

**HOLISTIC APPROACH TO NATURAL RESOURCE AND HUMAN MANAGEMENT:
A CASE STUDY OF THE HIMALAYAN NATIONAL PARKS IN NEPAL**

by

Nima Wangchu Sherpa

**A Professional Paper submitted in partial fulfillment
of the requirements for the degree of**

of

Master of Science

in

Soils

**MONTANA STATE UNIVERSITY
Bozeman, Montana**

April 1994

P378
Sh569

APPROVAL

of a Professional Paper submitted by

Nima Wangchu Sherpa

This professional paper has been read by each member of the thesis committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

April 29, 1994

Date

Cliff Montagne

Chairperson, Graduate Committee

Approved for the Major Department

4/29/94

Date

[Signature]

Head, Major Department

Approved for the College of Graduate Studies

5/18/94

Date

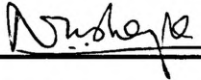
R. L. Brown

Graduate Dean

STATEMENT OF PERMISSION TO USE

In presenting this professional paper in partial fulfillment of the requirements for a master's degree at Montana State University, I agree that the Library shall make it available to borrowers under rules of the Library.

If I have indicated my intention to copyright this professional paper by including a copyright notice page, copying is allowable only for scholarly purposes, consistent with "fair use" as prescribed in the U. S. Copyright Law. Requests for permission for extended quotation from or reproduction of this professional paper in whole or in parts may be granted only by the copyright holder.

Signature 

Date April 29, 1994

ACKNOWLEDGEMENT

I am indebted to the World Wildlife Fund (WWF) for the financial support provided for my education at Montana State University. I owe my deep gratitude to WWF chairman Honorable Russell Train, President Kathryn Fuller, Dr. Bruce Bunting, Mingma Norbu Sherpa, Brian Peniston, and many others.

I extend my sincere thanks to my advisor, Dr. Cliff Montagne, for his inspirational and educational help. I am also thankful to committee members Dr. Clayton Marlow, Dr. Bruce Maxwell, and Dr. Keith Jamtgaard.

Former and current Directors General Dr. T. M. Maskey and Dr. U. R. Sharma of Department of National Parks and Wildlife Conservation of His Majesty's Government of Nepal deserve my kind appreciation for their approval of my study leave.

I am thankful to my wife Mingma and our children for their support during my long absence from home. Family members and many friends in the United States provided much help to me; I am thankful to all of them.

TABLE OF CONTENTS

	Page
LIST OF FIGURES	vi
ABSTRACT	vii
INTRODUCTION	1
PROTECTED AREAS SYSTEM	2
Himalayan National Parks	4
Indigenous people	5
Agro-pastoralism system	6
Park-people interface	8
CONSERVING BIODIVERSITY	10
TOP-DOWN vs BOTTOM-UP APPROACH	13
BUILDING SUSTAINABLE COMMUNITIES	15
TOURISM IMPACT	18
FUTURE CHALLENGES	21

LIST OF FIGURES

Figure

1. Cross section of the Nepal Himalaya 1
2. Protected Areas of Nepal 3
3. Holistic Resource Management-soft system Model 29
4. HRM-visual model 46

ABSTRACT

This paper is divided into two sections. Section I describes the Protected Areas Management System in Nepal, where a human population resides within the Himalayan National Parks. Local residents have to obtain firewood, fodder, and leaf litter from the park forest and also graze large herds of domestic livestock. Subsistence agriculture activities include growing annual crops at high elevations. An increasing number of tourist visits to the mountain national parks of Nepal are placing heavy demands on the forest for both fuelwood and timber requirements. The park management faces conflicting issues between preservation of the park forest and wildlife, while trying to meet the fuelwood, timber, and grazing demands of the local people.

Section II proposes theory and application of holistic management to natural resource and human management situations for Himalayan National Parks in Nepal. Holistic management is a systemic, problem solving and decision making process described by the Holistic Resource Management (HRM) model of Savory (1988). Montagne has adapted the HRM-model to the circular format of the Kolb learning styles and soft systems. HRM-soft systems requires perceiving the problem through the views of the users. Then both rational and intuitive reasoning can be used to develop possible solutions. The solutions are tested before use to predict if they will actually solve the systemic problem. When solutions are applied, the system is continually monitored and readjusted.

A scenario case study of Shey-Phoksundo National Park in Nepal addresses items of concern with the park policies, the local "indigenous people's" need for resources, and the impact of tourism on the environment and socio-economy of the people. The scenario case study explores the application of the Holistic Resource Management model to natural resource and human management of the park. Various paradigms, tools, and policies are described as solutions to the problems. The tools, and policies are tested to see if they would treat the causes, strengthen the weak links, and move the whole system towards the common goal.

PART I

INTRODUCTION

The Himalayan Kingdom of Nepal is a land of unique ecological contrast. Within a short span of about 200 km, the altitude varies from 75 m above mean sea level to the highest point on the Earth's surface at 8,848m. Nepal is known for its natural beauty as well as for the geographic and biological diversity within its borders.

Biogeographically, Nepal lies in the transitional zone between the Indomalayan and Palaearctic realms. Nearly 100 mammals and over 800 species of birds have been recorded in the country (Upreti, 1985; Mishra, 1985). Vegetation ranges from the subtropical sal (*Shorea robusta*) forests in the lowlands to fir (*Abies spectabilis*), pine (*Pinus wallichiana*), hemlock (*Tsuga dumosa*), birch (*Betula utilis*), juniper (*Juniperus recurva*), and the many rhododendron species that dominate the mountain landscapes (Figure 1).

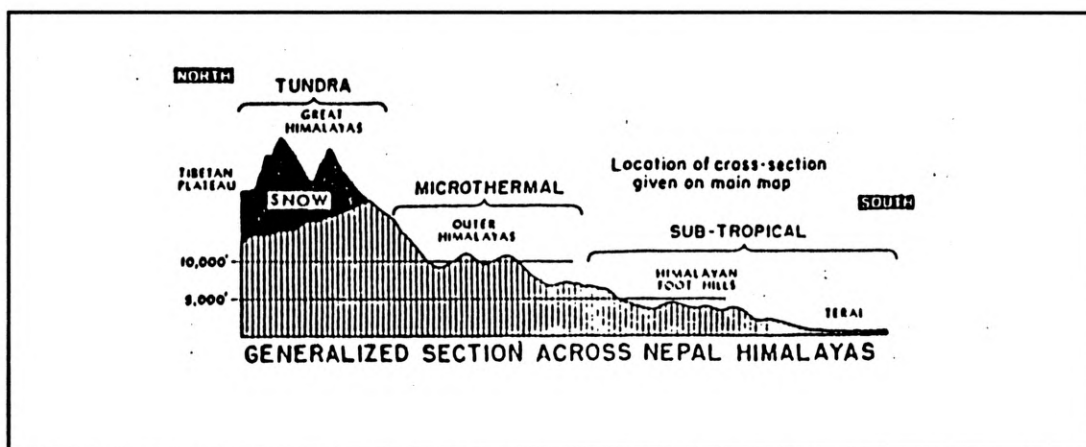


Figure 1. Cross section of Nepal Himalaya (Karan, 1960).

Nepal, as a landlocked country, is one of the poorest countries in the world with a population growth of 2.6% per annum. More than 90% of the people are subsistence farmers who depend on the forest lands for fuel, fodder for their animals, and timber for construction. Firewood meets more than 97% of the hill farmer's total energy requirements; however the forests are being destroyed at a rate of nearly 3% per annum (Hough and Sherpa, 1989).

Deforestation combined with overgrazing by domestic livestock and cultivation of crops on marginal land leads to soil erosion and landslides during the monsoon season. Nepal has some of the worst examples of human-induced erosion in the world (Dregne, 1992).

PROTECTED AREAS MANAGEMENT SYSTEM

Realizing the need to protect the diminishing forest areas, wildlife species, and scenic landscapes representing different ecological regions of the country, His Majesty's Government of Nepal promulgated the 1973 National Parks and Wildlife Conservation Act. The act and its subsequent amendments provide the legal basis for the creation and management of protected areas, protection to some species, hunting regulations, tourism concessions, and jurisdiction to enforce rules and regulations.

The Department of National Parks and Wildlife Conservation (DNPWC) of His Majesty's Government of Nepal implements policies and programs to protect and manage Nepal's wildlife resources and areas of outstanding scenic

landscapes. Thus far, 14 protected areas covering over 10% of the land area have been designated as national parks, wildlife reserves, hunting reserves, and conservation areas representing different ecological regions of the country (Figure 2).

