



SUSTAINABLE DEVELOPMENT PLAN OF MUSTANG

SUSTAINABLE DEVELOPMENT PLAN

mustang

(2008—2013)



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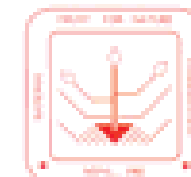


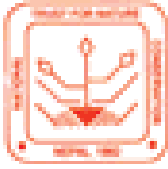
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mustang

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NATIONAL TRUST FOR NATURE CONSERVATION

Date: May 20, 2008

The Ministry of Forests and Soil Conservation is very pleased to know about the preparation of the Sustainable Development Plan of Mustang district. As the Ministry is concerned with the sustainable use of natural resources, especially renewable ones such as forests and soil, it is very much encouraged by the strong focus of the Plan on the critical aspects of sustainable development. I strongly feel that this Plan will be instrumental to establish Mustang district in the country's new perspective. It is highly anticipated that the Plan will contribute to the development of 'New Nepal' and to take Nepal in the path of sustainable development.

The success of any plan is in its smooth implementation. The Plan has identified the role of different institutions at different levels as well as the resources needed. Along with the people of Mustang, it is now a challenge for all concerned to ensure that the Plan is successfully implemented. The Ministry will provide all the help it can to directly support the implementation as well as facilitate the mobilization of other sources of support. The people of Mustang deserve our utmost recognition in their quest for a sustainable future.

I would like to thank the Regional Office of UNEP and all others who have contributed to this exercise and to the National Trust for Nature Conservation for the initiative and coordination of this important exercise.

Matrika Prasad Yadav
Hon. Minister
Ministry of Forests and Soil Conservation
Government of Nepal
and
Chairman
National Trust for Nature Conservation



"Fifty Years of Planned Development"

Government of Nepal

National Planning Commission



Jagadish C. Pokharel, Ph. D.
Vice-Chairman

Ref.:-

Disp. No.:

Date: May 15, 2008

Annapurna Conservation Area (ACA) is a treasure house of wide range of biological resources, cultural heritage and diverse natural landscapes. Diversity and uniqueness have made the area as one of the most important tourist destinations in Nepal. Similarly, successful design and implementation of integrated conservation and development programme in ACA by the National Trust for Nature Conservation (NTNC) has made the protected area a global model of community-based conservation. Recently, Government of Nepal has initiated to construct road networks to connect Mustang district as part of the National Planning Commission's (NPC) programme to link district headquarters by road networks. As reflected in the Poverty Reduction Strategy Paper of the 10th Five Year Plan, NPC considers road networking as a key strategy for poverty reduction. On the other hand, ACA is a protected area with a global significance. Hence, development of a road network and the changes it will bring in the protected area must be well understood and a better strategy should be adopted to sustainably protect the area while maximizing the benefits of development to the local communities.

The National Planning Commission welcomes this effort by the National Trust for Nature Conservation (NTNC) to develop the Sustainable Development Plan for Mustang district. The NTNC is uniquely placed to organize such an exercise because of its critical role in working together with the local people in the conservation of natural resources of the district. The people of Mustang are on the way to improve their quality of life and the Plan has addressed this through its different components. The preservation of unique cultural resources of the district as highlighted by the first objective of the Plan is an important thrust. Similarly, the Plan has also addressed other critical areas such as basic infrastructure, productivity enhancement of economic activities, tourism development and management of settlements. It has identified the resources needed and the institutional structures and roles for the successful implementation of the Plan. This Plan suggests priority areas for investment while protecting the fragile environment and delicate relationship of people with nature.



"Fifty Years of Planned Development"

Government of Nepal

National Planning Commission



Jagdish C. Pokharel, Ph. D.
Vice-Chairman

Ref.:-

Disp. No.:

Date: May 15, 2008

I am equally very pleased to note that the Plan has taken full cognizance of the Three Year Interim Plan (TYIP) and identified all the important sectoral policies emphasized by the TYIP. I am hopeful that this will help to integrate most of the proposed activities with the priorities of the government. The Sustainable Development Plan, first of its kind at the district level in Nepal, will guide the district to enhance the quality of human life through balanced progress in economic, social and environmental conditions. The National Planning Commission will facilitate relevant organizations for successful implementation of the Plan.

I would like to thank the Regional Office of UNEP, National Trust for Nature Conservation (NTNC), the people of Mustang and the different members of the Study and the Plan Review Team for a work well done. I hope the respective national agencies and local bodies will adopt the Plan and play an active role in its implementation.

Jagdish C. Pokharel, PhD.

Vice Chairman

National Planning Commission



NATIONAL TRUST FOR NATURE CONSERVATION

Date: May 28, 2008

Development which meets the needs of the present without compromising the ability of future generation to meet their own needs is the concept of Sustainable Development used by the Brundtland Commission Report (1987). This concept should be the main basis for the development of “New Nepal” in the changed political context.

Recognizing the importance and relevance of the concept, the National Trust for Nature Conservation, which is promoting conservation and sustainable development, has taken the lead to develop the Sustainable Development Plan of Mustang. The main objective is to systematically develop the district in an integrated, planned and holistic manner. The Plan has successfully integrated all four pillars of sustainable development, which includes environmental, economic, social and cultural spectrum of Mustang. Better understanding the dynamics of these four pillars and effectively integrating these in the development process will always help to find pragmatic solutions and we believe that it is possible to solve development problems in better ways.

‘Conservation for Development’ is the key theme promoted by the Trust in the last two decades both in the mountain and Terai regions. The Sustainable Development Plan of Mustang reinforces our commitment to balanced conservation and development in the Annapurna Conservation Area. We believe that this Plan will be a guiding document for transforming the district with a high quality of human life through balanced progress in economic, social and environmental conditions.

I would like to extend my sincere thanks to UNEP for their valuable support to prepare the document, and for their critical comments and suggestions in enriching the Plan. I would also like to extend my sincere appreciation to the Plan Study Team, Review Team and NTNC team for their hard work and commitment to successfully produce the document.

Finally, I would like to express my sincere thanks to Dr. Siddhartha B. Bajracharya of the Trust for leading the project and bringing out this document in its present form.

Bimal Kumar Baniya
Member Secretary
National Trust for Nature Conservation

ACKNOWLEDGEMENTS

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The Plan could not have been prepared without the cooperation of a large number of partner organizations and the help of many individuals who generously contributed their time, energy and expertise to its research, drafting and production. The Trust is especially grateful to the UNEP team in Bangkok for their continued support and encouragement, especially Mr. Surendra Shrestha, Dr. Aida Karazhanova, Dr. Subrato Sinha and Mr. Purna Chandra Lal Rajbhandari. We would like to recognize the contribution of UNEP for their feedbacks on the draft document, and Dr. Pitamber Sharma, which definitely helped us to improve the manuscript. The NTNC would also like to express its gratitude to Dr. Shankar Sharma, former Vice Chairman of the National Planning Commission for the concept and encouragement to develop the Sustainable Development Plan of Mustang district. We would also like to thank all the officials working with the government and non-government agencies in Mustang district and also to the participants of meetings/workshops held in Mustang and Kathmandu for providing their valuable suggestions in developing this Plan.

In addition, the Trust would like to thank the staff members of NTNC central office for their support during the preparation of the Plan, particularly Mr. Ganga J. Thapa, Mr. J.R. Onta, Mr. Deepak K. Singh, Dr. Shanta R. Jnawali, Mr. Ngamindra Dahal, Mr. Kirti N. Poudel, Mr. Bidur Pokharel, Mr. Binod Basnet and Ms. Rupa Basnet. Similarly, we would like to thank the NTNC team members in ACAP Pokhara, Jomsom, Lo-Manthang and Mustang, particularly Mr. Lal Prasad Gurung, Mr. Manish R. Pandey, Mr. Raj Kumar Gurung and Ms. Hari Maya Gurung. Former NTNC/ACAP staff members, Mr. Roshan Sherchan, Mr. Lizan Kumar Maskey and Ms. Anu Kumari Lama also contributed to the development of the Plan.

Last but not least, we would like to extend our gratitude to the local people of Mustang for their high interest and support in the preparation of the Plan.

National Trust for Nature Conservation

June 2008

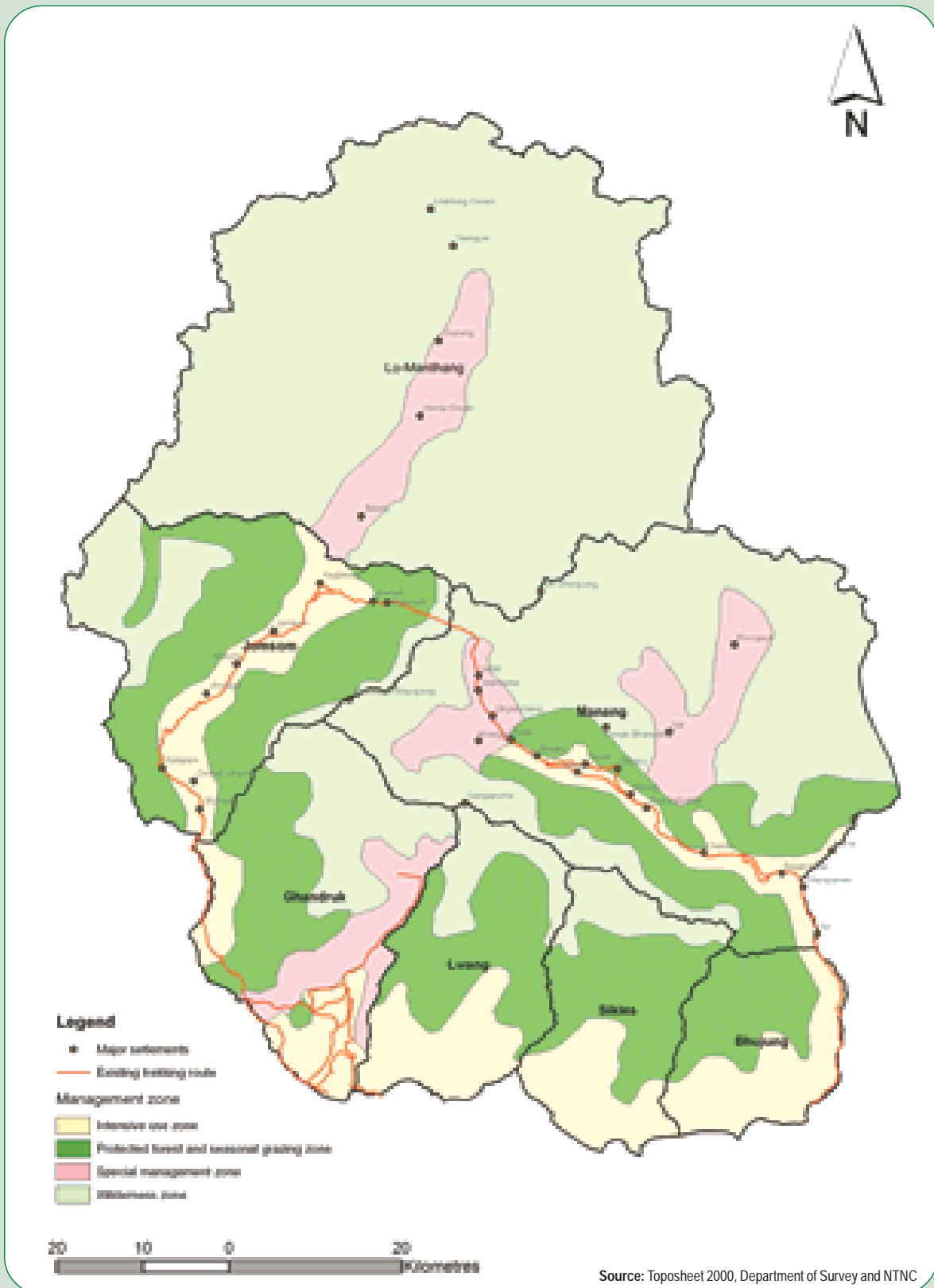
ACA	Annapurna Conservation Area
ACAP	Annapurna Conservation Area Project
ACT	Annapurna Circuit Trek
CAMC	Conservation Area Management Committee
CAMD	Conservation Area Management Directives
CAMR	Conservation Area Management Regulations, 2053 BS
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DCAMC	District Conservation Area Management Committee
DDC	District Development Committee
DNPWC	Department of National Parks and Wildlife Conservation
EIA	Environmental Impact Assessment
GLOF	Glacial Lake Outburst Flow
ICDP	Integrated Conservation and Development Programme
IEE	Initial Environmental Evaluation
INGO	International Non Governmental Organization
IUCN	The World Conservation Union
KMTNC	King Mahendra Trust for Nature Conservation (now NTNC)
MAPs	Medicinal and Aromatic Plants
MDG	Millennium Development Goals
NGO	Non Governmental Organization
NPC	National Planning Commission
NTFP	Non-Timber Forest Product
NTNC	National Trust for Nature Conservation
PRSP	Poverty Reduction Strategy Paper
SD	Sustainable Development
SDAN	Sustainable Development Agenda of Nepal
SDP	Sustainable Development Plan
SRN	Strategic Road Network
STD	Sexually Transmitted Diseases
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
VDC	Village Development Committee
WHO	World Health Organization

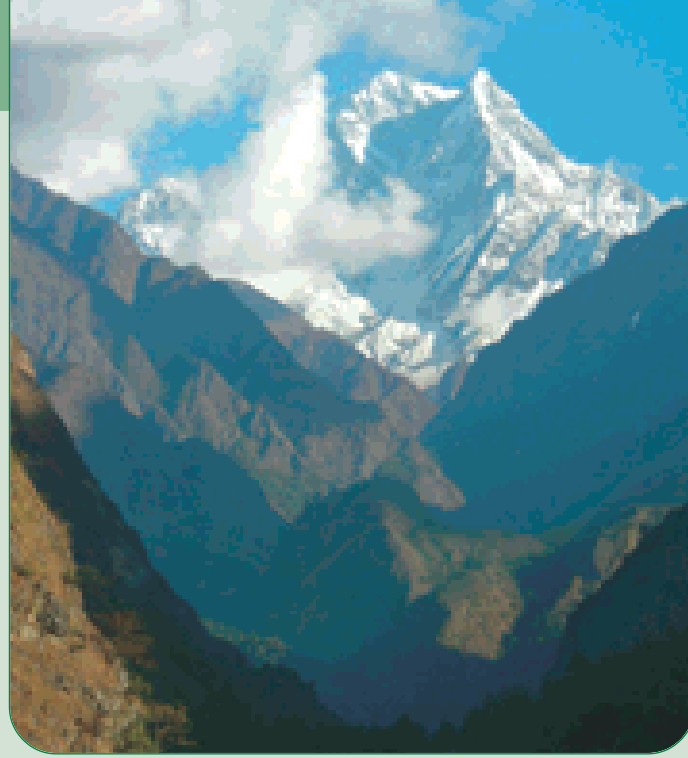
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Map 1: Map of Annapurna Conservation Area





1.1 Introduction

Mustang is located in the trans-Himalayan region and covers about 47% of the Annapurna Conservation Area (*Map 1*). It is the second most sparsely populated district in Nepal with a population of 14,000 people. The growing environmental crisis in early 1980s culminated in the conservation of Annapurna region, which was rapidly becoming the most popular trekking destination in Nepal. Consequently, the Annapurna Conservation Area Project (ACAP) was implemented in 1986.

Mustang is well known for its pristine biodiversity, spectacular scenery, world's deepest Kali Gandaki gorge and lunar-like landscapes. Until 1992, Upper Mustang, area above Kagbeni, was restricted to foreigners. However, after the political change, the government lifted restriction and for the first time allowed international visitors to Upper Mustang. Mustang is the most popular tourism destination within the Annapurna Conservation Area (ACA) receiving almost 30% visitors trekking in ACAP.

Mustang is yet to be connected by road. This has presented many barriers for development. The Poverty Reduction Strategy Paper (PRSP) of Nepal has identified road network as a key strategy for poverty reduction. In line with this policy, a road construction project has started linking Mustang district with other road networks. This road could open many opportunities, choices and options for poor people to build sustainable livelihoods and reduce the impacts of vulnerability to different types of stresses. On the other hand, it could also widen economic disparity, accelerate environmental degradation, heighten cultural disintegration and contribute to the haphazard growth of settlements in Mustang. These issues need to be addressed in order to maximize the benefit of road and reduce adverse impacts. The National Planning Commission (NPC) and the National Trust for Nature Conservation (NTNC), previously known as King Mahendra Trust for Nature Conservation (KMTNC), have collaborated with the United Nations Environment Programme (UNEP) in developing this Sustainable Development Plan (SDP) of Mustang district.

1.2 Objectives

The basic objective of this exercise has been to develop a comprehensive Sustainable Development Plan for Mustang. The specific objectives are:

- To review and assess current contribution and the role of ongoing projects and

- programmes, including road construction;
- To present opportunities, possibilities, constraints and alternatives for creating a model district on sustainable development within the country and the region;
 - To develop clear objectives and activities for sustainable development of Mustang;
 - To define appropriate partnerships for sustainable development of Mustang; and
 - To define necessary preconditions for the successful implementation of the Plan.

1.3 Methodology

The methodology used for the preparation of the Plan of Mustang district is as follows:

- Secondary information about the development problems, efforts and sustainable development issues of Mustang district were collected.

Annapurna Conservation Area and its importance

Launched in 1986, the Annapurna Conservation Area Project is the largest undertaking of the NTNC and the first and largest Conservation Area in Nepal. ACA is located in the mountain region of the west-central Nepal at latitude 28°50'N and longitude 83°57'E. ACA covers an area of 7,629 sq.km. and is home to over 120,000 local people of different ethnic, cultural and linguistic groups. It is a very large area of Himalayan mountain ecosystem, which overlaps several bio-geographical region and holds a diverse range of habitats and species.

The Kali Gandaki Valley runs through ACA and is a bio-geographical divide in the Himalayan mountain chain. ACA, therefore, has species typical to the eastern and western Himalayas. The Kali Gandaki valley is also an important north/south bird migration route. ACA also lies within a region of overlap between the Palaeartic and Indo-Malayan realms and so has species of both realms. ACA has a huge altitudinal range spanning from 790 to 8091m. It has a great range of rainfall, with some of the driest regions in Nepal in the trans-Himalayan zone and some of the wettest region south of Annapurna in the Modi Khola valley.

Although some of the habitats may not be species rich, they hold important population of several globally threatened species, some of which are of exceptional intrinsic appeal (snow leopard). ACA is rich in biodiversity and is a treasure house for 1226 species of plants, 38 species of orchids, 9 species of rhododendrons, 101 species of mammals, 474 species of birds, 39 species of reptiles and 22 species of amphibians. It harbours rare and endangered wildlife species such as snow leopard, musk deer, Tibetan argali, impeyan pheasant and Tragopan pheasant.

The ACA is well known internationally and in Nepal for its beautiful mountains and a unique ecology. The area is bounded to the north by the dry alpine deserts of Dolpo and Tibet, to the west by the Dhaulagiri Himal, to the east by the Marshyangdi Valley and to the south by valleys and foothills surrounding Pokhara. Some of the world's highest snow peaks over 8000m and the world's deepest valley of the Kali Gandaki river are in ACA. These extreme diversities have made it Nepal's most popular trekking destination with over 70,000 trekking tourists in the year 2000, which is over 62 per cent of the total trekking tourists visiting Nepal.

- Field work was undertaken to understand the context of sustainable development as well as meet and interact with various stakeholders.
- A series of meetings and discussions were held with government line agencies, NGOs, CBOs and other interest groups.
- Consultations were held with the staff members of NTNC and NTNC/ACAP.
- Roadside informal interviews were also conducted to solicit views of those who are normally not represented in groups and do not get the opportunity to have their say.

Altogether, over 200 people representing various walks of life were consulted during the preparation of this Plan. A team comprising four multi-disciplinary experts was formed in October 2006 for the field study and preparation of the Plan.

1.4 Limitations

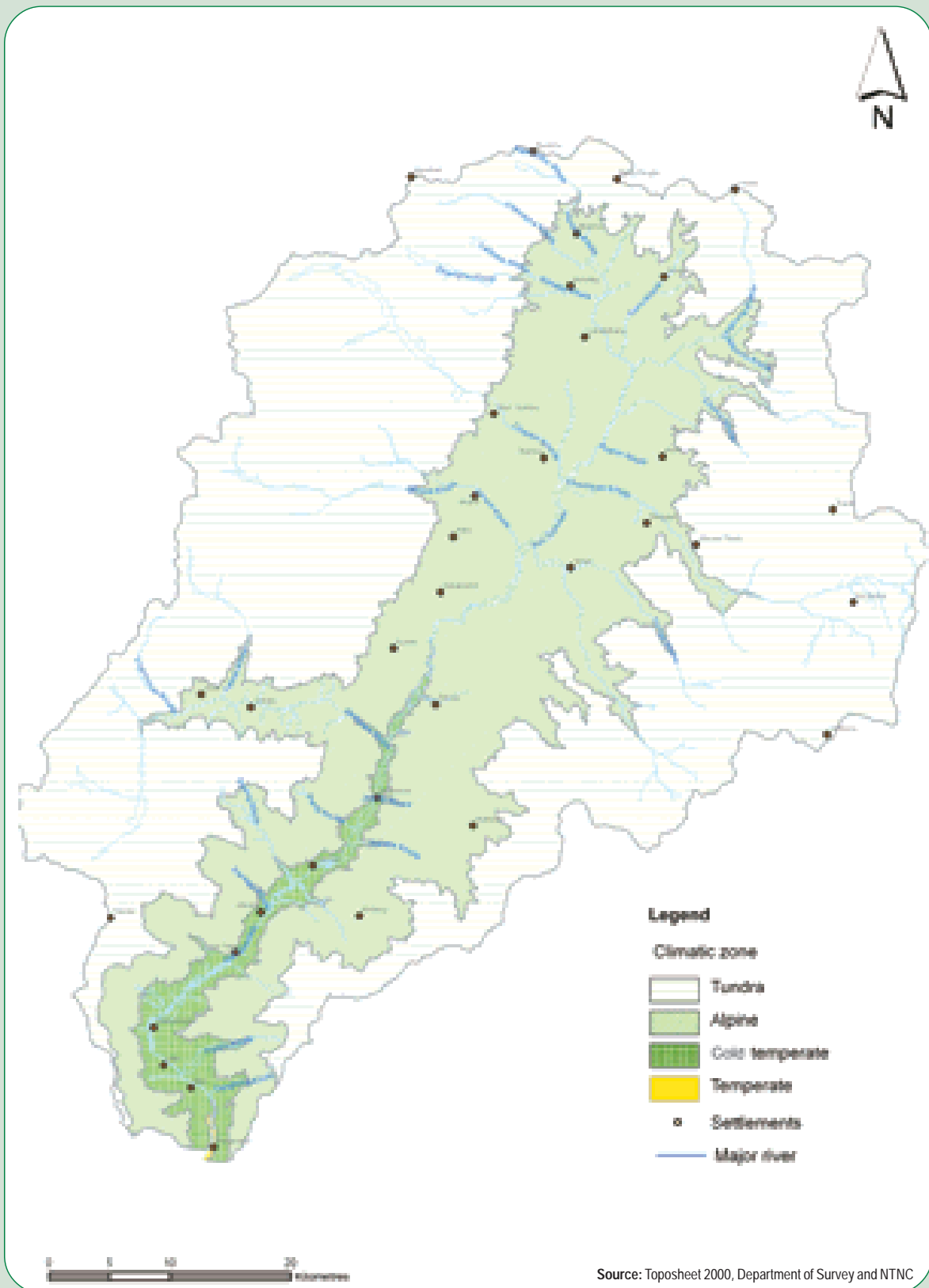
- There was a dearth of updated quantitative information on various social, economic and environmental aspects of the district. Data variations within the district were not available to a desired extent. In many cases, there was inconsistency between national and district level information.
- People were hesitant to talk about the negative impacts of road because of the fear that this might jeopardize road project. People, particularly politicians and civil society leaders, were not open in their discussion.
- Data on environmental status were lacking, which made difficulty in generating knowledge and create baseline data for Mustang. The study team has tried its best to use the latest and reliable information available in developing the Plan for Mustang.

1.5 Organization of the Plan

The Sustainable Development Plan of Mustang has been organized into eight chapters. Chapter 1 introduces Mustang and gives the rationale for the preparation of the Plan. Chapter 2 describes the current socio-economic, environmental and cultural features, and is aimed at providing background information about the district and its past development efforts. Chapter 3 identifies implications of the ongoing road project on sustainable development of the district. Chapter 4 identifies emerging trends and issues in the district that have implications on sustainable development. Chapter 5 discusses the concept of 'sustainable development' which sets the framework of the Plan.

Chapter 6 covers vision, goals, objectives and activities of the Plan that are considered necessary for sustainable development in the light of changes brought about by road and to meet the expectations of people. Chapter 7 discusses the implementation strategy and the role of different agencies, including ACAP. Chapter 8 provides budget for the first five years and a monitoring plan for the Plan with various indicators that help in tracking the achievements and impacts based on the Plan's objectives.

Map 2: Map of climatic zone of Mustang district



MUSTANG: THE CURRENT STATUS

2.1 Introduction

Mustang is surrounded by Manang to the east, Tibet Autonomous Region of China to the north-east and north-west, Dolpo to the west and Myagdi to the south. Mustang covers an area of 3573sq. km with the elevation ranging from 2000m to 8168m from the sea level. The world's 7th and 10th highest mountains—Dhaulagiri (8137m) and Annapurna (8161m)—are located in Mustang. It also includes the famous Nilgiri, Tukucho Peak and other popular trekking destinations.



Mustang lies in the rain shadow area and receives very little rain—less than 200mm annually. The climate of the district is generally dry with strong winds and intense sunlight. The maximum temperature recorded in summer is 26°C. Winter is very cold and the temperature freezes to as low as -20°C, according to the records.

