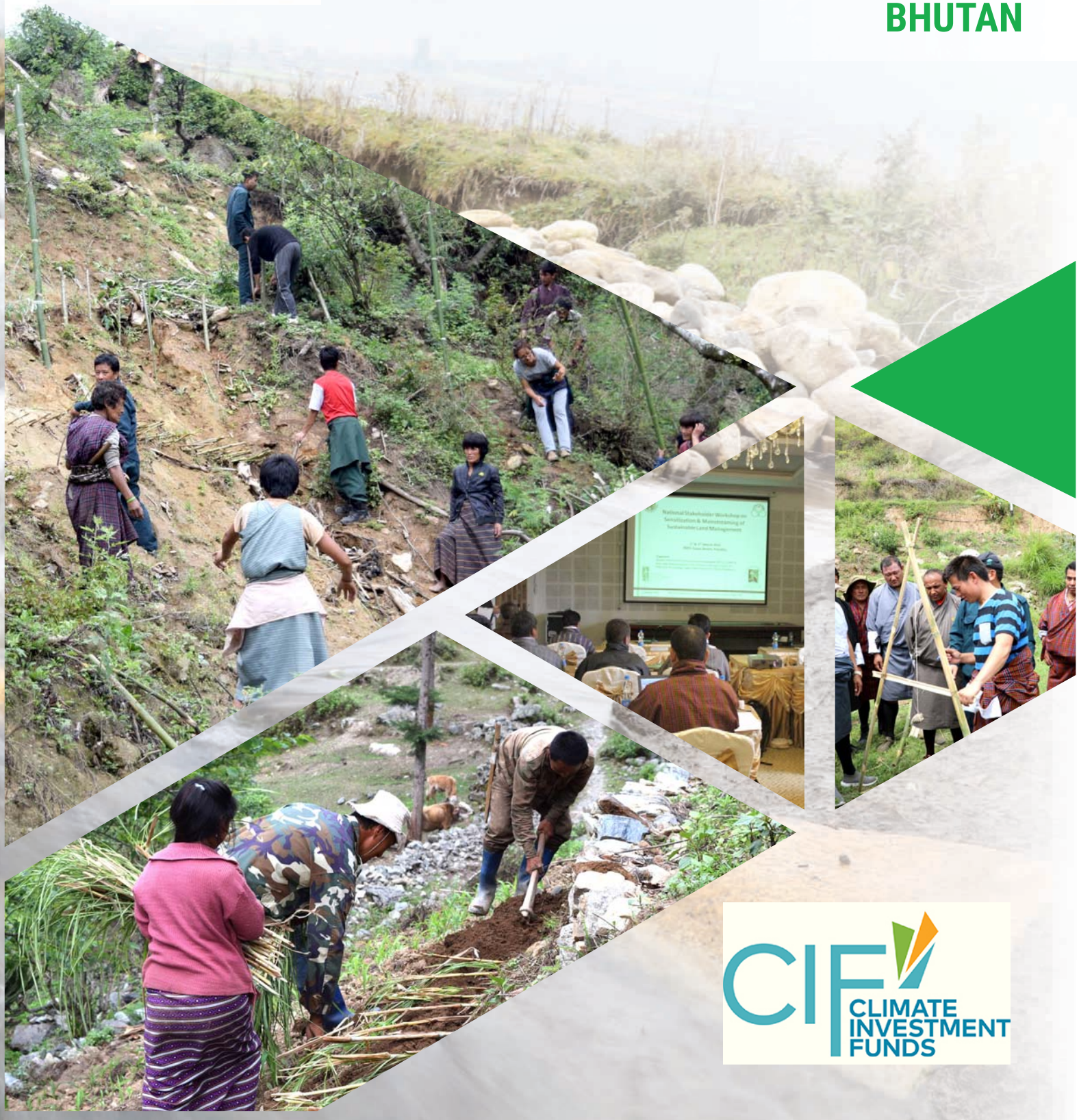
Bhutan Trust Fund
for Environmental Conservation

EVALUATION OF SUSTAINABLE LAND MANAGEMENT AND INNOVATIVE FINANCING TO ENHANCE CLIMATE RESILIENCE AND FOOD SECURITY IN BHUTAN



CIF CLIMATE INVESTMENT FUNDS

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BHUTAN TRUST FUND FOR ENVIRONMENTAL CONSERVATION
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Bhutan Trust Fund for Environmental Conservation (BTFEC) in collaboration with National Soil Service Centre (NSSC), and Gross National Happiness Commission (GNHC) has undertaken the Evaluation and Learning (E&L) activity with financial support from Climate Investment Funds (CIF) for the project '*Evaluation of Sustainable Land Management (SLM) and innovative financing to enhance climate resilience and food security in Bhutan*'.

The overall objectives of the project were to study the effectiveness of SLM projects by mapping and establishing the baseline data from existing sites; stocktake best practices of SLM projects and streamline them into national plans, policies and programs for scaling up of SLM; document and share experiences from SLM projects outside Bhutan; and undertake feasibility study for establishing innovating financing mechanisms for climate change and SLM.

BTFEC would like to thank CIF for providing funding support for the project and for its overall guidance to complete the project successfully. The Project management also thank the high-level government participants, officials from the districts, Gewogs and farmers, SLM implementers, for their enthusiastic and active participation at the stakeholders' workshop. A special gratitude to the Government of Tajikistan for facilitating Bhutanese delegates on study visit to learn the best practices of the PPCR/SPCR implementation and its benefits. Further, we would also like to acknowledge with much appreciation the crucial role of the KEHAT- Indonesia Biodiversity Foundation for assisting Bhutanese delegates on study visit in Evaluation & Learning on the Sustainable Development by empowering communities for Creating Climate Resilience and Adaptation.

The support of GNHC, and NSCC who provided timely support and collaboration in implementation of this project is highly acknowledged. I also offer our appreciation and thanks to two independent consultants who carried out the field study. Finally, I would like to thank my staff, and all those, who helped in successfully implementing the project and to complete this report.

Dr Pema Choephyel
Director/CEO
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Abbreviations

ADB	Asian Development Bank
ALD	Agriculture and Land Development
ARDC	Agriculture Research and Development Centres
BTFEC	Bhutan Trust Fund for Environmental Conservation
CBD	UN Convention on Biological Diversity
CIF	Climate Investment Funds
CSO	Civil society organization
E&L	Evaluation & Learning
ELESC	Evaluation and Learning Exercise Steering Committee
FYP	Five-Year Plan
GCF	Green Climate Fund
GEF	Global Environment Facility
GEO	Global Environment Objectives
GEI	Google Earth Image
GIS	Geographic Information System
GNHC	Gross National Happiness Commission
GCCA	Global Climate Change Alliance
GLOF	Glacial Lake Outburst Floods
ICIMOD	The International Centre for Integrated Mountain Development
IOD	Intensive Orchard Development
LD	Land Degradation
LG	Local Government
LDN	Land Degradation Neutrality
NAP	National Action Program
NAPA	National Adaptation Programme of Action
NEC	National Environment Commission
NEPA	National Environment Protection Act (2007)
NSSC	National Soil Services Centre
PDA	Pasture Development Association
PHCB	Population and Housing Census of Bhutan
PU	Pasture Union
PPCR	Pilot Program for Climate Resilience
PDO	Project Development Objectives
RGoB	Royal Government of Bhutan
RNR	Renewable Natural Resources
RNR-RC	Renewable Natural Resources Research Centre
ToR	Terms of Reference
SALT	Slopping Agriculture Land Technology
SDG	Sustainable Development Goals
SLM	Sustainable Land Management
SNC	Second National Communication
SLMP	Sustainable Land Management Project
SPCR	Strategic Plan of Climate Resilience
SWA	Sweet Water Association
UNCCD	United Nations Convention on Combating Desertification
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
US$/USD	United States of America (n) Dollar
WUA	Water User Associations
WB	World Bank

Contents

CHAPTER 1

Evaluation of Sustainable Land Management and innovative Financing

Executive Summary

Land degradation and desertification, climate change and biodiversity loss are interconnected and hence effective solutions to address these issues demand coordination and synergistic activities through the action programmes of concerned agencies.

Bhutan is undergoing rapid natural resource-based social and economic changes. These changes have important implications for land resources and consequently on long-term societal welfare. Due to the fragile mountainous landscape, land degradation is emerging as a key environmental issue, in Bhutan, despite environmental conservation occupying a pivotal place in the national development policies and programmes. Various forms of soil degradation are manifesting themselves all over the country largely owing to natural calamities and anthropogenic factors.

In Bhutan, more than 70 percent of the population depends on subsistence and mixed farming performed largely on steep to very steep slopes. Small-scale farmers are thus highly vulnerable to the adverse effects of more frequent climate extremes in Himalayas. The impacts of climate change pose new challenges to the sustainability of existing land-use systems making adaptation critical. Both anthropogenic and natural factors coupled with climate extremes may accelerate land degradation, undermining both the environment and farmers' livelihoods. These barriers are further compounded due to the socioeconomic and political challenges especially aging farmers; rural-urban migration, human-wildlife conflict, slow pace of agrarian reforms, and farm labour shortage, among others.

The Government of Bhutan is promoting Sustainable Land Management (SLM) practices to reduce vulnerability and help rural households adapt better to climate variability and change through multilateral donors, like the World Bank, Global Environment Facility (GEF) and national grant-making agency Bhutan trust Fund for Environmental Conservation in Sustainable Land Management Projects.

Evidences suggest that SLM interventions will enhance farmers' livelihoods by conserving soil and moisture, which makes agricultural production less variable, and diversifies agricultural income. The multiple benefits offered by SLM on steep cropping and degraded lands are central to decreasing on-site vulnerability and off-site dampening of peak flows and sediment loads. As a result, SLM represents a preventive and cost-effective approach to climate change with a positive long-term impact on rural landscape and farmers' livelihoods.

Recognizing the benefits of multi-function of land uses in addressing the issue of land degradation, biodiversity and climate change, participatory and holistic natural resource management has gained momentum amongst various stakeholders in past decades indicating increasing awareness of the people. However, the adoption of best

Sustainable Land Management (SLM) practices to realize its benefits fully is hindered by several barriers, including labour shortage, lack of information and financing, limited human and institutional capacities, lack of land use policies, and even lack or inadequate technologies. There, however, exist number of promising and best SLM practices for conserving agricultural land in the country. Some of the best practices include terracing hedgerows, check dams, contours stone bunds, terraces, bamboo, and planted trees, which could be scaled up and incorporated into the government policy. By doing so SLM can help reduce vulnerability and thus increase adaptability and the coping range of the poor. In particular, SLM can help restore soil fertility, improve water availability, and increase livestock productivity, which all ultimately improve conditions of the natural resource base and enhance food security. Existing SLM practises approaches in different parts of the country have important adaptation benefits in Bhutan.

This project took stock of lessons learnt and evaluated the technological interventions used in Sustainable Land Management Programmes (SLMPs) giving importance to SLM as an instrument to enhanced climate resilience and food security. The Project has generated nine SLMP site-specific GIS maps that provide baseline information on appropriate technologies and their effectiveness in combatting soil erosions and improving soil fertility for climate resilience of the communities. The information thus generated is shared with the planners and policy makers, which could be used for developing plans, and programmes and bring about changes in the policies for scaling up the SLM.

The other aspect of the project was to explore potential avenues to create an Innovating Financing Mechanisms for SLM for sustained financing for SLM and other climate change adaptation and mitigation projects for Bhutan. SLM is key to increasing resilience to climate change, enhancing crop production, and ensuring continuous supply of ecosystem services, thus this study recommends instituting an endowment fund for climate resilience activities including SLM as a separate financing window under BTFEC.

As part of the study, two study tours were conducted to Tajikistan and Indonesia Seven Bhutanese officials visited Tajikistan as part of an experience-sharing programme and to learn the best practices of Pilot Program for Climate Resilience (PPCR) implementation. Similarly, a team of nine officials, whose work is related to the sustainable land management and policy implementation for building climate resilient Bhutanese communities, were sent to Indonesia to evaluate and learn about activities being implemented by KEHATI - the Indonesian Biodiversity Foundation. The Bhutanese teams had extensive interactions with local communities and project implementers and learned that the model of sustainable and innovative funding, that these two countries followed, has greatly contributed to the farming communities' improved livelihood and resilience capacity to climate induced effects through various interventions. For instance, with assistance from USAID, KEHATI was granted almost US$ 19 million for establishing core endowment fund. As of 2005, a USAID evaluation team reported that KEHATI has evolved into an effective, independent foundation, capable of leading biodiversity program efforts into the foreseeable future. As

a result, a new working modality was also charted out with less supervision from USAID to allow KEHATI to attain institutional and programmatic stature commensurate with the ambitions of its mission. It was a perfect example of sustainably managed environmental fund in the region. In the recent past KEHATI has also launched SRI Kehati Index (SKI) for promoting Socially Responsible Investment. The KEHATI Foundation, in collaboration with the Indonesian Stock Exchange (IDX), developed this index in 2009. The creation of this index was triggered partly by the environmental destruction caused by some Indonesian companies in the recent past. Such innovativeness from developing countries in the region has been an eye-opening experience for the team from Bhutan.

