The National Action Program (NAP) to combat Land Degradation

Ministry of Agriculture and Forests
Royal Government of Bhutan
2014

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THE NATIONAL ACTION PROGRAM (NAP) TO COMBAT LAND DEGRADATION

Ministry of Agriculture and Forests
Royal Government of Bhutan
2014

MESSAGE FROM THE

HON'BLE MINISTER, MINISTRY OF AGRICULTURE AND FORESTS

Land is one of the most precious resources, but like the living environment that it hosts, it is under serious threats due to degradation. The National Soil Services Centre (NSSC) under Department of Agriculture (DoA), Ministry of Agriculture and Forests (MoAF) formally designated as the lead institution to combat land degradation welcomes the opportunity to contribute to sustaining the productivity of our lands and maintaining the pristine environment.

Aligning the Bhutan National Action Program (NAP) to combat land degradation with the United Nations Convention to Combat Desertification (UNCCD) is critical and a timely response especially at a time when communities are adversely affected by land degradation, floods, ecosystem degradation and other natural calamities.

With this aligned NAP as a guiding document to address land degradation problems and issues, the Ministry would be able to contribute significantly to the Royal Government of Bhutan's pursuit of Gross National Happiness (GNH) through enhancement of socio-economic development, conservation and protection our environment.

I believe that the healthy land and soil is the foundation for better agricultural productivity and ensures overall ecosystem balance. It cannot be denied that maintaining healthy soil through sustainable land management (SLM) is one of the most direct solutions for reducing rural poverty. As we move on implementing the NAP, we hope to set up a sustainable platform in addressing land degradation issues in the future.

Personally, I commend the NSSC as the UNCCD Bhutan Focal Agency for spearheading the task of updating of the NAP to combat land degradation. Furthermore, I would also like to thank all our partners from other institutions and agencies who participated actively and engaged meaningfully during the alignment process.

Finally, on behalf of the Ministry of Agriculture, Royal Government of Bhutan, I would like to thank the Global Environment Facility (GEF) for providing financial support to develop NAP and its alignment to the UNCCD 10 Year Strategic Plan.

Tashi Delek!!!

YESHEY DORJI

MESSAGE FROM THE

SECRETARY OF THE MINISTRY OF AGRICUTURE AND FORESTS

As a focal agency, the National Soil Services Centre (NSSC) of Department of Agriculture (DoA), Ministry of Agriculture and Forests (MoAF) has been making tireless efforts in addressing land degradation problems and issues in Bhutan. As we enter into a new era where the world is confronted by land degradation, impacts of climate change and ecosystem degradation, I would like to commend the efforts of NSSC in coming up with the updated Bhutan National Action Program (NAP) in accordance to the 10 Year Strategic Plan and Framework of the United Nations Convention to Combat Desertification (UNCCD).

Addressing land degradation problems and issues are of outmost importance for Bhutan mainly because about 69% of the country's population is comprised of people living in the rural areas sustaining their livelihoods on agricultural activities on limited land resources (< 8% of the total country area is cultivable). The need to recognize land degradation issues with extreme urgency is also reflected by the prevalence of high rural poverty- i.e. 16.70%, of the national average of 12%.

Land degradation is a cross-sectoral issue impacting everyone at the local, national and global levels. Therefore, with the help of this important document on combating land degradation, it is my hope and aspiration that we in Bhutan, be informed of the importance of combating land degradation in the country and shoulder collectively the responsibility of combating land degradation. The MoAF shall make every effort to bring together all the relevant stakeholders, both within and outside the Ministry, to address this common issue jointly and in a coordinated way.

Again, I applaud the National Soil Services Centre for its outstanding achievement in updating NAP to UNCCD's strategic plan. I would also like to thank everyone who is involved in shaping this important national document. Tashi Delek!

TENZIN DHENDUP

MESSAGE FROM THE

PROGRAMME DIRECTOR OF THE NATIONAL SOIL SERVICES CENTRE (UNCCD FOCAL AGENCY)

Land degradation is increasingly becoming an issue of serious concern both locally and globally. Today, an estimated 3.6 billion hectares worldwide (a quarter of the Earth's land area) are being affected by desertification and various forms of land degradation.

Although there is a lack of reliable, comprehensive and upto date information on the cause, extent, trends, and economic and social implications of land degradation, one can confidently say that land degradation is an apparent phenomenon in Bhutan impacting the livelihoods of many. In the dynamic mountain setting of the country with complex geology and geomorphology, mass movements, landslides and slips, floods and soil erosion driven by gravity and water on steep slopes are common sights across the country. Bhutan is largely an agrarian country with small farmers subsisting on average of less than a hectare of land holding. About 30% of the country's 7% arable land is on slopes between 50-100% and about 2% is on slopes greater than 100%. Hence, the heavy dependence on the limited arable land and land-based resources greatly contribute to land degradation. Unsustainable agriculture practices, deforestation, forest fires, poor irrigation system management and overgrazing are some agriculture land use related factors that contribute to land degradation.

Construction of infrastructure without proper environmental measures, mining, industrial development and urbanization are other causes of land degradation. Apart from these factors, growth of population and structure, poverty, and climate change equally contribute to land degradation.

The Ministry of Agriculture and Forests is responsible for policies, plans and programs that ensure sustainable management of agriculture, forest and livestock resources for the socio-economic development and environmental well-being of the Bhutanese people. However, there are many other agencies and institutions whose mandates and work relate to land management. Hence, a National Action Program (NAP), has been developed to direct future actions to combat land degradation problems and their causes in a more strategic and comprehensive manner in the country.

For the general public, it is hoped that this document will serve as an information tool informing them the importance of combating land degradation and similarly for the policy and decision makers, this document is expected to help in making informed decision and planning.

The National Soil Services Centre under DoA, MoAF, would like thank the Global Environment Facility for the funding support to develop this essential document to combat land degradation.

Tashi Delek

KARMA DEMA DORJI

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Glossary & Abbreviations

ADB	Asian Development Bank
BAP	Biodiversity Action Plan
BBSC	Bhutan Broadcasting Services Corporation
BCCI	Bhutan Chamber of Commerce and Industry
BEO	Bhutan Environment Outlook
BTFEC	Bhutan Trust Fund for Environmental Conservation
ca	Approximate/Calculated
CNR	College of Natural Resources, formerly Natural Resources Training Institute
CoRRB	Council for RNR Research of Bhutan (Ministry of Agriculture and Forests)
CST	College of Science and Technology
DANIDA	Danish International Development Agency
DDM	Department of Disaster Management (Ministry of Home & Cultural Affairs)
DEC	Dzongkhag Environmental Committee
DES	Department of Engineering Services (Ministry of Works & Human Settlement)
DGM	Department of Geology and Mines (Ministry of Economic Affairs)
DGPCL	Druk Green Power Corporation Limited
DHI	Druk Holding and Investments
DHS	Department of Human Settlement
DHMS	Department of Hydromet Services
DKRA	Dzongkhag Key Result Area
DoA	Department of Agriculture (Ministry of Agriculture & Forests)
DPA	Department of Public Accounts
DoE	Department of Energy (Ministry of Economic Affairs)
RNR – ED	Engineering Division (Ministry of Agriculture & Forests)
DoFPS	Department of Forest and Park Services (Ministry of Agriculture & Forests)
DoI	Department of Industry (Ministry of Economic Affairs)

DoL	Department of Livestock (Ministry of Agriculture & Forests)
DoR	Department of Roads (Ministry of Works and Human Settlement)
DT	Dzongkhag Tshogdu
EA	Environmental Assessment
EC	Environmental Clearance
ECOP	Environmental Codes of Practice
EFRC	Environment Friendly Road Construction
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
FMU	Forest Management Unit
FRMD	Forest Resources Management Division
FYP	Five Year Plan
GDP	Gross Domestic Product
GEF	Global Environment Facility
GLOF	Glacial Lake Outburst Flood
GNH	Gross National Happiness
GNHC	Gross National Happiness Commission
GT	Gewog Tshogde
GFR	Government Reserve Forest
ICIMOD	International Center for Integrated Mountain Development
JICA	Japan International Cooperation Agency
KPI	Key Performance Indicator
LDC	Least Developed Country
LMC	Land Management Campaign
MoAF	Ministry of Agriculture & Forests
MoEA	Ministry of Economic Affairs
MoHCA	Ministry of Home and Cultural Affairs
MoWHS	Ministry of Works and Human Settlement
NAP	National Action Program to Combat Land Degradation
NAPA	National Adaptation Program of Action for Climate Change

NAP-MCC	National Action Program Coordination Committee
NAP-SB	National Action Program Steering Board
NCAN	National Center for Animal Nutrition
NDDC	National Dairy Development Center
NDRMF	Natural Disaster Risk Management Framework
NEC	National Environment Commission
NEC	National Environment Commission Secretariat
NKRA	National Key Result Area
NLC	National Land Commission
NGO	Non-Governmental Organization
NRDCL	Natural Resources Development Corporation Limited
NRED	Nature Recreation & Ecotourism Division
NSB	National Statistics Bureau
NSSC	National Soil Services Center (Department of Agriculture)
NWFP	Non-Wood Forest Product
PHCB	Population and Housing Census of Bhutan
RDTC	Rural Development Training Center
RGoB	Royal Government of Bhutan
RLDC	Regional Livestock Development Center
RNR	Renewable Natural Resources
RNR-RDC	Renewable Natural Resources - Research Development Center
RSPN	Royal Society for the Protection of Nature
RUB	Royal University of Bhutan
SFED	Social Forestry Extension Division
SGP	Small Grants Program
SKRA	Sector Key Result Area
SLM	Sustainable Land Management
SNV	Netherlands Development Organization
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Program

UNEP	United Nations Environment Program
UWICE	Ugyen Wangchuck Institute for Conservation and Environment
WFP	World Food Program of the United Nations
WMD	Watershed Management Division
WSMF	Watershed Management Fund
WUA	Water Users Association
WWF	World Wildlife Fund

Glossary of Bhutanese Terms

Chathrim	Act, statute
Chhuzhing	Wetland (irrigated paddy field)
Dungkhag	Sub-District
Dungpa	Sub-District Administrator
Dzongdag	District Administrator
Dzongkhag	District
Dzongkhag Tshogdu	District Committee
Gaydrung	Gewog Clerk
Gewog	Smallest geographic unit of public administration made up of a block of villages
Gewog Tshogde	Block Committee
Gup	Head of a Gewog (local government), elected by the local community
Gyalpoi Zimpon	Royal Chamberlain
Kamzhing	Dryland
Lhakhang	Monastery
Sokshing	Government reserved forest land leased out for leaf litter production and collection for use in farm yard manure
Thromde	Municipal
Thromde Tshogdu	Municipal Committee
Tsamdro	Government reserved forest land leased out for grazing and improved pasture management
Tseri	Slash-and-burn cultivation, shifting cultivation

Executive Summary

General Introduction

According to estimates, some 1.97 billion hectares (hac) of usable land have been affected by various forms of human-induced land degradation worldwide (FAO). These are mainly caused by deforestation, overgrazing, fuel wood consumption, unsustainable land and crop management practices, industries, urbanization, and infrastructure development. Poverty, population growth and natural factors such as extreme climate and unstable geology also contribute significantly. At the United Nations Conference on Environment and Development in 1992, the international community called on the UN General Assembly to establish an Intergovernmental Negotiating Committee to prepare a legally binding international instrument to combat desertification. Consequently, a series of international negotiations led to the formulation and adoption of the UN Convention to Combat Desertification (UNCCD) in June 1994. Bhutan acceded to the UNCCD in August 2003. Today, there are 195 countries who have become party to this immensely consequential international treaty.

The Royal Government of Bhutan (RGoB) has been implementing various programs and projects to combat land degradation since the advent of Five Year Plans (FYP) in the early 1960s. These, however, have been largely taking place within the individual sector plans, without the required macro-level policies and strategic perspectives. In order to streamline the planning and implementation of various land management activities of different sectors, a national action program (NAP) was developed in 2010. It is mandatory for all UNCCD member countries to develop NAP and align it to the Convention's 10 year strategic plan (2008-18). However, regardless of being an obligation to the Convention, it also gives Bhutan an opportunity to:-

- take stock of existing measures, identify new ones, consolidate and direct future actions to combat land degradation problems.
- identify the causes of land degradation in a more strategic and holistic manner using participatory approaches that capture the views, insights and experiences of various stakeholders.

The Bhutan NAP, which was prepared in 2010, has largely been derived from a broad-based consultative and participatory planning process, involving a wide range of stakeholders. Community consultations were held in 13 Gewogs to get a representative sample of land degradation problems and issues at the grass root level. To help supplement and consolidate the information thus derived, a series of regional and national consultative workshops were conducted. The NAP was further strengthened by aligning it with the strategic plan and framework of the Convention. During this exercise, a number of workshops and meetings were held with the stakeholders, both within and outside the government, to seek clarifications, get additional information, views and insights.

Policy, Legal and Institutional Contexts to Combat Land Degradation in Bhutan

Bhutan has supportive environmental policies and legislations in place, through which land degradation problems and issues can be dealt with. The overarching Bhutanese development philosophy of Gross National Happiness (GNH) enshrines environmental sustainability as one of the four main pillars for pursuing peace, prosperity and happiness. The Constitution of the Kingdom of Bhutan explicitly outlines environmental conservation as a mandate and spells out, in very specific terms, the environmental responsibilities and rights of every Bhutanese citizen. A number of sector-based policies and laws reinforce the importance of environmental conservation and complement the country's overall philosophy of environmentally sustainable development. The policies that voice support for combating land degradation include: the National Forest Policy 2009, National Environment Strategy 1998, Bhutan Water Policy 2007, National Urbanization Strategy 2008, and Bhutan Sustainable Hydropower Development Policy 2008. The laws include: the Forest and Nature Conservation Act 1995, Mines and Mineral Management Act 1995, Environmental Assessment Act 2000, Road Act of Bhutan 2014, National Environmental Protection Act 2007, Land Act of Bhutan 2007, and Waste Prevention and Management Act 2009.

Institutionally, the Ministry of Agriculture and Forests (MoAF) and National Environment Commission (NEC) have more direct role in land use and environment management. The MoAF through its Department of Agriculture (DoA), Department of Forest & Park Services (DoFPS) and Department of Livestock (DoL) are responsible for implementing policies, plans and programs that ensure sustainable management of agriculture, forest and livestock resources. Likewise, the NEC, as an inter-ministerial body to guide and support development in an environmentally sustainable way, ensures that development policies, plans, programs, and projects fully consider environmental management needs and functions. Similarly, there are other government agencies that play significant roles in combating land degradation viz. the Department of Roads (DoR) and Department of Human Settlement (DHS), under the Ministry of Works and Human Settlement (MoWHS); Department of Geology and Mines (DGM) and Department of Industry (DoI), under the Ministry of Economic Affairs (MoEA); and Department of Disaster Management (DDM), under the Ministry of Home and Cultural Affairs (MoHCA).

There is also a small but effective fraternity of non-governmental organizations focusing on land and environmental issues. Among them, the Royal Society for Protection of Nature (RSPN) works primarily on environmental issues including those with links to community livelihoods; the Tarayana Foundation (socio-economic enhancement of poor and vulnerable communities); and the Greener Ways (solid waste management). And within the communities, there are also self help groups (Tshogpas) and cooperatives such as the Radhi Natural Resources Management Group, Community Forest Management Groups (e.g. Dungkarling CFMG in Bhur, Gelephu), Organic Farming groups, etc.

Several bilateral and multilateral development agencies assist Bhutan in combating land degradation either directly or indirectly. These include Asian Development Bank, Austrian Bilateral Assistance, Danish International Development Agency, European Union, Global Environment Facility, Helvetas, Government of India, Japan International Cooperation Agency, Netherlands Development Organization, UN Agencies (viz. FAO, UNEP, UNDP), World Bank, and World Wildlife Fund.

Land Degradation Problems and Issues in Bhutan

The main causes of land degradation in Bhutan have been identified as forest fires, excessive use of forest resources, overgrazing, unsustainable agricultural practices, poor irrigation management system, infrastructure development without proper environmental measures, mining, industrial development and urbanization.

Forest fires persist as a recurrent and widespread phenomenon in the country. According to records maintained by the DoFPS, 239 incidents of forest fires affecting ca. 19,230.77 hac have been reported between 2008-13, of which, many incidents have occurred in the same area. Almost all of the forest fires in the country are caused by human, either accidentally or intentionally.

It is a known fact that Bhutan's per capita fuel wood consumption is one of the highest in the world.

- In rural areas, fuel wood is the main source of energy for cooking and heating. In 2013, it accounted for about 94% of the total primary energy supply in the rural areas against 6% in the urban areas.
- Fuel wood is extensively used for industrial production, agro and forestry products processing, road construction, hospitals, schools, military encampments and monasteries.
- Timber usage in constructions is also high with traditional Bhutanese architecture requiring extensive use of wood.

Forest management units (FMU) have been created to ensure sustainable timber harvesting based on management plans that take account of growing stock and annual harvest. However, not all timber needs are met from FMUs. In the rural areas, timber needs are met on *ad hoc* basis. Trees of desired species and sizes that are required for construction/renovation of Dzongs and Lhakhangs are extracted from forest elsewhere if not available within the FMUs.

Besides timber and fuel wood, there is a wide array of non-wood forest products (NWFP) that are extracted from the forest to generate additional income. These include medicinal and aromatic plants, edible mushrooms, ferns, wild greens; bamboo and cane for local handicrafts; barks and pulps for traditional paper-making; animal fodder; and leaf litter for farmyard manure (FYM) production. In many places, over exploitation has rendered these NWFPs increasingly scarce.

In Bhutan, livestock rearing is an important economic activity among the rural communities. However, overgrazing is one of the factors contributing to land degradation, with much of the grazing occurring in open areas and forests on a free-range basis. In 2013, there were 302,526 cattle, 45,840 yaks including Zo/Zom, 39,264 goats, 9,917 sheep and 22,692 equines in the country. Despite government initiatives to encourage rearing of smaller and productive herds of livestock, local communities continue to maintain large herds as an immediate source of cash income and FYM. Further strong religious sentiments against culling and social status associated with the large herds are other reasons for maintaining large herds.

Unsustainable agriculture practices exist mainly in the form of imbalanced and prolonged use of inorganic fertilizers, farming on steep terrain without adequate soil and water conservation measures and tseri cultivation with shortened fallow cycle. Construction of earthen irrigation canals in places where the soil is highly erodible, poor maintenance and management of irrigation systems causes downward movement of slopes. Furthermore, infrastructure development such as construction of roads using heavy machinery and cutting of steep slopes is environmentally challenging considering the topography and fragile geological conditions. The quality of farm roads in particular, is of great concern. These roads, which are basically earthen roads built at minimal cost are poorly engineered with little or no maintenance. It often lacks basic structures such as proper drainage and breast/retaining walls. In addition, the mass influx of migrant road workers add to the demographic pressure to the surrounding natural resources particularly forests and water.

Of late, mining has become one of the fastest growing economic sectors in the country, particularly, the production of dolomite and gypsum. Between 2002-12, dolomite production increased from 0.39 to 1.50 MMT,[1] while gypsum increased from 0.11 to 0.31 MMT. The most significant adverse impacts of mining are land disturbance and fissure development from drilling, blasting, excavation, site clearing, destruction of vegetation, sedimentation, contamination of water and air with dust particles affecting human health and impacting livelihoods through decline in agriculture production. Due to the destructive nature of the activity, stringent laws, strategies and regulations for mitigation during planning, operation and post-operation phases are in place. However, these tools have not been effectively enforced due to lack of inter-agency coordination, ambiguous institutional mechanisms for enforcement, and inadequate technical capacity within the mining companies. The DGM itself faces challenges in terms of human resource with inadequate technical capacity to monitor and provide technical guidance.

Large numbers of industries depend on extraction of raw materials, such as wood and minerals, from the natural environment. Between 2006-12, the number of forest based industries increased from 470 to 954 and the mineral based industries increased from 91 to 236 in the country. In particular, the numbers of stone quarries saw manifold increase,

[1] MMT: Million metric tons

hence contributing to the overall increase in mineral based industries. Other major industrial activities that contribute to land degradation include dumping of industrial waste, discharge of harmful effluents, and conversion of forest and agricultural lands for development of industrial estates.

Urbanization has taken place at a very rapid pace over the decades. In June 2002, it was estimated that the urban population comprised only 15% of the total population. However, the Population and Housing Census of Bhutan (PHCB) projected urban population at 216,507 for the year 2013, translating to 30% of the total population. More than half of the current urban population (50.90%) is concentrated in Thimphu and Phuentsholing. This creates environmental problems such as air and water pollution, water shortage, municipal waste generation, congestion of traffic and buildings, and land degradation. In order to cope with the population pressures, expanding urban centers have consumed prime agricultural lands. In other urban centers, lack of proper infrastructure and facilities for drainage, sanitation and waste disposal have cumulative adverse impacts on land and water resources.

According to Thimphu City Corporation (TCC), solid waste problem is growing exponentially in the urban centers, especially in Thimphu and Phuentsholing. The waste generation in Thimphu is projected to increase from 51 tons/day in 2010 to 131 tons/day by 2030. The problem is aggravated by the absence of proper waste segregation system at source and poorly managed landfills. There are no regular measures to monitor and control pollutant emission, leaching and scavenging leading to overfilling, stench, contamination of land and water, and aesthetic dilapidation of the landscape.

In addition to the direct factors for land degradation, population growth and structure, poverty and climate change contribute almost in equal measures. The country's population in general does not pose a major problem. However, the geographically-skewed distribution of the population causes imbalances between Dzongkhags and regions, resulting in localized pressure on the natural resources. Similarly, with nearly 45% of the population being under the age of 20, the population will continue to grow because of significant difference between the current high Total Fertility Rate (ca. 2.90%) and low Contraceptive Prevalence Rate (31%).

The relatively high level of poverty in the country is largely a rural phenomenon. An estimated 12% of the country's total population live below the national poverty line. Poverty and land degradation are inextricably linked. The poor are directly dependent on a wide range of ecosystem services for their livelihoods. Therefore, it is usually the poor communities who bear the brunt of land degradation.

Bhutan is also highly vulnerable to the impacts of climate change. In the recent past, the country has experienced a number of incidents that have brought to the fore the threats of climate change. Prolonged dry winter resulting in exacerbated incidents of forest fires, unprecedented rainfall causing landslides and flash floods, glacial retreat, glacial lake

outburst flood (GLOF) and outbreak of new pests and diseases are the key climate-related events that have occurred recently.

Land degradation being a cross-sectoral issue, the policy perspective on national land use and management has been lacking at the macro-level. Consequently, land use conflicts between various sectors persist and land uses in many instances defy land capability. Furthermore, programs and activities to address the issue have remained compartmentalized within the sectors. The land policy of Bhutan, which would fill in the existing policy gaps, is still in draft form. There is also a lacuna in the institutional setting with respect to the overall coordination and management of the technical aspects. Effective enforcement of environmental laws will depend on the mass awareness. Currently, Bhutanese public in general are not aware of the intricacies of environmental laws and regulations. This may render efforts on law enforcement weak and futile.

Bhutan's Action Program to Combat Land Degradation

The Action Program draws its fundamental essence from the country's overarching development philosophy of GNH. Primarily, it shall contribute to the objective of environmental sustainability whilst also directly or indirectly contributing to poverty alleviation, food security, economic growth, and human safety. It is envisaged that this would eventually steer the country towards achieving the national objective of the 11th FYP (2013-18) of "self- reliance and inclusive green socio-economic development."

The main goal of the Action Program is to "prevent and mitigate land degradation[2] and its impacts through systems and practices of SLM that protects and maintains the economic, ecological and aesthetic values of our landscapes." It entails the following specific objectives:

1. Conservation, rehabilitation and sustainable use of forest resources to maintain well-functioning forest landscapes and watersheds.

2. Development and promotion of sustainable agricultural practices that enhances local livelihoods whilst maintaining the productivity and stability of agricultural lands.

3. Integration of environmental management measures in development activities that pose significant risks of land degradation.

4. Strengthening of systemic and institutional capacity to combat land degradation and its impacts.

5. Information, advocacy and education to create increased policy and public support for sustainable land management.

The action programs to combat land degradation and allied issues are outlined into two categories, viz. category A - the action programs featuring under the departments and

[2] Considering that the term land degradation is subjective and a cross-sectoral issue, attempts to define the terminology [land degradation] was prevented to avoid confusion.

central agencies and category B - those actions that are in the planned programs of the local governments (Dzongkhags and Gewogs) during the 11th FYP.

Action Program A: For the aligned NAP to be pragmatic, it demanded careful formulation of thematic areas that would encompass all the action programs to combat land degradation. During the formulation of thematic areas, great deal of consideration was given to two aspects:(1) action points that are enlisted in the existing NAP, and (2) the Convention's 10 year strategic plan- its strategic objectives and perhaps focusing on its operational objectives. A total of five thematic areas were identified and formulated.

- *Advocacy and capacity building*: Centering on advocacy that needs to address pressing land degradation issues, making a behavioral change of the stakeholders through awareness raising and enhancing the abilities of the stakeholders using various educational means.
- *Institutional strengthening and coordination*: Strengthening of the existing institutions that currently play differing roles in combating land degradation and ensuring better networking through collaborative and effective approach.
- *Policy and legislatives*: The tools that will support creating enabling environments for the stakeholders while implementing prudent solutions to combat land degradation and its related issues.
- *Research and knowledge management*: Generating appropriate knowledge and information within the domain of land degradation that would serve as viable inputs for decision making at different levels in addressing land degradation issues.
- *Support to SLM technologies*: Taking either direct/indirect action through implementation of the activities by the stakeholders to address the prevailing land degradation issues and/or contribute to preventing land degradation in future.

The action programs are a result of a comprehensive review of the 11th FYP of the RGoB. Particular focus was given to those action programs featuring under the national and sectoral levels that are currently in place. The cumulative results are presented in the form of matrices.

Action Program B: For convenience and clarity, this exercise was categorized by the four main topics: (1) the SLM, (2) water management, (3) integrated soil fertility management, and (4) human and institutional capacity building. Each main activity consisted of numerous sub-activities within its domain. In the 11th FYP, the Dzongkhags have total budget outlay of Nu. 2,493.86 Million (M), averaging to about Nu. 124.69 M for each Dzongkhag. Likewise, 205 Gewogs have total budget outlay of Nu. 3,282.59 M, computing to an average of Nu. 16.01 M for each Gewog. Apparently, in the local government, major share of the resources (71.20% and 77.50% respectively) are earmarked for development of road infrastructures, whereas, budget allocated for the actual SLM related activities is dismally low. Although land degradation is a pressing concern for the people in the rural communities, activities formulated to address land degradation issues are inadequate.

NAP Implementation Mechanism

The core action programs in this document are largely drawn from the 11th FYP of central government organizations and agencies, Dzongkhags and local governments. Therefore, most of the action components shall feature as the regularized activity. To facilitate the implementation of NAP, a two-tier mechanism has been considered.

- *Level 1*: At this level, a Monitoring and Coordination Committee (NAP-MCC) is proposed to oversee the implementation of the NAP.
- *Level 2*: Focal persons will be identified from each of the agencies who will be responsible for submitting the progress reports.

Acknowledgement

Land degradation has been one of the most pressing issues faced by Bhutan. In view of the geo-morphological construct of the landforms, rugged terrain, the socio-economic changes sweeping fast across the communities and an increasing effect of climate change, land degradation will continue to occur and affect the lives of people and impede the development of the country. Therefore, it is highly crucial to have the NAP to combat land degradation in place. It is envisaged that this document will act as guideline in addressing land degradation issues across Bhutan, and help prepare strategic policies, plans and programs in the future.

This NAP alignment exercise would not have been possible without the much needed financial assistance from the GEF.

The National Soil Services Center (NSSC), under DoA, MoAF profoundly acknowledges the unwavering support provided by all institutions and individuals in various capacities for completion of this exercise on time.

Program Director
National Soil Services Center

Part A: Introduction and Country Context

CHAPTER I: COUNTRY OVERVIEW

1.1 General Settings

1.1.1 Geo-political Situation

The Kingdom of Bhutan is a small country with a total area of 38,394 km^2 in the Eastern Himalaya. Landlocked and mountainous, the country is bordered by the Indian states of Arunachal Pradesh to its east, Assam and West Bengal to its south, and Sikkim to its west, and the Tibetan Autonomous Region of China to its north and north-west.

Administratively, the country is divided into 20 Dzongkhags. The Dzongkhags are further divided into 205 Gewogs. Some of the Dzongkhags, namely Chhukha, Samdrup Jongkhar, Samtse, Sarpang, Thimphu, Trashigang, and Zhemgang, have sub-districts, known as Drungkhag.

1.1.2 Physiography

Bhutan's terrain is almost entirely mountainous with nearly 95% of the country being above 600 meters (m) (Figure 1). The terrain is rugged and steep, with altitudes declining from above 7,500 m to under 200 m within a short north-south distance of 170 km. The country can be divided into three broad physiographic zones: (i) the southern belt consisting of the Himalayan foothills adjacent to a narrow belt of flatland along the Indian border with altitude ranging from under 200-2,000 m; (ii) the inner Himalayas made up of the main river valleys and steep mountains with altitude ranging from about 2,000 - 4,000 m; and (iii) the great Himalayas in the north along the Tibetan border consisting of snow-capped peaks and alpine meadows above 4,000 m.

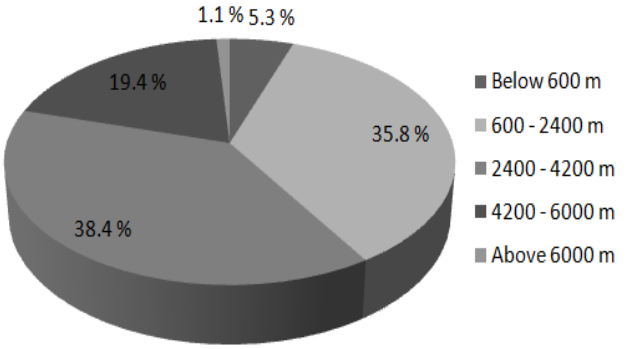

Figure 1: Area by Altitudinal Range (%)

1.1.3 Climate

The climate is dominated by southwestern monsoon, which originates from the Bay of Bengal and accounts for 60-90 % of the annual precipitation. Generally, the monsoon starts from June and lasts until early September. The post monsoon rain during October and November can be sometimes heavy. The period from November to March is usually dry,

although brief showers may be experienced due to the westerly wind that brings winter rains in the Himalayan foothills. During April and May, pre-monsoon occurs with light showers. Mean annual rainfall varies from approximately 2,500-5,500 millimeters (mm) in the southern foothills, from 1,000-2,500 mm in the middle valleys and inner hills, and from 500-1,000 mm in the northern part of the country. The country can be divided into three broad climatic zones: sub-tropical in the southern foothills; temperate in the middle valleys and inner hills; and alpine in the northern mountains. Generally, southern foothills are hot and humid during summer and cool in winter. The middle valleys and inner hills are warm in summer and cold in winter, with a pleasant spring and autumn. The alpine mountains are cold throughout the year with long icy winter conditions.

