution of the Panchayat policy in 1962, the administration of local affairs was gradually transferred to local councils (Panchayats), resulting in a considerable degree of self-government at the village level.

This introduction of the Panchayat system of local government, its village-level assemblies and councils, and other local level representations also gave new possibilities for local control of forests.

In line with the new panchayat political order, the idea of transferring some government forest area for the use of panchayat communities was also introduced in the Forest Act, 1962. The provisions of the Act, however, clearly indicated the government's reluctance to part with either its ownership of forest land or the overriding authority over it (HMGN, 1976).

As a result no further steps were taken to implement even these conservative provisions of the Act and gradual revival of interest in local community forests remained unattended for at least another decade. Initiation of community forestry in Thokarpa in 1973 contributed principally to the awakening of interest in the forests and an awareness by local communities that they might be able to control their destiny as it related to forested land.

3. INITIATION OF COMMUNITY FORESTRY

As noted above, forest degradation in Thokarpa and other similar areas had become extreme by the early 1960s. This was accompanied by a demoralisation of local communities concerning the effective control of forest resources for their purposes. The new possibility for local government given by the introduction of the panchayat system in 1962 was eventually seized. A few exceptional leaders, notably Nil Prashad Bhandari, the long-standing Pradhan Pancha of Thokarpa, clearly foresaw the need for local action. In 1973, the Divisional Forest Officer at Chautara (the author) decided that conservation of forest resources would not be possible without community awareness, motivation and involvement. More important, the need for local community participation in protecting the forest from unauthorised harvesting, grazing and fire was recognised. People's acceptance would also be needed to reforest, involving land-use changes, the non-agricultural areas on denuded slopes excessively over-used for grazing. Involvement of recognised social and political institutions was postulated as important and necessary for success, in which local leadership played a very important and useful role. In all this exercise, motivation and willingness of the "government forestry staff" to stay and work in rural areas and to tolerate, sympathise, assist and encourage the village people was a necessary pre-condition for success.

A Forestry Committee was formed in Thokarpa Panchayat in 1973. The Committee, with the Pradhan Pancha as its chairman, was very widely based and had a membership of 103 drawn from various components of the local society. The DFO, Chautara, worked as its advisor. Initial informal and formal meetings and discussions among the Panchayat Forestry Committee members themselves, and between them and the DFO were followed by an agreement. The principal features of this agreement were that the Panchayat through its Forestry Committee would work for the protection and conservation of forests and trees within its area, and the Forest Division Office in turn would not allow any harvesting of forest produce without the concurrence of the Panchayat Forestry Committee. Letters of understanding between the Panchayat and Forest Division were exchanged in August 1973, to formalise such an agreement. This arrangement was made for an initial two-year "trial period" with prospects of future extension which would depend upon the success and experience gained during the trial period. The DFO also promised to bring other forest developments. The effective control of the forest thus gained by the local community was initially the most important motivating factor for the local population to work for the protection, conservation and development of forest and trees that followed.

The Forest Committee first set about protecting and conserving the remnant forest on the lower slopes of the

Sun Kosi below Thokarpa and a few other much smaller patches scattered over the settlement area. Felling and lopping of trees, free-range grazing and lighting of fires were prohibited in forest set aside for natural regeneration. Only grass and dead timber could be removed.

In addition to forest protection and management, other activites such as those to work for local people's participation in development and operation of tree seedling nurseries, establishment and protection of plantations, encouragement in planting of fodder, fruit and other useful tree species on private land and religious grounds, and conservation of forest products by encouraging stall-feeding of livestock, etc., gradually came within the purview of the Panchayat Forestry Committee and community forestry.

On the ridge above Thokarpa village, the forest had been reduced to poor, low, open shrubbery or sparse grassland. The DFO Chautara agreed to support a pioneering community plantation endeavour and a tree seedling nursery was established at Bagbhairab, Thokarpa in 1975. Its opening was marked by H.M. King Birendra's coronation and was performed by Rastriya Panchayat member Pashupati Shumshere J. B. Rana. Much of the area was planted with seedlings of pine *Pinus roxburghii* and *P. patula*, and a few broad-leaved species. Among the pines many volunteer trees and shrubs have come up of species characteristics of the original forest (Campbell and Mohns, 1984). Forest conservation, nursery establishment and planting programmes attracted much active participation and enthusiasm on the part of the local community and forest protection and rehabilitation became a part of the local way of life. Barbed wire fencing, an essential part of plantation programmes elsewhere in Nepal, became unnecessary in Thokarpa because of the enthusiasm of the local people for forest plantations and the restrictions imposed by them on free-range grazing and browsing by their livestock. In January 1979, Thokarpa became the first of the 17 panchayat communities in Sindhu Palchok, and hence in the whole of Nepal, to obtain forest land as panchayat forest and panchayat protected forest under the newly introduced Panchayat Forestry Act of 1978.

As a complementary activity the DFO demarcated forest boundaries to resolve and avoid subsequent disputes and to give further confidence to the local people.

Laxman Dong Tamang and Tej Bahadur Basnet, the Pradhan Panchas of Banskharka and Pipaldanda Panchayats respectively, had much the same perception as Nil Prashad Bhandari. Community forestry in Banskharka has followed a similar pattern as that of Thokarpa. Strong leadership supporting the panchayat role in forest protection and other community forestry activities has continued in both Panchayats. There was similar motivation in Pipaldanda but as the influence of Tej Bahadur Basnet waned, the commitment to forest protection has fluctuated. This indicates the need to secure broad-based support for community forestry activities through appropriate education.

These activities in Thokarpa and a few other panchayats provided the foundations for the development of the subsequent Nepal-Australia Forestry Project stage 2 developed since 1978 (Campbell and Mahat, 1977, 1978; Griffin, 1977; Midgley and Mahat, 1978; Shepherd, 1981; Gilmour and Applegate, 1984). This development has since spread to other areas and projects throughout most of Nepal (Watanabe *et al.*, 1977; Campbell, 1978; Simeon *et al.*, 1979; Grunenfelder, 1980; Rana, 1984). That development, however, is beyond the scope of this paper.

The experience in Chautara Division assisted also in the formulation of the new panchayat forestry legislation taking into account the new concept. The Panchayat Forestry Act of 1978 is particularly appropriate as it allows for forest areas to be placed under local control. The Act has yet to be proved in practice, in particular regarding the flow of benefits to the local panchayat communities, but it is certainly a step in the right direction.

The Chautara experience has proved that large areas can be reforested and protected through the involvement of local communities. Indeed, the innovative thinking embodied in the Panchayat Forestry Act must be boldly extended to establish a partnership in the protection and improved management of forest areas between the central government and local communities for all forest land in the Middle Hill Region of Nepal. The idea could well be extended to many areas surrounding national parks, biosphere reserves, wildlife reserves and sanctuaries and other protected areas for nature conservation in the mountain region throughout the Hindu Kush-Himalaya.

The emergence of a sense of local community-based responsibility for the forest land is seen as the most likely way to arrest, even reverse, the slow deterioration of forests, with all the adverse environmental impacts this implies.

Partnership with Nature in the Nepal Himalaya

Chiranjeevi L. Shrestha

ABSTRACT. *People require the resources of the Himalaya in order to survive, yet these resources must be conserved if they are to be available for human use. The World Conservation Strategy provides guidance on solving this dilemma; based on this document, Nepal is preparing a national conservation strategy which will attempt to improve co-ordination among government agencies and to draw on the traditional concern of rural people about their living natural resources. Comparative research, monitoring, and a regional perspective are all required.*

1. INTRODUCTION

The intrinsic nature of life is to ensure one's own safety. In that context the topic of the workshop is deeply connected with human existence and happiness as it addresses the linkage between conservation and development. Furthermore, it is perhaps desirable to underline that man is a highly evolved member of the biosphere and his existence is entirely dependent on the various kinds of species in the plant and animal kingdoms. If the base on which he believes himself secure vanishes, he as well is destined to disappear.

2. THE SETTING

The Himalaya region is known for its water resources, which support the populations of the Indo-Ganga-Brahmaputra plain; and for its varying ecosystems, the rich and luxuriant wildlife and valuable forest products. The Great Himalayan peaks are majestic, beautiful and attractive; and the region has been the abode of migrated populations from north, south and west during the political upsurges and the socio-economic imbalances of the ages. It has been the seat of traditions enunciating partnership with Nature and the "Voice of the Forest" has been echoing in the philosophical insights, ethical considerations, and behaviour of the people.

The extensive lakes in the high plateau, the magnificent glaciers, the inspiring peaks, the wilderness below the snowline, the mountainous settlements flanked by cultivated terraces and pastured slopes, and the low-lying agricultural/industrial belts are the peculiarly fascinating but diagnostic features of the Himalayan frontier. The river systems and the successive physiographic/ecologic belts from the Indus-Tsangpo plateau to the Indo-Ganga-Brahmaputra basin constitute a major ecological province.

The system nature has put to work in an interconnected pattern in this region has led to highland/lowland interdependance necessitating calculated land-use practices and ecological reservations. In that framework the various cultures developed, economic pursuits flourished, and the trend of migration and distribution of settlements came into balanced expression in the historical period.

3. PROTECTED AREAS

The present biosphere consisting of interconnected groups of organisms of widely diverse evolutionary ages (ranging from the most ancient to the highest representatives of the plant and animal kingdoms), forms an organised community with a balanced and interdependant totality of life. This is the concept which can be addressed by the oriental phraseology, *"Vasudhaiva kutumbakam"*. Man is dependent on the various members of the biosphere, even including the bacteria. Thus extinction of the species means in a practical sense the limitation of human existence.

The national park movement started in Nepal in 1970; a separate division was created in the Department of Forestry in 1972; legislation was enacted in 1973; and the conservation education and publicity unit was created in 1974.

Nepal now has several national parks. They include glaciers, watersheds, and river catchment basins; rare Himalayan fauna and flora, including the blue sheep in Shey Phoksundo and varieties of migratory waterfowl in the special ecological niche of the lakes. In the Terai there is the unique riverine environment supporting luxuriant grasslands; this is the habitat of one-horned rhinoceros at Chitwan, wild buffalo at Koshi Tappu, endangered and vulnerable species at Royal Bardia Wildlife Reserve, and swamp deer at Royal Suklaphanta Wildlife Reserve.

The amphitheatre of the Annapurna Himalaya – the head watershed of the Modi Khola and the Seti River,

located north of Pokhara – was described for the first time by the British Expedition to Machapuchare in 1957. This region as described by Karna Sakya (1982) is a unique natural area in Asia, with prolific wilderness, lush rainforests and cascading rivers. Successive belts of sub-tropical forest, temperate rainforest, grassland, and alpine meadow give way to glaciers and moraines at the upper elevations. In the southeast watershed of the Seti River the proposed Pheasant Reserve of Pipar has four rare Himalayan Pheasant species – blood pheasant, satyr tragopan, koklass and impeyan. In addition, the culture and lifestyles of various ethnic groups are found unadulterated in the settlements located south of the region.

4. CONSERVATION

The Himalayan region is strictly marginal in character; the nature of land use is variable; and its carrying capacity is limited. About a century ago, as an adaptive measure, a sizeable number of the mid-land population had to move outside Nepal to eke out their subsistence, later returning home for political reasons. The migrating waves from outside push their way into the marginal regions, putting increasing pressure on the ecosystem.

In a region which is subject to monsoon outbursts, the forest is essentially a cushion to limit the impact of the weather. The people need food, fuel and shelter, but they know that they also need to preserve the forest. The cultural trend of the orient is definitely not materialistic. There are numerous traditions which reflect a deep concern for nature:

- *dya chhayagu* – to set aside a nominal portion of food for "mother earth" before eating;
- if edible things fall on the ground, leave a small portion for the insects;
- *hulmulma jiu jogaunu anikalma byujogaunu* – protect yourself from being trodden into the ground and set aside seed at the time of famine.

All these support the idea that man is an integral member of the biosphere; and conservation is the prerequisite for development. The poor farmer knows very well that his action contributes to further degradation; but he has few alternatives.

The National Forestry Plan (Nepal, 1976) seeks to initiate a collective effort of all the people in conservation, management and development of the forest; but as yet the co-operation of the people remains limited because of the painful effects of the Private Forest Nationalisation Act 1957. While people have been retained inside the Sagarmatha and Langtang national parks as a part of the ecosystem, there was a proposal to remove the villages of Chapra and Rara in the Rara National Park (Bolton, 1976). This is a very involved and tricky matter, and experience has taught that conservation-oriented programmes can be put to practice only with guaranteed co-operation of the local people.

Concern about soil erosion, certain land-use practices, the need of afforestation and measures about protection of wildlife can be traced in the Second and Third Plan; however, after the UN Conference on Human Environment (Stockholm, 1972) there was a major thrust in our activities and policy formulations. In the Fourth Plan period seven protected areas were established and in the Fifth Plan (1975-80) specific policies on conservation, land use and water resources were established.

Following the three main objectives of living resource conservation outlined by the IUCN in the *World Conservation Strategy* a prospectus on "National Conservation Strategy for Nepal" has been prepared; and the next phase of the Nepal National Conservation Strategy work has been undertaken with the assistance of IUCN.

The main objectives outlined in the *World Conservation Strategy* (IUCN, 1980) and "conservation" defined in the National Conservation Strategy (1984) remain the basic factors for thought-provoking exercises and guidelines for elaborate work programmes. Sincere efforts need to be made at the local, national and regional levels to explore the untapped resources which would release the stress on the marginal land and erase poverty in general.

But co-ordination among departments is failing, the people's commitment seems too remote, and the environment is deteriorating. In this situation, mere proliferation of the institutes, enunciation of policies and enactment of legislation do not bear much productive fruit. The constraints do not seem to disappear and the gap between what we aim at and what we achieve enlarges more and more. And the people-oriented forest and land use policies do not mean much in the dearth of practical programmes.

After the UN Conference on Human Environment (1972) several institutes and organisations have emerged in Nepal; but as yet the problem of co-ordination (as was recorded in the Fourth Plan 1970-75 document) remains unresolved in practice. It must be realised that committments at the political, economic and social level are imperative; and as long as people's confidence and co-operation cannot be won there is no guarantee that the wheel of conservation and development will move one centimetre further ahead.

5. RECOMMENDATIONS

Ecosystems in the Himalaya should be studied comparatively with similar belts in the region; and arrangements should be made for some of the protected areas to be declared as Biosphere Reserves. But such reserves cannot survive for long on grant or government subsidy; so specific thought needs to be given for exploring means to support each area through some resources generated internally.

Available resources should be examined to elevate the economy of the people around reserves, as the only way of seeking their co-operation and guaranteeing their commitments.

Conservation of wilderness and natural beauty should be taken up along with development of resort tourism. The local people will thus invent new avenues of earning instead of ploughing the marginal slopes.

Research findings on various ecosystems of the Tibetan plateau might prove notably contributive in the region to initiate research and fulfil objectives of the international network of biosphere reserves.

Studies should be made for determining whether the people settled in a particular area designated as a reserve can be allowed to remain there as part of the biosphere or should be shifted somewhere else.

A system of environmental monitoring with basic elements of observation, assessment, and forecasting should be organised.

The Indus-Tsangpo Valley of the Tibetan Plateau, the Himalaya, and the Indo-Ganga-Brahmaputra Basin form an integral part of one horizon with complicated interlinkages; which when isolated or partially looked into, is incomplete, truncated and imbalanced. This fact should be recorded and kept in mind when attempting to solve problems in the Himalaya.

The importance of enlarging national responsibilities should be stressed, and any input reasonably required be offered, not to overwhelm the national structure but to maintain a balance of progress and unfailing interest.

"Adventure" Tourism and Sustainable Development: Experience of the Tiger Mountain Group's Operations in Nepal

J.O.M. Roberts and B. D. G. Johnson

ABSTRACT. *Tourism is an important part of the economy of the Hindu Kush-Himalaya, but sensitivity is required if tourism is to bring lasting benefits to the people of the countries involved. This paper describes how one tourism organisation, the Tiger Mountain Group, works to bring benefits to local people through generating employment, providing markets for crops, and providing markets for local lodging. While "adventure" tourism can help demonstrate how wildlife can earn income without damage to the resource, the local people must also be prepared to take advantage of the opportunities presented.*

1. INTRODUCTION

Foreign tourism in developing countries can be a mixed blessing. It brings income and employment but distributes them unevenly. It can bring beneficial new ideas, but can also bring pollution of various kinds, some tangible, some cultural and intangible.

Within this context, we thought that it might be of interest and perhaps useful, if we tried, as candidly as possible, to consider the activities of the Tiger Mountain Group in Nepal against the five principles of sustainable development referred to in Sir Arthur Norman's paper (this volume).

These are:

- Meeting basic needs of the poor;
- Sensitivity to culture and traditions;
- A proper consideration of the carrying capacity of the natural resource base;
- Technology appropriate to the place where it is applied; and
- Income generation for all those involved.

2. MEETING BASIC NEEDS OF THE POOR

Profit-oriented foreign investment is unlikely to be a significant vehicle for meeting local people's most basic needs, if we take these to be clean water, basic health care, relainale nutrition, shelter consonant with human dignity, gainful employment, and cultural and spiritual sustenance.

In the case of Nepal, His Majesty's Government, helped by a variety of foreign aid programmes, concentrates on these basic needs. Yet any business operation of significant size will have some impact one way or another, however modest. Tourism is a particularly labour-intensive industry, and at the height of the peak season the Group employs some 5000 people in Nepal of whom all but a handful are Nepali. Depending upon assumptions, this may mean the economic support of somewhere between 4 to 8 times that number directly, or a substantially higher multiple indirectly, if we include the "multiplier effect." Foreign exchange earnings for 1984 ran at about US$ 1.5 million, which is roughly 3 per cent of Nepal's 1984 foreign exchange earnings from tourism.

Furthermore, the Group, by being a long-term employer working in close and relatively intimate terms with employees in a service industry, makes some contribution to improving basic standards of life, even if it cannot claim to have a significant impact on general infrastructure services.

One example of this improvement of basic standards is a service offered to the people of the Tharu Village on the fringe of the Royal Chitwan National Park, who have access not only to improved medical facilities, but basic technical assistance in such things as well-digging and agricultural techniques including a demonstration "permaculture" project, designed to produce meat, eggs and vegetables on an ecologically efficient basis for the company's needs, but also for villagers as well.

As regards the impact of basic needs of the mountain trekking activities of the Group, visitors will buy some food (which may, however, be in short supply), pay for cooked food and accommodation in lodges and above all pay good wages to guides and porters. As regards wages, the benefits are most uneven. Most of the guides (either

trekking or mountain) are from a single community, the Sherpas, and most of the load-carrying porters are professionals, coming often many kilometres away from the main trekking areas.

As trek operators, this situation has always worried the Group, as we would like to see the money being spent going to the people living alongside the trekking routes we use. As it is, by far the largest expense of agent-organised treks goes to wages, and the sums paid out, which are considerable, go, apart from in Khumbu, to people living far from the actual trekking routes. We can see no simple solution to this problem, though one can, of course, argue that the economy of the hill areas as a whole is being helped.

As regards food, the quantities bought by organised trekking groups on the trail are not large, and nor indeed should they be, as in few parts of the hills is food abundant. In the lodges, cooked food is sold, often at unnecessarily low prices, to the back-packing trekker, and this benefits the lodge owners, although not, probably, the community as a whole.

However, in this respect we feel that some villagers have lacked initiative, as trekking groups are avid buyers along the trail, of fresh vegetables, eggs, fruit and any consumable sort of meat. If these commodities could be produced on farms set up for the purpose, the trade would be both good and not a drain on normal resources.

It is a particicular criticism of mountain tourism that the cost of food to the locals is forced up. To some extent this is true, but in places such as the larger centres of Solu Khumbu, Jomsom, Manang and the like, the effect of development works, the opening of hospitals, banks, schools and government offices, brings an increase of population and a demand for food that has little to do with trekking.

It is also claimed that market purchase of food raises prices in the Chitwan area, which will also have adverse effect on the poorest. However, here the true incidence – as opposed to impact – of local purchase is unclear. One clear result, though, is that again, additional income is unevenly distributed. We return to this point later.

3. SENSITIVITY TO THE CULTURE AND TRADITIONS OF THE INDIGENOUS PEOPLE

Trekking and mountaineering have undoubtedly had some impact on the customs, culture, way of life and beliefs of the hill people. The loss of such local culture is sometimes referred to as "detribalisation" – the loss of tribal character, traditions and national dress, etc. During the last 40 years there have been very considerable, indeed immense, changes as regards the impact of the outside world on local culture and traditions. However, these go back much further than the relatively recent advent of mountain tourism. The changes have been due mainly to military enlistment in foreign armies, job-seeking in India, and commercial ventures. The changes have seldom been for the better, but are presumed to be the price that must be paid for "development", improved communications, and, one has to add, general education.

In our judgement, mountain tourism here must tread a difficult path. Just as the keepers of an ancient temple or other national monument strive to protect their edifice, so the mountain tourism industry must strive to protect their "product". And this product is not only scenery but people. We must strive to protect and conserve the wildlife, forests and natural resources of the Himalaya, as these are the lifeblood of mountain tourism. At the same time, mountain tourism has an incentive to encourage and educate the Himalayan peoples to repossess their cultural heritage, their music, dance, and traditions: to cast off the drabness of frayed khaki shorts and soiled singlets and to emerge once again as the proud inheritors of ancient mountain traditions. Such changes as the replacement of tile and slate roofs, which use local materials and are labour-intensive to construct but highly durable, with costly imported corrugated sheets, produce a form of visual pollution which undoubtedly diminishes the scenic beauty of hill villages. The mountains are the hill peoples' asset – they must be encouraged to use them so that the benefits are sustainable.

The above applies to reserve areas and protected mountain areas; but the Group also operates in a lowland national park (Royal Chitwan) and, in West Nepal, on the Karnali River in the Royal Bardia Wildlife Reserve. Here, the local people are generally not indigenous to the region but immigrants from hill regions who now practise settled agriculture in formerly malaria-infested forest areas of scant human population.

The true indigenous people are the Tharu, whose high resistance to malaria enabled them to inhabit the Terai region before it was cleared, and malaria was bought under control. The Group's impact on the culture and traditions of the Tharu is best seen in its guest facility in a Tharu village. Here, the "longhouse" is modeled on the traditional Tharu style of building, believed to date back to the 12th century. The building is constructed entirely in local materials, and the decor carried out by local craftsmen with relief paintings representing the flora and fauna of the Chitwan valley.

It is the Group's hope that, in presenting the arts and dance of the Tharu as an integral part of its operation in the Chitwan area, they can make a modest contribution to preserving the culture, showing the local people that their way of life is of interest to visitors from the outside world.

Naturally, such efforts, however well-intentioned, can have their negative effects as well. The very act of bringing foreign visitors into relatively close contact with traditional cultures poses threats to those cultures. The best control here is restraint of numbers, so the Tharu longhouse has only eight double rooms and visitors are not encouraged to stay for more than one night.

4. A PROPER CONSIDERATION OF THE CARRYING CAPACITY OF THE RESOURCE BASE

This is a particularly large topic for a Group working in a variety of environments, and only a few examples of the sort of problem that may be faced can be cited here.

In general, the impact of the Group's Chitwan operations is governed overall by limits of size and numbers (20 double rooms limit at Tiger Tops, 12 at the Tented Camp). Yet there are clearly major problems inherent in running a tourist operation in a park from which a growing local population is excluded.

One example of the type of impact that it is hard to avoid is the fact that around the western end of Chitwan there is now scarcity of firewood and of the formerly-abundant river bank grasses used for grazing, thatching and fencing. Here human population pressures have caused the villagers to clear and graze the north bank of the Rapti River, which forms the park boundary, so intensively that it has been the subject of rapid erosion. Meanwhile on the south bank, which lies in the park, the trees and grasses are protected; when the monsoon rains swell the Rapti it washes the unprotected bank, and its whole course shifts. In much less than a decade it has "taken" upwards of a kilometre of the villagers' land and added a roughly equivalent amount to the park area, thus increasing further the pressure on local livelihoods.

Then there is the vexing question of the carrying capacity of a park for wildlife, where live baiting is practiced. Here respected authorities are divided as to whether such baiting – which has been considered essential to maintain client interest and thus sustain an exceptional quality of experience – produces regional over-population in the case of leopard or tiger.

Turning again to the mountains, there is the environmental impact of the trekkers and expeditions, and the wear and tear on the countryside. Aside from the aesthetic problems of garbage and toilet paper (proper code of conduct such as that of the Sierra Club can easily eliminate these), the felling of trees for firewood has an economic as well as an environmental impact.

Contrary to a popular image, trekkers do not move through Nepal cutting down trees and leaving a trail of destruction behind them. The trees are cut and branches are lopped by the villagers, and then sold to the trekkers as bundles of firewood. As long as the villagers are harvesting the wood in a controlled and sustainable manner, no serious damage may be done. But this is not always the case. Any afforestation project is of value in Nepal, but there is a particular need for more social forestry, in the sense of villagers growing trees as crops. If such tree farms could be established by Panchayat initiative along the trekking routes, the output, after a time, might both meet local needs and also provide a valuable cash crop, as wood is one commodity the trekkers must buy.

Regarding the situation in Khumbu, the recent (1984) observations of a well-informed Sherpa, who is both a trekking Sardar and a well respected figure in Khumbu life, are worth quoting:

"Although Sagarmatha (Everest) National Park is now generally accepted among the Sherpas as a positive thing, tree cutting is still being done by the local people. There are many new trekker's lodges and shops, particularly in Namche. Much of the cutting goes for cooking fires in the lodges. Trekking parties who are camping (almost entirely organised treks through registered trekking agencies) are required to use kerosene and absolutely cannot cook using wood, and certainly not have camp fires. Thus it is not the trekking companies that are responsible for the cutting in Khumbu, but rather the trekker's lodges who are catering to the private trekkers not dealing with a trekking agency" (Roberts, 1984).

Sagarmatha National Park contains some magnificent forests. It seems essential that these be husbanded, controlled and propagated so as to produce sufficient supplies of fuel for both the inhabitants of the park and its visitors.

When looking at the environmental impact of trekking, we should distinguish between "transit trekking" (e.g. around Annapurna) and "destination trekking" such as the Annapurna Sanctuary and Khumbu. In the case of transit trekking such as the Annapurna trail, trekkers seldom spend more than one night in each camp or village, seldom leave the trail, and do little damage. In the case of the Sanctuary and Khumbu, however, trekkers and expeditions fan out all over the place and extensive damage is being caused to the high-altitude scrub and bushes, such as junipers, which have a very slow growth rate – as little as 1 cm per year. There seems an excellent case, for instance, for HMG to ban all camping and lodges in the Modi Valley beyond Hinko, with the implication that the upper glacier basin of the Modi will be closed for mountaineering, for a trial period of five years. During this time, an investigation could be carried out of the high altitude ecology of the region and later camping permitted when new regulations have been formed, and the fuel situation studied.

5. TECHNOLOGY APPROPRIATE TO THE PLACE IT IS APPLIED

There is less of relevance to comment on here. We have quoted the fact that registered trekking agencies are required to use kerosene and cannot have camp fires, so as to conserve fuel wood.

Regarding the lowland operations of the Group, we have also referred to the permaculture project at the Tharu Village. (Other permaculture experiments are being carried out in India at the Group's Ladakh facility).

In Chitwan and the Tharu village, solar heating is used for water to conserve fuelwood. It happens also to be a sound choice on general economic health and safety as

well as environmental grounds. The Group has examined the possibility of extending the use of solar power to photovoltaics, and perhaps even reintroducing the old technology of hydraulic ram pumping for a proposed hill-top operation not far from Pokhara.

Such "appropriate technology" choices must clearly be made primarily on economic rather than environmental grounds. However, with an environmentally-dependent industry like adventure travel and tourism, there is an obvious built-in incentive to opt for the most unobtrusive, low-impact technology where possible.

6. INCOME GENERATION FOR ALL THOSE INVOLVED

Regarding the final principle of sustainable development, the Group would have to re-adjust the wording slightly. The principal benefit to the host country – and region – of wildlife and adventure tourism is clearly income generation; and generally, with some exceptions in the case of trekking as mentioned above, all those involved *do* benefit, to some degree at least, in income terms. The problem lies first with those *not* involved, yet who are adversely affected by the existence of the park or the tourist operation (the people outside Chitwan, whose crops are destroyed by an arguably excessive population of roaming rhino, for example); second, with the inequality of income distribution, which is undeniable.

Should a degree of equality, or at least equity of income distribution, be a basic requirement of sustainable development? This is too large an issue to be argued here. To the extent that basic needs are denied in the course of the development – or at least not met – then there are arguably aspects of tourism that fall short of the first and last of the above general principles of sustainability.

Of these the outstanding one is loss of income – and food supply – on the fringes of a national park. There seems a clear case for greater compensatory action here along the lines suggested in point 5 of the Bali Declaration, which, in the context of the need for increased local support for parks, refers to "such measures as education, revenue sharing, participation in decision . . . and complementary development schemes adjacent to the protected areas."

7. CONCLUSION: THE NEED FOR MORE POSITIVE INPUT

As regards these "Point 5" recommendations, it seems clear that guidance should generally come from government rather than from the private enterprise operator.

Nevertheless, the Tiger Mountain Group has taken a few rather tentative steps towards meeting these Point 5 requirements.

One of these, the Tharu Village development, has been referred to above. In addition, in 1978 some Board Members of the Group, together with other like-minded individuals, established the International Trust for Nature Conservation, (ITNC). The purpose of this Trust was to promote the protection of, and research into, wildlife and its habitat both in Nepal and elsewhere. One of its principal activities has been a conservation education programme aimed at the villages that surround Chitwan. More recently, the scope of the Trust has been expanded to include more general concern with sustainable development in the areas surrounding the Group's operations, the idea being that the existence of the infrastructure of an adventure tourism operation offers a valuable support system for such activities.

The ITNC's philosophy is that wildlife – both plant and animal – if it is to survive in today's over-crowded and environmentally threatened world, must increasingly pay for itself. It can do this through the interest and enthusiasm which it evokes from people, both in its natural habitat and on screen and page. This is, of course, a philosophy shared with other wildlife organisations.

ITNC believes that adventure travel offers a special opportunity for the self-supporting potential of wildlife. Tourism of any kind, as we have seen, puts pressure on the object of touristic interest. These pressures affect not only flora and fauna but local people. Man the visitor, observer, and enjoyer, must in some measure repay what he has consumed.

New projects under study for ITNC support include revegetation of the north side of the Rapti river and other advice and support with tree cropping close to Tiger Mountain Group operations.

In this work, the Group hopes to co-operate closely with, and support the activities of the King Mahendra Trust for Nature Conservation, whose objectives it fully shares.

CHAPTER IV

PROTECTED AREA MANAGEMENT ISSUES

Basic Requirements for Nature Conservation and Management of National Parks and Protected Areas in the Hindu Kush-Himalaya

Abdul Latif Rao

ABSTRACT. *This paper discusses the elements which are required by all protected areas to obtain their objectives. These include legislation and law enforcement, research and surveys, education and training, management planning and implementation, and local support. Particular stress is put on law enforcement and training, with a number of suggestions on how these might be improved.*

1. INTRODUCTION

The value of nature conservation areas as scientific, educational and recreational assets is well understood. Other secondary objectives include: tourism, countryside recreation, regular water yield, and sustained harvest of wildlife, fish, grazing and other products. The charge sometimes heard that nature conservation areas are a sterilisation of land is thus totally incorrect. They are, nevertheless, sometimes an obstacle to certain types of land use development intended to produce a high level of profit and employment.

But these secondary objectives must be achieved in such a way that the conservation values of the area do not deteriorate and that exploitation of the ecosystem does not exceed sustainable capacities. This requires determining the productive capacities; adopting conservative management objectives for utilisation; reducing excessive yields to sustainable levels; reducing incidental take; equipping subsistence communities to utilise resources sustainably; maintaining the habitats of resource species; regulating international trade in wild species; allocating timber concessions with care and managing them to high standards; limiting firewood consumption; and regulating the stocking of grazing lands to maintain long-term productivity.

2. HOW TO CONSERVE NATURE

Methodology to conserve nature includes:

- survey and inventory of biological resources and the threats faced by them;
- identification, site evaluation and designation of appropriate conservation category;
- management of national parks and protected areas;
- creation of new habitats;
- land-use planning and development control within the region;
- programme for creation of public awareness and local support; and
- ecological research and dissemination of information to support management activities.

The strict protection of the most important areas under some kind of legal status is unquestionably the most powerful and cost-effective tool of nature conservation. Such protection amounts to a guarantee that management of the area for conservation will be sustained indefinitely. It is best to provide such guarantee through a formal designation, notably nature reserve or national park or wildlife sanctuary, depending on objectives for the area.

Protected areas should be large and varied enough to: guarantee the survival of the necessary minimum wildlife populations; prevent the extinction of species; preserve maximum variety of wild relatives of domesticated organisms; protect habitats of threatened and unique species and of wild relatives; and preserve unique ecosystems and representative samples of ecosystems.

The size, distribution and management of protected areas needs to be determined on the basis of the needs of the ecosystems and the plant and animal communities therein. Co-ordination of national protected area programmes with all states of the Hindu Kush-Himalaya is necessary to complete the network of protected representative samples of ecosystems as soon as possible.

Almost all ecosystems in the Hindu Kush-Himalaya are in varying stages of degradation and destruction. Some

species have suffered extinction and a large number of others are vulnerable or endangered. This situation underlines the need for conservation, comprising ecologically sound management to maintain their viability.

2.1. *Obstacles to conservation*

As pointed out in the *World Conservation Strategy* (IUCN 1980) one of the obstacles to achieving conservation is the lack of a capacity to conserve. The first reason for this is inadequate legislation and lack of enforcement. The second is poor organisation (notably government agencies with insufficient mandates and a lack of co-ordination). The third is a lack of trained personnel. The fourth is a lack of basic information on priorities, on the production and regeneration capacities of living resources, and on the trade-offs between one management option and another.

There are several other obstacles. First is the belief that conservation of living resources is a limited sector, rather than a process that cuts across all sectors. Second is the consequent failure to integrate conservation with development. Third is a development process that is often inflexible and needlessly destructive. A fourth obstacle is faced due to inadequacies in environmental planning, a lack of rational allocation of use and undue emphasis on narrow, short-term actions rather than broader, long-term ones. Fifth is the lack of awareness of the benefits of conservation and of the responsibility to conserve among those who use or have an impact on living resources, including, in many cases, governments.