At its core, the study tours were successful in creating a platform for interaction, networking and learning from each other's experience in innovative financing. It was found that Sustainable financing requires concerted collaboration, dialogue and consensus building. Policymakers and other leaders within a given sector must be able to rally a broad set of actors such as the private sector, CSO, farmers and everyday citizens. Finding meaningful ways to engage these actors together on sustainable financing encourages coherence, understanding and cross-fertilization between sectors, and hopefully generates better outcomes for all.

Another recommendation, spelt out strongly at the stakeholders' workshop as well as in the assessment studies, is to mainstream SLM through development of overarching land use policy that could be built on the existing legal frameworks, like Land Act 2007 and Local Governance Act 2009. With national land use policy put in place, National Soil Services Centre (NSSC) would then have a clearer picture as to how to take SLM forward, especially in the light of SLM mainstreaming, upgrading institutional set up, scaling up SLM beyond arable land, and securing financial resource. Hence, to move forward with SLM, rigorous awareness and advocacy at all levels of decision-making is recommended. This will be the foundation to mainstream SLM into national plans and policies. Advocacy could include establishment of demonstration sites in all 20 districts using existing farmers' groups or involving proactive citizens. Long-term monitoring of these sites would help in gathering concrete evidence of SLM benefits.

Bhutan has established policy support and guidance to promote environmental conservation and to pursue climate change adaptation and mitigation programs and projects. Nonetheless, in terms of the supportive policies and legislations to deal with climate change, particularly land degradation; Bhutan still suffers from resource limitations that are critical for addressing land degradation and other climate change effects. Bhutan is a party to UNCCD's convention of Land Degradation Neutrality (LDN) and in order to fulfil the objectives, SLM activities in the country should carried out as per the principles and guidelines of LDN. Three main indicators to be used for LDN are land productivity, Land Use Land Cover (LULC) change, and Carbon stock above/below ground. SLM is key to increasing resilience to climate change, enhancing crop production, and ensuring continuous supply of ecosystem services, thus this evaluation and learning

activity recommends instituting an endowment fund for climate resilience activities (including SLM) as a separate financing window under BTFEC.

In order to ensure sustainable funding for climate related adversaries, and its effects on the land, an institution of US$ 15 million as an endowment fund is recommended. The Climate Investment Funds (CIF), Global Environment Facility (GEF) and Green Climate Fund (GCF) are identified as some potential funding sources while contributions from the Royal Government of Bhutan was found crucial. The study also recommends the need for maintaining a databank on SLM interventions across the country by a single agency. This would avoid duplication of similar tasks by various agencies. A starting point for mainstreaming SLM is to encourage local communities to protect and manage land for achieving long-term agricultural and poverty reduction goals. The urgent need to mainstream SLM into national plans and policies was the highlight of the assessment studies and stakeholders' workshop. Sustainable Land Management activities have to be reflected into their annual plans at the same time it should be incorporated in the upcoming 12 Five-Year Plan (FYP). In addition, the need to enhance livelihood of the local communities with SLM interventions is recommended to promote ownership of SLM sites.

Introduction and Context

A panel of international experts assessing the current scientific knowledge on climate asserted that warming of the earth's climate system is "unequivocal" (IPCC, 2007). The Intergovernmental Panel on Climate Change (IPCC) team's conclusions are based on mounting evidence of shifts in the climate and consequent effects on ecological processes and biodiversity. According to the report, the world's least industrialized regions are particularly vulnerable to the effects of climate change. In rural areas, specifically, environmental change has immediate and direct effects on the health and well being of millions of households that depend on natural resources for their basic livelihoods (Koziell & Saunders, 2001).

When weather changes reduce families' livelihood options, these changes can act as a "push" factor: People leave resource-dependent rural areas and create new migration patterns (Bates & Rudel, 2004). Because migration represents a tremendous force of social change, the potential for climate change to increase migration deserves careful consideration and policy attention.

Climate change is recognized as one of the major factors contributing to land degradation. Land degradation means reduction in the potential of the land to produce benefits from a particular land use under a specified form of land management and is considered to be one of the major problems of the world in recent times (Blaikie & Brookfield, 1987, Borrow, 1992). Land degradation encompasses change in the chemical, physical and biological property of the soil. Such a change in soil properties alters and reduces the soil's ability to sustain a peculiar quality and quantity of plant growth (Douglas, 1994). Soils are also crucial to food security and change in climate has threatened the food security by affecting the soil property [see Pimentel, 2006, Lal, 2010, Blum & Northcliff, 2013, Brevik 2013).

Numerous literature suggest that land exhibited to degradation as a consequence of poor land management could become infertile as a result of climate change. Land degradation hazards included wind and water erosion, loss of soil carbon, nutrient decline mass movement, soil structure decline, acid sulfate soils and soil acidification. (See Kumar & Das, 2014; Crosson, 1994; Tiffen et al., 1994; Scherr and Yadav, 1996; Tengberg et al., 1998; Karmakar,et al,2016).

Land degradation, today, remains an important global issue because of its adverse impact on agronomic productivity, the environment and its effect on food security and the quality of life. Reports suggest (see Handy, Atef & Aly, 2014) that it is a massive, global environmental problem with worldwide-degraded land measuring about 18.1 million km

Warming is observed and predicted to be more rapid in the high mountain areas than at lower elevations, with areas higher than 4000 m experiencing the highest warming rates

(Shrestra & Devkota, 2010). A report of the Asian Development Bank (ADB, 2014) portray that the average temperatures in Bhutan will not only increase but it is more likely that there will be extreme hot temperature condition.

The potential impact of land degradation on food security at a global scale is difficult to quantify, given limited data and complex inter-linkages. However, across the world over 20 percent of cultivated areas, 30 percent of forests and 10 percent of grasslands are suffering from degradation, affecting about 1.5 billion people (Handy, Atef & Aly, 2014). This degradation may be the result of numerous factors or combination thereof including anthropogenic activities such as unsustainable land management practices and climatic variations. Data on land degradation on a global scale are scarce, but recent estimates suggest that 5-6 million hectares of arable land worldwide are irreversibly lost each year as a result of soil erosion, salinization and other degradation processes (FAO, 2015).

Information on climate and vulnerabilities to climate change in Bhutan is limited. The most recent official information on climate and climate vulnerabilities come from the Second National Communication (SNC) of the Kingdom of Bhutan to UNFCCC (RGoB, NEC, 2011). The SNC and various sources indicate that temperatures are increasing and are projected to increase. Annual precipitation is expected to increase with the monsoon season predicted to become wetter, while the winters will become drier.

The Climate Change Impact and Vulnerability in the Eastern Himalayas Synthesis Report by The International Centre for Integrated Mountain Development (ICIMOD) projects that surface air temperature in Bhutan will increase with the greatest change in the west,

gradually decreasing towards the east. The projected surface warming will be more pronounced during the pre-monsoon than during the summer monsoon season. The temperature increase will be higher in the inner valleys than in the northern and southern parts of the country. It predicts peak warming of about 3.5°C by the 2050s in Bhutan (Tshering et al., 2010) with higher changes in the inner valleys than in the southern and northern parts of the country. Most studies on climate in Bhutan report fluctuations and erratic rainfall in the recent past (Climate summit, 2011; SNC, 2011).

Bhutan is a small, land locked country located in the fragile eastern Himalayan ecosystem where climate change is not just an environmental problem, but also a serious challenge to sustainable development and the livelihoods of its people. Around 70 percent of the country is forested and approximately 80 percent of the country's population depends on subsistence farming for their livelihoods. As Bhutan is located among the most rugged and mountainous terrains, arable land for agriculture is limited due to these natural constraints. His Majesty the King of Bhutan during the National Day address in 2016 has said:

> *"As King, I feel privileged to carry out the noble work of Land Kidu. I undertook this responsibility as sacred, having received it from my Father, who has himself, carried out this noble duty for many years.*
>
> *Bhutan's difficult terrain means that only 7 percent or 664,000 acres of our total land is usable. We must ensure that this small amount of land is put to the best use for the benefit of our people.*
>
> *Many of our people continue to depend directly on land for their livelihood. In addition, land is traditionally considered a precious inheritance to be bestowed to our children. The objective of the Land Kidu is to place the much-treasured land upon the hands of our people, and enable them to use it to better their lives and secure the future of their children.*
>
> *It is a concern that in a rapidly growing economy, inequality may bring great divides in our society between the rich and the poor. Another objective of the Land Kidu has been to empower and uplift people, and allow them to prosper.*
>
> *With these objectives in mind, my Father and I have handed over 295,860 acres of land to our people till date.*
>
> *However, what I had hoped for with this undertaking has not been fully realized. Over the years, there are increasing numbers of Gungtong (absentee households), and I find that large portions of land continue to be left fallow across the country. The people, especially the young, have been leaving their villages for towns in greater numbers. I am deeply concerned that they will encounter unemployment and other difficulties in urban areas, and begin to despair."* (Kuensel December 18, 2016)

With high population growth rates, unchecked rural to urban migration, increased population density in the towns and cities, rapid increases in imports of cars, and rising demand for fuel wood, roads and building construction, the future suggests many negative effects on environmental assets, which can further expose the Bhutanese population to climate change vulnerabilities.

The Land Use and Land Cover of Bhutan 2016 (Ministry of Agriculture and Forest, 2016) reported the operated agriculture land at 2.93 percent. The conversion of arable land and forests into other land uses is increasing at an alarming rate. The pressure is mostly from accelerated construction of farm roads, electricity transmission/distribution lines, industries and urbanization. The prime agricultural land (especially paddy fields) is under increasing pressure from growth in existing urban areas and creation of new urban settlements. There are also emerging signs of forest degradations (NEC, 2016), such as much higher supply of timber and fuel wood, indicating that there is overall, very high pressure on the forests and its resources. Adverse impact of climate change is further aggravating water problem for agriculture. Pressures in critical watersheds and water sources are also likely to impact water supply. These impacts are compounded by rapid and poor road construction methods that are not only triggering numerous surface runoffs and landslides in geologically fragile areas but are also opening previously inaccessible forest areas and watersheds to exploitation.

Climate change impacts are no longer an issue for the distant future as its consequences are already being felt. A number of studies revealed rapid changes in average temperatures, precipitation patterns, and increased risks of climate related hazards in the recent years (NEC, 2016; MoAF, 2016). The Bhutan Department of Agriculture reported that climate-induced hazards such as excessive rains, flash floods, windstorms, hailstorm, droughts etc. have caused massive loss and damage to farming households. There is also evidence of new pests and diseases affecting crops and livestock production (MoAF, 2016).

All these changes are occurring against the background of high climate variability. Air temperatures are rising steadily and this warming has seen Bhutan experiencing more warm weather and extreme events, such as glacier retreat posing Glacial Lake Outburst Floods (GLOF) threats, reduction in availability of agricultural water, change in phenology, loss of habitat and increased incidences of pest and diseases over the recent years (State of climate report, 2016).

The National Centre for Hydrology and Meteorology's annual publication (Bhutan State of climate report, 2017) highlighted major factors influencing climate variability in Bhutan (such as monsoons, El Nino Southern Oscillation, western disturbances, and tropical cyclones). Meanwhile, the Bhutan State of Environment Report (NEC, 2016) shows that in 2010, landslides and flash floods damaged more than 2000 acres of agricultural land affecting some 4165 households over 20 districts and damaged farm roads and irrigation channels affecting 529 households. Subsequently, data from 2009-2010 shows that 40 acres of pastureland were washed away and over a thousand livestock were killed.

In an effort to make Bhutan's farming communities' climate resilient and adapt to the changing needs, the Ministry of Agriculture and Forests is mainstreaming climate change into sectorial plans and programs. The Climate Change Adaptation Program under the Global Climate Change Alliance (GCCA) aims to develop an adequate response of the Renewable Natural Resources (RNR) sector to the effects of Climate Change. The overall objective of the GCCA program for Bhutan is to enhance resilience of Bhutan's rural households to the effects of climate change. The specific objective is to ensure climate change readiness of the RNR sector in Bhutan by mainstreaming adaptation to climate change into the sector and ensuring steps are taken towards increasingly addressing climate change adaptation at a multi-sectorial level.

In addition to the direct factors leading to land degradation, population growth and structure, poverty, and climate change contribute almost in equal measure. Urbanization has taken place at a very rapid pace over the decades. In June 2002, it had been estimated that the urban population comprised only 15% of the total population. However, the Population and Housing Census of Bhutan (PHCB, 2017) revealed that as of 30 May 2017, Bhutan's total population was 735,553 persons. Out of the total population, 62.2 percent lived in rural areas and 37.8 percent lived in urban areas, with Thimphu (the capital city) holding 19.1 percent of the population.

