

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

Abdul Latif Rao

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ABSTRACT. This paper discusses the elements which are required by all protected areas to attain their objectives. These include legislation and law enforcement, research and surveys, education and training, management planning and implementation, and local support. A number of suggestions on how these might be achieved are given.

CHAPTER IV

PROTECTED AREA MANAGEMENT ISSUES

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 threatened by them;

— identification, site evaluation and designation of appropriate conservation category;

— management of national parks and protected areas;

— identification of new habitats;

— land use planning and development zones within the region;

— biological 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 ensures that management of the area for conservation will be sustained indefinitely. It is best to provide such guarantees 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 ecologically diverse enough to guarantee the survival of the necessary minimum wildlife populations; prevent the extinction of species; possess 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.

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- 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.

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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, over-exploitation 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 accommodate 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 consciously 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 management 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 in 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, concessionaires, 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 archaeological 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

Approvals page	
List of figures and tables	
List of appendices	
Preface	Acknowledgements, planning team members, management plan definition
Introduction	Location Legal Description and Overview

Chapter 1. National and regional background

- 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 | 7. Vegetation |
| 2. Watersheds and drainage patterns | 8. Fauna |
| 3. Water | 9. Role of fire (or other major natural influence) |
| 4. Climate and weather | 10. Critical areas and special considerations |
| 5. Geology and Geomorphology | |
| 6. Soils | |

Cultural Features

- | | |
|----------------|-------------------------|
| 1. History | 3. Anthropology |
| 2. Archaeology | 4. Contemporary culture |

Socio-economic Features

- | | |
|----------------------------------|---|
| 1. Regional Economy and land use | 3. Regional transportation system |
| 2. Demographic Characteristics | 4. Tourism, recreation, and existing infrastructure |

Chapter 2. Resource inventory and analysis (Summaries Only)

Biophysical Features

- | | |
|-------------------------------------|--|
| 1. Topography | 7. Vegetation |
| 2. Watersheds and drainage patterns | 8. Fauna |
| 3. Water | 9. Role of fire (or other major natural influence) |
| 4. Climate and weather | 10. Critical areas and special considerations |
| 5. Geology and Geomorphology | |
| 6. Soils | |

Cultural Features

- | | |
|----------------|-------------------------|
| 1. History | 3. Anthropology |
| 2. Archaeology | 4. Contemporary culture |

Socio-economic Use of the Area

1. Present land use and trends and regional integration
2. Visitor use of area
3. Analysis of visitors
4. Illegal uses in area

Synthesis and Statement of Significance

Chapter 3. Management considerations

Objectives

Limitations and Constraints

Management Zones

- Primitive or protection zone
- Extensive use zone (dispersed use)
- Intensive use zone (concentrated use)
- Cultural zone
- Recovery zone
- Special use zone

Boundaries

Chapter 4. Management programmes

- | | |
|--|-------------------------|
| 1. Environmental Management Programme. | 2. Public Use Programme |
|--|-------------------------|

- | | |
|------------------------|----------------------------------|
| a) Protection | a) Recreation |
| b) Resource management | b) Interpretation |
| c) Law enforcement | c) Education |
| | d) Tourism |
| | e) Public Relation and Extension |

- | | |
|-------------------------|----------------------------|
| 3. Operations Programme | 4. Research and Monitoring |
|-------------------------|----------------------------|

- | | |
|-------------------|--|
| a) Administration | a) Management-oriented research needs |
| b) Maintenance | b) Monitoring of resource status and management effectiveness. |

- | | |
|--------------------------------------|-------------------------|
| 5. Integrated Development Programme. | 6. Development Schedule |
|--------------------------------------|-------------------------|

- | | |
|--------------------------|----------------------------|
| a) Development Areas | d) General Development Map |
| b) Personnel Development | e) Financial Implications |
| c) Institutional factors | 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 of Chiltan-Hazarganji National Park, which is designed to deal with

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 South-west 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.

of dry temperate type. It is in the western part of the park, the vegetation is of the type of

Common birds of the area include such game birds as chikor and seese. 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 seese 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.

