

Building on Success

The National Conservation Strategy for Nepal



HIS MAJESTY'S GOVERNMENT OF NEPAL
INTERNATIONAL UNION FOR CONSERVATION OF
NATURE AND NATURAL RESOURCES



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**Prepared by His Majesty's Government of Nepal
together with the International Union
for Conservation of Nature and
Natural Resources (IUCN)**

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IUCN is a network of governments, nongovernment organizations and individuals interested in conservation and development joined together to promote the conservation and sustainable use of natural resources. Founded in 1948, the IUCN has more than five hundred members, including governments and NGO's in over one hundred countries.

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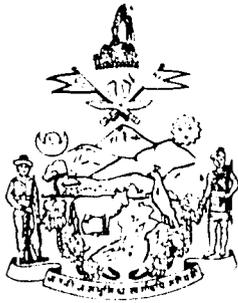
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Discussion in progress during NCS field meeting; Patmara, Jurnla District, November 1986.



Marich Man Singh Shrestha
Prime Minister

FOREWORD

One of the principal findings that emerged from the United Nations Conference on the Human Environment in Stockholm in 1972 was that the processes of development and management of the environment are inextricably joined together. The recent report of the World Commission on Environment and Development has also pointed out the need for bringing about harmony between economy and ecology so that development can be sustainable.

I am pleased to find that the Nepal National Conservation Strategy has been careful to develop, in addition to pragmatic policies for the sustainable use of our natural resources, a Conservation Action Agenda that addresses the needs of the people and aims at linking conservation with development. Designed as it is on the theme of conservation and development, the Strategy will, I trust, contribute substantially to the most important issue of the day, namely, meeting the basic needs of the people.

To respond to the current environmental challenge, Nepal must mount a concerted national effort based upon the wise-use of our natural resources in a way that takes into account the basic needs, social values and rich cultural heritage of its people.

I sincerely believe that our National Conservation Strategy will be duly translated into action in a meaningful way for the sustainable development of the nation.

Marich Man Singh Shrestha
Prime Minister and
Chairman, National Planning Commission
His Majesty's Government of Nepal

PREFACE

Sustainable development and conservation must be firmly linked if Nepal is to meet the needs and improve the quality of life of its present population and future generations. Nepal is, and will continue to be, heavily dependent upon its water, land and forest to meet its development objectives. Hence it is essential that these resources be managed in such a way as first to enhance, and then to sustain, their inherent productive capacity.

Within the conceptual framework of 'Conservation for Development', the National Conservation Strategy for Nepal provides a long-term perspective on natural resources management and describes a Conservation Action Agenda designed to attain four conservation objectives.

The need to manage the natural resource base stems from the need to improve productivity and minimize waste. That need, in turn, arises from the basic demands of a growing population. The degree to which the necessary resource management practices are successful will be largely dependent upon the nature and extent of the human energy, will and knowledge that are applied.

Thus the NCS for Nepal must, and does, focus upon people as the salient feature of resource conservation. In doing so, it endeavours to reflect the social and cultural values and the economic needs of the Nepalese people.

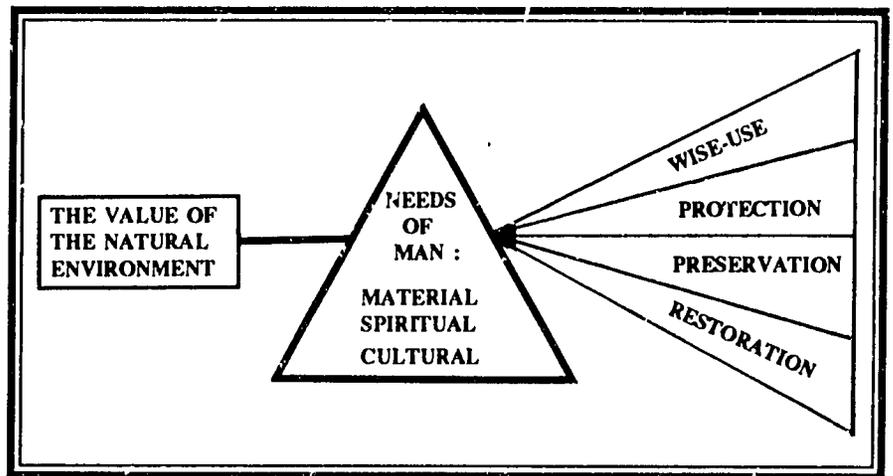
A well-founded conservation strategy must go beyond the simple consideration of the natural components of land, forest, water, air and wildlife. It must contain principles which reflect the real value of the natural environment expressed in terms of human needs. These fall into three categories: material, cultural and spiritual.

If one considers the value of the natural environment to be a beam of light passing through a prism comprising the three needs, the spectrum thus formed consists of four elements (see Figure 1). These four elements, wise-use, protection, preservation and restoration, may be considered the principal components of conservation.

A conservation strategy should reconcile man's needs in terms of the four elements. This reconciliation provides the guidelines for developing the National Conservation Strategy for Nepal.

Figure 1.

THE CONSERVATION SPECTRUM



<u>Elements</u>	<u>Guidelines</u>
Wise-use	manage the use of land, forest and water to ensure their productivity on a sustainable basis
Protection	maintain quality of essential ecological and life-support systems to prevent degradation of life-sustaining elements
Preservation	establish national parks and protected areas to protect aesthetic, wildlife, historical, archaeological and scientific values, and undertake measures to preserve cultural property and cultural expression
Restoration	reclaim, through specific restorative measures, land, forest and water in order to maintain or enhance their normal level of productivity, and undertake measures to restore cultural heritage components, such as temples and sculpture.

From the nature of the above guidelines, it is evident that man's material needs require consideration of the guidelines covering the three elements, wise-use, protection and restoration. Similarly, a conservation strategy, to be sensitive to man's cultural needs, must include both preservation and restoration components.

Conservation may be described as a concept to guide man's use of all natural resources. It therefore constitutes a rule of conduct for well-being and survival, based upon stewardship and wise-use, that must underlie all decisions concerning these resources. It further ascribes to them an intrinsic value, regardless of any human interest that may accrue.

Conservation also has a moral dimension. The way in which a society maintains its basic moral and social values must be an integral component of a conservation strategy.

Simply, conservation means the reduction of waste. To reduce waste effectively, however, all of the elements must be present. The National Conservation Strategy for Nepal includes all four - wise-use, protection, preservation and restoration.

By design, the National Conservation Strategy for Nepal is as much a process as it is a product. In formulating the NCS, the principal objective was not simply to produce a document that would be read in a cursory fashion by relatively few and then shelved for possible, but not probable, future reference.

For any strategy to be useful it must be implemented, and to be implemented it must be understood by, and have the active support of, a wide range of people.

One way to gain that understanding and support is to engage as many people as possible in the formulation stage. If Nepal's National Conservation Strategy is successful, it will be due, in large part, to the quality of input received from a substantial cross-section of concerned Nepalese people.

A determined effort has been made to avoid developing a Strategy that consists of a series of imprecise recommendations based upon theoretical constructs. Instead, the goal has been to develop a Conservation Action Agenda that is realistic, simple in style and practical in substance - hence capable of implementation.

Pragmatism characterizes the Nepalese farmer's successful struggle to survive. For this reason, his or her direct participation and practical insight during the formulation of the NCS for Nepal were deemed absolutely essential.

To accomplish this, the NCS Secretariat (see Annex I) conducted extensive field work in each of the five development regions and in each of the four geographic divisions - the Tarai, the Inner Tarai, the

Hills and the Mountains.¹ More than 100 meetings were held in villages and towns throughout the districts of Kanchanpur, Kailali, Jumla, Mustang, Kaski, Chitwan, Sunsari, Morang, Dhankuta and Jhapa.²

Views were received from several hundred people including tenant farmers, land-owner farmers, landlords, Village and District Panchayat elected officials, private business people, industrialists, representatives of nongovernment organizations including women's, farmers' and youth groups, educators, government administrators and Rastriya Panchayat members (see Annex II).

These views concerning resource conservation problems, their causes and recommended solutions were thoroughly examined, recorded and subsequently incorporated into the Central Document of the National Conservation Strategy.

Another component of the Strategy is a series of sectoral papers. The Secretariat identified 19 key subject areas, drafted terms of reference for each of 19 background papers and commissioned their preparation. Most of the papers were prepared by Directors-General of government departments or heads of other government agencies, and the remainder, by senior local professionals from Tribhuvan University and the private sector.

The Secretariat next commissioned a team of qualified reviewers, at least one for each background paper, to consider each of the prepared papers.³

Following this review, the Secretariat convened a series of five author-reviewer⁴ meetings. The purpose of the working sessions was two-fold. First, to receive and consider the reviewers' comments and second, to examine the critical, cross-sectoral implications of a wide range of issues that cross government department lines of responsibility.

On the basis of the village, district and regional meetings, the background papers, the reviewers' comments and the author-reviewer workshops, the Secretariat began formulating the Central Document of the Strategy. A set of ten Strategy criteria (see Annex IV) was developed which the Secretariat used to help guide its analysis of the material and preparation of the Central Document.

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1. The four geographic divisions traditionally used in Nepal correspond to the five physiographic regions of the recent Land Resource Mapping Project, except that the latter further divides the Mountains into the High Himalaya and High Mountain. See Map page 14.
 2. During the field trips the NCS Secretariat was accompanied by the Additional Secretary, Ministry of Forest and Soil Conservation and the Joint Secretary, National Planning Commission.
 3. See Annex III for a list of titles, authors and reviewers.
 4. With one exception, all of the more than 40 authors and reviewers of the background papers are Nepalese.

The first draft of the Central Document was reviewed by the authors of the background papers. The second draft, which took into account the review comments, was then subjected to rigorous examination by a 22-member panel (see Annex V).

Comments received from the review panel were then incorporated into the third draft of the NCS Central Document.

His Royal Highness Prince Gyanendra Bir Bikram Shah graciously consented to convene a meeting of senior officials to be briefed on, and consider, the contents of the National Conservation Strategy for Nepal. Observations made following the briefing were then reflected in the next draft.

The Vice-Chairman of the National Planning Commission convened a series of three meetings of all Ministry Secretaries and the Vice-Chancellor of the Royal Nepal Academy of Science and Technology and of Tribhuvan University. Participants provided both oral and written comments on the draft document which the NCS Secretariat incorporated into the final version prior to its submission to the Council of Ministers for formal endorsement.

Implementation of the National Conservation Strategy for Nepal is the crucial phase in the NCS continuum. The challenge now is to maintain the momentum and the interest of the vast number of people, ranging from remote villagers to the highest levels of government and nongovernment institutions, who have contributed substantially. To meet this challenge, steps are already underway to transfer responsibility for facilitating, coordinating and monitoring the implementation of the Strategy from the present NCS Secretariat to a permanent body of government.

Sole reliance upon government to implement the Strategy is neither appropriate nor practicable. Government must play the major role, but direct involvement of individual land users, Village and District Panchayats, private sector business persons and industrialists, nongovernment organizations and donor agencies is essential to a successful NCS. User groups, provided with the necessary support, can be among the most effective implementers as well as direct beneficiaries of the National Conservation Strategy for Nepal.

For centuries, the Nepalese farmer has melded the inherent properties of land, water, forest and livestock into a cohesive and productive whole.

Governments generally, on the other hand, as they establish institutional frameworks for resource administration, tend to compartmentalize resource conservation. This has the effect of disrupting valuable natural linkages. It may also lead to insufficient recognition of the fact that what is done in one sector of the resource base nearly always has an impact on other sectors.

This sectoral separation leads to consideration only of the effects of environmental degradation and ignores the causes. Remedial

measures, undertaken often at great cost, are usually directed at effects. The causes are less obvious, usually not the responsibility of a single agency and, because they are complex, require more difficult political decisions.

In addressing the question of integration, the National Conservation Strategy for Nepal does not recommend the establishment of a new superministry, major changes in legislation or vast expenditures of money. Its thrust is toward developing an atmosphere and environment within which human action is integrated, where the individual has a much larger role, and where personal commitment and participatory involvement are natural consequences.

Conservation is not new to Nepal. The NCS, however, provides the essential focus for mounting a more cohesive effort. By weaving the process of formulation into the means of implementation, the stage is set for the next phase - implementing the Conservation Action Agenda.

John K. Naysmith
Secretariat Director and Senior Advisor
National Conservation Strategy for Nepal

20 December 1987

A INTRODUCTION

1. Background

In 1980 the World Conservation Strategy (WCS)⁵ was endorsed by government officials and political leaders in 35 simultaneous ceremonies throughout the world. One point highlighted in the WCS was the need for preparation and implementation of national conservation strategies.

Strong endorsement of the World Conservation Strategy by His Royal Highness Prince Gyanendra Bir Bikram Shah resulted in a decision to initiate the formulation of a National Conservation Strategy for Nepal. Phase I took the form of a Prospectus published in 1983. The Prospectus, following the principles and guidelines described in the World Conservation Strategy, set the scene for Phase II, the formulation of a comprehensive National Conservation Strategy (NCS) for Nepal.

5. The WCS was prepared by the International Union for Conservation of Nature and Natural Resources (IUCN) with the assistance of the World Wildlife Fund and the United Nations Environment Program (UNEP). It was reviewed and endorsed by the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Educational, Scientific and Cultural Organization (Unesco). Launched in 1980, the WCS described in broad terms what should be done to conserve the earth's living resources, thereby enabling development to be sustained.

In 1985 Phase II commenced, again with the encouragement of His Royal Highness Prince Gyanendra who, in referring to the proposed NCS for Nepal, said...

"... the rational use of the resources requires a realistic approach enabling us to strike a balance between the needs of the growing population and those of nature conservation.

It is precisely with this in mind that Nepal has subscribed to the IUCN sponsored World Conservation Strategy and is now in the process of formulating a National Conservation Strategy."

With the formal endorsement of this, the Central Document of the NCS for Nepal, by His Majesty's Government (HMG), Phase III, implementation, is about to be launched.

2. Objectives

The National Conservation Strategy for Nepal has four objectives, which are to help :

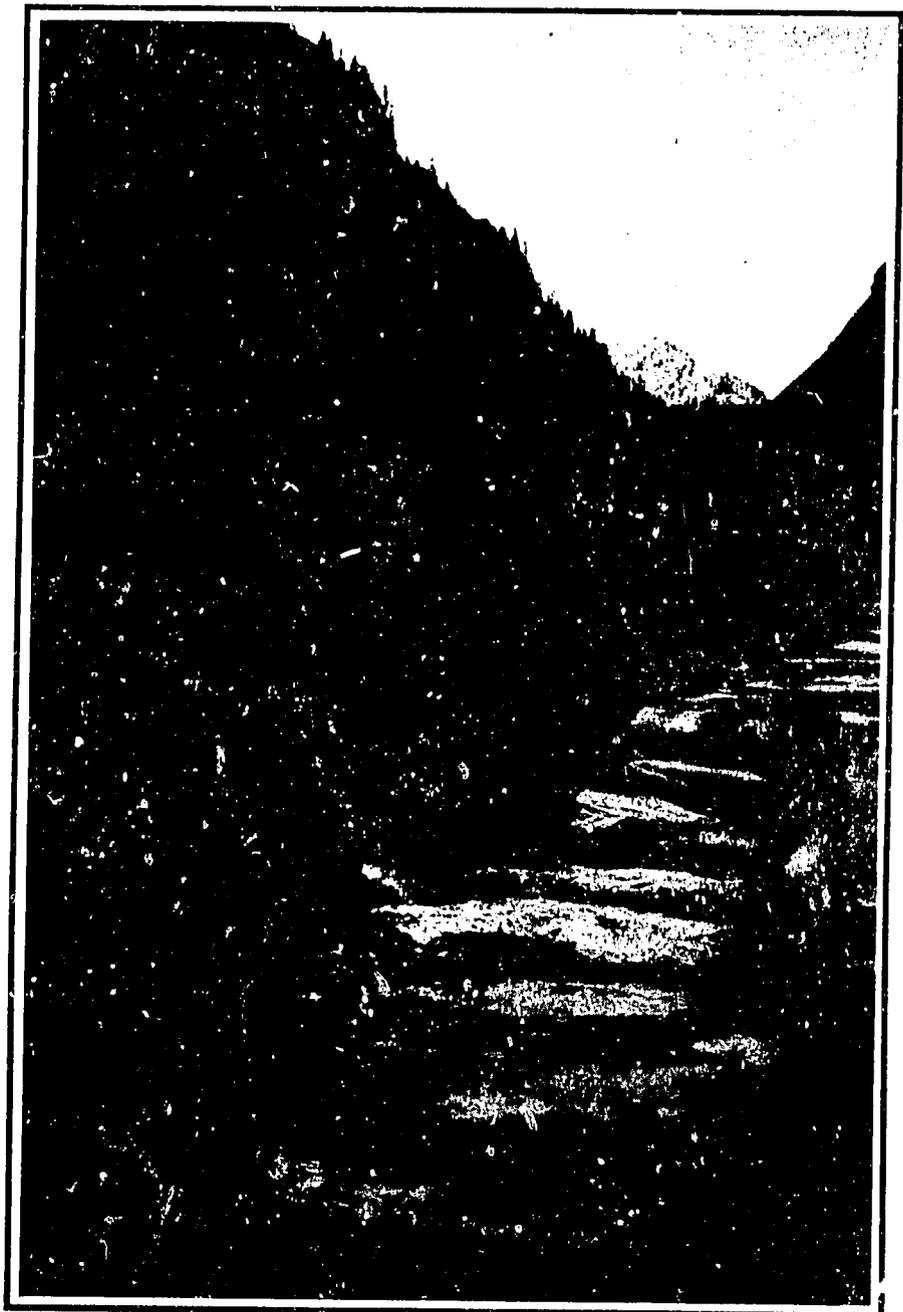
- a. satisfy the basic material, spiritual and cultural needs of the people of Nepal, both present and future generations
- b. ensure the sustainable use of Nepal's land and renewable resources
- c. preserve the biological diversity of Nepal in order to maintain and improve the variety of yields and the quality of crops and livestock, and to maintain the variety of wild species, both plant and animal
- d. maintain essential ecological and life-support systems, such as soil regeneration, nutrient recycling and the protection and cleansing of water and air.

3. Principles

In guiding the formation of the NCS for Nepal, the following principles were adopted :

- a. the Strategy must reflect the social and cultural values and the economic needs of the Nepalese people and be a counterpoise to acquired values and adopted practices that may be detrimental
- b. wise-use, protection, preservation and restoration are the four basic elements of the NCS for Nepal
- c. the Strategy must be designed to support the Seventh Plan and the objectives stated in the Royal Directive concerning basic minimum needs by the year 2000; it must also reinforce the need to integrate conservation with development by ensuring that future development plans and the NCS are complementary

- d. the Strategy, although national in scope, must reflect the basic differences in the four geographic divisions of Nepal as well as regional differences in economic development potential
- e. the Strategy must make full use of existing institutions and structures in the public as well as the private sector by avoiding wherever possible the introduction of new governmental organizations and agencies.



B CONSERVATION IN NEPAL

1. Historical

The Nepalese people have a long tradition of using wisely their natural resources. Economic necessity and centuries-old, deep-rooted cultural and spiritual values have resulted in myriad examples of both individual and collective effort to conserve natural resources. Such effort has protected, and often enhanced, a landscape that is sometimes benevolent, sometimes unforgiving.

This makes it essential that the formulation and implementation of the National Conservation Strategy for Nepal recognize and take full account of the existence of a rich inheritance of traditional enterprise.

Excavations at various sites, particularly in the Lumbini zone of the Western Tarai, have dated settlements from approximately the eighth to the sixth centuries B.C.

There are many historical sites in the Kathmandu Valley yet to be fully examined. For example, in the Balkhu Mahadev-Tham area, traces of early settlers have been found. Similarly, in Towloong, at the foot of Shivapuri, the foundation of an ancient Buddhist monastery was discovered.

Much of the recorded history of Nepal has centred in the Kathmandu Valley. While constituting only a small part of Nepal in terms of area and population, the Kathmandu Valley has always been politically and culturally a dominant force in the country. Because of this, Kathmandu has made a major contribution to the art and architecture

of Asia - attested to by the fact that as many as seven historic sites in the Kathmandu Valley have been identified in the World Heritage List.

Religious tolerance, coexistence, justice and people's participation in the affairs of administration had their beginnings during the Lichhavi period from the fifth to the eighth centuries A.D. King Mana Deva, the founder of the Lichhavi dynasty, gave shape to Nepalese society and laid the foundation of Nepalese culture. On this foundation, the Malla Kings strengthened and encouraged the talents of Newar artisans and out of this combination grew Nepalese art, architecture, religion, social norms, customs and rituals which are apparent to this day.

Among the customs and traditions that developed were those with a spiritual basis related to the natural environment. For example, there is the deep-rooted tradition of preserving, in their natural state, large expanses of forest adjacent to places of worship or important sources of water.

The custom also grew of commemorating past generations by constructing stone *Chautaras*, or rest-platforms, now features of the landscape. These resting places consist of shade trees, such as *pipal* and *barr* (banyan), planted along with the construction of the *Chautaras*. Nearby, there is a small water hole for cattle. Other such examples can be seen in the small *Patis*, or rest houses, placed conspicuously at the entrance to villages for the use of travellers or pilgrims, and stone water spouts and troughs, *Kuwa*, kept filled to quench the thirst of travellers. These often date from the Lichhavi period. The building and subsequent tending of such rest places were considered deeply religious acts.

There are many beautiful examples today of such rest places shaded by central *pipal* trees frequently several centuries old.

Conservation awareness dates back many centuries in Nepalese society. Ample evidence is recorded in the stone inscriptions dating from the Lichhavi period through the Thakuri, Malla and Shah periods which document the conservation and renovation of temples, *viharas* or monasteries, *raj kulo* or royal canals and water spouts. Nepalese society of the time considered it pious to care for its special sites. Whatever cultural heritage in wealth of art remains to this day is in large part due to the awareness of cultural values demonstrated in those ancient periods.

During the Malla period of the fourteenth and fifteenth centuries, culture and the arts further prospered and developed. Religious buildings were constructed with a view to permanence resulting from the benefactors' deep religious sentiment in search of merit; whereas family dwellings were generally looked upon as temporary structures to be rebuilt by each new generation. During this period *Chhen-Bhadel Apdda* was established with state funds for the purpose of carrying out repairs to ancient and public edifices.

The division of the Kathmandu Valley into at least three petty kingdoms during the Malla reign, although leading to rivalries

among the Malla rulers, also resulted in competition to beautify their respective capitals. Durbar Squares, consisting of palaces and temples that typified the intense Newar culture of that period, today still form a substantial part of Nepalese culture and are a great source of pride.

The history of Nepal contains many instances of the renovation and repair of temples and objects of worship. For example, the Pashupatinath temple, considered the most sacred temple of the Hindus in the Kathmandu Valley, has been renovated on several occasions. Though badly damaged in 1349 by the Muslim invader, Sam Suddin Iliyas of Bengal, it was completely restored by the beginning of the fifteenth century. In the seventeenth century, it was renovated by one of the Malla rulers and again in the nineteenth, by the Shah rulers. Today, under the World Heritage Convention, it is a protected site of international importance and there is an active national development program under the Pashupati Area Development Trust. This Trust is chaired by Her Majesty the Queen.

With the unification of Nepal in the eighteenth century under King Prithvi Narayan Shah, the founder of modern Nepal who was the tenth descendant of Drabya Shah, King of Gorkha from 1559 to 1570, there emerged a national culture based on Hindu values.

Today, His Majesty King Birendra Bir Bikram Shah Dev continues to give emphasis to, and encourage, the preservation and expression of Nepal's rich cultural heritage.

As well as this cultural heritage that derived over the millennia, there developed many conservation practices related to the use of land, water and forest. Perhaps the most prominent example of traditional resource management is the beautifully terraced fields of the midlands which reach magnificent proportions. The raised stone walls and footings necessary to support these terraces are clearly the result of laborious effort and technical design perfected through generations of experience.

An example of land management in the traditional system is demonstrated in the Kathmandu Valley where the hills were retained in forest, the settlements were situated in the *tars*, or plateaus, and cultivation took place in the *dobs* or bottom lands.

Irrigation systems that were built centuries ago are still in evidence today. The *Raj Kulo* of the Kathmandu Valley dates from the sixteenth century and the *Bhimsen Kulo*, built in Gorkha, from the seventeenth century. Similarly, there is evidence that the indigenous people of the Tarai developed and maintained irrigation systems and collection ponds.

In addition to the various forms of land management, there evolved traditional systems of resource administration. The Sherpa society of the Mountains, for example, elected *shingo nawa*, forest caretakers, to protect adjacent forests and regulate the use of pasture land.

In the eastern Hills, it was common practice to administer land under the *kipat* system whereby a tribe - this evolved into two or more

clans in some cases - exercised exclusive and inalienable communal rights over a large area. Only members of the designated clans could hold land or reclaim the uncultivated land within the *kipat* jurisdiction, which included streams and forests.

Also in the Hills during the nineteenth century, *chitaidar*, local non-official functionaries, were made responsible for administering and controlling the use of village forests from which were harvested fuelwood, fodder, leaf litter, grazing and building materials. Out of the *chitaidari* system there developed a sense of local responsibility for forest conservation and wise-use.

2. Institutional

As society grew more complex, government and institutional efforts were introduced to supplement traditional conservation practices. Because they were often too ambitious, they did not always attain the stated objective. Nevertheless, there are many examples of success.

One of the first major initiatives towards institutionalizing natural resource conservation took place in 1934 with the establishment of *Ban Janch Adda*, a forest office, for the protection and harvesting of Tarai forest. This office continued until 1956, when the office of Chief Conservator was established. This was the beginning of forest management and development in terms of demarcating and harvesting commercially valuable forest stands in concert with afforestation programs and construction of fire lines and forest roads.

In 1951, the Ministry of Forest was formed and ten years later became the Ministry of Forest and Agriculture.

The Forestry School was established in 1950, under the aegis of the Department of Forest, to commence the training of foresters at the technical level.

Early attempts at agrarian reform measures included the Royal Land Commission in 1952, the Land Reform Act of 1957, the Land Act of 1964 and the establishment of the Land Reform Office in 1964 to implement the national land reform program.

With the passage of the Forest Nationalization Act in 1957, the traditional forms of resource conservation, such as *shingo nawa*, *chitaidari*, and *kipat*, ceased to function. Other important resource legislation at that time included the Wildlife Protection Act (1958), and in 1961, the Forest Act and the Land Acquisition Act. In 1965, further compartmentalization took place when agriculture was separated from forestry and the Ministry of Agriculture was formed.

In 1952, the Department of Archaeology was formed and given a wide range of responsibilities related to buildings, paintings, icons and manuscripts having archaeological, historical, cultural or artistic value.

The Ancient Monuments Protection Act was passed in 1956, giving some legal protection to ancient monuments, sites and objects of archaeological, historic or artistic interest. It was amended in 1964, 1970 and 1986.

In 1957, the Nepal Academy Act was promulgated to give encouragement, protection and publicity to Nepalese literature, art and culture. In the same year, the Royal Nepal Academy was established, its principal objectives to include the production and publication of original and research-oriented works on the Nepali language, literature, arts, culture and science.

The Nepal Association of Fine Arts was established in 1965 - it would later be incorporated into the Royal Nepal Academy - with the aim of promoting contemporary art and fostering young talented artists of Nepal.

The early 1970's saw the start of monument conservation activities with the commencement of the Hanuman Dhoka Conservation Project, under the aegis of the Department of Archaeology, with additional technical and financial assistance. This project became the prototype for monument conservation technology in Nepal and was the training ground for many of the traditional craftsmen working today. The awareness created by the Hanuman Dhoka Project led to the preparation of a Master Plan for the conservation of the cultural heritage of the Kathmandu Valley and the subsequent inclusion of the Valley in the World Heritage List, referred to earlier. Similarly extensive activities, under the Ministry of Panchayat and Local Development, known as the Bhaktapur Development Project for the preservation of a historic town, Bhaktapur, in the Kathmandu Valley, and the restoration and conservation of important monuments, such as Dattatraya and Pujari Math Square, were undertaken in the 1970's.

With the Fourth Plan (1970-1975), the idea of regional development strategies was introduced as a means to achieve the government's development objectives, and phrases such as 'regional balance' and 'geographic specialization' became part of the planning documents.

In 1971, the Forestry School became the Institute of Forestry under Tribhuvan University. Plant and animal ecology at the postgraduate level has been offered by the University since 1983.

The Guthi Corporation Act, amending the Guthi Samsthan Act of 1964, was incorporated in 1972 to manage the diverse religious bodies controlling the endowed religious monuments and sites. Under the Act, most of the monuments in the Kathmandu Valley are under the control of the Guthi Samsthan.

Following several decades of wildlife conservation, including the protection of the rhinoceros, a landmark conservation measure took place in 1970, when His Late Majesty King Mahendra approved in principle the establishment of Royal Chitwan National Park in the lowlands and Lantang National Park in the mountains. Shortly after, a section was established within the Department of Forest to have specific responsibility for developing national parks and protected

areas and for the conservation of wildlife. In 1973, with the passing of the National Parks and Wildlife Conservation Act, these parks were embodied in legislation and, in 1979, the Department of National Parks and Wildlife Conservation was established.

During the 1970's, integrated rural development programs were undertaken across the country. In some cases, and with varying degrees of success, these programs addressed conservation issues.

In 1977, the Department of Agriculture launched the Land Improvement Program which contained several components including: rearrangement of farm holdings to improve efficiency and crop production, clearing and levelling of land to improve water conservation and the construction of farm drainage systems.

Reflecting the increased importance placed upon the role of livestock, the Department of Livestock Development and Animal Health was established in 1979. Previously, the program had been a division of the Department of Agriculture.

In 1976, the National Forest Plan was prepared by His Majesty's Government. The Plan gives emphasis to the need for conservation, with specific reference to controlling landslides and soil erosion. Perhaps most significantly, it speaks of the need for community participation in the development and protection of forests.

The Department of Soil Conservation and Watershed Management, as it is now known, was established in 1974 as the Department of Soil and Water Conservation. During the 1970's emphasis was given to reforestation programs and soil conservation activities, conservation education was initiated and the Remote Sensing Centre was established.

One of the most successful resource conservation initiatives established to date is the Community Forestry Program. The basic philosophy underlying the program is to encourage the active participation of villagers in forestry and related conservation projects.

In 1980, the Ministry of Education became the Ministry of Education and Culture and the position of Additional Secretary for Culture was established.

By 1985, the first year of the current and Seventh Plan, the need for more effective resource conservation measures was broadly accepted.

Accelerating population growth, decreasing areas of accessible forest and stagnation in some agriculture sectors were among the issues that the Seventh Plan had to, and did, address. In 1987, a Division of Environment and Resource Conservation was established within the Planning Commission - a recognition of the need for conservation and development issues to be addressed together.

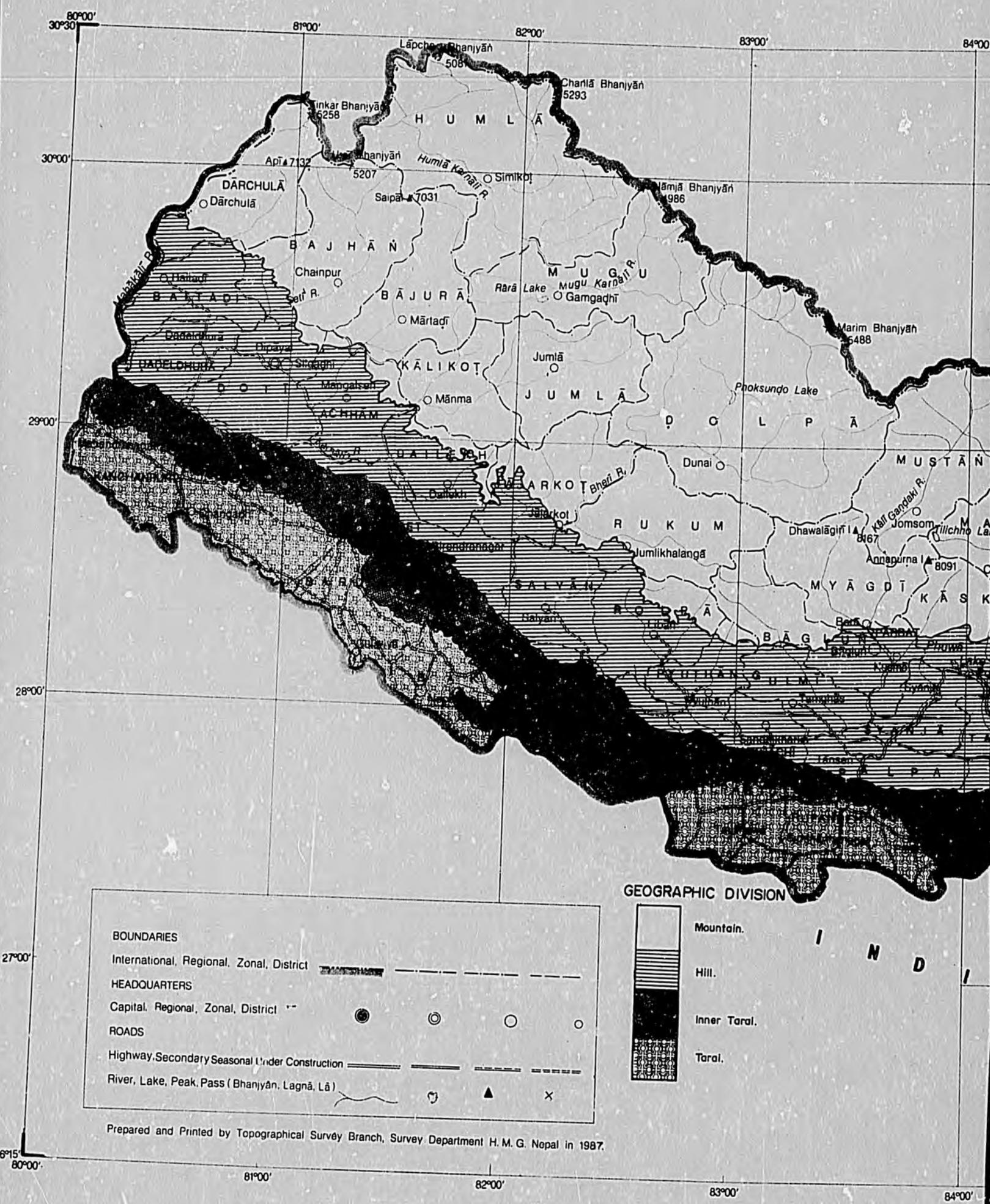
The 1980's have also seen a major initiative to strengthen and expand the role of nongovernment organizations in resource conservation activities.