Ineffective implementation is another problem. The major causes of this are lack of adequate governmental commitment and infrastructure or public understanding and support. Often enforcement is ineffective due to the low level of finance and penalties which are insufficient to serve as deterrents. Jurisdictional conflicts between agencies or between central, provincial and local governments may also discourage implementation of the law.

Wildlife habitats are threatened by agriculture, deforestation, afforestation of exotic monocultures, drainage of wetlands, pollution and eutrophication, water engineering works, mineral extraction, settlements, overexploitation of rangeland by domestic livestock and tourism.

2.2. *Requirements for management*

It is relatively easy within this framework to identify the basic requirements for the management of national parks and protected areas in the Hindu Kush-Himalaya. Land-use planning, regional development planning, and the mechanism of mandatory interdepartmental consultations are obviously basic. Legislation, organisation, education, and research are other considerations.

Conservation management thus requires a substantial input to:

- legislation and law enforcement;
- organisation for protection, management, survey, research, education, and training;
- trained manpower;
- management planning and implementation; and
- mustering local support and participation.

The development of conservation law in most countries of this region has been piecemeal and haphazard in response to sectoral needs and to emergencies. Therefore, there are gaps, duplications, and even conflicts in the legislation of many countries. Species are not appropriately protected and the creation and management of protected areas is not fully provided for. The habitats in the countryside continue to be degraded and destroyed.

Most of the threats to conservation can be avoided or their adverse effects minimised if mandatory consultations between the governments, departments and organisations are undertaken. Wildlife statutes should require that all departments and organisations consider conservation concerns in their planning. It might also be made mandatory for all organisations to report annually on their conservation activities.

Another way to improve legislation is by the following provisions in the statutes:

- selection criteria or guidelines;
- acquisition of land;
- designation and dedication;
- restrictions on disposition of reserved lands;
- limitations on the applications of other statutes; and
- restrictions on use and entry.

Legal regulatory measures are only one tool of conservation. Others include:

- enforcement of planning controls;
- acquisition of public ownership of critical habitats in private ownership;
- modifications to agriculture support systems; and
- financial incentives and management agreements.

Each of the various policy instruments mentioned here has its advantages and disadvantages. Some options are complementary rather than mutually exclusive in achieving the objectives of conservation.

Rao (1984) considers that enforcement can improve by:

- eliminating those problems from the law which could be solved easily with other policy options;
- involving persons likely to be affected by the law in the process of law making;

- making realistic provisions;
- enlisting public support;
- improving the administrative and judicial capabilities; and
- arranging conservation education.

Organisational structures for the management of national parks and protected areas and conservation in the wider countryside vary between States of the region, due to differences in the political set-up of a State, whether a unified State or one involving provincial ownership of land. Within this structure the responsibility for habitat must be allocated. Organisation in unitary States is more simple. In a Federal State, responsibility lies with the provinces and the Central Government plays a supporting role in policy, co-ordination, international co-operation, research, and training of professionals.

There is a dearth of expertise in this region in the field of management planning. Development of required expertise will take a long time. Under the circumstances it seems advisable that nations pool expertise and open a central or regional planning cell. Such cells may be headed by competent resource managers and may contain expertise in all relevant fields. Such cells can also be assigned the responsibility of Environmental Impact Assessment. Preferably such cells may be located near educational and research institutes for benefiting from availability of literature and consultation. Alternatively, consultancy services may be encouraged.

Again due to shortages of trained manpower, most nature conservation areas in the region are managed by foresters and forest departments. There is a need for organisational change and for supplementary training of existing staff in nature conservation and management of protected areas by arranging in-service training and local workshops.

Law enforcement organisations in the region are poorly structured and crippled with conflicting responsibilities (Rao, 1984). There are inadequate, untrained, immobile and low-paid staff. Further, the governments have not allocated adequate resources to enforce the laws. Better trained, mobile, and higherpaid staff are preferable to many untrained, stationary, and low-paid staff.

Support and involvement of non-governmental organisations, local advisory committees, honorary wardens and other locally-respected persons would increase the efficacy of government organisations and would make considerable savings in the expenditure of scarce government funds. There is a strong need for effective consultation between the various organisations engaged in the management of living resources.

2.3. *Training and education*

Literacy rates in the Hindu Kush-Himalaya are low. The objectives of nature conservation cannot be achieved in this region without education at professional, technician and user levels. Environmental education should be provided for all ages, at all levels, and as both formal and non-formal education (UNEP, 1984). Teacher training and professional and legal training are all essential. Training courses after secondary education can produce technicians. Professionals can be trained in the universities or training institutes. Non-formal education with the help of mass media is necessary for creating public awareness. At the user level, farmers, pastoralists, foresters, fishermen, loggers and other land and water users need to be educated to adopt both sustainable and more productive methods and to safeguard nature conservation interests at the same time.

The capacity of educational institutions, government departments and NGOs in nature conservation needs to be improved. In view of limited expertise in the region, pooling resources for organising comprehensive courses is required. Greater benefit would accrue if the technicians, professionals and experts are associated in conservation and environmental education courses by the schools, colleges and universities until their own capacities are developed.

There are regional and international programmes which cater for education in the field of nature conservation and management of national parks and protected areas. ICIMOD and the South Asian Co-operative Environmental Programme (SACEP) have been conceived as new regional programmes. India has taken a lead in establishing the Wildlife Institute of India in 1982 at Dehra Dun which is sponsoring wildlife biology, wildlife management, extension and socio-economic studies (FAO, 1984). UNESCO is actively helping the countries of this region in the field of education under its Man and the Biosphere Programme. The states of this region can also benefit from the educational programmes which are offered by international agencies such as IUCN, WWF and individual organisations and countries, like US Fish and Wildlife Service, and the park services of the US, New Zealand, and Australia.

There are, however, three problems with foreign training. First, the lengthy procedures involved in processing the nominations are very discouraging. Second, many trainees tend to live abroad after the training is concluded. Finally, on return they are not always employed in jobs relevant to the education and experience obtained.

2.4. *Research*

Research on species, habitats, physical features and ecosystems in this region is limited. Bibliographies, abstracts and reviews on all aspects of nature conservation and resource management should be developed.

National governments should also place research on living resources high in their national scientific programmes. They should encourage universities and other bodies to increase and co-ordinate their living resource research

activities and to relate research to conservation action on the ground.

Inventory and short-term management-oriented studies should get preference. Functional and long-term management-oriented studies, although necessary for planning and management, are second-order priorities. Constraints on financial resources suggest that national governments determine priorities, avoid duplication and relegate academic research. International research such as the UNESCO/MAB Programme and the Scientific Committee on Problems of the Environment (SCOPE) should make available the results of their research to the national conservation organisations.

Research programmes also need to be developed to further develop methodologies for preparing management plans and management manuals. The Nature Conservancy Council manual is one good example that could be applied to this region.

Management manuals and handbooks for all ecosystems with guidelines on management of communities and species must be produced.

Systematic recording schemes for all nature conservation areas to provide an inventory of environmental attributes of each and to monitor these sites are also necessary. Information should be published in resource handbooks. Each protected area should also have a descriptive leaflet.

3. CONCLUSION

In summary, nature conservation is an important land-use in the Hindu Kush-Himalaya but management needs to be improved. Establishing national parks and protected areas is the most efficient and cost effective method of conserving nature. Legislation, organisation, education, and research can improve the capacity to manage these areas.

An Expanded Approach to Protected Areas in the Himalaya

Jeffrey A. McNeely

ABSTRACT. *This paper outlines an expanded rationale for protected areas and shows how these areas can help to sustain human society, thereby contributing to the conservation and development of living natural resources in the Himalaya. It lists the benefits of protected areas for regional development, including such elements as stabilisation of hydrological functions, creation of employment opportunities, and conservation of renewable harvestable resources; but such benefits will only flow if the management of protected areas has clear objectives addressing the need to bring benefits to society, so a series of possible conservation objectives is presented along with a system of management objectives for ensuring their delivery.*

1. INTRODUCTION

The question is no longer whether conservation is a necessary part of social and academic development in the Himalaya, but rather *how* conservation can be achieved in such difficult conditions. This question is more important than ever, to ensure that the means employed to meet human needs from renewable natural resources are sustainable.

Natural habitats and living species should be maintained wherever they occur, but at least in the short term, national parks and other protected areas provide the most secure means of conserving samples of natural ecosystems. Protected areas will never be more than a small proportion of what formerly were natural areas, yet they must satisfy the habitat requirements of threatened species and meet certain basic human needs (especially in terms of environmental services).

2. AN EXPANDED RATIONALE FOR PROTECTED AREAS

Does the tremendous increase in human population in the Himalaya inevitably mean that "nature" is doomed; that the human requirement for more land and trees will be insatiable until everything is turned to human ends?

Ironically, hidden within this troubling question is the best hope for natural ecosystems: the better that protecting natural areas serves basic human needs, the better are the chances of survival for natural areas. Since demands on Himalayan resources can only be expected to continue to grow, it is necessary both to justify existing protected areas ever more convincingly and to establish additional new areas under a range of management regimes can adapt to varying local conditions and human requirements.

Linking protected areas together with human needs can support ecologically-sound development which takes on practical meaning for governments and local people. In order to demonstrate how protected areas can contribute to sustaining society, Miller (1980) devised a set of 12 broad objectives which can guide management decisions (Table 1).

However, the uncontrolled implementation of all of these expanded objectives within any one area could lead to over-exploitation, or even destruction, of the natural values the protected area was established to protect. Clearly some objectives are more compatible with others in areas with different natural values. Logging in a national park, for example, is clearly inappropriate, whereas wildlife management and certain types of education, training and research may be compatible and even help support sustained-yield forestry. On the other hand, a national park established to conserve sample ecosystems and ecological diversity can often also support tourism and conserve watersheds.

To accomodate this wider range of management objectives without giving up the important gains made by national parks and other strictly-protected categories, IUCN (1978, 1984a) devised a system of categories of conservation units (Table 2). These categories show, for example, that while nature reserves (category I) and national parks (II) must be strictly protected against resource extraction, their objectives can be reinforced by adjacent protected landscapes (V), resource reserves (VI), natural biotic areas (VII) and multiple-use management areas (VIII) where some carefully controlled resource exploitation is permitted.

A series of case studies illustrating how a range of complementary protected area categories can enable

governments in the tropics to meet their responsibilities for protecting nature while providing for human development on a sustainable basis is presented by McNeely and Miller (1984).

Linking the 12 objectives and 10 management categories provides a decision matrix for protected area planners and development agencies. The matrix suggests that, given an objective, several alternative approaches to management may be followed, and shows which objectives may be compatible with other objectives within a management category. But protected areas won't work by themselves.

There are two key points: While a reasonable number of protected areas have been established in the Himalaya, many more are needed, and by themselves, protected areas will never be able to conserve the species, genetic resources, and ecological processes they were established to protect. The best answer to this dilemma seems to be to select and manage protected areas to support the overall fabric of social and economic development; not as islands of anti-development, but as critical elements of regionally envisioned harmonious landscapes. Through a planned mix of well-protected national parks plus other types of reserves which permit some human use, amidst productive forests, agriculture and grazing, protected areas can serve people today and safeguard the well-being of future generations (McNeely, 1984a).

Garratt (1984) points out that Nature does not recognise Man's laws and boundaries, and that laws by themselves do not change human habits and traditions. Protected area management must therefore consider the physical and social environment of the broader region if it is to be effective, taking into consideration the need for other means of integrating conservation and development and for examining the impacts of protected areas on local people.

3. PROTECTED AREAS AND REGIONAL LAND USE

The previous discussion has suggested that protected areas are subject to ecological, physical, cultural, social and economic influences from outside the area and in turn influence neighbouring lands. These influences can be identified and integrated into the development process, for the benefit of both protected areas and surrounding land. This section suggests some of the ways and means for promoting linkages between protected areas, regional land use authorities, and economic development.

The first requirement is to ensure close co-operation between the various agencies involved in regional land use; this will usually require an institutional structure – such as a Regional Planning Board which oversees a Regional Land Use Plan – but ideally the various agencies will be so convinced by the wisdom and self-interest of co-operation that various informal linkages will spring up as well.

Strong ties between protected areas and other agencies and programmes involved in regional development are important for several reasons:

- Mutually beneficial inter-agency co-operation and dependencies can be developed, while settling interagency land use conflicts and overlaps in planning.
- Modifying plans of other agencies so threats to protected areas are reduced or that the integrity of such areas is enhanced.
- Promoting wider acceptance for the role of protected areas in regional development and including protected area management in wider multiple land use packages (including funding for vital protective functions as part of those projects and programmes which derive significant benefits from the protected areas).

3.1. *The benefits of protected areas for regional development*

The objectives defined in Table 1 suggest many of the benefits which protected areas provide to regional development. IUCN (1985) expanded upon these to derive 16 main benefits of protected areas for local communities:

1) Natural balance of environment
2) Stabilisation of hydrological functions
3) Protection of soils
4) Stability of climate
5) Protection of genetic resources
6) Preservation of breeding stocks and population reservoirs
7) Conservation of renewable harvestable resources
8) Promotion of tourism
9) Creation of employment opportunities
10) Provision of research facilities
11) Provision of educational facilities
12) Provision of recreational facilities
13) Maintenance of a high quality living environment
14) Advantages of special treatment.
15) Preservation of traditional and cultural values
16) Regional pride and heritage value

IUCN also provide details of each of these benefits, pointing out that they are of different scales of magnitude, accrue over different timespans and fall to different groups in the local community, but that they are additive and can provide considerable total value to the region as a whole. Some of the benefits will occur automatically with the establishment of the reserve, while others will require some

management effort to reach their full potential. Ideally, the sum of these protected area benefits compared with the potential values or benefits attainable if the area was designated for alternative use will determine the best land use for a particular area, though such an analysis is seldom made in practice.

3.2. *Protected areas and indigenous people*

Some types of protected areas, particularly protected landscapes (category V), anthropological reserves (category VII) and biosphere reserves (category IX), may be inhabited by indigenous people. In other categories of protected areas the presence of indigenous peoples may be acceptable where these people are living in close and balanced harmony with their environment and can be said to have become a part of the natural ecosystem. In other cases, where no people live in a reserve, traditional harvesting of various resources may be permitted on a seasonal basis along with the use of traditional cultural sites for religious or spiritual purposes.

Protection of indigenous cultures is highly sensitive, requiring a judicious balance between the continued practice of traditional rights in national parks or other protected areas, and pursuing the advantages of modern development. There must be no question of trying to establish "human Zoos" as scientific curios or tourist objects.

There are many areas in which native populations, following their traditional cultures on their own land, protect large areas of essentially natural ecosystems and harvest the renewable resources of their environment on a sustained yield basis (see McNeely and Pitt, 1985 for a number of case studies). These people and protected area managers can be appropriate allies; managers can learn much about resource conservation and use, while the conservation of natural areas can provide the opportunity for traditional cultures to survive. The social and behavioural patterns of these allegedly "primitive" peoples have become so integrated with their natural environment that usually, though not always, they achieve ecologically sound long-term use of an area. Both are easily disturbed by insensitive forces from outside.

Outright conflict between conservationist and indigenous objectives has occurred in the past. Tribes have been expelled from national parks or denied the use of resources within the Park: for example, the Rendille were driven from the Sibiloi National Park in Kenya and the Ik expelled from Kidepo National Park in Uganda with disastrous results for the tribes concerned (see especially Turnbull, 1973).

Indigenous groups can often link restrictive land use policies to conservation objectives. Brownrigg (1985) offers four options to consider:

1. *Reserves,* where a protected natural area corresponds with the territory of a particular native population;
2. *Native-owned lands,* where the protection of the area is by native peoples;
3. *Buffer zones,* where a protected area serves as a physical or ecological barrier between native lands and the lands of others; and
4. *Research stations,* where certain areas under native management are organised as agricultural or ecological research stations.

The option which is most appropriate will depend on the cultures of the native peoples and the specific objectives of the protected area. In general the local people make their best contribution to conservation when:

- indigenous peoples see the protected area as helping to maintain their culture (and to provide employment);
- indigenous organisations have strong bargaining positions (related to unambiguous title to their lands); and
- permitted land use in the protected area is well-defined.

4. CONCLUSION

George Schaller pointed out that protected areas are necessary because "Some day man may want to rebuild what he has squandered, and from such samples of original habitat he can then not only draw genetic stock but also learn how the ecological pieces have adjusted to create a harmonious system" (Schaller, 1977).

Perhaps more importantly, protected areas must continue to make their significant contributions to regional land use in the sorts of fields outlined in this paper. Because they are often environmentally critical areas and places of showcase status, well-managed protected areas can serve as the foci of regional development, helping to maintain a more natural balance in the ecosystem over a much wider area.

Table 1. Conservation objectives for protected areas in the tropics

1. *Sample ecosystems.* To maintain large areas as representative samples of each major biological region of the nation in its natural unaltered state for ensuring the continuity of evolutionary and ecological processes, including animal migration and gene flow.

2. *Ecological diversity.* To maintain examples of the different characteristics of each type of natural community, landscape and land form for protecting the representative as well as the unique diversity of the nation, particularly for ensuring the role of natural diversity in the regulation of the environment.

3. *Genetic resources.* To maintain all genetic materials as elements of natural communities, and avoid the loss of plant and animal species.

4. *Education and research.* To provide facilities and opportunities in natural areas for purposes of formal and informal education and research, and the study and monitoring of the environment.

5. *Water and soil conservation.* To maintain and manage watersheds to ensure an adequate quality and flow of fresh water, and to control and avoid erosion and sedimentation, especially where these processes are directly related to downstream investments which depend upon water for transportation, irrigation, agriculture, fisheries, and recreation, and for the protection of natural areas.

6. *Wildlife management.* To maintain and manage fishery and wildlife resources for their vital role in environmental regulation, for the production of protein, and as the base for industrial, sport, and recreational resources.

7. *Recreation and tourism.* To provide opportunities for healthy and constructive outdoor recreation for local residents and foreign visitors, and to serve as poles for tourism development based upon the outstanding natural and cultural characteristics of the nation.

8. *Timber.* To manage and improve timber resources for their role in environmental regulation and to provide a sustainable production of wood products for the construction of housing and other uses of high national priority.

9. *Cultural heritage.* To protect and make available all cultural, historic and archaeological objects, structures and sites for public visitation and research purposes as elements of the cultural heritage of the nation.

10. *Scenic beauty.* To protect and manage scenic resources which ensure the quality of the environment near towns and cities, highways and rivers, and surrounding recreation and tourism areas.

11. *Options for the future.* To maintain and manage large areas of land under flexible land-use methods which conserve natural processes and ensure open options for future changes in land use, incorporate new technologies, meet new human requirements, and initiate new conservation practices as research makes them available.

12. *Integrated development.* To focus and organise conservation activities to support the integrated development of rural lands, giving particular attention to the conservation and utilisation of marginal areas and to the provision of stable rural employment opportunities.

(modified after Miller 1980)

Table 2. Categories and management objectives of protected areas

I. *Scientific Reserve/Strict Nature Reserve.* To protect nature and maintain natural processes in an undisturbed state in order to have ecologically representative examples of the natural environment available for scientific study, environmental monitoring, education, and for the maintenance of genetic resources in a dynamic and evolutionary state.

II. *National Park.* To protect natural and scenic areas of national or international significance for scientific, educational, and recreational use.

III. *Natural Monument/Natural Landmark.* To protect and preserve nationally significant natural features because of their special interest or unique characteristics.

IV. *Managed Nature Reserve/Wildlife Sanctuary.* To assure the natural conditions necessary to protect nationally significant species, groups of species, biotic communities, or physical features of the environment where these require specific human manipulation for their perpetuation.

V. *Protected Landscapes.* To maintain nationally significant natural landscapes which are characteristic of the harmonious interaction of man and land while providing opportunities for public enjoyment through recreation and tourism within the normal lifestyles and economic activities of these areas.

VI. *Resource Reserve.* To protect the natural resources of the area for future use and prevent or contain development activities that could affect the resource pending the establishment of objectives which are based upon appropriate knowledge and planning.

VII. *Natural Biotic Area/Anthropological Reserve.* To allow the way of life of societies living in harmony with the environment to continue undisturbed by modern technology.

VIII. *Multiple-Use Management Area/Managed Resource Area.* To provide for the sustained production of water, timber, wildlife, pasture, and outdoor recreation, with the conservation of nature primarily oriented to the support of the economic activities (although specific zones may also be designed within these areas to achieve specific conservation objectives).

IX. *Biosphere Reserve.* To conserve for present and future use the diversity and integrity of representative biotic communities of plants and animals within natural ecosystems, and to safeguard the genetic diversity of species on which their continuing evolution depends.

X. *World Heritage Site.* To protect the natural features for which the area was considered to be of World Heritage quality, and to provide information for worldwide public enlightenment.

(adapted from IUCN, 1978).

Management Planning for Protected Areas in the Hindu Kush-Himalaya Region

James W. Thorsell

ABSTRACT. *An essential tool for effective management of protected areas is a management plan. This paper reviews the approach to the preparation of management plans developed by IUCN. It defines what a management plan is, and outlines why plans are needed, how they are undertaken, who should be involved in the process, and where and when plans are required. It includes a sample table of contents for a protected area management plan.*

1. INTRODUCTION

In his address on Future Directions for the IndoMalayan Realm at the World Congress on National Parks in Bali. Indonesia, 1982, Kasem Snidvongs of Thailand noted:

"While there has been notable progress in management planning in such places as Indonesia, most of the Realm still lacks management plans for even the key protected areas. I would like to see a crash programme to develop a capacity in each protected area department to prepare and implement plans for each protected area".

This remark is also true for the approximate 40 protected areas in the region that this workshop is considering. For all these areas, in fact, IUCN files only hold the management plans for three national parks: Sagarmatha, Royal Chitwan and Langtang in Nepal. Even these plans are somewhat deficient as they are not officially approved documents and are somewhat out-of-date.

If protected areas in the Hindu Kush-Himalaya region are to contribute effectively to sustaining society, then management plans are an essential tool, even a prerequisite for action in this regard. Benefits from protected areas do not occur spontaneously, they must be conciously designed and promoted by their guardians. The consequences of *not* having professionally prepared management plans might be summed up by saying: "A park that plans no future, has no future".

2. AN OVERVIEW OF PLANNING PROCEDURES

The purpose of the paper is to describe a procedure that can be used to plan for the management of a specific protected area. It is based on a workshop on managment planning convened at the World Congress on National Parks held in Bali in October 1982. The procedure has since been successfully applied in many countries, including Kenya, Ethiopia, Liberia, Thailand, Peru, Sri Lanka and China.

Based on the principles developed in the Bali Action Plan, this paper discusses the ways and means of putting those principles into action. How can the management of a protected area be planned to preserve its special values? What are those values? What is the relationship of the protected area to local and national socio-economic needs? How can the area be managed to meet those needs on a sustainable basis while preserving the values for which the area is being protected?

Focus in on the planning *process* – the steps that one goes through to plan for protected area management. It begins by defining just *what* a management plan is and *why* these plans are useful, followed by a brief discussion of the variation in the level of detail and sophistication required. The body of the chapter then outlines *who* should be involved and *what* the steps in the process are.

The method outlined below is a generalised one with built-in flexibility enabling its application to a wider range of protected area categories (i.e. not only national parks).

2.1. *What is a management plan?*

A management plan is a document that guides and controls the management of protected area resources, the uses of the area, and the development of facilities needed to support that management and use. Thus a management plan is a working document to guide and facilitate all development activities and all management actions to be implemented in an area.

Central to such a plan is a statement of goals and measurable objectives to guide management of the area. These goals and objectives form the framework for determining specific actions to take, when they will be taken, and the budget and personnel needed to implement

those actions. Thus a management plan is a valuable tool for identifying and prioritising management needs and organising our approach to the future.

A management plan provides this guidance for a particular period of time, typically five years. Annual operation plans are then developed during the implementation phase using the longer-term management plan as a guide. The management plan is always subject to modification as new information is obtained, particularly regarding feedback on the effectiveness of the actions taken in the annual operations plan.

2.2. *Why do a management plan?*

Several reasons for writing a management plan have already been stated in its definition. It is a useful means of defining your management purpose, setting your priorities, and identifying steps to be taken and the resources needed. It thus provides a tool for the manager on the ground to allocate limited staff, funding, equipment and materials.

Frequently, however, staff, funding, equipment, and materials are not adequate to implement the management objectives. In many cases, they are not available at all. In these circumstances, a management plan can be used to document and prioritise these unmet needs. In this way, the plan becomes a valuable fund-raising tool to seek needed support both internally and from outside assistance programmes.

A management plan can also serve as a communication tool to gain understanding and support of both the general public and relevant government officials. Such understanding is important for gaining the co-operation of local people and the political support needed for adequate funding. A plan also provides continuity over time and facilitates consistency during staff transfers.

Lastly, the management planning process can be an important means of training management personnel. By involving them in the planning process, they are exposed to the full range of management needs which leads to fuller understanding of their management role. The result is a strengthening of all management staff within the Agency.

2.3. *Types of planning – a clarification*

There are many types of planning at many different scales and for many different purposes. Clarification is useful to avoid confusion.

At the large end of the scale is planning for the design and organisation of a national system of protected areas. At the small end of the scale is detailed site planning for a specific development in a specific portion of a protected area. A management plan, as discussed here, falls between these extremes although it will undoubtedly result in the identification of needs for planning at both ends of the spectrum. It is a plan to guide the management of a single existing protected area and may include subplans to manage resources, uses, facilities development, research and monitoring, or others as appropriate.

A word on terminology is in order as well. Many managers and planners may be more familiar with the term "master plan" for what is described here as a "management plan". The two terms are essentially synonymous. The term management plan is preferred, for the simple reason that "master plan" implies a comprehensive and complete document, one that is static and covers all possible situations. What is needed, however, is a flexible plan that can be modified to reflect new information and changing needs. The term "management plan" embodies these characteristics and identifies its orientation to managers and management.

2.4. *Levels of detail*

A basic principle of management planning is to keep the plan as simple as possible, particularly at the start, in keeping with real world limitations on funding, staffing, degree of training, degree of national development, and the like. The simpler the plan, the easier it will be to develop and implement. It will take less time to prepare, it will cost less, it will be more flexible to implement and change, it will be easier to read and understand, and it will require fewer staff with lower levels of training – all of which are important factors to consider in a developing country. Complexity of detail and sophistication of approach will evolve naturally as the plan is regularly updated and as increased support, based on measurable progress, becomes available.

In short, start simple and stay as simple as possible, consistent with meeting your basic management needs.

2.5. *Interim guidelines approach*

In instances where the data base is inadequate or when a complete management plan is not required, it is possible to abbreviate the planning process by preparing interim management guidelines. The main purpose of this interim approach is to provide enough guidelines to serve as a holding action until a full plan can be prepared.

The important point to be emphasised is that the 16 steps listed in the planning process that follows cover the full range of possible factors to be considered. Needs, limitations, and priorities will vary widely with each situation. The management planner must tailor the process to meet his particular circumstances. Short-term interim guidelines are an acceptable and even necessary form of management planning in the early stages of an area's management.

Thus the management plan may be simplified to a set of interim guidelines to protect the most basic values

for which the area has been set aside. These guidelines can be as simple as a statement of the values to be protected and the most basic actions needed to maintain those values, or it can be a more sophisticated statement of policies to address specific management issues, types of use, and principles of facilities development.

2.6. *Regional integration*

Protected areas do not exist in isolation particularly in heavily populated regions of the world. They depend intimately on the understanding and support of the people living in the surrounding region and the nature of their land use needs. An evolving theme in protected areas management is the need for managers to look beyond the boundaries of their protected areas. What benefits do protected areas provide to the surrounding region and to the nation? Who benefits? How can an understanding of these benefits be used to gain support for protected area management? How does regional land use affect the values for which the area is being protected and managed?

The answers to these questions are important to the manager. They will assist him in evaluating protected area boundaries, in designating buffer zones and compatible uses within those buffer zones, in establishing internal zoning, and in designing educational, interpretative and public involvement programmes. Answers to these questions will also provide guidance for identifying compromises in allowed uses, consistent with the biology of the area and the preservation of site values.

2.7. *Public involvement*

Because protected areas are planned for public benefit, some form of public involvement is both inevitable and desirable. Public involvement and consultation is useful in identifying management issues, the type and intensity of existing land use, the positive and negative impacts of those uses, and the needs being met by those uses. Public involvement can also establish lines of communication that lead to the resolution of problems and to greater understanding and support for the protected area.

There are many different kinds of "public" so the first step is to identify who they are in your participation situation. Are they tourists, researchers, local hunters, farmers and fishermen, government officials, who? Different techniques may be required for different audiences to meet different needs. The type of involvement may be as simple as keeping some groups regularly informed on progress in developing a plan. It may involve seeking their advice in a review and comment procedure. Or it may involve their direct participation in preparing and writing the plan itself. The level, timing and intensity of public involvement will depend upon the individual circumstances and the policy of the particular agency.

2.8. *Diversity of approaches*

It is important to emphasise the variety of approaches to management planning in different countries. What follows is a comprehensive list of steps and generalised considerations to plan for the management of a protected area. It is not an absolute list. The management planning team can and should tailor the process to meet the needs and limitations of each individual situation.

Whatever the approach, it must be remembered that planning is only a tool for more effective management and not an end in itself.

3. THE PROTECTED AREA MANAGEMENT PLANNING PROCESS

Although planning methodology is complex, the basic steps in an idealised procedure are summarised below. It is important to note, however, that while the management planning process is presented as a list of ordinate steps, it will be necessary to consider many steps on a simultaneous basis. Planners may find also that upon completion of various steps it may be necessary to review earlier decisions as new information becomes available. Similarly, it is recognised that present developments in parks may prompt alternative approaches to decision making.

In addition, non-technical factors such as budgets, institutional limitations, and considerations of a political nature may affect the time scheduling of the plan. These factors can only be dealt with at a higher executive level where matters related to the programming of the park system are considered.

As a final caveat it is noted that the following steps display a thought process, a means of organising a future based on assessment of the present. It is not, therefore, the nomenclature or the exact order which is important but the process by which one evaluates and addresses the management problems of a protected area. The generalised process discussed here is based in good part on the manual prepared by K.R. Miller: "Planning National Parks for Ecodevelopment". Steps 1, 5, and 11 have been added, however, and the sequence has been renumbered. For a detailed outline of what to do on each of the steps the aspiring management planner is referred to Miller's original work.

Step 1. Form the Planning Team. Although a plan can be prepared by one individual, it is most often a team exercise involving a core group of three to six individuals. It is important that the team members have some capabilities in the methodology of planning, ecology, sociology, economics, and various other resource sciences. If individuals with at least fundamental awareness of these fields are not available from within the agency, they may be hired as consultants, borrowed from regional

institutions and universities, or requested through outside assistance programmes.

In addition to these specialists, the preparation of a management plan also requires the participation of those who now manage the park as well as those who will use the park and others who will be affected by the plan. To be truly effective, the planning process must be responsive to the needs of the managers in the field since the managers are ultimately responsible for the implementation of the plan. If the planning function is centralised at the headquarters office, field managers should still have an integral role in management plan preparation, perhaps through short-term attachments to the planning team. Most importantly, the park warden should be member of the planning team because of his knowledge of the park and his role in implementing the plan. The warden is perhaps best able to assist the planning team is finding practical approaches and solutions to the management problems faced by his park.

The full range of both technically trained and non-technical personnel within the management and research arms of a Parks Department should be involved in the planning process. In practical terms this means that the planning team should involve personnel from all levels of management, in addition to consulting with scientists, tourism experts, educators, concessionnaires, and people living in and around the area.

Step 2. Gather Basic Background Information. The planning process now proceeds through a review of all resource material available on the protected area. This includes an overview of the enabling legislation, biophysical features, cultural resources, and socioeconomic data. This information is collected from various sources including a literature review, office files, and interviews with knowledgeable people. A base map and reference file system are usually prepared at this stage.

Step 3. Field Inventory. Although the content and intensity of this step can vary considerably, all planning requires fieldwork to gather new information, to check and update existing data, and to view the area with new perspectives. The purpose is to develop the information base needed to make informed management decisions. Generally, a review is made of environmental resources and visitor use. Attention is also given to archaelogical sites and contemporary cultures, regional economics, poaching, transportation networks, and attitudes of local people. Particular attention is devoted to critical environmental areas and potential development sites. The warden and his staff, being most familiar with the area, play a key role in accumulating the necessary data.

It is important to note that planning does not set out to seek new information as an end in itself. However, it is concerned with compiling sufficient data to address the most important management problems. The caution given here is not to dwell on missing information through a long process of data collection but to address the most important management needs. The gaps can be identified in the next step.

Step 4. Assess Limitations and Special Problem Areas. Limitations of an environmental, economic, political, administrative or legal nature should be recognised and analysed at this point. Senior management at headquarters play a critical role in defining these limitations and identifying key problem issues. A review of programmes outlined in the national plan and in district development plans should be done at this stage, although the absence of such plans should not deter one from proceeding. The purpose of this step is to ensure that options to be developed in later stages will be realistic in the light of current limitations. Assets should also be recognised and analysed so the plan might make effective use of them.

Step 5. Review Regional Interrelationships. A protected area must be integrated as an essential element of the regional land use fabric. The planning team must attempt to review the potential effects of development outside protected area borders as well as review the effects of the protected area on the region. The special arrangements that may be required with adjacent inhabitants are outlined here as are the roles of buffer zones and key regional decision makers.

Step 6. State the Objectives of your Area. With the above steps completed it will be possible to spell out in detail the values and objectives of your area in relation to its particular set of resources, to the region, and to the country as a whole. A review by senior management should be undertaken at this point to ensure that all factors have been considered and that the objectives identified are appropriate to your protected area.

Step 7. Divide the Area into Management Zones. Most protected areas will have interior zones devoted to different objectives and uses. These could range from zones of intensive tourism development to dispersed recreation zones, from controlled resource production zones to full protection zones. Different management practices allowed or prohibited in each zone should be itemised. A standardised zoning scheme for all categories of protected areas in your country should be developed and applied to your area.

Step 8. Review Boundaries of your Area. Few protected areas have ideal boundaries from an ecological point of view. With the resource inventory, management objectives, regional integration review, and zoning stages of the plan in place, the team may wish to consider boundary modifications.