2.2 Environmental Context

Land (land use, habitat and rangeland)

Climatically, Mustang is divided into three zones (*Map 2*):

- i) **Cold Temperate** ranges from 2000m to 3000m, or the area below Jomsom, the district headquarters. This is the wettest part of the district and is dominated by coniferous forest. Six VDCs, namely, Jomsom, Marpha, Tukucho, Kobang, Kunjo and Lete are included in this area.
- ii) **Alpine** climatic zone varies from 3000m to 4500m. The area above Jomsom falls in this category and is dominated by shrub and thorny vegetation cover. The area is rich in non-timber forest products and includes all remaining ten VDCs of Mustang—Muktinath, Kagbeni, Jhong, Chhuksang, Ghemi, Surkhang, Tsarang, Lo-Manthang, Tshosher and Tshunup.
- iii) **Tundra** region ranges above 4500m and is covered with snow all year round. There are no permanent settlements in this climatic zone.

Mustang's geography

On the basis of geographical features, Mustang district has been divided into three distinct sub-zones (*Map 3*).

i) Northern Area: This falls under the rain shadow area and is characterized by dry, arid climate and desert type landscape. Due to cold climatic conditions, water scarcity and poor irrigation facilities, majority of villages in this area harvest crops only once a year. This area includes six Village Development Committees—Ghemi, Tsharang, Lo-Manthang, Tshosher, Tshunup and Surkhang.

ii) Central Area: This region also falls under the rain shadow area but has better moisture condition as compared to the Northern Area. The villages in this area are either located along the Kali Gandaki river or on the surrounding hill slopes. Majority of villages in this area have better irrigation facilities and harvest crops twice a year. Thus, this area is by far the most productive region in the entire district and includes seven VDCs—Tukuche, Marpha, Jomsom, Kagbeni, Muktinath, Jhong and Chhuksang.

iii) Southern Area: This area receives more rain than the previous two areas. Due to good rainfall, the landscape in this area is dominated by evergreen forests, particularly pine and fir species. This area includes three VDCs—Kobang, Kunjo and Lete.

Air, water, solid waste, noise and soil pollution

- **Air pollution:** No data is available on air pollution in Mustang. The presence of two-stroke motorbikes and tractors has started to have negative impacts on the district's quiet and clean environment. Trekkers plying through Lower Mustang have complained about noise and other traffic related hazards. The government has deployed two traffic policemen to regulate vehicular movements in Mustang. There is a growing concern that once Mustang gets connected to road, air and noise pollution will become inevitable.
- **Water pollution:** Information on water pollution is also not available. Mustang's settlements do not have sewerage treatment plants. In Marpha, Tukuche and Jomsom, kitchen water is drained straight into the Kali Gandaki river and there is increased concern of water pollution, which may become more acute with the growing residential and transient population, which the road may facilitate.
- **Solid waste:** The problem of solid waste is growing in densely populated areas. The ACAP has initiated solid waste treatment facility, which is insufficient. People burn plastics without taking into consideration environmental hazards. At present, tourist route is unaffected from solid waste pollution, but problem of disposing beer and water bottles is seen as one goes into the villages.
- **Noise pollution:** Noise pollution is not a serious concern so far. However, increasing number of two-stroke motorbikes and tractors may cause harm, in particular to wildlife, including mammals and birds.
- **Use of chemicals and fertilizers:** Use of chemical fertilizers, pesticides and fungicides are limited in Mustang as organic manures are widely used in the

Tourism divisions

From tourism point of view, Mustang is generally separated into two divisions (*Map 3*):

- i) **Upper Mustang**—area above Kagbeni village; and
- ii) **Lower Mustang**—area below Kagbeni village.

Until 1992, Mustang was a restricted area to foreigners. As Upper Mustang is considered very fragile from environmental and socio-cultural perspectives, the government adopted a special policy with twin objectives: a) limit the number of trekkers; and b) maximize tourism revenue and plough back to local development. Under this policy, tourists visiting above Kagbeni are required to pay a minimum of US\$ 700 per trek for 10 days, and US\$ 70 per day for additional days. As the regulated tourism area, a maximum of 1000 trekkers are allowed to trek Upper Mustang annually through authorised trekking agencies.

Lower Mustang is part of the famous Annapurna Circuit Trek and has been popular both for organized trekking groups, free and independent trekkers since early 1980s. A trekker pays Rs. 2000 per visit as a 'conservation fee' to trek in this area. It is the major revenue to achieve financial sustainability for ACAP. Large portion of the fee is used to support conservation and development activities within ACAP.

cultivation of crops. However, this may change in future as road connection may increase the use of chemical inputs in agriculture. If this happens, there will be increased release of different chemical inputs, which may adversely influence the condition of flora and fauna.

Biodiversity

- **Floral/faunal diversity:** Mustang is rich in both temperate and trans-Himalayan biodiversity. Flora and fauna are of most common to rare and endangered status. Lower Kali Gandaki valley forms the border to demarcate east and west for the distribution of flora and fauna (Acharya 2004). Biodiversity of Upper Mustang is comparatively well studied and documented. However, limited information is available on different aspects of the overall biodiversity of Lower Mustang.
- **Rangeland diversity:** Rangeland covers 147,679ha (40.73%) of Mustang's total land area. Altogether, 34 pasture units are distributed in seven VDCs of Upper Mustang, mostly consisting of *Caragana gerardiana*, *Caragana brevispina* and *Astragalus* species. Two types of pasture (summer and winter) exists in Upper Mustang with different sets of defined practices and traditional grazing rights. Local dependency on rangeland is extremely high. Rangelands are threatened with rapid degradation due to anthropogenic activities and changes in micro-climate of the region.
- Alpine rangeland usually covers meadows above 4000m. Rangelands are used for grazing livestock and collecting dung, medicinal plants, fuel wood and grass. Although these rangelands are home to many endangered species of global

significance, they are highly degraded due to over-grazing. There is an urgent need to improve pasture quality and grazing system.

- **Wetland diversity:** Mustang has limited wetlands covering only 92ha. These include Damodar Kunda, Dhumbatal, Titital and Sekongtal. Damodar Kunda is an important wetland from biodiversity, religious and tourism considerations. These wetlands are important habitats for resident and migratory birds and their surroundings and catchment areas are rich in biodiversity. Kali Gandaki is the major river of the district with 20 tributaries.



Wildlife

- **Species richness:** Mustang is rich in trans-Himalayan biodiversity and has recorded five species of zooplankton, seven nematode species, two mollusc species, one annelid species, 25 insect species (7 aquatic and 18 butterfly species), one spider species, 11 amphibian species, eight lizard species, five snake species, 105 bird species and 29 mammal species. Mustang is the habitat for snow leopard (*Uncia uncia*), musk deer, Tibetan wild ass and Tibetan gazelle.
- **Butterfly:** Out of 18 butterfly species recorded in Mustang, two species are new and three species are endemic to the area. The only native fish species (*Schizothorax richardsonii*), recorded at 3475m at Ghami Khola, has been identified as the highest elevation recorded fish in Nepal.
- **Trans-Himalayan corridor:** Tibetan Sand Grouse (*Syrrhaptes tibetanus*) and Eurasian Eagle Owl sub species (*Bubo bubo hemachalana*) are recorded in Mustang as new record of bird species for Nepal. The Tibetan gazelle (*Procapra picticaudata*) and Tibetan wild ass (*Equus kiang*) have been recorded in Upper Mustang for the first time in Nepal. The district is famous for fossilized molluscs or ammonites, also known as *shaligram* in Nepali. The district also serves as the major corridor for many trans-Himalayan migratory birds such as Demoiselle crane (*Anthropoides virgo*). The Ghasa area in Mustang is the only known area in Nepal where all six resident pheasant species are recorded, including the globally threatened cheer pheasant (*Cartreus wallichii*)
- **Species status:** Mustang harbours 11 species of birds and 10 species of mammals listed in different appendices of the CITES (*Table 2 and 3*). Six of the mammal species recorded from the area are protected by the National Parks and Wildlife Conservation Act (1973) and seven of these are included in different threat categories of the IUCN Red Data Book. Five butterfly species, extinct mollusc

species (*shaligram*), two frog species, one reptile species, two bird species (Tibetan Sand Grouse and Eurasian Eagle Owl), and seven mammal species found in Mustang have not been recorded so far from any other parts of Nepal.

Vegetation (Forests and NTFPs)

- Forest types:** Forest covers 12,324ha (3.24%) of Mustang's total landmass. Lower Mustang offers mixed broad leaved forest such as *Acer* species, conifers (mainly pine) and rhododendrons, and at the higher elevation conifers with birch *Betula utilis*. On unstable slopes, which have water close to the surface, pure thickets of *Hippophae tibetana* are found. Forest cover ends near Jomsom and is very limited in Upper Mustang, which falls in the Alpine climatic area. It is distributed over one small patch each in Lo-Manthang and Ghami VDCs, and seven patches in Chhuksang VDC. Natural forest is dominated by *Juniperus squamata*, *Juniperus wallichiana*, and *Betula utilis*. About 70ha of community and private plantation has been recorded in Upper Mustang. Forests and their products constitute primary resources of the district.
- Plant species:** Mustang is rich in medicinal and aromatic plants with very high economic and ethnomedicinal values. Local people use a number of plants for food, spices, fibre, medicine, fuel, dye, tannin, gum, resin, religious purposes, roofing materials, handicrafts, etc. Over 200 species of NTFPs/MAPs have been identified in Mustang. Local *Amchis* (traditional healers) use 72 species of medicinal plants to treat 43 human ailments. Few herbs are also used for some critical diseases like leprosy and paralysis.



2.3 Socio-cultural Context

People and population

Ethnically, Mustang can be divided into four distinct areas. All traditional villages are dominated by one major ethnic group. However, in new villages such as Jomsom, Tukuhe and Puthang, ethnic composition is much more diverse. Four geographical areas based on ethnicity are:

- Lochhoden Area:** The people of the Northern Area are known as *Loba*, but outside their lands, they use surnames such as *Bista* and *Gurung*. Lo-Manthang, also known as the only surviving walled city in Nepal, is known as the cultural capital of this area. This town and the palace situated inside the wall were built by Amapal, the

first King of Lo, during 9th century. His lineage, which has been recognized as the ‘King of Mustang’ by the Government of Nepal, still wields considerable social and political influence. The Lochhoden Area consists of six VDCs—Ghemi, Tsarang, Lo-Manthang, Tshosher, Tshunup and Surkhang.

ii) Baragaon Area: Baragaon (literally meaning 12 villages) now comprises 18 major villages which are spread across four VDCs south of Lochhoden. People are known as *Baragaunle*. However, outside the area, they use *Gurung*, *Bista* and *Thakuri* as their surnames. Lo and Baragaon share many cultural similarities. However, there are several endogamous villages within Baragaon who traditionally only marry among themselves (Tangbe), or with few neighbouring villages (Ghyakar, Chhuksang and Tetang). Baragaon comprises four VDCs, namely, Kagbeni, Muktinath, Jhong and Chhuksang.

iii) Panchgaon Area: Panchgaon (literally meaning five villages) includes two VDCs (Jomsom and Marpha) and has *Thakalis* as the dominant group. There are two groups of *Thakalis*: (a) *Yulkasummis Thakali* or Thakali of three villages; and (b) *Marwaten Thakali* or Thakali of Marpha. The latter is an endogamous group.

iv) Thaksatsae Area: Thaksatsae (literally meaning *Thak* of 700 households) is composed of *Tamang Thakali*, who are well known for their enterprising skills as traders, inn keepers and hoteliers. Thaksatsae comprises three VDCs—Kobang, Kunjo and Lete, and also wards 1 to 8 of Tukucho VDC.

Demographic dynamics

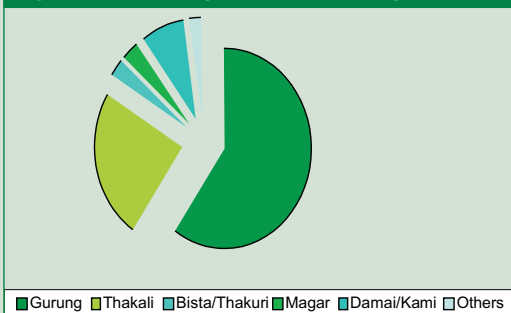
The population of Mustang in 2001 was 14,981 as compared to 14,319 in 1992. It shows a stable population with insignificant growth rate in the last one decade. Contrary to this, many local people believe that Mustang has a negative population growth rate of almost 1.5% annually. This is probably because of the fact that many locals have either migrated to south in Pokhara or Kathmandu, or are working overseas. They may still hold properties but their presence in Mustang is insignificant.

The Ministry of Environment, Science and Technology has projected that the population of Mustang will increase from 19,035 in 2006, to 20,912 by 2011. This projection does not consider the possible impacts of road link on population

dynamics, which may well encourage different groups to move in. Interestingly, the population census conducted 35 years ago shows that Mustang had almost 29,000 people. During the period, several well populated neighbouring villages were included as part of Mustang district.

The average household size of Mustang is 5.4 members. *Gurungs* and *Thakalis* are dominant groups (Fig. 2.1), representing 84% of the total population. Interestingly, *Bistas* who are very prominent as

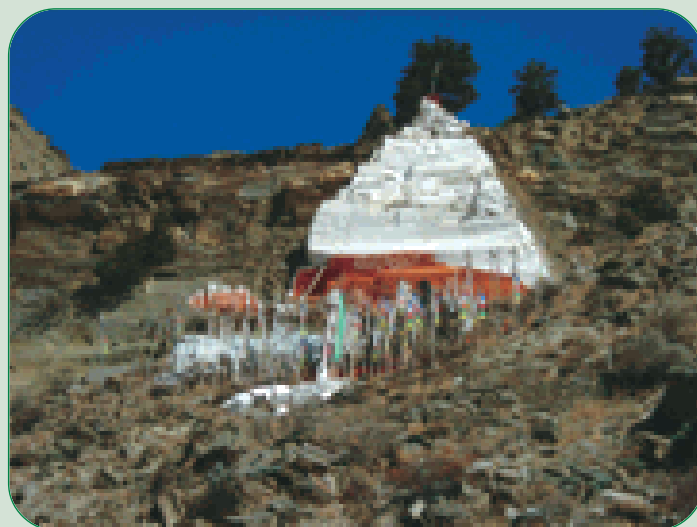
Fig. 2.1: Ethnic groups in Mustang



local leaders (particularly in Lochhoden) represent only 2.1% of the total population. *Dalit, Magar, Sherpa, Newar, Tamang, Brahmin* and *Chhetris* are in minority representing 16% of the total population. Amongst *Dalits, Bishwokarmas* and *Pariyars* represent 8.2% of the total population.

Culture and cultural heritage

High mountains and deep valleys of Mustang have provided excellent refuge for pre-Buddhism tradition and culture. They were protected and nurtured in this district. Throughout the history, Mustang received immigrants particularly from the north (Tibet) bringing various pre-Buddhist cult, religion and tradition such as *Shamanism* and *Bonism*. For centuries, Mustang was heavily influenced by Tibetan civilization. The Meki Lhakang Temple located near Kobang village was known as the southernmost outpost of Tibetan cultural influence.



Over the years, Tibetan missionaries arrived in Mustang influencing various Buddhist sects and reforming Bon religion. Some of the immigrants from Ladakh (India) and Tibet became local rulers. As time passed, immigrants were fully integrated into the indigenous population. What is seen in Mustang today is not a true representation of one particular culture or tradition, but four different sects of Buddhism (Bonpo-white and black tradition, Nyingmapa, Sakyapa and Kargyupa) overlapped on the indigenous faith. Over centuries, these tradition and culture have merged so well that they can hardly be differentiated from one another.

Mustang's natural wonders—natural fire at Muktinath and Muktinath Temple complex; fossilized ammonites found in abundance in Kali Gandaki river beds, which are revered

Mustang's treasure trove

Mustang is a cultural treasure trove for some aspects of the Tibetan culture and tradition, particularly in the Lochhoden Area. The district is full of monasteries that date back to the 8th century. Monasteries such as Jampa, Thupchen, Luri, Lo Gekar, Tsarang, Ku-Sap-Ter-Nga, etc. are testimonies of once glorious past, and also of cultural and historical significance of Mustang. These monasteries hold precious frescoes, wall paintings, images, relics, ancient texts and artefacts. Additionally, Mustang has many interesting cultural and historical monuments such as Tshortens, palaces, forts and walled city in Lo-Manthang. The existing treasure combined with vibrant cultural heritage has contributed to making Mustang a unique cultural district in Nepal.

as the manifestation of Lord Bishnu, and several natural ponds at Damodar Kunda— have become distinct centres of pilgrimage for Hindus. Additionally, the river tributary at Kagbeni, and Tilicho Lake (technically falls in Manang, but is also accessible from Jomsom) are other important pilgrimage sites.

Housing and settlements

Settlements in Mustang are built usually along the Kali Gandaki river on hill tops or on flat valleys with dense cluster of houses. Old villages look like fortified towns with no windows. Houses are built in the traditional style with flat roof filled with mud. Middle of the house acts as a courtyard. Stone is used for wall below Marpha village. Settlements in Upper Mustang widely use mud and mud bricks with wood used mainly for pillar support, roofing and flooring. In many cases, ground floor is used for animals, middle floor for cooking and worshipping, and the top floor is used for sleeping. In the past two decades, use of corrugated sheets, cement, mortar, glasses, etc. are also becoming popular.

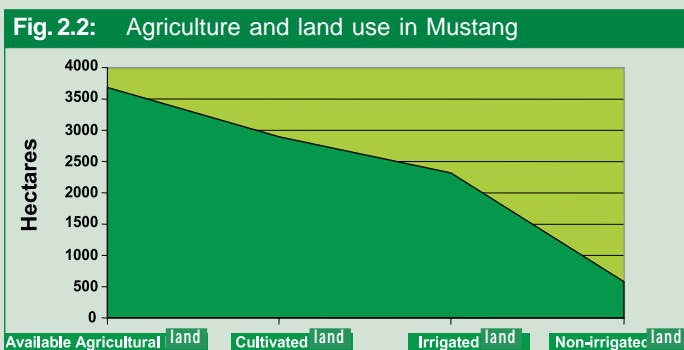
Mustang has a low population density of 3.87 per sq. km, and has less than 0.1% settlement coverage. According to 2001 census, the population of Jomsom (the largest settlement) stands at 1666 people with 309 households followed by Marpha with 1583 people and 302 households (Table 4). There is no municipality and most of the settlements do not have basic infrastructure such as drainage and sewerage system and dumping sites.

2.4 Economic Context

Agriculture, horticulture and fresh vegetables

Almost 77% of the people of Mustang are involved in agriculture. The district has 3662ha of land suitable for agriculture, of which 79% of agricultural land is under cultivation, and

63% is irrigated (Fig. 2.2). Major crops include barley, buckwheat, potato, maize, mustard, peas, wheat, etc. Most of the villages of central and southern Mustang harvest two crops in a year. Except for few villages such as Dhee and Tangye, northern Mustang harvests crops only once a year. In terms of food security, an estimate shows that Mustang produces enough crops to feed only for seven months in a year.



However, rice has become a staple diet, which cannot be cultivated in the district. Almost 50% crops are either used as animal feeds or to make *rakshi* (local spirit). Mustang annually imports 775 metric tons of food grains, mainly rice. This excludes food grains imported

from Tibet. An estimate shows that 68% of population has food security for more than nine months and only 19% has food security for less than three months.

Lower Mustang is self-sufficient in fresh vegetables. It annually produces 1600 metric tons of vegetables—almost 50% more than what can be sold locally. Similarly, it produces over 3088 metric tons of fruits. Apple represents almost 72% of the district's total fruit production, mainly dominant below Tsaille/Chhuksang villages in Upper Mustang and above Kobang in Lower Mustang. Marpha and Tukuhe VDCs top the list in apple production followed by Kobang and Jomsom VDCs. The District Agriculture Office records indicate that Mustang exports only 700 tons of apples annually, which makes only 30% of the total production. Both fruits and vegetables, which form one of the major income sources for the people in Lower Mustang, have enormous export potentials in future. In the absence of road connectivity, large quantity of fruits and vegetables do not get proper market value in the district.



Animal husbandry

Animal husbandry is considered more profitable as compared to agriculture. Mustang has over 77,000 animals of which 62% are goats. It has about 3000 yaks and a slightly higher number of cows. Yaks are more popular in Upper Mustang, particularly in villages bordering Tibet or villages outside main trails such as Surkhag, Dhi, Dhee, Tangya, Tshosher, etc. There are over 4100 mules, donkey and horses, and 2000 *Jhopas* (hybrid/cross-bred cow and yak) mainly used to collect fuel wood. For the majority of people in central and southern areas, mule business is the major source of family income. A mule owner with 7-9 mules can make a net profit up to Rs. 25,000 per month.

In recent years, animal husbandry has been declining in Mustang. Factors such as prohibition on Nepali animals to graze on the Tibetan side, low quality of pasture and difficulty of feeding animals during winters have contributed to the decline of animal husbandry. Similarly, unlike in the past, majority of children attend schools and younger generation is less interested in herding, which may have contributed to its decline.

Trade and industry

Only about 8% of local population is involved in trade. Northern Mustang has a road connecting Lo-Manthang from the Tibetan border. Imported cloths, shoes, high quality food, beads, watches, Chinese currency, pashmina, animal hides, wool, etc are prized commodities for Nepali traders. These are bartered with food (rice and flour), cloths, blankets, stoves, utensils, shops, detergents, timber, kerosene, gas cylinders, cements, etc. This cross-border trade has helped to reduce the prices of basic commodities by

as much as 30-40% on food items. However, local people think the quality of goods imported from Tibet are of lesser quality and prefer food stuff from the south. Minor agro-products like apple, brandy and fruit juice are major export items from central and southern Mustang. There is no data on the import and export status of Mustang but it is generally estimated that Mustang has a high trade deficit.

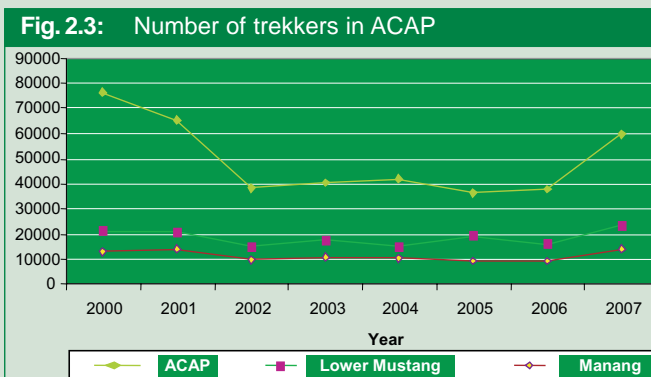


Hundreds of people from Mustang, particularly from above Jomsom, migrate to India during winter season for petty trade such as buying and selling of warm and second hand cloths. Some are engaged in trading agricultural and non-timber forest products such as garlic, jimbu (*Allium wallichii*), bhote jira (*Carum carvi*), yarsagumba (*Cordyceps sinensis*), dried juniper, etc. Some take their horses to warm places for grazing, and the owners are engaged in petty trade such as buying cloths and other household items from cities and selling them to different villages.

Mustang neither has big industries nor mining ventures. Salt mining in Tetang is a small local enterprise. There are few slate quarries for local use. Potentials exist for natural gas, coal and copper mining but these are not yet explored. The district record shows that 100 small industries have been registered, but only half of them are in operation. These include lodges, distilleries, agro-processing, carpet factories, etc. However, information is not available about their current impacts and status. It appears that most industries have been registered for accessing loans from banks.

Tourism

- **Annapurna Circuit Trek:** Lower Mustang below Kagbeni is part of famous Annapurna Circuit Trek (ACT). Lonely Planet has rated ACT in 2005 as one of the world's top ten exotic trekking destinations. This part of Mustang uses approximately 5 days of 21 ACT days, and has been opened for tourism since 1970s.



- **Primary destination:** Jomsom and Muktinath serve as the primary destinations for many visitors. Approximately, 25% of trekkers visiting this area either fly to or out from Jomsom. Majority of visitors who fly to Jomsom take a short trek up to Kagbeni/ Muktinath and walk down to Pokhara via Beni or Ghorepani.

Sacred sites

Kagbeni and Muktinath are sacred sites. Thousands of Indian and Nepali tourists visit these sites every year especially during *Janai Purnima*, *Dashain* and *Chaitra Dashain*. *Janai Purnima* is also the time for the 'yartung' or 'rain festival' for the local people, which takes place in Upper Mustang during August/September.

Damodar Kunda, which is another sacred site mainly for Hindus, is in Upper Mustang. Trail to the *Kunda* is very poor with high passes and without basic facilities. Visitors to this area need to be self-sufficient in food for almost 4 days. There are few shelters for resting. Due to these reasons, only around 100 pilgrims visit Damodar Kunda annually.

2.4.1 Tourist profile

Altogether, 23,226 tourists or trekkers visited Lower Mustang in 2007, up by almost 42% as compared to 2006 (*Fig. 2.3*). ACAP anticipates improvement in the number of trekkers visiting Jomsom after the peace agreement in April 2006.

Europeans, largely from Germany, France, UK and the Netherlands, visit Mustang. Trekkers from USA dominated until 1998/99 but their number dwindled over the years. Only 948 Americans trekked through Mustang in 2005, up by almost 25% as compared to 2004. With improved security situation, this group of trekkers is expected to increase. Mustang is also popular for trekkers from Israel, which make the 4th largest group. Approximately, 60% of visitors come as Free and Independent Trekkers (FITs). Remaining come through trekking agencies as Organized Group Trekkers (OGTs). The number of tea house trekkers is increasing every year.