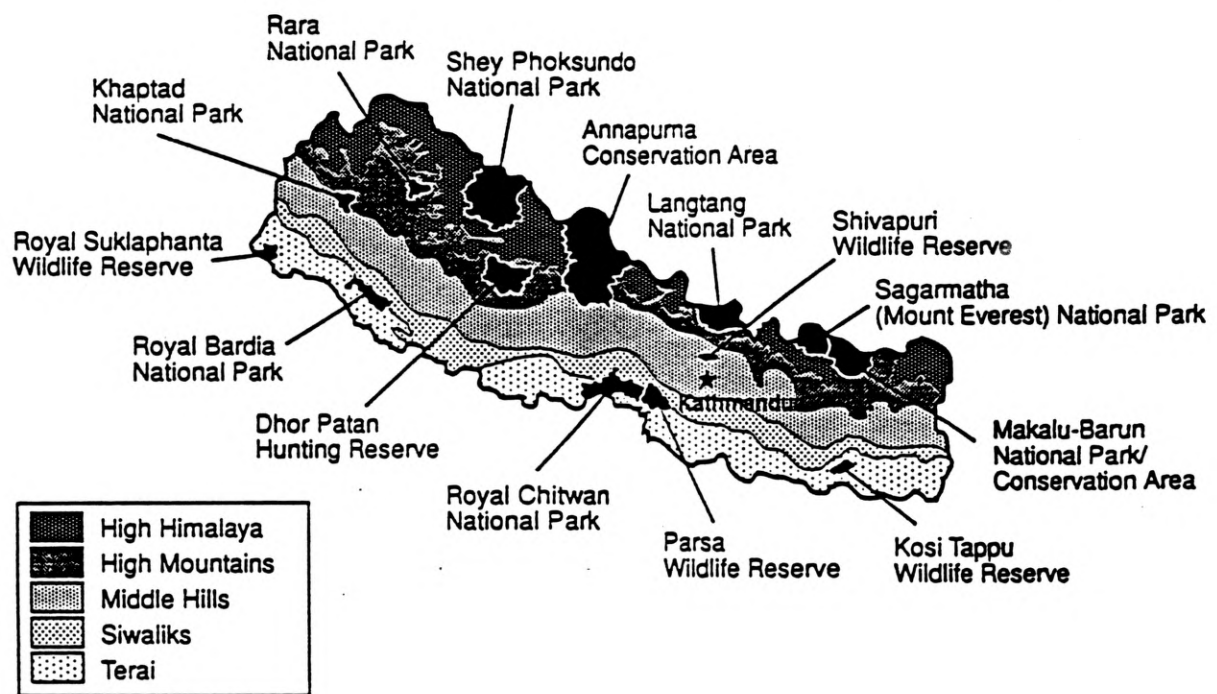


Figure 2. The protected areas of Nepal (Heinen and Yonzon, 1994)

The Himalayan National Parks

The Himalayan National Parks were primarily established for the protection of areas of outstanding scenery and to protect indigenous flora and fauna. The secondary objective was to promote tourism and visitor enjoyment so long as it was not detrimental to conservation programs.

In the Himalayan National Parks of Nepal, indigenous human settlements have been allowed to remain, although the villages proper are excluded from the park boundaries. Four national parks located in northern Nepal include several villages within their external boundaries.

Throughout the world, most mountain areas are managed under public ownership. In the United States, they are managed by the federal and state governments as national and state parks and national forests. In developing countries, national parks are sometimes used explicitly as mechanisms for extending the central government's influence into the most distant and least secure areas, often along international borders.

Conservation programs pursued by Nepal in rural mountain areas are designed to promote sustainable development leading to income generation for local indigenous people. The protection of major mountain water catchments is often driven by the influence of the lowland population, who desire the benefits of water development such as dams and irrigation (Marcus, 1993).

In Nepal, the national parks often take control of resource management away from the local indigenous people who depend directly on the productivity of

the land for their welfare. The central government, believing that the area is of national interest, asserts that it can control the land better with regard to that national interest than any local authority. As such, the rights or needs of the local people are often overlooked when locking away such resources from public use. It is not surprising that "poaching" and "encroachment" are common problems in the lowland and mountainous protected areas in Nepal.

Indigenous People

In the Himalayan parks, subsistence living needs such as firewood, timber, and grazing have to be met from within the protected areas. Thus, the 1979 Himalayan National Parks Regulation was enacted to permit traditional privileges such as free entry, collection of forest products, and grazing rights to the local people. The regulation defines "local people" or indigenous people as those living in settlements within the park boundaries.

However, there is the danger of identifying some citizens as "indigenous" worthy of special consideration, while leaving others in the category of "non-indigenous" and consequently not worthy of special consideration (Dasmann, 1984). Instead, when considering the relationship of people to protected areas, we must look well beyond the boundaries of villages and national parks and work with all people dependent on the same resources to create ecologically sustainable systems of land and resource use. There is also the danger of wealthy and influential people from the outside seeking to exploit the resources inside the

national parks; some control measures must be adopted to prevent such exploitation.

The denial of the right to collect forest products and grazing privileges for non-indigenous people in the mountainous national parks of Nepal is becoming a political issue. Where a river forms the park boundary, people living on the in-park side of the river are recognized as "indigenous," while people of the same ethnic group living on the out-of-park side are "non-indigenous." Those people left outside the park boundary frequently demand either the right to collect firewood and graze their livestock in the park or to extend the park boundary so that they have the same privileges. These kinds of disputes need to be settled without extending park boundaries.

Agro-pastoralism systems

Highland settlement has traditionally been based on subsistence agriculture and pastoralism. Annual crops of potatoes, barley, buckwheat, mustard, and maize are cultivated during the short growing season. However, agricultural production is very low because of poor soil, low temperature, and low precipitation. Animal dung and human waste provide the primary soil-building and nutrient input; these materials are mixed with leaf litter to be used as fertilizer. Crops are harvested in the autumn and soil remains vulnerable to freezing and thawing for six months. Limited crop production must be supplemented by pastoralism, or through trading, and income producing labor to purchase additional food grains.

Animal husbandry also provides an important living for the highland community. Domestic livestock such as yaks, goats, sheep, and cattle are kept for the purpose of dairy products, wool, pack stock, and ploughing. Pastoralism widely utilizes mountainous areas to graze livestock where the grazing land is communally owned. The use of mountain landscapes for grazing is known as transhumance, which requires the utilization of rangeland at various altitudes as summer and winter pastures (Price, 1981).

While crops are grown in the permanent villages, animals are taken to the high pastures during the summer. Hay meadows are cut to feed the livestock during the winter months. Animals do not provide protein in the form of meat because of the strong religious beliefs of the Buddhist community. Consequently, animal protein is consumed as dairy products.

Cultural modifications of the Himalayan landscape include irrigation, terracing, manuring, and the indirect cropping of marginal areas through animal husbandry. These activities, along with a variety of accompanying social and behavioral adaptations, divert and capture a good portion of the energy flowing through the system in allowing human populations to sustain themselves. Mountain agriculture includes different uses of land at various altitudes such as cultivated fields in the foothills, hay fields at mid-elevation, and pasture lands in alpine areas. This multiple use allows effective scheduling of labor throughout the growing season, since planting, ripening, and harvesting take place at different times.

The present level of traditional small farming terraces is not further degrading the parks' natural resources. The crops are sometimes eaten by wildlife; for example potato fields provide food to the Impeyan pheasant (Lophophorus impeyanus). Overgrazing and erosion in the summer pastures is causing the greatest human modifications of alpine areas. The Shey-Phoksundo National Park has many grazing-induced erosion scars. The semidesert landscape in the transhimalayan area of this northern park faces fuelwood shortage; there, the people use cattle dung to supplement firewood (Sherpa, 1992). However, the collection of cattle dung inhibits nutrient recycling in an area short of rainfall, reducing plant productivity. In addition available shrubbery around the settlements is severely depleted. This leads to soil erosion and sedimentation problems in the rivers.

Land tenureship must be recognized in order to give people the rights to cultivate their land and to grow hay. A proper land registration system needs to be initiated in all the mountain parks. The mapping of all private lands is essential to prevent further encroachment and illegal settlements.

Park-People Interface

Human settlements with their accompanying agricultural lands and livestock exist in Nepal's Sagarmatha (Mt. Everest), Shey-Phoksundo, Langtang, and Makalu-Barun National Parks. The needs of local people for fuel, fodder, timber, and grazing are met from within these protected areas. The degree of

resource use differs in each park depending on the socio-economic condition of its residents. The consumption of firewood and timber is highest in Sagarmatha National Park because of the heavy influx of tourists. Overgrazing is a problem in Shey-Phoksundo National Park because of the arid landscape and the people's heavy dependency on domestic livestock.

Disturbance to wildlife and its habitat is inevitable because of human activities, including livestock grazing and farming. Endangered wildlife species such as the wolf (Canis lupus) and the snow leopard (Panthera uncia) are most vulnerable, since they often prey upon domestic livestock. The snow leopard is often hunted for its fur (Jackson, 1979). These predators are in danger of becoming threatened or extinct unless measures are taken to alleviate the conflict through proper herding practices, compensation for predation, or reward that exceeds their fur value.

Limited forage availability and competition with livestock cause increasing numbers of wild ungulates such as the Himalayan tahr (Hemitragus jemlahicus) and the blue sheep (Pseudois nayaur) to raid crop fields in Sagarmatha and Shey-Phoksundo National Parks, respectively. The wild pig (Sus scrofa) is the most troublesome wildlife marauder in Langtang National Park and is dangerous to humans as well. Authorized killing of the marauding wild pigs has been introduced in Langtang National Park.