Step 9. Design the Management Programmes. Once the zoning concept has provided the basis for what is to be done where, the task now is to answer the questions of how and who. This is the heart and action-oriented component of the plan that addresses the four major programmes of protected area management:

a) Resource management and protection. This management programme focuses on issues that relates to the protection of the biological and physical resources of your area.

b) Human use. This programme deals with all aspects of use by people including traditional use, recreation, interpretation, and extension.

c) Research and Monitoring. The management of protected area resources frequently requires an understanding of specific ecological dynamics together with supporting data which may not yet exist for your area. An important aspect of protected areas management thus involves the design and development of research programmes to meet these information needs. Similarly, a monitoring programme is needed to gauge your progress in meeting the management objectives for your area. In addition, the role protected areas play as environmental benchmarks makes them attractive field sites for a wide range of research and teaching use. A separate management programme is often devoted to these aspects of research and monitoring use.

d) Administration. Here the operational, manpower, and financial resources needed to run your protected area are outlined. Headquarters facilities, vehicles, equipment, and maintenance requirements are the types of issues of concern in this programme.

Step 10. Prepare Integrated Development Options. This step in the management planning process now summarises all the physical facilities that must be developed to accomplish the various management programmes. The team may wish to present various development options and present the engineering and construction implications.

Step 11. Outline Financial Implications. No plan can be evaluated if the costs of the planning proposals are not given, at least as general estimates. In some cases, the economic justifications will need intensive treatment in a cost/benefit analysis. In any case, the planning team must now present the cost estimates of their proposals.

Step 12. Prepare and Distribute a Draft Plan. Before proceeding to the final steps, this step is a useful point at which to obtain feedback on the team's progress to date. Therefore, a rough first draft of a plan is compiled and distributed to the range of actors that are key to the success of the plan. This will include those within the agency and may also involve many individuals and groups from outside the agency depending on the public involvement policy followed.

Step 13. Analyse and Evaluate the Plan. After digesting input from the previous step, the team is now in a position to narrow its options. A final review of all development proposals is made and given approval by senior management.

Step 14. Design Schedules and Priorities. As the plan is now set to be finalised and put in motion, the team decides on the timing and priorities of each event. It is important that a formal approval is then presented to the Director for his signature.

Step 15. Prepare and Publish Final Version of Plan. With authorised approval of the Director the final plan is produced, published and distributed in a form to reach a general audience. Copies of the document should be given to political leaders, ministry officials, and related government departments, regional councils, international agencies, scientific personnel involved in research and monitoring, and to appropriate public interest groups.

Step 16. Monitor and Revise the Plan. Plans soon need revision as new information becomes available and basic conditions change. Thus a five-year planning horizon is often used as a realistic lifespan for a management plan. A review of the plan at intervals is thus the final step in this idealised process. You need not wait five years for review. Review may take place more frequently, but in each case, always planning five years into the future.

4. SAMPLE TABLE OF CONTENTS: PROTECTED AREA MANAGEMENT PLAN

The preparation of a management planning document is the major output of the management planning process. A sample outline of a planning document is included here to reflect the general layout of a typical plan.

PROTECTED AREA MANAGEMENT PLAN: A SAMPLE TABLE OF CONTENTS

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List of figures and tables
List of appendices

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Introduction	Location Legal Description and Overview

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National Context (Summaries only)
National Objectives for Conservation
National Strategy and System for Conservation Units
Biogeographic Provinces, Physical and Biological Regions
National Transportation System

Regional Context (Summaries Only)

Biophysical Features

1. Topography
2. Watersheds and drainage patterns
3. Water
4. Climate and weather
5. Geology and Geomorphology
6. Soils
7. Vegetation
8. Fauna
9. Role of fire (or other major natural influence)
10. Critical areas and special considerations

Cultural Features

1. History
2. Archaeology
3. Anthropology
4. Contemporary culture

Socio-economic Features

1. Regional Economy and land use
2. Demographic Characteristics
3. Regional transportation system
4. Tourism, recreation, and existing infrastructure

Chapter 2. Resource inventory and analysis (Summaries Only)

Biophysical Features

1. Topography
2. Watersheds and drainage patterns
3. Water
4. Climate and weather
5. Geology and Geomorphology
6. Soils
7. Vegetation
8. Fauna
9. Role of fire (or other major natural influence)
10. Critical areas and special considerations

Cultural Features

1. History
2. Archaeology
3. Anthropology
4. Contemporary culture

Socio-economic Use of the Area

1. Present land use and trends and regional integration
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Limitations and Constraints
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Intensive use zone (concentrated use)
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Chapter 4. Management programmes

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2. Public Use Programme
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   b) Interpretation
   c) Education
   d) Tourism
   e) Public Relation and Extension
3. Operations Programme
   a) Administration
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4. Research and Monitoring
   a) Management-oriented research needs
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5. Integrated Development Programme.
   a) Development Areas
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6. Development Schedule
   d) General Development Map
   e) Financial Implications
   f) Summary of Benefits

Literature Cited

Appendices

Budget
Law creating area
Species checklists
Supporting maps

Management of Chiltan-Hazarganji National Park in Baluchistan

Muhammad Rafiq

ABSTRACT. *This paper describes the management activities in Baluchistan's Chiltan-Hazarganji National Park. In order to protect the wildlife resources of the park, the entire area has been fenced; a remarkable recovery of the vegetation and wildlife has been noted. Habitat enrichment, supplemental feeding, and development of additional water holes have also enhanced the carrying capacity of the park. Future activities will include research, training of park officials, and relations with local people.*

1. INTRODUCTION

The Chiltan-Hazarganji National Park in the western province of Pakistan called Baluchistan is located Southwest of the provincial capital of Quetta at a distance of 20 km on Quetta-Kalat-Karachi highway. Total area of the national park is 13,761 ha. The park is comprised of two contiguous parts: Chiltan and Hazarganji. Chiltan was declared a protected forest in 1964 and is 10,368 ha in size. Hazarganji State Forest was designated as early as 1890. The forests are separated by the dividing line of the Chiltan Hills. Altitude ranges between 2,021 and 3,264 metres above sea level with Chiltan Peak as the highest point.

Physically, the park area is mountainous with precipitous slopes intercepted by ravines. Bedrock is sedimentary limestone and the soil on the flats is sandy loam. The mean annual precipitation is 200-225 mm, most of which is received in winter. Higher elevations get snow which remains until the end of March. Precipitation generally is very erratic and drought cycles are not uncommon. Temperatures reach 40 degrees centigrade in summer and drop to about -12 degrees centigrade in winter.

2. FAUNA AND FLORA

A comprehensive inventory of fauna of the national park has not yet been attempted. Chiltan markhor is the most important species from a utilisation point of view. A small number of Suleiman markhor and Urial are also found. Hyaena – a predator species – has also been seen.

Common birds of the area include such game birds as chikor and seesee. Reptilean fauna is very interesting as a variety of snakes and lizards is found.

The Botany Department of the University of Baluchistan has listed about 225 plant species in a preliminary survey.

3. MANAGEMENT OBJECTIVES

Chiltan-Hazarganji National Park was established in 1977 with the following objectives:

- to provide protection to wildlife – especially Chiltan markhor and birds against poaching, hunting, trapping, and grazing;
- to improve habitat and facilitate multiplication of wildlife
- to improve the aesthetic value of the area for countryside recreation for the residents of Quetta;
- to provide a study area for biologists;
- to train staff in park and wildlife management; and
- to arouse public awareness in nature conservation.

In management the emphasis so far has been on protection, fencing the entire national park area. This has improved the habitat and vegetation cover has visibly increased, leading to an increase in the number of Chiltan markhor from 80 in 1978 to 225 in 1983. Increase in numbers of chikor and seesee are also evident, which give an indication of improvement in the habitat.

Other activities undertaken to improve the habitat include planting of fodder trees and high yielding nutritious range grasses on the flats, providing supplemental feed during drought years, and provision of dams and water points. For effective patrolling as well as for recreation, a jeepable road along the periphery of the park has been constructed.

4. FUTURE STRATEGY

There is a need to design and implement a research project aimed at estimating the carrying capacity and quantifying the impact of increased vegetative cover on the faunal population. However, surveys would take time, and the Forest Department is currently considering extending the national park area to about 150,000 ha. Such a step would likely be in conflict with the interests of the human population living in and around the area.

The Wildlife Management Board of Baluchistan is attempting to address this problem by involving these people in the decision-making process. The general practice in Baluchistan is to allow certain rights of people like labour rights, right to remove dead and fallen trees, rights of way and rights to Government jobs. As long as conservation values of the park are not reduced, this policy fosters co-operation of the affected interests.

Finally it is essential to strengthen technical expertise by overseas training in wildlife and parks management. In addition, it is also essential to create a separate wildlife wing in the province to manage national parks, protected areas and non-commercial forest areas to more effectively address our conservation problems.

Management of Chitral Gol National Park, Pakistan

Muhammad Mumtaz Malik

ABSTRACT. *This paper describes the management of Chitral Gol National Park, which is designed to deal with problems of land tenure, livestock grazing, firewood collection, and poaching. The government has made a major investment in protecting the area from these threats, which has also required purchase of private lands, provision of jobs, and increased timber quotas. Future developments will include improved roads and rails, new infrastructure, increased staff, and enrichment planting of native species.*

1. INTRODUCTION

Chitral Gol National Park (7,780 ha), is located in Chitral, the northernmost district of Pakistan's Northwest Frontier Province. The district as a whole is a mountainous area comprising the high mountain ranges of the Hindu Raj and the Hindu Kush. Like all the side valleys in Chitral, the Chitral Valley is narrow and deep at its outlet near the town. It runs as a gorge for 6 km and then gradually widens until it opens into a basin surrounded by high peaks. Numerous side valleys also open into the main Chitral Gol Valley (in Chitral language "gol" means a stream, its watershed or a small valley).

The Park consists of high, rugged and steep mountains, varying in altitude from 1,450 to 4,865 m: 24 peaks exceed 3,000 m. The parent rock comprises shale and limestone. Glaciers and frequent landslides resulted in the accumulation of scree and moraine at the foot of the mountains. Steep slopes and high peaks are almost devoid of soil, while valleys have fairly deep and fertile soil.

The climate is dry temperate. The high peaks receive snow in September which descends to the valley floor in December, where it stays until March. At higher altitudes the snow stays until June. There is no meteorological station within the park. However, the climatic data recorded in the nearest town, Chitral, indicates a mean annual temperature of 16.8 C., the maximum being 43.3 C and the minimum 12.2 C. The mean annual rainfall is 462 mm, the highest and the lowest records being 675 mm (1931) and 218 mm (1905).

2. FLORA AND FAUNA

Chitral lies beyond the influence of monsoons. The limited rainfall has resulted in the establishment of flora of dry temperate type. Up to an elevation of about 2,400 m, the vegetation consists of oak forests *(Quercus ilex)*. Higher up this type merges into temperate coniferous forest with the addition of *Cedrus deodar* and *Pinus gerardiana*. Still higher, this type grades into dwarf juniper scrub.

Snow leopard, black bear, wolf, markhor and urial are the major mammalian species found in the park. Noteworthy bird species include snow cock, monal pheasant, chukor and green wood pigeon.

The snow leopard does not appear to be a permanent resident of Chitral Gol, visiting the park occasionally, staying for a few days and then abandoning the area; a female snow leopard which entered a house in upper Chiltral in March, 1985, was captured and released in the national park. The population of black bear in the park is also very low; about four bears occasionally frequent the park from the adjoining Kalash valley. The population of wolves varies with the season; they used to frequent the park in summer when herds of livestock grazed in the alpine pastures, but after restrictions on grazing, wolves are sighted less frequently.

Markhor is the principal game animal in the park with a population estimate of 650. In winter they remain confined to the lower altitudes where oak trees are available for browse, but in summer the markhor move towards alpine pastures in the higher reaches of the park; some of them also migrate to the adjoining Nooristan province of Afghanistan. Urial are only rarely sighted in the park area, with a population not exceeding twenty.

The Himalayan snow cock is usually seen on the high rocky ridges. There is some altitudinal migration with the fall of heavy snow, but the bird seldom descends to the bottom of the valley. The monal pheasant was once common in the higher reaches of conifer forests in Chitral but has been virtually exterminated from most of its habitat; a remnant population is present in the park near Kasavir which may act as a nucleus for further propagation of the species. Big flocks of chukor are often seen on the barren hill slopes of the park in the early morning and afternoon. The park supports a significant population of green wood pigeons. Large flocks of these birds are often seen searching for food on the forested hill slopes.

3. PARK MANAGEMENT

The objectives of management of Chitral Gol are to:

- Protect and preserve indigenous flora and fauna along with the landscape features in their natural state to act as a natural museum and nucleus for the propagation of wildlife.
- Manage wildlife populations, particularly the markhor, and forage/fodder species within the park area to maximise their production.
- Maintain the park as a representative ecosystem which is unique in the province.
- Develop facilities for the tourists and researchers to encourage study of flora and fauna and to promote the cause of nature conservation through increased awareness and involvement of people.

Since 1971 when Chitral Gol was declared a wildlife sanctuary, the management authorities have been confronted with a number of management problems including land tenure, livestock grazing, firewood collection, and poaching.

3.1 *Park land tenure*

Chitral Gol was the property of the Methars (local rulers) since the beginning of their rule over Chitral in the 16th century. The inhabitants of the adjoining villages had customary concessions for grazing livestock in the valley and collection of firewood. After the end of the British Raj in 1947 the state opted to join Pakistan, but the ownership status of Chitral Gol remained unchanged until the merger with Pakistan was complete in 1969. In the absence of a decision regarding the ownership of land, the Forest Department, which was the agency for wildlife protection, could not exercise full powers in the area. In 1975, the government declared all the mountains, forests, rangelands and hunting preserves in Chitral to be state property; however, the cultivated lands in these areas continued to the private property of the owners. By virtue of this decision the entire Chitral Gol became the property of government, with the exception of 8 ha of cultivated land along with several houses which remained the property of the ex-Mehtar.

This decision enabled the Forest Department to exercise better control over the area and its wildlife. However, the private land of the ex-Mehtar, in the form of small scattered pieces, was a constant source of disturbance to wildlife as five families lived in the park along with 40 cattle and 500 goats; timber and firewood for these families also came from the park.

3.2 *Grazing rights and concessions*

The District of Chitral is an underdeveloped area and the people depend upon subsistence agriculture and livestock rearing for their livelihood. Rearing of cattle for ploughing the lands and production of dairy products is an essential activity. People also rear sheep and goats for domestic and commercial purposes but the productivity of this livestock is low due to scarcity of forage and fodder. Being situated outside the influence of monsoons, the district does not receive sufficient rainfall and consequently the vegetation cover on the hills is limited. There is thus competition for good pastures and people in different villages have specific grazing grounds over which they have customary rights.

There are seven villages with 300 families situated around Chitral Gol. The inhabitants of these villages enjoyed grazing concessions in the summer pastures of Chitral Gol. Taxes were paid to the Mehtar in the form of goats or dairy products.

The merger of state in 1969 opened the area to public use and until 1975 there was heavy grazing and wood-cutting pressures all over the district. There were two categories of livestock grazing in the park area: regular and seasonal. Regular livestock consisted of 40 cattle and 500 goats which grazed in the lower ranges during winter months and migrated to the upper summer pastures in June. Seasonal livestock consisted of 100-150 cattle and 3,000-4,000 sheep and goats which foraged in the alpine pastures from June until September. All this livestock had heavy impacts on native flora and fauna. Cattle, though they do not compete much with wildlife for forage, cause heavy damage to vegetation by over-grazing, compaction of soil and soil erosion; they also trample seedlings which results in poor forest regeneration. Sheep and goats also affect vegetation adversely by over-grazing. Aleem (1977) compared vegetation in grazed and un-grazed areas in Chitral Gol and found that the forbs had a greater cover (78 per cent) in the grazed area and less (63 per cent) in the un-grazed area as compared to more palatable grasses. The presence of unpalatable forbs and shrubs was relatively higher in the grazed area and palatable perennial grasses were more common in the un-grazed areas. As a result of heavy browsing by goats and lopping of branches by the herdsmen, the leaves of *Quercus ilex* which is the preferred fodder tree, had become thorny and unpalatable.

In Chitral Gol there is heavy competition for food between livestock and the wildlife. Forage taken by goats and sheep is almost the same as that relished by markhor, but the livestock outnumber markhor by 6 to 8 times. In summer, herds of livestock compel the markhor to retreat to highly secluded corners or roam over a great area in search of food. Often they would move outside the park and get taken by hunters. In winter, when oak is the only available food source, the markhor suffer even more. In this limited area, 500-700 goats browsed almost every oak tree under the vigilant eye of the shepherd, who also lops branches. Under such conditions markhor remain in the upper reaches in the conifer forests before browsing early in the morning or late in the afternoon, before the arrival and after the departure of livestock.

3.3 *Concessions for collection of firewood*

In Chitral, firewood is one of the most important basic necessities. Non-availability of gas and a limited supply of electric power has placed a heavy demand on forests for firewood and the vegetative cover is decreasing at an alarming rate. In upper Chitral very little woody vegetation remains and locals can be seen digging hill slopes in search of old roots. They are less worried about the future hazards of erosion, or landslides than they are with the present priorities of eating cooked food and keeping warm.

People of the villages adjoining Chitral Gol also had concessions for collection of firewood from the park area for their domestic use. These were limited to dry firewood lying on the forest floor but the concession-holders felled green trees as well. Maximum damage was sustained by oak trees which are considered good firewood. The destruction of vegetation continued in Chitral Gol until 1983. The lower reaches of the habitat within three kilometres of Chitral town were devastated while dry fallen wood still covered the forest floor beyond Meeran. Habitat destruction forced the wild animals to restrict themselves to the interior of the park. Continuation of firewood collection would mean clear felling of the oak trees and consequent starvation of markhor and adverse affects on the soil.

3.4. *Poaching*

Poaching has always been a serious problem in Chitral. The large size of the area meant that adequate protection could not be given with the result that markhor and ibex were heavily poached.

Chitral Gol was declared a private hunting preserve in 1880 when Mehtar Aman-ul-Mulk issued certain instructions for its management (Khan, 1974). The area was closed to shooting except for the ruling family; punishment of poachers was quick and severe and poaching was controlled. During the period 1898-1941 a number of rules were made to regulate hunting with respect to species, age, and number of animals to be hunted in the hunting season (Khan, 1974), but none of these rules were ever implemented in Chitral Gol.

The rulers had constructed an excellent bridle path through the valley and built two shooting huts 8 km apart. The hunting, however, was indiscriminate. Like many Rajas and Maha-Rajas, the Mehtars used to kill as many animals as they could; in 1934, for example, the Mehtar shot sixteen markhor in Chitral Gol on a single day (Khan, 1974).

The incorporation of the state in the general administration of the country in 1969 opened the area to poachers and the wildlife population dwindled to such an extent that in 1970, only 100-125 markhor remained (Schaller, 1980). Alarmed by the situation, Commission of the Division declared Chitral Gol a wildlife sanctuary, which it remained until 1984. During this period the wildlife in the sanctuary increased significantly and the present markhor population is estimated to be 650. Although the park is now safe from poachers, animals which cross over to adjoining unprotected areas are still hunted.

4. CURRENT MANAGEMENT PRACTICES

The main factor in the management of Chitral Gol National Park is the understanding that it is a unique ecosystem in Pakistan which has to be conserved. Therefore, the government has adopted the following management practices:

Protection of the park against poaching has been given priority. One Deputy Ranger, one Head Wildlife Watcher and twelve Wildlife Watchers have been employed to protect the park. Some of them have been provided with binoculars. This staff has been accomodated within the park and is vigilant around the clock. A Divisional Forest Officer (Wildlife) is headquartered at Chitral town and administers all the activities in the park. Wildlife offences are reported to the district Magistrate for trial. Property involved in the offences is seized until the decision of the court is made. In order to involve the public in the conservation programme, honorary game wardens have also been appointed.

The government has also decided to acquire the private lands and houses in Chitral Gol. The tenant families residing in the park were ejected in December 1984 along with their livestock. The government has also withdrawn all firewood concessions from the inhabitants of the villages around Chitral Gol and they have been asked to select other areas to meet their requirements. At present the park is free of all interference caused by human settlements, agriculture, grazing, firewood collection, and poaching.

5. COMPENSATION TO THE PEOPLE

The NWFP government has taken the following steps to compensate the people affected by acquisition of private lands and houses in Chitral Gol National Park and withdrawal of concessions for grazing of livestock and collection of firewood:

- 2.1 million rupees is being paid for acquisition of the private land and houses in Chitral Gol.
- The annual timber quota of the inhabitants of villages around Chitral Gol has been enhanced by 12,000 cft over and above their normal share. This timber is sold by the Forest Department and the sale proceeds are handed over to the Deputy Commissioner of Chitral for distribution among the affected people through a committee of their representatives.
- Preference is being given to former residents of Chitral Gol for job opportunities in the national

park. Of 14 persons employed in Chitral Gol, 10 are from the local villages.

- Nine bio-gas units will be installed in these villages to overcome shortages of fuelwood. The villagers already have electric power from a nearby power station.

- As a special favour all the offence cases relating to illicit grazing pending against the inhabitants of the area have been withdrawn.

6. FUTURE DEVELOPMENT PROGRAMME

It is proposed to launch a special project for the development of the national park during 1985-1986. This programme will cost 4.8 million rupees and will continue until June 1988. The major features of the programme are:

- A 10 km road on the northern ridge of the park will be improved and made jeepable up to Kasavir top. Another jeep road 11 km long will be constructed on the southern ridge. Construction of these roads will facilitate monitoring of the park and provide an easy approach for visitors to the periphery of the park where they can easily walk in.

- Seventeen km of existing paths will be widened and improved and another 10 km of new paths will be constructed to facilitate movement of visitors.

- Six huts will be constructed at suitable points to house wildlife watchers and visiting officers.

- Two tourist huts will be constructed at suitable points.

- Managerial and protective staff will be increased.

- It is proposed to carry out planting of oak and to cultivate winter green legumes in the newly acquired agriculture lands to provide additional forage to wildlife during winter.

In order to guard against the possibility of shooting or poaching of markhor in areas adjoining the park, game reserves will be established to act as buffer zones. A proposal is also under consideration whereby limited hunting of big game will be allowed in these game reserves and a percentage of the fee realised will be paid to the locals as an incentive for wildlife conservation.

Finally, there is a programme for initiating research projects on snow leopard and markhor in the national park in which the US Fish and Wildlife Service and World Wildlife Fund may participate.

The Nature Reserves of China

Li Wenhua

Zhao Xianying

ABSTRACT. *This paper presents basic information on the physiography and natural resources of China, particularly the flora and fauna. The paper also deals with various types of nature reserves in China and highlights achievements in the field of nature conservation. The need for a national scientific classification system for protected areas in China is emphasised.*

1. INTRODUCTION

China is a country with vast territory and a diversified physiographical environment. The distance from east to west measures over 5,000 km. with a total area of 9.6 million square km.

The topographical outline is a three step west-east staircase. The highest step begins from the Chinghai-Tibet Plateau with an altitude of over 4,000 m. above sea level. Crossing the Kunlun and Chilien ranges on the plateau's northern edge and the Hengduan Mountains to the east, the land slopes away to highlands and basins mostly from 2,000 to 1,000 m. above sea level, then it descends further eastward to hilly regions and plains below 1,000 m.

Occupying two-thirds of the total area, China's mountain ranges criss-cross the country in a complex pattern. Varying in physical features, China's plateaus extend over one-fourth of the country. The four major ones are the Chinghai-Tibet Plateau, the Unnan-Kweichow Plateau, the Inner Mongolia Plateau and the Loess Plateau.

China has rich water resources. China's east and south coasts lie along the Pohai, Yellow, East China and South China seas. In the vast seas are scattered more than 5,000 islands.

Tremendous difference in latitude gives China a wide variation of climatic zones with different types of vegetation. From north to south one can see coldtemperate deciduous broad-leaved forest zones, subtropical evergreen broad-leaved forest zones, and tropical forest zones. Owing to the varying degrees of influence of the ocean monsoons, as one travels from east to west, one passes through first the humid, then the semi-arid and finally the arid climate regions with corresponding vegetation: forest, forest steppe, steppe, desert-steppe and desert zones.

Due to the fact that the temperature and the precipitation vary with the altitude, the altitudinal belts are distinguished sharply. In summary, China has almost all the examples of main vegetation types of the northern hemisphere of the world with few exceptions. According to the tentative classification systems there are 10 vegetation types, 29 sub-vegetation types and 70 formations. According to Udvardy's biogeographical classification, which acts as a general framework for planning the international network of biosphere reserves, 192 biogeographical provinces are divided, among which 12 provinces can be found in China. From 14 principal biome types of the world referred to in the classification of Udvardy, 13 types can be found in China.

The flora and fauna are particularly rich in China. It is estimated that there are over 27,000 species of higher plant (including fern) belonging to 353 families and 3,184 genera, of which 190 genera are endemic. There are many rare and precious species as well as pre-tertiary relics which have been long extinct in other parts of the world. This is mainly ascribed to the fact that a large part of China was not extensively covered by glaciers of the Quarternary era and that the NNE and SSW direction of most Chinese mountain ranges provides many refuges for biota. Among gymnosperms there are "living fossils" such as Ginkgo *(Ginkgo Biloba)*, Chathaya silver fir *(Cathaya argygrophylla)*, Metasequoia *(Metasequoia gyptostroboiedes)*, Golden larch *(Pseudolarix kaempferi)*, and Whitearil yew *(Pseudotaxus chienli)*. Among the angiosperms are *Davidia, involucrata, Eucomia ulmoides, Rhoiplera chilantha, Trochodendron aralioides, Tetracentron sinense, Bretschneidera sinense, and Cyclocarya paliurus.*

According to very preliminary estimates, China has 414 species of mammals and 1,175 species of birds. Many rare and endangered animals are being given highest priority for protection. These include Giant panda *(Ailuropoda melansleuca)*, Snub-nosed monkey *(Thinopithecus roxellanae)*, Whitelipped deer *(Cervus albinostris)*, Yangtze

alligator *(alligator sinensis), Panthera tigiris, Crossoptilon mantchuricum, Gius japonensis, Pygathreix namaeus, Cervus nippon, and Equus prezewalskii.*

The total number of aquatic fishes is estimated at about 800 species. One half of these species are endemic. There are many rare fish species and aquatic mammals with very high scientific and economic value, for example: *Lipotes vexillifer, Psephurus gladius, Hucho bleeker, Myxocyprinus asiaticus, Trachidermus fasciatus, Schizothorax taliensis, Anguilla, and Plecoglossus altivelis.*

The rich composition of plants and animals with the combination of environmental factors form a variety of ecosystems with significant scientific, educational, cultural and recreational importance.

The rapid growth of population and unsound exploitation of natural resources have led to hazards and disasters, including deforestation, soil erosion, desertification, ecosystem degradation and destruction and extinction of a variety of species. This situation underlines the need for strengthening the conservation of nature and natural resources. While the rapid growth of population and the development of technology are making an ever-increasing impact on the biosphere, natural ecosystems and a large number of species have become extinct.

2. PROTECTED AREAS

In order to conserve the diversity and integrity of biotic communities of animals within natural ecosystems, as well as to provide areas for ecological and environmental research and education, a series of protected areas have been established since 1956.

By the end of 1982, China had established 119 nature reserves. (Li Wenhua and Zhao, X 1984: 26) (See Table 1 for current numbers and types of nature reserves). These reserves include: representative examples or typical natural landscapes and their ecosystems in different geographical zones; the habitats of threatened and endangered plants and animals; places with outstanding features such as craters of volcanoes, and spectacular waterfalls as well as geographical profiles; areas for the protection of natural species and scenic spots of national or international significance; and other places with special scientific, educational and recreational interest.

In the meantime, most of the nature reserves have established organisations with staff members for management. Scientific research has been carried out in about one-fourth of the nature reserves. Several symposia on the planning and management of nature reserves have been held, and these have promoted research work on nature reserves in China. On the other hand a series of laws for nature reserves have been published by the government of China; for instance, "Guidelines for Protection and Rational Utilisation of Wild Animals", "Forest Law of the People's Republic of China", "Law of Nature Conservation" and "The Strategy of Nature Conservation of China".

Table 1. Categories and Numbers of Protected Areas.

Category	*Number*
1. Biosphere Reserve	3
2. For the Protection of Complex Ecosystem	23
3. For the Protection of Rare and Precious Animals	38
4. For the Protection of Precious and Extinct Plants/Vegetation Types	34
5. For the Protection of Natural Landscapes	11
6. For the Protection of Special Geomorphological Forms and Geological Sections	4
7. For the Protection of Coastal Environment and Natural Resources	9
Total Protected Areas	122

In order to promote international co-operation and exchange of information with other countries, Changbai, Wolong and Dingbu Reserves were included in the international network of biosphere reserves under the framework of MAB, UNESCO. A draft list of 290 threatened plants was prepared in 1981. All these activities marked a new development in nature conservation in China.

At present, the existing nature reserves cover an area of 8 million hectares which is about 0.8 per cent of the total area of China. There is a plan to enlarge this to 500 nature reserves with 16.84 ha. and 1.75 per cent of the total land area before the 2000 decade.

Analysis of the coverage within the network of nature reserves reveals that more than 95 per cent of the nature reserves are distributed in forest regions, whereas less than 5 per cent are in another type of vegetation.

Serious gaps exist in the desert, steppe, alpine plateau and marine ecosystems. Presently, an attempt is being made to distribute the nature reserves to cover different ecosystems.

On the other hand, most existing nature reserves belong to the representative examples of natural biomes and unique communities or areas with unusual natural features of exceptional interest. However, examples of harmonious landscapes resulting from traditional patterns of land use, as well as the examples of modified or degraded ecosystems capable of being restored to more natural conditions, to a certain extent are still ignored.

So far, we have no rational scientific classification system for nature reserves in China. In fact, the nature reserves of China fall into different categories. It is necessary to make an appropriate and scientific classification system for nature reserves in China.

We have to strengthen the role of nature reserves from the aspect of science and education. Full use of all

kinds of media such as booklets, newspapers, photographs, films, television, slides, videotapes, and radio broadcasts, to give education to the people and course preparation in nature reserve conservation for schools are essential. Meanwhile we still have to maintain a rational management relationship between concerns such as conservation and tourism, and conservation and production.

In general, we have made some progress in the establishment and management of protected areas in China. We still have a long way to go for the further achievement of conservation.

The Fragile Mountain Revisited: Nepal's Agenda for Halting the Slide

Hemanta R. Mishra

ABSTRACT. *This paper documents the conservation problems besetting Nepal, many of which stem from social and economic woes. As a result of deforestation and poor land use practices, Nepal has been losing precious ground and valuable time in a race against ecological ruin. The paper also introduces several concrete programmes for reversing these negative trends. One of the brightest hopes is the newly created King Mahendra Trust for Nature Conservation, an environmental agency dedicated to the preservation of Nepal's natural heritage. Another important mission of this non-profit organisation, unique in the Third World, is to promote economic opportunity through projects that require conservation of natural resources. Under the shadows of their fragile mountains, the Nepalese are now realising that ignoring ecological imblances makes economic development impossible.*

1. INTRODUCTION

Ten years ago, it was difficult to convince bureaucrats and planners that environmental conservation and human welfare are intimately linked. "Conservation programmes", they often replied, "are fine for rich Western nations, but inappropriate in destitute countries struggling to promote agricultural and industrial production." During the last decade, with increased soil erosion, floods, and famines in the Himalayan zone, the number of sceptics decreased.

Today, most Nepalese need little convincing. During the past rainy season the capital city of Kathmandu was completely cut off from the only two commercial routes linking it with the south. Several days of torrential rains triggered floods that swept away several key bridges and caused landslides that blocked highways. In many parts of the country, houses were washed away and this led to deaths by drowning of a number of villagers and livestock. Rivers ruined farmland and rice crops that were about to be harvested. Such ravages during the rains can only be expected to increase in severity if watersheds remain unprotected, spelling economic decline for the whole region if timely conservation measures are not taken.

The Himalayan Kingdom of Nepal serves as an appropriate site to demonstrate the principles of conservation for sustainable development. The crucial task is to bring about a delicate balance between meeting the needs of an expanding population and preserving a fragile environment (Shah, 1984a).

This landlocked country of incomparable natural beauty is also one of the world's poorest. Here, the plethora of environmental problems is staggering. Population growth is one of the highest in the world. Two-thirds of the people dwell in climatically hostile and rugged mountainous terrain that produces only one third of the food required. Each year, the four major rivers with over 6,000 tributaries export 240 million cubic metres of Nepal's precious soil into the Bay of Bengal (Joshi, 1981). Yet it is one of the few developing countries where both the leadership and the people understand the urgency for nature conservation. For example, the Kingdom of Nepal has achieved remarkable success in creating an extensive network of national parks and wildlife reserves in less than 15 years. Much of this work, however, will be undone if conservationists fail to grasp that without meeting the basic needs of the food, fuel, fodder, and shelter for impovershed farmers outside the park boundaries, there may be no wildlife left inside (Sherpa, 1979; Milton and Binney, 1980; Mishra, 1982; Hinrichsen *et. al,* 1983; Mishra, 1984).

The aim of this paper is to illustrate the harsh socio-economic realities in contrast to the abundance of natural resources in Nepal. It documents Nepal's efforts in attaining the objectives prescribed in the *World Conservation Strategy* (IUCN, 1980). Finally, this paper highlights the creation of a unique institution dedicated to promoting local development through conservation, the King Mahendra Trust for Nature Conservaion, and discusses the agenda which is designed to meet its goal.

As will become clear, Nepal's environment is in a precarious state, like a Himalayan forest perched on a precipitous mountainside. It is the task of the King Mahendra Trust and other agencies to halt the slide that jeopardises Nepal's future.

2. THE SETTING

The Kingdom of Nepal is a land of unique ecological contrasts. Within a short span of about 200 km, the

altitude varies from less than 100 m above mean sea level to the highest point on the Earth's surface (8,848 m) and contains some of the most outstanding natural areas in the World.

The country's 147,000 sq km include four distinct ecological zones. Approximately 23 per cent of the area is composed of the hot and humid lowland Terai, an extension of the fertile Indo-Gangetic plains. The midlands, a central region of rugged mountains and terraced farmlands, cover nearly 44 per cent of the land. The rest of the country is dominated by the Himalayas, a largely uninhabitable area of boundless energy with permanent snow, and the Trans-Himalaya region, characterised by the treeless steepes of the Tibetan plateau.