2.4.2 Tourism economy

There are 139 lodges/hotels in Lower Mustang whereas Upper Mustang has only 28 lodges with 1500 bed capacity. A five star hotel has been operating with half occupancy near Jomsom airport since 2000. In addition, 31 camping sites are in Upper Mustang, of which 23 are run by people who also operate lodges. The number of camp sites in Lower Mustang is not recorded but this facility is provided to trekking groups by almost half of the lodges/hotels.

More than 170 households are involved in operating lodges and camp sites, which represent only 5% of the total households in Mustang. Besides, there are hundreds of inns and informal lodges, which primarily cater to Nepali pilgrims, government officials and trekking support staff. An average tourist spends Rs. 1200 per day and also brings at least one staff who spends Rs. 700 per day. This means the total annual turn over of 20,000 trekkers and equal number of support staff for an average 5 days in Mustang is Rs. 190 million (US\$ 2.6 million).

Similarly, trekkers annually pay US\$ 1.1 million as fee (combined fee for Upper and Lower Mustang), which forms significant income for ACAP and it is used to support many small scale community development and conservation activities. Tourism has created demands for local products such as fresh vegetables, fruit juice, brandy and spirit, and created jobs for hundreds of people as guides and porters. Although tourism economy in Mustang appears small, it generates opportunities for trade, enterprises and linkages with other sectors.

2.5 Development Context

Infrastructure (physical and social)

Mustang's investment: Since the establishment of district headquarters in Jomsom in 1970s, the government has made significant investment to improve basic services in Mustang. The airport operating since early 1970s handles 50,000 passengers every year. The condition of trails and bridges are good and settlements are well connected.

Government offices: There are about 30 government offices in Jomsom and some of these such as agriculture, livestock, health offices, etc. have sub-offices spread across the district. Only small number of local people have been employed in government services and the majority are teachers.

Electricity: Electricity service in Mustang is insufficient and unreliable. There is one private electricity company and almost all villages in Lower Mustang have been electrified benefitting 53% households mainly below Chhuksang. Electricity of Lower Mustang has been connected to the national grid thus providing lodges (particularly below Kagbeni) cooking, heating, lighting and baking facilities. In Upper Mustang, two community managed micro-hydro projects have benefitted 288 households. However, these schemes operate only for 6/7 months in a year due to freezing of streams used for electricity during winters.

Communication: Almost all major villages in Mustang have telephone facilities. Jomsom VDC has 183 land lines. Other VDCs have only one VSAT each. Recently, CDMA lines have been distributed in Ghasa, Lete and Kobang VDCs, and plans are underway to extend it further. Postal services are available in all VDCs. Similarly, internet services are also available in villages such as Jomsom, Marpha and Kobang.

Traditional organizations: The system of *Mukhiya* (village headman) is still practised in majority of Mustang's villages. *Mukhiyas* are elected on the basis of local consensus. All the people who are listed as *kuriyas* (local land owners) are eligible to contest for the *Mukhiya* position. Their term is fixed varying from one to two years. They oversee village affairs and act as guardians for maintaining local culture and tradition.

Services (health and education)

The number of schools have increased significantly with 66 schools. Additionally, there are 5/6 monastic schools, some run very informally. Literacy rate of Mustang is 61.38%, which is above national average of 53.78%. Female literacy rate is also higher (55.47%) compared to the national average (42.49%). About 80% children (with 50% girls) attend primary education.

Mustang has two hospitals (one private), one primary health care centre, eight health posts, seven sub-health posts and one *Ayurvedic* (homeopathy) health centre. The private hospital, funded by Mustang Development Service Association (MDSA), is located at Ghami village in Upper Mustang. ACAP has a clinic at Lo-Manthang, which provides health care facilities such as mobile clinic, vaccination and awareness campaigns. Additionally, 20 *Amchis* (traditional healers) are providing services particularly in remote villages. Only 15% of villages have to walk for more than an hour to access health services.

Partnership development

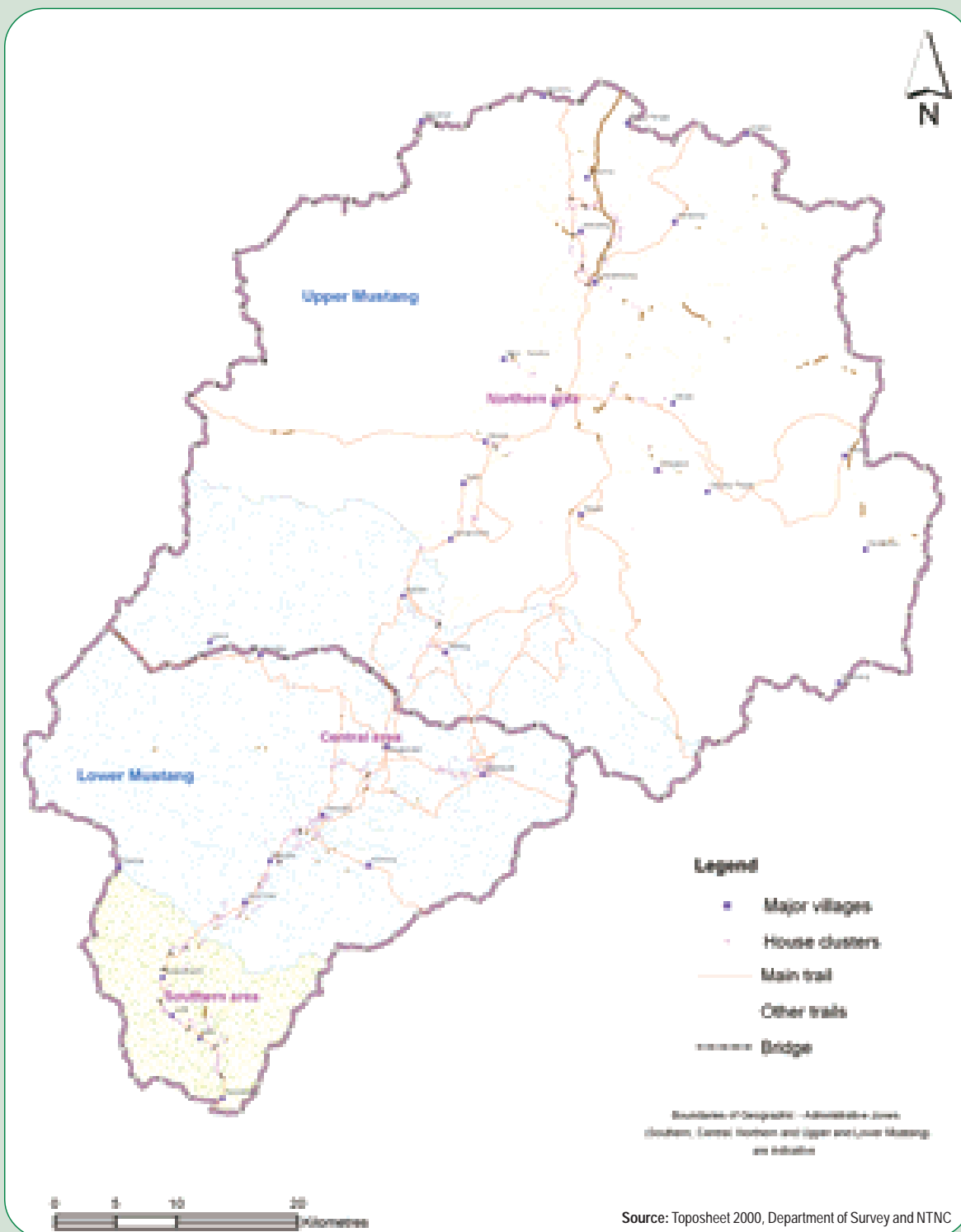
Nine NGOs are working in Mustang. NTNC/ACAP is the largest non-profit and autonomous organization working on conservation and development in Mustang since 1992. The MDSA, which has employed over 40 local people, is another NGO active in Mustang for almost two decades. Other local NGOs include Red Cross, local youth clubs, etc. Additionally, there are numerous community-based organizations working in conservation, cultural, tourism, etc.

The ACAP has two field offices in Mustang (Jomsom and Lo-Manthang) that works through the Conservation Area Management Committees and other CBOs such as Mother Groups, Monastery Management Committees, etc. as well as in coordination with line agencies to protect Mustang's rich biodiversity and promote sustainable development. The ACAP will be faced with greater challenges to maintain the critical balance between protecting Mustang's fragile environment and promoting economic development, particularly after the road connection.

There are different types of traditional institutions in the district such as *Panchgaon Samaj*, *Tihragaon Mukhiya*, *Tingaon Thakali Samaj*, *Baragaon Samaj*, *Lochhoden Samaj* and *Thakali Samaj*, all of which are actively working to maintain their culture and tradition and they command considerable influence in local affairs.

The District Development Committee, *Ilakas*, VDCs and Ward Committees manage district affairs. The government, with the support of UNDP, has initiated participatory district planning process, which starts from VDC level. The DDC is the main coordinating body for development activities. The government budget for Mustang in 2007 was Rs. 250 million, 27% of which was earmarked as administrative costs.

Map 3: Map of Mustang's Administrative Divisions



ROAD NETWORK

3.1 The Current Status

The construction of current feeder road in Mustang began in 2002. The DDC funded road construction in two sections: (i) from Jomsom to Lete; and (ii) from Korrella (border between Nepal and Tibet) to Jomsom. Construction of Beni-Jomsom road has been included as Priority 1 project in the government's Medium Term Expenditure Framework. The government allocated Rs. 170 million during 2006/07, and deployed Nepal Army to construct the road. With the improvement of security situation, the construction work in Beni-Jomsom section is expected to be completed by the end of 2008. It is learnt that Asian Development Bank has included the improvement of Maldhunga-Beni road as the first priority and Beni-Jomsom road as the third priority in its strategic road development loan package. Road construction in Mustang is not following environmental guidelines, which are mandatory in Nepal for any major project, and particularly essential in protected areas such as Mustang and Manang, both of which are included in the Annapurna Conservation Area.

Bumpy and dusty road with potholes bring old vehicles, and this will contribute to air and noise pollution. Upon their completion, Beni-Jomsom road will be about 82km long and Beni-Pokhara section will be about 90km long, which is almost completed except for a bridge over the Kali Gandaki river to connect Beni bazar. The total distance from Pokhara to Jomsom in future would be 172km long, and from Kathmandu 372km long. The construction of Jomsom-Korrella road was initiated by Mustang DDC with the contribution from each VDCs of Upper Mustang. Road track has already been opened from Korrella to Zaithe. As there is no commitment from the government and the contribution of VDCs is limited, this section of the road may take 10/15 years to complete.

3.2 Existing Impacts of Road Construction

Mustang is already experiencing impacts of road construction. The road has raised some new issues and concerns which may have long-term implications on the overall development of the district. Some of the existing impacts are as follows:



Drop in prices of basic household commodities: The people of Upper Mustang have been enjoying benefits of road as 50/60 Chinese trucks loaded with households and construction items have been arriving at Lo-Manthang for the past 3 years. Consequently, prices of most household commodities have been reduced by 30-40%.

The prices of basic household commodities coming from Beni, Pokhara and even Kathmandu is expected to fall significantly in future. The current price of most of basic commodities in Jomsom are almost double as compared to prices in Pokhara. The falling prices of commodities will be particularly beneficial to the poor people who spend about 70% of their income on food.

Trade with Tibet: The Korrela—Lo-Manthang road has made trade with Tibet easier and more profitable. Traders from Tibet arrive in Lo-Manthang. It has boosted demands for local goods such as animal hides, pashmina, *khulu* (fine yak hair), sheep wool, etc. It has also created market for good quality shoes, beads, watches and garments, which local traders bring from the south. These items are becoming very popular in Tibet. Few traders have profited immensely from this trading opportunity. However, the present trade with Tibet needs legal recognition.

Garbage and waste management: Garbage and wastes are visible in areas which are used for parking vehicles and in trading centres.

Cross-border smuggling and human trafficking: There is a small customs office at the border with China. However, ineffectiveness of the customs office has led to the increase in smuggling parts of endangered animals from Mustang. It has been reported that Tibetans use vehicles coming to Lo-Manthang to escape from Tibet. Consequently, the Chinese government has prohibited all vehicles to enter Mustang from China in 2007 although there are reports that some traders secretly transport goods on both sides.

Cheaper LPGs

Kerosene, LPG gas and improved stoves are available in much cheaper price and these are becoming popular amongst lodge owners and local households. It indicates that given the choice, people are willing to switch from burning dried dung cakes and bushes to more efficient and clean energy.

In Lower Mustang, majority of lodges use combination of kerosene, LPG gas, electricity for cooking, baking and heating. Majority of lodges between Muktinath and Ghasa have started using electricity for cooking and heating purposes as the electricity has been connected to the national grid.

Traffic hazards: Jomsom has over 250 two stroke motorbikes and 39 tractors. In the absence of regulatory mechanism, Mustang's motorbikes are being increasingly used to ferry people (mostly pilgrims) from Jomsom to Muktinath, and from Jomsom to Lete. Tractors are mainly used for transporting goods, but they also carry people, when there is demand. Few people have already died from road accidents.

Recently, ten new vehicles (eight by VDCs and two by private businessmen) have been purchased, which will be airlifted to Mustang. Needless to say, once the road gets connected, traffic volume is likely to increase significantly. Based on the current figures of pilgrims and air passengers, Mustang can generate passengers enough for 30/40 micro buses per day, excluding cargo vehicles. The volume of passengers and transport vehicles may increase by 3-4 folds within few years after road is open for traffic.



3.3 Potential Impacts and Issues

The existing and potential environmental pollution and the summary of likely changes, implications and impacts of motorable road in Mustang and its mitigation strategies is presented in *Tables 5 and 6*. Following are the potential impacts and issues of road construction in Mustang district:

- Beni-Jomsom road is the largest and the most significant single development project currently operating in Mustang. Upon the completion of this road, Mustang will be connected to the national road network making it one of the few mountain districts in Nepal that can be reached within a day's drive from Kathmandu. This road may also help in facilitating decisions for the construction of the Kali Gandaki Highway, which could eventually turn Mustang into one of the most important transit points for Indo-China trade in future.
- Similarly, road will change the scale, scope and pace of development activities and will generate far reaching impacts on all dimensions of local economy, society, culture and environment. Once the road is fully completed, Mustang will have to strike the right balance between broad based economic growth, biodiversity conservation and the preservation of unique traditional and cultural heritage. The objective of this Plan is to help Mustang balance these considerations.
- Road will improve access making travel and transportation of people and goods

easier and shorter. Road may promote greater choices, opportunities and options for local livelihoods, and may contribute to achieve the MDGs, particularly in poverty reduction, hunger, health and education related goals and targets.

- The construction of road may cause impacts on the state of Mustang's biodiversity. Noise pollution could increase. Easy movement of poachers, bio-pirates and smugglers can have some adverse impacts after the construction of road. But road will also make surveillance easier and faster. In some critical areas, road construction and use should observe certain guidelines like 'no horn area', 'under-passage for wildlife', so that wildlife movement can remain undisturbed. There will be a positive impact on environment with the road providing other fuel alternatives to fuel wood.
- Loss in biodiversity, bio-piracy and wildlife poaching has increased in recent times. Increased access to markets will enhance incentives for excessive harvesting and poaching. Positive developments in energy use, development of hydro power and increase in food security are positive effects of road construction. As the availability of alternative fuel like kerosene and gas will increase, pressure on forest for fuel wood will decrease.
- Road is instrumental for hydro power development. Investors will come forward to invest in developing hydro power once it is easily accessible. Similarly, agro and herb processing industries are also likely to be established. People of Mustang who are now living in Kathmandu and Pokhara, and who have access to remittances, are expected to bring in investments. In fact, they are playing a catalytic role in the construction of road. One main threat after the road construction could be the increase of STDs and HIV/AIDS. With the increased flow of people (especially young people and tourists), this problem could increase.
- Change in settlement patterns has been the cause of concern in recent years. Some settlements are expected to disappear because they are not linked to road. Similarly, the settlements which lie in between the stops (bus and other vehicles) will decline, if not disappear altogether. On the other hand, settlements having a central location will expand exponentially and will give rise to problems that are similar to other urban areas. The issues of sewerage, solid waste, haphazard settlement development, dumping of wastes into the river will feature as major problems.



- Improved access is likely to increase demands for local products such as apple, brandy, buckwheat, dried meat, juice, jam, cider, etc., which are already popular in Beni, Pokhara and Kathmandu.
- Road may facilitate large scale mining operation for coal, copper and slates. Possibility also exists for mining semi-precious stones, which are believed to be found in abundance in some parts of Mustang.
- As Mustang is located in the geological fault line, the possibility for geo-thermal exploration also exists. With the abundant availability of rocks and sand, cement industry may be a viable enterprise. This could be very damaging to Mustang's environment if proper measures are not taken and these are not located in designated areas.
- Road may trigger proliferation of small, family run as well as medium and large size industries, provided financial and non-financial services are made locally available.
- Cropping pattern is expected to change as more people will be cultivating cash crops. The area under traditional crops and farming system might decline. The existing agro-biodiversity will decline as only cash crops are likely to be grown.
- There will be changes in the ownership of the types of domestic animals. The number of horses and donkeys will decline. On the other hand, number of cows, yaks, goats and sheep might increase.
- Road may encourage farmers to use more chemical fertilizers, pesticides, fungicides, insecticides and preservatives in the short and medium term. The extensive and intensive use of chemicals is likely to affect the quality of soil and reduce fertility in the long run, and increase water pollution.
- The increased volume of traffic, agriculture mechanization, use of new technologies and new industries (cement factory) in future will lead to the increase in air and noise pollution. Increasing population, increasing tourists, new industries, new technologies and increasing traffic will generate waste. Unless waste is properly collected and disposed, these are likely to become major problems affecting human health. Therefore, Mustang will be faced with hard choices in future with regard to locating its industries, setting minimum industrial standards (labour, safety, wage, etc.), deciding on types of industries, regulating industries against pollution and other hazards, and developing local capacity and resources to deal with these problems. These



issues are very pertinent to maintain Mustang's image as a pristine and environmentally-rich district in Nepal, which is the major determining factor for international visitors or tourists.

- New tourists and pilgrims will change tourism service sectors. The service sector may develop as the major industry in future. Demands for more sophisticated hotels, lodges, variety of restaurants, entertainment and other leisure activities are likely to increase. This will put enormous pressure on natural resources as well as increase use of energy for cooking and heating purposes. Villages like Kagbeni, Jharkot, Muktinath and Jomsom are likely to face congestion problems.
- The increased development activities and volume of visitors will exert tremendous pressure on Mustang's scarce forest resource in the absence of viable and affordable alternative energy sources. The demand for timber to cater to the ever growing hotel industry is also likely to increase. Alternative building materials such as plywood, glass panels, aluminum frames, cement, iron rods, roofing materials, fuel efficient technologies, etc. may become available in affordable prices.
- The construction of road will help develop institutions for monks to pursue their studies as well as for visitors to learn various aspects of Mustang's culture and livelihood. There is already a plan to establish a Buddhist University in Upper Mustang. The road, however, may also increase the risk of theft. Safety and security of monasteries and other valuable cultural monuments and artefacts will remain a major concern for future.
- With the road connection to Mustang, the Annapurna Circuit Trek (ACT) will lose almost 20% of the current trekking route (*Map 4*) and duration. Road will reduce about five days of Mustang's trek, which may hamper tourism based settlements eventually leading to its disappearance. Unless some viable alternative economic activities are undertaken to revitalize tourism for these areas, they could face serious economic difficulties in future.
- Potentials also exist for developing other opportunities such as mountaineering, rock climbing, mountain biking, rafting, gliding, wildlife viewing, wildlife hunting, bird watching, paragliding, etc. These activities have to be explored and developed as tourism products of Mustang.
- Domestic and regional visitors, pilgrims and family groups are likely to increase demand for more services and facilities. This would result in the proliferation of lodges, hotels, restaurants, shops, entertainment, tour and travel operators, transport, communication and many other amenities. The service industry will flourish and it may become the largest sector in Mustang. Visitors will most likely



increase by 4/5 times within the next ten years of road connection from the current estimated 100,000 domestic and regional visitors as well as pilgrims. Crowding, criminal activities and social delinquencies will also increase in future.

3.4 Future Plan: The Kali Gandaki Highway

The government has proposed to develop the ambitious Kali Gandaki National Highway along the Kali Gandaki corridor to capture benefits from the enormous Indo-China trade potentials. In the changed context, the likelihood of Nepal developing into a major trade transit point connecting two Asian economic giants is very high. Upon the completion of this highway, the Beni-Jomsom-Korrella road would become part of the national highway, and Mustang one of the most important Nepal's transit points. With the direct road connection to India, the number of pilgrims will multiply by several folds. However, the government has other priorities and the Rasuwa Gadhi and Sankhuwasabha—Kimathangka roads are already in pipeline. As the highway of this nature is a multilateral issue, the construction of Kali Gandaki Highway will probably take 15—20 years. A detailed environmental impact assessment of the highway must be ensured before its construction.



Map 4: Map of existing Annapurna Circuit Trek (ACT) route



EMERGING TRENDS AND ISSUES

Based on the consultation with stakeholders and secondary information about Mustang district, the following trends and issues were identified for future development and environment conservation of the district:

4.1 Livelihood Diversification

Mustang used to be part of the Trans-Himalayan salt trade route with Tukuche as the frontier village for northerners and southerners to converge for bartering trade, mainly salt for rice and visa versa. Salt trade vanished in 1940s, and completely stopped after Tibet was annexed to the People's Republic of China. During 1960s and 1970s, Mustang and Manang became major base for the *Khampas* (Tibetan warriors), who took the advantage of its strategic location and unsuccessfully waged war against China. Initially, the *Khampa* occupation caused hardship to the local people, but later they supported local communities by providing economic incentives through animal husbandry and small scale enterprises. During this period, the people of Mustang lived in hardship and the majority of people migrated to south to spend 4/5 winter months, which used to be their important food security strategy.

With tourism and infrastructure in place, Mustang has now witnessed many changes. The growth of economically active population has created ample opportunities and choices locally to build their livelihood options (*Map 5*). Consequently, the people of Mustang have become more sedentary and enterprising to secure the benefits bestowed upon them through the decades of development efforts.

4.1.1 Livelihood strategy

Rich households in Mustang are likely to own lodges, shops/stores, apple orchards, distillery, above 5ha of agriculture land, and a number of livestock (horses, goats and *Jhopas*). They are likely to work as construction and ration contractors, and send their children for studies to Pokhara, Kathmandu or even in India, and are most likely to own lands or houses in Pokhara and/or Kathmandu. They are likely to have a member of the family working abroad, either in Japan, Korea or USA.

Middle income households are likely to own agricultural lands, small lodges/inns, apple orchard and livestock (mules, horses, *Jhopas* and goats), and are likely to have their children studying in local private schools, and may have a house or property in

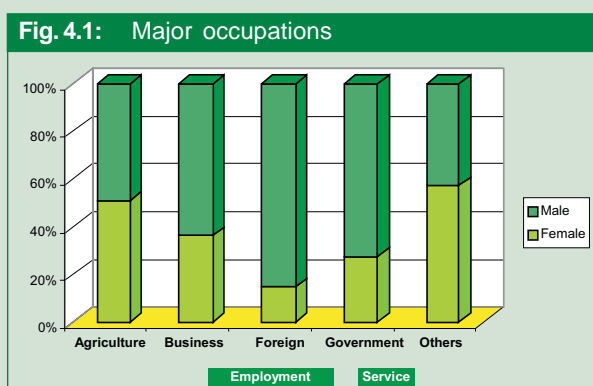


Pokhara. On the otherhand, low income households are likely to run inns, rent lands for agriculture, own a small apple orchard, take casual jobs, collect and sell fuel wood and work as a butcher during off-agricultural season to supplement their income.

People of Mustang have equal access to natural resources and other social and economic opportunities. The only condition is that they have to be registered as *kuriya* or household in a community which involves owning land or house. In most of the villages (particularly above Jomsom), village lands are sold only to *kuriya*. In some villages such as Muktinath, *kuriya* are not allowed to sell their land to outsiders.

4.1.2 Remittance and out-migration

In the past one decade, overseas jobs have become major attraction for the youths of Mustang. Approximately, 1000 people, representing almost 40% of the total households, are working in different countries mainly in USA, Japan and Korea. Although there is limited opportunity for investment in the district, the inflow of remittance has reduced annual interest rates from appalling 36% down to 10 to 12%. Youths are more interested to go abroad for jobs (*Fig. 4.1*). Consequently, some villages such as Dzong and Marpha have only old people.



The increased out-migration of young and physically active people has been a major concern for local people, particularly in maintaining local tradition, culture and also general upkeep of villages. Overseas job holders, when they return, usually divide their time between village and city where they have built new houses. Mustang might face leadership crisis at the village level.

Interestingly, lands and houses that are left behind by out-migrants have created space for poor people from Upper Mustang and Baragaon, and from neighbouring places such as Dolpo and Myagdi to secure their livelihoods. For example, almost all houses in Chimang are occupied by people from Myagdi, and 50% houses in Tangbe are occupied by people from Surkhang VDC, which is located in the northeast of Lo-Manthang.

Similar trends of out-migration is also seen in other villages along the main trail such as in Chhusang, Jomsom, Tukuche, Kobang and Lete. Mustang has 6% of occupational castes, mainly *Bishwokarma* (tool makers) and *Nepali* (tailors or musicians) who never used to farm in the past. These group of people are also changing their occupations and renting fields and houses. Guides, porters and even casual labours earn more as compared to farming.

4.2 Poverty and Food Security

In Mustang, only 3% households are landless. About 18% households can meet food from their own production for 3 months, and 38.6% can meet food for maximum 6 months. Average per capita income of the district is only Rs 6952. A household needs at least Rs 23,341 to have food giving at least 2124 Kcal (*Table 7*). According to the national survey, Rs 4404 is required for meeting this energy intake and meet other basic expenses.