Chief among these is the King Mahendra Trust for Nature Conservation established under the provision of the King Mahendra Trust for Nature Conservation Act (1982). Other major nongovernment organizations include the Nepal National Committee for Man and the Biosphere (MAB/Nepal) and the International Centre for Integrated Mountain Development (ICIMOD).

In Nepal, there also exist several professional organizations and societies that have some aspect of conservation as their principal objective. These include the Nepal Heritage Society, the Nepal Nature Conservation Society, the Nepal Environmental Journalists Forum, the Nepal Forestry Association, the Nepal Agricultural Association and the Nepal Animal Science Association.

Finally, there are several private sector operations and independent programs that have been very successful in promoting improved conservation practices. Here, one must include private plantation operations, some of the resource-use industries, and operators of nature lodges and wilderness camps.

One of the finest examples of a small-scale but effective conservation initiative is the *Jura Juri* Program. Each year, leading efforts by an individual or a community to promote soil conservation are identified and formally recognized. In the process, the general level of conservation awareness is raised, and appropriate recognition is given to those who have made a significant effort in advancing the role of resource conservation.



BOUNDARIES
 International, Regional, Zonal, District

HEADQUARTERS
 Capital, Regional, Zonal, District

ROADS
 Highway, Secondary Seasonal Under Construction

River, Lake, Peak, Pass (Bhanjyan, Lagna, La)

GEOGRAPHIC DIVISION

- Mountain.
- Hill.
- Inner Tarai.
- Tarai.

Prepared and Printed by Topographical Survey Branch, Survey Department H. M. G. Nepal in 1987.

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C THE SETTING

Nepal, with its rich biological diversity and spectacular landscape, lies for the most part on the southern slopes of the Himalaya.

Extending 800 km along a northwest-southeast axis, its 140-km width separates the arid Tibetan highland on the north from the fertile Ganga plain to the south.

The western half of the Tibet (People's Republic of China)-Nepal boundary stretches north of the Himalayan axis and there Nepal lies in the trans-Himalayan area - a transition zone between the Himalaya and the Tibetan plateau.

It is in this zone that many of the Himalaya's highest peaks are located, including Annapurna I to IV (8090 - 7525 m), Dhaulagiri (8167 m) and Manaslu (8156 m). In the eastern half of Nepal, along the Tibet-Nepal border, are found the highest peaks including Kanchanjunga (8599 m), Makalu (8476 m) and Sagarmatha - Mt. Everest (8848 m). In all, Nepal contains more than 200 peaks that are 7000 m or higher.

Nepal comprises the following distinct ecological zones: tropical and subtropical, ranging in elevation from 75 m to 900 m and including the Tarai and the Churia Hills; temperate, rising to 2750 m, including the upper part of the Mahabharat range above 915 m and the Hills; and alpine, covering all of Nepal above 2750 m.

Extending along Nepal's southern border, the Tarai, a northern extension of the Gangetic plain, lies at altitudes between 60 and 200 m. Its fertile soils are developed on alluvium. Erosion is generally slight, with slopes varying from flat to rolling, up to 0.7 percent from north to south. The main crops are rice and wheat. In addition to these items, tea, jute, and timber are produced.

North of, and adjacent to, the Tarai is the Churia Range also known as the Siwaliks. Rising abruptly from the plains of the Tarai, the Churia Hills reach 1800 m in places but generally lie between 300 and 1500 m. Although the soils are shallow and drought-prone, the land is cultivated. The Churia range supports a moderate to heavy forest cover with surface vegetation of grass and shrub.

The valleys of the Inner Tarai, formed by alluvial deposits from blocked rivers, are very fertile. These areas are similar in nature to the Tarai and are heavily cultivated.

The Mahabharat range lies between the Churia Hills in the south and the low areas of the midlands to the north. Its rugged terrain rises to 3500 m and is moderately to heavily forested.

The Hill division has an average altitude of 2000 m and contains several large and fertile valleys, including the Kathmandu and Pokhara Valleys covering some 350 and 160 km² respectively. Most of the forest has been removed and soil erosion presents a major problem. Slopes of up to 30 degrees are terraced, using traditional methods.

The Mountain division is characterized by high mountains, steep slopes and narrow valleys. Elevation of the river valleys is usually over 2000 m with mountain tops commonly above 4000 m.

The snow line is at 5000 m in the east and 4000 m in the west. The total area under snow is about 21,000 km², - 15 percent of the total area of the country.

The main river systems, crossing all of the geographic divisions, are the Mahakali, Karnali, Gandaki and Kosi. There are also many smaller rivers and streams.

The Nepal Himalaya is considered to be the youngest mountain system in the world - the result of several impulses some 35 million years ago. The Himalaya at present show little tectonic activity. Upheaval has not completely ceased however, and small spasmodic rises still occur which, in turn, make the Nepal Himalaya relatively unstable and susceptible to human activities.

Higher elevation forests include hemlock and fir, with rhododendron and birch in the form of shrubs extending up to 3700 m in elevation. In the less steeply sloping areas, cultivation extends up roughly 2500 m. Areas of alpine pasture extend above the tree line and are used for migratory summer grazing, as are most of the forested areas.

Nepal's current population of 17.5 million is increasing rapidly. It is estimated that during the 1950's, the annual rate of growth was

about 1.6 percent. During the period 1971-1981, this figure reached 2.6 percent. Recent estimates suggest that a very modest reduction in population growth has occurred in the past six years.

The distribution and density of population is not uniform among the Mountain, Hill, Inner Tarai and Tarai divisions. The Mountain and Hill divisions, comprising 77 percent of the total physical area and 50 percent of the total cultivated area, contain 56 percent of the total population. The Tarai and Inner Tarai divisions, with 23 percent of the total physical area and 50 percent of the cultivated area, are inhabited by 44 percent of the population.

If population density is considered in terms of cultivated land - an appropriate measure in view of the fact that most Nepalese people earn their livelihood from agriculture - the Mountain and Hill divisions are more densely populated at 0.12 ha per person than is the Tarai at 0.21 ha per person. In terms of available agricultural land, Nepal is one of the world's most densely populated countries. In the near to mid-term, this situation will become more acute. Even assuming a large measure of success in controlling future population increase, it is very likely that the population will exceed 21 million by the year 2000.

Since the 1950's, Nepal has experienced an ever-increasing flow of internal migrants, mainly from the Mountains and Hills, to the Tarai. Between 1961 and 1981, the proportion of lifetime migrants increased from 4.5 percent of the native-born population to 8.6 percent. The deteriorating environmental and economic situation in the Mountain and Hill divisions, coupled with relatively better socio-economic conditions and the eradication of malaria in the Tarai and Inner Tarai, have been the main causes of internal migration.

While adequate data are yet to be collected before any definitive statement can be made, evidence suggests that the annual rate of immigration has been increasing in recent years.

Nepal is largely a rural society with only seven percent of the population currently living in 33 urban settlements. By the year 2000, the urban population is expected to be about 2.3 million, some 11 percent of the total projected population.

Population pressures and distribution and settlement patterns are, and will continue to be, key factors in conservation considerations.



D SECTORAL ANALYSES

1 Population and Human Settlement

Since 1952, Nepal's population has doubled and, at current rates of increase, the present population of approximately 17.5 million will double again in about 25 years. Adding to the problems associated with rapid increment is the fact that the distribution of the population is uneven and settlement planning is inadequate.

Several factors, such as high fertility rates, declining death rates, a decreasing infant mortality rate, women's low off-farm earning power and lack of education and training, illiteracy, poverty and immigration contribute to the rapid population growth. With respect to the latter point, a 1983 survey (Task Force on Migration Report, National Commission on Population) showed 6.9 percent of the total Tarai population as immigrants.

Marked differences in land productivity, climate, economic opportunities and social amenities have increasingly contributed to internal migration and an imbalanced distribution of population among the Mountains, Hills and Tarai.

The pattern of internal migration is characterized primarily by an increasing flow of people from the Mountains and Hills to the Tarai. In addition, a gradually increasing flow of migrants from rural to urban areas is occurring.

Consequently, the population is becoming more and more concentrated in the Tarai, valleys and urban areas. The deteriorating environment, resource base and economy of the Hills are the main push factors. Despite the rising rate of out-migration, the total population of the Hills has increased substantially in the past 30 years.

Rapid population growth, internal migration and immigration in turn, have led to unplanned settlement patterns and often illegal occupation of land, encroachment on forests and marginal lands and congestion in urban areas. Similarly, Nepal is experiencing an increasing flow of international migrants, particularly in the Tarai and the urban centres of the country.

With few off-farm employment opportunities, the increasing pressure upon the land and forest has grown beyond the carrying capacity of many areas.

HMG recognizes the need to stabilize population growth and to realize a more balanced distribution of population in order to achieve the objectives of future Development Plans and the goals of the Basic Needs Programme.

HMG has recognized that a rapidly increasing population is the manifestation of a set of very complex social, cultural and economic factors, and that to tackle the problem simply by encouraging family planning is unrealistic.

In 1983, the government established objectives that would reduce the prevailing fertility rate from 6.3 to 2.5 and the annual population growth rate from 2.6 to 1.2 by the year 2000. To achieve these ambitious targets, it adopted a comprehensive and multi-sectoral population strategy that includes :

- integrating population with development programs
- raising the social and economic status of women
- according high priority to fulfilling unmet demands for family planning services
- increasing the participation of local Panchayats, class organizations⁶ and nongovernment organizations in population programs
- regulating increasing immigration.

To implement this strategy, HMG has undertaken a range of programs, some of which have enjoyed a modicum of success.

To be realistic, however, a more concerted effort and a substantial measure of success will be necessary if the population objectives are to be achieved.

Current initiatives include population education in the school system, information and communication programs addressed to the general public, emphasis on education, skill training and employment opportunities for women, and incorporating population components into line-agency extension programs and development programs.

Other programs include the provision of Family Planning and Maternal Child Health Care services (FPMCH) through local hospitals and district offices, as well as through mobile camps, on a regular basis. HMG and nongovernment organizations will both be used to deliver FPMCH services, with increased emphasis on providing services to young couples and more densely populated areas.

6. There are six at present - Youth, Women, Labour, Farmer, Ex-Military and Adult.

These and related programs suffer from a series of obstacles that seriously impede their chances of success :

- inadequate institutional and organizational capacity at the regional, district and village level for delivering and administering family planning programs and follow - up services on a regular basis
- failure on the part of line-agencies and project administrators to recognize the necessity of assisting in the implementation of multi - sectoral population programs and effectively involving women in developmental activities
- lack of any concerted effort in the field of public information, education and communication, resulting in *ad hoc* initiatives that have limited target group coverage and little lasting effect
- lack of an adequately coordinated effort at the ministerial, departmental, and field Population Commission levels in spite of the existence of the latter; this is due, in part, to the temporary nature of staff appointments in the National Commission on Population and the lack of population units at all three levels
- lack of a clearly defined policy and a plan of action concerning internal migration and the regulation of immigration
- lack of rural settlement planning and ineffective urban planning as well as fiscal, technical and administrative constraints which inhibit the implementation of urban and rural settlement strategies.

As with conservation and development, the link between conservation and population is direct. Unchecked population growth will seriously undermine any conservation, as well as development, strategy. The NCS for Nepal can help to further HMG's population programs.

Conservation, as it is defined for purposes of the National Conservation Strategy for Nepal, includes the preservation of cultural expression in literature and the performing arts and of cultural treasures, such as monuments and sculpture.

The cultural heritage of Nepal has a long history dating back to approximately the first century B.C. A recent survey shows that the Brahmanical cult, including the worship of Mother Goddess and Solar Divinity, was prevalent in the Valley of Kathmandu 2000 years ago (Bangdel 1982: 6-7).

a. current status and achievements

Establishment, over the past three decades, of the Royal Nepal Academy, the Nepal Association of Fine Arts, the Department of Archaeology, Guthi Samsthan, Lama Tatha Gumba Vaybastha Samiti, Durgam Chetra Vikas Samiti, Samskritik Samsthan (cultural undertakings), Tribhuvan University, the Nepal Art Council and the National Archives of Nepal are substantial evidence of the continuing importance His Majesty's Government places on the preservation of Nepal's cultural heritage.

The Constitution of the Kingdom of Nepal states that the country should develop its cultural life according to its ability and traditions. At present, various government and semi-government agencies are responsible for the preservation of cultural heritage. The Ministry of Education and Culture and the Ministry of Communications are the two major bodies concerned. Policies decided by these Ministries are implemented by various departments and semi-government bodies, such as those listed in the previous paragraph, and the Department of Information.

Several pieces of legislation, including the Ancient Monuments Preservation Act and the Nepal Academy Act, give legal force to government policy concerning cultural heritage.

The National Communications Plan of 1971 was prepared by order of His Majesty King Birendra and gives emphasis to the publicizing, documentation and exhibition of Nepalese culture.

Since its establishment, the Royal Nepal Academy has published over 300 books on various subjects including novels, collections of poems, short stories, essays, literary criticism, plays, biographies, language, history, research and scientific material, art history, music and traditional festivals, religion and philosophy. It has also translated and published some rare manuscripts from ancient Hindu and Buddhist texts. Seven dictionaries have been published and a thesaurus is in press.

To enrich the Nepali language and literature, the Academy has translated and published some of the world's classic literature including that of Aristotle, Dante, Shakespeare, Hugo, Voltaire and Rousseau. To further cultivate the spirit and talent of young Nepalese poets and writers, the Academy periodically convenes seminars on modern literature, plays and poetry. Annual poetry and drama festivals are held to encourage young, talented Nepalese people. His Majesty the King selects the title for the Annual Poetry Festival competition.

The Royal Nepal Academy annually provides several research fellowships in the fields of language, music, anthropology, history, literature, folk culture and traditional dance. Through the Pragya Awards, it honours and financially recognizes superior achievement in the fields of literature, art, history, music, drama, painting and the performing arts.

The Nepal Association of Fine Arts holds an annual exhibition of contemporary and traditional art and is currently collecting selective works of contemporary artists with a view to establishing a permanent art gallery. The first step toward permanently housing such work was taken recently with the inauguration of the Birendra Art Gallery at the Nepal Association of Fine Arts.

Similarly, much has been accomplished with respect to the conservation of cultural property. The Royal Nepal Academy has completed a survey of Nepalese woodcraft in the Kathmandu Valley, in particular the carved windows found in Bhaktapur, Patan, Kathmandu, Banepa and Panauti - one of the outstanding contributions of Newari craftsman. A complementary study to document skills, technology and terminology used in Nepalese woodcrafts has also been completed for publication.

A comprehensive survey of religious sculpture has been completed with a view to publishing a book on Hindu and Buddhist iconography. The study includes over 800 line-drawings of motifs, symbols, hand gestures, poses, ornaments, dress and iconographical elements.

In 1977, a Master Plan for the conservation of the cultural heritage of the Kathmandu Valley was prepared by Unesco, at the request of His Majesty's Government. The objective of the plan is to assist government in the preservation of the natural and cultural heritage in such a way that satisfactory living conditions for the Nepalese people are assured and that the sites and monuments are developed for the benefit of the local population, as well as for the encouragement of tourism. A major initiative to come out of the

Master Plan was the preparation and publication in 1980 of "Kathmandu Valley - Nepalese Historic Monuments in Need of Preservation".

The precept of the Master Plan was that the conservation of the cultural heritage of the Kathmandu Valley should not stand in the way of development but should, in fact, enhance it.

As more people become aware of Nepal's rich cultural history, reflected partially in the wealth of sculpture and idols located throughout the country, more care must be taken in its protection. As a first step, the Royal Nepal Academy is conducting an inventory of the stone sculptures of the Kathmandu Valley - these works of art number in the thousands. Ultimately, a photographic record and detailed description of each item - some dating back to the first and second centuries A.D. - will be stored in the National Archives.

Traditionally, the preservation of Nepal's cultural heritage has been associated with the system of Guthi (trust). Leaders established private or public Guthis to which they endowed, as an act of piety, land, other property or funds. In turn, these resources were used to maintain various forms of cultural expression manifested, for example, in monuments, rituals or festivals.

Today all of the public, and some of the private, Guthis are under the management of the Guthi Samsthan, a semi-government trust corporation established under the Guthi Samsthan Act of 1964 (amended in 1972). Included in the many responsibilities of the Guthi Samsthan is the financing and management of various festivals and the construction and maintenance of temples, shrines and other buildings.

More than 85 percent of the cultural structures of the Kathmandu Valley is the responsibility of the Guthi Samsthan - the rest is either jointly owned with HMG or entirely owned by government. Nearly all of the monuments, except the Palaces, included in the World Heritage List are under the control of the Guthi.⁷

Unfortunately, the Guthi Samsthan has been unable to meet its obligations, primarily because of its inability to collect revenue from Guthi lands. As a result, virtually all major restoration and development activities are carried out by the Department of Archaeology, mainly with external financing.

The Department of Archaeology has a major responsibility within HMG for matters pertaining to the preservation of Nepal's cultural heritage. Its mandate is vast. Not only does it control all museums in Nepal, but it is also responsible for the protection and preservation of monuments, temples, icons, paintings and manuscripts; the study of the historical, cultural and artistic heritage of the country; documentation of important historical, archaeological and artistic sites; and the publication of research material pertaining to the

7. Included are Swayambhu, Bouddha, Pashupati, Changu Narayan, Hanuman Dhoka Durbar, Patan Durbar and Bhaktapur Durbar.

history of Nepal.⁸ The Centre for Nepalese and Asian Studies (CNAS) of Tribhuvan University is also extensively involved in the publication of research papers.

b. obstacles and constraints

Much has been, and is being, accomplished with respect to the preservation of cultural heritage in Nepal. There are, however, several problem areas that must be addressed if the NCS is to meet its objectives. These include :

- i. failure of the public education system to increase students' awareness of Nepal's rich cultural heritage and to teach the importance of preserving it; curricula containing very little emphasis on cultural heritage and teachers with little interest in, or knowledge of, the subject appear to be the main contributing factors
- ii. the influence of the press, radio, television and tourists introducing western culture and lifestyles is weakening many of the traditional values, particularly those of the young urban population; ironically, one of the major attractions of Nepal for western tourists is its rich cultural diversity
- iii. increased urbanization and virtually uncontrolled town and city development, in part due to the lack of effective implementation of existing legislation, have resulted in serious encroachment on monuments and monument zones, religious forests and sacred grounds adjacent to rivers
- iv. the **Guthi Samsthan** owns vast tracts of land throughout the Tarai and Hills, including the Kathmandu Valley; theoretically, it should realize annual revenues from this land in the order of thirty million rupees (1.5 million US dollars); in fact, its actual earnings are roughly a quarter of this figure; there are several contributing factors, including the lack of administrative capability and financial management, and external interference of politicians and senior officials
- v. weakness in government administration including:
 - insufficient emphasis on cultural affairs within the Ministry of Education and Culture
 - lack of coordination among departments and agencies responsible for cultural matters, between the Department

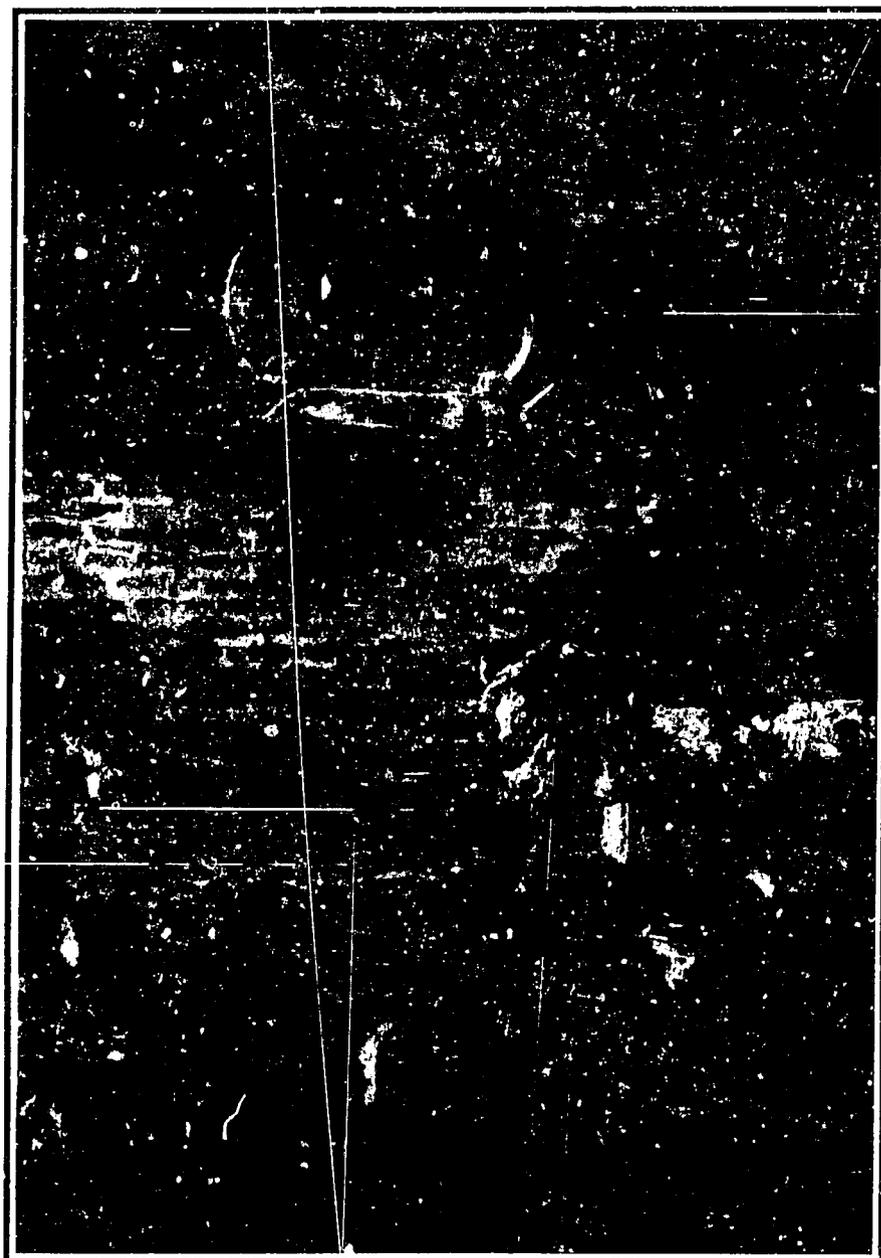
8. In collaboration with the Department of Building and Physical Planning, the Department of Archaeology was jointly instrumental in the preparation and publication of "Kathmandu Valley: The Preservation of Physical, Environmental and Cultural Heritage: A Protective Inventory" (2 volumes) published in Vienna by Anton Schroll and Co. in 1975. This was the first exhaustive inventory of monuments and sites, both cultural and natural, of the Kathmandu Valley and was intended as a legal instrument to augment the existing legislation.

of Archaeology and the Guthi Samsthan, and the Department and local administration and Town and Village Panchayats

lack of career opportunities for professionals at the mid-management level to proceed to senior management and executive positions within the Department and Ministry

lack of sufficient trained staff, both professionals and technicians, at all levels; less than five percent of the total staff in the Department of Archaeology has received any relevant technical training

inadequate financial resources for the Department of Archaeology to fulfil its mandate.



Conservation - the wise-use of natural resources and the preservation of cultural heritage - begins with improved understanding.

Conservation initiatives, to be successful, must first take into account the social and religious patterns and the often severe economic constraints with which the individual has to contend. That alone, however, is not sufficient. The individual's basic level of understanding must be raised if the conservation objectives are to be achieved.

Conservation is largely a matter of perception and attitude concerning the inherent capacity of nature to produce and reproduce, in response to careful stewardship, to meet the needs of mankind.

For this reason, successful conservation depends upon an informed public. In turn, this depends upon the free flow of information through all sectors of the community.

One of the best returns on investment is conservation education disseminated through the public school system. If concepts such as wise or managed use of land and resources and the importance of religion and culture to the well-being of the community become part of the lexicon of the country's youth, the possibility is greatly enhanced that, as future decision-makers, they will make more informed judgments.

Improving the level of awareness also means reaching the individual farmer through extension services; the local Panchayat decision-maker through training, seminars and public information programs; the administrator, technician and manager through in-service training; and the decision-maker, politician and religious leader through sustained exposure to conservation principles and their fundamental importance in the attainment of national development objectives.

Finally, a free flow of information does not mean linear, one-way or sectoral communication. If we agree that conservation is attitudinal, then we must also agree that there is not one authority nor a single repository for conservation intelligence from which all knowledge emanates.

The transmission of information is the wellspring of conservation consciousness. Only if the farmer, the scientist, the historian, the industrialist, the politician, the bureaucrat, the business owner, the teacher and the householder each has an opportunity to contribute effectively, will the sum of the parts be adequate to meet the whole challenge that lies ahead.

a. current programs

There are, at present, four broad categories of conservation awareness programs in Nepal - public information, extension-services, education and training.

The general public is exposed to conservation messages through a variety of media, including radio, the press, films, posters, exhibitions, demonstration centres and, to a very limited degree, television. The nature of the communication ranges from spot radio broadcasts and journalistic accounts, or news items concerning conservation issues to film documentaries professionally produced, professional articles in scientific journals, commissioned studies and research findings, and published seminar or conference proceedings.

Extension work is conducted by nongovernment as well as government organizations. The former include the King Mahendra Trust for Nature Conservation, the Nepal Forum of Environmental Journalists and the Nepal Heritage Society. Among the government departments most actively involved in extension services are the Departments of Agriculture, Livestock and Animal Health, Soil Conservation and Watershed Management, Forest, Health and Education.

Conservation in the school system is promoted in several ways. Basic science, social studies and vocational training courses contain a conservation component and, in a few cases, supplementary reading material dealing expressly with conservation issues is available. Extra-curricular activities such as tree planting, bird watching, bee keeping and gardening are undertaken. School-based volunteer organizations such as the Scouts, with its membership of 50,000 girls and boys, and the Junior Red Cross actively participate in a wide range of practical conservation activities.

Training - improving one's technical skills or acquiring new skills - is conducted by a variety of agencies, both in and out of government, including the University, through workshops and seminars. The training wing of the Ministry of Forest and Soil Conservation offers regular in-service training programs to both middle-level technicians and officers. Study tours and workshops are organized by NGO's, such as the King Mahendra Trust for Nature Conservation, Winrock International and the International Centre for Integrated Mountain Development (ICIMOD). As well, most of the bilateral programs provide for training.

The Nepal Administrative Staff College conducts in-service training programs for senior HMG personnel, mainly in the fields of administration and management.

Most of the training institutes also offer trainers' training programs. Such programs often involve teachers because they are an effective means for disseminating information at the village level, not only to students but also to adults.

Although all training programs provide equal opportunities for women, the number of women who actually participate is disproportionately low. Occupational training is provided by several government and nongovernment institutions but, to date, none of these institutions has a conservation component.

b. obstacles and constraints

The four conservation awareness programs cover a wide audience, employ a variety of useful mechanisms and provide for a healthy exchange of information. To varying degrees, each is successful - but each is also subjected to constraints which reduce its effectiveness and, indeed, pose obstacles to attaining the NCS objectives :

- i. in many villages, the school teachers may be among the few, if not the only, people with any formal training; in spite of this and the fact that government extension-services cannot cope with the whole problem, the potential of teachers as conservation educators is greatly underutilized, and teachers are not encouraged to undertake conservation programs
- ii. most rural schools have no trained science teachers
- iii. adult education programs usually continue only as long as funds are available from foreign aid projects; when the projects terminate and such funds are not available, the education program is not sustained by government
- iv. many, if not most, government officers who have received advanced and professional training fill administrative posts where their professional skills are little utilized; conversely, middle-managers and others with technical responsibilities often lack sufficient training to meet the needs of the job
- v. classroom instruction, teaching aids and text books related to science courses - where conservation would normally be taught - do not contain a conservation component to a sufficient degree, nor are they uniform throughout the country; rural schools may benefit little, or not at all, while urban schools, depending upon individual teachers, may be well advanced
- vi. an effective working relationship between journalists and the conservation sector, both in and out of government, has yet to be developed; HMG, NGO's and professional associations publish conservation journals and individual articles only occasionally

- vii. there is neither government policy nor an effective mechanism concerning the coordination of line-agency extension-services; currently, separate departments such as forestry and agriculture, and even departments within the same ministry, such as agriculture and livestock, conduct separate and independent extension activities, essentially to the same target group
- viii. extension workers are inadequately trained, insufficiently motivated and lack proper equipment and facilities
- ix. the distinction between the popular term, 'people's participation', and the actual and effective participation of community members in the decision-making process is frequently blurred; the most highly disadvantaged have the least effective voice because they are the least organized, yet they often have the most to gain when fair decisions are made
- x. the tendency of government to be virtually the sole implementer of conservation programs, to the exclusion of nongovernment groups and individual citizens, results in the loss of many opportunities that would incur very little or no cost by government
- xi. the literacy rate increased from 23 to 29 percent between 1981 and 1985; during the same period, however, the illiterate population rose from nine to ten million; although the successful exchange of information does not rest solely on an ability to read or write, a substantially increasing illiterate population is a serious constraint to improving the general level of understanding; indicative of the magnitude of the problem is the fact that, by the year 2000, some 10,000 new schools and 90,000 more teachers will be required to provide minimum primary education in Nepal.

4 The Role of Women in Resource Conservation

Essential to the successful attainment of either conservation or development objectives is an informed public with real opportunities to articulate needs and participate fairly in the decision-making process.

There is a need for a concerted effort if the public at large is to become well-informed about conservation issues. A special effort will be necessary where women are concerned.

The current national literacy rate is 29 percent whereas, for women, it is roughly half that. Although, in absolute terms, women lag behind men in education, in relative terms, female education is making substantial advances. In 1981, twelve percent of females six years of age and over were literate. In the case of adult females, 14 years of age and over, the percentage of literacy was 9.2. Over 44 percent of literate females were in the 6 to 14 age group, indicating a recent spread of education among the female population. A major contributing factor has been HMG's policy with respect to the decentralization of education facilities.

As more women assume responsible positions, particularly in government, their role in policy-making and program design and delivery will effectively contribute to the overall role of women in resource conservation. At present, the percentage of women employed by HMG at the gazetted level as I, II and III Class Officers is 3.0, 2.6 and 3.6, respectively.

Considering the major role women play in resource activities at the village level, one could expect that they would eventually assume a larger, if not dominant, role in efforts to improve resource conservation.

The time spent by women in field work, animal husbandry, food processing and fuelwood, fodder and water collection is nearly double that of men - 4.9 compared to 2.6 hours per day. When income-earning activities and domestic work are added, the average work day for women is 10.8 hours and for men 7.5 hours.⁹

9. Status of Women in Nepal, Vol.II, Part 9, Tribhuvan University, Centre for Economic Development and Administration, Acharya and Bennett; 1981:158.

Much of women's daily activity centres on the use of basic resources - wood, water, land, fodder, crops and livestock, the production of food, shelter, energy and clothing and, ultimately, the concern for human health and family well-being.

Against this background, it is obvious that the National Conservation Strategy, to be successful, must clearly involve and target rural women. To do this, it will be necessary to reach women at the farm household level. Since society outside of the village, that is government bureaucracy, politics, the private sector and commerce, is dominated by men, it will take a concerted and determined effort to achieve this objective.

In 1980, His Majesty's Government established the Women's Development Section (WDS) under the Training, Research and Evaluation Division of the Ministry of Panchayat and Local Development.

The main purpose of the WDS is to close the existing gap between rural women and the expertise and services associated with the development process. In particular, the WDS seeks to enhance women's ability to generate both subsistence and market income by :

- the implementation of targetted programs, and
- the integration of women in all sectors of the development process through incorporating their needs and interests into all rural development projects and other Ministry activities.

Some of the programs initiated by the WDS include: production credit for rural women; family planning services; nutrition and child care services; and communication services.

