

Land Policies, Land Management and Land Degradation in the Hindu Kush-Himalayas

Bhutan Study Report

**Policy and Planning Division
Ministry of Agriculture
Royal Government of Bhutan**

**International Centre for Integrated
Mountain Development
Kathmandu, Nepal
1999**

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MOUNTAIN FARMING SYSTEMS' DIVISION

Mountain Farming Systems constitutes one of the thematic research and development programmes at ICIMOD. The medium-term objectives of the programme include i) Appropriate Technologies for Sustainable Mountain Agriculture, ii) Institutional Strengthening for Mountain Agriculture, iii) Integration of Gender Concerns into the Development of Sustainable Mountain Agriculture, iv) Agricultural Research Networking, and v) Better Understanding of Sustainability Dimensions.

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Preface

The Mountain Farming Systems' Division of ICIMOD, with support from the Global Mountain Programme, initiated a comparative study on the effect of land policies on land management and degradation in six regional countries; Bangladesh, Bhutan, China, India, Nepal, and Pakistan; sharing the Hindu Kush-Himalayan mountain range. One study was commissioned in each country. The exception to this was India where two studies, one in the Northwest and one in the Northeast, were conducted to capture the diversity and size of the Indian Himalayas. Each of the country studies was carried out by a team of experts from biological as well as socioeconomic disciplines.

The study was based on a concept paper developed by Professor Piers Blaikie in association with ICIMOD staff. The Team Leaders of the country studies came to ICIMOD in May 1997 to discuss the concept paper and agree on the methodology and operational aspects of the project. Each of the studies was to investigate four sectoral policies, e.g., Agriculture, Forestry, Wildlife and National Parks, and Tenure and Property Rights. Additionally, each study looked at the national and/or provincial environmental policy and its implementation. The idea was to investigate thoroughly all the sectoral policies and their impact on land management. Each of the studies also chose one particular issue of interest for the country or area that had a significant impact on land management. The study period was between June-October 1997 and final reports were presented in a workshop at ICIMOD in early November. Subsequently, the reports were revised for publication.

We believe that, by publishing these studies, ICIMOD will facilitate an important contribution for a wider audience, in the Hindu Kush-Himalayan region and beyond, who would benefit from the detailed information and analysis of this very important topic.

ICIMOD would like to acknowledge the contribution of Professor Piers M. Blaikie, of the University of East Anglia, U.K., in the design and implementation of this study. From within the Centre, Professor Blaikie was assisted by Dr. Syed Zahir Sadeque, Social Scientist, ICIMOD, and Dr. Tej Partap, Head, Mountain Farming Systems and coordinator of the Global Mountain Programme at ICIMOD. In addition, a multidisciplinary advisory team of ICIMOD professionals, namely, Dr M.Banskota, Dr N.S.Jodha, and Dr T.S.Papola, provided valuable inputs during the study.

Tej Partap

Syed Zahir Sadeque

Abstract

BAP
BCCI
BTF

Biodiversity Action Plan
Bhutan Chamber of Commerce and Industries
Bhutan Inland Fisheries and Environmental Conservation

The present study on land policies, land management and land degradation in Bhutan is part of the overall efforts of ICIMOD to assess the impact of land policies on land management and land degradation in the Hindu Kush-Himalayan region. The study highlights the clarity of vision of the RGOB on pro-environment land policies. The land policies in Bhutan are process oriented and are mainly related to agriculture, forests, and livestock.

Limited availability of arable land in the country is seen as a major constraint to further improving the livelihoods of mountain households and a challenge to balancing agricultural land needs with environmental conservation. Similarly, the livestock population is rising beyond the carrying capacity of the rangelands.

Key issues that emerged from the study are that presently environmental degradation is limited to a few pockets and necessary changes to policies and programme are being contemplated to reverse the process. Implementation of holistic programmes has helped maintain forest cover over 72 per cent of the country's area. The government policy is to maintain the forest cover well above 60 per cent, even though some land will have to be brought under agriculture to cope with the increasing scarcity of cultivated land. Policy implementation on phasing out shifting cultivation is being followed strictly, and there are clear policy guidelines about causing minimal damage to the environment during infrastructural development.

NCS
NEC
NES

Nature Conservation Section
National Environment Commission
National Environment Secretariat

Acronyms

BAP	Biodiversity Action Plan
BCCI	Bhutan Chamber of Commerce and Industries
BTF	Bhutan Trust Fund for Environmental Conservation
CSO	Central Statistical Organization
FAO	Food and Agriculture Organization of the United Nations
FNCA	Forest and Nature Conservation Act 1995
FSD	Forestry Services' Division
GDP	Gross Domestic Product
ICIMOD	International Centre for Integrated for Mountain Development
LUPP	Land Use Planning Project
MoA	Ministry of Agriculture
MoF	Ministry of Finance
MoHA	Ministry of Home Affairs
MoHE	Ministry of Health and Education
MoP	Ministry of Planning
MoTI	Ministry of Trade and Industries
NCS	Nature Conservation Section
NEC	National Environment Commission
NES	National Environment Secretariat
PPD	Planning and Policy Division
REID	Research, Extension and Irrigation Division
RGoB	Royal Government of Bhutan
RSPN	Royal Society for Protection of Nature
UNDP	United Nations Development Programme
WWF	World-wide Fund for Nature

Glossary

Contents

chhuzhing Irrigated paddy field

dungkhag Subdistrict

dzongkhag District

Abstract

geog Block

Gup Elected leader of a block

kamzhing Dryland farm areas under annual field crops that are not irrigated

tseri Slash and burn agriculture

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The case study was conducted to investigate the impact of agricultural policy in Samdrup Jongkhar district. This area was deficit in food in the late 1980s. The situation has now changed. The case study tried to find out if there was a link between agricultural policy and this change. It provides details of

Chapter 1 Background

Planned development in Bhutan was initiated only in 1961. Development achievement since then has been significant and diverse. However, the Royal Government of Bhutan (RGoB) is not complacent; it is fully aware of the issues related to land resources and their utilisation. Localised problems have started to emerge although they are not experienced in the magnitude and to the extent of some other countries.

This document has been written for the International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal, as a part of the Centre's regional programme to take stock of the current situation of land resources in the Hindu Kush-Himalayan Region. National problems and potentials for improvement have to be understood before putting them into a regional context.

1.1 Objectives and Study Methodology

This publication attempts to

- describe current land-use patterns in Bhutan,

- identify and present existing policies and programmes affecting land resources,
- highlight emerging land resource problems, and
- list major impacts of the policies.

The document has been written by the Policy and Planning Division (PPD) of the Ministry of Agriculture (MoA) based on its general and professional knowledge. It has been discussed further with other organizations at several sessions and workshops. Since land degradation problems are just emerging, the main emphasis will be on impacts and not details of the land degradation itself. A case study was conducted to find out how farmers have benefited from agricultural policies and programmes.

The study started first with the identification and collection of relevant literature available within the MoA and other offices. An extensive study of policies, plans, acts, and review papers was undertaken. The list of the documents referred to is included in the bibliography. Key informants were staff of the MoA in Thimphu. District staff,

extension agents, and the Gup (elected leader of a block), and some farmers from Samdrup Jongkhar district were also consulted and interviewed. A list of these informants is provided in Annex 1.

The case study was conducted to investigate the impact of agricultural policy in Martshalla geog in Samdrup Jongkha district. This geog was deficit in food in the late 1960s. The situation has now changed. The case study tried to find out if there was a link between agricultural policy and this development. Annex 2 provides details of

how the case study was conducted. The findings are incorporated in the section on impacts of agricultural policy.

This document is divided into four chapters. The first chapter is an introduction. Chapter 2 presents an overview of the country and its major features, including macro-economic progress achieved so far. Chapter 3 lists and highlights current policy and its legal framework, and its impact on land resources and their utilisation. Chapter 4 concludes with a summary of findings.

Background

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1.1 Objectives and Study Methodology

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Chapter 2 Country Profile

2.1 Socioeconomic Overview

Bhutan is a small landlocked country. It is situated in the eastern Himalayas. It covers about 40,077 sq. km. It is bordered on the west, south and east by the Indian states of Sikkim, West Bengal, Assam and Arunachal Pradesh, and on the north by the Tibetan Autonomous Region of China (Figure 1). The total population of this Buddhist country is estimated to be 600,000. About 85 per cent live in rural areas. According to the 1994 National Health Survey of the Ministry of Health and Education (MoHE), the population growth rate is 3.1 per cent per year. At this rate, the population is projected to double by 2015 A.D. The country is mountainous and elevation ranges from about 200 to 7,600 masl. The extreme variation in elevation and climate means that the country is divided into three broad agro-ecological zones: alpine, temperate, and subtropical.

Through successive five-year development plans, Bhutan has established a network of basic infrastructure, and economic and social services. The country today has a

fairly good motorable road-network connecting every district. Bhutan also has an excellent telecommunication network that connects all major settlements. The RGoB is already in the process of extending it deeper into the rural areas. The introduction of the Royal Bhutan Airlines has provided the country with direct access to some neighbouring countries.

Most of the country, including rural areas, has access to electricity and safe drinking water. Today, according to the Ministry of Finance (MoF), Bhutan spends more than 30 per cent of its budget on social sectors. The results have been encouraging. According to the MoHE, 72 per cent of the school-going age group has access to education, the literacy rate has surpassed 54 per cent, health coverage is now 90 per cent, and average life expectancy is 66 years. Furthermore, the renewable natural resources' (RNR) sector has regional research centres and an extension network reaching rural areas for the direct benefit of farmers.

Agriculture is the mainstay of the economy. Almost all the rural population is engaged

in agriculture and agriculture-related livelihoods. The Central Statistical Organization (CSO) estimated that farming, animal husbandry, and forestry accounted for about 38.6 per cent of the gross domestic product (GDP) in 1997. The per capita income in 1996 was US\$ 551 (CSO 1997), which is one of the highest in the Asian region. Also, there is little abject poverty and no significant income gap.