But the cost of living in Mustang is higher. There are 1429 households whose annual income is less than Rs 5000. It is estimated that 55.5% households belong to 'ultra-poor' category and 19.8% belong to 'poor' category. This is an alarming statistic which shows that the number of people under poverty in Mustang exceeds the national average of 33%.

As Mustang is a food deficit district and is not linked by road, the government is still providing subsidized food (transport subsidy) to the district. The government has provided quota of about 1500 quintal of rice in 2006. The quota has been reducing because of the government's policy of withdrawing from this welfare activity. There are two food stores in Mustang—Jomsom and Upper Mustang—that provide food to VDCs for distribution.

4.3 Mustang's Rating Against Development Indicators and Indexes

Mustang holds 19th position out of 75 districts in the overall development indicators. It stands right on top in Adult Gender Imbalance Ratio in non-agricultural occupation and livestock per farm households, and holds 2nd position in the rank based on Gender Discrimination Index (*Table 8*). Mustang also stands highest (4th rank) in per Capita Development Budget Expenditure. However, in poverty and child deprivation indicators, Mustang trails behind to 33rd position. The district also ranks 37th position in the overall literacy rate and is down to 40th position for having toilet facilities, highlighting health and sanitation situation of the district.

Mustang stands 26th position out of 75 districts in Nepal in Human Development Index but is on the top in Gender Empowerment Index. However, in various indicators like literacy, women's position is ranked low. Mustang falls behind in human poverty index (*Table 9*) with (41.5%) as compared to the national average (39.4%).

4.4 Climate Change

Nepal is one of the most vulnerable countries in terms of climate change. Within Nepal, it is seen that trans-Himalayan region such as Mustang district is seen to be directly affected. Yet the level of understanding and awareness on the issue is very limited. Field observation and the experience of elderly people clearly indicate that climate change is taking place and general warmness is increasing. For example, Upper Mustang is receiving more rainfall and the rate of snowfall is declining during winters. Summer is unusually getting warmer and farmers have to irrigate their field during winters.

Mosquitoes are seen in Jomsom, located at an altitude of 2700m. Weather records of the horticultural farm at Marpha confirm changes in temperature and rainfall. The average temperature of Mustang has risen significantly up by 3-4 degree centigrade within a decade. Local people are already experiencing localized impacts of climate change, some of which are discussed below.



Impact on agriculture: There has been a shift in apple farming practices as the incidence of disease has increased. Possibility of cultivating new crops have been reported, which could be due to new knowledge or technology or due to the change in climate. While more rain means greener pasture, changes in climatic condition have been matters of great concern to farmers. Mustang is already experiencing shifting trend in agriculture. Lower Mustang is experiencing higher crop failures due to unpredictable changes in temperature and rainfall patterns.

Impact on water and settlements: Less snowfall has decreased the water level in channels that link settlements. Irrigation has been affected and the area under cultivation has also declined. The people of Upper Mustang are worried that they may be faced with water scarcity in future as they have experienced in the past. Many settlements have been left abandoned due to water scarcity.

Impact of natural hazards: Elderly people believe that weather induced hazards such as large avalanches, windstorms and hailstorms are becoming increasingly common. Death of animals from ice fall has increased. In 2003, a herd of 36 yaks was killed near Jomsom. Flash flood incidents are also rising in the district.

4.5 Energy

Forests are still the main source of energy in Mustang. Approximately, 89% households still depend on fuel wood for cooking and heating purposes. Solar system and kerosene lamps are used for lighting electricity. Unlike in the past, the use of *diyalo* or pine wood for lighting has been abandoned. Use of kerosene, LPG gas, and fuel-efficient utilities such as pressure cookers, thermos, and low wattage cookers are becoming popular, particularly among the lodge and hotel owners. Similarly, the use of improved hearths or iron stoves imported from Tibet, back-boilers, smoke water heaters, solar lighting, solar water heating system and solar mills are also increasingly becoming popular largely due to ACAP's efforts. Consequently, the use of dried dung cakes or thorny bushes, which used to be the main source of energy in Upper Mustang until a decade ago, is declining.



All the villages below Jomsom are electrified. However, in the Lo area, two villages receive electricity only for 7/8 months in a year, as streams used for generating electricity get frozen during winter season. Electricity in Lower Mustang below Kagbeni has been connected to the national grid, thus increasing the possibility of using electricity for cooking and heating purposes, which is insignificant at present.

4.5.1 Household use of fuel wood

Information on the trend and quantity of fuel wood consumption in Lower Mustang is not available. However, fuel wood consumption in Upper Mustang is estimated 3.1 kg per person per day (1.1 ton per person per annum), which is equal to 6123.6 metric ton/annum for 5412 people of Upper Mustang. Lodges use almost 60% more fuel wood as compared to ordinary households. However, lodges of Lower Mustang and to some extent Upper Mustang are increasingly using kerosene and LPG for cooking and heating. The price of fuel wood is increasing every year.

4.5.2 Use of fuel wood by Nepal Army

The Nepal Army, who has two bases in Mustang (Jomsom and Kaisang), is the largest single group using large quantity of fuel wood. They purchase more than a ton of fuel wood every day to serve almost a total strength of 500/600 army personnel. Local people claim that they have been one of the major groups for accelerating forest degradation in Jomsom. As army bases are outside ACAP's jurisdiction, their haphazard collection of timber and fuel wood have gone unchecked for quite sometime.

4.5.3 Potential future sources of energy

Known as the “Windy Valley” particularly between Tsaile and Larjung, Mustang has a high potential to harness wind power to generate electricity in future. The Upper Mustang valley experiences comparatively long hours of sunshine, and thus has a high potential for harnessing solar energy. Currently, solar heating systems are used by lodge owners, which are not versatile enough to withstand Mustang’s cold winter. There is also the potentiality of harnessing existing rivers and streams for generating electricity.

Energy is one of the major issues of Mustang (particularly above Jomsom) for protecting its dwindling forest resources. It will continue to be the overriding issue in Mustang in future when it gets connected to the national road network, and when the number of visitors in the district will increase in the future.

4.6 Biodiversity Loss

Mustang’s rich biodiversity is under constant threat from various quarters. Wildlife poaching (particularly musk deer), illegal NTFP collection, over-exploitation of forest and rangeland products, fire, wildlife depredation, and inadequate alternative energy sources are some of the major concerns that have been impacting the overall biodiversity of Mustang.

4.6.1 Hunting

Illegal hunting still occurs in the area for meat and commercial purposes. Musk pod, bear gall bladder and fur are sought after by traders. In the past, fur caps made up of red fox, beach marten, leopard cat, Himalayan weasel and other wildlife were available on sale as souvenirs, although in limited numbers, and they are used, especially by the people of Upper Mustang. People mostly from other districts are engaged in large scale illegal collection and smuggling of NTFPs. Similarly, local people claim that the Nepal Army personnels are also engaged in killing wild animals, particularly blue sheep, Goral and Tahr, during their regular training and exercises in remote mountain areas.



4.6.2 Human—wildlife conflict

Mustang has been reported having a significant level of human—wildlife conflict. The most problematic livestock predators are common leopards and snow leopards in the Lower and Upper Mustang, respectively. A study conducted in 2004 shows that of the total livestock lost due to predation in Upper Mustang, 58% were killed by snow leopards. Regular wildlife crop damage is also a common problem. Although

no information on crop depredation by wildlife is available from Lower Mustang, monkeys and Himalayan black bear are significant crop depredators in Kunjo VDC.

Major human-wildlife conflicts are due to killing, mauling, habitat degradation and disturbances. Despite the strict ban imposed by the government, ACAP, local conservation bodies and 'Lamas' on the killing of wild animals, retaliatory killing and occasional illegal hunting is still prevalent in the district.



4.6.3 Habitat degradation

Villagers widely use all accessible lands for livestock grazing and fodder collection, which inevitably impact wildlife habitat, both directly or indirectly, and also create food shortage and general habitat disturbances. A recent study has shown that competitive relationships existed between wild and domestic stock (Shrestha 2007). These activities may drive wild ungulates away to areas of sub-optimal habitat.

The unregulated collection of timber, fodder, fuel wood, medicinal plants and livestock grazing have negatively impacted forest and rangeland biodiversity. Deliberate and incidental forest and alpine grassland fires also occur in the district.

4.7 Vulnerability

Natural disasters such as river and flash floods, forest fires, earthquakes and avalanches have been reported in Mustang. As river cutting is predominant, several villages settled on the bank of Kali Gandaki river are likely to disappear within the next few decades. Villages such as Chhusang, Kagbeni, Tukuiche, Khanti, Kobang and Larjung are most vulnerable to river cutting. Tukuiche village has raised Rs. 10 million with the help of Toga (a sister city in Japan) and donation from the residents of Pokhara and Kathmandu for river protection programme.

4.7.1 Kali Gandaki embankment

Mustang DDC and local leaders have proposed the idea of building the Kali Gandaki river embankment from Chhusang to Larjung in order to control river meandering and reduce river cutting. The DDC has already received support from CARE International a few years ago to survey and estimate costs for river training from Tsaille to Lete. Local people are cognizant of the fact that the ambitious river

embankment project will reclaim thousands of hectares of land which can be distributed to poor for use in agriculture and horticulture. The embankment can also be used to build road, particularly between Kagbeni and Chhusang.

4.7.2 Social security and safety net

Mustang does not have a disaster preparedness contingency plan. In the absence of the focal agency to monitor the aftermath of natural hazards, government agencies such as the District Administrative Office and the security forces are mobilized to provide relief and rehabilitation measures with the help of the Red Cross Society. Relief support is provided for a short period lasting a few days or weeks depending upon the extent of damage.

The social capital of the people of Mustang appears strong as they have a system of helping their members in need. This includes people who have lost their property in natural disasters, who are trapped in debt due to business failures, etc. They are offered *Dhikuti*, a revolving fund to which members contribute agreed amount on agreed dates. *Dhikuti* is the major safety net for the people of Mustang. A person in dire need is the first recipient and receives full amount. Remaining members have to bid for money, and the amount is distributed equally to all members. In Upper Mustang, *Dhikuti* is operated differently. The first recipient gets full amount and she/he pays back to contributing members. Local people see *Dhikuti* as a very practical and feasible option for helping vulnerable people to rebuild their livelihoods. However, *Dalits* do not enjoy the same privilege, particularly because they are few in numbers and are often seen as cash poor. The only help they would get is in the form of renting land for cultivation and wage employment or some emergency help on humanitarian grounds.

4.7.3 Forest fire

Deliberate or incidental forest and alpine grassland fires have been reported in Mustang time and again. Natural fires are rare in Mustang. Forest fire is set either by the villagers to improve forage or poachers to drive targeted wildlife or by porters working for mountaineering and trekking groups. Usually villagers are responsible for fighting fires. Neighbouring villagers, ACAP and government staff and security personnel also provided the much needed assistance. Forest fire is a significant problem in Lower Mustang.

4.7.4 HIV and other infectious diseases

Incidents of HIV/AIDS have not been reported yet. However, its probability cannot be undermined. The people of Mustang migrate to India for petty trade during winter season. The chances of infecting with HIV is very high in the absence of proper tests or health services. Some sexually transmitted diseases are common. The incidence of tuberculosis is declining because of the improvement in local diet and availability of treatment. There is no report of other communicable diseases.

4.8 Urbanization

Mustang is an unurbanized district. Jomsom is the largest VDC, which has several villages within a 3km radius, with a total population of 309 households (approximately 1666 people). However, this figure excludes government, non-governmental staff (approximately 1000) and airport settlements, which is within less than 1km in distance from the old settlement of Jomsom. Jomsom airport, technically belongs to Marpha



VDC, but is part of Syang village. Similarly, the population figure excludes hundreds of construction and casual labour working in Jomsom. Marpha trails slightly behind Jomsom as the second largest settlement with 302 houses and a population of 1583 people. Tsarang and Lo-Manthang are largest settlements in Upper Mustang.

Over the years, Tukuiche, Marpha, Jomsom, Muktinath, Kagbeni, Tsarang and Lo-Manthang have shown signs of growth. New hotels are being built and new settlements on the periphery of old villages have been developed. The airport area near Jomsom, developed only in the last 3 decades, is considered the most expensive place in Mustang. Local people say the value of land in Jomsom is almost equal to that of Pokhara or Kathmandu. The land value along Kali Gandaki river is rising. Marpha, Muktinath, Tsarang and Lo-Manthang have also been considered as expensive places.

Lo-Manthang is the final destination for tourists visiting Upper Mustang. In the last one decade, three dozen houses have been built, some of which are built against its famous ancient wall. Now, this has been one of the most contentious issues. Tsarang is also growing as a dozen new houses have been built in five years' time along the road alignment.

Nearly 90% of Mustang's population is served by piped water system. However, there is no system to monitor water quality and it is also not treated. Majority of Upper Mustang villages do not have proper drainage and/or sewerage facilities. Some villages (Marpha) have used irrigation channels to drain their household wastes. Most of the toilets are built without safety tanks, and it is a major issue particularly in Upper Mustang. In the absence of proper waste disposal system, haphazard development is likely to have negative impacts on Mustang's pristine environment.

SUSTAINABLE DEVELOPMENT FRAMEWORK

5.1 Introduction

Sustainable development means mainstreaming environmental, economic, social and conservation values and concerns into the developmental (planning) processes. This mainstreaming will be achieved in this case through the following processes:

- developing institutional mechanism at different levels (wards, villages—VDCs, *Ilakas* and district level) to look after environmental concerns in the planning of development projects or any intervention;
- developing information or data base on environmental status, including the quality of environment;
- monitoring of the development achievements and feeding back of concerns to the planning process;
- developing capacity (including legal regulations) of different agencies in sustainable development planning, implementation and monitoring; and
- Ensuring adequate incentives to promote sustainable activities and disincentives for unsustainable and environmentally polluting and damaging activities.

Mainstreaming is considered important for balancing the development and environmental conservation of Mustang district, which is being connected to external world by road.

The concept of sustainable development was initiated by the Brundtland Commission Report (1987). The report had defined sustainable development as ‘development which meets the needs of the present without compromising the ability of future generation to meet their own needs’. In order to achieve this, social, economic and environmental objectives are to be made complementary and inter-dependent in the development process. Accordingly, any plan or strategy should integrate these three pillars of sustainable development—social (poverty alleviation and employment generation), economic (macro-micro level economic policies, and private sector activities) and environmental (brown and green issues). In areas where this integration is not possible, trade-off between them is also necessary. UNESCO in 2001 elaborated the concept of sustainable development by adding a new pillar ‘cultural diversity’.

In 1992, the Earth Summit endorsed Agenda 21 setting the milestone in promoting sustainable development principles. Eight years later, the Millennium Summit reaffirmed these commitments and redoubled efforts to make sustainable development a reality through the declaration of the Millennium Development Goals (MDGs). The central

theme of MDG is poverty reduction on a sustainable basis. The MDG has eight goals to be achieved by 2015. The seventh goal is directly linked to environmental conservation. Targets are set for each MDG goal and are to be monitored through 48 indicators.

The MDG gives people the power to claim their fundamental human rights, including right to food, education, shelter, health, live in healthy environment; and allow all citizens to become active advocates for development. The Government of Nepal endorsed MDGs, set numerical targets for each goal, and has committed to achieve it by 2015. The SDP has been developed to achieve the fulfillment of MDGs in Mustang district. In most of the indicators, Mustang's MDG status seems to be much higher than the national average. Poverty level is considerably low. But the district level data shows that more than half of the population is under poverty line. On the other hand, food security status of the district seems very marginal as compared to the national status. In contrast to the national level, Mustang district ranks fairly well as compared to other districts of the country. But planning needs to consider the intra-district (between geographical region and socio-economic groups) disparity and differences.

Nepal started integrating sustainable development principles in its national plans, policies and strategies. This is seen in the 8th 5-year Plan (1992-1997) and continued upto 10th Plan. Previously, Nepal had formulated National Conservation Strategy in 1987.

Mountain environment presents special challenges for sustainable development. This has also been the issue of Agenda 21 and the mountain chapter 'managing fragile ecosystems—mountain sustainable development'. This shows the general concern of the policy makers for mountain environment. Mountains are considered as water towers for an increasingly thirsty planet, vast resources of cultural and biological diversity, sensitive indicators of climate and environmental change, vital recreational areas for an ever more urbanized world population, sacred places for religion and culture, and uniquely privileged regions of protected areas, but also sites of erosion, risk and disaster with damaging effects on the surrounding lowlands. Over 50% of humanity depends, in one way or another, directly and indirectly, on mountain resources¹. This Plan has also been made for a district which is located in the high mountain region, and hence, should receive attention of not only local/national agencies but also the global agencies.

¹. Messerli, Burno. 2006. 'Keynote Address—Securing Sustainable Livelihoods in the Hindu Kush-Himalayas: Directions for future Research, Development and Cooperation. In: *ICIMOD 2006. Securing Sustainable Livelihoods in the Hindu Kush-Himalayas: Directions for future Research, Development and Cooperation*. P. 12-26.

5.2 Sustainable Development: Current Policy Context

Poverty Reduction Strategy Paper (PRSP)

Nepal's Poverty Reduction Strategy Paper (2002-2007) and Three Year Interim Plan (2007/08—2009/10) give main emphasis to poverty reduction. In Nepal, environment/poverty linkages across many sectors are well recognized as income in rural areas is mainly based on natural resources, whether it is agriculture or tourism or pastoralism. Their degradation, therefore, is the main source of vulnerability for rural poor. In designing and carrying out its poverty reduction strategy, the Tenth Plan has adopted a number of new approaches and initiatives, which represent a significant departure from past plans and strategies. One of them is to improve the accessibility of the districts by, at least, linking the district headquarters to road network.

Three Year Interim Plan

The Three Year Interim Plan has set the goal of reducing poverty, increasing employment and making people feel perceptible positive changes. The vision of this plan is to build a prosperous, modern and just Nepal that is self-sustaining and free from absolute poverty level. For the attainment of this vision, the plan has adopted strategies such as giving emphasis to relief, rehabilitation and reintegration; achieving pro-poor and sustainable economic growth rate; increasing investments in physical infrastructure; carrying out inclusive development and targeted development programmes; and emphasizing social development, which will make people feel improvements in governance. The private and cooperative sectors will have important roles in the overall economic activities of the country whereas investments from the government sector will be directed mainly to relief, rehabilitation and reconstruction, development of physical infrastructure, and poverty alleviation. The Interim Plan has a clear objective that ten of the remaining district headquarters of the country will be connected by road by the end of 2010. One of these ten districts is Mustang.

5.3 Cross-cutting Policies

5.3.1 Road for development

The objective of PRSP is to develop and manage a cost effective transport network for economic development. By expanding road network, the goal is to improve access to rural areas and market sectors, and enhance the management of existing assets.

In 2002, the Department of Road produced a 'National Transport Policy (NTP) and 20-year Road Master Plan' (RMP) and in June 2004, produced a draft 'Master Plan for Strategic Road Network (SRN)'. Whilst the NTP covers a variety of transport related issues, the RMP is mainly concerned with the development of the SRN.

The SRN proposes various strategies, one of which is the 'connection to all district headquarters by road and provide road links to the district headquarters with adjacent

road network of the neighbouring country. Similarly, providing road access to centres of pilgrimage, areas with hydro power potential, flourishing centres of trade, industry and commerce, centres of tourism and recreation, agricultural potential areas, areas of mines and other resources, and attract private sector in the construction, maintenance and operation of SRN is another objective. Out of fifteen district headquarters, which are not yet connected by road, twelve will have road connection in the 10th Plan and three will have the road connected during the 11th Plan. Mustang road forms part of the SRN plan.

5.3.2 Water resource management

The government has adopted an Integrated Water Resources Management (IWRM)



plan in 2002. This is based on the use of water from a holistic perspective, both in natural state and in balancing the competing demands on it such as domestic, agriculture, hydro power, industrial, cultural and environmental. Water resource development aims to contribute to improving the quality of life by: (i) reducing incidence of poverty; (ii) providing people with access to safe and adequate drinking water and sanitation to ensure health security; (iii) increasing agricultural production and productivity to ensure food security; (iv) generating hydro power to meet national energy requirements; and (v) protecting the environment and conserving the biological diversity.

Relevant policy principles mentioned in the National Water Plan (NWP 2005) are also useful for Mustang, and these include:

- Developing and managing water resources in a holistic manner, relying in the principle of IWRM;
- Utilizing water sustainably to ensure conservation of resource and protection of the environment;
- Delivering water services in a decentralized manner by involving accountable stakeholders and agencies (public, private, community and user based organizations);
- Adopting best existing technologies and practices in micro-hydro power generation suitable at the local level; and
- Sharing of water resources benefits among the communities on equitable basis.

5.3.3 Food security, agriculture and animal husbandry

Food security comprises access to all people at all times for enough food for an active and healthy life. Therefore, food security must be viewed in terms of availability (production of food), access (economic and social access), and utilization (proper processing of food items into food). This requires increasing the income of poor and small farmers through employment creation from agricultural growth and intensification of small farms with high value crops, empowering the poor and needy, particularly women. Given massive food deficit in Mustang district, focus should be made on addressing the root causes of food insecurity. The existing plans and policies aim to achieve this goal.

Agriculture Perspective Plan (1995):

This 20-year plan for agricultural development emphasizes to intensify agricultural activities for poverty reduction through sustainable utilization of genetic resources for food and agriculture. It envisages the diversification and commercialization of agriculture by enhancing the production of fruits, high value crops, including NTFPs and livestock in hilly and mountain region. It is a prioritized plan of action in which a small number of key priorities are carefully packaged together into a Prioritized Productivity Package (PPP). The plan has put limited inputs in irrigation, seed, rural roads, electricity, fertilizer, and appropriate technology at

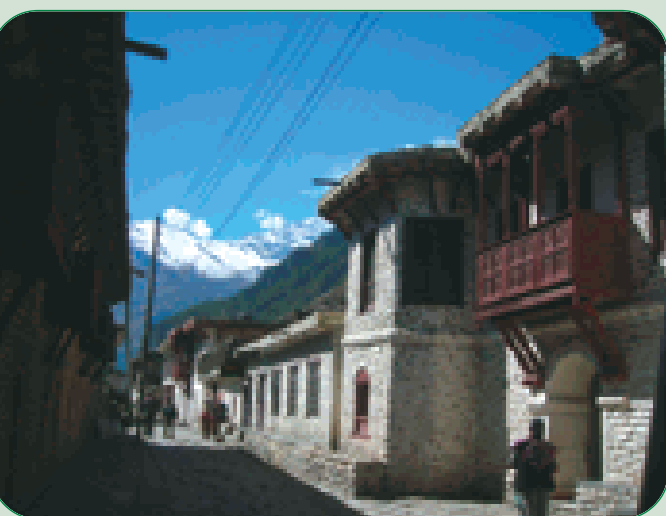


the national level. Budget in agricultural sector for Mustang is extremely low. Emphasis should be given to encourage, use and maintain the current practice of using organic fertilizers. If not all, at least Upper Mustang is using organic fertilizer, and forest resources and animal husbandry play a key role to fulfilling the needs of fertilizers.

Agriculture Policy (2004): The policy emphasizes to increase agricultural production and productivity so as to compete regionally and globally, to strengthen conservation of natural resources, environment and biodiversity for sustainable use. The policy aims to: (i) support reducing poverty by transferring degraded forests and unused public land to target community for planting fodder trees, forage grass, medicinal herbs, sericulture trees on leasehold basis; (ii) mitigate negative impacts of usage of agricultural chemicals on soil and wetlands; (iii) promote production and usage of compost fertilizer; (iv) manage gene bank and promote *in-situ* conservation; and (v) develop participatory conservation-oriented

agriculture system for the management of watershed and river banks. For Mustang, emphasis should be given to increase 'niche' agricultural products and develop comparative advantage in the context of road development.

Tourism Master Plan (1972): Nepal has always remained a popular tourism destination due to its natural beauty, unique culture and incredible heritage. A ten-year tourism master plan was prepared (amended in 1984) in 1972 aimed at providing a clear direction on policy reform and development work. Apart from these, a number of working plans targeting special issues were also implemented; one of them was "Visit Nepal Year 1998" with a target to increase tourist numbers to 500,000 and increase or maintain tourists arrival in the coming years (NPC 2002).



Despite a moderate success achieved by 2000, a decline in the arrival of tourists has taken place in the country. Mustang, being a popular destination for tourists, remained adversely affected for a decade (mainly lower parts) due to insurgency. The long-term vision and strategy adopted for sustainable tourism in the country has also been envisaged in the SDP for Mustang. These include: (i) developing tourism sector as an important part of economy and re-establishing ACAP globally as a prime destination; (ii) expansion of earning and channeling the benefits accrued from tourism to rural communities equitably through qualitative improvement and local community participation in accordance with the decentralized policy; (iii) promoting sustainable tourism through the conservation of natural and cultural heritages, and providing alternative routes

throughout main tourist stay points along the feeder road; and (iv) developing environment-friendly safe road and air services by involving other sectors.

5.3.4 Education

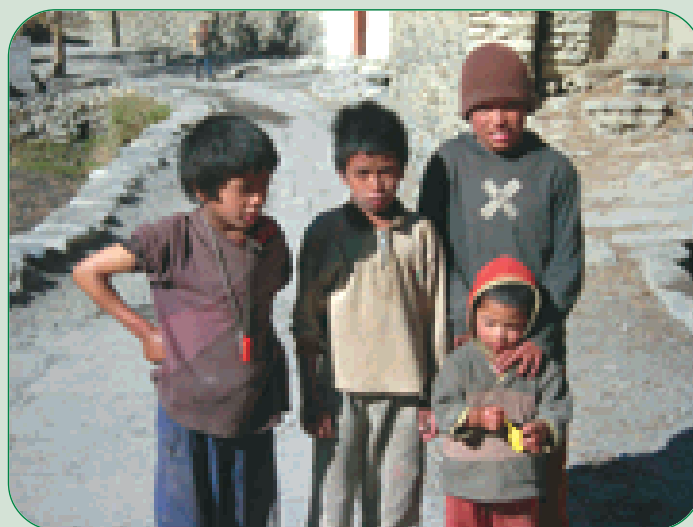
Achieving "Education for All" is the primary goal of Nepal. Improving access to primary education to local communities, disadvantaged children, and women, and improving education quality are two major challenges that need to be addressed. Recognizing the importance of proper education policy for bringing about greater equity, PRSP and Three Year Interim Plan also emphasize the universalization of primary education. The Interim Constitution of Nepal (2006) has ensured citizens to get education as fundamental human right. Recent policies include scholarship schemes to children of disadvantaged communities and those below poverty line.

