

The Middle Path

National Environment Strategy for Bhutan



National Environment Commission
Royal Government of Bhutan

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This document has been prepared by the National Environment Commission. We are very grateful to the National Environment Strategy Task Force members and to the many Ministries, Dzongkhags and persons who have contributed to this work.

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National Environment Commission
Royal Government of Bhutan

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Opposite page: His Majesty the King, Jigme Singye Wangchuck, with school children



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Page 26	John Kelly
Page 28	Suki Dixon
Page 36	SNV/Thimphu
Page 39	Mark Van Alstine
Page 39	Lincoln Potter (bottom)
Page 40	WWF Bhutan
Page 46	Yasushi Yuge
Page 48	Lincoln Potter
Page 50	Lincoln Potter
Page 52	Mark Van Alstine
Page 53	Anand Prakash (right)
Page 53	WWF Bhutan (left)
Page 54	Yasushi Yuge
Page 56	Yasushi Yuge
Page 60	Yasushi Yuge
Page 62	John Kelly
Page 66	David Keen
Page 68	UNICEF
Page 71	Nedup Tshering
Page 74	Yasushi Yuge
Page 76	Yasushi Yuge
Page 77	UNICEF
Pages 78/79	Nedup Tshering
Page 80	WWF Bhutan
Page 87	Nedup Tshering
Page 89	UNICEF (top and bottom)
Page 90	Yasushi Yuge
Pages 92/93	UNICEF

MAP 1:
BHUTAN: PHYSICAL FEATURES

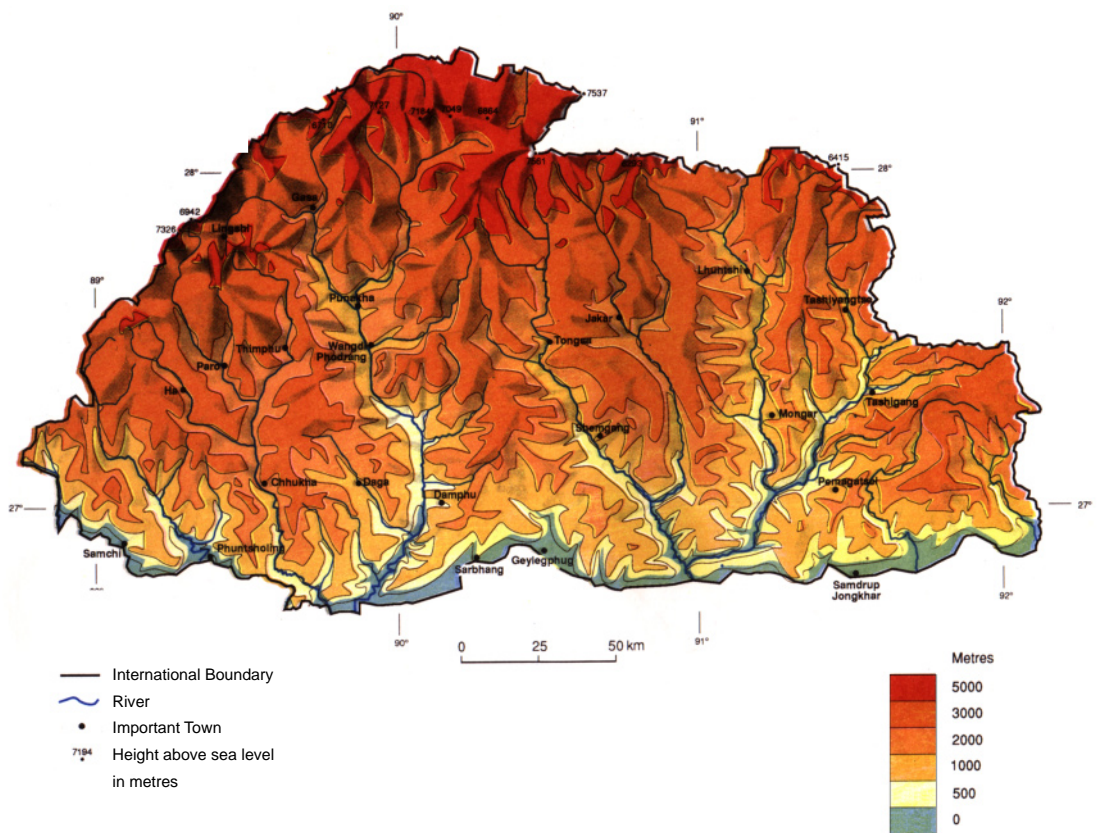


TABLE OF CONTENTS

List of Acronyms	10
Glossary	11
Foreword	12
Executive Summary	14
Chapter 1 SUSTAINABLE DEVELOPMENT IN BHUTAN: THE MIDDLE PATH	16
· Surveying the Avenues of Development	21
· Formulating a National Environmental Strategy	23
Chapter 2 ACHIEVING SUSTAINABLE DEVELOPMENT: A NATIONAL STRATEGY	26
A DEVELOPMENT OF HYDROPOWER	30
· Current Status and Objectives	30
· Enabling Conditions and Strategic Needs	32
· Implications and Considerations	34
B INCREASE SELF-SUFFICIENCY IN FOOD PRODUCTION	36
· Current Status and Objectives	36
· Enabling Conditions and Strategic Needs	38
· Implications and Considerations	40
C INDUSTRIAL DEVELOPMENT	44
· Current Status and Objectives	44
· Enabling Conditions and Strategic Needs	47
· Implications and Considerations	49
Special Focus A Tourism and Its Effect on Culture and the Environment	51
Special Focus B Roads and the Environment	54
Special Focus C Resource-Based Mechanisms for Financing Sustainability	57
Special Focus D Environment and Public Health: A Growing Concern	62
Special Focus E Preparing for Rapid Urbanisation	65
Special Focus F Gender and Natural Resource Management	67
Special Focus G Environmental Impact Assessments	69
Special Focus H Population and Sustainability	72
Chapter 3 THE EFFECTS OF DEVELOPMENT ON BHUTANESE CULTURE	74
Chapter 4 KEY CROSS-SECTORAL NEEDS AND OTHER CONCERNS	80
A INFORMATION SYSTEMS AND RESEARCH	81
B INSTITUTIONAL DEVELOPMENT AND POPULAR PARTICIPATION	83
C POLICIES AND LEGISLATION	85
D TRAINING AND EDUCATION	87
E MONITORING, EVALUATION AND ENFORCEMENT	88
Chapter 5 CONCLUSION	90
Bibliography	94

BOXES:

1	Gross National Happiness	19
2	Sustainable Development in the Bhutanese Context	28
3	Yak Herding in the Himalayas: A Microcosm of Sustainability	42
4	Soil Resources Management Programme	43
5	The Bhutan Trust Fund	61
6	Waste Disposal: An Emerging Problem in Thimphu	65
7	Urban Pollution	66

FIGURES:

1	National Environment Strategy Task Force Members	25
2	Dynamics of Sustainable Development	29
3	Crop Production Data, 1992	38
4	Socioeconomic, Cultural and Institutional Environment of the Farm Household	41
5	Annual Tourist Visits, 1985-1997	51
6	Existing Protected Areas System	58
7	Donors to the Bhutan Trust Fund for Environmental Conservation	61
8	Health Infrastructure, 1996	64
9	Education Data, 1985-1996	68
10	Environmental Impact Assessments, 1991-1997	70
11	Environmental Reviews, 1991-1997	70
12	Population Trends, 1990-2040	72
13	Ratio of External Assistance by Sources, 1992-1994	86

MAPS:

1	Bhutan: Physical Features	5
2	Bhutan: Existing Road Network	56
3	Bhutan: Existing Protected Areas	60

TABLE:

1	National Power Generation Data, 1990-1995	32
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LIST OF ACRONYMS

ADB	Asian Development Bank
BBS	Bhutan Broadcasting Service
BCCI	Bhutan Chamber of Commerce and Industry
BDFC	Bhutan Development Financial Corporation
BTC	Bhutan Tourism Corporation
BTCL	Bhutan Tourism Corporation Ltd
BTF	Bhutan Trust Fund for Environmental Conservation
BTN	Bhutan Ngultrum (also Nu.)
CHPC	Chukha Hydropower Corporation
CSO	Central Statistical Organisation
DGM	Division of Geology and Mines
DOP	Division of Power
DYT	Dzongkhag Yargay Tshogchung (District Development Committee)
EIA	Environmental Impact Assessment
FNC	Forest and Nature Conservation Act
FSD	Forestry Services Division (Formerly Department of Forests)
FY	Fiscal Year
FYP	Five Year Plan
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
GYT	Geog Yargay Tshogchung (Block Development Committee)
HRD	Human Resources Development
IEE	Initial Environmental Examination
IPM	Integrated Pest Management
IPCC	Intergovernmental Panel on Climate Change
MOA	Ministry of Agriculture
MOC	Ministry of Communications
MOF	Ministry of Finance
MOFA	Ministry of Foreign Affairs
MOHA	Ministry of Home Affairs
MOHE	Ministry of Health and Education
MOP	Ministry of Planning
MPFD	Master Plan for Forestry Development
MTI	Ministry of Trade and Industry
NA	National Assembly
NCS	Nature Conservation Section
NEAP	National Environmental Action Plan
NEC	National Environment Commission
NEPA	National Environment Protection Act
NES	National Environment Strategy
NGO	Non-Governmental Organisation
NHS	National Health Survey
NWAB	National Women's Association of Bhutan
PPD	Policy and Planning Division
PWD	Public Works Division
RCSC	Royal Civil Service Commission
REID	Research, Extension and Irrigation Division
RGOB	Royal Government of Bhutan
RNR	Renewable Natural Resources
RNR - RC	Renewable Natural Resource - Research Centre
RSPN	Royal Society for the Protection of Nature
RSTA	Road Safety and Transport Authority
SAARC	South Asian Association for Regional Co-operation
TAB	Tourism Authority of Bhutan
TCC	Thimphu City Corporation
UN	United Nations
UNCDF	United Nations Capital Development Fund
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
UPU	Urban Planning Unit
WB	World Bank
WWF	World Wildlife Fund

GLOSSARY

<i>Bardo</i>	Festival performance where <i>Choekje Gyalpo</i> (Lord of Death) reminds the audience of different paths they will follow after death
<i>Chu-zhing</i>	Irrigated rice land
<i>Dratshang</i>	Monastic body
<i>Dratshang Lhentshog</i>	Council for Ecclesiastical Affairs
<i>Driglam namzha</i>	Code of conduct
<i>Dzong</i>	Fortress or Monastery
<i>Dzongdag</i>	District Administrator
<i>Dzongkhag</i>	District
<i>Dzongkhag Yargay Tshogchung</i>	District Development Committee
<i>Geog</i>	Administrative block under the district
<i>Geog Yargay Tshogchung</i>	Block Development Committee
<i>Gho</i>	National dress for men
<i>Gup</i>	Elected leader of a <i>geog</i>
<i>Kira</i>	National dress for women
<i>Kam-zhing</i>	Rain-fed dryland
<i>Lyonpo</i>	Minister
<i>Nheys</i>	Distinct topographic features that are believed to be the home of local deities or guardians
<i>Pang-zhing</i>	Land use similar to shifting cultivation, with very scanty tree cover
<i>Sangha</i>	Clergy
<i>Sok-shing</i>	Public wood lot on which either individuals or a community have user rights for leaf-litter, fodder and dry firewood
<i>Tha-damtshig</i>	Strict observance of vows
<i>Tsamdro</i>	Natural pasture/grassland on which an individual or a community has grazing rights
<i>Tsechu</i>	Annual festival
<i>Tseri</i>	Shifting cultivation
<i>Zomdu</i>	Community meeting

FOREWORD

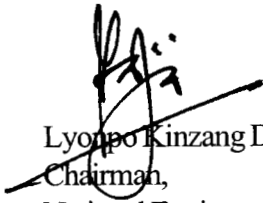
For centuries, our people have preserved their natural resources and lived in balance with nature. Ensuring the integrity of forests, rivers and soil was vital to survival in the high valleys of the Eastern Himalayas. The relationship between the Bhutanese people and the environment has been forged over centuries within moral, cultural and ecological boundaries. Respect for these boundaries was ensured historically through a set of formal and informal rules and norms. Traditional and local beliefs promoted the conservation of the environment, and key ecological areas were recognized as the abodes of gods, goddesses, protective deities and mountain, river, forest and underworld spirits. Disturbance or pollution of these sites would result in death, disease or famine. Buddhism and animism reinforced this traditional conservation ethic and promoted values such as respect for all forms of life and giving back to the Earth what one has taken away. This traditional respect for the natural world ensured that Bhutan emerged into the 20th century with an intact natural resource base.

Bhutan has recognized the need to preserve this rich conservation heritage. His Majesty King Jigme Singye Wangchuck has categorically stated that development must not take place at the expense of our natural resources. The members of the National Assembly have mandated the country to maintain forest cover at more than 60% (National Forest Policy, 1974) at all times. Currently, we have set aside more than 26% (FSD, 1995) of the country as a protected areas system and have more than 72.5 % (CSO, 1994) of the country under forest cover; have introduced environmental studies into the curriculum of primary students; and have begun formulating policies and programs, legislation and financing mechanisms for the conservation of Bhutan's rich natural environment.

The future of Bhutan will depend on how our natural resource base is managed and utilised in the next decade. The Middle Path-National Environment Strategy for Bhutan aims to highlight issues, potential problems and constraints, and choices that our country has to make in order to ensure the conservation of our natural resources while pursuing economic development. Can we adopt modern development while still maintaining our traditional values? Can we accept the need to develop industries, social infrastructure and markets, while still recognising that development is not material development alone, but the enhancement of knowledge, spiritual and cultural development? Can we maintain our traditional values and sustainable livelihoods in a changing global environment? Can we raise the living standards of the present population without compromising the country's cultural integrity, historical heritage or the quality of life for future generations? These are some of the key challenges that we will face in the coming decade.

His Majesty King Jigme Singye Wangchuck has recognised that Bhutan must follow the middle path to development. This is development that recognises the need to develop our economy, to progress technically, medically and scientifically while still maintaining our rich cultural heritage and our traditional values, as well as preserving our natural resource base. How do we meet the social and economic needs of our people while still conserving the natural environment? This is the challenge of sustainable development for Bhutan.

The National Environment Commission is pleased to release Bhutan's National Environment Strategy to commemorate the golden reign of His Majesty King Jigme Singye Wangchuck. The state of Bhutan's environment reflects the commitment of His Majesty's enlightened leadership, which has resulted in the successful stewardship of the environment and the conservation of Bhutan's rich natural resource base. It is this political commitment and personal courage to protect the natural environment that has ensured that future Bhutanese will inherit a country that will be an oasis, the last remaining area of rich biological diversity and a pristine environment in the Eastern Himalayas.



Lyonpo Kinzang Dorji
Chairman,

National Environment Commission (1998)

EXECUTIVE SUMMARY

After centuries of self-imposed isolation, the Kingdom of Bhutan has emerged into the 20th century with an extensive forest cover and a largely intact natural resource base. Aware of the problems that uncontrolled economic progress can cause, the Royal Government of Bhutan has chosen the “middle path” of sustainable development, in order to raise the living standards of the present population without compromising the country’s cultural integrity, historical heritage or the quality of life for future generations. Sustainable development is particularly important for a country like Bhutan, with its fragile mountain ecosystems and extremely high level of biodiversity.

The National Environment Commission (NEC), which was formed after the Paro Workshop on Environment and Sustainable Development in 1990, was given the responsibility of drawing up a national strategy to ensure that environmental concerns became an integral part of the development agenda. The ultimate goal of this National Environment Strategy (NES) is to minimise or mitigate the impacts that are likely to result from the development process.

The NES outlines three main avenues of sustainable economic development: expanding hydropower, increasing agricultural self-sufficiency and expanding the industrial base. The NES then examines each avenue in detail, taking into consideration the current status of each sector, enabling conditions for development and the implications of such development.

The first avenue, hydropower, represents a sustainable and relatively clean source of revenue. Although only 2% of the country’s estimated hydropower potential had been tapped by the end of 1996, electricity accounted for one-third of Bhutan’s total annual foreign revenue. Expanding this sector is expected to

improve the living standards for Bhutan’s own population and to reduce the currently high levels of domestic fuelwood consumption, in addition to raising much-needed revenue in the future. Expanding this sector, however, depends on maintaining the integrity of the country’s watersheds. This will mean that current threats to the country’s forests — illegal cutting, unsustainable rangeland practices, agricultural expansion and road development — will have to be minimised.

More than 85% of Bhutan’s population is engaged in agriculture and relies on an integrated system of crops, livestock and small-scale forest management. The country currently meets 65% (Eighth Five Year Plan) of its food needs. The second avenue of development, increasing self-sufficiency in food production, faces several constraints: the limited amount of arable land, which hinders extensification; the nature of the terrain, which makes intensification difficult; a high population growth rate of 3.1% per year (NHS, 1994); and the increase in urban, non-farming communities. Moreover, increasing food production could potentially conflict with the first avenue of economic development. Converting forest land for agriculture, for example, would threaten watershed maintenance, a prerequisite for hydropower expansion and maintenance. Increasing food self-sufficiency will require intensive agriculture, diversification of commodities and promotion of agro-based industries. These, in turn, will depend on sustainable soil fertility and pest management practices, improved extension services for farmers and better rangeland management.

Industrial development in Bhutan is currently based on four main resources: hydropower, wood, agriculture and minerals. Constraints to industrial development in Bhutan include competition for different land use, topographical factors that make power, transport

and communication costly, and the limited access to and supply of raw materials located in remote and protected areas. Some of the implications of industrial development include pollution and a variety of other environmental problems, conflict with traditional land use practices and unsustainable migration of rural populations to industrial complexes. Environmental criteria need to be incorporated into industrial development planning. This involves setting environmental quality standards, establishing a legal basis to enforce environmental regulations and using environmental impact assessments to screen out potentially damaging projects. Given Bhutan's low-cost hydro-electricity, power-intensive domestic industries based on imported raw materials could prove a sustainable alternative in the industrial sector. The NES also examines several areas of special importance to balancing economic development with cultural and environmental conservation: tourism, roads, resource-based mechanisms for financing sustainability, public health, urbanisation, gender and natural resource management, Environmental Impact Assessments and population and sustainability.

The NES analyses the effects of development on Bhutanese culture, examining the conflict between traditional Buddhist values and modern lifestyles. Although development has brought about undeniable material benefits, it also has contributed to the erosion of traditional beliefs, a decline in respect for elders and parents, and a loss of community spirit. It has had negative effects on traditional arts and crafts and festivals as well. The role of the Special Commission for Cultural Affairs in mitigating these effects and preserving Bhutanese culture is examined.

Five key cross-sectoral issues that are essential to the successful integration of environmental concerns with economic planning also are examined in the NES. These issues

include the need for information systems and research on Bhutan's environment, land ownership and use, demographics, social and cultural trends and local institutions; the need to develop local institutions that facilitate popular participation; the need for environmental legislation based on environmental quality standards; the need for training and education in natural resource management — not only for government policy-makers but also for researchers, private-sector managers, students, resource users and the general public; and the need for effective monitoring mechanisms, including environmental indicators, as well as the need for clear and effective enforcement procedures.

The NES is only one step in the process to achieve sustainable development. The next step in the process is the development of a National Environmental Action Plan to guide the implementation of the NES. The final outcome of this ongoing process will be to provide Bhutan with a combination of regulatory mechanisms, mass awareness and fiscal incentives to encourage the public and private sectors to develop economically without unnecessarily compromising the natural resource base.



SUSTAINABLE DEVELOPMENT IN BHUTAN : THE MIDDLE PATH

**“It is better to have milk and
cheese many times,
than beef just once.”**

— traditional Bhutanese proverb —

For centuries Bhutan's isolated location and its self-reliant national character kept the Kingdom outside the path of economic development in South Asia. Although this seclusion prevented Bhutan from fully benefiting from many of the medical, technical and scientific advances of the day, it also shielded the country from many of the detrimental side effects of poorly planned or haphazard development. As a result, while most of the Himalayan region has seen its natural resource base severely compromised through deforestation, soil degradation, erosion and pollution, Bhutan's natural patrimony of extensive and varied forests, limited yet fertile and productive farmland, and pristine water and air remains largely intact.

During the second half of the 20th century, however, Bhutan has seen its isolation steadily eroded by the inexorable forces of progress and development. Even if it wanted to, the country, no longer secluded, could not prevent itself from being swept up in the surge of economic and social activity that is propelling the entire region into the 21st century. But Bhutan now realises that it has much more to gain than to lose by joining in the march of progress. Foremost among the benefits is vast improvement in the very quantity of life for the

Bhutanese people that results from breakthroughs in medicine and technology. A close second is improvement in the quality of that life — i.e., the many technological innovations that take much of the drudgery from the centuries-old practices of eking an existence out of the rugged terrain.

But Bhutan is well aware that development is a double-edged sword — it that can cause undue and unnecessary diminutions in national living standards if not properly anticipated and fully prepared for. Indeed, for examples of the extensive problems that inappropriate or uncoordinated development can cause, Bhutan does not have to look far. Of immediate concern is the fact that many of the undesirable and debilitating aspects of unbridled progress already are starting to manifest themselves inside the country. Threats to the continued integrity of Bhutan's natural resource base are increasingly being felt from a variety of “developmental” sources, including infrastructural construction, industrial expansion, increasing urbanisation and the growth of foreign tourism.

In addition, Bhutan is being forced to deal with the compromising land use management practices that are an inevitable result of

steady increases in the population. Although Bhutan's population density remains low, especially in comparison to its South Asian neighbors, the constraining fact is that the land available for cultivation in the country is very limited. Expansion of the agricultural sector is thus highly circumscribed, and Bhutan's need to feed its own people will soon place clearly unsustainable pressures upon our Kingdom's otherwise enviably intact natural resource base.

At the same time, traditional Bhutanese lifestyles are being dramatically transformed as a result of employment shifts, urbanisation, changing consumption patterns, commoditisation, technological innovations and the increasing monetisation of the economy. In a country where families have lived on the same plot of land, pursuing the same subsistence activities for generations, such changes are particularly disruptive. But that is only half the problem. Bhutanese people are also being increasingly separated from their unique culture by eroding influences of "modern cultures". Many of these manifestations are in flagrant opposition to traditional Buddhist values and practices.

If left alone to seek its own course, the process of development will continue to extract an increasingly heavy price from both the land and the people. Preferring to take proactive measures now rather than make reactive responses later, the Royal Government of Bhutan (RGOB) decided to take charge of the direction and pace of the development process. Fundamental to the intervention was the premise that socioeconomic development and environmental and cultural integrity are not mutually exclusive, but are equally critical to the long-term viability of the Bhutanese nation. As eloquently summarised by His Majesty King Jigme Singye Wangchuck: "Gross National Happiness is more important than Gross National Product" (see Box 1: Gross National Happiness).

In its mission to take control of development, Bhutan is blessed with four significant assets. First, as a result of its delayed arrival on the world stage, Bhutan — perhaps more than any other country in the world — has the opportunity to plan its own development. Second, its cautious and incremental pursuit of foreign-assisted development has meant that Bhutan

is not in danger of accumulating large debts. Third, the one prerequisite upon which any truly effective development strategy depends — political will — is clearly there. Experiences from around the world have conclusively demonstrated that unless the highest authorities in the land are committed to the cause, the process of development will inevitably be co-opted by a powerful elite whose ability to profit inordinately from development activities will undermine the mechanisms of self-help and mutual cooperation and also erode both the communal and national spirit. And finally, there is the powerful ally that lies in the country's strong Mahayana Buddhist culture, with its emphasis on spiritual, as opposed to material, enrichment.