Poaching of the Himalayan musk deer (Moschus moschiferus moschiferus) for commercial purposes is another common problem in the mountain parks. The

most severe poaching of both the musk deer and the snow leopard is reported in the Langu-Namlang valley in the Dolphu area of Shey-Phoksundo National Park (Jackson, 1979). Musk deer poaching is frequently reported in Sagarmatha National Park.

Long-term management solutions might include proper herding systems to reduce livestock predation and economic incentives to allow the coexistence of wildlife and people. For example, an incentive program could encourage villages to manage their landscapes for maintenance of snow leopard populations. The resultant revenue from wildlife tourism could support the incentive program and provide needed income for the village.

CONSERVING BIODIVERSITY

Biodiversity is the totality of genes, species, and ecosystems in a region (McNeely, 1988; WRI, IUCN, UNEP, 1992). There has been a clear shift in focus from the conservation of single species to the broader aspects of biodiversity in Nepal. Nepal has proposed a Biodiversity Action Plan to develop a biodiversity classification system that will test the representativeness of the protected area system for its geographic and physiographic coverage (Heinen and Yonzon, 1994).

With its unparalleled variation in altitude, slope, rainfall, and temperature over short spatial distances, the Himalaya region fosters regions of biological diversity rich in endemic species (Denniston, 1993). Nonetheless, biological diversity declines with increasing elevation (McNeely, 1988).

Mountains profoundly influence the migration and evolution of species. An important consequence of such isolation is that each species has a limited gene pool that receives little infusion from the outside. Although mountain ecology supports diverse animal and plant life, species numbers and individual animal numbers become low as the environment becomes more severe.

Isolated mountain peaks in the Nepal Himalaya harbor a high degree of endemic plant and wildlife species. Over 400 species of birds and 10 species of rhododendron have been identified in Sagarmatha Park alone. Langtang National Park contains more than 1,000 species of flowering plants and ferns, including the endemic Himalayan larch (Larix nepalensis). Shey-Phoksundo National Park is believed to contain over 20 species of endemic plants (Shrestha, 1985).

The use of medicinal plants is still widely practiced by people in the mountainous areas of Nepal; this practice reduces the people's dependency on western drugs not readily obtainable in remote parts of the country. Traditional medicine is now encouraged by the World Health Organization (WRI, IUCN, UNEP, 1982). The maintenance of an area's inherent diversity sustains local herbalists.

The value of biological diversity is equally apparent in agriculture. For generations, people have raised varieties of crops and livestock to stabilize and enhance the land's productivity. This diversity, maintained through knowledge of traditional farming practices, is critical for maintenance of cultural and religious values such as respect for life and conservation of resources.

The judicious use of protected areas can assist in conserving biological diversity and environmental quality (Hamilton, 1992). The people in the mountainous areas have lived in harmony with nature and their surroundings, until external pressures and government control led to massive destruction of the forested areas akin to Hardin's (1968) "Tragedy of the Commons" situation.

The government's conservation policies need to demonstrate the economic values of biodiversity for meeting the country's social and economic requirements. Many approaches to conservation can be promoted by demonstrating their economic values (McNeely, 1988). Often, direct economic incentives may encourage the over exploitation of biological resources. Instead, indirect incentives in the form of social services and natural resource policies designed to benefit people at the community level can enhance long-term goals. Appropriate measures may include assigning some management responsibility to local institutions, strengthening community-based resource management systems, and providing property rights and land tenure to the local people.

The implementation of a database information system for biological diversity can track the status of flora and fauna for future monitoring. Geographic Information Systems (GIS) is a powerful tool that can be helpful in predicting wildlife habitat loss, vegetation cover and types, deforestation, potential soil erosion sites, and human settlements.

TOP-DOWN vs. BOTTOM-UP APPROACH

In developing countries, the transfer of western technology and consumerism can be viewed as a top-down approach (Hough and Sherpa, 1989). Decisions about development projects and activities are made at a high level and then imposed on a particular location and its people, often benefitting only a small percentage of the population. Rather than focusing on individuals or communities and their physical needs, the focus should be on the social structure of the community and how the community itself can facilitate its own development.

While national parks have been one of the most universally adopted mechanisms for protection, and governments have often determined that it is necessary to take a centralist approach when questions of the national interest supersede local aspirations, more effective means are required to ensure that conservation and local people can work together as partners rather than antagonists. Under today's conditions, governments need to think in terms of the ecological and economic viability of their nations. It is in the government's interest to decentralize power and responsibility by returning more resource management to local communities. This will provide the foundation for more sustainable resource use, especially for multiple-use lands.

Implementation of such an approach is difficult because the local people in the Himalayan National Parks of Nepal have a limited voice in the management of park resources. Park managers have little authority and usually lack skills and experience for resolving land resource use conflicts. Direct links to those who

might hear their concerns are far away in the district or national offices. Most villagers have no obvious way to have meaningful communication with park service personnel. This frustrates them and adds to their negative attitude toward park management.

The Himalayan National Parks regulations make no provision for public involvement in any sector of park management and conservation policies. Perhaps the formation of a park advisory committee or a management committee represented by all sectors of the society in each mountain park might help foster public involvement in resource management, thus enhancing the park-people relationship (Garratt, 1984).

A bottom-up approach in the Annapurna Conservation Area both protected and enhanced the sovereignty of the local people. Control of the forest and grazing areas was taken away from the government forestry department and returned to the local people via local forest management committees (Hough and Sherpa, 1989). The conservation entry fees paid by tourists are used for local developments such as for the establishment of tree nurseries, plantation of seedlings, safe drinking water supplies, medical facilities, environmental education programs, sanitary facilities, and tourism management. The bottom-up approach aimed to help the people themselves organize to identify and meet their own needs through participation at the local level. In essence, it used grassroots methods to help the villagers maintain control over their local resources.

While the bottom-up approach may produce more desirable social outcomes in the long term, its consequences for conservation are less certain. The luxury of choice between these two approaches may be precluded by ecological, sociopolitical, and economic factors (Hough and Sherpa, 1989). Returning resource management powers to local inhabitants of Nepal's mountain parks will only be effective if it is slowly and carefully done. Otherwise there is danger of even more resource degradation during the period needed for local peoples to adjust to new landuse freedoms and conservation responsibilities. For the bottom-up approach to be effective, park policies need to stimulate more interaction with local people. This will lead to greater involvement in decision-making and subsequent feelings of ownership and control over local natural resources. The number of nonlocal park personnel and armed guards must be slowly reduced, replacing them with local staff.

BUILDING SUSTAINABLE COMMUNITIES

The long-term viability of a protected area depends on its ecological, social, and economic integration with the surrounding region. The future of sustainable development depends on the long-term maintenance of ecological diversity and productivity (Rees, 1989). Upon any adoption of sustainable development strategies, decisions affecting local ecosystems must favor the local community and be under its control. This bottom-up approach requires that greater decision-

making authority be delegated to regional and local levels within the broader national policy framework.

Humanity's relationship to the biosphere will continue to deteriorate until a new international economic order is achieved, a new environmental ethic adopted, human populations stabilize, and sustainable development becomes the rule rather than the exception (IUCN, UNEP, WWF, 1980). The World Conservation Strategy argues that ecologically sound, sustainable development offers the only prospect of conserving the living resources on which human survival and well-being depends (IUCN, UNEP, WWF, 1980, Jacobs 1981). For development to be sustainable, it must take into account social and ecological factors as well as economic ones (Jacobs, 1981; Rees, 1989; Waldman, 1993).

That conservation and sustainable development are mutually dependent can be illustrated by the plight of the rural poor (IUCN, UNEP, WWF, 1980). Poor rural communities are directly dependent on biological resources to meet their daily requirements for food, fuel and shelter. Both conservation and development must benefit from mutual support and interdependence. The task of conservation is not to resist development but rather to guide it through appropriate measures suitable to the local environment (Jacobs, 1981).

We must build a sustainable community with a "sense of place" including land, water, wildlife, and human settlements because the local people within the mountainous national parks feel pessimistic about their future. They feel that park authorities are more concerned about wildlife preservation than they are about

human lives. This attitude was best illustrated by the mayor of a village within Langtang National Park while speaking to the visiting Royal Family "Who is more important, the people or the wildlife?"

Sustainable communities depend on economic prosperity, social equity and environmental values (McKinney et al., 1994). The terms "sustainability" and "sustainable development" embrace the concept that environmental, economic, and social needs are complex and require integrated decision making. Such decision making relies on consensus rather than unilateral action. Consensus processes encourage creative and innovative solutions to complex problems by bringing a diversity of knowledge and expertise together to resolve issues.

The Roundtable is a multi-sectoral organization that builds consensus about the changes needed to attain an environmentally sustainable economy (McKinney et al., 1994). Opportunities for using consensus exist at all stages of decision making around issues of sustainability--from the establishment of broad policies, to long range planning, to allocating land and resources, to resolving specific disputes, and to monitoring and enforcement (Canada Round Table, 1993).