The strategies adopted by the government are decentralization of school management, including management to communities, and scholarship targeted to women and children from disadvantaged communities. For Mustang, the strategies include expanding teachers' training, improving curricula and introducing teachers'

materials in local languages, and strengthening supervision by the communities.

5.3.5 Health

Improving health of all, especially that of vulnerable groups who depend on manual labour, is one of the major challenges. The policy measure aims at ensuring equitable access to health system in urban and rural areas. Another government policy is to provide maternity services and benefits to women and reduce child mortality, in particular, those living in remote areas. This requires incentives to service providers and health institutions assisting during childbirth.



Traditional healing system is an important practice that provides health care services in remote and inaccessible areas. Traditional healers play an important role to provide health services in the Himalayan region. One of the major challenges in Mustang is to integrate traditional healing system based on knowledge and skills with modern allopathic system. In order to conserve the existing knowledge and resources, traditional healers need to be provided national recognition as in India and China.

5.3.6 Drinking water and sanitation

Unsafe drinking water and poor sanitation are main reasons for high incidence of communicable diseases in Nepal. The government aims to increase drinking water supply coverage and sanitation facilities through decentralized demand driven opportunities. Key challenges in Mustang include improving safe water supply in increasing settlement, urbanization and tourists inflow that require increased demand of water supply. Developing water quality standards/guidelines, and implementing/monitoring requires the involvement of NGOs/CBOs, and other support organizations to plan and implement schemes demanded by local communities.

A major concern is also to give high priority to toilet construction with safety tank and regulate its uses by rural households. Availability of drinking water along the trails in Mustang is another major issue. The above objectives can be achieved through the involvement of communities in management of drinking water schemes, by improving cost effective mechanism.

5.3.7 Social inclusion

Certain caste and ethnic groups, women, marginalized and poorest of the poor living in remote areas, face additional barriers in getting access to social services and economic opportunities. The main aim of social inclusion is that targeted programmes are essential to reach the excluded groups. Realizing this, several efforts have been initiated in the Interim Constitution of Nepal (2006) to ensure social inclusion in all sectors.

Several policy initiatives have been undertaken to achieve the target of social inclusion. The National Foundation for Development of Indigenous Nationalities (2002) has been implementing various programmes and special scholarship packages for disadvantaged ethnic groups. The Local Self Governance Act (1999) has made provisions for the nomination of disadvantaged community representatives in local bodies aimed at the elimination of economic and social discrimination against *Dalits* and to bring *Dalits* and *Janjati* groups into the mainstream of development. A major challenge in Mustang has been to mobilize disadvantaged groups for their meaningful participation in all sectors of the society.

5.4 Environment and Biodiversity

Many legislative arrangements are related to environment and biodiversity conservation. The protection of environment and sustainable development are equally pressing challenges.

Forest Act (1993): The Forest Act empowers the District Forest Officer (DFO) to hand over any part of a national forest to user groups in the form of community forests entitling it to develop, conserve, use and manage such forests, sell and distribute the forest products by independently fixing their prices as per the operational plan (Section 25.1). However, handing over of a part of the national forest as community forest does not change forest land ownership. Land ownership of community forests remains under the government (Section 67). Nevertheless, it is one of the most progressive provisions of the Forest Act that empowers local communities for the management, development and partial sharing of the benefits arising from such forests.

National Parks and Wildlife Conservation Act (1973): Section 3A of the National Parks and Wildlife Conservation Act empowers the government to delineate buffer zones around the national parks and reserves. The warden is empowered to constitute the requisite number of users committees in coordination with local authorities to be involved in various activities such as community development and judicious utilization of forest resources; conservation of forest, wildlife, natural environment and natural resources, biodiversity preservation; and other development works.

Soil and Watershed Conservation Act (1982): The Soil and Watershed Conservation Act is essentially aimed at, among others, protecting the agricultural economy from the impacts of various natural disasters. No recognition is given in the legislation to the role of indigenous system of land management to any other form of public participation other than through government controlled user groups.

National Trust for Nature Conservation Act (1983): Under this Act, the government has established the National Trust for Nature Conservation, previously known as King Mahendra Trust for Nature Conservation. The NTNC is mandated as an autonomous

and non-profit organization to work in the field of nature conservation. It has been managing two conservation areas—Annapurna and Manaslu. The Act is supported by the NTNC Regulations (1984).

Water Resources Act (1992): The Water Resources Act aims to make arrangements for rational utilization, conservation, management and development of all types of water resources available in the country, and to make timely arrangements for determining beneficial uses of water resources, preventing environmental and other hazardous effects thereof and also for keeping water resources free from pollution.

Himalayan National Park Regulations (1979): The Himalayan National Park Regulations have made special provisions for local communities living within the Himalayan protected areas to collect biological resources for their daily requirements such as fuel wood, leaf litter, small pieces of timber and fodder. The regulations also allow local communities to continue to graze their domestic animals on park rangeland. Communities can organize harvesting and make grazing plans in consistent with the park's objectives. They can also control or even stop 'outsiders' from entering the park to harvest resources, and thus help reduce the pressure on natural resources of the area. However, no provisions have been made for handing over parcels of parkland for management by the communities.

Environment Protection Act (1996): The Environment Protection Act aims to promote conservation and sustainable development in Nepal and to maintain a clean and healthy environment by minimizing the adverse effects of environmental degradation on human beings, animals, plants, nature and material things. This Act specifically defines biodiversity as 'ecosystem diversity, species diversity and genetic diversity.' However, the Act does not provide provision to sharing of the benefits arising from genetic resources.

Nepal Biodiversity Strategy (2002): The strategy honours obligations under the Convention on Biological Diversity. It is a commitment by the Government of Nepal and the people of Nepal and serves as a guide to all government organizations, private sector and civil society organizations for the protection and wise use of biologically diverse resources of the country on a sustainable basis, the protection of ecological processes and systems from genetic to landscape level, and ensuring fair and equitable sharing of benefits to the people. NBS implementation plans have been implemented by forming National Biodiversity Coordination Committee (NBCC) at the national level. However, its implementation at the district level through community participation has not been effective due to lack of political commitment.

NTFP Policy (2004): The long-term vision of NTFP policy is to boost the economic condition of the country by sustainable utilization of the medicinal plants and non-timber forest products. The policy aims to identify the country's diverse reservoir of

medicinal plants and NTFPs by conserving and managing resources by 2020. Key objectives include sustainable development of medicinal plants and NTFPs through *in-situ* conservation, adding value through infrastructure development, processing and enterprise development, assist in social transformation, and earn foreign currency through competitive international marketing of niche products. Implementation of the policy is poor due to monetary constraint and lack of political commitment.

Medicinal plants of Annapurna Conservation Area possess immense cultural and economic values, and provide basic healthcare for millions of people. Upper and Lower Annapurna region have been identified as Important Plant Areas (IPAs) for medicinal plants (Hamilton and Radford 2007). There is need for involvement of community in the identification of medicinal plants and management of IPAs.

Access to Genetic Resources and Benefit Sharing (AGRBS) Bill: The Access to Genetic Resources and Benefit Sharing (AGRBS) Bill has been finalized following Bonn Guideline and is awaiting approval from the parliament. The Bill spells out provisions to facilitate sustainable use and access to genetic resources and fair and equitable sharing of benefits arising out of the utilization of genetic resources. It provides that the authority to determine access to genetic resources rests with the national government. Other features of the Bill include: (i) the collectors need to obtain Prior Informed Consent (PIC) from government organizations; (ii) a fair share of benefits goes to indigenous communities for using their traditional knowledge and resources conserved by them; and (iii) capacity building and transfer of technology of the country need to be promoted. These provisions may not be achieved unless Community Biodiversity Registration has been institutionalized.

5.5 Climate Change

Climate change is a global issue potentially affecting all types of ecosystems. Accurate projection of climate change is paramount to assess its impacts in the Himalayas which exhibit varied biological and hydrological resources that govern numerous economic activities beyond the boundaries of the Himalayas itself.

The National Communication Report of Nepal (2004) indicates higher rate of temperature rise in upper mountain region, including the Himalayas. Receding glaciers and formation of glacial lakes are already giving alarming signals for the future. However, there are uncertainties on the nature of impacts on life, livelihood and environment.

Climate change at high elevation sites is characterized by high degree of complexity, and high degree of uncertainty (Beniston et al. 1997), because of the problems related to lack of observation and data for the Himalayas. Climate change will likely have greater impact on vegetation, agricultural productivity, glacier retreat in trans-Himalayan districts of Mustang and similar areas that exhibit great altitudinal range

within short horizontal distances. A small shift in precipitation pattern in the Himalayas could lead to widespread disruption of future water supply. There is a need to examine the impact of climate conditions (e.g. temperature, precipitation, extreme weather events) on natural processes and resources (water resources and crop yield), and then to infer impacts on human population using simple indices related to livelihood such as food security, water stress, etc. (Berkhout and Hertin 2000).

Vulnerability to climate change in the Himalayas is characterized by economic, institutional and political factors of the regional countries. However the effects at the local level are specific to social groups who are themselves dynamic (Aase and Chaudhary 2007). Policy regarding the vulnerability and adaptive capacity concepts are still at an initial stage of development, and academic scientific and indigenous knowledge based approach are needed to measure and understand them in the context of climate change. Local communities with traditional knowledge and experience cope with different strategies to sustain and manage landscape (Salick and Byg 2007). From the data and perceptions of globalization process in Mustang, it becomes evident that indigenous peoples' knowledge and perceptions must be incorporated into climate change policy (Chaudhary *et al.* 2007).

The national development plans of Nepal do not consider the possible impacts of climate change neither in terms of environmental changes nor in terms of peoples' livelihood, in particular indigenous peoples whose livelihoods depend on surrounding natural resources that are directly affected by climate change. An urgent need has been to link development activities of Nepal with climate change in general, and make commitment to undertake further scientific study of observed global warming and its human causes, and observe new set of projections about how climate might change in the future on natural systems as well as peoples' livelihood. A commonly perceived weakness in these studies has been their inability to integrate socio-economic change, and how this may effect changing human vulnerabilities and adaptation in the future. Important conceptual and practical challenges remain in producing future scenarios that can be a useful input for the Himalayan region.

For Mustang, a network of researchers should work to develop sustained carbon neutral and carbon negative livelihoods as suggested by Salick and Byg (2007). Some potential activities include:

- Formation of joint network of researchers and indigenous people;
- Documentation of baseline data and monitoring of climate change and vegetation pattern, ecosystem, agricultural, cultural, health and welfare changes;
- Exploration of carbon offset strategies; and
- Development of policy and carbon credit benefit sharing potentials.

In case of Mustang, maintaining socio-economic conditions in many instances may concern simple technological adjustments such as maintenance of water channel

for irrigation using polythene pipes (Dannevig 2007), and maintaining the diversification of crops that are suited to the local environment and culture (Chaudhary *et al.* 2007).

5.6 Governance Sector

Local Self-Governance Act (1998):

Decentralization is one of the priority policy areas for Nepal ever since the government promulgated the Local Self-Governance Act in 1998. The preamble of the Act requires to utilize the benefits of democracy and maximize the participation of sovereign people of the country (including socially and economically marginalized) through decentralization.

This Act has been instrumental in empowering the District and Village Development Committees who are fully responsible for coordinating development activities as well as mobilizing local resources within the district to achieve development goals and targets. The DDCs and VDCs can tax on the use of resources within their political boundaries, and are also entitled to 50% of tourism revenue in the district. In 2007, the government returned 60% of tourism revenue through the efforts of NTNC from Upper Mustang split equally between the DDC and ACAP.

Conservation Area Management Committees: Mustang district was annexed to the Conservation Area in 1992, bringing it under the jurisdiction of the National Parks and Wildlife Conservation Act (1973). Later, the government approved a separate Conservation Area Management Regulations in 1996 for the Annapurna Conservation Area (ACA), and its management was entrusted to the National Trust for Nature Conservation. The Regulations provide legal basis for the operation of ACAP. Under this, the Conservation Area Management Committees (CAMCs) are seen as the key institutions operating at the VDC level and are fully responsible for natural resource management.

CAMC's jurisdiction sometimes overlaps with that of VDCs and DDCs, particularly on the taxation use of natural resources and development priorities. The changing political context is exerting pressure on ACAP and its CAMCs to become more participatory, transparent and accountable.



VISION, GOAL, OBJECTIVES AND ACTIVITIES

6.1 Vision

Transform Mustang into a mountain district with a high quality of human life through balanced progress in economic, social, cultural and environmental conditions.

6.2 Overall Goal

Improve, without degrading the resource base and the environment, the living standard of the people of Mustang in which every citizen has access to basic services and guarantee of fundamental human rights, including economic, socio-cultural and environmental rights.



6.3 Mustang Plan: Objectives and Activities

Objective 1: Protect and Promote the Identity of Mustang by Conserving Mustang's Unique, Vibrant and Valuable Cultural Landscapes

- **Activity 1.1:** Support religious, cultural and community institutions in Tshortens and Gompas such as Lo Ghekar, Jhamba, Thubchen, Chhyode, Chhujung, Luri cave, Tashi Chhoeling (Ghiling), Namgyal, Garfu and Nifuk Gompa (Chhoser), Chungsi cave of Upper Mustang and Ma Ki La Khang, Narsang, Lubra Bon Gompa, Jhong, Chhyonkhar Gompas, Kag Chhode and Tiri Gompa of Lower Mustang, palaces, Lo-Manthang Wall, Muktinath Temple and other monasteries inside Muktinath Temple premises and ruined forts, to be more active with appropriate cultural preservation and promotion activities giving emphasis to:
 - Identify heritage zones and provide proper guidelines for undertaking development activities in and around heritage zones
 - Encourage teaching of appropriate local language and culture in schools and other local institutions
 - Support aspiring monks and monastic schools for religious studies, and identify programmes to engage them in the district
 - Strengthen the links between culture and conservation through different programmes in schools and the community and encourage Head Lamas (*Khempo*) and monks to become cultural and environmental ambassadors
 - Document indigenous knowledge of *Amchis* and others
 - Cooperate with other local and national bodies to generate awareness about Mustang and attract visitors by organizing different types of festivals
 - Assist in getting national recognition of valuable cultural resources and indigenous knowledge system of Mustang
 - Link heritage conservation with tourism

- **Activity 1.2:** Support local cultural and religious bodies to prepare a complete inventory (photography documentation, micro films, listing etc.) of all monuments, sites, artefacts, and valuables that have high cultural, historical, religious and archaeological significance in places such as Lo Ghekar, Jhamba, Thubchen, Chhyode, Chhujung Luri cave, Tashi Chhoeling, Namgyal Gompas, Garfu and Nifuk Gompa, Chhoser cave, newly explored caves by Brod team (konchokling cave) in Upper Mustang, Muktinath Temple, Chokhopani, Myabrak and Pudzeling caves, Lubra Bon Gompa, and ruined forts in Khechar Dzong of Upper Mustang and Gharab Dzong, Jhong, Jharkot and Kagbeni of Lower Mustang by:
 - Developing documentation of all artefacts
 - Developing an archive of indigenous people
 - Strengthening the cultural museum
 - Sporting to implement Upper Mustang management plan

- **Activity 1.3:** Assist in the preparation of a phase-wise restoration and maintenance plans of important historical sites, cultural and religious monuments in monasteries such as Lo-Manthang Wall, Ghami Mhane Wall, Lo Ghekar Gompa of Upper Mustang, Muktinath Temple, Ma Ki La Khang, Narsang, Tiri, Chhairo, Rani (Tukche) and Lubra Bon Gompas of Lower Mustang, and others by:
 - Supporting restoration and maintenance of cultural heritage
 - Developing and regulating adoption of codes for buildings and other development activities around other sites to reflect the protection of local architecture, craftsmanship and harmony with local cultural landscape
 - Developing capacity of local institutions to better monitor and regulate the implementation of building codes, and protection and conservation guidelines
 - Promoting/adapting traditional systems of maintaining/managing heritage sites
 - Maintaining the integrity of cultural heritage

Objective 2: Use the Natural Environment Positively and Wisely

- **Activity 2.1:** Institutionalize community-based management of natural resources and environmental conservation by:
 - Increasing the capacity of local organizations to manage, use and monitor their natural resources based on the principles of equitable benefit sharing by all stakeholders
 - Protecting identified and potential biodiversity hotspots and environmentally sensitive areas such as Damodar Kunda, Ghami Lekh, Dhalung-Chhujung, (Ghansa area for bird watching, especially pheasant) and other areas from any form of activity that would lead to environmental degradation
- **Activity 2.2:** Promote biodiversity conservation of local, national and global significance, and enhance fair and equitable benefits by:
 - Working together with local stakeholders to implement a conservation management plan with key milestones, focusing on:
 - a comprehensive inventory of different ecological landscapes and their preservation
 - identify the status (use, threat categories such as endangered, threatened, extinct, endemic, vulnerable, data deficient, etc.) of flora and fauna species, and the conservation of selected species (snow leopard, musk deer, Brown bear, Tibetan Argali, Kiang, *Cordyceps sinensis*, *Fritillaria cirrhosa*, *Neopicrorhiza scrophulariiflora*, *Taxus baccata*, Morchella species, etc.)
 - identify options for improving economic utilization and domestication of NTFPs/MAPs, and other natural resources through value additions (processing etc.), and explore the feasibility of locally sustainable biodiversity prospecting options
 - Preserve traditional knowledge on biodiversity, traditional healing system, ethnomedicine and agrobiodiversity management

- Encourage biodiversity registration, recognize indigenous knowledge, record, create a database, regulate commercial collection and export, and monitor biodiversity
 - Ensure the implementation of CAMR and CAMD in the collection of natural resources
 - Undertake discussion with centre to resolve existing contradictions between Local Self-Governance Act, CAMR and CAMD on the use of natural resources
 - Help coordinate efforts to secure Intellectual Property Rights and Farmer Property Rights
 - Explore potentials of using abandoned farmland for domesticated cultivation of NTFPs/MAPs
 - Maintain and improve potential biological corridors
 - Develop mechanisms for trans-boundary cooperation on biodiversity conservation
 - Mitigation measures for possible habitat loss due to construction of roads
 - Preserve indigenous crop, fruit and animal genetic resources through gene pool conservation initiatives
 - Preserve fossils (eg. ammonite)
- **Activity 2.3:** Work together with local partners to develop guidelines for implementation and monitoring of district water security strategy to:
- Meet local needs of drinking water, irrigation and clean energy
 - Protect people and their assets from water related hazards
 - Fully adopt EIA guidelines by major hydro electricity projects
 - Acquire a fair share of local benefits from major hydro electricity projects
- **Activity 2.4:** Strengthen community-based sustainable management of forest resources, giving priority to:
- Sustainable harvesting of fire wood, timber, NTFPs and MAPs
 - Promote alternative fuels and devices
 - Develop degraded forest spots by involving local institutions
 - Control timber extraction for construction along new road alignment
 - Document practices of local institutions that conserve and regulate forest resources
 - Mitigation measures for soil erosion, landslide, flash flood and forest fire
- **Activity 2.5:** Improve the quality of rangelands, giving priority to:
- Improve traditional grazing practices by better understanding of livestock pressure on such land
 - Enhance productivity of rangelands based on an analysis of carrying capacity
 - Enhance grass and fodder seed/seedling support to farmers
 - Strengthen pasture management sub-committee

- **Activity 2.6:** Strengthen awareness and capacity of local organizations to keep Mustang free from all biological and non-biological forms of pollution of renewable natural resources such as water, soil, air, arising out of increased tourism, commercialization and construction boom
- **Activity 2.7:** Help to establish security and compensation mechanisms for loss of livestock and crops from wildlife depredation
 - Develop participatory monitoring mechanism to periodically assess such loss
 - Promote improved practices like the use of predator proof corrals
 - Introduce compensatory measures like livestock insurance
 - Strengthen veterinary services
 - Utilise Community Trust Fund that has been established in Upper Mustang for livestock insurance scheme
- **Activity 2.8:** Strengthen national and local capacity for developing and implementing a biodiversity monitoring system and production of regular monitoring reports on: (i) the status and distribution of vegetation, indicator species, flagship species, functional flora and other valuable species; (ii) role of alien and invasive species, including ways of eradication; (iii) conditions regarding access to genetic resources; (iv) impact of climate change on local flora and fauna; and (v) develop and maintain a comprehensive digital database of biodiversity resources

Objective 3: Improve Access to Livelihood Options for the Poor, Marginalized Groups, Aged, Women and Children

- **Activity 3.1:** Make Mustang "free from poverty and hunger" district focusing on:
 - implementing a food security programme and ensuring that stocks of basic food items are maintained for at least six months in vulnerable areas
 - developing a better distribution system in remote parts
 - undertaking "Food for Work" programmes so that people can get income and food
 - encouraging business and commercial enterprises to sponsor food distribution for disadvantaged groups
 - identifying groups vulnerable to impacts of various natural disasters and other types of vulnerability, in particular the poor, disabled, widow and children, and providing them with appropriate support
 - involving local partners to implement strategy for mitigating and monitoring impact of various natural disasters, food shortages, and other specific group related problems

- **Activity 3.2:** Improve Mustang's position in development indicators as set in MDGs focusing on:
 - Establishing district poverty monitoring and assessment system to monitor performance regarding achievement of MDGs, PRSP and the Three Year Interim Plan targets dealing with:
 - Reducing the percentage of population below one dollar a day
 - Reducing the percentage of population below the national poverty line
 - Reducing the percentage of population below minimum level of dietary energy consumption
 - Reducing the percentage of stunted children aged 6-59 months
 - Completing enrolment in schools of all primary school going age children
 - Improving percentage of children starting grade 1 and completing grade 5
 - Substantial improvement in literacy rate of ages 15-24
 - Improving the ratio of girls to boys in primary and secondary education
 - Improving the ratio of women to men at tertiary level of education
 - Improving ratio of literate men and women ages 15-24
 - Improving the share of women in wage employment
 - Increasing the proportion of seats held by women in district political bodies
 - Substantial reduction in infant mortality, under 5 mortality and maternal mortality rates
 - Increasing the percentage of immunized children
 - Improving the deliveries attended by health care providers
 - Expanding the use of contraceptives
 - Reducing the prevalence of HIV, malaria and tuberculosis
 - Increasing the area under forests and protection of area designated for maintaining biological diversity and unique landscapes
 - Improving access to safe drinking water, toilets and better sanitation
 - Improving access of villages and settlements to road head

- **Activity 3.3:** Encourage and promote gainful self-employment in natural resources, tourism and other potential sectors in the changed context of improved access and the opportunities created by it through:
 - Skill enhancements and training the youth from the poor and marginalized groups
 - Improved access of local people to financial and non-financial services as well as to natural resources, including forest, water resource and land
 - Creation of enabling environment for increased local investments and employment generation
 - Promotion of decentralized recruitment processes and procedures of both public and private offices, companies and enterprises giving priority to local people
 - Implementation of the provisions of equitable and fair labour policies and ensure

rights, entitlements, security and benefits to women workers and others from disadvantaged communities

Objective 4: Accelerate Growth in Productivity of Agriculture, Livestock and other related Economic Activities

- **Activity 4.1:** Promote the productivity of indigenous crops such as wheat, barley, buckwheat, potato and others, including livestock focusing on:
 - Improving productivity of traditional cereal and non-cereal crops
 - Introducing the use of appropriate threshers to reduce the drudgery of farm work burden of women
 - Encouraging the development of high value cereal, non-cereal crops and fruits, including livestock products that are environmentally sustainable
 - Promoting organic farming
 - Motivating domestication of medicinal and aromatic plants
 - Monitoring the overall impact of exotic varieties of crops and livestock breed

- **Activity 4.2:** Promote the development of credit and marketing services by:
 - Encouraging formation of groups and cooperatives for mobilizing and expanding credit and marketing services
 - Generating awareness of the benefits of marketing environmentally-safe products
 - Facilitating access to off-season markets for local produce
 - Promoting awareness of special products of Mustang

- **Activity 4.3:** Generate better awareness, skills, capacity and services for the development of environmentally sound high value organic agriculture and livestock products focusing on:
 - Organizing consultations of farmers and pastoralists, both women and men, to better understand the problems and opportunities in the development of agriculture and livestock sectors
 - Organizing farmer to farmer visits, including women farmers, to other similar environments experiencing high value crop production, new marketing linkages and institutional changes
 - Identifying improved agriculture and livestock related skill enhancement and awareness generating packages and mobilizing support for the implementation of training packages
 - Setting up reliable veterinary services
 - Establishing animal and plant quarantine check posts along the border
 - Encouraging markets to be locally and environmentally-friendly and diversify services provided in tourism, environment conservation, renewable energy resources and business development
 - Developing awareness campaigns (food festivals, value addition) to promote

local food culture and knowledge which is based on food produced in the local ecosystem