But Bhutan also faces some daunting challenges. By virtue of the country's location in the heart of the Eastern Himalayas, the highest and most active of the Earth's major mountain ranges, the topography is characterized by steep to precipitous slopes that descend rapidly into narrow river valleys. The large-scale tectonic movements that push the Himalayas a few centimeters higher each century crush the underlying rock, thus increasing its penetrability and absorptive capacity. When soaked by the relatively heavy monsoon rains and exposed to the corresponding high runoff volumes and velocities, the land becomes particularly vulnerable to erosion.

This results in landslides, scouring and the formation of rills and gullies. Until now, soil erosion in Bhutan has been limited by the low intensity of current land use practices, but that is destined to change as the pace of development quickens.

Compounding the effects of Bhutan's geography are the effects of its demography. Only a decade ago, the population was growing at an annual rate of 2.6% (NHS, 1994). But the opening up of the country to aid projects, combined with socioeconomic development efforts, has brought about significant reductions in the crude death rate — from 19.3 in 1984 to 9.0 per 1,000 population in 1994 (NHS, 1994). The most appreciable drops have come in the infant and under-5 mortality rates, from 142 to 70.7 for the former, and from 195 to 96.9 for the latter, both per 1,000 live births,

GROSS NATIONAL HAPPINESS

According to both Buddhist and pre-Buddhist philosophies, the mountains, rivers, streams, rocks and soils of Bhutan are believed to be the domain of spirits. Pollution and disturbance are believed to be the causes of death and disease for those spirits. The Buddhist respect for all living things has led to the development and adoption of ecologically friendly strategies — a solid base upon which a national environmental strategy can be built. This, coupled with the Buddhist tenet that the acts of this life will be rewarded or punished in the next, provides a powerful motivational principle for sustaining Bhutan's natural resource base.

Historically speaking, economic development has generally been dedicated to improving the quality of life. In Western cultures, this has usually meant the satisfaction of the population's material wants. According to this conventional definition, a country could only be called “developed” once it reached a certain advanced level of material consumption. On an individual level, this translates into consumerism and materialism.

Compounding the waste and excess inherent in these attributes is their essentially progressive and competitive nature. Not only do individuals want to be better off than they were last year, they also want to be better off than their neighbors, who also are seeing their material fortunes improve. Given that the vast majority of these material acquisitions are derived from nature, this geometrically rising pattern eventually exceeds the ability of the surrounding resource base to regenerate itself. Unless consumption patterns are altered or foreign resources can be brought in to fill the gap, the inevitable result is unsustainable development. This dynamic is only accelerated when individually increasing “needs” are compounded by collectively increasing populations.

In Bhutanese culture, however, the original definition of development was based on the acquisition of knowledge. Those who possessed greater knowledge were considered to be more developed. In a similar vein, the process of communal enrichment was based on a dynamic in which those who possessed superior knowledge imparted that knowledge to others. In the Buddhist religion, this concept of personal development was refined even further to entail overcoming the delusions arising from ignorance, aggression, and the desire for consumption and acquisition.

The notion that gross national happiness is more important than gross domestic product is thus inherent to the Bhutanese value system.

between 1984 and 1994 (NHS, 1994). If the current annual growth rate of 3.1% is not checked, the present population of about 600,000 will double by the year 2015.

Bhutan's most pressing resource-based need is thus providing food, shelter and clothing for its rapidly expanding population. This will not be easy. Despite the fact that 85% of the population is currently engaged in agriculture, Bhutan is only able to produce 65% of its total cereal needs — 65% in the case of rice, but 70% in the case of wheat (Eighth Five Year Plan). Meeting this long-term objective in terms of self-sufficiency in food production is clearly not likely in the near future. The country continues to be handicapped by the limited amount of land available for cultivation.

The prospects for agricultural expansion are thus very limited and will have to be supplemented through intensification — with all the attendant environmental repercussions. Although enhancing the productivity of its agricultural sector is one of Bhutan's most critical needs, it is certainly not one upon which a programme of overall national development can be based. In any case, the viability of existing land use systems will face serious short- and long-term challenges as increasing pressures come to be put on rural resources. Therefore, the Ministry of Agriculture has fixed a target of attaining 70% food self-sufficiency by the end of the Eighth Five Year Plan (1997-2002) and total self-sufficiency thereafter. This cereal deficit is currently made up by imports paid out of agricultural export earnings.

Another set of equally daunting challenges confronts Bhutan's rapidly expanding urban sector. Although only 14.5% (CSO, 1994) of the population currently resides in urban areas, this figure is expected to increase dramatically as a result of the combination of two dynamics — the “pull” of urban communities, in terms of the enhanced employment and social opportunities they offer, and the “push” that comes from the perceived diminishing of employment, educational and social prospects in rural areas.

Although such surges are common in the first phases of development, they are particularly problematic in Bhutan because of the shortage of suitable level ground. Bhutan's urban centres have sprung up in the only places they can — in major river valleys and along the southern border. The narrowness of most of these valleys has severe environmental implications for urban development activities.

Exacerbating the problem is the fact that these settlements have grown with only minimal urban planning. Town planners were simply not prepared for the dramatic increases

in urban populations that have come to pass since the first five-year development plan in 1961. As a result, there have been substantial adverse effects. In Thimphu and Phuentsholing, Bhutan's two largest towns, urban residents already face a host of housing, sanitation and pollution problems, including noxious vehicular emissions, contaminated water supplies and a growing accumulation of industrial and domestic pollutants.

Based on the plausible assumption that half of Bhutan's upcoming population increase will occur in the urban sector, it is estimated that the 100,000 current urban dwellers will grow to more than 500,000 by the year 2020. The next five years alone will thus see unprecedented stress put upon the country's urban and peri-urban environments by an increasing stream of economic migrants. Within the next 10 to 20 years, a dozen or more budding population centers can be expected to be affected by the same ailments that have recently come to the nation's two largest towns. The demand for low-cost urban housing will increase dramatically. There also will be great pressure on the government to provide educational, health and recreational facilities — all of which will put considerable stress on the natural resource base and prevent alternative land use practices from taking place, besides creating undue social problems.

Compounding the actual degradation of the surrounding environment, the very congestion of urban areas leads to increased levels of human discomfort. As a result, many Bhutanese have discovered to their chagrin that their relocation to an urban community has not improved their lives as originally anticipated but has actually led to a decrease in their material well-being.

Furthermore, migration to urban areas has resulted in an acute shortage of manpower to work the fields. Most educated youth do not return to the family farm. In many areas of the nation, large ancestral homes have been closed and the lands left fallow. This situation contrasts sharply with the shortage of agricultural land in other parts of the country.

Although towns will continue to attract people with their “pull” opportunities, much can



Urbanisation: Thimphu is one of the largest growing urban centres in Bhutan

be done to alleviate the “push” factors. The most pressing of these is the increasing difficulty of supporting a modern family on a traditional Bhutanese farm. Increasing rural populations and the dynamics of farm fragmentation have meant that a larger percentage of the population is losing access to land holdings large enough to meet subsistence — much less cash cropping — needs. Besides inducing these increasingly marginalised farmers — and their undernourished children — to seek their livelihoods in urban areas, insufficient land holdings force them to use more and more marginal land, especially steep slopes where the forces

of erosion eventually lead to land degradation and watershed damage.

The ongoing sustainability of many activities is threatened not only by numerical increases, but also by simultaneous increases in the expectations and living standards of the Bhutanese people. Adequately meeting their needs in ways that preserve the natural resource base upon which these and all future needs are dependent is destined to be the largest challenge facing Bhutan as it enters the 21st century. As such, it has become the primary objective of the Eighth Five Year Plan (1997-2002).

SURVEYING THE AVENUES OF DEVELOPMENT

In May 1990, senior government representatives gathered in Paro to begin formulating the broad criteria of Bhutan's development agenda. Bolstered by a national character that promotes the community rather than the individual, these representatives committed the country to what they termed “The Middle Path”. Bhutan's Middle Path focuses on the concept of sustainable development — i.e., development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.

The tangible result of that workshop was “The Paro Resolution on Environment and Sustainable Development”, a holistic statement of principles and beliefs that redefined sustainable development in a Bhutanese context. Its preamble clearly articulates the challenge that the RGOB has chosen to meet head-on:

This is the challenge of sustainable development: To raise the material well-being of all our citizens and to meet their spiritual aspirations, without impoverishing our children and grandchildren. The key is to find a development path that will allow the country to meet the pressing needs of the people, particularly in terms of food, health care and education, without undermining the resource base of the economy. New industries, new agricultural markets and new forestry products need to be carefully developed with respect to their broader environmental ramifications.

Achieving this laudable objective, however, is made even more difficult by the fact that Bhutan has relatively little experience upon which to draw. But as Lyonpo C. Dorji, the Planning Minister (1997), pointed out, the country is not willing to allow itself to become a victim of its own needs, nor the solicitations, no matter how well-intended, of developmental agencies:

We will not be rushed into an uncritical adoption of all things that are modern: we will draw on the experience of those who have trod the path of development before us and undertake modernisation with caution, at a pace that is consistent with our capacity and needs.

At the conclusion of that first workshop, the National Environment Commission (NEC), a high-level, cross-sectoral committee, then set about the hard task of identifying those economic avenues that would best enable Bhutan to pursue its Middle Path. In doing so, they took on the difficult task of balancing the material needs and aspirations of the people with the very real constraints caused by the country's geophysical status and its current level of social and economic development.

There were other concerns as well. For example, the RGOB is committed to providing a wide range of comprehensive free services to its people, e.g., education, public health and public safety. These services are not without cost

in any case, but especially not in a country like Bhutan, where so many people live in remote, scattered settlements that are isolated from each other and from administrative centres.

Compounding these expenses is the narrow tax base. Much of Bhutan's domestic economy is still based on centuries-old methods of subsistence farming, and the government has not yet started to charge user fees for most public services. However, in urban areas user fees now are being levied for basic services. Rural taxes are primarily token because of the low level of monetisation of the rural communities. As a result, the country is unable to generate internally the revenue that it will need to meet its development agenda.

The same forces that make Bhutan so rich in natural beauty make it relatively poor in those commercially valuable raw materials upon which most national development agendas are based. Although the land is covered in healthy forests, the conservation-oriented policies of the government do not encourage unscientific, large-scale extraction of timber and other forest products. And although valuable mineral

deposits exist, unscientific large-scale mining also is discouraged. Finally, although the soil is rich in nutrients, agriculture is limited by the topographical constraints discussed earlier. Because Bhutan's future natural resource base will be in large part determined by the way its current base is exploited, it is imperative that proposed development strategies emphasise not only the optimal utilisation of existing natural resources, but also the possibility of alternative utilisation, especially in the industrial sector.

As much as the country would like to proceed along a path of strict sustainability, it is readily understood that accomplishing the goals it has set for itself will inevitably involve compromises. For example, although strict environmental imperatives have been implemented in developed countries, Bhutan is an underdeveloped country striving to attain progressive levels of economic growth in order to improve the quality of life for its citizens. It cannot afford to have environmental laws, rules and regulations that will lead to either the locking up or the underutilisation of its limited supply of marketable resources. Having committed itself to a workable plan of economic development, Bhutan also has committed itself to using what it has to achieve optimum levels of socioeconomic benefits (as opposed to maximising resource exploitation), reduce the production of waste and arrest the process of all types of environmental degradation.

To achieve sustainable development, the National Strategy focuses on three avenues of development: hydropower, food production and industry.

Given the country's predominantly mountainous nature and size— both of which place severe limitations on the land's absorptive capacity — it was decided that the most promising of three avenues of development lies in further harnessing Bhutan's immense hydropower potential. As of 1996, hydropower generation accounted for one-third of the country's total annual revenue — and yet less than 2% (DOP, 1996) of the estimated hydropower potential had been brought into production. With a ready market in neighboring India, hydropower presents a relatively clean source of foreign revenue.



The topography of the country is characterised by steep precipitous slopes

The second avenue of economic development was determined to be increasing the country's self-sufficiency in food production, an objective made even more critical in light of projected population increases. The third is enlarging the industrial base to expand productivity and diversify employment. By taking

advantage of the relatively cheap electricity that will be generated by its expanded hydropower activities, the country has a unique opportunity to reduce its dependence on imports and create meaningful employment opportunities for its citizens.

FORMULATING A NATIONAL ENVIRONMENTAL STRATEGY

As affirmed at the Paro workshop, NEC's ultimate objective would be drafting a National Environment Strategy (NES), a dynamic, long-term vision to achieve sustainable development through improved environmental planning, policy-making and management. The underlying purpose of this document is to provide a long-term perspective of renewable natural resources management and outline a development agenda that has as its goal the material and spiritual benefit of both present and future Bhutanese citizens. To accomplish this, it must be premised on principles that reflect the real values of the natural environment in terms of human needs in a problem-oriented way that also anticipates changes in those needs. As such, its purpose is not to unnecessarily prevent, restrict or impede the growth of urban centres and viable industrial projects, but to recognise their environmental implications and reduce their adverse effects on Bhutan's fragile ecosystems. The ultimate objective of such a document is to prevent, wherever possible, and minimise or mitigate the environmental impacts that are likely to result from the implementation of national economic agendas — in Bhutan's case, the three avenues of development.

To ensure that environmental concerns were made an integral part of the development agenda, an NES Task Force was established in December 1993. Recognising that the activities of one sector of socioeconomic life invariably spill over — in greater or lesser degrees — into the activities of all other sectors, the task force was comprised of representatives nominated from the various line ministries and from the private sector (see Figure 1: National Environment Strategy Task Force Members).

The NES Task Force's first task was to investigate the environmental implications of the three avenues of development. An overview report provided by the NEC Secretariat outlined the status of Bhutan's resource utilisation and the obstacles ahead. Thirteen sector reports were then written by the NES Task Force to identify current issues and priorities on a sector-by-sector basis. In order to more fully appreciate the on-the-ground dynamics of sector activities, the Task Force met with villagers and local leaders and incorporated their views in the sector reports.

The NEC then convened a Task Force workshop in September 1994. The sector reports enabled the Task Force members to begin processing the sector-specific issues and priorities into comprehensive framework upon which a NES could be based. In recognition of the need for an overarching structural approach to natural resource management, three cross-sectoral principles were identified:

1. Sustainable economic development depends upon effective natural resource management;
2. Urban growth requires integrated urban/rural planning; and
3. All developmental planning and management should be sensitive to traditional Bhutanese culture and values.

These principles provide a way to address the fundamental two-sided issue of the "upstream" enabling conditions of pursuing development and the "downstream" implications of that development.

In evaluating Bhutan's institutional and technical capacities, the Task Force members identified five cross-sectoral and institutional needs. Although the country's deficiencies in these areas primarily derive from its late start in development, not any underlying lack of commitment or philosophical conflict, it was understood that any progress that Bhutan would make toward achieving sustainable development would be compromised if there was a basic shortfall in:

1. Information systems and research;
2. Institutional development and people's participation;
3. Policies and legislation;
4. Training and education; and
5. Monitoring, evaluation and enforcement.

The Task Force also identified a number of issues of special importance that the NES would have to address in order to balance environmental concerns and economic development. These include tourism and its effects on culture and environment; roads and the environment; resource-based mechanisms for financing sustainability; environment and public health; preparing for urbanisation; gender and natural resource management; Environmental Impact Assessments (EIAs); and population and sustainability. Each of these issues is addressed as a special focus in the Strategy.

The next step in the process was to begin drafting the NES document. This is a long

process that must be well-embedded in the economic, social and political composition of the country. While each economic sector may be concerned with the environment in respect to its own activities, it may not be aware that its utilisation of a particular natural resource may deprive other sectors of that resource, thereby creating scarcity and possible environmental degradation. For example, an important concern of the irrigation sector will be the alignment of channels to avoid landslides and soil erosion. Although this consideration is important, the overall effectiveness of these channels may deprive urban residents of access to water during dry periods, thus creating unhygienic conditions and potential health hazards.

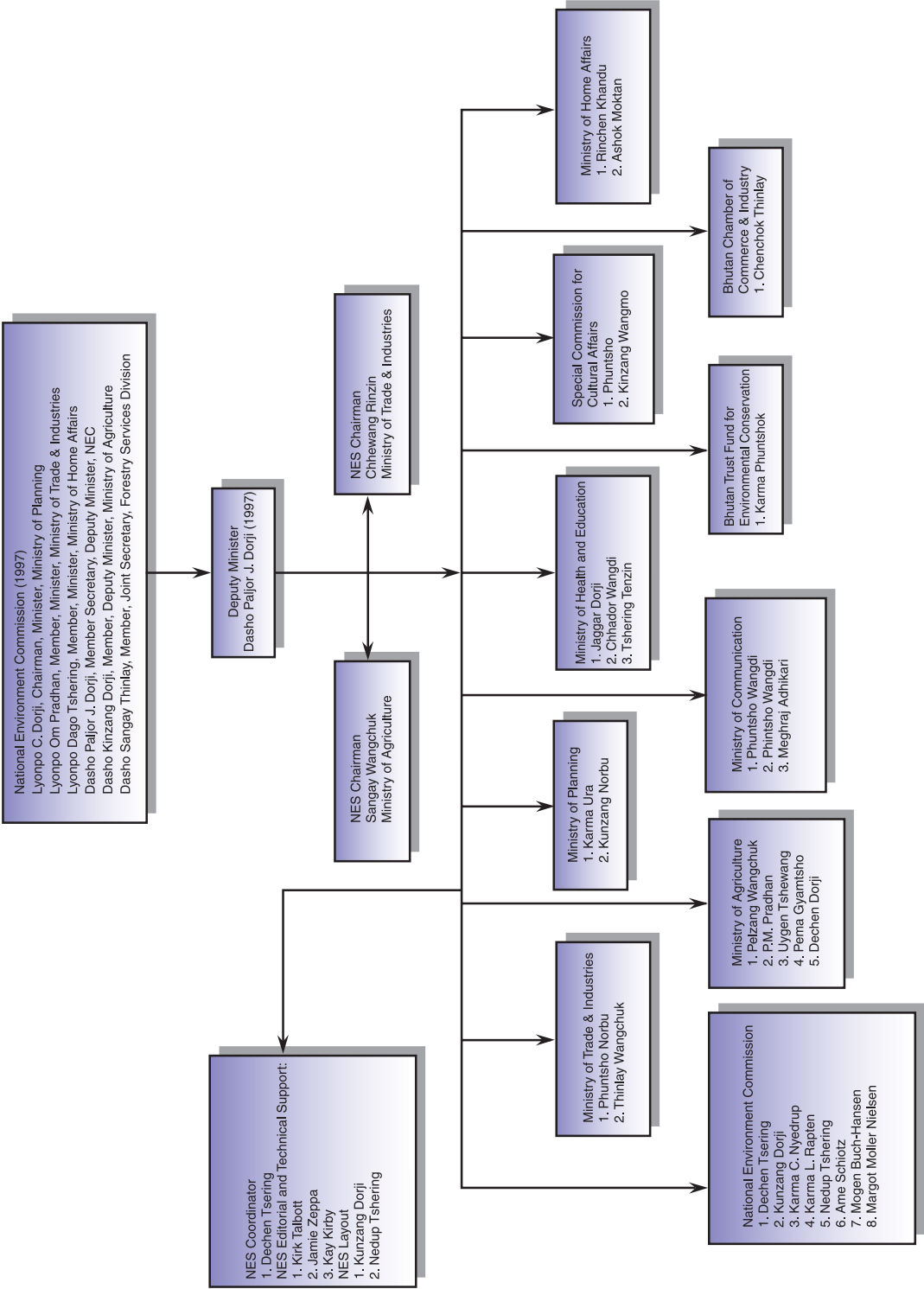
The lead role in drafting the NES was taken by NES Task Force members in their capacity as officers of pertinent ministries, agencies and the private sector. Their mandate was to ensure that the views of the ministries and the needs and perceptions of the people were incorporated into the Strategy from the beginning. Their working principle was that no NES can be effectively implemented unless it expresses the views of local-level resource users — the very ones who are responsible for managing most of the country's resources on a daily basis. As a result, the NES has to take into consideration their needs and their perceptions of environmental preservation. For example, although road construction damages fragile mountainous ecosystems, rural citizens need access to agricultural markets and schools, medical facilities, and technological innovations; this makes roads a necessary part of Bhutan's economic development. If Bhutan's NES does not strike this kind of balance, its implementation will be seriously impeded.



Livestock provide draught power for agriculture in rural Bhutan

FIGURE 1:

NATIONAL ENVIRONMENT STRATEGY TASK FORCE MEMBERS





ACHIEVING SUSTAINABLE DEVELOPMENT: A NATIONAL STRATEGY

All economic activity depends upon the availability of adequate quantities and qualities of raw materials — including labor. Generally speaking, availability is comprehensively considered before any economic activity is undertaken. If the supply of raw materials is deemed insufficient to justify the expense of extracting, transporting and processing, the activity is simply not undertaken — or it is postponed until technological advances or shifting economic values tip the balance in favor of initiating it. This is the situation with many mining-sector ventures currently under consideration. Although it is believed that sufficient quantities of copper, iron and gold do exist, the cost of extracting them now cannot be justified given demand levels.

Similarly, all economic activities also are responsive to their own after-the-fact implications — implications that may, in incrementally small but decisive ways, alter the status of that activity's continued viability. Should these prove unduly negative — either in terms of expense or social repercussions — or have adverse effects on the ongoing provision of the raw materials upon which the activity is based, then profitability will be effectively undermined and the activity will either cease or be appropriately reconstituted. Because of the ongoing

nature of extractive activities, after-the-fact implications thus become considerations in meeting the threshold of before-the-fact enabling conditions. The result is the cycle of cause and effect (see Figure 2: Dynamics of Sustainable Development).

Such after-the-fact implications are particularly important in comprehensive national development strategies, in that due regard must be paid to both the immediate and delayed repercussions of a number of overlapping and often interdependent economic activities. No longer is the profitability of any single activity a decisive factor; it is the overall effect of that activity's economic and social impacts across the spectrum of national objectives that matters. Assessment of those impacts must be conducted with even higher scrutiny when the goal is sustainable national development. This requires not only comprehensive information-gathering mechanisms and effective regulatory mechanisms but also specific mitigating measures.

If Bhutan's development strategy is to be built upon three specific avenues of development, its implementation depends upon successfully fulfilling the enabling conditions of those three avenues. Successful continuation,

SUSTAINABLE DEVELOPMENT IN THE BHUTANESE CONTEXT

There is no single definition for sustainable development. Each country, with its own historical and cultural heritage, unique geographic and physical characteristics, and social and political systems, brings an individual meaning to the term. The NES Task Force, during the course of developing the National Environment Strategy, came up with the following definition of sustainable development for Bhutan:

“The capacity and political will to effectively address today’s development and environment problems and tomorrow’s challenges without compromising Bhutan’s unique cultural integrity and historical heritage or the quality of life of future generations of Bhutanese citizens.”

however, ultimately depends upon monitoring the implications of those avenues of development and making the necessary adjustments to ensure that the overall strategy continues to be sustainable.

Nowhere is this complex and cyclical dynamic more apparent than in the hydropower sector, the primary avenue of Bhutan’s development strategy. Hydropower expansion is predicated on maintaining a dependable flow of silt-free water. That, in turn, is possible only if the present integrity of Bhutan’s watersheds can be maintained, which means maintaining the integrity of the country’s forests.

The construction of hydropower projects, however, will require the maintenance of even larger watershed areas. The progressive implementation of these new hydropower projects will alter pre-existing social and economic conditions, as well as enabling conditions of continued hydropower generation. The sustainability of an expanded hydropower sector thus will depend upon the maintenance of those enabling conditions, both as they change over time and as they change in response to the “downstream” implications of the implementation of national development objectives.