Livestock continue to be a vital part of the rural economy providing milk, meat, manure, and draught power. However, the cattle population presents serious localised problems of overgrazing.

RGoB has generally pursued economic policies characterised by prudent macroeconomic management and emphasis upon protection of the environment and the country's cultural heritage. Bhutan has, however, been dependent upon foreign aid to finance most of its development efforts. The country also faces formidable development constraints associated with its remoteness and rugged topography, limited capacity to plan and implement programmes, and a shortage of trained manpower. However, the RGoB is able to meet the cost of recurrent expenditure from its own domestic revenue.

2.2 Land-Use Patterns

2.2.1 Agriculture

The entire country is mountainous except for the foothills in the south. According to

the Land-Use Planning Project (LUPP 1994), agricultural land is limited to about 7.8 per cent of the total area of the country. However, agriculture is still the most important sector and contributed 19.2 per cent to GDP in 1996 (CSO 1997). The predominant agricultural land uses are *chhuzhing* (irrigated paddy fields), *kamzhing* (dryland), *tseri* (slash and burn agriculture), and orchard cultivation. Details of land uses are given in Table 2.1.

Chhuzhing

Chhuzhing is irrigated, bench-terraced paddy land. A rice-based cropping system is practised on this type of agricultural land. While paddy is the main crop, other crops, such as wheat, potatoes, and vegetables, as second crops in winter, are not unknown. In some areas, particularly in the southern subtropical zone, paddy is grown twice. It is estimated that approximately 12 per cent of the total cultivated area is *chhuzhing* (LUPP 1995).

Chhuzhing is mostly found in the broad valleys of Punakha, Wangdue, and Paro districts. In other parts of the country, such as Trashigang, Mongar, Lhuentse, and Trongsa, *chhuzhing* is found scattered on steep slopes. In the southern subtropical zone, there is a long and extensive stretch of *chhuzhing* in the foothills along the border area.

Kamzhing

Kamzhing is either terraced or unterraced rainfed agricultural land. It is found

Table 2.1: Agricultural Land by Type (in '000 ha)

Type of Land Use	Total Area	Percentage
<i>Chhuzhing</i>	388	12
<i>Kamzhing</i>	977	31
<i>Tseri</i>	883	28
Orchard	58	2
Others	840	27
Total	3146	100

Source: LUPP 1994

throughout the country, mainly on mountain slopes. Bunds help to mitigate soil erosion problems. *Kamzhing* constitutes about 31 per cent of the total agricultural land. Maize- or potato-based farming systems are practised. Besides these crops, other annual crops, such as mustard, buckwheat, turnips, and vegetables, are grown in the temperate northern zone. In the subtropical zones, millet is grown as the second crop.

Tseri

Tseri is a conventional slash and burn system of agriculture, except that *tseri* farmers do not shift their homes like their counterparts elsewhere. *Tseri* areas are cultivated on a rotational basis with an average fallow period of five to six years. The land is left fallow for regeneration of its vegetative cover and soil nutrients. *Tseri* is important as it comprises 28 per cent of the cultivated area (Table 2.1). Common crops are maize, millet, wheat, barley, and buckwheat. Other crops, such as chilli, beans, and leafy vegetables, are grown as intercrops. Since *tseri* areas are inside or near forests, crop losses from wildlife are high.

Orchard

Fruit-growing has long been part of Bhutanese life, but commercial orchards are a recent practice, introduced in order to improve the living conditions of the rural population by increasing their cash income. Orange, apple, cardamom, ginger, nuts and mango are some of the major crops planted. The estimated area under orchards is two per cent of the total cultivated land (Table 2.1). The orchard area is underestimated since the satellite images used failed to account for areas of less than five acres (2 ha) and some orchards could not be differentiated from forest cover.

The area under apple plantation is expanding, particularly in Thimphu and Paro

Dzongkhags. Most of these new plantations are being developed on dryland and, to some extent, on *tseri* land. There is pressure on *chhuzhing* as it is relatively more accessible than other land types. Most orchard crops are exported to India; however, efforts are being made to diversify. Markets in Bangladesh, Thailand, and Singapore are being explored for selected crops. Poor quality and lack of standardisation are the major problems that Bhutanese crops face in these markets.

Others

This is agricultural land that could not be identified with the mapping technique deployed. It is a 'club' land category that can be classified into one of the above categories with finer mapping techniques.

2.2.2 Forests

Forest is defined in the Forest and Nature Conservation Act 1995 as 'any land and water body, whether or not under vegetative cover, in which no person has acquired a permanent and transferable right of use and occupancy, whether such land is located inside or outside the forest boundary pillars, and it includes land registered in a person's name as *tsamdog* (grazing land) or *sokshing* (woodlot for collecting leaf litter)'. Bhutan has extensive and rich forest resources. Wide variations in altitude and climate mean that forest resources are habitats for some of the world's endangered species of animals and plants. Bhutan is one of the ten 'hot spots' in the world. Currently, forests occupy 72.5 per cent of the total area of the country. They are managed as government-reserved forests. Table 2.2 provides forest cover composition (LUPP 1994).

The species' composition of the country's forests can be placed into three broad ecological zones. Forests that occur in the range of 200 to 1,000m among the southern foot-

Table 2.2: Composition of Forest Cover by Type and Area

Forest Type	Area (sq. km.)	Percentage
Fir	3453	11
Mixed conifer	4868	17
Blue pine	1286	4
Chir pine	1009	3
Broadleaved with conifer	1358	5
Broadleaved	13749	47
Plantations	64	1
Shrub	3258	12
Total	29,045	100
(LUPP 1994)		

hills are known as subtropical. These forests are composed of broadleaved species that have high economic value. Most plantations are also found in these forests. The Black Mountain region, which is considered to be the richest subtropical forest in the world, is part of this forest zone. These forests are also habitat for most of the endangered wildlife, such as the rhinoceros, tiger, elephant, pigmy hog, and so on.

The temperate zone forest lies between altitudes of 1,000 and 4,000m. It contains important inhabited areas. Forests between 1,000 and 2,000m in humid areas are classified as warm broadleaved forest and contain a mixture of evergreen and deciduous broadleaved species. In the drier areas at this altitude, chir pine is common. Cool broadleaved forest is found on moist exposed slopes above the warm broadleaved forest. Evergreen oak forest occurs at the same elevation as cool broadleaved forest but on drier sites. The forest above 2,500m consists mainly of temperate conifers with some hardwoods. The conifer forest, especially blue pine and spruce, is the main forest type of commercial significance.

The alpine zone occurs at 4,000m and above. This zone is an important natural conservatory of glaciers, alpine meadows and scrublands, and subalpine and cool temperate conifer forest. It harbours spe-

cies of wildlife, many of which are endangered or extinct elsewhere in the world. Takin, snow leopard, blue sheep, musk deer, Himalayan black bear, marmots, red panda, tiger, and species of pheasant are some important species. Jigme Dorji National Park, which is the largest park in the country, is mostly in this zone. There are also several species of plants that have commercial, medicinal, traditional, and religious significance. More than 300 species are currently being used to make indigenous medicine. The area also has great potential for trekking tourism, and this is being gradually exploited; the number of tourists is increasing every year.

Forest resources play an important role in conservation of the environment and in the national economy. While attempting to kept the environment intact, the forestry sector contributed 11.7 per cent to the GDP in 1996 (CSO 1997). Forestry is of strategic importance because the young and expanding industrial sector is largely dependent on forest resources. It also provides food and other important products to rural communities. Furthermore, in the absence of improved pasture, cattle are allowed into government-reserved forest for free grazing. In addition, forests are a tourist attraction as unspoilt natural beauty, exotic excursion spots, wildlife habitat and a peaceful resort to rest. Given all these

features, the RGoB recognises the important role and functions of the forest in the sustainable development of the country's economy.

In order to preserve the rich flora and fauna, 26.5 per cent of the country's total area is under a protected area system. The objective is to protect and preserve biodiversity and genetic resources. Currently, there are four national parks, four wildlife sanctuaries, and one strict nature reserve occupying a total of 11,078 sq. km.

2.2.3 Livestock

The Bhutanese economy is traditionally centred on subsistence and migratory patterns of livestock farming. As more than 95 per cent of households own cattle, this is a strong indicator of the importance of livestock in the country's rural economy. However, livestock cannot be looked at in isolation from crops and forestry – it is an integral part of the Bhutanese farming sys-

tem. For instance, livestock provide draught power and manure for crop production, which is 'reciprocated' with feed, fodder, and fallow grazing; the forest is a source of litter for animal bedding, and also a place for grazing. Wild grazing is common practice.

In the last decade or so, the traditionally harmonised practice of livestock farming has been increasingly put under pressure by implementation of a successful livestock programme. The irony of its success is the threat of imbalance in the crop-livestock-forest relationship. With improved veterinary facilities, the animal population has increased but this has not resulted in an increase in livestock products. Livestock production now competes with crops for arable land and causes overgrazing of forests. There is no currently appropriate means of balancing livestock population and pasture availability or of reducing the number of economically unproductive animals.

Chapter 3

Policy and Legislative Framework and Their Impacts

This chapter focusses on the policy and legal framework of the RGoB with regard to land use and its management. Forest and wildlife policies are dealt with separately, although they are closely related and the institutional framework is the same.

3.1 National Environmental Strategy

3.1.1 Institutional framework

The National Environmental Strategy 1997 was developed with contributions from the Ministry of Planning (MoP), Ministry of Home Affairs (MoHA), MoA, MoHE, Ministry of Trade and Industries (MoTI), Ministry of Communication, Special Commission for Cultural Affairs, Bhutan Trust Fund for Environmental Conservation (BTF), and Bhutan Chamber of Commerce and Industries (BCCI). The strategy was formulated over a period of three years based on a series of consultations, various technical meetings, regional workshops, and a final national workshop. The National Environment Secretariat (NES) coordinated its formulation.