Consensus decision making involving the Roundtable technique is being used to explore the challenges of balancing economic development and environmental protection in Montana and Canada (Scruggs, 1992; British Columbia Roundtable, 1992).

TOURISM IMPACT

The Himalayan National Parks serve as multiple use areas for fuelwood, lumber, grazing, cultivation, and recreational purposes. The most noticeable tourism impact can be seen in Sagarmatha National Park where annual visitors now exceed 10,000 a year, three times the approximate 3,000 local population. An improved standard of living among the local people has accelerated the demand for timber to enlarge their traditional houses. Tourism has had a social impact through increased differentiation in wealth and living standards among the villages and between individual families. This differentiation has led to subtle changes in agriculture and pastoralism which may have significant environmental ramifications.

Forest land inside and adjacent to the Sagarmatha Park is under pressure for firewood and timber to meet tourist demands. Private hotel entrepreneurs catering to tourists are using large volumes of fuelwood; the heaviest impact is on the scarce juniper shrubs above the treeline. All timber requirements for private houses and hotels come from the forest outside the park because of the prohibition on timber harvesting inside the park. Selling timber is becoming a booming business to the people in the park's buffer zone, where the forest is not under the park jurisdiction. This reinforces the need to include areas and people outside the park in park planning efforts.

In Sagarmatha, some summer pastures are being converted to tourist destinations, replacing hayfields with hotels. The traditional yak herding practices have now been replaced by increasing numbers of pack stock and even mules.

Male pack stock are becoming more and more valuable for tourist-related load carrying. The value of other livestock as traditional sources of dairy products, wool, manure and meat is diminishing. The result is an increase in fodder prices, and an inability for the traditional yak herders to maintain their dairy producing cattle.

The presence of two cheese factories inside Langtang National Park encourages the local people to increase the number of cattle to produce milk and thereby manufacture cheese for sale to tourists in Kathmandu. Both of these cheese factories use large quantities of firewood from the park forest. The environmental impact on fuelwood and the deteriorating rangeland condition due to the presence of the cheese factories needs to be further investigated.

The government has opened some parts of western Nepal for tourist visits in order to stimulate local economies and reduce tourist impact in central and eastern Nepal. Tourism is permitted in the southern part of Shey-Phoksundo Park where a small proportion of the human population earns cash by selling locally grown food products and eggs. The number of tourists visiting the park is very low because of difficult access and high cost. However, these tourists have already added to the inflation rate and the food supply shortage.

It has been disadvantageous to restrict tourism in the transhimalaya area of the park. The government's policy of limiting tourist numbers by imposing high fees and requiring visits through organized trekking groups does not benefit the local economy, since the trekking outfitters keep most of their profits in the city.

Ecotourism is now widely accepted as a suitable approach for tourist visits in protected areas around the globe. Ecotourism promotes the sustainable use of resources with a minimum impact on the ecosystem thereby returning profits directly to the local economy. This can only be done at the site through a co-operative system involving local residents who serve as guides and porters to park visitors.

The limits of the carrying capacity theory on Nepal's resources will be reached when the social, environmental, and economic impacts on the local community become visible (Johnson and Snepenger, 1993). Stankey, McCool, and Stokes (1984) expressed carrying capacity in terms of Limits of Acceptable Change (LAC): " LAC involves identifying desired social and resource conditions to orient management towards maintaining or restoring those conditions."

Realizing the need for both the conservation of biodiversity and the sustainable development of areas adjoining protected areas, the government of Nepal is currently considering appropriate legislation to delineate a buffer zone concept around its national parks (Wells and Brandon, 1993). The buffer zone concept permits the sustainable use of natural resources such as timber harvesting, grazing, and collecting firewood, grass or other vegetative products in areas surrounding the park boundary. The 1982 World Parks Congress defined a buffer zone as an area adjacent to a protected area on which land use is partially restricted to give an added layer of protection to the protected area itself while

providing valued benefits to neighboring rural communities (Mackinnon et al., 1986).

FUTURE CHALLENGES

With increasing human pressures on the natural resources of Nepal, protected areas face critical management challenges in the future. The need to expand agricultural areas to feed more people will force park authorities to sacrifice wildlife habitat unless urgent measures are adopted to improve present land-use systems. Growing pressure on the forests may lead to a decline in soil fertility, site productivity, and the supply of forest products (Ives & Messerli, 1989). There is generally a one-way flow of nutrients from the forest to the farm in the form of grass, green leaves, and dry leaves (Schmidt et al., 1993).

The slash-and-burn practice of shifting agriculture in the Makalu-Barun National Park and Conservation Area is a major cause of habitat destruction and increased conflict with wildlife crop predators (Shrestha et al., 1990). In addition, the use of steep slopes and the shortening of the rotational cycle increases soil erosion and loss of fertility.

Where the uses of renewable forest and rangeland resources are denied and few replacement resources are available, hardship and even malnutrition can result, along with bitter conflicts between protected area managers and local people (West et al., 1991). It must be emphasized that access to renewable

natural resources is important to local people, not only in an economic sense but also as an important element in cultural identity and continuity.

There is a need to use local agricultural extension services for agricultural development within the protected areas of Nepal. These agricultural extension activities include programs to reduce soil erosion and adoption of better land use practices that would enhance the objectives of the protected area (Bunting et al., 1991).

Although government resources for livestock development and pasture improvements are available in the remote parts of Nepal, park policies prohibit the introduction of exotic species, either plants or wildlife, inside the park. These conflicting issues must be resolved through the coordination of the highest authoritative policy and decision makers in the government. For example, the Government Yak Farm in Sagarmatha National Park is trying to introduce a higher quality forage for livestock improvement, but this is prohibited by park policy.

Efforts to minimize the human impact on Nepal's parks have focused on patrolling by guards and the imposition of penalties to discourage encroachment and illegal activities. However, the viability of relying totally on law enforcement activities is increasingly being questioned as a long-term solution to the protection of many critical ecosystems. Recognition is growing that the successful management of protected areas ultimately depends on the cooperation and support of local people. It is neither politically feasible nor ethically justifiable to

exclude poor people with limited resources access from parks and reserves without providing them with alternative means of livelihood.

Park policy must clearly identify such questions as "What is to be preserved in the Himalayan national parks?", "What measures will be taken to preserve the identified resource?" and "How much will be left for community use?" The answers could best be described in the preparation of management plans for each park. Most management plans prepared for the mountain parks are outdated and need immediate revision for conservation and sustainable development with greater input from the locals as well as various governmental and private agencies.

Mutual trust and open communication is necessary between park managers and the local people. Such trust and communication can establish common goals along with better control over resource protection for the betterment of the ecosystem and humankind in the long run (Montagne, 1994).

Perhaps the greatest challenge to sensitive park planning and management is the need to weigh the complexity and dynamics of the ecosystem in national parks against increasing use by people using a more holistic approach, an issue which will be examined in part II of this paper.

PART II

**APPLICATION OF HOLISTIC RESOURCE MANAGEMENT
TO HIMALAYAN NATIONAL PARKS IN NEPAL**

LIST OF CONTENTS

INTRODUCTION	26
HOLISTIC RESOURCE MANAGEMENT	26
HRM Model	28
SCENARIO CASE STUDY	29
Introduction	29
Situation	32
Solutions	36
Testing guidelines	43
Management guidelines	45
Application of HRM-visual model	46
CONCLUSION	49
LITERATURE CITED	51

INTRODUCTION

The term "holism" refers to an understanding of reality in terms of integrated wholes whose properties cannot be reduced to those of smaller units (Savory, 1988; Wilson and Morren, 1990). According to Savory (1988), one must seek to understand the greater whole in order to understand its parts, but not vice versa.

Ecosystems are wholes consisting of living and nonliving components. The interactive processes operating between these components describe ecosystems and their functions (Montagne, 1994). Given the complexity of our ecosystem, any attempt to manage natural resources must consider the entire system or else assume a high risk of environmental degradation. In many natural systems, the condition of the soil indicates overall system health (Montagne, 1994) because poor soil leads to poor people (Savory, 1988).

The problems of sustainable living involve complexities of natural systems and human systems combined (Montagne, 1994). They are systemic in nature, involving and enveloping entire systems. Thus, management and problem solving associated with whole systems must become aware of and promote the proper functioning of the whole system rather than just particular parts.

HOLISTIC RESOURCE MANAGEMENT

According to Savory (1988), the management of resources has to be holistic to be successful. We must realize that a whole, be it a family or a national park

cannot be managed without looking inward to the lesser wholes that combine to form it, and outward to the greater wholes of which it is a part.

Even national parks cannot be managed as isolated islands just to support the protection of wildlife for tourism. The human residents in Sagarmatha and Shey-Phoksundo National Parks historically practiced wise use of their forest and rangeland resources through a traditional system of laws. The local tradition also strictly protected the wildlife as part of the ecosystem's function. The establishment of the national parks in both of these areas viewed local residents as threats to park management objectives. No wonder poaching and overexploitation are the result of the ignorance of the professional bureaucrats in managing those resources (Savory, 1988). The interrelationship between mankind, the planet, and its resources is not taken seriously. We must be aware that nothing exists in isolation.