For example, if hydropower projects affect downstream agricultural activities, the extent and conditions of upstream water catchments would also be affected. This would occur because additional forest lands would need to be converted to agriculture to compensate for the overall shortfalls in productivity. This, in turn, could affect the volume and quality of the water available to the hydropower projects, thus reducing their efficiency and

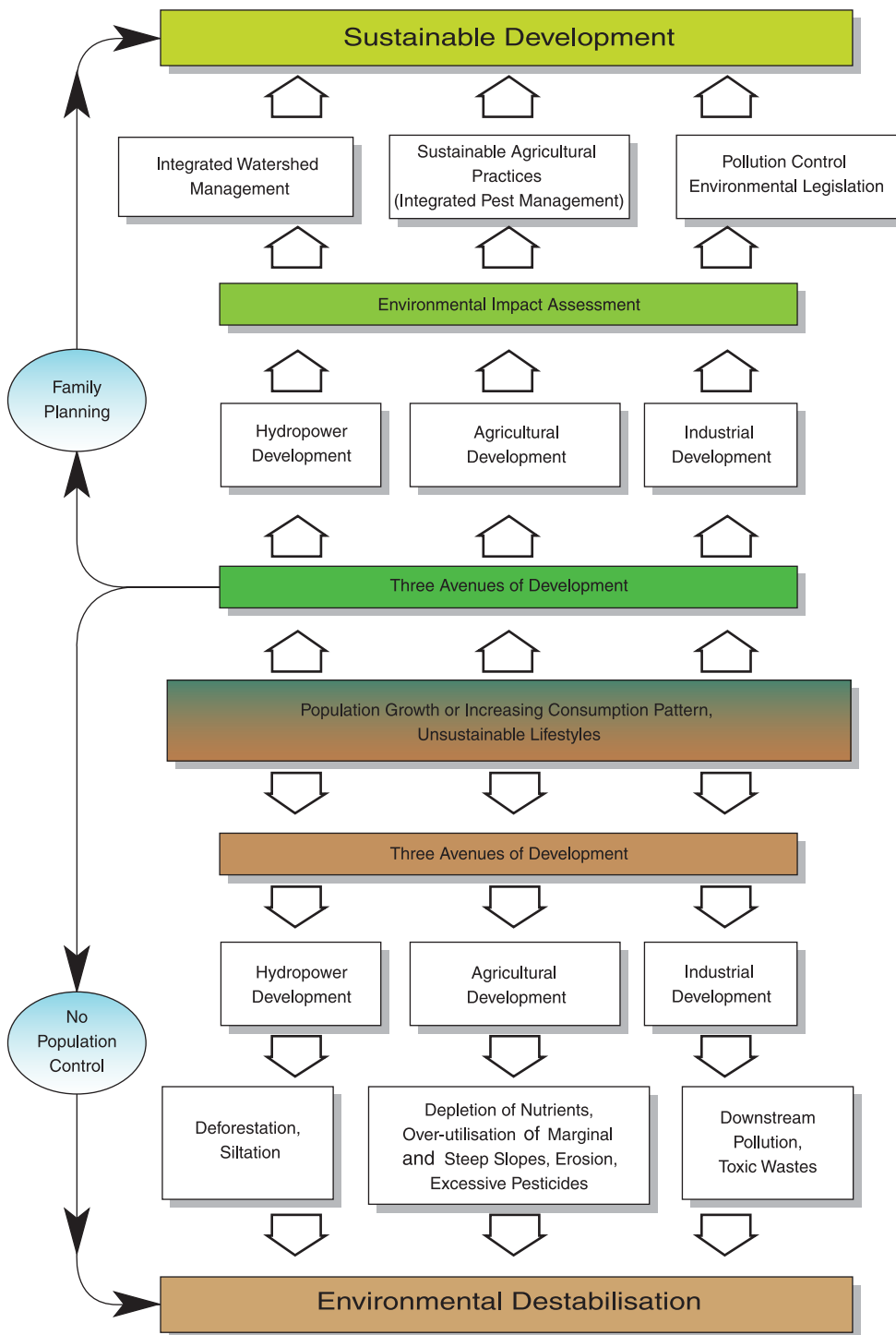
income generation. The end result might be a compromise of the country’s Middle Path of sustainable development.

Although many effects of economic activity are predictable, and thus can be prepared for, others are not. But whether anticipated or not, they will need to be addressed in a timely and effective manner on two fronts: first, to prevent debilitating constraints from compromising the proposed economic activities before these activities actually take place, and second, to remedy whatever detrimental effects they might have after the activities have been put into production.



Bhutan’s rich water resources serve as the major source of hydroelectric energy

**FIGURE 2:
DYNAMICS OF SUSTAINABLE DEVELOPMENT**



As noted above, the implementation of each of the three activities is dependent upon maintaining Bhutan's natural resource base. In addition to the enabling conditions and the implications that each of these has individually, we must consider the direct and indirect effects they have on each other. The better all these contingencies are anticipated and

prepared for, the better the country will be able to meet its sustainable development agenda. Given the hydropower sector's leading role in the economic development of the country, it is imperative that both its enabling conditions and its implications be given preeminent consideration.

A. DEVELOPMENT OF HYDROPOWER

CURRENT STATUS AND OBJECTIVES

Bhutan did not have electricity until 1964, when the first diesel generator sets were installed in Phuentsholing and Samtse. Assisted by the Government of India, the RGOB began establishing the first mini-hydel projects in 1967. By 1996, there were 21 of these projects scattered throughout the country (DOP,1996).

In 1986, Bhutan's first major hydel scheme, the 336 megawatt (MW) plant of Chukha Hydropower Corporation (CHPC), came onstream. Based on the success of the CHPC, two medium-sized projects — the Kurichhu (45 MW) and Bashochhu (60.8 MW) — and a major project, the Tala (1020 MW), are under construction (Eighth Five Year Plan, 1997). Detailed project reports have been completed for three large projects, the Sankosh (4060 MW), Wangchhu (900 MW) and Bunakha (180 MW), with technical and financial assistance from the Government of India (Eighth Five Year Plan,1997).

Although India remains the single most important partner in the development of Bhutan's hydropower, Japan, Austria, Norway and the Netherlands have contributed bilateral financing in recent years, while multilateral organizations such as the United Nations (UN), the World Bank (WB) and the Asian Development Bank (ADB) also have contributed to the development of the energy sector.

As of 1996, hydropower generation accounted for one-third of Bhutan's total annual foreign revenue, although less than 2% of the estimated total potential of 20,000 MW had been brought into production (DOP,1996).

With a ready and practically insatiable market in the region, hydropower represents a sustainable and relatively clean source of revenue, which Bhutan needs in order to finance other aspects of both its development and conservation agendas.

The further development of the hydropower sector also will result in the provision of much-needed electricity to the Bhutanese people. Although Bhutan currently exports most of its generated electricity, what it does retain has provided significant benefits. After the CHPC came onstream, 29,000 households (MTI, 1996) had access to electricity for the first time, and now enjoy a substantially improved standard of living. Moreover, with inexpensive electricity provided by this project, it has been possible to set up a few industries in the southwestern part of the country.

With electricity now generally available in the major urban areas, the government has turned to the arduous task of expanding the power grid into the countryside through extensive rural electrification projects. Given the rugged nature of the terrain and the vast distances that must be covered, extending the transmission line system is prohibitively expensive. The logical alternative has been the installation of micro-mini hydroelectric power stations and other alternate energy sources to cater to the power requirements of village communities. Initiated in the 1980s, these 20-200 kilowatt (kW) projects (DOP,1996) have already played a leading role in improving conditions for Bhutan's still-overwhelming rural majority. They are expected to assume an even larger role in

the near future. Among the more significant of the anticipated benefits of rural electrification are:

- encouraging cottage industries, both agro- and forest-based;
- replacing fuelwood for domestic heating, lighting and cooking;
- improving medical facilities by increasing the availability of preserved medicines;
- improving the level of education because more time would be available in the evenings for studying;
- increasing rural incomes because more time would be available for pursuing revenue-generating cottage industries such as weaving, painting and carpentry; and
- strengthening cultural identities and traditional crafts because more time would be available for community-building and personal enrichment.

Of these, the most widespread short-term benefits will come from the replacement of fuelwood for lighting, cooking and heating. Currently, fuelwood accounts for 75% (Eighth Five Year Plan) of domestic energy needs; Bhutan is one of the highest per-capita consumers of fuelwood in the world, more than 1.2 tonnes per year (Eighth Five Year Plan). Because of the traditional reliance on internal wood-burning stoves, the Bhutanese people suffer from eye diseases, high incidences of lung cancer and other respiratory illnesses.

The high levels of domestic fuelwood consumption also have adverse effects on Bhutanese forests. In many parts of the country, abundant fuelwood can be found in the form of dead trees and branches. But fuelwood collection near towns, and especially in more densely populated areas, has damaged peri-urban forests, sometimes to the point of unsustainability. The expansion of electricity would result in less pressure on these forests for fuelwood and hence increase prospects for maintaining the integrity of existing watersheds — a chief requirement for sustaining hydropower programmes.

In addition to bringing in increased revenues and expanding the existing electrical grid, the expansion of Bhutan's hydropower

sector also would allow for the development of a network of small-scale industries. Because Bhutan's four major river systems — the Amochhu, the Wangchhu, the Punatsangchhu and the Dangmechhu — all flow north-south, the expansion of the hydropower sector would promote more regionally balanced development. At present, industrial development is concentrated near the CHPC in the southwestern corner of the country. A 20-year Power System Master Plan was completed in 1993 to determine the optimal siting of these new or expanded hydropower plants, based on a combination of technical, economic and environmental criteria. One of the guiding principles has been to spread the benefits of industrialisation and reduce the concentration of its detriments. The net result of these activities is that the quality of village life will be significantly improved. This will reduce the number of rural migrants in search of better employment opportunities and social conditions. This migration not only strains the scarce resources of urban centres, causing a wide array of social problems, but also jeopardises agriculturally dependent rural communities by reducing the farming workforce.

In addition to benefiting the people, the expansion of the hydropower sector also would have tangible benefits on the land itself. Both "run of the river" projects (the most appropriate for Bhutan) with limited water storage mechanisms, as well as reservoir (dam) schemes, can reduce both the number and extent of destructive floods — an annual occurrence in the monsoon. They also encourage forest growth and retention by raising the level of water tables, thus mitigating erosion.

Healthy and extensive forests also provide a number of indirect ecological benefits. For one, forests act as carbon sinks that not only mitigate the potential effects of global and micro-level climate change, but also help offset local industrial pollution. In addition, the larger the expanse of protected forests, the greater the protection afforded to Bhutan's rich biodiversity with its extensive genetic benefits. Finally, forests are highly valued for their aesthetic and spiritual values. According to Buddhism, Bhutan's mountains, rivers, lakes, streams, rocks and soil are the domain of spirits. Preserving them is thus one of the many intangible aspects of gross domestic happiness.

Perhaps just as important as the benefits that hydropower does bring are the consequences that it does not. As an essentially clean source of energy, hydroelectric power reduces Bhutan's current dependence upon other forms of energy, the vast majority of which are much more environmentally destructive and expensive. The most significant of these substitute fuels is petroleum, nearly all of which is

imported from India. These imports contribute to Bhutan's currently unfavorable balance of trade, while their burning produces various forms of air and water pollution, including acid rain. The benefits from replacing coal, thermal and nuclear power with hydroelectricity extend to India as well, because this substitution will reduce the amount of pollutants being emitted into the air in the region.

<div>TABLE 1:</div> <div>NATIONAL POWER GENERATION DATA, 1990-1995</div> <div>(EIGHTH FIVE YEAR PLAN)</div>					
National Power Generation Data during 1990-1995 in GWh (million units)					
Source	1990-1991	1991-1992	1992-1993	1993-1994	1994-1995
Mini-hydel	6.619	7.364	5.046	5.488	5.880
Micro-hydel	0.876	0.876	1.445	2.015	2.015
Chukha hydel	1542.408	1554.370	1677.812	1679.239	1623.310
Diesel Power	0.046	1.315	3.059	1.085	1.069
Total Generation	1549.949	1563.925	1687.362	1687.827	1632.274

ENABLING CONDITIONS AND STRATEGIC NEEDS

The hydropower sector in Bhutan has grown rapidly in recent years. So far, however, this growth has not been consistent with the ability of the country to support the sector on a sustainable basis. Numerous impediments may further compromise the sector in both the long and the short term.

Topographically, Bhutan is certainly capable of expanding current levels of hydroelectric production many times over. Annual precipitation averages between 500 and 5,000 millimeters (Eighth Five Year Plan), and the mountainous topography channels the runoff through a series of narrow valleys that lend themselves to small, medium and large “run of the river” hydropower projects. In some valleys, reservoir schemes with dam structures also have proven viable.

If these projects are to remain productive, however, it is essential that the watersheds upon which they depend also are maintained.

This will be possible only if the government is able to limit forest incursions from a variety of socioeconomic development activities, including agricultural and rangeland encroachment, logging, human settlements, mining and road construction. To that end, the government committed itself to maintaining a national forest cover of at least 60% (National Forest Policy, 1974). Adhering to this commitment is one of the cornerstones of the present NES.

Initially mandated to earn revenue from forest resources, the Forestry Services Division (FSD) allowed for a proliferation of commercial sawmills, many of which logged indiscriminately. Some accessible forest areas were clearly overexploited until the government restricted private commercial logging in 1979. In 1984, the Forestry Services Division created the Forestry Development Corporation (formerly known as the Bhutan Logging Corporation) to manage all commercial logging activities. In the past five years, however, there has

been a major shift in forest policies. The present forest policy stipulates that revenue generation is secondary to conservation and protection. The Forest and Nature Conservation Act of Bhutan, enacted in 1995, also stipulates that all forest harvesting or logging operations should be strictly based on approved management plans and sound ecological considerations to ensure sustainability.

Experiences from other countries with similar topology and economic conditions have demonstrated how difficult it is to exploit mountain forests in a genuinely sustainable manner. In spite of good intentions, deforestation and severe degradation were often the end results. As a consequence of both internal and external experiences, it became increasingly apparent that the indirect benefits of forests far outweighed the direct cash revenues from the sale of timber. According to the new government policy, Bhutan's forests are to serve the following prioritised needs:

1. Watershed maintenance and general protection against erosion.
2. Maintenance of a stable climate and Bhutan's rich biodiversity.
3. Use by farmers for grazing, firewood collection, fodder, timber for construction and non-timber products.
4. Supply of raw materials for the growing wood-based industrial sector.
5. Export (only if sustainability permits).

Meeting these priorities will require concerted and comprehensive efforts. As the population continues to grow, so too does the demand for more arable land. Given the mountainous terrain, clearing forests is often the only practical solution in many locations. In such cases, the government's desire for food self-sufficiency could potentially conflict directly with the need to protect hydropower project catchment areas.

Encouraged by a large and ready market, illegal cutting, felling and logging — including that from areas declared protected or reserved — constitutes a major threat to the

health of Bhutan's forests and thus to the natural ecosystem.

Another threat to the forests stems from existing rangeland management practices. Because of the lack of sufficient pastureland, as well as the fact that people had traditional grazing rights on some of the forest land, there has been increasing encroachment of livestock into forests, which may cause soil erosion and may be a potential threat to regeneration.

In addition, migratory grazing practices, especially between temperate and subtropical regions, promote the degradation of both forest and agricultural resources. Absentee grazing rights constitute a serious disincentive for the proper care and management of grazing lands because the herders who use them do not have any long-term interest in maintaining the productivity of the land.

However, there are positive aspects of cattle grazing with regards to returning the biomass and providing organic fertiliser to the forests. The perceived negative impact of cattle grazing in the forests is only an assumption, because no in-depth studies have been done.

Livestock, particularly cattle, is important as a source of protein food. Of late, however, it has become clear that the role of livestock is equally, if not more, important to agriculture in terms of providing draught power and as the main source of organic fertilisers, which reduces the need for chemical fertilisers.

In many areas, cattle are kept primarily as a financial and social investment. It may be necessary to modify some of the cultural attitudes toward cattle in order to bring about long-term improvements in the environment. However, while our culture plays a positive role in the conservation of the environment, through the belief in the sanctity of all life, it plays a negative role when it comes to livestock reduction or breed improvement. Any significant change in the cultural attitude towards livestock is likely to have a commensurate negative impact on the Bhutanese philosophy of preserving the environment.

Encouraging social and community forestry programmes while maintaining the

policy of government ownership of all trees of a certain age leads to less productive forms of forest management practices. This policy of government ownership of all trees of a certain age further discourages individuals from abandoning *tseri* or converting fallow land into forests. Indiscriminate felling of young trees on the pretext of initiating *tseri* cultivation ensures retention of land ownership.

However, with the enactment of the Forest and Nature Conservation Act of Bhutan, the ownership of trees, whether under private or community forestry, will not be a constraint anymore because private ownership will be allowed, provided certain prescribed procedures are followed.

Threats to the quality of Bhutan's water come from economic growth and development. Besides increasing pressure on forests for fuelwood and timber for domestic and commercial construction, human settlements contribute to the pollution of rivers through sewerage and waste disposal. Industrial pollutants are equally capable of compromising downstream catchments by their destruction of flora and fauna. Agricultural expansion threatens water quality with the siltation that comes from clearing, while agricultural intensification

results in the runoff of equally destructive pesticides and fertilisers. Road construction and quarry operations could contribute to both the diminution of Bhutan's forests and the disturbance and degradation of existing drainage patterns if these activities are not carried out in an environmentally sound manner. Even the activities of trekkers high in the Himalayas can have significant downstream effects.

Thus, the need to protect forested watersheds in order to sustain the prospects for hydropower development inevitably conflicts with some of the needs of all major economic sectors. As a result, it is only through a coordinated and integrated planning process that Bhutan will be able to achieve the optimum use of its vast hydropower potential. An integrated approach to the development of the hydropower sector that determines land use priorities, implements afforestation programmes and utilises environmentally friendly construction methods is therefore essential. Paramount to the success of these activities is the necessity for all relevant sectors to have open dialogues before any medium or large power project is approved to ensure that the needs and interests of all relevant actors are given proper consideration.

IMPLICATIONS AND CONSIDERATIONS

In addition to its many upstream conflicts, hydropower development also has myriad downstream consequences. Although hydropower projects are designed to improve the overall flow of water by making more of it available during dry seasons, this does not always prove to be the result. Malfunctions or unforeseen ramifications result in premature release or ineffective storage. Even a properly functioning project can change the pre-existing pattern of water flow to such a degree that flora and fauna are adversely affected and established water-use patterns, such as those for irrigation and human sanitation needs, are compromised. On a more drastic note, dam bursts or other large-scale system failures can displace human settlements and destroy productive farmlands downstream.

The main conflict with other sectors, however, concerns the best use of forest land. In a country where nearly a quarter of the land consists of snow- and rock-covered mountains, making it unfit for human activities, maintaining a forest cover of 60% presents a considerable challenge. The need for more agricultural area and pasture land, as well as the growing cattle population and human settlements — all brought about by increases in population — directly threaten the existence of current forest lands. The need to meet domestic energy requirements and supply timber for construction further aggravates the situation. In addition, mining, wood-based industries and inundation by hydropower projects could all potentially serve to reduce forest coverage.

The physical construction of a hydropower project generates its own set of environmental implications. A great deal of care must be taken to minimise damage to the surrounding topography. Access and construction roads must be carefully contoured and constructed so that erosion is limited. The superstructures themselves must be designed so that the storage area behind the intake for “run of the river” projects and reservoirs behind dam structures maintain the integrity of the immediate watershed. Any logging operation that may disturb the ecological integrity of watersheds must be regulated through comprehensive management plans, which are a prerequisite of the Forest and Nature Conservation Act of Bhutan.

Although the liabilities associated with hydropower development are obvious for the most part, at times they can be quite subtle — and quite far removed from the project. Before any hydropower project is approved, therefore, it is crucial that proper Environmental Impact Assessments (EIAs) are conducted. The assessments should pay particular attention to the upstream integrity of the catchment areas, as the long-term sustainability of the project is dependent upon it. Resource pricing should be introduced to enable a full analysis of a particular project’s costs and benefits. This would assist planners in making choices about which follow-on activities would be most beneficial in the given locality, e.g., industrial development, mining, cash crops, forestry activities or tourism. A study is urgently required to determine energy use trends so that a comprehensive energy plan can be formulated. Of particular interest would be the amount of fuelwood for cooking, heating and lighting that would be replaced by hydroelectricity. In view of the myriad socioeconomic benefits that rural electrification brings, such a study should be conducted independent of the concerns of commercial hydropower development. The prospects of privatising some aspects of the hydropower sector also should be explored.

One prerequisite should be to have hydropower projects contribute to the protection of the catchment areas through afforestation, improved human settlements, alternative livelihoods for the upstream population and inexpensive electricity as a substitute for fuelwood. A system to ensure that the construction

industry uses environmentally friendly methods is also a high priority; for example, road construction may need to be subsidised by the power sector.

Because of the widespread repercussions that forest management policies have on the economic and social life of so many Bhutanese, there is a pressing need for clear policies. But first, an urgent need exists to document the extent and status of current forest resources, in order to make appropriate management decisions. The lack of such a database could easily undermine the sustainability of the resource base and all economic sectors that are directly or indirectly dependent on the health of the nation’s forests.

The following are among the more pressing currently needed reforms:

1. Afforestation and controlled commercial uses of private forests must be encouraged among the public wherever excess lands are allowed to remain fallow (the provision for afforestation and commercial uses of private forest is very well reflected in the Forest and Nature Conservation Act of Bhutan, under which trees grown under the private forestry programme are not subject to royalties).
2. The conservation of protected areas must not be left to the forestry sector alone. Other sectors benefiting from well-preserved, up-stream catchments should contribute to the continued protection of watersheds, especially within the hydropower sector.
3. Forestry conservation and use must be organised according to a “bottom-up” approach so that public participation is maximised. Where strict conservation rules and regulations must be implemented, it may be necessary to provide affected populations with alternative means of meeting basic needs.
4. Fully appreciating the fact that the overall sustainability of the national economic development plan hinges on the conservation of Bhutan’s forest resources, it may be necessary to ensure that timber prices

are rationalised and that timber is not subsidised.

5. For whatever timber is exported, as much value addition should be done in-country as possible.
6. Although preventing forest degradation through strict enforcement of rules and regulations is important, educating the people about the importance of forest conservation also is needed.
7. In all cases where either conservation or exploitation of forests is concerned, it is necessary to conduct an initial environ-

mental examination and, if needed, a thorough Environmental Impact Assessment. Private and public-sector industries must be made to pay adequate compensation when violations occur.

Enacting these reforms would require the active participation of many economic sectors, especially forestry, agriculture and industry. But only such an integrated approach to hydropower development — and more importantly, the proper management of the watershed — will ensure the long-term sustainability of an expanding hydro-power sector.

B. INCREASE SELF-SUFFICIENCY IN FOOD PRODUCTION

CURRENT STATUS AND OBJECTIVES

More than 85% (MOA, 1996) of the Bhutanese people live in rural areas, where they practice various forms of subsistence farming. Despite the relatively low population density, the average Bhutanese family in the north owns a farm of about two acres and in the south about eight

acres. Households with insufficient land of their own enter into tenancy contracts and share-cropping arrangements to get additional land for food production. Landless households are estimated at 7% of all rural households (MOA, 1996). Most of the land currently under cultivation lies in small and often isolated pockets along the main river valleys and throughout the southern foothills. Farming in Bhutan is not easy, because the steep slopes of most agricultural land make farming labor-intensive and mechanisation often is not possible.



Subsistence farming practices in rural Bhutan

The RNR sector covers agriculture (including horticulture), livestock and forestry. It remains the single most important sector, accounting for 40.7% of Gross Domestic Product (GDP) in 1993 (Eighth Five Year Plan). It is estimated that arable and horticultural production together account for about 53% of sector output, growing by an estimated 2% per annum between 1990 and 1993 (MOA, 1996). Livestock production is estimated to account for around 21% of sector output, while forest products account for around 26% (MOA, 1996).

Updated estimates for land cover, based on the analysis of 1994 satellite data, show that forests accounted for 72.5% of land area, while cultivated area accounted for 7.8%

(CSO, 1994). Given the location of their farms and the primitive transportation network, most Bhutanese farmers integrate their activities so as to become self-sufficient, producing a variety of grains, fruits, vegetables and dairy products and harvesting both timber and non-timber forest products. For centuries, this has been the Bhutanese way of life.