The NES also coordinates its implementation. All government agencies, private companies, or individual developers work within the national strategy while formulating and implementing environmental programmes. The environmental policy-making body at the national level is the National Environmental Commission (NEC). Members of the NEC are the heads of the ministries. The NES seeks policy guidance and approval of its work plan from NEC.

The two international events that triggered the formulation of the strategy were the Brundtland report and the Rio declaration. However, it should be noted that the strategy is prepared by and for the RGoB; its contents and intentions reflect the Bhutanese philosophy of spiritual and material development while respecting concerns for conservation of the environment. Formulation of the strategy was initiated mainly because of the following concerns.

- The current population growth rate of 3.1 per cent per annum will double the population by 2015. Pressure on lim-

ited land resources and the fragile ecosystem will increase significantly.

- Uncoordinated development programmes have diverse environmental ramifications. There are many isolated projects that waste resources from duplication of activities. A holistic approach is necessary, not only to avoid duplication but also to avoid abuse of the resource base for future generations.

The ultimate aim of the strategy is to provide improved living conditions for rural communities using sustainable resources. The local community and district administrations were consulted and involved deeply in its formulation.

3.1.2 Objective and Scope of the Strategy

The strategy aims 'to raise the material well-being of 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' (NEC 1997a). In the Bhutanese context, the objective is clear that development *per se* cannot be isolated from respecting and promoting what we stand for – our beliefs, culture, and their values. These are that we provide for future generations. Material achievement intertwined with the promotion of our systems and values will contribute to sustainable development.

The strategy defines and outlines hydropower development, self-sufficiency in food production, and industrial development as the three avenues of sustain-

able development. It identifies the following five key cross-sectoral issues that are essential to the successful integration of environmental concerns while pursuing national development.

- The need for information systems on 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 standards of environmental quality.
- The need for training and education in natural resource management.
- The need for effective monitoring mechanisms, including environmental indicators, and effective enforcement procedures.

3.1.3 Key Legislation and Programmes

The enabling National Environment Strategy was formulated only in 1997, but some of the sectoral strategies were already being implemented. Some are listed below.

- Environmental Impact Assessment Guidelines for Bhutan were drafted by the NES in 1992.
- A serious discussion is being conducted on the need and preparation for the National Environmental Protection Act.
- The government is in the process of enhancing the national capacity to manage the environment by implementing a human resources' development plan.
- The government has already initiated the process of developing a National Environmental Action Plan to implement the strategy.
- Another notable programme is the implementation of an environmental sector programme under long-term development collaboration with the Danish government. All environment-related

programmes are being coordinated and implemented under this programme.

The NES is working on operational aspects of the strategy so that the necessary legal framework will be in place by the end of the 8th Five-Year Plan.

3.1.4 Impact of the Strategy

Bhutan's forest has experienced a significant positive impact of the strategy. Various sectors have implemented pro-environment programmes. Thus, environmental problems are localised to a few pockets only. However, to achieve objectives, the following preconditions need to be met.

- The required legal framework for effective management of natural resources and the environment should be in place. The framework should be developed and agreed upon by all concerned stakeholders.
- The national capability to coordinate the implementation of the strategy in particular and the management of the environment in general have to be further strengthened.
- There will be a requirement for fiscal incentives to encourage public and private sectors to develop economically without unnecessarily compromising the natural resource base.
- The education and extension campaign should be conducted continuously to create mass awareness of sustainable management of natural resources. This will require concerted efforts from both public and private organizations.

3.2 Agriculture

3.2.1 Institutional Framework

The Research, Extension and Irrigation Division (REID) of MoA is responsible for

agricultural development in the country and hence the implementation of agricultural policy and programmes. The division has a network of field offices spread throughout the country, including an extension centre in each geog. There are four research centres with satellite stations that are responsible for conducting research and providing appropriate agricultural innovations to farmers. These innovations are made available through extension agents.

The role of the division is guided by the principle that agriculture is primarily a private domain. Farmers and local communities take initiatives, provide their own labour and capital, and bear the risk and consequences of their actions. The government is only a facilitator, extending the range of available opportunities through constructive regulatory measures, appropriate fiscal policies, provision of infrastructure, and cost-effective research, technical support, and advisory services.

The Planning and Policy Division (PPD) of MoA coordinates the formulation of agricultural policy. The other main contributors to policy-making are field and other staff of REID. The concerns and views of the local community are incorporated in this process through the participation of field staff.

3.2.2 Agricultural Policy

The agricultural policy of RGoB is to attain national food security. There are three aspects to this policy. First, to maintain national food self-sufficiency whereby the export of crops for which Bhutan has a comparative advantage provides sufficient foreign exchange to cover the cost of food imports. Second, to increase self-sufficiency in food grain production from 65 per cent to 70 per cent. Third, to ensure household food security whereby the population has assured access to food at all times.

Prior to 1960, Bhutan was self-sufficient in food grains and even exported small surpluses. After the introduction of planned development in the early 1960s, the policy of food security was formulated for the following reasons.

- High population growth rate
- Emergence of non-farming communities
- Recurrent food shortages in the hills
- Importation of manpower mainly from India
- Shift to rice-eating
- Accessibility to food at times of natural calamity

Government policy gives priority to production of food. The issue is how the present subsistence agriculture can shift to commercial farming while pursuing the food self-sufficiency policy. Some constraints are as follow.

Agricultural lands are subjected to a slow process of degradation in some populated areas. A preliminary analysis by PPD indicates that the majority of *tseri* land is found on slopes greater than 50 per cent. There is no slope limit beyond which farming is allowed. Hence soil erosion is taking place.

Population growth has intensified land use, particularly on steep slopes. With the increase in family members, agricultural land is being fragmented because the 1979 Land Act provides equal rights to all family members to the family landholding. The economics of the size of landholding is not taken into consideration.

For generations monocropping has depleted soil nutrients. The cultivation of maize and potatoes in eastern and central Bhutan is now dependent on artificial fertilizers. The Sustainable Soil and Plant Nutrient Management Project document (REID 1998) states the adoption rate of inorganic fertilizer in the districts of

Trashigang and Bumthang, where these crops are grown, has increased many times.

Damage to field crops by wildlife has been consistently reported throughout the country. The general consensus is that it is the result of the increased wildlife population. A survey on crop damage found 18 per cent loss of paddy, 11 per cent loss of wheat, 14 per cent loss of maize, 20 per cent loss of buckwheat, and 15 per cent loss of potatoes result from attack by wild animals (Choden *et al.* 1996).

Conversion of *chhuzhing* to other uses is protected by the Land Act of 1979 but there is increasing pressure, particularly in the peri-urban areas of Thimphu and Paro. PPD detected 17 illegal cases in 1998; and requests for conversion are on the increase.

Bhutan has been constrained by lack of information for making appropriate policy decisions on these problems. PPD has been instructed to review current land-use systems and the policies affecting them. The review aims at identifying:

- *chhuzhing* areas to be retained for intensified paddy production,
- *chhuzhing* areas to be used for other purposes such as cash crops,
- agricultural lands that require conservation measures,
- marginal agricultural lands suitable only for forestry uses, and
- forest areas suitable for future agricultural expansion.

This land resources' information should be the basis for the preparation and implementation of a national land-use policy.

3.2.3 Key Legislation

The Land Act and the Taxation Policy of 1992 provide the legal framework for the use of agricultural land to achieve food

security. The Land Act has the following provisions.

- An addendum to the Act states that 'chhuzhing will not be allowed for conversion to other uses. However, the Ministry of Agriculture and the dzongkhag administration will investigate and identify those areas that cannot be used as chhuzhing and allow the conversion. Conversion can also be allowed if there is an approval from the government. Also no construction of buildings will be allowed on those areas recorded as chhuzhing.
- All family members have equal rights to the registered land of the family.
- A household is entitled to 25 acres of agricultural land for each family.
- Nobody can buy land from a family possessing five acres of land. Conversely, a family member having only five acres of land cannot sell the land.
- Tseri is to be government-reserved forest after 12 years of fallow.

The Revised Taxation Policy of 1992 is the basis for land tax. In general, agricultural taxation is minimal. This policy of low taxation is a deliberate strategy of the government to improve living conditions in rural areas and to stop rural-to-urban migration. In keeping with this policy, tax on chhuzhing should be as low as possible. However, annual tax per acre of chhuzhing is still the highest land tax.

With respect to conservation of agricultural land, a stronger legal framework is needed. First, there is a need for a legal provision to take up structural conservation measures on private farms. This would require mandatory soil and water conservation measures on private land. The Forest and Nature Conservation Act (1995) now has this provision, but it is yet to be operationalised by formulating and implementing the required rules and regulations. There is also a need to identify the upper

slope limit beyond which farming is prohibited. Most tseri areas and some dryland farms are on steep land vulnerable to severe soil erosion. The Land Act allows conversion of dryland to other land types – including construction of buildings. The use of dryland for non-crop production has an adverse effect on the food self-sufficiency policy.

3.2.4 Major Programmes

Government interventions to achieve food security are many and various. The following are some of the main programmes that have direct impact on land use and the farming community.

Market and Distribution System

This programme provides assured markets to the farming community to sell cash crops and other surplus products. Several auction yards have been established in border areas with India. Also, organized export is arranged for cash crops such as apples, oranges, potatoes, and cardamoms. Furthermore, Sunday markets have been established in almost all dzongkhags to facilitate the sale of local produce. There is a nationwide agricultural input supply system. This system ensures that new varieties of seeds and seedlings, chemicals and fertilizers, etc are made available to farmers on time.

Rural Credit Programme

This programme provides both short-term and long-term loans for investment in agriculture, livestock, and forest operations. Credit offices are decentralized in all 20 dzongkhags. The agency managing this programme is the Bhutan Development Financial Corporation.

Promotion of Improved Farm Machinery

Through the Agricultural Machinery Center at Paro, MoA develops or identifies appro-

priate farm tools, procures or produces these tools, and sells them to farmers. Since labour shortage is a constraint in Bhutan, this programme promotes labour-saving technologies that at the same time increase farm production. The mechanisation programme has been taken closer to farms by establishing regional centres.