In an attempt to manage natural resources, the ecosystem must include human, biological, and financial resources (Savory, 1988). Unless ecology and economics can be merged with ethics to include environmental as well as human values, we cannot be optimistic about the future of humankind (Montagne, 1994). Ultimately, the goal of sustainable natural resource management while providing human sustenance and prosperity may be accomplished by merging all of these aspects.

HRM Model

Both holism (Savory, 1988) and systems thinking (Wilson and Morren, 1990) are approaches to complex natural resources and human management situations. Wilson and Morren (1990) described the systems thinking approach for problem solving in both agriculture and natural resources management. It starts with the learning styles of Kolb as expressed by the four quadrants of a circle:

- 1) describing the situation by diverging out and gathering information;
- 2) Assimilating the information into possible solutions;
- 3) Converging on the most realistic solutions; and
- 4) Accommodating other factors or concerns.

Holistic Management is a systemic, iterative problem solving and decision making process described by Savory's (1988) Holistic Resource Management (HRM) model. The Savory model is further modified by Montagne in a circular format, synthesizing the Kolb learning styles and the soft systems approach (Figure 3).

The HRM-soft system requires perceiving the problem through the views of the users. Then both rational (objective) and intuitive (subjective) reasoning can be used to develop possible solutions. Solutions are tested before their use to predict if they will actually solve the systemic problem at hand. When solutions are applied, the system is continually monitored and readjusted (Montagne, 1994).

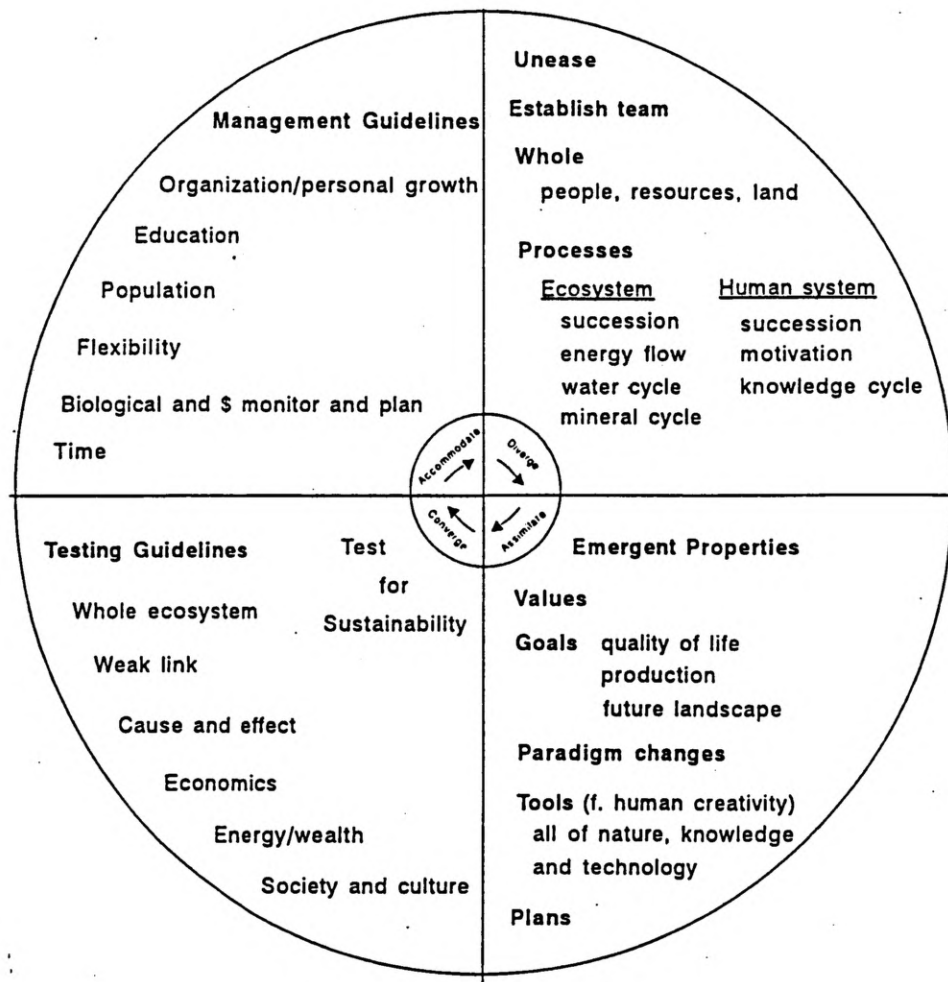


Figure 3. Synthesized HRM-soft system model of Savory, Kolb, and Montagne (Montagne, 1994).

SCENARIO CASE STUDY

Introduction

The scenario case study described here will demonstrate the application of the Holistic Resource Management model to one particular manageable whole. Rather than considering the complexities of the different environmental and socio-

economic conditions of all the mountain national parks in Nepal, this case study will focus on Shey-Phoksundo National Park as a single unit. However, the HRM model could be applied to other mountain parks of Nepal singularly or all of them as a unit.

Shey-Phoksundo National Park covers parts of the Dolpa and Mugu administrative districts in northwestern Nepal. Covering an area of 3,555 km², it is the largest park in Nepal. Much of the park area lies in the rainshadow on the north side of the main Himalayan range. The arid landscape in the transhimalaya receives annual precipitation of less than 15 inches (Miller, 1986). The transhimalaya is a tree-less area except for Caragana spp and Lonicera spp shrubs that dominate the hillslopes. Sparse stands of rhododendron nivalis, rhododendron lepidotum, and dwarf juniper (Juniperus wallichiana) are the predominant vegetation. Grassland covers most of the area. In the south, forests are composed of pine (Pinus wallichiana), spruce (Picea smithiana), cypress (Curpressus torulosa), fir (Abies spectabilis), birch (Betula utilis), and juniper (Juniperus recurva).

Of the 3,000 persons residing within the park boundary, about 2,000 reside in the transhimalaya. Barley, potatoes, and buckwheat are the staple diet of all the local people. The annual crop production is low and must be supplemented with barter trading and animal husbandry. Croplands must be flood irrigated through a traditional community distribution system. Barter trading for salt is done in Tibet

each year. In the winter the villagers move to lower elevations and trade salt for foodgrains grown in the lower valleys.

Animal husbandry plays an important role in the survival of the people. Practicing transhumance pastoralism, they graze their yak, sheep, goats, and crossbred cattle in the summer pastures. Livestock counts totalled over 9,000 in the transhimalaya (Sherpa, 1992). Sheep and goats comprise over 70% of this livestock. Limited rangelands and overstocking have resulted in overgrazing throughout the area. All grazing lands show severe erosion problems in the transhimalaya (Schaller, 1977; Miller, 1986).

The area is also grazed by a blue sheep (Psuedois nayaur) population. Predators who prey on blue sheep are the snow leopard (Panthera uncia) and wolf (Canis lupus); and they also frequently kill livestock. Angry villagers then attempt to kill the predators, and their populations are becoming depleted throughout the Himalaya. Competition for limited forage between the blue sheep and livestock has forced the wild ungulates to raid crops.

In the transhimalaya, villagers collect all available shrubs from nearby slopes to meet their fuelwood needs. This activity has also resulted in erosion problems in areas surrounding all villages. Willow trees are planted on private fields to be used later as lumber and fuel. The timber requirements for house construction comes from the forested areas in the south, at least three days walk from the nearest village.

Government assistance for medical facilities and environmental programs are nonexistent. Enrollment in school is low, and in some villages, school buildings do not exist. Government officials rarely visit the area because of difficulty in crossing over snowbound high passes to reach the villages in the transhimalaya. The people are economically poor and the environmental quality is degraded by soil erosion, but the residents are rich in cultural heritage and have maintained their traditional customs without outside interference.

This simplified case study scenario will be used to demonstrate the four quadrants of the HRM-soft circle system in a problem solving mode.

The Situation

In the context of Shey-Phoksundo National Park, three issues are of most concern. First, park policy does not encourage active public participation in conservation. The traditional laws of the Buddhist community regarding the protection of nature and wildlife have been manipulated by the politicians for their personal gain. The top-down approach, which nullifies local power in resource management, caused the people to lose faith in park authorities. Then large numbers of park personnel had to be stationed to guard against the people's actions.

Second, the local people's need for fuel, food, and shelter goes against the park's management objective: to protect the wildlife and vegetation. The collection of shrubs for fuelwood needed in the transhimalaya degraded the ecosystem

through loss of vegetation, resulting in soil erosion problems. The fuelwood crisis is further exacerbated by the overgrazing of rangelands. Severe erosion both around the permanent villages and in the summer pasture lands threatens the local culture, causing physical stress for both people and animals.

Wild ungulates raiding croplands are becoming an irritant to the locals, while at the same time increasing stock numbers are deteriorating the range condition. The reasons for heavy stocking are many and complicated and cannot be easily resolved (Holechek et al., 1989). Hardin's (1968) "Tragedy of the Commons" demonstrates the consequences of overgrazing on the common rangelands shared by large numbers of animals; the land quickly approaches its grazing capacity (Gilles and Jamtgaard, 1982) as herders vie for available forage.