With the growing urban population and work force involved in development activities, Bhutan has been a net importer of food since the early 1960s. The current level of food self-sufficiency is about 65%. Despite significant improvements in yield, the output of food grains has not been able to keep pace with increasing demand. The primary reasons for this are:

- rapid growth in population;
- emergence of an urban, non-farming community;
- changes in food consumption patterns, especially from maize, wheat and buckwheat to rice; and
- feeding guest workers on development projects.

Bhutan thus continues to rely on imports to make up the shortfall. In recognition of both the long- and short-term implications of this, the government has made food self-sufficiency its long-term goal.

A comprehensive and ambitious set of policies and initiatives must be implemented effectively if Bhutan is to improve its current ability to feed itself. Among the more prominent policy objectives that are being adopted during the Eighth Five Year Plan are:

1. Sustainable and balanced development of RNR for the enhancement of self-sufficiency and food security through an integrated systems approach within the national economy;
2. Improvement of income and nutritional standards of the rural population; and
3. Conservation of the unique natural and cultural heritage of the country and protection of the fragile mountain environment.

To achieve these policy objectives, the main strategies are:

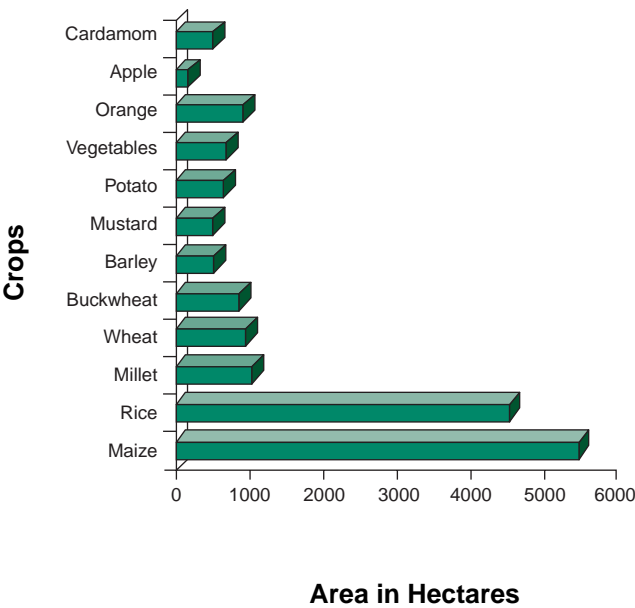
1. Conceiving and implementing needs based research to increase production, conservation and efficient use of local resources. The role of the RNR research programme has been broadened to include input into policy development and monitoring technology to avoid inappropriate or harmful introduction.
2. Maintaining an integrated RNR extension service for technical guidance, farmers' training and educating rural households on how to increase their own self-reliance in a sustainable way. A new extension policy adopted by the Ministry of Agriculture (MOA) emphasises environmental considerations and the need to expand income generating activities in rural areas.
3. Promoting agricultural and livestock products that have comparative advantages.
4. Phasing out subsidies on production inputs and ensuring credit, input and marketing services in the public and private sectors.
5. Promoting popular participation through collective and private institutions.
6. Maintaining integrated conservation of biodiversity (plant and animal genetic resources). Biodiversity conservation will be of immense importance for continuous improvement of agricultural productivity and production.
7. Enforcing integrated protection and rehabilitation of natural watersheds.
8. Enhancing the planning base for the sector and an enabling regulatory framework.

In recent years Bhutanese farming has been progressively moving toward more market-oriented practices. As a result, many Bhutanese farmers now produce cash crops such as apples, oranges, cardamom, mushrooms and potatoes, which are sold at both local and regional markets. The improved, high-yielding varieties of horticultural commodities

available to all farmers have benefited household economies. There is evidence that local income generation from non-timber forestry products is also increasing. As with the increased availability of other social facilities,

horticulture development will help in reducing rural-urban migration, thus improving the overall quality of life for all segments of the population.

FIGURE 3:
CROP PRODUCTION DATA, 1992 (EIGHTH FIVE YEAR PLAN)



ENABLING CONDITIONS AND STRATEGIC NEEDS

As mentioned earlier, extensification and intensification of agriculture both face serious constraints in Bhutan because the expansion of arable land is not possible and the nature of the terrain makes enhancing the productivity of cultivated land difficult. Most rural Bhutanese households rely upon an integrated system of crops, livestock and small-scale forest management. This close relationship between the three sectors is essential to ensure sustainable production.

Converting forests to agricultural land is undesirable for a variety of reasons. Besides the absolute shortage of land, increased agricultural productivity in Bhutan is handicapped by poor road access and communications networks. The problems associated with harvest

storage facilities, transport and sale of farm produce encourages subsistence farming, because farmers are reluctant to take chances by growing crops that may not survive the trip to distant markets. The combination also makes the production cost much higher in Bhutan than in neighboring India.

In addition, the limited specialised agricultural personnel and supportive institutions (e.g., farmers' agribusiness consortiums), as well as the isolated nature of many farming communities, restricts the dissemination of technical know-how throughout the country.

To address the agricultural sector's myriad needs and obstacles, the MOA has initiated a number of research programmes and



Most Bhutanese villages are located in remote mountain valleys

policy initiatives. The first step in moving towards food self-sufficiency is to know the nature, extent and state of current agricultural practices. Without this critical crop and ecosystem-specific information, government planners will be hard-pressed to determine exactly which adjustments to current practices or which new initiatives are likely to have the desired effects. It is essential that the decisions are based on sound cost-benefit analyses that take into consideration the long-term sustainability of proposed activities.

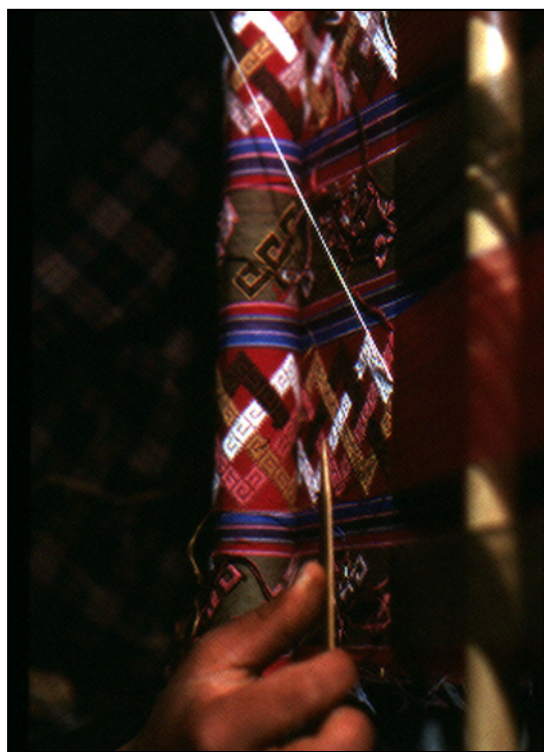
One of the potential conflicts arises from growing urban areas. More and more agricultural lands are used for roads, housing, waste and sewerage systems, power plants and transmission lines. Even in rural areas, substantial pressure is felt to convert arable land and pastures into space for schools, hospitals and other public facilities. Power production, mining, industrial development and infrastructure construction are other areas that are in conflict with the sector.

At the current rate of population growth, 3.1% per annum (NHS, 1994), maintaining a high degree of food self-sufficiency is going to be difficult. It is most important that population growth is controlled in a manner

consistent with the country's ability to feed itself. Specifically, the unrestricted growth in urban population must be checked. Although population control is important, however, it should not compromise development activities and the continuity of family farms.

With Bhutan's increasingly commoditised economy and its exposure to modern material goods, most rural households are no longer content with just maintaining traditional levels of income. The change from subsistence to intensive cropping has resulted in an increased rate of nutrient loss from the soil. As agricultural land becomes less productive, pressure on forest lands will increase in order to maintain rising production levels.

A number of small- and medium-sized cottage industries also are dependent on the agricultural sector. Bhutan's agro-products are of high quality and compete well in regional markets. By adding value to basic agricultural commodities, agro-industries not only increase rural income, but they also extend otherwise seasonal agricultural activities and help reduce rural-urban migration. Expanding the currently



Textile weaving is a growing cottage industry in Bhutan

limited extent of these industries should be a priority in the national development agenda.

Increasing Bhutan's food self-sufficiency is a worthy objective and one that clearly serves both short- and long-term national interests. Because this objective depends on al-

terations and improvements in the use of Bhutan's limited land, it is going to interfere with the simultaneous accomplishment of those other national objectives which rely upon the same land. The overall challenge will be to make sure these changes occur in ways that are as environmentally sustainable as possible.

IMPLICATIONS AND CONSIDERATIONS

The potential conflict between hydropower generation and increasing food self-sufficiency arises in both land and water use. The easiest and most traditionally implemented way of increasing food production has been to convert the nearby forest into agricultural land. However, the soil characteristics and topography of much of Bhutan's forest lands effectively limit how much forest land can be converted. Hydropower, on the other hand, could call for the inundation of valley bottoms, which often contain prime agricultural land. There is not enough land available to meet both the needs of an expanded hydropower sector and to achieve a high degree of food self-sufficiency. Land use priorities must therefore be determined through comprehensive studies that consider the economic cost of the benefits and the effects of the alternatives on the environment. In accordance with these findings, proper plans will then need to be prepared and implemented.

Bhutanese people over the centuries have optimised land use for agricultural purposes. The traditional land use classes include:

- *Chu-zhing* (irrigated rice land).
- *Kam-zhing* (rain-fed dryland).
- *Pang-zhing* (land use similar to shifting cultivation, with very scanty tree cover and short-fallow rotation).
- *Tseri* (long-fallow rotation/shifting cultivation).
- *Sok-shing* (public wood lot on which either individuals or a community have user rights for leaf-litter, fodder and dry firewood).
- *Tsamdro* (natural pasture/grassland on which an individual or a community has grazing rights).

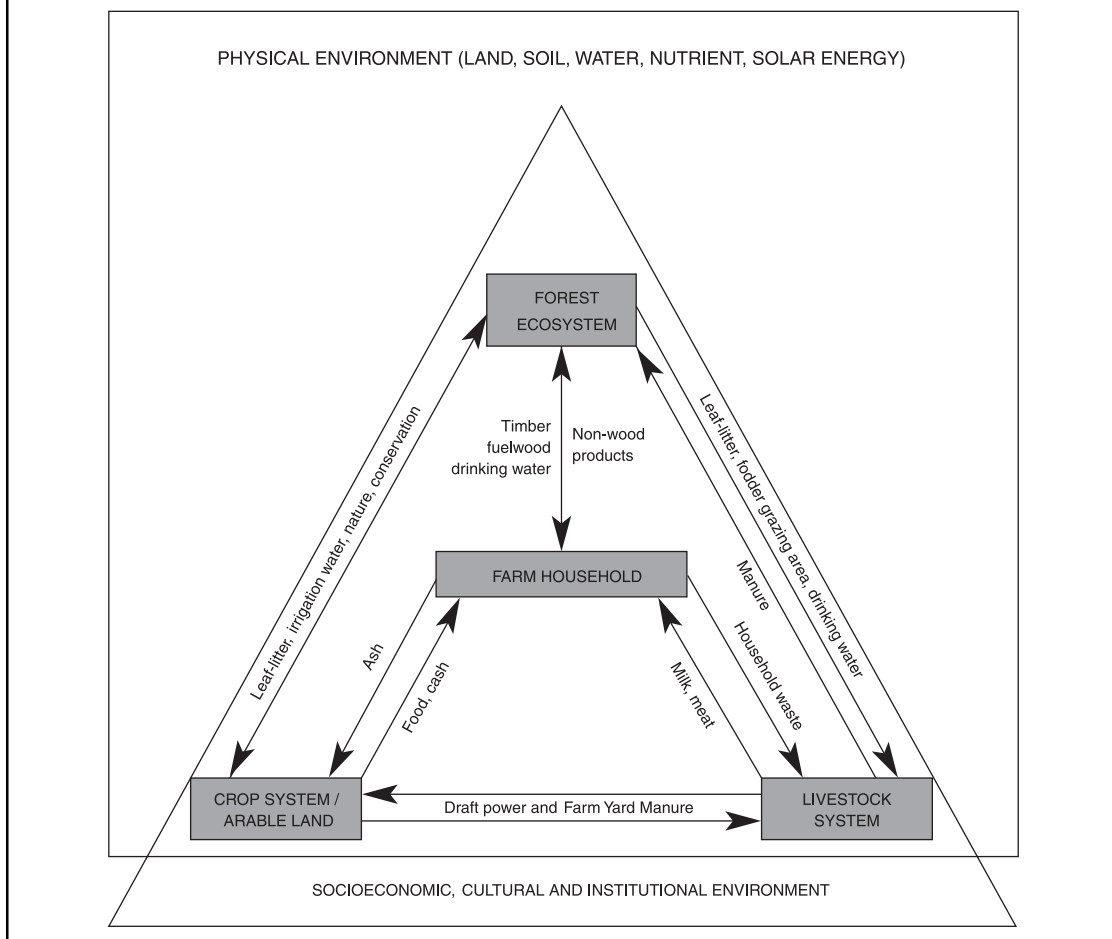
These land use categories, which have not changed significantly, take into account the



Yak herders' camp

FIGURE 4:

SOCIOECONOMIC, CULTURAL AND INSTITUTIONAL ENVIRONMENT OF THE FARM HOUSEHOLD



agro-climate, land capability and the socio-cultural aspects of Bhutanese society. Thus, this system of land use is not dictated simply by the subsistence needs of isolated communities but by a sophisticated ecological response to a risk-prone micro-climate environment.

Sok-shing, for example, is a tested traditional system of using natural resources sustainably. Leaf-litter collected from the *sok-shing* serves as bedding for cattle in their sheds, and the combination of decomposed litter and manure is applied to the field so as to improve soil fertility.

This practice has been a lifeline for Bhutanese farmers as, generation after generation, farms have been kept-fertile through leaf-

litter collected from *sok-shing*. Although modern chemicals are now being used in limited quantities, the compost/leaf-litter from *sok-shing* is still applied widely in the country. If Bhutanese farming is to remain sustainable, the continuity and improvement in *sok-shing* management is imperative.

Another example of sustainable land use is *tsamdrol* in the high mountainous region of northern Bhutan. Here the pastoralists depend primarily on yak herding for their livelihood (Box 3: Yak Herding in the Himalayas: A Microcosm of Sustainability). The grasslands of northern Bhutan are not suitable for crop production and have little alternative use. The system of checks and balances in the management of community grazing lands has led to

YAK HERDING IN THE HIMALAYAS: A MICROCOSM OF SUSTAINABILITY

Pastoralists in the more remote mountain regions of northern Bhutan maintain yak herds. The pastures are grazed on a rotational basis. Yaks provide milk, meat, fiber and hides and are used as pack and draft animals as well as for riding. Yak hair is woven into tents.

Pastoralism in Bhutan has developed through long-term persistence under generally inhospitable circumstances. Over the centuries, pastoralists have been successful in using multiple species and traditional grazing systems to maintain the productivity of their range resources and to prevent overgrazing. In the past 40 years, however, profound changes have taken place on the rangeland of Bhutan; the modernisation process has brought improved access to markets, the expansion of agriculture on grasslands, increased tourism and alternative employment opportunities, and a gradual settling down of many nomads. The increase in the human population and rise in incomes have resulted in a rising demand for livestock products. Cash has replaced the traditional barter system, and many of Bhutan's nomadic pastoralists now have better standards of living. These social and economic transformations have altered the previously stable relationship between the settled agriculturists, the pastoralists and the rangeland environment.

the maintenance of both a fairly stable yak population and productivity of the grazing land.

The local institutions regulating the use of these grazing lands ensure that they are rotated every three years or so in an equitable way among the pastoralists. Methods used to allocate the grazing lands include a lottery draw. Parts of grazing lands are ranked according to their quality by consensus among the pastoralists. Because pastoralists do not know who will eventually get which part of the grazing land, they rank the land objectively. Afterward, they cast dice three times and the highest scorer gets preference. This ensures equity among the pastoralists.

Currently, the MOA is establishing a database that will provide planners with reliable information about Bhutanese farming systems and land use practices. Included will be physical as well as socioeconomic factors. Equipped with this information, the MOA will be able to conduct data analysis for land use planning purposes, specifically at local levels.

Bhutanese agricultural planners continue to be handicapped by the low level of literacy of the farming communities and poor communication. Improved farming practices are of no practical value if they cannot be conveyed to all Bhutanese farmers. There is, therefore, a need to ensure that adequate

information is disseminated to farmers in a timely manner. To facilitate this process, the MOA has established a Farmer-Extension Communication Support Unit and Market Information Unit at its headquarters.

Bhutan will need to implement a number of activities geared toward improving agricultural productivity. Among the most important and widespread of these will be to improve the irrigation system. But water used for irrigation could potentially interfere with the needs of the hydropower sector. Given the fact that most of Bhutan's hydropower projects are the "run of the river" type, potentially there could be a conflict between the needs of both sectors during the dry season, when both sectors need water most.

Irrigation projects are not new to Bhutan. Until now, however, they have yet to produce their anticipated impact on overall agricultural productivity. Among the most conspicuous problems encountered are technological deficiencies in the design of projects and disappointing levels of "ownership" of the schemes by local user groups. The former is in large part a consequence of the nationwide shortage of properly trained irrigation engineers. Poorly designed or inappropriate irrigation schemes not only waste precious water, but they also often cause severe gully erosion along the course of the irrigation route. At the same

SOIL RESOURCES MANAGEMENT PROGRAMME

Ensuring the sustainability of agricultural practices is a concern that cuts across many of the programmes in the RNR sector. During the Eighth Five Year Plan (1997-2002), the Soil Resources Management Programme will work together with the research, extension and input supply programmes of the Ministry of Agriculture in specifically addressing these issues:

- the use of farmyard manure, crop residues and forest litter;
- improved cropping systems and water management practices;
- the judicious use of mineral fertilisers;
- introduction of an integrated plant nutrient systems approach in research and extension;
- introduction of Effective Micro-organisms Technology;
- production of appropriate inoculants of nitrogen-fixing bacteria in required quantities;
- participatory methods for natural resource management to be applied by farming communities; and
- development of fertiliser input distribution policies and strategies.

time, reduction of the original flow or the addition of new runoff patterns can cause detrimental environmental effects of their own. In a truly worst-case scenario, both can occur.

Under the current system of government-initiated, -designed and -constructed projects, local-level users tend to lose both interest in and responsibility for these irrigation schemes. This unfortunate but widespread eventuality has been addressed by the National Irrigation Policy, a primary tenet of which is that the operation and maintenance of all government-assisted irrigation schemes is to be performed by the beneficiaries themselves. Water users' associations have been formed to establish rules and regulations for the effective use of irrigation schemes.

Another method of improving agricultural yields lies in the use of agro-chemicals (fertilisers and pesticides), for which alternatives must be found. Although these practices are well-established throughout the world and have been used successfully to increase production, they must be employed carefully and judiciously to avoid unwanted pollution and health consequences. The increasing usage of agro-chemicals is particularly threatening in a country like Bhutan, where the quick succession of ecosystems caused by the steep topography would increase the potential downstream effects from each application. Also, the general unfamiliarity of Bhutanese farmers with

usage practices increases the likelihood of errors, which can have far-reaching ill effects on human health and crops. Therefore, organic farming must be promoted.

Even so, Bhutan's agricultural sector has to continue to develop. The use of fertilisers should be closely coordinated with soil fertility management and conservation programmes, because the increased production of crops is directly dependent upon the productivity of the soil. When using fertilisers for soil fertility and pesticides for crop protection, the side effects must be carefully studied so that mitigation measures, such as banning certain pesticides, do not end up undermining the productivity of the soil.

The cycle of sustainability within the traditional farming system is based on a close linkage between arable agriculture, livestock and forestry. Ensuring the sustainability of agricultural practices is a concern that cuts across many of the programmes of the RNR sector. During the Eighth Five Year Plan, the Soil Resource Management Programme will address cross-cutting issues of sustainability that are related to productivity of land under cultivation (see Box 4: Soil Resources Management Programme).

Another avenue for improving agricultural productivity lies in reducing per-unit labor inputs by increasing mechanisation.

Although the prospects for mechanisation are severely limited in most Bhutanese farming communities because of small plot size, isolation and rugged terrain, in some areas it can be expanded. As the precepts of mechanised farming become better known and appreciated and more equipment becomes available, the extent of mechanisation will naturally increase.

In agriculture it is important to note that, unlike activities in the hydropower sector, which must be implemented via large-scale and coordinated government actions, agricultural interventions are ultimately in the hands of individual farmers. The farmers take into account taxes, prices and availability of agricultural inputs and make their cropping decisions based upon what they perceive to be in the best interest of their families. Past efforts to implement “better” farming practices often have fallen short because the intricacies of small-scale farming have not been fully appreciated. For example, a high-yield variety of rice that does not appeal to the taste or makes threshing more time-consuming will soon be abandoned by farmers. Thus, there is a need to better understand how farmers think strategically and what their objectives, constraints and long-term priorities are.

The MOA lacks qualified and trained manpower to work closely with farmers, both at higher levels of specialisation and at the extension level, particularly at the *dzongkhag* level and in more remote areas of the country. With

the adoption of the RNR approach, the agricultural, animal husbandry and forestry programs now will be implemented in an integrated manner, resulting in better understanding of small-scale farming.

The primary objectives of a high degree of food self-sufficiency, household income and employment in rural areas can only be achieved through intensive agriculture, diversification of commodities and promotion of agro-based industries. In view of the above, the specific priority activities related to the environment and biodiversity are:

- Dissemination of low-cost sustainable soil fertility management and conservation practices.
- Development, demonstration and promotion of pre- and post-production technologies and Integrated Pest Management (IPM) practices.
- Capacity building for developing natural resource/agricultural statistics and farming systems information.
- Development of a comprehensive national listing of biodiversity (phyla, genus, species and sub-species), with location, distribution, description and status.
- Development and rehabilitation of natural pastures in subalpine and alpine areas.

C. INDUSTRIAL DEVELOPMENT

CURRENT STATUS AND OBJECTIVES

Bhutan has limited mineral resources and agricultural potential and must devise alternative ways to generate foreign revenue. The twin objectives for industrial development are:

- 1.Expanding productivity in the industrial sector in order to finance increasing public expenditures, the high cost of social and basic infrastructure and trade deficits.
- 2.Diversifying and increasing employment

opportunities for a rapidly expanding population.

To do this, Bhutan must utilise its comparative advantages. One of these is the abundance of swift-flowing water. By converting this resource into low priced electricity and using indigenous raw materials, Bhutanese industries can be competitive in regional markets. Moreover, by expanding both the extent and number of these activities, the government hopes

to be able to put even more Bhutanese to work and generate revenue.

During the course of the Seventh Five Year Plan, the RGOB has emphasised the development of the private sector. To facilitate this growth, many manufacturing companies and service industries have been privatised. In a complementary move, the government has established technical assistance programmes for the private sector. By setting aside 28.4% (HRD Master Plan, 1997-2002) of its Human Resources Development (HRD) Budget for activities in the private sector, the government hopes to significantly enhance managerial and technical capabilities.

Meanwhile, in the area of trade development, quantitative restrictions have been replaced with tax and price incentives. Rules and regulations for imports and exports are being simplified, and the government has liberalised the licensing system to encourage and promote free enterprise.

The Bhutan Chamber of Commerce and Industry (BCCI), a non-profit organisation, aims to facilitate discussions between the private sector and the government, extend and facilitate services in various areas of business and act as a forum for discussion on commercial issues. As a newly formed organisation, however, BCCI lacks technical capability. This, of course, is the same daunting challenge faced by the emerging private sector.