1.1.4 Geology

In Bhutan, three main geo-tectonic units have been recognized: the Frontal Belt, making up the foothills and parts of the Lesser or Lower Himalaya; the Central Crystalline Belt, occupying portions of the Lesser and Higher Himalaya; and the Tethyan Belt, covering the Higher Himalaya and isolated but large portions of the Lesser Himalaya.

The Frontal Belt consists of recent deposits of sand, gravel, and boulders in the foothill terraces. The Siwalik group of rocks consists of sedimentary and meta-sedimentary rocks extending in an east-west direction and dipping north. They are exposed in the south-central part of the country extending from the east of Raidak River (Wang Chhu) to the west of Sarpang town and in the eastern part from the east of Manas River to the eastern boundary with the Indian state of Arunachal Pradesh. The Damuda (Gondwana) and Diuri Formations are exposed in the eastern part of the country. The Damuda rocks of Permian age consist of sandstone, shale, and coal seams; they overlie the Siwalik rocks along the Main Boundary Thrust. The Diuri Formation, at times considered part of the Damuda, comprises grey slate boulders, made up of pebbles of quartzite, phyllite, dolomite, and gneiss in a slaty matrix. The Buxa group of rocks consists of dolomite, variegated phyllite, quartzite, and conglomerate. This group of rocks stretches from the western-most part of the country to the east along the foothills. The Shumar Formation overlies the Buxa group and consists of meta-sedimentary phyllite, quartzite, and thin marble bands.

The two main lithological groups of metamorphic thrust sheets of the Central Crystalline Belt are the Thimphu Gneissic Complex and the Paro Formation. The Thimphu Gneissic Complex is characterized by magmatites and biotite-granite-gneisses with thin beds of quartzite, quartz mica schist, calc-silicate, and marble, and is the major rock type covering the country. The Paro Formation is characterized by quartz mica schist, quartzite, calc-silicate, marble, and a thin bed of graphitic schist, and this is exposed in and around Paro. The Central Crystalline Belt is affected by intrusion of tourmaline bearing granites and pegmatites in the form of dykes, sills, laccoliths, and larger intrusions. The larger intrusive bodies are concentrated in the northern ranges.

The metamorphic and granitised contact of the Tethyan rocks with the underlying Thimphu Gneissic Complex is gradational. The Tethyan rocks are exposed in the extreme north of the country and the central area of Black Mountains and their surroundings. This rock type basically comprises quartzite, siltstone, sandstone, phyllite, slate, limestone, and conglomerate.

1.1.5 Demography

According to the PHCB (2005), the country's total population in 2005 was 634,982 with a growth rate of 1.30 %/annum and a population density of 16 people/km^2. Based on this figure, for 2013, the NSB projected a total population of about 733,000, which translates to a projected population density of 19 people/km^2 .

The majority of the Bhutanese are a homogenous group divided into three main ethnic groups: the Sharchops (inhabitants of the east); the Ngalongs (inhabitants of the west); and the Lhotshampas, (inhabitants of the south). There are also a number of smaller groups and communities with distinct dialects and cultural nuances. These include Bumthaps in Bumthang, Khengpas in Zhemgang and in parts of Mongar and Dagana, Monpas in Trongsa, Kurtoeps in Lhuentse, Layaps in Gasa and Lunaps in Thimphu, Brokpas and Dakpas in Trashigang, and Doyas in Samtse. The ethnic divisions are, however, gradually disappearing as a result of growing inter-marriage, inter-regional migration and population dynamics.

1.1.6 Economy

Bhutan's economy is one of the smallest in the world but one which is growing fast. From 2000-07, the country's Gross Domestic Product (GDP) has grown at an average of 9.10%/annum. However, the average annual growth has decreased to about 7.30% during the 10th FYP (2007–12). The Bhutanese economy basically revolves around four key sectors; hydropower, renewable natural resources (RNR) - including agriculture, livestock and forestry, tourism and industry.

Bhutan is endowed with abundant hydropower resources as a result of high precipitation, extensive forest cover and well preserved watersheds. At present, the country has a total installed hydropower capacity of 1,488 megawatts (MW). In the next 5-10 years, the total installed capacity is expected to increase to 4,359 MW with the completion of ongoing and pipeline hydropower projects. These include Punatsangchhu I and II, Mangdechhu, and Dagachhu hydropower projects. During the year 2012, the annual revenue from the export and domestic sale of energy was calculated to be about Nu 10,134.02 M from Tala, Chhukha and Kurichhu hydropower plants. Hydropower resources accounted to about 16.80% of the GDP in 2012 (Figure 2).

The RNR sector accounted for 17.10% of the GDP in 2007. This sector is crucial for a sustainable economy as the rural communities, which make up 69% of the country's total population, primarily depend on it for their livelihoods.

Despite the policy of "low volume, high value" tourism, the number of tourist arrivals and consequent tourism revenue has grown significantly over the years. The number of tourist arrivals increased from 4,765 in 1995 to 7,559 in 2000, 21,094 in 2007 to 105,407 in 2012. The arrivals in 2012 also include both international and regional tourists and other visitors on business and official trips. Consequently, direct revenue from tourism increased from US$ 5.8 M in 1995 to US$ 10.5 M in 2000, US$ 29.9 M in 2007 and US$ 62.80 M in 2012. The growth in tourism has been due to the "exclusivity" factor stemming from well preserved culture, relatively unspoiled environment and improved communications facilities and marketing strategies.

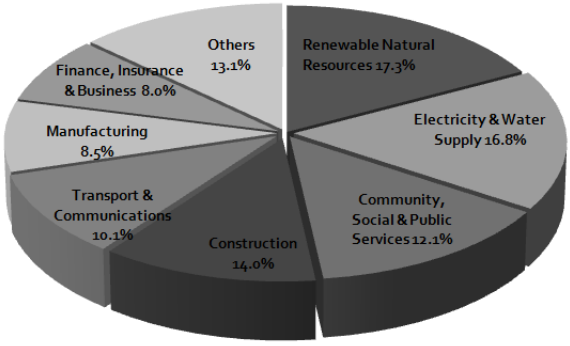

Figure 2: GDP Contribution by Sector (%)

Bhutan has witnessed steady growth in the industrial sectors. Number of industrial establishments by sectors (excluding trade) increased from 13,908 in 2002 to 37,282 in 2012. The manufacturing industry is dominated by small number of entrepreneurs. In 2007, income from exports and domestic sales of major industries was Nu. 6,069.20 M. The prospect of mega-scale major industrial development in Bhutan is limited because of mountainous topography and small domestic workforce.

1.2 Environmental Settings

1.2.1 Land Use and Land Cover

According to the Land Cover Mapping Project (LCMP, 2010), the forest cover accounts for 70.46% (excluding 10.81% shrubs) of the country's land cover (Figure 3 & *Annexure IV*). Broadleaf forests and mixed conifers are the main forest types. Other forest types include fir, broadleaf with conifers, blue pine and chir-pine. The country's forests are presently managed as government reserved forests (GRF) under the legal framework of the Forest and Nature Conservation Act 1995. The Bhutanese society, especially those living in the rural areas, depend heavily on forests for timber, fuel wood, roofing materials (shingles, thatch etc.), fodder, and many edible, medicinal and aromatic plants.

While the rural communities, which make up 69% of the Bhutanese population, largely depend on subsistence farming, only 2.93% of the country's total area is under cultivation, which are located mostly in the central valleys and in the southern foothills. The main land uses for agriculture are kamzhing (dryland cultivation) and chhuzhing (irrigated paddy field).

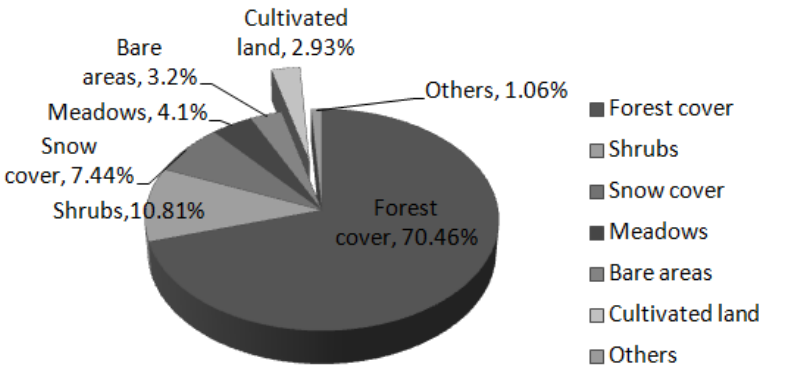

Figure 3: Land Cover in Bhutan (%)

Kamzhing is either terraced or un-terraced rainfed agricultural land. It is found throughout the country, mainly on the steep slopes. Maize and potato are the main crops grown. Besides these crops, other annual crops such as mustard, buckwheat, turnip and vegetables are grown in the temperate areas. In the subtropical areas, millet is grown as a secondary crop. Under kamzhing, there also exists the practice of tseri, which is still prevalent in some remote areas, but strongly discouraged by the government. Since tseri is generally located within or adjacent to forests, incidences of crop depredation by wildlife are high. Hence, more suitable alternatives are being explored and promoted, e.g. orchard development and terracing.

While paddy is the primary crop in chhuzhing, other annual crops viz. wheat, potatoes and vegetables are grown as secondary crops. In the subtropical areas, paddy is grown twice a year. Chhuzhing is mainly found in the fertile valleys of Paro, Wangdue and Punakha. In other parts of the country such as Trashigang, Mongar, Lhuentse and Trongsa, chhuzhing is found scattered on hill slopes. In the southern foothills, it can be found in long and extensive stretches, and is partly rainfed.

Other land cover includes shrubs (10.81%), snow and glaciers (7.44%), meadows (4.10%) and bare land (3.20%). Degraded areas, water bodies, built-up and non built-up areas, marshy areas constitute < 1.06%.

1.2.2 Water Resources

Bhutan has an extensive network of rivers, arising from high level of precipitation, presence of numerous glaciers and glacial lakes, and relatively well-preserved forests. The country's river system can be divided into four major river basins, namely Amo Chhu (Toorsa), Wang Chhu (Raidak), Puna Tsang Chhu (Sunkosh), and Drangme Chhu (Manas).[3] Drangme

[3] The names within the parenthesis are the ones used in southern parts of the country and the adjoining states of India.

Chhu, which is the largest river basin, drains more than one-third of the country. Besides, several small river basins exist occupying largely the southern part of the country (Table 1).

In addition, there are a number of small and medium-sized lakes spread across the northern frontiers of the country. However, a systematic assessment of the area and location of various lakes in the country (except glacial lakes), have not been carried out. As for glacial lakes, the Inventory of Glaciers, Glacial Lakes and GLOF in Bhutan produced in 2001 by the DGM reports a total of 2,674 lakes[4]. However, most of the glacial lakes are extremely small. The largest of all the lakes is the Raphstreng Tsho, which is located at an altitude of 4,360 m in the eastern part of Lunana. According to WAPCOS (1997), the lake measures 1.94 km long, 1.13 km wide and 107 m deep.

Table 1: River Systems of Bhutan

River Basin	Major Tributaries	Basin Area (km^2)
Amo Chhu (Toorsa)	-	2,400
Wang Chhu	Thim Chhu, Pa Chhu, Haa Chhu	4,689
Punatshang Chhu	Mo Chhu, Pho Chhu, Drang Chhu, Daga Chhu	10,355
Drangme Chhu (Manas)	Mangde Chhu, Chume Chhu, Chamkhar Chhu, Kuri Chhu, Kholong Chhu, Gongri Chhu	16,599
SamtseArea multi-river	-	962
Gelephu Area multi-river	-	1,956
Samdrup Jongkhar multi- .	-	2,279
Shingkhar- Lauri multi- .	-	779

(Source: Water Resources Management Plan. DoE, 2003)

1.2.3 Biological Diversity

Bhutan's biological diversity is considered one of the most outstanding for a country of its size. The country's location at the junction of two major bio-geographic realms; the Palearctic realm of the temperate Eurasia and the Indo-Malayan realm of the tropical Indian subcontinent and it is extremely heterogeneous physical relief and climatic condition. These features have given rise to a diversity of ecosystems ranging from the hot and humid subtropical forests and grasslands through temperate mountain forests and valleys to alpine scrublands and meadows.

[4] The Inventory was produced with support from the International Center for Integrated Mountain Development and the United Nations Environment Program.

The country's diverse ecosystems harbor a remarkable assortment of wild flora and fauna. The Flora of Bhutan has recorded 5,603 species of seed plants, of which 105 species are currently endemic.[5] The country's wild fauna includes 700 species of birds and close to 200 species of mammals, of which 27 species are globally threatened. These include several species such as the Bengal tiger *Panthera tigris tigris*, snow leopard *Uncia uncia*, Asian elephant *Elephas maximus*, red panda *Ailurus fulgens*, golden langur *Trachypithecus geei*, takin *Budorcas taxicolor* (national animal of Bhutan), white-bellied heron *Ardea insignis*, and black-necked crane *Grus nigricollis*[6]. Other wild fauna, such as herpeto-fauna and invertebrates, although only partially assessed so far, are also expected to exist in significant numbers.

In terms of agro-biodiversity, there is a high species diversity of agricultural crops and livestock with 100 species of agricultural crops and 15 species of livestock. Some of these have adapted in the country's rugged mountain and harsh climatic conditions and, therefore, bear distinctive features.

[5] All figures pertaining to biodiversity cited in this document derived from the Biodiversity Action Plan for Bhutan 2009.
[6] Globally threatened species are those which are characterized as critically endangered or vulnerable listed in the Red List of Threatened Species maintained by the World Conservation Union (IUCN).

CHAPTER II: OVERVIEW OF UNCCD

2.1 The Conception of UNCCD

Desertification and land degradation are environmental problems of global dimension. It is estimated that worldwide 1.97 billion hac of all usable land have been affected by various forms of human-induced land degradation (FAO, 1996). Deforestation, overgrazing, fuel wood consumption, agricultural mismanagement, industries, urbanization, and infrastructure development are the key causes. Poverty, population growth and natural factors such as extreme climate and unstable geology also contribute significantly. Desertification and land degradation reduce carbon sequestration and storage, increase carbon emission, diminish agricultural productivity, lead to loss of biodiversity, adversely impact water resources through sedimentation, and increase vulnerability to natural disasters.

The problems of desertification and land degradation have long been recognized internationally. The United Nations Conference on Desertification (UNCOD) held in 1977 at Nairobi, Kenya, urged the international community to halt land degradation and implement restoration activities. The Conference, culminated in the release of a Plan of Action to Combat Desertification.

In June 1992, the United Nations (UN) convened the UN Conference on Environmental and Development (UNCED), commonly referred to as the Earth Summit, at Rio de Janeiro, Brazil, to discuss the wide range of environmental concerns and to come to an understanding of "development" that would support socio-economic development and prevent the continued deterioration of the environment. The Earth Summit laid the foundation for global partnerships between the developing and developed nations, based on mutual needs and common interests that would ensure environmentally sustainable development. Altogether 172 governments, including 108 Heads of State or Government, participated in the conference.

At the conference, the international community adopted Agenda 21 – a blueprint of action on environment and development for the 21st century and reaffirmed the need for managing fragile ecosystems to combat desertification. They also called on the UN General Assembly to establish an Intergovernmental Negotiating Committee to prepare a legally binding international instrument to combat desertification. Consequently, a series of international negotiations led to the formulation and adoption of the UNCCD in June 1994. The UNCCD came into force in December 1996, i.e. 90 days after 50 countries had deposited the instrument of ratification. Bhutan acceded to the UNCCD in August 2003. Altogether, as of May 2012, 195 countries had become party to this immensely consequential international treaty.

2.2 The Objectives of UNCCD

The main objective of the UNCCD is "to combat desertification and land degradation and mitigate their effects through effective action at all levels, supported by international cooperation and partnership arrangements, in the framework of an integrated approach which is consistent with Agenda 21 with a view to contributing to the achievement of sustainable development in affected areas." [7] This objective requires holistic strategies that focus on improved productivity of land, the rehabilitation, conservation and sustainable management of land resources, leading to improved living conditions of communities.

The UNCCD aims to promote effective action through innovative local programs and supportive international partnerships. Key obligations under the UNCCD are outlined below:

- Adoption of an integrated approach addressing the physical, biological and socio-economic aspects of the processes of land degradation.[8] Such an approach should include strategies for poverty reduction into efforts to combat land degradation and mitigate its effects.
- Establishment of institutional mechanisms to combat land degradation and its effects.
- Placing priority to combating land degradation and mitigating its effects and allocation of adequate resources in accordance with national circumstances and capabilities.
- Establishment of strategies and priorities to combat land degradation and mitigate its effects within the framework of national sustainable development plans and/or policies.
- Awareness building and facilitation of the participation of local communities, particularly women and youth, with the support of NGOs in efforts to combat land degradation and mitigate its effects.
- Creation of an enabling environment by strengthening, as appropriate, relevant existing legislation and, where they do not exist, enacting new laws and establishing long-term policies and action programs.
- Development and implementation of a national action program to combat land degradation and mitigate its effects, and its enhancement through a continuing participatory process on the basis of lessons learned from field action and results from research.

2.2.1 Convention's 10 Year Strategic Plan

The UNCCD serves as a unique organisational instrument that highlights land degradation in the dryland where some of the most vulnerable ecosystems and people in the world exist. Ever since the Convention came into force and after years of implementation, it is recognized that numerous detrimental factors have curtailed deployment of the Convention. Some of the major factors include insufficient financing contrary to two Rio sister conventions, inadequate advocacy and awareness among various constituencies, weak scientific basis, institutional weaknesses and failing to reach consensus among the Party

[7] In this document, a slight modification to the original UNCCD text has been made in view of the broader scope that the UNCCD has assumed since its conception.

[8] The original UNCCD text refers to desertification and drought. However, in the context of Bhutan the term "land degradation" is considered more appropriate and comprehensible, and therefore has been used in place of desertification.

members. Thus, the Convention's 10 year strategic plan and framework envisage in leveraging the implementation of the Convention. The Convention's Vision and Mission statements state:

Vision

"The aim of the future is to forge a global partnership and prevent desertification/land degradation and to mitigate the effects of drought in affected areas in order to support poverty reduction and environmental sustainability."

Mission

"To provide a global framework to support the development and implementation of national and regional policies, programs and measures to prevent, control and reverse desertification/land degradation and mitigate the effects of drought through scientific and technological excellence, raising public awareness, standard setting, advocacy and resource mobilization, thereby contributing to poverty reduction."

The vision pursues four strategic objectives, with set of expected impacts. The strategic objectives are expected to guide all actions of the stakeholders and partners during 2008–18 in achieving the vision.

Furthermore, the five operational objectives have been formulated with a view to supporting the attainment of vision and strategic objectives. Each operational objective is further expected to deliver number of outcomes.

"Operational objective 1: Advocacy, awareness raising and education

To actively influence relevant international, national and local processes and actors in adequately addressing desertification/land degradation and drought-related issues

Operational objective 2: Policy framework

To support the creation of enabling environments for promoting solutions to combat desertification/land degradation and mitigate the effects of drought

Operational objective 3: Science, technology and knowledge

To become a global authority on scientific and technical knowledge pertaining to desertification/land degradation and mitigation of the effects of drought

Operational objective 4: Capacity-building

To identify and address capacity-building needs to prevent and reverse desertification/land degradation and mitigate the effects of drought

Operational objective 5: Financing and technology transfer

To mobilize and improve the targeting and coordination of national, bilateral and multilateral financial and technological resources in order to increase their impact and effectiveness."

CHAPTER III: THE NAP IN BHUTANESE CONTEXT

3.1 The Rationale for NAP

The NAP is a key tool for the implementation of the UNCCD at the country level. They are strengthened by action programs at sub-regional and regional levels. It was developed through participatory approach involving wide spectrum of stakeholders, including relevant government agencies, scientific institutions, local governments and communities.

The RGoB has been implementing various programs and projects to combat land degradation since the advent of FYPs in the early 1960s. Unfortunately, these have been largely taking place in a piecemeal fashion within individual sector plans and basically without any macro-level strategic policy. The *Report on the Review of Sustainable Land Management Mainstreaming in Government Policies and Plans in Bhutan* (NSSC, 2008), indicated that while targeted programs and projects for SLM have increased in the 10th FYP when compared to the 9th FYP, they remain basically sector-based as in the past. The review further observes that green sectors such as agriculture and forestry feature SLM more strongly in their policies and programs whereas brown sectors, especially those concerning infrastructure development and urban development, have only cursory or no reference to SLM in their policy and programmatic frameworks. It calls for a broader perspective and an integrated approach to combat land degradation as a problem which cuts across various development sectors. Hence, NAP, regardless of being an obligation under the UNCCD, is an opportunity to take stock of existing measures, identify new ones, and consolidate and direct future actions to combat land degradation issues and causes in a more strategic and holistic manner using participatory approaches that capture the insights, experiences and views of various stakeholders.

3.2 The Process of NAP Preparation

The NAP process in Bhutan was initiated with an Inception Workshop on 29th October, 2008, followed by a Process Framework Workshop on 29th December, 2008. These workshops familiarized the representatives of various stakeholder agencies with the concept and objectives of UNCCD and NAP, and discussed the NAP structure and process framework particularly with respect to stakeholder consultations and participatory planning.

Based on the adopted NAP process framework, community consultations were held in 13 Gewogs to understand land degradation problems and issues at the local community level on a first-hand basis. Altogether, 327 local people participated in the community consultations in various Gewogs (Table 2). They included local community leaders, village elders, youths, and women. In order to capture experience as well as new perceptions, local people across various age groups were involved in the community consultations. Participants below 30 years of age comprised 18.60% in the community consultations while persons above 60 years made up 15%. During the consultations, 77 local government staff

participated in various Gewogs as observers, providing clarifications and additional contributions.

The community consultations were followed by a series of four regional consultative workshops organized in April 2009, in collaboration with the respective regional Renewable Natural Resources Research Centers (RNR-RDCs). The workshop for the eastern region was held at RNR-RDC, Wengkhar, RNR-RDC, Jakar for the east-central region, College of Natural Resources (CNR), Lobesa for the west-central region and NSSC, Simtokha for the western region. The workshop recorded the participation of 114 people comprising officials from agriculture, livestock and forestry sectors; planning, engineering, and environment divisions of various Dzongkhag administrations; and territorial forestry divisions and regional RNR-RDCs. At the regional consultative workshops, facilitated by the NAP consultant, the participants analyzed land degradation problems, issues, identified the causes, and outlined possible activities to address these causes.

On completion of the regional consultative workshops, the NAP consultant collated and analyzed the results of the workshops as well as those of the community consultations held at Gewog level to put together the draft NAP document. In preparing the draft NAP, existing documents related to land degradation and SLM were also reviewed and meetings with individuals in various organizations were held to seek additional information, insights and clarifications.

Table 2: Community Participants for Consultation (by Age Groups)

Gewog (Dzongkhag)	Age (Years)			Total
	< 30	30 – 60	>60	
Bjena (Wangdue)	2	17	4	23
Bumdeling (Trashiyangtse)	8	14	2	24
Darla (Chhukha)	9	21	1	31
Drujegang (Dagana)	4	15	2	21
Gelephu (Sarpang)	1	14	3	18
Hungrel (Paro)	2	7	5	14
Langthel (Trongsa)	5	20	2	27
Mewang (Thimphu)	5	13	6	24
Orong (Samdrup Jongkhar)	6	26	10	42
Pugli (Samtse)	3	21	8	32
Semjong (Tsirang)	6	12	2	20
Talo (Punakha)	0	18	2	20
Zobel (Pemagatshel)	10	19	2	31
TOTAL	**61**	**217**	**49**	**327**

The first draft of the NAP was presented to representatives from various organizations on 17th June, 2009, coinciding with the World Day to Combat Desertification. The draft was then revised, incorporating comments received at the presentation of the first draft, and circulated for wider review and feedback from relevant stakeholders and task force members. The final draft of the NAP was presented at a high level workshop, chaired by the Hon'ble Minister of MoAF on 12th August, 2009.

3.3 The NAP Alignment

Special attention was given to the existing NAP document to bring out the collective actions to address land degradation issues in the country. The document essentially highlights the types of activities crucial to address the issues under various stakeholder organizations. However, it falls short in unfolding to what extent these action programs would be implemented, how the progress of each would be assessed during the implementation phase, the budget size in place to address a particular action point and the targets realized at the later stages of NAP implementation.

To address land degradation in the country, it is imperative to look at the planned programs in the national planning document. The NAP alignment should not be brushed off as merely an exercise to fulfill the obligation to the Convention. Rather, the aligned NAP should essentially serve as a national guiding document. This exercise gives a perfect opportunity to assess the status of land degradation in the country, different sectors' initiatives to address land degradation problems and issues and make the concerned stakeholders responsible.

The decision for the NAP alignment to 10 year strategy was made during (Conference of Parties) COP.8, through which decision 3/COP.8 urged all the affected country parties "…to align their action programs and other relevant implementation activities relating to the Convention with The Strategy by, inter alia, addressing the outcomes under the five operational objectives (paragraph 5)." Further, the decision 13/COP.9 sets for the performance indicator CONS-0-5 the target of an 80% completion of NAP alignment process of the affected country parties by the year 2014.

Currently, the implementation of Convention's 10 years strategic plan is mid way through, indicating that half of the strategic plan period for Bhutan has already elapsed. However, the execution of NAP alignment exercise and implementation of 11th FYP is underway simultaneously.

3.4 The process of NAP alignment

The approach that was adopted to execute NAP alignment exercise was no different from original NAP preparation, which included inception workshop, meeting of the taskforce members (TFMs) and consultation workshops at various levels. A substantial effort was

put into revisiting the 11th FYP documents of central government agencies and local governments.

The process began with the inception workshop conducted on 19th October 2013, followed by the TFM meet on 21st October 2013. These workshops enabled familiarization of the various stakeholders with the formulation of existing NAP, concepts and objectives of the Convention. The NAP alignment structure and its process framework, particularly with respect to stakeholder consultations and participatory planning were also discussed extensively during the workshop.

A total of four regional consultation workshops were held, one each at Mongar, Samdrup Jongkhar, Gelephu and Phuentsholing, with participants from 12 Dzongkhags. The main objective was to sensitize the stakeholders on issues concerning land degradation, its causes and preventive measures. Besides, the workshop also aimed at collecting information on stakeholders' approach to addressing the issues at stake through various means, including policy, human and institutional capacity building and integration of SLM technology and indigenous knowledge into addressing the land degradation issues.

Participants during the workshops comprised of Dzongkhag sector heads, local government leaders, Gewog extension agents, Gewog administrators and Mangmis (Table 3). Since comprehensive stakeholder consultation meetings involving many participants were already conducted during the NAP preparation phase, the number of events and participants during this consultation was kept comparatively low owing to time and financial constraints.

Table 3: The Number of Regional Consultations held during the NAP Alignment Exercise

Participants	Gelephu	Mongar	Phuentsholing	Samdrupjongkhar
Dzongkhag RNR staff	10 + 1[9]	9	7 + 2[10]	11
Gewog RNR staff	9	6	6	6
Gewog Administration	30	26	26	30
Farmers	11	16	8	-

3.5 The Eleventh Five Year Plan

The national objective of the 11th FYP of Bhutan is to achieve "**Self Reliance and Inclusive Green Socio-Economic Development**" – achieving the "*ability to meet all our national development needs as articulated through 5 Year Plans by 2018" and "reducing poverty and inequality by enhancing the standard of living and the quality of life of the most vulnerable sections of our society*."

[9] One participant from RDC, Bhur
[10] One participant each from RDC, Bajo and Phuentsholing Thromde

Unlike the past plans, the current plan is significant and unique for its inclusion of clear National Key Result Areas (NKRA) - an outcome at the national level, which the government expects to achieve during the plan period through respective Sector Key Result Areas (SKRA) and Dzongkhag Key Result Areas (DKRA). All KRAs can be monitored by a set of Key Performance Indicators (KPI) at different levels making the task of assessment and monitoring the progress of action components more intuitive and practical.

Part B: Overview of Land Degradation in Bhutan and its Causes

CHAPTER IV: LAND DEGRADATION AND ITS CAUSES

4.1 Overview of land degradation

The Bhutanese economy essentially revolves around how land and the resources therein are used and managed. The stability and productivity of arable land, rangeland and forests are critical for the sustenance of rural economy. Hydropower, which is the largest revenue-generating sector and the main engine of socio-economic development, is very much dependent on sound land use and management practices in the watersheds. The mining industry, which in recent years has reportedly registered the highest growth rate among all sectors, can have severe impacts on the land and surrounding environment (air, water, and biodiversity) if essential environmental safeguards and land management measures are not implemented. Similarly, infrastructure development such as construction of roads and power transmission grids, which are necessary for equitable socio-economic development, can have disastrous consequences if geologic stability considerations and environmental management needs are not incorporated in their alignment, design and construction.

Habitable and cultivable land in Bhutan is severely limited (< 8%) as a result of difficult mountain terrain, vast areas of snow and barren rocks, harsh climatic conditions, and vast forest cover, which by law is to be maintained at no less than 60% at all times. This has inadvertently led to increased land use competition between various development sectors often without adequate consideration of land capability and environmental management needs. SLM based on holistic approach, involving inter-sectoral dialogue and coordination, is critical to harmonize competitive land use.

Furthermore, the benefits of actions to combat land degradation in Bhutan will not be limited to the country but will have trans-boundary effects in geographic scale. The protection of watersheds in Bhutan from adverse land use practices, whilst being crucial to sustain hydropower development and agriculture within the country, will also be enormously important to the livelihoods of downstream communities in the floodplains of India and Bangladesh, who largely subsist on agriculture and fishery.