Promotion of High-yielding Varieties of Seeds and Seedlings

This programme identifies and develops package technology to increase agricultural production. The programme aims to provide cash income through promoting cash-crop cultivation; and also to achieve food self-sufficiency. Some high-yielding varieties of rice, maize, citrus, apples and potatoes have already been distributed and adopted by farmers.

Research and Extension Network

The MoA has established a network of extension centres throughout the country in order to support the implementation of its various development programmes. At the end of 1997, there were 159 agricultural extension centres and 35 renewable natural resource centres. Four renewable natural resource research stations had been established. They are backed by six substations. The mandates of these centres include development and providing better seeds and technologies to the farming community.

Irrigation Development

Irrigation development is an important element of MoA's strategy towards greater self-sufficiency in food grains. This programme aims at providing technical and material inputs to farmers to construct irrigation channels. Once the construction is completed, it is the responsibility of farmers to maintain these channels. Water users' associations are formed for every irri-

gation channel constructed. The objective of the associations is to use water cost-effectively.

Protection of *Chhuzhing*

The RGoB protects *chhuzhing* since rice is a staple food; conversion of *chhuzhing* to other uses is prohibited. In spite of this protection, the *chhuzhing* are under pressure, particularly in the peri-urban areas of Thimphu and Paro. *Chhuzhing* are normally converted to apple plantations or residential areas as they are relatively accessible.

3.2.5 Impacts of Policy

Figures on crop production and area are vague as there has been no systematic attempt to collect such data on a regular basis. Here, the trade statistics of MoTI have been used for cash crops and estimates of CSO have been used for cereal crops.

Increased Cash-crop Production

The main cash crops in the country are apples, oranges, potatoes, and cardamoms. The production of these crops has increased considerably over the last few years. This is indicated by increases between 1991 and 1997 in exports of apples by 23 per cent, oranges by 273 per cent and potatoes by about 22 per cent. Oranges and potatoes are grown throughout the country by a large number of farmers. Increase in orange and potato production has contributed to the cash income of a wide section of farmers. Oranges have become a main source of cash income after the establishment of trade relations with Bangladesh.

Increased Cereal Production

The average yield increase of major food crops (rice, maize, wheat/barley) over the last 16 years is approximately 87 per cent.

Rice has increased in production by about 49 per cent, maize by 113 per cent, and wheat/barley by about 99 per cent. Punakha, Wangdue Phodrang and Paro *dzongkhags* now produce surplus paddy which is mostly sold in Thimphu market. The increase in maize production is mostly from eastern Bhutan; some surplus maize is bought by the government and supplied to educational institutions. There is a noted change in farming practices both in dryland and *chhuzhing*. Improved paddy and maize varieties have become popular. Double cropping of paddy has also contributed to the increase in paddy production.

3.2.6 The Case Study

Findings from the case study indicate that the food-security policy is being implemented effectively in the field.

The following programmes have benefitted households.

- Distribution of high-yielding varieties of paddy
- Distribution of high-yielding varieties of maize
- Distribution of orange seedlings of improved quality
- Distribution of piglets
- Subsidy on terracing
- Farmers' study tour
- Irrigation development
- Distribution of vegetable seedlings

Increased paddy production in the three villages is a result of the promotion of high-yielding paddy varieties, extension efforts, and irrigation development.

High-yielding varieties of paddy seeds were distributed to farmers free of cost through the crop promotion scheme. All the farmers selected for interview adopted the BR variety because its yield is higher than other varieties; it can withstand

strong wind; and damage from birds and insects is less than with other varieties. The extension agent has been instrumental in this high rate of BR adoption. He made this variety available through promotional schemes. He then assisted farmers in technical aspects of paddy cultivation. Also, households in Martshalla and Kakpadung villages benefitted from RGoB assistance to construct irrigation channels. These channels were constructed during the 7th Five-Year Plan with labour from the farmers and technical and other material from the RGoB. The water users' association now manages them and is responsible for their maintenance and proper use of irrigation water.

Besides the increased area under *chhuzhing* (Annex 3), other major indicators of food security in the case study area are highlighted below and details are given in Annex 4. The RGoB programme to increase maize production has been implemented. In all three villages, farmers cultivate the improved maize variety Yangtsepa. It has a higher yield than others and can withstand strong wind. The content of *kharang*, the portion that is eaten after cooking, is higher than traditional maize varieties. Farmers have reported an increase in cash income from the sale of oranges, the main cash crop. The number of orange trees in the three villages increased after the 5th Five-Year Plan. Thirty-one households planted additional orange trees. These households sell their oranges either through auction yards established by RGoB or in open markets at the border. Kitchen gardening is a common sight; out of 37 selected households, 24 have kitchen gardens. Cauliflower, cabbage, tomatoes, and leafy green vegetables are grown. This has contributed to food security. The extension agent supplies vegetable seeds. Unlike in the recent past, farmers no longer buy vegetables from Bhangtar market. Instead, some farmers sell their surplus vegetables.

3.3 Forest

3.3.1 Institutional Framework

The Forestry Services' Division (FSD) of the MoA is responsible for management of national forest resources. The territorial divisions, forest resources' development section, nature conservation section, social forestry section, and forest protection and land-use section assist the division in managing these forest resources.

The Planning and Policy Division (PPD) assists the division in the analysis and formulation of forest policy. Technical inputs and other experiences from field and other staff form the basis for policy analysis and revision. The concerns and views of the local community are incorporated in this process through the participation of field staff. At the national level, NEC is the overall coordinating agency for national environment issues. Hence, conservation and other forestry operations have to be guided by NES.

The Bhutan Trust Fund for Environmental Conservation (BTF), FAO, UNDP, WWF, and some bilateral donors are major partners in managing forest resources. This international community provides the funds needed for meaningful management and conservation programmes, ranging from establishment of an efficient information system to enhancement of national capacity. In this respect, the RGoB exercises careful screening of donors, ideas, and consultants. This screening has avoided the involvement of too many donors with different development intervention styles.

Until recently, forests were controlled by the RGoB. However, within the overall decentralization policy and the changing role and functions of the forests, there has been a gradual loosening of this state control recently and a change from policing to extension. Management of forest resources

is now shared with the local community. Also, institutional strengthening and further legislative clarification are taking place. The result is that the government still remains the custodian of forest resources, but it is now concerned with effecting a smooth transition between management styles that avoids a destabilising vacuum. One major institutional constraint to effective forestry management is the lack of local expertise with technical competence in planning and management. In fact, there are staff shortages in many forestry operations.

3.3.2 Forest Policy

Over the last three decades, forest policy has shifted its focus from that of revenue generation to protection of the environment. At the beginning of planned development in the 1960s, it was recognised that a major contribution to the national exchequer would come from forests. The then forest policy was therefore to exploit forest resources to generate revenue. It was contemplated that revenue from forests would grow at 10 per cent per annum. This revenue was required for investment in roads, education, health, and agriculture.

However, in 1991 forest policy became conservation-oriented; aimed at multiple use of forest resources; and involving local people in planning and management. Revenue generation is no longer important although it is necessary and can be obtained from scientifically managed areas. The main areas of policy are as follow.

- Preserving the natural ecological balance by maintaining at least 60 per cent of the land area under forest cover at all times
- Developing and managing wildlife reserves in each ecological zone
- Conserving and managing forest resources on a sustained yield basis
- Banning the export of round timber – this is a recent addition to the policy;

RGoB aims at adding value to forest resources.

3.3.3 Key Legislation

Forestry policies in Bhutan are supported by the Forest Act 1969 and the Forest and Nature Conservation Act 1995 (FNCA). While both acts provide the legal framework for effective forest management, the 1995 act is aimed more at conservation. Some salient features, which can be considered improvements over the 1969 act, are listed below.

- The use of forest resources should be based on scientific management plans.
- Those forests not owned by any individual will continue to be maintained as government-reserved forests.
- Plants that are listed in Schedule 1 (Annex 5) are declared to be totally protected.
- Based on MoA-approved management plans, local people can now develop and maintain community forests in MoA-approved government-reserved forests.
- An individual can develop or register his land as social forest.
- Unlike in the past, trees from social forests belong to the people and there is no need to pay a royalty to use them.
- The procedure to establish wood-based industries has been streamlined. Authority to grant licenses to establish wood-based processing plants now rests with the MoA.
- The lack of legal provision for soil and water conservation programmes on private land is now addressed. The act empowers MoA to take up soil and water conservation programmes on private land if RGoB finds it necessary to protect soil, water, and wildlife resources.
- In order to provide smooth marketing of forest products, including those from social and community forests, the MoA

is to issue rules regulating their transport, import, and export.

The underlying objective of the act is to involve local people in forestry management to meet their own requirements and thereby release pressure on government-reserved forests. The government acts as facilitator and provides technical and advisory services to individual farmers and community groups. This act was formulated and adopted by the people through their participation in the National Assembly. People can provide feedback on the act so that the RGoB can improve it.

3.3.4 Key Programmes

Forestry management can be divided into three broad programmes: production forest management; protection; and social and forest extension. Each of these is highlighted below.

Production Forest Management Programme

FSD prepares management plans for reserved forests where the demand for fuelwood and timber, in particular, is met. At the end of the 7th Five-Year Plan, a total of 38 management plans had been prepared and implemented. Their objectives are to conserve the natural environment, to meet the increasing demand for forest products, and to generate revenue on a sustainable management principle. One component is therefore afforestation: logged areas are planted with seedlings before closing the area for regeneration. Bhutan Logging Corporation is implementing these plans under the direct supervision of FSD.

Protection Programme

This programme consists of a forest fire prevention activity under which fire incidences are checked and controlled; in-

sect and disease control activity to control bark beetle and other epidemics; and forest legislation activities that cover a whole range of legal aspects including the amending, revising, and enforcement of acts.

Social and Forest Extension Programme

This is a new programme placed at district level under the decentralization policy. It has the following five broad components.