At the same time, there is a relatively high level of poverty in the country, which is largely a rural phenomenon. An estimated 12 percent of the country's total population lives below the national poverty line. Poverty and land degradation are inextricably linked, with impoverished communities prone to engage in activities that contribute to land degradation (such as illegal extraction of forest resources) if they are not provided with livelihood and income-generating opportunities (PHCB, 2017). However, sustainable land management activities – for instance, agro-forestry – can help the poor to enhance

their livelihoods and break away from the poverty cycle. Furthermore, the poor are directly dependent on a wide range of natural resources and ecosystem services for their survival and well being. Therefore, when soil erosion, forest degradation and decline in biodiversity occur, it is generally the poor who are most severely affected.

Climate modelling in Bhutan faces challenges due to its complex mountain topography and the implications this geography has on local climatic conditions. However, the country's National Adaptation Programme of Action (NAPA) anticipates that an increasing trend of precipitation will occur. This conclusion is consistent with climate modelling for South Asia as a whole, which project that the region will experience: a median increase in temperature of 2.3^{o}C by 2100; that the greatest amount of warming will take place at higher altitudes; precipitation during the dry season will decline by 5 percent by 2100, but during the remainder of the year will increase by a median of 11 percent (RGoB 2006, MoAF 2016). The NAPA in Bhutan primarily focuses on disaster risk management, freshwater supply, climate information services, as well as agriculture, human health and forestry.

Bhutan's National Environment Strategy, "The Middle Path," highlights hydropower development, industrial growth and intensification of agriculture as the three major avenues for sustainable development in Bhutan. Tourism is also an important economic sector. All of these sectors are highly climate sensitive and vulnerable to the adverse effects of climate change. Hydropower critically depends on predictable and stable patterns of precipitation, which will be perturbed due to climate change. Subsistence farmers will be directly affected by temperature changes and monsoon patterns that are less predictable as a result of climate change. Bhutan's roads and other important infrastructure will suffer more damage from landslides and flash floods. The rapid melting of glaciers, besides affecting the base flow of Bhutan's rivers, will dramatically increase the risk of GLOFs. Bhutan's extensive forest cover, rich biodiversity and clean water resources will also be affected by climate change, which will then negatively impact the tourism and service sectors. In keeping with the country's longstanding commitment to environmentally sustainable development and recognition of environmental conservation as one of the cornerstones of Gross National Happiness, the Constitution of the Kingdom of Bhutan, which was formally adopted on 18 July 2008, explicitly features environmental conservation as a constitutional mandate.

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. 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 provide support for combating land degradation include the National Forest Policy, National Environment Strategy, Bhutan Water Policy, National Urbanization Strategy, and Bhutan Sustainable Hydropower Development Policy. Laws include the Forest and Nature Conservation Act 1995, Mines

and Mineral Management Act 1995, Environmental Assessment Act 2000, Road Act of Bhutan 2004, National Environmental Protection Act 2007, Land Act of Bhutan 2007, and Waste Prevention and Management Act 2009. While, in general, there are policies and institutional mechanisms in place to effectively address land degradation problems and issues, there are a few policy and institutional issues that need more attention. Furthermore, programs and activities to address land degradation have remained compartmentalized within various sectors. There is also a lacuna in the institutional setting with respect to the overall coordination and management of the technical aspects of land use and land management. Finally, effective environmental law enforcement will greatly depend on the awareness of the public of their environmental rights and responsibilities. Currently, a large majority of the Bhutanese public are not aware of various environmental laws and regulations and the intricacies of these laws and regulations. Without public awareness and participation, law enforcement is expected to be ineffective.

Institutionally, the Ministry of Agriculture & Forests and National Environment Commission (NEC) have traditionally had the most direct role in land use and management from the environmental perspective. The Ministry through its Department of Agriculture, Department of Forest & Park Services and Department of Livestock are responsible for policies, plans and programs that ensure sustainable management of agriculture, forest and livestock resources for the socio-economic development and environmental wellbeing of the Bhutanese people. Likewise, the NEC has the role of ensuring that development policies, plans, programs, and projects fully consider environmental management needs and functions as an inter-ministerial body to guide and support development in an environmentally sustainable way. Other government agencies that are increasingly becoming important and have key roles in combating land degradation include the Department of Roads and Department of Urban Development and Engineering Services under the Ministry of Works and Human Settlement; Department of Geology and Mines Department of Energy and Department of Industry under the Ministry of Economic Affairs, and Department of Disaster Management under the Ministry of Home and Cultural Affairs.

The Bhutanese farming system has evolved over a long period of time characterized by diversity of ecological conditions. The variability over time and heterogeneity over space has led to the development of unique and diverse agriculture systems specific to different locations. While these diverse farming systems contributed as adaptation mechanisms to different climatic and biophysical conditions, majority of the farming communities in Bhutan still constantly face floods and landslides. These events have, to a larger extent, affected agricultural activities and also human health, livestock and the overall ecosystem. Adaptation to climate change primarily calls to consider security of human health, shelter, settlement and food resources. Thus, in addition to improving soil stability, Sustainable Land Management is crucial for food security for all the Bhutanese.

The Climate Investment Funds (CIF) was founded with the mandate to serve as a learning laboratory for scaled-up climate finance. The CIF Evaluation and Learning (E&L)

Initiative is helping to fulfil this mandate through a range of strategic and demand-driven evaluations covering some of the most important and pressing challenges facing climate finance funders and practitioners. Drawing on experience from across the CIF portfolio of investments in clean energy, forests and resilience in 72 developing countries, the E&L Initiative uses evaluation to enable learning that is relevant, timely and used to inform decisions and strategies, for both the CIF and the wider climate finance sector. This study was commissioned by CIF's E&L Initiative and was undertaken by the Bhutan Trust Fund for Environmental Conservation (BTFEC) in alliance with the National Soil Services Centre (NSSC) and Gross National Happiness Commission (GNHC). This report provides the results of the evaluation and learning activity titled "Evaluation of Sustainable Land Management and innovative financing to enhance climate resilience and food security in Bhutan". This activity has conducted studies in Sustainable Land Management Project sites in order to assess and understand the impacts of SLMPs and need for sustainable financing for scaling up similar projects in the country. For this, it was imperative that baseline data and experiences from SLMPs were established and financing mechanisms for similar projects were explored.

Thus, the evaluation and learning study aimed to achieving the following four objectives:

1. Study the effectiveness of SLM projects by mapping and establishing the baseline data in the form of Geographic Information System (GIS) maps in nine existing sites in increasing community resilience to climate change,
2. Take stock of best practices of SLM projects and streamline them into plans, policies and programmes for scaling up,
3. Document and share experiences from SLM projects outside Bhutan, and
4. Undertake a feasibility study for establishing innovating financing mechanisms for climate change and SLM in future.

To enhance information base on SLM and help influence the government in scaling-up SLM projects in the face of climate change, a detailed impact assessment and mapping of past SLM activities in Trashigang, Zhemgang, and Chhukha Dzongkhags was conducted in collaboration with GNHC and with technical inputs from the NSSC, Ministry of Agriculture & Forests (MoAF). To have further insights, an external consultant carried out an evaluation of the SLM interventions in the same sites. Similarly an independent consultant investigated potential means to create an Innovating Financing Mechanisms for SLM project for sustained financing for SLM and other climate projects for Bhutan.

The findings from various SLM impact assessment studies were discussed during two regional workshops in Phuentsholing and Samdrupjongkhar. The workshops provided a forum for sharing field experiences on SLM and identify major issues and challenges of SLM. The outcomes from the grassroots level stakeholder workshop were further deliberated during the national stakeholder workshop. The CIF E&L activity evaluated and explored the possibility of instituting an innovative and sustainable financing mechanism, such as a climate change trust fund to support climate change activities, including SLM activities to increase community resilience and food security in Bhutan.

Methodology

The evaluation and learning activity is based on an analysis of qualitative and quantitative information from a combination of primary and secondary research through the following approaches and sources:

a. **Desk review** of the available reference documents, including the project documents of the previous SLM projects, and international best practices. In addition, reviewed project reports including Annual Project Review/PIRs, national strategic and legal documents and other materials found useful for this evidence-based review;

b. **Field visits, farmers' interview and focus group discussion, and direct observation** to three pilot sites to validate the information and learn on-the-ground experiences of SLM benefits, in relation to climate change and various SLM technologies deployed;

c. **Meeting with stakeholders** from various line ministries and beneficiary farmers;

d. **Proceedings from Workshops** where the findings of the evaluation were presented to the stakeholders, including CIF-ELESC and the BTFEC.

A wide range of documents was reviewed during the course of the evaluation. These primarily included national land management campaign (MoAF, NSSC & NAP, 2005), documentation and mapping SLMP activities (NSSC, MOAF, 2013), this E&L project's inception report, and the final draft of the National Action Program to combat land degradation (NAP). Additional documents such as technical/consultancy reports, training materials, 11th Five-Year-Plan and policy documents, and project publications (GNHC, 2013) were also reviewed.

Among 20 districts, Trashigang, Chhukha, and Zhemgang were selected as the three pilot sites for the GEF/World Bank funded SLMP Project implemented from 2006 to 2013. Within each pilot Dzongkhag (district), Radhi Gewog under Trashigang, Phuntsholing Gewog under Chhukha, and Nangkor Geowg under Zhemgang were selected as SLM Pilot sites for this evaluation and learning activity.

However, in the later part of the SLMP Project period, two additional Gewogs (blocks of villages) were selected from the respective three pilot districts to scale up the knowledge, experience, and SLM activities from the three main SLM pilot sites. Under Trashigang, Lumang and Thrimshing Gewogs were selected. Similarly, Bongo and Lokchina Gewogs under Chukka, and Bardo and Goshing Gewogs under Zhemgang were selected.

Therefore, in total, there were nine SLMP pilot sites investigated for this evaluation and learning activity. The selection of the pilot districts (Dzongkhag) and Gewogs for the SLMP

Project was purely based on the extent and severity of land degradation and incidence of poverty in the Dzongkhags and Gewogs. A visit to these sites was to validate the information and learn on-the-ground experiences of SLM benefits, SLM projects in relation to climate change and various SLM technologies deployed.

Prior to the mapping exercise, a stakeholder meeting was organized with the SLM farmers to have first-hand information on the status of the SLM activities supported by the previous project, their benefits, challenges, sustainability of the gains, and recommendations for future plans for scaling up SLM activities in the country. A simple questionnaire was used to gather this information from the SLM implementers (see annexure 1).

In addition to the above methods, the feasibility study on innovative and sustainable financing mechanism conducted a study on the current situation of climate change funding modality, a financial gap analysis for SLM projects and other climate related activities, assessed institutional arrangements and legal conditions, and developed a set of feasibility criteria for decision making based on the experience of other countries.

Implementation

This E&L activity took stock of lessons learnt and evaluated the technological interventions used in Sustainable Land Management Programmes giving importance to SLM as an instrument to enhanced climate resilience and food security. The other aspect of the activity was to explore potential avenues to create Innovating Financing Mechanisms for SLM for sustained financing for SLM and other climate change adaptation and mitigation projects for Bhutan.

As mentioned, there were four primary objectives for this study. To achieve these objectives, 5 sub-activities were undertaken. These sub-activities are discussed below. **Report of each activity is submitted as separate attachment, found in the annexure.**

SLM Maps

Activity 1: Establishment of baseline data, by mapping out experiences gained and producing GIS maps for the existing nine sites.

The National Soil Services Centre carried out this activity.

The overall aim of this exercise was to establish baseline data on SLM activities so that the planners and policy makers are informed with regard to SLM activities in the country and can make decisions. At the moment, due to lack of such information, SLM activities are carried out mostly on an ad-hoc basis without much visible impact on the ground. In an attempt to address this limitation, the SLM activities in the nine SLMP sites were documented and mapped with the following objectives:

- To take stock of past SLM activities through participatory GIS mapping in nine SLMP sites under three Dzongkhags
- To provide baseline information to help assess the impacts of SLM activities on land degradation mitigation, rural livelihood enhancement, and climate change resilience
- To briefly assess the impacts of SLM activities in combating land degradation, improving soil quality, increasing crop production, and increasing the ease of workability
- To contribute in exploring the possibility of establishing an innovating financing mechanism for future SLM activities.

Recognizing the importance of having sound baseline information, the past sustainable land management activities of the Global Environment Facility/World Bank funded SLM Project (SLMP), implemented from 2006 to 2013, were documented and mapped. The assessment was undertaken in order to assess the SLM benefits and challenges of the past SLM Project sites and to identify the needs for scaling up SLM activities across the country. The SLMP activities were undertaken in nine pilot Gewogs (blocks) under three Dzongkhags

(districts) viz: Phuntsholing, Bongo, and Lokchina under **Chukha Dzongkhag;** Radhi, Thrimshing, and Lumang under **Trashigang Dzongkhag;** and Nangkor, Bardo, and Goshing under **Zhemgang Dzongkhag**.

The mapping of past SLM activities was done in close consultation with the SLMP beneficiaries using Google Earth Image (GEI) in the Geographic Information System (GIS) environment. Along with the mapping of SLM activities, an attempt was made to have some insight on the impacts of SLM on halting land degradation mitigation, soil quality improvement, and rural livelihood enhancement through farmers' interview and focus group discussions, using a simple semi-structured questionnaire.