In addition to institutional challenges, private-sector growth is hindered by the need to preserve both the cultural and the natural environment. Strong conservation policies restrict the extraction of commercially valuable raw materials and minerals. For example, although the country is covered in extensive natural forests, the government's strong conservation policies discourage the commercial extraction of timber. In tourism, the unique culture and natural beauty of the country are favorable for the growth of tourism, but high tariffs set by the government discourage large-scale tourism.

Other areas where the private sector faces constraints are:

- an acute shortage of both trained and semi-skilled manpower;
- appropriate technology;
- adequate financing; and
- entrepreneurial and managerial skills.

Contemporary industrial activities in Bhutan are broadly classified into four categories: forest- or wood-based, agro-based, mineral-based and service-based. The three most important of these are currently the forest-based, mineral-based and service industries, which total 2,730 (Eighth Five Year Plan). There were 72 agro-based industries as of June 1995 (Eighth Five Year Plan). In addition, there is a good potential for agro-based industries, given the high quality of Bhutanese apples, pears, apricots, peaches, oranges, asparagus and mushrooms. Products from the two agro-industries, Bhutan Fruit Products Ltd. and Bhutan Agro Industries Ltd., apples and oranges already have found a place in the Indian market, and export of these products to Bangladesh has increased in recent years.

As a result of the strong conservation standards contained in the Forest Act of 1969, the Forest and Nature Conservation Act of 1995 and subsequent government documents, the extraction of timber for sale or commercial usage has been reduced substantially. Most of the recent growth in the industrial sector thus has come in mineral-based activities. From 1982 to 1992, the contribution of mining and quarrying to the GDP has risen from 0.01% to 3.2% (Eighth Five Year Plan). The bulk of this output has come from small, captive mines in the southern foothills that produce low-value industrial minerals such as dolomite, limestone and quartzite. Because these substances must be extracted in large volumes to be economically viable, their growth has had increasingly greater impact on the local environment.

Because of the location of the raw materials; proximity to India, which serves both as a source of some industrial inputs and an export market; and availability of power, Bhutan's major industries (particle board, calcium carbide, ferro-silicon, cement and liquor) have been established in the south and southwest. The government is, however, fully aware of the need to achieve a certain degree of regional balance and is encouraging industries in

other areas. A fruit processing plant and two wood-based industries are located in the Thimphu district, and a major, 1,500 tonne-per-day cement factory (NA, 1995) will soon be set up in the southeast. In addition, an industrial estate is being developed at Jemina near Thimphu to encourage the establishment of more industries in the region. Nevertheless, this industrial estate and the Service Centre at Changzamtog, Thimphu, are located on river terraces, with the potential to generate downstream pollution unless strict pollution control measures are enforced.

Not only would the goods manufactured by these industries be sold abroad, they also would be sold domestically, thus increasing the overall well-being of the Bhutanese people and reducing the country's dependence on imports as well as the trade deficit. In addition, by facilitating greater use of the country's common resources through technical and financial assistance, the expansion and

modernisation of industry would enhance the development of Bhutan's private sector. Last — but certainly not least — the expansion of indigenous industries would provide employment to both urban and rural populations.

At present, the service industry is the area of greatest growth. The construction business is booming, largely caused by the infrastructure necessary for development. Construction projects recently completed or currently under way include hospitals, schools, administrative buildings, power substations, road maintenance, new roads and sewerage plants.

Although officially a part of the service sector, recent expansions in foreign tourism have brought in substantial amounts of foreign revenue. However, tourism involves opportunities and challenges that are significantly different from traditional industrial development and therefore is discussed as a separate issue in Special Focus A.



Wood is an important material for construction in Bhutan

As with both the hydropower and agricultural sectors, the expansion of Bhutan's industrial sector presents a number of constraints. To a large extent, the future growth of this sector is limited by the country's rugged topography, which makes power supply, transport and communication impossible in some situations and extremely difficult and costly in others. While industrialisation may be necessary to keep the growing and predominantly youthful population employed, it will directly compete with urbanisation for land and for fields and pastures needed for agricultural growth.

Experience has demonstrated that it is extremely difficult to find extensive and suitable land in the upland portions of the country for anything other than small manufacturing facilities. Most towns in these areas have grown up around the *dzongs*, many of which were constructed to take advantage of strategically defensible positions such as rock outcroppings and floodplains. In such locations, there is little or no space for expansion. For those towns that grew up around *dzongs* located in river valleys, industrial expansion can occur only by extension into valuable agricultural land or hazard-prone areas. As a result, larger towns and industrial centres can only be sited on some of the gentler slopes. The "squeezing in" of industrial estates, however, can lead to slope instability problems — all in addition to the environmental problems generated by the industrial activity itself.

Industrial development in Bhutan also is constrained by the supply of and access to raw materials. Future industrial development will have to rely primarily on harnessing hydropower, either by itself or in conjunction with accessible mineral resources. This brings industrial development into direct conflict with established priorities to preserve the integrity of the nation's watersheds and the commitment to restrict access to protected areas such as wildlife sanctuaries, national parks and reserve forests.

Although most of Bhutan's mining occurs in the southern foothill region, mineral surveys are being carried out across the country. However, if no human activities are to be permitted in officially protected areas, then the mineral resources they contain — whether discovered or undiscovered — will be unavailable for utilisation. Because the present extent of these protected areas is large relative to the size of the country, a substantial portion of Bhutan's mineral resource base could be potentially locked up.

Eventually, the mineral deposits in the southern foothills will be depleted. When this happens, there will be a need to concentrate mineral exploration and development activities in the central valleys and at higher elevations. Given the increased problem of access and the greater fragility of those ecosystems, their opening up will involve significantly higher levels of potential environmental degradation.

In addition to official protected areas are *nheys*, distinct topographical features that have been left untouched by local populations because they are believed to be the home of local deities or guardians. These *nheys*, which may take the form of mountain lakes, peaks, forest groves or rocky outcroppings, must be strictly avoided. To ensure that these *nheys* are not infringed upon, they will need to be officially authenticated and demarcated by appropriate local authorities.



Trashigang Dzong: traditionally dzongs were located at strategic sites

Until now, the impacts of Bhutan's industrial activities on the local environment have been insignificant, primarily by virtue of being small-scale. However, Bhutan's extremely fragile mountain environment can be seriously and easily compromised by further industrial growth if preventative measures are not taken. As the industrial sector expands, adverse impacts on the local environment and public health will become inevitable.

The few mineral-based industries that exist are generally located on river terraces. Effluents from larger or more numerous plants, if left uncollected or untreated, could contribute significantly to the incremental pollution of nearby rivers and streams. Fly-ash and gas emissions from chimneys and dust from other sources could come to constitute both an environmental and a human health hazard.

Depending on their needs, industrial development activities also can bring about potential changes in land use patterns. If industrial projects come into conflict with agricultural needs, they may end up competing for available water resources. This could affect local drinking water supplies and village irrigation schemes.

In the special context of Bhutan's delicate mountain environment, the adverse consequences of mining activities need to be continuously monitored, because, by their very nature, these activities have the potential to result in deforestation, slope instability, the blockage of natural drainage patterns and soil and gully erosion. The RGOB has been diligent in allowing mining to occur on only a highly selective basis. There is a need, however, to ensure that future activities in this sector remain as environmentally benign as possible.

In a small and sparsely populated country such as Bhutan, it is important to ensure that industrial development is not pursued to the exclusion of other economic activities, because this could result in the unsustainable migration of rural populations to industrial complexes. The consequences of such development would be mounting pressure on limited local

resources, environmental and social problems in the industrial areas and the appearance of fallow agricultural land in the villages, which would undermine the government's long-term policy of achieving regionally balanced development. In addition, rapid labor absorption by the industrial sector might create severe shortages in other sectors, thus making development there both difficult and unsustainable.

For all these reasons, it is necessary for Bhutan to assess, regulate and monitor the future development of the industrial sector. Inadequate prior resource assessment, limited technical and economic market surveys and the absence of social assessment and cost-benefit analysis, can easily result in the establishment of a few large, environmentally threatening industries.

Environmental criteria or imperatives need to be incorporated into industrial development planning and implementation to control industrial pollution. Relevant environmental laws need to be enacted to provide the legal basis for enforcing environmental rules and regulations.

Of immediate need in this capacity is initiating activities to establish basic environmental quality standards that can be used to evaluate pollution levels in industrial areas. Only then can major industrial projects be subjected to an EIA process in order to screen out those that are highly pollution-prone and to ensure that proven economically viable projects have adequate environmental management plans and implementation programs. Under the Mines Act passed in 1995, mining project proposals will be screened and all mining operations in the country will be regulated in accordance with strict environmental standards.

In light of the large environmental cost of mining low-value raw materials, the establishment of power-intensive domestic industries based on imported raw materials needs to be explored, especially because the overall demand for some of these materials is not great and they can be cheaply and conveniently supplied by sources in northern India. In this way, Bhutan

could continue to utilise its comparative advantage — low-cost power — to more than compensate for the cost of importing raw materials. At the same time, the country would be

conserving its own natural resources and greatly reducing the risk of environmental damage that is inherent in the extraction process.



Villagers help to construct a new road near Trongsa, Central Bhutan

TOURISM AND ITS EFFECTS ON CULTURE AND THE ENVIRONMENT

With its beautiful and largely unspoiled Himalayan setting, its rich flora and fauna and its vibrant Buddhist culture, Bhutan has become an increasingly popular destination for international tourists. In addition to generating hard-currency revenue, tourism also provides impetus for the development of the service sector, including hotels, restaurants, transportation and communications — services that also can be used by the Bhutanese. Tourism has further helped to promote indigenous cottage industries and handicrafts, as well as an expanding network of shops in Thimphu and other frequently visited locations.

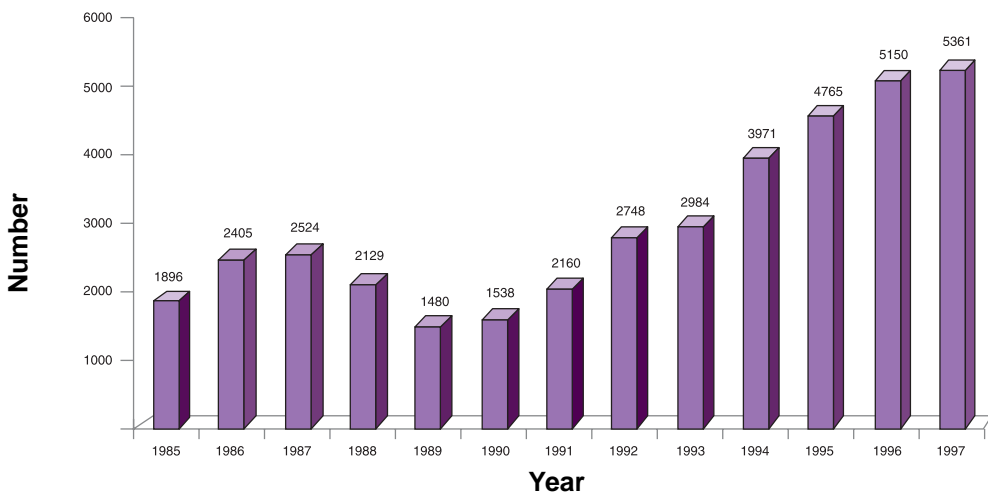
Realizing that an unrestricted flow of tourists could easily contaminate the pristine environment and the rich and unique culture, the government has been regulating tourism since the industry began in 1974 (TAB, 1997).

The overall objective is simply to maximise foreign exchange earnings while minimising the adverse cultural and environmental consequences.

Initially, only high-value, low-volume tours to the western part of the country were allowed. By the late 1980s, roughly 3,000 tourists were visiting Bhutan each year, leaving behind them just over US\$ 2 million in revenue (TAB, 1997). Fearing that the volume of tourists was becoming unsustainable, the government sought to limit their numbers by significantly raising the tourist tariff in 1989. That year, there were only half as many visitors (1,480), but revenues were down only slightly, to US\$ 1.95 million. Three years later, absolute numbers were back up to 2,748 as a result of increased promotion and facilities. Revenue, meanwhile, had jumped to US\$3.3 million, thus accounting for roughly 15-20% of the total value of Bhutan's exported goods and services (TAB, 1997). In 1996, 5,150 visitors entered the country. Bhutan's tourism infrastructure has steadily grown: Currently 32 hotels, lodges and guest houses are approved by the Tourism Authority of Bhutan (TAB) for tourist accommodation (Eighth Five Year Plan). However, the dramatic increase in the number of hotels may prove unsustainable in the short term because

FIGURE 5:

ANNUAL TOURIST VISITS, 1985 - 1997 (TAB, 1997)





A wide variety of flora are found in Bhutan

they are all geared to tourists, who mostly tend to visit the country in only about three months of the year. Given the overall success of its high-value strategy, the government is expecting tourist revenues to continue to provide a sizable portion of the country's total foreign revenue earnings.

From 1974 to 1991, the development and management of the tourist trade was the responsibility of the Bhutan Tourism Corporation (BTC), a quasi-autonomous and self-financing body. In November 1991, the Bhutan Tourism Corporation Limited (BTCL) bought a controlling share of the former BTC and took over its management, making it a privatised tour operator. Now there are 33 licensed tour operators in the country (Eighth Five Year Plan). Cultural tours and sightseeing account for 80% of current activities, with trekking tours, introduced in 1978, accounting for the rest.

Monitoring the flow of tourists is paramount to preserving the pristine nature of Bhutan's higher elevations. Because of the highly fragile nature of mountain ecosystems, damage takes much longer to undo. Maintaining the integrity of these systems thus requires additional measures of diligence and prevention. If the alpine meadows, streams and forests that Western tourists are willing to pay substantially more to see are to be preserved, a wide variety of actions will need to be taken to ensure that human impacts are kept well below maximum levels of acceptability.

Among the more pressing tourism-related environmental problems currently encountered are:

- the destruction of vegetation through the cutting of slow-growing trees for firewood;
- the erosion of delicate vegetation;
- the creation of "garbage trails" from the indiscriminate disposal of non-biodegradable waste; and
- the alteration of essentially sustainable farming and cropping patterns to unsustainable but highly profitable ones to meet the needs of affluent tourists.

To reduce these adverse impacts, some guidelines for environmentally friendly tourism have been drawn up by the Ministry of Trade and Industry (MTI).

Among the more significant of the remedies being advocated are the substitution of kerosene and liquid petroleum gasoline (LPG) for fuelwood; the construction of permanent campsites, rest houses and toilet facilities along established trekking routes; the full retrieval of all non-biodegradable waste; and strict limits on the amount of washing and other activities that pollute the environment.

But there are also socioeconomic problems being generated as well — and these are less open to solution. Through their lack of awareness of traditional culture and customs, tourists can contribute to the erosion of

traditional Bhutanese values and can impose unnecessary pressures on local people, especially in remote areas. Although local people are benefiting from tourism, it also has heightened materialism and eroded traditional community standards. In lieu of extending traditional Bhutanese hospitality at minimal (if any) charge, many villagers now charge rates that other Bhutanese cannot afford to pay. For example, remote village lodges with few modern facilities often charge as much as an average hotel in Thimphu. In a correlated development, barter economies have been transformed into monetary ones.

Though the impacts and activities themselves stretch across a number of economic and social sectors, their management clearly falls upon the Ministry of Trade and Industry insofar as it is responsible for monitoring and regulating tourism in the country. A number of the guidelines prepared by the Ministry address the various forms of “cultural pollution” currently being experienced. In general, they focus on imposing standards of etiquette and dress and limiting tourism to select — and hence minimal — areas of the country. Because the tourists themselves cannot be expected to have a proper Bhutanese respect for local tradition, culture, and religion, their guides must be trained in how to influence, regulate and correct improper behavior.

The TAB is responsible for training and

certifying guides. The training involves teaching guides about local culture and history and encouraging respect and appreciation for local standards of dress and etiquette. Although most tour operators attended a TAB-sponsored ecotourism workshop in 1993, a comprehensive ecotourism project still needs to be implemented. The more innovative of the interventions may include:

- providing meditation services in national parks or protected areas by utilising existing monastic facilities or constructing new meditation centres;
- replicating traditional and religious festivals so that the real ones will not be corrupted; and
- sponsoring exhibits of traditional ethnic minority cultures, such as that of the Layaps, Brogpas and Monpas, to ensure that a fair share of tourism-generated revenue will be returned directly to their communities.

Based upon the rationale that there is a cost for everything, the government believes that it is justified in seeking compensation for forgoing the exploitation of Bhutan's natural resources for economic gains. On that basis, there are plans to levy an environmental fee on all visitors to Bhutan. Revenues from this fee would be used to underwrite the costs of providing ecologically benign facilities and general maintenance and cleaning services.



Wildlife biodiversity: takin and tiger

ROADS AND THE ENVIRONMENT

One overarching development activity that merits its own discussion is the expansion and upgrading of Bhutan's transportation networks, particularly roads and their impact on the environment. Other types of transportation, such as Bhutan's national airline carrier, Druk-Air; footpaths and ropeways, also are significant but they do not have as much environmental impact as roads.

Telecommunications systems including phone lines, radio communication links and new technologies such as television, video conferencing and electronic mail will also play an increasingly important role in Bhutan's development. These telecommunications

advances can have positive environmental effects because they can lessen the need for physical travel and thereby reduce road use and its stress on the natural environment.

The expansion and improvement of Bhutan's road network is important to all three avenues of development. For example, roads are integral to the supply of materials, equipment and labor needed for the development of both hydropower and the industrial sector. They are equally important for agriculture, both for the provision of inputs and expertise and the timely delivery of crops to markets. Tourism also depends upon the ease of delivering people from one destination to another.

In addition, roads are vitally important to the national goals of promoting rural development and improving the quality of life of all Bhutanese people. Without better access to health, education and social services, the more remote portions of the Bhutanese population will not be able to be fully integrated into the national development agenda.

In short, practically all development activities in the country are in some way dependent upon the extent and condition of Bhutan's transportation network.

Ensuring that all developments in this network are made as environmentally benign as possible, is no easy task. The alarming degradation currently taking place elsewhere in the Himalayas could easily be replicated in Bhutan if appropriate soil conservation techniques are not implemented. But once completed, roads can actually have positive environmental effects. Improving roads can facilitate the implementation of natural resource management programmes and techniques, and by providing access to markets and credit, they can indirectly lessen the exploitation of available natural resources, including the many ecologically sensitive areas that are accessible primarily to otherwise isolated communities.



Ropeways can serve as an environmentally friendly and innovative transportation system

The reverse side, of course, is that roads can create “open access” into previously isolated or protected vulnerable areas of the country. New roads provide migrant families, loggers or other “outsiders” access to lands that were previously the sole domain of communities that have been there, largely undisturbed, for many generations. Roads must be planned and built in an environmentally and culturally sensitive manner within an integrated framework for national sustainable development.

The steep topography of the lower Himalayan foothills makes this task particularly difficult. Over time, these slopes have attained a level of stability. The construction of roads, however, introduces slope cutting and changes in drainage patterns that disturb this equilibrium and can easily lead to severe and irreversible land degradation. Such problems are magnified when the construction is poorly done or inappropriately sited. Because of the high costs of repairing environmental damage caused by roads, all possible efforts must be made to prevent it from occurring initially. However, the cost of proper engineering can often be prohibitive.

Among the most common detrimental effects resulting from the presence of roads are:

1. The removal of trees for logging and commercial purposes and the overgrazing of cattle without regulation on steep slopes in the immediate vicinity of roadbeds, which result in blocked drainage and encourage the formation of landslides and erosion gullies.
2. Mass wasting and landslides that increase the soil runoff, along with the increased incidence of fires, which augment the rate of runoff and erosion and reduce soil moisture retention, thereby increasing the seasonality of stream and river flows.

As a conspicuously large activity, undertaken for an often substantial period of time, road construction has great potential to disturb the often delicate balance of existing land formations. The prevailing construction practices only exacerbate the dangers because they rely on side cuts with little or no embankment

construction. The main problems specific to current construction activities include:

- extensive cutting in soils and rock;
- extensive rock blasting;
- heavy retaining walls;
- the casual disposal of excavated rocks and soils downhill;
- limited funding; and
- inadequate institutional capabilities, particularly in terms of essential equipment and manpower.

Resolving these problems requires the promotion of mechanised and environmentally friendly road construction and the elimination of destructive practices such as side casting and the improper stacking of construction materials along the edge of the road.

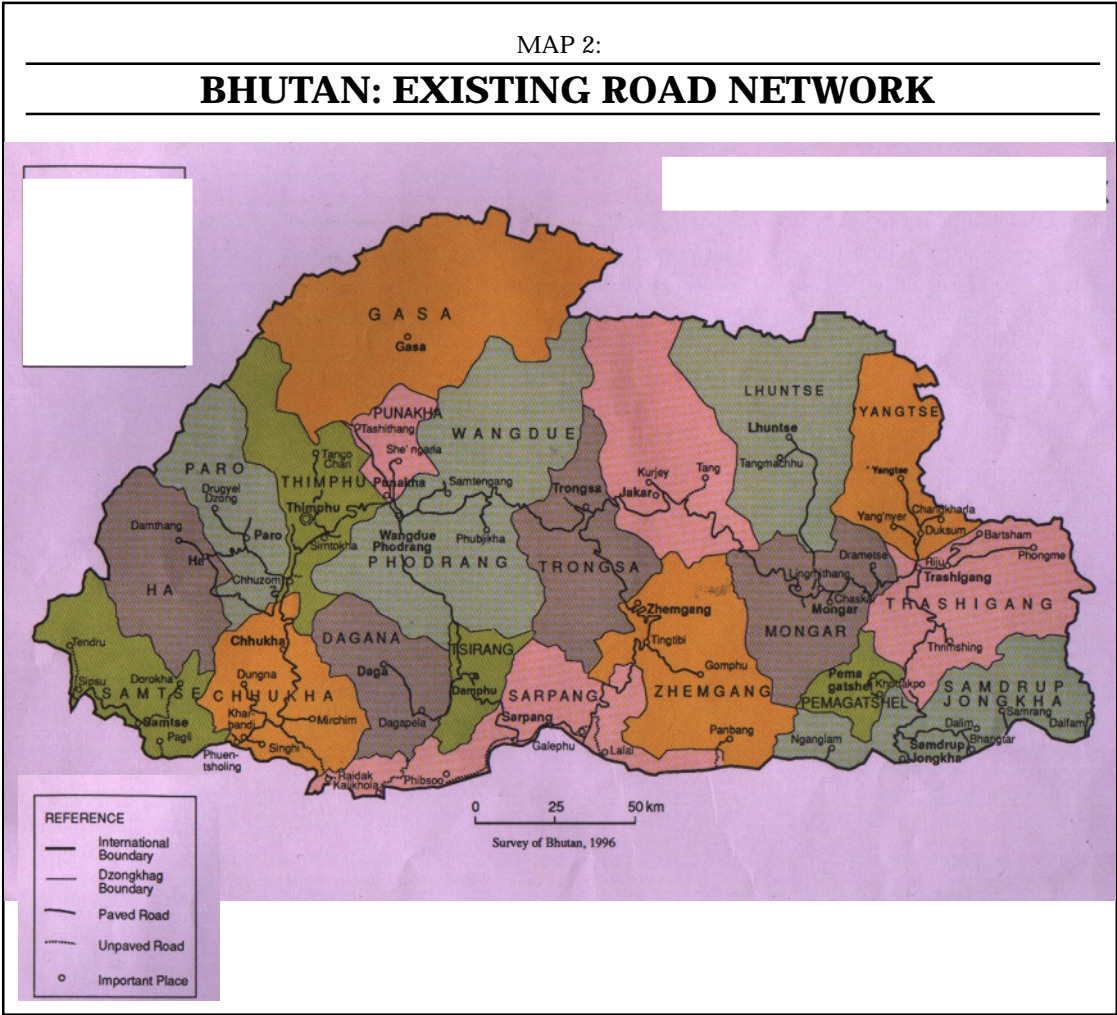
Improvements in site selection also can help minimise environmental damage. Ideally, the alignment should be as direct as possible to economise construction, maintenance and vehicle operating costs. This requires a high degree of site-specific investigation and involves skilled, multi-disciplinary consultations. Surveys for all medium and large projects should be carried out as part of an integrated study and involve a team of specialists in engineering, agriculture, ecology, geology and sociology who work together throughout the entire planning and construction process. Although this may be quite costly in the short run, it will reduce adverse environmental effects and hence the need for even more expensive remedial actions.