ABSTRACT: This paper discusses the management of the national park in Baluchistan, Pakistan. It is one of the largest national parks in the world and has been declared a national park in 1977. The park is situated in the western part of the province and covers an area of 150,000 ha. The park is a natural habitat and is home to a variety of wild animals and birds. The park is a natural habitat and is home to a variety of wild animals and birds. The park is a natural habitat and is home to a variety of wild animals and birds.

1. MANAGEMENT OBJECTIVES

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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 deodard* 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 Chitral 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 be 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 effects 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 accommodated 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 Chilian 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 argyrop-hylla*), 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 roxel-lanae*), Whitelipped deer (*Cervus albinostriis*), Yangtze

alligator (*alligator sinensis*), *Panthera tigris*, *Crossoptilon mantchuricum*, *Gius japonensis*, *Pygathreix namaeus*, *Cervus nippon*, and *Equus przewalskii*.

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.

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 section of this nonprofit organization, unique in the Third World, is to promote economic opportunity through projects that require conservation of natural resources. Under the shadow of their fragile mountains, the Nepalese are now realising that ignoring ecological imbalances 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 skeptics 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 tumbled landslides that blocked highways. In many parts of the country, homes were washed away and this led to deaths by drowning of a number of villagers and livestock. Rivers ruined farmland and ate 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, 1984).

This landlocked country of incomparable natural beauty is also one of the world's poorest. One of the plagues of environmental problems is stagnating population growth is one of the highest in the world. Two-thirds of the people dwell in agriculturally hostile and rugged mountainous terrain that produces only one-third of the food required. Each year, the fast eroding rivers wash over 6,000 tonnes of soil and 240 million tonnes of Nepal's precious soil into the Bay of Bengal (Shah, 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 King of Nepal has achieved remarkable success in creating an extensive network of national parks and wildlife reserves in less than 11 years. Much of this work, however, will be undone if governments fail to grasp that systems covering the basic needs of the food, fuel, health, and shelter for the government farmer outside the park boundaries, there may be an 80% loss in soil (Shah, 1975; Miller and Shrestha, 1981; Miller, 1981; Shrestha et al., 1981; Shrestha, 1981).

The aim of this paper is to illustrate the hard work necessary to conserve in a country where the abundance of natural resources in Nepal. It follows the King Mahendra Trust for Nature Conservation Strategy (KNTNS, 1981). Finally, this paper highlights the creation of a unique institution dedicated to promoting rural development through conservation, the King Mahendra Trust for Nature Conservation, and discusses the agenda which it designed to meet its goal.

As will become clear, Nepal's environment is in a precarious state. The Himalayan forest peopled by a primitive population. It is the task of the King Mahendra Trust and other agencies to help the state that has been left behind.

2. THE SETTING

The Kingdom of Nepal is a land of unique ecological features. Within a short span of about 200 km, the

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 imbalances 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 impoverished 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 Conservation, 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 augmented 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 annually (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 manage-

ment 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 rehabilitation 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 administrative 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 accommodate 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 occurred. 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 comparisons 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 archaeologists. 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 officer'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 accommodation, 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 close 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 reforestation 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 gumpa 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-Castanopsis 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 endemics 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 expedition 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 Marmot
Rhesus Macaque	Magnificent Flying Squirrel	
Assamese Macaque	Squirrel	
Large Indian Civet	Red Panda	
Jungle Dog	Yellow Throated Marten	
	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
Yellow-Bellied Flycatcher	Warbler
Gold-Crowned Black Finch	Lesser Long-Billed Thrush
Chestnut-Crowned Warbler	Tailor Wren Babbler
	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 con-

sideration. 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 earth.