- Designation of community forest areas to be managed by local people
- Community afforestation or reforestation initiatives in degraded areas
- Agroforestry and private forestry on privately-owned agricultural land
- Allocation of dry fuelwood for rural consumption
- Protection of forests from fire and encroachment

Under this programme, the following two national activities deserve to be mentioned. The second of June is celebrated as Social Forestry Day throughout the country. Seedlings are planted in institutional compounds and degraded forests by local people and communities. Environmental studies are now incorporated in the school syllabus. A Nature Study Centre has been established by FSD to facilitate school children to study nature and the environment.

3.3.5 Impacts of Policy

In assessing the overall impact of forest policy, it is necessary to stress that deforestation has never been a critical problem in Bhutan, mainly because of low population pressure and tight state control over forest resources. Nationalisation of forests in 1961 and logging operations carried out by a single organization that was directly and continuously supervised by RGoB, demonstrated this tight control. This limited uncontrolled expansion of commercial logging by regulating the ac-

tions of powerful individual, community and government interest groups. Furthermore, it resulted in maintaining a good forest cover; Bhutan has avoided excessive forest degradation. However, with increasing demand for forest products, the following are some localised problems that show that the forest is subject to some degradation.

With so much forest cover, there should not be a shortage of fuelwood. However, shortage in Thimphu is typical of growing scarcity in some urban areas where population is concentrated. This has become an urgent national issue; MoA is already exploring alternatives to fuelwood consumption. The first target groups are the armed forces, monk bodies, and some educational institutions.

Some forest areas have been encroached to cultivate agricultural crops, mainly cash crops. There are cardamom plantations in the subtropical humid forests of Sarpang, Zhemgang, Danaga, and Tsirang districts. About 3,500 ha of cardamom plantation were recorded during the 7th Five-Year Plan (LUPP 1994). Since this figure was derived from satellite imagery, the actual figure will be greater. These plantations are now showing signs of land degradation, such as landslides and gully formation, mainly because of poor drainage systems.

Cattle grazing is allowed in government-reserved forests on an annual payment basis. This has resulted in overgrazing that has led to a serious problems of soil degradation, gully formation, poor vegetative cover and composition, and poor regeneration processes. Cattle are let loose in forests and are free to graze.

Forest areas are also subjected to mounting pressure from the need to develop infrastructure. New roads are constructed through forest areas, open spaces are created to erect electricity transmission lines,

and there are other needs such as construction of buildings for educational and agricultural extension purposes.

The MoA should be able to address these emerging problems with the new Forest and Conservation Act (FNCA). For example, with the change in forestry rules that allows full rights to use and sell timber under the social forestry programme, the option of timber plantation on *tseri* has become attractive in many areas. This alternative use of *tseri* will provide fuelwood, leaf litter, fodder, and other minor forest products. Consequently, it will release pressure on government-reserved forests and help the RGoB to manage its forests in a sustainable way.

3.4 Wildlife

3.4.1 Institutional Framework

The Forestry Services' Division (FSD) of the MoA is the lead agency for biodiversity conservation and sustainable management of protected areas – including wildlife. In particular, the Nature Conservation Section (NCS) of this division is entrusted with the responsibility of formulating, implementing, and monitoring biodiversity programmes. The PPD of the MoA assists the division to identify, review and recommend policy revisions. At the national level, the NEC is the overall coordinating agency for national environmental issues. The NES is the basis for future planning and management of wildlife.

The BTF was one of the major sources of funding for implementing conservation programmes during the 7th Five-Year Plan. It contributed to the development of human resources, increased park infrastructure, and supported a pilot project on the integrated conservation and development programme. The BTF will continue to fund conservation programmes not covered by other donors.

The Royal Society for Protection of Nature (RSPN) is the only non-governmental organization in the country that deals with conservation of nature. The organization focusses its efforts on creating conservation awareness. This is achieved mainly through schools and training institutes. Its programmes are developed in close cooperation with FSD and other organizations.

Bhutan is party to the Convention on Biological Diversity. Policy and act revision is an obligation of being a signatory to the convention.

In the past, the protected area system was fully controlled by the government and managed purely on the principle of conserving biodiversity. Local people were not involved in the decision-making process. This was because human activities, particularly agricultural activities, were limited in protected areas. Change in the role of forests and the need to involve affected communities mean that the participation of local people and the concept of integrated development are key to current protected area management. The first step in involving the people in policy and legislation was initiated with adoption of the FNCA in 1995. Its central focus is that the needs and rights of communities living inside or adjacent to protected areas are now considered as important as the conservation of the biodiversity itself.

Shortage of skilled staff has always been a constraint. This shortage is mainly because of the low intake of graduates as a result of the general shortage of qualified graduates in the country; the large number of projects; the limited staff of the NCS; and the need to send existing staff for further training. There are 12 professional and support staff at NCS headquarters against a total requirement of 37. This staff has a large number of projects and other assignments to implement. For example, the Black Mountain National Park Project

has only 11 staff against a long-term requirement of 50.

Other institutional aspects affecting nature conservation are lack of information and databases, an inadequate mechanism for enforcing protected area policy, rules and regulations, and lack of infrastructure and equipment to implement management plans.

3.4.2 Wildlife Policy

The forest policy of 1991 gives priority to conservation of biodiversity and the environment; and it places revenue generation in a secondary position. While this is the overall policy, the main objectives are:

- biodiversity issues should be integrated into economic development plans and programmes,
- provision of support to parks and protected areas, and
- development of information on biological diversity for conservation and sustainable utilisation of biodiversity resources.

The RGoB develops management plans through a participatory process. Development activities are introduced in the wildlife area in accordance with these management plans and implemented with the participation of local communities. While preparing these plans, sustainable alternatives to compensate inhabitants deprived of economic opportunities resulting from limited access to protected sections of the wildlife area are identified for implementation.

The RGoB is continuously considering its policy on wildlife. Areas of concern for policy analysis are identified and debated. Some current areas of concern are highlighted here. The protected areas' or national parks' policy needs to be reassessed because agricultural land is limited and because of crop damage by wildlife. In view of the need for

increased food production, the RGoB has to make the best use of the limited land resources. Some land most suitable for agriculture is in protected areas. The problem of crop damage as a result of the increased wildlife population has been consistently reported throughout the country.

According to the NES, hydropower is one of the main avenues for sustainable development. In the light of this, the protection of wildlife through better planning and management of protected areas is a continuous concern.

Bio-physical problems in biodiversity conservation are overgrazing, fire, collection of medicinal plants, and poisoning of predators in alpine areas; shifting cultivation, forest fire, clearing of forests for orchard development, and logging in the temperate zone; and poaching, mining, and encroachment in the subtropical zone. The extent and intensity of these problems are increasing because of increased pressure on limited land resources. With rapid population growth, these problems will become significant in the future. Therefore, they are concerns that permanently demand the attention of the RGoB.

3.4.3 Key Legislation

FNCA 1995 is the main document that provides the legal framework for the conservation and management of protected areas and wildlife. Its salient features are as follow.

- Any area may be declared a protected area for the preservation of natural beauty, protection of biological diversity, and management of wildlife.
- Each protected area should be managed by a plan approved by the head of FSD.
- The head of FSD is empowered to issue rules to regulate or prohibit any activity within a protected area.

- All wild animals listed in Schedule 1 (Annex 5) are totally protected: they are not to be killed, injured, destroyed, captured, or collected.
- The MoA is allowed to issue special permits for taking or exporting any animal or plant listed in Schedule 1 for purposes approved by the MoA.
- The MoA can allow a person to keep any animal or plant that is listed in Schedule 1.
- Appropriate punishment will be awarded to offenders.

The Biodiversity Action Plan for Bhutan (BAP) (MoA 1998) is the other legal document for the protection and conservation of wildlife. The RGoB developed BAP since Bhutan is a signatory to the Convention on Biological Diversity.

The MoA instituted a core working group to coordinate the preparation, formulation, and finalisation of BAP. The group was assisted by members from the MoP, NEC, National Institute of Traditional Medicines, WWF, RSPN, MoTI, Bhutan Tourism Authority, BCCI, MoHE, MoF, UNDP and senior staff of the MoA. Representatives of the people were also members. Thus BAP is a product of a multidisciplinary team. Several national workshops, regional workshops, and other brainstorming sessions to consult, discuss, review, and analyse and coordinate its development were conducted. An extensive field visit was made to collect information. Relevant organizations were given the opportunity to comment on the draft. The draft was finalised with comments from a final workshop and submitted to the MoA for approval. The RGoB considers this document as part of an ongoing process. There will be revisions as conditions change since ecosystems are dynamic.

The BAP proposes a number of objectives and recommendations leading to the conservation and sustainable use of

biodiversity. Its focus is mainly on the following.

- Improvement of the information base on biodiversity
- Use of this information to strengthen the protected area system
- Involvement of local communities in managing protected areas
- Continuous monitoring of development in protected areas
- Support for development of the national capability to ensure the productivity, diversity, and integrity of biodiversity and natural systems

3.4.4 Key Programmes

The RGoB implements various conservation programmes. The number and nature of these programmes are increasing with improved management functions. The following are some of the major programmes; some are at an advanced stage of implementation while others are in the pipeline.

The Royal Manas National Park Management Plan

This WWF-assisted plan started in 1996 and is for three years. It aims to improve management of the park through the following five components.

- Demarcation of boundaries for effective patrolling and enforcement of park regulations
- Conservation research on species such as golden langur, hornbill, and tiger.
- Extension and publicity services for developing a visitor information centre, organizing students and teachers' excursions, developing extension materials, and conducting conservation awareness meetings
- Strengthening of park management facilities
- Enhancement of capacity-building by providing training in park management

Institutional Support and Species' Conservation Programme

This three-year WWF-assisted programme started in 1996 and aims to assist the MoA in developing capacity for park management. It includes the following main components.