Responding to the need for liaison and for facilities at the district level, the WDS established a field component and currently has a Women's Development Officer (WDO) in each of 33 districts. The work of the WDO falls into two major categories - income generation and community development. It includes skill training courses, family planning and health care, cottage industry, livestock and pasture management programs and community development activities.

Beyond the role of the WDS there is, however, only minimal recognition within resource line-agencies of the need to make women a special priority concerning resource conservation programs. Almost without exception, line-agency staff at the district level is male. The recruitment of staff at policy, management, administrative and field levels clearly favours males.

The record of development projects with respect to the employment of women is no better than that of departments. Women are rarely included in any phase of a development project from the planning, policy and management level to village extension work or the identification and program formulation and women-targetted components. Assigning a woman staff officer the job of

coordinating and ensuring women's participation in various phases of a project would seem to be a logical first step - as yet it has not been taken.

The Seventh Plan recognizes that women have not been able to participate in the development process and cites, as reasons, illiteracy, ignorance, poverty, superstition and conservative traditions.

In an effort to overcome such substantial constraints, the plan contains a series of policy statements to guide government programs during the period 1985-1990. The following are relevant to resource conservation:

- i. special emphasis to be laid on providing educational opportunities to women
- ii. enhance women's participation in training and programs designed to raise agriculture production
- iii. generate increased employment opportunities for women through vocational training and provide access to sources of capital, raw materials and markets
- iv. improve, through training programs, the effectiveness of women currently employed in both the public and private sectors in the decision-making process
- v. amend laws and regulations that detrimentally affect the social and economic status of women.

Within this policy framework, the NCS will endeavour, in the 'Conservation Action Agenda' that follows, to describe programs designed specifically to give women a more effective role in resource conservation.

5 Drinking Water Supply and Sanitation

a. current status

Two of the NCS objectives - helping to satisfy peoples' basic needs and maintaining essential life-support systems - relate closely to the subjects of safe drinking water and effective sanitation facilities.

His Majesty's Government recognizes the importance of providing basic health needs and is taking substantial steps in that direction. Water supply and sanitation have been given top priority in both national policies and related national strategies.

In spite of the efforts and successes in this field, the incidence of health problems and disease that can be related to unsafe drinking water and inadequate sanitation is high. Part of the problem is the lack of understanding by a large segment of the public that personal hygiene and health are directly linked.

Nepal was one of the first countries to respond to the call to observe the 1980's as the International Drinking Water Supply and Sanitation Decade. As part of that response, a comprehensive Decade Plan related to drinking water and sanitation was prepared in 1980, with the assistance of the World Health Organization.

Prior to the First Five-Year Development Plan in 1956, the total population of the country served by a piped water supply numbered less than 300,000. By the end of the Sixth Plan in 1985, that figure had risen to more than four million. The Decade Plan had, as one of its targets, to increase water supply coverage from 11 to 70 percent of the total population by 1985. Due to an increase in population beyond the original estimate, doubling of costs and shortfalls in implementation, this target was modified downward in line with existing conditions.

The difference between drinking water coverage and sanitation coverage is notable, however. In 1985, approximately 25 percent of the rural population had access to safe drinking water but less than three percent to adequate sanitation facilities. In the urban centres, the figures were 70 percent and 17 percent, respectively.

HMG's water supply objective for the year 2000, according to the Health for All (HFA) program, is 100 percent coverage for the urban, and 90 percent for the rural, population. The figures for sanitation are 100 percent and 35 percent, respectively.

b. obstacles and constraints

If the the drinking water and sanitation program objectives relevant to the National Conservation Strategy are to be achieved, the following obstacles must be addressed :

- i. an inadequate extension and education program concerning the importance of personal hygiene and sanitation, combined with a limited capital budget for sanitation facilities; in addition to the obvious restriction this places on the sanitation program, there is the added problem of safe drinking water becoming polluted, thereby compounding the health hazard
- ii. a safe water supply depends first upon a properly protected source and a properly installed facility; the former requires that precautionary measures be taken with respect to the area surrounding a water source in terms of forest removal, grazing, use of chemicals in agriculture and soil erosion; this implies the need for an integrated approach to resource management and coordination among relevant government departments; in this regard, departmental and line-agency coordination is currently inadequate
- iii. in formulating plans, installing facilities and implementing extension-services, insufficient attention has been given to health, social, cultural and environmental issues, and the role women can play in such programs is largely overlooked
- iv. an increase in urban population and housing requirements greater than had been planned for, leading to inadequate drinking water and sewage facilities
- v. failure to develop necessary local institutions has resulted in little, or no, consumer participation in managing, operating and maintaining installed facilities; this, in turn, has led to unreliable services and local discontent
- vi. inadequate financial allocation for the development of the sector
- vii. failure to pay attention to the development and modernization of traditional sources of drinking water such as springs, wells, tube-wells, ponds and facilities such as stone spouts, *Dhunge Dhara*, has severely hindered the capacity of agencies to provide safe drinking water to a significant section of the population, particularly in rural areas.

a. current status

The Mountains, Hills and Tarai constitute Nepal's natural splendour. At the same time, because of their ecological diversity and potential, they have, if properly managed, the productive capacity to meet the food needs of the country's rapidly growing population.

Cultivated land accounts for approximately 2.65 million ha.¹⁰ The average area of cultivated land per capita is just 0.15 ha.

There are more than two million farms in Nepal and the farming population constitutes more than 90 percent of the total population of the country.

Small subsistence farms predominate in the Hills, where more than 60 percent of them contain less than one ha of land. The average size of these holdings is less than 0.5 ha, and many of the farms are divided into several plots in different locations. The average farm in the Hills operates at the subsistence level, being too small to generate a marketable surplus.

Landholdings in the Tarai average more than two ha per family. More than 60 percent of the families have holdings larger than one ha and most of these farms are capable of producing a surplus.

In the Hills, crop production is practised on the valley bottom land, small areas along the river banks and on terraced slopes. At least 80 percent of these slopes consists of rain-fed upland terraces; the rest are partially irrigated valley bottom lands along river banks. The small and scattered nature of land holdings in the Hills, combined with very limited transportation facilities, make commercialization of crop production difficult and, in most cases, impossible. In comparison, richer soils, flatter topography, a relatively well developed transportation and irrigation system, combined with a more favourable man-land ratio, enable many Tarai farmers to produce a surplus of food and cash crops.

10. The Seventh Plan, HMG/Nepal, 1985-1990. Land use figures, based upon aerial surveys, developed by LRMP 1986 are shown in Annex IX.

Although, on a national basis, the total production of food crops has steadily increased, agricultural productivity in the Hill and Mountain areas has not been sustained.

Rice, maize and wheat account for nearly 90 percent of the total cropped area of Nepal and, in each case, the average yield per ha in the decade 1971/72 to 1980/81 was less than in the previous decade.¹¹

For rice, which covers over 50 percent of the total cropped area, the reduction in yield per ha was two percent. For wheat and maize, the comparable figures were five and ten percent respectively. The reasons for the decline in productivity include increased cultivation of marginal lands, particularly in the Hills, and inadequate replenishment of soil nutrients.

In the Tarai where irrigation facilities exist and agricultural development activities, such as block production programs, are concentrated, yields have been significantly increased.

b. development objectives

The agriculture objectives of the Seventh Plan (1985 to 1990) are four-fold:

- i. to increase food production to, and sustain it at, the level necessary to meet the food requirement of the increasing population
- ii. to maintain the current level of production increases where such increases have occurred, for example in vegetables, fish and fruit
- iii. to increase income and employment opportunities through increasing production of exportable items and of import substitution products
- iv. to make agrobased industries more self-sustaining through the increased production of raw materials

There is a direct link between these development objectives and two of the National Conservation Strategy objectives, namely, to meet the basic needs of the people and to ensure the sustained productivity of the resource base. The two other NCS objectives related to genetic diversity and ecological processes are implicit in all of the agriculture development objectives as they often set an upper limit to the rate of growth in agriculture production.

11. Department of Food and Agricultural Marketing Services.

c. obstacles and constraints

Some of the obstacles or constraints to achieving the agriculture, as well as the conservation, objectives are as follows :

i. land ownership

- in 1981, 50 percent of the total number of households owned less than 0.5 ha each, representing about seven percent of the total cultivated land,¹² and to date, the land reform measures have been marginally successful in rectifying the situation
- most tenants have few legal rights; the land tenure system, however, is such that both landlords and tenants feel insecure and, in particular, the tenant has little incentive to make any extra efforts when he is unsure of his rightful share

ii. farming practices

- due to the rapid depletion of forest resources and the consequent use of crop residues and dung for fuel, traditional farming practices are not being maintained and, in many cases, agricultural productivity has declined
- improvement in cropping patterns is hindered by inefficient water management, inadequate irrigation facilities and insufficient integration of crop farming with other resource sectors, such as livestock, fisheries and forestry, which, in turn, inhibit improvement in productivity

iii. infrastructure

- lack of transportation and marketing facilities and improper storage facilities result in annual losses of up to 15 percent of total production

iv. institutional

- administrative procedures, including delegation of authority, coordination between district, regional and central offices, and uncertainty as to individual responsibilities, lead to inefficient line-agency operation
- difficulty of supplying agricultural input on time, particularly in the Hills, and the high cost of such input
- lack of appropriate pricing mechanisms for various agriculture products and lack of access for much of the farm population to loan or credit services

12. Central Bureau of Statistics, HMG, 1981.

- inadequate research efforts to develop scientific dry-farming agriculture systems suitable for the Hills
- lack of sufficient linkage between extension and research activities

v. land management

- increasing population pressure in the Hills, resulting in use of marginal lands for crop production, and uncontrolled grazing by an increasing livestock population beyond the carrying capacity of the forest and pasture land.

d. successes

- i. an extensive agricultural extension-service covering each of the 75 districts
- ii. an agricultural research network serving each of the ecological zones and development regions
- iii. proven successes where 'block production' programs have been undertaken with increases in per ha productivity, in some cases, more than double
- iv. significant success in advancing aquaculture development. In 1985, 65 ha of new ponds were added to the 2147 ha of existing ponds, resulting in the production of 3500 mt of table fish¹³
- v. establishment of extensive branch networks concerned with input supply, credit and marketing, including the Agricultural Development Bank, the Agricultural Inputs Corporation and Sajhas, or cooperatives
- vi. creation of an agriculture staff of more than 3000, including professionals, junior technicians and junior technician assistants
- vii. establishment of an Institute of Agriculture and Animal Science at Tribhuvan University capable of producing approximately 100 agriculture graduates and about 800 agriculture technicians yearly.¹³

13. Nepal Agricultural Sector Strategy Study, HMG 1982: 160.

a. current status

Nepalese farmers have been irrigating their fields since time immemorial so that, today, literally thousands of irrigation projects bear witness to the traditional practice of using water to improve agriculture production.

These projects vary in size from a few ha to several thousand ha and some are centuries old. All have been developed and maintained through experience, knowledge and practice passed down from generation to generation.

In Nepal, the opportunity to significantly increase the amount of land under cultivation is severely restricted. For this reason, irrigation, drainage and flood control measures will play an increasingly important role in enhancing agricultural production.

Nepal's water resources are considerable, with surface run-off in the order of 200 km³ annually. About 80 percent of the annual precipitation occurs during the monsoon period - June to September. In general, there is very little rainfall from November to January and the early rain between January and June is often insufficient for many crops. Considering this, the main potential benefits of irrigation are :

- i. to decrease the risk associated with production due to the vagaries of rainfall while aiding crop production without increasing dependence upon fertilizer and pesticide
- ii. to allow production and harvest times to be staggered and thereby better matched to the availability of labour and marketing opportunities
- iii. to afford crops, such as early paddy, the advantage of pre-monsoon sunshine hours when growing would otherwise be impossible due to lack of moisture.

In addition to surface water, Nepal's groundwater resources are extensive. The available overall water resources, if fully harnessed, theoretically would permit irrigation greatly in excess of the total cultivated land. Given topographic and other constraints, the potential irrigable areas, subject to economic viability, would be about 1.9 million ha (Asian Development Bank Agriculture Sector Study 1982 V-II : 76).

b. policy and achievements

The total area of cultivated land in Nepal is approximately 2.65 million ha. Of this amount, roughly 700,000 ha or 26 percent are irrigated. Farmers' and nongovernment projects account for slightly more than half of this - the rest has been developed by government.

In the Tarai, there is an estimated 1.6 million ha of potentially irrigable land. Of this, slightly less than one-third, or 500,000 ha, is irrigated - half by the government and half by the farmers.

The potential irrigable areas in the Hills are estimated to be approximately 300,000 ha. Exact figures are not available, but it is estimated that 200,000 ha are currently irrigated of which about 150,000 ha have been developed by the farmers. These systems are mainly for supplementary irrigation of the monsoon crop and consist of seasonal structures with individual service areas, usually ranging from a few to less than a thousand ha.

To date, virtually all of the irrigation systems in Nepal use surface water. Due to low stream flows in the dry season, this permits only supplementary irrigation during the wet season. There is considerable potential, however, for groundwater development in the Tarai, and the government has recently initiated such projects.

One of the Seventh Plan objectives is to increase the present government irrigation coverage by 70 percent, to 574,000 ha. The responsibility for this will be shared by the Ministry of Agriculture - 100,000 ha - and the Ministry of Water Resources - 135,000 ha, of which 20 percent will be covered by district level projects launched under the decentralization plan through the Ministry of Panchayat and Local Development.

Achievement of the irrigation objectives is essential if Nepal is to increase agricultural productivity sufficiently to stem the increasing food deficit which it has experienced in recent years.

The Department of Irrigation, Hydrology and Meteorology (DIHM) was established in 1951 and today is a part of the Ministry of Water Resources. Its major activities consist of the following :

- collection, analysis and dissemination of hydro-meteorological data
- planning, design and construction of irrigation systems
- operating and maintaining completed irrigation projects, both surface and underground water.

When DIHM was transferred from the Ministry of Agriculture to the Ministry of Water Resources in 1976, the Farm Irrigation and Water Utilization Division (FIWUD) remained behind. FIWUD's primary purposes include :

- construction of small irrigation systems, below 50 ha in the Hills and 500 ha in the Tarai

- organization of water user groups
- provision, operation and maintenance of tertiary and farm-level irrigation works
- provision of water management extension-services.

The Ministry of Panchayat and Local Development (MPLD) provides financial and technical support to various local development programs, including small-scale irrigation schemes which have service areas of normally less than 50 ha. Both farmer initiated irrigation schemes, usually less than ten ha, and Panchayat initiated schemes, with larger areas, fall within the purview of MPLD.

In both the Sixth and Seventh Plans, the irrigation sector has been accorded priority as an essential factor in improving agricultural productivity. Current programs include not only undertaking new projects and completing on-going ones but also improving the performance of many existing irrigation projects.

Specifically, HMG's current policy regarding irrigation is as follows:

- i. utilize surface and underground water resources for irrigation to achieve agricultural production targets by mitigating the uncertainties of a farming system that relies on monsoon rains
- ii. emphasize the implementation of irrigation projects in the Hills
- iii. emphasize irrigation projects that are low cost and small to medium in size
- iv. improve and maintain existing irrigation projects to ensure continuous and efficient operation
- v. encourage local participation in the formulation and implementation of irrigation projects
- vi. arrange special weather forecasts for agricultural purposes.

c. problems associated with irrigation development

- i. irrigation projects that are poorly designed and managed and inadequately maintained have led to inefficient or inequitable distribution of water and siltation of canals, at times making such facilities inoperable; siltation of croplands results in lost agriculture production; similarly, lack of effective monitoring and improper control of the use of groundwater can lead to an irreversible loss in the aquifer's capacity
- ii. insufficient priority has been given to providing the technical and financial assistance needed by privately controlled irrigation facilities, which are nearly 60 percent of the total, to improve their efficiency and productivity

- iii. failure to involve farmers in all phases of public projects including planning, design, operation and maintenance; as a result, farmers show little interest in government-sponsored schemes or in paying water charges; hence, the potential benefits of such projects are often not realized
- iv. in the planning and design of new irrigation systems, insufficient attention has been given to potential cross-sectoral implications; poor design can lead to increased erosion, waterlogging and drainage problems, siltation and the wastage of irrigation water; conversely, poor land use practices leading to forest depletion, soil loss and the loss of water supply can have a detrimental effect upon the operation and life of the irrigation scheme
- v. defective planning and design of tubewell irrigation in the Tarai have led, in some cases, to the deposit of sandy soil on fertile land
- vi. lack of common objectives concerning resource management and conservation among line-agency departments leads to interdepartmental conflicts; similarly, lack of clearly defined mandates and roles of government agencies leads to duplication, confusion and omissions
- vii. conservation information concerning irrigation practices is not readily available to farmers, nor is it clear which agency, or agencies, has the responsibility or capacity to disseminate it; improper use of water may lead to soil salinity or leaching, and the inadequate replacement of nutrients may eventually lead to less, rather than more, productive cropland; farmer-managed projects characteristically have high per ha water application rates
- viii. the Department of Irrigation is primarily concerned with the design, construction, operation and maintenance of irrigation schemes; very little attention has been given by the Department to conservation issues, such as land management, soil regeneration and water application. It is responsible, however, for conservation related issues such as river training and flood control; to assume a greater role in conservation, its mandate needs to be broadened and its technical expertise expanded; administrative procedures would have to be established as it assumed additional conservation responsibilities
- ix. emphasis is placed on the development of large irrigation systems, and too little attention is paid to the development of small, farmer owned and operated irrigation schemes such as shallow tubewells and small canals
- x. emphasis is placed on the construction of new irrigation systems, while the maintenance and timely delivery of water through the existing systems has received insufficient attention; the linkage between irrigation and drainage development receives only limited attention, leading to the problem of salination of irrigation areas; consequently, the full benefit of irrigation investment in raising agricultural productivity has not been realized.

a. current status

Livestock production represents a major portion of Nepal's economy. In 1984/85, it contributed about 17 percent of the total Gross Domestic Product (GDP) in the form of milk, meat, ghee and skins, and 28 percent of the total agricultural GDP. In addition, livestock provides almost all of the power for cultivation and, in many areas, is the only means of replenishing soil nutrients.

Until relatively recent times, Nepal's abundant forests easily maintained a relatively large livestock population which, in turn, provided manure nutrients to maintain soil fertility.

This is not the case today. Rapidly increasing human and livestock populations are exerting demands upon forest land that cannot be sustained given the current levels of management. Even at present livestock population levels, the percentage deficiency in feed nutritive requirements is high (see Annex VI).

Twenty percent of the total cattle population, compared to less than one percent of the buffalo population, is unproductive. While making heavy demands upon already scarce feed resources, its only contribution to the farming system is the provision of manure.

The feed deficiency in the Tarai is, for each component, somewhat less than in the Hills. With a serious depletion in the animal feeding base throughout the Hills, the productivity of livestock has fallen substantially. In essence, the livestock consumes most of its energy in the search for food rather than in production.

While the livestock population is degrading the forest, it is at the same time compacting the soil which, in turn, leads to the suppression of vegetation and to erosion problems.

b. livestock development objectives

- i. to increase the income of farming communities through livestock rearing
- ii. to bring about self-sufficiency in milk and milk products and at the same time increase the export of high value dairy products

- iii. to achieve self-sufficiency in meat and egg production
- iv. to increase the production of wool and other animal by-products
- v. to bring about an improved system of fodder production and pasture management
- vi. to provide extensive and efficient animal health services.

c. obstacles and constraints

i. policy

- emphasis has been placed upon meat and dairy production, but correlative programs to improve pasture land productivity and development of the livestock feed base have not kept pace
- the absence of a policy concerning a selection and culling system does not accord with the objective of improving the quality of the livestock population; there is also little emphasis on stall feeding of animals, given the potential benefits in improved animal and manure productivity
- adequate attention has not been paid to the provision of quality animal health services; research efforts are yet to be upgraded to the level at which more productive breeds of livestock can be developed in adequate numbers within the country
- inadequate mechanisms and support policy for the marketing of animal and dairy products

ii. institutional

- the Department of Livestock Development and Animal Health has been charged with the responsibility of improving the quality of the livestock population, but the responsibility for administering pasture, grazing and range land rests with the Department of Forest

iii. administrative

- inadequate coordination at the district level among all line-agencies

iv. management

- the need to improve the condition of pasture lands is urgent but, due to the general remoteness and inaccessibility of pasture lands and the lack of infrastructure and facilities, it is difficult to enlist and retain the necessary field staff; in addition, there is a lack of animal health and pasture management technicians

v. subsistence farming

- the immediate problem of survival is so formidable that it is difficult, if not impossible, for the farmer to consider undertaking remedial measures that he feels may only benefit him in the long term

vi. awareness

- conservation awareness programs for the rural population are of little value if concrete solutions are not adopted to substantially improve present pasture and forest land management

d. successes

- i. approximately 75 veterinary hospitals and 25 dispensaries have been established and are being upgraded to provide animal health services throughout the country
- ii. the Department of Livestock Development and Animal Health was separated from the Department of Agriculture, and five regional directorates were formed with responsibility for veterinary hospitals, dispensaries, quarantine check posts and livestock farms operating in the area
- iii. twelve livestock farms have been established to conduct demonstration projects and to raise and distribute improved strains of livestock
- iv. more than 12 major ongoing projects involving livestock development, covering such areas as upgrading livestock and veterinary services at regional and district levels have been implemented; provision of livestock extension-services, fodder production research and credit, training, and marketing of livestock products have been undertaken.

9	Soil Conservation and Watershed Management
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a. current status

Soil loss is probably Nepal's single most serious resource conservation problem. It must be noted, however, that the problem cannot be totally attributed to human intervention. Natural or geological erosion rates are very high in Nepal.

Over the last century, the proportion of the erosion induced by growing population pressures on a limited land base has increased considerably. Forest clearing, overgrazing, poorly maintained marginal arable lands and fire have greatly altered the natural vegetation of Nepal, leaving the soil exposed to massive degradation.

The serious detrimental effects of erosion in Nepal are manifested in the following ways :

- i. loss of topsoil from cultivated land and grazing land; as topsoil is eroded, soil fertility declines and the land is less able to maintain its productive capacity
- ii. mass movement of slopes - including rock failure, landslides, slumps and debris torrents - causes large-scale destruction of productive land, irrigation systems, paths, roads and villages
- iii. high sediment loads in rivers quickly reduce the useful storage capacity of man-made reservoirs and cause silting of irrigation canals and damage to turbines and water control structures
- iv. sedimentation, in conjunction with peak discharges, results in abrupt channel changes; these changes may cause complete loss of fertile farm land due to deposition of eroded material or slumping of river banks and, in some cases, destruction of human settlements and loss of life (Carson 1985:1).

According to an inventory of watershed conditions in Nepal, it is estimated that seven percent of the total land area - about 10,000 km² - is sufficiently devoid of vegetation to be considered to be in the process of desertification (Nelson D. et al 1980). In addition, 17 percent of the land needs immediate conservation attention.

b. current policy objectives

The Seventh Plan states that soil conservation and other measures will have to be directed to specific problem areas in order to conserve natural resources and maintain the ecological balance. It further cites two specific objectives related to soil conservation :

- to conserve watershed areas giving high priority to the participation of local people in natural resource, soil and watershed conservation programs
- to emphasize labour intensive techniques in forest and soil conservation programs in order to generate employment opportunities.

Based on these policy objectives, the soil conservation and watershed program includes the conservation of watershed areas through measures such as the construction of check-dams, torrent control, landslide control, terrace improvement and vegetative methods. In addition, the program refers to the need for increasing the public's awareness of soil erosion problems and its participation in overcoming such problems.

c. obstacles and constraints

In considering obstacles and constraints, it is important to differentiate between surface erosion and mass wasting. Surface erosion refers to the loss of topsoil resulting from rainfall or wind, whereas mass wasting is the en masse movement of fractured rock and other unconsolidated materials, including soil, from a slope. Recent research has concluded that mass wasting is the dominant process in the evolution of natural slopes throughout much of the Nepal Himalaya. The instability of these slopes is natural, and man's effect on this erosion process is incidental at best.

Some of the obstacles confronting the soil conservation program are as follows :

- i. although projects such as terrace improvement, drinking water source protection and trail construction provide immediate benefits in some cases, there remains a general problem in gaining public support for, and participation in, conservation and watershed management issues. This is primarily due to the apparent absence of short-term benefits for a rural population that is just managing to survive at or below the subsistence level
- ii. a rapidly increasing human population and a livestock population of roughly 100 head per km², which together are placing excessive demands upon the productive capacity of the land

- iii. inadequate coordination among line-agency programs and the failure to incorporate conservation measures into development activities
- iv. with the exception of specific integrated watershed programs, there is a lack of any long-term planning on a watershed basis with respect to either development activities or conservation practices, resulting in the application of *ad hoc* measures spasmodically undertaken
- v. constraints faced specifically by the Department of Soil Conservation and Watershed Management include :
 - shortage of technical staff at all levels, district, regional and central
 - insufficient opportunity to develop as a fully effective agency of government with departmental objectives and a capacity to deliver programs, due to the preponderance of projects and the deployment of staff to support them
 - inadequate budget to implement soil conservation measures, considering the magnitude of soil erosion and watershed degradation problems

d. successes

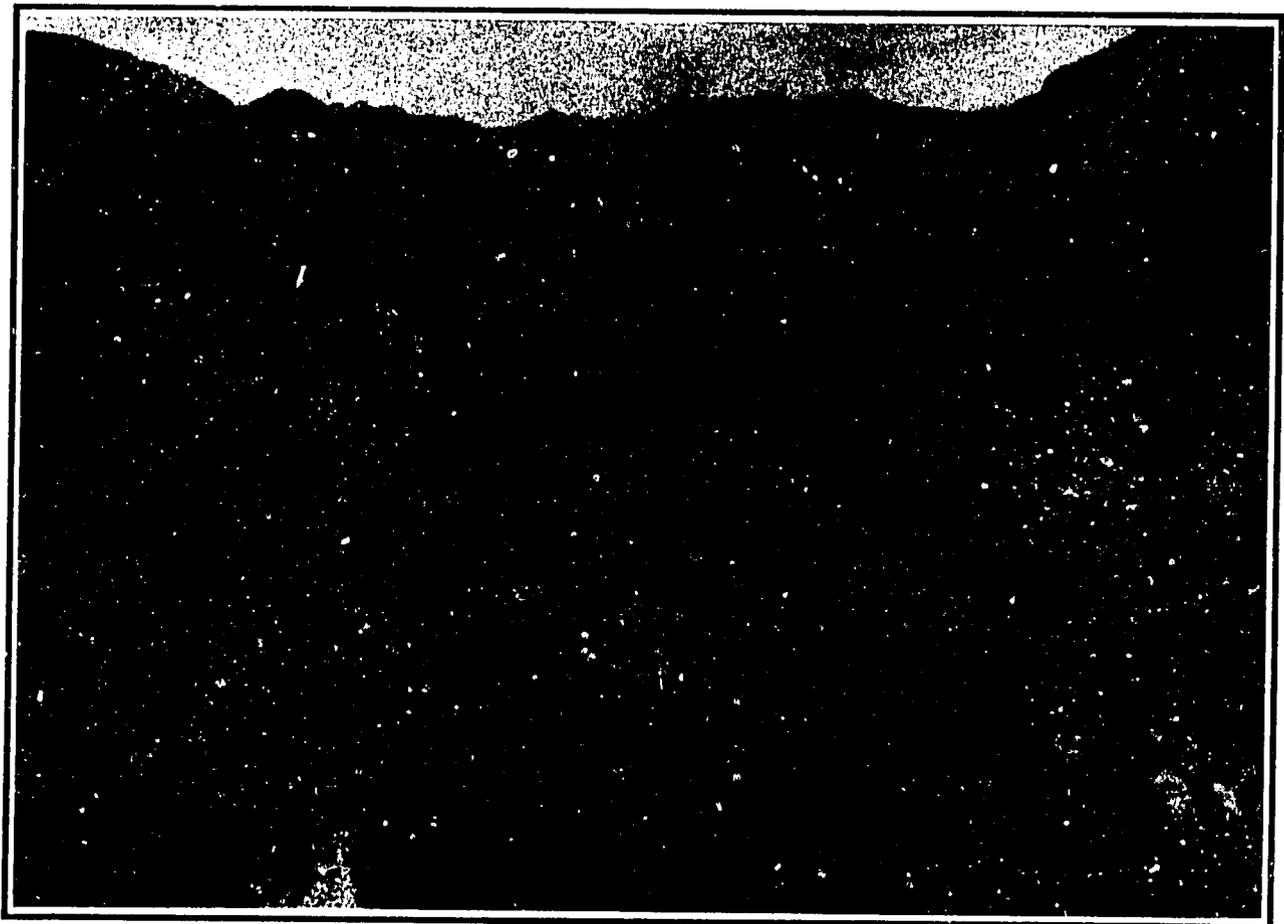
The Department of Soil Conservation and Watershed Management has a relatively short history. It was not until the Fifth Plan (1975-1980) that major policies and objectives concerning watershed management were specifically enunciated.

Since that time, the Department has endeavoured to meet its objectives by carrying out a series of major activities through specific projects, including :

- i. conservation plantations, purely for protective purposes, including light construction works in severely degraded watershed areas, along river banks and in gullies
- ii. grass plantations to check soil loss adjacent to waterways and to reduce the use of fodder from existing forests
- iii. gully and torrent control to minimize loss of agricultural land and settlement areas by reducing the effects of run-off through engineering or vegetative methods, or both
- iv. terrace improvement measures to reduce soil loss from existing terraces and to maintain, and in some cases enhance, the productivity of cropland
- v. conservation education and extension programs to increase the public's understanding of, and need for, conservation of natural resources and improved land use practices

- vi. trail improvement programs to reduce the detrimental effect of uncontrolled run-off and to improve year-round accessibility
- vii. water source protection to increase water yield, to reduce the contamination of drinking water and to sustain water flow for other domestic uses
- viii. establishment of meteorological and river flow measurement stations and the collection of related data
- ix. establishment of district resource conservation committees to improve the level of people's participation in conservation activities.

In many cases, the targets of both the Fifth and Sixth Plans were either achieved or nearly achieved. However, in terms of the magnitude of the overall national problem, the results must be considered only modest.



a. current status

Forest covers some 5.6 million ha, or 38 percent of Nepal's land area,¹⁴ and stretches from the lowlands' tropical, deciduous, riverain forest, below 300 m elevation, to the *Abies* forest, found at 4500 m in the Himalaya.

A popular misconception concerning Nepal's forest is that the amount of forest area is rapidly decreasing. Although this may be true for the Tarai and the Inner Tarai, which contain roughly 30 percent of the total forest area, for the country as a whole the picture is somewhat different. In a study completed in 1986, it was estimated that the total forest area, excluding the High Himalaya,¹⁵ had been reduced by only 382,000 ha, or 3.3 percent,¹⁶ during the 14-year period prior to 1978. Recent trends, although leaving no room for complacency, continue to indicate that, notwithstanding the reduction in forest stands, the loss of actual forest land is not yet significant.

A consideration of forest land area may appear inconsequential since it is volume of growing stock, not hectares of land, that is consumed for fuelwood and fodder. Nevertheless, in terms of future management, it is a critical factor and one that is in Nepal's favour, particularly in the Hills which contain two-thirds of the forest land.

This is not to minimize the seriousness of the rapidly deteriorating state of the forest. The picture is less bright if one uses tree crown cover, in the absence of better data, to represent growing stock as a measure of volume depletion.

14. Forest land with at least ten percent tree crown cover. If forest shrub land (i.e. more than ten percent tree crown cover but height class less than 3 m) is included, the area is 6.4 million ha, or 43 percent. At 50 percent tree crown cover, the figure is 29 percent. Figures based on 1978 - 79 aerial photos. See Annex IX "Land Use in Nepal".

15. High Himalaya is considered to be predominantly arctic, with permafrost, permanent snow fields and glaciers (LRMP).

16. Land Utilization Report, LRMP 1986.

The major use of forest and shrub land is as a source of fuelwood, fodder and timber for domestic purposes. Based, in part, on the condition of the residual forest stands in areas which are accessible to users, consumption far exceeds sustainable supply - at least at current management levels. It has been estimated that, in specific locations in the Hills, the demand-supply ratio ranges from 2.3 : 1 to 4.1:1.¹⁷

The 1976 National Forest Plan, prepared by the Department of Forest, sets out the nation's forest policies and objectives and describes a comprehensive forest management policy for Nepal.

The main objectives of the National Forest Plan are as follows :

- i. to make the Nepalese people self-reliant in timber, fuelwood, fodder and other forest products
- ii. to create an ecological balance and conserve the physical environment
- iii. to mobilize the forest resources for social and economic benefits on a sustainable basis.

In order to meet the objectives, the National Forest Plan called for the following steps to be taken :

- all forests should be managed according to a written plan
- forests should be considered the social property of the people
- intensive forest management systems should be developed by involving communities in accordance with geographic conditions and social needs.

b. current policy objectives

The Seventh Plan recognizes the critical nature of Nepal's declining forest. It notes that, in order to keep pace with current consumption, reforestation should be carried out at the scale of 100,000 ha annually, but, in fact, just 50,000 ha in total have been reforested in the past ten years.