Although the environmental and social problems associated with automobiles and roads are not yet acute — nor even readily apparent — here, one need not look far beyond Bhutan's borders to see the extensive public health and ecological damage wrought by many countries' almost exclusive reliance on these factors. Therefore, the government is undertaking a study that analyses the alternatives to automobile use, especially for Thimphu. Electric-powered vehicles already are being experimented with in some countries. Similarly, the use of bicycles in urban areas holds much promise in reducing vehicular pollution. The construction of tunnels can prevent road building on steep slopes, with its associated erosion and river valley siltation. Boats are a viable means

of transport in the southern areas of the country and have relatively few adverse impacts on the environment. Ropeways also can provide short-distant transport, and their use can be considerably expanded. Conventional reliance on cars, trucks and roads should be balanced with these and other innovative, environmentally benign transport systems so as to ensure a healthy environment for future generations.



Mule tracks connect remote regions of the country



RESOURCE-BASED MECHANISMS FOR FINANCING SUSTAINABILITY

In addition to the avenue-specific activities mentioned previously, Bhutan's intact, rich natural resource base allows for a number of innovative mechanisms for financing sustainability. Among the more promising of these are biodiversity protection, debt-for-nature swaps, carbon sequestration and the promotion of environmentally certified products.

Although similar activities are being pursued throughout the world, they are particularly promising in Bhutan because of the discrepancy between the relatively low cost of preserving these resources and the relatively high value that developed nations are able — and now increasingly willing — to place upon them. More simply put, it costs environmentally conscious developed countries much less to preserve globally valuable resources in developing countries than it does in their own.

For its size, Bhutan probably has the greatest biodiversity of any country in Asia. It has a special place in the global environment because, among other reasons, it represents the last best chance for conservation in the Eastern Himalayas, one of the priority regions in the world for biodiversity preservation. The importance of biodiversity is increasingly being recognised throughout the world — not only for sustaining the wealth of living organisms, but also as a genetic resource for humanity, providing food crop and medicinal species for both current and future generations. In Bhutan, however, biodiversity is a matter of everyday necessity, especially in rural areas. This interdependency is so strong that a breakdown in one link can create a chain of disorders — with disastrous effects on human well-being. Maintaining the integrity of these ecological chains will be even more important as increases in harvesting caused by rises in population and consumption patterns will put additional strain on biological support systems, many of which are poorly understood.

The preservation of Bhutan's rich biodiversity also corresponds with national objectives. Unless the water catchment areas for new and proposed hydropower projects are safeguarded from environmental degradation, for example, siltation and sedimentation will compromise the sector's earning potential and thus jeopardise many of the government's developmental objectives. In addition, a wealth of exotic and rare wildlife attracts ecotourists and hence provides other sources of foreign exchange revenue.

For all these reasons, the RGOB has established a system of national parks, wildlife sanctuaries and nature reserves. The Forest and Nature Conservation Act establishes guidelines for the creation and management of all protected areas and empowers government officials to fulfill that mission. The Act calls for strategies for biodiversity conservation to be built upon two main concepts:

1. Conservation value lies in the cumulative effect of species diversity.
2. Natural resources must be used to meet the collective needs of the Bhutanese people.

Given these precepts, it is unrealistic to impose restrictions on the use of all forest resources. The only prudent course of action, therefore, is setting aside adequate habitats for biodiversity conservation. To date, nine such areas have been delineated. Together, they account for 26% of the national territory. In addition, 61 endangered species are now protected against poaching and illegal trading by fines and other punishments (FNC Act, 1995).

All activities designed and implemented to protect biodiversity need to be based upon a solid understanding of the area and factors involved. Before protected areas are gazetted, for example, feasibility studies are needed

FIGURE 6:

EXISTING PROTECTED AREAS SYSTEM

Existing Protected Areas System
(As per Notification No. AFD/FO/ic-5/93/1464)

Name	Dzongkhag	Area (sq km)
Torsa Strict Nature Reserve	Ha/Samtse	644.00
Jigme Dorji National Park	Paro/Thimphu/Gasa/ Punakha	4,200.00
Black Mountain National Park	Wangdue/Trongsa/ Zhemgang/Bumthang	1,400.00
Thrumshingla National Park	Zhemgang/Bumthang/ Mongar	768.00
Royal Manas National Park	Gelephu/Zhemgang/ Samdrup Jongkhar	1,000.00
Sakteng Wildlife Sanctuary	Trashigang	650.00
Kulong Chhu Wildlife Sanctuary	Lhuentse/Tashiyangtse	1,300.00
Phibsoo Wildlife Sanctuary	Gelephu	278.00
Khaling/Neoli Wildlife Sanctuary	Samdrup Jongkhar	273.00
Total		10,513.00
Percentage of total land area: 26.23%.		

to ensure that local residents are consulted and biological studies are needed to show that the area is indeed worthy of being preserved. By early 1996, 50% of the areas already gazetted had been surveyed in detail. Once this information has been collected, appropriate management plans can then be formulated in accordance with site-specific needs, which is particularly important given Bhutan's wide diversity of ecosystems and land use patterns.

Because most of the protected areas encompass human settlements, the needs of the local people are integrated into the overall conservation strategy. Wherever appropriate, buffer zone management is employed in an effort to maintain the existing relationships between residents and their surrounding resource base.

A pilot integrated conservation and development project has been developed for Jigme Dorji Wangchuck National Park in northwestern Bhutan. Using socioeconomic and biodiversity data gathered through a rapid rural appraisal carried out by the Forestry Services Division, this project aims to reduce the negative socioeconomic impacts that will inevitably ensue as a result of the area being

declared protected. As much as possible, conservation and development in the area will be integrated so that both humans and nature can survive — if not flourish.

Conserving natural resources entails more than just establishing and maintaining protected areas. There needs to be a greater emphasis on conservation in all aspects of land management. The policy of retaining 60% of the national territory under forest cover should be strengthened through policies and regulations that reduce the impacts of potentially destructive practices such as logging, grazing, mining and plantation or orchard agriculture, as well as the construction of roads and hydro-power projects. In order to do this, land use planning should take place at the water-catchment level because each catchment has its own needs for water, farmland, fuel, grazing land and industries and its own requirements for hydrological protection.

Once they are completed, these comprehensive land use plans will need to be supported by enforceable sanctions and adequate legal authority. The Forest and Nature Conservation Act is currently the only

legal document that addresses any aspect of environmental degradation and biodiversity loss. But these provisions may be inadequate in light of the complex nature of environmental issues and the immediate needs of a developing country. Appropriate legislation such as a National Environmental Protection Act (NEPA) and National Environmental Quality Standards therefore need to be enacted quickly to ensure that resource abusers are properly penalised and that law-abiding resource users are encouraged and rewarded.

Similarly, the “polluter pays” principle provides an important economic incentive to minimise the emission of pollutants. For example, this principle would require cement factories to pay the cleanup costs for any pollution generated by the factory, thereby internalising the full economic costs of production.

A technique for incorporating actual environmental costs is “natural resource accounting”, which accurately reflects the depreciation value of non-renewable natural resources such as timber. This approach to valuating the true long-term exploitation costs of limited resources ultimately promotes sustainable rates of extraction.

Another approach for promoting improved environmental practices utilises a range of positive incentives for minimising environmental damage and using cleaner technologies. Tax reductions, duty exemptions or subsidised loans, for example, can reward environmentally progressive manufacturing practices.

Finally, there is the revenue to be earned from environmentally clean products such as spring water, organically produced agricultural products, vegetable dyes, horticultural products and aromatic substances. This is an area that has great potential because Bhutanese products are already identified with cleaner methods of production and higher quality in the regional market.

Eventually, Bhutan will want to move from being a passive conserver of genetic resources to an active partner in their commercial utilisation and international promotion.

The hope is to someday develop the technical and legal capacity to undertake the sophisticated genetic research and international negotiations involved in germ plasm development and gene patenting. In addition to its current small-scale commercial activities in medicinal herbs and decorative flora, Bhutan would like to develop its own pharmaceutical industry so that it can take proper advantage of its own immense biological storehouses.

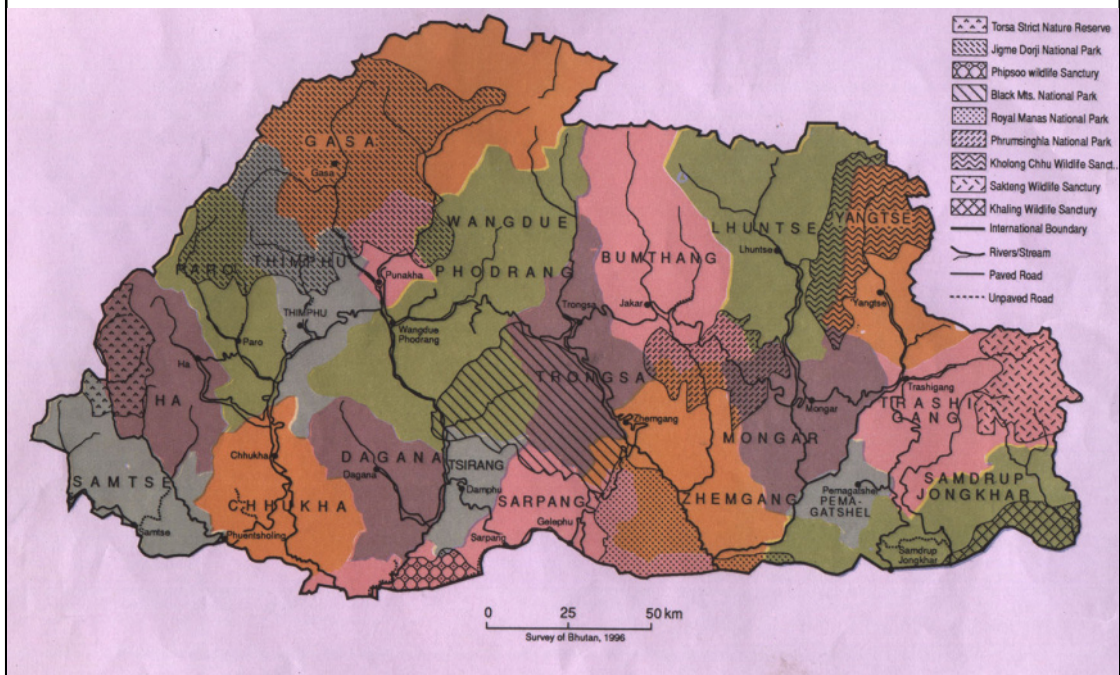
One innovative financing mechanism is represented by “debt-for-nature swaps”. In these arrangements, a donor will either pay off or cancel Bhutan’s debt in order to preserve the natural environment. For example, although a feasibility study conducted in the 1980s deemed the Gedu Wood Manufacturing Corporation to be both economically viable and environmentally sound, the factory proved to be unsustainable. As a result, the RGOB refused to allow it to expand its logging operations and closed the company in December 1995. The Royal Government of the Netherlands, in a debt-for-nature swap, provided Bhutan with assistance so that the Kingdom could pay off a loan to the Kuwait Fund for Economic Development in order to close down the logging operations.

Another such mechanism under consideration is carbon sequestration. The United Nations Framework Convention on Climate Change seeks to stabilize anthropogenic carbon dioxide (CO₂) emissions at levels that do not threaten global ecosystems. To this end, the Intergovernmental Panel on Climate Change (IPCC) has recommended increasing the size and number of “carbon sinks”. With more than 72.5% of the country under forest cover, Bhutan has great potential for participating in carbon trading arrangements, whereby Bhutan would agree to “lock up” a portion of its forests, to plant forests in degraded and barren areas or to harvest mature forests by reforestation for carbon sequestration in exchange for selling a commensurate number of “rights to pollute” to another country.

The government and citizens of Bhutan will be increasingly faced with these options as Bhutan’s rich natural resource base and biological diversity attain greater international recognition in the coming year.

MAP 3:

EXISTING PROTECTED AREAS



Black-necked cranes spend every winter on the protected valleys of Phobjika, Bomdiling and Bumthang

THE BHUTAN TRUST FUND

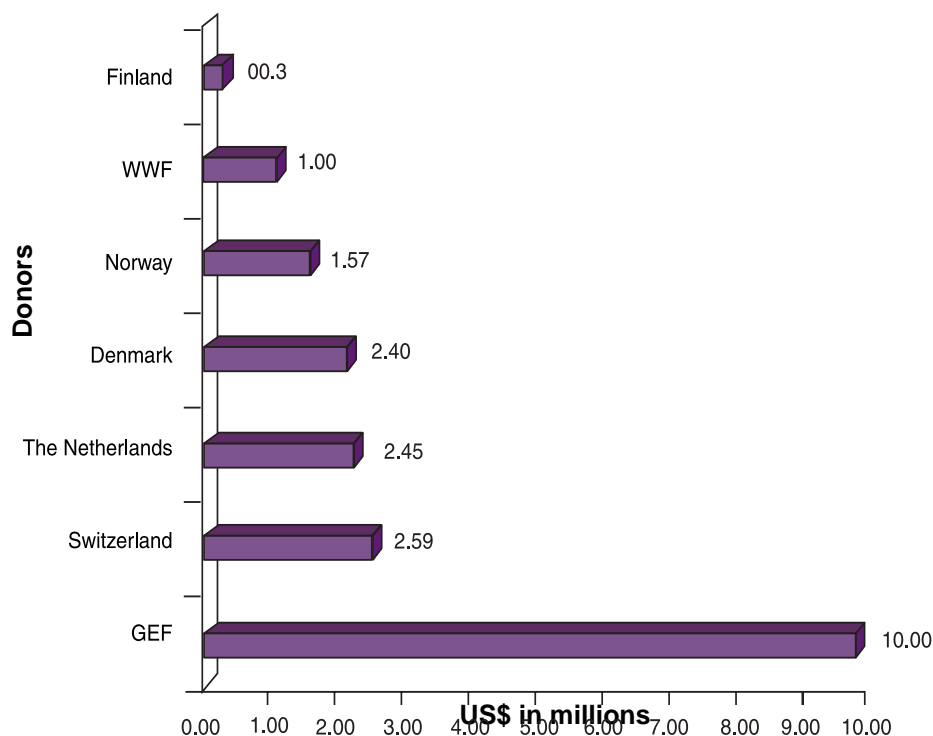
The Bhutan Trust Fund for Environmental Conservation (BTF) was established in March 1991 as an innovative financing mechanism that will help Bhutan continue conservation activities and ensure that the country can uphold its commitment to the environment, in spite of the pressures to reduce conservation activities and focus on economic development.

Activities of the BTF include:

- developing a national system of protected areas;
- drawing up and implementing management plans for protected areas;
- providing institutional support to environmental organizations and training natural resource professionals;
- surveying Bhutan's rich biological resources;
- developing a natural resource database; and
- designing and piloting integrated conservation and development projects.

FIGURE 7:

DONORS TO THE BHUTAN TRUST FUND FOR ENVIRONMENTAL CONSERVATION (BTF, 1998)





Bhutan's health care improvements promise a brighter future for the country's children

ENVIRONMENT AND PUBLIC HEALTH: A GROWING CONCERN

One of the driving forces behind environmental policy in Bhutan is the concern for public health. In all developing countries, environmental problems such as water supply, sanitation and the proper disposal of solid wastes can have a significant impact not only on the quality of life, but also on its very duration. For example, a large number of needless deaths from diarrhea could be prevented by the provision of adequate potable drinking water and sanitation services. As a result, environmental policy in relation to public health has much in common with preventive health policy. Two issues emerge as pre-eminent in this capacity: the stress placed on water resources by rapidly growing human demands for water and sanitation, and the costs to human health and productivity of not being able to meet those needs.

The rapidly growing urban population and the change from traditional self-sufficiency to government-provided services has made water availability and quality a major concern in Thimphu, Phuentsholing and other urban centres. Major infrastructural investments will be needed to cope with increasing demands. The sanitary disposal of excreta and other human waste is another important issue for public health, especially in high-density urban settlements. Although sewerage systems have been installed in the central parts of Thimphu and Phuentsholing, major investments are needed in other growing urban centres. The collection and disposal of non-biodegradable solid waste also is increasing as a result of the steady growth in consumption patterns. And finally, the growing number of vehicles creates a potential public health hazard from pollution caused by vehicle emissions.

Public health problems in rural areas have traditionally been associated with poor hygienic conditions and a shortage of accessible health services. Both of these root causes are currently being effectively addressed in Bhutan with the establishment of

well-distributed health facilities in rural areas, along with increasing numbers of health workers. The improved primary health care coverage reached 90% in 1991 (NHS, 1994). As a result, the crude death rate decreased from 19.3 to 9.0 per 1,000 population between 1984 and 1994 (NHS, 1994). The most significant decreases have come in the infant and under-5 mortality rates.

Even though such progress is encouraging, much more still needs to be done. Of particular concern in our Kingdom is the high incidence of respiratory diseases that results from nearly year-round exposure to smoke emitted from primitive fireplaces used to cook food and heat traditional Bhutanese houses. Because the use of firewood for cooking and heating also has environmental repercussions, initiatives such as the provision of smokeless stoves and alternative energy sources are being undertaken to reduce this health hazard.

While modern development has brought many improvements in the quality of rural life, it also has brought previously unknown adverse environmental impacts. Most of the current litter problem is caused by the recent shift from biodegradable waste to non-biodegradable waste (plastic, tins, glass, etc.) and the tendency to throw such waste away indiscriminately. Before such problems become insurmountable, Bhutanese will have to be educated on the environmental costs of such non-biodegradable substances, through regular broadcasts on the radio and articles in the printed media. Part of the strategy also may include enacting strict environmental legislation on the disposal of such wastes. Although it is mainly of a cosmetic nature, the growing litter problem definitely detracts from the otherwise aesthetically pleasing Bhutanese countryside. Of a potentially much more harmful nature, however, are agricultural chemicals. As of yet, however, their extent is still minimal.

Until recently, Bhutan has avoided permanent slum areas with its still-minimal urban population. However, additional urban growth will certainly challenge the ability to provide low-cost housing, water and sanitation, as well as the ability to educate new urban dwellers about hygiene and environmental health in congested urban areas.

Investments in water and sanitation through preventive health policies offer high economic, social and environmental returns.

Effectively incorporating preventive health policies into environmental policies will involve:

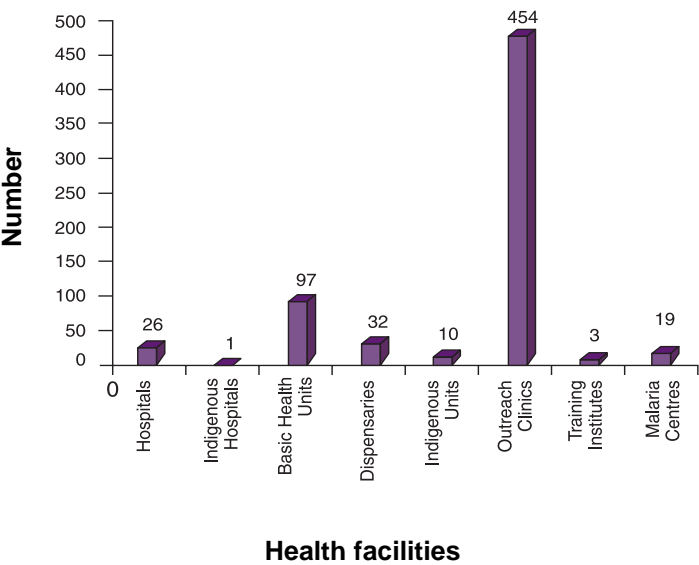
- integrating health impact assessments into relevant environmental and economic decision-making processes;
- conducting systematic development analysis and monitoring of agreed-upon environmental health indicators;
- monitoring the state of environment and health;
- improving public understanding and scientific assessment of health risks and benefits; and

- ensuring that necessary cooperation among health, environmental and planning authorities takes place.

In order to monitor the possible public health hazards caused by deteriorating environmental conditions, baseline data should be established on all major environmental/public health indicators, such as the quality of river water, drinking water and air. Ambient standards should be determined with a view toward identifying sources of pollution and determining appropriate emission standards.

In addition to improving overall public awareness, by-laws, rules and regulations must be formulated by the relevant Ministries and city corporations. Ideally, this will all be incorporated in a comprehensive NEPA. Among the more pressing of the tasks at hand are setting standards for sewerage systems and water supplies, improving solid waste collection and decreasing pollutants from vehicles and service industries in urban areas.

FIGURE 8:
HEALTH INFRASTRUTURE, 1996
(EIGHTH FIVE YEAR PLAN, 1997)



PREPARING FOR RAPID URBANISATION

Urbanisation in Bhutan really began in 1961 with the introduction of the country's first five-year development plan. Before that, urban settlements in the Kingdom had been limited to a few traditional clustered villages, generally in the most fertile and centrally located valleys. Before its designation as the new national capital by the late King, Jigme Dorji Wangchuck, in 1953, Thimphu was simply a typical *dzong* surrounded by scattered homes.

In a pattern that would be repeated in other new administrative centres, Thimphu's growth began quite slowly. During the 1960s, only a handful of people relocated to staff new public-sector positions. But that was soon succeeded by a chain migration of additional support personnel. The establishment of infrastructural, educational and health facilities increased the advantages of urban areas and attracted more job seekers and entrepreneurs. Although this growth has largely been dependent on public-sector support, there also has been a steady increase in employment in the private sector — particularly in small trades and services, as well as cottage industries such as carpentry, weaving, tailoring, painting, carving and goldsmithing.

Today, Thimphu has a population of roughly 35,000 and Phuentsholing has about 23,000 inhabitants, while 20 other townships also are considered major urban areas. In total, urban population in 1995 accounted for 14.5% (CSO, 1994) of the national population.

With the continued improvement of health facilities and employment opportunities, this percentage can only be expected to increase. Presently the rate of population growth in Thimphu alone, according to some estimates, is about 10% per annum, which implies that by year 2006 the population of the capital will have reached about 100,000. If this trend continues, the demand for both physical and socioeconomic infrastructure will put increasing pressures on urban and peri-urban environments.

Urban growth in Bhutan has increased pressure on the existing housing supply. This has led to the exponential growth of unauthorised housing outside the town limits, including an emerging squatter population. As mentioned earlier, the land available for urban growth is severely limited by topography. Further restrictions arise from the government's clear policies of limiting the conversion of

BOX 6:

WASTE DISPOSAL: AN EMERGING PROBLEM IN THIMPHU

Eight truckloads of solid waste are collected in Thimphu each day, either from sweepers going door-to-door in the city center or from strategically positioned bins. This material is transported in closed trucks to a landfill located on the edge of a ravine. The site was developed by erecting a retaining wall to prevent the garbage from slipping down into the ravine and by diverting a small stream to avoid water pollution. Once this site has reached capacity, it is to be landscaped as an amenity area/picnic spot. Thimphu City Corporation (TCC) already has begun the process of developing a second landfill site.

As traditional family-oriented lifestyles continue to dominate in Bhutan's urban centers, poverty and unemployment have yet to become significant problems. Evidence, however, suggests that the continued effects of modernisation are changing the existing social structure in undesirable ways. Small-scale theft and drug usage, for example, are clearly on the rise. An additional problem stems from the fact that people tend to bring their rural habits with them when they move to urban areas. In Bhutan's case this translates into incompatible uses of surrounding land, taking running water for granted and the indiscriminate disposal of waste and litter.

agricultural land for urban purposes in order to obtain agricultural self-sufficiency, and of maintaining the present level of forest cover for economic, ecological and aesthetic purposes. Securing land for urban growth and then utilising it in ways that contribute to both sustainable development and gross national happiness will be one of Bhutan's most difficult challenges in the years ahead.