It is also important that proactive measures are taken to combat land degradation and its impacts considering the landscapes that are extremely vulnerable to climate change as a result of the fragile geologic conditions, intense rainfall, and rugged topography. Not only do well-managed landscapes play an important role in moderating the impacts of climate change, they also function as a major carbon sink.

With the advent of democracy, new environmental challenges are expected to emerge. In the new political scenario, there is the risk of short-term economic development needs of the public taking precedence over the long-term benefits of environmental conservation. In the changing social, economic and political scenarios, proactive and concerted actions for sustainable management of our landscapes have become more crucial than ever before.

4.2 Physical land degradation in Bhutan - its implications

Due to geo-morphological and climatic conditions prevailing in the country, land degradation due to water erosion is of great concern (Gyeltshen & Norbu, 2013). Most of the landscape is "quasi-stable" due to its topography and geological construct. The soils derived from gneiss rock types erode less in contrast to soils formed from other rocks such as schists and phyllites. This is mainly because soils developed from such rocks are coarser in nature than the more silt and clay rich soils over schists and phyllites. According to Norbu *et al*. (2003) only a small trigger is necessary to destabilise it for the surface materials to slip down and eventually be washed away. A real cause of concern for Bhutan is that greater part of the landscape in the Eastern, Central and Southern parts of Bhutan is underlain by an inherent less stable geological formation which has dominant schists and phyllitic rocks. This contributes in making the slopes very fragile and susceptible to land degradation processes, particularly water erosion. It is important to recognise that people cultivate on these fragile steep slopes due to limitation of gentle slopes and flat lands across the country – thereby causing probable occurrence of land degradation due to water erosion. It may be because of such favourable factors that the degree of severity of water erosion is rated as high to very high (Oldeman *et al.*1993*)*, though, this was concluded using generalized datasets. All these demand explicit establishment of interconnection when trying to address land degradation problems.

In recent years, occurrence of increasing land degradation has been reported from across the country (NSSC, 2005). Rinzin (2008) indicates a very strong interplay amongst the factors responsible for causing land degradation such as anthropogenic factors (i.e. increased population, unsustainable land management practices, overgrazing, deforestation, etc.); the bio- physical factors like unfavourable geology; and the environmental factors viz. monsoon climate and the emerging effects of climate change observed through uncharacteristic patterns of weather conditions. There are other factors that do not trigger immediate attention like socio-economic changes and earthquakes in contributing to land degradation (Gyeltshen, 2010). The need to look at the socio-economic changes is essential because Bhutan has been undergoing rapid changes in these contexts since the introduction of planned programs starting late 1960s.

Furthermore, inclusion of the natural factors such as earthquake is crucial, especially in regions located in the seismically active zones, for instance in the Himalayan belt (Bali *et al*. 2009), as one of the indirect factors causing physical land degradation. Series of physical land degradation assessments carried out by NSSC concludes that natural events such as earthquake, is in fact, one of the main factors causing land degradation in Bhutan (NSSC, 2013).

4.3 Direct Factors

4.3.1 Forest Fires

Each year, about 20 M hac of forests worldwide are razed by wildfires (Tishkov, 2004). Globally, loss and degradation of forest lands resulting from forest fires is estimated to be equivalent to that caused by the combined factors of destructive logging and conversion of forest lands to agriculture. In Bhutan, forest fires persist as a recurrent and widespread phenomenon. They typically occur between November and May in the western region and between January and June in the eastern region. These periods are characterized by dry and windy weather conditions. According to records maintained by the DoFPS, about 239 incidents of forest fires affecting a total forest area of about 19,230 hac have taken place between 2008-13. This translates to an average of about 49 fire incidents and 3,849 hac of burnt forests each year.

The impacts of forest fires basically depend on two factors: local site conditions and the time of occurrence. In steep areas, the negative impact may be immediate, especially if heavy rain follows a forest fire. The rainwater washes away topsoil and ash, depriving the exposed area of nutrients to support natural regeneration. When such processes recur, a succession process is triggered whereby the site may completely degenerate into a barren area. However, some species such as chir-pine *Pinus roxburghii* can withstand minor forest fires. Nevertheless, recurrent forest fires can lead to gradual degeneration of the site and obliteration of associate species rendering the site vulnerable to land degradation and ecosystem change. Nearly, all forest fires that occur in the country are caused by human actions.

4.3.2 Unregulated Farming Activities

These include deliberate burning activities and accidental burning. The former consists of activities such as:

- Agricultural and horticultural burning operations in tseri lands and orchards, from where the fire escapes into the adjacent forests.
- Burning activities carried out to enhance regeneration of forage for cattle since free-range grazing is widely prevalent across the country.
- Prevention against wildlife incursion, since crop and livestock depredation by wildlife is a widespread problem in the rural areas.
- Burning of forest to enhance lemon grass regeneration, since this activity is a major source of income for local communities, especially in the Eastern Dzongkhags.

On the other hand, accidental burning proves to be one of the contributing factors in causing land degradation. These occur due to campfires left un-extinguished by picnickers and cattle herders; careless disposal of cigarette butts by travelers; short-circuits from poorly maintained electrical lines; children playing with match-sticks; and roadside fires used for melting bitumen, etc. There are a number of key issues related to the persistence of forest

fires as a major problem in the country. The existing fines and penalties are deemed too severe to be enforced on offenders, who are generally the poor peasants or children. In such circumstances, forest authorities have to, more often than not, either ease the fine or let off the offender with a warning. Although the national strategy and policies for forest fire management exist, it was formulated in 2013. Its implementation has not been effective due to lack of adequate resources. Hence, activities relating to prevention and control of forest fires, research on forest fire management, and public education and awareness are generally planned and implemented in an *ad hoc* manner. The existing trend on occurrence of forest fire indicates that current public education and awareness activities do not seem to have had the desired impacts. The suppression of forest fires, especially in mountainous terrain, is a highly perilous and arduous task that requires special training and proper fire fighting gears. However, existing fire fighting capacity in terms of training as well as equipment is rudimentary and inadequate.

Forest fires are not always necessarily detrimental. In some natural areas, for instance, in Manas and Kaziranga National Parks in India, controlled burning of ground vegetation is used as a habitat management tool. It is also believed that in chir-pine forest, which is a fire-adapted ecosystem, moderate frequency of fires can have beneficial effects in terms of reducing fuel loads that may accumulate as a result of prolonged absence of forest fire.

4.3.3 Excessive Forest Use

Bhutan's per capita fuel wood consumption is considered as one of the highest in the world. Fuel wood is the main source of energy for cooking and heating in rural areas. Although collection of dry fuel wood in the form of fallen twigs and driftwood is common, bulk of the fuel wood needs is met from natural forests. According to the DoE, in 2013, fuel wood accounted for about 94% of the total primary energy supply in the rural areas against 6% in the urban areas. Apart from domestic use in rural areas, it is heavily used for industrial production, agro and forest products processing, road construction, hospitals, schools, military establishments and monasteries.

The use of timber in construction is also high with traditional Bhutanese architecture entailing extensive use of timber. Almost all traditional housing structures including flooring, staircase, windows and doors, beams, pillars and roofs are made of wood. Dilapidation of old houses, population growth and fragmentation of families, make construction of new houses necessary. In addition, constructions of socio-economic service infrastructure such as hospitals, basic health units, outreach clinics, schools, agriculture research and extension centers, and Gewog administrative offices have surged in the recent years.

The FMUs are created for sustainable timber harvesting based on forest management plans that take account of growing stock and annual permissible harvest. However, not all timber needs are met from FMUs. A significant amount of timber needs, especially for rural construction, is met on *ad hoc* basis, implying that such practices could lead to

unsustainable harvesting and cause forest degradation. There are also instances when the desired species and size of timber for special infrastructure projects, such as construction or renovation of Dzongs or Lhakhangs (monasteries) are not available in the FMUs and have to be extracted from non-FMU areas. The Forest Resource Management Division (FRMD) has developed planning guidelines for management of forest areas outside the FMU system so that these areas can be used for extraction of forest resources based on simple but sound silviculture principles and practices. However, these guidelines have not yet been applied in the field for want of technical capacity development in terms of staff training and equipment.

Other major concerns related to logging operations include depletion of water availability to downstream communities as a result of felling of trees in catchment areas, and soil erosion and destruction of young natural regeneration due to dragging and rolling of logs down slopes in places where cable cranes have not been installed for timber extraction.

In addition to timber and fuel wood, there is a wide array of NWFPs that the Bhutanese use for subsistence and income-generation. These include medicinal and aromatic plants, edibles such as mushrooms, ferns and wild greens, bamboo and cane for local handicrafts, plant barks and pulps for paper-making, animal fodder, and collection of leaf litters for farmyard manure. In many places, these NWFPs are becoming, scarce due to overexploitation.

Illegal harvesting of timber and fuel wood is also a major concern. According to the DoFPS records, there were a total of 3,539 offences detected between 2008-13, working it out to an average of 708 forest offence cases every year pertaining to illicit timber and fuel wood extraction. Many more are likely to have occurred and gone undetected. In the forest areas bordering India, illegal extraction of fuel wood and timber is reportedly common because of the exhaustion of forest resources and burgeoning human population across the border. A porous international border and shortage of forest law enforcement personnel make it very difficult to regulate cross-border illegal forest harvesting.

4.3.4 Overgrazing

In Bhutan, overgrazing is one of the factors contributing to land degradation as much of the grazing occurs in forests and open grazing areas on a free-range basis. Livestock rearing is an important economic activity among the rural communities. Cattle are owned by most of the rural households in the country with higher population in the temperate and subtropical regions. In the alpine and sub-alpine regions of the country, such as Laya and Lingshi, yaks are the dominant animals, and the economy is solely based on yak products. Yaks are reared for dairy products, meat and transportation of goods. By the end of 2013, there were 302,526 cattle, 45,840 yaks including Zo/Zom, 39,264 goats, 9,917 sheep and 22,692 equines. Comparing this with the Figure 4, it is apparent that despite continuous government initiatives to reduce livestock population through introduction of improved breeds, artificial insemination and sterilization, and increased animal health coverage, livestock population has remained almost unchanged. Local communities generally continue to maintain large livestock herds as an immediate source of cash income, production of FYM, social status associated with large herds and religious sentiments against culling.

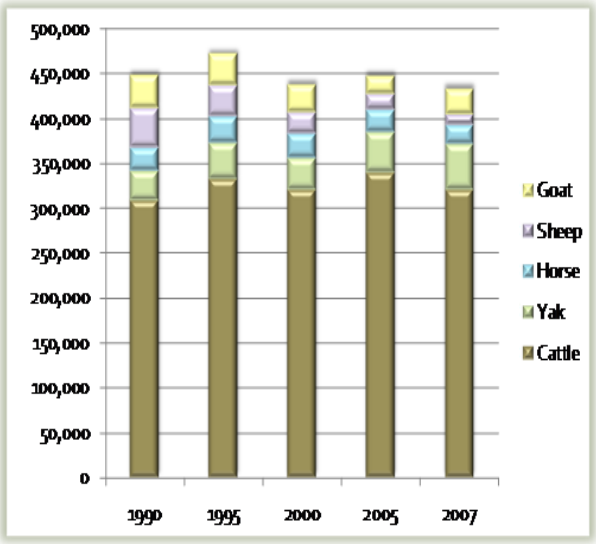

Figure 4: Livestock Population (Major Species) 1990-07

Where livestock densities are high, overgrazing readily occurs. Removal of protective vegetation and trampling of exposed soils lead to decline in biological regeneration of the land, reduced water infiltration and storage, and soil compaction and erosion.

In Bhutan, free-range and migratory grazing is the most common practices as it is far less labour-intensive and less investment required vis-à-vis stall-feeding. Consequently, most of the pastures and adjoining grazing areas near forest in the temperate region are subjected to grazing throughout the year; by yaks in winter and cattle in summer- allowing very little time for regeneration of grazed areas.

4.3.5 Unsustainable Agriculture

4.3.5.1 Imbalanced Use of Inorganic Fertilizers

Traditionally, farmers have relied on FYM (cattle dung or cattle dung mixed with forest litter and/or crop residues) for fertilizing agricultural soils. It is still pre-dominant in many parts of the country. Use of inorganic fertilizers for crop production started in Bhutan only in the 1960s, concurrently with the promotion of high-yielding crop varieties and cash crops. With the expansion of road network, development of distribution systems, promotional activities through subsidies and agricultural extension services, and increased farming of high-yielding crop varieties and cash crops, the use of inorganic fertilizers grew substantially over the years. The import of fertilizer was about 660 metric tons (MT) in 1992 which gradually increased to about 3,270 MT in 2011 averaging about 2,240 MT per year for between 1992-11 (Figure 5).

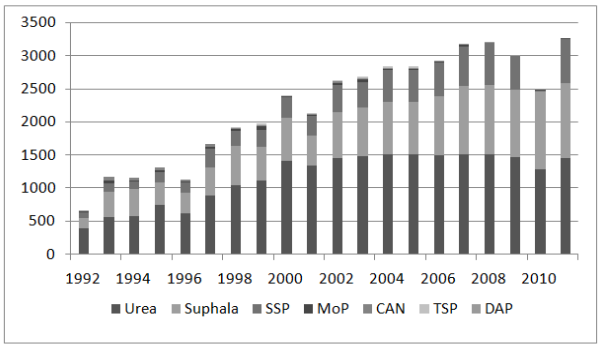

Figure 5: Fertilizer Distribution (1992-11)

Although absolute levels of use of inorganic fertilizers in Bhutan is still comparatively low by global standards, at the household level their use has become increasingly significant especially due to the increase in area for cash crops such as potatoes and apples. The use of inorganic fertilizers in the country is geographically skewed. For instance, on scrutiny of fertilizer distribution pattern for the Dzongkhags during 2011, Bumthang, Trashigang and Wangdue Dzongkhags accounting more than 57% SSP, 26% Urea and 36% Suphala of the major inorganic fertilizers distribution in the country (Figure 6).

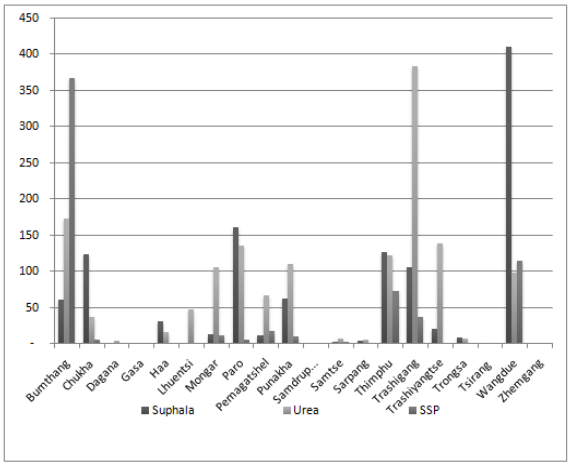

Figure 6: Dzongkhag-wise Fertilizer Distribution (2011)

Furthermore, Urea (nitrogen-supplying compound) is the most commonly used fertilizer because it is cheaper compared to other inorganic fertilizers. This has resulted in an increasing gap between the application of N (Nitrogen) and that of P (Phosphorus) and K (Potassium), creating an imbalance in soil nutrients. The NPK ratio at the national level is 6:1:1. The ratio varies between the regions, with the eastern region

having the highest at 16:1:1 and the western the lowest at 3:1:1 (Table 4). Consequently, mining of natural soil nutrients and chemical degradation of agricultural lands are likely to have occurred. Interactions with local communities suggest that soil hardening is taking place as a result of recurrent use of urea in greater proportions.

Table 4: Share of Plant Nutrients by Region (1997-06)

Region	N	P_2O_5	K_2O	Total	NPK Ratio
Eastern	3,789.40	280.30	239.30	4,309.00	16:1:1
East-central	736.60	459.50	96.80	1,292.90	8:5:1
West-central	1,243.60	387.00	313.10	1,943.70	4:1:1
Western	1,351.80	508.80	504.70	2,365.30	3:1:1

(Source: Norbu C, 2008)

NSSC has been imparting training to farmers on balanced use of inorganic fertilizers and promoting integrated use of inorganic fertilizers and FYM. Technological adoption has, however, been limited owing to rising prices of compound fertilizers, participation of irrelevant participants[11] in training programs and farmers' low literacy level.

4.3.5.2 Steep Slope Agriculture

With the exception of a few wide valleys in the western and central regions and some plain areas in the southern foothills, agriculture is practiced around human settlements which are located on mountain slopes. Ongoing analysis of slope data using GIS-based digital elevation model by the MoAF reveals that 31% of agriculture occurred on lands with more than 50% slope. Pemagatshel, Zhemgang, Mongar, Lhuentse, Trashigang, and Trashiyangste Dzongkhags have the highest proportion of agricultural land on terrain with more than 50% slope while Bumthang, Punakha, Chukha, Thimphu and Paro Dzongkhags have the smallest proportion of agricultural land on terrain less than 50% slope (Figure 7). Agriculture on steep slope is inherently risky, and where such cultivation is practiced

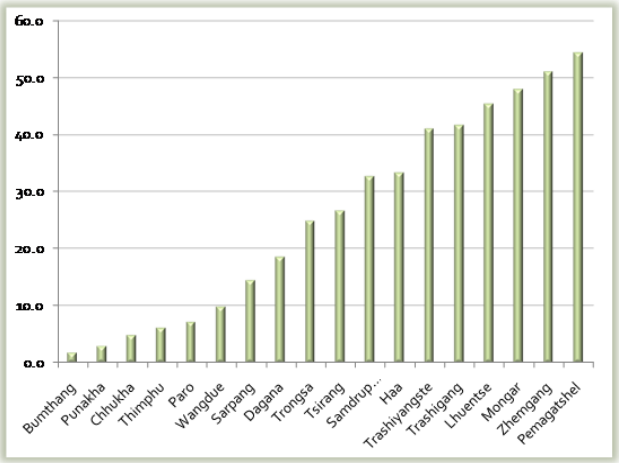

Figure 7: Agricultural Land on Terrain of > 50% Slope

[11] There is a general tendency among rural households in Bhutan to send proxy members, often children or old people, to community meetings and training programs especially when such events coincide with the farming season.

without proper water and soil conservation measures, loss of physical stability and soil fertility is inevitable.

Recognizing the vulnerabilities of steep slope agriculture, the MoAF has been promoting soil conservation measures such as contour-bunding, kamzhing terracing and hedgerow plantation through targeted SLM campaigns and other programs. However, small land holdings, labor shortage and inadequate monitoring and technical backstopping by RNR extension personnel are some key factors that constrain the progress of SLM activities in the field.

4.3.5.3 Use of Plant Protection Chemicals

The use of plant protection chemicals is seen as an easy, inexpensive and quick solution for controlling insect pests and weeds. However, improper and prolonged use of chemical pesticides can pose significant environmental risks such as contamination of land and water (both ground and surface) and negative effect on non-target organisms ranging from beneficial soil microorganisms to fish and birds. Statistics maintained by the National Plant Protection Center (NPPC) of DoA show that the distribution of chemical pesticides for agriculture use particularly for herbicides has been substantial, increasing drastically from 2000 kg/liter (equivalent) in 1986-87 to 28,8368 kg/liter (equivalent) in 2013-14 (Figure 8). The pesticide usage in Bhutan is however considerably low when compared globally (Figure 9). Butachlor, which is an extensively used herbicide in paddy cultivation, alone accounted for nearly 93.75% of the total pesticide import. Extremely hazardous (Class Ia), highly hazardous (Class Ib) pesticides (as per the WHO classification)

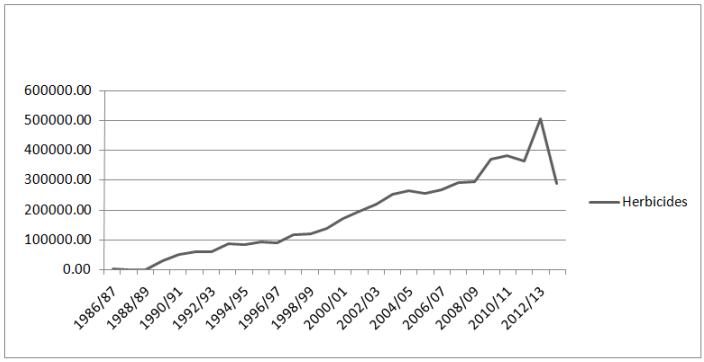

Figure 8: Herbicide Use Trend 1986/87-2012/13

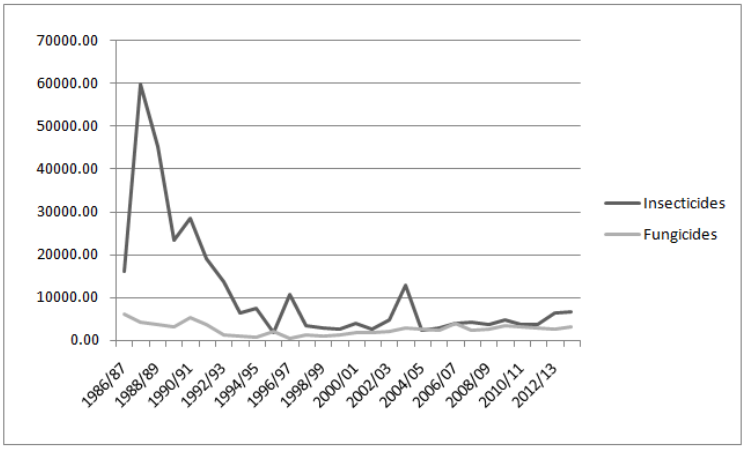

Figure 9: Chemical Pesticide Use Trend 1986/87-2012/13

have been restricted for used in Bhutan since 1990. Nonetheless, it must be noted that a chemical pesticides even if with no acute hazard label may pose cumulatively significant environmental risk when used in great quantity over a long period of time and extremely and highly hazardous pesticides even if used in very small quantities may cause disproportionately higher environmental hazards.

4.3.5.4 Irrigation Management System

According to the responses of Dzongkhag officials and the local communities during the consultation process, improper management of irrigation systems is one of the biggest causes of soil erosion and mass movement of agricultural land. Most irrigation channels in the country are earthen and in places where the underlying soil is loose such irrigation channels cause high percolation of water through the soil medium, which gradually causes gully erosion and landslides downstream. The Phenday irrigation scheme in Talo Gewog (Punakha) is a striking case in point. The irrigation scheme, which is the largest in the country, covers about 600 acres of farm land and benefits around 200 farm households. The tertiary irrigation channels, which are all earthen, were originally about 10-12 inches deep but have now become 20-30 feet deep at a number of places as a result of heavy scouring. Another major weakness in existing management of irrigation systems is the lack of management of the tail section of irrigation channels resulting in overflow and consequent instability of lands beneath the irrigation systems. The National Irrigation Policy requires that project beneficiaries constitute Water Users Associations (WUA) for community management of irrigation systems after their construction is taken over by the project beneficiaries. However, many of the WUAs have become dysfunctional, due to the ambiguity in the institutional mandate for support to WUA as a result of the merging of irrigation services with general engineering services[12] in the Dzongkhags.

4.3.6 Infrastructure Development

4.3.6.1 Construction of Roads

As a landlocked country with little or no domestic air transport infrastructure, Bhutan is currently fully dependent on the road network for travel and transportation of public goods and services. As of 2013, the country had a total road length of 10,578 km including farm roads, forest roads and power tiller tracts and 331 motorable bridges (NSB, 2013). During the 11th FYP, total length of construction of new roads and up gradation/improvement of existing roads is set at 3,820 km. On completion, the road networks are expected to improve efficiency in road travel and transportation of public goods and services. Considering the terrain and fragile geologic conditions, construction of roads is extremely environmentally challenging. Use of heavy machineries and cutting of mountain slopes to build roads without proper environmental safeguards and mitigation measures inevitably cause

[12] Types of infrastructure served by engineering services at the dzongkhag level include farm roads, irrigation systems, schools, basic health units and outreach clinics, gewog administrative buildings, gewog RNR Centers, and rural water supply schemes.

problems such as slope failure, deforestation, disturbance to wildlife habitats, and sedimentation of water bodies. In addition to direct impacts, the mass influxes of migrant road workers add additional demographic pressure to the surrounding natural resources, mainly forests and water.

While the DoR has developed Environmental Codes of Practice (ECOP) for the design, construction and maintenance of roads using environment-friendly practices, it has not been able to adequately implement these practices due to inadequate budget, technical expertise and lack of proper monitoring and evaluation. A preliminary study done by the SNV/World Bank Environment Friendly Road Construction (EFRC) support project in 2007 revealed that initial cost of building roads using EFRC approach and techniques would be around 15-20% higher than building roads using conventional approach and techniques. However, the overall cost difference would balance out after 4 years and over the long term EFRC roads are expected to be significantly less expensive than conventional roads as a result of lower recurrent maintenance costs (Figure 10).

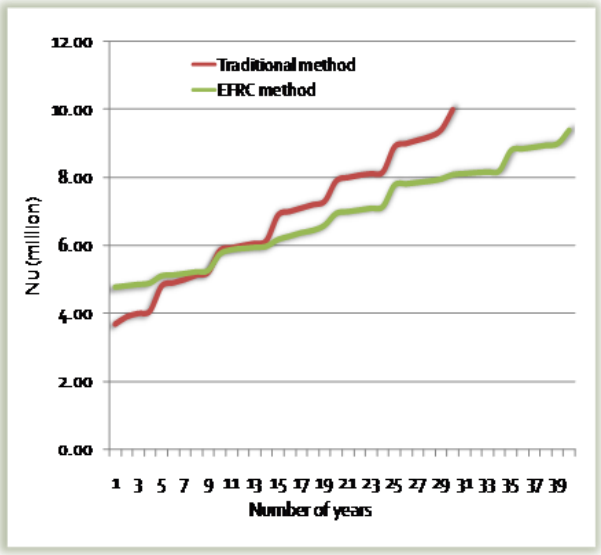

Figure 10: Comparative Cost Trends between EFRC Roads and Conventional Roads

A major cause of concern is the quality of farm roads. They are basically earthen roads built at minimal cost to provide access to farmers for production and marketing of agricultural goods. Most of the farm roads are poorly engineered and maintained. It often lacks basic structures such as drainage and breast/retaining walls and, consequently triggers landslides, gully formation, and sedimentation of water bodies and agricultural fields. The poor condition of the existing farm roads is solely attributable to the limited construction cost. As a rule of thumb, the cost of a farm road was estimated at Nu. 3 M/km, since 2009. This estimated amount is still low considering the rugged terrain and unstable geologic conditions. The draft "Farm Road Development Guidelines" indicates that the cost of construction of 1 km of farm road using EFRC techniques would be about Nu. 2.3 M. Other reasons associated with poor quality of farm roads are lack of proper road survey equipment, dearth of trained engineers for planning, supervising and monitoring road construction works at the Dzongkhag level and lack of awareness and ethics among contractors for proper road construction.

4.3.6.2 Construction of Power Transmission Grids and Distribution Lines

The construction of power transmission grids and distribution lines also affects land. The commissioning of new hydroelectric projects would necessitate installation of more power transmission towers and lines. In the past, power transmission towers have been constructed on prime farmlands because of logistical convenience and associated reduction in costs. The NAP local community consultations revealed that this has affected some farmers and forced them, especially those with small landholdings, to cultivate marginal agricultural lands such as on steep terrain or in forest fringes. Moreover, the construction of grids through forests results in removal of forest vegetation, thus depriving soil of protective cover against erosion. Depending on the site conditions, if clearance of forest vegetation is not accompanied with proper land rehabilitation measures, slope failure and landslips are bound to be triggered eventually.

4.3.7 Unsustainable Mining

In recent years, mining has become one of the fastest growing economic sectors in the country. In particular, the production of gypsum and dolomite has increased substantially (Table 5). Significant adverse impacts from mining are land disturbance and fissure from drilling, blasting, excavation, and site clearing, destruction of natural vegetation, sedimentation and contamination of waters, and air pollution with dust particles affecting human health and local livelihoods such as agriculture production.[13] Such negative impacts can be mitigated to some extent, or even can be avoided if proper mine planning and designing, responsive environmental management practices, and timely implementation of effective land rehabilitation measures are adopted. To curb the potential environmental risks, the MoEA has formulated the Mines and Mineral Management Act 1995 outlining a comprehensive set of provisions for integration of environmental management principles and processes in mining operations. Unfortunately, the enforcement of laws and supporting regulations are ineffective due to lack of inter-agency coordination, poor institutional mechanisms and inadequate technical capacity within the private mining companies to plan and implement environmental management measures and within the DGM to monitor and provide technical guidance.

Most of the mines are located along the southern belt due to abundance of mineral deposits and proximity to principal markets (India & Bangladesh). However, the zone is extremely vulnerable to land degradation because of steep terrain and unstable geology, heavy rainfall and high population pressure on the environment. Illegal cross-border mining is prevalent in pockets due to a porous international border and lack of law enforcement capacity in terms of personnel, equipment and mobility. Another key issue pertains to the operation of small scale mines that are mostly carried out on *ad hoc* deposits which are not studied

[13] Local communities in Jemina and Pugli inferred that excessive dust from mining is the main cause of decrease in crop yields in their localities.

thoroughly. Consequently, such nature of mining activity resorts to spontaneous removal of the deposit, leading to unplanned mining operations.

Table 5: Mineral Production in Bhutan (2006-12)

Minerals	2006	2007	2008	2009	2010	2011	2012
Dolomite (MMT)	0.48	0.58	1.25	1.03	1.06	0.91	1.50
Limestone (MMT)	0.58	0.54	0.58	0.65	0.68	0.75	0.68
Gypsum (MMT)	0.20	0.19	0.25	0.30	0.34	0.38	0.31
Slate (M sq. feet)	0.01	0.08	0.01	0.02	0.00	0.00	0.00
Coal (MMT)	0.10	0.11	0.12	0.05	0.06	0.10	0.10
Marble (M sq. feet)	0.01	0.01	0.01	0.01	0.00	0.00	.000
Quartzite (MMT)	0.04	0.06	0.10	0.08	0.12	0.09	0.09
Talc (MMT)	0.05	0.06	0.07	0.06	0.03	0.02	0.02
Stone (MMT)	0.23	0.39	0.41	0.51	0.79	2.42	1.49
Granite (M sq. feet)	0.01	0.01	0.01	0.02	0.00	0.00	0.02

(Source: Department of Geology and Mines, 2014)

4.3.8 Industrial Activities

Majority of the Bhutanese industries depend on extraction of raw materials, such as wood and minerals from the natural environment. As of 2012, there were 954 forest-based and 236 mineral-based industries including manifold increase in stone quarries in the country. The volume of extraction and the technology used for extraction of these natural resources have considerable bearing on the environmental quality of the lands from where they are extracted. Other major industrial activities that contribute to land degradation include

dumping of industrial waste, discharge of harmful effluents,[14] and conversion of forest and agricultural lands for development of industrial estates.