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

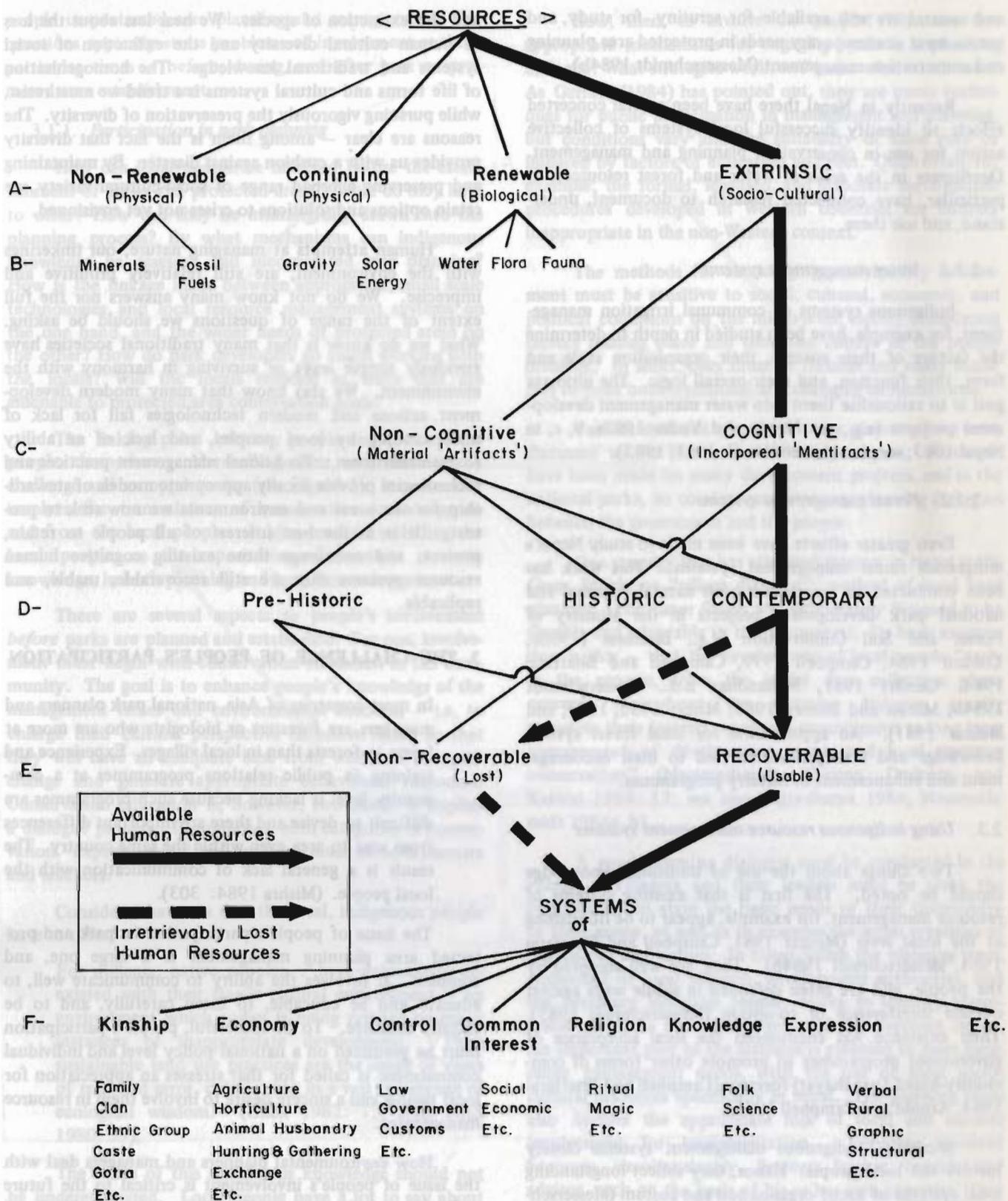


Figure 1. Resources.