These extremes are enriched by a diverse fauna and flora perhaps unparalleled at this latitude. The Oriental and the Palaearctic fauna merge here. Nepal, as a transition zone between these two biogeographic realms, provides a natural laboratory for testing ideas of zoogeography. Nearly 100 mammalian species have been reported from Nepal (Mishra and Mierow 1974). Nepal is also regarded as an ornithologist's paradise as over 800 species occur here, more than half of all the species recorded for southern Asia (Fleming et al. 1979).

Unfortunately, less is known about the wealth of plant life in this landlocked country. Over 5,000 species have been listed of the angiosperms alone. This is almost two and half times greater than the number reported from the United Kingdom, even though Nepal is less than two-thirds the size of Britain (Shrestha 1983). Many of these plants are increasingly in demand by pharmaceutical companies for their medicinal value. Nepal's endangered flora also represents a reservoir of genetic materials that can be exploited to develop or improve food, fodder, or fuelwood crops. The loss of irreplaceable plant communities and the wildlife they support is a tragic loss of Nepal's natural heritage. But this is by no means the only justification that merits their conservation. Another practical reason for taking action before it is too late is Nepal's growing dependence upon wilderness-oriented tourism to generate revenue and employment in rural and remote parts of the country.

3. THE SOCIO-ECONOMIC SCENE

3.1 *The human dilemma*

The United Nations has classified Nepal as one of the least developed of the developing countries (LDC). The population is currently 16.6 million and is increasing at an alarming rate of 2.6 per cent. Thus, the population which had taken 60 years to double by 1971 may now take less than 27 years to double again. Nearly 40 per cent of the population is less than 15 years of age. The density is 472 persons per sq km of cultivable land. More than 90 per cent of the people are subsistence farmers who depend upon depleted forest for fuel, fodder and water (ADB, 1982).

The fertility rate is one of the highest in the world as it is common for a woman to have 5 to 7 children. Family planning programmes have been quite active, yet only 17 per cent of families practice birth control. Infant mortality is 133 per 1000 live births and life expectancy is 44 years. Adequate health care is unavailable for most Nepalese; there is one doctor for every 32,000 persons and one hospital bed for every 5,000 (ADB, 1982; Bhattarai, 1983).

Despite government efforts to provide free primary education to all children the literacy rate is a mere 23 per cent (Manandhar, 1982). Only half of the eligible primary school-aged children enroll in schools, even though education is free.

With the exception of tourism, industries are extremely underdeveloped; they employ about 60,000 people and provide only 4 per cent of the Gross Domestic Product (GDP). Although the government has heavily emphasised cottage industries, their average turnover is merely $150 per annum. The per capita income of $120 per annum is one of the lowest in the world (Manandhar, 1982; ADB, 1982). Nearly 65 per cent of the 1.3 million rural labour force is unemployed or under-employed (ADB, 1982). In spite of these hardships, outsiders regard the people of Nepal as hard working, friendly and tolerant. The Kingdom's Tibeto-Burman and Indo-Aryan ethnic groups form a mosaic of rich and diverse cultures that still flourish today (Bista, 1967).

3.2. *Land-use pattern*

It is an unfortunate paradox that over 90 per cent of the people live off the land in a country where only 20 per cent of the area is ecologically appropriate for farming (Bhattarai, 1983). In comparison to other mountainous countries, the patterns and trends are more of abuse rather than use of land. Definitive data on the tenure system do not exist and land capability surveys have not been undertaken. Nevertheless, figures obtained from the National Planning Commission (NPC, 1981) indicate that at present, 29 per cent of the land is forested and 22 per cent under agriculture. Natural pasture occupies 13 per cent while 18 per cent is classified as barren. Water bodies, including the large snow-fed rivers, form 3 per cent of the surface area. Urban areas occupy a mere 0.2 per cent of the land whereas the gigantic peaks with permanent snow command 15 per cent of the total land mass of Nepal. But, the most alarming fact is that forests are being destroyed at a rate of nearly 3 per cent per annum.

3.3. *The food situation*

Between 1975 and 1980, a total of 15,000 sq km of natural habitat, including 7,000 sq km of highly prized

virgin forests, were converted to agricultural use (ADB, 1982). However, during the same period the per capita food production decreased because the population exploded. In 1980, grain production increased by 3 per cent and the population increased by 14 per cent. It has been estimated that by the year 2020, the population will have expanded by over 50 per cent, whereas the grain output will increase by only 5 per cent (NNCS, 1983).

The livestock situation at present is also not encouraging. It is estimated that there are 14 million head of hoofed stock in Nepal. Although they contribute 15 per cent of the GNP, they consume 50 million tons of green plants and most of the new growth of fodder plants (Bhattarai, 1983). Yet, over 50 per cent of the cattle may be suffering from diseases or malnutrition and many have become feral.

3.4. *The state of the natural environment*

It is worth reiterating that it took only 5 years to lose 15 per cent of Nepal's forests (ADB, 1982). This, combined with the cultivation of slopes of over 30 degrees or land with thin soil depth, and augumented by heavy monsoon rains, has triggered the processes of erosion. Soil loss per annum is estimated to be between 20 and 50 tons per hectare. This is 20 times more in weight than the amount of rice produced from the same amount of land (NNCS, 1983). Though some of the erosion could be attributed to the geologically young mountains, over half is caused by human activities (Joshi, 1981). Soil loss from overgrazed pastures is estimated to be nearly 40 metric tons per annum and the top soil on crop lands is being reduced at a rate of 25 tons per hectare per year (Bhattarai, 1983).

In the energy sector, the fuelwood crisis in Nepal is well publicised as 97 per cent of the people use fuelwood for cooking (Eckholm, 1976; Joshi, 1981). Statistics on supply and demand indicate that the deficit averages out to 5.1 million cubic metres of wood. As more trees are cut from the reserve forests, the country will suffer from a wood shortage by the turn of the century (Upadhyaya, 1981).

The demand for commercial timber is expected to increase from 292,000 cu m in 1980 to 736,000 cu m in the year 2000. The loss of these renewable resources, which during 1980/81 alone contributed $16.3 million in export earnings (ADB, 1982), will have grave economic consequences. It may not be long before Nepal becomes heavily deforested and a net importer of timber.

The government's efforts to improve human welfare are strained by the miseries caused by recurrent disasters such as floods and landslides. Sediments carried by the numerous rivers and streams are causing riverbeds to rise 15 to 30 cm anually (ADB, 1982). Twenty years of data on natural calamities indicate that there is an average of one major disaster each year that kills over a thousand people (Earthscan, 1984). Other accounts reveal that at least two large hydro-electric turbines, several kilometres of highways, and a number of bridges were washed away during the last 5 years. These consequences resulting from the degradation of the environment are not the only ones that impede human prosperity.

4. POSITIVE TRENDS IN CONSERVATION

4.1 *An overview*

Despite the pessimistic outlook for conservation and economic development, few other developing countries can match the optimistic trends prevailing in Nepal at present. Largely due to the well-publicised concern of His Majesty the King of Nepal, planners and decision makers are realising that conservation and economic development are inseparable. International aid and concern for Nepal's environmental issues have augmented further awareness.

Since 1973, a total of 11 sites covering approximately 6 per cent of the country's surface area have been declared as National Parks or equivalent reserves. Even at an early stage, His Majesty's Government of Nepal (HMG) believed that sound management plans cannot be formulated without adequate scientific knowledge and baseline data. Consequently, HMG has collaborated with the Smithsonian Institution, Frankfurt Zoological Society and others in the field of applied ecological research (Mishra and Maskey, 1982; Wemmer *et al.*, 1983). More recently, His Majesty's Government of Nepal has enacted a soil and watershed conservation act to provide legal provisions for preventing man-made erosion. Integrated watershed management projects have been implemented in several major catchment areas by HMG. The United States Agency for International Development (USAID) has supported more than a dozen programmes that include soil conservation, watershed management and projects that monitor changes in the environment (Joshi, 1981). With technical assistance from the Food and Agricultural Organisation of the United Nations (FAO), community plantation projects have been launched in 29 out of the 75 districts of Nepal.

The role of the Family Planning Association of Nepal is not only to distribute free condoms and birth control pills. They have also been actively involved in planting fast-growing fodder trees under the aegis of World Neighbours of the United States. In addition their projects aim at providing economic incentives to raise the standards of rural women.

The air is clean and water plentiful, apart perhaps, from the expanding city of Kathmandu. The panoramic spectrum of natural scenes combined with an exotic cultural heritage are Nepal's biggest assets in these days of international tourism. Consequently, the number of visitors, contributing more than one-third of the country's foreign exchange earnings, has currently peaked to over 160,000 from a few hundred in the sixties. Nature-oriented tourism supports more than 50 companies that employ over

1,000 permanent staff and are supported by 5,000 to 7,000 seasonal field staff. Per capita income of these workers is US$ 290, which is almost two and a half times more than the national average (Shah, 1983). Wilderness-oriented tourism is the fastest growing industry and is regarded as a potential source for generating employment and income in remote parts of the Kingdom. Yet its successes could also be its demise in places such as Sagarmatha (Everest) National Park (Hinrichsen *et al.*, 1983; Hillary, 1983; Mishra, 1983). Fortunately, tourism authorities are learning that nature conservation is the only insurance against killing the goose that lays the golden egg (PATA, 1983).

In addition to the unmeasurable scope for hydro-electric power, potential sources of energy other than wood are substantial. Government plans are increasingly encouraging the development and use of bio-gas and solar energy (RECAST, 1981).

The government is stable and Nepal's image as a zone of Peace and Tranquility is recognised on the international scene. This alone warrants international support as neither conservation nor development programmes can survive without peace.

From a short-term point of view, Nepal's initial conservation efforts have been successful. They have at least demonstrated that determined actions by the Government, combined with local and international concern, have restored endangered animal populations and depleted habitat in many parts of the country. Furthermore, the social, economic and environmental realities in Nepal offer an ideal venue to promote the ethics of conservation for development. It was precisely for this reason that His Majesty's Government of Nepal subscribed to the *World Conservation Strategy* (WCS, 1980) at the behest of His Royal Highness Prince Gyanendra. In collaboration with the IUCN, His Majesty's Government has already prepared a prospectus (NNCS, 1983) and is planning an in-depth Nepal National Conservation Strategy (NNCS).

4.2. *The King Mahendra Trust for Nature Conservation*

To execute fully the WCS, efforts of the government alone are not enough in an impoverished country like Nepal. Moreover, in a country where financial resources are limited, every sector claims preferential treatment. These realisations sparked the idea for creating a Conservation Trust. A number of dedicated conservationists from organisations such as the Smithsonian Institution, World Wildlife Fund, IUCN and the International Institute for Environment and Development (IIED) were consulted. By the end of 1982, the seeds finally germinated when the elected legislators passed the King Mahendra Trust for Nature Conservation Act. It is named after the late revered monarch of Nepal, without whose farsightedness, areas such as the Royal Chitwan National Park would have been converted into agricultural land in the early sixties.

The King Mahendra Trust for Nature Conservation is an autonomous, non-governmental and non-profit institution, established for the purpose of conserving natural resources and improving human welfare. It is an action-oriented organisation that aims at striking a balance between basic human needs and the needs of conservation (Shah, 1984). Initially, it will concentrate on raising funds from within and outside Nepal. A unique feature of the Trust is that the Governing Board of Trustees will not only be Nepalese but also authorities from abroad. It is the only non-government organisation to have been created by a special and separate act of the Rastriya Panchayat (Parliament). The gracious consent of His Majesty King Birendra Bir Bikram Shah Dev to be its Patron and the nomination of His Royal Highness Prince Gyanendra Bir Bikram Shah, as the first Chairman, has been a great source of encouragement in attaining its goal.

The goals of the Trust have been broadly defined in the Act (Nepal Gazette, 1983). This includes bringing about attitudinal changes in the masses through conservation education and by implementing programmes that involve participation of the local people (Shah, 1984a). It will work in close collaboration with His Majesty's Government and foreign aid agencies. The Trust supports field projects that the government or others are unable to fund or execute. They include research and development of alternative energies besides fuelwood; launching of an effective conservation education and publicity campaign; applied ecological research and captive propagation of endangered species (Rana *et al.*, 1984). Above all, its target is to implement programmes that support the ethnics of conservation for sustainable development as outlined in the *World Conservation* Strategy.

The King Mahendra Trust is a novel concept for a developing country like Nepal. Its success will have immense demonstration value for other Third World nations. As a body adhering to the basic policy of an NGO, some of its characteristics are bound to be unorthodox (Rana *et al.*, 1984). However, the motive behind the creation of the Trust is to ensure that conservation programmes are pragmatic and in harmony with Nepal's overall development goals.

5. DISCUSSION

Environmental problems breed from seeds of a diverse nature: population growth, poverty, hunger, greed, apathy, and above all the emphasis on economic development at any cost (Joshi, 1981). The governments of the Third World are faced with a series of conflicting issues. Lack of qualified personnel creates contradictory and shortsighted policies. Several officials entrusted with plantation forestry want large scale introduction of fast-growing exotics, whereas others are adamant about the need to maintain the purity of indigenous plant communities. Technocrats want paper mills and dams upstream from localities that tourists visit to see crocodiles and

rhinoceros. People want more farmland while ecologists assert that nature has reached its absolute limit from an agricultural perspective. Farmers want highways and foresters oppose. The poor want jobs while environmentalists are wary of industries that cause pollution.

In Nepal, problems conceived 10 years ago as being of a biological nature are now known to be economic and social. Delegates to the Third World Congress on National Parks in Bali expressed concern about the future of many protected areas in the developing countries that have been created over the last ten years. Such areas were seen as sometimes being mere islands in a sea of struggling humanity, with no real value to poor rural communities. When hungry peasants are forced to worry about the source of their next meal, principles of environmental conservation have little relevance.

Recently, many of the seasoned leaders of the conservation movement have stressed the view that conservation of nature involves processes much more complex than previously understood. The problem cannot be approached in isolation (Shah, 1984b). Biologists and naturalists are recognising that the processes of development are also evolutionary and not revolutionary. Similarly economists and developers are coming to understand that the quest for more, might eventually end up producing less.

6. CONCLUSION

Today, the people of Europe, North America and Japan are preoccupied with the issues of nuclear war and acid rain. The question they ask most frequently is "Shall we and our children survive another decade?" For the poor of Asia, Latin America and Africa, the question is more immediate: "Shall we survive until tomorrow?"

The conservation issues in the Third World are inextricably linked to social and economic problems. In Nepal, through agencies such as the King Mahendra Trust, we seek to tackle these issues head-on, and create an agenda based upon reality rather than rhetoric. For years, field ecologists working in Third World countries produced voluminous papers and articles on wildlife. Many of these publications ended with a glib remark that the future survival of the wildlife species in question would be determined by preservation of critical habitat and the betterment of the economic conditions of poor villagers who live nearby. While many have paid considerable lip-service to this notion, Nepal has given this idea highest priority. Our most pressing conservation problems are not inside protected areas, but in the mountain watersheds and in poor villages along the flood plains of the lowlands. We urge donor agencies and conservationists to recognise this fact and join us in our efforts. conservation or sustainable development can no longer remain merely a slogan of the West passed off to the Third World nations. Ignorance of this vital relationship in South Asia and elsewhere ensures a future of environmental and economic decay that all nations must seek to avoid.

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Basic Requirements for Improved Management of National Parks and Reserves in Nepal

Rabi B. Bista

ABSTRACT. *Overutilisation of the forest resources and land clearance for agriculture have been responsible for environmental deterioration, resulting in the loss of life and property and suffering and poverty for millions of people living in the region. Realising the great importance of protected area systems in the maintenance of ecological processes, the preservation of genetic diversity and the sustainable utilisation of the resources therein, six national parks, five wildlife reserves and one hunting reserve have been established in Nepal. The competent authority of the country must manage such areas and ensure that basic infrastructure, logistics, legal protection, visitor facilities and removal or introduction of plants and animals are carried out in accordance with overall system objectives.*

1. INTRODUCTION

Due to its diverse land forms, the Kingdom of Nepal provides a wide variety of ecosystems considering its small geographical area. Different species of plants begin to appear at every 350 m rise in elevation and within a few such rises, new species of wildlife also begin to appear.

The past two decades have been an era of destruction for forests and their denizens, the wildlife. Mile upon mile of virgin forests, the abode of many large mammals, mostly in the lowland south, have been cleared for lumber and cultivation.

The annual population growth rate of 2.7 per cent provides over 40,000 additional mouths to be fed each month and this exerts increasing demand on land and forest products which in turn require conversion of more forest to agriculture. The present area of forest cover is estimated at 3.8 million ha, of which 2.9 million ha lie in the hills and 0.9 million ha in the Terai, with a total growing stock of 186 million cubic metres.

Overexploitation of the forest area to meet the demand of 1 cubic metre of fuelwood and 0.1m3 of timber per person per annum, amounts to the equivalent of clearfelling 100,000 ha annually, whereas reforestation averages only 5,000 ha/yr – an alarming imbalance. The overall situation regarding the conservation and management of natural resources is ominous. The challenge is not limited to ecologists but to all who are involved in planning and developments of Nepal.

2. CONSERVATION

The exploitation of 40 per cent of Nepal's forest cover in the past 15 years has led to the destruction of habitats which in turn depleted the numbers and kinds of wildlife. The pigmy hog is now extinct in Nepal. Others such as Chauka, four-horned antelope, black buck and wild elephant are seriously threatened.

The real impetus for a protected area system materialised when the late King Mahendra in the early seventies directed his Government to identify and secure areas for the purpose of wildlife conservation. With the blessing of His Majesty King Birendra Bir Bikram Shah Dev, the National Parks and Wildlife Conservation Act, 2029, was promulgated in the year 1973. Some 7.4 per cent of the total land area of Nepal has been brought under protected area status (10,927 sq km).

2.1 *Planning and management of parks and reserves*

All of us recognise the ecological need for diverse networks of parks and reserves as living laboratories for study of biological productivity, evolution and population dynamics. We need them as gene banks of wild plants and animals. We need them for rehabitation of destroyed areas. We also need them for making comparison with areas which have been, or are being, modified by man. We need them as intact biocommunities for educational and biochronological purposes. We need them for our emotional satisfaction, physical health and well-being.

While selecting natural areas for inclusion into a network, ecological criteria should be the main basis in order to provide a complete coverage of various natural ecosystems and major biomes.

The following principles provide some guidelines:

- Create national parks in each of the major biomes so that these may preserve representative samples

of their principal ecosystems in conditions which will ensure their permanent preservation.

- Preserve any significant biotic community or species population in supplementary reserves if these are not included within the primary national park system.

- National park and protected area authorities should co-operate with each other and with authorised international bodies to ensure preservation throughout the world of both representative and outstanding natural areas thus providing a pattern of all major natural ecosystems and biomes.

A particularly important conservation role of a national park is the protection of species that are endangered, e.g., rhinoceros in Chitwan, swamp deer in Suklaphants, blackbuck in Bardia, musk deer in Langtang, snow leopard in Shey Phoksundo and wild buffalo in Koshi Tappu. National parks and reserves constitute the most direct and rational way to protect endangered and rare species of plants and animals through habitat and ecosystem conservation.

The basic requirements considered essential for improved management of national parks and reserves are variable because each park or reserve is different. Typically, the basic requirements include: legislation, administrative organisation, training, tourist amenities, roads, trails, campsites, large mammal control, management provisions for animals and plants, and physical development.

2.2. *Legislation*

The National Park and Wildlife Conservation Act, 2029 was promulgated in 1973. It defines national park, strict nature reserve, wildlife reserve and hunting reserve. The Act empowers HMG/Nepal through the Department of National Park and Wildlife Conservation (DNPWC) to declare any area in one of these categories and formulate and implement rules and regulations. It prohibits activities that contravene park objectives and ethics. Wardens are made responsible for the day-to-day administration and management of the park and are given authority to punish those who are found guilty of illegal activities. The maximum penalty includes 5-year jail sentences and a fine of Rs. 2,500 for offences dealing with protected species such as musk and rhino. It also outlines the fully protected species in Nepal, whose hunting, killing and export are totally restricted.

Appendix 1 of the Act lists 26 mammals, 9 birds and 3 reptiles as fully protected. The act designates special responsibility to the Director General of the Department of National Park and Wildlife Conservation to regulate and fix quotas for different species of common wildlife for sport and recreation. The Act also provides opportunities for tourism management. Under the Act, several rules, such as National Park and Wildlife Conservation Rules 2030, Wildlife Reserves Rules 2034, Royal Chitwan National Park Rules 2030, and Himalayan National Park Rules 2036 have been formed. These rules are very specific and include restrictions prohibiting certain activities and provide for recognised rights of way, traditional use of certain resources, and sale and management of some forest products.

Although at the moment, the provisions in the Act and rules seem adequate, the following points need to be considered.

- Since each park or reserve is different, separate rules for each area should be formulated and implemented.

- Separate rules for concessions need to be formulated.

- Resources such as fallen and dead trees, including valuable species such as sal, asna, khair and sisso, if not utilised wisely, burn away completely. The rules should be flexible over the use of these resources.

- Historical sites like the ruins of Singhpur fortress in Suklaphants, Danwatal fortress in Bardia, religious places such as gompas and shrines in Sagarmatha, Langtang, Rara and Shey Phoksundo National Parks should be given legal protection.

2.3. *Administrative organisation*

Under the Ministry of Forests and Soil Conservation, the DNPWC through its respective field offices directly administers 6 national parks, 4 wildlife reserves, one hunting reserve and the Jawalakhel Zoo. Each park/reserve is headed by a senior warden and supported by technical, administrative and accounts sections. Once the area is gazetted and management staff assigned, the responsibility for protecting the national park/reserve from illegal activities is assigned to the Royal Nepal Army.

The present adminstrative structure will be complete when a "Research and Management Division" is created in the Department itself in order to co-ordinate research activities, gather data on plants and animals, and other activities of the field. This division would directly control and collect data through a biological station headed by a wildlife biologist with two wildlife rangers in each park/reserve. Based on this data a thorough and complete management plan should be prepared and all activities carried out according to the management plan. The management plan should be flexible enough to accomodate amendments as may become necessary.

2.4. *Training*

Personnel involved in this endeavour should be adequately trained. Those involved in the administration,

management and research of the park and reserves are grouped into two categories.

CATEGORY A. Senior Level Technicians. All those officers who have a basic degree in forestry or another natural resource management speciality, should be sent overseas to receive master's level education on national park management, wildlife ecology or conservation education.

CATEGORY B. Junior Level Technicians. The national park and wildlife conservation rangers should be specialised in several of the following:

- Park/reserve management, including zoning, mapping, classification of major vegetation types;
- Developmental activities, such as road/trail building, construction and maintenance, boundary demarcation, water supply;
- Public relation duties such as visitor interpretation and extension;
- Research and monitoring of plants and animals;
- Administration and protection of parks/reserves including law enforcement, correspondence, and office duties.

The Forestry Institute located at Hetauda should be able to provide such training. In-service training and short courses should be provided by the Training Wing of the Ministry of Forest and Soil Conservation. Such training should concentrate on practical aspects of inventory work, monitoring activities and management plan preparation.

Having described these administrative arrangements within the national parks and reserves, it may be observed that wildlife conservation outside parks and reserves has not been effective. There is no direct linkage between the DNPWC and the district forest offices. The Forest Department should be made responsible for the conservation and management of wildlife resources, wildlife sanctuaries and refuges outside parks and reserves.

2.5. *Tourist amenities*

Tourism in national parks is considered essential but it should be subjected to proper control. Visitors should be allowed for observation and appreciation, and recreational activities should be restricted so as not to damage the environment. Visitors should be dispersed throughout the park to control over-utilisation of one area and visual and ecological effects of tourist facilities should be minimised.

All lodges and tourist facilities should be located outside the park or reserve. When it is impossible to have such facilities outside, peripheral areas within the park boundaries should be utilised. Those that already have such facilities inside the park should be asked to consider moving them outside in the interests of conservation. Discussions with the concessionaires should be held so that starting with the next contract period, tourist infrastructure could be moved. Touristic activities should be confined to designated tourist or utility zones of the park. Buildings should be designed to fit in with the natural landscapes and not dominate or compete with the local environment; and local construction materials should be given preference over costly imported materials.

Roads. The normal means of approaching and travelling in national parks/reserves is by roads, which have become one of the most essential facilities in the age of motorisation. But roads can destroy nature, transplant culture and urban development, metamorphose the quality of recreation and result in park overuse, Many animals are killed by vehicles if highways pass through reserves. Roads should, if possible, be built around the perimeter of a national park to minimise damage to the environment. The decision to allow the East-West Highway to pass through Royal Bardia Wildlife Reserve is a good example where a minimum distance of 15 km from prime habitats of deer and other important mammal species has been specified for the route alignment. During construction, restrictions have been imposed so that all raw materials like sand, soil and gravel have to be brought from outside. Only necessary trees shall be cut. Entry and work shall take place during the daytime.

Earthen roads in our parks have to be standardised in width, design and maintenance with similar types of road signs, culverts and bridges. A maintenance team should keep roads in good condition. All parks should be closed in heavy rains.

Trails. Since our aim is to minimise the hazards caused by tourist amenities and roads, backpacking tours and treks along trails should be encouraged. A true nature lover can get maximum pleasure by trekking along the unique scenic places of the parks. In many parks of developing countries trekking along trails is the only form of transportation possible. Trekking along the scenic trails of Sagarmatha, Langtang, Rara and Shey Phoksundo National Parks is the favourite tourist pastime in Nepal. In some parts of Nepal and India, visitors are taken around on elephant, which should be encouraged in other parts of Asia.

Campsites. The location of campsites is an important management tool in influencing where visitors should be dispersed or congregated. Frequently, campsites are crowded and so heavily used that they resemble more a tented city, as in Sagarmatha National Park. Since national parks lie in relatively unsettled country, there are large areas of public and private lands which could provide campgrounds or other recreational developments. A series of campsites one day's trek apart should be built along major trekking routes in Sagarmatha, Langtang, Shey Phoksundo, Rara and Khaptad National Parks.

Jasper and Banff National Parks in Canada contain moderate-sized towns and many national parks in devel-

oped countries have supermarkets, service stations and golf courses. Some countries do not wish to copy these developments in the hope of getting more visitors. Zoning of parks or reserves to differentiate various uses should be applied and villages with some areas around them should be designated as utility zones. Other zones should include tourist zones, wilderness zones, religious zones, and buffer zones. All hotels, restaurants, garage facilities, playgrounds, and sport areas should be outside the park. We simply cannot have both facilities inside the park and wilderness values at the same time in the same place.

2.6. *Large animal control*

In some parks we have overabundant wildlife, while in others certain species have either become rare or extinct. Some animals cause direct harm to man or to his property, so we have to adopt policies to control large mammal populations in the management of national parks and reserves. Overprotection could be more serious than hunting, but killing and capturing of fauna should be prohibited except under the direction and control of the park authorities. Protection must therefore include management of animal communities and the subsequent reduction of certain animal numbers within some protected areas. Otherwise, overprotection results in overgrazing thereby altering the biological succession of an area. This may be fatal to other species.

Scientific research and experimentation should be undertaken to indicate what kind of animal controls are necessary. In the case of endangered species, we can retain species which are on the verge of extinction by four means:

- *Translocation* Isolated localised populations of species such as rhinoceros in Chitwan, wild buffalo in Koshi Tappu and swamp deer in Suklaphanta have a greater risk of extinction than very scattered species such as leopard and barking deer. The solution is to move them to another area of similar habitat where these species are very few in number or previously occured. Translocation of rhinoceros to Royal Bardia and Royal Suklaphanta Wildlife Reserves and swamp deer and wild buffalo to Royal Chitwan National Park should be given first priority.
- *Encourage natural predation.* Natural predation results in healthy populations of animals.
- *Hunting of animals outside the Protected Area/ Reserve.* In many areas recreational hunters are allowed outside the park to thin out certain proportions of animals. Buffer zones or hunting reserves adjacent to parks/reserves should be established, unless the animals are stationary.
- *Culling inside national parks when necessary.* Culling should be carried out under supervision of park personnel.

3. MANAGEMENT PROVISIONS

The future of national parks will depend, among other things, upon the application of ecological knowledge to environmental management. Since our aim is to preserve the natural state of plants and animals in national parks, certain management provisions are necessary for their permanent preservation.

Interpretation and Education. Viewing wild animals in national parks is often very difficult in areas of thick vegetation, so many people visit parks without seeing many animals. Interpretation centres should be provided near the entrance of the park to provide visitors with information on what the area is protecting. Such centres located at Saurah in Royal Chitwan and at Namche in Sagarmatha, have been very effective in promoting conservation.

Ecological research. This is necessary for obtaining information needed in the management of the park. A park is also ideal for studies making comparisions between ecosystems and areas altered by man.

4. MANAGEMENT OF ANIMALS AND PLANTS IN PARKS

There is a common misconception that the management of wildlife in national parks consists mainly of the protection and control of animal species. The truth is that wildlife management is largely a matter of the conservation of habitats. Given reasonable freedom from disturbance, animal populations will require little or no management provided their habitats remain constant. The management of animal life in national parks is so closely associated with the management of the vegetation which supports it, that it is unprofitable to discuss one without the other. Some details are as follows:

Introduced species. These are plants and animals which have been translocated by humans into lands and waters where they have not lived previously. Some of the more disastrous introductions man has recorded are those of banmara *(Eupatorium)* to Nepal and India, water hyacinth *(Eichhornia crassipes)* to Africa and Asia, the European rabbit to Australia, and the Gypsy moth *(Porthetris dispar)* to America.

Hunting and trapping. Hunting and trapping are prohibited in parks, except for educational, administrative or scientific purposes. These activities must be carried out under the supervision of designated reserve authorities.

Fishing. Sport and traditional fishing may be allowed either in all or some park areas provided that adequate attention is given to maintain representative natural habitats within the park.

Lumbering, firewood collecting, thatch-cutting and berry picking. Lumbering and firewood collecting should not be allowed for commercial purpose but may be necessary to control the attack of insects or diseases or otherwise

to conserve the scenery and successional stages of natural or historical objects. Every year in the months of December/January thatch-cutting is allowed for 15 days in all of Nepal's Terai parks and reserves. Other traditional ways of life such as berry picking may be permitted when scientific study has shown it to be an essential management tool in the maintenance of biotic communities. While thatch grass is being cut the operation is supervised and woody vegetation invading the grasslands removed. The villagers are permitted to take this as fuelwood.

5. PHYSICAL DEVELOPMENTS IN NATIONAL PARKS

Within the parks, one of the most difficult decisions facing administrators is the type and extent of development to permit. Any park planner has to deal with this subject in great depth, as many failures in park management can be traced directly to a lack of proper planning. There should be no development in advance of planning. The location, kind and extent of development must be guided by an overall park plan, and every park organisation should assign some of its most talented staff to the planning function. All physical development should be designed to match the local environment; imported designs and materials tend to pollute the aesthetic value of the area. Management considerations for development, in brief, should weigh the desirability of:

- building facilities in parks only when they cannot function well outside the park;
- building on perimeter land – as contrasted with heartlands – when facilities must be placed in parks;
- building day-use facilities, rather than overnight facilities, when feasible;
- building facilities that minimise environmental damage (e.g. trails rather than roads);
- using extreme caution and control in permitting concession development, but treating concessioners as valued partners where they are needed; and
- developing with simplicity, utility, quality and appropriateness in mind. Some specific concerns are now discussed.

Boreholes, dams and salt. Dams and boreholes should be located only in areas where it is deemed essential, as their presence could lead to a concentration of wildlife or domestic stock during dry periods resulting in serious habitat damage. Salt could be used in areas where it is lacking naturally to encourage use of pasturage there and to decrease pressure on other areas.

Game fences. Fences should be used to reduce intrusion of wildlife into cultivated areas or domestic stock into the park. They must avoid cutting migration routes.

Ranger posts. These are needed to control poaching and grazing of domestic stock and for assisting tourists, but buildings should be kept outside or along the perimeter of the park so as to reduce their effects inside. Ranger posts are especially needed in Africa and Asia where many people do not appreciate the importance of national parks and law enforcement is challenged.

Airport and aircraft operations. Many national parks have airports, often causing tremendous disturbance to animal populations. Airports should not be located within the national parks and construction of new airports near parks should be discouraged. Runways built for STOL aircraft in Chitwan and Bardia have been abandoned and moved outside. Air traffic over parks should be re-routed if it proves incompatible with the natural surroundings of the park.

Dams and water diversions. Dams constructed to supply water and electricity create reservoirs, drowning trees and lands which cannot be justified aesthetically as in the case of Koshi and Mahkali barrages. Ecological changes, too, are most uncertain but it is important to differentiate between ecology and aesthetics. On both counts, of course, hydro-developments conflict with parks. Dams and water diversions should not be allowed in or near parks if they alter the natural conditions within the park. Development of dams and diversion canals to be built in Karnali and Banai are of serious concern.

Utility lines. Rights of way for utilities passing through a park should not be granted as in the case of the 132 kv utility line over Koshi Tappu. When utility lines must be placed within parks they should be placed so as to minimise their ecological and visual effects. Buried pipelines are probably compatible with the environment, while above-ground pipelines may obstruct the migratory movements of animals.

Village and private lands. It is common everywhere in the world to find townships, villages, or private lands inside a national park. Such privately-owned properties should not be allowed inside the park unless they are devoted to the preservation of historically-significant buildings or properties of a similar kind. Provision should be made that if someone decides to sell his property he should do so to the park authorities only.

6. LOCAL SUPPORT

The establishment of parks has prohibited many people living in and around such areas from utilising resources such as fuelwood, fodder, leaf compost, timber, meat, fish, and other minor forest products. Still, their active support to protect and preserve the flora and fauna is essential.

Whatever hardship the local people have suffered as a result of the parks, they must be duly rewarded by providing other incentives such as school facilities, drinking water schemes, Panchayat grazing grounds, vaccination of

cattle against rinderpest and foot-and-mouth-disease, supply of electricity, roads, and health posts. As far as possible, local people should be given priority in job opportunities in the park.

A conservation committee should be formed to involve local people in park and reserve affairs, so that they feel the park belongs to them. The committee should include the local Pancha's, distinguished persons and representatives of various governmental institutions. The warden of the park should be the member secretary of the committee and should convene the committee at least twice a year.