In keeping with the 1976 National Forest Plan, the major forest policy components of the current Development Plan, covering the period 1985-1990, are as follows :

- i. mobilize people's participation in massive afforestation and forest conservation programs
- ii. emphasize labour intensive techniques in forestry programs

17. LRMP 1986.

- iii. encourage forest farms to supply domestic needs of forest products, to provide raw materials for forest-based industry and to produce industrial forest products.

c. obstacles and constraints

- i. Problems of encroachment for purposes of settlement and cultivation have led to an increased emphasis upon the protection of the forest. This in turn has led to the following :
 - a large part (up to 75 percent in many districts) of forest staff time being spent in protection/guardian, judicial and administrative roles
 - the underutilization of the professional and technical expertise and forest management qualifications of forest staff
- ii. with total responsibility for managing virtually all government land, except national parks and protected areas, the human and financial resources of the Department of Forest are insufficient to undertake effective forest management activities
- iii. although the multidisciplinary nature of land management is recognized, the necessary interdisciplinary coordination can still be improved
- iv. there are no specific legal provisions enabling the Department to permit the private sector, including individuals, user groups and small industry, to undertake forest management under leasehold agreements or similar arrangements
- v. lack of realistic alternatives to using fuelwood as the main source of energy
- vi. plantation programs that have little or no research component and suffer from poor planting practices and insufficient follow-up and maintenance
- vii. personnel administration practices that inhibit personal achievement and career development
- viii. financial administration practices, such as late budget release, that prevent districts from completing planned programs; this is particularly crucial with respect to plantation programs.

d. successes

The 1976 National Forest Plan referred to the need for developing an intensive forest management system by involving communities - an initiative that had attained only limited success up to that time - and also for mobilizing forest resources for social and economic benefits on a sustainable basis.

The Community Forestry Program responded to this National Forest Plan objective. The Program, which to date has been implemented in 67 districts, undertakes four major activities :

- i. establishing plantations on bare but previously forested land, and transferring such plantations to the Village Panchayats as Panchayat Forest
- ii. transferring control and management responsibilities for existing forest and shrub land through the mechanism of Panchayat Protected Forests to Village Panchayats
- iii. free distribution of nursery seedlings to individuals for planting on their own farm land
- iv. distribution of fuelwood-efficient stoves to village households.

Some of the principal achievements of the Community Forestry Program to date have been:

- seedling distribution - reflecting the individual's interest in improving productivity on his own land
- the establishment of Panchayat nurseries
- the establishment of Panchayat plantations with reasonable success without having to use fencing
- demonstrating that degraded forests, if properly managed, can produce a high-yield forest without the need for planting.

Beginning with the Sixth Plan, the Community Forestry Program has achieved some success and shown that, with modification, the concept can be viable. In terms of the overall national problem concerning the forest and forest productivity, there is considerable work yet to be done.

Written records, such as the *Rigveda*, dating back several thousand years, refer to the use of plants from the Himalaya for medicinal purposes.

Today, medicinal plants from Nepal are still widely harvested for use by a large segment of the Nepalese population that relies upon traditional systems of medicine, as well as for a large export market both in India and overseas.

a. current status

During the five-year period 1979 to 1984, more than 12,000 mt of medicinal herbs were exported from Nepal to India and other neighbouring countries. Nepalese herbal plants are also exported overseas.

The volume of exports has been dropping steadily since the early 1980's, and there is concern that this may be due to a depletion of accessible and preferred species - the result of lack of management and poor harvesting practices.

The recorded list of medicinal plants found in Nepal now exceeds 700 species, constituting 13 percent of the vascular flora of 5400 species so far reported.

For a large segment of the rural population, many of whom live at, or below, the subsistence level, the collection and selling of medicinal plants may represent one of very few sources of cash income. The weak economic position of the collectors often means that they are forced to accept less than fair market value for their product.

Unfortunately, most of the collecting is done indiscriminately and not in accordance with any regulatory procedure or recognized management practices. This has threatened the survival of some species and reduced the quality of many more.

The following case illustrates the nature and extent of the problem. Very large quantities of orchids in several genera are collected from the Tarai and the Churia and Mahabharat ranges for use in Ayurvedic medicine. In the lowland areas, the genus used is

Flickingeria (syn. *Ephemeranthar*) *macraei*. In 1985, it was reported that some 500,000 plants of *Flickingeria* were collected in one operation alone and exported to India (Bailes 1985:5). This genus, which was formerly abundant, is now difficult to find. Further, it will take many years for the population to build again to previous levels, during which time other common species may invade the area, making recolonization of the preferred species uncertain.

b. current policy

The rules and regulations which currently apply to the collection and export of minor forest products, including medicinal plants, were promulgated in 1970. They contain provisions respecting application and permission to collect and export medicinal plants, royalty-revenue schedules, export clearance certificates and tariffs.

The main emphasis of the regulations is upon administrative and revenue earning procedures. Rules concerning actual harvesting practices, or the management of the resource to ensure continuation of supply and maintenance of quality, are not included.

Similarly, at the international level, there are rules concerning the collection and marketing of flora and fauna. For example, the Convention on International Trade in Endangered Species (CITES), to which Nepal is a signatory, has banned the export of orchids collected from the wild. As noted earlier, the enforcement of such rules is not an easy task.

In the 1976 National Forest Plan, major forest products received most of the attention and, in turn, emphasis was placed upon management with respect to trees, soil and wildlife. It must be noted, however, that reference is made to the need for improved management of minor forest products and for more scientific methods to be adopted concerning their collection, sale and distribution.

Similarly, the Seventh Plan contains specific reference to herbal farm expansion and drug research and production programs. The National Forest Plan refers to the collection of pine resin, medicinal herbs, grass, lac and wild honey; however, no overall management objectives concerning medicinal plants, or minor forest products in general, are articulated.

c. obstacles and constraints

In addition to the absence of stated policy, legislation, or regulations concerning the management of medicinal plants, there are several specific obstacles to be overcome, some of which are :

- i. the Department of Medicinal Plants contains the scientific expertise and research capacity necessary to provide timely and effective advice on issues related to the management of

medicinal plant population, whereas the Department of Forest has the responsibility for administering all forest land, including the harvesting of medicinal plants; there is a need to make coordination between the two departments more effective

- ii. the large-scale loss or deterioration of valuable medicinal plant habitat, resulting from the cutting and removal of trees in the absence of forest management plans; and the over-harvesting of underground plant parts, such as roots, rhizomes and corms, which leads to soil erosion and subsequent habitat loss
- iii. the frequent occurrence of forest fires, particularly in the Tarai and adjoining hills, many of which are deliberately set to produce fresh grass crops for grazing, results in the loss of medicinal plant populations
- iv. until the recent introduction of the Herbs Production and Processing Co. Ltd., a government corporation, trade in herbs was conducted by individuals or commercial firms, neither of which had any technical expertise nor institutional backing concerning herbal plants; collections were made by individual villagers, usually for purposes of earning a cash income, but with little knowledge or support concerning gathering, drying or storage procedures; this has led to considerable waste and the liquidation of some species.

d. successes

In spite of the absence of effective administrative and management procedures concerning the use of medicinal plants, the Department of Medicinal Plants has achieved considerable success through its various research activities. Although the Department was not actually established until 1960, as early as 1937 some herbs indigenous to Nepal, such as *Aconitum spicatum*, and two important exotic herbs, *Digitalis purpurea* and *Saussuria lappa*, were brought under cultivation on a small scale northeast of the Kathmandu Valley in Manichur.

Some of the more recent accomplishments are :

- The Botanical Survey and Herbarium has collected, documented and preserved over 4500 species of vascular plants out of some expected 6500 species available in Nepal. It has also published seven books on the flora of Nepal including keys to the genera and wild edible plants of Nepal. Recently, the Botanical Survey and Herbarium has initiated a study on threatened and endangered plants, recording more than 250 endemic species to date. Work on ecology, vegetation mapping and ethnobotanical investigations has also been undertaken.

- The **Royal Botanical Garden at Godawari** has been developed as a National Garden for indigenous flora and exotic plants. The establishment of a germplasm centre for medicinal and aromatic plants of known therapeutic value, both indigenous and exotic, is now underway. Some 1570 indigenous species of trees, shrubs, climbers and herbs have been introduced in the Garden. As well, experimental plots include over 150 different species of medicinal plants, and *in vitro* culture of some important species of orchids, medicinal plants, trees and agricultural crops is being done.
- Four **Experimental Herbal Farms** have been established in different agro-climatic zones of the country. Important medicinal and aromatic herbs, both indigenous and exotic, consisting of alkaloids, glycosides and oil bearing plants are being studied to determine such things as their potential for improved yield and the selection of populations that can maximise growth under various altitudinal and climatic conditions. Lower income farmers with small land holdings have taken a keen interest in the seeds and seedlings which have been distributed, in a limited way, by the herbal farms and have undertaken herb cultivation in different parts of Nepal as a potential alternative source of income.
- The **Royal Drug Research Laboratory (RDRL)** has undertaken work on indigenous herbs with respect to their drug potential and studies concerning development processes and extraction technology for the production of pharmaceutical raw materials. This laboratory also provides services for testing, standardization and quality control of medicines, crude drugs and allied products. Under the aegis of the Department of Medicinal Plants, the Drug Research Laboratory has published two books on medicinal plants of Nepal. The 700 plants described are used in the traditional Ayurvedic, as well as contemporary, medicinal systems.

Under the RDRL, a pilot plant has been established to develop and test the technology necessary to process herbs on a commercial and industrial scale. The plant is now supplying pharmaceutical raw materials, in small quantities, to local industries. The future economic advantage of this enterprise, in terms of import substitution, could be substantial.

The production unit of the RDRL was reconstituted to become 'Royal Drugs Limited' and the main user of the products and skills of the Department of Medicinal Plants.

- In 1981, the **Herbs Production and Processing Co. Ltd.**, was established and, in concert with the Department of Medicinal Plants, is working on the production and processing of plant materials on a commercial scale. Its objectives include motivating collectors and growers of medicinal plants to produce better quality herbs and to adopt simple, but effective, management principles that will ensure a sustainable yield.

a. the setting

Nepal presents a great diversity of flora and fauna ranging from the dense tropical monsoon forests of the Tarai, with highly productive paddy fields and warm waters, to deciduous and coniferous forests of the subtropical and temperate regions, and finally to the subalpine and alpine pastures and snow covered Himalayan peaks, with their cold streams, glaciers and lakes.

Nepal's rich biological diversity reflects the stability of those widely varied physical conditions. Over 5400 species of vascular plants, including 240 species of endemic plants and 700 species of medicinal plants, 130 species of mammals, 800 species of birds and 117 species of fish have thus far been recorded in Nepal. The single genus *Garrulax* is represented in Nepal by 16 of the total 20 species of the eastern Himalaya.

This abundance of biological diversity is present within a relatively small geographic area of 147,181 km². The significance of this fact is that, if one of the components, or a major part of it, were lost, it could have a devastating effect upon a broad range of biological species.

For example, if Nepal were to lose its remaining humid tropical forest - a possibility which is frequently predicted - lost would be ten species of highly valuable timber, six species of fibre, six species of edible fruit trees, four species of traditional medicinal herbs and some 50 species of little known trees and shrubs. In turn, the habitat for 200 species of birds, 40 species of mammals and 20 species of reptiles and amphibians would be severely altered, if not eradicated.

Obviously, the importance of conservation measures necessary to ensure the maintenance of Nepal's rich biological diversity is paramount.

b. obstacles

- i. the single sector approach of government departments toward resource conservation is not conducive to maintaining biological diversity, which requires a comprehensive approach, integrating the management of all of the resource sectors

- ii. the absence of a multi-sectoral coordinating body within HMG that would view the task of resource conservation from a multidisciplinary perspective
- iii. inadequate policy respecting the role and responsibility of the private sector that either uses natural resources or uses processes that may detrimentally affect the environment
- iv. lack of a comprehensive national program for the collection of inventory data related to the various ecosystems, including a scientific catalogue of flora and fauna occurring within the present network of national parks and protected areas
- v. absence of a national system for the storage and retrieval of existing data currently held in government and nongovernment agencies
- vi. insufficient public awareness of the potential contribution to economic development and environmental stability of maintaining biological diversity, for example, in order to provide sources of wild genetic materials for improving established plant and animal domesticates.

c. successes

- i. Nepal's existing network of six national parks, five wildlife reserves and one hunting reserve includes large tracts of diverse ecosystems ranging from the lowlands to the mid hills and valleys to the Himalaya and the trans - Himalayan regions; it covers representative samples of the country's major biotic regions; as well as protecting various plant and wildlife species and their habitat, it also provides a number of reference sites for baseline monitoring and scientific research
- ii. some work has been undertaken in the production of new, and the improvement of established, domesticates by the use of wild genetic resources; two native medicinal plants have been cultivated, and some genetic resources are being maintained, off-site, for the improvement of established domesticates in various vegetable and fruit seed collections
- iii. species and provenance trials of some fast-growing fuelwood and fodder species are being conducted in the forestry sector; Tribhuvan University is conducting research on the taxonomy, distribution and ecological behaviour of some economically valuable plant and animal species
- iv. the Royal Botanical Garden at Godawari in the Katmandu Valley provides off-site protection for several economic species of plants collected from various parts of Nepal.

13 National Parks, Protected Areas and Wildlife Conservation

a. current status

When, in 1970, His Late Majesty King Mahendra approved in principle the establishment of Royal Chitwan National Park and Langtang National Park, the conservation movement in Nepal was effectively launched.

With the passage, in 1973, of the National Parks and Wildlife Conservation Act, Royal Chitwan National Park was officially established. That same year, His Royal Highness Prince Gyanendra announced, at the Third International Congress of the World Wildlife Fund, the creation of Sagarmatha National Park.

Today there are six national parks, five wildlife reserves and one hunting reserve in Nepal. In total, these parks and reserves cover approximately 11,000 km² - more than seven percent of Nepal's land area (see Annex VII).

It is the policy of His Majesty's Government to include pristine areas, representing principal geographic divisions and biotic regions, within the network of parks and protected areas. Accordingly, the following network of national parks has been established:

- Sagarmatha, in the eastern Himalayan region
- Langtang, in the central Himalayan region
- Rara, in the western Himalayan region
- Shey-Phoksundo, in the west Himalayan region
- Khaptad National Park and Shivapuri Watershed and Wildlife Reserve represent the Hill region
- Royal Chitwan National Park lies in the southern lowlands and the Churia Hills and contains subtropical vegetation and oriental fauna.

Other areas, such as Trijuga, Barun-Makalu and Annapurna, are under consideration.

In addition, the flood plain of the Koshi River in the east, the Tarai-Bhabar region of Parsa and Bardia, and the riverine open grassland of Sukla Phanta are also representative ecosystems included in the network of national parks and protected areas.

Sagarmatha National Park, containing the world's highest mountain, and Royal Chitwan National Park have both been included in the World Heritage List.

Currently in Nepal, 26 mammals, nine birds and three reptiles have been classified as endangered species. The network of national parks and protected areas encompasses the habitat of most of these species. Most of the wildlife habitat, however, occurs outside of parks and protected areas, where wildlife resources are virtually unprotected. Similarly, aquatic species, including fish, receive no protection. As a result, a substantial percentage of wildlife is harvested indiscriminately both for commercial and domestic purposes.

b. current policy

The National Parks and Wildlife Conservation Act of 1973 identifies four categories of protected areas, namely national parks, wildlife reserves, strict nature reserves and hunting reserves.

The Act defines a national park as an area set aside for the conservation and management of the natural environment including fauna, flora and landscapes. It is primarily intended to protect sites, landscapes or formations of scientific or aesthetic importance together with their associated flora and fauna. The second objective, provided it is compatible with the first, is to develop the area for tourism.

Similarly, a strict nature reserve has been defined as an area of unusual ecological significance set aside for the purpose of scientific studies. Such areas are to be kept free, as far as possible, from alteration due to human intervention.

Wildlife reserves are set aside for the conservation and management of fauna and their habitat, whereas hunting reserves are managed essentially for sports hunting.

Although the basic policy governing the establishment and maintenance of national parks and protected areas is to protect the natural landscapes, flora and fauna, there are also other considerations. Cultural values are deemed very important and several parks include sites of considerable cultural significance. For example, Shey Monastery in Shey Phoksundo National Park and Thangboche Monastery in Sagarmatha National Park are of great religious and cultural importance to local Buddhists. Similarly, religious sites in Khaptad National Park are highly revered by the Hindus of that region, and Gosainkund Lake in Langtang National Park is renowned as a place of pilgrimage for Hindus from India and Nepal.

Under the National Parks and Wildlife Conservation Act, hunting, killing or capturing of any wild animal is not permitted in the parks or protected areas but only in the hunting reserves. Equally important, the cutting of trees, cattle grazing, mining, quarrying, and clearing or occupying of any land are all prohibited within the boundaries of the parks or reserves.

There are specific exceptions to these rules to accommodate particular local and traditional needs. For example, in the parks and protected areas of the lowlands, local villagers are permitted to harvest thatch grass at specified times and under specific conditions. In the Himalayan region, local people are permitted to graze cattle and cut trees for fuelwood and building timber. These exceptions, although essential if the local people are to continue living in their traditional areas, do conflict with the overall policy of protecting natural resources within the parks and protected areas.

The use of firewood by expeditions and organized trekking groups is prohibited under the Himalayan National Park Regulations and such groups are required to be self-sufficient in fuel before entering a park. Enforcement of this regulation, unfortunately, has not been taken seriously.

Outside of parks and reserves, the principal wildlife policy is to make wildlife resources available on a sustainable basis to meet the domestic needs of local villagers and for the purpose of sports hunting and developing wildlife tourism.

The Conservation Act makes provision for determining which animals are endangered and need to be protected, and which may be declared surplus and can be hunted under licence. The Act also provides for fixing annual quotas, based on periodic inventories, and declaring closed seasons by specific areas.

The extent of legal big-game hunting in Nepal is limited. There are only a few big-game outfitters and no sports hunters' associations supporting conservation issues. There is very little illegal hunting by Nepal's large rural population. Occasionally, local villagers will hunt wildlife for their own purposes. Much more serious, however, is organized poaching carried out for commercial purposes at the international level.

c. obstacles and constraints

i. shared responsibility:

- the Department of National Parks and Wildlife Conservation (DNPWC) is responsible for the administration and management of national parks and protected areas, whereas the Royal Nepal Army is responsible for surveillance and protection activities
- the Immigration Department is responsible for issuing trekking permits
- the Department of Tourism is responsible for issuing mountaineering permits and for the development of auxiliary services and infrastructure needed to accommodate the trekkers and tourists who visit Nepal and the national parks; the Department of National Parks also has responsibility for developing similar facilities; the programs and policies of the

Departments of Tourism and National Parks do not always coincide, nor are the Departments' respective responsibilities coordinated

- DNPWC and the Department of Forest are responsible for wildlife conservation in Nepal
- the Department of Agriculture has responsibility for administering commercial fisheries, whereas DNPWC and the Department of Forest are responsible for sports fishing and aquatic habitat management

ii. manpower:

- a major obstacle is the lack of staff positions within DNPWC to effectively manage the parks and protected areas
- most of the parks are in remote areas where community services are limited; as a result, there are difficulties in filling the available positions with qualified people
- the administration of wildlife regulations outside of the parks and reserves is the responsibility of the district forestry personnel; in most cases, staffing limitations inhibit their capacity to carry out effective wildlife management

iii. village conflict:

- the protection of wildlife populations within parks and reserves has, in some areas, serious implications for nearby settlements and communities; each year, local communities suffer human fatalities, loss of livestock and the destruction of crops as a result of marauding wildlife; furthermore, for many villagers, the only accessible source of fuelwood, wild vegetables, medicinal plants and construction materials is within the parks, but to enter the parks means breaking the law and facing extreme danger from the protected wildlife

iv. conservation awareness:

- management programs, as they apply to parks and wildlife, can only be successful if the principles of conservation are accepted by the general public; when that public lives at, or below, the subsistence level and is heavily dependent upon forest products for its survival, it is not easy for people to understand why wild animals apparently receive preferential treatment

v. information:

- outside of the parks and protected areas, the absence of reliable inventory data on wildlife populations, including wetland, migratory and aquatic species, as well as other factors, such as habitat and carrying capacity, make the wide-scale management of wildlife virtually impossible

d. successes

- i. the establishment of six national parks, five wildlife reserves and one hunting reserve, covering seven percent of Nepal's land area; and the maintenance of, and in some cases increase in, the population of several endangered species
- ii. the recovery of the one-horned rhinoceros population in Nepal, which about 20 years ago numbered less than 100 and was in danger of becoming extinct; today, the population exceeds four hundred; similarly, a 1979 survey indicated only 14 black bucks in Khairi Panditpur area; today, they number nearly 200
- iii. the Gharial Crocodile Conservation Program, whereby eggs are collected and hatched in natural hatcheries along the Narayani River, reared at the conservation centre, and eventually released in their natural habitat
- iv. thousands of trekkers and tourists visit Nepal's national parks annually to view wildlife and mountain scenery and experience indigenous cultures and traditions
- v. a key step toward wildlife conservation in recent years has been the establishment, in 1982, of the King Mahendra Trust for Nature Conservation under the Chairmanship of His Royal Highness Prince Gyanendra; in a relatively short period of time, the Trust has undertaken or initiated a variety of projects, some of which are:
 - the Nepal Tarai ecology project
 - the grassland and human ecology project Tarai
 - the musk deer project
 - the red panda project
 - the snow leopard project
 - translocation of rhinoceros from Royal Chitwan National Park to Royal Bardia Wildlife Reserve
 - Annapurna Conservation Area Project - implementation of a first-phase study to examine priorities and specific strategies for involving local residents in the management and administration of the area
 - an inventory of endemic, endangered and threatened plants of Nepal.

Nepal's natural beauty, extraordinary cultural heritage and rich ethnic diversity attracted nearly two million tourists during the 17-year period, 1970 to 1986. In 1970, about 45,000 tourists visited Nepal. By 1986, this figure had increased to 223,000. Between 1975 and 1986, the number of tourists who came for trekking and mountaineering alone rose from 12,600 to 33,600.

Tourism plays a substantial role in the economy of Nepal, where few employment opportunities exist beyond the agricultural sector and the capacity for earning foreign exchange is limited. In 1975, gross foreign exchange earnings from tourism amounted to 11.5 million dollars. By 1985, this figure had risen to 43.0 million and represented 18.5 percent of the total gross foreign exchange earnings that year.

Ministry of Finance estimates put the volume of employment generated through trekking and mountaineering in 1978/79 - a year when there were some 19,000 trekkers and mountaineers - at roughly 46,000. By 1986, the number of trekkers increased by 77 percent. The employment figure for that year is not available, but it can be assumed that there was a proportionate increase in the number employed.

The importance HMG places upon tourism in Nepal's future economic growth is reflected in the current Development Plan for the period 1985-1990. The target in increased annual earnings from tourism is set at 12.3 percent for each of the five years. The programs designed to help meet this target include the following :

- develop tourist areas in Palpa, Ilam, Mugu, Kailali, Baglung, Makwanpur and the Annapurna Himal region
- expand trekking routes and establish the necessary ancillary physical facilities.

Mountaineering and trekking activities, by their very nature, are bound to have a direct impact upon the social and economic structures of mountain villages - erosion of traditional values being one. However, the native Nepalese and Tibetan handicrafts that had languished for lack of patronage prior to the advent of tourism in

Nepal have, since that time, experienced a significant revival.¹⁸ Similarly, the renovation of many buildings in the ancient cities of the Kathmandu Valley can be attributed to outside influence (Gurung 1984).

Clearly, many economic benefits accrue at the local level. In general, however, these benefits are not distributed throughout any given community. Porters, who may live some distance from the actual trekking routes, and lodge owners are usually the principal beneficiaries.

In those areas where well-travelled routes exist, there are detrimental effects to the environment that can be attributed directly to mountaineering and trekking activities.

For example, alpine and subalpine vegetation, lying between the tree line and the snow line, support most of the medicinal plants of the Nepal Himalaya. Shrublands of this region are facing rapid destruction as they are indiscriminately used to meet the fuelwood needs of trekkers and mountaineers.

If fuelwood harvesting were prohibited in these unique high mountain systems, and harvesting of medicinal plants such as juniper berries, rhododendron leaves, bulbs of aconites and lillies, were carried out on a managed-use basis, production of such plants could be sustained indefinitely.

It is necessary to distinguish between organized trekking groups that carry in their fuel and trekkers who travel independently and usually stay in lodges en route. Lodge owners require fuelwood to meet the needs of trekkers. In the Khumbu region, the average daily consumption of firewood by a trekker is 6.4 kg (Sharma 1982); by comparison, the comparable figure for a villager in the same area is about 4.0 kg. Although visitors contribute to the local economy by purchasing wood from local villagers, the villagers in turn are spending increasingly more time in meeting their own needs from a rapidly receding forest.

Pressure exerted by lodge owners and trekkers upon the forest is serious. However, deforestation is not the only problem. Overcrowded campsites, careless handling of disposable material and insufficient attention to personal hygiene have resulted in sanitation problems, aesthetic deterioration and the exacerbation of village health problems.

The current Tourism Development Plan does not adequately take into account environmental issues.

The critical issue of carrying capacity as it relates to outdoor recreation is one that bears directly on two of the NCS objectives, namely, ensuring the sustainable use of Nepal's land and its renewable resources, and maintaining essential ecological and life-support systems.

18. Pilgrims and traders between Kathmandu and Lhasa provided the market for handicrafts prior to the arrival of tourists.

A third objective - dealing with the basic material needs of Nepalese people - relates to another kind of tourism/outdoor recreation issue.

As we have seen, there are very significant economic benefits that accrue from tourism. At the local level, benefits may accrue to individuals though not to all. For example, a national park may be of considerable value to a tourist in terms of a wilderness experience, or to some local residents who may be gainfully employed. It may also pose a serious threat.

Human safety and destruction of crops are two issues facing villagers who live near some of the parks and protected areas. For example, the villagers of Padampur have suffered as a result of the peregrinations of the protected rhinoceros population of Chitwan.

The King Mahendra Trust for Nature Conservation is endeavouring, with its Annapurna Project, to address this kind of problem by making a concerted effort to involve local people beginning with the initial planning phase.

Some progressive thinking by the private sector was also employed in the late 1970's. The Tiger Mountain Group, a private company operating in Chitwan National Park, pioneered the idea of reaching out to villages on the periphery of the park with various forms of support to help minimize the detrimental effects suffered as a result of the park's existence.

In response to the concern for protecting the mountain environment and landscape, the International Union of Alpine Associations, in 1982, adopted a series of principles and guidelines referred to as the "Kathmandu Declaration on Mountain Activities".

a. current status

Nepal's theoretical hydroelectric potential is estimated to be 83,000 MW, of which 27,000 MW is considered economically feasible under current conditions. Nepal's installed capacity of 161 MW meets less than one percent of the total energy requirement. Fuelwood supplies 84 percent of the need, and agricultural residues and animal dung, 11 percent. Petroleum and coal - both imported - provide the remaining five percent. Petroleum alone accounts for 3.8 percent of total energy consumption and, during the decade 1975 to 1985, petroleum product imports doubled in volume and increased four-fold in value.

The generation, transmission and distribution costs associated with electrical power are, and will continue to be, very high. Increased urbanization will result in increased use of electricity. Nationally, however, the consumption ratio of fuelwood to hydroelectric power will alter very little. At present, about five percent of the population has access to electricity. This represents less than a two percent increase in the past 25 years.

It is estimated that the total annual fuelwood consumption in Nepal is about 11 million m³. This is roughly equivalent to clearing, annually, 50,000 ha of well-stocked forest. Since only 10 to 15 percent of Nepal's forest land can be considered well-stocked, the 'equivalent' area cleared is closer to 100,000 ha. The Seventh Plan, (1985-1990), calls for planting 175,000 ha in total over the five year period.

It is planned that, by 1990, installed capacity will be increased by 85 percent to 238 MW. The new projects include Kulekhani II - 32 MW; Marshyangdi - 69 MW; Andhikhola - five MW; and a number of small projects with a total capacity of roughly four MW.

A large number of attractive hydroelectric projects have been identified on the basis of studies undertaken in three major river basins - the Karnali, the Gandaki and the Kosi. Possible future projects include the Sapta Gandaki (225 MW) in the Gandaki Basin, and Arun No.3 (400 MW single stage) in the Kosi Basin. Although

both these projects are economically attractive, commissioning will take a long time and will occur only when detailed engineering design is completed and required financing is arranged. Therefore, it is more likely that smaller projects will be undertaken to help meet the expanding demand until one of the projects mentioned above is undertaken.

Two megaprojects are also being studied - the Karnali (Chisapani) and the Pancheswor, with installed capacities of 3600 MW and 2000 MW, respectively. Both projects would be multi-purpose, comprising power generation - primarily for export, irrigation and flood control. The magnitude and complexity of these proposed projects, including environmental considerations, capital costs and the international market aspects, are such that considerable study and research are necessary before a decision concerning feasibility can be reached.

Since 1975, when HMG initiated a biogas development program, nearly 2000 plants, including both family and community size, have been installed. One of the major advantages of biogas plants is that, in addition to producing energy for both cooking and lighting, the animal dung used in producing the biogas is ultimately returned to the farm land as fertilizer. It is estimated that there is a potential for over 350,000 family-size plants in the Tarai, Inner Tarai and Kathmandu. The benefits from the extensive use of biogas include less reliance on forest resources, chemical fertilizers and kerosene (for cooking), and improved agricultural yields through the use of organic fertilizer, hence a saving of foreign currency and additional job opportunities.

One of the objectives of the Seventh Plan is to install 4000 additional biogas plants by 1990. Provision has been made to encourage more use of this alternative form of energy through a 25 percent subsidy on the capital cost of such plants.

Agricultural residues, such as rice husks, straw, maize cobs and stalks, bagasse and jute sticks, have long been used by rural populations for cooking and heating. In terms of industrial application, rice husks and bagasse have been used as boiler feed stock to generate steam or to produce electricity.

Regarding utilization of solar energy, solar water heaters and driers have been marketed in urban centres. Photo-voltaic cells have application at present in high frequency wireless or telecommunication stations. During the Seventh Plan period, installation of 20 automatic solar radiation measuring stations is targetted.

There is evidence of abundant wind energy potential in the northern mountainous area of Nepal. During the Seventh Plan period, 20 wind velocity measuring stations are scheduled to be installed.

b. policy respecting alternative energy development

i. the objectives of the Seventh Plan concerning alternative energy are :

- to reduce reliance on traditional energy sources through the development of alternative energy resources, and to reduce household consumption of fuelwood by promoting greater utilization of improved technology, such as improved cooking stoves
- to improve existing technology for the use of small-scale water utilization programs in rural areas

ii. current policies include :

- promoting the use of alternative energy, such as biogas, solar and wind power, and encouraging private sector participation in such development
- giving high priority to establishing biogas plants and the production and distribution of improved cooking stoves and improved water mills
- along with the collection and analysis of necessary statistics for the development of solar energy and wind power, measures will be taken to demonstrate and disseminate existing technology
- assistance, facilities and incentives will be provided to consumers, according to need, and to institutions involved in the production and distribution of alternative energy technology for the development and expansion of alternative energy sources

iii. HMG's current targets for 1990, in addition to installing 4000 biogas plants, are to distribute 160,000 improved cooking stoves, install 640 multi-purpose water mills and 320 cross-flow turbines, and initiate development of solar and wind power in modest research and training programs.

Solar power is currently being used in a variety of ways. For example, it is used to operate high frequency wireless or telecommunication stations in remote areas, and to run water pumps used on irrigation projects.

c. obstacles and constraints

i. energy programs are implemented by several government and nongovernment organizations independently, with the result that inconsistencies and unnecessary duplication occur

- ii. the absence of a single agency with a mandate to formulate, oversee and coordinate national programs and policy with respect to alternative energy leads to policy being formulated on an *ad hoc* basis, in isolation, without taking into account cross-sectoral implications; the present emphasis in energy analysis and planning is at the national level, focusing on energy supply and demand in aggregate terms rather than considering local issues through a decentralized approach
- iii. research and development with respect to alternative energy technology is conducted by several agencies, including the National Council on Science and Technology, the Royal Nepal Academy for Science and Technology and the Research Centre for Applied Science and Technology, but with little or no coordination among government agencies and departments or between government and the private sector; the research and development that is being carried out lacks effective monitoring, evaluation and reporting systems concerning existing initiatives in the field of alternative energy technology
- iv. the energy policy is based largely on social objectives and does not fully take into consideration the real cost of producing and supplying, in accordance with conservation measures, either fuelwood or hydroelectric power
- v. shortage of trained man-power, the absence of effective subsidy and incentive programs, inadequate information and data base, rapid population growth and difficult geographical terrain are further obstacles to energy development programs
- vi. a major constraint is that energy consumption patterns are governed largely by economic conditions; for Nepal's rural population, these conditions will not significantly alter in the foreseeable future; thus, without financial aid, most people will not be able to benefit significantly from improved technology and more effective alternative energy systems.