- Promoting local yak cheese, *pashmina* and market it as a special Mustang product
- **Activity 4.4:** Undertake scientific and participatory research in order to:
 - Identify and conserve globally important genetic resources of cereal crops (barley—*Hordeum vulgare* and oat—*Avena sativa*, horticultural crops (apple, walnut, cherry), livestock (*Lulu* cow and yak), and wild species, including *Allium*, seabuckthorn (*Hippophae tibetana*), *yarsagumba* and other important local products
 - Support the development of a participatory field gene bank
- **Activity 4.5:** Ensure that EIA/IEE are fully undertaken when establishing local enterprises or factories based on milk products (cheese), seabuckthorn (juice), apples (brandy), wild allium (*jimbu*) and other local resources in the protected environment

Objective 5: Promote Sustainable Tourism focusing on Mustang as a Unique Destination

- **Activity 5.1:** identify and develop alternative trekking routes offering similar or better choices, in terms of experiences and adventure, as a viable substitute to the current Annapurna Circuit Trek by:
 - Identifying viable alternative trekking routes of short (less than a week) and long (2-3 weeks) duration around the Annapurna massif
 - Identifying and developing viable alternative mountain biking routes
 - Encouraging development of trekking routes to avoid potential congestion problems
 - Using villages as the focal points to diversify tourist suitable for different groups (trekking, mountain biking, rafting, sports, pilgrimage, sacred site experience, meditation, high altitude wilderness, biodiversity hotspots, etc.)
- **Activity 5.2:** Encourage local private sector and community groups to invest in tourist facilities by:
 - Encouraging banks and financial institutions to support private and community groups to invest in marketing and promotion of new trekking routes, facilities and services
 - Enhancing local entrepreneurial skills and capacities in product packaging, marketing, promotion, networking and linking to national, regional and international travel and tour agencies
 - Controlling haphazard development of settlements and tourism facilities along the road and trekking routes, particularly in environmentally-sensitive forest and alpine areas focusing on:

- Acceptable standard for lodges, camping sites and other facilities
 - Identify and designate areas for tourism facilities—lodges, camping sites, tea shops, picnic spots, hot spring, recreation sites, etc.
 - Identify infrastructure requirements (trails, bridges, sign postings, pits, incinerators, information/visitor centres with modern information and communication system, safe drinking water and lavatory facilities, fuel depots, well equipped view towers, museums and recreation centres where appropriate, etc.)
 - Ensure health, safety and communication facilities
 - Set high environmental standards for other subsidiary tourism industries and make them socially responsible in compliance with social, cultural and environmental norms being promoted
- **Activity 5.3:** Improve communication and awareness about Mustang’s sustainable tourism products, opportunities and practices, nationally and even globally, focusing on information about:
 - Fee and levy, visitor safety and security, rules and regulations about treks and other activities, contact persons and organizations for special needs, biodiversity hotspots, weather forecasting and other important issues
 - Tourism products such as wildlife based activities mainly bird watching, butterfly and wildlife sighting (active and passive), nature based activities like flora, mountain and landscape viewing, geological and fossil park and heritage based activities (monastery, caves, festival and lifestyle), rock climbing, rafting, kayaking, paragliding, bungee jumping, mountain biking, filming (feature films, documentaries and music videos) and research/study etc. that are suitable for all types and age groups
 - New trekking routes/side treks to Tilicho Lake, Dolpo, Around Dhaulagiri, Marche Kharka and North Annapurna base camp; day hikes to Sherdhak, Thini Hill, Chhetrasum (Dhamang), Yak Kharka, Dhaulagiri icefall, Nupsang Kharka, Dhulu Danda, Kalo Badal, etc.
 - Current policies regarding waste management and fuel-sufficiency
 - Carrying capacity of the valley with regard to different types of tourism
 - Promoting various tourism product activities other than existing trekking and pilgrimage such as new tourism destinations so that local people are motivated to stay in the area
 - Permit system and other policy and rule changes
 - **Activity 5.4:** Monitor changes in the society, economy, environment and tourism as well as the impacts of tourism on different groups

Objective 6: Manage Growing Settlements in an Environmentally-friendly Manner

- **Activity 6.1:** Maintain urbanization and settlement growth in harmony with the prevailing social, environmental and cultural integrity concentrating on:
 - Developing building and housing codes to reduce adverse impacts on environment and local architectures
 - Specifying minimum facilities such as sewage, drainage, sewerage treatment, street lights, public space, car park, bus terminals, mechanical workshops, dumping sites, garbage waste collection and disposal systems etc. for settlements
 - Promoting land use zoning based on environmental, land suitability, cultural heritage, public facilities (car park, bus terminal, treatment plants, etc.) office blocks, markets and other considerations
 - Identifying settlements in especially high risk areas and encouraging adoption of appropriate safety measures
 - Developing a settlement plan for each settlement that has potential for rapid growth
 - Safeguarding corridors, open areas and hotspots important for biodiversity
- **Activity 6.2:** Develop regulations and monitoring mechanism to maintain highest environmental standards in cultural landscapes and implement in collaboration with DDC and CBOs focusing on:
 - Strengthening capacity of CAMCs, sub-CAMCs and other local bodies for the preservation of cultural landscapes
 - Helping them to develop sustainable standards and plausible regulations
 - Developing and implementing participatory monitoring mechanisms

Objective 7: Develop Basic Infrastructure and Services in an Environmentally-friendly Manner

- **Activity 7.1:** Integrate building and construction activities under the overall guidance of District Development Committee focusing on:
 - Integrating district infrastructure development strategy with Mustang Sustainable Development Plan
 - Putting in place a district monitoring system to ensure that adequate resources are allocated and utilized for meeting basic infrastructure requirements
 - Improving decentralization and effectiveness of public services and guaranteed community involvement in the delivery of different public services

- **Activity 7.2:** Complete the high standard environmentally-sound road giving due considerations to:
 - Improve physical accessibility of a maximum number of settlements by increasing connectivity with feeder roads and tracks
 - Develop and introduce vehicular standard and monitor pollution
 - Minimize adverse environmental impacts of road
 - Provide properly planned bus stops, resting place, toilets (for both males and females) and road side shops as required
 - Ensure road safety and security (use proper signs in symbols and local languages, set speed limit in ecologically and culturally-sensitive areas, under-road passes for wildlife, pedestrian path, special management during winter season, especially snowfall, etc.) for human, animal and wildlife
 - Develop programmes to generate awareness on all aspects of road

- **Activity 7.3:** Promote the development of hydro electricity resources in a socially desirable, economically viable and environmentally acceptable manner focusing on:
 - Mobilizing interested parties to prepare feasibility studies of most potential projects for generating hydro power
 - Facilitating negotiations with concerned parties for the implementation of investments for power generation
 - Encouraging hydro electricity for all uses—heating, cooking, lighting and industrial purposes
 - Providing local tax and other incentives to encourage the involvement of local people in hydro power generation
 - Ensuring implementation of EIA for all projects

- **Activity 7.4:** Provide incentives for the development of alternative energy sources and use of fuel-efficient technology focusing on:
 - Making Mustang self-sufficient in energy sources
 - Meeting energy requirements from clean energy sources
 - Promoting sustainable forest management systems and equitable sharing of benefits accruing to local communities
 - Emphasizing the development of green energy sources, particularly those based on local resources (bio-briquette, wind and solar)
 - Encouraging sustainable harvesting of fuel wood from the forest specified on rotation basis by ensuring no harm to forest and species that need protection
 - Promoting large scale collection of fuel wood by using pack animals to be controlled

- Establishing participatory monitoring system to reduce adverse impacts on forests due to increasing population and development
- **Activity 7.5:** Improve access to piped and safe drinking water and solid waste disposal system to the residents encouraging:
 - Community groups to mobilize support for increasing the coverage of piped drinking water to local population
 - Encouraging households to have proper sanitation and waste disposal facilities

Objective 8: Build Capacity of Local Organizations and Strengthen Partnerships with Community and Other Organizations

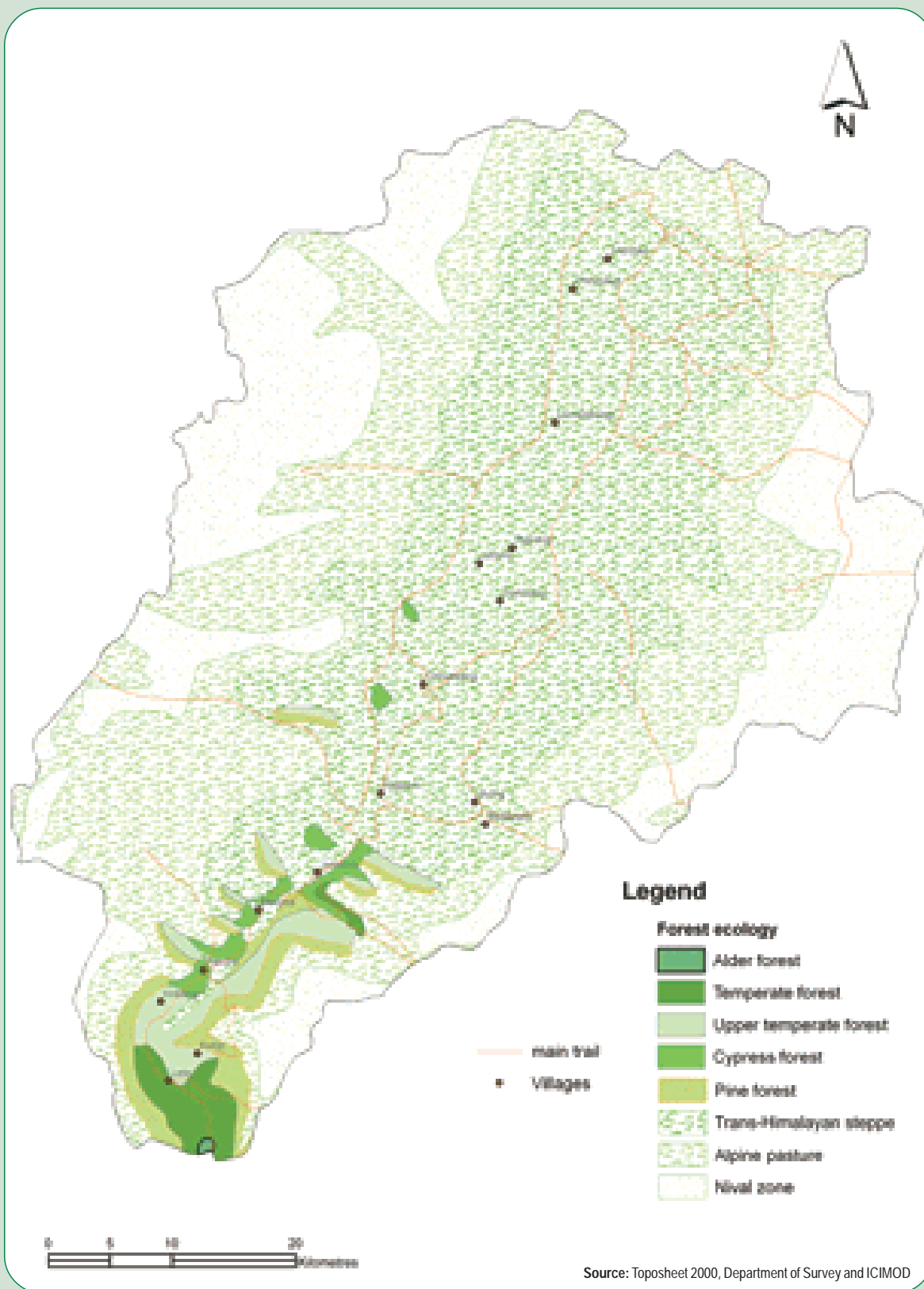
- **Activity 8.1:** Encourage group formation in all aspects of local level planning, implementation and monitoring of Sustainable Development Plan activities concentrating on:
 - Mobilizing and encouraging the participation of households in all settlements and villages to participate in groups for undertaking development activities
 - Organizing into specific area and/or activity groups for collective development action
 - Articulating own development priorities and those specified by MDGs and PRSP, including key environmental issues and formulating a consolidated integrated and viable local plan of activities
 - Mobilizing all available support locally, and from the district and other sources for the implementation of the local plan
 - Interacting with all the concerned local level government line agencies, NGOs and agreeing a framework for systematic implementation of the plan
 - Discussing and finalizing with specific private groups about their contribution to the plan
 - Identifying specific responsibility for implementation, monitoring and feedback on progress
 - Identifying and implementing with the support of other groups different awareness raising, training and capacity building activities at the local level
- **Activity 8.2:** Improve coordination and monitoring capacity at the Ward and Village Development Committee levels focusing on:
 - Integrating proposed activities from the groups in settlements and villages
 - Coordinating interaction for finalizing activities and support levels with the district government, line agencies and other organizations
 - Coordinating implementation and monitoring of progress
Organizing different training and awareness generation activities to generate technical skills and facilitate programme awareness, implementation and participation in the community

- **Activity 8.3:** Improve coordination, monitoring, evaluation and mobilization capacity in different organs of the district government, especially District Development Committee, focusing on:
 - Reviewing demands from local units, prioritizing these based on local needs and national development goals and priorities and providing adequate resources to implement the activities
 - Integrating plans and programmes from different organizations to avoid duplication and strengthen support for local and national priorities, especially on MDGs, PRSP and environmental issues
 - Monitoring overall progress on the implementation of priorities and providing feedbacks at local and national levels
 - Undertaking capacity building activities for the overall improvement of district and lower level capability for organizing and undertaking sustainable development activities
 - Mobilizing resources from all potential sources for sustainable development

- **Activity 8.4:** Integrate NGO and other organizations to support sustainable district development plan focusing on:
 - Working together with the district government and other organizations to increase the capability of household groups, community-based organizations and others to improve planning, implementation and monitoring of sustainable development activities
 - Helping district government and community organizations to design innovative programmes and activities for sustainable development bringing successful experiences and knowledge from other areas
 - Mobilizing resources, skills and identifying technologies appropriate to sustainable development
 - Undertaking advocacy for mainstreaming those excluded from development and monitoring the implementation of the changes in the poor participating and benefiting from development

- **Activity 8.5:** Integrate private sector in sustainable development focusing on:
 - Increasing investments in the district for sustainable development
 - Working together with local government and community groups in promoting tourism and other economic opportunities in the district
 - Helping the poor, marginalized and the disadvantaged sections of the society

Map 6: Map of forest ecology of Mustang district



IMPLEMENTATION STRATEGY AND THE ROLE OF ACAP

Sustainable development is a holistic approach to development and environmental conservation with different agencies involved in the promotion of various components. There are different government and non-governmental organizations, civil societies and other stakeholders in the district. All need to be involved in an integrated and coordinated way in both planning and implementation of the activities.

7.1 Role of Different Agencies

(i) Community-based organizations and household user groups in settlements and villages

As development has become more decentralized and participatory, community-based organizations and household user groups in different settlements and villages, including towns and market centres, are becoming increasingly important for the decisions (planning and implementation) regarding local development activities. While the experience so far has been encouraging, especially where such organizations have been actively promoted, in bulk of the areas of the country, they are either completely absent or perform quite unsatisfactorily. However, the NTNC has been promoting community-based approach in the ACA from the very beginning. The approach has been acknowledged by the global conservation community.

In the case of Mustang district, efforts have been made to promote local organizations at this level. In future, a great deal of strengthening is needed to improve the capacity of many different types of local organizations. If the fulfillment of the MDGs are to be seriously pursued, active participation and mobilization of households and community based institutions will be critical. Their role will be to systematically identify the MDG gaps in their respective areas and groups—focusing on the most needy and distressed households. These individual requirements should be consolidated and submitted for support to the VDC and district level governments and through them to other line agencies and special projects. In the past mobilization across the district at this scale has been seen only in political events or in the vaccination of children. Similar effort is needed to enhance the ownership and implementation of the household and community related components of the Sustainable Development Plan of Mustang.

(ii) Ward and VDC governments

The main role at this level is to strengthen, coordinate and consolidate local level needs, demands and requirements. Additional responsibility may also be to identify and help implement critical social and physical infrastructure that may be needed at

the local level. Many of the functions at this level have been identified in Local Self-Governance Act. What is now needed is their more rigorous implementation. This level of the government should be a major voice for advocating local needs of their residents and gaining support from different organizations at higher levels. Facilitating implementation of local projects is also an important responsibility at this level, including monitoring of impacts and the pace of implementation of projects.

(iii) District level government, including line agencies

Given the fact that significant components of the Sustainable Development Plan are part of the regular responsibilities of the district government and the different sectoral line agencies, there is a major role for the district government and district line agencies. From articulation of the specific district sectoral strategies to the design, funding and implementation of specific projects, all organs of the district government must play a critical role in the successful implementation of the Plan. In this context, mobilization of different partners from the community, NGOs, private sectors and other agencies will also be important as the district government has only limited resources and the capacity for the implementation of this comprehensive Plan.

In order to facilitate better understanding, awareness and commitment of different agencies to the Plan, the district government along with NTNC should organize broad-based consultations and agreement on the specifics of the Plan as it provides adequate scope for local fine-tuning.

(iv) District NGOs and private sectors

These group of organizations can become important players in the district development in future if they are given the opportunity. In the past also, some of these such as Mustang Development Service Association, Panchgaon, Baragaon or Thakali Societies have played important roles with their strong links to relatively big business houses in Kathmandu. In the local tourism business, local private sector will continue to play an important role. There is a need to diversify the involvement of NGOs and private sector into other development activities as well.

(v) Conservation Area Management Committee (CAMC)

The ACAP covers 55 VDCs in five districts, including Mustang. Each VDC has a political body elected by people. In order to address conservation issues, each VDC has a Conservation Area Management Committee (CAMC), which has been formed according to the Conservation Area Management Regulations. Within this committee, there are many other sub-committees or institutions such as tourism management committee, forest management committee, women development committee, etc. Each CAMC consists of 15 members in which VDC chairperson has been designated as ex-officio member, nine members are nominated by people from nine wards, and three members are represented from special groups—women, *Dalits* and social workers, and the remaining two are elected to complement the works of the chairperson and secretary.

The Conservation Area Management Regulations (1996) guide the formation of these local institutions and their functions.

(vi) Annapurna Conservation Area Project and National Trust for Nature Conservation

The NTNC has established ACAP Headquarters in Pokhara and seven field offices in different locations—Ghandruk, Lwang, Sikles, Bhujung, Manang, Jomsom and Lo-Manthang (*Map 1*). Location of these field offices also reflect the management zone concept formulated in 1986. Under this concept, different areas were demarcated depending upon their management needs and potentialities. One of the field offices is in Mustang district. Major focus has been tourism management, biodiversity conservation and cultural heritage conservation. As the construction of road network is expected to bring about many changes, a new approach needs to be adopted for the conservation and development that meets people’s expectations to improve livelihoods and at the same time conserve natural resources and cultural heritage.

NTNC/ACAP, at present, is an agency more specialized in natural resource conservation and environment protection. In order to analyze what could be its role in implementing SDP, a matrix of different activities under ‘sustainable development’ are placed in different boxes formed by two coordinates—importance in sustainable development and ACAP’s influence. This matrix is shown below:

The areas considered important for NTNC/ACAP and in which NTNC/ACAP has more influence, expertise and relevance are given in the box below. These areas should be the priority for NTNC/ACAP in terms of its full time involvement. Other areas are also equally important to bring about sustainable development. NTNC/ACAP’s role in this regard is to influence these offices to implement the sustainable development

Importance of different sectors and the role of NTNC/ACAP is highlighted below:

Table 7.1: Importance	
High	Low
<p>ACAP as a lead agency ACAP is directly involved in execution and covers areas such as forestry, biodiversity, NTFPs, biodiversity monitoring, building local capacities in environmental mainstreaming, tourism, cultural heritage, etc.</p>	<p>ACAP as a facilitating agency ACAP provides expert inputs but no resources for activities. These may cover sectors such as agriculture, horticulture, enterprise development, poverty analysis, etc.</p>
<p>ACAP as a partner agency ACAP provides resources but does not work as a direct implementer and covers areas such as community development activities, agriculture, horticulture, health, education, etc.</p>	<p>ACAP as an influencing agency ACAP provides little inputs in these sectors but will maintain high strategic interests such as road development, settlement planning, pollution control, industrial development, etc.</p>

Based on the above matrix, the role of NTNC/ACAP can be summarized as:

- ACAP as a 'lead agency' (high involvement and high importance—directly involved in execution; eg. biodiversity conservation)
- ACAP as a 'partner agency' (high importance but low involvement—provides matching funds but does not work as a direct implementer; eg. community development)
- ACAP as a 'facilitating agency' (low importance and high involvement—provides expert inputs but little or no funds for activities; eg. agriculture, horticulture, livelihood analysis)
- ACAP as an 'influencing agency' (low involvement and low importance—provides little inputs but maintains a high strategic interest; eg. pollution and settlement issues)

policies outlined above. For this to happen, NTNC/ACAP, in essence, should help in mainstreaming environmental concerns in the planning process, monitor its activities, evaluate impacts and provide feedback of its findings to the line agencies. It should also help in developing the capacity of these line agencies in integrating environmental conservation values in the planning process so that in future they can carry out this task for themselves. Research to generate knowledge of the environmental status and standards required for the district will also rest on NTNC/ACAP.

The sustainable goals, objectives and activities identified in Chapter 6 are guidelines for the policies and programmes of DDC/local government and NTNC—the principal implementing agency of the Plan. It is expected that these guidelines are to guide the policy, programme and budget formulation each year in DDC, in various governmental offices, NGOs and civil society. The lessons learned and the analysis of successful and failure cases, will also inform the formal policy making at the higher levels. A mechanism to inform the lessons learned from micro to macro levels need to be prepared so that local knowledge and experiences are also taken into account. Public auditing of the Plan, budget and its expenditure will also increase its transparency. Local agencies should have the capacity to plan, monitor and evaluate the activities. There will be a formal process to take the lessons of these agencies at higher levels.

The NTNC will work at the national and international levels to mobilize full support for the implementation of the Plan. Without a strong support from the national and international levels, the Plan is unlikely to make much progress. Already local resource constraints are quite severe for organizing new activities. The Plan's proposed activities are new and comprehensive requiring significant mobilization of financial resources.

The NTNC must play an influential role to bring together different national and international organizations and convince them of the importance of this Plan. In the past, there have been excellent piecemeal activities and time has now come to move beyond just a few isolated projects towards the implementation of the Sustainable Development Plan for Mustang district.

7.2 Coordination of District Level Planning and Monitoring

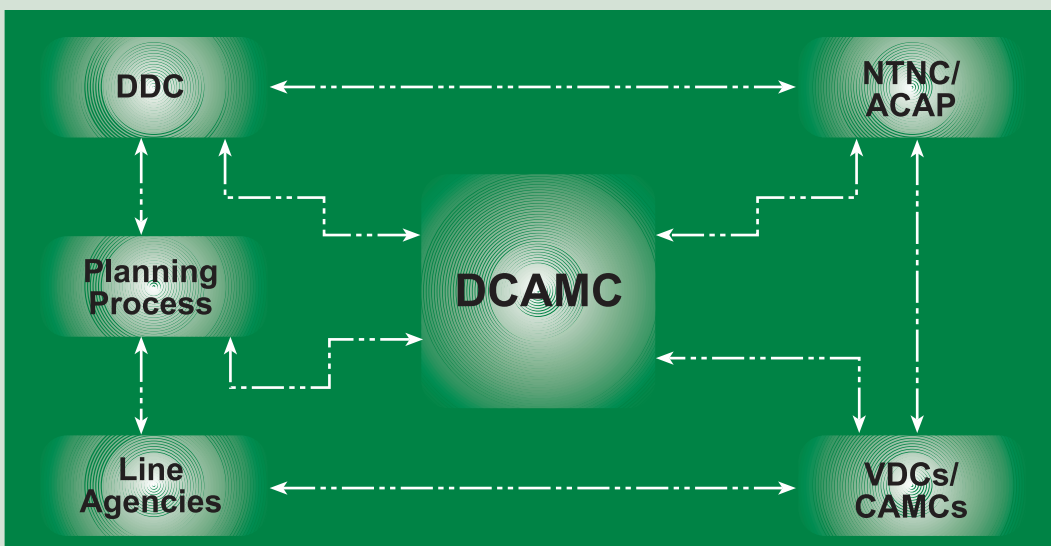
A district level District Conservation Area Management Committee (DCAMC) will be formed (Bajracharya 2004). This Committee, of which NTNC/ACAP can be the secretariat, will coordinate the activities of all related agencies and play an active role in streamlining these activities for sustainable development. As the planning process in the district does not take into account the environmental concerns, this Committee will take into account monitoring and evaluation of the achievements against the targets and reformulate targets according to achievements and constraints faced. The NTNC/ACAP's grassroots institutions can be mobilized so that they work in close coordination with other local institutions.

The following chart shows how coordination mechanism can be achieved. The DDC in Mustang has its own planning process under which VDC and *Ilaka* will make plans which will be sent to DDC. The DDC and line agencies will revise the plans for submission to the DCAMC. A new stratus will be added which will look after the Plan and review the environmental concerns.

The DCAMC will also examine the sustainable development goal, objectives and activities and distribute them to related stakeholders for implementation. The NTNC will monitor and submit the report to the DDC through DCAMC recommending the DDC to formulate necessary regulations and policies for the district.

7.3 Regulating Development in Mustang

The DCAMC needs legal authority in order to influence decision-making processes in the district and facilitate implementation of sustainable development policies by amending the existing Conservation Area Management Regulations. Similarly, the



planning process that has to consider environmental and biodiversity concerns need be made mandatory through legal provisions so that proper process is followed in effectively implementing development interventions in Mustang.

7.4 Role of the State and International Agencies

Mustang is a district located in the trans-Himalayan region, which is known for its rich biodiversity of global importance and cultural uniqueness. This region is directly affected by global changes, including climate change. It is here where the impact of climate change can be easily noticed. Even though it seems that climate change might have brought about a few positive impacts, it is revealed that people are also affected adversely. There is scarcity of fresh water and rising cases of diseases and pests in crops. These people, who still do not have access to road networks and are living in simple environment without destroying the natural resources and wildlife, have the right to development and to enjoy the fruits of modernization. Therefore, it is the responsibility of the global community to transfer resources to such areas where people are conserving the resources and biodiversity despite problems in their development. The State should also give more resources to the district for various benefits this district provides to the downstream villages and people.