A semi-structured questionnaire was used for a focus group discussion to assess the SLM impacts. The questionnaire was structured to collect some of the key information, including: i) farmers' perception on land degradation, its causes and impacts, and measures to mitigate them, ii) type of SLM activities carried out during the SLM Project period, iii) whether these SLM activities have been scaled-up, iv) impacts of SLM measures in mitigating land degradation, improving soil quality, increasing crop production, etc., v) challenges faced while implementing SLM activities, vi) future plans to take up SLM activities, and vii) recommendations to successfully scale-up SLM activities in the country.

SLMP Evaluation

Activity 2: Stock taking of lessons learnt and experience sharing from the SLM established sites for influencing the plans, programs and policies of the Bhutan government.

A national consultant carried out this activity.

The purpose of the Evaluation of the SLM Projects was to study the current SLM practices and evaluate its impacts of the past SLM Projects in Bhutan. It is envisaged that the evaluation will enhance the information base on the prevailing SLM and help guide the government in scaling-up SLM projects in the face of threatening climate change, through domestic and international financing. As such, this sub-activity intended to achieve the following objectives:

- Learn whether SLM projects in the country have been effective in increasing community resilience to climate change,
- Determine whether SLM projects need to be scaled-up,
- Determine opportunities to mainstream the best practices of the SLM approaches in the policies, program and plans.

In order to study and understand current SLM practises and understand its impacts on adaptation to climate change and its adverse impacts, the SLMP evaluation was undertaken. This evaluation was intended to undertake stock of in-country and ex-country SLM experiences and lessons learnt on SLM projects, to recommend an appropriate way forward in terms of policy mainstreaming and scaling-up SLM in Bhutan.

The SLMP Evaluation focused on the evaluation of the Global Environment Facility (GEF)/ World Bank financed Sustainable Land Management Project, SLMP ID: P087039 (2006 – 2013). The evaluation mission was undertaken for 35 days spread over four months, 28 August – 31 December 2017, including 15 days site visits to the three pilot sites of the SLMP (Nangkor Gewog in Zhemgang Dzongkhag, Radhi Gewog in Trashigang Dzongkhag, and Phuentsholing Gewog in Chukha Dzongkhag). The primary focus of the SLMP has been to elevate poverty eradication by increasing agriculture productivity through SLM techniques. The factors for selection of the nine Geogs under three Dzongkhags for the SLMP were mainly on consideration of major cropping pattern, land degradation type and incidence of poverty (Annexure 2).

Study on Financing Mechanism

Activity 3: Feasibility study on sustainable and innovative mechanism for financing SLM and Climate projects.

A national consultant carried out this activity.

Climate change and its impact on various sectors such as agriculture, water, infrastructure and hydropower have increased pressure on implementing climate adaptation activities in Bhutan. Addressing challenges posed by climate change requires significant financial resources.

Against the backdrop of resource constraints faced by the Royal Government of Bhutan, due to competing priorities and increasing withdrawal of bilateral and multilateral donor agencies, the Royal Government and BTFEC are keen on exploring setting up of an Innovative Financing Mechanism to ensure sustainable flow of funds for climate change activities.

This activity was carried out to draw on the relevant policies and plans of the government in emphasizing the need and basis for an endowment fund. The study was carried out based on interviews with the experts of BTFEC, NSSC, observations of on-ground implementation of SLMP projects that were implemented in 2006-2013 and the beneficiaries thereof.

The objectives of this activity were:

- First, to provide a clear overview of the key issues faced with respect to climate change and land degradation and the institutional arrangements that are established in Bhutan to deal with them.
- Secondly, to explore the possibility of establishing an endowment fund within the current set up of BTFEC using a set of feasibility criteria developed by the UNDP.

The feasibility criteria were developed by UNDP based on the learning from various climate funds in the Asia-Pacific countries.

Exchange Program

Activity 4: Conduct Experiential sharing with Tajikistan

As envisaged under the E&L project, a Bhutanese delegation visited Tajikistan as part of experience sharing programme and to learn best practices of Pilot Program for Climate Resilience (PPCR) implementation, due to Tajikistan's successful implementation of SLM projects. The visit was made from 16 to 26 June 2018 involving representatives from Gross National Happiness Commission (CIF National Focal Point and agency coordinating SPCR preparation and implementation); Prime Minister's Office (Responsible for Government Performance Management); National Soil Service Centre (CIF E&L SLM evaluation implementing partner) and Bhutan Trust Fund for Environmental Conservation (CIF E&L coordinating agency).

The aim of the visit was to ensure mainstreaming of SLM experiences into policies, plans and programs of the government, thereby ensuring sustainable implementation of SLM related projects in future. Further, this group of officials shall be fully engaged in implementing and supervising SLM evaluation project and ensuring that the deliverables are delivered on time with quality.

The team had an extensive interactions with different implementing partners and project beneficiaries at different sites and noted that the Strategic Plan of Climate Resilience (SPCR) and in particular the SLM has greatly attributed to the farming communities increase in their livelihood and resilience capacity to climate induced effect through various

interventions such as formation of water user associations (WUA), pasture Development Association (PDA), Pasture Union (PU), Sweet Water Association (SWA) and Intensive Orchard Development (IOD) among others.

After the visit, it became clear that it would be valuable for Bhutan to take stock of all on going activities related to land utilization and management executed by various agencies. This will include activities such as land development management, pasture development and management, utilization of barren land for agriculture, watershed management, and so on. Secondly, in order to make Bhutan's SPCR program more realistic, if need be, the SPCR document should be revised and designed to be more inclusive.

Lesson learnt from this visit are as follows:

- Water can be best utilized and managed through formation of water user associations. With proper coordination and cooperation, associations function well and provide effective services to the community.
- Land has been managed through various small-scale activities at the community level. In this manner, community takes the ownership of the program.
- Use of appropriate technology where it is most fit. For example, not all SLM technology fits in a particular environment. Therefore it is vital that the best possible technology is used.
- In a resource stressed area, it is through collective efforts that the maximum use of the resources can be achieved.
- Efficient pasture management program has been functioning well. Such initiative contributed to land utilization and its management.

A detailed report of the exchange programme to Tajikistan and lesson learnt is provided in Report 4.

Activity 5: Study tour on Innovative Financing Mechanism

In the initial stage of the project, the exchange visit to learn about innovative finance mechanisms was put on hold, due to the need to focus on other priority areas and speculation that the budget fund would not be enough.

To complete the stalled activity as per the inception report, a team of nine officials – three from BTFEC, one from Gross National Happiness Commission, two from National Land Commission, two from Department of Local Governance, and one from National Soil Service Centre (whose works are related to the Sustainable Land Management and policy implementation for building up climate resilience Bhutanese communities), were sent to Indonesia to learn about activities being implemented by KEHATI- the Indonesian Biodiversity Foundation. This activity was carried out from 24 November to 2 December 2018.

The program was aimed to learn about approaches, methods, and tools used for community empowerment by studying program and project design that facilitate transformational change; capture and compare tools and approaches used in bringing about sustainable and climate resilient activities to the communities' doorsteps; evaluate involvement of local stakeholders' engagement in the areas of resource mobilization and their participations; study and understand the synergy and complementarity among activities undertaken by KEHATI in the empowerment of the communities for policy advocacy and implementation of sustainable interventions; and evaluate the role of leadership in communities in bringing about the transformational change if any.

The team had extensive interactions with KEHATI (which was established around same time as BTFEC and follows almost similar funding mechanism), its project-implementing partners and project beneficiaries at different sites. The team noted that KEHATI's model of sustainable and innovative funding has greatly contributed to the farming communities increase in their livelihood and resilience capacity to climate-induced effect through various interventions.

KEHATI's diversified financing mechanism for biodiversity conservation efforts and sustainable development consists of measures that have not yet been initiated in Bhutan; in order to secure funds for in green business initiatives with local communities KEHATI relies on the stock exchange through the creation of mutual funds, while also considering other avenues like debt-for-nature swaps, etc. in addition, KEHATI's financial and technical support towards the community's green initiative, the role of influential people within a community is also seen as a huge contributing factor.

Lesson learnt from this visit are as follows:

- KEHATI has three key principles of assessment while deciding to engage local communities. They are 1) Assessment of institutional setup, 2) Community capacity,

management and available human resources, and 3) Community portfolio.
- KEHATI leverages on its existing endowment fund for seeking funds from multilateral and bilateral donors.
- In all the projects there were balance approach by KEHATI in terms of achieving their conservation and socio-economic goals.
- KEHATI experienced that majority of donors are not willing to add onto already existing endowment funds.
- KEHATI is an ISO certified organization, and the team was told that their status of having ISO certification was key for them to be receiving funds from donors like UKaid.
- Use of crowd funding as a means of advocacy.
- KEHATI has also been proactively engaging with numerous national and multinational companies in implementing their CSR.
- Opportunity for Debt-for-Nature swap deal. For example, Bhutan builds hydropower with loan from Government of India; Bhutan can negotiate with India and instead of paying off the loan, invest similar amount in environmental conservation.

The detailed report of the study visit is reflected in Annexure 5.

Stakeholders' Workshop

To share the findings of the above assessments (sub-activities 1-3), and to understand the grassroots realities, two regional workshops were conducted in Phuentsholing, from 21 to 23 January 2018, and Samdrupjongkhar between 26 and 28 January 2018. Attendees included District Agriculture and Planning Officers of 20 districts, staff of Agriculture Research and Development Centres (ARDCs), SLM adopters, and potential SLM farmers of GEF/LDFC pilot districts.

The Workshops were conducted with the following objectives and expected outcomes:

- Provide an opportunity to share field experience on SLM
- Understand the importance and benefits of SLM
- Discuss issues and challenges of SLM
- Recommend measures to address SLM challenges
- Contribute to mainstreaming SLM into government plans and policies.

The workshop provided a forum for sharing field experiences on SLM and identified its major issues and challenges. Measures to address the challenges and mainstreaming of SLM into government plans and policies were also discussed. Upcoming plans for SLM and its linkage with nationally prioritized Sustainable Development Goals (SDGs) and UNFCCD's Land Degradation Neutrality (LDN) goals were discussed. The participants were also introduced to newly adopted Agriculture and Land Development (ALD) guidelines of Bhutan.

An independent consultant presented the research findings on impact of past SLM projects. Another consultant presented the findings of assessment study on objectives, legal feasibility, financial sustainability, institutional and human resource capacity, and

potential source of funds for establishment of an endowment fund to support climate adaptation activities including SLM.

The farmers from previous SLM sites who attended the workshop shared their field experiences in implementing SLM interventions. Thus, the workshop provided a platform for everyone to share his or her experiences. At the end of both workshops, all participants were thoroughly sensitized on SLM and SLM related topics. In addition, the presentations on technical details on SLM by NSSC clearly educated the participants on various aspects of SLM. Upcoming SLM plans for 12 FYP were also shared by GNHC and NSSC.

Some of the common lessons learnt shared in the workshop were:

- SLM reduced surface erosion
- Hedgerows through SLM interventions has reduced top soil erosion
- SLM Reduced slope of the terrain
- Orange, broom-grass plantation, sale of Napier grass cutting, through SLM activities, enhanced agriculture productivity and income generation
- SLM increased soil fertility on steep slopes.

At the same time, there were a number of challenges in implementing SLM; some common challenges shared at the workshops were as follows:

- SLM intervened sites were left unused due to limited budget for irrigation schemes in SLM introduced sites
- Lack of national policy related to land development and management has resulted into SLM activities not being mainstreamed
- SLM technological challenges, like increases in pest incidences for the crops due to hedgerows
- Lack of proper documentation of past SLM activities
- Small landholding per household often poses challenges for farmers to use the available farmlands for implementing new SLM technologies
- Shortage of farm labour and limited incentives and financial support for SLM adopters
- Free grazing by cattle
- Lack of coordination among development sectors
- Less awareness on long-term benefits of SLM
- Incidences of human-wildlife conflicts

The outcome of the grassroots level stakeholder workshop was further deliberated during the national stakeholder workshop on 1 and 2 March 2018 in Punakha. The consultative workshop was conducted in order to create awareness and sensitize policy makers, implementers, donors, and Civil Society Organizations, on SLM and agree on a mechanism to mainstream into national policies; and agree on financing mechanism for scaling up SLM activities. The head of agencies from various departments of the Royal Government of Bhutan attended this workshop.

The need for continuous capacity building on SLM for both central agencies like NSSC and grassroots like Local Government (LG) staff was found crucial in scaling-up SLM activities. Such capacity building in the form of basic training or refresher course would serve as a SLM sensitization programme, which in long-run would be crucial for SLM mainstreaming.

The report on feasibility of instituting an endowment fund for climate change adaptation activities (including SLM as a separate financing window under BTFEC) was also discussed. The meeting also highlighted SLM as the key to increasing resilience to climate change, enhancing crop production, and ensuring continuous supply of ecosystem services.