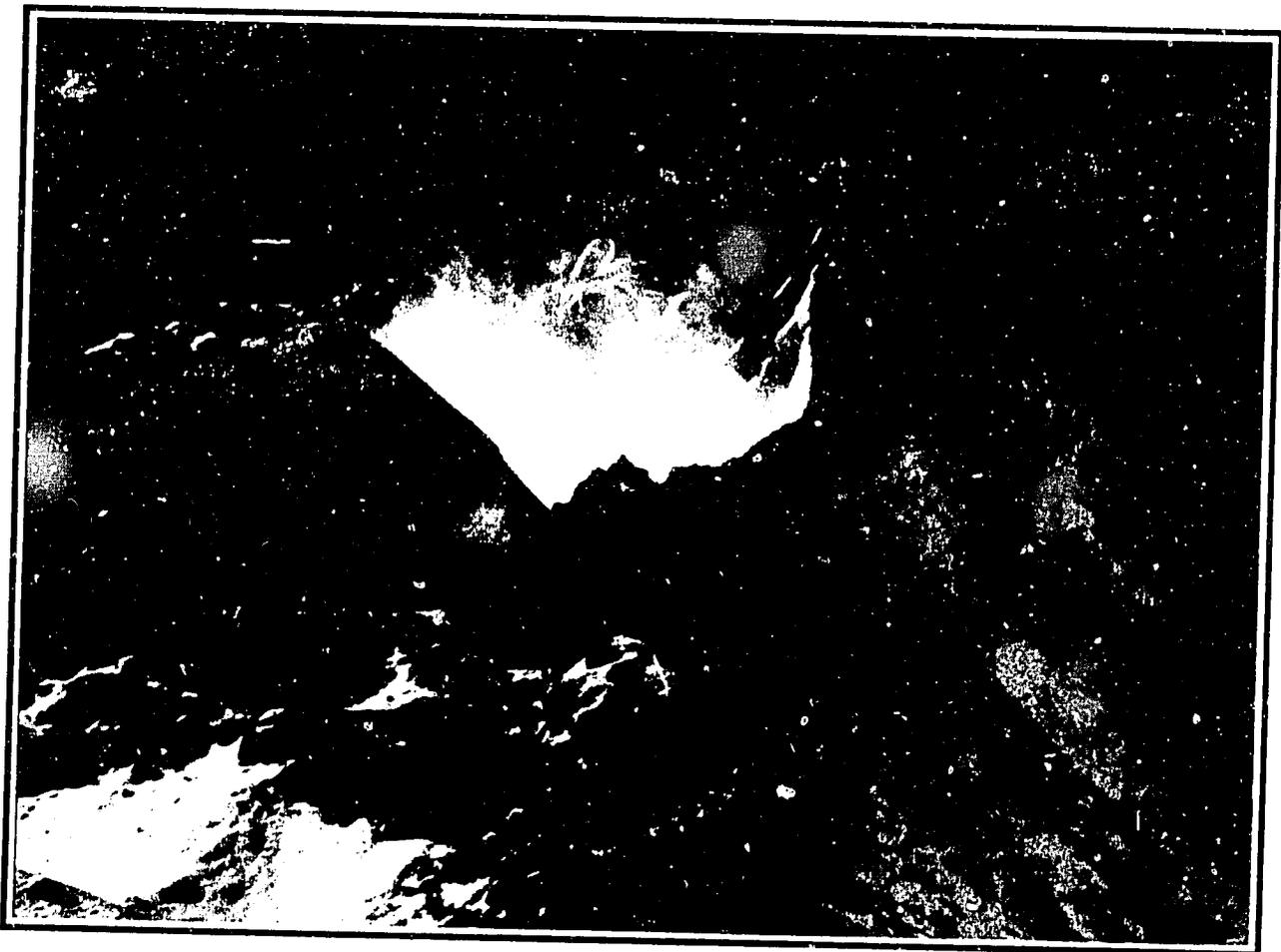
Perhaps nowhere are the cross-sectoral implications of resource use more apparent than in the energy field. The heavy reliance upon wood for fuel has resulted in severe degradation of forested areas in many parts of Nepal. This, in turn, has led to increased social and economic costs to the individual, including time expended to meet fuel requirements, loss of agricultural land through erosion, siltation of irrigation systems and flooding.

Severe forest depletion leads to increased reliance upon agricultural residues as a source of fuel. The loss of these residues as fertilizer may lead to reduction in crop production or the use of chemical fertilizers. Either of these results represents social and/or economic costs to the individual.

Under the right conditions, large-scale hydroelectric power development may have substantial benefits for the nation as a whole, such as developing a strong and competitive industrial base for

earning valuable foreign exchange, provided favourable export agreements can be reached. Such major projects however, because of their size, may not be able to provide power to local populations. In addition, local communities may be detrimentally affected, for example, by the formation of a large impoundment area.

Conversely, the project itself may be adversely affected by upstream land use practices such as deforestation, leading to silting, and a possible reduction in the life of the reservoir or damage to the power generating facilities. Catastrophic damage may also be incurred, for example, by the sudden discharge of flood waters or massive slope movements.



a. current status

Although the industrial sector accounts for just five percent of Nepal's gross domestic product, its contribution to the nation's economy is growing significantly. In the ten-year period between 1974 and 1984, industrial output more than doubled. During the five-year period ending in 1982 the number of employees in the industrial sector increased by 62 percent to more than 81,000. It is estimated that by 1990, this figure will be 95,000.

Of the 1,642 industrial units registered with the Department of Industry, more than 80 percent are concentrated in four areas, namely Kathmandu, Biratnagar, Birgunj-Hetauda and Butwal. The concept of regional planning, including the need to reduce inter-regional, social, and economic imbalances, was introduced in 1975. It appears, however, that so far industrial development in Nepal is not being influenced by regional development principles but, rather, is being determined along the more conventional lines of transportation, power, raw material availability and readily accessible markets.

The major part of Nepal's industrial enterprise is in the nature of import-substitution, and, in this respect, considerable success has been attained in making Nepal self-sufficient in a variety of commodities. The domestic market is limited, however. Thus, Nepal is beginning to consider how and where its industrial sector can successfully penetrate the foreign market. It should be noted that, at present, 75 percent of industrial establishments are engaged in providing primary agricultural products. A relatively small, but growing, cottage industry produces a variety of products including hand-made paper, bronze utensils, woollen carpets and handicrafts.

In spite of its relatively modest size, industrial development in Nepal, particularly the forest and agrobased sector, is beginning to have considerable impact upon the natural environment. For example, what initially appeared to be an abundant supply of forest products, such as *khair*, *semal* and *sal*, is now depleted to the extent that particular operations cannot be sustained. Impacts of a different nature - industrial pollutants - have begun to affect air quality in the Kathmandu area and water quality in Birgunj.

b. policy objectives

Current government objectives with respect to industrial development include :

- i. identifying and promoting industrial production that is based on indigenous raw materials and that significantly contributes to gross domestic production
- ii. operating industries at optimum capacity
- iii. promoting industries that can replace imports and that produce consumer goods and construction materials; and evaluating and improving, as needed, procedures to attract foreign investment
- iv. gradually transferring public sector industries into the private sector
- v. encouraging the private sector to promote industries other than those related to defence production.

Toward the attainment of these objectives, the current plan envisages completion of two paper mills - using sabai grass and paddy and wheat straw - a cement factory, two hard-rock mining operations, a sugar mill and a cotton/synthetic yarn mill.

In endeavouring to expand the industrial sector, thereby creating needed employment opportunities, strengthening the nation's economy and improving its balance of payments position by expanding export trade, His Majesty's Government also recognizes the potential hazard to the natural environment posed by improperly managed industrial development.

A statement contained in the official industrial policy reflects this concern :

"While establishing new industrial enterprises and/or expanding, modernising and diversifying existing ones, effective means will be adopted to prevent or minimize environmental pollution".

c. obstacles

- i. lack of long term plans that link programs for increasing and sustaining industrial growth to maintenance of environmental quality, the social needs of the people and management of the necessary raw resources
- ii. inadequate coordination between line-agencies having sectoral responsibilities for resources, such as forestry, soil conservation and watershed management, and the Department of Industry responsible for promoting industrial growth; similarly, there is insufficient liaison between departments and the National Planning Commission toward establishing a comprehensive position on resource conservation issues; as a result, industrial development and conservation are not mutually supportive

- iii. most of the private sector industrialists in Nepal are first-generation and lack experience and strong financial backing; as a result, they are not familiar with the ramifications of an industrial operation on the natural environment; if they were, they might still not be in a position to assume the financial burden of taking corrective action
- iv. lack of experience of government administrators and researchers in measuring the degree of potential hazard to the environment caused by industrial effluent, and hence in advising on the appropriate nature and degree of control measures necessary; controls that are too lax may lead to undesirable levels of environmental degradation, whereas those that are too stringent may make capital and operating costs prohibitive, thereby discouraging private sector enterprise.

17 Non-Renewable Resource Development and Hydrocarbon Energy

a. current status

Implicit in the "wise-use" definition of conservation adopted by the NCS for Nepal is the idea of sustaining productive capacity. When considering non-renewable resources, the definition can be refined to read wise-use of the resource in order to attain optimum recovery.

Existing laws in Nepal broadly identify the importance of the conservation of hydrocarbons and minerals, and require that "the best" conservation measures be practised. Well-articulated conservation policies and programs concerning non-renewable resources, however, do not yet exist. In part, this reflects the fact that very little mineral production has occurred to date.

Mineral exploration in Nepal has established that there are large deposits of carbonate minerals, namely limestone, dolomite and magnesite, talc and erratic low-grade phosphorites, along the Mahabharat and midland belts of the Hills. Deposits of such metallic minerals as copper, cobalt, iron, zinc and lead occur in different parts of the country.

The zinc-lead deposit of Ganesh Himal, at 4200 m above sea level, is one of the best-known medium size metallic mineral deposits. Occurrences of semi-precious stones such as garnet, tourmaline and aquamarine are located in the pegmatites of eastern Nepal, and, in a few cases, in the central and western parts of Nepal. In the central part of the country, some pegmatites also contain ruby.

Except for the low-quality lignite deposits of the Kathmandu Valley, no commercial coal deposit is known to occur in the country. However, the sedimentary basins underlying the Tarai and the Churia zones are known to hold thick layers of sedimentary rock, and it is probable that these basins have hydrocarbon deposits.

An iron ore deposit, containing proved reserves of 3.3 million tons of ore averaging 56 percent iron content, exists in the Phulchoki Hills southeast of the Kathmandu Valley. A study was conducted in the late 1970's to determine the feasibility of establishing an iron smelter using the Phulchoki ore. Due to the lack of coal in commercial volumes, the study considered the use of locally produced charcoal. It would have required 20 to 25 thousand ha of plantation forest to provide the necessary volume of charcoal on a

sustained yield basis. The project did not go ahead - the fuelwood requirement being one of the major drawbacks.

The contribution of the mineral sector to the Gross Domestic Product is small - less than one percent, but it is growing. During the eight-year period, 1978 to 1986, the total value of minerals produced increased by 300 percent.

The production of limestone, magnesite, zinc and lead, agricultural lime, slate and boulders provides employment in the order of 3000 full-time jobs and several thousand more seasonal, short-term job opportunities.

Recent studies in Nepal have identified the possibility of hydrocarbon basins in the order of 10 to 20 thousand km². Over 1200 line-km of seismic survey were completed in 1982-84, and more seismic work is currently underway. If commercially recoverable reserves of petroleum were to be found, the result could be significant in terms of Nepal's energy position and trade balance.

Nepal currently imports all of its petroleum and coal requirements, amounting annually to approximately 180,000 and 100,000 tons, respectively. The import of petroleum products amounted to 42 percent of the total export earnings in 1983/84, and the demand for petroleum products is steadily increasing. Nepal's import requirements of petroleum and coal could be replaced by the production of 4000 barrels of crude oil per day. A small to medium size field will produce, on average, between 20,000 and 30,000 barrels per day.

b. environmental policy

Recent legislation passed by His Majesty's Government - the Mines and Minerals Act (1985), and the Nepal Petroleum Act (1983)- contains references to the environment and conservation.

Section 13 of the Mines and Minerals Act makes provision for terms and conditions related to the prevention of erosion and pollution.

Similarly, Section 5 of the Petroleum Act refers to "avoiding damage to the forest and other natural resources, pollution and ecological damage".

Currently, regulations are being drafted pursuant to the Mines and Minerals Act (1985) which will elaborate upon the environmental and conservation conditions applicable to mining operations.

c. obstacles

- i. insufficient coordination among key government departments, and inconsistencies concerning their respective responsibilities

- ii. the Department of Mines and Geology is responsible for administering all mining activities except the excavation of boulders; the Department is highly centralized with no field or district offices
- iii. boulder excavation is controlled by local Panchayats, but the technical aspect of excavation operations receives little or no attention
- iv. the Forest Act considers mineral deposit in a forest area to be a forest product, thus under the jurisdiction of the Department of Forest; this arrangement, in addition to being cumbersome, may result in administrative inefficiencies
- v. independent lines of authority, such as those between forestry and mines, are not conducive to having an integrated approach to conservation issues
- vi. mine and quarry sites are often in remote and inaccessible locations; this fact, combined with the lack of field personnel, makes the surveillance and monitoring of mining operations virtually impossible; as a result, once a mining or quarry lease has been granted, little formal follow-up is done to see that the terms of the lease, including environmental conditions, are adhered to.

18	International and Regional Aspects
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Nations exercise sovereign rights with respect to natural resources contained within their boundaries. It is this principle that gives substance to the concept of national conservation strategies; it also places the prime responsibility for conservation, or the wise-use of natural resources, upon individual nations.

However, not all natural resources are confined within political boundaries. For example, fish and bird populations often migrate over international boundaries, and air and water quality may be affected by activities occurring beyond a nation's borders.

The conservation of such resources must begin with national policy and programs, but ultimately, international cooperation and action is necessary if they are to be fully protected. International trade commodities, such as timber, animal products, or medicinal plants, require not only national policies and laws with respect to harvesting and processing but also international cooperation, agreements, and, sometimes, conventions to prevent illegal trading practices.

There is also the potential for two or more nations to cooperate in establishing protected areas that straddle common boundaries. Such areas might contain, for example, outstanding or unique ecosystems, such as the Barun Valley in Nepal, and the contiguous area to the north, lying in the Tibetan Autonomous Region of China. Internationally protected areas such as these may assist in preserving rare and endangered species, sites necessary for the preservation of genetic diversity, or habitat essential for the significant survival of a migratory bird, fish or mammal population. In addition to helping develop a spirit of common responsibility between nations, internationally protected areas may also reduce the amount of land that the respective countries must set aside.

Trading on an informal basis has existed between Nepal and its neighbours to the north and south for centuries. Northern trade was characterized by barter of Nepalese foodgrains for Tibetan salt and wool. Trade with India traditionally involved Nepalese export of foodgrain, timber and fuelwood. Today, because of the open border with India, considerable quantities of timber, fuelwood and foodgrain are exported informally - sometimes illegally.

During the 19th century, Nepal's forest was seen as a source of considerable revenue, and official policy led to the export of large volumes of valuable hardwood species to India. To facilitate the movement of logs, the Indian railway network was extended northward to several points along, and across, the Nepalese border. The result - major revenues for Nepalese rulers and access to an extensive, and relatively inexpensive, source of timber by British India.

In 1920, the first of three major Nepal-India river development projects was initiated - the Sarda Canal Project on the Mahakali River. Two more agreements were signed in the 1950's for similar major river development works - the Kosi and Gandak projects.

Although irrigation and flood control were the prime objectives of these projects, it is apparent that the needs of Nepal, and potential benefits to the country received very little attention, as did conservation issues and ecological consequences.

Less than four percent of the 1.5 million ha of irrigated land in the Gandak project are in Nepal and, in the Kosi project, less than two percent of the 900,000 ha (Sharma 1983). The impact on Nepal has been mainly in terms of inundated cropland, the loss of forest and forest products, and the obligation to provide quarry materials.

Setting aside, for the moment, today's emerging debate concerning the extent to which siltation is due to natural phenomena and not deforestation, one important fact remains. The project life of these major river works has been greatly reduced, and in some cases the projects rendered ineffective, by siltation.

Illegal trade, which often has serious environmental repercussions, in valuable tree species, such as *khair* and *sal*, medicinal plants, orchids and, to a lesser degree, wildlife products, currently exists between Nepal and India. Much of it can be attributed to a rural population having few other off-farm income earning opportunities. Illegal trade, however, is not always conducted by individual, traditional movement across an open border. Much of this trade is done through large-scale commercial operations made possible by inadequate legislation and ineffective government surveillance procedures, particularly in remote rural areas.

Nepal is a signatory, as is India, to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). CITES addresses, in part, the problem of illegal trade in Nepal. Both a strong national commitment and complementary legislation are needed, however, to make such international conventions truly effective. The fact that there is no single agency to act as a coordinator of national conservation efforts, or to present the national view at the international level, adds to the difficulty.

Atmospheric pollution due to extra-territorial emissions is a potential problem for Nepal. India currently operates three nuclear power plants and has four others under construction - one in Narara in the nearby state of Uttar Pradesh. Recent experience in Europe shows

that radioactive fall-out can be widespread and unpredictable. The fact that Nepal is greatly influenced by southerly winds increases the potential problem and danger from such atmospheric pollution. Radioactive pollution of the Himalayan glaciers could be catastrophic to the Himalayan region. Nepal's capacity to monitor and measure radiation is very limited.

Nepal can claim several significant conservation contributions at the international level, a major one being the King Mahendra Trust for Nature Conservation, discussed earlier. Enjoying widespread international recognition and support, the Trust is actively involved in several projects which have the attention of the international conservation community. Included among these are the Annapurna Conservation Area Project and the proposed Makalu - Barun Valley protected area.

Nepal's cultural and natural heritage has been formally recognized as being of not only national, but also international, significance. Several cultural sites in the Kathmandu Valley as well as Sagarmatha (Mt. Everest) National Park and Royal Chitwan National Park have been included in the World Heritage List. Nepal is a signatory to the World Heritage Convention.

Within Nepal, there are several national and international agencies engaged in conservation activities. Nepal's National Committee for Man and the Biosphere (MAB/Nepal) was established in 1974 under the broad framework of the Nepal National Committee for Unesco, formed in 1971. Working closely with Unesco and the United Nations Environmental Program (UNEP), MAB/Nepal has been a major participant in environmental studies and awareness activities and the principal initiator of the World Environment Day activities in Nepal.

Through its own research activities, and in concert with international agencies, MAB/Nepal has aided in the understanding of ecological problems in Nepal. In this regard, it made a substantial contribution to the Mountain Hazard Mapping Project in the study of *Kakani* (Hill), and *Khumbu* (Mountain), areas, which led to an improved understanding of the erosion problems in Nepal and the Himalaya. One of the conclusions of this project is that the Hills are more stable than has been generally believed. Similarly, MAB/Nepal recently completed a Mountain Hazard Mapping Project in the Churia Range. It also participated in the formulation of the Prospectus of the National Conservation Strategy for Nepal in 1983.

At a meeting jointly organized by MAB/Unesco and MAB/Nepal in 1975, it was recommended that a centre be established for integrated ecological research and training needs in the southern Asian mountain systems, particularly the Hindu Kush - Himalaya. His Majesty's Government offered to host such a centre. In 1983, the International Centre for Integrated Mountain Development (ICIMOD) was established in Kathmandu.

The primary objectives of ICIMOD are "to help promote the development of an economically and environmentally sound mountain ecosystem, and to improve the living standards of

mountain populations of the Hindu Kush - Himalaya region". The countries involved are Afghanistan, Bangladesh, Bhutan, Burma, China, India, Nepal and Pakistan.

Other major objectives of ICIMOD include the furtherance of practical knowledge and the promotion of effective regional cooperation and exchange in mountain development and environmental management.

Regional cooperation is the guiding principle of ICIMOD. Hence, its major contribution is in the promotion and exchange of regional expertise. In this context, ICIMOD could complement regional efforts toward conservation.

Two other regional organizations could also play an effective role in the international aspects of resource conservation. They are the South Asian Cooperative Environmental Program (SACEP) and the South Asian Association for Regional Cooperation (SAARC).

SACEP, established in 1981 and headquartered in Sri Lanka, includes Afghanistan, Bangladesh, India, Iran, the Maldives, Pakistan and Sri Lanka and is conceived to play a complementary role to existing organizations in the region. Nepal, Bhutan and Burma have indicated their interest in joining SACEP to further the field of environmental conservation.

Several possible areas of cooperation, including tourism and environmental education, have been identified.

Membership in SAARC, which was formed in 1985, consists of Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan and Sri Lanka. His Majesty's Government of Nepal is actively participating in SAARC and the Association's permanent Secretariat is situated in Kathmandu. The major emphasis of SAARC is to be on regional cooperation for development. In keeping with the now widely held view that conservation and development are mutually dependent, it is quite conceivable that SAARC's regional development programs will incorporate the conservation measures necessary to attain, and sustain, such development.

E	BASIC NEEDS AND THE NATIONAL CONSERVATION STRATEGY
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The first of the four objectives of the National Conservation Strategy for Nepal is

" to help satisfy the basic material, spiritual and cultural needs of all the people of Nepal, both present and future generations "

It was also noted earlier that one of the five principles adopted to help guide the formulation of the NCS states, in part, that

" the Strategy must be designed to integrate conservation with development and help attain the objectives of His Majesty's Government related to meeting basic needs of the Nepalese people by the year 2000 "

To meet those needs, Nepal is, and will continue to be, heavily dependent upon its land, forest and water. It is essential, therefore, that these resources be managed and utilized in such a way as to ensure the sustainability of their productive capacity. Similarly, air and water quality must be maintained at a level that will guarantee the health of Nepalese people. Ensuring sustainable use and maintaining essential life-support systems are important objectives of the NCS for Nepal.

The Basic Needs Programme of His Majesty's Government covers six key areas - food, shelter, clothing, education, health and security. Among these, food, shelter and health are highly dependent upon sound conservation principles if their respective objectives are

to be achieved. Conversely, if the NCS for Nepal is to be successful, it must include an effective conservation education component. For this reason, the National Conservation Strategy for Nepal gives special attention in the Conservation Action Agenda to these four components of the Basic Needs Programme.

The level of economic activity and development needed to meet the stated targets of the Basic Needs Programme will draw heavily upon the productive capacity of the natural resource base and increase markedly the potential for detrimentally affecting the air, water and soil, upon which the nation's well-being is so heavily dependent.

Target increases for the 13-year period, 1987-2000, include doubling the annual foodgrain production from 4.3 to 8.6 million mt, and increasing the production of other agricultural products, such as meat and dairy products, by a factor of between two and three, and increasing fish production by a factor of eight. Related to increased agriculture production is the need to enlarge the total land area under irrigation from 0.37 to 1.25 million ha. The Basic Needs Programme envisages an increase in the use of chemical fertilizers by a factor of five, from the present 43,000 mt annually, to 214,000 mt, and a proportional increase in the use of insecticides.

The Basic Needs Programme targets also include substantial improvement and expansion in the areas of shelter and sanitation. An additional 100,000 new houses are required annually during the 13-year period. The 1.3 million new housing units will require a substantial land development program, roads, drinking water and sewage facilities, a sizeable expansion in the manufacture of lumber, bricks, cement and tile, and in the supply of timber, bamboo, clay and stone.

The Conservation Action Agenda has been designed so that the NCS can play a vital role in successfully attaining the targets of the Basic Needs Programme. This is done, first, by ensuring that the productive capacity of the essential resources - land, forest and water - is sustained; second, by mitigating, where necessary, the potential detrimental social and environmental effects inherent in such large-scale development activities; and, finally, by improving the level of understanding of the relationship between conservation and development.

The Conservation Action Agenda of the NCS for Nepal contains a series of conservation resolutions or action plans. Most of these relate directly to HMG's Basic Needs Programme and cover the following subject areas :

- agricultural productivity
- forest productivity including timber, fuelwood, fodder and medicinal plants
- livestock development and pasture management
- pesticide control
- irrigation
- tissue culture research and production
- monoculture research

- data bank concerning gene and genetic variation and germplasm storage
- land use planning
- air, water and noise pollution
- drinking water source protection
- soil conservation and watershed management
- energy planning and alternative energy research
- conservation awareness programs, including in-service and extension-service training, and conservation education in the school system.

The integration of conservation with development is a salient feature of the NCS for Nepal, and the Strategy describes, in detail, how this will be done.

For example, the Conservation Action Agenda describes improved management practices, such as simple silvicultural treatment of forest land, rotational grazing patterns for pasture land, and intercropping and mixed cropping practices on agricultural land, all of which lead to increased productivity as it relates to the basic needs of food and shelter.

Similarly, the NCS contains several resolutions concerning basic health needs. These include the regulation and control of the importation, storage, marketing, distribution and use of pesticides; the monitoring, and improvement of, air and water quality - here the potential problem of radioactivity is also addressed; and the protection of drinking water sources through various land management practices and local surveillance procedures.

The level of achievement called for in HMG's Basic Needs Programme can only be sustained if it contains a solid and effective conservation component. The principal objective of the National Conservation Strategy for Nepal, and the Conservation Action Agenda that follows, is to sustain such a level of achievement.

**F THE CONSERVATION
ACTION AGENDA**

1 Institutional

**a. The National
Council for the
Conservation of
Natural and
Cultural
Resources
(NCCNCR)**

- i. recognizing that**
 - there is a need for a senior level, policy-making body that includes government members whose respective Ministries have the executive power necessary to implement the National Conservation Strategy and nongovernment members who, collectively, can assist in facilitating the overall national conservation effort with respect to both natural and cultural resources

- ii. but given that**
 - because of the multi-sectoral nature of the NCS and the wide-ranging resolutions contained in the Conservation Action Agenda (CAA), such a policy-making body, to be most effective, should not be aligned with any specific government Ministry or line-agency

 - the National Commission for the Conservation of Natural Resources (NCCNR), under the aegis of the Ministry of

Forest and Soil Conservation, has not, since its inception, been able to function as intended, largely because it was perceived by other ministries, and many departments, to be primarily oriented toward the Ministry of Forest and Soil Conservation, and not particularly suited to addressing the comprehensive nature of conservation development issues; and because it was supported by staff that already had other full time responsibilities

iii. it is resolved that

- HMG will establish a separate, policy-making body named the National Council for the Conservation of Natural and Cultural Resources (NCCNCR), supported by a permanent secretariat, to replace the present body (NCCNR); the NCCNCR will have the following objectives :
 - to ensure that the implementation of the National Conservation Strategy takes place in a timely and orderly fashion through government ministries, line-agencies, nongovernment, class and voluntary organizations and the private sector
 - to facilitate the implementation of the CAA, to monitor its progress and effectiveness, and subsequently to provide guidance, where necessary, with respect to the application of corrective measures
 - to examine, in the context of the National Conservation Strategy, major conservation - development issues as they arise
 - to provide a focus for coordinated action, and the point of resolution for intersectoral conflicts, concerning resource and cultural conservation issues
 - to formulate policy guidelines concerning resource and cultural conservation matters
 - to raise the level of commitment to the National Conservation Strategy of individuals, nongovernment organizations, international and bilateral agencies, business, industry and government.
- HMG will appoint the Vice-Chairman of the National Planning Commission and the Member (Environment and Resource Conservation) National Planning Commission as the Chairman and Vice-Chairman, respectively, of the NCCNCR
- the NCCNCR membership will include the Secretary of each of the appropriate ministries and heads of other appropriate agencies, including the Central Disaster Relief Committee, the Chancellor of the Royal Nepal Academy, the Vice-Chancellor of Tribhuvan University, the Vice-Chancellor of the Royal Nepal Academy of Science and Technology (RONAST) and the Vice-Chairman of the

National Population Commission, and five members from the private sector, the latter to represent business, industry, nongovernment organizations, professional organizations, and conservation societies, on a rotational basis; at least two members of the NCCNCR will be women

the NCCNCR will meet quarterly and, in addition, twice yearly to provide information to the Council of Ministers on matters respecting the conservation of natural and cultural resources; at least once annually, the NCCNCP will brief the Rastriya Panchayat Water Resources and Finance Committees on all major conservation issues

the NCCNCR will be served by a permanent secretariat, to be known as the National Resources Conservation Centre (NRCC) headed by a Member Secretary at the Secretary level.

the National Resources Conservation Centre will :

- provide full time support to the NCCNCR on all matters related to the conservation of natural and cultural resources in order to facilitate the deliberations of the Council and to expedite the conduct of its business with respect to its responsibilities as described above
- establish effective working relations with all relevant government departments and agencies, including the NCS Ministry Steering Committees and the NCS Regional Committees [CAA 4 (a)] see Annex VIII, nongovernment organizations, departments and institutes of Tribhuvan University, international and bilateral agencies, and components of the private sector having a role, or potential role, in the implementation of the National Conservation Strategy for Nepal
- provide a focal point for all activities related to the implementation of the NCS Conservation Action Agenda among the various groups noted above
- coordinate conservation programs at the national level with respect to development activities, provide a referral point for proposed resource-related studies and facilitate their integration, where appropriate
- establish an effective functional relationship between the Central Disaster Relief Committee and appropriate departmental ministries
- address a wide range of activities under the following major subject areas :
 - conservation education, training and public information [CAA 2]
 - research, inventory and directed studies [CAA 5]
 - implementation of NCS policy initiatives [CAA 3]
 - the role of NGO's and the private sector [CAA 2 (h)]

international and regional conservation issues [CAA 1 (b)]

prepare position papers for the NCCNCR on major policy issues related to resource and cultural conservation, and prepare briefing material for use by the NCCNCR during its own quarterly meetings and meetings with the Council of Ministers and the Rastriya Panchayat Committees

provide, on a sustained basis, a national perspective on, and evaluation of, the performance of government and the nongovernment sector with respect to the Conservation Action Agenda

provide a quarterly progress and evaluation report to the NCCNCR concerning the status of the NCS and, where appropriate, make recommendations concerning necessary further action, including modifications to the implementation process

the principal role of the NRCC will be to support the National Council for the Conservation of Natural and Cultural Resources and, in so doing will contain and be supported by two operational sections, namely :

- the Assessment and Review Office [CAA 6 (a)] responsible for socio-economic and environmental assessment and review, and
- the Nepal Remote Sensing Centre responsible for providing technical support to the land use planning process [CAA 6 (b)].

b. International Cooperation

i. recognizing that

- the prime responsibility for the conservation of natural and cultural resources rests with individual nations; however, in addition to strong national programs, international cooperation is necessary if the detrimental effects of development are to be minimized
- Nepal enjoys friendly relations with all of its neighbours in South Asia and the support of a large number of countries throughout the world for its Zone of Peace initiative; it has also received widespread international recognition for major conservation initiatives, such as the King Mahendra Trust for Nature Conservation and its Man and the Biosphere program, and actively participates in regional research initiatives, for example, through its membership in ICIMOD

ii. but given that

- there are several areas requiring attention at the international level, including :
 - the illegal export trade in various forest products, including medicinal plants and special woods, animals and birds
 - the protection of migratory species and the maintenance of genetic diversity
 - potential atmospheric pollution due to extra-territorial emissions
 - bilateral and multilateral issues related to hydroelectric power development, flood control, and irrigation schemes

iii. it is resolved that

- the South Asian Association for Regional Cooperation (SAARC) will be encouraged to include "sustainable development through conservation" as one of its principal objectives
- the NCCNCR, with the support of nongovernment agencies, such as KMTNC, MAB/Nepal and ICIMOD, appropriate government agencies, Tribhuvan University and RONAST, will work with the permanent secretariat of SAARC in formulating conservation guidelines for consideration by SAARC members
- the NCCNCR will encourage and promote, among SAARC countries, exchange programs related to research, education, training and extension in the fields of natural and cultural resource conservation
- with respect to the problem of illegal export, migratory species, and the protection of rare and endangered species, Nepal will :
 - as a signatory to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),¹⁹ adopt the legislation and administrative procedures necessary to implement CITES, as described in the "IUCN Environmental Policy and Law Paper" No. 17; 1981
 - become a signatory to the Wetlands Convention and the International Convention on the Conservation of Migratory Species of Wild Animals and commence joint action with its neighbouring countries concerning the protection of endangered flora, fauna and habitat

19. Nepal is also a signatory to the World Heritage Convention.

- become a member of the International Atomic Energy Association (IAEA) and, through the IAEA, seek assistance and training in order to establish a national capability concerning the problem of nuclear hazards to complement the CAA program of air and water quality monitoring
- endeavour to have future bilateral development agreements between Nepal and any of its neighbours that involve the direct use of, or that may have a detrimental impact upon, her natural resources, such as rivers, that cross international boundaries, incorporate terms and conditions, and describe respective areas of responsibility, with respect to mitigatory measures
- support the recent initiative of the World Commission on Environment and Development (WCED) in preparing a 22 Article set of principles proposed as guidelines for deliberations on a United Nations Convention entitled 'Environmental Protection and Sustainable Development'; the guidelines cover such subjects as settling international environmental disputes, compensation for damage, warning and information on potentially dangerous activities or accidents, conservation principles and trans-boundary issues.



**a. National
Coordination**

i. recognizing that

- a well-informed public requires an effective flow of information and a strong commitment from nongovernment, as well as government, sectors to provide and disseminate information
- improving the overall level of conservation awareness requires the effective use of a variety of mechanisms including nongovernment organizations, the school system, the public information media, the private sector, the university community, research institutions and special interest groups

ii. but given that

- to be most effective, a conservation awareness program must utilize all of the mechanisms in a cohesive and concerted manner; only in this way can the complementarity of the respective components be realized and potential redundancy be minimized

iii. it is resolved that

- one of the major areas of responsibility of the NCCNCR will be conservation education
- the NCCNCR Secretariat, that is the National Resources Conservation Centre, will contain a conservation education section responsible for developing, in concert with the appropriate agencies and institutions both in and out of government, a comprehensive national conservation awareness program.