4.3.9 Urbanization

Urbanization has taken place at a rapid pace in Bhutan. During the 8th FYP (1997- 02), the urban population was estimated to be only 15% of the country's total and at the onset of the 9th FYP (2002-07) it was estimated at 21% - an increase of 6%. The PHCB (2005) projects urban population to 216,507 for the year 2013, which translates to 30% of the country's population. This is indeed a disconcerting prospect given the country's geologically fragile mountainous ecosystem, rugged terrain and agrarian culture.

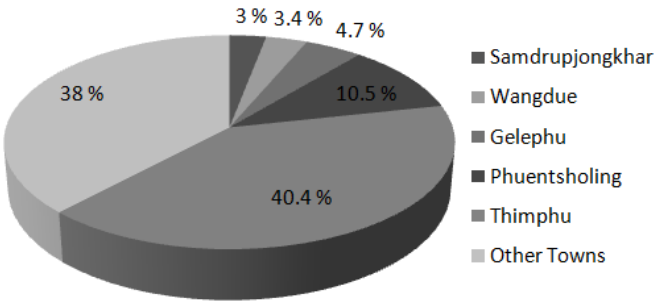

Figure 11: Urban Population Distribution 2013

More than half of the urban population (50.9%) is concentrated in just two towns – Thimphu and Phuentsholing. Thimphu alone has more than 40% of the total urban population (Figure 11). Increasing urban population creates environmental problems such as air and water pollution, water shortage, municipal waste generation, congestion of traffic and buildings, and land degradation. In order to accommodate surplus population and develop concomitant infrastructure, urban centers have consumed prime agricultural lands in the valleys and encroached on hill slopes which were once forested. In the smaller urban centers, the lack of proper infrastructure and facilities for drainage, sanitation and waste disposal will have cumulative adverse impacts on land and water resources. Furthermore, there is increased extraction of sand and stones from the river banks and roadsides, and harvesting of timber from adjacent forests to cater to the growing construction demands in the urban centers. Rural-urban migration and the influx of expatriate workforce for construction work in the urban centers have spawned squatting populations in and around the urban centers and exacerbated illicit collection of fuel wood and small timber from adjacent forests. At the same time, rural-urban migration deprives villages of the farm labor required for sustainable management of agricultural lands. Shortage of farm labor was cited by local communities and RNR field staff as one of the main impediments to adoption of SLM technology in the field.

[14] Interactions with local community members of Darla gewog revealed that some farmers were experiencing decrease in crop yields in farms through which industrial wastewater from the Bhutan Board Products Limited flow.

4.3.10 Solid Waste

Rapid urbanization, growing affluence, changing food habits, low level of awareness and poor civic sense among the Bhutanese public are the key factors that have led to increased generation and improper disposal of solid wastes. The solid waste problem is growing exponentially in the urban centers. In its first national survey carried out by the Department of Urban Development and Engineering Services (DUDES)[15] between November 2007 and January 2008, municipal solid waste generation has been estimated at a total of 43,697 tons/year. Per capita household waste generation is highest in Paro and Phuentsholing and while per unit commercial waste generation is highest in Bumthang and Paro (Table 6).

Table 6: Average Solid Waste Generation in Major Urban Centers

Urban Center	Population (2005)	Household waste (mean) kg/person/day	Commercial waste (mean) kg/unit/day	Office waste (mean) kg/staff/day
Bumthang	3,246	0.29	3.12	-
Damphu	1,666	0.19	2.85	0.21
Gelephu	9,199	0.24	1.64	0.16
Mongar	3,502	0.28	2.86	0.38
Paro	2,362	0.36	3.11	-
Phuentsholing	20,537	0.34	1.66	0.21
Samdrup Jongkhar	5,952	0.21	1.89	0.19
Samtse	4,981	0.20	2.75	0.17
Thimphu	79,185	0.23	2.48	0.22
Trashigang	2,383	0.19	2.86	0.29

(Source: Phuntsho et al, 2008)

[15] DUDES is bifurcated into 2 departments: Department of Engineering Services (DES) and Department of Human Settlement (DHS) since 2010

According to the TCC, the solid waste generation is projected to triple in the next 20 years (Figure 12). The major urban areas such as Thimphu and Phuentsholing carry out partial segregation of wastes. However, in other urban areas, there is no proper system of waste segregation at source and the landfills are poorly managed with basically no regular measures to control pollutant emission, leaching and scavenging. This leads to overfilling, stench, contamination of land and water, and aesthetic dilapidation of the landscape. The Waste Prevention and Management Act 2009 is in place and its Regulation is under preparation which will identify sectors and their responsibilities for different types of waste. The Integrated Solid Waste Management Strategy has also been developed. In the current setting, the urban municipals carry out door to door collection of solid waste and dispose the wastes at the landfill sites. In Thimphu, a private entrepreneur (Greener Ways) is actively engaged in collecting paper and plastic wastes for export over the past few years and it is already looking for ways to expand its services to other major urban centers like Phuentsholing.

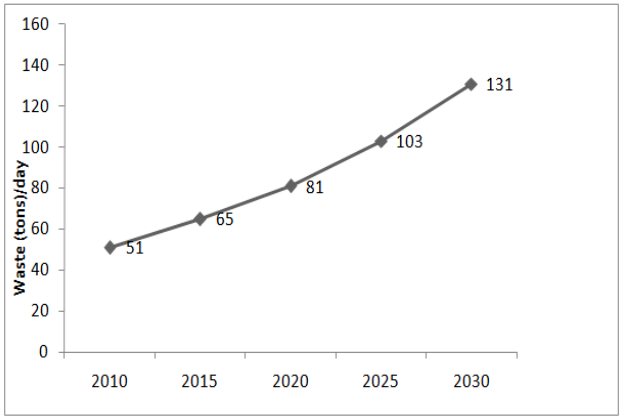

Figure 12: Projection of Waste Generation in Thimphu Thromde for 2010 -30

4.4 Indirect factors

4.4.1 Population Growth and Structure

According to the PHCB, the country's population in 2005 was 634,982 with a growth rate of 1.30% per annum and based on this figure, the projected total population by NSB for 2013 was about 733,000.

Although the country's population in general does not pose a major problem, the geographically-skewed distribution of the population have caused imbalances between Dzongkhags and regions creating localized pressures on the natural environment leading to localized deficits of environmental resources. Similarly, with nearly 45% of the population being under the age of 20, the population is likely to increase at a higher rate in the near future. Furthermore, the scenario may worsen considering the high Total Fertility Rate (ca. 2.90%) and low Contraceptive Prevalence Rate (31%). There are also evidences of population growth and gradual transformation from joint family system to nuclear

families[16] leading to fragmentation of farms lands, which has a bearing on how lands are used and managed.

4.4.2 Poverty

There is relatively a high level of poverty in the country. The NSB (PAR 2012) estimates that about 12% of populations live below the national poverty line. The report also elaborates that the poverty in the country is comparatively a rural phenomenon, with about 16.70% of the rural population living below the total poverty line compared to 1.80% of the urban population (Figure 13).

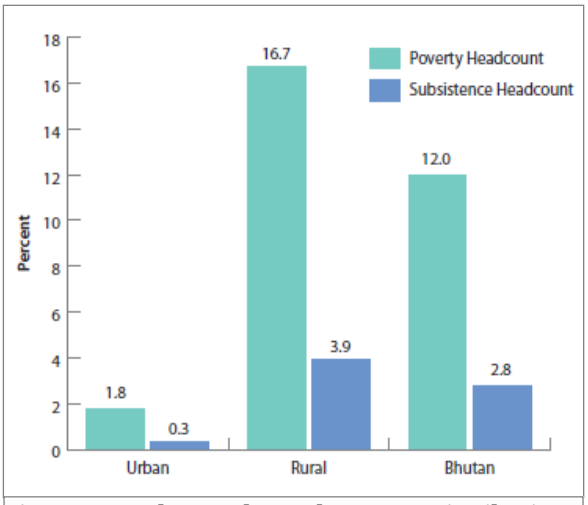

Figure 13: Urban and Rural Poverty Distribution (source: PAR 2012)

Poverty and land degradation are inextricably linked. The poor are directly dependent on a wide range of natural resources and ecosystem services for their survival and well-being. Environmental resources (including grazing land, water and forest) contribute significantly to poor people's income but they are also vulnerable to being used unsustainably. When soil erosion, forest degradation, and decline in biodiversity occur, it is generally the poor who are most severely affected.

4.4.3 Climate Change

Communities and its natural environment are becoming increasingly vulnerable to the vagaries of climate change. Although ecosystems have adapted to changing climates in the past, current changes in climate are occurring at a faster rate with a greater impact on people and their natural environment. The impacts of climate change to Bhutan's natural environment have not yet been properly assessed, mainly due to lack of institutional capacity. Nonetheless, the country has experienced in the recent past a number of incidents that have brought to the fore the threats of climate change as indicated below:

[16] This transformation is more noticeable among urban families but is also becoming common among rural communities.

Recent climate related natural disasters in Bhutan

- In 1994, there was a major glacial lake outburst flood emanating from Lugge Tsho, in Lunana area, northwestern Bhutan. This caused extensive damage to agricultural lands and pastures, and loss of several human lives and livestock along Pho Chhu. There are about 2,674 glacial lakes existing in the country, of which 24 were classified as potentially dangerous. Of these, the most immediate threat comes from the Raphstreng and Thor Thormi lakes in the headwaters of Puna Tsang Chhu. These lakes are adjacent to each other separated by just a moraine wall. The combined discharge of outbursts of these lakes is estimated at 53 M m^3 – three times more than 1994 Lugge Tsho GLOF.

- The 1998-99 winters was characterized by a prolonged spell of dry (snowless) weather. This exacerbated incidents of forest fires that winter, even occurring in places where the fire incidences are previously not known to have occurred. The year saw a record number of 112 forest fire incidents - the highest ever since forest fire occurrence began to be officially recorded.

- The country experienced unprecedented rainfall in the summer of 2000. The heavy rains triggered off unprecedented number of floods and landslides, causing loss of dozens of human lives and damage to infrastructures and natural resources.

- In May 2009, just three days of incessant rain, in the aftermath of Cyclone Aila, left nine people dead, washed away bridges, damaged and/or destroyed government buildings, private houses, and irrigation and drinking water supply lines, blocked or washed away several highways, feeder roads and farm roads, and inundated forest plantations and agricultural fields. The DDM, MoHCA, had estimated that restoration works would cost the government more than Nu. 719 M (US$ 15.60 M).

- In June 2012 summer, the low intensity and prolonged rainfall followed by extremely high downpour (about 170 mm in four hours) caused landslides, landslips and flooding at Damji, under Gasa Dzongkhag. This event has washed away the arable fields & roads, caused siltation and completely damaged the irrigation canal networks.

The relationship between climate change and land degradation is complex. Climate change affects land potentials through drought, flooding and other impacts. Yet, when the land is degraded, it emits more greenhouse gases and in turn worsens climate change. Soils are an important carbon sink and help in slowing global warming. Organically managed soils can convert carbon dioxide from a greenhouse gas into a food-producing asset. Soils contain more carbon than is contained in vegetation and the atmosphere combined.

Well-managed landscapes can moderate the impacts of climate change. On the contrary, degraded landscapes are extremely vulnerable to impacts of climate change such as storms and floods. The impact is more pronounced in Bhutan, which is characterized by rugged terrain, fragile geology, and erratic climatic conditions. The effect of climate change on the hydrological cycle is a major concern for Bhutan as the regional predictions foresee an initial increase of glacial discharge followed by a considerable fall in discharge due to

ongoing glacial retreat. As a result this will have adverse implications on the country's hydropower potential and overall use of water.

4.4.4 Policy and Institutional Issues

4.4.4.1 National Land Use and Management Policy

At the macro-level and as a cross-sectoral issue, a well-defined policy perspective on national land use and management has been lacking for so long, which often resulted in conflicts among various sectors. Urban expansion has led to loss of prime agricultural lands and depletion of forests; road construction in geologically fragile areas has caused and exacerbated landslides; agriculture on steep terrain have led to soil erosion; several mining operations have reportedly caused health and environmental hazards; new townships have been developed or planned along riversides which are vulnerable to GLOF and/or other natural hazards. Programs and activities to address land degradation have remained compartmentalized within various sectors. Green sectors such as agriculture and forestry feature SLM more prominently in their policies and programs whereas brown sectors, especially those concerning infrastructure and urban development, have only cursory or no reference to SLM in their policies and programmatic frameworks. However, the National Land Policy, which is in its advanced stage of formulation, would most likely address the existing issues.

4.4.4.2 Enforcement of Environmental Laws and Regulations

Bhutan has strong laws and regulations in place for the conservation of environment and mitigation of adverse environmental impacts resulting from developmental activities. The existing laws and regulations include Environment Assessment Act 2000, Forest and Nature Conservation Act 1995, Mines and Mineral Management Act 1995, National Environmental Protection Act 2007 and Water Act of Bhutan 2011. These are some of the key policy documents that provide immense scope for pursuing environmentally sustainable development and pre-empting environmental degradation at a far-reaching scale. However, our environmental laws and regulations have not been effectively implemented. Lack of adequate law enforcement personnel, ambiguity in institutional mechanisms and lack of technical and financial resources to implement environment-friendly technology are some of the key issues related to weak law enforcement. On the other hand, there is also the acknowledgement that there is some degree of public and professional apathy towards existing laws. Effective environmental law enforcement will also depend on the awareness and education of the public of their environmental rights and responsibilities. Local community consultations during the course of NAP preparation revealed that a large majority of the local people were not aware of various environmental laws and regulations.

4.4.4.3 Institutional Lacuna for National Land Use and Management

During the NAP preparation processes, the participants representing the local governments and village communities voiced strong opinion that a more pragmatic way forward to combat land degradation would be through collaborative approaches. There is a weak coordination between the stakeholders in addressing land degradation problems and issues. Although the efforts to address land degradation issues are made in various capacities by the respective stakeholders, these are happening in total isolation.

The current institutional scenario is that the NSSC is the focal agency for the UNCCD and the main implementing agency for any SLM programs in the farmers' fields. The GEF/World Bank funded SLM Project implemented by NSSC from 2006-13 was the largest project ever specifically dedicated to combating land degradation. However, the institutional construct of NSSC as a soil management referral and research facility within the MoAF is such that it can have only limited influence on other agencies, especially those outside the MoAF. This reduces its efficiency to oversee and coordinate sustainable land management in a cross-sectoral manner.

Thus, there is an urgency to identify an entity at the national level to take the lead in coordinating the land use and land management programs of different sectors within and outside the MoAF. At present, there is a void in the institutional setting for overall technical coordination of national land use and management policies, plans and programs.

4.4.4.4 Inadequate financial support for SLM

As a responsible organization for addressing the issues of land management especially on agricultural land, the MoAF perhaps is the only organization which plans and budgets for SLM activities annually. However, even within the MoAF, budget allocation for SLM interventions is comparatively low as major portions are allocated for infrastructural development such as farm roads and irrigation channels. For instance, in the 11th FYP, the Dzongkhags have total budget outlay of Nu. 2,493.86 M, averaging about Nu. 124.69 M for each Dzongkhag and the Gewogs have total budget outlay of Nu 3,282.59 M, forming an average of Nu. 16.01 M/Gewog. In both cases, maximum budget resources (71.19% and 77.49% respectively) have been earmarked for either construction or the renovation of the farm roads and irrigation channels. Similarly, in the 10th FYP, the progress made in SLM was mostly brought in through project tied activities with minimum share allocated from government.

The renewed emphasis on SLM started in 2005 with first national level Land Management Campaign (LMC) that was conducted in 8 Gewogs, under Trashigang Dzongkhag. During the event, proven low cost SLM technologies were demonstrated to the stakeholders and were implemented in areas facing land degradation and in the vulnerable areas. Ever since, LMC has become an annual event in the calendar of the MoAF. In 2013, the MoAF conducted LMC at Pemagatshel, and recently in Lhuntse and Mongar Dzongkhags. Additionally, other Dzongkhags and RNR-RDCs have been executing SLM related

activities in their areas, but on a much smaller scales due to limited budget allocation. It is generally accepted that the problem of land degradation is widespread across Bhutan and there are thoroughly tested low cost SLM technologies with the parent institution. However, the transfer of low cost SLM technologies from institutions to the farmers' fields requires adequate financial resources. This continues to be the main constraints in transferring the SLM technologies.

Part C: Existing Conditions for Combating Land Degradation in Bhutan

CHAPTER V: CURRENT SETTINGS

The ensuing sections outline the existing policy tools and legal frameworks that are available in the country.

5.1 Policy and Legal Frameworks

5.1.1 Gross National Happiness Philosophy and Bhutan 2020

As mandated by the existing policies, development processes in Bhutan are to be based on the overarching development philosophy of "Gross National Happiness" (GNH). While conventional development models stress economic growth as the ultimate objective, the concept of GNH is based on the premise that true development of human society takes place when material, spiritual and emotional well-being occur side by side to complement and reinforce each other.

The GNH philosophy recognizes environmental sustainability as one of the four pillars of development. It advocates a multi-dimensional development approach that seeks to maintain harmony and balance between economic growth, environmental sustainability, cultural preservation, and good governance. "Bhutan 2020", the country's vision document outlining development goals, objectives and targets with a twenty-year perspective, enunciate the following four essential constituents to maximize GNH:

- Equitable socio-economic development, ensuring equity between individuals and communities as well as regions to promote social harmony, stability and unity and to contribute to the development of a just and compassionate society.
- Conservation of the environment, ensuring development pursuits are within the limits of environmental sustainability and are carried out without impairing the biological productivity and diversity of the natural environment.
- Preservation and promotion of culture, instilling appreciation of the cultural heritage and preserving spiritual and emotional values that contribute to happiness and cushion the people from the negative impacts of modernization.
- Promotion of good governance, developing the country's institutions, human resources and systems of governance and enlarging opportunities for people at all levels to fully participate and effectively make development choices that are true to the circumstances and needs of their families, communities and the nation as a whole.

5.1.2 Environmental Conservation as a Constitutional Mandate

In keeping with the country's longstanding commitment to ensure environmentally sustainable development and recognition of environmental conservation as one of the cornerstones of GNH, the Constitution of the Kingdom of Bhutan, which was formally

adopted on 18th July, 2008, explicitly features environmental conservation as a constitutional mandate.

The Article 5 of the Constitution stipulates that:

- Every Bhutanese is a trustee of the Kingdom's natural resources and environment for the benefit of the present and future generations and it is the fundamental duty of every citizen to contribute to the protection of the natural environment, conservation of the rich biodiversity of Bhutan and prevention of all forms of ecological degradation including noise, visual and physical pollution through the adoption and support of environment friendly practices and policies
- The Royal Government shall:
    1) Protect, conserve and improve the pristine environment and safeguard the biodiversity of the country;
    2) Prevent pollution and ecological degradation;
    3) Secure ecologically balanced sustainable development while promoting justifiable economic and social development; and
    4) Ensure a safe and healthy environment
- The Government shall ensure that, in order to conserve the country's natural resources and to prevent degradation of the ecosystem, a minimum of 60% of Bhutan's total land shall be maintained under forest cover for all time.
- The Parliament may enact environmental legislation to ensure sustainable use of natural resources and maintain intergenerational equity, and reaffirm the sovereign rights of the State over its own biological resources and
- The Parliament may, by law, declare any part of the country to be a National Park, Wildlife Reserve, Nature Reserve, Protected Forest, Biosphere Reserve, Critical Watershed and such other categories meriting protection.

5.2 Existing Policies and Legislations

Currently, the policies, legislations and supporting documents exist, all of which contain component(s) that would, through proper adoption and effective implementation by the stakeholders, contribute towards addressing the land degradation across Bhutan. However, the details may not feature prominently. Nevertheless, it is important to note that, the platforms to curb land degradation have been created from the policy and legislation perspective.

The existing policies, legislations and other supporting regulations that are relevant to land degradation are listed in Table 7.

Table 7: List of existing Policies, Legislations and Supporting Documents[17]

Existing Policies & Strategies	Existing Legislations & Supporting Regulations
National Forest Policy 2009 Community Forest Strategy 2009 Plantation Strategy 2010 National Strategy for Development of NWFP in Bhutan 2008 National Human-Wildlife Conflict Strategy 2008	Forest and Nature Conservation Act 1995 Forest & Nature Conservation Rules 2006 Forest Management Code of Bhutan 2004 Forest Fire Rules 2012
National Environment Strategy 1998	Mines and Mineral Management Act 1995
Bhutan Water Vision and Bhutan Water Policy 2007	Environmental Assessment Act 2000
National Urbanization Strategy 2008 National Strategy and Action Plan for Low Carbon Development 2012	Road Act of Bhutan 2013 Livestock Act 2001 Biodiversity Act Of Bhutan 2003
Bhutan Sustainable Hydropower Development Policy (2008)	National Environmental Protection Act 2007
Environment Management Framework 2013	Land Act of Bhutan 2007 Disaster Management Act 2013
Biodiversity Action Plan for Bhutan 2009	Local Governments Act 2009
National Adaptation Program of Action for Climate Change Economic Development Policy of Bhutan 2010	Waste Prevention and Management Act 2009 Water Act of Bhutan 2011

5.3 Current Institutional Set-ups

There is a credible and comprehensive list of government institutions, non-government and autonomous agencies, corporations, institutes and external development partners playing differing roles in tackling issues related to land degradation. With the roles of these institutions varying significantly, most of the departments and central agencies under the

[17] The list of existing documents, legislations and supporting documents all of which were referred during preparation and alignment of NAP are uploaded at NSSC website (www.nssc.gov.bt).

MoAF have a direct role in addressing land degradation and on the other hand, there are many other stakeholders, whose roles and responsibilities are indirect.

Table 8: Web-Link for Central Government Institutions and other Relevant Agencies in Bhutan[18]

Agency	Department/ Central Agencies	Web-link
Ministry of Agriculture & Forests	• Department of Agriculture • Department of Livestock • Department of Forest & Park Services • National Soil Services Center • National Plant Protection Center • National Bio-diversity Center	www.moaf.gov.bt
Ministry of Economic Affairs	• Department of Geology & Mines • Department of Energy • Department of Industry • Department of Hydromet Services • Department of Hydropower & Power Distribution Services	www.moea.gov.bt
Ministry of Home and Cultural Affairs	• Department of Disaster Management	www.mohca.gov.bt
Ministry of Works and Human Settlement	• Department of Roads • Department of Human Settlement • Department of Engineering Services	www.mowhs.gov.bt
Autonomous Agency	• National Environment Commission • National Land Commission • Gross National Happiness Commission	www.nec.gov.bt www.nlcs.gov.bt www.gnhc.gov.bt

[18] Description of the mandates of the institutions is much beyond the scope of this document - their web-links have been provided easing access for the users.

Non Governmental Organization (NGO)	• Royal Society for the Protection of Nature • Tarayana Foundation • Bhutan Trust Fund for Environmental Conservation	www.rspnbhutan.org www.tarayanafoundation.org www.bhutantrustfund.bt
Corporation	• Druk Holding and Investment • Natural Resources Development Corporation Limited • Druk Green Power Corporation Limited • City Corporation	www.dhi.bt www.nrdcl.bt www.drukgreen.bt www.tcc.gov.bt
Training Institute	• College of Natural Resources • Ugyen W. Institute for Conservation & Environment • Rural Development Training Center • Jigme Namgyel Polytechnic • College of Science and Technology	www.cnr.edu.bt www.uwice.gov.bt www.moaf.gov.bt www.jnp.edu.bt www.cst.edu.bt

Table 9: Web-link for External Development Partners

Agency	Web-link
• Asian Development Bank	www.adb.org/bhutan
• Austrian Government	www.ada.gv.at
• Danish International Development Agency	www.bhutan.um.dk/en/danida
• European Community	www.eeas.europa.eu/bhutan/
• Global Environment Facility	www.thegef.org/gef/bhutan
• Government of India	www.indianembassythimphu.bt
• HELVETAS	www.bhutan.helvetas.org/en/
• ICIMOD	www.icimod.org/bhutan+10
• Japan International Cooperation Agency	www.jica.go.jp/bhutan/english
• Netherlands Development Organization	www.snvworld.org/
• United Nations Agencies	www.undp.org.bt
• World Bank	www.worldbank.org/
• World Wildlife Fund	www.wwfbhutan.org
• IFAD	www.asia.ifad.org/web/bhutan

5.4 Linkage amongst Rio-Conventions

To put the current scenario into perspective, the national focal agencies for three Rio-conventions fall slightly apart in terms of taking coordinated approach for synergistic planning and programming. The subjects addressed by these three conventions including land degradation, bio-diversity and climate change are in fact inseparable entities. Therefore, a proper coordination mechanism may be necessary for synergistic planning and implementation.

In essence, there is a strong case for the need of a policy that can drive this process forward, if not, at least a systemic structure such as a national coordination body that includes focal points of all three conventions for synergy and coherence of actions. The lack of a system either in the form of a national policy or a systemic structure that can leverage synergistic approach in planning and programming is perhaps the main factor, which is in dire need. In its true sense, existence of this void may also pose questions on the seriousness of the stakeholders, and nation at large, in addressing the issues related to land degradation, bio-diversity and climate change, in achieving the desirable outcomes.

Part D: National Action Programs

CHAPTER VI: MATRIX OF ACTIVITIES

6.1 Basic Premise and Guiding Principles

This Action Program draws its fundamental essence from the country's overarching development philosophy of GNH. It shall, first and foremost, contribute to the objective of environmental sustainability whilst also either directly or indirectly contributing to poverty alleviation, food security, economic growth and human safety, and eventually steer the country towards achieving the national goal of "self-reliance and inclusive green economic development" by the end of the planned period.

In implementing this Action Program, the following guiding principles shall be pursued:

- **Interdisciplinary and Partnerships.** Land degradation is an issue that cuts across several sectors and disciplines. Compartmentalized development of one sector may create adverse environmental conditions that affect another sector. Therefore, the approach to combat land degradation will need to be inter-disciplinary. Emphasis will need to be given to eliciting knowledge, perceptions and interests of various sectors and using them in synergy to effectively deal with land degradation.

  In Bhutan, there is a small but highly effective fraternity of NGOs that work in the field of environmental management and community development. The number of NGOs participating in addressing land degradation is increasing by the year. Considering the fact that these organizations function with less administrative burden in contrast to the government agencies, NGOs will need to be engaged through effective partnerships especially in areas that concern livelihood-based land use and management issues.

- **Adaptive Management.** Activities to address land degradation will have to be flexible to adapt to changing circumstances and new insights. This approach is particularly important to manage complex land use practices and vulnerable landscapes, characterized by a high level of unpredictability.

  An important aspect here is that adaptive management will ensure that SLM measures are not static but rather dynamic and sufficiently resilient to respond to fast-changing and immediate needs, and take advantage of new opportunities. This is particularly important because of the country's diverse landscapes and micro-environments, the dynamics of socio-economic changes and the emerging effects of climate change and other environmental issues.

- **Knowledge Management.** This guiding principle, in particular, has been one of the loosely stacked building block in addressing land degradation and issues related to it.

Consistent monitoring and organisational learning are important components of an adaptive management approach.

Henceforth, greater emphasis will be given on learning from past successes as well as failures to continuously evolve activities to address land degradation in evolving circumstances. This will involve proper documentation of methodologies, approaches and techniques developed in order to combat land degradation and the experiences gained in the process. To effectively address land degradation issues in the country, it is crucial to make this knowledge available to the stakeholders.

- **Sustainability.** The ability to continue and support activities that deal with land degradation over the long term will be crucial. To be sustainable, activities will have to be viable, technically feasible, socially beneficial and environmentally non-damaging to the extent possible. A key to enhance sustainability will be to generate and nurture community ownership of SLM initiatives. Participatory planning of SLM activities is seen as a core element to ensure sustainability at the grassroots level.

6.2 Overall Goal and Objectives

The overall goal of the Action Program is to "prevent and mitigate land degradation and its impacts through systems and practices of SLM that protects and maintains the economic, ecological and aesthetic values of our landscapes."

In pursuit of the goal, the following specific objectives have been set:

1. Conservation, rehabilitation and sustainable use of forest resources to maintain well-functioning forest landscapes.

2. Development and promotion of sustainable agricultural practices that enhances local livelihoods whilst maintaining the productivity and stability of agricultural lands.

3. Integration of environmental management measures in development activities that pose significant risks of land degradation.

4. Strengthening of systemic and institutional capacity to combat land degradation and its impacts,[19] and

5. Information, advocacy and education to create increased policy and public support for sustainable land management.

6.3 Actions to Combat Land Degradation in the 11th FYP

To ensure that the aligned NAP is pragmatic, the TFMs executing the exercise revisited the 11th FYP document and carried out a comprehensive review on it. During the review, focus

[19] Systemic capacity includes both policies and legislations

was given to those activities at national and sectoral levels that are programmed to address the issues concerning land degradation either directly or indirectly.

During the NAP alignment process, attention was given to Action Programs of existing NAP- its basic premise and guiding principles, overall goal and its strategic objectives and the Convention's 10 year strategy, its strategic objectives and particularly its operational objectives.

To facilitate this review, five broad thematic areas were selected to encompass the necessary activities that feature in the plan document, all of which contribute to addressing the land degradation issues in varying degrees.

Theme 1- Advocacy & Capacity Building

It centers on advocating the need to address pressing land degradation issues in the country, making a behavioral change of the stakeholders through awareness raising and enhancing their abilities through various educational means.

Theme 2- Institutional Strengthening & Coordination

Strengthening of the existing institutions that currently play differing roles in combating land degradation and ensuring better networking and coordination in a more collaborative and effective manner.

Theme 3- Policy & Legislative

The policy and legal tools that would help to create enabling environments for the stakeholders while implementing prudent solutions to combat land degradation related issues.

Theme 4- Research & Knowledge Management

Generate appropriate knowledge/information within the domain of land degradation that would serve as viable inputs for decision making [at different levels] in addressing the land degradation issues.

Theme 5- Support to SLM Technologies

Take either direct or indirect actions through implementation of the activities by the stakeholders to address the prevailing land degradation issues and/or contribute to preventing land degradation in future.