Each year a "Pancha Vela" or local seminar for 2-3 days should be organised and dialogues between park and people should be initiated. Activities, programmes, and problems should be discussed, as people's participation and direct involvement are perhaps the surest way to ensure the long-term survival of parks and reserves.

Rights of way of people should be recognised and certain pathways, roadways and waterways should be designated as public rights of way in park rules. Traditional uses of the resources such as earthen canals, fishing, and collection of leaves, should be allowed under close supervision. Worshipping at religious places and visiting gompas and temples should be unhindered. Studies leading to traditional utilisation of resources by local people would help in the management of the national parks and reserves.

7. CONCLUSIONS

The determination of how much land is to be reserved and managed as wilderness and how much reserved and developed for visitors and administrative facilities is a decision that should be made only with the advice of planners. In turn, planners should receive advice from ecologists, sociologists, landscape architects, resource planners, engineers, and archaelogists. Management considerations for development should be based on the desirability to preserve the park in as natural a condition as possible.

With the rapid conversion of natural ecosystems all over the world, the scarcity of areas for scientific investigation is becoming more acute. Protected area systems can and should serve as laboratories for carrying out scientific observations. They should also be used for making comparison with other areas subject to different management (lumbering, water use, hunting).

Although intentions often are to preserve the ecosystems that existed at the time the park was established, when an area is given complete protection, it will still continue its natural course of development and may later become another type of natural area. Some ecosystems reach a climax and will remain more or less unchanged for hundreds and even thousands of years. Others, such as marshes and secondary woodlands, when left alone, are rapidly transformed.

It must be decided whether complete protection should be given to a park or reserve or whether, through suitable management, it is more desirable to maintain the present plant and animal communities. Continuous monitoring is essential for the maintenance of a park.

Management Issues in Nepal's National Parks

Lhakpa Norbu Sherpa

ABSTRACT. *There are a number of basic requirements for improved management of national parks and protected areas. In Nepal's national parks and reserves, these include: trained staff, adequate budget, appropriate infrastructure, logistical support, good public relations, sufficient legal standing, information resources based on comprehensive research, and a clear, consistent policy for tourism and development.*

1. INTRODUCTION

In managing the protected areas of Nepal, it has become clear that there are certain basic requirements which must be met if we are to be successful in meeting our goals. These will be discussed under eight headings below.

2. TRAINED STAFF

Trained personnel are the most important requirement to ensure good management of our parks. Three levels of staffing with appropriate training are required:

2.1. *Managers (Wardens)*

Wardens must have a wide variety of skills, the most essential being a clear understanding of the concepts of protected areas, ability to maintain good relations with visitors and residents, good co-ordination, staff management and planning skills, a basic understanding of many disciplines, and legal knowledge.

Western training has distinct advantages for park managers of this region. The national park concept originates in the west. Some western nations, such as the United States and New Zealand, have years of experience in park management. Their management techniques are seldom directly applicable, but can be studied and modified to suit our own circumstances.

Many of our parks receive large numbers of Western tourists, who expect our national parks to be pristine wilderness. This is clearly unrealistic, and park managers must be able to reconcile visitors' expectations with reality.

Managers do not need to be specialists in any particular field, but must possess a good understanding of natural resource management. Our parks managers must be familiar with many disciplines, such as engineering, economics, and social science, so that they will be able to work with specialists from diverse fields. A manager's training needs to be oriented towards dealing with people as much as with trees and animals. Many of our present wardens have been trained as foresters and lack an appreciation of the full scope and applicability of the protected area concept.

Employing specialists as managers has its drawbacks. Specialists may prefer to do research and are sometimes reluctant to deal with the day-to-day running of the park. A manager with a specialisation in entomology, for example, may concentrate on his insect study and ignore the leaking roof, falling bridges, and inefficient staff.

Staff morale is another important consideration. To encourage our wardens to stay in the park service, we need to have opportunities for rotating service in other parks. They should not be given long-term postings in remote areas. In Nepal we hold a wardens workshop each year at different parks. We find this is a valuable opportunity for wardens to discuss management problems and exchange ideas.

2.2. *Senior field staff*

Rangers are the senior field staff whose support is essential if our parks are to operate smoothly. Rangers need the following skills: communications and interpretative skills to deal with locals and tourists; knowledge of park flora and fauna; ability to deal with rescue operations; report writing; legal matters; and enthusiasm for the task.

One of our major handicaps in Nepal is the lack of senior field staff. Rangers are presently trained at Hetauda Forestry Institute, primarily for work in forestry. As the Forestry Department is a larger organisation with a greater number of postings, it is difficult to attract rangers to Nepal's national parks. To overcome this deficiency in our staffing, new arrangements must be made for training rangers. One option would be to incorporate additional

parks-related subjects to the existing course at Hetauda, and to provide sponsorship for students to train for parks and reserves. A second option would be to establish a joint regional training centre at a suitable location in order to train national parks and reserves rangers for all ICIMOD member nations.

2.3. *Junior field staff*

At present our game scouts are forced to undertake duties beyond their abilities due to the shortage of rangers. Ideally they should be selected and trained so that they are capable of carrying out practical tasks and day-to-day maintenance. Some could be trained to undertake specialist work such as carpentry or rock masonry. Training for junior staff could be conducted in the parks themselves by the wardens, with the assistance of a training officer.

3. PARK PROTECTION UNITS

Demand for natural resources created by growing populations makes park protection a difficult task. In Nepal the Royal Nepal Army units are stationed in our parks to fulfil this function. The use of army units reflects our government's concern for protecting our natural and cultural heritage. The present system, however, has room for improvement as army training alone is not sufficient for park management. Army units are changed every one to two years, so that by the time a unit has become familiar with the park and their duties, their term is completed. Units that are to be deployed in parks need to be specially trained for park protection work.

Another factor affecting the army protection unit's performance is the commanding oficer's ability to understand the park concept, and to co-operate with the park warden in the field of park protection. It is vitally important to ensure that park staff (both protection and administrative) do not break park rules (e.g., cutting green wood). Every park warden's ability to co-ordinate and every commander's ability to co-operate will not be the same. The welfare of our parks and reserves must not be dependent solely on the discretion of individuals. There should be clear guidelines concerning the chain of command and field of responsibility and authority in order to help prevent misunderstanding.

The number of protection units and all other staff categories must be directly related to park needs, as too many staff can aggravate deforestation problems, and create the need for unnecessarily large infrastructural developments. Too many staff can also cause social problems, and can have a detrimental impact on the local economy, leading to poor public relations.

4. INCENTIVE SCHEMES

Working for national parks and reserves in remote areas requires a special dedication and interest. Extreme isolation, harsh climatic conditions, food shortages, lack of medical facilities, unpaid overtime, and separation from families for long periods are not uncommon. Such conditions do little to attract good long term staff unless they are given extra incentives.

Various incentive measures could be introduced to combat the serious problems of vacancies, fast turnover, and lack of enthusiasm. Some of these are:

- Improved living conditions such as good quality accomodation, provision for families, etc.
- Advancement and job satisfaction such as opportunities for promotion, transfer to other parks, further studies, attendance at courses and seminars, greater authority, responsibilities, encouragement and merit awards.
- Special allowances such as overtime payments or time-in-lieu for duties such as collecting park entrance fees, poaching control, fire control, night patrolling, and park rescue services.
- Creation of a uniform and insignia to create an identity and pride in the job.
- Since park duties often involve working in dangerous conditions, full safety measures should be taken. In case of serious accidents or illness in remote areas, the parks department should provide immediate evacuation.

5. INFRASTRUCTURE DEVELOPMENT

Our park headquarter complexes are usually located away from major towns, necessitating the development of separate infrastructures. The construction of staff accommodation, visitor facilities, water supply, and trails involves huge sums of money; and once established, relocation or modification becomes cost-prohibitive. Therefore, the park developments must be carried out carefully, with proper site selection and long-term planning.

Infrastructure in most of our parks is casual and unco-ordinated, which leads to impractical and visually unacceptable results. An overall site plan with consideration of layout, circulation, design, and aesthetics can be prepared by the warden in consultation with an architect and a planner before constructing any permanent structure. As an example, at Lake Rara National Park, the warden's quarters were built well away from the existing villages, which were subsequently removed. Over the next eight years, a visitor centre, headquarters complex, a guesthouse, a staff quarters block, and an entire protection unit camp were added. The site was small, swampy and too chose to the lake shore. To expand required the removal of good forest. It would have been preferable to have located the park's facilities on the site of the former Rara village where it is flat and sunny, with a good spring, fertile existing fields, and most importantly, existing houses that could have been used.

Initial infrastructure establishment is often carried out with the assistance of foreign aid and advisors. Project initiation is emphasised, often with large expenditures and elaborate plans, but long-term maintenance and other practical considerations are frequently neglected. At Sagarmatha, for example, asbestos roofing was used for the large visitor centre and it disintegrated in the cold conditions. To replace the entire roof is a major undertaking which is beyond the normal maintenance budget. HMG maintenance budgets are often inadequate and it is difficult to repair or replace expensive imported items. Locally available materials and equipment should be used where possible, and projects requiring low levels of maintenance should be given preference. Equipment such as audio-visual and radio needs to be chosen with local expertise and maintenance limitations in mind.

6. LOGISTICS

Development of improved transportation links must be carefully assessed. The benefits of improved access must be weighted against environmental damage, aesthetic considerations and other ramifications. Improved transportation links can facilitate increased visitation which may be beyond the carrying capacity of the park. In the case of Sagarmatha National Park, the shortage of flights to Lukla is a limiting factor. Were the numbers of flights related only to tourist demand (and not ultimately under the control of weather and the limitations of the runway), the park could be overwhelmed during the peak season.

Improved radio links, within the park and to Kathmandu, would be invaluable in conducting park business. Radios provide a valuable visitor service in case of accident and serious illness. Sagarmatha National Park's radio has saved the lives of many trekkers and mountaineers, and has also failed to save a few due to erratic operations. It is hoped that the radio system will be upgraded in the near future.

7. LOCAL SUPPORT

There is a low level of local support for the establishment of national parks and reserves here in Nepal. The establishment of protected areas, to control resource use in a country densely populated by people heavily dependent on natural resource, is not easy. Conservation often means restricting people's use of local resources, such as timber and grazing land, while they are struggling to fulfil their basic needs. When establishing national parks and protected areas, some impact on local people is unavoidable. However, we have an obligation to ensure that the livelihood of the people within the park and on the periphery is not threatened because of inappropriately rigid regulations. Public support is essential for the success of our parks, especially where there are resident people.

Unless the local people understand and support the park concept, and recognise the relationship between park protection and their own long-range interests, the destruction of forest, wildlife and aesthetic values will continue. We cannot run national parks purely by application of inflexible rules and regulations. The co-operation of an informed, involved local population is essential, but conservation education alone will not convert people to the support of national parks. One of the most effective ways is to convince the local residents that parks are in their own long-term interests. Parks can gain support by assisting in community-oriented projects in the villages, undertaking reafforestation projects to supply demands as well as to meet the park's conservation goals, repairing bridges and trails, maintaining religious and cultural sites, and offering employment opportunities to locals. Sagarmatha National Park, for example, has gained public support with gompa restoration, plantations, and the development of water supplies with the assistance of the World Heritage Fund and the Himalayan Trust. The real involvement of local people in decision-making is an essential way to gain local support. Antagonism between local people and park staff can be reduced, information on park purposes augmented, and support for parks increased, by inclusion of residents in the staff at all levels.

8. TOURISM POLICY AND MANAGEMENT

Tourism is of major importance to Nepal's economy, so one of the original reasons for the establishment of the country's national parks and reserves was to encourage tourism; but conservation must remain the prime objective. Tourism must not be encouraged to the extent that it is detrimental to the park's integrity. Some of our parks, such as Sagarmatha, already suffer from the negative impacts of tourism. Sagarmatha is visited annually by about 6000 tourists who are attended by an equal number of supporting staff. These visitors accelerate the demand for natural resources and have a substantial impact on culture and economy. The benefits of tourism to the local economy should not be over-emphasised. Some local people involved in the tourist industry may benefit, but many others suffer from the tourist-created inflation and accelerated deforestation.

No provision is made in the national park by-laws for regulating tourist numbers and activities. The park manager needs authority to regulate the number of visitors, and to manipulate their flow within the park, should the need arise. Tourist use of natural resources, such as firewood, needs to be regulated. Legal provision is made under the national park regulations to prohibit tourist use of firewood in the parks, but efforts to apply this regulation are made only in Sagarmatha where there is only partial success. Effective prohibition of tourist wood fuel use is vital to park management throughout Nepal. Local development that serves tourists must also be regulated. Scarce resources such as timber and productive agricultural lands should not be sacrificed to tourist development. Inappropriate installations, such as substandard trail-side tea-stalls, and lodges and hotels which are not in keeping

with indigenous architecture should not be permitted. This requires some park jurisdiction over tourism-related village activities.

Mountaineering expeditions in national parks need closer control by the park office. At present, expedition permits are distributed by the Tourism Ministry and the Nepal Mountaineering Association. Mountaineers have very little contact with the park office, which makes control difficult. The Ministry of Tourism needs to co-operate with the Department of National Parks and Wildlife Conservation to control environmental damage due to tourism. Expedition groups, are potentially greater threats to the park environment than most tourists.

Concentrated use by pack stock en route to fragile high altitude base camps, consumption of firewood, and notorious expedition garbage dumps, are continuing problems despite legislation meant to address some of them. Perhaps incentives could be devised to increase compliance. A substantial deposit might be required for all expeditions, refundable when camps are cleaned to the satisfaction of the park authorities.

9. RESEARCH FOR MANAGEMENT

Parks are simultaneously sites for scientific enquiry and areas to be managed. Successful management of national parks and reserves requires an understanding of the environment to be protected, which can be best achieved through comprehensive, co-ordinated research. Studies by competent researchers should be encouraged in our national parks and reserves, providing that such studies are compatible with park objectives, and that research be co-ordinated to maximise returns in information gained while minimising impacts on the parks and their residents. For the most part, only limited research has been carried out in Nepal's national parks. All studies in the parks and protected areas should be conducted in consultation with the park authorities. It is the responsibility of the researcher to provide study results to the parks. Superficial, short-term studies by unauthorised researchers are counterproductive, often undermining the work of serious scholars while increasing the burden of prying enquiry that park residents must endure.

Development works in national parks are another area where adequate planning, co-ordination and prior study should be encouraged. The availability of funds alone should not be the criterion for initiation of projects. Such projects must be judged to be compatible with park objectives, cost-effective, and truly well planned. Seemingly good ideas by well-intentioned "experts" can sometimes backfire, creating more problems than they solve.

The management of national parks and protected areas in the Hindu Kush – Himalaya is complicated because of fragile ecosystems and resident peoples. Conservation efforts must continue in spite of difficulties encountered. To succeed in our objectives, we need to discuss our solutions, and extend our co-operation to one another in the field of nature conservation.

Botanical Wealth of Mountain Parks and Reserves in Nepal

Tirtha Bahadur Shrestha

ABSTRACT. *Mountain national parks and reserves of Nepal offer unique opportunities to save samples of the disappearing ecosystems of the Himalayas. Approximately 7,500 sq km of mountainous terrain in Nepal have been established as national parks and hunting reserves. Over 25 types of forest are represented in the protected areas. A number of plants endemic to Nepal as well as a wide variety of threatened plants can be found in them. However, what is known about plants and vegetation in these areas still needs to be co-ordinated with what is known about animals and communities, in order to devise a scientific management system for parks and reserves.*

1. INTRODUCTION

The diversity of the fauna and flora of Nepal suggests that even a small area can sustain a large number of species for their *in situ* preservation. For example, Langtang National Park contains more than 1,000 species of flowering plants and ferns, and Shey-Phoksumdo National Park contains over 20 species of plants endemic to Nepal besides a wealth of several hundred species of high plateau flora. Sagarmatha National Park has over 10 species of rhododendron within its boundaries. Thus it is evident that a wealth of genetic resources is preserved in those protected areas. However, there is little point in protection if the real value of their contents is not understood and appreciated.

2. BOTANICAL CLASSIFICATION OF MOUNTAIN NATIONAL PARKS

There are five national parks and one hunting reserve in the mountainous region of Nepal: Khaptad National Park (22,500 ha), Lake Rara National Park (10,600 ha), Shey-Phoksumdo National Park (355,500 ha), Langtang National Park (171,000 ha), Sagarmatha National Park (124,300 ha) and Dhorpatan Hunting Reserve (132,500 ha). They all lie in the main range of the Himalaya, except Khaptad National Park which falls in a midland area. Two national parks, Khaptad and Rara, lie in the West Himalayan floristic region. The Dhorpatan Hunting Reserve and the Shey-Phoksumdo National Park lie in the boundary area of the East and the West Himalayan floristic regions. Plants belonging to various floristic regions (East Himalayan, West Himalayan Central Asiatic, Indian, S.E. Asian and to some extent the Mediterranean) are represented in these national parks. An assessment of genetic resources of plants and animals found in these national parks is very important in order to understand and appreciate the real value of conservation.

Stainton (1972) has identified 35 forest types in Nepal, of which more than 25 are represented within the five national parks. Forest types of the midlands and Mahabharat Hills are poorly represented in Nepalese national parks; forest types such as *Schima-Castonopsis Terminalia* and sub-tropical evergreen hill forest are almost absent. Such forest types are continually receding since their distribution overlaps with the range of human habitations and cultivation. Thus, there is an urgent need to protect some areas in the midlands and the Mahabharat Hills where a significant number of plants and animals are facing an ever-increasing threat from human activities.

3. GENERAL VEGETATION AND BOTANICAL SIGNIFICANCE OF NEPALESE NATIONAL PARKS

Khaptad National Park, lies mostly between 2,100 m and 3,000 m. West Himalayan Forest types and floristic elements are represented in this park. The park is well-known for its graceful, grassy meadows and coniferous forest mixed with oaks, rhododendron and maples. Large thickets of Bamboo *(Arundinaria spp)* and extensive shrubberies of pink Daphne *(Daphne glacialis)* make it distinctive In addition there are a number of medicinal plants, such as *Aconitum* sp., *Paris polyphylla, Swertia* sp., and *Rhoum* sp. There are also a number of rare flowers, for example *Taraxacum Nepalese,* an endemic dandelion of Nepal, was first discovered in Khaptad. Forests of *Quercus incana* and *Quercus lanuginosa,* which are either scarce or absent in other national parks, are well represented in this park. Similarly, forests of the West Himalayan fir, *Abies pindrow,* are not found in other parks and reserves of Nepal.

Lake Rara National Park encompasses the largest lake (1,000 ha) of Nepal. Most of the park area lies above 2,100 m in the temperate and sub-alpine zone. It has a number of West-Himalayan species of plants and about 20 Nepalese endemicas are thought to be found in this park area. About 16 types of forest occur here and it is the only park which contains the spruce *Picea smithiana,* the cedar, *Cedrus deodar,* and the cypress, *Cupressus torulosa* in its forests.

Shey-Phoksumdo National Park, is the largest national park in Nepal and most of its area is in the Trans-Himalayan region with altitudes varying from 3,600 m to 6,400 m. The greater part of the park is treeless and is dominated by steppe vegetation of *Caragana* and *Lonicera.* A large number of plants belong to the Central Asiatic species. At the same time over 20 endemic species of plants, most of them not known outside, occur in this park.

Langtang National Park is comprised of the dry inner valley and the humid mountain region lying north of the Kathmandu Valley. It has a large variety of ecological zones and vegetation types. There are 15 forest types in the park area, with the flowering plants and ferns amounting to over 1,000 species. This represents 20 per cent of the whole flora of Nepal in an area which is less than 2 per cent of the country. The area lying within the National Park is of great historical importance as far as the botany of the Himalayas is concerned because a large number of important Himalayan plants have been discovered and described from the Gosainkund and Langtang areas. The earlier classical collections of Buchanan Hamilton (1802-1803), N. Wallich (1820-1821), Gardener (1817-1820), Lal Dhwoj (1927-1930), Sharma (1931-1937) and others have added a large number of new species to the botany of the Himalayas. Thus type localities for a number of Nepalese plants fall in this park. This park has a goodly number of medicinal herbs which have been marketed for over 100 years but many species have now become rare and endangered. Over 20 species of such plants are being conserved in the park.

Sagarmatha National Park consists of an amazing assembly of high mountain peaks, four of which are over 8,000 m high. More than a dozen other peaks are well over 6,000 m. The entire area of the park lies above 3,000 m and the habitat for high altitude life forms is best represented in this park. The park is particularly rich in species of rhododendrons. Out of 32 species reported so far in Nepal, 10 species occur in this park. Botanically there is little documentation on this park and therefore a thorough investigation of plant life is essential. This is the only national park area where one can study plant and other life forms at very high altitudes.

4. CONCLUSIONS

Nepalese national parks offer a unique opportunity to preserve a wide variety of plants and animals. Each park should be thoroughly studied and investigated. Botanical species are generally ignored in the management of parks and reserves. Park management should publicise the importance of plants and vegetation to make the general public aware of this aspect of nature conservation. There is little point in protecting national park and reserve areas if the remainder of the country is allowed to deteriorate. National parks should be used as natural gene banks, and sites should be identified according to types of important plant life. A seed catalogue should be maintained for the purpose of propagation. Protection of certain middle-hill areas in the Mahabharat Range should be initiated. Without such a conservation programme, present trends will continue, and most of the common hill plants and forests will be lost.

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The Makalu National Park - A Proposal

Daniel Taylor-Ide and Tirtha B. Shrestha

ABSTRACT. *The papers in this volume eloquently describe the environmental diversity of the Hindu Kush-Himalaya. Many of the varied ecozones of the Hindu Kush-Himalaya are represented in the proposed Makalu National Park, comprising 500 sq km immediately east of Mt. Everest (Sagarmatha). The altitudinal spread from 1,020 m to 8,470 m creates climatic zones ranging from subtropical to arctic, and a parallel variation in rainfall causes ecological diversity across the spectrum of zones between rainforest and semi-desert. The area has no permanent human settlement. It is vital that this diversity be preserved, to create a unique scientific hallmark – a single laboratory where Himalayan environmental diversity can be preserved. The Makalu National Park conserves a range of plants, animals and ecosystems that are rare and otherwise will be lost; it also conserves a watershed which provides a steady source of silt-free water during the hot dry months.*

1. PEOPLE AND PROTECTION IN THE MAKALU REGION

Throughout the Hindu Kush-Himalaya the central environmental issue is people. How can we save the land and, at the same time, meet the needs of the people? Over a long-term perspective, the answer is clear: The needs of the people can only be met if conservation practices occur. People need the forests for fuel, for homes, and for securing soil on the mountain slopes. People need regular and pure water for agriculture and for hydro-electricity. People need the majesty of the mountains themselves for the tourist dollars the mountains bring.

However, such a long-term perspective does not apply on a personal level. It is often to a villager's short-term interest to destroy the land. Trees can be sold. A field on marginal land means grain. Overgrazing provides pasture for emaciated animals.

Villagers know the consequences of what they are doing to the land. Their pain is greater than ours as landslides cut mountains apart around them. They do not need scientists to tell them that their future washes down the hills and flows away down the streams. The environmental challenge for conservationists in the Hindu Kush-Himalaya is to present ways whereby people and conservation can both be served without injuring either.

Two models exist for preventing devastation and incorporating the needs of the people into conservation plans. In one model, villages exist within parks; people learn to use the land while caring for it. In the second model, conservation projects are separate from people, but land and people still coexist.

In both models conservation must benefit village people in immediate, tangible ways. If conservation does not, people will encroach upon the reserves and silently steal their nation's natural treasure.

Only the most strident police measures can protect parks and reserves when local villagers are opposed to them. On the other hand, when reserves are supported by people who see that conservation is in their interests, virtually no outside policing is needed. The villagers themselves become effective police.

The proposed Makalu National Park would be a new attempt in Nepal to integrate people with a critically important geobiological system. However, because the area has no permanent settlement within it, unlike most reserves in Nepal, the integration of people with conservation is done by means that support development but do not permit permanent settlements.

2. DESCRIPTION OF THE MAKALU REGION

Unfolded across a flat surface, the proposed Makalu National Park covers over 500 sq km. However, the land is not unfolded. It contains some of the most mountainous land on earth. Recent field investigations have provided an initial portrait of this remarkable valley.

The valley floor where the Barun River meets the Arun River is at 1,020 metres (3,700 feet). Makalu, the world's fifth highest peak, is the centrepiece of the valley, at 8,470 meters (29,790 feet). Mt. Everest and the world's fourth highest mountain, Lhotse, comprise the Barun Valley's formidable western wall. With over 7,000 metres from three mountain summits to the valley floor, this is the world's deepest valley.

There are two main streams on the Nepal side of the Park, the Barun and its tributary the Mangrwa. The Barun River is 22 km long, running west to east. The drainage is exceptionally steep, yet heavily forested even on 70-degree slopes making it probably some of the most difficult terrain to travel in all the Himalayas.

The Mangrwa is quite different from the Barun, running north to south for about 16 kilometres, and starting in permanent snowfields on the Chinese border. Its slope is less severe. Below one headwater lies a grassy meadow of roughly 500 hectares. At another headwater is a large, usually frozen, lake.

From a scientific viewpoint, these two valleys offer a remarkable opportunity to study the interplay of two critical environmental variables – altitude and precipitation.

In contrast, the northern tributary (the Mangrwa) demonstrates variety caused by altitude in an arid environment. Although ground-based studies have not yet been conducted in this valley, aerial observations and infra-red readings of vegetative radiation, as measured by satellite imagery, confirm a series of altitude based ecozones corresponding to those in the southern valley although possessing a much drier climate. In addition to the species configuration as a result of the drier climate in the Mangrwa, vegetation is less dense and generally lower. Grasses are more common.

Satellite imagery indicates even more arid, desert-like conditions adjacent to the Mangrwa across the border in China. Ideally, the Makalu National Park should include an altitude transect of these desert-like Chinese ecozones as well.

The mechanism by which this precipitation microclimate functions is still unclear. Possibly a chronic low pressure region on the southern side of Makalu and Lhotse increases precipitation in the southern Barun Valley, while the height of these mountains casts a rainshadow over the northern Mangrwa drainage.

Using the differential special values of infra-red radiation, as measured by the Landsat III satellite over the Makalu region, these diverse ecozones in the Mangrwa were mapped. Although these vegetative maps are still in their first generation, hard data now graphically demonstrates the area's ecozones.

2.1 *Fauna and flora*

To date, our study concentrated on a 20 sq km region of the southern Barun valley lying below 3,000 m. There, remarkably diverse flora and fauna were discovered.

Previous studies have investigated other parts of the biosphere. In 1972-1973 the Arun Valley Wildlife Expedition described the adjacent Kasuwa Khola and the upper Barun Khola. The 1971 Japanese expendition to Makalu, in addition to their mountaineering, described the flora of Makalu Base Camp region. Findings from our research are summarised below.

In terms of flora, one type of oak, *Lithocarpus fenestratus* occurs only here in Nepal. Similarly, the "people-pate" or *Tetracentron sinense* is abundant, and trees are of gigantic dimensions.

The valley has an exceptional profusion of rhododendrons, magnolias and orchids. So far 25 of the 30 species of rhododendrons known in Nepal have been collected in this valley. One form, *Rhododendron tricholadum nepalense* is only known from the Barun.

Eastern Himalayan magnolias (including *Michelia)* are well known for their majestic size and huge flowers. Five such species of trees are found in abundance in these low forests.

The fauna of the Makalu region reflects the richness of the ecosystem. Nowhere else in the Himalaya does one geobiological system possess such a diversity of mammal species (Table 1).

Table 1. Typical Mammals of the Makalu Region

Low Altitude Mammals	*Middle Altitude Mammals*	*High Altitude Mammals*
Asiatic Jackal	Barking Deer	Musk Deer
Common Leopard	Serow	Snow Leopard
Wild Boar	Goral	Weasel
Jungle Cat	Himalayan Flying Squirrel	Himalayan Thar
Rhesus Macaque	Magnificient Flying Squirrel	Marmot
Assamese Macaque	Red Panda	
Large Indian Civet	Yellow Throated Marten	
Jungle Dog	Himalayan Black Bear	
	Langur	
	Himalayan Striped Squirrel	

Within the 20 sq km research site 131 species of birds were seen and/or collected in four weeks of rapid surveying.

The spotted Wren Babbler and Dark Slaty-bellied Ground Warbler are both new additions for Nepal. In addition, a third bird, the Coral-billed Scimitar Babbler, first seen in Nepal in 1972, was also seen twice again. The Broad-billed Ground Warbler, last collected in Nepal in 1846, was also collected. Hence, in Nepal these four birds have been sighted only in the Barun Valley. Other rare birds observed and listed in Table 2.

Table 2. Rare birds observed within radius of the research area.

White-Gorgetted Flycatcher	White-Browed Short Wing
Blue-Winged Laughing Thrush	Nepal Parrot-Bill
Slender-Billed Scimitar Babbler	Fire-Tailed Myzornis
Golden-Headed Babbler	Broad-Billed Flycatcher Warbler
Yellow-Bellied Flycatcher	Lesser Long-Billed Thrush
Gold-Crowned Black Finch	Tailor Wren Babbler
Chestnut-Crowned Warbler	Red-Headed Martin

3. RELATIONSHIP BETWEEN ENVIRONMENT AND PEOPLE

Over the centuries, Hindu culture has venerated the purity of the Barun River waters. Each winter, pilgrims flock by the thousands (from India and China as well as Nepal) to bathe at the confluence of the Arun and Barun Rivers.

Today, the Barun waters are virtually unique among Himalayan rivers for their sustained purity. From the source high on the glaciers of Makalu, descending over 6,000 m (over 22 km with enormous ferocity) the Barun River remains clear because the forest cover on its watershed is intact. By contrast the Arun is silty and this is increasing due to deforestation upstream.

Because of the dense forest cover, which prevents soil erosion, the Barun carries a remarkably large volume of clear water during the non-monsoon months. As a result, according to a recent Japanese survey, the Barun can produce a minimum of 238 sustained megawatts of hydroelectric potential without disrupting the forest ecosystems. In fact, this sustained resource is possible only because of the forest.

The Barun remains pure today because no permanent human settlements are inside the watershed. This situation will not last long; during the past two years of research a significant portion of the unique low-altitude forest (between 1,020 meters and 2,000 meters) was cut and the soil planted with corn and tobacco.

The local economy ranks among the poorest in the Himalaya. Villagers number their stock of sheep, yaks or goats by ones and twos and not by herds. Homes are built from stacked rocks and have bamboo mat roofing. There is no sanitation or central water supply in any one of five villages rimming Makalu National Park.

Despite significant hardships, and an agricultural soil that is at best marginally productive, the people of these villages are exceedingly hard working. Certainly any proposal to preserve the Makalu National Park must recognise that the success of such preservation will be achieved only if the poor and industrious local people accept conservation to be in their interests. Villagers, in the final analysis, will safeguard or destroy this unique region.

Consequently, in order to protect these natural treasures, two human factors must be taken into consideration. First, services are obviously needed that will improve local human welfare. Education, health (especially water supply and sanitation) and agricultural assistance are needs that must be attended to right away. Not so obvious are the equally universal needs of improved transportation and controlled energy requirements for a National Park, in order to redirect local dependence away from the Park itself.

A second element which can also incorporate people into the reserve is the provision of well-paying jobs generated by the reserve programmes. The intent here is to make local village economics dependent upon conservation. For example, a proposal is currently under study to transform the local experts (that is, people who now are the best local poachers) into the wardens of the new Makalu National Park. Normally police, army or special park rangers are brought in to patrol national parks. Bringing in these outsiders costs a great deal and often makes conservation unattractive.

The ecological consequences are enormous when outsiders are brought in; personnel from outside require homes, firewood and harvesting or hunting privileges. Devastation creeps in, as the outsiders usually have higher environmental carrying costs than locals.

4. CONCLUSION

Thus, as can be seen, the Makalu National Park, in addition to saving a priceless environmental treasure that is a microcosm of the climatic diversity found in the Hindu Kush-Himalaya, also offers the region another approach to integrating the protection of the environment with the needs of people.

The need in the Makalu region is for immediate action to save a valuable resource. This valley has the singular potential of being the only major natural habitat in Nepal where the vegetative cover from sub-tropical to alpine (from 1,000 to 4,000 meters) may be seen in a single sweep of the slope. A second sweep of the eye across the adjoining slope covers the ecozones from alpine to arctic (4,000 meters to over 8,000 meters).

The altitude and precipitation mix in the Makalu Biosphere creates an exciting scientific laboratory and a pure environmental resource representing the majesty of the Hindu Kush-Himalaya.

Local Participation in Park Resource Planning and Management

Donald A. Messerschmidt

ABSTRACT. *There is a fundamental need to develop appropriate strategies to involve local participation in the planning and management of parks and protected areas. Local communities often possess profound knowledge of their ecosystem. The paper emphasises the important role of extrinsic resources in the management of natural resources and describes some successful examples from Nepal.*

1. INTRODUCTION

The challenge is enormous, but we like to believe that the human intellect is infinitely resourceful. (Cool 1983b: 47)

More than ever before park planners and managers are confronted by questions of how to deal with indigenous peoples in relation to protected areas. What do the locals know of natural resources? How valuable is their folk knowledge? How can it be tapped? How can local people participate meaningfully in park affairs?

Today's circumstances dictate that we pay close attention to human and social issues, unlike a century ago when considerations of wilderness preservation were initiated. What is the nature of *human* resources? How can they be used in conservation and development? What strategies exist to guide local involvement in the planning and management of parks and protected areas?

Before planning for conservation takes place, these questions should be answered and borne in mind as ongoing concerns. The cultivation of human resources, that is, of the cultural knowledge and social systems of the local people, is one of the wisest investments park developers can make.

With a few possible exceptions in remotest polar, mountain, ocean, and desert places, there are no natural areas that do not bear the mark of human activity in some form. In the developing world including that of the Hindu Kush-Himalaya, few areas are without population pressures and environments are being transformed at an alarming rate in the quest for more room for basic subsistence.

Given that there are virtually no places where humans have not transformed the landscape, and given that the protection of certain environments in the form of parks and reserves is a priority for many governments, today's challenge should be to clearly understand and appreciate the human dimension. By taking human resources into consideration in parks planning and management, positive relations between local people and the environment have the greatest chance to flourish. There is ample room for human resource expression in protected areas.