Compounding the problem is the fact that most of the present development plans were prepared in the mid-1980s. Given the limited urban settlements at that time, government policy focused mainly on rural areas, and urban areas were not adequately planned. Because it is now clear that urbanisation is here to stay, concerted government efforts are being made to assure that all future development takes place in accordance with proven principles of modern urban planning.

Among the major problems of rapid urbanisation are:

- 1.Limited level land for urban construction, leading to land use conflicts and environmental degradation.
- 2.Housing and infrastructure shortages leading to environmental and social problems.
- 3.Employment shortages leading to social problems.
- 4.Labor shortages in rural areas caused by rural-urban migration.
- 5.Lack of municipal legislation for effective implementation of plans and policies.



Air pollution from vehicles

6. Shortage of funds for investments to cover the higher costs of urban infrastructure.
7. Shortage of trained manpower for effective and timely planning, implementation and monitoring, both at central and local levels.

As a result, the Eighth Five Year Plan will focus on the following areas:

- creating autonomous municipalities and enhancing their management capability;
- preparing development plans through the increased participation of the people;
- ensuring that housing is made more accessible, especially for those in the lower- income brackets;
- promoting better urban sanitation through the provision of appropriate services, public campaigns and appropriate rules and regulations; and
- levying charges for all services provided by the municipality.

BOX 7:

URBAN POLLUTION

Urbanisation also has brought with it a large number of cars and other vehicles. As of 1995, there were about 6,000 (RSTA, 1996) vehicles in the Thimphu valley alone. The consequences of such unanticipated growth include increasing traffic congestion, structural strains on road networks and parking facilities, and a general decline in the environment from litter, noxious emissions and vehicular noise. In an attempt to deal with the most pernicious of these, a comprehensive vehicle emission testing program recently has been devised. The ultimate objective of this program will be to reduce both the volume and the debilitating effects of current emissions through the enforcement of workable emission standards, improvements in vehicle maintenance practices and the introduction of less noxious fuels.

As part of the government's new commitment to urban development, policies and strategies are being developed that will create employment and privatise urban service. This will make the urban economy more efficient. In addition, rules will be enacted pertaining to municipal administration, land acts, subdivision regulations and building codes.

Urban development in Bhutan is the responsibility of the Urban Planning Unit (UPU) within the Public Works Division of the

Ministry of Communications. The UPU is divided into two sections, the City Section, which deals with the two large cities of Thimphu and Phuentsholing, and the Districts Section, which is responsible for planning activities in all the *dzongkhags*. At present, only the Thimphu City Corporation (TCC) has any formal environmental management procedures. The corporation has recently established very strict rules concerning mandatory connection to the newly constructed piped sewerage system.

SPECIAL FOCUS :

GENDER AND NATURAL RESOURCE MANAGEMENT

Bhutanese women, who constitute about 48% (Eighth Five Year Plan) of the total population, do not suffer from any form of gender discrimination. They have always enjoyed equal status and the same level of freedom as men, according to the laws of the land. They have actively contributed to all areas of economic, political and social life as farmers, businesswomen, entrepreneurs, doctors, engineers, and homemakers. Their participation in the decision-making process, especially in grassroots community meetings (*zomdus*), is as high as 70% (Eighth Five Year Plan). They also participate actively in the district- and block-level development committees. Therefore, as a result of both historical and cultural practices, Bhutanese women play a major role in the overall development of the country.

About 62% (Eighth Five Year Plan) of the female population is involved in agricultural production — slightly less than the corresponding percentage of men. Currently women comprise more than 16 % (Eighth Five Year Plan) of the civil service, primarily as a result of the enhanced enrollment in educational institutions in recent years. The number of women holding senior management positions is comparatively small, however. This is caused largely by the fact that at the early stages of national development, children were sent for education to

India. Going to India meant that young children would spend seven to ten days walking to their destination. Parents were therefore reluctant to send their daughters because it was felt that since girls inherited both the land and the house in many parts of the country, it was not necessary to educate them. This attitude has changed with the emergence of schools nationwide.

In the private sector, the overall development is greatly hindered by a lack of entrepreneurial management skills on the part of both men and women, simply because the practice is so new to Bhutan. On the whole, however, women are very actively involved in the private sector. They own travel and trekking and construction companies and face no discrimination in access to credit.

Nonetheless, there are also initiatives geared primarily to women to enhance their representation in business, spearheaded by the activities of agencies such as the National Women's Association of Bhutan (NWAB) and the Bhutan Development Finance Corporation (BDFC). Established in 1981 in accordance with a resolution passed in the 53rd Session of the National Assembly, NWAB is currently the only women's non-governmental organisation in the country. Its mission is to address the

critical needs of rural women in education, family health, skills training, employment and rural credit through a system of nationwide chapters. The association's objectives are four-fold:

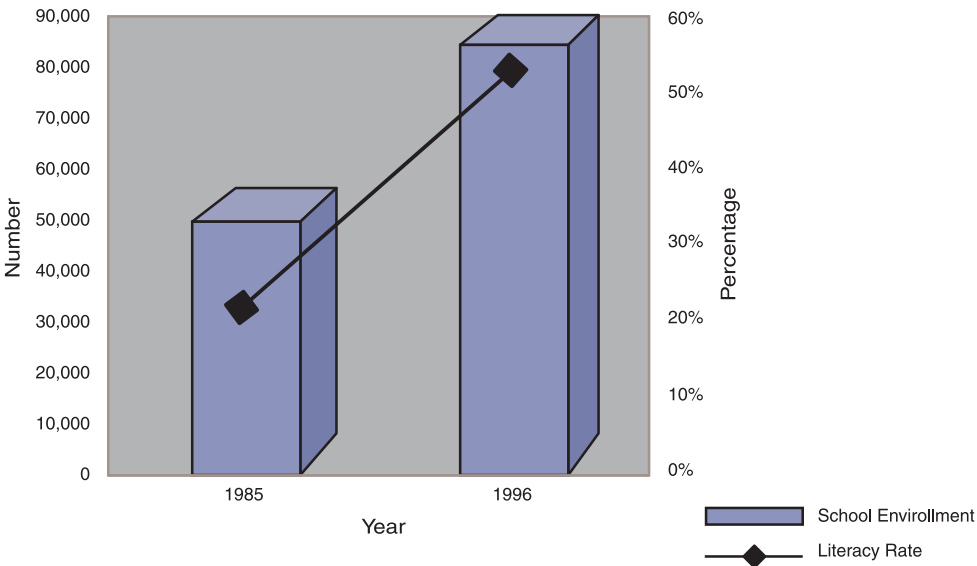
- to encourage the participation of women in developmental activities;
- to motivate women to implement development programmes;
- to enhance women's awareness of socio-economic and sustainable development issues; and
- to impart the value of education and its benefits to all women.



Village women working on the farm

FIGURE 9:

EDUCATION DATA, 1985-1996 (EIGHTH FIVE YEAR PLAN)



Out of the total clientele of BDFC, which provides both urban and rural credit programmes for industrial development, commercial farming and rural improvement, 32% are women (Eighth Five Year Plan).

Although impressive achievements have been made, areas that require further attention remain. Education in Bhutan is free and there is no discrimination on the basis of gender. In spite of its limited resources, the government's strong drive to encourage the enrollment of all children has increased primary coverage to more than 72% as of 1995 (Eighth Five Year Plan). In 1996, female enrollment in community and primary schools was as high as 43% (Eighth Five Year Plan), one of the highest rates in developing countries. Unfortunately, it is only 20% at the college level. The dramatic

drop-off is primarily the result of the proportionally larger role that girls play in household management and the care of younger siblings, as well as the inheritance patterns. To help alleviate this situation, the government aims to locate schools closer to communities and increase public awareness campaigns targeted at women on the value of education.

The importance of women's contribution to the process of achieving sustainable development is emphasised in Agenda 21, 1992. Bhutan has always recognized that women are a "major group", and policies and measures are in place to ensure that they are active participants in environmental policy-making and management, thus providing a sound support base for sustainable development.

SPECIAL FOCUS :

ENVIRONMENTAL IMPACT ASSESSMENTS

The RGOB has recognised that one way to ensure a sustainable natural resource base is to institutionalise the process of Environmental Impact Assessments (EIAs) for development activities. Assessments can be conducted at many levels, from a simple ten-minute environmental questionnaire to a detailed, multi-year assessment by independent consultants. Comprehensive EIAs are generally only applied to development projects that preliminary screening indicates are likely to have major economic, social, cultural or biological impacts.

EIAs help decision-makers at the planning level to balance demands of immediate gain from exploitation of natural resources with long-term sustainable uses and protection of valuable ecosystems. In addition, EIAs are useful management tools for predicting and addressing potential impacts of development policies, plans and projects. And finally, the procedures and technical studies needed to conduct an EIA provide essential data for sound environmental planning and management.

By institutionalising EIAs, the RGOB is committed to the following goals:

- making development projects environmentally and economically sustainable in the long term;
- reducing adverse environmental (physical/biological), economic, cultural and social impacts;
- identifying environmental impacts on ecologically fragile landscapes before development projects proceed;
- assessing the effects of development pressures on the natural resource base and people;
- reducing the overall environmental, cultural, social and economic cost of projects; and
- optimising project benefits.

In order to be successfully implemented, the EIA process must involve key stakeholders — including the proponent local governments, NGOs, private-sector interests, and those segments of the population directly and indirectly affected by proposed projects or policies. Screening, to determine what level of EIA should be performed, should be applied to all government and private-sector projects, regardless of whether they are foreign or domestic in origin. Equally important, EIAs

should be applied at an early stage of the policymaking process to ensure that social, cultural, physical and environmental concerns are adequately addressed.

The RGOB recognizes that in addition to EIA laws and regulations, political support, institutional backing, the delineation of clear roles, available and skilled human resources, monitoring and enforcement, accurate data and public participation also are required for

effective implementation. Although evaluation of potential environmental impacts for proposed projects may seem costly, in the long term these costs are usually justified. This is because remedial actions to clean up environmental problems generally cost much more than preventative ones.

The NEC has been given the mandate of developing national guidelines for EIAs. The NEC Secretariat has been put in charge

FIGURE 10:

ENVIRONMENTAL IMPACT ASSESSMENTS, 1991-1997 (NEC, 1997)

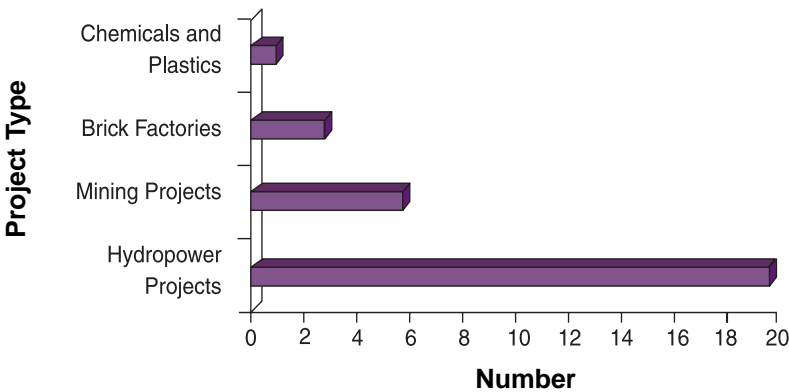
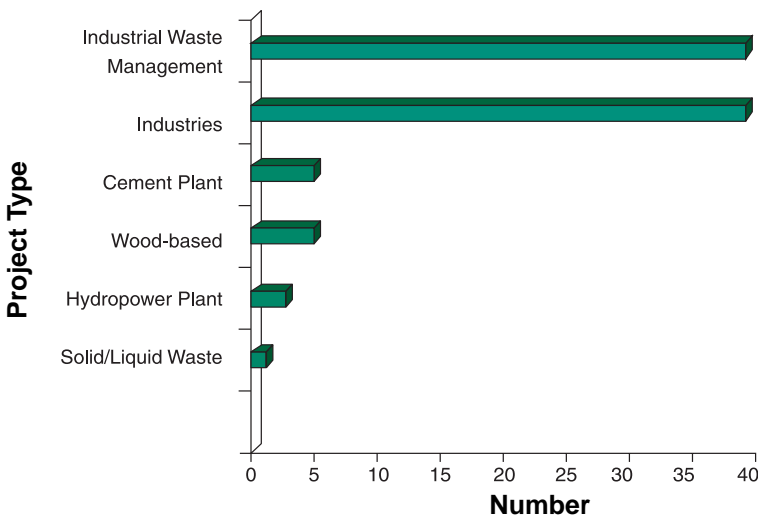


FIGURE 11:

ENVIRONMENTAL REVIEWS, 1991-1997 (NEC, 1997)



of ensuring EIA procedures are given an adequate Bhutanese context.

The RGOB is now in the process of refining and implementing EIAs, particularly with regard to the decision-making process. In addition, it will improve, by coordinated effort, the quality and use of the existing knowledge base in assessing the acceptability of environmental impacts in relation to the economic benefits and the cultural, social and community values and services.

An EIA division within the NEC has been formed to manage the development of an EIA system that will be used as an integral part of the country's development planning and environmental management processes. The EIA division participates in and oversees proposed activities as well as further monitoring after development activities have concluded. The EIA division is working with relevant counterparts from other Asian countries to learn from their experiences — especially from those countries that have had extensive experience in setting up, evaluating and/or participating in their own EIA systems. In general, the EIA division's role is to help formulate ideas and to provide technical advice on issues relating to the preparation of an EIA, setting up an EIA system and drafting EIA guidelines.

The EIA division is in the process of developing formal linkages with representatives from stakeholders such as government agencies, NGOs, academic institutions and the private sector. In this way, effective participation of a wide range of persons with differing concerns and viewpoints in the EIA development process can be encouraged.

Ongoing priority activities include:

1. Institutionalise Initial Environmental Examinations (IEE), screening and EIA procedures.
2. Establish environmental baseline data for water, air and selected industrial discharges.
3. Provide guidelines and training — discuss the draft detailed guidelines for priority sectors such as hydropower, transmission lines, roads, forestry, new and existing

industry, mining and mineral processing.

4. Demonstrate EIAs on infrastructure projects (roads and hydro development) to assist the NEC/EIA division with the actual preparation of an EIA for hydropower and infrastructure sectors. This will expose a team of Bhutanese practitioners to the rigors of preparing an actual EIA.



Basochhu Waterfall, Wangdue Phodrang Dzongkhag, Western Bhutan

POPULATION AND SUSTAINABILITY

Population growth rate affects all areas of development, but because of the severe effects uncontrolled growth can have on a country's environment, population is an area of special focus in the NES. With a current growth rate of 3.1% (NHS, 1994) per annum, Bhutan's population is expected to almost double in 20 years. This growth will put even greater pressure on the country's fragile environment and natural resource base and will make Bhutan's chosen path of sustainable development even more difficult.

One specific effect of the high population growth rate will occur in the form of increasing pressure on the country's limited available agricultural land. If the current growth rate is not reduced, the per-capita availability of agricultural land is expected to be reduced by 50% in 20 years — in fact, by the time the population has doubled. This increasing pressure on land comes not only from the actual demand

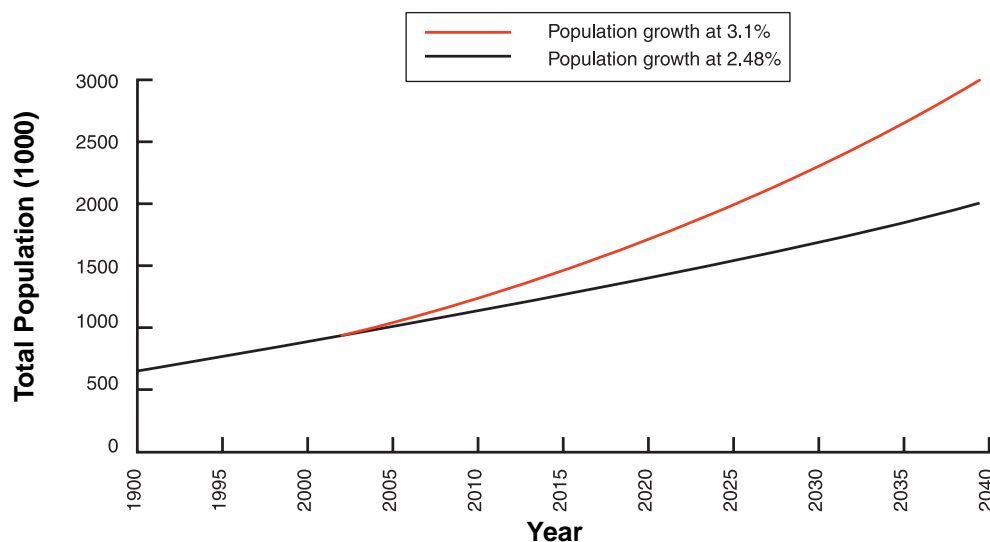
for farmland, but from the effects of population growth on land use. We also must realise that more land will be needed to meet the additional needs of a growing population — the needs for housing, schools, roads, industry and recreation space, among others. Moreover, greater pressure will be put on the government to continue providing free education, health care and other social services to the rapidly growing population.

The decline in agricultural land, combined with a growing population obviously will affect Bhutan's ability to feed itself and thus interfere with the second avenue of development — increasing food self-sufficiency. Food shortages, fragmentation of landholdings, growing landlessness and increasing use of marginal lands are foreseeable results of the current high rate of population growth.

The population growth rate also will

FIGURE 12:

POPULATION TRENDS, 1990-2040 (NATIONAL ENVIRONMENT COMMISSION PROJECTIONS, 1997)



speed up the process of urbanisation, as more and more people leave rural areas in search of employment opportunities. As discussed earlier, rural-urban migration will put greater stress on existing urban structures and resources and peri-urban environments.

The net result of these effects will be the unsustainable exploitation of Bhutan's natural resources. Shortages of available agricultural land, in combination with food shortfall will lead to the cultivation of unsuitable land such as steep slopes and other marginal sites. Pressure on forest lands will increase as the growing population searches for adequate fuelwood, timber, fodder, living and grazing space.

Recognising the social and environmental consequences of an unabated high population growth rate, the RGOB has formulated several demographic objectives for the Eighth Five Year Plan. In order to reduce the population growth rate in the shortest possible time, the RGOB aims to reduce the growth rate during the Plan period, from 3.1% in 1996 to 2.48% in 2002 (NHS, 1994). Eventually, the goal is to have a stable national population, with each couple having a family of two children.

To achieve this goal, a multi-pronged approach will be used. It will include the following strategies:

- raising awareness of the benefits of small families and the economic, social and health benefits of delayed marriage and spacing of births;
- improving awareness of and access to a wide range of contraceptives;
- strengthening existing maternal and child health services;
- supporting a special education programme on reproductive health for adolescents; and

- continuing efforts to keep girls in school longer, because this has been demonstrated to be one of the most effective ways to reduce the population growth rate.

A number of sectors will be involved in these efforts, including the Health and Education Divisions, the media, the MTI, the MOA and the MOP. There is also a need to establish coordinating committees at the national and district levels. Further support also is required for research on population trends; the socio-cultural factors affecting fertility; the relationship between population, poverty alleviation, sustainable development and environmental conservation; and operational research on the use and effectiveness of various contraceptives in the socio-cultural context of Bhutan. Support for training and data collection must also be addressed.

Other measures which may have to be considered include:

1. Free education and admission priority for two children per mother. Thereafter, rates for entrance and hostel fees will be raised for each successive child.
2. Reduced-interest or interest-free loans to couples who have limited their family size to two children.
3. Recognising female education and employment will be key factors for successful family planning programmes.
4. Assuring couples who limit their families of old-age security. The RGOB shall consider an appropriate pension scheme if parents' children predecease them. They will be eligible for this pension scheme after the age of retirement.



THE EFFECTS OF DEVELOPMENT ON BHUTANESE CULTURE

Over the centuries, the Bhutanese people developed farming systems specific to their microclimate. Valley communities diversified their agro-pastoral activities in ways that the natural environment could sustain. These practices have not changed significantly in many remote parts of the country and are not dictated simply by subsistence needs of isolated communities. They are sophisticated ecological responses to a risk-prone microclimate environment.

Because the country was never colonized, there has been considerable stability in the political and social environment in which rules, organisations and knowledge about management of renewable natural resources like water, pastures and land could evolve.

Further, there was very little intervention on the part of the state in those agro-pastoral communities, until modernisation began in the 1960s. Both of these factors favored the emergence of local institutions and a strong indigenous knowledge base in the form of local innovations.

There are vibrant customary rules and norms regulating the use of community grazing land, irrigation channels, forests, breeding

stock, footpaths, shrines, bridges and so forth. These are held in community ownership and use. Sophisticated institutional arrangements have evolved to equitably and efficiently regulate their uses.

The Bhutanese culture is thereby based on customary rules, norms, indigenous knowledge systems and institutions, in addition to a rich religious heritage based on a unique blend of Mahayana and Vajrayana Buddhism, animistic beliefs (Bon) and the Nyingma and Kagyu sects called Ka-Nying Zungdrel. This heritage bears the indelible imprints of leaders such as Guru Padmasambhava, who visited Bhutan in the 8th century and Zhabdrung Ngawang Namgyel, who founded the first *dratshang* (monastic body) in the 17th century. It was Zhabdrung who created the code of conduct known as *driglam namzha* in order to carve out a distinct Bhutanese identity. In addition to promoting a national dress (the *gho* for men and the *kira* for women), *driglam namzha* is built upon a strict observance of vows (*tha-damtshig*) that emphasise strong kinship loyalty, community-oriented behavior, hospitality to guests, respect for one's parents, elders and superiors, and mutual cooperation between rulers and ruled, parents and children, and teachers and students. These values have

survived the test of time and are now integral to the Bhutanese culture.

The formal development process began in 1961, when traditional Bhutanese culture was exposed to the problems of modernisation for the first time. Concurrent with the benefits of modernisation is its potential to undermine traditional culture. The preamble to the Seventh Five Year Plan (1992-1997) defined the challenge and dedicated the country to meeting it:

For a small country like Bhutan, maintaining and strengthening a distinct national identity will always be an important factor in its continued well-being and security. It must be remembered that through the centuries, Bhutan has remained a sovereign, independent country because our past generations greatly cherished the unique national identity which had been forged by the high values of the Bhutanese systems and the rich cultural and religious heritage of the nation.

Therefore, not only must this unique identity be preserved and safeguarded against the negative attitudes and influences that emerge with the development process, but constant efforts must be made to foster an unfailing faith in, and love and respect for, the nation's traditional values and institutions. Concrete steps must also be taken to promote all the aspects of the nation's traditions, culture and customs that are relevant and

practical for strengthening the country's unique national identity. At the same time, it must be realised that such measures are not being taken because of sentimental values or orthodox views to uphold past practices, but that they are crucial steps that must be taken to consolidate and safeguard the sovereignty and security of the nation.

Preserving Bhutan's cultural heritage and its emphasis on the sanctity of the natural environment, however, does not imply that Bhutan intends to remain static and isolated. The aspiration of the country is to bridge the gap between modern development and traditional Bhutanese culture. Buddhism per se is not directly in conflict with development insofar as it holds that whatever is beneficial to the people is good. Many aspects of development have clearly met that test, e.g., the construction and expansion of health care facilities and communication networks.

Others have not. Buddhist values, for example, stress the subjugation of desire by forsaking materialism. Traditional reverence for nature and the belief that one must give back to the Earth what one has taken also reinforces a sustainable lifestyle. This is in direct conflict with modern development's emphasis on the acquisition and consumption of material goods. The modernisation process in Bhutan has raised the expectations of people and created desires that may not be sustainable, both of



Buddhism is an integral part of everyday life in Bhutan



Tsechu: one of the finest traditional forms of mass communication

which tend to lead to both personal and collective unhappiness. Therefore, development has to be accompanied by the reinforcement of a traditional value system that moderates these desires.