BUDGET AND MONITORING PLANS

8.1. Budget Plan

Current pattern of expenditure

The total government expenditure in 2006/07 in Mustang district was about Rs. 51.15 million (*Table 8.1*). About 21% has been allocated to improve the natural environment and additional 21% has been earmarked to protect the identity of Mustang, which should be achieved within five years. This budget does not cover the administrative cost (including human resources). If the funds for road construction come from the government, the total budget for the implementation of various socio-economic, environmental and cultural programmes would be Rs. 228 million for the first five years, which includes livelihood options for the poor, improving productivity of economic sectors such as agriculture and livestock, development of basic infrastructure and capacity building of local organizations. It is assumed that the present administrative structure of NTNC/ACAP will implement these programmes.

It should be noted that practically no resource has been allocated to cultural preservation and even for tourism from the government side—at least the present budgetary heads do not show this very clearly. Similarly, support for developing settlements is also absent. Bulk of the government support (20%) has been allocated to build the capacity of local organizations and strengthen partnerships with community and other organizations. This is followed by another 14% of the total support allocated for developing basic infrastructure and services in an environmentally-friendly manner. On account of the lack of information, it is not possible to provide further breakdown of the government expenditure.

Other important source of resource for the district is the Annapurna Conservation Area Project of the National Trust for Nature Conservation. The estimated total NTNC/ACAP expenditure in the district for 2006/07 was about Rs. 123 million. This includes some important expenditure components made in previous years but not included in 2006/07. This has been spread over more areas than the government resources. About 19% has been provided to protect the identity of Mustang which is followed by another 13% allocated to use the natural environment positively and wisely. Clearly, government and NTNC/ACAP expenditure is quite complimentary with NTNC/ACAP strong on the conservation front and the government strong on infrastructure and capacity building. Improving access to livelihood option receives the largest percentage (20%) followed by developing basic infrastructure and services. The relatively larger share of government expenditure in non-environmental areas is quite evident from the combined account.

Proposed Plan Outlay

The prevailing political instability makes it very difficult to discuss about the availability of resources and planning. Changing political situation can drastically alter priorities even in the short run. Furthermore, there are many discussions about political and administrative changes which can influence many aspects of district planning. However, for the present there is no basis to predict how things will move and the best option is to continue to use the past as guidelines for future. Under the circumstances of high uncertainty, a conservative estimate of a ten percent increase in the current level of support has been used for the resources coming from the government and NTNC/ACAP. There will be additional resources coming from private sectors and from local sources but this has not been taken into consideration. Even assuming certain percentage of the total is quite difficult at present.

Annual resources for the first year of the Plan from the government and NTNC is about Rs. 415 million and this increases in the fifth year to Rs. 559 million, which is about 50% increase from the base year proposal. This appears to be quite realistic given the uncertainties of the present. The total Plan outlay for the five years is about Rs. 228 million (*Table 8.1*). Twenty one percent goes to improving livelihoods on account of the high priority given to it. Next priority goes to developing basic infrastructure which receives about 20% of the support. The central government should give high priority to complete the present road. This Plan has not taken road construction into consideration.

As indicated earlier, the political situation in Nepal increases the uncertainties for the Plan. There are local uncertainties on account of changing local political priorities and conditions introduced not only by road but also bigger opportunities for major hydro electricity projects which could pump in significant level of resources into the local economy. There are national level uncertainties in terms of resources, development priorities and political stability. There are uncertainties of support from international level for environmental conservation and sustainable development planning because of the unfolding political scenario of Nepal—which in the current context appears to be addressing mostly immediate pressures and priorities. The NTNC has a major role in working together at the local, national and even in international levels with different partners in order to promote the sustainable goals and Plan for the people of Mustang. It must ensure that adequate resources are forthcoming and the Plan implementation process is smooth and effective in reaching its goals.

Table 8.1: Government and NTNC Budget (Rs.) for Mustang's Sustainable Development Plan

Activities	Government	Gov.	NTNC	NTNC	Total	Total	For five years					Total (%)	
							Year 1	Year 2	Year 3	Year 4	Year 5		Total
OBJECTIVES													
A. Protect the Identity of Mustang			(%)			(%)							
1. Encourage traditional institutions	-	0%	19,500,000	16%	19,500,000	16%	5,000,000	6,050,000	6,655,000	7,320,500	30,525,500	1%	
2. Prepare a complete inventory	-	0%	1,500,000	1%	1,500,000	1%	1,500,000	1,815,000	1,996,500	2,196,150	9,157,650	0%	
3. Prepare a phase wise repair maintenance plan	2,500,000	2%	2,500,000	2%	5,000,000	4%	25,000,000	27,500,000	33,275,000	36,602,500	152,627,500	7%	
Sub-total	2,500,000	2%	23,500,000	19%	26,000,000	21%	31,500,000	34,650,000	41,926,500	46,119,150	192,310,650	8.41%	
B. Use the Natural Environment Positively and Wisely													
1. Institutionalize community based management	500,000	0%	7,500,000	6%	8,000,000	6%	3,000,000	3,630,000	3,993,000	4,392,300	18,315,300	1%	
2. Promote and enhance biodiversity conservation	-	0%	3,500,000	3%	3,500,000	3%	4,500,000	4,950,000	5,445,000	6,588,450	27,472,950	1%	
3. Develop guidelines for implementation and monitoring of district water security strategy	-	0%	-	0%	-	0%	2,500,000	2,750,000	3,025,000	3,660,250	15,262,750	1%	
4. Strengthen community based sustainable management of available forest resources, giving priority to degraded forest areas	-	0%	500,000	0%	500,000	0%	3,500,000	3,850,000	4,235,000	5,124,350	21,367,850	1%	
5. Improve the quality of rangelands	-	0%	1,500,000	1%	1,500,000	1%	3,500,000	3,850,000	4,235,000	5,124,350	21,367,850	1%	
6. Strengthen capacity of local organizations to keep Mustang free from all forms of pollution	530,000	0%	1,500,000	1%	2,030,000	2%	20,000,000	22,000,000	24,200,000	29,282,000	122,102,000	5%	
7. Establish security and compensation mechanisms for wildlife degradation	-	0%	500,000	0%	500,000	0%	7,500,000	8,250,000	9,075,000	10,980,750	45,788,250	2%	
8. Strengthen local capacity for developing and implementing a biodiversity monitoring system	-	0%	1,000,000	1%	1,000,000	1%	3,000,000	3,300,000	3,630,000	4,392,300	18,315,300	1%	
Sub-total	1,030,000	1%	16,000,000	13%	17,030,000	14%	47,500,000	52,250,000	57,475,000	69,544,750	289,992,250	12.68%	
C. Improve Access to Livelihood Options for the Poor, Marginalized Groups, Aged, Women and Children													
1. Make Mustang "free from poverty and hunger" district	6,600,000	5%	1,000,000	1%	7,600,000	6%	17,500,000	19,250,000	21,175,000	23,292,500	25,621,750	106,839,250	5%
2. Improve Mustang's position in development indicators as set in MDGs	3,600,000	3%	1,500,000	1%	5,100,000	4%	25,000,000	27,500,000	30,250,000	33,275,000	36,602,500	152,627,500	7%
3. Encourage and promote gainful self-employment in natural resources, tourism and other potential sectors	1,000,000	1%	500,000	0%	1,500,000	1%	35,000,000	38,500,000	42,350,000	46,585,000	51,243,500	213,678,500	9%
Sub-total	11,200,000	9%	3,000,000	2%	14,200,000	12%	77,500,000	85,250,000	93,775,000	103,152,500	113,467,750	473,145,250	20.68%

Table 8.1: (continued)

Activities	Government	Gov.	NTNC	NTNC	Total	For five years					Total	Total (%)
						Year 1	Year 2	Year 3	Year 4	Year 5		
D. Accelerate Growth in Productivity of Agriculture, Livestock and other related Economic Activities												
1. Promote productivity of crops such as barley, buckwheat and potatoes and livestock without increasing the work burden on women	3,000,000	2%	250,000	0%	3,250,000	3,500,000	3,850,000	4,235,000	4,658,500	5,124,350	21,367,850	1%
2. Promote the development of credit and marketing services	2,345,000	2%	350,000	0%	2,695,000	8,500,000	9,350,000	10,285,000	11,313,500	12,444,850	51,893,350	2%
3. Generate better awareness, skills, capacity and services for the development of environmentally sound high value organic agriculture and livestock products	5,000,000	4%	350,000	0%	5,350,000	10,000,000	11,000,000	12,100,000	13,310,000	14,641,000	61,051,000	3%
4. Undertake scientific and participatory research to identify and conserve globally important genetic resources of cereal crops	-	0%	-	0%	-	6,500,000	7,150,000	7,865,000	8,651,500	9,516,650	39,683,150	2%
5. Conduct EIA/IEE and establish local enterprises or factories based on milk products	-	0%	-	0%	-	15,000,000	16,500,000	18,150,000	19,965,000	21,961,500	91,576,500	4%
Sub-total	10,345,000	8%	950,000	1%	11,295,000	43,500,000	47,850,000	52,635,000	57,898,500	63,688,350	265,571,850	11.61%
E. Promote Sustainable Tourism Focusing on Mustang as a Unique Destination												
1. Identify and develop alternative trekking routes offering similar or better choices	-	0%	750,000	1%	750,000	35,000,000	38,500,000	42,350,000	46,585,000	51,243,500	213,678,500	9%
2. Encourage local - private sector and community groups to invest in tourist facilities	-	0%	250,000	0%	250,000	13,000,000	14,300,000	15,730,000	17,303,000	19,033,300	79,366,300	3%
3. Improve capacity for communications and information dissemination	-	0%	500,000	0%	500,000	15,000,000	16,500,000	18,150,000	19,965,000	21,961,500	91,576,500	4%
Sub-total	-	0%	1,500,000	1%	1,500,000	63,000,000	69,300,000	76,230,000	83,853,000	92,238,300	384,621,300	16.81%
F. Manage Growing Settlements in an Environmentally-friendly Manner												
1. Maintain the urbanization and settlement growth in harmony with local social, environmental and cultural integrity	5,000,000	4%	-	0%	5,000,000	30,000,000	33,000,000	36,300,000	39,930,000	43,923,000	183,153,000	8%
2. Develop regulations and monitoring mechanism to maintain highest environmental standards in cultural landscapes	-	0%	-	0%	-	3,500,000	3,850,000	4,235,000	4,658,500	5,124,350	21,367,850	1%
Sub-total	5,000,000	4%	-	0%	5,000,000	33,500,000	36,850,000	40,535,000	44,588,500	49,047,350	204,520,850	8.94%

Table 8.1: (continued)

Activities	For five years										Total (%)	
	Government	Gov.	NTNC	NTNC	Total	Year 1	Year 2	Year 3	Year 4	Year 5		Total
G. Develop Basic Infrastructure and Services in an Environmentally friendly Manner												
1. Integrate building and construction activities under the overall guidance of District Development Committee	4,600,000	4%	0%	0%	4,600,000	1,500,000	1,650,000	1,815,000	1,996,500	2,196,150	9,157,650	0%
2. Complete the high standard environmentally sound road in the district	5,000,000	4%	0%	0%	5,000,000	-	-	-	-	-	-	0%
3. Promote the development of hydro electric resources in the district in a socially desirable, economically viable and environmentally acceptable manner	1,600,000	1%	0%	500,000	2,100,000	65,000,000	71,500,000	78,650,000	86,515,000	95,166,500	396,831,500	17%
4. Provide incentives for development of alternative energy sources and use of fuel efficient technologies	1,200,000	1%	3%	4,000,000	5,200,000	20,000,000	1,000,000	1,100,000	1,210,000	1,331,000	24,641,000	1%
5. Improve access to piped drinking water and solid waste disposal system to the residents in the district	4,500,000	4%	0%	500,000	5,000,000	15,000,000	1,000,000	1,100,000	1,210,000	1,331,000	19,641,000	1%
Sub-total	16,900,000	14%	4%	5,000,000	21,900,000	101,500,000	75,150,000	82,665,000	90,931,500	100,024,650	450,271,150	19.68%
H. Build Capacity of Local Organizations and Strengthen Partnerships with Community and other Organizations												
1. Encourage group formation in all aspects of local level planning, implementation and monitoring of Sustainable Development Plan activities	7,500,000	6%	1%	750,000	8,250,000	2,000,000	2,200,000	2,420,000	2,662,000	2,928,200	3,221,020	0%
2. Improve coordinating and monitoring capacity at the Ward and Village Development Committee levels	17,500,000	14%	0%	200,000	17,700,000	3,500,000	3,850,000	4,235,000	4,658,500	5,124,350	5,636,785	0%
3. Improve coordination, monitoring, evaluation and mobilization capacity in the different organs of the district government, especially District Development Committee	-	0%	0%	250,000	250,000	1,000,000	1,100,000	1,210,000	1,331,000	1,464,100	1,610,510	0%
4. Integrate NGO and other organizations to support sustainable district development plan	-	0%	0%	-	-	2,000,000	2,200,000	2,420,000	2,662,000	2,928,200	3,221,020	0%
5. Integrate private sector in sustainable development of the district	-	0%	0%	-	-	8,500,000	9,350,000	10,285,000	11,313,500	12,444,850	13,689,335	1%
Sub-total	25,000,000	20%	1%	1,200,000	26,200,000	17,000,000	18,700,000	20,570,000	22,627,000	24,889,700	27,378,670	1.20%
Grand Total	71,975,000	58%	42%	51,150,000	123,125,000	415,000,000	420,000,000	462,000,000	508,200,000	559,020,000	2,287,811,970	100%

Fig. 8.1: Government of Nepal vs NTNC budget allocation

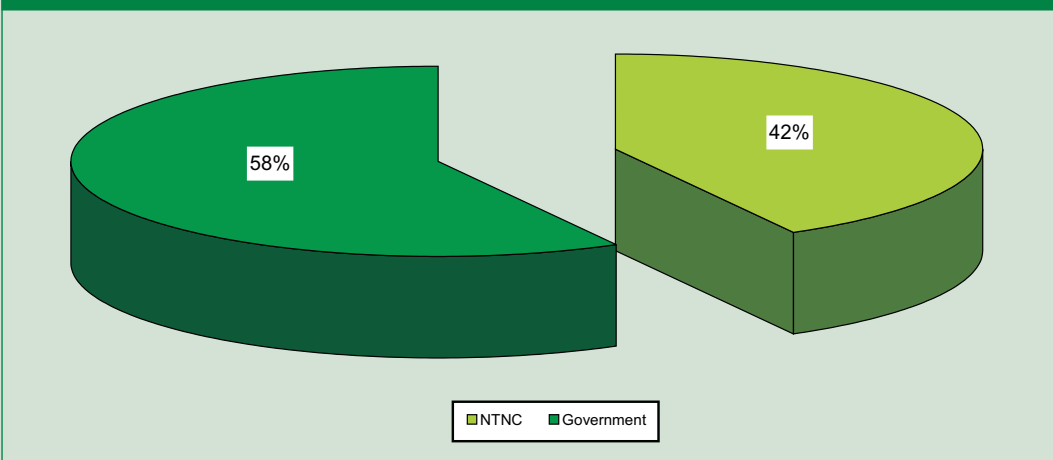


Fig. 8.2: Base year budget allocation

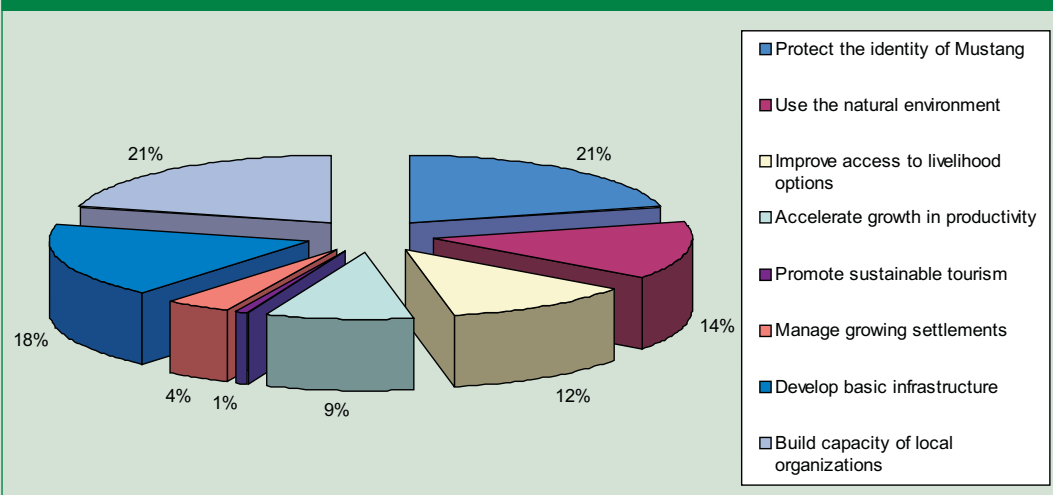
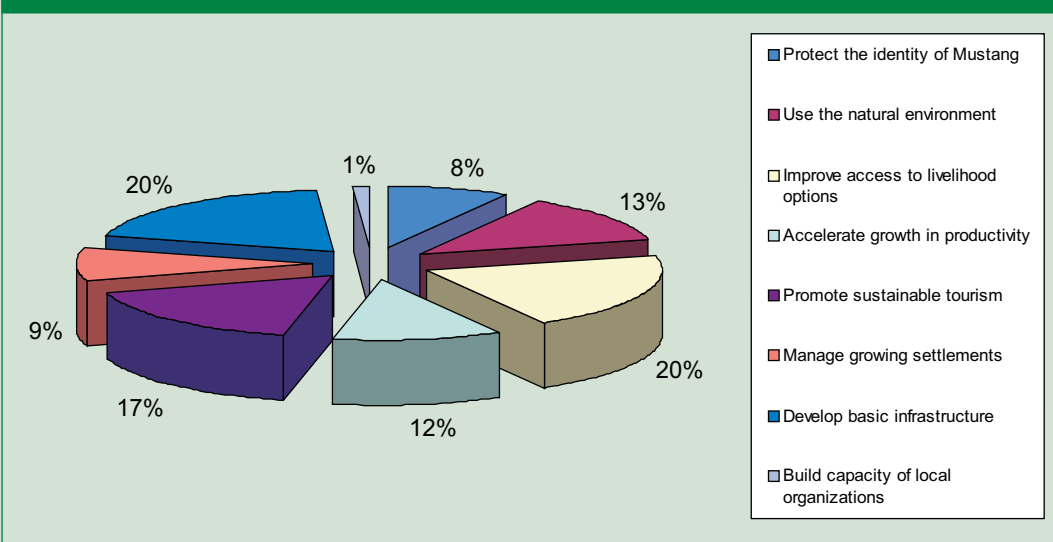


Fig. 8.3: Budget distribution by Plan Objectives



8.2. Monitoring Plan

Monitoring is very critical to fulfil the goal and objectives of the Sustainable Development Plan of Mustang district. By keeping close track of the progress in the implementation of the proposed activities and their impacts, it is possible to determine the nature of changes in the livelihood of people, their access to resources, opportunities, overall improvement in the quality and quantity of services available and the conditions of the environment. Monitoring on a regular basis helps policy makers and others to better address the priorities by identifying the existing gaps. At the level of a district like Mustang, monitoring activities are quite limited at present and much of it is focused on sectoral targets and budget transactions with very little focus on the conditions of the people and the environment. While the former is important as part of the process monitoring efforts, there must be greater emphasis on the latter also in the new monitoring systems, if the goals of sustainable development are to be fulfilled.

The eight different objectives along with the resources and the institutional set up proposed for implementation must be seen as a minimum benchmark for improving the quality of life and the environment in Mustang. It is important that these are not compromised and monitoring should be used as a powerful instrument to keep the plan on its track. Monitoring is a joint responsibility of all the organizations active in the implementation of the Plan. Under the institutional set up for implementation, different types of monitoring roles have been identified. Even in the Plan, there are proposals for base line assessments, inventories, research and improvement in the capacity of local organizations for better monitoring and evaluation. The Monitoring Plan given in Table 8.2 identifies some of the major activities under each of the Plan objectives and broadly points out the nature of monitoring.

8.3 Preconditions for Successful Implementation of the Plan

(i) Commitment at the national level

The National Planning Commission, concerned ministries, central government organizations and NTNC are important organizations at the national level for the successful implementation of the Plan. The proposed activities need to be integrated with different national programmes. Adequate support needs to be provided for the proposed Plan activities. Clear indication of strong national support of the Plan will also facilitate donor support for the Plan.

Commitment at the district and local levels

While local resource mobilization will be important, extensive institutional mobilization at different levels as discussed earlier will be more critical for the successful implementation of the Plan.

Table 8.2: Monitoring Plan of Mustang’s Sustainable Development Plan

MONITORING PLAN FOR FIVE YEARS	INDICATORS
OBJECTIVE 1: PROTECT AND PROMOTE THE IDENTITY OF MUSTANG	
Activity 1.1: Support religious, cultural and community institutions	Number supported and amount provided
Activity 1.2: Support local cultural and religious bodies	Number supported and amount provided
Activity 1.3: Phase-wise restoration and maintenance plans of important historical sites, cultural and religious monuments	Plans prepared and number supported
OBJECTIVE 2: USE THE NATURAL ENVIRONMENT POSITIVELY AND WISELY	
Activity 2.1: Institutionalize community-based management of natural resources	Number of communities with resources handed over
Activity 2.2: Promote biodiversity conservation and enhance fair and equitable benefits	Number of programmes initiated in different sub-activities such as inventory, status identification, local knowledge, biodiversity registration, etc.
Activity 2.3: Develop guidelines for implementation and monitoring of district water security strategy	Guidelines prepared on a participatory basis
Activity 2.4: Strengthen community-based sustainable management of forest	Number supported
Activity 2.5: Improve the quality of rangelands	Area of rangeland improved and type of improvement
Activity 2.6: Strengthen awareness and capacity of local organizations to keep Mustang free from all biological and non-biological forms of pollution	Number of capacity improvement activities
Activity 2.7: Help to establish security and compensation mechanisms	System in operation and amount of compensation
Activity 2.8: Strengthen national and local capacity for developing and implementing a biodiversity monitoring system	System in operation with progress reports on different components
OBJECTIVE 3: IMPROVE ACCESS TO LIVELIHOOD OPTIONS	
Activity 3.1: Implement food security programme	Develop food security strategy and implementation of programme
Activity 3.2: Improve Mustang’s position in development indicators as set in MDGs	Continue progress reports on different indicators
Activity 3.3: Encourage and promote gainful self-employment	Number of programmes undertaken and number of people benefited
OBJECTIVE 4: ACCELERATE GROWTH IN PRODUCTIVITY OF DIFFERENT SECTORS	
Activity 4.1: Promote productivity of crops	Number of different crop related programmes, progress reports on changes in productivity
Activity 4.2: Promote the development of credit and marketing services	Number of programmes undertaken
Activity 4.3: Generate better awareness, skills, capacity and services in high value crops	Number of programmes undertaken

Table 8.2: Monitoring Plan of Mustang (continued)

MONITORING PLAN FOR FIVE YEARS		INDICATORS
Activity 4.4:	Undertake scientific and participatory research	Number of programmes undertaken & progress reports
Activity 4.5:	Ensure that EIA/IEE are fully undertaken	Number of EIA/IEE undertaken and made public with monitoring reports on compliance
OBJECTIVE 5: PROMOTE SUSTAINABLE TOURISM FOCUSING ON MUSTANG AS A UNIQUE DESTINATION		
Activity 5.1:	Identify and develop alternative trekking routes	Alternative routes made public and promoted
Activity 5.2:	Encourage local—private sector and community groups to invest	Investments coming from private & community groups
Activity 5.3:	Improve communication and awareness	Number of promotional programmes undertaken
Activity 5.4:	Monitor changes in the society, economy, environment and tourism	Sectoral reports prepared on changes
OBJECTIVE 6: MANAGE GROWING SETTLEMENTS IN AN ENVIRONMENTALLY-FRIENDLY MANNER		
Activity 6.1:	Maintain urbanization and settlement growth in harmony with the prevailing social, environmental and cultural integrity	Implementation of building codes, land use zoning, settlement plans, protection of biodiversity and cultural hotspots
Activity 6.2:	Develop regulations and monitoring mechanism	Plans produced and implemented
OBJECTIVE 7: DEVELOP BASIC INFRASTRUCTURE AND SERVICES IN AN ENVIRONMENTALLY-FRIENDLY MANNER		
Activity 7.1:	Integrate building and construction activities	Meeting and coordination with different district line agencies about Plan activities
Activity 7.2:	Complete the high standard environmentally-sound road	Inauguration of road and report on daily traffic
Activity 7.3:	Promote the development of hydro electricity resources	Number of projects undertaken
Activity 7.4:	Provide incentives for development of alternative energy sources and use of fuel-efficient technologies	Number of programmes undertaken
Activity 7.5:	Improve access to piped and safe drinking water and solid waste disposal	Number of programmes undertaken
OBJECTIVE 8: BUILD CAPACITY OF LOCAL ORGANIZATIONS AND STRENGTHEN PARTNERSHIPS		
Activity 8.1:	Encourage group formation in all aspects of local level planning	Number of groups formed and made functional
Activity 8.2:	Improve coordination and monitoring capacity at Ward and VDC levels	Number of monitoring activities in place Consultations at lower levels to improve coordination
Activity 8.3:	Improve coordination and monitoring capacity with various government organs	Number of monitoring activities in place Consultations at district level to improve coordination
Activity 8.4:	Integrate NGO and other organizations	Number of NGOs involved, regular meeting
Activity 8.5:	Integrate private sector	Reports on different private sector collaboration