- Construction and operationalisation of the Nature Study Centre at Kebithang
- Preparation of a plan for Phibsso Wildlife Reserve
- Preparation of a tiger distribution map and a tiger monitoring system
- Assistance to anti-poaching programme
- Support for database management using GIS technology

Integrated Management of Jigme Dorji National Park

This co-financed project by the Global Environment Facility, UNDP and RGoB will strengthen the integrated management of Jigme Dorji National Park. The project will focus on the implementation of selected activities through the promotion of sustainable livelihoods and development of alternative approaches that help to conserve and sustainably utilise the park's biodiversity.

Management of Bomdiling Wildlife Sanctuary

This DANIDA-supported five-year project is to support the management of Bomdiling Wildlife Sanctuary. An operational plan has been prepared and will be implemented over the next four years. The park office has been opened, and the park manager and other staff posted.

Conservation Activities under Other Programmes

Besides these programmes, many conservation activities are built into other forestry-

related programmes that are supported by other organizations such as BTF and bilateral donors. These conservation activities include protection of endangered species of flora and fauna outside protected areas; reforestation and afforestation; and preparation of environmental conservation guidelines.

3.4.5 Impacts of Policy

The protected area management system is in the initial stages. It is, therefore, too early for the policy to have any tangible impacts. However, there are three obvious general points associated with the current programme. First, the declaration and demarcation of nine protected areas is an achievement. For a small and mountainous country, like Bhutan, maintaining 26.5 per cent of the total area of the country under protected area indicates an undisputed commitment to conservation of the environment. Second, this protected area system is the habitat of endangered flora and fauna. In fact, this protected area has been called a 'biodiversity supermarket'; this has national prestige and global significance. Third, crop damage by wildlife is a recurring problem in the farming community. Beyond a certain level of damage, agriculture will not be sustainable. This problem contradicts the food self-sufficiency policy. No compensation programme or any other remedial measures have been instituted as yet.

In future, impacts of the wildlife programme should be considered along with the following central concerns of the RGoB.

- The local community should not fall prey to adverse impacts of policy. Wildlife should not pose any serious problem to the community living inside or adjacent to protected areas.
- There should not be conflicting land uses. The overall national land allocation should consider the growth rate

of human population and the need for additional agricultural land.

- Protected area management should be a commercial venture; the aim is that protected areas should be self-financing from revenue generated from their activities and products. Currently, external donors finance protected area management plans.

3.5 Land Tenure

3.5.1 Institutional Framework

The formal land tenure system in Bhutan is governed by the Land Act and the FCNA 1995. This system is under continuous review in order to make best use of limited resources. The MoHA implements the Land Act through twenty district administrations. The MoA implements the FNCA through the FSD.

Land Act

Important provisions in the Land Act that affect the use of land resources are explained earlier. Approximately one-third of farmers practise sharecropping. In addition to sharecropped land, almost all sharecroppers own some land; pure sharecroppers are insignificant. The sharecropper has to provide all labour, draught power, and material inputs, and terms are based on informal agreements between owner and sharecropper.

The present Land Act appears inadequate in delineating the shares to be paid or in providing security of tenure to the sharecropper. Thus, sharecropping arrangements constitute a constraint to increasing both crop yields and crop intensity. Without security of tenure, there is also a lack of incentive for the sharecropper to invest in land development activities to ensure long-term productivity. It is, therefore, imperative that the RGoB improves and updates the existing act.

Forest and Nature Conservation Act

The salient features of the FNCA 1995 that are relevant to the use of the land resources are highlighted below.

- Land not registered in anyone's name is government-reserved forest land; the government thereby owns the trees grown on this state land.
- Cattle owners can obtain the right to graze their cattle in government-reserved forests on payment of tax.
- No government-reserved forest will be converted to other uses without a royal decree.
- Government can intervene on private land if there is a need for soil and water conservation measures.
- A community can develop and own a community forest on government-reserved forest land.
- Tseri land left fallow for more than 12 years will be reverted to and designated as government-reserved forest.
- Private forest can be developed on registered agricultural land if it is within the 25-acre (approx. 10-ha) ceiling.

3.5.2 Impacts of Land Tenure

The Land Act provides equal access to land to all citizens and avoids any skewed distribution of limited land resources. There is no abject problem of landlessness. However, some of the following drawbacks in the Act may have adverse impacts in the future.

- The act allows for fragmentation of landholding: a family landholding becomes smaller with the growth of family size.
- The lease period is short and does not provide an incentive for the land tiller to invest in conservation measures.
- The act is silent on the extent of fallow period (except for tseri land): a farmer can keep his land fallow for any

number of years, yet the state cannot intervene. This has implications for overall food production.

- The act has weak provisions on share-cropping.

It is too early to assess the impacts of the FNCA but its worthiness should be ultimately manifested in

- reinstating traditional forest management by local communities,
- providing a system of allocating scarce land resources,
- successfully sharing responsibility and use of forest resources with local communities,
- meeting the growing demand for various forest products,
- providing acceptable and economically viable options to replace *tseri*, and
- resulting in an increase in forest cover at the end of the 8th Five-Year Plan.

3.6 *Tseri*

In this section, the issue of *tseri* in Bhutan is presented as a wild card. The reason for this is that it is both a forest and an agricultural issue. The section will attempt to review the process and justification of the RGoB and the people to find alternative options for this old agricultural practice.

The case of *tseri*, as an agricultural issue and as part of the forest and environment conservation programme, presents a typical policy-making process in Bhutan. It takes into account the changing development scenario both within and outside the country. It also indicates the recognition by the RGoB for the need to involve local people in the management of forest resources. It shows that policy is process-oriented and is continuously readjusted with growing experience and knowledge. The processes that led to the decision on the phasing out of *tseri* are presented below as an example of how a decision is made.

The *tseri* practice has been subject to serious debate. There is a group that maintains that *tseri* is environmentally sound as it is practised today. There is vegetative cover during the fallow period; this vegetative cover protects the soil from erosion, it provides shelter to wildlife, and serves as grazing for cattle. Fuelwood and other forest products, such as edible roots and stems and fruit are collected during the fallow period. However, there is also a group that argues that *tseri* is harmful to the environment and that it should be stopped. The argument runs that, even if it is not a problem today, it is only a matter of time before *tseri* gives rise to problems because of high population growth. Population pressure will force a reduction in the fallow period.

Both groups have, however, a common denominator: they want to provide better living conditions to rural communities and also protect the environment. They are trying to deal with *tseri* by making available preventative measures that make best use of this vast national resource. The ultimate result of this debate has been the decision by the RGoB and the people to phase out *tseri*. Some of the processes and major events that led to the present *tseri* policy are highlighted below.

The first attempt to discourage *tseri* was made by the Forest Act of 1969. The act did not allow fresh clearance for *tseri*. It considered the *tseri* issue as part of forest resources. In 1974, the RGoB promulgated the national forest policy that stated that *tseri* had to be abolished if forests were to be conserved. Immediately after this, the Land Act was promulgated. This act supported the spirit of the forest policy by allowing the conversion of *tseri* to *chhuzhing* and cash-crop plantation.

It appears from the 6th Five-Year Plan (1987-92) that a decision was taken to initiate a more rational approach to phasing out *tseri* cultivation following comprehen-

sive and systematic land-use survey and mapping work for the entire country under the lead agency of the Survey of Bhutan. The issue of *tseri* attained its zenith in 1993 when the 72nd National Assembly passed a resolution to phase out *tseri* by the end of the 7th Five-Year Plan (1992-1997). Detailed information on *tseri* areas was collected and research activities were planned and carried out to identify and make available a range of options to farmers. Today this resolution is reinforced by a recent policy that those *tseri* areas that are left fallow for 12 years will revert to forest after cash compensation at a rate fixed by the government. This could be interpreted as encouraging a reduction in the fallow period of *tseri* cultivation.

As it is such a complicated social and economic issue, nothing concrete in terms of providing alternative options has been done in the field so far. However, if the opportunity arises, including adequate fi-

nancial resources and other appropriate enabling environments, both the government and *tseri* farmers would readily take up alternative options and ultimately phase out *tseri*. In the meantime, *tseri* continues for several reasons; among them the following are the most important.

Tseri is practised in remote areas of eastern and central Bhutan where there are no government staff to monitor and enforce the law. No viable options are available to substitute *tseri* farming. This problem emerges as communities are scattered and far from motorable roads. Growing of oranges or converting *tseri* into private forests, to name two examples, are not feasible from a marketing point of view even if they are climatically and physically feasible. It has been argued that little is done because of a lack of social, cultural, and political understanding of the *tseri* community; but the most relevant point is that there are simply too many *tseri* farmers to deal with easily.

Exotic breeds have benefited peri-urban and more accessible areas where there is a market for perishable products and access to manufactured feeds. Environmental problems in rural areas have not improved and have often become worse as a result of livestock programmes.

Monocultural farming practices have been replaced with new and improved varieties of crops promoted by the government. Farming is to a great extent driven by market forces.

The implementation of holistic programmes has helped to maintain forest cover at 72.5 per cent of the total area, but it is under pressure. The government plans to maintain forest cover at 60 per cent; more land has to be brought under cultivation to help meet new demands for food and income.

The phasing out of khat and relocations

The general conclusion is that the RGoB is clear on what it is aiming for both at present and in the future. Land degradation problems are minimal as a result of the implementation of pro-environment policies and programmes.

First, policies are process-oriented. Implementation of policies generates field experiences and knowledge that are taken into account when refining new policy. Popular participation in policy-making is encouraged at all levels through local institutions. Furthermore, policies and programmes implemented are pro-environment, giving more emphasis to environmental safety than economic return.

Second, major land uses are related to agriculture, forest, and livestock. They are inter-related and their relationship is delicately balanced. There is, however, pressure distorting this relationship. Some of the main factors are as follow.