Matrix 6.3.1: Advocacy & Capacity Building

Agency	Activities in Brief	Implementing & Collaborating Agencies	Cost (Nu. M)	Funding Source	Expected Output	Means of Verification
MoAF/ **DoA**	Training on farm road survey, design & EFRC techniques	Engineering Division (**ED**) , DoA	10.00	RGoB/Donor[20]	Engineers trained on farm road survey, design & EFRC techniques	APR & MTR[21]
	Training of farmers and staffs on sustainable land management (SLM)	**Dz** /NSSC/RDC Wengkhar	2.00	GCCA	800 farmers & 45 staffs trained	PLAMS/APR
	Documentation of best SLM practices following LADA - WOCAT format	**NSSC**	0.50	RGoB/TCP	The document on best SLM practices documented	A document published
	Update & refine soil fertility management guidelines	**NSSC**/RDCs	1.50	RGoB	The guideline is updated and developed	APR & MTR
	Capacity building & and produce provisional soil survey map using the soil classification manual	**NSSC**/RDCs	3.00	RGoB	The soil survey map production started	Report published
	Implementation of SLM practices to improve vulnerable land	**NSSC**/RDCs/ Dz	2.50	RGoB	SLM carried out in 7,925 acres (ac)	APR & MTR
	Promotion of organic agriculture principles and technologies	**NOP**/NSSC/NPPC	5.55	RGoB	Farmers adopt organic plant nutrient management technologies	APR & MTR
	Generation of environment friendly IPM technologies	**NPPC**/NOP/RDCs/Dz	5.00	RGoB	Technology in place & promotional activities carried out	APR & MTR

[20] Donor: fund to be partly sourced from the donor agencies that is currently active in a particular agency.

[21] APR: Annual progress report of the activity; MTR: mid-term review report of FYP

MoAF/ **DoFPS**	Formation of new CFMGs & strengthening of existing groups	**SFED/** Dz/ TFD/ Parks/ CFMG	68.00	Helvetas/ RGoB	CF established & managed sustainably	APR & MTR
	Create awareness & other education programs on forest fire management	**FPED**/ Dz/FD[22]/Parks/ FFVs	14.00	RGoB/Donor	Forest fire incidences reduced	APR & MTR
MoAF/ **DoL**	Organize livestock related festivals/awareness programs on breed improvement & sustainable rangeland management	**DoL/** Dz/Yak herders	2.50	RGoB/Donor	3 festivals/ Awareness conducted	APR & MTR
	Sensitization of herders and farmers on leasing of GRF land as Tsamdro and preparation of Tsamdro management plans	**DoL/** PPD/DoFPS/ Herders/Farmers	3.00	No fund	Herders/Farmers in 20 Dzongkhags sensitized	APR & MTR
	Farmers training on improved pasture development, fodder development & fodder conservation technologies	**NCAN/** Dz/Farmers	1.00	RGoB/Donor	3147 farmers trained	APR & MTR
	Farmers training on soil fertility management & erosion control using forage crops	**RDC Jakar/** NCAN/ Dz	0.50	No fund	240 farmers trained	APR & MTR
	Yak herders group formation & capacity building on yak breed improvement to keep less but more productive yaks	**DOL/** NDDC/Dz / Herder Groups	1.50	RGoB/Donor	3 Herder Groups formed	APR/Field verification
MoWHS/ **(DoR/DHS)**	Engineering capacity building towards Green Technology & Eco-Construction (5 long term study and 111 short time training?)	**DoR**	87.02	No fund	Engineers trained on survey design, EFRC techniques & environmental management	Study completion report

[22] Field Divisions under the Department of Forest and Park Services

	Capacity building on Integrated Solid Waste Mgt (ISWM)	**DHS /**Thromdes	7.50	No fund	Relevant people trained on ISWM concept and management plan developed	Training report & Mgt. plan in place
	Advocacy and awareness on Road Rules & Regulations	**DoR**	0.20	RGoB	Govt. agencies, Dzongkhags & Gewogs made aware on Road Rules & Regulations	Report
	Review existing EFRC module in the engineering courses at the College of Science and Technology and integrate EFRC module at Jigme Namgyel Polytechnic	**DoR**/CST/JNP	3.50	No fund	EFRC module integrated in the engineering courses	Modules
NEC	Strengthening capacity, enhancing awareness on ECP mainstreaming and Mainstreaming tools such as SEA and EO	**NEC**/ MRG[23] members	10.00	No fund	Central and Dzongkhags level officials trained to mainstream ECP in the policies , plans and programmes. Decision makers sensitised on importance of mainstreaming of ECP	MTR/ Budget expenditure
	Advocacy and awareness on environmental legislations	**NEC**	1.00	RGOB	Govt/Agencies/Public aware on the provisions of Acts and Regulations	MTR/ Budget expenditure
	Commemorate Global environment events	**NEC**	5.00	RGOB/Donors	Public aware on importance of environment. Global Environment events commemorated according to each year's theme	MTR/Budget expenditure
NBC	Development of a one-stop web-based portal for National Biodiversity Information System with features for citizen science participation and data analysis	**NBC**/DoFPS/ DoL	7.80	No fund	Increased biodiversity information of the country with improved access	NBC website/Bhutan Biodiversity Portal

[23] Mainstreaming Reference Group

	Organization of biodiversity fairs, exhibitions and documentaries	**NBC**/ RDCs/ Dz	3.00	Partial Funding from Donors	Stakeholders and general public aware on the need for conserving rich biodiversity	Events organized
	Capacity building of farmers on adaptation to changing climate and importance of broad genetic base	**NBC**/ DoA/RDCs/ Dz	4.00	RGoB/Donor,	Farmers trained on importance of broad genetic base	ILCCP/BUCAP project report

Matrix 6.3.2: Institutional Strengthening & Coordination

Agency	Activities in brief	Implementing & Collaborating Agencies	Cost – (Nu M)	Funding source	Expected output	Means of Verification
MoAF/ **DoA**	Strengthening of engineering division under DoA; climate smart/proof irrigation technologies for sustainable water management.	**DoA**/RDCs	N/A	N/A	Engineers placed at regional level.	Transfer orders
	Strengthening laboratory facility for NPPC as National Referral Laboratory for all plant protection programs	**NPPC**/NOP/RDCs	20.00	No fund	NPPC upgraded	Physical
	Strengthening soil laboratory facility for bio-fertilizer production	**NSSC**/NOP/RDCs	20.00	No fund	Laboratory facilities strengthened	Physical
MoAF/ **DoL**	Strengthening the existing government dairy farms to supply improved cattle breeds & reduce local cattle population	**NDDC**/ NJBC/ CRC/NHP/BSF	23.50	RGoB/Donor	Reduced population of local cattle	APR & MTR
	Establishment of Embryo Transfer facilities at NDDC, Yusipang to facilitate breed improvement & conservation	**NDDC**	5.22	RGoB/Donor	ET facilities established	APR & MTR
	Establishment of Animal Health Outpost (AHO) in highlands	**DOL**/NCAH/ RLDCs/Dz	1.00	RGoB/Donor	2 AHO established & functional	APR/Field visits
	Strengthening of Contract Heifer & Bull Production Program	**NDDC**/ RLDCs/ Dz/Farmers	1.50	RGoB/Donor	CHBPP strengthened	APR & MTR

	Establishment new Artificial Insemination (AI) Centers	**NDDC/**Dz	2.60	RGoB/Donor	AI Centers established	APR/Field Visits
MoWHS/ **DHS**	Segregation of Municipal from Dzongkhag Engineering Section to improve municipal governance and strengthen capacity	DHS/ Municipal/ Dz	N/A	N/A	Municipal and Dzongkhag segregated	APR & MTR
NBC	Operationalize National Committee to address biodiversity concerns and Coordinate implementation of programs relating to CBD	**NBC**/ NEC/ DoFPS/DoL/ DoA/ PPD	0.60	Donor/RGoB	Functional National Committee in place	Progress reports
	Reviewing mandates and programs of NBC, initiate up-gradation of the Center to Directorate	**NBC**/ MoAF/ NEC/Other stakeholders	0.60	Donor	The mandates and programs of the Center reviewed	Progress reports

Matrix 6.3.3: Policy & Legislative

Agency	Activities in brief	Implementing & Collaborating Agencies	Cost – (Nu M)	Funding source	Expected output	Means of Verification
MoAF / **DoA**	Revision of the existing Farm Road guidelines	**ED**/DoA	0.20	RGoB/Donor	FR guidelines revised and updated	APR & MTR
MoAF/ **DoFPS**	Develop National REDD+ strategy	**WMD**/ DoA/DoL/ NEC/ NLC/MoEA/MoWHS/ MoF/GNHC	2.00	UN-REDD	National REDD+ strategy developed	APR & MTR
	Develop framework for Payment for Environmental Services	**WMD**/ FRMD/FDs/Dz	1.50	BTFEC & SNV (BMF)	National PES framework developed	APR & MTR
	Development of management plans for organic NWFPs	**DoFPS**/NOP/BAFRA/DAMCS	0.50	RGoB	Management plan in place	Policy document
MoAF/ **DoL**	Development of guidelines for leasing reverted State Forests as Tsamdro* and Preparation of Tsamdro management plan	**DoL**/ PPD/ DoFPS	0.30	No fund	Guidelines developed & implemented	Publication/ APR
	Development and institution of PES framework in high altitude rangelands	**DoL**/Dz/Herder groups	2.00	No fund	1 PES scheme instituted	APR & MTR
MoWHS/(**DHS/DoR)**	Formulation of National Human Settlement Policy	DHS	29.00	WB	Policy in place	Policy Document
	Development of Human Settlement Strategy	DHS	-	UNDP	Strategy in place	Strategy document

	Formulate Spatial Planning Act	DHS	5.80	WB	Act in place	Act
	Prepare Planning Standards	DHS	5.80	WB	Planning standards in place	Planning standard document
	Formulate Road Rules & Regulations	DoR	0.57	RGoB	Road Rules & Regulations in place	Rules & Regulations
MoHCA/ **DDM**	Formulation of National Disaster Management Strategy	**DDM**	1.20	LDC/GEF	NDMS approved	NDMS document
	Mainstreaming the disaster risk reduction process in all Ministries/agencies and Dzongkhags	**DDM**/ Other Ministries/Agencies	0.60	ADPC	Mainstreaming process followed	Plans & reports
	To formulate & publish rules & regulations, bye-laws, SoP and standards for relief and compensation	DDM	1050.00	GFDRR/World Bank	Rules & Regulations, bye-laws, SoP & standards in place	Documents published
NEC	Drafting of Water regulation	**NEC**	4.00	RGOB	Water Regulation in place and enforced	MTR/ Budget expenditure
	Amendment of EA Act 2000 and Regulations, sectoral guidelines	**NEC** / Competent Authorities relevant stakeholders	3.00	No fund	Amended EA Act in place and enforced	MTR/Budget expenditure
	Revision of regulation on Waste Prevention and Management 2012	**NEC**/ Competent authorities	4.00	No fund	Revised Waste Regulation and mgt. 2012 in place and enforced	MTR/ Budget expenditure
	Revision of National Environment Strategy 1998	**NEC**//relevant Stakeholders	2.00	UNDP,/RGOB	Revised NES prepared and implemented	MTR/Budget expenditure
NBC	Review and develop policies addressing agro-biodiversity and ABS.	**NBC/DoA**	1.80	Donor	Document reviewed and updated	Policy document

	Develop national implementation mechanism for agro-biodiversity and ABS.	**NBC/DoA**	0.20	No fund	Document developed	Policy document
	Review and amend Biodiversity Act, 2003	**NBC/DoA**	4.00	No fund	Revision of Act completed	Policy document
	Formulate and implement Biodiversity Rules and Regulations	**NBC**/ PPD (MoAF)	4.00	No fund	Biodiversity rules and regulations formulated	Policy document
	Review and realign existing NBSAP (BAP III, 2009) with Aichi 2020 Targets as per national priorities; Mainstream the revised NBSAP/BAP IV into national plans and programs;	**NBC**/ NEC/ DoFPS/ DoA/ DoL	8.50	GEF	NBSAP aligned and mainstreamed into national plans and policies	NBSAP document

Matrix 6.3.4: Research & Knowledge Management

Agency	Activities in brief	Implementing & Collaborating Agencies	Cost – (Nu M)	Funding source	Expected output	Means of Verification
MoAF/ **DoA**	Cost benefit analysis between the farm roads built with EFRC & conventional techniques.	**ED**/DoA		No fund	Study carried out	Report published
	Assessment of LD including its causes, extent and impacts	**NSSC**/RDCs	1.50	RGoB	Assessment carried out	Report published
	Quantification of annual soil loss through erosion	**NSSC**/RDCs	1.62	RGoB	A study carried out	Report published
	Study impacts of SLM on soil properties & crop yield in SLMP sites	**NSSC**/RDCs	0.30	RGoB	A study carried out	Report published
	Conduct study on adoption SLM best practices in SLMP sites	**NSSC**	0.50	RGoB	A study carried out	Report published
	Conduct long term studies on soil quality of major farming systems	**NSSC**/RDCs	3.50	RGoB	A study carried out	Report published
	Develop soil quality database for major farming systems	**NSSC**/RDCs	1.50	RGoB	Development of a soil database	Database developed
	Production of soil fertility maps for site specific soil fertility management	**NSSC**/RDCs	1.60	RGoB	Soil fertility map produced	Maps produced
	Assessment of soil carbon stock in selected major farming systems	**NSSC**/RDCs	2.50	RGoB	A assessment carried out	Report published

	Conduct detail, semi detail & reconnaissance soil surveys	**NSSC**/RDCs	6.70	RGoB	Carried out soil surveys	Report published
	Conduct soil & land investigation surveys	**NSSC**/RDCs	6.80	RGoB	Carried out the activities	Report published
	Refine land capability, classification & land suitability evaluation systems	**NSSC**/RDCs	1.80	RGoB	Refining of LCC &LSE systems	A manual published
	Draft framework for digital soil mapping (DSM)	**NSSC**/RDCs	0.50	RGoB	A draft framework for DSM carried out	Framework for DSM produced
MoAF/ **DoFPS**	Conduct National Forest Inventory	**SFED**/ TFDs/ Parks/ Dz	61.00	RGoB/Donor (Partially funded by BTFEC, proposal submitted to WB, GIZ))	Clustered plots surveyed	APR & MTR
	Carry out carbon assessment	**SFED** / TFDs/ Parks/ Dz	5.00	RGoB/Donor (proposal submitted to FAO, WB))	Clustered plots surveyed	APR & MTR
	Conduct studies on NWFPs & CF groups	**SFED** / TFDs/ Parks/ Dz	2.50	Helvetas	CFs & NWFP groups registered as farmer group & cooperatives	APR & MTR
	Assessment of watersheds in Chamkhar Chhu, Mangde Chhu and Kuri Chhu river basin	**WMD**/ Dz/Gewogs//NRED/ SFED/ NGO/ FDs	8.00	MHPA EMP, EU-GCCA	Watersheds assessed in Mangde Chhu and Kuri Chhu river basin	APR & MTR
	Watershed management research	**RDCs**	3.00	RGoB/Donor	Research carried out	APR & MTR
MoAF/ **DoL**	Inventory and documentation of forage biomass and carrying capacity of native grasslands including seasonal migratory routes	**NCAN**/ RDC-Jakar	1.53	BTFEC	Data on forage biomass and carrying capacities of rangeland published	Publication & APR
	Characterization of livestock production and feeding systems in Bhutan	**NCAN**/RDC-Jakar/Dz	2.00	RGoB/Donor	Livestock production & feeding system documented and published	Publication & APR
	Soil erosion control using selected forage species	**RDC-Jakar**/ NCAN/Dz.	0.40	No fund	3 forage species identified for soil erosion control	Publication & APR

	Soil fertility management using forage legumes in different AEZs	**RDC-Jakar/** NCAN/Dz	0.30	No fund	Fertility management practices identified	Publication & APR
MoWHS/ **DoR**	Undertake feasibility study for half and full tunneling (Thumnangdrak, Namlingdrak &Thrumshingla)	**DoR**	464.0	No fund	Feasibility studies undertaken at three sites	Study report
	Cost-Benefit Analysis (CBA) between roads built with EFRC techniques and conventional techniques	**DoR**	2.00	No fund	CBA completed	Analysis report
	Carry out Environment Impact Assessment (EIA) at three sites (Gelephu-Panbang, Lhamizingkha-Sarpang & Samrang-Jomotsangkha)	**DoR**	8.00	No fund	EIA carried out for three sites	Assessment report
NEC	Preparation of Integrated Water Resource Management Plan	**NEC**	10.00	No fund	Integrated Water Resource Management Plan prepared	MTR/Budget expenditure
	Impacts Assessment (IA) of industries, mines and hydropower	**NEC**	2.00	No fund	IA of industries, mines and hydropower conducted to incorporate mitigation measures to minimize environmental impacts	MTR/Budget expenditure

	Conduct carrying capacity assessment for mines and industries	**NEC**	20.00	No fund	Maximum limit of mining activities and number of industries that an area can take up ascertained to avoid overloading resulting in degradation of qualities of the environment.	MTR/Budget expenditure
	Conduct minimum environmental flow for hydropower plants planned	**NEC**	20.00	Austrian Coordination Office	Minimum environmental flow maintained to sustain aquatic biodiversity	MTR/Budget expenditure
	Conduct Strategic Environment Assessment (SEA) for hydropower and transmission line	**NEC**	20.00	No fund	SEA for hydropower and transmission line conducted and all environmental and social impacts considered	MTR/Budget expenditure
NBC	Develop strategy for TK documentation; Conduct inventory and documentation of TK associated with biological resources	**NBC**	2.70	GEF	Sustainable utilization of biological resources promoted	APR/MTR
	Identify species requiring sustainable management interventions and promote community based management.	**NBC**	3.50	GEF/RGOB	Sustainable utilization of biological resources promoted	APR/MTR

	Conduct research on varietal selection, release and promote for adoption to increase crop genetic base and climate resilience in selected sites	**NBC/** DoA/ RNR-RDC/ Dz	4.50	RGoB/Donor	Enhanced crop genetic base and climate resilience	APR/MTR
	Conduct comprehensive assessment of endemic plants and develop recommendations for management	**NBC**/DoFPS	7.80	BTFEC	Endemic plants comprehensively assessed and management practices implemented	APR/MTR
	Conduct comprehensive assessment of invasive plants and develop recommendations for management	**NBC/**DoFPS/NPPC	8.00	No fund	Endemic plants comprehensively assessed and management practices implemented	APR/MTR
	Coordinate inventory and documentation of horticultural crop diversity and crop wild relatives	**NBC**/DOA/RDC/Dz	1.40	RGOB/Donor	Horticulture Crop diversity Catalogues	MTR/Expenditure reporting

Matrix 6.3.5: Support to SLM Technologies

Agency	Activities in brief	Implementing & Collaborating Agencies	Cost – (Nu M)	Funding source	Expected output	Means of Verification
MoAF/ **DoA**	Terracing or reconsolidation of 1,000 Ac of land for horticultural and field crops production	**CMU** / NSSC/ Dz/RDCs /Gewogs	25.00	RGoB/Donor	1000 ac of land terraced	APR & MTR
	Improvement of 2,648 Km existing farm roads	**ED**/RDCs/Dz	10.00	RGoB/JICA	15 farm roads improved	APR & MTR
	Terracing and establishment of hedgerows	**Dz** /NSSC	8.78	GCCA/RRCDP	125 ac of land under SLM	PLaMS/ APR
	Implementation of SLM technologies in selected pilot sites to increase the area of agricultural land under SLM interventions	**NSSC**/RDCs/Dz	7.50	RGoB	SLM carried out in 11071 ac	APR & MTR
	Implementation of SLM practices where necessary to improve vulnerable land	**NSSC**/RDCs/ Dz	2.50	RGoB	SLM carried out in 7925 ac	APR & MTR
	Promotion & strengthening organic sources of plant nutrients	**NSSC**/RDCs/Dz	0.55	RGoB	Promotion programs of organic sources of plant nutrients carried out	APR & MTR
	Promote green manure through farmer training & field demonstration trials	**NSSC**/RDCs/ Dz	1.00	RGoB	Promotion programs of green manure carried out	APR & MTR

	Conversion of vulnerable Kamzhing to SLM practices from 4% to 15%	**NSSC**/RDCs/ Dz	10.00	No Fund	Kamzhing brought under SLM	APR & MTR
MoAF/ **DoFPS**	Sustainable forest management unit & working scheme	**FRMD**/ FDs/ NRDCL/ NEC/ Dz	16.30	RGoB/Donor	Increased FMUs & WS	APR & MTR
	Management of forest areas outside FMU system through scientific planning and monitoring	**FRMD**/ FDs/ NRDCL/ NEC/ Dz.	2.20	RGoB/Donor	Mgt. of forest area outside FMU enhanced	APR & MTR
	National REDD+ scheme piloted	**WMD**/ FRMD/ FDs/ Dz	10.70	UN-REDD/ WB	REDD+ scheme piloted	APR & MTR
	Watershed management planning & implementation in degraded areas	**WMD**/ Dz/Gewogs/NRED/ SFED/ NGOs/FDs/ Parks	7.00	RGOB	Watershed mgt. developed & implemented	APR & MTR
MoAF/ **DoL**	Sustainable Rangeland Management in leased Tsamdros	**NCAN**/ RLDCs/ DoL/ Dz	6.00	No fund	850 ac of rangeland brought under SLM practices	APR & MTR
	Support development of improved cattle shed for stall feeding	**NDDC**/ NCAN/ RLDCs/Dz	15.50	RGoB/ Donor	Improved cattle sheds constructed	APR & MTR
	Construction of check dams in degraded rangelands	**NCAN**/ DoL/ Dz/ NSSC/ Communities	0.21	BTFEC	Check dams constructed	Field verification/ APR
	Renovation of degraded native pasture through Replenishment/ Reseeding	**NCAN**/ RLDCs/ Dz/ Communities	1.65	No fund	90 ac of degraded rangeland reseeded	Field verification/ APR
	Integrated Fodder development (IFD) under orchards, paddy bunds through fodder plantation	**NCAN**/ RLDCs/ Dz	4.00	RGoB/ Donor	174 ac of land brought under IFD	Field visit/ APR
	Establishment of fodder germplasms banks and supply of	**NCAN**/ RLDCs/ Dz/F	4.00	RGoB/ Donor	Fodder germplasms banks established	APR /Field visits

	fodder slips, cuttings, seedlings, etc.					
	Plantation of fodder trees to supplement livestock grazing	**NCAN**/RLDCs/Dz/F	1.00	RGoB/ Donor	100000 Nos. of fodder trees planted	APR /Field visits
	Fodder development, processing, preservation & conservation to reduce grazing pressure	**NCAN**/RLDCs/Dz/ Farmers	15.00	RGoB/ Donor	Annual & winter fodder crops promoted	APR /Field visits
	Promotion of feed blocks to reduce grazing pressure	**NCAN**//RLDCs/Dz/Farmers	1.00	RGoB/ Donor	10 MT of feed block supplied	APR /Field visits
	Promote and supply solar lighting facilities to herders as an alternative to conventional fuel wood	**DOL**// Dz/Herders	4.00	RGoB/ Donor	500 No. of solar lighting facilities supplied	APR /Field visits
	appropriate SLM technologies identified and implemented in selected sites	**NCAN/N**SSC/Dz/ Communities	3.99	BTFEC	120 ac of degraded rangelands revived	APR / Field visits
	Reviving degraded rangelands through proven appropriate SLM technologies involving local communities at national scale	**NCAN**/NSSC/Dz/Communities	35.00	No fund	1000 acres of rangelands brought under SLM practices	APR/ Field verification
MoWHS/ **DoR/DHS/ Thromde**	Construction of 187.25 km 2nd East-West High Way following EFRC techniques (Manitar-Raidrak, Raidrak-Lhaimoizingkha, Panbang-Nganglam, Samdrupcholing-Samrang, Tsebar-Mikuri/Durungri) on-going	**DoR**	2398.05	ADB	187.25 km of road constructed following EFRC techniques	Progress report

	Construction of 87.50 km Lhamoizingkha-Sarpang high way following EFRC techniques	**DoR**	1378.48	No fund	87.50 km road constructed following EFRC techniques	Progress report
	Construction of 97 km Gelephu-Panbang high way following EFRC techniques	**DoR**	2421.90	No fund	97 km road constructed following EFRC techniques	Progress report
	Construction of 85 km Samrang-Jomotsangkha high way following EFRC techniques	**DoR**	3049.80	In process with World Bank	85km road constructed following EFRC techniques	Progress report
	Construction of 75 km Gyelposhing-Nganglam high way following EFRC techniques (on-going)	**DoR**	2303.94	GoI	75km road constructed following EFRC techniques	Progress report
	Construction of 18 km of Kheri-Yadi road	**DoR**	343.30	GoI PTA	18 km road constructed following EFRC techniques	Progress report
	Construction of Dagapela-Dalbari/ Lhamizingkha North-South highway (81 km) on-going	**DoR**	2369.96	ORIO & RGoB	81 km of road constructed	Progress report
	Construction connecting to HPP (6 km)	DoR	167.40	GoI PTA	6 km of road constructed	Progress report
	Construction of 19.45 km Refe-Khosela road constructed (on-going)	**DoR**	609.97	GoI	19.45 km road constructed	Progress report
	Road side stabilization and bio-engineering	**DoR**	40.00	No fund	Critical road sides stabilized through bio-engineering	Progress report
	Replicate PPP model of Bajothang town to other Municipal areas (Monggar, Paro, Phuntsholing)	**Municipal**/Dz/MoWHS	24.00	No fund	Improved solid waste management	Site visit and reports

	Plantation in barren city & Government areas	**Thimphu Thromde**	??	PES/ SFED/ DoFPS	4 acres of barren areas planted	Plantation reports
NBC	Explore, rescue, conserve and maintain living collection.	**NBC**	18.00	No fund	Increased and diversified ex-situ conservation of biodiversity	RBGS data
	Explore and implement innovative measures to conserve and promote on-farm PGR diversity	**NBC** / DoA/RDCs/ DAMC/ Dz	3.60	RGoB/BUCAP	Increased on-farm conservation and sustainable utilization of agro biodiversity	ILCCP/BUCAP project report
	Implement innovative measure to promote on farm conservation of local animal breeds	**NBC** / DoL/Dz/ DAMC	6.20	RGoB	Increased on-farm conservation and sustainable utilization of agro biodiversity	ILCCP/BUCAP project report
	Promote PPP for native livestock farming and utilization	**NBC** / DoL/Dz/ DAMC	2.40	RGoB	Increased on-farm conservation and sustainable utilization of agro biodiversity	ILCCP/BUCAP project report
	Establish community seed banks in selected areas.	**NBC** /DoA/RDCs/ Dz	2.00	RGoB/Donor	Enhanced capacity to adapt to changing environmental conditions	PGR program

6.4. Review Summary of the Existing NAP

The task force members carried out a review of the existing NAP to look at its achievements and progress. The outcomes of this review exercise indicated that:

- Most of the activities under different line agencies remained incomplete while few were completed. The completion and the achievements made depended on the availability of the funds. The major achievement were made in putting rules and guidelines in place such as Forest fire rules, revised farm road guidelines, revised National Irrigation Policy, the Mineral Development Policy, etc.
- The interventions requiring major financial allocation such as capacity building program including training of staff, survey and research works, and procurement of equipments/goods remained unattended owing to the limited funding sources.
- Viewing the past progress, it is likely that the action points containing programs/activities requiring higher resources both in terms of human and financial inputs may be constrained while implementing the aligned NAP.
- The program components and recommended actions for the relevant stakeholders that feature in the existing NAP were derived from extensive consultations. These action points were found to be still valid. Where necessary, the task force members updated these action points, and are attached as *Annexure II*.

6.5 Land Degradation Scenarios in 11th FYP of Local Government

With the bottom up approach adopted for planning process for the local governments, the farmers and other stakeholders are aware of the prevalence of land degradation, its severity and its eventual impacts (*Annexure III*).

With an elected government at the helm serving its citizens since 2008 and the annual growth rate reaching close to double digits, the Bhutanese people have experienced rapid socio-economic development. The ultimate impact of the development is the change in their livelihoods, priorities and needs.

A quick review of the existing NAP document would unfold action points to address land degradation issues at the national and central levels only. Further, this NAP alignment exercise made an attempt to review all the Dzongkhag and Gewog 11th FYP documents. For ease and clarity, this was categorized into four activities, including the SLM (as the principal activity); water management; integrated soil fertility management; and human and institutional capacity building. The summary of activities along with its allotted fund for implementation is presented in the form of matrix (Matrix 6.5.1 & 6.5.2).

Considering the pressing land degradation issues that affect the rural livelihoods, more efforts to address the problem at the local levels are required. The emphasis of the government has always been more on developing infrastructure, such as construction of roads. The important question here is- should the more pressing issues such as land degradation be left unattended?

Accessibility is an important aspect of development. Access to road would enable communities to market their produce with ease and consequently uplift the communities economically and alleviate rural poverty. However, it is often ignored that an un-degraded land is essential for better crop production.