Various mechanisms for SLM mainstreaming, as means to address climate change vulnerability in the rural pockets, was identified through group discussion and then thoroughly debated. The key step in mainstreaming SLM was through development of overarching SLM or land use policy. Development of such policy has to be built on the existing legal frameworks like Land Act, 2007, and Local Governance Act. With national land use policy put in place, NSSC would then have a clearer picture as to how to take SLM forward, especially in the light of SLM mainstreaming, upgrading institutional set up, scaling up SLM beyond arable land, and securing financial resource.

Highlighting SLM linkages with land degradation, climate vulnerabilities, and biodiversity and carbon sequestration would also assist in establishing linkages with key stakeholders. This was identified as another way of mainstreaming SLM. Linking SLM with loss of arable land, biodiversity loss, and food and nutritional security could be another way to emphasize the need to mainstream SLM into government plans and policies.

Need assessment pertaining to SLM at grassroots level has to be conducted. NSSC could also work on developing national SLM target through active participation of Local Government (LG) officials and head agencies. Through such activity, need for SLM intervention could be properly mapped and argument for need for SLM at national level would be convincingly justified. Annexure 6 provides a detailed report of the outcome of the stakeholders' workshops.

Results and Findings

An effective response to Sustainable Land Management calls for improving the incentives for farmers to care for their land and improve their access to the knowledge and inputs required for proper care. Overall it was found that the past SLM interventions have produced visible tangible impacts on livelihood of the farming communities in all project sites. SLM interventions were reported to have significantly reduced soil erosion, eased workability on steep terrain, increased fodder availability through hedgerows plantation, fallow lands were brought under cultivation, and eventually culminated in increased agriculture and livestock productivity. In addition, farmers could generate additional income through various SLM interventions like orange plantation, sale of broom grass, Napier rhizomes, and bamboos. The farmer, for the first time, has experienced hands-on-training on SLM technologies through the sub-activity 1 of this &L Activity "*Documentation and Mapping of SLM activities under Trashigang, Chukha, and Zhemgang Dzongkhags*."

This sub-activity supported different types of SLM measures in its nine pilot sites to mitigate land degradation, increase crop production, enhance rural livelihoods addressing climate vulnerabilities, reduce climate change, and enhance ecosystem services. Some of these SLM measures include: bench terracing, orchard terracing, alley cropping (hedgerows), contour stone bunds, orchard establishment, tree & bamboo plantation, bio- engineering measures (e.g. check dam), fodder development, irrigation channel renovation, water source protection, and community forest establishment. Further, the project also supported construction of improved cattle and poultry sheds, beehives, and supply of improved breeding bulls in the SLM pilot sites.

In order to facilitate and encourage farmers to take up SLM activities, the SLMP provided a range of incentives. For instance, Nu 10000/- and Nu 3000/- were paid to the farmers to construct an acre of bench terraces and contour stone bunds, respectively. Further, planting materials for establishing hedgerows, orchards, and community forests, and construction materials for renovating irrigation channel, water source protection, and construction of check dams, improved cattle sheds, and poultry farm were also provided free of cost. In return, the SLM beneficiaries provided free labour to implement SLM activities at their respective sites.

Current SLM Interventions

The annual reports of the National Soil Services Centre (NSSC) are clear on the SLM efforts put in by the Department of Agriculture (DoA) as the focal agency for land management. Two SLMPs have been implemented by NSSC prior to 2013 and two projects are currently being implemented, supported by Bhutan Trust Fund for Environment Conservation (BTFEC). Bhutan National Adaptation Programme of Action (NAPA) II also revisited its 2006 prioritized project list and re-prioritized eight projects linked to SLM.

With support from the GEF/WB SLMP (2006 to 2013), a total of 7684.3 ac of vulnerable land was brought under SLM to mitigate land degradation, increase agriculture production, and contribute to reducing climate change impacts and enhancing ecosystem services. Within different SLM pilot Districts, about 2948.3, 2187.7, and 2548.3 ac of vulnerable land area was brought under SLM in Chukha, Trashigang, and Zhemgang Districts, respectively. With regard to the overall area under different SLM measures in the nine SLM pilot Gewogs (blocks), area under Community Forest (CF) was largest (4964.3 ac) followed by area under tree plantation (1210.4 ac), hedgerows (338.5 ac), orchards (364.5 ac), stone bunds (323.6 ac), bamboo plantation (237.6 ac), bench terracing (161.8 ac), critical water source protection (62.2 ac), and check dams (21.3 ac). Further, the SLMP also supported other SLM related activities such as renovation of irrigation channels, construction of cattle and poultry sheds, supply of seeds and seedlings (vegetable, cereal and fruit tree) and breeding bulls to improve rural livelihoods and also as incentives to take up SLM activities.

While mapping SLM activities, the study also assessed the present status and performance of different SLM measures in mitigating land degradation, improving soil quality, easing workability, and enhancing rural livelihoods. In general, it was found that most of the SLM measures, implemented by the SLMP, are doing well. Having said this, there are also some issues that need to be addressed to ensure the sustainability of SLM activities in the future.

Numerous policies, plans, legislations and guidelines exist that provide abundant context and guidance to stakeholders for addressing land degradation if implemented in a coordinated and effective manner. Notwithstanding the supportive policies and legislations to deal with climate change, particularly land degradation, Bhutan still suffers from resource limitations that are critical for addressing land degradation and other climate change effects. Establishment of an Endowment Fund is deemed to be the most appropriate response in this regard.

Mainstreaming SLM into national developmental plans, accessing climate funds and establishing endowment funds to sustain SLM activities is a common demand. Successive discussions, planning and documentation of mainstreaming SLM, Environment, Climate Change, Gender, and Disaster Risk Reduction is visible. The 11th Five Year Plan (11th FYP) and numerous reports as early as 2009 reflects efforts put in to mainstream these cross-sectorial factors. Only the implementation in reality seems to have taken longer time. In 11th FYP, Gross National Happiness Commission (GNHC) developed two frameworks for mainstreaming poverty, environment and climate change; (1) Framework to Mainstream Environment, Climate Change and Poverty concerns into the Eleventh Five Year Plan (2013-2018), and (2) Framework to Mainstream Gender, Environment, Climate Change, Disaster Risk Reduction and Poverty.

Socio-economic impacts of past SLM

From the SLM impact assessment, it is clear that farmers at the SLMP sites are aware of the importance and benefits of SLM in combating land degradation, increasing crop production, and enhancing ecosystem services. Although some farmers find it difficult to pinpoint the direct benefits of SLM, local perceptions about changing climate, its vulnerabilities and farmers' adaptive measures toward climate change are relatively good. In this regard, any future advocacy on SLM should be done with regard to land degradation, climate change, biodiversity conservation, and ecosystem services. From the assessment, it was also clear that the technical know-how of most of the farmers on SLM is moderately high and this could be attributed to the numerous SLM training and awareness programs supported by the SLMP. Further, the actual implementation of SLM measures in the field has also contributed to enhancing their knowledge and experience on SLM. However, there are farmers who would still require further sensitization and capacity building on SLM.

With regard to the benefits of SLM, almost all the participants of the workshops expressed that SLM has multiple benefits. They said that SLM might be the "silver bullet" to safeguard limited land resources by avoiding, reducing, and reversing land degradation. As such, it plays a pivotal role in achieving soil security, food and nutrition security, and water security. The participants also acknowledged and appreciated the benefits of various SLM measures implemented on their land, which included bench terracing, hedgerows, stone bunds, orchards, and bamboo plantation in reducing soil erosion, improving soil fertility, conserving soil moisture, easing workability, and improving rural livelihoods. Realizing the multiple benefits of SLM, the farmers mentioned that they would endeavour to scale-up SLM activities in the near future.

Wetland terracing, Orange orchard and agro-forestry has improved family income to many in Nangkor Gewog (block). Bamboo plantation in Radhi Gewog has not only stabilized the land but it has become a source of monetary income from sales of the Bamboo. Agriculture field stability and productivity increase is significant in Phuentsholing Gewog. Complimentary infrastructure development like access roads, bridges, irrigation drains, storage yards and marketing space through coordinated efforts will be cost-effective and efficient in project implementation.

The study also found that the farmers/SLM beneficiaries faced many challenges in implementing SLM activities. Some of the main challenges expressed included limited financial support, shortage of farm labour, small land holding, and human-wildlife conflicts among others. It was found that if SLM activities were to scale-up to prevent and or mitigate land degradation, increase resilience to climate change, and ensure continuous ecosystem services, all these SLM related problems should be adequately addressed. Without this, the study found that the desire for achieving food security, land degradation neutrality target and or maintaining the current status of a carbon neutral country could remain a farfetched dream for Bhutan.

Innovative Financing

Due to competing priorities of the government, such as education, healthcare, poverty, road, hydropower, tourism, etc., financial support to agriculture, particularly to land management has been limited. The government budget allocation for SLM interventions within the agriculture sector is also comparatively low as major portions are allocated for infrastructural development such as farm roads and irrigation channels.

Sustainable financing requires concerted collaboration, dialogue and consensus building. Policymakers and other leaders within a given sector must be able to rally a broad set of actors such as the private sector, CSO, farmers and everyday citizens. Finding meaningful ways to engage these actors together on sustainable financing encourages coherence, understanding and cross-fertilization between sectors, and hopefully generates better outcomes for all.

At the same time, Sustainable Land Management (SLM) is an obligatory need to fulfil all the three Rio Multilateral Environment Agreements (MEAs). Considering climate change is a causal factor for land degradation while biodiversity degradation and desertification are risks similar to land degradation, accelerated by climate change, opportunity must be availed to access climate funds for SLMPs. The United Nations Framework Convention on Climate Change (UNFCCC) has created more sources funding windows for combating climate change and enhancing developing countries capacity to build resilience to climate change impacts. The UNFCCC funding sources include Green Climate Fund (GCF), Adaptation Fund (AF) and Least Developed Countries Fund (LDCF) for NAPAs. Multinational institutions like GEF, World Bank and Asian Development Bank (ADB) also provide support for MEA related projects. Funds may be accessed for direct time- bound SLM projects or to establish an endowment fund within the country with institutions like BTFEC for continuous SLM support.

In order to ensure sustainable funding for SLM, to address farmers' vulnerabilities to climate change and adaptive measures, establishing an institution of US$ 15 million as an endowment fund is recommended. CIF, Global Environmental Facility (GEF) and Green Climate Fund (GCF) are identified as some potential funding sources. In addition to international sources, the government's contribution in establishment of the fund is deemed crucial. The objectives of fund are well aligned with Bhutan's global commitments including SDGs and establishment of the fund would have far reaching impact in addressing one of the most important national priorities of ensuring food security in the country. The Bhutan government's contribution to the fund would be the first step that signals the commitment and ownership of the government to address challenges related to climate change including land degradation.

With regard to source of fund, mobilization of fund from both external and internal sources will be crucial. Support of GEF and GCF in establishing fund is inevitable. BTFEC is eligible

for continued GEF funding for climate change, biodiversity, sustainable agriculture, and agroforestry and land restoration programs. The objectives of establishing the fund are also fully aligned with both the BTFEC Strategic Plan for 2015–2020 as well as the Green Climate Fund (GCF) investment priorities. A lesson learned from a visit to Indonesia, BTFEC in collaboration with GNHC and other relevant agencies in the country might explore possibility for Debt-for-Nature swap deal with international banks or other key developmental partners in Bhutan. BTFEC is already an accredited entity for Adaptation Fund (AF) and is in the process of getting accredited to Green Climate Fund (GCF). In coming years such accreditation has potential to boost confidence of other multilateral donors to work in partnership with BTFEC.

Studies also suggest that to promote better ownership and sustainability, farmers need to be encouraged to bear certain cost of SLMPs carried out in their land and the incentive package that is normally provided may be reviewed. This appears to be critical given the prevalence of high dependency syndrome among the beneficiaries of the erstwhile projects.

Challenges and Constraints on current SLM Practices

The importance of SLM and need understandings in the country elevated since the National Land Management Campaign initiated by the Ministry of Agriculture and Forests (MoAF) in 2005. Bhutan is vulnerable to several different types of natural disasters including earthquakes, flash floods, landslides, and glacial lake outburst flooding which pose varying degrees of threat to the lives and livelihood of its people. MoAF assessed the cause of devastating floods of the 2004 monsoon and found poor land management induced by climate change to be a prominent catalytic factor for the floods. Thereon the SLM campaign was initiated. SLM is expected to address almost all the challenges in a multi-tasking attempt, provided there is multi-stakeholder cooperation and coordination. The challenges of SLM therefore call for being more inclusive in planning and designing of the activities to consider beyond a direct agriculture land management techniques. Some of the prevailing challenges present today include:

- Lack of a coherent and comprehensive Climate Change Adaptation Strategy that covers SLM needs. Climate change being a pressing issue is undeniable. International agencies like the United Nations Development Programme (UNDP) have developed numerous guidebooks for preparing Low-emission climate resilient development strategies, formulating climate change scenarios to inform climate-resilient development strategies, blending climate finance through national climate funds. RGoB should utilize these guiding resources and develop a comprehensive climate change strategy focussing more on climate resilience and food security. SLM helps maintain soil fertility and productive land is key to maintain food security as the population increase and the negative impacts of climate change on cultivable land increase.