- Population growth rate of 3.1 per cent per year

consumption compete on this limited land. Unfortunately, both animal and human populations are increasing at a rapid rate. The livestock population is beyond the carrying capacity of pastures. As a result, overgrazing and encroachment into protected areas are a direct threat to the safety of the environment. Furthermore, Bhutan is a part of a fragile mountain ecosystem; a slight error in planning and implementation of a programme could result in irreparable damage to the environment. A programme approach to development has

Chapter 4 Conclusions

First, the implementation of policies and programmes had had some effect, and some policy issues have emerged.

- Increasing of livestock population, particularly unproductive numbers
- Conversion of *kamzhing* into orchards
- Loss of *kamzhing* to construction of buildings and other uses
- Limited land available for pasture development
- Pressure on *chhuzhing* for other uses
- Landholdings fragmented beyond economic sizes

Third, crops grown can be grouped into cereals and cash crops. Major cereals cultivated are maize, paddy, wheat, buckwheat, and barley; and major cash crops are apple, orange, potato, cardamom and assorted vegetables. The area under cash crops is expanding at the cost of cereal crops. This will continue as the Land Act protects only *chhuzhing*.

Fourth, there are some constraints in development, particularly in the environmental sector. Arable land is limited; only 7.8 per cent of the country's total area is available for cultivation. Cultivation of feed and fodder for animals and crops for human

consumption compete on this limited land. Unfortunately, both animal and human populations are increasing at a rapid rate. The livestock population is beyond the carrying capacity of pastures. As a result, overgrazing and encroachment into protected areas are a direct threat to the safety of the environment. Furthermore, Bhutan is a part of a fragile mountain ecosystem; a slight error in planning and implementation of a programme could result in irreparable damage to the environment. A programme approach to development has been adopted to avoid implementation of uncoordinated and isolated programmes and projects.

Fifth, the implementation of policies and programmes had had some effect, and some policy issues have emerged.

- Environmental degradation is limited to a few pockets; damage is not irreparable in most cases. Constraining factors are being reviewed, and acts and guidelines prepared for the implementation of future programmes and projects.
- The government introduced exotic livestock breeds to increase livestock products. It was the intention that farmers would adopt more productive animals and simultaneously reduce unproductive numbers. On the contrary, the livestock population has increased without increasing livestock productivity.
- Exotic breeds have benefitted peri-urban and more accessible areas where there is a market for perishable products and access to manufactured feeds. Environmental problems in rural areas have not improved and have often become worse as a result of livestock programmes.
- Monocultural farming practices have been replaced with new and improved varieties of crops promoted by the government. Farming is to a great extent driven by market forces.
- The implementation of holistic programmes has helped to maintain forest cover at 72.5 per cent of the total area, but it is under pressure. The government plans to maintain forest cover at 60 per cent; more land has to be brought under cultivation to help meet new demands for food and income.
- The phasing out of *tseri* and relocation of affected farmers would help to maintain the safety of the environment. Further loss of biodiversity and habitats for wildlife would be minimal.
- Another increasing threat to environment is fuelwood consumption, particularly in institutions. The threat is recognised by the government and an immediate solution is necessary.
- Guidelines for construction of infrastructure such as roads, bridges, and telephone lines have been prepared recognising possible threats. Implementation of the guidelines will reduce danger to the environment.

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Annex 1

Key Informants

1. The Joint Secretary, Forestry Services' Division
2. The Staff of the Policy and Planning Division
3. The Acting Director, Research, Extension and Irrigation Division
4. The Director, Crop and Livestock Services' Division
5. The Dzongkhag Agricultural Officer, Samdrup Jongkha
6. The Gup, Martshalla Geog
7. The Agricultural Extension Agent, Martshalla Geog
8. The Livestock Extension Agent, Martshalla Geog
9. Changlopai, Kakpadung Village
10. Tendi Tshewang, Kakpadung Village
11. Yangba, Kakpadung Village
12. Kapchi, Kakpadung Village
13. Passang, Kakpadung Village
14. Geypo, Kakpadung Village
15. Merpo, Kakpadung Village
16. Sanorbu, Kakpadung Village
17. Naktong, Kakpadung Village
18. Lungchhey, Kakpadung Village
19. Ugen Tshewang, Kakpadung Village
20. Thinlay, Kakpadung Village
21. Phatshu, Kakpadung Village
22. Penpa, Kakpadung Village
23. Norbu, Kakpadung Village
24. Kezang, Kakpadung Village
25. Sanpo, Kakpadung Village
26. Dorji Wangdi, Kakpadung Village
27. Lengay, Kakpadung Village
28. Phuntsho Daza, Gorthongma Village
29. Pem Tshewang, Gorthongma Village
30. Kezang Dema, Gorthongma Village
31. Geypo, Gorthongma Village
32. Dorji, Gorthongma Village
33. Tshewang Namgay, Gorthongma Village
34. Ugyen Wangchuk, Gorthongma Village
35. Serpay, Gorthongma Village
36. Tsering Dorji, Gorthongma Village
37. Rinzin Dorji, Gorthongma Village
38. Passang, Gorthongma Village
39. Zala, Martshalla Village
40. Bonthong, Martshalla Village
41. Tshering Wangchuk, Martshalla Village
42. Pemang, Martshalla Village
43. Kezang Norbu, Martshalla Village
44. Chheyten, Martshalla Village
45. Namgay Wangdi, Martshalla Village

Annex 2

Key Informants

Background Paper on the Case Study

Martshalla block (*geog*) of Samdrup Jongkha *Dzongkhag* (district) was selected as the site for a case study on the impact of the food security policy. It is one of 11 *geog*(s) under Samdrup Jongkha *Dzongkhag*. It is bordered by Bakuli, Orong, Lauri, Kangpara, and Gomdar *geog*(s). It is situated on the upper foothills bordering the Indian plain. It has a subtropical climate. There is no motorable road connecting the *geog* to the *dungkhag* (subdivision) headquarters at Bhangtar. It takes half a day to reach this *geog* centre.

The *geog* has mixed agriculture. The main cereal crops are maize and paddy. Other cereal crops are mustard, beans, soybean, millet, and buckwheat. The main cash crops are orange, ginger, and potato; orange plantations are now being developed.

The case study was conducted in stages.

First Stage

1. Discussion of *dzongkhag*-level RNR programmes with the RNR sector staff and Dasho Dzongda, including budget plan for irrigation, crop promotional programmes, etc.
2. Discussion of programmes and activities specific to the organization with the above *dzongkhag* authority.
3. Discussion of trend of development, food security in particular, of the *geog* over the past years with the above *dzongkhag* authority.

It was expected that this discussion would lead to the identification and assessment of development efforts at the *dzongkhag* level as perceived by the *dzongkhag* authority as the implementing agency of policies and programmes.

Second Stage

1. What were development activities in the past? Discussion with the extension staff and Gup.
2. What was the role of extension staff in these development activities? Discussion with extension staff and Gup.
3. What has been the increase in area and production of paddy and maize and number of oranges? Discussion with extension staff and Gup.
4. Selection of farmers to be interviewed and fields to be visited with extension staff and Gup.

It was expected that this discussion would provide an overall development situation of the geog. The increase in the area and production of cereal and cash crops should establish the link between policy and its impact in the field. It would also identify households for interview.

Third Stage

1. Interview with selected farmers (checklist for discussion).

Support received from the extension staff to develop new terraces?

Paddy and maize varieties grown?

Source of seed?

Enough food for one year?

How is food deficit met, if not food self-sufficient?

Role of the extension staff in agriculture, livestock, irrigation, forest?

Plans to expand existing fields or develop new fields? Why?

Irrigation channel: when constructed, support from extension staff, role of farmers in constructing and maintaining the channel, Water Users' Association (WUA)?

Been on farmers' study tour? Lessons from the tour?

Own orange plantation: number of trees/area/source of seedlings/role of extension staff?

2. Visit field to see major paddy production areas, irrigation channels, and orange plantations.

It was expected that this interview would reveal land-use change, shift in type of crops grown, and increase in yields as a result of implementation of food security policy.

Annex 3

Village-wide Increase in *Chuzhing* in the Case Study Area

No	Name of Farmer	Before 5th Five-year Plan	Addition after 5th Five-year Plan	Benefitted from Subsidy
<u>Kakpadung Village</u>				
1	Changlopai	0.50	1.50	Yes
2	Tendi Tshewang	1.00	0.30	Yes
3	Yangba	-	1.00	No
4	Kapchi	0.30	2.00	Yes
5	Pasang	0.79	0.50	Yes
6	Geypo	0.81	0.50	Yes
7	Merpo	-	1.00	No
8	Sanorbu	0.45	1.50	Yes
9	Naktong	-	1.50	No
10	Lungchhey	-	0.50	No
11	Ugen Tshewang	-	1.25	Yes
12	Thinlay	-	2.00	No
13	Phatshu	-	2.00	Yes
14	Penpa	0.75	0.50	Yes
15	Norbu	1.50	0.30	Yes
16	Kezang	2.40	1.35	Yes
17	Sanpo	-	1.10	No
18	Dorji Wangdi	-	1.00	No
19	Lengay	-	0.25	No
Total Kakpadung		8.50	20.05	

No	Name of Farmer	Before 5th Five-year Plan	Addition after 5th Five-year Plan	Benefitted from Subsidy
Gorthongma Village				
1	Phuntsho Daza	0.20	0.60	Yes
2	Pem Tshewang	0.97	1.00	Yes
3	Kezang Dema	-	0.20	No
4	Geypo	1.20	0.60	Yes
5	Dorji	-	1.20	Yes
6	Tshewang Namgay	1.10	0.40	No
7	Ugen Wangchuk	-	1.50	Yes
8	Serpay	-	0.50	No
9	Tsering Dorji	-	1.00	Yes
10	Rinzin Dorji	-	0.20	No
11	Passang	-	0.25	No
Total Gorthongma		3.47	7.45	

Martshalla Village

1	Zala	-	4.00	Yes
2	Bonthong	0.50	0.50	No
3	Tsering Wangchuk	-	1.35	Yes
4	Pemang	-	1.00	Yes
5	Kezang Norbu	-	1.00	Yes
6	Chheyten	1.00	0.50	Yes
7	Namgay Wangdi	-	1.00	Yes
Total Martshall		1.50	9.35	