Matrix 6.5.1 Cumulative SLM and SLM related programs for 11th FYP

		Dzongkhags		Gewogs		
	Unit	**Target**	**Outlay (M Nu)**	**Target**	**Outlay (M Nu)**	**Sustainable Land Management Activities (Dzongkhag Total;GT= 2219.51; Gewog Total; GT= 2768.49)**
Land management programmes	Acres	61	16.15	...	21.43	
Dryland terracing	Acres	0	9.00	0	0.00	
Chhuzing terracing	Acres	0	0.00	0	0.00	
Machinery hire for land development	No	3	9.50	0	0.00	
Check dam	No	0	1.30	0	1.00	
Hedgerow	Acres	0	0.00	0	0.89	
Stone bunding	Acres	0	0.00	0	0.00	
Bio-engineering	No	1	3.50	0	0.00	
River and stream bank protection	Metres	0	117.00	4000	18.11	
Drainage improvement for farm roads	km	0	45.35	10	14.88	
Lake protection	Acres	5	1.20	0	5.50	
Soil and water conservation	Acres	0	7.31	0	0.25	
Watershed management	No	5	5.17	1	9.42	
Catchment protection	Acres	0	3.00	5	3.85	
Water source protection	Acres	4	7.45	10	28.62	
Afforestation/reforestation programs	Acres	54	38.23	23	31.62	
School greening programmes	Acres	0	8.05	0	1.68	
Support for environment conservation	No	0	1.98	0	0.45	
Bamboo plantation	Acres	0	5.00	0	3.53	
Feed and fodder development	Acres	0	10.71	867	27.68	
Support on Bio-gas plant	No	96	3.43	27	5.38	
Rehabilitation of degraded areas	Acres	0	2.20	0	0.00	
Support community forestry	No	64	13.00	92	31.31	
Support private forestry	No	0	4.50	15	6.79	
Construction of EFRC roads	km	260	1168.90	8340	1775.00	
Maintenance of roads	km	1005	606.51	2373	768.03	
Waste management (pits, landfill)	No	6	110.05	6	9.80	
Forest fire management	No	0	11.30	0	2.78	
Promotion of eco-tourism	No	0	9.75	0	0.50	

Matrix 6.5.2 Cumulative SLM and SLM related programs for 11th FYP

Construction of irrigation channels	No/km		51	76.200	313	194.37	Water management (DT= 219.59;
Renovation & maintenance of irrigation channels	No/km		222	45.200	918	259.54	
Installation of rain water harvesting techniques	No		16	7.850	6	3.28	
Installation of improvised irrigation system	No		29	11.340	0	0.30	
Drainage improvement (municipal)	km		0	79.000	0	0.00	
Support to compost pits	No		0	0.85	0	0.05	Integrated Soil Fertility Management (DT= 12.11; GT= 4.30)
Support to Bio-pesticides	No		0	2.50	0	0.00	
Support to Bio-fertilisers	No		0	0.20	0	0.00	
Promote large scale cultivation of pulses in potential areas	Kg		10000	2.50	0	1.00	
Construction of Farmyard manure shed	No		12	4.50	2	2.91	
Promotion of legume & green manure crops.	Kg		0	1.56	0	0.05	
Intercropping	Kg		0	0.00	0	0.00	
Soil fertility development	No		0	0.00	0	0.29	
Formation of road user group	No		0	6.61	4	7.47	Institutional and Capacity Building (DT= 42,65; GT= 52.31)
Formation of water user associations	No		360	7.75	15	1.57	
CF management planning & training	No		51	10.94	7	9.60	
Training and public awareness on forest fire	No		19	5.85	0	3.00	
PF initiation & awareness program	No		0	0.90	0	1.26	
Farmers training on soil nutrient management	No		0	1.50	0	1.13	
Awareness on proper land management practices	No		1200	3.65	1	1.75	
Forest fire management group	No		0	0.00	0	1.02	
Training on EFRC road construction	No		0	0.00	0	0.00	
Waste management training	No		0	1.20	8	20.05	
Training on watershed management	No		0	0.80	19	1.19	
IPM approach training for farmers	No		10	2.00	0	0.36	
Training on preparation and use of bio - pesticides and fertilizers	No		0	0.00	0	0.05	
Training on feed & fodder development	No		0	0.00	1	0.95	
Training on Bio-gas development	No		5	0.20	0	0.13	
Farmers training on sustainable management of NRs	No		0	0.00	1	2.79	
Community education for adaptation to climate change	No		100	1.25	0	0.00	

Part E: Implementation and Reporting Mechanisms

CHAPTER VII: IMPLEMENTATION and M&E MECHANISM

7.1 Implementation mechanism

A two-tier mechanism is proposed for the implementation of the NAP. At the upper level, it is proposed that a NAP Monitoring and Coordination Committee (NAP-MCC) is proposed for monitoring and coordinating the implementation of the NAP. The composition of the NAP-MCC is proposed as follows:

1. Hon'ble Minister, Ministry of Agriculture & Forests (Chair)
2. Hon'ble Secretary, National Land Commission Secretariat (Co-Chair)
3. Director General or Director, Department of Agriculture, MoAF (Member)
4. Representative, Department of Forests and Park Services, MoAF (Member)
5. Representative, Department of Livestock, MoAF (Member)
6. Representative, Department of Geology and Mines, MoEA (Member)
7. Representative, Department of Energy, MoEA (Member)
8. Representative, Department of Industry, MoEA (Member)
9. Representative, Department of Roads, MoWHS (Member)
10. Representative, Department of Human Settlement, MoWHS (Member)
11. Representative, Department of Disaster Management, MoHCA (Member)
12. Representative, National Land Commission (Member)
13. Representative, National Environment Commission (Member)
14. Representative, GNH Commission Secretariat (Member)
15. Representative, Ministry of Finance (Member)
16. Program Director, National Soil Services Center, DoA, MoAF (Member Secretary)

The NAP-MCC would meet at least once in two years to review the progress of the activities implemented as part of the NAP, discuss the status of implementation of the NAP, and identify issues, constraints and lessons learnt. This group will be also responsible for resolving any policy and coordination issues that may emerge during the implementation of NAP.

At the lower level, it is proposed that focal persons be identified in each of the agencies that will have a role in the implementation of NAP. These focal persons will be responsible

for submitting progress reports on the implementation of NAP activities pertaining to their agencies to the NAP-MCC on annual basis.

The agencies that would need to nominate NAP focal persons include:

1. Department of Agriculture, MoAF
2. Department of Forests and Park Services, MoAF
3. Department of Livestock, MoAF
4. Council for RNR Research of Bhutan, MoAF
5. Department of Geology and Mines, MoEA
6. Department of Energy, MoEA
7. Department of Industry, MoEA
8. Department of Hydro-met Services, MoEA
9. Department of Roads, MoWHS
10. Department of Human Settlement, MoWHS
11. Department of Disaster Management, MoHCA
12. National Land Commission
13. National Environment Commission
14. GNH Commission Secretariat
15. Thimphu City Corporation
16. Representative from Druk Green Power Corporation
17. Representative from Civil Society Organization
18. National Soil Services Center, MoAF

7.2 Monitoring and Evaluation

In order to keep track of the NAP implementation, it is proposed that the NAP focal persons will submit the progress reports on NAP implementation annually to the NAP-MCC. The MCC in turn meet once in two years and publish the report and circulate to all stakeholders.

It is also proposed that a review of the NAP implementation be carried out after 2 years. This would serve as a mid-term review. Furthermore, the current NAP be evaluated and updated by the end of 10 year strategic plan. This would enable the stakeholders to plan and integrate their land degradation related activities in the 12th FYP (2018-23).

Part F: Integrated Financing Strategy

Background

The Convention (UNCCD) strongly emphasizes the need to mobilize resources through all existing channels, to strengthen financing, and explore new sources in order to respond to the Convention's integrated, bottom-up approach. It has set up the Global Mechanism (GM) to increase the effectiveness and efficiency of existing financial mechanisms for tackling land degradation. The GM acts as a hub for a dynamic network of partners committed to focusing their energies, resources and knowledge on combating desertification. The GM has elaborated the IFS as an instrument to support governments in mobilizing financial resources for UNCCD implementation at the country level. As stated in the GM's report to COP7, IFSs are meant to "contribute to broadening the scope of planning processes beyond specific sectors and include comprehensive coordinating arrangements between different financing sources, instruments and mechanisms." Their objective is to improve the investment climate and create a stable, predictable and enabling environment for increasing investments in SLM. The IFS approach is adjusted to each country's specific characteristics.

With the experiences and initiatives of GM in resource mobilization for SLM activities including mainstreaming of NAP into the National Planning Process (NPP) and overarching development frameworks, Bhutan is impelled to design its own IFS to support resource mobilization for implementation of NAP in the context of Bhutanese topography and economy. The financing mechanism for SLM in Bhutan today is "as is available and project bound" in light of the limited national budget against more pressing need for budget allocation to other activities perceived to yield quicker responses and benefit.

This part of the document describes the IFS for NAP. The IFS determines the financial flows for implementation of the NAP, including funding sources. Financing for NAP can be sourced from internal funding sources within national, Dzongkhag and Gewog budgets and from other internal sources like the private sector or NGOs. In addition, funding can be mobilized externally from development partners, such as multilateral and bilateral donors and/or international private investment and NGOs. Another important source of financing is the innovative financing mechanisms which include, among others, the Clean Development Mechanism (CDM), Payments for Ecosystem Services (PES) and a mechanism for Reducing Emissions from Deforestation and Degradation(REDD+).

The possible funding sources to implement the NAP are as discussed in the following chapter.

CHAPTER VIII: INTERNAL SOURCES OF FUNDING

8.1 Bhutan's Fiscal Situation

The policy of the Royal Government of Bhutan is to maintain the fiscal deficit to a sustainable level of the GDP. In the medium term, the economy is projected to grow at an average of 6.90% driven by high level of investment in hydropower projects and expansion in the service sectors. The fiscal deficit for FY2013-14 is currently projected at about 3.70% of GDP. The domestic revenue is projected to be at Nu.21, 860.89 M, which is about 3.30% more than that of the previous year. The tax revenue to GDP ratio is 13.50%.

For the Fiscal Year 2013-14, the external debt outstanding is estimated at Nu. 11,399.10 M, which is about 92.2% of the estimated GDP. Although the percentage of external debt outstanding is quite high, looking at the composition of the external debt stock, 67.40% comprises of bilateral loans for hydropower projects which are self-liquidating. The non-hydropower loans account for about 32.60% of the estimated GDP and are borrowed from International Financial Institutions at highly concessionary terms. Debt service ratio for the FY 2013-14 is estimated at about 9.30%.

8.2 Legal Framework for Budgeting

The Constitution of Bhutan 2008, Public Finance Act 2007, Financial Rules and Regulation 2001, mandates the MoF for preparation of annual budget including preparation of Budget Policy and Fiscal Framework Statement (BPFFS), the Appropriation Bill and budget management and output monitoring.

8.3 Budgeting and Internal Sources of Financing

The Department of National Budget (DNB) within the MoF is the agency responsible for: (i) preparation of annual budget; (ii) proposing budgetary allocations for implementation of the general policy set by the Cabinet; (iii) assessing government agencies' requests for budgetary allocations through comparisons, reductions and revisions; (iv) examining all programs, work and projects; and (v) verifying that requests for allocations are compatible with RGoB's fiscal policies. The DNB examines, coordinates and approves requests for funds before these requests are submitted for authorization, to the Cabinet through MoF and then to the National Assembly in summer session. The DNB reviews the annual funding request and interacts with budgetary agencies for discussion and negotiation. It also has special role in of carrying out monitoring of the budget execution where it may appropriately introduce changes in the budgeting process to improve the service delivery.

8.4 Budget Preparation Process

The budget is formulated within the overall Plan outlay and Budget Policy Fiscal Framework Statement, which is an indicative planning figure of the sectors, Dzongkhags,

Gewogs (Table 10). The plans and programs should remain within the Government's available resources. As a basis for the formulation of the budget, the DNB prepares an estimate of the expected receipts and a forecast of expenditure based on the estimate of the internal receipts from tax and non-tax sources prepared by the Department of Revenue & Customs (DRC), and the estimates of receipts of external grants and loans, loan recoveries and estimates of counterpart fund and the debt servicing requirements prepared by the GNH Commission and the Department of Public Accounts (DPA).

Table 10: Budget Process

Activity	Timeline	Agency Responsible
Policy Guidelines from Cabinet	October	Cabinet/MoF
Receipts and Expenditures Forecasts	November & March	DNB
Budget Call	December/January	DNB
Preparation and Submission of Budget Proposals	February & March	Sectors
Budget Discussion	March & April	DNB, GNHC & Sectors
Submission of Budget Report to Cabinet	May	MoF
Budget Report Discussion	May/June	Cabinet & Parliament
Fund Release Forecast	Quarterly (July/Oct/Jan & Apr)	Sectors
National Budget Discussion and Approval	June	Parliament
Budget Notification	July	DNB
Release of funds	July-May	DPA
Implementation of budgeted activities	Year round	Sectors
Disbursement of Payments	Year Round	Sectors
Reporting/Completion of Monthly Accounts including BRS to DPA	Monthly	Sectors
Financial/Physical Progress Reports to DNB & GNHC	Quarterly	Sectors
Mid-Year Budget Review	February/March	DNB
Monitoring of Financial/Physical Progress	Year round	DNB & GNHC
Auditing	Year round	RAA
Re-Appropriation and Release of Funds	As per the Delegation of Financial Powers	GNHC, DNB,DPA & Sectors
Supplementary Budget Incorporation and Release of Fund.	Cabinet & MoF	GNHC, DNB, DPA & Sectors

8.5 RNR Budget and Expenditure

A budget is an annual proposal outlining anticipated government revenues and designating program expenditures for the upcoming fiscal year. It is based on estimated expenditures for the year and the proposed means of financing. The RGoB's budget consists of: current and capital expenditures. The capital expenditure is the productive component that generates economic growth and spurs economic cycle.

Since the MoAF is the main agency involved in SLM activities in Bhutan, an analysis of RNR sector budget allocation and actual outcome was carried out to look at its share of financing vis-à-vis SLM programs. The sector-wise allocation for FY 2013-14 (Table 11) and a comparison of budget allocation (FY03/04-08/09) and actual outcome (FY03/04-07/08) presented below (Table 12):

Table 11: Sector Allocation of the FY13-14 (Nu. in M)

Sectors	**Current**	**Capital**	**Total**	***%***
Social Services	**6,675.021**	**3,255.730**	**9,930.751**	**25**
Health	1,977.02	1,162.42	3,139.43	8
Education	4,698.01	2,093.31	6,791.32	17
Economic and Public Services	**3,699.83**	**9,075.100**	**12,774.93**	**32**
Agriculture	1,969.90	2,162.15	4,132.05	10
Mining & Manufacturing Industries	458.50	379.15	837.65	2
Roads	325.41	3,008.15	3,413.56	9
Housing & Community Amenities	492.51	1,674.78	2,167.30	6
Communications	379.96	1,003.16	1,383.12	3
Energy	73.56	767.71	841.26	2
Religion & Cultural Services	**628.62**	**757.00**	**1,385.62**	**4**
Law and Order Services	**1,582.01**	**396.92**	**1,978.93**	**5**
General Public Services	**4,449.78**	**3,469.00**	**7,918.78**	***20%***
National Debt Services	**2,124.86**	**3,414.29**	**5,539.15**	***14%***
Repayment	2,124.86	2,758.10	4,882.96	*12%*
Lending	0.00	656.19	656.19	*2%*
Total	**19,160.11**	**20,368.04**	**39,528.16**	***100%***

(Source: National Budget Report 2013-the figures include both internal and external sources of financing)

Note: The approved allocation for MoAF in FY13-14 is Nu. 4,132.05 M representing 10% of the RGoB's total budget.

Table 12: Budget/Actual Outcome- Overall vs RNR

Description	2008-09	20 09-10	20 10-11	20 11-12	20 12-13	20 13-14
Total Budget allocation:						
Total RGoB budget allocation	27,016.52	30,402.34	35,796.51	42,174.74	38,044.20	39,528.16
Total RNR budget allocation	3,589.02	3,392.24	3,547.60	5,362.92	4,551.29	4,132.05
% of RNR budget	13%	11.20%	10%	13%	12%	
24Actual outcome:						
Total RNR spending	1,457.92	1,788.28	1,787.30	2,082.57		
Total RGoB spending	25,519.70	31,568.78	35,073.08	37,892.57	39,343.35	
% of RNR spending	5.71	5.66	5.09	5.59		

The total budget allocated to RNR sector varied between 9-14% of the RGoB's total budget during past six years. Likewise, the share of the RNR spending ranged from 5-6% of the total RGoB's spending.

8.6 Comparison of Budget allocation and actual expenditure

The breakdown of MoAF's budget allocation and actual outcome during the past five years as under (Table 13):

Table 13: Comparison of RNR allocation vs. Actual outcome

Details	2003-04	2004-05	2005-06	2006-07	2007-08
Total RNR Allocation	1,771.10	1,497.62	2,094.23	2,427.62	2,673.70
Total RNR Actual Outcome	988.96	869.97	1,228.48	1,709.38	1,600.14
Variance (%)	44	42	41	30	40
Utilization Rate (%)	56	58	59	70	60
Capital component					
RNR Allocation	1,048.41	693.05	1,162.43	1,349.51	1,555.21
RNR Actual Outcome	515.12	310.34	568.06	759.48	715.92
Variance (%)	51	55	51	44	54
Utilization Rate (%)	49	45	49	56	46

(Table 12 & 13 Source: Dept. of Public Accounts and Dept. of National Budget (the figures include both internal and external sources of financing)

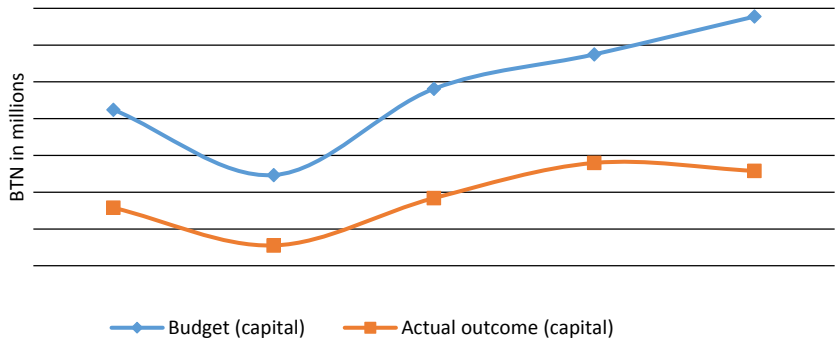

Figure 14: RNR Allocation vs. Expenditure (Capital)

Comparison between the budget allocations and the actual outcome during the FY2003-04 through FY2007 - 08, reveals the following:

- The actual expenditures were consistently below the allocated budget;
- The budget utilization rate for RNR is about 56-70% on the overall and for capital component is only about 45-49% through FY2003-04 to FY2007-08;
- The actual expenditures for RNR sectors showed gradual increase over the past five years.

Some of the possible reasons attributing to the under-utilization of budget are:

- Late approval of the appropriation bill by National Assembly, resulting in delayed releases;
- Delays in the tendering process due to ambiguous procurement rules resulting in implementation delays;
- Non-compliance by contractors with contractual obligations and implementation schedule;
- Technical capacity constraints - both in terms of quality and number in MoAF;
- Delays in disbursement for the programs/project funded through external sources (grants or loans); and
- Preparation of overestimated and unrealistic budget in anticipation of budget cuts

Table 14 outlines the proposed actions to enhance the mobilization of resources from internal sources.

Table 14: Measures to Enhance Mobilization of Internal Resources

Starting Point	Description	Actor/Level of Action	Measures to be Adopted
Formulation of National FYP	National FYP is a comprehensive national development plan laying out expenditure plan for five years.	MoAF, Dzongkhags, and Gewogs	• Ensure that all SLM related program is included in the FYPs thereby becoming a regular feature of the annual budget

Budget Proposal	The wide gap between the funds allocated vs. actual expenditure in the past years has resulted in loss of credibility of MoAF in spending the allocated budget thereby losing its bargaining power for additional budget.	MoAF, Dzongkhags, and Gewogs	• MoAF properly assess their capacity to implement the planned SLM programs • Increase MoAF's implementation capacity • Prepare realistic budget with sound justification
Political Lobby	The preparation of budget involves several phases of negotiation which provides room for justifying budget for SLM-related program, Lobbying for land management issues can happen during budget discussions, Cabinet meetings, and Parliamentary sessions.	MoAF; Members of Parliament & General Public	• Increased advocacy and awareness programs on the importance of SLM for policy makers including the politicians

CHAPTER IX: EXTERNAL SOURCES OF FUNDING

9.1 Overview

Since the start of the planned economic development in early 1960s, Bhutan had relied heavily on the external resources to finance its development activities. Overtime, Bhutan graduated from the stage when the entire recurrent and capital expenditures were financed by external assistance to a stage where it is able to cover the entire recurrent and some part of the capital cost from its internal resources. The steady progress in the mobilization of the domestic resources has enabled Bhutan to make significant stride towards its goal of economic self-reliance. Despite such progress, as reflected in Table 15, the country still remains extensively dependent on the external assistance to finance its major development projects and programs. While fiscal reforms were initiated to increase domestic revenues, the prospects for enhanced revenue through domestic taxation are limited because of the weak private sector and the existence of the large share of non-monetized economy. The reliance on the external assistance to finance its development activities is therefore expected to continue in the foreseeable future.

Table 15: Trends in External Financing over the Plan Periods (Nu. in M)

Five Year Plan	Outlay[25]	Internal	External	External Resource % to Outlay
I (1961 -66)	174.70	0.00	174.70 (GoI)	100
II (1966 – 72)	220.00	9.80	210.20 (GoI)	95.55
III (1972 – 77)	355.00	25.00	330.00 (GoI)	92.96
IV (1977 -82)	900.89	94.00	806.69[26]	89.54
V (1982 – 87)	4,338.10	942.00	3396.10	78.29
VI (1987 -92)	9,559.20	3,632.49	5926.70	61.99
VII (1992 – 97)	15,590.70	5,489.00	10,101.70	64.79
VIII (1997 – 2002)	39,523.82	13,000.00	26,523. 82	67.11
IX (2002 -08)	70,000.00	32,000.00	38,000.00	54.29
X (2008 – 13)	148,074.72	75,390.56	72,684.16	49.09
XI (2013-18**)**	213,291.49	139,816.34	58,638.70	27.49

(*Source: Good Governance for Development, Ninth Round Table Meeting, 2006*)

The Government of India continuous to be the main source of external assistance to Bhutan. Its assistance to Bhutan dates back to as early as 1960s when it financed the entire portion of the Bhutan's First Five Year Plan (1961–66). Since then, the assistance from the Government of India has increased incrementally to the successive plans and it continues to be the largest bilateral donor to Bhutan.

The assistance from other bilateral and multilateral agencies including grants and loans

[25] Under columns Outlay Internal and External, the figures are indicative only

[26] Start of UN agencies assistance to Bhutan with an indicative commitment of Nu. 103.69 Million (Source - FYP Documents)

from the international financial institutions started to flow after Bhutan joined the UN in 1972. Thereafter, there has been steady interest in Bhutan from international agencies and, consequently assistance from the UN and other agencies began to increase. From the third plan onwards, assistance from the Government of India has been increasingly augmented by assistance from other bilateral and multi-lateral sources. Currently, Bhutan receives external assistance from as many as 15 multilateral organizations, 19 bilateral donors, 4 Financial Institutions (ADB, World Bank, IFAD and KFAD) and some nongovernmental organizations (NGOs)/foundations such as Helvetas, WWF, Save the Children (USA) and other foundations.

9.2 The Donor Community in Bhutan

External finance has underpinned Bhutan's development efforts, both by financing successive development Plans and by improving the skills of Bhutanese through training and technical assistance. Aid will continue to be important in the coming years. Table 16 presents the main bilateral, multilateral and other aid agencies currently active in Bhutan and their indicative commitment in the 11th FYP.

Table 16: Indicative Commitment of Donors for the 11th FYP- 2013-18 (Nu. in M)

Sl. No.	Donor	Grant	Loan	Total
Bilateral Donor				
1	Austria	640.00		640.00
2	Australia	1,485.00		1,485.00
3	Denmark	303.60		303.60
4	India	45,000.00		45,000.00
5	Japan	3,856.44		3,856.44
6	Netherlands	800.00		800.00
7	Norway	1,224.00		1,224.00
8	Switzerland (SDC)	432.00		432.00
Sub-Total		**53,741.04**		**53,741.04**
Multilateral Agencies				
1	Asian Development Bank		2,201.74	2,201.74
2	European Union	2,560.00		2,560.00
3	GEF	427.50		427.50
4	IFAD		2,292.31	2,292.312
5	UN Agencies[27]	4,454.64		4,454.64
6	World Bank		1,736.00	1736.00
Sub-Total		**7,442.14**	**6,230.05**	**13,672.19**
NGOs and Foundations[28]		**847.34**		**847.34**
TOTAL		**62,030.51**	**6,230.05**	**68,260.56**

[27] Active UN Agencies in Bhutan include FAO,UNCDF, UNESCO, UNFPA, UNICEF, UNDP,UNEP,UN Women, Habitat, UNIDO, WFP, WHO and GFATM.

[28] NOGs/Foundations include Helvetas, SCF and WWF. (Source: Preliminary Resource Projection)

The fact that the process of development in Bhutan was initiated and to a large extent still sustained by external assistance has been fully recognized by the Government. Therefore, the aid policy of the Government of Bhutan had been to continue to cover the recurrent expenditures through internal revenue while at the same time working on the ways of increasing the domestic revenue to reduce donor dependency. The 11th FYP will work towards reducing donor dependency through achieving economic self-reliance by 2020. To this end, the plan was founded on the overall objective of accelerating economic self-reliance through green and inclusive economic growth.

With regard to external assistance, the policy of the RGoB had been and will be, to use the development assistance for capital investment programs/projects prioritized by Bhutan and, the preferred choice of assistance will be in the form of grants. Loan financing had been and shall be sought only where grant financing for high priority program/projects are not available and where the investment is of relatively commercial in nature. Donor's engagement in a particular sector shall be on the basis of their expertise and comparative advantage and the assistance shall be aligned and harmonized with the priorities of the RGoB, with core/predictable aid resources channeled to high priority programs/projects and vice-versa.

Technical Assistance (TA) has been an important aid component that has helped Bhutan build its local capacity – human resource as well as institutional capacity. The policy of the Government will be to continue to seek TA in areas where Bhutan either lacks or have inadequate capacity and simultaneously to build and improve skills of the Bhutanese people.

9.3 Development Cooperation Strategy

The broad strategies of the Government has been to concentrate the efforts of donors in particular fields or sectors where their experience or technology has been preferred within the context of Bhutan's development. As the attainment of economic self-reliance remains the major objective of the country's development process, continuous efforts have been made to harness and utilize the available resources in the most productive and judicious manner.

Nonetheless, until the time the Government is not in a position to finance its entire development program from its domestic resources, grant financing will still be a very important source of financing for the Government. The Government had taken a very cautious strategy to loan financing and had resorted to only if grant financing is not forthcoming and, only for revenue generating projects in the economic sectors.

As external assistance forms a substantial component of Government financing, the Government has put in place institutions and systems to ensure effective coordination and management of external resources. This has resulted in improvements in utilization and accountability of the external resources. The Government is committed to placing the

highest priority on efficient management of external assistance and to further strengthening and improving the systems.

With significant improvements in financial reporting and accountability systems made over the years, the Government is emphasizing on a shift in aid modality. The funding modality that the Government proposes to advance in the coming years will be a shift from the project mode to program financing and gradually to budget support modality. This strategy is motivated by the fact that the approach provides opportunity for both the parties to focus on larger goals and objectives and benefit from economies of scale and scope. The strategy will also contribute to reducing the transaction cost of the aid by aligning and harmonizing aid to Government priorities and systems.

Further, with the aim of dovetailing the development assistance with the overall plan of the country, the Government emphasized on the need for all the major donors to develop a long-term assistance program/partnership strategy. Such a partnership strategy also gives a certain level of predictability in resource forecasting and helps the in better planning of development interventions.

9.4 Future Trends

The focus areas for each major international donor are expected to remain unchanged for the foreseeable future. The Table 17 summarizes key SLM-related areas of donor support and development partners' preferences.

Table 17: Development Partners' Preferred Areas of Support to SLM and its Related Activities

Sector/Thematic Area	Development Partner's Ongoing and Planned Programs
Natural Resources Management, Watershed Management and Environment	**Austria: ACB** • Forest Research; **Australia** • Research on fruit flies (ACIAR); • Mandarin production. **Denmark: DANIDA** • Environment and climate change; **India** • Sustainable livestock development. • Irrigation • Agriculture marketing **Japan: JICA** • Horticulture research and development;

	• Farm Mechanization; • Rural development. **The Netherlands: SNV & SDS** • Agro-biodiversity conservation; • Environment friendly road construction; • Community based natural resource management **Swiss/Helvetas** • Rural livelihood; • Participatory forest management; **Asian Development Bank (ADB)** • Environment and climate change. **European Union (EU)** • Sustainable livestock development; • Sustainable agriculture. • Climate Change **Global Environment Facility (GEF)** • Livestock and crop conservation; • Sustainable land management; • Bio-safety; • Biodiversity conservation. **International Fund for Agriculture Development (IFAD)** • Agriculture; • Rural development. **United Nations Agencies:**[29] • Environment and climate change; • Agriculture production; • Bio-diversity conservation; • Disaster management. **Food and Agriculture Organization** • REDD Climate change • Sustainable Agriculture **World Wildlife Fund (WWF)** • Bio-diversity conservation; • Species research and monitoring;

[29] UN Agencies include UNDP & UNED

With the wisdom of the Monarchs, the commitment and dedication of the Government and generous support from the development partners, Bhutan has achieved remarkable progress socio-economically. This is evident from the improvements in the GDP per capita of the Bhutanese from a mere US$ 66 in 1960s to about US$ 2,986 in 2013. Bhutan has now graduated from the category of Least Developed Countries (LDCs) to the category of middle income countries (Human Development Report (HDR) 2009). While such an achievement in a short span of time is highly appreciable, the worrying aspect is that Bhutan will not be able to enjoy the generosity of the development partners as done in the past – implying that it would be difficult for Bhutan to access grants and that it will have to increasingly resort to either enhancing domestic revenues or borrowings to finance its future development plans. The ongoing discussion by some of the development partners to gradually phase out their support in the coming years does substantiate this imminent situation. This is expected to have implication to the financing of the SLM activities and, thus calls for a greater need to mainstream SLM activities into the national plans and policies and to explore innovative financing windows to supplement the traditional financing option to sustain SLM activities.

9.5 Recommendations for Improving Resource Mobilization from External Financing Sources

Based on the synthesis of the information provided thus far, reports reviewed and observations, the following recommendations are being made to enhance external sources of financing for the SLM activities.

1. Bhutan has an impressive track record in terms of utilization of the resources – both internal as well as external. All the donors that have supported and been supporting Bhutan has expressed satisfaction over the outcome of their assistance. It will therefore be in the interest of Bhutan to continue to build on this credibility to motivate the existing donors for continuation of their assistance and to attract new ones.

2. Recently the RGoB and the World Bank has jointly carried out the Public Financial Management (PFM) assessment for Bhutan to determine the strength and weakness of the RGoB's PFM system and to articulate reform program in the context of RGoB's harmonization strategy with the ultimate goal of achieving increased reliance on country systems. Although the report is in the draft stage, it is indicative of the fact that RGoB's PFM system is adequate to move from project-tied to more of sector-wide and general budget support approaches. This would not only help in reducing the administrative cost associated with projects but also help Bhutan align its aid resources to national prioritie.