Bhutanese lifestyles also have been dramatically affected. Nowhere is this more palpable than in the expansion of urban areas. Many Bhutanese view village life as an integral part of the national character; modern towns are therefore generally perceived to contribute to the erosion of traditional Bhutanese social values. Before the beginning of modernisation, the subsistence level of most Bhutanese households served to make villagers interdependent. At that time, if a person wanted to construct a house, most of the other households in the village would generously contribute their labor. Today, however, most people are unwilling to help unless they are compensated financially. This loss of community spirit is widely bemoaned, but there is no denying that one of its causes has been the increasing relative affluence of many Bhutanese. Formerly,

community spirit was strengthened because of the interdependent nature of communities set in remote isolated villages. Certainly no one would advocate preserving community spirit by reverting to former levels of poverty or inaccessibility, but one must acknowledge that, despite the many positive aspects of development such as better health care systems, education and clean water supply, there have been many negative impacts on culture. Chief among them are the erosion of traditional religious beliefs, the loss of respect for elders and parents, and the loss of traditional customs such as community support.

Development also has had an impact on traditional arts, crafts and architecture. The increase in income from tourist sales has led to a boom in these areas — but again, not without a price. Traditional Bhutanese art is both religious and anonymous because it is based on the belief that both commissioning and creating works of art will earn the artists merit in their next life. Now art is produced primarily for aesthetic value and financial reward.

In much the same manner festivals have lost much of their meaning to many Bhutanese. Villagers still flock to see the masked dances at *tsechu*. The *Bardo* dances, the main event of the *tsechu* festival, serve as a reminder to Bhutanese of their future destiny depending on their past and present deeds. *Bardo* dances are live dramatized performances where *Choekje Gyalpo* (Lord of Death) reminds the audience of the different paths they will follow after death. These dances revive the people spiritually and in many ways refine them culturally. This occurs because the dances communicate moral lessons and both the performer and the observer benefit from the exchange. Although the number of festivals has actually increased in recent years, many of them are now geared primarily to tourists. The once-meaningful exchange between the audience and the performers is no longer present. In addition, the values that are imparted no longer strike a responsive chord in more urban and educated people. With the commercialisation and trivialisation of the festivals, we may lose one of the finest examples of mass communication.

Many other aspects of traditional Bhutanese culture also are being diminished; nuclear families are replacing extended families, and community loyalty is on the decline. Values such as obedience and deliberation are being usurped by efficiency, progress and financial success. Respect for both elders and possibly even parents is declining. Often Bhutanese youth seek to emulate media stars from India and the West and pay little attention to local and religious elders. The net result of all these trends is that modernisation has reduced the distinctiveness of Bhutanese culture. The economic forces that development has harnessed only encourage the Bhutanese people to integrate themselves into an increasingly homogeneous global culture.

In its mission to preserve the culture of the country, the Planning Commission recently adopted the following objective:

The preservation and promotion of cultural and traditional values is seen as a means to safeguard and strengthen Bhutan's status as a



Kurje Lhakhang, Bumthang, Central Bhutan

sovereign and independent nation. Without a distinct identity of its own, the Royal Government is fully conscious of the fact that a small country with a population like Bhutan, which does not have either military might or economic strength to safeguard its security, would find it difficult to maintain its sovereignty. Definite and determined efforts would be made to promote the spiritual and cultural heritage so that values and customs which have given strength and resilience to Bhutan through the ages are not eroded in the process of modernisation.

In addition to being undermined spiritually, Bhutanese culture is actually being depleted physically through the smuggling of cultural properties from the country and the desecration of monuments. The RGOB has taken measures to curb these illegal activities through the tougher criminal sanctions contained in the Antique and Art Treasures Rules and Regulations and increased vigilance.

To meet the challenges of preserving traditional Bhutanese culture, the Special Commission for Cultural Affairs has been

established. Charged with integrating cultural development into the overall national development policy, the Commission is comprised of a number of divisions, each of which is responsible for a different aspect of Bhutanese culture. Among the activities currently being carried out are the revitalisation of the National Library and the National Museum, and the preservation of traditional crafts and skills such as weaving, painting and the performing arts.

The *Dratshang Lhentshog* (Council for Ecclesiastical Affairs) was established in 1984 (Seventh Five Year Plan, 1992-1996) to preserve and promote Bhutan's rich spiritual heritage and the general well-being of the *sangha* (clergy). In so doing the members of the *sangha* could in turn better administer to the physical and spiritual well-being of the Bhutanese people and more effectively promote Bhutan's traditional respect for nature and a sense of stewardship for the country's rich natural patrimony.





KEY CROSS-SECTORAL NEEDS AND OTHER CONCERNS

In addition to the three cross-sectoral principles (sustainable economic development depends upon effective natural resource management; urban growth requires integrated urban/rural planning and all developmental planning and management should be sensitive to traditional Bhutanese culture and values) identified at the second NES workshop in 1994, the Task Force noted five key cross-sectoral needs that Bhutan must effectively address if it is to integrate environmental considerations into economic planning and policymaking. These needs all involve strengthening capacity in critical, overarching areas:

- A. Information Systems and Research
- B. Institutional Development and Popular Participation
- C. Policies and Legislation
- D. Training and Education
- E. Monitoring, Evaluation and Enforcement.

The particulars of these needs, and some of the practical steps being taken to address them, are discussed below.

A. INFORMATION SYSTEMS AND RESEARCH

Because a development agenda can only be as good as the information upon which it is based, one of the objectives of an NES process is the establishment of information systems for gathering and managing environmental data and effectively linking them to government planning and decision-making processes. A good information system must have the required technical capabilities and be able to be integrated into the institutional framework. It should allow all

natural resource managers to be able to identify the options available to them, forecast their potential impacts, make intelligent estimates regarding the cost-effectiveness of proposed interventions and assess their relative merits.

Any meaningful advance in Bhutan's attempts to achieve sustainable development is therefore predicated upon enhancing knowledge in all the relevant fields. Information on

the following would be most helpful:

- topography and land use;
- soil quality and characteristics;
- land ownership;
- meteorology;
- non-spatial data (air and water quality, etc.); and
- demographic, economic, social and cultural trends.

Among the more significant purposes to which this data will be put are:

- assessing the progress and achievement of environmental policy objectives (in all sectors);
- studying linkages and trends between socioeconomic and biophysical conditions; and
- bringing relevant information to bear on environmental problem-solving, decision making, policy formulation, analysis and reporting on the state of the environment.

In recognition of current data shortfalls, a comprehensive series of surveys and inventories has been undertaken by the Central Statistical Organisation (CSO). In addition, the recent establishment of a Geographic Information Systems (GIS) unit within the Ministry of Agriculture should help increase knowledge about current land use trends, especially in remote sections of the country. The end result of this GIS project will be a series of valuable resource planning maps.

Almost as important as obtaining this information is the manner in which it is processed and stored. The information must be standardised so that it is compatible with both current and anticipated data.

In order to improve the country's capacity to collect and disseminate natural resource and environmental information, primary efforts will focus on improving data collection and coordination, maximising the availability and use of existing data, identifying user needs and coordinating the activities of different levels of government to avoid overlap and duplication.

An information policy for environmental management, including a management information system, will need to be developed to articulate the relationship between policy processes and the specific subjects about which information is required. Some indication also should be provided regarding what information will be required to support and adjust the policy that is formulated, specifying by whom, when and how the necessary data is to be collected. Such clarifications will provide the basis for monitoring implemented policy.

Equally as important as the collection of existing data and its effective integration into a comprehensive and user-friendly information system is the generation of new data. This is the purview of research. As with information acquisition, the government needs to enhance its capacity in this regard if it is to provide the knowledge, techniques and technologies needed to achieve sustainable development objectives and address cross-sectoral issues.

Research must be conceived and conducted in accordance with proven principles. Research agendas must fit the needs of local people, and findings must be disseminated quickly and applied effectively. A related need is improving the exchange of information (including research reports) and appropriate technology. It is especially important that information gathered in resource-related research projects be used in environmental and economic decision-making.

The government also should work to ensure that relevant research supports the sectoral and cross-sectoral objectives contained in the NES. This should include efforts to secure cooperation between sectors, institutions and disciplines in adopting comprehensive, holistic approaches to sustainable development-related research.

But Bhutan should not rely solely upon its own work and initiatives. As a small country with only the foundations of its own academic and informal groups in place, it should not hesitate to draw upon the information resources of its regional neighbors and the international community.

B. INSTITUTIONAL DEVELOPMENT AND POPULAR PARTICIPATION

One of the benefits of Bhutan's long history of isolation is the development and refinement of institutions that are particularly well-suited to the country's unique socioeconomic needs. For centuries, traditional village-based institutions were able to effectively address socioeconomic and environmental needs. The *dzongkhag* system currently works to ensure not only the survival, but also the cultural and spiritual well-being of the Bhutanese people who, despite their ethnic homogeneity, generally lived in highly individualised communities. These locally based institutions are being adapted and strengthened to support participatory development.

Poor institutional capacity presents a major obstacle to the formulation and implementation of the sustainable development policies encompassed by the Middle Path. Bhutan must now develop an institutional arrangement that allows for the inclusion of sustainable development principles in policy formulation. Mechanisms to achieve this should include:

- strengthening government processes for integrating policy decision-making, including assessing sustainable development principles and their implications; and
- incorporating sustainable development principles in existing institutional arrangements across all strata of government.

Jurisdictions will need to recognise the regional and local dimensions of their policy formulation and ensure that appropriate community consultation mechanisms are established.

Both the Royal Government and NGOs need improved institutional capacities if they are to implement the national development agenda in the most sustainable way possible. Doing so will require improvements in organising and managing personnel skills and expertise, as well as strengthening environmental laws and enforcement. Other necessary measures include enhancing cross-institutional coordination, improving the organisation and

use of databases and avoiding sectoral overlap and duplication. In addition to what they do for themselves, these institutions also should be empowered to support community groups and NGOs participating in sustainable development activities. Such institutional capacities are beginning to be built through the concerted effort of the government and various international organisations.

The ultimate success of any NES depends upon the active and daily involvement of the resource users — those people who actually consume, manage and conserve the nation's natural resource base. Bhutan is no exception to this, especially in that 85% of its people continue to subsist off that resource base: farming the land, harvesting the forests and tapping into rivers and streams. By their collective force, it is Bhutan's overwhelming rural majority who will continue to have the most significant effect upon the nation's natural resource base.

Participation of local-level resource-users will mean active inclusion in every stage of the resource management project: defining research priorities, directing and carrying out research activities, planning, policy advising, project implementation, enforcement and monitoring. For example, in research and development projects for sustainable agriculture and rural resource management, farmers need to be integrated into all phases of the policymaking process — as full partners.

His Majesty the King personally introduced and promoted the policy of people's participation in national planning and decision-making processes by establishing the *Dzongkhag Yargay Tshogchungs* (DYT), or district development committees, in 1981. These DYT meet quarterly to discuss development issues and comment on major decisions concerning both the formulation and implementation of plans and programs. In 1991, even more broadly based, grassroots organisations were formed — the *Geog Yargay Tshogchungs* (GYT), or block development committees. These groups are actively involved

in the preparation of development plans. Subsequent stages of the NES process, such as the formulation of the NEAP, should be based upon the maximum feasible participation of local communities, informal groups and those private interests affected by the plan. Private business interests also can bring specialised insights into environmental problems and the practical and cultural constraints underlying various policy options. With this in mind, the NES should establish a

deliberate, publicised process of public participation through the NES Task Force, technical review committees and routine meetings at the community level. These meetings can be viewed as public information opportunities as well as working sessions for analysis, impact assessment and the design of policy and programme options. Such participation will help identify appropriate projects and priorities and develop a consensus for implementation.

C. POLICIES AND LEGISLATION

The current layer of environmental legislation and administrative instruments in Bhutan is based upon age-old traditions. Only recently has a “modern” series of laws, policies and regulations been developed. Moreover, Bhutan has no constitution, and therefore the relationship between the state and the society is mediated by means of a number of written laws, rules, notifications and orders, as well as values and traditions.

At present, the majority of Bhutan's environmental legislation concerns the conservation of forests and the protection of wildlife and wildlife habitat. Among the most prominent of these are the Forest Act of Bhutan, 1969, and the Forest and Nature Conservation Act of 1995. Although they encompass many of the basic elements and processes of environmental legislation, this legislation often is inadequate to the task at hand. Nonetheless, it is upon this framework that the next set of environmental legislation in Bhutan will have to be constructed.

It is fully anticipated that the national legal framework will be aided by a well-established system of local-level regulation. As developed over time and with specific reference to localised conditions, traditional rules — such as those determining grazing rights on the *tsamdos* and the communal use of forest resources — have ensured an equitable and largely sustainable use of renewable resources. Although not always appropriate under modern conditions, this longstanding and respected framework should still be incorporated in developing the national legal framework.

A prerequisite for creating environmental legislation is the establishment of environmental standards. Such standards never have been systematically developed for Bhutan; this has often led to the adoption of regional and international standards instead. Environmental legislation should eventually be developed for all sectors in the society, based on environmental quality standards determined by the sectoral Ministries and the NEC. There is a need for legislation that is well-grounded in the ethical, legal and cultural setting of Bhutan, legislation that depends upon a significant degree of decentralisation, and legislation with strong and workable appeal mechanisms.

Critical sections of important legislation need to be reviewed and in some cases revised to achieve a more coherent legislative and policy framework for environmental management and land use planning. For example, critical sections of the Inheritance Act, Land Act, Livestock Act (1981) and Forest and Nature Conservation Act need to be carefully scrutinised and assessed in order to support better land use.

The environmental legislation Bhutan adopts will need to be responsive to the trends in international environmental legislation. Of particular concern in this regard are the various international conventions and treaties dealing with transboundary and global topics such as biodiversity, transnational pollution and trade restrictions — especially as they become more standardised and accepted.

International awareness of the transboundary nature of environmental problems has grown in recent years. Bhutan, too, is aware that regional and international coordination is increasingly necessary to ensure that environmental policy is effective. The national policy is to first and foremost strengthen regional linkages. Bhutan currently participates in regional environment and sustainable development discussions in order to come to agreements on issues such as trade, forestry, water resources, and pollution.

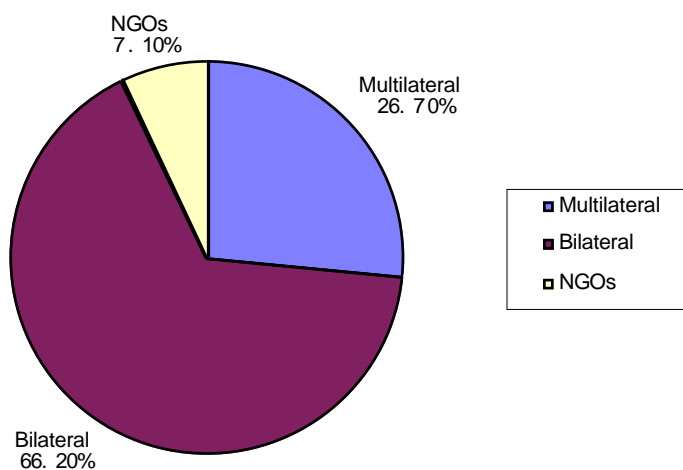
At the international level, Bhutan continues to play a role in supporting sustainable development policies. It continues to work toward international environmental agreements and is involved with a variety of international organisations on issues such as forestry and other global environmental issues.

Bhutan also has signed and ratified the Convention on Biological Diversity and the United Nations Framework Convention on

Climate Change. Although the country participates in these and other international fora and signs international conventions, an essential challenge that Bhutan, as well as all other signatory nations, faces is in meeting the legal obligations, implementing the activities and enforcing the provisions of the conventions.

Despite its small size, Bhutan, with its rich natural resource base and high-level political commitment to sustainable development, wishes to further its participation in international environmental programmes. An immediate priority will be to continue to develop the institutional capacity and technical expertise to constructively contribute to the development of this rapidly evolving field of international law and global governance.

FIGURE 13:

RATIO OF EXTERNAL ASSISTANCE BY SOURCES, 1992 -1994

D. TRAINING AND EDUCATION

Bhutan is currently handicapped by a shortage of well-trained environmental practitioners, both at the institutional and implementation levels. The most pressing of current needs is to be found in the public sector: not enough trained personnel are available to promulgate — much less implement — an NES. Such shortages are government-wide.

In an attempt to address this problem, Bhutan in the Seventh Five Year Plan embarked upon an ambitious, five-year Human Resource Development (HRD) Programme targeted primarily at the technical level. This programme is specifically geared toward training and developing the capacity of the Royal Government. In addition, HRD programmes in environmental planning and management need to be developed for both the public and private sectors of the country.

Some of the institutional needs and resources can be met from the wealth of institutional experience that is brought to developmental policy research and decision-making by international organisations. Study tours, in which Bhutanese officials work alongside their counterparts in other countries, also provide a valuable means of gaining on-the-job experience.

Training and education are also vital to empowering local-level resource users to plan and carry out those programmes that institutional development and popular participation have joined forces to formulate. Investments in HRD have immediate payoffs because they can increase the productivity of labor and scientific capabilities. They also have significant future benefits to society. Currently, long-term educational needs are being addressed by the Education Division, which seeks in the national primary education system to foster greater awareness of environmental considerations.

Education in the fields of environmental studies and resource management has to include not only formal schooling, but also practical training courses and informational programmes for all relevant actors, regardless

of their level: government decision-makers, scientists and researchers, private-sector managers, graduate and undergraduate students, secondary and primary pupils, resource users and the general public.

Increasing awareness and use of sustainable development principles in education and training programmes can be advanced by public education campaigns and non-formal education programmes such as those presented in the media.



Non-formal education

To help ensure that the implementation of the NES benefits from informed community participation and that progress toward ecologically sustainable development is supported by community understanding and action, the government should facilitate the exchange of comments and review of the NES document itself. This could be done by coordinating with those community, industry and business groups with proven expertise in sustainable development, and by providing the broader community with access to all policy development and programmes affecting them. In addition, sustainable development-related educational programmes should be targeted primarily at raising public awareness of sectoral objectives and strengthening the level of public involvement in environmental management and conservation.

E. MONITORING, EVALUATION AND ENFORCEMENT

Monitoring and evaluation procedures are important project management tools and should therefore be designed with the needs of management in mind. Although there are important similarities between monitoring and evaluation functions, they have different objectives, audiences and timing. Their functions should therefore be kept separate.

Monitoring practices are designed to provide managers with an ongoing tracking mechanism for agreed-upon objectives, work programmes, implementation schedules, physical inputs and expenditures. As such, monitoring is primarily an internal project activity and should be considered an integral part of day-to-day management.

Evaluation, on the other hand, involves assessing the quality of a given activity in relation to its objectives. Specifically, the evaluation of a particular programme will seek to measure the level of efficiency of its implementation in relation to costs and accrued benefits, reassess the relevance of the objectives and eventually measure its contribution to overall development. Even though some measurable criteria for gauging the progress of a flexible institutional process such as the implementation of an NES can be devised, these evaluations will always remain subjective to some extent.

Upon the completion of the NES, the government will want to monitor and evaluate the degree to which it is being implemented and to assess its effectiveness in meeting long-term national objectives. Monitoring and review activities should occur at each critical level, from policy development to programme delivery, generally in accordance with a matrix based upon the enumeration of key indicators for each component being monitored. This is a difficult challenge for Bhutan because much remains to be done to develop an effective monitoring and evaluation system for the environment.

One of the most proven monitoring mechanisms is establishing environmental

indicators. These indicators are quantitative measures that establish a baseline against which aspects of a project, programme or public policy can be measured. Baseline measurements for monitoring purposes related to soil resources, air and water quality, and demographic and land use changes can be particularly useful within the context of the NES and its implementation.

To take advantage of this proven mechanism, Bhutan will need to develop or adapt a set of natural resource management indicators that are appropriate to the country's setting and effective in assessing progress. Among the more pressing qualitative tasks evaluators will need to perform are assessing the pressures on, and state of, the resource base and the institutional capacity to effectively manage those resources.

Effective enforcement mechanisms require two things: clear regulations and efficient instruments. The key to the first is that all regulations must focus on infringements that can be detected, and it must be clear which regulations apply in any given situation. Enforcement instruments must be immediately available, and effective coordination must exist among all those organisations charged with enforcement responsibilities. As mentioned previously in this document, there are two basic environmental regulatory approaches: command and control regulatory mechanisms that employ penalties for negative environmental practices; and a positive economic incentive approach that encourages practices, and reforms through such instruments as subsidies and tax reductions. Both approaches should be utilised in Bhutan. A national enforcement structure needs to be established to ensure the proper enforcement of NES activities. Such a structure would call for the cooperation of all enforcement agencies at the national, *dzongkhag*, and *geog* levels. The role of each of these actors in the overall structure should be clearly articulated.

Giving individual entities more latitude to take responsibility for a clean environment through self-regulation implies the need for

society itself to take a more prominent role in encouraging environmentally sound behavior and in supporting self-regulation. This can be done, for example, by making it easier for

anyone to institute civil actions in the courts in cases of actual or potential environmental damage.



Primary school children





CONCLUSION

For centuries Bhutan's isolated location, combined with its inward-looking and self-reliant national character, has kept many of the unfortunate elements of modern development outside its borders. Many of its neighbors have seen their natural resource base degraded by rampant deforestation, soil erosion and the consequences of overpopulation and pollution.

Bhutan's robust stocks of natural forests, fertile soils, clear and ample water and rich biological diversity remain remarkably intact. Similarly, the country is still blessed with a vibrant religion that stems from centuries of harmonious coexistence between humanity and nature. Bhutan's cultural patrimony and unique social and political heritage is based to a large extent on a profound respect for the natural order of the world and farmers' and herders' deep understanding of the importance of living within the carrying capacity of the land and its resources.

Now, however, the nation is at a crossroads. The development process has recently accelerated, and the Kingdom is faced with many difficult issues related to the environment, development, and population growth and associated demographic changes. As the end of

the 20th century approaches, it is now clear that Bhutan's future depends on the range of decisions and strategies to be implemented in the coming years. Such a process is necessary and inevitable. National development can lead to greater prosperity, greater diversification of the economy and greater security against natural and man-made threats. It can improve the welfare of all Bhutanese.

Blazing the most appropriate path for development that sustains the country's natural resource base will not be easy. Potentially negative impacts to the land, forests and watersheds from industry, hydropower development, increased food production and other avenues of national development are looming.

Bhutan's challenge is to build on the foundation of cross-sectoral analysis, collaborative problem identification and integrated strategic planning that this NES represents. The NES document represents only a beginning. The process will continue with the development of an effective NEAP that can provide the Royal Government with a road-map for implementing the recommendations of the NES. It will further develop an integrated policy and legislative framework for guiding development projects and programmes toward

a path of sustainability. This ongoing process will provide Bhutan with a realistic combination of regulatory mechanisms and fiscal incentives to encourage the public and private sectors to develop without unnecessarily compromising the natural resource base.

To successfully meet the challenges of the future, we the Bhutanese people will be well-served by our longstanding characteristic

sense of balance. We must balance our commitment to maintaining our ancient culture and deep-rooted respect for the sanctity of nature with a willingness to develop economically and adopt technological and social changes. We must meet the challenge of preparing for population growth and its associated demographic changes and stresses on limited and fragile lands through the integration of family planning policies and practices within a far-sighted



Conserving the environment for the future of our children

development framework that emphasises environmental management.

We must develop our capacity to anticipate and plan for a wide spectrum of changes in resource use, the social fabric of the nation and international relations. Sustaining the health and potential of our natural resources and environment will be at the centre of this challenge.

We can build on all that is good in our history and culture while adapting to a changing world and meeting the imperatives of modernisation. By proceeding along this balanced path, our Kingdom can meet the challenges of the 21st century without sacrificing that which is most vital to our national well-being: our unique cultural heritage and the integrity of our environment and natural resources.



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