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Table 1: Geographical, tourism and ethnic division of Mustang district

	VDCs	UM	LM	NA	CA	SA	LC	12G	5G	T700	Population		T-Pop	HH
											M	F		
1.	Lete										417	281	698	138
2.	Kunjo										406	310	716	153
3.	Kobang										361	318	679	152
4.	Tukuche										279	262	541	131
5.	Marpha										510	476	986	216
6.	Jomsom										590	584	1174	253
7.	Kagbeni										629	495	1224	161
8.	Muktinath										561	528	1089	216
9.	Jhong										273	311	584	91
10.	Chhuksang										548	520	1068	172
11.	Ghami										425	405	830	135
12.	Tsarang										396	384	780	133
13.	Lo-Manthang										363	325	688	140
14.	Tshoser										420	407	827	170
15.	Tshunup										618	583	1201	189
16.	Surkhang										341	384	725	126
Total											7137	6714	13,851	2576

Population and household data based on DDC Mustang's record (2001)

UM: Upper Mustang

LM: Lower Mustang

NA: Northern Area

CA: Central Area

HH- Households

SA: Southern Area

LC: Lo-Chhoden

12G: Baragaon

5G: Panchgaon

T700: Thak Satsai

M: Male

F: Female

T-Pop: Total Population

Table 2: Threatened bird species of Mustang district

Common name	Scientific name	NRDB threat category	CITES appendices
Tibetan snowcock	<i>Tetra gallus tibetanus</i>		I
Blood pheasant	<i>Ithaginis cruentus</i>	S	II
Black necked crane	<i>Grus nigricolis</i>		II
Demoiselle crane	<i>Grus virgo</i>	S	II
Common crane	<i>Grus grus</i>	E	
Ibisbill	<i>Ibidorhyncha struthersii</i>	S	
Common buzzard	<i>Buteo buteo</i>	S	II
Upland buzzard	<i>Buteo hemilasius</i>	S	II
Golden eagle	<i>Aquila chrysaetos</i>	S	II
Northern shoveler	<i>Anas clypeata</i>		III
Northern pintail	<i>Anas acuta</i>		III
Garganey	<i>Anas querquedula</i>		III
Rock pigeon	<i>Columba livia</i>		III
Little owl	<i>Athene noctua</i>	S	

Legend: E—endangered, S—susceptible; I, II, III—CITES Appendices

Table 3: Some of Mustang’s flora and fauna not recorded elsewhere

Scientific name	Common name	Remarks
<i>Poa mustangensis</i>	NA	Plant, grass
<i>Clematis bracteolata</i>	NA	" , climber
<i>Saxifraga neopropagullifera</i>	NA	" , herb
<i>Coenonympha amaryllis forsteri</i>	Mustang heath	Butterfly
<i>Albulina orbitulus lobbichleri</i>	Greenish mountain blue	"
<i>Parnassius epaphus capdevillei</i>	Common red apollo	"
<i>Parnassius acco acco</i>	Varnished apollo	"
<i>Argiades luana</i>	Tibetan argus	"
<i>Ammonite spp.</i>	Ammonites (<i>shaligram</i>)	Mollusc in fossilized form
<i>Scutigera boulengeri</i>	Boulenger's lazy toad	Amphibian
<i>Nanorana parkeri</i>	Parker's high altitude frog	"
<i>Phrynocephalus theobaldi</i>	Theobald's toad-headed agama	Reptile
<i>Syrhaptes tibetanus</i>	Tibetan sand grouse	Bird
<i>Bubo bubo hemachalana</i>	Eurasian eagle owl subspecies	"
<i>Vulpes ferrilata</i>	Tibetan sand fox	Mammal
<i>Ursus arctos</i>	Himalayan brown bear	"
<i>Equus hemionus kiang</i>	Tibetan wild ass/Kiang	"
<i>Ovis ammon hodgsoni</i>	Tibetan argali	"
<i>Procapra picticaudata</i>	Tibetan gazelle	"
<i>Ochotona lama</i>	Lama's pika	"
<i>Bos species</i>	Cattle (<i>Lulu</i>)	"

Table 4: Settlements of Mustang district within 2km radius

VDCs	Major settlements	Other settlements within 2km distance	Population size		
			M	S	VS
Lete	Ghasa		✓		
	Kalopani	Lete Khola, Naya Chautari, Dhampu, Kolhethanti and Larkyu	✓		
Kunjo	Pahiro Thaplo				✓
Kunjo	Taglung	Titi, Chhayo, Jhopra Deurali	✓		
Kobang	Kobang	Larjing, Khanti, Sauru, Sirkung, and Naurkot	✓		
Tukucho	Tukucho	Chokhopani, Chimang, Tukucho and Naya Bajar	✓		
Marpha	Marpha	Tshairo, Laky and Marpha	✓		
Marpha	Jomsom Airport	Syang and Puthang	✓		
Jomsom	Jomsom	Thini, Dhumba and Samle	✓		
Kagbeni	Kagbeni	Ekalbhatti, Pagling, Phalyak, Ghagarjung and Tiri	✓		
Kagbeni	Shangta		✓		
Muktinath	Jharkot	Khinga, Jharkot, Lhatuk, Purang, Rani Pauwa and Lupra			
Jhong	Jhong	Jhong, Chhangor and Putak		✓	
Chhuksang	Chhusang	Tangbe, Chhusang, Tetang, Tsaile, Gyakar and Summar			
Ghami	Ghami	Ghiling, Vena, Tamagoan, Dakmar		✓	
Ghami	Ghami		✓		
Tsharang	Tsharang	Marang		✓	
Lo-Manthang	Lo-Manthang	Chhunup	✓		
Surkhang	Surkhang	Dhi, Yara, Ghara, Dhe amd Tanggya		✓	
Tshoser	Tshoser	Nyanol, Garphu, Arka, Achainburg, Varcha and Samjung	✓		
Tshunup	Tshunup	Nyamdo, Chumjung, Kimling, Thinkar, Phuwa and Namgyal	✓		

Source: District Profile of Mustang (2001)

M: Medium (>70 households)

S: Small (<70 households)

VS: Very Small (< 10 households)

Table 5: Existing and potential environmental pollution in Mustang district

Type	Existing pollution levels	Likely impacts of road on pollution levels		
		Short-term (2007-2012)	Medium-term (2013-2023)	Long-term (2024-2040)
Air				
• Total Solid Particles (TSP)	NA			
• PM ¹⁰ (Particulate matter)	NA			
• Sulphur dioxide	NA			
• Nitrogen dioxide	NA			
• Lead	NA			
• Carbon mono-oxide (indoor pollution)	NA			
• Benzine	NA			
• Carbon dioxide (indoor pollution)	NA			
Water				
• Suspended matter	NA			
• Dissolved solid	NA			
• Heavy metals	NA			
• Total hardness	NA			
• BOD	NA			
• COD	NA			
• Coliform bacteria	NA			
• Arsenic	NA			
• Harmful chemicals	NA			
• pH	NA			
Land				
• Bio-degradable materials	NA			
• Chemicals	NA			
• Soil pH	NA			
• Heavy metals	NA			
• Construction materials	NA			
• Plastics/glass/metals	NA			
• Infectious/contagious materials	NA			
Others				
• Noise (decibels)	NA			
• Heat	NA			
• Vibration	NA			

<NA: Not Available> <national average> <within national average> >national average

Table 6: Summary of likely changes, implications, impacts of motorable road in Mustang and mitigation strategies (continued)

Likely changes	Implications	Impacts	Mitigation strategies
Agriculture <ul style="list-style-type: none"> • Increase in conversion of agriculture land into fruit orchards • Increase in use of chemical fertilizers • Increase in use of pesticides, insecticides, fungicides, etc. • Increase in trends of agriculture mechanization • Increase in agro-based industries 	<ul style="list-style-type: none"> • Change in land use patterns • Change in cropping patterns • Increase in demand for agricultural labour • Increase in demand for skilled labour • Increase in industrial wastes 	<ul style="list-style-type: none"> • Job creation • Loss of traditional crops • Changes in cultural landscapes • Air, water and land pollution • Health hazards 	<ul style="list-style-type: none"> • Promote organic farming techniques, including the use of organic manures, integrated pest management techniques, etc. • Create values for organic products • Set environmental standards for enterprises • Promote contract farming systems • Train local people in new skills • Work closely with agriculture agencies and VDCs • Promote zone based planning system
Animal Husbandry <ul style="list-style-type: none"> • Increase in goat herding for pashmina and meat. • Increase in sheep herding for wool and meat • Increase in yak herding for diary products, wool as well as for hides • Phasing out of mules for transportation • Reduction of the use of horses • Reduction of the use of <i>Jhopas</i> • Increase in the use of new technologies for shearing, butchering, drying, processing, etc. 	<ul style="list-style-type: none"> • Increase in pressure on alpine pasture lands • Decrease in demands for crops such as barley, maize, silage and hay • Decline in the use of animal dung and goat/sheep dropping for manure • Increase in use of dairy products • Increase in export of animal hides • Increase in export of animal meats and other products. • Increase in wool-based enterprises factories such as carpet and pashmina factories 	<ul style="list-style-type: none"> • Job creation • Increase in conflict between wildlife and domesticated animals • Increase in threats on biodiversity hotspots • Genetic loss of local crops • Increase in the use of chemical fertilizers and preservatives • Air, water and land pollution health hazards 	<ul style="list-style-type: none"> • Promote rangeland productivity through integrated management system combining pasture improvement, rotational grazing, and animal pooling systems. • Strictly enforce regulations to protect biodiversity hotspots • Develop community based incentive mechanisms to reduce conflict between wildlife and domesticated animals • Promote use of organic manures as an alternative • Set environmental standards for enterprises • Develop participatory mechanism to enforce environmental standards • Work closely with livestock agencies to improve rangeland condition as well as to improve animal health
Industries/Enterprises <ul style="list-style-type: none"> • Growth in industrial estates • Significant changes in traditional economic base • Increase in demands for NTFPs • Increase in demands for chemicals, preservatives and raw materials • Increase in demands for transportation and other services • Increase in demands for financial services • Increase in demands for non-financial services 	<ul style="list-style-type: none"> • Significant changes in land use patterns • High traffic volumes • Increase in import of raw materials, chemicals etc. • Increase use of technologies • Diversified investment opportunities • Increase in banking, cooperatives and other financial institutions • Proliferation of large, small and micro factories, companies and enterprise 	<ul style="list-style-type: none"> • Diversification of livelihood opportunities and choices • Growth in local population and settlements • Increase in traffic volumes • Increase in congestion and crowding • Increase in industrial pollution • Increase in health hazards • Increase in crimes and social delinquencies 	<ul style="list-style-type: none"> • Zone based planning and regulations • Work closely and empower VDCs to enforce zoning systems • Set environmental standards for companies, industries and enterprises • Build capacity of VDCs, DDCs, DSCO, FNCCI etc., for environmental screening, environmental impact assessment and environmental auditing. • Develop settlement plans with particular emphasis on minimizing negative impacts on old settlements, developing adequate drainage, sewage and waste disposal facilities, public space for greening, and public facilities such as car park, bus terminal, sewage treatment plants, etc.
Tourism <ul style="list-style-type: none"> • Increase in Indian holiday makers • Increase in domestic holiday makers • Increase in Indian pilgrims • Increase in domestic pilgrims • Increase in international family groups • Increase in international trekkers to new destinations • Opening up of trans-national tourism 	<ul style="list-style-type: none"> • Increase in number of hotels, lodges, restaurants, teashops, entertainment etc. • Increase in tour and travel services • Increase in local guides and guiding services • Increased investments in tour, travel and accommodation sectors 	<ul style="list-style-type: none"> • Development of tourism as a full fledged local industry • Proliferation of accommodation, transport, communication, entertainment, retailers, fuel depots, and other service sectors. • Increase in job opportunities • Increase in wastes and other pollution 	<ul style="list-style-type: none"> • Take proactive measures to sustain tourism growth • Develop a development plan for Muktinath temple complex • Standardize and regulate hotels, lodges and other tourism related sectors for long term sustainability of tourism as an industry

Table 6: Summary of likely changes, implications, impacts of motorable road in Mustang and mitigation strategies

Likely changes	Implications	Impacts	Mitigation strategies
<p>destinations (Kailash, Ladakh, Lhasa and Bhutan)</p> <ul style="list-style-type: none"> • Increase of trekkers in Upper Mustang • Loss of 60% of ACT • Change in tourism destinations • Improvement in tourism seasonality • Increase in number of tourist days and also in tourism expenditures • Development of marketing links and marketing chains • Increase in package programmes for family groups • Development of range of alternative trekking routes • Increase in number of FITs in Upper Mustang • Increase in number of tourists or trekkers using alternative routes or circular routes in Upper Mustang (Dhee, Dhtee Tangya, Tsaille, Tetang, Jhong and Muktinath) 	<ul style="list-style-type: none"> • Increase in insurance, banking and other subsidiary sectors • Increase in demands for skilled and professional personnel • Potential loss of conservation fee • Potential loss of tourism revenue for Upper Mustang 	<ul style="list-style-type: none"> • Increase in congestion and crowding • Increase in traffic volumes • Growth in alternative routes and tourism products • Growth in new tourism centred towns or settlements • Increase in pressure on natural resources along the alternative routes • Growth in rubbish, waste and pollution problems along the new routes • Encroachment of public lands and haphazard development of new settlements along the new trekking routes 	<ul style="list-style-type: none"> • Designate amenity blocks along the new routes, and standardize/regulate development activities • Forge partnerships with private sector to promote new routes • Develop local capacities to organize and market new products and also enable them to operate • Develop plans for all potential settlements to avoid crowding and congestion problems • Avoid development activities that have potentially damaging impacts on tourism • Develop strong partnerships with DDC, VDCs, local tourism interest groups, Nepal Tourism Board and private sector organizations to develop, implement and monitor tourism policies
<p>Forest and Biodiversity</p> <ul style="list-style-type: none"> • Increase in number of accommodation and other subsidiary sectors • Increase in resident population • Increase in transient population • Increase in livestock population • Improvement in access to sub-alpine and alpine areas 	<ul style="list-style-type: none"> • Increase in demands for alternative energy sources such as LPG, electricity and kerosene • Increase in use of alternative materials for buildings and other facilities • Reduction in per capita fuel wood use but increase in volume • Increase in poaching incidents • Increase in illegal collection of NTFPs • Increase in bio-piracy incidents • Increase in use of fossilized and non-renewable energy sources • Increase in demands for timber • Increase in demands for alternative energy • Reduction in per capita household use of fuel wood • Increase in volumes of fuel wood use for industrial and enterprise uses • Improvement in access to biodiversity hotspots • Increase in the number of poachers, bio-pirates and illegal NTFP collectors 	<ul style="list-style-type: none"> • Loss of forest coverage • Loss of wildlife habitats • Increase in incidents of soil erosion and landslides • Increase in threats to NTFPs or possible extinction of some key NTFP species • Increase in threats to key wildlife population and possible extinction of endemic, rare and endangered species 	<ul style="list-style-type: none"> • Develop a database of flora and fauna with the current status, distribution, occurrence and potential threats • Develop stringent but effective biodiversity recording, registration and monitoring systems • Develop incentive based participatory wildlife management system by involving communities living on the edge of BHSs or ESAs or most affected communities • Ensure there are enough supply of alternative fuels • Work with DDC, VDCs, NEA and private sectors to make Mustang self-sufficient in electricity generation for cooking, heating, lighting and industrial purposes • Encourage CAMCs to establish fuel wood depots and discourage individual collection of fuel wood • Reduce the use of fuel wood by 90% by 2024.
<p>Services</p> <ul style="list-style-type: none"> • Improvement in transportation and communication systems • Increase in demands for better medical care • Improvement of hygiene and sanitation conditions • Increase in demands for quality education system • Increase in demands of skilled manpower and professionals in tourism, enterprises, companies and factories 	<ul style="list-style-type: none"> • Improvement in access to medical facilities • Increase in the number of toilets • Improvement of drainage • Increase in the number of people receiving health care • Reduction of child and maternity mortality cases • Reduction of the spread of HIV and other infectious diseases • Improvement of rating in school level certificate examinations • Improvement in primary and higher education enrolment • Increase in number of people trained locally 	<ul style="list-style-type: none"> • Increase in average life expectancy • Reduction in skin, stomach, respiratory ailments • Reduction of incidents of HIV and other infectious diseases • 100% literacy rate by 2025 • Increase in the number of local people in professional positions • Increase in the number of local people in skilled positions 	<ul style="list-style-type: none"> • Develop better coordination between all service providers to improve service delivery in health, education, sanitation condition etc. in the district • Develop and enforce settlement plans with adequate infrastructure to cope with population pressure and to cope with the proliferation of service sector

Table 7: Food security situation in Mustang district

	Nepal	Mustang
Prevalence rate of calorie intake (below threshold (2709 Kcal))	0.35–0.39	0.55
Prevalence rate of stunting (0–59 months age)	0.50	0.60
Prevalence rate of severe stunting (“)	0.20	0.28
Prevalence rate of underweight (“)	0.45	0.28
Prevalence rate of severe underweight (“)	0.14	0.06
Prevalence rate of wasting (“)	0.09	0.01
Prevalence rate of severe wasting (“)	0.09	0.01

Prevalence rate: Percentage of population having that characteristic in the total referent population.

Source: CBS and WFP, 2006: *Small Area Estimation of Poverty, Calorie Intake and Malnutrition in Nepal*; Kathmandu

Table 8: Ranks of Mustang in various development indicators as compared to other districts of Nepal.

(Rank 1 represents best situation)

	Mustang	Manang
Per Capita Income (US\$) (Nepal=240)	453 (3)	504 (2)
Rank based on Overall Composite Development Index	19	10
Rank based on Poverty Deprivation Index	33	25
Rank based on Socio-economic and Infrastructural Development Index	17	10
Rank based on Women's Empowerment Index	17	5
Rank based on Child Deprivation Index	33	1
Child Illiteracy Rate (%)	18.57 (37)	3.31 (1)
Rank based on Gender Discrimination Index	2	1
Adult Gender Imbalance Ratio in Literary Status	0.57 (29)	0.68 (5)
Adult Gender Imbalance Ratio in Non-agricultural Occupation	0.49 (1)	0.46 (2)
Contraceptive Prevalence Rate (%)	49.30 (12)	70.09 (4)
Drinking Water Coverage (%)	84.67 (28)	93.51 (9)
Toilet Facility (%)	40.78 (40)	35.94 (45)
Livestock per Farm Households	20.19 (1)	20.05 (2)
Per Capita Development Budget Expenditure (Rs.)	4,772 (4)	4,796 (3)
Overall Literacy Rate	52.08 (37)	60.45 (18)
% share of girls enrolled at primary level	50.69 (4)	51.16 (3)

Source: *Districts of Nepal. Indicators of Development (update 2003)*. Kathmandu: ICIMOD, GoN, SNV; December 2003.

Table 9: Human development situation of Mustang district as compared to Nepal
(Figure in bracket represents rank among the 75 districts of Nepal. Rank 1 is the best case).

	Nepal	Mustang
Human Development Index (HDI)	0.471	0.482 (26)
Life expectancy at birth	60.98	57.03
Adult literacy	48.6	47.8
Mean years of schooling	2.75	2.58
GDP per capita (PPP US\$)	1310	2466
Human Poverty Index (HPI)	39.4	41.5 (33)
Chronic malnourishment among children (under 5 years)	50.5	63.2
Adult illiteracy rate	51.4	47.8
Proportion of population with life expectancy less than 40 years	17.74	22.69
Population without access to safe water	20.48	6.64
Gender Discrimination Index (GDI)	0.452	0.470 (25)
Life expectancy (female)	61.5	57.26
Life expectancy (male)	60.5	56.85
Adult literacy (female)	34.9	41.6
Adult literacy (male)	62.7	61.4
Mean years of schooling (female)	1.95	2.57
Mean years of schooling (male)	3.56	3.77
Estimated earned income (female)	0.345	0.517
Estimated earned income (male)	0.485	0.58
Gender Empowerment Index (GMI)	0.391	0.528 (1)
Women's participation in local election (%)	19.33	23.17
Women in professional jobs	18.75	17.31
Women in administrative jobs	12.71	21.68
Women's share in income	0.302	0.358
<i>Source: Human Development Report, 2004; UNDP, Kathmandu</i>		

Table 10: New Annapurna Circuit Trek (ACT) route

Name	Start	Via	To	Passes	Distance (km)	No. of days
Present ACT	Beshisahar	Ngawal, Thorong La	Nayapul	Thorong La (5416m); Ghorepani (3000m)	215	18—22
Old ACT + alternative trails	Ngadi to Dharapani (will change as the road progresses)	Pisang or Ghyaru or Nar, Manang, Jomsom	Tatopani, Nayapul	If Nar: Kang La(5322m); Thorong La (5416m); option: Nupsang Kharka (3000m) Ghorepani (3000m)	200 to 170 (if Nar: 225 to 195)	15—21
New ACT	Nayapul	Jomsom and Manang	Dharapani / Koto	Ghorepani (3000m); Nupsang Kharka (3000m); Thorong La (5416m); Kang La (5322m)	210	17—22
		Jomsom	Manang	Same, except Kang La	140	12—15
Half ACT	Tatopani	Jomsom	Manang	Nupsang Kharka (3000m) Thorong La (5416m)	110	10—12
Full Circle	Anywhere between Khudi and Nayapul	Nayapul, Jomsom, Manang, Nar, Namun, Sikles	Return to start	Ghorepani (3000m) Nupsang Kharka (3000m) Thorong La (5416m) Kang La (5322m) Namun La (5500m)	290	21—28

Table 11: Impacts on life and livelihood sources in Mustang district

Changes in temperature, wind and precipitation	<ul style="list-style-type: none"> • Winters are less cold and frosty • The river valleys of Kali Gandaki are getting windier • Less snowfall in winter • Increased rain and snowfall after winter • Unusually intense summer rainfall
Weather hazards	<ul style="list-style-type: none"> • Increased frequency of avalanches, flash floods, windstorms and hailstorms • Rainfall patterns are getting more erratic with long droughts and sudden heavy rains • More loss of life and property from harsh weather incidents
Vegetation	<ul style="list-style-type: none"> • Altitude of tree line is rising • Grasslands are less green because reduced snowfall results in moisture deficiency and less grass production
Water supply and housing	<ul style="list-style-type: none"> • Reduced water flow in local streams and springs • Unpredictable fluctuation in flow levels and timing of seasonal spring recharging • More roof leakage and wall erosion in traditional mud houses • Water supply is a major problem leading to the abandonment of some old settlements in Mustang
Agriculture	<ul style="list-style-type: none"> • Bigger tasty apples at higher altitudes where it used to be too cold for apple farming; apple orchards and nursery farms are emerging • Successful farming of cabbage, cauliflower, cucumber, chilli and tomatoes in open gradens (without a greenhouse)
Lifestyle/business	<ul style="list-style-type: none"> • Older people find their villages more comfortable due to warmer winters • Tourism businesses are more profitable due to longer drought periods during post monsoon months • Agricultural businesses suffer due to reduced irrigation and variable precipitation patterns

Source: Based on personal observations and communications with local residents and development workers in Mustang district between December 2003 and March 2005.

Table 12: List of 57 endemic species of flowering plants of Nepal found in Annapurna Conservation Area

Family	Species
Balsaminaceae	<i>Impatiens scullyi</i>
Berberidaceae	<i>Berberis mucrifolia</i>
Boraginaceae	<i>Maharanga wallichiana</i>
Campanulaceae	<i>Codonopsis nepalensis</i>
Caryophyllaceae	<i>Arenaria mukerjeeana, Arenaria paramelanandra, Silene helleboriflora, Silene holosteifolia, Silene vautierae, Stellaria congestiflora</i>
Compositae	<i>Cremanthodium nepalense, Cremanthodium purpureifolium, Saussurea spicata, Taraxacum nepalense</i>
Crassulaceae	<i>Rhodiola nepalica, Rosularia marnieri, Sedum pseudo-multicaule</i>
Cruciferae	<i>Glaribraya lowndesii</i>
Cyperaceae	<i>Carex rufulistolon, Kobresia esbirajbhandarii, Kobresia fissiglumis, Kobresia mallae</i>
Elaeagnaceae	<i>Elaeagnus tricholepis</i>
Ericaceae	<i>Rhododendron lowndesii</i>
Flacourtiaceae	<i>Homalium napaulense</i>
Gramineae	<i>Poa kanaii, Poa mustangensis</i>
Labiatae	<i>Lamium tuberosum, Micromeria nepalensis</i>
Leguminosae	<i>Astragalus nakaoui, Caragana campanulata, Hedysarum manaslense</i>
Orchidaceae	<i>Oberonia nepalensis</i>
Papaveraceae	<i>Corydalis megacalyx, Meconopsis regia, Meconopsis taylorii</i>
Polygonaceae	<i>Fallopia filipes</i>
Primulaceae	<i>Primula sharmae</i>
Ranunculaceae	<i>Clematis bracteolata, Delphinium himalayai</i>
Rosaceae	<i>Sibbaldia minutissima</i>
Salicaceae	<i>Salix eriostachya</i>
Saxifragaceae	<i>Saxifraga alpigena, Saxifraga cinerea, Saxifraga hypostoma, Saxifraga lowndesii, Saxifraga namdoensis, Saxifraga neopropagulifera, Saxifraga poluninana, Saxifraga staintonii, Saxifraga williamsii</i>
Scrophulariaceae	<i>Pedicularis annapurnensis, Pedicularis breviscaposa, Pedicularis chamissonoides, Pedicularis sectifolia, Pedicularis wallichii</i>
Verbenaceae	<i>Caryopteris nepalensis</i>

SUSTAINABLE DEVELOPMENT PLAN
mustANG
(2008—2013)

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