3. While donor coordination has not been a serious issue in Bhutan, it would be meaningful to organize donor coordination at the sectoral level as this will help to reduce duplication of resources through harmonizing assistance within the donors as

well as with the donors and the sectors. Such a process would specifically ensure addressing and financing cross-sectoral issues such as SLM.

4. Bhutan's clear procedures/protocol for seeking donor assistance – both grants and concessional loans has helped in coordination of external resources to a large extent. Nonetheless, resource mobilization efforts have largely remained limited with the existing donors and only few initiatives were undertaken to explore new financing sources. It will therefore be worthwhile to extend the efforts of the resource mobilization work to identify potential and new financing sources to supplement the existing ones.

5. Climate change issues offer tremendous opportunity and potential to enhance the inflow of external resources, particularly for the activities related to SLM. Since such financing schemes are relatively new, it would be important for Bhutan to built capacity of the stakeholders in exploring the financing schemes and its modalities. These could be advanced both from the convention approach as well as from the innovative approach. Some of the innovative sources relevant to Bhutan are presented in the next chapter.

CHAPTER X: INNOVATIVE SOURCES OF FUNDING

10.1 Introduction

Innovative sources of financing mechanisms are non-traditional funding sources intended to supplement "traditional" funding for development that normally come from national government treasuries, official development assistance (ODA), or support from multilateral and bilateral donors. This non-traditional financing mechanism focuses on generating new and innovative financial sources and aims to implement financing mechanisms that would not require consensus of multilateral actors or bilateral donors. Such additional financial sources are needed to finance long-term programs in developing countries as financial support from developed countries cannot guarantee predictable and stable ODA. Against such scenario, international agencies, national governments and special groups have devised several innovative financing mechanisms and instruments which are at varying levels of implementation in different countries.

Bhutan has received most of its development aid through multilateral and bilateral donors. Considering the global economic meltdown, it is worthwhile to explore other forms of financing mechanisms to supplement internal government funds, multilateral and bilateral aid for development. Several innovative financing mechanisms developed and practiced elsewhere, are described below.

10.2 Examples of innovative financing schemes in practice or proposed at the international level

There are several innovative financing mechanisms and instruments that are already in practice worldwide such as PES, Carbon Finance, CDM, and many others. There are also several new ones proposed at the international level, some of which are being implemented by certain groups of countries as many of these instruments do not require international consensus. Given, enabling legal frameworks and agreement amongst developed countries, these innovations could help generate a large amount of funds that will go into supporting the countries in the Global South in attaining the Millennium Development Goals (MDGs) including sustainable land management. A few of these innovative mechanisms that may be applicable to Bhutan are presented in Table 18.

Table 18: Revenue Generation Potentials through Innovative Sources of Finance

Sources	Description of Tax Source	Impleme -ntation	Potential Revenue (US$)
Air-ticket tax	Taxing air transport e.g. France levies tax on all air tickets issued in France. The 13 member countries party to this tax measure from the developing countries only tax on international travel.	2006	400 M

Tackling tax evasion	Tax evasion at the international level accounts for as high as all the funds necessary for attaining MDGs. UN based committee to oversee payment of taxes would contribute and make funds available for development		50 billion p.a.
Carbon tax	A tax on the carbon content of fuels – effectively a tax on the CO_2 emissions from burning fossil fuels. Taxing fuels according to their carbon content will infuse incentives at every chain of decision and action – from individuals' choices of new product design, capital investment and facilities location, and governments' choices in regulatory policy, land use and taxation. A global tax on the use of carbon at a rate equivalent to a tax on gasoline of 4.8 cents per gallon levied only on high income countries could raise some US$ 50 billion a year		60-130 billion p.a.
Global lottery or global premium bond	Global lottery operated through national state-operated and state licensed lotteries, with proceeds shared between national participants and independent foundation established in conjunction with UN. Global premium bond, parallel to national bonds with lottery prizes		126 billion
Assigned Amount Unit (AAU) Auction	A portion of the international emissions allowances allocated to Annex I countries should be set aside and auctioned off. The best approach for generating new climate change adaptation financing is that links directly to a fundamental emissions reduction system as part of the post 2012 global agreement. It is estimated that billions of US$ could be generated through this auction. If a 7.5% of the AAUs are auctioned , the fund generated could yield more than US$ 50 billion by 2015		50 billion

(Source: Oxfam 2008; Frank Schroeder 2006; A.B Atkinson 2004; Tony Addison and Abdur R. Chowdhury 2003)

10.3 Innovative financing mechanisms and instruments for Bhutan

While many of the innovative financing mechanisms proposed or in practice at the international level may not be effective in Bhutan due to complex legal framework, technicalities etc., there are some that could be applicable to Bhutan.

10.3.1 Environmental Trust Fund

Bhutan is one of the leading countries among the developing ones to establish environment trust fund. The BTFEC was established in 1993 with a Royal Charter. The trust fund started with an initial capital of US$ 20 M of which US$ 10 M was contributed by GEF/UNDP through grant and the rest were raised through contributions from WWF-US and bilateral donors. Currently, BTFEC has a capital of nearly US$ 40 M from which the interest generated is annually given as grants to various agencies and non-governmental agencies for conservation programs.

Today more than 50% of Bhutan's land area is within the national system of protected areas, conservation areas and biological corridors. The interest generated from the BTFEC capital fund is not adequate to support conservation and management programs in the protected areas. Therefore, concerted efforts are required to increase the endowment fund to at least US$ 70-80 M to effectively support conservation programs including watershed management. If the BTFEC's endowment can be raised considerably the Royal Government will not need to provide budgetary support to the parks and conservation programs which could be diverted for other programs such as the land management programs.

10.3.2 Environmental Revolving Fund (ERF)

Currently Bhutan does not have any environmental revolving fund (ERF) but a modest start could be made from collection of nominal fees from tourists visiting Bhutan. Donations from individuals and businesses can also be solicited. Public corporations could also be encouraged to contribute to the fund as part of corporate-social responsibility.

The first step towards such a venture could be to assess how much funds can be raised. A total of 27,636 tourists visited Bhutan in 2008 an increase of 6,952 over 2007 arrival and brought in US$ 38.82 M (MoEA, 2009). For instance, if a nominal fee of US$ 5 each is levied on every tourist visiting the country, US$ 138,180 (Nu. 6.63 M) would have been collected taking 2008 tourist arrivals. If the Government's objective of bringing in 200,000 tourists annually can materialize, ERF could generate as high as US$ 10 M annually. Considering different kind of collection mechanisms and instruments, environmental revolving funds can supplement sustainable livelihood programs in protected areas.

10.3.3 Watershed Management Fund (WMF)

Establishment of Watershed Management Fund is also feasible. Bhutan has one of the

highest per capita water availability in the world (DoE, 2003). It is estimated that Bhutan has a long-term mean annual water flow of 73,000 M m^3/year and the capita mean annual flow availability is estimated at114, 964 m^3/year. It is also estimated that Bhutan has a hydropower potential of 30,000 MW out of which 23,760 MW has been identified and assessed to be technically feasible (MoEA, 2009). The RGoB has signed a memorandum of understanding (MOU) with the government of India to develop 10,000 MW of hydropower potential by 2020. This would help realize over 33% of the total hydropower potential (MoEA, 2009). There is a clear link between hydropower generation, economic development and watershed management. Considering this important economic link between sustainable hydropower generation and the importance of watershed management, the hydropower policy of the RGoB has a clearly stated policy objective to provide 1% of the royalty from hydropower to watershed management programs. Future watershed management programs will greatly benefit from such funds. Therefore, the MoAF and the MoEA must realize the establishment of WMF at the earliest.

10.3.4 Payment for Ecosystem Services

The PES is a program where payments are exchanged for the delivery of ecosystem or environmental services. It is a voluntary transaction where a well-defined environmental service is bought by an environmental service (ES) buyer from an ES provider. Environmental services can be understood to be non-material, non-extractive benefits from natural resources, such as watershed protection, carbon sequestration, biodiversity conservation and landscape preservation.

Payment of Ecosystem Services in Vietnam

A pilot project in southern Vietnam aims to emulate the success of the PES as is widespread in Latin America. Over 200 households in Lam Dong Province in the Dong Nai river basin have just received their first quarterly payments - a total of 12 billion dong (around US$ 680,000) from two hydropower plants- for protecting 76,113.36 hac of forest. By the end of the year, more than 2,000 households will share US$ 2.8 M pledged by the Da Nhim and Dai Ninh hydropower plants. The payment excluding the money committed by water and tourism companies will raise each household's annual income by US $ 730 or 350%.

The Lam Dong Project, which started in April 2008, is first PES scheme in Southeast Asia.

(*Source: http://www.alertnet.org)*

Though, it is not that popular currently, PES program is expected to grow in future, not only in the water sector, but also in other sectors including biodiversity, nature tourism, carbon sequestration etc. The scale of PES can also be at various levels; between public agencies, between public and communities and between national government and international agencies. With proper policy guidelines and technical capacity there are tremendous scope for PES implementation in Bhutan.

10.3.5 Carbon Market

The United Nations Framework Convention on Climate Change (UNFCCC) provides opportunities for the Non Annex I countries to trade carbon offset in the form of certified emissions reductions (CERs) to Annex I countries through the creation of carbon market. Through this instrument an emission trading system is established wherein an international or national regulator establishes an overall cap on emissions, issues emission units or rights, and allows the transfer and acquisition of such rights. International agencies such as the World Bank, GEF, and UNEP oversee these trading systems in order to reduce GHG emissions. The CDM, Voluntary Market and REDD+ are the main carbon markets either established or are in the process of being refined for implementation.

10.3.6 Clean Development Mechanism (CDM) for afforestation and reforestation

The CDM is a mechanism established in Article 12 of the Kyoto Protocol designed to assist developing countries to take up emission reduction projects to earn CERs credits, each equivalent to one ton of CO_2. CERS can be traded and sold, and used by industrialized countries to meet a part of their emission reduction targets under the Kyoto Protocol. The CDM assists countries in achieving sustainable development and emission reductions, while giving industrialized countries some flexibility in how they meet their emission targets. However, as of March 2009 only two afforestation and reforestation (A/R) projects have been approved under CDM within the forestry sector (Simula, 2009). There are several limitations to this mechanism – there is a lengthy process of 1-2 years in getting CDM projects fully formulated, validated and approved; transaction costs are so high that smaller projects are not viable and tedious monitoring procedures.

In the context of Bhutan, CDM may have limited benefits as it only deals with afforestation and reforestation. However, future changes in the whole climate and carbon policy, situations may change and Bhutan may stand to benefit from carbon trade including CDM.

10.3.7 Reducing Emissions from land Degradation and Deforestation (REDD+)

The REDD+ is another mechanism for carbon trade. Countries that are willing and are able to reduce emissions from deforestation should be financially compensated for doing so. In addition to CDM carbon market, REDD+ provides opportunities to simultaneously address climate change and rural poverty, while conserving biodiversity and sustaining vital ecosystem services. This new mechanism tries to consider avoided deforestation of existing forests such as conservation areas, protected areas, catchments, and sustainably managed forests etc. as part of the carbon trade dialogue. If amendments to the current protocol is effected through inclusion of existing forest cover as part of avoided deforestation as part of REDD+, Bhutan will benefit as large part of Bhutan is already protected under the network of protected areas, biological corridors, conservation areas,

catchments, community forests and forest management units. These forests would provide multiple benefits as they will not only contribute to reducing GHG, but also contribute to protection of watersheds, clean and steady water supply and hydrological systems, control of soil erosion and landslides, biodiversity conservation and sustainable use of forest resources for socio-economic development.

Current rates of carbon ($_tCO_2$) in the international market ranges between US$ 5 – US$20 depending upon different trading arrangements. Taking the lower end of the market price at US $ 5/ t CO_2 per ha unit area per year, Bhutan could bring in a total of US$ 1,725 M annually for socio-economic development including sustainable land management and poverty alleviation. However, the above calculation is based on the forest biomass of the entire country. If we decide to adopt REDD+ program in the future, smaller portions of our forest may be put under REDD+ as we would also depend on forest for economic development. Protected areas, catchments, conservation areas could very well be included for REDD+ program. Community forests under REDD+ program would benefit communities directly.

Table 19: Carbon Biomass in South Asia

Country	Growing Stock			Biomass		Carbon in	
	Per Hac	**Total**	**Commercial**	**Per Hac**	**Total**	**Per Hac**	**Total**
	(m^2/hac)	*(M m^3)*	*(%)*	*(tons/hac)*	*(M tons)*	*(tons/hac)*	*(M tons)*
Afghanistan	16	14	40	15	13	7	6
Bangladesh	34	30	75	72	63	36	31
Bhutan	**194**	**621**	**40**	**216**	**690**	**108**	**345**
India	69	4698	40	76	5,178	35	2,343
Maldives	No Data						
Nepal	178	647	40	267	969	133	485
Pakistan	97	185	43	271	516	136	259
Sri Lanka	22	42	40	41	79	21	40

(Source: FAO, 2009)

10.3.8 Voluntary Carbon Markets

Besides the conventional carbon trade through CDM and REDD+, there are also voluntary markets. Polluting companies in developed countries need to reduce carbon emissions and for this they can buy carbon credits through plantation projects in developing countries in collaboration with private companies in the host country. Such arrangements cost less than developing technologies to reduce carbon emission at home. While there are many carbon trading schemes in the voluntary markets, there is none in Bhutan yet. Eco Tara, a Thimphu-based private company has developed proposals to venture into carbon trading with a UK-based company. The DoFPS is conducting surveys to allocate 1,000 hac of

degraded forest lands for this purpose. Eco Tara will fund the plantation of these designated degraded lands until the plantation is fully established within 4-5 years after which the Department of Forests will take over for sustainable management. Eco Tara and the UK-based company will monitor measure and conduct carbon credit sales. Such ventures will reduce the cost of plantations to the national government. Alternatively, the funds allocated for plantation programs could be allocated for other programs such as SLM and agriculture development.

10.4 Support to SLM through public-private partnership programs

Several different forms of public-private partnership programs are developed to support SLM. In the Bhutanese context there are few that can be explored to support SLM.

10.4.1 Foreign Direct Investment (FDI)

FDI is a means to bring in hard currency to support investment projects through private public partnership (PPP). The MoAF is currently formalizing hazelnut plantation in eastern Bhutan with a foreign company. The ministry will facilitate leasing of degraded government land for hazelnut growing and also facilitate individual farmers to grow hazelnuts on their farmlands with technical support from the FDI project. This FDI hazelnut project, besides having the potential to bring in substantial amount of income to the farming communities in eastern Bhutan, employment will be generated and there will be a big contribution to SLM as the degraded lands will brought under SLM.

10.4.2 Private investment

Besides FDI, government can also facilitate leasing of barren and degraded government forest lands for sustainable commercial agriculture to Bhutanese firms and individuals. The Land Act of Bhutan 2007 allows leasing of GRF for commercial agriculture and other economic development activities. The MoAF is currently facilitating leasing of GRF land for commercial cultivation of coffee in Samtse. Similarly, land could be leased for other economic activities and through these degraded forest lands can be sustainably and productively managed.

There are over 600 NWFP species that have medicinal values and there are scope for both FDI and private investment in the management and use of medicinal plants. Besides, there are other NWFPs requiring bio-prospecting, value addition through processing, product development and enterprise development and eco-labeling and certification. These ventures will ensure sustainable management of NWFP and medicinal plant resources and bring in income to the local communities if investors and local communities could form partnerships. Bio Bhutan, a small private venture has pioneered in eco-labeling and product certification for lemon grass oil and they are exploring other products development. Such arrangements in the case of lemon grass oil extraction fetch better prices for the harvesters in eastern Bhutan.

Some examples of these partnerships include Bio Bhutan buying lemon grass oil from the community forest management groups of Dozam Community Forest in Dremetse (Mongar) and Domkhar-Umling Community Forest Management Group in Lhuentse.

Considering donor fatigue and limited scope of increasing internal financial resources, it is prudent to develop innovative financial mechanisms to support SLM in the long run. Bhutan could take advantage of international Carbon Finance and the host of instruments that are available for carbon trading in the form of REDD+, CDM, PES etc. Besides, other mechanisms such as FDI and private investments and PE, environmental funds within country could generate huge revenue to support SLM and poverty alleviation.

CHAPTER XI: PARTNERSHIP BUILDING

Although land degradation is an important issue that results from the activities across many sectors, addressing land degradation problems or mainstreaming of SLM within the sectors' plans and policies remain rather weak. Mainstreaming of SLM remains isolated with the green sectors putting in more efforts than others that may equally be responsible for causing land degradation and its effects. While it is necessary for partnership building among the sectors within the country, it is also necessary to build partners with external organizations in order to source funds and technical assistances. According to the GM, "partnership building is central to resource mobilization due to the cross sectoral nature of combating land degradation and SLM, and multitude of actors involved in it. Based on the strong understanding of internal and external financing procedures, partnership optimizes the contribution of each party to the integrated process. A partnership is the collaboration of two or more parties working towards a common goal. Partnerships are meant to foster comprehensive and widespread cross sector collaboration to ensure that sustainable development initiatives are imaginative, coherent and integrated to face the most intractable problems. Partnerships provide an opportunity for improving activities by recognizing the qualities and competences of each sector and finding new ways of harnessing them for common good."

The aim of this section is to assess the range of existing partners and to look into potential partnership building at various levels including national, international and development partners for resource mobilization. Thus an attempt has been made to list all the existing and potential partners and assess the resource mobilization capacity of these partners.

Table 20: Stakeholder Category and Stakeholders

Stakeholder Category	Stakeholders
Key government agencies	MoAF (DoA, DoFPS, DoL, CoRRB & NBC), MoWHS (DoR,DHS, Municipalities), MoEA (DGM, DoE, DoI, TCB), MoF (DPA, DNB), MoFA (BD, MD), MoHCA (DDM, DLG, LG), MoE
Semi-governmental agencies	NRDCL, DGPCL, NHDC
Research Institutes (DoA)	RC Yusipang, RC Bajo, RC Jakar, RC Wengkhar
NGOs (Local, Regional & International)	RSPN, Tarayana, SNV, WWF, ICIMOD
Donor / Funding agencies	EU (ML), WB (ML), UNDP(ML), UNEP(ML), GEF(ML), FAO (ML), IFAD (ML), SDC (L), JICA (BL), ACIAR (BL), GoI (BL)
Autonomous Agencies	NLC (DSLR), NEC, GNHC

Table 21: Potential Partners

Levels	Partners
Local	Private Companies (BCCL, BFAL, TMT Bar Producers, Druk Ferro-Alloy Limited, Bhutan Marble Ltd, Royal Bhutan Cables, Penden Cement Factory, Lhaki Cement Factory); All "A" and "B" Construction Companies; All Mining Companies; Local NGOs; WUA; NRM Groups; Cooperatives; Farmers' Groups
National	Municipalities, MoH
Regional	SAARC
International	ICRAF, CIFOR, CGIAR, GM, ICARDA, ICRISAT

Table 22: Roles of key Stakeholders in SLM Resource Mobilization

Institution	Role in combating land degradation & ensuring SLM	Role in Resource Mobilization for SLM
Ministries		
MoAF	Responsible for formulating and implementing national policies and programs aimed at ensuring SLM in the country; to develop the RNR sector (agriculture, forest and livestock) through research and development processes; raise the living standards of the rural communities and ensure food security of the country through sustainable farming practices. It is the focal point for UNCCD.	• Sourcing of internal and external sources of funding • Building institutional and human capacity in SLM • Dissemination and playing a leading role in implementing resource mobilization strategy • Leading and coordinating SLM activities to combat land degradation • Ensuring linkage between SLM & poverty alleviation strategy
MoWHS	Responsible for formulating and implementing policies and strategies such as the National Urbanization Strategy, which recognizes various adverse environmental impacts, including conversion of agriculture and forest land for infrastructure development. The strategy outlines the need for zoning of ecologically vulnerable lands and institutional strengthening of the municipal environmental units.	• Sourcing of internal and external sources of funding • Building institutional and human capacity in eco-friendly infrastructure principles and developments
MoEA	Responsible for formulating and implementing national policies such as the Bhutan Sustainable Hydropower Development policy to ensure a clean energy; and creation of Renewable Energy Development Fund for environmental services in the form of upstream catchment protection and for renewable energy initiatives.	• Sourcing of internal and external sources of funding • Promotion of innovative financing resources
MoE	Incorporate SLM into school curriculum to enhance the SLM knowledge of the younger generation. Create awareness on the importance of SLM through campaigns and exhibitions led by schools.	• Sourcing of internal and external sources of funding
MoF	NA	• Mobilization and allocation of internal source of funding

Institution	Role in combating land degradation & ensuring SLM	Role in Resource Mobilization for SLM
		• Link with donors (financial institutions)
MoFA	NA	• Sourcing of internal and external sources of funding • Link with donors
MoHCA	Responsible for formulating and implementing national disaster risk management framework for promoting disaster risk management approach; and recognize the respective roles of different organizations in disaster risk management.	• Sourcing of internal and external sources of funding • Strengthening of institutional mechanisms at various levels and capacity development at Dzongkhag and Gewog levels, knowledge management and partnership and mainstreaming of disaster risk management in development programs and plans
Autonomous Agencies		
NLC	Responsible for implementing the National Land Act for sustainable management of land based resources. It formulated land rules and regulations for Bhutan. It spells out rights, responsibilities and legal condition for the management, regulation and administration of the ownership and use of land.	• Sourcing of internal and external sources of funding
NEC	Responsible for formulating and implementing the national policies, strategies and Acts for environment protection. The national environment strategy titled 'The Middle Path' which enshrines the concept of sustainable development through three main avenues: hydropower development based on integrated watershed management; agriculture development based on sustainable practices and industrial development based on effective pollution control measures and environmental legislation. The Environmental Assessment Act 2000 to ensure that environmental concerns are fully taken into account. It makes environment clearance mandatory for any project or activity that may have adverse impact on the environment. The National Environment and Protection Act to specify the principles and directives for the protection of environmental quality and the maintenance of forest, biodiversity and ecosystem integrity.	• Sourcing of internal and external sources of funding • Promotion of innovative financing resources
GNHC	Mainstream SLM into national planning process	• Sourcing of internal and external sources of funding • Allocation of funds • Link with donors
Semi-Government Agencies		
NRDCL	Ensures sustainable harvesting of FMUs according to the approved forest management plans and cater to the market demands for timber and timber products.	• Sourcing internal source of funding
DGPCL	NA	• Sourcing internal source of fund to do payment for environment services (PES)

Institution	Role in combating land degradation & ensuring SLM	Role in Resource Mobilization for SLM
NHDC	NA	• Sourcing internal source of fund to combat land degradation caused by construction of infrastructure
CoRRB (RNR-RDCs)	Coordinates RNR research and carries out research programs and activities in forestry, field crops, livestock development, horticulture, plant protection, soil fertility, water management and farming system.	• Sourcing internal and external sources of funding • Institutional and human capacity building
Civil Societies (NGOs)		
RSPN	Carries out nature conservation programs and activities such as endangered species conservation, sustainable livelihoods, and environment education and conservation areas management.	• Sourcing internal and external sources of funding • Human capacity building
Tarayana Foundation	No direct link to SLM but works closely with rural communities to enhance their livelihoods e.g. regenerate bamboo and cane species for use of artisan and crafts. Has the potential to promote SLM among the rural communities.	• Sourcing internal and external sources of funding • Human capacity building
SNV	Supports programs and projects for collaborative forestry management, development of rural enterprises based on sustainable natural resource use. It also supports environment friendly road construction and watershed management activities through support of Technical Assistance (TAs)	• Sourcing external source of funding • Human capacity building
WWF	Provide support to protected areas such as national	• Sourcing external source of funding
ICIMOD	Integrated watershed management, rangeland management and documentation of SLM techniques and approaches	• Sourcing external source of funding • Capacity building on low cost soil and water conservation and documentation of SLM techniques and approaches
Local Institutes		
Dzongkhag	Dzongkhag administration as an executing agency of development programs and activities at the Dzongkhag level has the responsibility to ensure integration of environmental concerns in Dzongkhag plans. It is also responsible to implement environmental assessment and clearance procedures for Dzongkhag and Gewog level projects and activities.	• Mobilize local resources
Gewog	Responsible for Gewog level planning, management and implementation of development programs and activities related to SLM activities.	• Mobilise local resources e.g. labour
Potential Partners		
Industrial Establishments	NA (Pollutes the environment)	• Mobilize internal source of funding to reduce environment pollution
Construction Companies	NA (Cause land degradation due to construction works)	• Mobilize internal source of funding to combat land degradation in the construction sites

Institution	Role in combating land degradation & ensuring SLM	Role in Resource Mobilization for SLM
Mining Companies	NA (Cause land degradation due to mining activities)	• Mobilize internal source of funding to combat land degradation in the mining areas
WUA	Efficient use of water resources through proper maintenance of irrigation channels and regulation of irrigation water use	Mobilize community for maintenance of irrigation channels
NRM Group	Carryout SLM activities to combat land degradation	Generate NRM group fund to carryout SLM activities
Cooperatives	NA	Mobilize internal resources to fund SLM activities in the community
Municipalities	NA	• Mobilize internal and external sources of fund to carryout SLM activities in the municipal areas
International		
CRAFT	Generate science-based knowledge about the diverse roles that trees play in agricultural landscapes and to use its research to advance policies and practices that benefit the poor and the environment. Partner with range of scientific and development institutions in their efforts to generate tree-based solutions to the global problems of rural poverty, hunger and environmental degradation.	• Mobilize internal and external sources of funding
CIFOR	Improves scientific basis that underpins balanced management of forests and forest land. Develops policies and technologies for sustainable use and management of forest goods and services	• Mobilize internal and external sources of funding. Assist partner governments improve their capacity to research and support the optimal use of forests and forestlands
CGIAR	Generates cutting-edge science to foster sustainable agricultural growth that benefits the poor through stronger food security, better human nutrition and health, higher incomes and improved management of natural resources	• Mobilize internal & external sources of funding
GM	NA	• Provides advisory services and capacity building support • Strengthening National Action Programs and other UNCCD processes • Supporting domestic approaches to financing SLM • Partnership building with IFIs, GEF & bilateral organizations
ICARDA	NA (improves the welfare of poor people and alleviate poverty through research and training in dry areas of the developing world, by increasing the production, productive and nutritional quality of food, while preserving and enhancing the natural resource	NA

11.1 Recommendations in building partners

1. Land degradation is rather a complex cross cutting issue that requires the involvement of many stakeholders to address it. Therefore, building partnerships among the relevant stakeholders within the country is very necessary not only to address land degradation problems efficiently and effectively but also to avoid duplication of resources and efforts.

2. Partnership building among the stakeholders within the country would be useful in mobilizing the limited resources efficiently. Some stakeholders like the mining companies can make funds available to promote SLM interventions.

3. Partnership building with stakeholders at all levels i.e. local, regional, and national levels is necessary in order to enable mainstreaming of SLM.

4. Linking with international partners would be useful in obtaining financial and technical supports. While some international partners are established in the country other agencies like CRAFT, CIFOR, CGAIR, ICARDA, ICRISAT, etc. can be approached as potential partners that could assist the country with SLM interventions financially and or technically.

CHAPTER XII: CONCLUDING REMARKS

Bhutan has been on the ascendency over the past decades in terms of developments. However, the focus has been mainly in the social infrastructure viz., health and education. Despite land degradation being one of the compelling issues faced by the country, efforts to address these issues have been largely inadequate in contrast to other sectors within and outside the MoAF.

Due to the steep topography, geo-morphological construct and other developmental activities, land degradation will continue to occur and impact the livelihoods of people and overall environment.

The aligned NAP is expected to serve two main purposes for fulfilling the obligation of Bhutan, as the affected member country to UNCCD; 1) to align the NAP to the Convention's 10 Year Strategic Plan and 2) to serve as a national guideline in addressing land degradation issues in the country.

Bhutan started preparing its NAP in 2009 and submitted its final version to the Convention in 2010. Works on NAP alignment exercise commenced in October 2013. During the NAP preparation and alignment processes, a wide spectrum of stakeholders was involved. In addition, the national plan documents for the Central, Dzongkhags and Gewogs were reviewed. These enabled Bhutan to come up with a more pragmatic NAP.

Although, the actions to address land degradation feature in the plan documents at the central level, they are generally inadequate and patchy. The general observations on actions to address land degradation at the local government level are even more disappointing. The underlying reasons may be primarily because of the priority placed on other developmental activities; budget ceiling enforced by MoF; lack of awareness and an urgency to address land degradation issues.

Lack of coordination amongst the central agencies and absence of streamlined approach to address land degradation will continue to be one of the main hindrances in combating land degradation. Absence of a lead institute at the national level to coordinate land management activities of different sectors and land use policy could be the other reasons. These views were also raised strongly by the stakeholders during the NAP consultations.

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Annexure 1: NAP Alignment Team

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12. Ms Sonam Pelden, Druk Green Power Corporation
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TFMs sourced from NSSC during Alignment Exercise

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Annexure II: Program Components and Recommended Actions

The following actions points for different sectors are enlisted in the NAP document that was prepared in 2010 and these action points have been used as the basis to align NAP to the UNCCD ten year strategy.