**b. Public
Education
System**

STUDENTS

i. recognizing that

- the use of the school systems for the dissemination of conservation principles and practices is the single most effective way to develop a society aware of the fundamental importance of conservation

ii. but given that

- in relatively few cases are students exposed to the subject of resource and cultural conservation, either in the classroom or through extra-curricular activities

iii. it is resolved that

- a 'natural and cultural resources conservation' component, including traditional sports and games, will be developed for incorporation into the school curricula by the Ministry of Education and Culture in consultation with appropriate government and nongovernment agencies
- the conservation education component will consist of field training, including demonstration projects; extra-curricular activities related to natural and cultural resources; and student voluntary services, such as tree seed collection, seedling production and horticulture programs
- books, charts and display material emphasizing natural and cultural resource conservation will be prepared in Nepali and used for instruction in the classroom. With respect to cultural conservation, programs will be developed to familiarize students with traditional forms of sports and games, dance, music, literature and drama.

TEACHERS

i. recognizing that

- school teachers, as a group, have considerable potential to effect change in public attitudes and perceptions concerning conservation issues, both within the schools and in the local communities at large

ii. but given that

- the potential of school teachers as conservation educators is greatly underutilized
- most schools, particularly in the rural areas, have no trained science teachers who could play a significant role in conservation instruction, nor appropriate teaching aids or textbooks related to science courses

iii. it is resolved that

- a national program will be mounted to
 - prepare school teachers to disseminate basic conservation information and to provide leadership in initiating related conservation activities at the local level
 - provide classroom materials, teaching aids, reference material and textbooks related to natural and cultural resource conservation
- a conservation component will be incorporated into teachers' training by :
 - expanding the existing curriculum of the Faculty of Education, Tribhuvan University, to include conservation education, and upgrading the qualifications of the teaching staff within the Faculty through a series of seminars and workshops conducted by qualified persons
 - providing present teachers with an in-service training program under the auspices of the NCS District Committees, which, in part, consist of all of the district resource line-agencies; for example agriculture, livestock, forestry, and soil conservation [CAA 4 (a)]
 - encouraging qualified local persons, government and non-government, to support teachers in undertaking student conservation programs.

c. In-Service Training

i. recognizing that

- a number of HMG in-service programs exist that provide, on a regular basis, training opportunities for middle and senior level officers through workshops, seminars and conferences
- included in the present in-service training programs of HMG are several management and administration training centres serving the needs of individual ministries and public enterprises, and the Nepal Administrative Staff College (NASC), which has overall national responsibilities and is the principal national management and administrative training centre

ii. but given that

- most of the in-service training programs, including the NASC, do not contain a specific conservation component

iii. it is resolved that

- the subject of natural and cultural resource conservation will be incorporated into the NASC and individual government agency training programs, with special emphasis on matters related to their respective mandates
- curricula will be based upon the National Conservation Strategy and developed by an interdisciplinary group under the aegis of the NCCNCR and in collaboration with the NASC and appropriate ministry in-service training staffs
- the target group for in-service conservation education will include all levels of government officers, from Secretary and Department Head to mid-manager and technician.

d. Extension-Service Training**i. recognizing that**

- a key factor in increasing conservation awareness at the local level is an effective extension - service program consisting of an adequate number of trained extension workers

ii. but given that

- there are, currently, very few specific programs for training extension workers in the field of natural and cultural resource conservation

iii. it is resolved that

- at the central level, the NCCNCR Secretariat will coordinate the preparation of extension-training conservation programs and curriculum development
- at the regional level, the existing training facilities throughout Nepal, such as the Panchayat Training Institutes, the Agricultural Training Centres, the Regional Health Directorate Training Centres and the Women's Training Centres, will
 - supplement their existing programs with natural and cultural resource conservation instruction
 - be assisted in developing such subject matter, and supported in the teaching of it, by resource persons drawn from the NCS Regional Committees [CAA 4 (a)] and other appropriate agencies
- at the district level the NCS District Committee will provide a core group of trainers, and emphasis will be placed upon developing trained village level extension workers through the District Panchayat Secretariat

- trainees will be selected - with particular emphasis on encouraging women to participate - throughout the regions, and, initially, will be provided with basic training of three to four months' duration, after which they will return to their respective home areas and to full time employment under the supervision of one of the District line-agency offices
- the NCS District Committees will, under the aegis of the NCCNCR Secretariat, examine the relationship between local communities and their surrounding environments in order to improve extension-service training at the village level
- those village level extension workers showing particular aptitude and interest will be given further training in order to become extension-service trainers.

**e. Developing
Technical
Capacity**

i. recognizing that

- one objective of HMG is to substantially increase the area of irrigated land, and that this will entail large-scale construction projects and will provide increased opportunities for local engineers, project administrators and technicians

ii. but given that

- the available supply of experienced people in this field and the financial capacity to undertake such projects are limited

iii. it is resolved that

- a development program will be undertaken to provide training, finance and equipment for the local construction and consulting industry for irrigation development
- concurrent with such a program, industrial and lending institutions will initiate policies designed to increase the local capacity of such industry and training programs to improve the ability of executing agencies to supervise construction, and administer contracts, related to irrigation projects
- similar programs will be established for developing technical capacity with respect to high altitude pasture development, water supply and sanitation, and turbine mills and small hydroelectric developments.

**f. Resource
Conservation
Tribhuvan
University**

i. recognizing that

- an essential component of a sound resource conservation program is a cadre of professional and technical people, trained to meet current problems and challenges
- Tribhuvan University provides training at the professional and technical levels in several resource sectors, such as agriculture and forestry

ii. but given that

- there is a need to prepare students as natural resource managers to meet today's challenges in the field of resource conservation
- university training and research must be attuned to current resource conservation problems and programs in order to contribute usefully to the national conservation effort

iii. it is resolved that

- a Resource Conservation Steering Committee (RCSC) will be established at Tribhuvan University under the joint auspices of the Institutes of Forestry and Agriculture and Animal Science, and in concert with other departments of the University, RONAST and HMG
- the RCSC will
 - direct the development of new courses at all levels reflecting recent initiatives in integrated resource management, including pasture development and range management, conservation of feed resources and crop residues, community forestry, forest and soil conservation, energy and biomass production, medicinal plant cultivation and management, and wildlife conservation
 - promote the adoption of an interdisciplinary approach to training students in the field of agroforestry, soil conservation and watershed management, zoological and botanical garden management, wildlife conservation and park management, and the management and development of medicinal plants
- the University will
 - extend its preparatory training to postgraduate students, prior to their undertaking the National Development Service Program (NDSP), to include resource and cultural conservation issues; the students, while carrying out NDSP field work, will be in a position to help improve the level of conservation awareness at the community level

- extend the existing network of field research stations, under the aegis of the Institute of Forestry, to cover each of the four geographic divisions which, collectively, will represent most of the resource conservation problems and needs; the field research stations will be used by students and university faculty for lab work and by government research officers for carrying out applied research programs
- provide for the establishment by the Institute of Forestry of close working relationships with the various projects carried out within HMG ministries, such as Forest and Soil Conservation, Agriculture and Water Resources, in order to keep abreast of current problems and developments and to draw upon resource persons from the projects as short-term instructors and research advisors for the University.

g. Women and Conservation Education

i. recognizing that

- women have traditionally played, and continue to play, a major role in the husbanding of agricultural crops, the harvesting of forest crops and the management of livestock

ii. but given that

- the number of women who have received any training - either as extension workers, technicians or professionals - in the field of resource conservation related to agriculture, forestry, animal health or pasture management is disproportionately low
- social constraints and obligations faced by women, particularly in rural areas, inhibit their participation in such programs

iii. it is resolved that

- the selection process related to such programs, such as the extension-service training [CAA 2 (d)], will place particular emphasis on encouraging women to participate, and an appropriate number of places will be reserved for them
- until such time as substantially more women are engaged in resource conservation at the technical and professional levels a comprehensive program will be undertaken for the purpose of encouraging women to enter diploma and degree courses in various fields of natural and cultural resource management by providing :
 - information programs at the high school level, including vocational guidance instruction concerning course requirements and career opportunities in the fields of natural and cultural resources

- financial incentives
- special consideration with respect to entrance requirements
- facilities and accommodation especially suited to women students.

h. Role of Non-government Organizations and the Private Sector

i. recognizing that

- the task of improving conservation awareness and the level of understanding of the general public concerning natural and cultural resource issues is both complex and comprehensive and requires the full support of the communications media, special interest groups, nongovernment organizations and the private sector
- there are, at present, many organizations that, on an individual basis, are making significant contributions to the conservation movement in Nepal

ii. but given that

- such individual efforts, if appropriately focused and adequately supported, could contribute substantially to the successful implementation of the Conservation Action Agenda

iii. it is resolved that

- under the aegis of the NCCNCR, a Task Force will be established to define the role of NGO's and the private sector with respect to the NCS Action Agenda and to formulate measures to facilitate their participation
- the NCCNCR Task Force membership will include representatives of NGO's, such as the King Mahendra Trust for Nature Conservation, Man and the Biosphere - Nepal, special interest groups, such as the Nepal Heritage Society, the Nepal Forum of Environmental Journalists and the Nepal Environmental Conservation Group, and local private consultants, research institutions and business people
- the Task Force will prepare, on the basis of the National Conservation Strategy and, in particular, the Conservation Action Agenda, a coordinated action plan to include the following :
 - the role of the communications media with respect to public information and publicity
 - conservation promotion programs, particularly those undertaken at the local level

- conservation research and programs conducted by the private sector, business and nongovernment organizations
- conservation education and training programs
- the preparation and dissemination of information concerning specific conservation components, such as a revised "Trekking Code of Conduct", [CAA 3(i)] or a manual concerning the cultivation of medicinal plants
- the provision of incentives to assist and encourage nongovernment and private organizations to actively promote and undertake resource conservation programs.



The Policy section of the CAA consists of eleven subject areas, many of which are directly related to the basic needs of the Nepalese people. For example the resolutions concerning agriculture, forestry, and livestock development and pasture management relate to improving productivity on a sustained yield basis.

While striving to meet the food and shelter requirements of the people, it is also necessary to ensure that other basic needs, such as health and personal safety, are provided for. Here, the Policy section deals with matters such as drinking water source protection; pesticide use and control programs; and environmental quality related to air, noise and water pollution.

The third set of policy resolutions deals with the need to safeguard natural and aesthetic values and to maintain the vast cultural heritage of Nepal. The subject areas here deal with trekking and mountaineering activities, the conservation of cultural heritage, and national parks and protected areas.

a. Drinking Water Source Protection

- i. recognizing that**
 - an adequate supply of safe drinking water is of paramount importance to the health of the Nepalese people and is fundamental to the welfare of the nation
 - HMG's objectives for the year 2000 are 100 percent drinking water coverage for the urban, and 90 percent for the rural, population
- ii. but given that**
 - the protection afforded drinking water sources is generally inadequate, particularly in the context of animals grazing in the catchment areas and related pathological contaminants, the use of chemicals in agriculture and soil erosion
 - the importance of rehabilitating, and subsequently maintaining, long-established traditional drinking water sources has been largely overlooked

- legal provisions respecting the protection and rehabilitation of sources of drinking water exist, but are generally not enforced

iii. it is resolved that

- every effort will be made, through the education and information programs referred to in CAA 2, to improve the public's understanding of the importance of pure water in terms of human health, the need to protect sources of drinking water from becoming polluted and the need for effective local maintenance of drinking water and sewage facilities
- each village, supported by the Water User's Committee, the NCS Village Panchayat and District Committees [CAA 4 (a)], will undertake the following :
 - determination of the boundary of the area necessary to protect the water source
 - installation and maintenance of vegetative fencing along the boundary
 - rehabilitation of the actual water source and the enclosed protected area, including the planting of trees and basic soil conservation work to maintain soil stability
 - regular follow-up surveillance of the water source area to monitor the adequacy of the protection program and the installed water supply and sewage facilities and to take the necessary corrective measures
- legal provision for the protection of drinking water sources, currently contained in various pieces of legislation, will be consolidated under a "Water Supply and Sanitation Act" (WSSA)
- the WSSA will make provision for the protection of water source areas, the installation, operation and maintenance of drinking water and sanitation facilities, and for protection against vandalism and damage to such facilities.

b. Forestry

i. recognizing that

- Nepal's forest, if properly managed, can be a major factor in reducing the serious erosion and flooding problems that beset many areas of the country; in providing the basic essentials of fuelwood, fodder and timber upon which the majority of the population is directly dependent; and in contributing significantly to the gross domestic product as a source of off-farm employment opportunities

ii. but given that

- increasing population pressure and road accessibility in the future can only exacerbate the current problem of encroachment in the forest areas of the Tarai and Inner Tarai
- displaced villagers, for example, the victims of natural calamities such as landslides and floods, have a legitimate need to be resettled in, or adjacent to, forested areas
- the major emphasis of the Department of Forest has been one of protection and prohibition in order to maintain, or enhance, natural productivity; these measures have not been sufficient, however, to meet the rising demand for forest products or to control the increasing problem of forest degradation
- although the community forestry program is extremely modest in relation to the magnitude of the national problem, its success has shown that local people are willing to assume more responsibility for forest management
- private sector industry and nongovernment organizations can contribute substantially to the protection and management of the forest, as well as to the national economy, through forest-based industries and enterprises

iii. it is resolved that

- forests in the Churia Hills and adjoining Bhabar, because of their particular susceptibility to erosion, will be strictly protected against encroachment, the heavy removal of biomass and injurious effects of grazing and fire
- areas of forest land necessary to maintain the ecological balance, for example, in the Churia Hills and Mountains, will be identified and managed in such a way as to minimize human activity
- inhabitants of the flat land in the Bhabar tract will be encouraged, through various financial incentives, to grow industrial tree plantations and horticultural crops
- people displaced because of landslides and floods will be allotted land in agroforestry projects
- existing and potential encroachers on forest land will be employed in plantation and silvicultural activities, including intercropping in the plantation areas, thereby reducing the loss of forest land through unregulated settlement
- a survey of forest deficient Panchayats in each District will be undertaken and an assessment made of the amount of forest area that will be required to meet future local demands based on current consumption patterns

- an assessment will be made to determine the area of forest cover required to re-establish an ecological balance in identified critical areas, and a data base will be established and updated at regular intervals, for purposes of both short- and long-term forest resource management and development
- harvesting of government forests will be conducted according to HMG approved local forest management plans, containing silvicultural measures and, where appropriate, agroforestry techniques based upon accepted forestry principles
- in order to meet the future household demand for fuelwood,²⁰ and taking into account alternative energy sources and the use of more efficient stoves, a system of intensive forest management will be adopted
- the following tentative targets for the year 2000, with respect to plantations and silvicultural practices, will have to be met in order to meet the fuelwood requirements by the year 2011²¹ (based on HMG Forestry Master Plan Draft 1987)

Geographic Division	Total Forest Area in 000's ha ²²	Targets in 000's ha by the Year 2000			Percent of Total Forest Area
		Plantation	Silvicultural Treatment ²³	Total	
Mountains (High Himalaya and High Mountain)	2034.6	-	-	-	-
Hills (Middle Mountain)	2203.4	320	620	940	42.7
Inner Tarai (Siwaliks)	1476.2	14	58	72	04.9
Tarai	592.3	140	106	246	41.5
	6306.5	474	784	1258	19.9

20. The Forestry Master Plan Draft (1987) estimates that the national demand for fuelwood in 2001 and 2011 will be 13.1 and 15.5 million mt, respectively. On the basis of geographic divisions, the estimated demand for the years 2001 and 2011 is: Mountains, 0.8 and 0.8; Hills, 6.6 and 7.7; Inner Tarai, 0.9 and 1.2; Tarai, 4.8 and 5.8 million mt; respectively.
21. Estimates of current annual productivity per ha of natural forests are 2.3, 4.8 and 6.4 mt for the Hills, Inner Tarai and Tarai, respectively. Under a vigorous management program, productivity can be increased to 5.8, 7.9 and 9.6, respectively, in 25 years (HMG 'Forestry Master Plan', 1987).
22. Including shrub.
23. Including periodic removal of mature and overmature timber, thinning operations and the enrichment of the growing stock.

- in order to improve forest land productivity, more of the responsibility for forest management and the production of forest crops will be transferred to the private sector through leasehold agreements and other arrangements with user groups at the ward level, and, in other cases, individuals, small and marginal farmers and minor forest product users
- where such responsibility is transferred to the private sector, the Department of Forest, through the appropriate district offices, will ensure that the terms and conditions of the leasehold agreements and other arrangements are complied with
- private owners of trees or forest will be entitled, without interference from government, to utilize, transport and sell forest products to the domestic market
- the creation of more nurseries in the private sector will be encouraged, including, for example, school nurseries; the present incentive to land owners of a land tax concession will be supplemented with cash incentives, where appropriate; land ownership limits under the Land Reform Act may be waived with respect to private, unproductive land converted to forestry plantation, and recognition certificates may be awarded to those who have successfully established such nurseries
- forest development projects will be designed and structured to include activities that will be of direct benefit to local communities in order to motivate villagers to actively participate in forest management and protection
- in those areas where it is deemed absolutely essential, and no viable alternative exists, the forest will be protected, that is, forest harvesting will be prohibited
- following careful analysis of the adequacy of the existing network of national parks and protected areas, consideration will be given to expanding it in accordance with the criteria and procedures described in CAA 3 (c)
- the remaining forest land - after accounting for areas required to maintain ecological balance, for plantation and intensive management and for national parks and protected areas - will contain forest that is either fully protected, deemed inaccessible in terms of harvesting or to be declared National Forest
- The National Forest will be harvested according to forest management plans under bilateral licencing agreements between HMG and commercial timber operators, and other major forest product users; the licence holders will operate according to management plans and the terms of the licencing agreements
- forest-based industry will be encouraged to invest in industrial plantations in order to become self-sufficient in raw materials

- government regulations regarding the operation of forest-based industry will be reviewed and amended in order to encourage more private sector operations and to make more efficient those operations currently under government control regarding management, production and marketing.

c. National Parks and Protected Areas

i. recognizing that

- one of Nepal's major conservation achievements has been the establishment of a network of national parks and wildlife and hunting reserves, which together cover just over seven percent of Nepal's land area, and that two of the National Parks, Chitwan and Sagarmatha, have been declared World Heritage Sites

ii. but given that

- there are gaps in the present network of protected areas, for example, in terms of sites necessary for the preservation of biological diversity, sites of unique scientific and research value and sites having significant cultural, archaeological or historic value
- land and other resources within the parks and protected areas are not managed in the context of a comprehensive management plan, nor within established planning guidelines
- the successful protection of wildlife, resulting in specific population concentrations in some areas, has had serious effects upon local communities in terms of both personal danger and damage to agricultural crops
- restrictions placed upon the customary harvesting practices of local communities pursuant to the establishment of parks or protected areas have, in some cases, resulted in social and economic hardships
- the lack of effective two-way communication and a comprehensive management system combined with regulatory procedures, at times lead to acrimonious relationships between local villagers and those responsible for park administration and management

iii. it is resolved that

- for purposes of future park and protected area selection, the current broad classification of geographic divisions - the Tarai, Inner Tarai, Hills and Mountains - will be refined by taking into account other factors, for example, flora and fauna
- gaps in the current network of protected areas will be identified on the basis of the refined classification, giving priority to those areas considered to be most seriously threatened

- to qualify for consideration, the lands to be protected must satisfy one or more of the following criteria :
 - contain sites of significant religious, cultural, archaeological or historical value
 - contain habitat essential to the survival of a significant population of terrestrial mammals, migratory birds or freshwater fish
 - contain examples of outstanding site-specific or unique landforms or geomorphic features
 - contain sites necessary for the preservation of genetic diversity
 - contain habitat essential for the preservation and enhancement of rare and/or endangered species
 - contain nationally important landforms or water bodies that are, or may become, subject to environmental deterioration
- in consultation with those local communities that may be affected by the establishment of a proposed park or protected area, management plans will be prepared according to one of three categories of protected lands, namely those:
 - having settlements within their proposed boundaries
 - containing no settlements but which may be subjected to heavy pressures from adjacent settlements
 - subjected to no human pressures
- relocation of communities due to the creation of a new national park will be avoided to the fullest extent possible, recognizing the severe hardship that such relocations impose
- the consultative process and subsequent management plans will address such issues as :
 - identification of management zones within the parks and protected areas on the basis of the nature and level of acceptable human activity and/or intervention; such management zones might include :
 - * core areas in which no human activity is allowed
 - * zones in which tourist activity is permitted
 - * community facility zones in which local communities will have access to natural resources
 - * buffer zones adjacent to areas where customary harvesting is permitted, to be harvested according to

a described management plan and to be subject to control measures with respect to wildlife where local communities are endangered

- location of boundaries that will cause the least interference with customary harvesting practices
 - measures necessary to minimize personal danger and property damage
 - the nature and extent of harvesting activities that can be carried out, having regard for the purpose and objectives of the park or protected area and the resource needs of the local people
 - management techniques to be applied to each area including, for example, silvicultural treatment, choice of species where plantations are to be established, or the use of fire if necessary to promote ecological succession
 - more effective use of the existing and extensive body of scientific data and research findings to support park and wildlife management
 - design and implementation of monitoring programs to measure progress in meeting the management objectives of the area
 - administration of each park or protected area, including the operational, manpower and financial resources necessary to meet the management objectives and the role of local residents in park administration, including on-the-job training needs
- as the primary objective of the National Parks and Wildlife Conservation Act is to protect sites, landscapes or geological formations of scientific or aesthetic importance, together with their associated flora and fauna, and the second objective, provided it is compatible with the first, is to develop such areas for tourism, therefore the lead agency, with respect to all activities within a national park, will be the Department of National Parks and Wildlife Conservation (DNPWC); in this regard, several key subject areas requiring policy decisions will be given highest priority by DNPWC, including :
- the nature and extent of visitor traffic
 - regulations concerning lodge operations, for example, the mandatory use of solar panels to replace the burning of fuelwood
 - the nature and extent of necessary wildlife culling
 - further consideration will be given to the establishment of one or more protected areas straddling Nepal's

borders; such protected areas could assist, for example, in preserving rare or endangered species, protecting genetic diversity and / or essential wildlife habitat

during the initial stage of consideration concerning the establishment of a new national park or protected area, the Department of National Parks and Wildlife Conservation will consult with all concerned agencies that may be affected. For example, the Department of Mines and Geology would be consulted in connection with the possible occurrence of valuable mineral or hydrocarbon deposits. If, after preliminary investigations, a conflict is identified, adjustments in the proposed park boundaries will be considered and, if feasible, made in order to minimize, if not eliminate, such a conflict.²⁴

**d. Medicinal
Plants and
Minor Forest
Products**

i. recognizing that

- medicinal plants are widely harvested for use by a large segment of the Nepalese population that continues to rely upon traditional systems of medicine, as well as for a growing export market
- medicinal plants and minor forest products, if harvested under proper management and control, can contribute significantly to the local, as well as the national, economy

ii. but given that

- existing rules and regulations and institutional arrangements respecting medicinal plants and minor forest products deal mainly with matters of revenue collection and not harvesting procedures and management practices

iii. it is resolved that

- as a part of the broader program of forest management and the preparation of management plans, medicinal plants and minor forest products will receive specific attention; in this context, the following will be undertaken with respect to medicinal plants and minor forest products :
 - a district by district inventory
 - a conservation program including protection, management and propagation
 - a systematic harvesting program, including rotational cropping, with the active participation of the private sector

24. An example of a possible source of conflict is the eastern canal of the future Babai project and the Bardiya Wildlife Reserve.

- research and directed studies with respect to management, propagation and marketing techniques and processes
- development of a technical capability at the district level with respect to the administration and management of such programs
- the cultivation of medicinal plants in Panchayat Forests and Panchayat Protected Forests as part of the agro-forestry program

regulations respecting the management and harvesting of medicinal plants and minor forest products will be promulgated pursuant to the Forest Act. Such regulations shall contain provisions :

- declaring illegal the harvesting of certain species
- stipulating required harvesting practices and allowable limits
- for the protection of medicinal plants from fire and detrimental forest harvesting practices.

e. Agriculture

i. recognizing that

- the present annual agricultural production of four million mt will have to increase to nearly nine million mt by the year 2000 if the basic minimum food requirement of the Nepalese people is to be met
- virtually all of the land suitable for cultivation is being used for that purpose; there is also land that is unsuitable for crop production and should not be, but is being, cultivated

ii. but given that

the average area of cultivated land per capita is just 0.17 ha

the cultivated land distribution in Nepal is highly skewed; approximately 50 percent of all households have holdings of less than one-half ha and in total, account for only 06.6 percent of all of the cultivated area; conversely, 47 percent of the total cultivated land covered by holdings of more than three ha are owned by only nine percent of all households

fragmentation of agricultural lands continues to occur, resulting in inefficient farming practices; although total production has increased, inadequate replenishment of nutrients and increasing reliance upon lands not suitable for cultivation have led to an overall decline in agricultural productivity, and serious soil erosion problems have resulted

- dual rights and conflicting interests between landlords and tenants result in inefficient land use and low productivity
 - inadequate storage and transportation facilities result in substantial losses of agricultural production
 - deforestation and overgrazing have led to soil erosion and flooding which, in some cases, have resulted in the loss of agricultural land
 - specific successes with respect to block-production, aquaculture and horticulture programs show the individual farmer's capacity to improve and diversify agricultural production if given appropriate incentives and encouragement
- iii. it is resolved that
- HMG will make every effort to redress the highly skewed nature of land distribution and to address the problems of increasing fragmentation of agriculture lands, dual rights and conflicting interests
 - a program will be developed to encourage landowners to enter into contractual arrangements with private sector groups and nongovernment institutions to cultivate unused land
 - in order to enhance productivity in the Hills and the Mountains, agricultural land management policy will include the protection of watershed areas, soil conservation, including the determination of the maximum slope of terraces for which cultivation rights may be granted, promotion of agroforestry and communal pasture management
 - a large-scale conservation extension program, particularly directed toward small farmers, will be launched, utilizing extension agents and the NCS District and Village Panchayat Committees [CAA 4 (a)] adequately supported to improve their understanding and adoption of the following :
 - mixed cropping, alternative cropping and green manuring practices
 - integrated farming; for example, poultry, piggery and aquaculture
 - horticulture with intercropping in dry-hill areas
 - planting of leguminous crops following harvesting of main crops
 - use of marginal crop lands for horticulture, pasture, fodder and fuelwood tree development, and aromatic and medicinal herbs

- programs will be undertaken, particularly with respect to small farmers, to:
 - enhance their access to credit for such purposes as improved terracing, gully control, small-scale irrigation and agricultural diversification into cash crops, agroforestry and horticulture activities
 - improve local storage and transportation facilities and facilitate effective marketing procedures
- the most critical soil erosion problem areas and their potential for affecting productive agricultural lands will be identified; in such areas, major restoration measures will be undertaken - the Department of Soil Conservation and Watershed Management being the lead agency - with respect to gully and torrent control and catchment conservation; and, in flooded agricultural lands, agroforestry reclamation measures will be implemented.

f. Pesticide Use and Control Program

i. recognizing that

- although the use of pesticides is not common throughout Nepal, there are specific areas, such as the Kathmandu Valley, where they are used, and their use will increase as more emphasis is placed upon increasing national food production levels

ii. but given that

- there is insufficient information available to users concerning which pesticides should be used, and in what quantities
- the problem of storage and disposal of pesticides is becoming increasingly urgent
- the unregulated use of some pesticides poses a significant health hazard to pesticide handlers and food consumers

iii. it is resolved that

- there will be established a "Crop Protection Division" within the National Agricultural Research and Service Centre, Ministry of Agriculture, with the administrative and legal authority to oversee and regulate all aspects of pesticide use in Nepal²⁵, including :
 - marketing; labelling, formulation and quality control; safety training for applicators and handlers; distribution; testing and recommendation for use; residue testing; and disposal of expired products

25. see 'Pesticide Use in Nepal' by Klarman, W. L. February 1987.

- compliance with such regulations will be carried out at the district level by the Local Administrator in concert with the Department of Agriculture
- there will be control over the importation of controversial pesticides and chemical fertilizers that are already banned from use in other countries
- the Crop Protection Division will identify and prepare an inventory of pathogens, both fungi and insects, and rodents as a first step in controlling specific causes of crop disease and destruction.

**g. Livestock
Development and
Pasture
Management**

i. recognizing that

- current livestock development objectives include :
 - achieving self-sufficiency in meat and dairy products and increasing the export volume of specific dairy products
 - increasing the income of farming communities through livestock rearing
 - increasing the production of wool and other animal by-products
 - bringing about an improved system of fodder production and pasture management
 - providing extensive and efficient animal health services

ii. but given that

- there is, even at the current livestock population level, a substantial deficiency in feed nutritive requirements
- the portion of the total livestock population that is under-productive consumes approximately 14 percent of the total digestible nutrient requirements
- the policy to increase the production of meat and dairy products is not supported by effective programs to improve pasture land productivity
- loss in total production, in terms of meat, dairy products, fibre, manure and draught power due to parasites and disease, has been estimated to be as high as 25 percent
- inadequate attention is paid to the need to improve the quality of the livestock population through, for example, a selection and culling system, the provision of animal health services and the development of more productive breeds

- high quality livestock is inaccessible to the average farmer either because of high cost or unavailability, but the need for draught power and manure results in his or her maintaining low quality, unproductive livestock
- the Department of Livestock Development and Animal Health is responsible for improving livestock quality, and the Department of Forest is responsible for the management of pasture and range land; despite the high correlation between the two activities, the responsibility is split between two departments in two different ministries
- education and information programs related to animal health, husbandry and grazing practices have reached only a very limited number of farmers
- such education programs will remain virtually ineffective until substantial land management programs - directly involving the farmer - are undertaken
- to meet the basic needs objectives for the year 2000 with respect to meat and dairy products, there is a need to undertake a substantial program of fodder tree plantations and intensive management of pasture land

iii. it is resolved that

- **with respect to pasture management :**
 - the Department of Livestock Development and Animal Health (DLDAH) and the Department of Forest will jointly develop a plan for the administration and management of pasture land whereby :
 - the DLDAH will be responsible for high altitude pasture and specified grassland areas
 - the Department of Forest will undertake an integrated resource management program, including the practice of rotational grazing, with respect to range land within the forested areas and the balance of grassland areas not the responsibility of DLDAH
 - under the aegis of the DLDAH, targets will be defined and programs undertaken to establish the necessary fodder tree plantations and intensively managed high altitude pasture land; such programs will, to the extent feasible, be carried out in concert with Village Panchayats through leasehold agreements with, or private ownership by, user groups or, in some cases, individuals
 - the fodder tree plantation program will include fodder grasses for eventual use as stall feed
 - DLDAH will ensure, where such fodder plantations are established, or the management of high altitude

pasture management is introduced, that the terms and conditions of the leasehold, or other, agreements are complied with

- farmers will be encouraged to plant preferred fodder tree species on their homestead areas, and leguminous crops, white clover and alfalfa following the cultivation of major crops
- **with respect to livestock development :**
 - priority will be given to two areas - the upgrading of native stock and animal health care
 - an assessment will be made of the available genetic resources of livestock at the village level, and unproductive animals will be identified; the gradual removal of such animals will be encouraged by replacement with productive stock and the promotion of stall feeding; male breeding stock suitable to meet village requirements, supplemented by artificial breeding practices, where possible, will be established
 - an effective animal health service and livestock extension program will be established at the village level; initially, this program will concentrate on disease control and animal treatment, including the administration of vaccines; where feasible, animal health service programs will be self-sustaining, thereby reducing the financial burden upon the government
 - through the District Livestock Offices, and in conjunction with the NCS District and Village Panchayat Committees, education and extension programs related to animal health, husbandry and fodder tree and grass plantation will be given increased emphasis
 - as effective marketing of livestock and livestock products is key to a successful livestock development program, the development of such market policy and programs will receive priority attention.

h. Conservation and Large-Scale Projects

i. recognizing that

- HMG's development objectives call for the construction of many large-scale projects related, for example, to hydro-electric power, irrigation, road construction and industrial development

ii. but given that

- such projects have the potential for causing detrimental environmental and/or social impacts

iii. it is resolved that

- the terms of reference for feasibility studies related to such projects will include a requirement for the preparation of environmental and socio-economic impact statements, including proposed measures to minimize possible detrimental effects [CAA 6 (a)]
- the proponent of any large-scale project, either government or private sector, will be required to :
 - establish a conservation fund as a part of project capital costs to carry out the necessary social and environmental programs associated with the project; the purpose of the programs would be to minimize the detrimental social, economic and environmental effects that may be caused by the project
 - establish a conservation section within the project to manage the social and environmental programs; where the project is within the private sector, the management of the conservation programs will be carried out jointly with the appropriate government agency or agencies.

i. Trekking and Mountaineering Activities**i. recognizing that**

- in 1986 more than 33,000 trekkers and mountaineers visited Nepal - a three-fold increase over the number ten years earlier
- the ratio of employment opportunities to the number of trekkers and mountaineers is in the order of 3:1, which represents a substantial benefit in an economy where few job opportunities exist beyond the agricultural sector

ii. but given that

- the uncontrolled influx of large numbers of trekkers and/or mountaineers in a given area can be detrimental in a variety of ways, including :
 - the destruction of alpine and subalpine vegetation, including medicinal plants, as shrubs are used to meet fuelwood needs
 - increased competition from trekkers for fuelwood, resulting in progressively fewer accessible sources for local people
 - garbage, litter and sanitation problems and aesthetic deterioration

iii. it is resolved that

- the NCCNCR will develop an authoritative "Trekking Code of Conduct" and facilitate its distribution and the administrative follow-up necessary for its implementation
- the "Trekking Code of Conduct" will address trekking and mountaineering activities and, specifically, such problems as the need to minimize, if not eliminate, the destruction of alpine and subalpine vegetation, including medicinal plants, and the concomitant detrimental social and economic effects
- the Code will include the following subject areas :
 - rules for camping and trekking
 - rules with respect to fuel requirements
 - handling of disposable material
 - personal safety guidelines
 - measures to control the number and distribution of trekkers at specified times and in given areas
 - penalties for non compliance
- the Code will be published in booklet form and given wide distribution - local, national, regional and global - through the existing network and facilities of appropriate government and nongovernment organizations; the latter will include, for example, the King Mahendra Trust for Nature Conservation, the International Union of Alpinist Associations and the Nepal Heritage Society
- under the aegis of the NCCNCR, relevant NGO's, conservation societies and other private sector organizations as well as government agencies will embark upon a comprehensive conservation awareness program directed at hoteliers, lodge owners, outfitters, tourist agencies, tour guides, trekkers and mountaineers concerning the Trekking Code and the importance of complying with it
- to reduce the unnecessary consumption of fuelwood along trekking routes, solar-heating water systems will be mandatory with respect to new hotels, lodges or similar facilities; existing facilities will be provided financial incentives to install solar systems within a prescribed time period; beyond such period, the use of wood for heating water will be prohibited; a complementary program to install public bathing facilities, using solar energy for heating water and for which trekkers would be charged, will be initiated by government and administered by the appropriate Village Panchayats.

j. Environmental Quality

i. recognizing that

- increasing urbanization and an expanding industrial base are major contributors to the problems of air, noise and water pollution
- the quality of human life and health are adversely affected by such pollution

ii. but given that

- no effective government policy or legislation exists concerning air, noise or water pollution

iii. it is resolved that

- the NCCNCR will develop, as a matter of priority, for early consideration and adoption by HMG, policy and supporting draft legislation concerning air, noise and water pollution
- at the time such policy and legislation is formally adopted, HMG will make appropriate provision for their implementation and enforcement and for an appropriate conservation education program related to environmental quality
- the policy and legislation respecting air, noise and water pollution will include such issues as :
 - urban zoning and the provision of green belts and parks in densely populated areas
 - the planning, installation and maintenance of water, sewage and storm drainage systems in urban and suburban areas
 - industrial effluent discharge, and noise abatement standards, and correlative mitigating and/or preventive measures
 - building construction and the treatment and handling of solid waste in urban and suburban areas
 - drinking water and sewage systems in rural areas
 - the establishment of an air and water quality monitoring and evaluation system [CAA 5 (b)].

k. Cultural Heritage

i. recognizing

- the exceptional wealth of Nepal's cultural heritage and the growing awareness of its importance at the local, national and international level

ii. but given that

- pilferage, damage and, in some cases, destruction of idols, monuments, temples and other physical assets of Nepal's cultural heritage and encroachment on heritage sites, religious forests and sacred grounds have occurred and continue to occur at an increasing rate

iii. it is resolved that

- HMG will make a concerted effort to substantially reduce, and, where feasible, eliminate, the growing loss and deterioration of Nepal's physical cultural heritage by :
 - promoting the need for a fully subscribed international convention concerning illegal trade in antiques
 - ensuring that the *Guthi Samsthan* and the Department of Archaeology undertake, as part of their respective responsibilities, the protection - armed, where necessary - of the national heritage, such as temples
 - improving the public's level of awareness of the value of such heritage and encouraging, through an improved understanding, the public's participation in the maintenance and protection of such property
 - undertaking a program to improve general conditions and the state of cleanliness at cultural sites, such as Pashupati and Swayambhu and the various Durbar Squares
 - undertaking urban and regional land use planning and city planning on a scale that will protect and enhance heritage sites and monuments, buildings of cultural value and religious and sacred grounds.