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 tinkering 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 interpret 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 co-existed 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, there are many techniques for public participation in management and planning, but conditions vary and the suitability of some may be impaired 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 *Gaun 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, simultaneously, 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

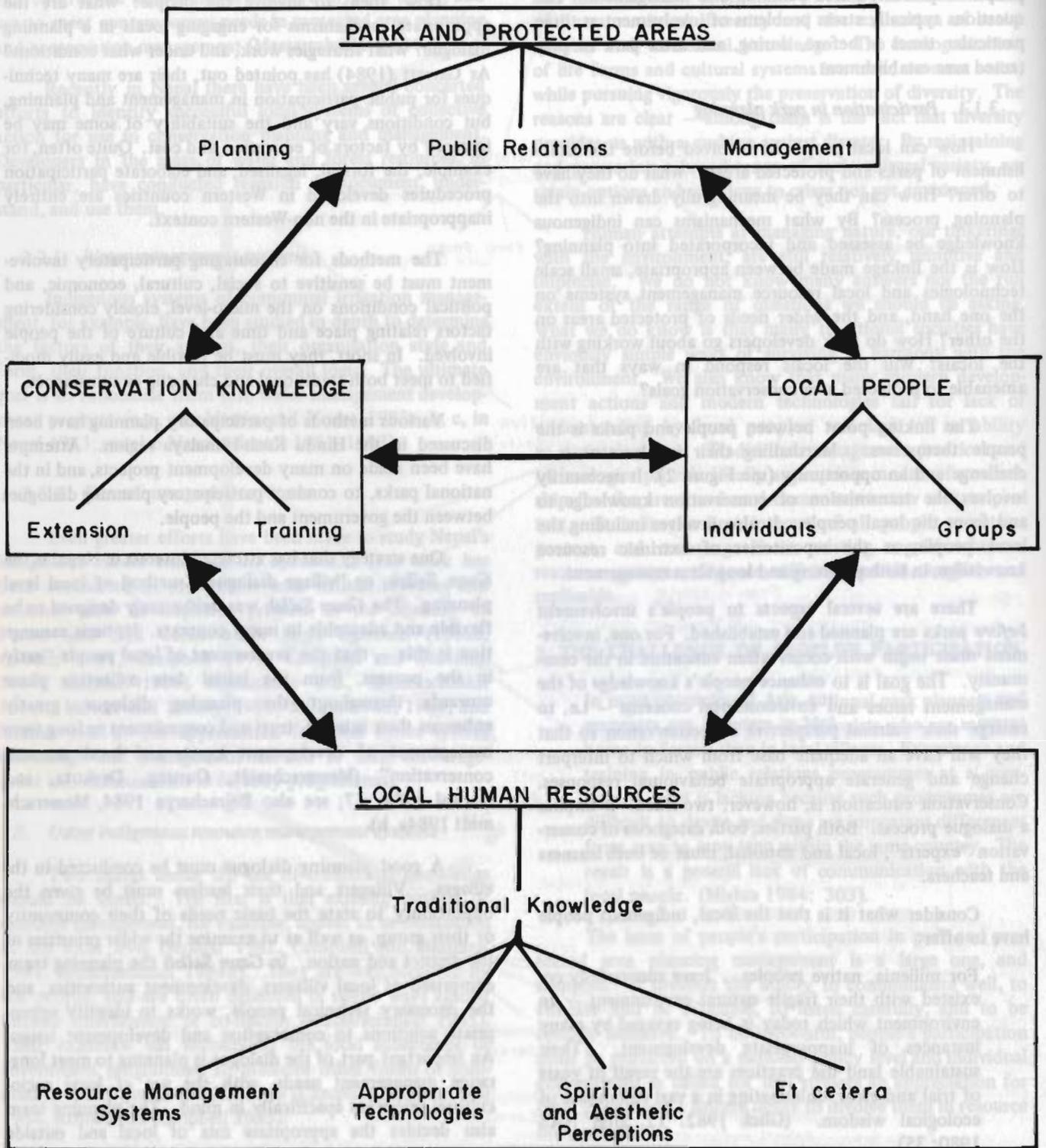


Figure 2. Use of Human Resources

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-military 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, comple-

mentary 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).

HUMAN

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 seasons away from their birthplaces. They include ex-military men, guards and watchmen, medical practitioners, teachers, coolies, divers, mechanics and various other categories. Many of them are literate and return home as teachers and opinion makers in their communities. They are an invaluable pool of human resources for parks and reserves.

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