Third, the opening of some parts of the park area to tourism could impact the fragile environment of the park through fuelwood demand created by the increasing numbers of porters. While, tourism has benefitted the local economy of Sagarmatha and Langtang National Parks, it has not yet been to the advantage of the local people in Shey-Phoksundo National Park because of government rules to limit tourist visit through organized trekking agencies and by imposing high fees. Even the portage jobs are not made available to the locals.

The whole

The people in the whole include local residents, park personnel, politicians, central and local government officials, entrepreneurs, merchants, and traders

whose activities and policies have direct impact within the park. Tour and trekking operators for tourists, and international donor agencies are only part of the whole yet provide an important financial resource base. The government, trekking agencies, and hotel entrepreneurs handle the services required for tourist visits to the park, so tourists are not included as part of the management. The people living in the buffer zone on the periphery of the park also must be integrated within the whole. Human settlements just outside the park have a great impact on the park management because they depend on resources within the park.

The financial base for managing the park and for sustenance of the local village economy is generated from park entry fees, fines, government expenditures, tourist expenditures, trading income, hotel entrepreneurs, local industry, food products, and knowledge and experience in farming and animal husbandry.

The park landscape together with the houses of traditional design, religious monasteries and shrines, forests, agricultural lands, alpine pastures, streams and lakes are considered the landbase upon which all living organisms, including humans depend. It is this landbase which is exploited to its fullest extent by humans; this landbase needs to be taken care of if we, and future generations are to survive.

Ecosystem and human processes

Increasing human disturbance has had an adverse effect on the four ecosystem foundation blocks of succession, water cycle, mineral cycle, and energy flow. Savory (1988) has classified the environment as nonbrittle to brittle on a scale from one to ten based on precipitation, temperature, relative humidity, elevation, and vegetative cover. The true tropical jungle can be classified as a nonbrittle environment and the arid, semiarid, and desert landscape as a brittle environment. The degree of brittleness depends on the amount of biological versus oxidative decay occurring at a particular site. Environments with little moisture to support biological decay microorganisms during warm seasons are brittle, and decay is mostly by oxidation processes or by macro animals. In nonbrittle environments most decay is by microorganisms near and in the surface soil.

The transhimalayan area in Shey Phoksundo National Park can be classified as brittle because of its semiarid landscape with its erratic distribution of moisture, low temperatures, and short growing season. Vegetation cover is sparse and widely spaced because of fuelwood collection. The ecological carrying capacity of this region is limited because of low precipitation and cold temperatures. This makes a brittle environment where farming is not very viable and where stock grazing is limited by the potential native vegetative production.

The degree of brittleness or nonbrittleness of the environment interacts with the four ecosystem processes. A brittle environment can be at any stage of succession for the growing conditions it has (Montagne, 1994). This suggests that

the transhimalaya area could be managed for advanced or intermediate succession. The decay of old plant materials is slow because of less biological activity in the cold and dry environment. As new plant growth is retarded by old material, the spaces between perennial grass plants becomes more open exposing more bare soil. High animal impact for short periods can help to reduce plant spacing, whereas low animal impact tends to expose soil and widen plant spacing.

Ecological processes are usually complex and involve the entire soil-plant-animal-microorganism-atmosphere system that is itself subject to external influences (Ovington, 1984). Increased human disturbance of the natural ecosystem can retard the successional stage. Ecological succession can be slow in high elevations because of cold temperatures and short growing seasons both of which delay incorporation of organic matter into the soil.

As with the brittle environment of the park, the human systems are threatened by shortages of food, fuelwood, and grazing lands that are made worse by the absence of government input in providing education, training, and initiative to improve the environmental condition and standard of living of the local people.

Solutions

Savory (1988) has mentioned that Holistic Resource Management depends on well-formulated goals. The fullest possible participation, acceptance, and responsibility of the people can build a common goal towards sustainable community development. First, a quality of life statement that embraces their

values, which all parties can support must be found. Next, the forms of production required to support the desired quality of life must be determined. Last, a description of the future resource base that will support the production and sustain the quality of life must be worked out. This order, according to Savory (1988), often leads to a resolution of long-standing conflicts over land management because people who are drawn to the same piece of land often seek similar personal rewards, despite different approaches.

Defining a permanent three-part goal will take time and effort. Government agencies, international organizations, and other consultants will have to stop giving advice from the perspective of narrow disciplines and training. Instead, their prime task will be to help people in whole communities set their own three-part goals (Savory, 1988).

Holistic management, according to Savory (1988), must come from those people who are the most intimately connected to the resources they possess. People at the farm and village level must determine their three-part goals, not bureaucrats from the central government. The goals of the local people must be identified by asking two questions: "What do you want to keep?" and "What do you want to change?" (Stoltz, 1994, pers. comm.) The quality of life (values), forms of production, and future landscape base can be stated as follows:

Values

The values of the local people as individuals are the family, the connection to the land, traditional knowledge, friends, and cultural heritage, whereas the values of other people in the whole focus on personal economic gain from tourism activities.

Quality of life

The quality of life for the people of the management whole are to have a good living for themselves with sufficient food, clothes, and shelter.

Production

The good living depends on forms of production which include tourism and the items needed to support both tourism and the local people such as fuel and food. The locals need to produce the items which attract tourists, such as local culture and views of and experience with animals, plants, and local culture found in a well-functioning ecosystem.

Future landscape base

These forms of production require a future landscape base with a well functioning ecosystem including people who are living in harmony with nature.

Paradigms

Although the local residents want to maintain their traditional way of life, they also want to exploit opportunities in the materialistic culture for personal use, trading and profit. Since the park was restricted for several decades to entry by the outside world for political reasons, exposure to tourism was limited. Eventually the local people realized that money can be generated from tourism. These people accept western materialistic influences as part of their lives but they want the benefits without interference in their traditional values, culture, and religion.

One paradigm of the locals is that livestock numbers increase their wealth and power. Social status is also added to by extensive landholding. Time has modified their way of life because of the outside influences of diet, clothing, and education. Hardship in their villages along with a need for better living, migration to outside valleys and cities will slowly change their way of life from agro-pastoralism to business enterprises.

A paradigm shift from agro-pastoralism to generating income from tourism will enable locals to generate cash and improve their poor quality diet, which causes malnutrition and poor health. This shift would increase local awareness of education values that could reduce the population growth rate and decrease the infant mortality rate.

Tools

People living in the rural areas of Nepal use money and labor as tools for subsistence farming and animal husbandry. Both agriculture and pastoralism involve extensive human labor. Human creativity is the crucial element and is needed constantly (Savory, 1988). The HRM model itself is nothing more than a bit of "human" software to help organize thinking and planning. Creativity and labor are cheap, available and can be easily supplied by the locals. Money is less available but is an important tool (Montagne, 1994). Generating income from human creativity, labor, and constant sources of solar energy tends not to damage one's life support system (Savory, 1988). The conversion of solar energy for plant growth when utilized by animals sold at market is termed the solar dollar (Savory, 1988). This is the most efficient method for survival as long as the people take care of the land on which they live.

Grazing ranks as an important tool because management can manipulate it. Animals, both domestic and wild, prefer plants according to their mouth structure as well as taste, smell, and digestibility of the plant. Livestock, as well as most wildlife species, are highly selective feeders both in the species they eat and the parts of the plant that are actually consumed. Studies done in Africa have shown that big animals prepare forage for smaller ruminants (Marlow, 1992). Mixed grazing by cattle and sheep or goats can benefit the plant community.

Herd effect (with or without predators) can stimulate the ecosystem processes (water cycle, mineral cycle, energy flow, and succession) in a brittle

environment. An animal herd in the absence of predators behaves differently from those threatened by the presence of predators. Animal herds without fear from predators tend to spread out and walk gently and slowly. They tend to place their hooves beside coarse plants and not on top of them. They also place their weight on the full hoof, compacting the soil below the surface but hardly disturbing the surface itself. Thus, they have little impact on the plants and the soil (Savory, 1988).

Savory (1988) also observed that animal herds threatened by predators behaved differently. They bunched together and in their fear, kicked up quite a bit of dust. While bunched as a herd, each animal stepped recklessly on coarse plants and trampled down old plant materials into the soil surface. In addition, the trotting and galloping hooves left the soil chipped and broken, providing a seed bed for new plants.

The combination of overgrazing and overresting is desertifying the brittle rangelands and leading to a barren soil surface that is susceptible to wind and water erosion (Savory, 1988). This problem is seen at its worst in the brittle environment of the transhimalaya of Shey-Phoksundo National Park. The dung that helps to increase the return of nutrients to the soil is collected by the locals for fuel, preventing vegetation succession in the mountain plant communities. Herding can prevent the loss of livestock to predators and lead to plant succession. The role of herd effect on brittle and nonbrittle environments needs further investigation.

Technology is a powerful tool, but it also can be most destructive to the ecological processes. Appropriate local and affordable technology should be investigated, such as: ways to decrease the use of fuel biomass through improved stoves, alternative insulating material, heating systems, and energy sources. There is no income source for the locals to purchase the technological tools except from the sale of food supplies and livestock, trading profits, and providing labor for money.