The international community today recognises ten categories of protected area (IUCN 1984). These include national parks; monuments and landmarks; scientific, biological, and anthropological reserves; multiple-use management areas; and special heritage sites (IUCN 1984). They vary in relative protection versus human involvement, from one category stressing strict control and exclusion, to another category encouraging multiple-use areas, altered or settled by people, but planned and managed to ensure maintenance of overall productivity of resources in perpetuity.

Protected areas of all categories are important, if not essential to the survival of life on earth. The aspirations of science, technology and the human spirit, for example, demand strictly controlled reserves where natural processes can be retained without interference, and where biological or geological diversity and rare genetic forms can be carefully protected.

At the same time, elementary human concerns for sustaining economic productivity and natural resources demand more multiple-use management areas. To a certain degree, indigenous people and the resources of local society and culture have a part to play in each instance.

2. THE RESOURCES OF MAN AND NATURE

Rural communities often have profound and detailed knowledge of the ecosystems and species with which they are in contact and effective ways of ensuring that they are used sustainably. Even when a community is growing in numbers and is clearly destroying a part of its environ-

ment it should not be assumed that all of this knowledge has disappeared or become invalid or that the traditional ways of regulating use have atrophied. . .(IUCN 1980: Section 14, No. 10)

The fields of cultural ecology and economics recognise four broad classes of resources (see Figure 1; cf. Riddell 1981):

(1) *Non-Renewable* – being physical (geological) in nature such as minerals and fossil fuels;

(2) *Continuing* – physical, such as gravity and solar energy;

(3) *Renewable* – biological, such as water, flora and fauna;

(4) *Extrinsic* – socio-cultural, in both cognitive and non-cognitive forms (of human behaviour).

2.1. *Extrinsic resources – traditional knowledge*

At the heart of this discussion are the extrinsic or socio-cultural resources i.e. the *human* resources; the people themselves and their traditional knowledge concerning the living resources on which they depend.

The resources of people in society are at one and the same time the most malleable, educable, and expressive, as well as potentially aggressive and destructive. For these reasons, they are among the most important resources to take into account for planning and managing protected areas. All too often, however, the people are the last to be meaningfully involved.

Extrinsic resources fall into two categories, "cognitive" and "non-cognitive" (Figure 1). The former include the resources of human behaviour, speech, and thought. The latter include the resources of our own making. Both kinds encompass the traditional knowledge in all our varieties of expression. The resources of the mind are incorporeal or intangible "mentifacts" (mental facts, thought), while those of matter are manifest as tangible "artifacts".

In some societies cultural knowledge is considered as "science", in others as "folk knowledge". These forms of knowledge, whether scientific or folk, are precious human resources. By nature they may survive the moment of creation or enlightenment and become a part of history, or they may suffer neglect or change and be destroyed or forgotten.

All the vast array of human knowledge, beliefs, attitudes, and values (economic, aesthetic, and spiritual) fall within the definition of extrinsic cognitive resources. They also include systems of categorisation of the animate and inanimate. They appear systems of classification designed to structure our experiences in order to make them more comprehensible, containable, controllable, and ultimately, predictable. They also appear as systems of behaviour by which we act and create new experiences. They are all a part of "culture", or the *acquired knowledge that people share and use to interpret experience and to generate behaviour* (after Spradley and McCurdy, 1975).

As the product of human creative design, culture is the greatest wealth of a people. It becomes the focal point of daily life and the corpus of information that is regularly transmitted to offspring and heirs. It includes systems of kinship, economy, control, common interest, religion, knowledge, and expression. (Figure 1, D-F).

In short, our socio-cultural existence, defined as human culture, encompasses a vast encyclopaedic range of rules, customs, expectations, and things that tend to simultaneously order and reflect the ways in which we manage ourselves in societies. It also conditions how we manage, for better or for worse, the living resources on which we depend for life and sustenance. (Figure 1, A-B). Like the loss of genetic resources which concerns world scientists today, the potential loss of socio-cultural resources is also a tragedy to be avoided at all cost.

2.2. *Traditional knowledge of resource management*

It is the indigenous systems of natural resource management that hold the most potential for use in protected area planning and management. The task is to determine what these systems are, understand them, and incorporate them into the long-range management of parks and protected areas.

The mountain regions of Asia have played host to human wanderings and settlement for countless centuries. Preserved in these mountains are the socio-cultural expression of many centuries, maintained by people of myriad identities (caste, clan, and ethnic group), who have pursued traditional forms of livelihood closely allied to and dependent upon the living resources of the eath.

Throughout the Hindu Kush – Himalaya, local systems of management can be found for all the major resource systems – forest, pasture, water, et cetera. They are, in some instances, well designed and well used, but not often well known beyond the immediate locality. Some are of an old vintage, reflecting the needs and conditions of ancestral populations. Others are of relatively recent invention, but typically follow acceptable pre-existing patterns of social organisation, custom, and use. Each is an expression of the close relationship between people and nature

In recent decades, however, that relationship has eroded and the balance between Man and Nature has tipped towards serious trouble. There is now clear evidence and mounting concern that the pressures of increased population growth are causing a severe strain on the natural resource base of the mountains (Bajracharya 1983, Bhattarai 1983, Cool 1983a, b, Eckhold 1976, Gurung 1981, 1982, Macfarlane 1976, Nichols 1982). But the fact remains that pre-existing systems of resource management

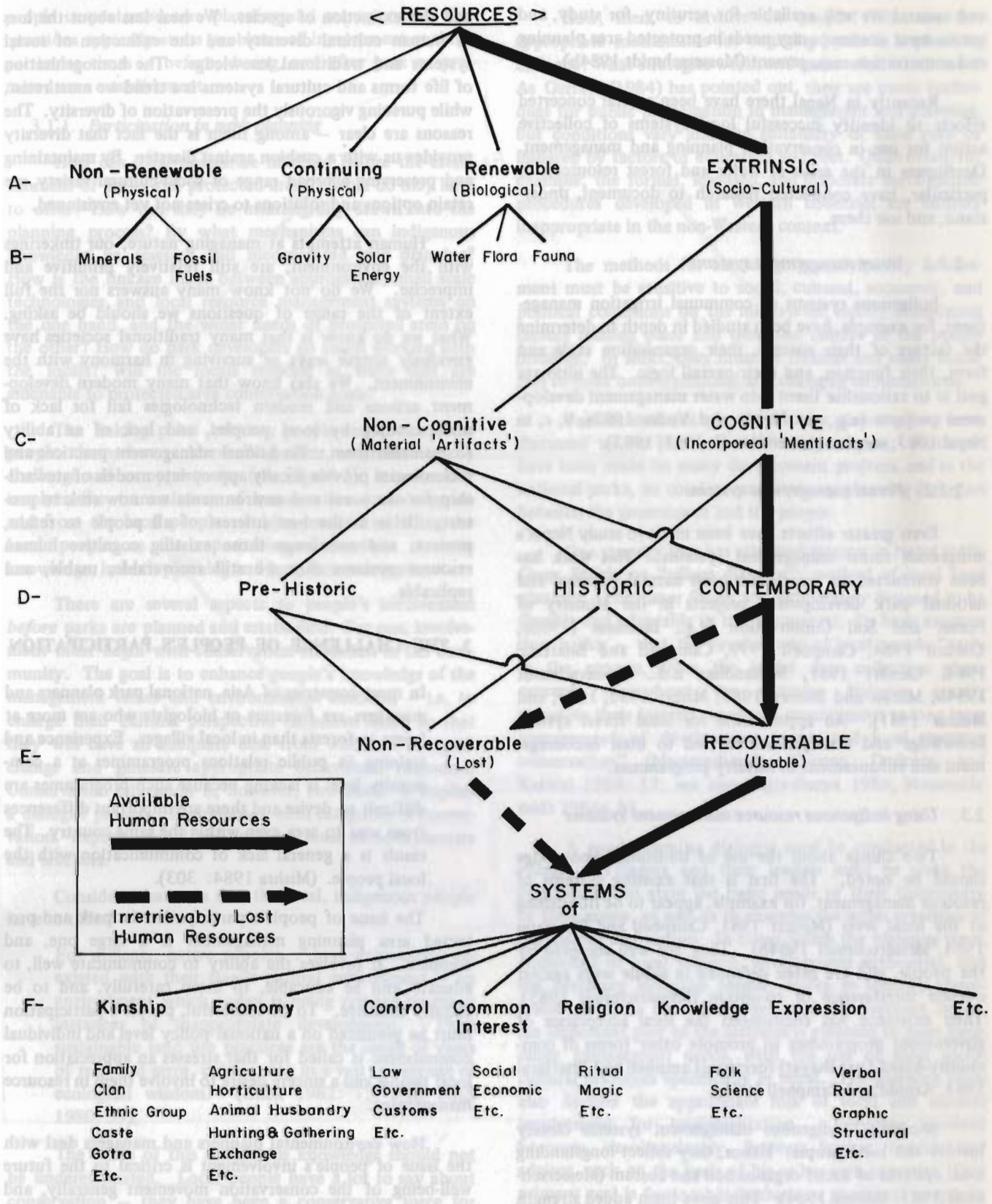

Figure I. Resources.

and control are still available for scrutiny, for study, and use to meet contemporary needs in protected area planning and conservation management (Messerschmidt 1984b).

Recently in Nepal there have been several concerted efforts to identify successful local systems of collective action for use in conservation planning and management. Developers in the areas of water and forest resources, in particular, have conducted research to document, understand, and use them.

2.2.1 *Water management systems*

Indigenous systems of communal irrigation management, for example, have been studied in depth to determine the factors of their success, their organisation style and form, their function, and their overall logic. The ultimate goal is to rationalise them into water management development projects (e.g., see Martin and Yoder 1983a, b, c, in Nepal 1983; see also Messerschmidt 1981, 1983).

2.2.2. *Forest management systems*

Even greater efforts have been made to study Nepal's indigenous forest management systems. This work has been conducted in association with natural resource and national park development projects in the Ministry of Forest and Soil Conservation (e.g., Bjonness (1980a, Coburn 1984, Campbell 1979, Campbell and Bhattarai 1984, Garratt 1981, Manandhar n.d., Messerschmidt 1984b, Milton and Binney 1980, Mishra 1982, 1984, and Moinar 1981). An appreciation for local forest system knowledge and management has led to their encouragement and enhancement in forestry programmes.

2.3. *Using indigenous resource management systems*

Two things about the use of traditional knowledge should be noted. The first is that existing systems of resource management, for example, appear to be flourishing at the local level (Molnar 1981, Campbell and Bhattarai 1984, Messerschmidt 1984b). They are well accepted by the people, and are often defended in subtle ways against outside interference or co-option (Messerschmidt 1985). Their existence has encouraged the local acceptance of government programmes to promote other forms of community-based (panchayat) forestry (Campbell and Bhattarai 1984, Arnold and Campbell 1985).

Secondly, indigenous management systems closely involve the local people. Hence, they reflect longstanding local systems of social organisation and custom (Messerschmidt 1981, Molnar 1984). This gives them added strength and longevity, and increases the chances that the living resources they are designed to protect and manage can be sustained.

2.4. *Preserving extrinsic resources and their variety*

We hear a great deal these days about the dangers to life on earth posed by the potential loss of genetic diversity and the extinction of species. We hear less about the loss of human cultural diversity and the extinction of social systems and traditional knowledge. The homogenisation of life forms and cultural systems is a trend we must resist, while pursuing vigorously the preservation of diversity. The reasons are clear – among them is the fact that diversity provides us with a cushion against disaster. By maintaining and preserving a broad range of socio-cultural variety, we retain options and solutions to crises not yet envisioned.

Human attempts at managing nature, our tinkerings with the environment, are still relatively primitive and imprecise. We do not know many answers nor the full extent of the range of questions we should be asking. What we do know is that many traditional societies have enviously simple ways of surviving in harmony with the environment. We also know that many modern development actions and modern technologies fail for lack of understanding by local peoples, and lack of an ability to maintain them. Traditional management practices and technologies provide locally appropriate models of stewardship for the areas and environments we now seek to protect. It is in the best interest of all people to retain, protect, and encourage those existing cognitive human resource systems that are still recoverable, usable, and replicable.

3. THE CHALLENGE OF PEOPLE'S PARTICIPATION

> In most countries of Asia, national park planners and managers are foresters or biologists who are more at home in forests than in local villages. Experience and training in public relations programmes at a community level is lacking because such programmes are difficult to devise and there are important differences from area to area even within the same country. The result is a general lack of communication with the local people. (Mishra 1984: 303).

The issue of people's participation in park and protected area planning management is a large one, and complex. It involves the ability to communicate well, to educate and be educable, to listen carefully, and to be socially sensitive. To be successful, people's participation must be predicted on a national policy level and individual commitment is called for that stresses an appreciation for local people and a sincere desire to involve them in resource management.

How environmental planners and managers deal with the issue of people's involvement is critical to the future well-being of the conservation movement generally, and to people/park interrelationships in particular not only in the Hindu Kush-Himalaya but worldwide. As Mishra implies (above), there are no easy solutions.

3.1. *Opportunities and issues*

Many questions are asked by resource development and conservation agents regarding the involvement of local

people in protected area planning and management. The questions typically stress problems of involvement at three particular times – before, during, and after park or protected area establishment.

3.1.1. *Participation in park planning*

How can local people be involved before the establishment of parks and protected areas? What do they have to offer? How can they be meaningfully drawn into the planning process? By what mechanisms can indigenous knowledge be assessed and incorporated into planning? How is the linkage made between appropriate, small scale technologies and local resource management systems on the one hand, and the wider needs of protected areas on the other? How do park developers go about working with the locals? Will the locals respond in ways that are amenable to protected area conservation goals?

The linking point between people and parks is the people themselves. Marshalling their involvement is a challenge and an opportunity (see Figure 2). It necessarily involves the transmission of conservation knowledge to and from the local people. It also involves including the local people, as the repositories of extrinsic resource knowledge, in both planning and long-term management.

There are several aspects to people's involvement *before* parks are planned and established. For one, involvement must begin with conservation education in the community. The goal is to enhance people's knowledge of the management issues and environmental concerns – i.e. to enlarge their cultural perspective on conservation so that they will have an adequate base from which to interpert change and generate appropriate behavioural responses. Conservation education is, however, two-sided. It implies a dialogue process. Both parties, both categories of conservation "experts", local and national, must be both learners and teachers.

Consider what it is that the local, indigenous people have to offer:

> For millenia, native peoples. . .have successfully coexisted with their fragile natural environment – an environment which today is being ravaged by many instances of inappropriate development. Their sustainable land use practices are the result of years of trial and error, culminating in a vast storehouse of ecological wisdom. (Glick 1982: 12, after NAS 1980: 35).

The value of this indigenous knowledge should not be underestimated. Local people have a lot to say about conservation – they have been a conservative force for centuries. Only of late have they been faced with coping, sometimes abusively, with unprecedented changes in the natural environment. Locally appropriate technologies and management systems tend to preserve genetic resources and landscapes. They also have value in and of themselves and are significant in terms of their part in a nation's historic and cultural heritage (Borg 1977, Lipe 1984).

How, then, to involve the people? What are the appropriate mechanisms for engaging locals in a planning dialogue? What strategies work, and under what conditions? As Garratt (1984) has pointed out, their are many techniques for public participation in management and planning, but conditions vary and the suitability of some may be impared by factors of education and cost. Quite often, for example, the formal, legalised, and elaborate participation procedures developed in Western countries are entirely inappropriate in the non-Western context.

The methods for encouraging participatory involvement must be sensitive to social, cultural, economic, and political conditions on the micro-level, closely considering factors relating place and time and culture of the people involved. In short, they must be flexible and easily modified to meet both traditional and changing circumstances.

Various methods of participatory planning have been discussed in the Hindu Kush-Himalaya region. Attempts have been made on many development projects, and in the national parks, to conduct participatory planning dialogues between the government and the people.

One strategy that has attracted interest in Nepal is the *Guan Sallah*, or "village dialogue", method of local level planning. The *Gaun Sallah* was deliberately designed to be flexible and adaptable in many contexts. Its basic assumption is this – that the involvement of local people "early in the process, from the initial data collection phase onwards throughout the planning dialogue, greatly enhances their interest, trust and commitment to long term management of development inputs and local resource conservation" (Messerschmidt, Gurung, Devkota, and Katwal 1984: 17; see also Bajracharya 1984, Messerschmidt 1984a, b).

A good planning dialogue must be conducted in the villages. Villagers and their leaders must be given the opportunity to state the basic needs of their community or their group, as well as to examine the wider priorities of the district and nation. In *Gaun Sallah* the planning team, comprised of local villagers, development authorities, and the necessary technical people, works to identify appropriate solutions to conservation and development issues. An important part of the dialogue is planning to meet long-range management needs, with the use of local socio-cultural resources specifically in mind. The planning team also decides the appropriate mix of local and outside involvement for implementation. Everyone involved becomes, simultaneiously, listener, learner, teacher and advisor, each on the basis of his or her own expertise. One primary goal is for local individuals or groups of people to take on specific management tasks and roles that may continue on a long-term basis.

3.1.2. *Participation in management*

How can such local involvement in management be institutionalised and maintained? In what capacities can

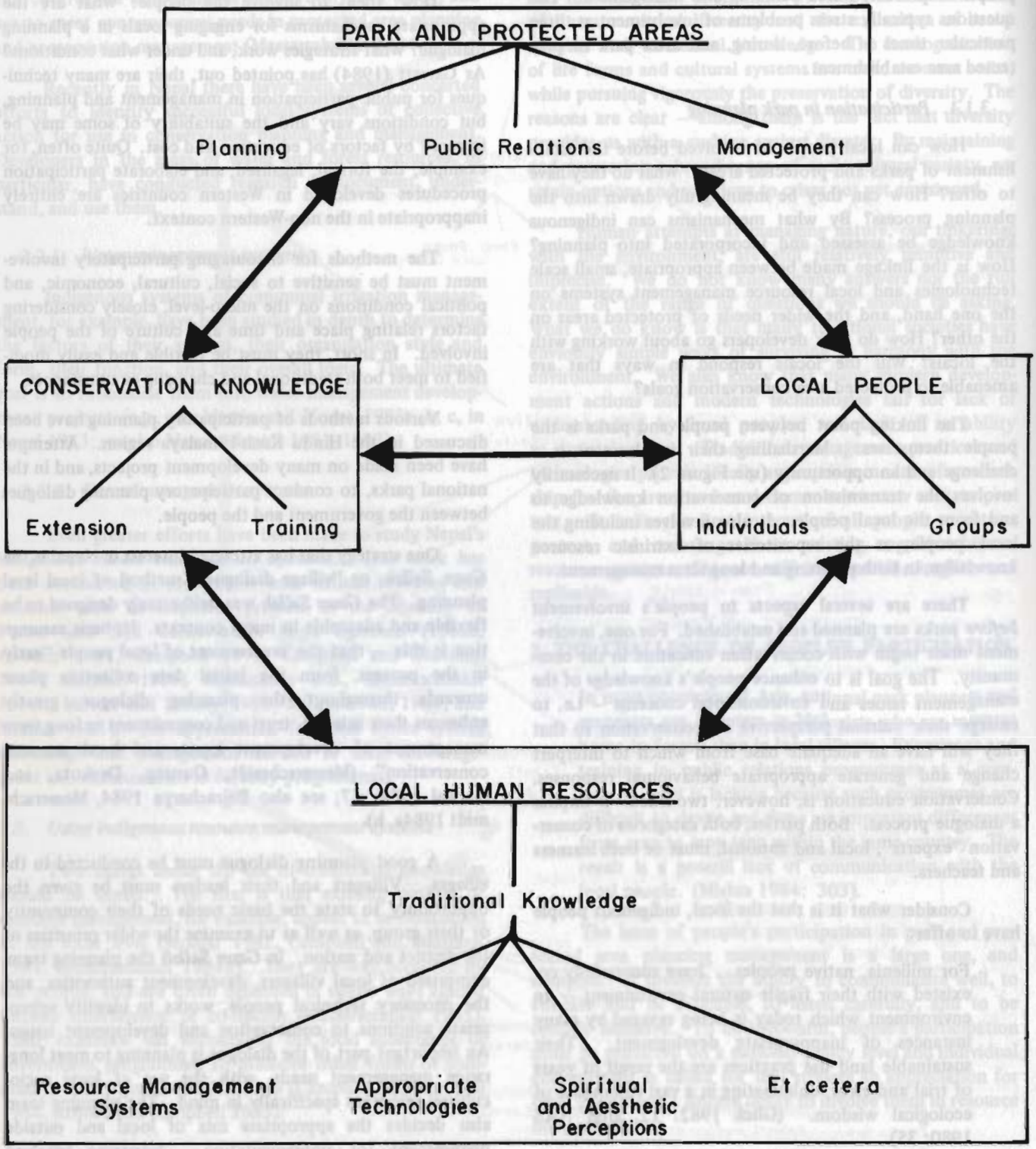

Figure 2. Use of Human Resources

local people serve the long-range management goals of the protected area and its environs. Can they be adequately trained and trusted? Is their co-operation assured, or is their potential estrangement too great and, hence, their reliability and trust too fragile? Do they possess the necessary problem-solving and decision making tools to function within the wider circumstances of protected area or park management design?

Like their involvement in planning, local people can be encouraged and/or trained to have considerable positive input in the day-to-day management of protected areas and parks. If a meaningful dialogue has already been established through participatory planning, local involvement in ongoing management flows automatically.

Local people can fill many kinds of management and park administration roles depending upon their own inclinations and interests, as well as on the sort of education and training they receive. Local groups can participate as advisory and management committees or councils. Some may form co-operatives for investment in the necessary support services – from running inns and guest houses to raising and/or delivering the supplies (food-stuffs, fuelwood, et cetera) necessary for the day-to-day operation of park institutions. It is not inconceivable that local men and women can be trained to take on a variety of formal jobs ranging from park guards and wardens to superintendent. The critical ingredients are education, communication, and trust.

It should also be pointed out that not all management needs reside within a formally designated protected area. More and more it is apparent and essential that protected area management strategies be designed to include the surrounding area. Rural development action may be necessary outside of protected areas to ameliorate various problems, including the changes wrought by the protected area itself (IUCN 1980, Bjonness 1980b, Mishra 1984).

Finally, it is well known that many inhabitants of the Himalaya, even in some of the remotest villages, have been trained in management and service skills during employment sojourns away from their birthplace. They include ex-miltary men, guards and watchmen, medical practitioners, teachers, cooks, drivers, mechanics, and various other categories. Many of them are literate and return home as leaders and opinion makers in their communities. They are an invaluable pool of resources for conservation and development in and near the national parks and reserves.

3.1.3. *Conflict resolution*

The last and probably the most common concern about people's participation involves local people after the fact of park designation and formal establishment. Given the formal rules to protect area resources, how can the local antagonisms between park managers and villagers be avoided, or resolved, to the satisfaction of both parties? And, how can the park manager negotiate meaningfully with local villagers who live near and who may have once lived within the park boundaries and, at the same time, uphold the goals of protecting the environment from their use or abuse? How can villagers be compensated for lost or curtailed access to their resource base in ways which satisfy their need and at the same time uphold the integrity of the protected area?

Park authorities in Nepal are presently experimenting with two solutions to these problems. One effort is in public relations, the other is a form of compensation. As they are described at length elsewhere (Mishra 1982, 1984), only a brief sketch is necessary.

The public relations effort is conducted through the *Panch Vhela,* a forum of community leaders presently in operation at Royal Chitwan National Park. Once each year, villagers, school teachers, and leaders, gather for two days at park headquarters to discuss the problems of the local communities and the needs of the national park. They are housed and fed at park expense, and are encouraged to express their views and air their complaints and grievances. At the same time, the park staff explain park policy and the reasons why certain forms of resource exploitation are prohibited. An attempt is made to solve or answer every issue raised.

In analysing the success of the *Panch Vhella* approach, Mishra makes this important observation (1984: 202):

> The biggest impact of these meetings has been psychological, since the local people are beginning to feel that they are being involved in park processes that affect them. Though these gatherings were envisaged to allow park staff to learn about the real problems faced by local people, they have also allowed us to demonstrate the complexities of various problems to the local people. These gatherings have also given the local people a change to "blow off steam" against the park or against other government programmes.

By way of compensation, each January, Chitwan park officials allow villagers living near the park entry to collect thatch grasses and cane traditionally used for building materials. Each household removes grass during a period of fifteen days, first by cutting the smaller materials, then by burning to gain access to the taller cane.

This enlightened approach to resource management integrates the human and natural systems of the park quite well Park management is defined to include local human communities in proximity to the park. Community/park relations are enhanced by involving villagers in a form of conservation action that they can readily understand and appreciate. The methods are both ecologically and economically sound (Mishra 1984: 202-203; see also Mishra 1982, Milton and Binney 1980, and JES 1984).

3.2. *The three-pointed trisul of participation*

Recognising the importance of traditional human resources, it is time for action. There are several well

tested strategies now available to involve local people in protected area planning and management. The author suggests that a combination of strategies, such as the *Gaun Sallah* and the *Panch Vhella* (or their various modifications and versions, be seriously considered for implementing this Trisul (Lord Shiva's three-pronged trident) of participatory action: (1) at the beginning of protected area development, in conception and planning, (2) in managing the protected area and its environs over the long run, and (3) in ameliorating the inevitable conflicts and antagonisms that arise.

4. CONCLUSIONS

Among the final statements of the most recent World Congress on National Parks, held in Bali, Indonesia in 1982, is the declaration to:

> Recognise the economic, cultural and political contexts of protected areas; increase local support for protected areas through such measures as education, revenue sharing, participation in decisions, complementary development schemes adjacent to the protected area, and, where compatible with the protected area's objectives, access to resources. (McNeely and Miller 1984:xi).

Likewise, recognition was given to the importance of traditional societies and of their extrinsic resources in the form of indigenous knowledge and wisdom. The World Congress recommended that "those responsible at every level of protected area research, planning, management, and education fully investigate and utilise the traditional wisdom of communities affected by conservation measures". And further, that every effort be made to implement "joint management arrangements between societies which have traditionally managed resources and protected area authorities appropriate to the varied local circumstances. . ." and "to study and foster oral traditions associated with ecosystem management of parks and protected areas through appropriate projects" (McNeely and Miller 1984: 770-771).

In short – "Go to the people. Answers are there" (Sainju 1983).

CHAPTER V

INTERNATIONAL PERSPECTIVES

World Heritage and the Man and the Biosphere Programme: Tools for Promoting Conservation in the Hindu Kush-Himalaya

MAB Secretariat, UNESCO

ABSTRACT. *This paper describe UNESCO's work in the field of nature conservation, which essentially follows two major endeavours. The first aims at safeguarding the exceptional and/or unique elements of the natural areas of the world through an international standard-setting instrument known as the Convention Concerning the Protection of the World Cultural and Natural Heritage. The second endeavour aims at conserving representative examples of the natural ecosystems of the world and developing a scientific basis for their rational use and protection: this work is based on the international biosphere reserve network of the Man and the Biosphere (MAB) Programme.*

1. INTRODUCTION

Both the World Heritage Convention and the International Biosphere Reserve Programme are relatively less well developed in the Hindu Kush-Himalaya region than in other parts of the world for a variety of historic and practical reasons. However, in briefly reviewing the country statements of the Proceedings of the First International Symposium and inauguration of ICIMOD one is struck by the keen awareness of the ICIMOD countries of the need to protect and safeguard the unique natural features of their territories and also to carefully develop and utilise the natural resources of their fragile, high mountain ecosystems. In parallel, there is a consciousness that these needs can best be met by international co-operation, not only within the region itself in managing catchment basins and mountain chains which straddle international frontiers, but also with other countries whose experience in managing and protecting high mountain ecosystems can provide useful lessons and ideas. It would appear, therefore, that it is timely for promoting UNESCO's two conservation programmes in the Hindu Kush-Himalaya region, particularly through this international workshop. Indeed, nature conservation, as will also be pointed out by our colleagues from IUCN, is a key element under-pinning the development process and in this respect it is fitting that this workshop is being held by ICIMOD.

2. THE WORLD HERITAGE CONVENTION

Known as the "World Heritage Convention", the Convention concerning the Protection of the World Cultural and Natural Heritage was adopted by UNESCO in 1972. The rationale behind this Convention is that there are elements of the cultural and natural heritage of individual countries which are of such outstanding universal value that their protection and enhancement should be the concern and responsibility of the international community. The World Heritage Convention provides a means for identifying the cultural and natural properties of outstanding universal value and for placing them on the select World Heritage List. There also exists a list of World Heritage in Danger which is for the World Heritage properties threatened by "serious and specific dangers" as defined under the Convention. This list acts as a "warning light" mechanism to draw attention to severely threatened properties. The Convention also has established a World Heritage Fund to which all nations (whether States Parties to the Convention or not), private organisations and individual persons are invited to contribute. The resources of the Fund are used to meet requests from the less-favoured States Parties to help restore, protect and enhance their cultural and natural World Heritage properties.

The World Heritage Convention is therefore very much operational in character and serves as a tool for international co-operation, solidarity and assistance, particularly through sharing of resources and expertise and the building of a basic core of training personnel specialising in the conservation of cultural and natural heritage. National efforts in these fields are therefore stimulated and complemented; in addition, the international legal protection afforded by inclusion on the World Heritage List considerably strengthens protection under national jurisdiction as well as bringing the properties concerned to the attention of the international community.

The origin and evolution of the World Heritage Convention, a description of its procedures, and concrete case studies for natural properties theroughout the world, have been given in some depth in *Ambio* (1983) and

Monumentum (1984). It is the World Heritage Committee which makes all decisions on nominations emanating from States Parties to the Convention (for both the lists of World Heritage and World Heritage in Danger) as well as on requests for assistance under the World Heritage Fund. This Committee is made up of 21 of the States Parties to the Convention and its membership changes on a rotational system. The Committee is assisted in making its decisions by non-governmental organisations which provide impartial technical advisory services for three following tasks: elaborating guidelines for implementing the convention, including the establishment of criteria for selection of World Heritage properties; evaluating the nomination of properties against these criteria; and advising on the allocation of resources from the World Heritage Fund. The International Council for Monuments and Sites (ICOMOS) and the International Centre for Conservation (ICCROM) are the advisory non-governmental organisations for cultural heritage. IUCN is the non-governmental organisation giving advisory services for natural heritage. UNESCO provides the Secretariat which implements the decisions of the World Heritage Committee, including providing assistance financed by the World Heritage Fund. The World Heritage Secretariat has a mandate from the Committee to encourage the adherence of more countries to the World Heritage Convention and to stimulate its implementation throughout the world. It was thus possible for the Secretariat to obtain support for this workshop from the World Heritage Fund to promote the Convention in this part of the world.

Indeed, at the time of writing (April 1985) there are 86 countries which are States Parties to the Convention. The Hindu Kush-Himalaya region is represented by the following States Parties which have adhered to the Convention: Afghanistan, Bangladesh, India, Nepal, and Pakistan. At the 25th meeting of the IUCN Commission on National Parks and Protected Areas held in Corbett National Park, India, in February 1985, the representative of Bhutan indicated that his country was considering ratifying the Convention in the near future.

It is therefore promising that the majority of Hindu Kush-Himalaya countries have already taken concrete steps to implement the Convention. However, of the 186 properties inscribed on the World Heritage list, only two are natural properties from this region, namely Sagarmatha National Park, Nepal (inscribed in 1979) and Royal Chitwan National Park, Nepal (inscribed in 1984). This year, the World Heritage Committee and its Bureau will examine three natural sites which have been nominated by India, namely Kaziranga National Park, Keoladeo National Park and the Manas Sanctuary. The latter nomination is of particular interest to this workshop as it lies within the Hindu Kush-Himalaya region. Interested participants at this workshop may wish to reflect on which sites within their countries may qualify for World Heritage nomination.

It was stated earlier that the nomination and eventual inclusion of a natural property on the World Heritage List has the advantages of strengthening its protection of making the site better known. The case of Sagarmatha National Park has been documented in *Ambio* by Hinrichsen *et al.*, (1983) and by Coburn (1984) in *Nature and Resources*. Increased recognition worldwide usually results in increased tourism and foreign income but consequently can exacerbate the problems of managing the World Heritage Site. For Sagarmatha, the rise in the number of trekking parties and visitors would probably have happened anyway, due to the international appeal of the world's highest mountain and the increase in world tourism in general. What is interesting to note, however, is how the World Heritage Fund has provided seed money to help mitigate some of the inherent management problems of the park, notably to replace depleted fuelwood resources by other energy sources such as solar energy or micro-hydroelectric power, and to protect reafforested areas from grazing livestock.

The World Heritage Fund has also been used to develop the level of training of the personnel responsible for wildlife management. In the Hindu Kush-Himalaya region, to date, support from the World Heritage Fund has been used to train two such persons from Nepal, and another two from Pakistan. Preference has been given however by the World Heritage Committee to training courses within the beneficiary countries themselves, if possible within a park inscribed on the World Heritage List. This is because more people can be trained per unit of money and, furthermore, trainees need not be absent for the long period of time required to complete university studies. This means that "training" under World Heritage is a very flexible form of assistance which can be tailored to fit the need of specific countries.

The World Heritage Fund can also be used to assist States Parties in identifying properties of "World Heritage quality" for the preparation of indicative lists and eventually of the nomination dossiers themselves. Such "preparatory assistance" as it is called can furthermore aid in the formulation of technical co-operation and training requests. Many examples of such assistance exist for countries other than those of the Hindu Kush-Himalaya region, for example Algeria, Benin, Guyana, and Zaire.

It should not be construed that the World Heritage Convention can help everywhere and provide the ideal solution to the problems of safeguarding the world's most remarkable cultural and natural properties. Its procedures of nomination and listing may appear to be cumbersome and too formal. The support available from the World Heritage Fund may appear pathetically small in comparison with the sums required for the restoration, protection and enhancement of the properties on the World Heritage List. However, the Convention has the invaluable virtue of existing and actually working. It constitutes an extremely valuable tool in marking these natural or cultural sites for which every effort should be made to ensure their sound management and protection by the international community as a whole.