4 Organization and Administration

a. The NCS for Nepal Corporate Planning Process

i. recognizing that

- the successful implementation of any national strategy is highly dependent upon the existence of close working relationships and strong lines of communication among several key government agencies

ii. but given that

- there is, at present, a pressing need to strengthen lines of communication between ministries, departments in separate ministries and departments within the same ministry
- there is no single forum at the regional and district levels where resource and cultural conservation issues and problems can be addressed or where comprehensive and integrated conservation measures can be developed
- although the decentralization policy requires close working relationships at the district level among line-agencies and between line-agencies and the Village and District Panchayats, such relationships have yet to be fully developed
- under the present structure, district resource development issues are addressed by several separate committees
- establishing coordinating mechanisms within government may be counterproductive in the absence of the necessary political will and commitment to make them effective

iii. it is resolved that

- at the Political level
 - the periodic meetings of the NCCNCR with the Council of Ministers and the Rastriya Panchayat Committees will be used largely for the purpose of developing an improved understanding, at the political level, of conservation issues and problems and how such problems may best be solved; and an awareness of the

kind of political support that is essential if the NCS Conservation Action Agenda is to be successfully implemented

- **at the Ministry level**
 - an NCS Steering Committee will be established in each ministry with two or more departments, having NCS implementation responsibilities with respect to the Conservation Action Agenda; the Steering Committee will be chaired by the Secretary, or his or her designate, and will comprise the Executive Head of each department and the Ministry Planning Division and a senior officer to act as Member-Secretary
 - the NCS Steering Committee will meet not less than monthly to review ministerial and departmental programs related to the CAA; the Committee will also provide Department Heads with an opportunity to discuss cross-sectoral matters and develop cooperative initiatives that will help minimize conflicts and improve overall management
 - the NCCNCR Secretariat will establish close working relationships with each Ministry NCS Steering Committee and be the operational link and facilitator for the overall planning, programming and implementation of the CAA (see Annex VIII)
- **at the Regional level**
 - there will be established, in each of the five development regions, an NCS Regional Committee, consisting of each Regional Director whose respective Ministry has responsibilities with respect to the Conservation Action Agenda, the regional representative of the National Planning Commission and representatives of the private sector and nongovernment organizations
 - the five NCS Regional Committees will serve as the principal points of contact between the NCCNCR Secretariat and the field components of NCS implementation
 - the regional office of the National Planning Commission will serve as the Secretariat for the NCS Regional Committee, with the latter meeting at least once every month
 - the NCS Regional Committee will provide a forum for developing cooperative measures between government agencies, and between government and the private sector with respect to the Conservation Action Agenda, including energy planning, land use planning, research, extension and training, and monitoring and evaluation
- **at the District level**
 - there will be established in each of the 75 districts an NCS District Committee

- the NCS District Committee will be chaired by the Chairperson of the District Panchayat or his or her designate and will include the District Head of each government department or agency
- the District Panchayat Secretariat will act as the Secretariat for the NCS District Resource Committee, with the latter meeting at least once every month
- the NCS District Committee will be responsible for developing cooperative measures with respect to implementation of the Conservation Action Agenda, making more effective the relationship between line-agencies and the Village Panchayats and playing a key role in the preparation of land use plans
- the NCS Regional Committees will be the operational link between the NCS District Committees and the NCCNCR Secretariat on such matters as the preparation of land use plans

at the Village Panchayat level

- at the Village Panchayat level, the various single-sector developmental committees, such as forestry, soil conservation and water, will be amalgamated into one NCS Village Panchayat Committee, chaired by the Village Pradhan Pancha and supported by the appropriate field level line-agency personnel. Where appropriate and consistent with decentralization, similar committees will be established at the ward level.
- the NCS Village Panchayat Committee will include representatives of the NCS Ward Committees and the private sector and nongovernment organizations; the committee will deal with all resource conservation matters, including land use planning and, with respect to the latter, will be the formal link with the NCS District Resource Committee.

b. Improving Performance

i. recognizing that

- the effectiveness of the NCS corporate planning process described above will be contingent upon the ability of individual government departments and agencies to carry out their respective responsibilities and fulfill their mandate

ii. but given that

- there are some organizational and administrative weaknesses inherent in most line-agencies having resource conservation responsibilities

iii. it is resolved that

- more attention will be given to establishing strong regional directorates with necessary restructuring so that most admin-

istrative and management matters, including regular monitoring and evaluation of field programs, can be dealt with at the district and regional levels, allowing the central level to devote more time to policy matters, interdepartmental consultation and corporate planning issues

- it will be necessary to make more effective the working relationship between department and Panchayat personnel
- there will be established a Conservation Section within each of those departments, such as Roads, Housing and Physical Planning, Industry, Cottage Industry, Irrigation, Hydrology and Meteorology, Nepal Electricity Authority, Water Supply and Sewerage, Mines and Geology, and Tourism, that need to deal with resource conservation matters but have no organizational capacity to do so
- government at all levels will become much less project oriented, and there will be a basic shift in emphasis so that department staff begin to work corporately toward the attainment of departmental objectives and the delivery of programs and services; where it is necessary for a department to administer a specific project, it will do so, to the maximum extent possible, through its existing district offices; where a project involves more than one district, the appropriate Regional Directorate will be responsible for ensuring the necessary coordination between districts
- government staff at the regional and district levels will be given explicit terms of reference related to the role and mandate of their respective offices, and each staff member will be provided with a written job description clearly describing his or her responsibilities, reporting relationships and annual goals
- individual job performance evaluations will be done annually, based upon explicit job descriptions and previously agreed to annual goals; such annual evaluations will be a major element in decisions respecting future promotion considerations; in this regard, consideration for promotion will be based upon an objective analysis conducted by a three-person interview board and previous annual employee evaluations; the three-person board will consist of the person to whom the successful candidate will report, a member of the Public Service Commission and a person from another department, or agency, acceptable to both of the other two board members
- provided a candidate has the requisite professional or technical qualifications, any person, irrespective of which department, group or subgroup he or she may be in, will be eligible to compete for a position
- a concerted effort will be made to incorporate into the day-to-day operation of government, principles related to corporate effort, delegated authority, responsibility, accountability, recognition of performance and reward

- the decisions and actions of government officers, provided they are consistent with stated policy and made within the authority granted to them, will receive the backing and support of those to whom they are responsible, including their political masters
- the role of the District Forest Officer (DFO) will be primarily that of a forest resource manager, thereby utilizing his professional qualifications and training to improve the productivity of the forest and to realize its potential capacity in terms of environmental, economic, social and cultural values
- departments will implement effective follow-up supervision to ensure not only that physical targets are met but also that the desired effects of a given program are achieved and maintained; and to monitor and evaluate input, for example, human and financial resources and timeliness of budget allocations.

**c. Program
Administration
& Management**

Soil Conservation and Watershed Management

i. recognizing that

- major policies and objectives concerning watershed management were not specifically enunciated until the Fifth Plan (1975 - 1980)
- since that time, the Department of Soil Conservation and Watershed Management (DSCWM) has endeavoured to meet its objectives by carrying out a series of major activities through specific development projects

ii. but given that

- the Department's targets, described in the Fifth and Sixth Plans, were essentially achieved; however, in terms of the overall national problem related to soil conservation, the accomplishments are marginal at best
- the nature of the soil conservation problem is such that it pervades the activities and responsibilities of every department or line-agency having resource management responsibilities, for example, forestry, agriculture, livestock development and pasture management and water resources
- district soil conservation offices, wherever they have been established, are completely dependent upon project funding for their operation and maintenance; under the present circumstances, when a project terminates, the district soil conservation office cannot be sustained and must cease operation
- district soil conservation offices, due to their dependence upon development projects for funding, may not necessarily be in districts having the most critical soil conservation or watershed management problems

- local people have been generally hesitant to participate in government-sponsored, large-scale soil conservation and watershed management projects, due to the apparent lack of short-term benefits that accrue to them as individual participants

iii. it is resolved that

- the Department of Soil Conservation and Watershed Management will:
 - emphasize its role as catalyst and facilitator respecting soil conservation activities by working closely with other departments and the private sector in the implementation of programs
 - establish a Regional Directorate in each of the five regions, thereby providing the organizational capability to decentralize administrative and operational matters to the district and regional levels and also to enable DSCWM to play a role in the NCS Regional Committee including the regional land use planning process
 - establish, in those districts where it is deemed essential, district soil conservation offices independent of, and not contingent upon, project funding; in those districts where a need exists but is less urgent, District Soil Conservation Technicians will be assigned; the role of the Technician will be largely one of facilitating local conservation works under the District Panchayat
- the Department of Soil Conservation and Watershed Management will take the lead role with respect to:
 - undertaking conservation education and extension-service in concert with other appropriate line-agencies
 - establishing catchment conservation areas within which land productivity will be improved through construction of water reservoirs and irrigation facilities and the establishment of nurseries and tree plantations
 - initiating gully and torrent control measures in the most critical areas of soil erosion - particularly where such erosion may endanger lives or result in loss of agricultural land [CAA 3 (e)]
 - carrying out agroforestry practices as well as reclamation measures in agricultural lands affected by flood waters.

Wildlife Conservation

i. recognizing that

- within the existing network of six national parks, five wildlife reserves and one hunting reserve, wildlife conservation, including the protection of several endangered

species, has enjoyed and continues to enjoy a large measure of success

- in the 93 percent of Nepal's land area that lies outside of national parks and protected areas, the principal policy objective with respect to wildlife conservation is to make wildlife resources available, on a sustainable basis, to meet the domestic needs of local villagers, and for the purpose of sports hunting and fishing and developing wildlife tourism

ii. but given that

- the level and effectiveness of wildlife conservation outside of national parks and protected areas are substantially less than within such areas and are insufficient, in terms of managing the wildlife, including fish, on a scientific basis as envisaged in the policy
- the detrimental impact upon wildlife populations of illegal hunting by villagers for domestic consumption is not significant; there is, however, a substantial problem due to organized poaching for commercial purposes at the international level
- the overall responsibility for wildlife management lies with the Department of National Parks and Wildlife Conservation; however, the administration of wildlife regulations outside of national parks and protected areas is the responsibility of the Department of Forest; in most cases, staffing and funding restrictions place severe limitations upon district forest personnel to carry out effective wildlife management
- outside of the national parks and protected areas, the absence of reliable data on wildlife populations and habitat inhibits the implementation of sound wildlife conservation measures

iii. it is resolved that

- the following measures will be undertaken with respect to wildlife conservation outside of national parks and protected areas in concert with those resolutions contained elsewhere in the CAA relating to international conventions [CAA 1 (b)], conservation awareness [CAA 2] and national parks and protected areas [CAA 3 (c)]:
 - the systematic collection and assessment of data concerning wildlife and wildlife habitat will be initiated in those areas in which wildlife populations are deemed to be most susceptible to hunting and development pressures
 - based on such inventories, wildlife management plans, including the determination of annual harvesting limits and hunting quotas by specific areas, will be prepared
 - in those areas where it is determined that allowable harvest limits exceed local needs for domestic purposes,

sports hunting and/or fishing will be promoted, subject to appropriate licencing and regulation procedures

- except with respect to rare or endangered species, regulated sports hunting will be permitted in buffer areas outside of, and adjacent to, national parks and wildlife reserves
- marshes, wetlands and shorelines that are considered to be of particular significance in terms of wildlife habitat will be identified as special biotic reserves and managed accordingly
- the Department of National Parks and Wildlife Conservation will begin a program to bring its institutional capability more in line with its wildlife conservation responsibilities, which include research and inventory, monitoring and evaluation, planning and management
- in Districts where there is an officer of the Department of National Parks and Wildlife Conservation, he or she will be a member of the NCS District Committee [CAA 4 (a)].

Cultural Affairs

i. recognizing that

- the major government responsibility for the promotion and preservation of cultural heritage lies with the Royal Nepal Academy, the Nepal Association of Fine Arts and the Department of Archaeology in the Ministry of Education and Culture

ii. but given that

- both the Cultural Affairs component in the Ministry of Education and Culture and the Department of Archaeology have limited staff and funding to meet their broad legislative obligations

iii. it is resolved that

- the Ministry's Division of Culture and the Department of Archaeology will be strengthened in terms of both human and financial resources more commensurate with their responsibilities
- to alleviate the problems inherent in staff shortages and limited funds, the Ministry and Department will, as much as possible, undertake projects and conduct programs through short-term contracts with other institutions or non-government experts
- there will be established in each of the regions, except the Central Development Region, a Regional Cultural Centre for the purpose of promoting and developing cultural heritage programs; such Cultural Centres will organize, for example,

cultural and craft shows, art exhibitions, literary discussions, theatre and musical programs; the Regional Cultural Centres will serve as regional offices for the proposed Department of Culture

- the present Department of Archaeology will become the Department of Cultural Affairs, comprising seven divisions as follows :
 - Conservation of Monuments and Sites
 - Museums
 - Archaeological Survey and Excavation
 - Historical Research
 - Protection of Movable Cultural Heritage
 - Protection of Environmental Component of Cultural Heritage
 - Central Conservation Laboratory.

Energy Planning

i. recognizing that

- Nepal's heavy dependency upon fuelwood as the major source of energy has serious environmental, social and economic implications
- Nepal is fortunate in having other forms of energy, such as hydroelectric power, that, although still largely undeveloped, could help substantially to alleviate the demands on diminishing forest resources

ii. but given that

- the current single-sector approach to energy issues and the absence of an integrated approach to national energy planning lead to *ad hoc*, and, from time to time, inconsistent policy formulation and less than efficient use of the total energy resource base
- there exists no single authority with overall responsibility for energy planning at the national level, including the monitoring of existing sectoral programs
- current national energy analysis is primarily at the macro-level, with focus on various energy supplies and demands in aggregate terms and little attention given to analysis of local energy problems and solutions

iii. it is resolved that

- in formulating a national energy plan, particular attention will be given to:
 - developing a policy that takes into account the potential of all viable energy sources
 - designing programs that integrate the use of such energy sources in a way that will be compatible with the

projected demand and consumption patterns and take into account current and future national investment programs and the overall national economic development strategy

- the importance of incorporating a decentralized approach into energy planning and management that will reflect the potential role of local communities in the implementation of a national energy plan
- developing an effective planning and operational capacity with respect to hydroelectric power transmission and distribution, including pilferage losses, and the timely implementation and completion of projects
- increasing oil and natural gas exploration activities
- creating a reliable data base with respect to agriculture residue resources and undertaking a thorough economic analysis of agricultural residue energy conversion technology
- the Ministry of Water Resources will provide the focal point for the national energy planning process, as described above, and the role of the Water and Energy Commission, as advisor to the Ministry, will be to :
 - coordinate comprehensive energy surveys and investigations
 - conduct analyses of total national energy requirements
 - prepare programs respecting energy conservation, utilization and development
 - prepare long-term and short-term plans and projects including those related to research and development
 - develop guidelines and criteria for selection of projects
 - evaluate and monitor sector energy programs, including the review of sectoral investments and the effectiveness of energy strategy guidelines, developed by the Water and Energy Commission and other government agencies
 - monitor alternative energy programs, including research activities of the private sector, nongovernment organizations and government agencies
 - provide legal advice on national and international issues pertaining to development of water and energy resources
- the Water and Energy Commission Secretariat will work closely with the National Resource Conservation Centre, that is the NCCNCR Secretariat, in all conservation aspects of energy planning and provide technical advice concerning such matters as they relate to the implementation of the NCS Conservation Action Agenda.

Sufficient data are already available to begin implementation of all components of the Conservation Action Agenda. Some gaps do exist, but they will not be permitted to delay implementation. A few modest research programs will be useful, however, in helping to achieve the four objectives of the NCS for Nepal. They include the following :

a. Traditional Building Crafts

i. recognizing that

- many of the traditional building crafts are still practised

ii. but given that

- no detailed written record of the skills and techniques of these crafts has been made
- today, much of the vital information is not being handed down from father to son, as it was traditionally, due to the desire of young people to seek other forms of employment

iii. it is resolved that

- various guilds or studios will be established, ideally as a unit of an ongoing building conservation program, where the designs, techniques, tools, materials and history of the crafts will be recorded and studied
- such guilds or studios will include :
 - Wood Carvers and Stone Masons - *Silpakar*
 - Metal Workers - *Tamrakar*
 - Brick and Tile Makers - *Awalay*

b. Air and Water Quality and Noise Abatement

i. recognizing that

- the deterioration of the quality of air and water and increasing urban noise level directly affect the health and

well-being of the individual and that, in some areas of Nepal, air, water and noise pollution have reached debilitating levels

ii. but given that

- no legislative or regulatory authorities exist to control pollution levels
- although the Department of Water Supply and Sewerage (DWSS) has been designated the lead agency, it has not been given the specific authority to undertake water pollution control measures
- few scientific data with respect to air quality and noise level are available upon which to determine the actual extent of the problem or the areas that should receive priority treatment, although HMG and RONAST have undertaken some air and water quality monitoring
- recent experience in Europe has shown that radioactive fallout can be both unpredictable and widespread. India now operates three nuclear power plants and has four others under construction, and Bangladesh has one nuclear power plant in operation

iii. it is resolved that

- as a basis for establishing air and water quality criteria and standards and noise level standards; air, water and noise pollution legislation and regulations; and the procedures necessary to administer related programs and enforce regulations,
- a comprehensive network of air and water quality monitoring stations will be established under the aegis of the Department of Irrigation, Hydrology and Meteorology (Met Service), the Department of Health and DWSS, assisted by RONAST and the appropriate departments of Tribhuvan University
- the air and water quality and noise level programs will both collect and analyse data and, on the basis of scientific evidence and analysis, develop recommendations that will be the basis for legislation, regulations and standards and for establishing the procedures necessary to administer air and water quality programs and to enforce the regulations pertaining to air, water and noise pollution
- the data respecting air quality will cover suspended particulates, carbon dioxide and carbon monoxide, oxides of nitrogen, sulphur dioxide and radioactive contamination
- water testing will include both surface water and groundwater - starting with the former - and cover both chemical and microbiological analysis; the facilities

available within the Water Supply and Sewerage Corporation and the Central Health Laboratory will be improved and utilized

- Tribhuvan University, in addition to working with HMG and RONAST in data analysis and compilation, will also conduct programs at its regional campuses to train local people to undertake various testing programs.

c. Tissue Culture Program

- the Departments of Medicinal Plants, Forest and Agriculture will collaborate in undertaking a tissue culture program to provide genetically improved seedlings and large-scale production of valuable and preferred species for the massive fuelwood, fodder and timber plantation programs recommended in CAA 3 (b).

d. Agroforestry

- the Department of Forest will undertake an agroforestry, intercropping research program to identify optimal crop mixtures and cropping patterns under various conditions in order to improve overall land productivity and to determine ecological compatibility.

e. Impact of Monoculture Tree Plantations

- the Departments of Agriculture (Division of Pathology) and Forest will undertake joint studies related to the potential environmental problems of mass-scale monoculture tree plantations, such as the effect of *Eucalyptus* on groundwater levels and the potential effect of the sissoo leaf defoliator on adjoining cultivated land, and, in concert with RONAST, the epidemiology of plant disease.

f. Wood Technology - Secondary Tree Species

- the Department of Forest, Forest Research Section, will undertake a wood technology research program related to the properties and potential uses of common tree species that currently are not being used but which may have domestic or commercial potential.

g. Mine-Site Reclamation

- under the aegis of the Department of Soil Conservation and Watershed Management, a program of mine-site reclamation will be undertaken; the initial test site will be on some five to ten ha of the Himal Cement Factory quarry site; the test site reclamation program will include :
 - the replacement of overburden and the introduction of suitable grasses and trees in abandoned areas of the quarry
 - stabilization of the spoil-site through terracing, compacting, check dam construction and tree planting.

h. Data Bank

- the Departments of Medicinal Plants and Agriculture, in concert with RONASt and Tribhuvan University, will establish an ecosystem and biological resources data bank to facilitate the storage and retrieval of :
 - ecosystem data
 - species data
 - gene data, including established plant and animal domesticates, with respect to distribution, germplasm storage and regeneration data; genetic variation data; and wild relatives of domesticates with respect to information on related domesticates and distribution.

i. Alternative Energy

- a research and development program related to various aspects of the alternative energy sector will be coordinated by the Water and Energy Commission Secretariat; principal participants will include RONASt, the National Council for Science and Technology, the Research Centre for Applied Science and Technology (RECAST) of Tribhuvan University, government departments and the private sector; the research and development will include training programs and the collection, analysis and dissemination of information and data related to, for example, solar and wind energy development and the use of agricultural residues; study areas will include :
 - lowering costs of biogas plants and maintaining biogas plants in cooler regions
 - improving design and operating costs of solar collectors and wind energy devices
 - the production and use of charcoal for cooking and the use of low cost, efficient cooking stoves

- improving the feasibility of using small hydroelectric power plants and water turbines and photovoltaic cell units; and developing means for promoting more extensive use of such alternatives.

j. Irrigation

- a series of studies will be undertaken concerning the long-term viability of irrigation schemes of the magnitude necessary to meet the objective of doubling agricultural productivity by the year 2000; the studies to include:
 - groundwater surveys with respect to potential capacity; determination of acceptable rates of depletion, including the optimal density of tubewells for different areas; and the design of a country-wide monitoring system
 - the impact of irrigation and specific crop rotation on soil nutrients and the formulation of improved irrigation and cropping practices to reduce depletion of such nutrients
 - the impact on soils, within the irrigation project areas, of clearing forest land, the downstream impact of such projects in terms of siltation and water availability; and the recommendation of measures that would minimize detrimental effects
 - the erosion and siltation processes occurring in irrigation canals and recommendations for new designs and operating procedures to reduce such occurrences
 - farmer-managed irrigation schemes, including an analysis of the social dynamics and benefits with respect to local communities.

k. Biological Surveys

- increased attention will be given to collecting and assessing data concerning flora and fauna - including habitat and range of distribution - and to identifying endemic, rare and endangered species
- such surveys and studies will be carried out jointly by several agencies, including the King Mahendra Trust for Nature Conservation, Tribhuvan University, Man and the Biosphere - Nepal and the Department of Medicinal Plants
- ethnobotanical and ethnopharmacological studies will be conducted by the Department of Medicinal Plants, at the community level, with respect to the traditional uses of medicinal plants by various groups and communities to determine improved collection and processing methods

I. Cultural Site Management

- a series of impact studies and protection plans related to the problems of physical encroachment and/or the deteriorating state of cultural heritage sites, including temples, monuments, monument zones, religious forests and sacred grounds, will be undertaken
- these studies, carried out under the direction of the Department of Archaeology, will include, for example :
 - the preparation of impact assessment statements for the Thengboche and Thame Monastery Sites in Sagarmatha National Park as a first step in protecting the unique environment of these sites and controlling development in the area
 - the formulation of a comprehensive set of guidelines for the development of the compounds and related facilities, on the basis of the impact assessments
 - the preparation of a comprehensive environmental protection plan for the preservation of the Swayambhu Hill - a World Heritage Site - and the adjacent Saraswati Sanctuary; the plan will address such issues as slope stabilization, landscaping, storm water and sewage system, monument conservation and the provision of visitor services.



**a. Socio-Economic
and Environmental
Impacts**

i. recognizing that

- in order to meet the basic needs of the Nepalese people, substantial developmental activity must be undertaken and such development will cover a wide range of projects, including, for example, large-scale hydroelectric power development, hydrocarbon development and related large-diameter pipelines, industrial complexes, including those requiring natural resource raw materials, and large-scale irrigation schemes
- the effect of such projects upon local people is often substantial; in some cases it may be beneficial and, in others, detrimental

ii. but given that

- in order to minimize potential detrimental effects and to embody the principle of 'wise-use', it is necessary first to ascertain the potential consequences of such developmental activities
- it is government policy to encourage effective public participation in planning and development

iii. it is resolved that

- an Assessment and Review Office (ARO) will be established, in concert with the National Resources Conservation Centre, the NCCNCR Secretariat, and will be responsible for the socio-economic and environmental assessment and review process
- the proponent of a development project or industrial activity that may have significant detrimental social and/or environmental impact (a government department in the case of a highway or irrigation scheme, or a private developer in the case of a resource-based industry) will prepare and file with ARO a statement concerning the

potential socio-economic and environmental effects of the proposed development; the impact statement will be prepared in accordance with guidelines provided by ARO

- a review process, open to both government and nongovernment participants, consistent with the government's policy concerning public participation, will consider the proponent's socio-economic and environmental impact statement
- projects that are subsequently approved will be subject to terms and conditions based on the findings contained in the impact statement and the review process
- the socio-economic and environmental impact assessment and review process will include :
 - a description by the proponent of the environmental measures to be taken, for example, a pulp mill's effluent control process, or reclamation measures with respect to a mining operation
 - a description by ARO of the socio-economic and environmental data required from the proponent, much of which may already exist, including potential health hazards to local residents, for detailed assessment and subsequent monitoring of the project
 - data provided by the proponent concerning the results of any previous experience with similar projects or studies
 - the design by the proponent of mitigating measures to offset adverse environmental and/or social effects and safety precautions with respect to potential health hazards and, subsequent to approval by government, the incorporation of such measures and precautions into the project's terms and conditions
 - the design by ARO of surveillance procedures necessary to ensure compliance with the terms and conditions, for example :
 - the recording and reporting by the proponent of data on waste discharge, or the number and nature of job opportunities provided to local residents
 - data verification and regulation enforcement functions by appropriate government line-agencies
 - the design by government of environmental monitoring systems to detect changes in the environment as a result of the developmental activities and to judge the adequacy of the terms and conditions set out in the regulatory permits of the project.

b. Land Use Planning

i. recognizing that

- land policy should have as one of its major themes the maintenance and, where possible, the enhancement of the inherent productivity of the land
- land policy should include several components, for example, the optimal use of human resources, the conservation of natural resources and economic growth
- the development of land use policy is an evolutionary process and one that can benefit from a concomitant process of land use planning
- land use planning, to be most effective, must :
 - take into account the natural values and properties of the land base in order to provide for their maintenance and protection
 - consider the potential uses of the land and its capability to meet various demands on a sustained basis
 - incorporate the knowledge of local communities and others familiar with the planning area
 - be based upon adequate inventories, analyses and pertinent factors affecting land use, but should not be delayed in order to fill gaps in the data base
 - accord with national development policy as well as take into account local land use needs, but must be carried out for a rational planning area and at a level of detail adequate to produce a land use plan that can be implemented
 - provide, from its inception, for the effective participation of local communities and the involvement of elected public officials at both the local and national level

ii. but given that

- land use plans without the necessary political will and support are of little value
- a properly executed land use planning process and the development of a series of well-conceived and publicly supported land use plans are germane to improving the management, hence production, of Nepal's land resources
- the concept of land use planning accords with HMG's decentralization policy, indeed the two are mutually

supportive, and reflect the initiative in the Seventh Plan with respect to land use policy

- land use planning must consider all of the components of the resource base, for example, agricultural land, pasture land, forest and wildlife, as well as land for purposes of urban and rural settlements
- land use planning must take into account the social and cultural values of the local people as well as the physical characteristics of the land
- line-agencies with responsibilities in these areas must be directly involved in the planning process; several government departments currently have programs that will contribute to the land use planning process
- Nepal is in the fortunate position of having a substantial data base, arising from the 1986 Land Resource Mapping Project (LRMP) and the work of the Nepal Remote Sensing Centre, that can be readily adapted to meet the needs of land use planning
- there is, at present, sufficient local expertise to initiate the process and begin the necessary training of others

iii. it is resolved that

- as a pivotal component in the Conservation Action Agenda, land use planning and the preparation of land use plans will be initiated as soon as possible
- policy matters with respect to land use will be addressed at the central level by the NCCNCR; policy decisions will be directed to the respective regions through the National Planning Commission
- in some cases, land use planning will be conducted at the regional level, for example, with respect to highway, major hydroelectric power and irrigation projects, and natural gas or crude oil pipeline rights-of-way; the coordinating agency with respect to regional land use planning will be the National Planning Commission, which will also prepare guidelines concerning land use planning for use at the District and Village Panchayat levels
- land use planning, as it relates to such matters as allocation on the basis of best use, will be conducted at the district level through the NCS District Committee under the general direction of the NCS Regional Committee; the latter will be supported by a full time land use planning officer who, in turn, will work with members of the District Village Panchayats
- at all three levels, central, regional and district, an in-service training program [CAA 2 (c)] will be undertaken, including

the use of maps, photographs, collection of data, methodology, monitoring and evaluation

- Regional, District and Village Panchayat land use plans will designate land for various purposes according to land capability and will form the basis for resource conservation in terms of :

agriculture

- to provide for the cultivation of lands that are suitable for the production of annual and/or forage crops
- to improve and, where necessary, restore grazing land capability through more intensive management

forestry

- to maintain and ultimately increase the sustained yield of fuelwood and timber supply for local public use and, where appropriate, for wood-using industries through a permanent forest land base consistent with optimal forest land allocation
- to integrate, where appropriate, the cultivation of agricultural and horticultural crops and medicinal plants with the production of trees

pasture land

- to restore highland pasture on which forage productivity has declined
- to improve highland pasture capability through more intensive pasture land management
- to reclaim waste land for the production of fodder

watershed management

- to manage and develop the soil and water resources in an area in order to sustain quality and quantity of water yield and to control surface erosion and subsurface discharge

other resource values

- where appropriate, and where local conditions warrant it, land use plans will also take into account biological diversity, wildlife, fisheries, mineral, recreational and cultural resource values and land required for road and transmission rights-of-way, impoundment areas, and urban and rural settlements.