Annex 4

Other Indicators of Food Security in the Case Study Area

Name of Farmer grown	Name of Paddy	Name of maize grown	Number of orange trees	Kitchen garden	Double cropping	Improved piglets
<u>Kakpadung Village</u>						
Changlopai	BR	Yangtsepa/ local	15	Yes	No	No
Tendi Tshewang	BR	Yangtsepa	19	Yes	No	1
Yangba	BR	Yangtsepa/ local	22	No	Yes	No
Kapchi	BR	Yangtsepa	12	No	Yes	No
Pasang	BR	Yangtsepa	27	No	Yes	2
Geypo	BR	Yangtsepa/ local	20	No	Yes	1
Merpo	BR	Yangtsepa	28	No	Yes	No
Sanorbu	BR	Yangtsepa/ local	30	No	Yes	No
Naktong	BR	Yangtsepa	25	Yes	Yes	1
Lungchhey	BR	Yangtsepa	6	Yes	Yes	No
Ugen Tshewang	BR	Yangtsepa	10	Yes	Yes	No
Thinlay	BR	Yangtsepa	15	Yes	Yes	2
Phatshu	BR	Yangtsepa	17	Yes	Yes	No
Penpa	BR	Yangtsepa/ Local	20	Yes	Yes	1
Norbu	BR	Yangtsepa/ lcoal	25	Yes	No	1

Name of Farmer grown	Name of Paddy	Name of maize grown	Number of orange trees	Kitchen garden	Double cropping	Improved piglets
Kezang	BR	Yangtsepa	30	Yes	Yes	No
Sanpo	BR	Yangtsepa	15	Yes	Yes	No
Dorji Wangdi	BR	Yangtsepa	No	No	No	No
Lengay	BR	Yangtsepa/ local	No	Yes	No	No
<u>Gorthongma Village</u>						
Phuntsho Daza	BR	Yangtsepa/ local	41	Yes	Yes	2
Pem Tshewang	BR	Yangtsepa/ local	30	Yes	Yes	No
Kezang Dema	BR	Yangtsepa	20	No	Yes	No
Geypo	BR	Yangtsepa/ local	48	Yes	No	No
Dorji	BR	Yangtsepa	18	Yes	Yes	1
Tshewang Namgay	BR	Yangtsepa/ local	28	Yes	No	2
Ugen Wangchuk	BR	Yangtsepa/ local	36	No	Yes	1
Serpay	BR	Yangtsepa	15	Yes	Yes	1
Tsering Droji	BR	Local	10	Yes	Yes	2
Rinzin Dorji	BR	Yangtsepa	25	No	Yes	1
Passang	BR	Yangtsepa	13	No	Yes	No
<u>Martshalla Village</u>						
Zala	BR	Yangtsepa/ local	50	No	No	2
Bonthong	BR	Yangtsepa	57	Yes	Yes	1
Tsering Wangchuk	BR	Yangtsepa	45	Yes	Yes	No
Pemang	BR	Yangtsepa/ local	60	Yes	Yes	No
Kezang Norbu	BR	Yangtsepa/ local	35	Yes	Yes	No
Chheyten	BR	Yangtsepa	33	Yes	Yes	2
Namgay Wangdi	BR	Yangtsepa	45	No	No	1

Annex 5

Schedule 1 Listing the Animals and Plants Protected by the Forest and Nature Conservation Act 1995

Common Name	Scientific Name
Asian elephant	<i>Elephas maximus</i>
Clouded leopard	<i>Neofelis nebulosa</i>
Golden langur	<i>Presbytis geei</i>
Musk deer	<i>Moschus</i>
Pangolin	<i>Manis crassicaudata</i>
Pigmy hog	<i>Sus sylvanicus</i>
Snow leopard	<i>Panthera uncia</i>
Takin	<i>Budorcas taxicolor</i>
Tiger	<i>Panthera tigris</i>
Wild buffalo	<i>Bubalus bubalis</i>
Black-necked crane	<i>Grus nigricollis</i>
Monal pheasant	<i>Lophophorus impejanus</i>
Peacock pheasant	<i>Polyplectron bicalcaratum</i>
Raven	<i>Corvus corax</i>
Rufous-necked hornbill	<i>Aceros nepalensis</i>
Golden mahseer	<i>Tor tor</i>
Spotted deer	<i>Axis axis</i>
Gaur	<i>Bos gaurus</i>
Leopard	<i>Panthera pardus</i>
Leopard cat	<i>Felis bengalensis</i>
Himalayan black bear	<i>Selenarctos thibetanus</i>
Red panda	<i>Ailurus fulgens</i>
Serow	<i>Capricornis sumatraensis</i>
Indian aloe wood	<i>Aquilaria malaccensis</i>

Name of Farmer	Common Name	Name of plant	Number of plants	Double cropping	Improved piglets
Kezang	Chinese caterpillar fungus	<i>Cordyceps sinensis</i>	3	Yes	No
Sanpo	Snow dew lily	<i>Gentiana crassuloides</i>	1	Yes	No
Dorji Wangdi	Blue poppy	<i>Lloydia yunnanensis</i>	1	No	No
Langay	Ginseng	<i>Meconopsis grandis</i>	1	No	No
		<i>Panax pseudoginseng</i>			
			No	Yes	No
Gorthongma Village					
Phuntho Daza	BR	Yangtsepa/ local	41	Yes	Yes
	BR	Yangtsepa/ local	30	Yes	No
	BR	Yangtsepa/ local	45	Yes	No
	BR	Yangtsepa/ local	28	Yes	No
Ugen Wangchuk	BR	Yangtsepa/ local	36	No	Yes
Serpay	BR	Yangtsepa/ local	15	Yes	Yes
Tsering Droji	BR	Yangtsepa/ local	10	Yes	Yes
Rinzin Dorji	BR	Yangtsepa/ local	25	No	Yes
Passang	BR	Yangtsepa/ local	13	No	Yes
Marshalla Village					
Zala	BR	Yangtsepa/ local	50	No	Yes
Bonthong	BR	Yangtsepa/ local	57	Yes	Yes
Tsering Wangchuk	BR	Yangtsepa/ local	45	Yes	Yes
Pemang	BR	Yangtsepa/ local	60	Yes	Yes
Kezang Norbu	BR	Yangtsepa/ local	35	Yes	Yes
Chheyten	BR	Yangtsepa/ local	33	Yes	Yes
Namgyan Wangdi	BR	Yangtsepa/ local	45	Yes	Yes

The Policies and Planning Division of the Ministry of Agriculture of the Royal Government of Bhutan is the focal point for ICIMOD in Bhutan. The Division has carried out several other studies for ICIMOD in the past. Dr. Pema Gyamtso, an Agricultural Specialist, is Head of the Division.

Participating Countries of the Hindu Kush-Himalayan Region



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Bangladesh



Bhutan



China



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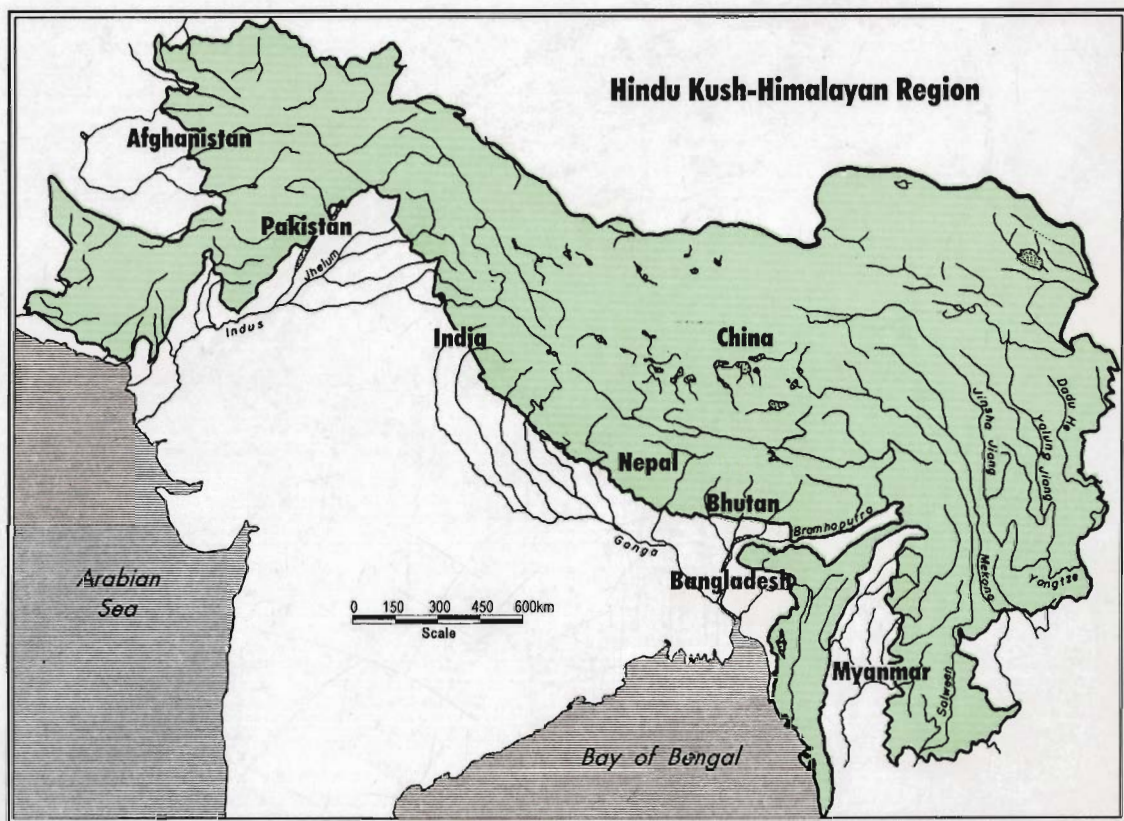
Myanmar



Nepal



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