3. THE INTERNATIONAL BIOSPHERE RESERVE NETWORK OF THE MAB PROGRAMME

The Man and the Biosphere (MAB) Programme, launched in 1971, is a worldwide programme of international scientific co-operation dealing with people-environment interactions in the whole range of bioclimatic and geographic situations of the biosphere – from polar to tropical zones, from islands and coastal areas to high mountain regions, from sparsely populated regions to dense human settlements. Research under the MAB Programme is designed to provide the information needed to solve practical problems of resource management. It also aims to fill the still-significant gaps in the understanding of the structure and function of ecosystems, and of the impact of different types of human intervention. Key ingredients in the MAB Programme are the involvement of decision-makers and local people in research projects, training and demonstration in the field and the pooling of disciplines from the social, biological and physical sciences in addressing complex environmental problems.

The International Co-ordinating Council which supervises the MAB Programme, at its first session in 1971, decided that one of the themes of this programme was to be the "conservation of natural areas and the genetic material they contain". Under this theme was introduced the concept of the "biosphere reserve" which was intended to be a series of protected areas linked through a co-ordinated international network, which would demonstrate the value of conservation and its relationship with development. The concept was innovative because of this network character and because it combined nature conservation with scientific research, environmental monitoring, training, demonstration, environmental education and local participation. Since the very beginning of the implementation of the concept of biosphere reserves as representative ecological areas, the international biosphere reserve network has formed a geographic focus for implementing the MAB Programme.

The first biosphere reserves were designated in 1976 Subsequently, the network has grown steadily until at present, it consists of a total of 243 in 65 countries. Much has been written about biosphere reserves and the reader is referred to UNESCO (1974), IUCN (1979), Batisse (1982), di Castri and Robertson (1982) and Maldague (1984) for basic information on this subject. Note should be made, however, of the First International Biosphere Reserve Congress, jointly convened in Minsk, USSR, in 1983 by UNESCO and UNEP in co-operation with FAO and IUCN, at the invitation of the USSR. The contributions to this Congress (UNESCO/UNEP, 1984) give many case studies from biosphere reserves throughout the world which provide an indication of the variety of ways in which the biosphere reserve concept has been adopted and implemented in very different cultural, institutional and ecological contexts.

The first International Biosphere Reserve Congress furthermore gave rise to the basis of the Action Plan for Biosphere Reserves which was adopted at the intergovernmental level by the International Co-ordinating Council for the MAB Programme at its last session in December 1984. This Action Plan provides a working framework for governments and international organisations to expand and improve the international biosphere reserve network in the period 1985-1989.

The Action Plan identifies a total of 35 actions grouped under the nine main objectives which came out of the First International Biosphere Reserve Congress.

At present, of the 243 biosphere reserves, only one biosphere reserve lies in the Hindu Kush-Himalaya region: namely the Kinghu Nature Reserve in China. (The Lal Sohanra Biosphere Reserve in Pakistan lies in the Cholistan desert and is therefore not included). However, we believe that the biosphere reserve concept has great potential in the region, for two main reasons.

First, the integrated approach to nature conservation is inherent within the biosphere reserve concept. In other words, nature protection is not regarded separately from other sectors such as forestry, basic scientific research, agricultural improvement, socio-economic development and/or the preservation of traditional cultural values. The need for an interdisciplinary approach to planning in mountain ecosystems is echoed by very many specialists, including Messerli (1984) and the planning and management of protected areas is no exception. The multiple-function approach of the biosphere reserve lends itself to accommodate these different considerations. For example, biosphere reserves can provide basic research sites, where long-term observations can be made and experiments repeated in the same place at different periods of time, a fundamental requirement to understand and better predict mountain ecological processes. Also, a key element in the "ideal" biosphere reserve is the involvement of the local people both directly and indirectly in the running and planning of the reserve and indeed, as an example, Jeffries (1984), has recognised that in Sagarmatha National Park, success lay in the selection and training of Sherpas who were entrusted with the management of the area.

Another aspect of the concept is the place of the reserve in regional planning. Rather than being considered an area which is put aside from the development process and is thereby artificially cut off from its surroundings, biosphere reserves offer an excellent way of integrating conservation with development, by building on the traditional knowledge of how best to manage such high-risk ecosystems and about the properties and values of the plants and animals therein. The biosphere reserve concept therefore provides a new way of thinking about conservation and land-use problems.

A second reason why the biosphere reserve concept should by attractive to the Hindu Kush-Himalaya region is that it is a tool for regional and international co-operation. Individual biosphere reserves have an added value in that they belong to an international network which should generate and disseminate knowledge from one reserve to

another. Such a network is very important and has great potential for the countries of the Hindu Kush-Himalaya which share the same ecological conditions and environmental problems. Useful links can also be established with other countries of other mountainous areas, e.g. the Alps or the Andes, in order to exchange experience and ideas and to build up personal working-level contacts between comparable biosphere reserves. ICIMOD could play a vital role in developing such a regional network of biosphere reserves, particularly by acting as a documentation centre, serving as a focus for information exchange through articles, newsletters, workshops, and acting as a training centre to expand the knowledge and experience of the personnel assigned to the biosphere reserves of the region.

4. CONCLUSION

It would appear from this very brief overview of the World Heritage Convention and the MAB biosphere reserve network that there are many opportunities to develop both endeavours in the Hindu Kush-Himalaya region. These two activities can serve to enhance national efforts in protecting the natural heritage of the region and to promote inter-regional and international co-operation in this field.

Ding Hu Shan Biosphere Reserve

Wang Zhuhao

ABSTRACT. *Ding Hu Shan is an area of 1,200 ha in China's densly-populated Guangdong Province. Now strictly protected, it contains over 2,000 species of higher plants, including many which are important for human welfare. The area is particularly important because it contains elements from both the tropical and subtropical Zones. In order to ensure that the area is well-protected for scientific investigation yet can still meet some of the needs of local people, the area is divided into two zones, one for science, the other for certain limited human used.*

1. INTRODUCTION

Ding Hu mountain rises west of Guangzhou (Canton), China, 86 km from the city. Ding Hu Shan Arboretum was established there in 1956, organised by the South China Institute of Botany, Academia Sinica. For many years, Ding Hu Shan has fascinated scientists with its unique biology. Since 1956, when Ding Hu Shan was designated a nature reserve, it has been a base for scientific research, academic exchanges and student field work. In 1979 it was made part of the international network of Biosphere Reserves by UNESCO. In 1981, it was linked with a research centre in northeastern Australia as one of the interractions between countries of a region in the first project of the MAB Programme – The ecological influences on tropical and subtropical forest ecosystems by increasing human activities.

In recent years the environmental and biological conservation in Ding Hu Shan has been promoted by China's Environmental Protection Law, which is designed to guarantee a rational utilisation of natural resources in socialist modernisation, to prevent environmental pollution and violation of ecological balance, so as to create a clean living and work environment for the people, protect their health and promote production. Under the Act, "Forest resources must be protected and developed and great efforts made to making the country green. Natural flora and fauna must be protected, developed and rationally used".

2. ENVIRONMENTAL CONDITIONS

Ding Hu Shan Biosphere is situated in the central part of Guangdong Province, near the Tropic of Cancer and in the southern fringe of a south subtropical region. The total area is 1,200 ha.

The rocks in the biosphere reserve are sandstone, sandy shale and shale belonging to the Devonian period. There are many hills and low mountains running from northeast to southwest with slopes ranging from 30 degrees to 40 degrees. The elevations range commonly from 150 m to 500 m. The altitude of the highest peak is 1,000.3 m.

The soils in this region are lateritic red earth, yellow earth and mountain shrubby-meadow soil. There is a vertical zonality in the distribution of soils. The growth of plants on these soils is vigorous and the organic matter content of the soil is high. Decomposition and synthesis of organic matter are rapid.

The mean annual temperature is 21.4 degrees C, with an annual precipitation of 1,900 mm and a mean annual relative humidity of 80 per cent.

3. FLORA, VEGETATION AND FAUNA

The vegetational forms in Ding Hu Shan Biosphere Reserve include: subtropical monsoon evergreen broad-leaved forest; ravine rainforest; subtropical evergreen broad-leaved forest; needle and broad-leaved mixed forest; needle and broad-leaved forest; riparian forest; shrub forest; and shrubby grassland.

Statistics gathered over many years by the Ding Hu Shan Arboretum of the South China Institute of Botany reveal that Ding Hu Shan has about 2,110 species of higher plants including 349 cultivated by the scientists. Ancient tree ferns and cycads are living specimens for research in plant evolution from the Mesozoic Era. More than 30 species of endemic plants are named after Ding Hu Shan, including *Ilex dinghushansi, Rhododendron dinghuense*, etc. In addition, there are 320 kinds of timber trees, 185 oil-bearing plants, 40 starch plants, 100 fabric plants, 60 tanning extract plants, 900 medicinal plants and more than 300 species of fungus.

In total, the biosphere reserve has 45 families, 86 genera and 141 species of bryophyte; 37 families, 74 genera and 128 species of pteridophyte; 4 families, 4 genera and 5 species of gymnosperm; and 181 families, 713 genera and

1,488 species of angiosperm. In addition to these wild plants, there are 349 species of cultivated plants. The chief families of the flora are Lauraceae, Theaceae, Fagaceae, Aquifoliaceae, Myrtaceae, Symplocaceae, Elaeocarpaceae, and Hamamelidaceae. These families compose the main elements of the climax, subtropical monsoon evergreen broad-leaved forest. Because the biosphere reserve is near the Tropic of Cancer, its floristic composition is a transition between the tropic and subtropic, but some typical tropical families are lacking, such as Dipterocarpaceae, Nepenthaceae, Ecythidaceae and Restionaceae.

The woody plants including the woody climbers, belong to 112 families and 371 genera, about 51.7 per cent of the total genera. Most of the woody plants are evergreen trees, shrubs or lianas; just 30 species of trees are deciduous.

According to geologists, the influence of Quarternary glaciers is not strong in South China. Therefore, many species of relic plants occur in the floristic composition, such as *Psilotum, Lycopodium, Selaginella, Angiopteris, Helminthostachys, Osmunda, Dicranopteris, Hicriopteris, Lygodium, Cibotium, Blechnum, Brainea, Equisetum, Cycas, Ginkgo, Glyptostrobus, Podocarpus* and some genera of Magnoliaceae.

In a 400 sq m quadrant 94 species of higher plants have been measured in the subtropical monsoon evergreen broad-leaved forest. The upper layer of the canopy consists of several important tree species, but there are no conspicuous dominant species. Because the shapes of the crowns of the important species are quite different, the physiognomy of the canopy is irregular.

The climax community indicates some characteristics of tropical rainforest. Many woody lianas and climbers climb up the trunks and branches of trees, and many epiphytic ferns and orchids grow on the tree trunks and branches. *Ficus microcarpa* and *F. virens* are common stranglers in the forest; some of the host trees are killed by them. Several species bear inflorescens and fruits on the trunks or old branches, and some trees have prominent buttressed base roots.

Several species of tree ferns, such as *Cyathea podophylla, C. gigantea* and *C. spinulosa* grow in the forest especially beside the ravines. In certain parts of the forest *C. podophylla* is locally the dominant species of the community.

Ding Hu Shan's high, densely forested slopes provide all kinds of wildlife with a suitable habitat. There are 1/8 species of birds; 38 mammals including serow, pangolin, muntjak, and wild boar; 20 snakes including pythons and various cobra-related snakes; and innumerable insects.

The consevation and management in Ding Hu Shan Biosphere Reserve are conducted by Ding Hu Shan Arboretum. The Biosphere Reserve is divided into two zones: the larger portion, the central and western part, is zoned for conservation and research; the smaller eastern part for tourism, recreation, religion and eduction.

Since Ding Hu Shan Biosphere Reserve became a MAB research centre, a new research organisation, Ding Hu Shan Forest Ecosystem Station, was established in 1979. Narrowly-focused research has given way to an interdisciplinary programme in which the South China Institute of Botany, Academia Sinica, Guangzhou Institute of Geography, Guangdong Institute of Soil Science, Guangdong Institute of Microbiology, Guangdong Institute of Entomology, and the Departments of Biology and Meteorology of Zhongshan University participate.

In recent years scientists have worked in every corner of Ding Hu Shan, observing its biological resources and natural environment. A number of reports on geography, soil, climate, flora and vegetation and indices of local plants, fungus, algae, birds, mammals and insects have been published. Scientists have set up permanent experimental plots and a meteorological observation tower for further research on the forest ecosystem.

5. THE RELATIONSHIP BETWEEN CONSERVATION AND LOCAL PEOPLE

Subtropical evergreen monsoon broad-leaved forest is the climax community in this reserve. This forest has been protected for over 400 years, but most forests in other regions of this province have been disturbed or destroyed partially or wholly by the impacts of human activities. Therefore, the conservation of this forest is very valuable for economic, scientific, educational and other purposes. Historically, Ding Hu Shan is a famous beautiful landscape, and there is a large old temple located at the fringe of the forest on the mountain, so it is also a notable religious site. In addition, the people who live in the villages around the reserve collect plant materials for timber, fuel, medicine and some other uses. So some conflicts have arisen between tourism, religion, and other needs of the local people on the one hand, and the conservation of the biological resources and environment in the biosphere reserve on the other hand.

In the past three decades, the following approaches have been taken to resolve the above problems and have yielded good results:

- Posters, booklets, newspaper articles and radio announcements have educated the people to understand the value and necessity of the conservation of nature and natural resources.
- Several workshops have been organised for the cadres of forestry and nature conservation and the teachers of middle schools from many districts in the province. The courses on protection of nature and natural resources were especially useful.
- After the discussion between the leaders of Ding Hu Shan Biosphere Reserve and the chief officers

of local government, the provincial government issued a degree to separate the region into two zones, one for conservation and research which is strictly protected, the other for tourism, recreation, education and religion, which is open to tourists, pilgrims and local people.

- An area for fuelwood collection is arranged for the local people outside the boundary for the reserve so that disturbance to the climax forest is diminished. Permission is given to the local people to enter some parts of pine forest to prune the dense of dead branches for fuel.

- Some trials of fuelwood forest composed of fast-growing trees of *Acacia, Cassia, Leucaena, Liquidambar, Schima* and some other genera have been established. The local people were trained to plant such kinds of forest near the villages for their permanent resources of fuelwood. It is hoped that the natural forest in the reserve will no longer be disturbed by fuelwood collection, and the conservation objectives of the reserve will be achieved.

International Aid and Environmental Training for the Management of Himalayan National Parks

Barry Leach

ABSTRACT. *International support for training efforts has a number of advantages but also some disadvantages, especially if it prevents an indigenous training capacity from being developed. The most important training is for the field staff; courses need to be mobile and flexible in order to meet the variable needs of different situations. Funding support for such courses is available from a number of international agencies; the Canadian International Development Agency is particulary active in this region.*

1. INTRODUCTION: WHY INTERNATIONAL AID?

International support for training protected area managers has at least three major justifications:

- Because the involvement of international aid organisations, especially non-governmental organisations, is a two-way educational process that can help to foster interest, perception and understanding on a worldwide rather than just a regional basis.
- Because national and local budgets do not generally give high priority to the provision of environmental education or training.
- Because training programmes for national park personnel are required too urgently to be left entirely to the methodical development of the environmental aspects of formal education.

2. WHAT CAN INTERNATIONAL AID DO?

Earlier conferences and workshops have pointed out that international aid can provide experts with experience in planning and management (Hart, 1966; Gibert, 1974; IUCN, 1984). It can also provide access to academic and training institutions in various parts of the world. However, Dr. Simon Max Franky, in summarising the session on training at the Second World Conference on National Parks in 1972, stressed ". . . the danger of relying too much on international co-operation to take the place of development of training facilities within individual countries."

Of particular importance is aid to regional, national and local training programmes aimed at what Miller has called "medium and basic level personnel." (IUCN, 1974). These are the personnel who guard the park, guide and interpret (to both tourists and local people), and construct and maintain park facilities. The success of a park will depend much upon the majority of such personnel being local people whose former means of subsistence may well have been cut off by the park (Curry-Lindahl, 1974).

Training programmes for such personnel should be:

- *Mobile* Teams of instructors capable of operating from temporary facilities such as a tented camp may be more useful than teachers tied to institutional buildings.
- *Flexible* Instructors need to be capable of giving instruction in the local language and relating it to the traditions and beliefs of the people. Concepts of the inter-relationships of living beings and their environment spring more readily for them from familiar religious teachings than from text-book ecology.

Training programmes should also be designed to ensure that the management and operation of recreational and tourist facilities meets standards that will maintain the quality of the environment inside and outside the parks.

3. INTERNATIONAL AID FOR TRAINING FIELD PERSONNEL

Mobile, flexible vocational training to meet urgent needs at the grassroots level are typical of the programmes offered by international non-government agencies. For example, the Non-Government Organisation Division of the Canadian International Development Agency (CIDA) was formed in 1968 to operate a programme of co-operation between governments and private overseas aid

organisations. In 1982-83 over 300 such organisations contributed more than US$ 120 million to 2,000 projects. These included agricultural development, school and medical centre construction, and vocational training for Himalayan peoples.

This experience demonstrates clearly the ability of overseas governments and NGOs to respond quickly and flexibly to the need for funds for training programmes at the grass roots level. If this workshop can serve to define the need and stress the urgency of aid for national parks, I have no doubt that the people of Canada and of the world will respond fittingly.

Management of the Giant Panda in Nature Reserves of China

Wang Menghu

ABSTRACT. *The giant panda is one of China's rarest species, with a total population of less than 1,000 individuals. Totally dependent on bamboo, the panda has suffered greatly with the recent mass flowering and subsequent die-off of bamboo, requiring intensive management efforts which have included field research, artificial insemination, capture and rehabilitation of starving individuals, and captive breeding. A management plan for the entire giant panda habitat is now being prepared.*

1. INTRODUCTION

After millions of years of evolution, the present distribution of the giant panda has been reduced to a few areas in the Chinese provinces of Sichuan, Shanxi and Gansu. From 1973-1975 a three-year survey was undertaken by the Chinese Forestry Department, in an attempt to ascertain the range and population status of giant pandas in these three provinces. A great deal of biological information has now been collected and indications are that the number of giant pandas remaining in the wild is approximately 1,000 animals.

2. RESCUING THE GIANT PANDA

Ten years ago, mass flowering of bamboo occurred in some areas of panda habitat in Sichuan Province. Since bamboo is the principal food of the giant panda, the subsequent death of the bamboo after flowering resulted in the loss of at least 138 pandas from starvation. In 1983, mass flowering of the bamboo occurred again in Sichuan, Shanxi and Gansu provinces. This natural calamity is far more serious than in 1975 since it covers a much larger area and is persisting for a longer period. This crisis has caused much concern to the Chinese and to people all over the world.

The Chinese Government has committed significant resources backed by considerable manpower to a rescue operation for giant pandas threatened by starvation. We have received a great deal of help from other countries and from international conservation bodies. Up to the present time the Chinese Government has allocated 8 million yuan (RMB) to this rescue operation for the pandas. In addition to this sum the Chinese people have themselves donated a further 2 million yuan. We have also received US$ 90,000 from our overseas friends and a donation of 50 million yen from the Japanese Government. Within the terms of the co-operative agreement between China and WWF International for the Panda Project, WWF Japan and Japanese N.T.V., were entrusted with the task of shooting a documentary film on the rescue campaign in Sichuan Province. This resulted in a further donation of US$ 200,000. Altogether our country has raised 10 million yuan and contributions from abroad total 16 million yuan (note: 2.5 yuan = US$ 1). These funds have played a very important role in supporting the preservation of the Giant Panda.

By the end of March this year, although 47 pandas have been found dead, we have achieved much in our rescue efforts.

Many stirring deeds have occurred during this rescue operation. For example, in March 1985 in Baoxing Country, Sichuan Province, a local peasant named Chen Cau Jiun saw a starving giant panda exiting from the forest and sitting by the side of a forest path. Chen rushed back to his home and returned with food and water – but the panda was too weak to take nourishment. Help was summoned the next day and the local government transported the animal to Chengdu Zoo that night. Under the care of the veterinary staff, the panda slowly recovered.

At the moment there are five giant pandas recovering under medical treatment, all of which were found and saved by local people. We have now organised patrols in all areas of panda distribution. In spite of these efforts, because of the large area involved and poor communication, the deaths of some pandas is unavoidable. Our goal is to reduce to a minimum the loss of animals from starvation.

3. FUTURE MANAGEMENT EFFORTS

The Chinese Forestry Ministry, IUCN and WWF are all very concerned over the future of the giant panda and are preparing a new co-operative agreement with this concern in mind. The new co-operative plan begins this year

with an overall survey of the distribution and population of pandas as well as surveys of bamboo and human social and economic activities within the range of the pandas. On the basis of this survey we will work out a long-term management plan for preservation of the giant panda.

We in China believe that the implementation of this plan will play a very effective role in the long-term preservation of the giant panda and will also benefit countless other species occurring in the same habitat. The most immediate problem is that the bamboo die-off will require ten years regrowth before the bamboo is again providing adequate food for giant pandas. How to take adequate artificial measures to bridge this ten year period is a problem that will require serious study.

The Khao Yai Management Plan and Action for the Future

Robert J. Dobias

ABSTRACT. *The "Khao Yai National Park Management Plan 1985-1989" represents Thailand's first attempt to use an efficient managerial approach in its protected area system. In light of experience from plan preparation, four major issues are discussed: integration of community development and park management; staff training; establishment of an infrastructure for expansion of management planning; and procurement of government support. Gaining government support for proper protection and management of parks and sanctuaries is of principal importance. It is suggested that Thailand's protected area managers develop a method to evaluate beneficial uses in these areas and then present the data in a cogent form to the country's decision makers.*

1. INTRODUCTION

The Khao Yai Management Plan was prepared in 1984 by the Royal Forest Department (RFD) with assistance from World Wildlife Fund (WWF) and the International Union for the Conservation of Nature and Natural Resources (IUCN). It sets an important precedent in being the first management plan for any Thai protected area, and it is expected to serve as a prototype for similar action at other parks and sanctuaries. The plan addresses 5 major management parameters – community development, park administration, law enforcement, visitor use and interpretation, wildlife management, and research and monitoring – for which management recommendations were written following careful assessment of park resources (structural, human, financial and biological) and of past and present management practices. As a prototype plan, it is intended to supplant the RFD's traditional day-to-day management of Thailand's protected areas with long-term planning, considering all major issues treating them as an integrated whole rather than isolated incidents to be dealt with separately.

Preparation of the Khao Yai plan has brought to light several issues regarding the future management of Thailand's protected area system. Below, four of the major and most immediate issues are discussed.

2. INTEGRATING COMMUNITY DEVELOPMENT WITH PARK MANAGEMENT

Poaching and encroachment are threatening most of Thailand's parks and sanctuaries, including Khao Yai. Surrounded by about 100 villages, Khao Yai National Park is suffering acute pressures. Approximately 100 sq km of the park boundary has been deforested by shifting cultivators; populations of most major wildlife species are being depleted through poaching; and plants such as *Aquilaria crassna* and certain orchids are in danger of extinction due to over-collection. The RFD has responded to these threats primarily by increasing the level of law enforcement. Nonetheless, villager abuse of park resources does not appear to have decreased and in fact may by increasing.

The Khao Yai Plan has broken with tradition by examining the causes for this illegal activity and tracing much of it to rural poverty – the average annual per capita income in villages surrounding Khao Yai is just US$ 200, lower than Thailand's northeast, which itself has the lowest PCI of the country's 5 regions. Acting on the assumption that most poaching and encroachment is being done by subsistence farmers who rely on Khao Yai's resources to supplement their meager incomes, a park management programme was formulated to provide villagers with significant economic inputs derived from non-consumptive use of the park and from outside sources.

The programme involves a wilderness trekking scheme, based in villages along the park boundary, and a direct rural development aid scheme. Demonstration projects are now in operation. The development aid project is particularly exciting and holds much promise for the future, not only for Khao Yai but for other areas as well. An "Environmental Protection Society" (EPS) is now being established in a village which has been a source of frequent park abuse. The EPS will function as part collective business enterprise, part credit co-operative and part non-formal education centre besides being a base for conservation activity (Suvanakorn and Dobias, 1985). The EPS has great potential for significantly improving economic conditions in the village, thereby lessening the villagers' need to exploit the park's forest, wildlife and soil resources.

The aid project is being co-implemented by two private concerns, the Population and Community Development Association (PDA), which has over 10 years of experience in rural development, and Wildlife Fund Thailand (WFT), a national conservation body, in co-operation with the RFD. It is expected that this collaboration between a rural development organisation and conservation agencies will produce a "mushrooming" effect. That is, it should allow PDA to apply the conservation techniques it will learn to many of its 16,000 project villages. Similarly, the RFD and WFT can incorporate their acquired rural development knowledge into conservation programmes at other parks and sanctuaries.

An equally important benefit of this management programme is that it provides the basis for increased support of Khao Yai from two critical sectors: the rural population and government. The community development programme is in line with one of the government's major national development policies, thus providing for favourable reactions by decision makers and helping to sway their support for other park programmes. It has already begun to affect the attitudes of some villagers, who formerly perceived park policy as directly opposed to their welfare. It should be emphasised, however, that the trekking and development aid schemes are not intended to obviate the need for law enforcement. Rather, community development and law enforcement should complement one another if park protection is to be improved.

3. TRAINING

The RDF has few officers with previous experience in protected area management; many superintendents, though possessing university degrees, lack formal instruction in this field. Realising that certain management programmes, particularly those related to visitor use/interpretation and law enforcement, need trained officers for effective implementation, the Khao Yai Plan calls for training seminars to be held annually at the park. In anticipation of future management plans for other areas, training should be offered on a Division-wide basis for key personnel so that a pool of knowledgeable people is available to carry out more ambitious management programmes. Steps have been taken in this direction by some Bangkok universities which offer extended site visits to parks and sanctuaries for students in natural resource and related fields.

4. PROVISION OF PLANNING SECTIONS

With preparation of the Khao Yai Management Plan, a base of planning skill has been formed in Thailand. But if management plans are to be prepared for a significant number of protected areas within a reasonable time, a suitable infrastructure must now be established. This should take the form of Planning Sections within the National Park Division and Wildlife Conservation Division (which is responsible for management of wildlife sanctuaries). The Planning Sections should be staffed by one full-time Chief Officer, two assistants and a secretary. In close consultation with the respective superintendents, the Planning Sections could produce a minimum of three plans annually. University professors and other experts could be hired on short-term consultancies to provide any technical assistance beyond the capabilities of the Planning Sections, and to review the plan before it is finalised. Establishment of Planning Sections is crucial because it will "institutionalise" the preparation of protected area management plans. When these sections become operational, they will remain permanent fixtures in the RFD's central administration (Chettamart, 1985).

5. GAINING GOVERNMENT SUPPORT

In Thailand, development pressures and economic realities are forcing the government to look more critically at protected areas and their impact on the population. In the absence of quantifiable justification for protected areas, decision makers are tending to support uses which run counter to the reasons for which these areas were established. Ironically, they are doing so at a time when protected areas are playing, or could play, an increasingly important role in the country's sustained economic growth and development (Snidvongs, 1984).

In order to turn the tide against destructive uses in protected areas and to secure needed funds for the proper management and maintenance of these areas, Thailand's protected area managers not only need to prepare long-range management plans but must also develop a method for evaluating the benefits which parks and sanctuaries, in an undisturbed state, provide the Thai people. The evaluation must then be presented in a form which decision makers can more readily understand and support (Ludwig and Evans, 1984).

A proposed method for Khao Yai National Park would include, first, the identification of existing and potential beneficial uses in Khao Yai which are non-destructive. These beneficial uses would then be quantified in socio-economic terms to the extent possible. A few examples: the average amount of money spent by Khao Yai's 200,000 visitors from point of departure to Khao Yai and back; the estimated impact of dry-season stream flow on agriculture equated to monetary terms from the market value of these crops or their real value as subsistence crops; improvement in village incomes by park-initiated rural development projects; the estimated potential value of the park's genetic material based on precedents both inside and outside the country. In cases where economic quantification is not feasible, such as the cultural importance of elephants, the benefits would be qualified in terms understandable to economists and politicians. The third step would involve projecting the impact of these beneficial uses on the population over the next 20 years, assuming complete protection of Khao Yai compared to graded levels of consumptive use of park resources. Finally, the data would be presented in a

suitable form commonly used by government agencies when presenting their case to decision makers as benefit-cost analysis.

Such a method would not be easily developed and would rely on inputs from a variety of disciplines. But it would allow the park manager to compete for funds on the same turf, using the same weapons, as other agencies. It would also provide him with tools to better rationalise the protection of parks against destructive exploitation; since 1975, government-approved development projects have had serious detrimental effects on no less than 14 protected areas. Two of Thailand's premier parks are now being threatened with dam projects.

Thailand's conservation proponents have never successfully stopped a major development scheme from being implemented in a protected area. One of the primary reasons is that the projects' backers present their case to government decision makers in concrete terms (whether justifiable or not) showing how the population will be better off with the project than without it. In Thailand, all requests for government funds must first pass through an agency staffed primarily with economists possessing virtual veto power over submissions; projects rejected by them never reach the political arena for debate. Although most staff members consider factors other than purely economic ones, all members are heavily influenced by the economic justifications presented. Thai conservationists have thus far been unable to develop such justification beyond a primitive level.

Another major reason is the reactionary character of protected area conservation. Thai conservationists normally do not take issue with these development schemes until project planning is well underway. And when they do decide to fight, it takes additional months to prepare a case of enjoining or modifying the scheme. An existing beneficial use analysis of the protected area would allow for immediate rebuttal of plans for destructive development.

Finally, beneficial use analysis of parks and sanctuaries will help improve management of these areas by pointing out potential benefits which could be supplied to the population. New management strategies can then be formulated, or existing strategies modified, to maximise these benefits. In doing so, the arguments for protection will be further enhanced.

6. CONCLUSIONS

The Khao Yai National Park Management Plan is a useful document for showing how Thailand's protected areas can be better administered and thus more fully achieve their biological and social objectives. Management programmes outlined in the plan, especially the community development programme, offer patterns that other parks and sanctuaries can follow to alleviate the widespread problems of persistent poaching and encroachment. However, without proper government support, the future of park planning and the viability of the protected area system as a whole is in doubt. A system to evaluate the benefits Thailand receives from these areas must be developed so that protected area managers can present cogent and prevailing arguments to the country's decision makers.

Management Problems in the Andean National Parks and Protected Areas of Peru

Marc J. Dourojeanni

ABSTRACT. *Peru shares many features with countries of the Hindu Kush-Himalaya, being mountainous, diverse, and filled with difficult social and ecological problems. Therefore, many of the lessons learned in Peru can be applied in this region, and vice versa. Peru has established a range of different categories of protected areas which maintain the integrity of the national park ideal for the most superb areas, while also providing some degree of conservation to other areas where some human involvement is desirable or at least inevitable. Public awareness among the urban decision makers and improved co-operation with local people are highlighted as the two critical problems.*

1. INTRODUCTION

Three natural regions clearly define the 129 million hectares of Peru: the long and generally narrow desert coast, along the Pacific ocean; the wide Andean range, composed of three more or less parallel chains of tall mountains delimitating high plateaux and deep valleys; and the vast Amazon jungle, covering the eastern slopes of the Andes from 3,800 m above sea level (asl) and extending to the lowland forests at 100 m asl on the boundary with Brazil. The geography of Peru makes this country ecologically complex, 84 life zones being recognised *(sensu* Holdridge, 1978; ONERN, 1976). Thus the establishment of a representative network of national parks and protected areas is a difficult task, well advanced but still not yet complete.

The Peruvian system of Conservation Units is formed by 21 areas covering 5,137,725 ha (4 per cent of the national territory). The Peruvian categories included are national parks (6), national reserves (8), national sanctuaries (4) and historic sanctuaries (3). There are also other categories of protected areas such as national forests (6 covering 5,500,102 ha), biosphere reserves (3 covering 2,511,841 ha, mostly existing national parks), reserved zones (2 covering 305,735 ha), and official hunting reserves (2 covering 124,735 ha). Excluding the biosphere reserve areas superimposed to other categories, Peru has 8.6 per cent of its land territory under protective status.

In the Andes there are several conservation units, protecting important examples of the biogeographic provinces *(sensu* Udvardy, 1975) known as Yungas, Puna, Southern Andes and Titicaca Lake. The Yungas correspond to the eastern slopes of the Andes and includes Manu National Park and Macchu Picchu Historic Sanctuary. Other conservation units in the Eastern slopes are not included because most of their area is below 2,000 m asl.

2. ESTABLISHMENT OF ANDEAN CONSERVATION UNITS

The Andes have been heavily populated for several thousand years. The main human impacts prior to the European arrival, were the fire-clearing of forests *(Polylepis, Buddleia)* to allow the establishment of natural grasses for vicuna, guanaco, and deer, and later also for the domesticated llama and alpaca as well as to develop agriculture in the valleys. More than a million ha of irrigated terraces were built. The Andes are the source of more than a hundred domesticated plants, including potatoes, tomatoes, corn, ullucu, maca, quinoa, coca, beans, tobacco, lucumo and hot peppers. After the Spanish arrival the modification of the environment was even greater due to introduction of cattle, sheep, goats, horses, and donkeys and the disruption of the communal lifestyle. Today, only some 6,000 ha of degraded *Polyepis* and *Buddleia* stands still remain, mainly in the Huascaran National Park and a few other conservation units. All other natural ecosystems of the Andes were also heavily modified during more than 15,000 years of human presence and especially during the last five centuries.

When establishing the Peruvian system of conservation units in the late 1960's and 1970's it became evident that only the snow peaks were unmodified by man and that most lands were privately owned. Despite the heavy modification and degradation of the natural ecosystems, it was also obvious that the Andes still had significant genetic diversity as well as other natural values such as scenery.

The strategy to establish conservation units in the Andes had to be different from what was currently ap-

plied on the coast or in the Amazon, where virgin natural areas were still available and most of the land was still in State hands. This strategy was based on the concept of "national reserve", which in Peru, is a category of protected area where some of the natural renewable resources (e.g., grasslands for livestock, wild animals of high value, fisheries or some species of plants) are managed for the benefit of local people following traditional uses of the land (e.g. pasture of alpaca, llama, sheep or cattle) or applying new technologies (e.g., management of cicuna, guanaco or waterfowl). The ownership of the land could be entirely private and national reserve status is used to restrict destructive land use patterns (e.g. grassland burning, overfishing).