The present restrictions on tourism restrict opportunities to provide employment to the majority of the local population. While the people in the south gain some advantage from tourism, those in the transhimalaya are totally disadvantaged. It is to the advantage of the park service to promote low impact tourism while at the same time allowing the villagers some monetary benefit.

Ecotourism is an excellent alternative that needs to be promoted to sustain park resources and provide income to the local economy. Wildlife tourism will provide employment opportunities to locals who can act as guides and porters with permission from the park authority. Wildlife tourism seems feasible to promote awareness among visitors and locals about the value of preserving endangered species such as the snow leopard. Only then will our efforts to preserve wildlife prove successful from the visitor's and local's point of view.

The Himalayan National Park regulations prohibit the use of firewood by park visitors, and require the use of gas or kerosene. Because of the distance from the nearest cities and markets where kerosene is available, park visitors are most

likely to use firewood illegally. Park policies could implement a higher entry fee and use those funds to establish nurseries and plant seedlings for future firewood sources. Providing economic incentives to plant willow trees in the transhimalaya needs to be studied seriously to meet the future need for fuelwood and lumber.

In this scenario, a team of experts will visit the park area to learn the situations by organizing meetings and workshops with the local people. The learning team shall collect socio-economic data of the local people including the calendar year of their life style. Data collection will also include uses of forest products, rangeland resources, agricultural practices, and tourism impact. The collected data will be analyzed for future incorporation in the park management plan.

Testing guidelines

Testing guidelines are applied to ensure that the tools and plan guide the management whole towards the three-part goal in an ecologically, economically, and socially sustainable manner. Park policies on resource management which stimulate encroachment and illegal activities by locals are weak links that could be strengthened by empowering people to involve themselves in decision-making processes at the local level. Local committees formed with the advice and participation of village officials must be given recognition by the central government. This will close the gap of weak links between park administrators and local people by facilitating open communication.

Planting willow trees in the transhimalaya will strengthen a weak link in the ecosystem foundation and support tourism needs. This will alleviate some of the effects of environmental degradation. The government must strengthen the weak link in the system by providing employment to improve the standard of living of the rural poor rather than stationing large numbers of park personnel, including armed guards. As long as people's basic needs are not met, efforts to guard park resources will not succeed; that fact is recognized throughout the world.

The lack of coordination between park authorities and the Tourism Department can be strengthened by adopting common goals to promote low impact tourism. The flow of tourism income into the treasury, not into land improvement and reforestation programs, is one cause for poor land-use practices and subsequent siltation and sediment load problems in the rivers which make the water undrinkable.

The traditional monoculture cropping practice does not provide an adequate food supply to last throughout the year. Such a weak link in agricultural practices could be strengthened by introducing crops that increase the yield in dry climates while providing protein supplementation, such as legumes.

Management guidelines

Most of the principles reflected in the management guidelines stem from understanding the time dimension in resource management, the different decay processes and functioning of succession in brittle and nonbrittle environments, and the roles that the herding animals and their predators play in brittle environments (Savory, 1988). The guidelines also include biological monitoring to bring about desired changes in the ecosystem processes and growth rates of plants and recovery from severe grazing (Montagne, 1994).

Management also has to be flexible, as the natural world is composed of interdependent wholes in a state of constant change. Management must focus on restructuring the organization to shift from traditional management style to holistic management. The park authorities must build trust among the people as a top priority. Trust and acceptance are the foundation upon which the success of the ecosystem and human systems will depend (Montagne, 1994). Once trust and acceptance have been established, they will lead to open communication and the creation of common goals to better control the resource problem. The Gibb's triangle model requires 50% effort in building trust and open communication (Montagne, 1994). The hierarchical system of top-bottom approach has to be changed to a collaborative bottom-up approach .

Monitoring, adjusting, and replanning are continuous processes which ensure that the tools applied to sustain the three-part goal are functioning and effective.

Application of HRM-Visual model

In applying the HRM-visual model developed by Kroos and Montagne (1994) for Shey-Phoksundo National Park, five steps must be taken (Figure 4).

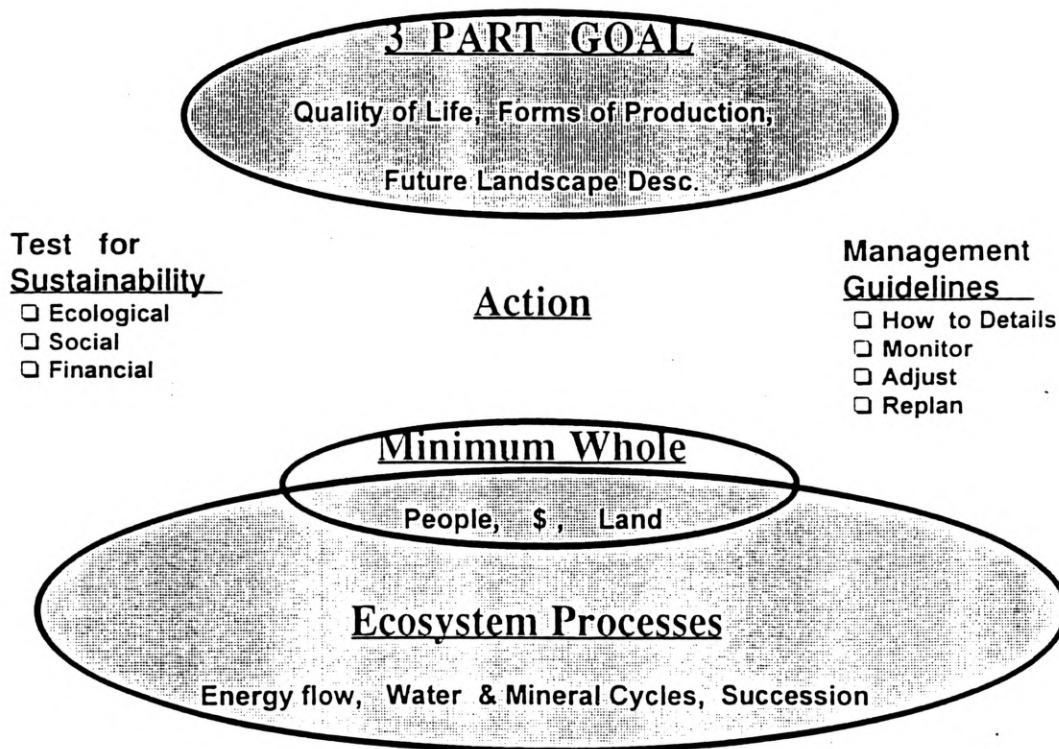


Figure 4. HRM-soft systems model (Kroos and Montagne, 1994)

The first step is to identify the minimum whole including the central government, locals, district administrators, tourists, and all related agencies. It will be the responsibility of the park manager to identify the whole including the people, the financial resources, and the land in close consultation with Department of National Parks and Wildlife Conservation.

Thorough research must be conducted to evaluate the ecosystem processes of the park -- the second step. Funding for the study has to be provided by international organizations; their experts must study rangelands, animal husbandry, and the grazing competition between wildlife and livestock.

To establish a common goal for all people will comprise the third step. The integration as a team of locals, park authorities, district administrators, elected district parliament members, tourist agencies, and others will build a common goal. The parliament member who represents the district will influence the inclusion or protection of local policies at the national level. The overall goal is to ensure the permanent conservation of viable examples of all natural communities and to promote tourism.

Based on the common goal, a comprehensive management plan would be prepared by team experts for future management guidelines. The action plan and tools for managing resources will be integrated into a five-year development program for implementation by the Department of National Parks and Wildlife Conservation. Funding for the implementation of the management programs should be provided by the government and international organizations.

Exclosures to monitor vegetation change can be installed. These exclosures will be monitored closely using the assistance of local people. This will help educate them and orient them to park management needs. However, if scientific analysis of the exclosures suggest changes in grazing management, effective implementation must seek a balance with public opinion and tradition (Marlow, 1992).

CONCLUSION

The management of the Himalayan National Parks with their indigenous human residents is complex and difficult. Conservation programs cannot succeed without the full cooperation from the local people, and that cooperation cannot be gained unless their basic needs are met. This would include recognizing people's rights to use their present land tenureships and holdings as long as traditional farming practices do not involve major environmental changes. For example, application of chemical fertilizers, pesticides, and herbicides might upset the ecological balances within the park environments.

Where sustainable utilization of resources is to be managed in multiple-use management areas, the government should supplement national parks through a participatory process and a return of decision-making power to the local communities. To be sustainable park policy must empower the people to manage resources in a manner that meets their present needs along with honoring cultural values and without compromising future generations.

For development to be sustainable, it must take into account social and ecological factors as well as economic ones. Integrated conservation and development must meet subsistence needs while promoting conservation of biodiversity. Government must guide the local people in building a sustainable community with a "sense of place" as part of biodiversity conservation.