- Mainstreaming SLM into national developmental plans, accessing climate funds and establishing endowment funds to sustain SLM activities is a common demand. Successive discussions, planning and documentation of mainstreaming SLM, Environment, Climate Change, Gender, and Disaster Risk Reduction is visible. The 11th Five Year Plan (11th FYP) and numerous reports as early as 2009 reflects efforts put in to mainstream these cross-sectorial factors However, in reality, it seems that only the implementation has taken longer time, with documentation duplicating exercises. For 11th FYP, Gross National Happiness Commission (GNHC) developed two frameworks for mainstreaming poverty, environment and climate change; (1) Framework to Mainstream Environment, Climate Change and Poverty (ECP) concerns into the Eleventh Five Year Plan (2013-2018), (2) Framework to Mainstream Gender, Environment, Climate Change, Disaster Risk Reduction and Poverty (GECDP). It is not clear if either is effectively implemented.

- Although SLM activities have been relatively similar to climate change adaptation, at the moment, climate change resilience knowledge have not been highlighted. Bamboo plantation especially in Radhi Gewog has a visible success story in protecting the land erosion and generating cash income. Such examples are good example for replication of site-specific SLMP activities. Another good example of site-specific story is the stone bunds construction and Hedgerows plantation in Phuentsholing Gewog. The activities have been highly beneficial in stabilization of steep slope soil erosion.

Recommendations and Way forward

Bhutan is among the countries most vulnerable to climate change in the Asia-Pacific region because of its vulnerable mountain terrain and volatile ecosystems. The country is exposed to multiple hazards, in particular glacial lake outburst floods resulting from glacial melting, flash floods, landslides, windstorms, forest fires, localized changes in rainfall patterns and increasing droughts during dry season. Climate change is projected to significantly magnify the intensity and frequency of these hazards, as has already been evidenced by the glacial lake outburst flood of Lugge Tsho in 1994 and more recently the high intensity cyclone Aila which caused major damages in Bhutan in 2009. The National Adaptation Programme of Action, Second National Communication and National Human Development Report 2011 give an account of a number of recent, climate-related disaster events that have impacted national and local economies and livelihoods. It is more difficult to study and understand climatic characteristics in the mountains than in the plains due to the complexity of the topography features. Existing knowledge of the climatic characteristics of the Eastern Himalayas, including Bhutan is limited by both lack of long-term observation data and the limited theoretical studies done to understand complex interaction of spatial scales in weather and climate phenomena in mountains.

Sustainable Land Management (SLM) technology fits well in the mixed farming environment of Bhutan, particularly in Climate Change Adaptation Program (CCAP) area, as most of the

lands are sloppy. SLM is one of the climate change adaptation technologies that could be harnessed in order for remote communities to reduce their vulnerabilities and increase their coping strategies against climate change. To support the vulnerable communities in building their resilience to climate change through various adaptation measures, SLM should be mainstreamed into government's plans and policies and scaled up.

In order to facilitate scaling-up and ensure sustainability of SLM activities, the following recommendations are made:

- Since most of the SLM interventions take several years to reap the benefits, farmers do not have the means and interest or patience to scale-up SLM activities without any incentives. In this regard, farmers need to be incentivized, with cash or through supply of farm machines and seeds, wherever possible to encourage and support them to take up SLM activities.
- Inculcate a sense of ownership and responsibility among the farmers to take up SLM activities because at the moment they still feel that government will do everything for them.
- Due to infrastructure development activities such as schools, hospitals and roads, not much importance is given to SLM during the planning process. As such, only few SLM activities are included in the FYP. In this regard, there is a need to include mandatory SLM indicators in the FYP so that SLM activities are adequately incorporated.
- Since SLM activities are labour intensive, it is necessary to mechanize where possible (e.g. use of stone pickers for construction of stone bunds and spider machines to terrace the land). Further, the age-old tradition of labour sharing should be revived and adopted as it was proven effective in addressing farm labour shortage for SLM activities.
- Agriculture Land Development Guidelines (ALDG) 2017 should be followed to maintain uniformity in service to the farmers when it comes to hiring of machineries, compensation to the crop lost to climatic conditions and wildlife, or other standard of SLM activities in the country.
- SLM technologies and approaches should be considered as the part and parcel of the climate smart agriculture (CSA) because as of now, especially within the country, CSA seems to be focusing mostly on cropping systems, organic agriculture, etc.
- Needs assessment of SLMP interventions across the country and detailed cost estimates should be conducted and produced.
- The best option may be to create an endowment fund with USD 10 million until 2021 after which the fund becomes sinking fund that would be sufficient to cover financing of climate change activities for around ten years.
- While there are no imminent challenges found in establishing an endowment fund, securing a sustainable source of finance for capitalization will depend primarily on BTFEC's ability to raise initial capital from donors and RGoB.
- Possibility of incentivizing industries adopting environment-friendly technologies

with concessional rates may be explored. Close coordination and policy coherence between major stakeholders such as the RMA, NEC, GNHC, BTFEC and BCCI is crucial in this regard.

- To promote better ownership and sustainability, farmers may be encouraged to bear certain cost of SLMPs carried out in their land and the incentive package provided in terms of money may be reviewed. This appears to be critical given the prevalence of high dependency syndrome among the beneficiaries of the erstwhile project.

Based on the findings and lesson learned from this E&L study, the following policy actions should be considered:

- Development of comprehensive national land use policy, implementation of NAP for combating land degradation and increasing level of awareness on ALD guideline are some of the key measures to address mainstreaming issues.
- Urgent need to mainstream SLM into national plans and policies and SLM activities have to be reflected into annual plans and propose SLM activities for upcoming (current) 12 Five Year Plan (FYP). Similarly, a SLM management plan needs to be developed in all SLM sites in collaboration with the local beneficiaries and various developmental partners in ensuring sustainability of the SLM intervened sites.
- Capacity building for Local Government officials is one of the key measures in achieving SLM objectives. Through various workshops it was found that SLM would enhance community vitality through reviving community labour sharing mechanism. It also provides opportunity to land management as key to enhancing livelihood of both rural and urban population.
- In order to ensure sustainable funding for climate related mitigation measures including SLM, establishing an institution of US$ 15 million as an endowment fund is recommended.
- The study found that SLM offers an avenue for re-cultivation of fallow lands, and encourages farm mechanization, making farming attractive, thus curbing rural urban migration. It can also be a platform for encouraging implementation of climate smart agriculture. SLM is also vital for industries of national importance like hydropower and tourism.
- To move forward with SLM, rigorous awareness and advocacy at all levels of decision-makings is recommended.
- Establish demonstration sites in all 20 districts using existing farmers' groups or involving proactive citizens.
- Maintain a databank on SLM interventions across the country by a single agency. This would avoid duplication of the similar tasks by various agencies.
- Incorporate the short-term benefits in SLM techniques, as it would encourage the new SLM adopters.
- To achieve long-term goals SLM should be integrated with horticulture, improving market accessibility, mitigating human-wildlife conflicts, capacity building and sustainable financial supports.

Conclusion

Financing of any program is deeply dependent on priorities set by the policy makers. To be sustainable, it requires concerted collaboration, dialogue and consensus building. Policymakers and other leaders within a given sector must be able to rally a broad set of actors such as the private sector, CSO, farmers and everyday citizens. Finding meaningful ways to engage these actors together on sustainable financing encourages coherence, understanding and cross-fertilization between sectors to generate better outcomes for all.

Since SLM cuts across all sectors, achieving a desired level of collaboration and partnership with relevant agencies has been a challenge. Such challenges have impeded putting NAP into action. In recent years, low level of participation from livestock and forestry extension agents for SLM interventions have been noted.

It is still unclear which agency should take the lead in mainstreaming land management, as land is a cross-sector issue. Therefore, all land stakeholders such as National Land Commission, Ministry of Agriculture and Forests, Ministry of Works and Human Settlement, Ministry of Economic Affairs, GNHC should come together to discuss how land management should be taken forward. Farm labour shortage fuelled by rural-urban migration is a serious concern in successful implementation of SLM activities. Immediate intervention to address this issue is paramount. Lack of clear SLM or land use policy has been identified as a major challenge in mainstreaming it into government policies.

SLM plays key roles in achieving the national targets of reducing land degradation, increasing agriculture productivity and ultimately curbing rural-urban migration. MoAF have also proposed implementation of ALD guideline as a flagship programme in 12FYP for achieving the above-mentioned goals. Within ALD guideline, bench terracing was proposed as one of the key activities during 12 FYP. Main areas of mainstreaming SLM in 12 FYP can be in two key area results, areas of the plan namely: Enhance food and nutrition security; and Carbon neutral, climate & disaster resilient development enhanced.

Bhutan has also become a party to UNCCD's convention of Land Degradation Neutrality (LDN) and in order to fulfil the objectives, SLM activities in the country will be carried out as per the principles and guidelines of LDN. Three main indicators to be used for LDN are land productivity, Land Use Land Cover (LULC) change, and Carbon stock above/below ground.

SLM is key to increasing resilience to climate change, enhancing crop production, and ensuring continuous supply of ecosystem services, thus this evaluation and learning activity recommends instituting an endowment fund for climate resilience activities (including SLM) as a separate financing window under BTFEC. CIF, GEF and GCF, and other global agencies could be potential sources, with RGoB contributions found to be a critical co-funding source. There is also need for cost estimations for SLM interventions

across country. Yearly estimated cost would help to plan the sustainability of the fund use in coming years. In addition, the need to enhance livelihood of the local communities with SLM interventions is recommended to promote ownership of SLM sites.

A final recommendation is to mainstream SLM through the development of overarching land use policy that could be built on the existing legal frameworks like Land Act 2007 and Local Governance Act 2009. With national land use policy put in place, NSSC would then have a clearer picture as to how to take SLM forward, especially in the light of SLM mainstreaming, upgrading institutional set up, scaling up SLM beyond arable land, and securing financial resource.

CHAPTER 2

Documentation and Mapping of SLM activities under Trashigang, Chukha, and Zhemgang Dzongkhags

1. EXECUTIVE SUMMARY

Baseline information is crucial to facilitate efficient and effective monitoring and evaluation (M&E) of any activities. Further, it serves as baseline information to make informed decision for any future studies or activities. Recognizing the importance of having sound baseline information, the past sustainable land management (SLM) activities of the Global Environment Facility (GEF)/World Bank (WB) funded SLM Project (SLMP), implemented from 2006 to 2013, were documented and mapped. The SLMP activities were undertaken in nine pilot Gewogs under three Dzongkhags *viz*: Phuntsholing, Bongo, and Lokchina Gewogs under Chukha Dzongkhag; Radhi, Thrimshing, and Lumang Gewogs under Trashigang Dzongkhag; and Nangkor, Bardo, and Goshing Gewogs under Zhemgang Dzongkhag. The documentation and mapping of past SLM activities were done with the objectives to: i) establish SLM baseline data in the country; ii) use this information to assess SLM impacts; and iii) form sound basis to formulate innovative financing strategy to support future SLM activities in the country. This documentation and mapping exercise of past SLM activities was carried out with financial support from the Climate Investment Fund (CIF) Project which is implemented by the Bhutan Trust Fund for Environmental Conservation (BTFEC).

The mapping of past SLM activities was done in close consultation with the SLMP beneficiaries using Google Earth Image (GEI) - Version 7.1.8.3036 (https://www.google.com/earth/download/ge/ - accessed on 20th September 2017) in the Geographic Information System (GIS) environment. This was made possible due to readily available GEI with high spatial and temporal resolution which enabled the farmers to demarcate their SLM sites very easily and accurately on the computer screen. As a result, it saved a lot of time in mapping and also reduced fieldwork for ground truthing exercise. Thus, the GEI should be used along with GIS to map any future SLM activities. Along with the mapping of SLM activities, an attempt was made to have some insight on the impacts of SLM on land degradation mitigation, soil quality improvement, and rural livelihood enhancement through farmer's interview and focus group discussion (FGD) using a simple semi-structured questionnaire.

With support from the GEF/WB SLMP (2006 to 2013), a total of 7684.3 ac of vulnerable land was brought under SLM to mitigate land degradation, increase agriculture production, and contribute to reducing climate change and enhancing ecosystem services. Within different SLM pilot Dzongkhags, about 2948.3, 2187.7, and 2548.3 ac of vulnerable land area was brought under SLM in Chukha, Trashigang, and Zhemgang Dzongkhags, respectively. However, with regard to the overall area under different SLM measures in the nine SLM pilot Gewogs, area under CF was largest (4964.3 ac) followed by area under tree plantation (1210.4 ac), hedgerows (338.5 ac), orchards (364.5 ac), stone bunds (323.6 ac), bamboo plantation (237.6 ac), bench terracing (161.8 ac), critical water source protection (62.2 ac), and check dams (21.3 ac). Further, the SLMP also supported other SLM related activities such as renovation of irrigation channels, construction of cattle and poultry sheds, and supply of seeds and seedlings (vegetable, cereal and fruit tree) and breeding bulls to improve rural livelihoods and also as incentives to take up SLM activities.