- the land use planning process will :
 - consider the potential uses of the land and its capability to meet local needs and aspirations as well as to attain national goals
 - account for the natural values and properties of the land and identify regions vulnerable to floods and landslides
 - adopt an interdisciplinary approach to urban planning
 - assess the consequences of various forms of land use and development, including the potential benefits to, as well as possible detrimental effects upon, the quality of life of local residents
 - monitor and document land use in order to take remedial action if necessary and to compare the actual with the estimated effects in order to improve performance in the future; such findings will be periodically incorporated into the on-going planning process
 - play a key supportive role in the government's policy concerning regional development planning
- a pilot program, as the first stage in the implementation of the land use planning process, will :
 - be carried out in the Districts of Dhankuta and Kanchanpur
 - be conducted under the aegis of the National Planning Commission and through the NCS District and Village Panchayat Committees [CAA 4 (a)]
 - provide for the effective participation of the local population including members of the District and Village Panchayats
 - make full use of existing data and take into account the social and cultural values and economic needs of the local people as well as the physical characteristics of the land
 - produce a preparatory land use plan for four or five Village Panchayats in each of the two districts
 - serve as a training program in land use planning, particularly for people at the local level.

a. Background

Conservation, or the wise-use of land, water and forest, must take into account the interrelationships among the three resource sectors as well as the cross-sectoral implications associated with their use. By adopting an integrated approach to resource management, it is possible to enhance overall productivity and minimize the detrimental effects implicit in single-sector management.

One of the components of the Conservation Action Agenda is the Vanguard Programs. Each Program comprises from four to six closely related activities, integrated to the maximum extent and implemented in the field.

All of the activities pertaining to a particular Vanguard Program will usually be contained within one or two Village Panchayats. The same Program, or with slight variations, can be repeated in various regions within a geographic division as well as in other geographic divisions.

The nature, design and location of the Vanguard Programs described below reflect, in large part, the views and suggestions expressed by local people during the NCS field meetings. As such, they are considered as prototypes and the initial step in field implementation of integrated resource management programs.

b. Four Models

Vanguard Program	Geographic Division	Activity
I	Mountain	Catchment Conservation Agricultural Development Integrated Livestock and Pasture Management Water Source Protection Conservation Education
II	Hill	Forest Management Water Source Protection Women's Role in Conservation Intensive Horticulture Intercropping
III	Inner Tarai	River Bank Stabilization Agricultural Development Conservation Education Medicinal Plant Management and Utilization
IV	Tarai	Fisheries and Livestock Farming Agroforestry Women's Role in Conservation Community Biogas Agricultural Development Leasehold Forest Management

c. Activities**i. Catchment Conservation**

- to protect and manage a catchment area of some five to ten km² covering part of one or two Village Panchayats for purposes of securing a perpetual supply of water and to improve land productivity by constructing a reservoir and irrigation facilities, and the establishment of a nursery and plantation

ii. Agricultural Development

- to improve land use on some 50 to 100 ha by increasing agricultural production through land consolidation, improved input delivery system, modified cropping patterns and the use of bunds and irrigation-canal sites for the production of fuelwood and fodder trees and improved grasses

iii. Integrated Livestock and Pasture Management

- to increase productivity on some 25 to 50 ha of pasture land with respect to fuelwood, fodder and grass through various management techniques including nurseries, plantation, irrigation and improved livestock quality through animal health and husbandry

iv. Water Source Protection

- to identify a drinking water source that is currently polluted and which covers an environmentally degraded area of not more than ten to 15 ha and to improve the quality of the water by, for example, the construction of vegetative fencing, the establishment of plantations and other soil conservation measures, and to increase the level of understanding concerning the measures necessary to maintain high quality drinking water

v. Conservation Education

- to increase the level of conservation awareness throughout a Village Panchayat by establishing one or more Conservation Education Centres in selected schools and, through the NCS District Committees, preparing training programs for teachers, students, local leaders and villagers

vi. Forest Management

- in support of, and complementary to, the Preparation Report on Forestry III prepared by FAO/CP, to provide forest land to user groups at the Ward level and/or private sector on a leasehold basis; under the terms of the lease, and according to a detailed forest management plan, the leaseholder will undertake silvicultural practices - including planting and thinning operations - and other management measures necessary to ensure the provision of preferred fuelwood and fodder species on a sustained yield basis

vii. Women's Role in Conservation

- to encourage more effective participation by women in resource conservation matters and, as a preparatory step for their involvement in the Extension - Service Training Program [CAA 2(d)], to provide practical roles in local conservation initiatives, including nursery and plantation establishment and maintenance, development project participation and income generating activities

viii. Intensive Horticulture Intercropping

- establish, on two or three ha of privately - owned, marginal agricultural land, a mixed species fruit-tree plantation; the program will include land improvement, the acquisition of growing stock, planting, irrigation, fencing, tending - including the intermediate harvesting of leafy material for fodder - and the storage, transportation and marketing of the fruit products

ix. River Bank Stabilization

- to arrest critical bank erosion on a river or stream near, or adjacent to, a village and to prevent the further loss of settlement and crop land by constructing riprap spurs to

deflect flood water and by establishing grass, fodder and fuelwood plantations on the adjacent river bank

x. Medicinal Plant Management and Utilization

- to establish a medicinal plant management program for Village Panchayats to include training of villagers with respect to the collection, cleaning and storage of medicinal plants and to conduct studies related to regeneration capability and optimal harvest times

xi. Fisheries and Livestock Farming

- to establish, on an individual farm basis, one or two small-scale integrated fisheries - livestock farm operations; the program to consist of the construction of a fish pond and piggery and other necessary facilities, the acquisition of the fingerlings and livestock, and provisions for fish, pig and poultry production and marketing

xii. Agroforestry

- to provide ten ha of degraded forest land, on a community-leasehold basis, to undertake agroforestry, such as intercropping of cash crops with preferred fuelwood and fodder species

xiii. Community Biogas

- to establish a community biogas plant of approximately 100m³ capacity, sufficient to meet the domestic requirements of some 200 people, thereby reducing excessive demands on the supply of fuelwood, the use of manure as a source of fuel and also the use of chemical fertilizers

xiv. Leasehold Forest Management

- to meet the fuelwood requirements of one grower for the drying and processing of tea by providing some 100 ha of degraded forest land, on a leasehold basis, on which the grower will establish a fuelwood plantation with the objective of becoming self-sufficient in fuelwood, thereby bringing into production land that is currently non-productive and, at the same time, reducing the burden upon government forests.

CONCLUSION

There exists in Nepal a large body of knowledge and experience - traditional, practical, scientific and technical - related to resource and cultural conservation.

In spite of this collective capability, the opportunity to effect desired change with respect to the conservation of the country's natural and cultural resources is inhibited by a rapidly growing population and limited financial resources.

Nepal has serious conservation problems. It also has considerable assets. For example, more than one-third of the country is either forested or contains land capable of growing a healthy forest. In addition, Nepal has considerable potential for increasing the productivity of its agriculture and grazing lands.

Nevertheless, much of the forest and pasture land is either underproductive or unproductive due, in part, to inadequate management and over-utilization. Too much reliance has been placed upon government to improve this situation, and insufficient opportunity and responsibility have been given to the users - collectively or individually - to help remedy the problem through personal initiative.

It is particularly noteworthy in this regard that, in spite of the key role that women play in crop production, animal husbandry and forest utilization, when it comes to resource development projects,

conservation training programs, or employment in the field of resource administration and management, their involvement is disproportionately low.

With respect to the conservation of cultural resources, programs related to cultural expression and the arts are achieving substantial success. The same cannot be said about the conservation of the physical component of Nepal's immense cultural heritage, including its temples, monuments, stone and wood carvings and statues. Here, individual examples of successful conservation programs may be found, but, overall, the picture is less encouraging. This is largely a function of the vast quantity of such cultural wealth and the limited financial resources available for restoration, protection and preservation work.

The 18-sector analyses, contained in Section D identifies many obstacles to the attainment of the four NCS objectives. A few observations are recurrent, of which the principal one is the need to improve coordination between government departments and agencies. The resolutions related to the NCCNCR and the NCS Corporate Planning Process have been designed, in large part, to address this issue.

A related and recurring issue is the tendency to deal with resource conservation problems on a single-sector basis. Several of the CAA resolutions deal with this question, including the Vanguard Programs, which describe four models of integrated resource management - one for each of Nepal's four geographic divisions.

Much of the Conservation Action Agenda is designed to help achieve the Basic Needs Programme and HMG's targets for the year 2000. To be successful, it is essential that the NCS has the political support necessary to ensure its implementation. HMG's formal approval of the National Conservation Strategy for Nepal is the first step in this direction.

The Conservation Action Agenda is not based on socio-economic or environmental theory, but rather it is the collective contribution of a wide range of people, from remote villages to senior levels of government, who have taken an active interest in the NCS and personally provided views and recommendations based upon hard, practical experience.

Wherever possible, the CAA avoids calling for the formation of new institutions of government. The effort expended in establishing such institutions, including the possible reallocation of executive powers, can be time-consuming and, in some cases, counter-productive. The net benefit accruing to the national conservation effort as a result of reorganization may not exceed the cumulative loss incurred during the period of hiatus when the reorganization is underway.

Conservation awareness - the individual's basic level of understanding - is essential to the successful attainment of the Conservation Action Agenda. For this reason, the National

Conservation Strategy stresses this point and includes, under the Conservation Awareness section, seven separate programs related to creating a more informed public. The free flow of information through all sectors of the community is essential if a successfully implemented NCS is to be realized.

Finally, Nepal's most valuable resource, its people, have shown their willingness - given the proper encouragement and assistance - to undertake conservation measures that will improve resource productivity and maintain the nation's valuable natural and cultural heritage. The Conservation Action Agenda underscores the importance of capitalizing on Nepal's invaluable human resource and **building on success.**



His Majesty's Government
National Planning Commission
Singha Durbar
Kathmandu, Nepal

Dr. B. P. Dhital
Vice-chairman

AFTERWORD

I am pleased to see that the National Conservation Strategy for Nepal has been very careful to develop a Conservation Action Agenda that reflects the social and cultural values and the economic needs of the Nepalese people. Indeed, the salient feature of the Strategy is its emphasis upon people and the human component of resource and cultural conservation.

The title "Building on Success" is, I believe, very appropriate. Although Nepal is faced with many challenges concerning the wise-use of its natural resources, we must not overlook the fact that conservation is not new to Nepal. Nepalese people have a long tradition of practising conservation.

Those who were responsible for developing the National Conservation Strategy for Nepal very wisely encouraged, and successfully obtained the participation of a broad spectrum of Nepalese people from the farmer to senior levels of government and nongovernment groups. This has several very positive effects. It means, for example, that the Strategy is clearly a 'made in Nepal product', is pragmatic, takes into account existing strengths and values and, very importantly, describes a Conservation Action Agenda that can be implemented.

Let us now move forward and implement the National Conservation Strategy for Nepal.

Dr. B. P. Dhital
Vice - Chairman
National Planning Commission
His Majesty's Government of Nepal

NCS for Nepal Secretariat

- | | |
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| Tshetan Dolma | - word processor operator |
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| Basant K. Rimal | - seconded officer - Department of
Soil Conservation and Watershed
Management |
| John K. Naysmith | - secretariat director and
senior advisor |

Annex II

Participants - NCS Field Meetings

Zonal Commissioners

Narendra Kumar Chaudhary
Gandaki Zone

Jagdish Khadka
Karnali Zone

Bindu Prasad Nepali
Seti Zone

Surya Bahadur Sen Oli
Kosi Zone

Regional Directors

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Forest Regional Directorate
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K. K. Sharma
Agriculture Regional
Directorate, Biratnagar

Govinda Prasad Sharma
Drinking Water Supply
Dhankuta

S. L. Shrestha
Eastern Regional Livestock
Office, Dhankuta

Jumla District

J. R. Adhikari
Soil Conservation Office

Tirtha Bahadur Bharati
Chairman
Chandranath Village
Panchayat

U. Bhattarai
Livestock Development Office

S.B. Chand
Family Planning Office

Mani Krishna Chaulagai
Chairman
Lamra Village Panchayat

Adan Singh Khadayat
Ex-Rastriya Panchayat
Member

D. C. Khadayat
Chairman, District Panchayat

Harishchandra Mahat
Ex-Minister

M. D. Mishra
Agriculture Office

R. Mishra
Chief District Office

Chetra B. S. Oli
Agriculture Development
Bank

P. K. Pathak
Cottage Industry Office

K. B. Paudyal
Gaira Gau Apple Farm

T. R. Sharma
Karnali Zonal Commission
Office

Krishna Kumar Shrestha
District Panchayat Secretariat

B. K. Singh
Forest Office

Dhan Man Singh
Land Reform Office

T. N. Singh Agriculture Research Centre	Santa B. Praja Farmer, Ward No. 3, Saktikhor
Chandra Bahadur Thapa Rastriya Panchayat Member	Bal B. Shrestha Chairman Saktikhor Village Panchayat
Ram Bahadur Thapa Chairman Patmara Village Panchayat	Ganesh Prasad Shrestha Farmer, Ward No. 6, Saktikhor
Purna B. Tuladhar Nepal Electricity Authority	Raj K. Shrestha Family Planning
Chitwan District	Manoj Sriwastava Agriculture Office
Mohmad Azir Forest Office	K. R. Timilsina Irrigation Office
Mr. Balchandra Farmer, Padampur	Mustang District
Toya Nath Chapagai Chairman Mangalpur Village Panchayat	Anirudra Adhikari Farmers' Organization
Dimber Ram Chaudhary Chairman Padampur Village Panchayat	Thakur Prasad Baruwal Veterinary Hospital
Harshit Prasad Chaudhary Livestock Office	Tulsi Prasad Chaudhary Agriculture Office
Mukti Lal Chuke Chairman Bharatpur Nagar Panchayat	Sarada Prasad Dahal Chief District Office
Ramaji Prasad Gupta District Panchayat Secretariat	Bishnu Mirachan Chairman Mustang District Panchayat
T. P. Gurung Chairman Chitwan District Panchayat	Mohan Koirala Forest Office
Arjun N. Joshi Farmer, Saktikhor	Lal Chandra Pradhan District Soil Conservation Office
Mr. Kharel Chief District Office	S. Pradhan Livestock Development Office
Santa Ram Saran Kumar Farmer, Ward No. 2 Ratna Nagar	Babu Ram Sharma Cottage Industry Office
Hira Lal Pari Farmer, Ward No. 5 Saktikhor	Rudra Prasad Sherchan Rastriya Panchayat Member Mustang
	Pasang Sherpa Marpha Horticulture Farm

Krishna Prasad Shrestha
District Panchayat Secretariat

Ms. N.K. Thakali
Women's Development Office

Chandeshwar Thakur
Livestock Hospital

Morang District

M. N. Aryal
Morang Sunsari
Irrigation Project

Ram Avtar
Farmer

Raja Baral
Forest Office

Bidyananda Chaudhary
Chairman
Kathari Village Panchayat

Shri K.R. Dhungana
Eastern Regional
Industrial Office

K. L. Dugar
Industrialist

Amar Karki
Chairman, Youth Organization
Chakraghatti, Sunsari

P. B. Karki
Chairman
Farmers' Organization

Mr. Lohani
Farmer

B. D. Mandal
Regional Irrigation Office

Ms. Ganga Maske
Chairman
Women's Organization

G. S. Mathema
Forest Office

R. R. Neupane
Land Reforms Office

D. B. Panday
Mill Manager
Raghupati Jute Mill

Gun Raj Pathak
Principal, M.M.A.C. Campus

Kamal Pokharel
Headmaster

Mr. Pokharel
Pokharel Dairy Farm
(Private Sector)

Badrinarayan Rajbansi
Farmer

Ram Lal Rajbansi
Vice-Chairman
Kathari Village Panchayat

Surya S. Regmi
Regional Panchayat and Local
Development Office

Mr. Rijal
Industrialist

S. K. Sakya
Tarara Agriculture Farm

Lav Bahadur Shah
Chief District Office

K. R. Sharma
Raghupati Jute Mill

R. B. Shrestha
Agriculture Development Office

Daroga Singh
Farmer

Ram C. Singh
Family Planning Office

Mr. Thapa
Ex-Justice

K. P. Upadhya
Agriculture Regional Directorate
Office

R. P. Upadhyaya
District Panchayat Secretariat

Jagdish Yadav Experimental Herbal Farm Department of Medicinal Plants	G. K. Sharma Industrial Service Centre
N. K. Yadav Livestock Office	Mahesh Sharma Kosi Hill Rural Development Project
Dhankuta District	Ms. P. Sharma Women's Training Centre
Jai Prakash Baidhya Poultry Farm Debrebas	Bisweshar Shrestha Industrialist, Soap Industry, Ghalitar (Private Sector)
H. P. Basyal Forest Office	Ms. Bunu Shrestha Integrated Community Health Service Development Project
G. Devan Chairman, District Panchayat	Chandra Shrestha Agriculture Development Bank
Iswari Prasad Devkota CIDB Office	Kalam Bahadur Shrestha Agriculture Development Office
Ms. Dhana Maya Ghimire Farmer Sewali Village Panchayat	Sher Bahadur Shrestha Family Planning Office
Netra Bahadur Ghimire Farmer Sewali Village Panchayat	Jagannath Subedi District Panchayat Secretariat
Nanda Kumar Karki Chief District Office	Thakur Subha Livestock Development Office
Surendra Bir Khoju National Planning Commission Regional Office	Dhangari/Kanchanpur District
J. N. Mahasetha Agriculture Development Office	Nahkul Acharya Resin and Turpentine Company
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Udaya Singh Rai Member District Panchayat	K.M. Shrivastava Agriculture Development Office Kathmandu
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Annex III

Background Papers - Titles, Authors, Reviewers

1 Population and Human Settlements

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2 Cultural Heritage

Amatya, S. **author**
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Bangdel, L. S. **reviewer**
Chancellor, Royal Nepal Academy

3 Conservation Awareness : Public Information, Extension, Education and Training

Bhujju, U. R. **author**
Publicity and Extension Officer
Watershed Management Project
Department of Soil Conservation and Watershed Management

Adhikari, P. K. **reviewer**
Consultant
Deutsche Gesellschaft fur Technische Zusammenarbeit

4 Role of Women in Resource Conservation

Joshi, C. Ms. **author**
Chief, Women's Development Section
Ministry of Panchayat and Local Development

Shrestha, Indira Ms. **reviewer**
Program Coordinator
Integrated Development Systems

5 Water Supply and Sanitation Sector

Singh, P. M. **author**
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Superintending Engineer
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- Acharya, A. M. reviewer
National Program Officer
World Health Organization
- 6 Agriculture and Fisheries**
- Gorkhaly, P. P. author
Director General
Department of Agriculture
- Gautam, J. C. co-author
Project Coordinator
Agriculture Research and Production Project
- Bhattarai, A. N. reviewer
Chief Agronomist
Department of Agriculture
- 7 Surface and Underground Water Development for Irrigation**
- Bhatt, C. D. author
Director General
Department of Irrigation, Hydrology and Meteorology
- Sharma, C. K. reviewer
Executive Director
Water and Energy Commission Secretariat
- 8 Livestock Development and Pasture Management**
- Rajbhandary, H. B. author
Additional Secretary
Ministry of Agriculture
- Pradhan, S. L. co-author
Senior Livestock Development Officer
Department of Livestock Development and Animal Health
- Panday, Kk. reviewer
Program Coordinator
International Centre for Integrated Mountain Development
- Pyakural, S. N. reviewer
Consultant
Royal Nepal Academy of Science and Technology
- 9 Soil Conservation and Watershed Management**
- Rimal, B. K. co-author
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- Joshi, M. D. co-author
Director General
Department of Soil Conservation and Watershed Management

Kayastha, B. P. reviewer
 Additional Secretary
 Ministry of Forest and Soil Conservation

10 Forest Development and Management

Amatya, D. B. author
 Consultant
 National Conservation Strategy for Nepal Secretariat

Kayastha, B. P. reviewer
 Additional Secretary
 Ministry of Forest and Soil Conservation

11 Medicinal Plants : Their Utilization and Management

Malla, S. B. author
 Director General
 Department of Medicinal Plants

Shrestha, T. B. reviewer
 Member, Royal Nepal Academy

12 Biological Diversity

Gorkhali, C. P. author
 Rector, Tribhuvan University

Yadav, R. P. reviewer
 Deputy Director
 International Centre for Integrated Mountain Development

13 a. National Parks and Protected Areas

Upreti, B. N. author
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Mishra, H. R. reviewer
 Member-Secretary
 King Mahendra Trust for Nature Conservation

b. Wildlife Management

Upreti, B. N. author
 Director General
 Department of National Parks and Wildlife Conservation

Bista, R. B. reviewer
 Deputy Chief Conservator
 Department of Forest

14 Tourism and Outdoor Recreation

Thapa, J. author
 Director General, Department of Tourism

- Nepal, B. H. co-author
International Publicity and Promotion Officer
Department of Tourism
- Pradhan, G. B. N. reviewer
Executive Director
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- 15 Energy Development**
- Sharma, S. N. author
Chief Engineer
Department of Water Supply and Sewerage
- Bhadra, B. reviewer
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- 16 Industrial Development**
- Bhattarai, R. B. author
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- Shah, G. B. reviewer
Executive Director
Industrial Service Centre
- 17 Non-Renewable Resource Development and Hydrocarbon Energy**
- Tater, J. M. author
Deputy Director General
Department of Mines and Geology
- Shrestha, C. L. reviewer
Joint Secretary
National Planning Commission
- 18 International Implications : Regional and Global**
- Chalise, S. R. author
Environmental Specialist
International Centre for Integrated Mountain Development
- Shrestha, C. L. reviewer
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National Planning Commission
- 19 Resource Planning: Socio-Economic and Environmental Impacts; and Land Use Planning**
- Naysmith, J. K. author
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National Conservation Strategy for Nepal

Annex IV

NCS Central Document Criteria

- 1 Does the Strategy provide a structure or framework within which future development proposals and aid programs can be evaluated, accepted, modified or rejected ?
- 2 In terms of the administration, management and implementation including monitoring - of the Strategy, is the fullest practicable use being made of existing government and nongovernment institutions ?
- 3 Does each recommendation address at least one of the four objectives of the NCS for Nepal ?
- 4 Do the recommended action plans and policy guidelines take into account the fact that government line-agencies must carry out their current mandates with already limited financial and manpower resources ?
- 5 Does the Strategy recognize that most of the ninety percent of Nepal's population that depends upon the land and forest for its subsistence is personally unable to incur the cost of undertaking conservation measures ?
- 6 Does the Strategy effectively take into account the basic needs and aspirations of the villagers, the landless and the small land owners as they expressed them to the Secretariat ?
- 7 Does the Strategy incorporate the objectives of HMG's decentralization policy and the local Panchayat system and utilize, to the maximum extent feasible, the existing village and district structures ?
- 8 Does the Strategy provide a focal point for existing sectoral efforts within government respecting resource conservation and coordinate those efforts into a series of integrated resource management action plans ?
- 9 Does the process for preparing the Strategy provide for the effective contribution of local villagers, general public, government agencies and nongovernment agencies ?
- 10 Does the Strategy contain the measures necessary for the maintenance of the spiritual and cultural values that are of fundamental importance to the Nepalese people ?

NCS Central Document Reviewers

Mr. L. S. Bangdel Chancellor Royal Nepal Academy	Dr. S. N. Pyakural Consultant Kathmandu
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Annex VI Animal Feed Balance by Physiographic Region

(in '000 mt)

Physiographic Region	Feed Requirement			Feed Available			Balance		
	DM	TDN	CP	DM	TDN	CP	DM	TDN	CP
Tarai (%)	4703.70	2681.00	400.90	3452.78	1501.88	157.45	-1250.82 (26.6)	-1179.12 (44.0)	-243.45 (60.7)
Siwalik (%)	2153.70	1227.30	183.90	2586.11	1124.90	117.90	432.41 (20.1)	-102.40 (8.3)	-66.00 (35.9)
Middle Mountain (%)	7295.00	4158.30	621.50	4337.00	1866.61	197.76	-2958.00 (40.5)	-2291.69 (55.1)	-423.74 (68.2)
High Mountain (%)	1957.60	1115.70	166.60	3231.09	1405.95	147.27	1273.49 (65.1)	+290.25 (26.0)	-19.33 (55.7)
High Himalaya (%)	488.00	278.30	41.50	1415.64	615.80	64.61	927.64 (190.1)	+337.40 (121.3)	23.11 (55.8)
Nepal (Total) (%)	16597.90	9460.70	1414.00	15023.62	6535.14	684.99	-1574.23 (9.5)	-2925.56 (30.9)	-729.01 (51.6)

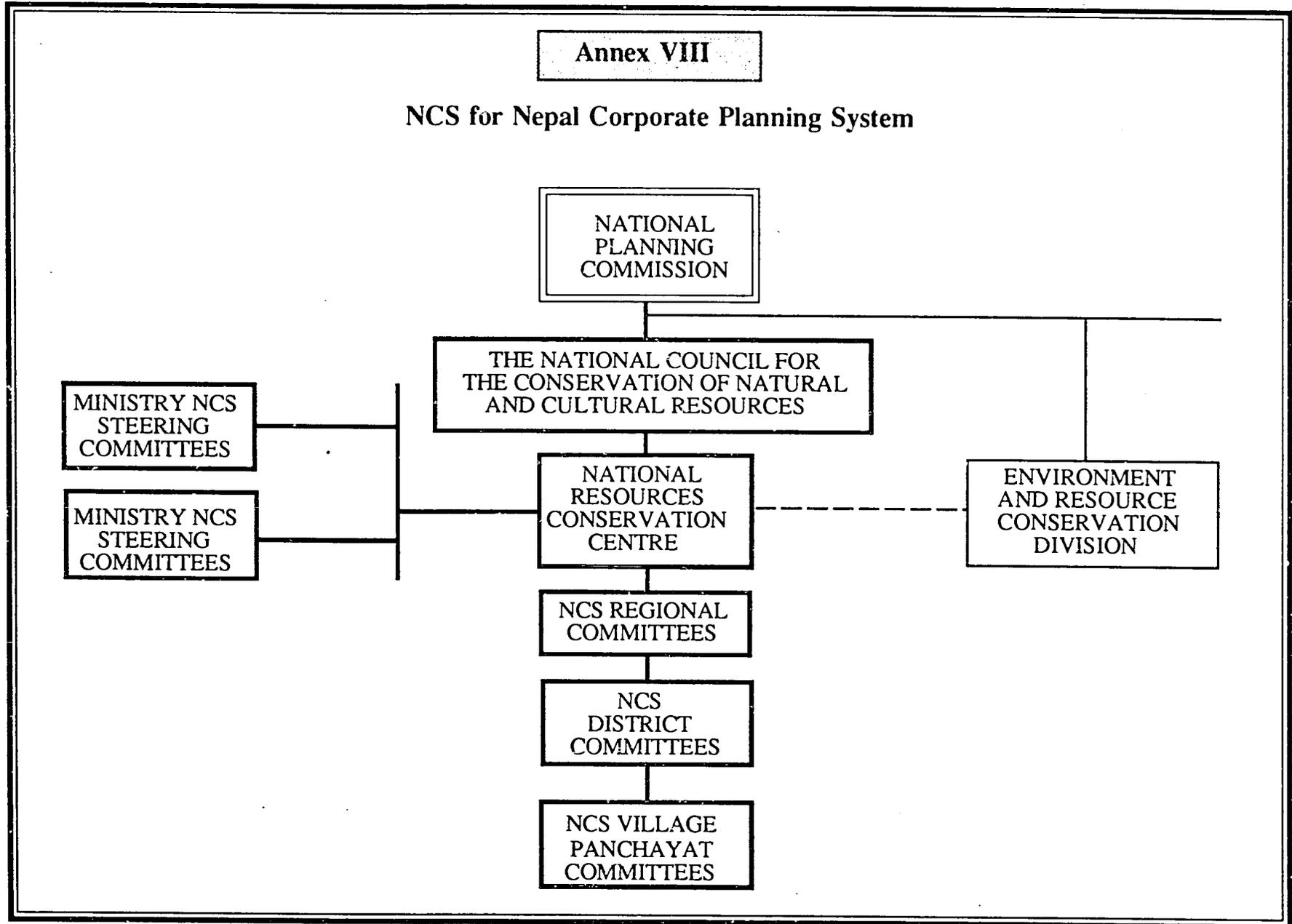
Source : H. B. Rajbhandary and S. L. Pradhan - Background Paper on Livestock Development and Pasture Management for NCS Nepal, 1986.

Note :
DM - Dry Matter
TDN - Total Digestible Nutrient
CP - Digestible Crude Protein

Annex VII

Present Areas of National Parks and Wildlife Reserves

Name	Area (sq km)
Royal Chitwan National Park	932
Sagarmatha National Park	1148
Langtang National Park	1710
Rara National Park	106
Shey-Phoksundo National Park	3555
Khaptad National Park	225
Royal Sukla Phanta Wildlife Reserve	155
Royal Bardia Wildlife Reserve	968
Koshi Tappu Wildlife Reserve	175
Parsa Wildlife Reserve	499
Shivapuri Watershed & Wildlife Reserve	145
Dhorpatan Hunting Reserve	1325
Total	10,943
Total area of Nepal	147,181
Percentage of Total National Parks and Protected Areas	7.43%



Annex IX

Land Use in Nepal ('000 ha)

Zone	Cultivated Lands	Non- Cultivated Inclusions	Grass Lands	Forested Lands/Plntr Burned Areas	Shrub Lands	Other Lands	Total
High Himalaya	7.8	1.9	884.2	155.2	66.6	2233.8	3349.5
High Mountain	244.4	147.2	509.9	1631.5	181.3	245.0	2959.3
Mid Mountain	122.5	665.4	292.6	1794.1	409.3	59.5	4443.4
Siwalik	258.8	55.3	20.7	1444.9	31.3	74.8	1885.8
Tarai	1234.6	117.1	49.7	590.9	1.4	116.7	2110.4
TOTAL	2968.1	986.9	1757.1	5616.6	689.9	2729.8	14748.4
Percent	20.1	6.7	11.9	38.1	4.7	18.5	100.0

Source : Land Resource Mapping Project, 1986
Based on 1979 Data

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Acronyms

ADB	Asian Development Bank
APROSC	Agricultural Projects Services Centre
ARO	Assessment and Review Office
CAA	Conservation Action Agenda
CEV	Conservation Education Unit
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973
CNAS	The Centre for Nepalese and Asian Studies
DFO	District Forest Officer
DIHM	Department of Irrigation, Hydrology and Meteorology
DLDAH	Department of Livestock Development and Animal Health
DNPWC	Department of National Parks and Wildlife Conservation
DSWCC	District Soil and Watershed Conservation Committee
DSCWM	Department of Soil Conservation and Watershed Management
FAO	Food and Agriculture Organization of the United Nations
FIWUD	Farm Irrigation and Water Utilization Division
FMP	Forestry Master Plan
FPMCH	Family Planning and Maternal Child Health Care Service
HMG	His Majesty's Government of Nepal
HFA-2000	Health For All by the Year 2000
IAEA	International Atomic Energy Association
ICIMOD	International Centre for Integrated Mountain Development
IUCN	International Union for Conservation of Nature and Natural Resources
KMTNC	King Mahendra Trust for Nature Conservation
LRMP	Land Resource Mapping Project
MAB	Man and the Biosphere
MPLD	Ministry of Panchayat and Local Development
NASC	Nepal Administrative Staff College

NCCNCR	National Council for the Conservation of Natural and Cultural Resources
NCCNR	National Commission for the Conservation of Natural Resources
NCP	National Commission on Population
NCS	National Conservation Strategy
NDSP	National Development Service Program
NGO	Nongovernment Organization
NPC	National Planning Commission
NRCC	National Resources Conservation Centre
NRSCN	National Remote Sensing Centre Nepal
RCSC	Resource Conservation Steering Committee
RDRL	Royal Drug Research Laboratory
RECAST	Research Centre for Applied Science and Technology
RONAST	Royal Nepal Academy of Science and Technology
SAARC	South Asian Association for Regional Cooperation
SACEP	South Asian Cooperative Environmental Program
TU	Tribhuvan University
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
Unesco	United Nations Educational, Scientific and Cultural Organisation
VPRC	Village Panchayat Resource Committee
WCED	World Commission on Environment and Development
WCS	World Conservation Strategy
WDO	Women's Development Officer
WDS	Women's Development Section
WECS	Water and Energy Commission Secretariat
WSSA	Water Supply and Sanitation Act