This will require consensus decision making by all people to balance economic development and environmental protection. Village level meetings

complemented by district level workshops can facilitate roundtable decisions to be incorporated into a final plan.

This consensus decision making process, which considers human, ecological, financial, and biological resources can best be guided by the Holistic Resource Management model. The HRM model considers both ecological and human system processes in developing plans and tools for local application. External influences can be used for positive benefit where appropriate.

Testing guidelines are used to identify causes and weak links, and to predict if particular actions will remedy the problem situation. The management guidelines of the park authority must close the mistrust gap between the locals and the park by changing the hierarchical top-bottom to a collaborative bottom-up approach. Finally, continuous monitoring and evaluation has to be implemented with the full participation of the local people to guide changes for future management of the whole to meet their desired goals.

LITERATURE CITED

- British Columbia Round Table on the Environment and the Economy. 1992. Towards a strategy for sustainability. A report to the citizens of British Columbia, Victoria, Canada. British Columbia Round Table on the Environment and the Economy, Victoria, BC V8W 3C6.
- Bunting, B.W., M.N. Sherpa, and M. Wright. 1991. Annapurna Conservation Area:Nepal's new approach to protected areas management. In West and Brechin (eds.).Resident Peoples and National Parks. The Arizona State University, Tucson.
- Canada Round Table. 1993. Building consensus for a sustainable future. Guiding principles. Ontario Round Table on Environment and Economy, P.O. Box 4, Toronto, M5G 1Z3.
- Dasmann, R.F. 1984. The relationship between protected areas and indigenous peoples. In J.A. McNeely and K.R. Miller, (eds.), National Parks, Conservation and Development:The role of protected areas in Sustaining society. Smithsonian Institution Press, Washington D.C. p 667-671.
- Dregne, H.E. 1992. Erosion and soil productivity in Asia. Journal of Soil and Water Conservation, 47(1):8-13.
- Denniston, D. 1993. Saving the Himalaya. Worldwatch Institute, Washington D.C., 6(6):10-21.
- Garratt, K. 1984. The relationship between adjacent lands and protected areas: Issues of concern for the protected area manager. In McNeely and Miller (eds.). National Parks, Conservation and Development: The role of protected areas in sustaining society. Smithsonian Institution Press, Washington D.C., 65-71pp.
- Gilles, J.L., and K. Jamtgaard. 1992. The commons revisited. Rangelands, 4(2):51-54.
- Hardin, G. 1968. The Tragedy of the Commons. Science, 162(12):1243-1248.
- Hamilton, L.S. 1992. Mountain Protected Areas. In Stone, P. B. (ed.). The State of the world's mountains. Zed Books, London, pp.351-358.

- Heinen, J.T., and P.B. Yonzon. 1994. A Review of Conservation Issues and Programs in Nepal: From a single species focus towards Biodiversity Protection. *Mountain Research and Development*, 14(1):61-76.
- Holechek, J.L., R.D. Pieper, and C.H. Herbel. 1989. *Range Management, Principles and Practices*. Prentice Hall, Englewood Cliffs, New Jersey.
- Hough, J.L., and M.N. Sherpa. 1989. Bottom-up vs. Basic needs: Integrating Conservation and Development in the Annapurna and Michiru Mountain Conservation areas of Nepal and Malawi. *Ambio*, 18(8):434-441.
- IUCN, UNEP, and WWF. 1980. *World Conservation Strategy: Living Resource Conservation for Sustainable Development*.
- Ives, J.D., and B. Messerli. 1989. *The Himalayan Dilemma. Reconciling Development and Conservation*. Routledge, New York.
- Jackson, R. 1979. Aboriginal hunting in West Nepal with reference to musk deer (Moschus moschiferus moschiferus) and snow leopard (Panthera uncia). *Biol.Conserv.*, 16:63-72.
- Jacobs, P. 1981. Human Settlement Issues 6. In *Environmental Strategy and Action: The challenge of the World Conservation Strategy*. University of British Columbia, Vancouver, Canada.
- Johnson, J. D., and D.J. Snepenger. 1993. Application of the tourism life cycle concept in the Greater Yellowstone Region. *Society and Natural Resources*, 6:127-148.
- Karan, P.P. 1960. *Nepal, a cultural and physical geography*. University of Kentucky Press, Lexington.
- Kroos, R.H.K. and C. Montagne. 1994. Personal communication. Crossroads Inc., 5999 Thorpe Road, Belgrade, MT 59714.
- Mackinnon, J., K. Mackinnon, G. Child, and J. Thorsell. 1986. *Managing Protected Areas in the Tropics*. IUCN, Gland, Switzerland.
- McNeely, J.A. 1988. *Economics and Biological Diversity: Developing and Using Economic Incentives to conserve Biological Resources*. IUCN, Gland, Switzerland.
- Marcus, W.A. 1993. Assistant Professor. Department of Earth Science, Montana State University, Bozeman, MT.

- Marlow, C.B. 1992. Personal communication. Associate Dean of College of Agriculture, and Resident Instruction, Department of Animal and Range Science, Montana State University, Bozeman, MT.
- McKinney, M., and R. Rasker. 1994. Guidelines for Building Sustainable Communities. Class handout, Montana State University, Bozeman, MT.
- Miller, D.J. 1986. High Elevation Grasslands of Nepal. *Rangelands*, 8(3):112-114.
- Mishra, H.R. 1985. The Fragile Mountain Revisited:Nepal's agenda for Halting the slide. In J.A. McNeely, and J.W. Thorsell (eds.). *People and Protected Areas in the Hindu Kush-Himalaya*. King Mahendra Trust for Nature Conservation and International Center for Integrated Mountain Development, Kathmandu, Nepal.
- Montagne, C. 1994. Personal communication, Associate Professor. Plant, Soil, and Environmental Science Department, Montana State University, Bozeman, MT. 59717.
- Ovington, J.D. 1984. Ecological Processes and National Park Management. In J.A. McNeely and K. Miller (eds.) *National Parks, Conservation and Development*. Smithsonian Institution Press, Washington D.C. pp60-64.
- Price, L.W. 1981. *Mountains and Man, A Study of Process and Environment*. University of California Press, Berkeley.
- Rees, W.E. 1989. Defining "Sustainable Development". Center for Human Settlements, University of British Columbia, Vancouver, B.C. pp1-7.
- Savory, A. 1988. *Holistic Resource Management*. Island Press, Washington D.C. 564pp.
- Schaller, G.B. 1977. *Mountain Monarchs, wild sheep and goats of the Himalaya*. University of Chicago Press, Chicago.
- Schmidt, M.G., H. Schreier, and P.B. Shah. 1993. Factors affecting the nutrient status of forest sites in a mountain watershed in Nepal. *Journal of Soil Science*, 44:417-425.
- Sherpa, N.W. 1992. *Operational Plan-Shey Phoksundo National Park*. World Wildlife Fund-US. 63pp.
- Shrestha, T.B. 1985. Botanical wealth of Mountain Parks and Reserves in Nepal. In McNeely and Thorsell (eds.), *People and Protected Areas in the Hindu*

- Kush-Himalaya. King Mahendra Trust for Nature Conservation and International Center for Integrated Mountain Development, Kathmandu, Nepal.
- Shrestha, T.B., L.N. Sherpa, K. Banskota, and R.K. Nepali. 1990. Makalu-Barun National Park and Conservation Area Management Plan. Department of National Parks and Wildlife Conservation and Woodlands Mountain Institute.
- Scruggs, P. 1992. State Level Sustainable Development Draft. Center for Policy Alternatives. 1875 Connecticut Ave., NW, Suite 710, Washington D.C. 48pp.
- Stankey, G.H., S.F. McCool, and G.L. Stokes. 1984. Limits of acceptable change: A new framework for managing the Bob Marshall Wilderness. *Western Wildlands*, 10(3):33-37.
- Stoltz, P. 1994. Personal communication. Consultant, Resource Management Planning, Apt.2C, 103 Grant Chamberlain Drive, Bozeman, MT 59715.
- Waldman, D. 1993. Charting a course for Sustainable Development. *Environment views*, pp19-21.
- Wells, M.P., and Brandon, K.E. 1993. The principles and practices of buffer zones and local participation in biodiversity conservation. *Ambio*, 22(2-3):157-162.
- West, P.C., and S.R. Brechin, (eds).1991. National Parks, Protected Areas, and Resident Peoples: A comparative assessment and integration. Resident peoples and National Parks. The University of Arizona Press, Tucson.
- Wilson, K., and G.E.B. Morren, Jr. 1990. Systems approaches for improvement in Agriculture and Resource Management. Macmillan Publishing Company, New York.
- WRI, IUCN, and UNEP. 1992. Global Biodiversity Strategy. World Resource Institute, International Union for Conservation of Nature and Natural Resources, United Nations Environmental Program, Washington D.C.
- Upreti, B.N. 1985. The Park-People Interface in Nepal: Problems and New Directions. In J.A. McNeely and J.W. Thorsell (eds.), *People and Protected Areas in the Hindu Kush-Himalaya*. King Mahendra Trust for Nature Conservation and International Center for Integrated Mountain Development, Kathmandu, Nepal.