From the preliminary SLM impact assessment, it is quite clear that farmers at the SLMP sites are well aware of the importance and benefits of SLM in combating land degradation, increasing crop

production, and enhancing ecosystem services. Although some farmers find it little difficult to pinpoint the direct benefits of SLM in mitigating climate change, they do understand that SLM has a great potential to increase their resilience to climate change. From the assessment, it was also clear that the technical know-how of most of the farmers on SLM is moderately high and this could be attributed to the numerous SLM training and awareness programs supported by the SLMP. Further, the actual implementation of SLM measures in the field has also contributed to enhancing their knowledge and experience on SLM. However, there are farmers who would still require further sensitization and capacity building on SLM.

With regard to the benefits of SLM, almost all the participants expressed that SLM has a multiple benefits. They said that SLM might be the "silver bullet" to safeguard our limited land resources by avoiding, reducing, and reversing land degradation. As such, it plays a very pivotal role in achieving soil security, food and nutrition security, and water security. The participants also acknowledged and appreciated the benefits of various SLM measures implemented on the their land which included bench terracing, hedgerows, stone bunds, orchards, and bamboo plantation in reducing soil erosion, improving soil fertility, conserving soil moisture, easing workability, and improving rural livelihoods. Realizing the multiple benefits of SLM, the farmers mentioned that they would endeavour to scale-up SLM activities in the near future.

However, the participants shared that they are faced with many challenges in implementing SLM activities. Some of the main challenges expressed included limited financial support, shortage of farm labour, small land holding, and human-wildlife conflicts among others. It was mentioned that if SLM activities were to scale-up to prevent and or mitigate land degradation, increase resilience to climate change, and ensure continuous ecosystem services, all these SLM related problems need to be adequately addressed. Without this, the participants felt that the desire for achieving food security, land degradation neutrality target and or maintaining the current status of a carbon neutral country could remain a farfetched dream for Bhutan.

2. INTRODUCTION

Bhutan lies in the foothills of the Eastern Himalayas with a total land area of about 38,394 km^2. Because of its rugged terrain, the altitude ranges from about 900 m to about 7750 m above mean sea level within a short distance of about 200 km. As such, there are several distinct agro-ecological zones with very rich biodiversity. About 70% of its total area is under forest (LCMP 2010) and this is very much in line with the constitutional requirement of maintaining 60% of its total area under forest for all times to come. However, the arable land is estimated to be less than 8% due to its rugged terrain and extreme climatic conditions. The cultivated agriculture land is even less constituting only about 3% of the total area (LCMP 2010) despite 58% of its total population depending on agriculture for their livelihoods. As expected, most of the agriculture lands are located on steep slopes which, by international standards, are marginal lands unsuitable for farming. However, farmers in Bhutan have not much choice than to cultivate on such slopes for their livelihoods.

On the other hand, the pressure on limited agriculture land is mounting with increase in human population and rapid socio-economic development taking place in the country. There is a huge demand

for land by various sectors, which not only reduce the size of the existing agriculture land but also decrease the overall land productivity and its functions to provide various ecosystem services through unsustainable management practices. To further aggravate the situation, adverse impacts of climate change have accelerated soil erosion and other forms of land degradation, thereby, decreasing the land productivity. With climate change, frequent and severe weather events are inevitable directly impacting crop production through outbreaks of pest and diseases, increased land degradation, water scarcity, and rapid mineralization of soil organic matter.

It is now widely recognized that emission of greenhouse gases (GHG), causing climate change/global warming, is one of the most pressing environmental concerns or challenges faced today. The resilience of many ecosystems will, very likely, be threatened by unprecedented impacts of climate change, such as, flash floods, drought, wildfire, pest and disease outbreaks, land use land cover (LULC) change, pollution, fragmentation of natural systems, and overexploitation of land and land-based natural resources (IPCC 2007). This will be more so for the people living in mountainous countries as the impacts of climate change will be relatively high in such areas. Further, the Intergovernmental Panel for Climate Change (IPCC) reports also claim that the adaptive capacity against climate change is comparatively low in developing countries than in developed countries (IPCC 2007). In short, developing and mountainous countries, such as Bhutan, are more vulnerable to climate change. It is estimated that, due to climate change, crop production under rain-fed system would significantly decrease by almost up to 50%.

To this end, there is a clear need to sustainably manage our limited land resources to be more resilience to land degradation, climate change, and biodiversity loss. The way forward for this is to go for SLM to enhance food and nutrition security, water security, and ecosystem services. SLM (technologies and approaches) is the only effective method prescribed by the United Nations Convention to Combat Desertification (UNCCD) to combat land degradation or desertification. The impacts of implementing SLM is mainly through improving the soil quality, mitigating land degradation, and reducing GHG emission. In pursuit of combating land degradation and mitigating climate change, the Ministry of Agriculture and Forests (MoAF), Royal Government of Bhutan (RGoB) implemented various SLM programs and projects since the advent of the country's Five Year Plans (FYP) in the early 1960s. However, these SLM activities were carried out in small and isolated areas and as such did not have much visible or effective impacts on the ground.

Hence, in 2006, a six year SLMP funded by the GEF/WB was implemented in three pilot Dzongkhags covering nine Gewogs as its pilot sites. The overall budget for the project was US$ 7.69 million. The project was implemented with the following main objectives to: i) implement appropriate SLM technologies and approaches to combat land degradation, enhance rural livelihoods, and build both human and institutional capacities to anticipate and handle land degradation problems and issues. Around same time as the SLMP, a GEF/UNDP medium sized project on "Building Capacity and Mainstreaming Sustainable Land Management (SLM) in Bhutan" was also implemented with a funding support of US$ 0.5 million. Through this project a National Action Program (NAP) to combat land degradation was produced for the country in order to guide SLM activities by different sectors within and outside the MoAF. Although SLM activities were successfully implement in all the nine

pilot Gewogs with visible impacts on the ground, proper documentation and mapping of these activities and sites could not be done largely due to lack of budget and expertise at the National Soil Services Centre (NSSC). As such, the area, extent, and location of these SLM activities are not clearly documented and mapped for wider use and in particular for making informed decisions on future SLM activities.

In this context, the BTFEC is exploring the feasibility of establishing an endowment fund to support future SLM activities to enhance resilience of people and land to climate change through the CIF Project. For this, a detailed impact assessment of past SLM activities needs to be done to have a better understanding of the cost-benefit of SLM activities. In order to facilitate this impact assessment, the NSSC under the Department of Agriculture (DoA) was requested to document and map all the SLM activities in the nine SLMP sites. The documentation and mapping of SLM activities in the nine SLMP Gewogs, under three Dzongkhags, were carried out from 25th September to 29th October 2017 followed by a four day write-shop for data analyses and report writing (Annex 3).

An effort or an initiative such as this made by the BTFEC would undoubtedly be of an immense benefit to a country like Bhutan where the limited land resource is constantly being put under pressure from rapid developmental activities, increasing population, and climate change. Where, 58% of the total population of the country still derives its livelihood from agriculture activities and the majority of them subsisting on small land holdings of less than a hectare on average. Further, as a land locked country, achieving food self sufficiency and security has always been a priority for the country.

3. AIMS & OBJECTIVES

The overall aim of this exercise was to establish a baseline data on SLM activities so that informed decision could be made by the planners and policy makers with regard to SLM activities in the country. At the moment, due to lack of such information, SLM activities are carried out mostly on an *ad-hoc* basis without much visible impact on the ground. In an attempt to address this limitation, the SLM activities in the nine SLMP sites were documented and mapped with the following objectives:

- To take stock of past SLM activities through participatory GIS mapping in nine SLMP sites under three Dzongkhags;
- To provide a baseline information to help assess the impacts of SLM activities on land degradation mitigation, rural livelihood enhancement, and climate change resilience;
- To briefly assess the impacts of SLM activities in combating land degradation, improving soil quality, increasing crop production, and increasing the ease of workability; and
- To contribute in exploring the possibility of establishing innovating financing mechanism for future SLM activities.

4. EXPECTED OUTPUTS

Some of the key outputs of this exercise are:

- SLM activities in nine SLMP sites documented and maps produced using GIS;
- SLM documentation report and GIS maps formed the basis for SLM impact assessment;

- Preliminary impact assessment of SLM activities carried out; and
- Recommendations provided to make SLM interventions more effective and sustainable.

5. MATERIALS & METHODS

5.1 SLM Pilot sites

The six year GEF/WB funded SLMP was implemented in nine Gewogs under three Dzongkhags from 2006 to 2013 with one year at no-cost extension. The three pilot Dzongkhags i.e. Chukha, Trashigang, and Zhemgang were selected from 17 other Dzongkhags based on the degree and prevalence of land degradation, extent of poverty, and unsustainable land management practices. Further, these three Dzongkhags are representative of different regions across the country with unique land degradation problems. During the first three year of the SLMP, only one Gewog was selected in each pilot Dzongkhag to implement the SLM activities i.e. Phuntsholing Gewog under Chukha Dzongkhag, Radhi Gewog under Trashigang Dzongkhag, and Nangkor under Zhemgang Dzongkhag. However in the fourth year, two additional Gewogs were selected from respective pilot Dzongkhags to scale-up the SLM activities and lessons learned during the first three years of project implementation. In this regard, Lokchina and Bongo Gewogs under Chukha Dzongkhag, Thrimshing and Lumang Gewogs under Trashigang Dzongkhag, and Bardo and Goshing Gewogs under Zhemgang Dzongkhag were selected (Fig. 5.1.1).

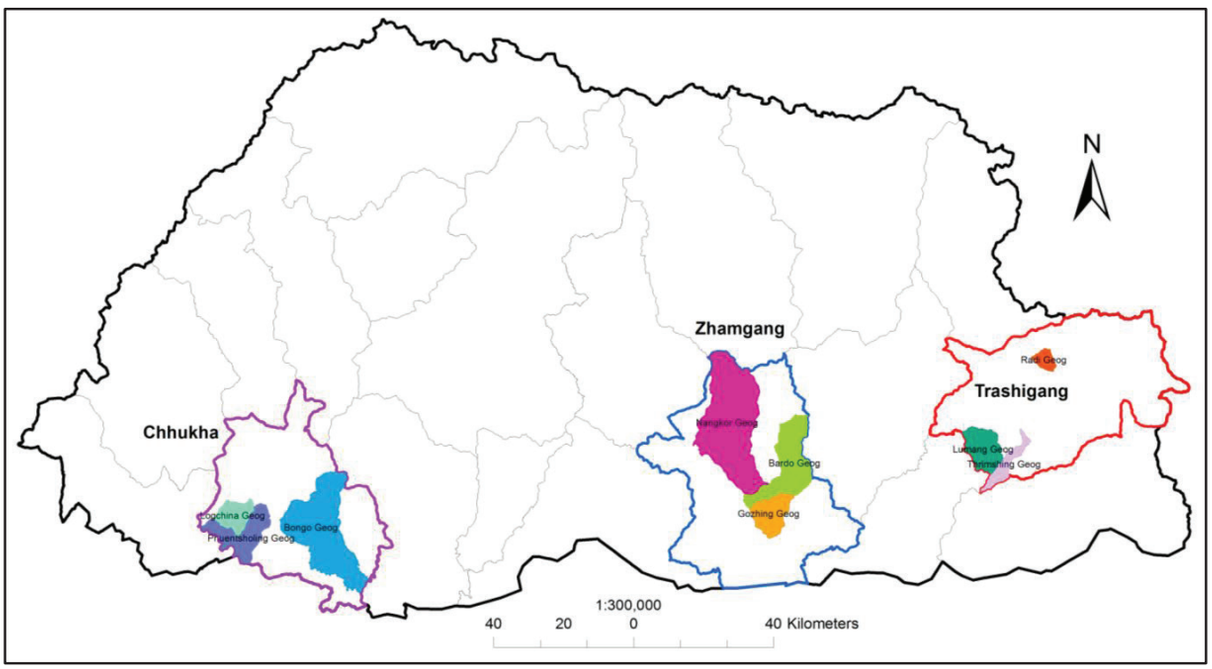

Figure 5.1.1 Location map of SLMP Gewogs under three Dzongkhags.

As summarized in Table 5.1.1, each SLMP site has specific land degradation problems. For instance, Radhi Gewog is known as the rice bowl of the east with lots of paddy fields. However, due to improper water management and unstable geology, the whole slope of Radhi is slowly sliding down hill. If no

action is taken on time to stabilize the slopes, the rice bowl of the east would be lost forever due to land degradation. Likewise, Thrimshing Gewog also shares the same problem with Radhi Gewog though it may not be as severe as that in Radhi Gewog. Its unstable geology, poor water management, and unsustainable land management practices pose a huge land degradation risk in Thrimshing. On the contrary, Lumang Gewog is fairly stable except for few localized sites with deep seated massive movements e.g. Tsho Gonpa. Nonetheless, it is one of the least developed Gewogs in the Dzongkhag with most of its people living below the national poverty line.