The success of the national reserves depends on the advantages and benefits that accrue to local people. Usually it is easy to demonstrate that more effective use of natural resources is achieved. The vicuna management in Pampa Galeras National Reserve and in hundreds of thousands of ha of communal land is one of the better known examples (Brack *et al.*, 1981; Ponce, 1984). The same applies to Titicaca and Junin National Reserves, where peasants living in artificial islands on the lake or around it obtain benefits from waterfowl and frog management as well as from aquatic vegetation (Dourojeanni and Ponce, 1977; Dourojeanni *et al.*, 1967). Another advantage is that the status of national reserves avoids external exploitation of local natural resources by consolidating the ownership of local people. There are many other advantages and benefits, such as tourism and recreation, sport hunting and fishing, which may provide extra income from the land as well as employment.

The above description of natural reserves is also partially valid for national sanctuaries with the important difference that species or other resources which are the reason for the establishment cannot be used. Calipuy National Sanctuary protects a relictual stand of *Puya raimondi* and some spectacled bears *(Tremarctos ornatus).* Huayllay National Sanctuary protects unique geological features and also some interesting wildlife. In both areas there is livestock grazing and the land is privately owned.

In the case of two of the three historic sanctuaries the land is also private. Only Macchu Picchu is partially State-owned and an expropriation procedure is being undertaken.

Peruvian forestry legislation requires that national park land be State-owned. This is the case for Manu National Park although tribal groups are resident and allowed to follow their traditional lifestyles. In the Huascaran National Park the greatest part of the area is owned by the State but there are several small portions of its lower range which are communal land. The agreement for the use of this portion is that only native livestock (llama and alpaca) should be allowed and that grass burning is prohibited. In general, the Peruvian Forestry Service policy for the establishment of conservation units in the Andes was very successful and most of the social and environmental goals were reached. Failures were always a consequence of local mismanagement or mistakes. These policies were perhaps even more effective than when the land was State-owned as in the Amazon region, which caused antagonism with neighbouring populations. In summary, policies consisted of:

- full recognition of local people's rights and interest;
- a realistic approach to categories of protected areas, especially definition of national reserves;
- elasticity in the application of the legislation in order to cover exceptions as in the Huascaran National Park.

3. MANAGEMENT OF ANDEAN CONSERVATION UNITS

Management problems in Peru are essentially of an administrative nature: inadequate funding; scarcity of qualified staff; lack of equipment and infrastructure; lack of control; and poor application of plans.

Financial resources available for national parks and protected areas recieved a low political priority and even lower priority in the Forestry Service to conservation responsibilities (wildlife, protected areas, watersheds). This is a symptom of a lack of national public awareness for environmental matters. This is essentially a characteristic of the urban population which make up the majority of the voting citizens.

Of all Andean conservation units only Pampa Galeras National Reserve and Manu and Huascaran National Parks have official budgets. Some others, like Junin, Titicaca and Salinas-Aguada Blanca National Reserve, have some funding from the local Forestry District offices. But others have no funding and are essentially "pauper" protected areas such as Calipuy National Reserve and Calipuy National Sanctuary. Macchu Picchu, as well as the other Historic Sanctuaries, receive some funds from other from other public sectors, like Education or Army, but those resources are not usually oriented to environment management.

The major management problems of the Peruvian Andean conservation units are:

- the interference of protectionist – minded activists against the utilisation of natural renewable resources for the benefit of local populations. The resistence is strongest when there is need to manage populations of endangered species like vicuna (even when the local vicuna population is high);
- the interference of anti-government politicians in rural communities; and
- the interference of local or regional economic power groups, especially those dealing with mining activities.

The scarcity of well trained people, but especially the lack of commitment among the professionals in charge of the units, is a key constraint. Alcoholism is a very serious problem affecting professional staff. Low salaries are not the only cause of this behaviour; curiously enough, guards and technicians, with the lowest salaries and opportunities, generally show more interest and enthusiasm than their superiors. However, a slow but noticeable positive change in the professional staff attitude, has begun.

Manu, Huascaran, Huayllay, Titicaca, Junin and Pampa Galeras have management plans, though they are not officially approved except in the case of Titicaca. In fact, management plans have never been effective due to lack of adequate budgets. Year after year implementation has been postponed. Often only emergency actions receive attention.

Many of the conservation units are submitted to threats. These may be grouped as follows:

- threats originating from regional or national interests like road building (Huascaran, Manu), mining (Huacaran, Manu, Huayllay, Salinas-Aguada Blanca), pollution (Titicaca, Junin, Salinas-Aguada Blanca), new settlements (Manu), oil exploration and exploitation (Manu), hydraulic development (Junin, Salinas–Aguada Blanca, Macchu Picchu, Manu).
- threats originating from local interest such as over-grazing (Titicaca, Junin, Huascaran, Salinas-Aguada Blanca, Calipuy), unlawful hunting and fishing (all units); and
- threats originating from land-owners in the units.

A special threat to Huascaran National Park and Macchu Picchu Historic Sanctuary is tourism. Huascaran receives hundreds of high mountain climbers and many more hikers. Macchu Picchu receives several thousand visitors. In both cases tourists are a major cause of pollution and vegetation destruction, including forest fires.

4. THE FUTURE

The key issues for the future of Andean conservation units in Peru are twofold: on the one hand it is critical to raise public awareness, especially among the dominant urban citizenship, to highlight the political priority for conservation. This action must focus on obtaining increased budgets for management of protected areas and support to address the threats to them. On the other hand, the Forestry Sector should follow its present relationships with local people, making them full participants in the long-term goals of conservation. The relationship between the conservation units and the local communities must be a mutual symbiosis and the main effort of professional staff must be to build, with originality and inventiveness, these relationships.

Annexes

I. Recommendations

II. List of Participants

III. Workshop Programme

IV. Scientific names of species referred to in the text

V. Selected References

Annex I. Recommendations

1. PEOPLE AND PROTECTED AREAS IN THE HINDU KUSH-HIMALAYA

Realising that the people who belong to the area designated as a protected area should not be relocated elsewhere as, over the centuries, they have developed adaptation technologies which need to be conserved;

Recognising that the increase in both human and animal population is one of the major factors which brings about negative effects in Protected Areas; and

Considering the need to help support national population programmes:

The International Workshop on the Management of National Parks and Protected Areas in the Hindu Kush-Himalaya at its meeting in Kathmandu from 6 to 11 May 1985,

Stresses that there exists a need for a *community development strategy* at the regional or district level, around the Protected Areas, which should include:

- research and studies to suggest alternatives to existing methods utilised in agriculture and animal husbandry;
- the socio-economic development of the people living in the vicinity of National Parks and Protected Areas;
- the development of special training courses on conservation for social workers who deal directly with social welfare in districts where protected areas are located;
- the creation of a real basis for the alliance between the communities around the Protected Areas and the managers of such areas to work together towards a "partnership for conservation";

Urges ICIMOD to play a leading role in collecting information on the Social and Cultural patterns of various societies of the region, and to act as the repository of techniques, customs and traditions related to the sustainable use of resources for the countries of the region.

Recommends that more research be undertaken along interdisciplinary lines with emphasis on participation action research by involving the local people in the protection and development of the ecosystems, and

Urges that studies of successful population programmes in the region be undertaken for identification, analysis and further promotion.

2. BIOSPHERE RESERVES

Recognising the need for clearer understanding of the concept of Biosphere Reserves, especially how it is different from the existing and future National Parks which too are being managed on a core-buffer zonation basis; and

Noting with concern the slow progress in the establishment of Biosphere Reserves in this region; The Workshop

Endorses the biosphere reserve concept as a productive means of dealing with lands surrounding national parks and other protected areas;

Recommends unanimously that the Man and the Biosphere Programme of UNESCO should organise a meeting/seminar within the framework of the Biosphere Reserve Action Plan to be attended by the policy makers, planners and managers of proposed Biosphere Reserves to understand the concept and vigorous implementation of the Biosphere Reserve Action Plan in the region, and

Further Recommends that, in view of the importance to comprehend fully the complex and integral relationships between major river basins and mountain systems of the region, the countries of the Hindu Kush-Himalaya undertake to co-operate in the establishment of Joint Biosphere Reserves as important symbols and vehicles of international co-operation in the field of nature conservation.

3. PLANNING THE ESTABLISHMENT OF PROTECTED AREAS IN CONSIDERATION OF GENETIC RESOURCES AND HUMAN NEEDS

3.1 *Professional development of protected area managers*

Realising the importance of regular meetings to exchange information and promote further professional experience for protected area managers; and

Warmly welcoming the efforts of ICIMOD and the King Mahendra Trust for Nature Conservation in making the workshop a reality; The Workshop

Suggests that ICIMOD consider development of training programmes for professional managers of protected areas and holding of regional Workshops in different countries of the region on a regular basis, and of ICIMOD in conservation and resource management in the mountains of the region.

3.2 *Planning*

Concerned about the increasing pressures on protected areas in the Hindu Kush-Himalaya;

Convinced that improved management of protected areas is intimately linked with developments in the surroundings lands; and

Aware that well-designed management plans can be crucial documents in improving protected areas; The Workshop

Recommends that management plans be prepared for each protected area in the Hindu Kush-Himalaya, that such management plans be prepared by the institutions that actually manage the protected areas, based on sufficient data and modern approaches to management, that mechanisms be explored for integrating protected area management plans with the national, regional and local development planning and implementation process; that area management plans be considered part of the national conservation strategy, in the countries where such documents are being prepared; and

Calls on IUCN, UNESCO, FAO, and other international organisations to be prepared to provide assistance in the preparation of management plans on request by governments of the Hindu Kush-Himalaya region.

3.3 *Data base on protected areas*

Aware of the great quantity of information about the natural resources of the Hindu Kush-Himalaya, and

Considering the need to use these data effectively to improve design of development projects and management of protected areas; The Workshop

Calls on ICIMOD to further develop the work initiated by IUCN in preparation of a data base on protected areas in the Hindu Kush-Himalaya, to be applied for monitoring, identification of priorities for establishment of new protected areas, and promotion of conservation efforts; and

Suggests that consideration be given to the establishment of a group of highly qualified protected area managers from within the Hindu Kush-Himalaya region who would have the responsibility of monitoring the status and trends of protected areas in the region.

3.4 *Categories of protected areas*

Recognising that a variety of approaches to protecting natural ecosystems is required to supplement the strict protection afforded by National Parks if significant additional land is to be added to protected area systems; and

Welcoming major international programmes such as World Heritage and Biosphere Reserves; The Workshop

Recommends that countries which have not already done so consider adding categories other than National Parks to their protected area systems; and

Calls on the governments of the region to consider adhering to the World Heritage Convention and nominating appropriate sites for inclusion on the World Heritage List;

3.5 *Conservation in the Annapurna region*

Being aware of the Directive of His Majesty the King of Nepal regarding conservation and tourism in the Annapurna region; and

Concerned with the need to balance human use with the sustained capacity of natural resources; The Workshop

Endorses the concept of incorporating the needs of local communities and the tourist industry with protection of the unique natural values of the Annapurna region, and

Further encourages the non-governmental organisation, the King Mahendra Trust for Nature Conservation to consult with all interested parties in developing a model conservation and development plan for the Annapurna region, in close collaboration with His Majesty's Government of Nepal, Department of National Parks and Wildlife Conservation.

4. MANAGEMENT OF PROTECTED AREAS

4.1 *Energy needs of protected areas*

Realising that firewood is a basic need common throughout the Hindu Kush-Himalaya region: and

Aware that forest cover is critical for environmental preservation, The Workshop

Recommends that alternative energy sources (especially hydro-electricity) should be developed to meet the energy needs of the region as a whole through regional co-operation, and

Suggests that possible hydro-electric installations within National Parks and Protected areas must carefully

examine their environmental impact before final decisions are made.

4.2 *Tourism and protected areas*

Being Concerned that the environmental impacts of tourism, particularly in several of the National Parks in Nepal. The Workshop

Calls on IUCN to undertake a project on Environmental Impact of Tourism in the National Parks of Nepal in collaboration with relevant agencies of His Majestry's Govvernment of Nepal, and

Suggests that the findings be incorporated in the Nature Conservation Strategy of the countries in the Hindu Kush-Himalaya,

5. ENVIRONMENTAL EDUCATION AND TRAINING

Recognising that environmental education and training are major steps towards dealing effectively with the problems of conservation and utilisation of natural environment; and

Aware that environmental education should be mutually supportive to the National Parks and Reserves management; The Workshop

Recommends that a regional manpower requirement survey be undertaken to determine future requirements in the human capacity to manage protected areas with special attention to the lower level cadre of staff and to the possibility of establishing a regional training centre for the management of Protected Areas.

Calls on all the countries of the Hindu Kush-Himalaya region to promote and further strengthen their programmes of environmental education and training at all levels of formal education;

Recommends that appropriate programmes for the promotion of environmental education and training in the Hindu Kush-Himalaya be developed in co-operation with the governments of the region and other international agencies.

Suggests that in addition to the formal programmes, non-formal education programmes through the use of Radio and Television, should also be introduced and encouraged for mass education and particularly for the benefit of rural population by involving local social and religious institutions and leadership,

Further Suggests that more efforts should be made to improve the educational, training and research roles of national parks and protected areas for the benefit of the local population.

Stresses the need to encourage non-governmental organisations of the region to be actively involved in the national environmental education and training programmes,

Emphasises that greater regional co-operation among the countries through exchange of expertise would help improve the environmental education programmes of individual countries of the Hundu Kush-Himalaya, and

Urges UNESCO and the countries of the Hindu Kush-Himalaya to intensify efforts to produce suitable low-cost books, literature, slides and films in local languages for wider public dissemination.

6. BASIC REQUIREMENTS FOR THE MANAGEMENT OF NATIONAL PARKS AND PROTECTED AREAS

Considering that the natural and cultural heritage of the Hindu Kush-Himalaya has not been catalogued and that this should be documented before the increasing population pressure greatly affects such heritages,

Recognising that the primary interest of nature conservation and secondary objectives of obtaining water, tourism, forestry, game and others can be achieved by designating and managing national parks and protected areas;

Aware that there is a strong need to improve the capability to manage the national parks and protected areas; and

Recalling that the world conservation strategy has suggested that legislation, organisation, education and research are the basic requirements to improve the capacity to manage, The Workshop

Urges the countries of the region to take effective measures to reduce the population growth rate, to introduce land use planning, and to undertake environmental impact assessment of major development projects in order to assure sustained development without affecting conservation interests;

Recommends that the economy of mountain and flood plains be integrated to provide alternatives and additional resources to the mountain people.

Recommends that each country take up a review of its natural and cultural heritage and ensure preservation of samples of all ecosystems, species and habitats with designation and management of strict nature reserves.

Suggests that the existing legislation on national parks and protected areas be reviewed and improved by the countries of the region in consultation with all concerned interest groups.

Urges the countries of the region to provide organisational and financial back-up to match their commitment to nature conservation and for achieving other objectives of land use in national parks and protected areas;

Further Urges that because of the growing awareness of the role of protected areas in sustaining society and in the national development process of the Hindu Kush-Himalaya countries ICIMOD convene another workshop on the status of the management of protected areas in the region in three years time.

Annex II.
List of Participants

BHUTAN

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CHINA

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Mr. B.R. Chalise	Deputy Director, Department of Tourism, HMG/N Tripureshwar, Kathmandu
Mr. K. B. Chitrakar	Acting Project Chief, Forest Department, HMG/N, Babar Mahal, Kathmandu
Dr. C. P. Gorkhali	Rector, Tribhuvan University, Tripureshwor, Kathmandu
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Mr. Rajen Upreti	ICIMOD

Annex III.
Programme: International Workshop on the Management of National Parks and Protected Areas in the Hindu Kush-Himalaya

May 5 – Sunday

16:00 – 19:00 Registration at Hotel Shankar

May 6 – Monday

08:15 – 09:15 Registration at Hotel Shankar

09:30 Departure of Participants from Hotel Shankar to Gokarna Raj Nikunja

INAUGURATION PROGRAMME

10:00 – 10:15 Arrival of Participants and Guests at Gokarna Raj Nikunja Safari Park

10:15 – 10:30 Arrival of VIPs

10:30 – 10:45 Arrival of Members of the Royal Family

10:55 Arrival of Their Majesties
Welcome by the members of the Organising Committee

11:00 – 11:10 Welcoming Address and Highlights of the Workshop: Dr. Ratna S. S. J. B. Rana, Chairman of the Workshop and Chairman, ICIMOD Board of Governors

11:10 – 11:20 Response to the Welcoming Address: Mr. Russel Train, President WWF-US and Member, Governing Board of Trustees KMTNC

11:20 *INAUGURATION BY HIS MAJESTY KING BIRENDRA BIR BIKRAM SHAH DEV*

11:30 – 11:55 Keynote Address: HRH Prince Gyanendra Bir Bikram Shah, Chairman, King Mahendra Trust for Nature Conservation (KMTNC)

11:55 – 12:05 Vote of Thanks: Mr. Prabhakar Rana, Chairman Workshop Organising Committee

12:05 – 13:00 Lunch for Participants – Compliments of Gokarna Safari Park at Gokarna Raj Nikunja

13:00 Transfer to Hotel Shankar Workshop Venue

14:00 **Session 1**

Chairman: Dr. Ratna S.S.J.B. Rana, Nepal

Co-Chairman: Mr. Mohammad Rafiq, Pakistan

Rapporteurs: Mrs. Greta Rana and Ms. Zhang Li

Introductory Remarks: Prof. S. R. Chalise, ICIMOD – Secretary of the Workshop Organising Committee

Theme 1: HUMAN PRESSURE IN THE HINDU KUSH-HIMALAYA IN RELATION TO NATIONAL PARKS AND PROTECTED AREAS

1. Towards Sustainable Development. Sir Arthur Norman, KMTNC
2. Population Changes in the Hindu Kush-Himalaya with Reference to National Parks and Protected Areas. Dr. C. Jest, ICIMOD
3. The Fragile Mountain Revisited: Nepal's Agenda for Halting the Slide. Dr. H. Mishra, Nepal
4. Protected Areas vis-a-vis Local Population. Mr. W. A. Kermani, Pakistan

15:40 – 17:00 **Session 2**

Chairman: Sir Arthur Norman KMTNC

Co – Chairman: Dr. R.P. Yadav, ICIMOD

Rapporteurs: Dr. D. Bajracharya and Ms. Nima Ome

1. Park – People Interface: Some Problems and Prospective Suggestions. Mr. B. N. Upreti, Nepal
2. Man and Nature in the Himalaya. Mr. Jeffrey McNeely, IUCN
3. The Status and the Prospects of the Establishment and Management of the Nature Reserve in China. Dr. Li Wenhua. Member, ICIMOD Board of Governors.
4. Conflict of Interest between People and Management. Dr. Barry Leach, Canada.

18:00 Reception by KMTNC

May 7 – Tuesday

09:00 **Session 3**

Theme 2: BIOSPHERE RESERVE

Chairman: Mr. A. Latif Rao, Pakistan

Co-Chairman: Dr. H. R. Mishra, Nepal

Rapporteurs: Ms. P. Thacker and Mr. A. Storrs

1. Biosphere Reserve. Dr. G. Glaser, UNESCO, Member, ICIMOD Board of Governors
2. Community Protection of Forest Areas – A Case Study of Chautara Nepal. Dr. T.B.S. Mahat, ICIMOD
3. The Management of Ding Hu Shan Biosphere Reserve. Prof. Wang Zhuhao, China
4. Makalu Biosphere Reserve – a Proposal. Dr. D. Taylor-Ide, USA and Dr. T. B. Shrestha, Nepal

10:30 **Session 4**

Theme 3: PLANNING THE ESTABLISHMENT OF PROTECTED AREAS IN CONSIDERATION OF GENETIC RESOURCES AND HUMAN NEEDS

Chairman: Dr. M. Derkatch, UNESCO

Co-Chairman: Prof. S. R. Chalise, ICIMOD

Rapporteurs: Dr. Vinod Kumar and Mr. Anis Dani

1. Management Planning for Protected Areas in the Hindu Kush-Himalaya. Dr. J. Thorsell, IUCN
2. Role of National Parks for the Conservation of Endemic, Endangered and Threatened Plants of Nepal. Dr. T.B. Shrestha, Nepal
3. Preservation and Management of Endangered Panda in Nature Reserves of Szechuan, China. Mr. Wang Menghu, China.
4. Annapurna National Park: The Nepal Plan for Joining Human Values and Conservation of Mountain Ecosystems. Dr. Bruce Bunting/Dr. M. Wright, WWF-US
5. An Expanded Rationale for Protected Area in Hindu Kush-Himalaya. Dr. J. McNeely, IUCN

13:30 **Session 5**

Theme 4: MANAGEMENT OF THE PROTECTED AREAS

Chairman: Mr. Wang Zhuhao, China

Co-Chairman: Mr. Karna Sakya, Nepal

Rapporteurs: Dr. B. Bhadra and Dr. C. Jest

1. The Right to Graze in National Park – A Management Crisis. Dr. K. Sankhala, India
2. Management Problems in the Andean National Parks and Protected Areas of Peru. Dr. M. J. Durojeanni, IUCN
3. Development of National Parks and Management of Wild Life in Baluchistan, Pakistan. Mr. M. Rafiq, Pakistan
4. Adventure Tourism and Sustainable Development. Mr. B. D. G. Johnson and Mr. J.O.M. Roberts, U.K.
5. Management of Chitral Gol National Park, Pakistan. Mr. M. Malik, Pakistan

15:30 **Session 6**

Theme 5: ENVIRONMENTAL EDUCATION FOR PROTECTED AREAS

Chairman: Mr. B.N. Upreti, Nepal

Co-Chairman: Mr. T.B. Mongar, Bhutan

Rapporteurs: Dr. P. Roy and Mr. S. Basnyet

1. The Need for Environmental Education. Mr. Karna Sakya, Nepal
2. General Management Principles of Conflict Resolutions. Dr. C.P. Gorkhali, Nepal

16:25 – 17:30 **Session 7**

Theme 6: BASIC REQUIREMENTS OF IMPROVED MANAGEMENT OF PROTECTED AREAS

Chairman: Dr. M. Wright, WWF-US

Co-Chairman: Dr. Kk. Panday, ICIMOD

Rapporteurs: Dr. T.B.S. Mahat and Ms. Nima Ome

1. Basic Requirements for improved Management. Mr. A. Latif Rao, Pakistan
2. Basic Requirements for Improved Management of National Parks and Reserves in Nepal, Mr. Rabi Bista, Nepal
3. Basic Requirements for Improved Management – Case Study of Sagarmatha National Park, Nepal. Mr. Lhakpa N. Sherpa, Nepal
4. The Implementation of the Appropriate Energy Conserving Technology .Sagarmatha National Park. Dr. B. Coburn, USA

May 8 – Wednesday — Field Excursion to Royal Chitwan National Park, Narayani Zone.

07:00 — Departure from Kathmandu.

12:00 — Arrival Meghauli and transfer to Tiger Tops Lodge.

12:30 — Arrival at the lodge.

13:00 — Lunch and Briefing.

16:15 — Tour of National Park – 2 hrs.

19:30 — Cocktail reception, Dinner and Discussion on Local Education and Park Use with slides. Moderators: Mr. B. N. Upreti and Mr. K. K. Gurung

May 9 – Thursday — Field Excursion

06:30 — Departure for Kasra: Park Headquarters. Presentation of the activities of the Park and visit to the Gharial Conservation Centre

10:00 — Departure from Kasra

12:30 — Lunch at Tiger Tops

14:00 — Presentation of Slide Shows concerning National Parks and Protected Areas in the Hindu Kush-Himalaya Region.

15:30 — Drive to Narayani River and boat ride up Amaltari ghat and drive back to the lodge.

19:30 — Cocktail reception, and dinner followed by a discussion on the emerging issues on Parks Management and Biosphere Reserves

Moderators: Dr. H. R. Mishra, Dr. G. Glaser, Mr. B. Johnson

May 10 – Friday — Field Excursion/Return to Kathmandu

06:00 — Elephant Safari/Jungle Walk

09:00 — Departure for Kathmandu

15:00 – 17:00 — Visit to ICIMOD

18:00 — Farewell Reception by ICIMOD

May 11 – Saturday

08:30 — Final Session

Chairman: Dr. C.P. Gorkhali, Nepal

Co-Chairman: Mr. Jeffrey McNeely, IUCN

Rapporteurs: Dr. M. Banskota and Dr. H. Bista

Summary of the discussions presented by the rapporteurs and final discussion.

12:30 — Vote of Thanks

1. Brig. Gen. Sushil S. S. J. B. Rana, Member, Governing Board of Trustees, KMTNC.
2. Prof. S. R. Chalise, Secretary, Workshop Organising Committee

12:45 — Closing of the Workshop

Annex IV.
Scientific names of species referred to in the text

Latin and Common Names	
FAUNA	
Mammals	
Black Bear	*Selenarctos thibetanus*
Blackbuck	*Antilope cervicapra*
Wild Buffalo	*Bubalis bubalus*
Jungle Cat	*Felis chaus*
Desert Cat	*Felic libyca ornata*
Chauka, Four Horned Antelope	*Tetracornis quadricornis*
Chinkara	*Gazella gazella bonneti*
Large Indian Civet	*Viverra zibetha*
Barking Deer	*Muntiacus muntjak*
Musk Deer	*Moschus moschiferus*
Swamp Deer	*Cervus duvauceli*
Jungle Dog	*Cuon alpinus*
Gangetic Dolphin	*Platanista gangetica*
Elephant	*Elephas maximus*
Desert Fox	*Vulpes vulpes griffithi*
Gazelle	*Gazella gazella*
Goral	*Nemorhaedus goral*
Pigmy Hog	*Sus sylvanus*
Striped Hyaena	*Hyaena hyaena*
Asiatic Jackal	*Canis aureus*
Common Leopard	*Panthera pardus*
Snow Leopard	*Panthera uncia*
Assamese Macaque	*Macaca assamensis*
Rhesus Macaque	*Macaca mulatta*
Markhor	*Capra falconeri falconeri*
Chiltan Markhor	*Capra falconeri chiltanensis*
Suleiman Markhor	*Capra falconeri jerdoni*
Marmot	*Marmota bobak*
Yellow Throated Marten	*Martes flavigula*
Red Panda	*Ailurus fulgens*
Wild Pig	*Sus scrofa*
Rhino	*Rhinoceros unicornis*
Serow	*Capricornis sumatrensis*
Great Tibetan Sheep	*Ovis ammon hodgsoni*
Blue Sheep	*Pseudois nayaur*
Cairo Spiny Mouse	*Acomys cahirinus*
Himalayan Flying Squirrel	*Petaurista petaurista*
Magnificent Flying Squirrel	*Petaurista magnificus*
Himalayan Striped Squirrel	*Callosciurus macclellandi*
Himalayan Thar	*Hemitragus jemlahicus*
Tiger	*Panthera tigris*
Urial	*Ovis orientalis*
Weasel	*Mustela altaica*
Wolf	*Canis lupus*
Wild Yak	*Bos grunniens*
Birds	
Great Indian Bustard	*Choriotis Nigriceps*
Houbara Bustard	*Chlamydotis undulata macqueenii*
Lesser Bustards	*Chamydobis undulata*
Chukor	*Alectoris graeca*
Himalayan Snow Cock	*Tetragalus himalayensis*
Bonelli's Hawk Eagle	*Hieraaetus fasciatus*
Redheaded Merlin	*Falco chicquera*
Blood Pheasant	*Ithagerus cruentus cruentus*
Impeyan Pheasant	*Lopophorus impeyanus*
Satyr Tragopan Pheasant	*Tragopan satyra*
Koklass Pheasant	*Pucrasia macorlopha nipalensis*
Monal Pheasant	*Lophophorus impejanus*
Ring-necked Pheasant	*Phasianus colchicus*
Green Wood Pigeon	*Crecopus phoenicopterus*
Grey Partridge	*Francolinus pondicerianus*
Seesee Partridge	*Ammoperdix griseogularis*
Coronetted Sandgrouse	*Pterocles coronatus*
Imperial Sandgrouse	*Maquila heliaca*
Indian Sandgrouse	*Pterocles exustus*
Painted Sandgrouse	*Pterocles indicus*
Egyptian Vulture	*Neophron percnopterus*
Reptiles	
Gharial	*Gavialis gangeticus*
FLORA	
Bamboo Jungle	*Dendrocalamus* spp

Bamboo Jungle	*Arundinaria* spp
Bamboo Jungle	*Bambusa* spp
Birch	*Betula utilis*
Cedar	*Cedrus deodara*
Conifer	*Pinus gerardiana*
Cypress	*Cypressus torulosa*
Nepal Dandelion	*Taraxacum nepalese*
Daphne	*Daphne glacialis*
West Himalayan Fir	*Abies pindrow*
Fir	*Abis spectabilis*
Hemlock	*Tsuga dumosa*
Juniper	*Juniperus recurva*
Oak	*Quercus ilex*
Blue Pine	*Pinus wallichiana*
Pine	*Pinus roxburghii*
Pine	*Pinus patula*
Monterey Pine	*Pinus radiata*
Rhododendron	*Rhododendron* spp
Spruce	*Picea smithiana*
Sal	*shorea robusta*

Annex V.
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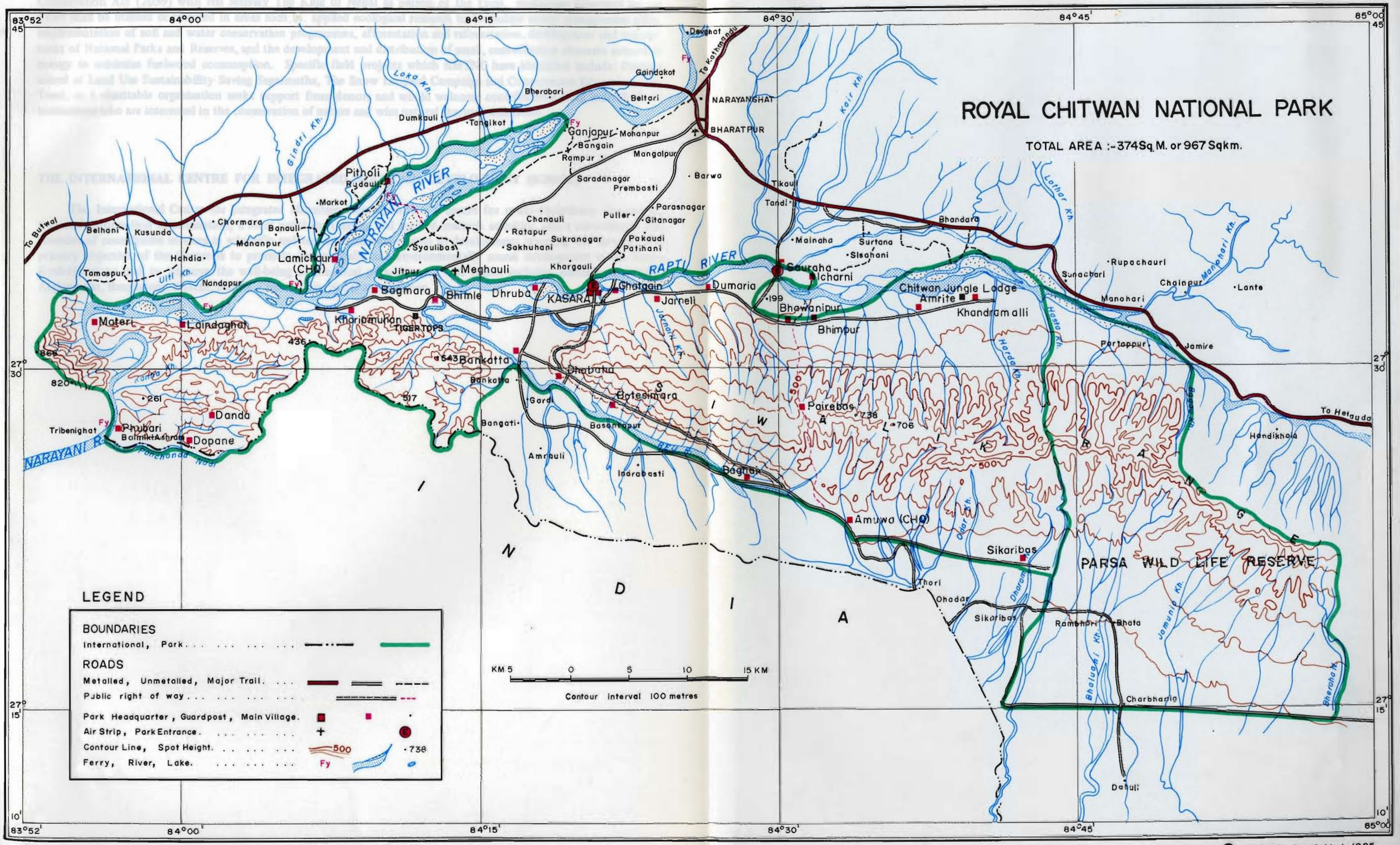
Annex VI.



Source: Department of National Parks and wildlife conservation. American Topo Sheet.

Prepared by: ICIMOD Jawalakhel 1985

THE KING MAHENDRA TRUST FOR NATURE CONSERVATION (KMTNC)

The King Mahendra Trust for Nature Conservation is an autonomous non-governmental and non-profit organisation established for the purpose of conserving, preserving and managing nature and its resources to improve the quality of life of the human population. The Trust is a legal entity established under the King Mahendra Trust for Nature Conservation Act (2039) with His Majesty The King of Nepal as patron of the Trust. Resources generated by the Trust shall be utilised or invested in areas such as: applied ecological research to formulate sound management plans, implementation of soil and water conservation programmes, afforestation and reforestation, development and management of National Parks and Reserves, and the development and distribution of small, cost-effective alternate sources of energy to minimise fuelwood consumption. Specific field projects which KMTNC have identified include: Projects aimed at Land Use Sustainability Saving Sagarmatha, The Snow Leopard Campaign and Conservation Education. The Trust, as a charitable organisation seeks support from donors and would welcome contributions from individuals or institutions who are interested in the conservation of nature and wise natural resource utilisation.

THE INTERNATIONAL CENTRE FOR INTEGRATED MOUNTAIN DEVELOPMENT (ICIMOD)

The International Centre for Integrated Mountain Development is a centre for multi-disciplinary documentation and information dissemination, a focal point for training and applied research activities, and a co-ordinator and provider of consultative services in scientific and technical matters related to development planning and actions. The primary objective of the Centre is to promote economically and environmentally sound development in the Hindu Kush-Himalaya and to improve the well-being of the local populations. This region includes, partially or totally, Afghanistan, Bangladesh, Bhutan, Burma, China, India, Nepal and Pakistan.