1.0. Conservation, Rehabilitation and Sustainable Use of Forest Resources

1.1. Forest Fire Management

Action 1: Fully assess the occurrence, trends and causes of forest fires. Concurrently, carry out a nation-wide public attitude and behavior survey to assess public perception and outlook towards forest fire and its impacts. *(Responsible Agency: DoFPS)*

Action 2: Carry out in-depth research on forest fire ecology in various forest ecosystems. Such research would need to take into account the results of prescribed burning trials carried out in eastern Bhutan. *(Responsible Agency: DoFPS)*

Action 3: Based on the results of Actions 1 and 2, develop forest fire management strategies for various fire-vulnerable forest ecosystems. *(Responsible Agency: DoFPS)*

Action 4: Develop and implement public education and awareness programs using innovative avenues such as rural theatre, folk music, school cultural events, religious festivals, and painting/ quiz/ debate competitions. It is desirable that the awareness programs are developed based on public perception and outlook towards forest fire and its impacts assessed through public attitude and behavior survey (refer Action 1). *(Responsible Agency: DoFPS in coordination with ICS of MoAF, Dzongkhag Administrations, and RSPN)*

Action 5: Develop and implement community-based forest fire management schemes targeting specific groups of local communities, such as lemon grass oil producers and graziers. *(Responsible Agency: DoFPS in coordination with Dzongkhag Administrations)*

Action 6: Review and rationalize existing forest fire penalties to make them enforceable. *(Responsible Agency: DoFPS)*

Action 7: Review and strengthen institutional arrangements for networking, reporting and forest fire suppression. Institutional strengthening would among other things include procurement and management of forest firefighting equipment such as helmets, fire-proof gear, fire fighting tools, walkie-talkie, first-aid kit, and binoculars. It would also entail identification of focal persons in various agencies for mobilization of fire fighters and strengthening a network of community fire watchers and volunteers for expeditious reporting and suppression of forest fires. *(Responsible Agency: DoFPS in coordination with Dzongkhag Administrations)*

1.2. Sustainable Production and Utilization of Forest Resources

Action 1: Develop the capacity of the territorial forestry divisions to effectively implement the planning guidelines for management of forest areas outside the FMU system for sustainable production and utilization of forest resources. Capacity development would include staff training backed up with necessary computers, customized software and field instruments required for implementation of the planning guidelines. *(Responsible Agency: FRMD, DoFPS)*

Action 2: Implement the planning guidelines in at least one forest area in each territorial forestry division and evaluate the applicability and effectiveness of the guidelines in these forest areas. The results of the evaluation will be used for improving the planning guidelines for more widespread use. *(Responsible Agency: FRMD, DoFPS)*

Action 3: Carry out a detailed evaluation of the effectiveness of FMUs through out the country in the context of environmental sustainability and socio-economic development, and use the results of the evaluation in enhancing the planning and management of FMUs. It is recommended that the evaluation be done using a multi-disciplinary approach involving representation from various relevant agencies. *(Responsible Agency: MoAF)*

Action 4: Develop and promote alternative fuels and construction materials to reduce dependence on forest resources. For instance, the NRDCL has introduced production and sale of sawdust briquettes in Thimphu in the recent years. This initiative could be scaled-up to other dzongkhags such as Bumthang, Haa and Paro where there is a huge demand for fuelwood especially during winters. The possibility of using paper waste for production of briquettes could also be examined especially considering that paper waste constitutes

the second highest proportion – 17.2%[30] – of the total municipal solid waste generated in the country. *(Responsible Agency: NRDCL in coordination with MoAF and MoWHS).*

1.3. Rehabilitation of Degraded and Barren Forest Lands

Action 1: Assess the extent of degraded and barren forest lands, map these areas, and prioritize them for re-afforestation taking into consideration a number of factors such as socio-economic benefits to the local communities, ecological risks (both immediate and long-term) of not rehabilitating the forest land, and contribution to global environmental needs such as carbon sequestration and adaptation to climate change. *(Responsible Agency: DoFPS)*

Action 2: Re-afforest prioritized degraded and barren forest lands using species and methods that are environmentally appropriate to local conditions. *(Responsible Agency: DoFPS)*

Action 3: Lease out degraded and barren forest lands to private parties for plantation and commercial forestry based on a public-private partnership model through which DoFPS provides technical support and guidance to ensure that such enterprises are economically beneficial as well as ecologically sound. *(Responsible Agency: DoFPS)*

Action 4: Establish a fully-functional system for developing plans for the establishment and long-term management of forest plantations. Such plans would need to include detailed activities related to site survey, species selection, planting methods, thinning, weeding, pruning, harvesting, fire management, and control of pests and diseases. This is recommended because many forest plantations are established without clear management objectives and suffer from paucity of resources for proper maintenance.[31] *(Responsible Agency: DoFPS)*

1.4. Participatory Forest Management

Action 1: Design and impart participatory training to develop community skills for community and private forestry focusing on activities such as community organization, conflict resolution, benefit-sharing and community fund management. This is recommended because community forestry has

[30] Phuntsho S, 2008

[31] DoFPS, 2009

evolved into a major program since the first community forest was established in 1997. As of September 2014, there were 556 community forests covering about 62,141.70 hac of forest land, involving 23,808 rural households. For the sustainability of the fast-spreading community forestry program, it is very crucial to equip the local communities with adequate technical and social skills to establish and manage community forests. *(Responsible Agency: SEFD, DoFPS, in coordination with Dzongkhag Administrations and RDTC)*

Action 2: Train Dzongkhag and Geog forestry staff in communications and extension approaches and techniques to effectively provide guidance and technical backstopping to community forest user groups and private forest owners. *(Responsible Agency: SEFD, DoFPS, in coordination with CNR and MoAF's Information and Communication Services)*

Action 3: Integrate sustainable use of various types of non-wood forest products, based on community priorities, in the community forestry schemes. Such schemes will also need to include strategies for marketing NWFPS. *(Responsible Agency: SEFD, DoFPS, in coordination with DAMC & Dzongkhag Administrations)*

Action 4: Develop and promote agro-forestry models as part of the private forestry program with special attention to soil and water conservation, and maintenance of soil fertility. *(Responsible Agency: SEFD, DoFPS, in coordination with NSSC, DoA)*

1.5. Livestock and Grazing Management

Action 1: Carry out carrying capacity studies and based on these, develop a taxation scheme to discourage the rearing of livestock in excess of the carrying capacity. *(Responsible Agency: DoL in coordination with CoRRB and PPD of MoAF)*

Action 2: Provide effective animal health coverage to give livestock farmers the security to keep smaller but more productive herds of livestock. *(Responsible Agency: DoL in coordination with Dzongkhag Administrations)*

Action 3: Establish farmer cooperatives that will among other things oversee proper utilization of forage resources through monitoring of stock numbers, grazing pattern, nutrient management, and control of weeds. *(Responsible Agency: DoL in coordination with Dzongkhag Administrations)*

Action 4: Develop hay meadows with high-yielding fodder legumes and grasses under high nutrient supply conditions to reduce grazing pressure on forests. *(Responsible Agency: DoL in coordination with Dzongkhag Administrations and CoRRB)*

Action 5: Promote homestead forests of species with high forage and soil conservation values. *(Responsible Agency: DoL in coordination with Dzongkhag Administrations)*

Action 6: Where overgrazing is a problem but livestock rearing is the primary source of livelihood, develop and promote improved pasture management and forage development. Concurrently, promote alternative livelihoods that are environmentally sustainable. *(Responsible Agency: DoL in coordination with CoRRB and Dzongkhag Administrations)*

Action 7: Identify barren/degraded government lands that can be potentially leased for pasture management as per the provision of the Land Act of Bhutan 2007. Prepare and implement pasture management plans for the leased barren/degraded government lands. *(Responsible Agencies: DoFPS and DoL in coordination with Dzongkhag Administrations)*

2.0. Development and Promotion of Sustainable Agricultural Practices

2.1. Integrated Soil Fertility Management

Action 1: Develop toolkits for training of farmers on integrated soil fertility management. The toolkits may include training handbook (for the agriculture extension staff), posters, flipchart, video, pictorial manual and other materials that may be necessary for farmer-friendly training. *(Responsible Agency: NSSC in coordination with ICS of MoAF, CNR and CoRRB)*

Action 2: Train agriculture extension staff in the use of farmer training toolkit for integrated soil fertility management. *(Responsible Agency: NSSC in coordination with ICS of MoAF and CNR)*

Action 3: Conduct farmer training on integrated soil fertility management in a phased manner, first focusing on Dzongkhags where use of inorganic fertilizers is most excessive. *(Responsible Agency: NSSC in coordination with RDTC and Dzongkhag Administrations)*

Action 4: Disseminate through television and radio the advantages of integrated soil fertility management and the disadvantages of disproportionate and prolonged use of inorganic fertilizers. Innovative TV and radio scripting, for instance developing TV and radio programs around the story of a Bhutanese farmer, may have more impact than run-of-the-mill programs. *(Responsible Agencies: NSSC and ICS of MoAF in collaboration with BBSC)*

Action 5: Carry out comparative studies on various soil fertility management techniques and practices, both indigenous and introduced, and based on the results improve soil fertility management techniques and practices. *(Responsible Agency: NSSC in coordination with CoRRB)*

Action 6: Establish soil testing labs within RNR-RCs to provide more expeditious information on soil quality and guidance for soil improvement to extension staff and farmers. This is being recommended because currently there is only one soil testing lab, located at NSSC Semtokha, and this inadvertently leads to inconveniences and longer duration in delivery of soil samples and test results. *(Responsible Agency: NSSC in coordination with CoRRB)*

Action 7: Develop and promote cropping systems and practices that help soil nutrient management. *(Responsible Agency: DoA and CoRRB in coordination with Dzongkhag Administrations)*

2.2. Sustainable Land Management for Steep Slope Agriculture

Action 1: Conduct and complete land capability studies. Based on these studies, develop agricultural land capability classification and formulate management guidelines for agricultural land use as per land capability. *(Responsible Agencies: NSSC and PPD of MoAF)*

Action 2: Develop and promote low-cost SLM technology for steep slope agriculture. An option would be to examine existing external SLM technology, such as Sloping Agriculture Land Technology (SALT) practiced in the Philippines,[32] and adapt it to Bhutanese conditions. Such technology must be backed up by development of farmer-friendly training and extension materials followed by training of farmers in a phased

[32] SALT is a system in which dense hedgerows of fast growing perennial nitrogen-fixing tree or shrub species are planted along contour lines thus creating a living barrier that traps sediments and gradually transforms the sloping land to terraced land. The hedgerows both markedly reduce soil erosion and contribute to improving and/or maintaining soil fertility.

manner. *(Responsible Agency: NSSC in coordination with CoRRB and Dzongkhag Administrations)*

Action 3: Develop and promote SLM-based farm enterprises, linking SLM with poverty alleviation/ income generation, and thus making SLM more attractive for farmers. *(Responsible Agency: NSSC in coordination with CoRRB and Dzongkhag Administrations)*

Action 4: Mainstream SLM in RNR-Research programs and translate SLM research results and recommendations into farmer-friendly extension materials on SLM. *(Responsible Agencies: CoRRB and PPD of MoAF)*

2.3. Phasing Out of Tseri and Promotion of Suitable Alternatives

Action 1: Review all existing reports of studies on tseri cultivation and alternatives, analyze the findings and recommendations, and consolidate them into a succinctly well-analyzed document for discussion and decision at the National Assembly and National Council. *(Responsible Agencies: CoRRB and PPD of MoAF)*

Action 2: Depending on the resolutions of the parliament, carry out policy, legislative and administrative reforms to phase-out tseri cultivation and/or promote suitable alternatives which are more environmentally sound and economically viable than tseri. *(Responsible Agency: PPD of MoAF in coordination with DoA, DoFPS and CoRRB))*

2.4. Integrated Pest Management

Action 1: Building upon past work with additional research and consolidate integrated pest management technology incorporating biological control strategies to manage agricultural pests and diseases. *(Responsible Agency: NPPC, RDC, Dzg)*

Action 2: Carry out an inventory of agricultural pests and diseases that includes an assessment of the severity and prevalence scale of various pests and diseases, control measures applied on them, and the effectiveness of these measures. Based on the results of this inventory, develop research and extension packages for integrated pest management giving priority to pests and diseases which are most widespread and problematic to the farmers. *(Responsible Agency: NPPC in coordination with RDC and Dzongkhag Administrations)*

Action 3: Develop extension and communication packages for integrated pest management and disseminate them through farmer training and radio/ television programs. *(Responsible Agencies: NPPC and ICS of MoAF in collaboration with BBSC)*

Action 4: Promote environment friendly/ new generation PP products and initiate/establish national biological control program. *(Responsible Agencies: NPPC, BAFRA)*

2.5. Improvement of Irrigation System Management

Action 1: Review and revise existing irrigation development guidelines, especially examining ways in which management of the tertiary irrigation channels and tail sections of the irrigation channels can be improved. *(Responsible Agency: DoA in coordination with CoRRB and PPD of MoAF)*

Action 2: Review the functionality of WUAs and invigorate dysfunctional WUAs with community training, extension services and financial support. *(Responsible Agency: DoA in coordination with CoRRB and PPD of MoAF)*

Action 3: Train Dzongkhag engineers to provide irrigation-related services and backstopping to WUAs using irrigation development guidelines as the basis *(Responsible Agency: DoA in coordination with CNR)*.

Action 4: Rectify existing irrigation schemes that have become risky from the land degradation point of view. One such irrigation scheme could be the Phenday Irrigation Scheme in Talo geog (Punakha), which is reportedly the largest in the country. Tertiary earthen irrigation channels of this irrigation scheme have cut deep into the soil and created gullies as deep as 20-30 feet in a number of places. *(Responsible Agency: DoA in coordination with Dzongkhag Administrations)*

3.0. Environmental Management of Development Activities that pose Land Degradation Risks

3.1. Environment-friendly Road Construction

Action 1: Make adoption of existing environmental codes of practices for road construction mandatory for all types of roads by enhancing legal provisions for EFRC in the Roads Act of Bhutan. *(Responsible Agency:*

MoWHS in coordination with other agencies involved in road construction, e.g. MoAF for farm roads, NRDCL for logging roads, and MoEA for mining roads and access roads to hydropower projects)

Action 2: Adopt the existing farm road development guidelines, including budgetary enhancement, as early as possible. *(Responsible Agency: MoAF)*

Action 3: Train DoR engineers, Dzongkhag engineers, private road contractors and contract engineers in EFRC approach and techniques based on existing ECOP and (approved) farm road development guidelines. *(Responsible Agencies: MoWHS and MoAF in coordination with CST and JNP)*

Action 4: Carry out cost-benefit analysis between roads built with EFRC techniques and traditional techniques. Such analysis will need to look at economic (cost of road construction and maintenance), environmental (e.g. soil erosion, loss of vegetative cover, sedimentation of rivers) and social costs (e.g. disruption to human activities as a result of frequent road blocks). The results of the analysis would come useful in policy-making. *(Responsible Agencies: MoWHS for highways, district roads and feeder roads, and MoAF for farm roads)*

Action 5: Review and rationalize existing farm road targets vis à vis existing technical and financial capacity for EFRC. *(Responsible Agency: MoAF in coordination with Dzongkhag Administrations)*

Action 6: Provide all Dzongkhag engineering sectors the full range of road survey equipment necessary for alignment of roads in ways that can minimize adverse environmental impacts whilst optimizing socio-economic benefits. *(Responsible Agencies: MoWHS and MoAF)*

Action 7: Integrate EFRC as a module in the engineering courses provided by the Jigme Namgyel Polytechnic and CST. Logically, such integration will have to precede with capacity development of faculty for teaching EFRC and concurrent preparation of course materials. *(Responsible Agency: MoWHS in coordination with CST and JNP)*

3.2. Sustainable Mining

Action 1: Review existing institutional mechanisms for the implementation of mining law and regulations, and strengthen/ revamp them to enhance law enforcement. *(Responsible Agency: MoEA)*

Action 2: Provide training support to private mining companies to develop their technical capacity for environmental management of mining operations and restoration of mined areas. *(Responsible Agency: MoEA)*

Action 3: Develop ECOP for mining activities and make its application mandatory through incorporation in mining law and regulations. This will have to be backed up with capacity development in terms of staff training and equipment for application of mining ECOP. *(Responsible Agency: MoEA)*

Action 4: In keeping with the Mines and Mineral Management Act 1995 and Mines and Mineral Management Regulations 2002, ensure all existing and new mining operations have mine plan, environmental management plan, and mine restoration plan as per acceptable standard stipulated by law, regulations and ECOP, and that these plans are being effectively implemented. *(Responsible Agencies: MoEA and NEC)*

Action 5: Develop the capacity of the DGM and collaborating agencies, in terms of technical knowhow and skills as well as equipment and mobility, for monitoring, inspection, regulation and technical backstopping of environmental management activities of mining operations. *(Responsible Agency: MoEA)*

Action 6: Carry out cost-benefit analysis of various mining operations in the geologically fragile southern foothills fully taking into account factors of environmental sustainability, immediate, medium- and long-term social and environmental costs, and potential trans-boundary repercussions. *(Responsible Agencies: MoEA and NEC)*

Action 7: Through the existing Annual Border District Coordination Meeting, pursue dialogue with West Bengal (India) state government authorities to operationalize an effective bilateral mechanism to curb illegal mining along border areas.[33] *(Responsible Agency: MoEA in coordination with MoHCA and Ministry of Foreign Affairs)*

3.3. Sustainable Urban Development

Action 1: Identify regional growth centers in central and eastern regions, where proportion of urban population is significantly less, and promote urban development in those areas for regionally-balanced urban development. *(Responsible Agency: MoWHS)*

[33] Such a mechanism could also cover the issue of illegal collection of forest products along the border areas.

Action 2: Decelerate the growth of Thimphu and Phuentsholing urban centers and enhance environmental management of these centers, including beautification of urban lands and development of public amenities for recreation, drainage, sanitation, and waste disposal. *(Responsible Agency: MoWHS in coordination with Thimphu and Phuentsholing City Corporations)*

Action 3: Improve municipal governance and strengthen municipal capacity to effectively manage urban environments and deliver public services. *(Responsible Agency: MoWHS in coordination with Thimphu and Phuentsholing City Corporations)*

Action 4: Integrate rural-urban planning to address rural-urban migration and bring about balanced development of rural and urban areas with particularly emphasis on social welfare infrastructure such as schools, health care facilities, roads, and markets. *(Responsible Agency: GNHC Secretariat in coordination with line ministries)*

Action 5: Carry out ecological mapping and zoning of all major urban centers and their peripheries, identifying areas that are vulnerable to land degradation and areas that possess special natural and cultural values. Classify such areas as protected zones and restrict intrusive human activities in these zones. Where such areas have already become degraded, carry out rehabilitation activities. *(Responsible Agency: MoWHS with technical and planning support from NEC and MoAF)*

3.4. Solid Waste Management

Action 1: Improve solid waste management by introducing a system for waste segregation at source and adoption of proper landfill management practices. *(Responsible Agency: MoWHS with technical support from NEC)*

Action 2: Establish waste recycling hubs in major towns. In establishing such hubs, examine the possibility of introducing models of community-based entrepreneurship and public-private partnership for waste management. With greater access to Indian markets, bordering towns such as Phuentsholing, Gelephu and Samdrup Jongkhar may be more viable options. *(Responsible Agencies: MoWHS and MoEA in coordination with NEC and BCCI)*

Action 3: Create appropriate implementation mechanisms and develop by-laws and technical norms/guidelines, backed up with capacity development, for the implementation of the newly ratified Waste Prevention and Management Act 2009. *(Responsible Agency: NEC in coordination with line ministry agencies and civil society organizations)*

Action 4: Conduct public attitude/ behavior survey with regards to solid waste and littering and, based on the results of this survey, develop and carry out public awareness campaigns to change public attitude and inculcate healthy habits (e.g. reduce, reuse and recycle). *(Responsible Agency: NEC in coordination with RSPN and other relevant civil society organizations)*

4.0. Strengthening of Systemic and Institutional Capacity

4.1. Policy and Legislation Development

Action 1: Develop a National Land Use and Management Policy (this could be possibly addressed through the soon-to-be developed National Land Policy/ National Spatial Policy). *(Responsible Agency: NLC in coordination with NEC and relevant line ministry agencies)*

Action 2: Formulate a National Mining and Mineral Development Policy laying out Bhutan's fundamental position and principles for mining to ensure equitable allocation and access to mineral resources, sustainable management of non-renewable mineral resources, long-term sustainability of mineral-based industries, and mitigation of adverse environmental impacts. *(Responsible Agency: MoEA in coordination with NEC and BCCI)*

Action 3: Finalize the long due Grazing Management Policy and Act. Such a policy and law have been in discussion for a long time. Draft versions exist but they need to be expeditiously carried forward, refined, consolidated, finalized and enacted. *(Responsible Agency: MoAF)*

4.2. Strengthening Enforcement of Environmental Laws and Regulations

Action 1: Assess the institutional capacity and identify capacity needs, including clear delineation of inter-institutional roles and responsibilities, for the enforcement of various environmental laws and regulations. Strengthen institutional capacities based on the assessment. *(Responsible Agency: NEC in coordination with relevant line ministry agencies)*

Action 2: Enforce the full range of procedures and processes for environmental assessment and clearance on projects which inherently have very high potential of adverse environmental impacts. These would essentially include infrastructure development that involves use of heavy machinery, industries and mines. *(Responsible Agencies: NEC, MoEA, MoWHS and MoAF)*

Action 3: Develop the technical capacity of Dzongkhag Environment Officers and other members of DEC to effectively implement the EA process. *(Responsible Agency: NEC)*

Action 4: Develop the technical capacity of Competent Authorities within the line Ministries to effectively implement the EA process. *(Responsible Agency: NEC)*

Action 5: Develop NEC's capacity to carry out compliance monitoring of EA Act and Regulations, and provide technical backstopping to the Competent Authorities and DECs. *(Responsible Agency: NEC)*

Action 6: Create public awareness of environmental laws and regulations, including their rights and responsibilities, to foster active public participation and support to law enforcement. *(Responsible Agency: NEC in coordination with relevant line ministry agencies)*

Action 7: Make all environmental laws and regulations accessible to the public. This could be among other things done by means of posting them on the internet as well as making them available for sale in bookshops. *(Responsible Agency: NEC in coordination with relevant line ministry agencies)*

4.3. Institutional Development

Action 1: Create a cross-sectoral agency, within NLC or NEC, for overall technical coordination of national land use and management. *(Responsible Body: National Cabinet)*

Action 2: Strengthen the institutional capacity of the Department of Disaster Management and Dzongkhag Administrations to effectively deal with natural disasters. *(Responsible Agency: MoHCA)*

Action 3: Upgrade NSSC into an independent MoAF institution to enable it to coordinate and provide soil conservation and land management services across the three RNR sub-sectors of agriculture, livestock development and forestry. *(Responsible Agency: MoAF)*

Action 4: Establish a central weather organization supported by regional real-time weather stations for weather monitoring and forecasting.[34] This will enable better preparedness for climate-induced natural disasters. In addition, creation of such an organization would improve management of hydrological and meteorological data which can be used for a wide range of purposes, including planning of roads and irrigation systems and monitoring of river sedimentation levels. *(Responsible Body: National Cabinet).*

5.0 Information, Advocacy and Education for Policy and Public Support

Action 1: Carry out a country-wide quantitative survey of land degradation using Geographic Information System technology. This survey would need to assess the nature, extent and scale of land degradation and generate quantitative information to primarily inform decision- making, provide baseline for monitoring land degradation trends, support awareness raising programs, and aid planning of geographically-targeted actions to combat land degradation. Information derived from the survey could be fed into mainstream information systems such as the NEC's Environment Information Management System and Dynamic Information Framework for Bhutan (DrukDIF). *(Responsible Agency: NEC/MoAF)*

Action 2: Create a national website dedicated to land degradation issues, through which information views and solutions on land degradation can be exchanged. This website could also contain a "Bhutan-Land Degradation Information System", which could be developed using the data accrued from the land degradation survey (refer Action 1). *(Responsible Agency: NEC/MoAF)*

Action 3: Develop and use public information documents such as the Bhutan Environment Outlook/ State of the Environment Reports for advocacy and public education on environmental trends and issues. Produce and disseminate these reports in advance of the next FYP(s) to aid informed their formulation. *(Responsible Agency: NEC in coordination with relevant line ministry agencies)*

[34] At the present, basic meteorological data collection and weather forecasting is being done by the Hydromet Division under DoE. This facility is, however, primarily meant for hydropower development and operates on observed data. There is a need to upgrade this facility into a national weather organization which caters to the needs of various sectors and is equipped with real-time weather monitoring and forecasting capability.

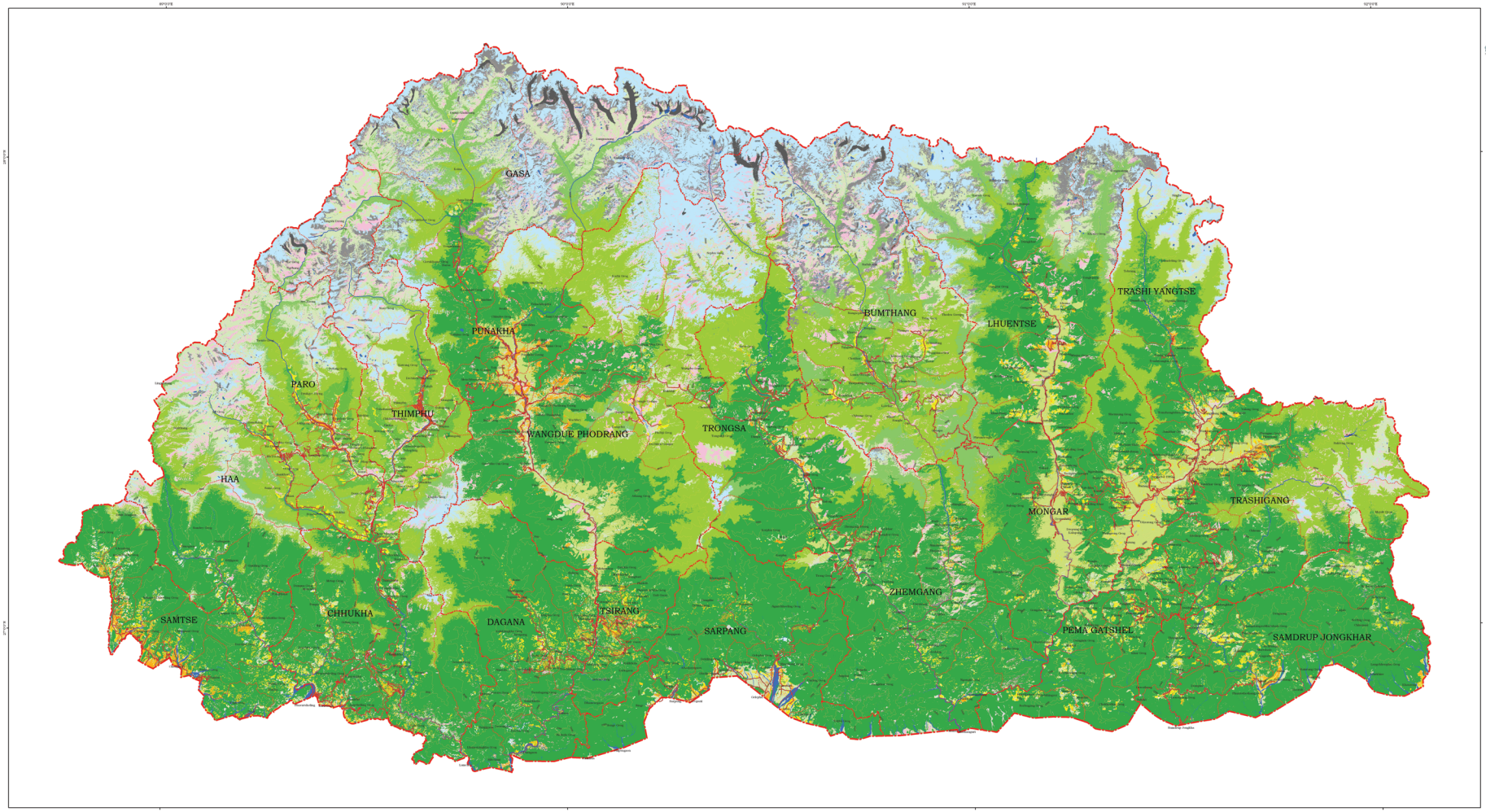
Action 4: Produce and broadcast a TV documentary series, highlighting land degradation trends and issues in the country, to create increased public awareness. (*(Responsible Agency: NEC in coordination with relevant line ministry agencies)*

Annexure III: Farmers' Perceptions of Soil Erosion Hazards

Do farmers see land degradation as a problem?	Chaskhar% (n=60)	Balam% (n=41)
Yes	98.3	100
No	1.6	0.0
How severe is the land degradation problem?		
Very severe	38.3	39.0
Severe	40.0	26.8
Moderate	18.3	26.8
Minor	3.3	4.8
Changes in soil erosion severity observed in the pact years		
Has become more severe	86.6	56.0
Has become less severe	8.3	31.7
No change in soil erosion	5.0	9.7
How severe is the impact of soil erosion on crop productivity		
Very severe	51.6	21.9
Severe	21.6	46.3
Moderate	25.0	26.8
Has no effect	1.6	2.4
Can soil erosion be controlled?		
Yes	56.7	97.5
No	43.3	2.4

(Source: Gyeltshen, 2010)

BHUTAN



LAND COVER

Ministry of Agriculture and Forests
Royal Government of Bhutan
Thimphu

N

1:250,000

0 5 10 20 30 Km

Disclaimers

1. This map describes land cover as observed on remote sensing materials of Advanced Land Observation Satellite (ALOS), Advanced Visible and Near Infrared Radiometer type 2 (AVNIR-2) and through ground truthing by field verification. It is not a legal document and has no legal connection to the laws, rules and regulations affecting the ownership or registration of land.
2. The administrative boundary, road network and place names are based on the information provided by the Department of Survey and Land Records (DSLR), National Land Commission (NLC).
3. The administrative boundaries follow recent information on border demarcation, but cannot be taken as authoritative.
4. The 100m interval contour information is generated from available Digital Elevation Model (DEM).
5. The river network is based on the Landuse Planning Project (LUPP) 1995 dataset.

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Coordinate System

Projected Coordinate System:	PCS BHUTAN DRUKREF03
Projection:	Transverse Mercator
False Easting:	250000
False Northing:	0
Central Meridian:	90
Scale Factor:	1
Latitude Of Origin:	0
Linear Unit:	Meter
Datum:	GRS1980

Topographic Legend

- International Boundary
- Dzongkhag Boundary
- Geog Boundary
- 1000m Contour
- Roads
- Drainage

Land Cover Legend (Area in Sq Km)

Chhuzhing	313.61	Areca nut Plantation	9.85
Kamzhing	696.71	Citrus Orchard	50.86
Built up Areas	61.51	Cardamom Plantation	33.98
Bare Soils	0.27	Others	0.13
Gullies	0.07	Marshy Areas	3.19
Landslides	70.33	Moraines	135.96
Broadleaf	16889.56	Non-built up Areas	3.30
Broadleaf with Conifer	314.71	Snow Cover	2854.79
Blue Pine	800.24	Rock Outcrops	996.59
Chir Pine	1076.67	Scree	232.88
Fir	1832.08	Shrubs	4005.26
Mixed Conifer	6139.64	Lakes	47.53
Meadows	1575.69	Rivers	226.85
Apple Orchard	20.41	Reservoirs	1.31

Total Area 38394 Sq km

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