Phuntsholing Gewog under Chukha Dzongkhag is also prone to massive landslides due to unstable geology, unsustainable land management, poor soil quality, and high precipitation. In addition to this, the Gewog falls within the major Thrust Zones and this makes it even more susceptible to land degradation. With regard to Bongo and Lochina Gewogs, shifting cultivation is still practiced despite it being illegal. Because of this, the two Gewogs were selected as SLMP sites to discourage farmers from practicing shifting cultivation and promote SLM to better manage their fragile slopes.

The three SLMP sites under Zhemgang Dzongkhag do not have any major land degradation issues due to its good forest cover and natural environment. However, shifting cultivation is also practiced in the Dzongkhag which undermines its effort to conserve its good environment. Further, Zhemgang is considered as one of the least developed Dzongkhags in the country with most of its people living below the national poverty line and living in far flung areas. Because of all these reasons, the Dzongkhag was included as one of the pilot Dzongkhags of the SLMP.

Table 5.1.1 Site information of the nine SLMP Gewogs.

SLM Pilot Gewog	Area (km^2)	Altitude (m)	Forest cover (km^2)	Agri. Land (km^2)	Major crop grown	Land degradation type	Incidence of poverty
Radhi	28.58	1100-2900	14.14 (50%)	8.78 (31%)	Paddy & maize	Deep seated movement plus gullies	Low
Lumang	105.69	900-3000	94.93 (90%)	4.96 (5%)	Maize	Localized deep seated movement plus surface erosion	High
Thrimshing	53.63	1000-3200	45.46 (85%)	3.55 (7%)	Maize & paddy	Deep seated movement plus surface erosion	Moderate
Phuntsholing	133.55	200-2300	98.80 (74%)	14.78 (11%)	Maize, paddy & orchard	Deep seated movement plus surface erosion	Moderate
Bongo	399.37	200-1400	342.52 (86%)	7.65 (2%)	Maize, paddy & orchard	Surface erosion	Moderate
Lokchina	71.92	400-2500	55.89 (78%)	10.26 (14%)	Maize & orchard	Surface erosion	High
Nangkor	492.56	300-4500	428.49 (87%)	4.51 (1%)	Maize, paddy & citrus	Surface erosion	Moderate
Bardo	209.69	200-3400	153.47 (73%)	6.82 (3%)	Maize & paddy	Surface erosion	High
Goshing	99.12	100-2400	84.03 (85%)	5.08 (5%)	Maize & orchard	Surface erosion	High

5.2 Mapping of SLM activities

The main objective of this exercise was to document and map the past SLM activities in order to establish a baseline information on SLM. The baseline information is expected to facilitate in assessing the SLM impacts on mitigating land degradation, enhancing rural livelihood, building resilience to climate change, and ensuring continuous ecosystem services. The mapping was done using high resolution GEI that is freely available online. Since all these SLM activities were implemented between 2006 and 2013, most of them could be clearly seen on the GEI. In addition, past SLM reports were referred to find out what type of SLM interventions were undertaken at each site.

Using the GEI - Version 7.1.8.3036 (https://www.google.com/earth/download/ge/ - accessed on 20th September 2017), on-screen digitization of SLM activities was done in consultation with the past Gewog SLM Planners, Gewog RNR staff, local leaders, and SLM adopters. Because of the high spatial and temporal resolution of the GEI, the participants were able to identify the exact location and type of SLM activities carried out in their respective Gewogs. After mapping the SLM activities on-screen, ground truthing was carried out in selected areas to assess the mapping accuracy. However, some of the SLMP sites did not have high resolution GEI e.g. Goshing Gewog. In such cases, on-screen digitization of SLM activities was not possible and, instead, hand-held GPS was used to get the area and location of the SLM activities. GPS tracks were then downloaded in Google Earth and crosschecked whether the field data matched with the Image. After confirming, the data from the Google Earth was exported into the GIS environment to produce SLM maps.

5.3 SLM impact assessment

Although SLM impact assessment was not the main focus of this study, it was decided to carry out to have some insights on its impacts. This is a preliminary impact assessment and may not cover all aspects of SLM with regard to land degradation, climate change, biodiversity, and ecosystem services. Therefore, the findings from this assessment should be used in conjunction with the findings from the other in-depth assessment done by the local consultant.

A semi-structured questionnaire was used followed by a focus group discussion (FGD) to assess the SLM impacts. The questionnaire was basically structured to collect some of the key information including: i) farmers' perception on land degradation, its causes and impacts, and measures to mitigate them, ii) type of SLM activities carried out during the SLM Project period, iii) whether these SLM activities have been scaled-up, iv) impacts of SLM measures in mitigating land degradation, improving soil quality, increasing crop production, etc., v) challenges faced while implementing SLM activities, vi) future plans to take up SLM activities, and vii) recommendations to successfully scale-up SLM activities in the country (Annex 1).

The FGD was done by splitting the participants into two groups with equal number of male and female participants wherever possible. The two groups deliberated principally on two main topics i.e. importance and benefits of SLM and the way forward for SLM to make it more sustainable and effective in addressing issues pertaining to land degradation, national food security, climate change, biodiversity, and ecosystem services in the country. After the group work, representatives from each group made a presentation and their answers were compared and merged together after reaching consensus among the group members.

6. FINDINGS

Through the support from SLMP, both short-term and long-term SLM interventions were carried out in the nine SLMP sites. Short-term SLM interventions, such as, supply of vegetable seeds, construction of cattle and poultry sheds, and establishment of tree nurseries, etc. were geared towards increasing cash income for the farmers to enhance their livelihoods. On the other hand, long-term SLM interventions, such as, construction of terraces and contour stone bunds, establishment of hedgerows and community forests, renovation of irrigation channels, and critical water source protection were carried out to

reduce land degradation, enhance crop production, and contribute to reducing climate change and enhancing ecosystem services. As it is obvious from the name itself, the short-term SLM interventions took relatively less time to reap the benefits out of it as opposed to long-term SLM interventions which take about 3-4 years to benefit the land owners. However, the long-term SLM interventions have more visible impacts on the ground and are, therefore, more effective in mitigating land degradation, reducing climate change, and enhancing ecosystem services. Nevertheless, to encourage farmers to take up long-term SLM interventions successfully, short-term SLM interventions are very necessary. Therefore, during the SLMP period, every effort was made to strike a balance between short-term and long-term SLM interventions so that farmers' immediate needs were fulfilled while at the same time have more visible impacts on the ground to address land degradation, climate change, and ecosystem services. However, in this study, only the long-term SLM interventions have been documented and their impacts assessed. The information on the short term income generating support provided by the Project can be found in the past documents of the project. Besides implementing various SLM measures on the ground and providing short term income generating assistance, the approach especially the SLM planning methodology has been an important outcome of the SLMP. A comprehensive and an effective SLM Planning manual was developed, promoted and encouraged to be used for any natural resources management programs.

6.1 Mapping of SLM activities

The SLMP supported different types of SLM measures in its nine pilot sites to mitigate land degradation, increase crop production, enhance rural livelihoods, reduce climate change, and enhance ecosystem services. Some of these SLM measures include: bench terracing, orchard terracing, alley cropping (hedgerows), contour stone bunds, orchard establishment, tree & bamboo plantation, bio-engineering measures (e.g. check dam), fodder development, irrigation channel renovation, water source protection, and community forest establishment. Further, the Project also supported construction of improved cattle and poultry sheds, bee hives, and supply of improved breeding bulls in the SLM pilot sites.

In order to facilitate and encourage farmers to take up SLM activities, the SLMP provided a range of incentives. For instance, Nu. 10000/- and Nu. 3000/- were paid to the farmers to construct an acre of bench terraces and contour stone bunds, respectively. Further, planting materials for establishing hedgerows, orchards, and community forests, and construction materials for renovating irrigation channel, water source protection, and construction of check dams, improved cattle sheds, and poultry farm were also provided free of cost. In return, the SLM beneficiaries provided free labour to implement SLM activities at their respective sites.

The efforts and investments put in by the project have not gone in vain. All the SLM activities carried out by the project are very much there on the ground benefiting farmers in combating land degradation, increasing crop production, and enhancing rural livelihoods. As expected, SLM interventions undertaken at each pilot site are slightly different from each other due to the difference in land degradation problems and climatic regimes. Thus, a brief description of SLM activities carried out at each SLMP site in three Dzongkhags is given in the following sections.

6.1.1 SLM activities in three SLMP sites under Chukha Dzongkhag

Under Chukha Dzongkhag, a total of 2948.3 ac of vulnerable land has been brought under SLM with 165.4 ac under Phuntsholing, 1327.5 ac under Bongo, and 1455.4 ac under Lokchina Gewogs (Table 6.1.1). SLM interventions, such as, bench terracing, hedgerow establishment, bamboo and tree plantation, and water source protection are relatively done more under Phuntsholing Gewog than under Bongo and Lokchina Gewogs (Fig. 6.1.1 - 6.1.3). This is probably because the former is more feasible for these SLM interventions to combat land degradation, improve soil fertility, and enhance rural livelihoods. However, Lokchina Gewog has the largest area under contour stone bunds (147.62 ac) than under Phuntsholing and Bongo Gewogs due to the former's high prevalence of surface stones.

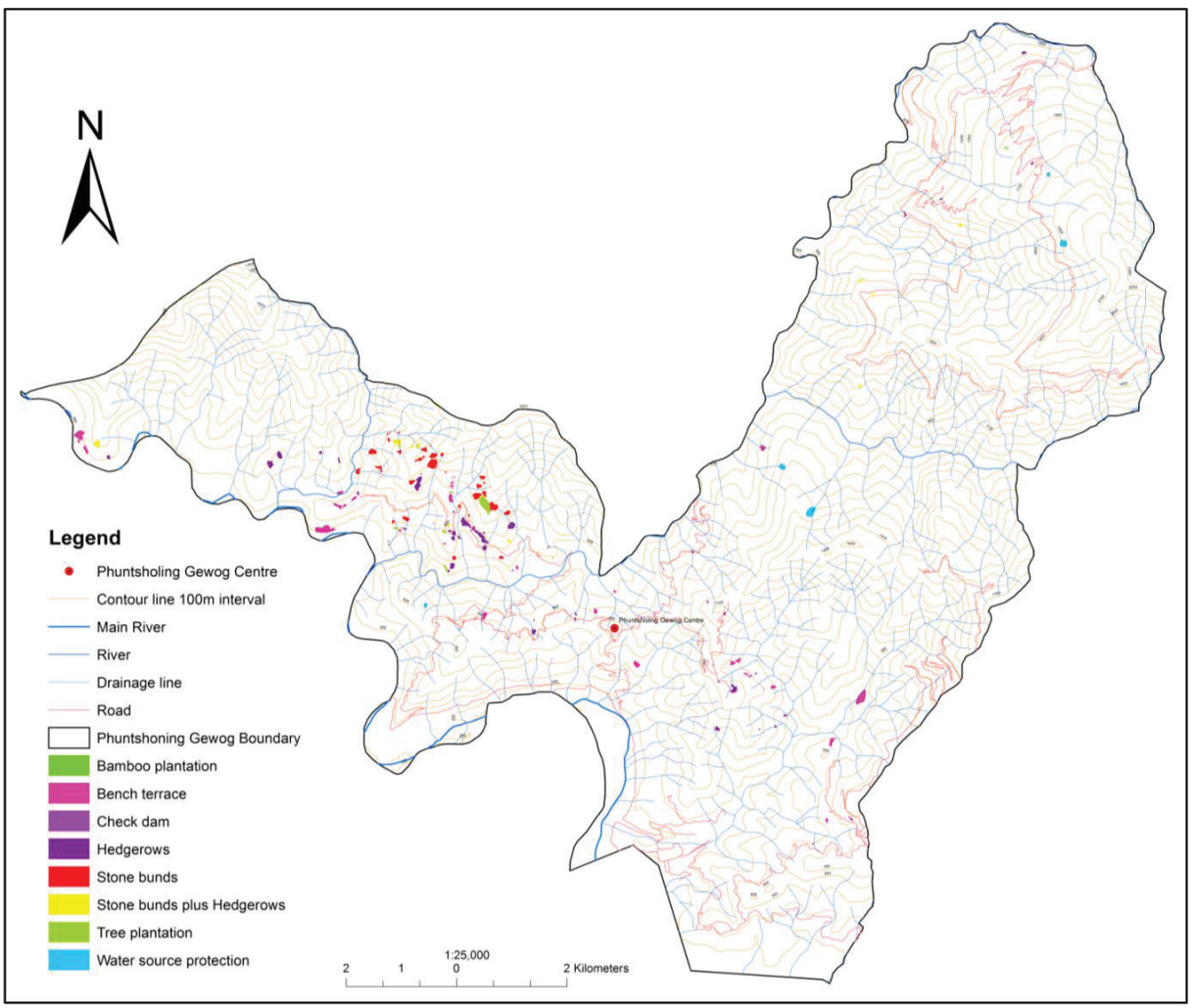

Figure 6.1.1 Map showing different SLM activities under Phuntsholing Gewog.

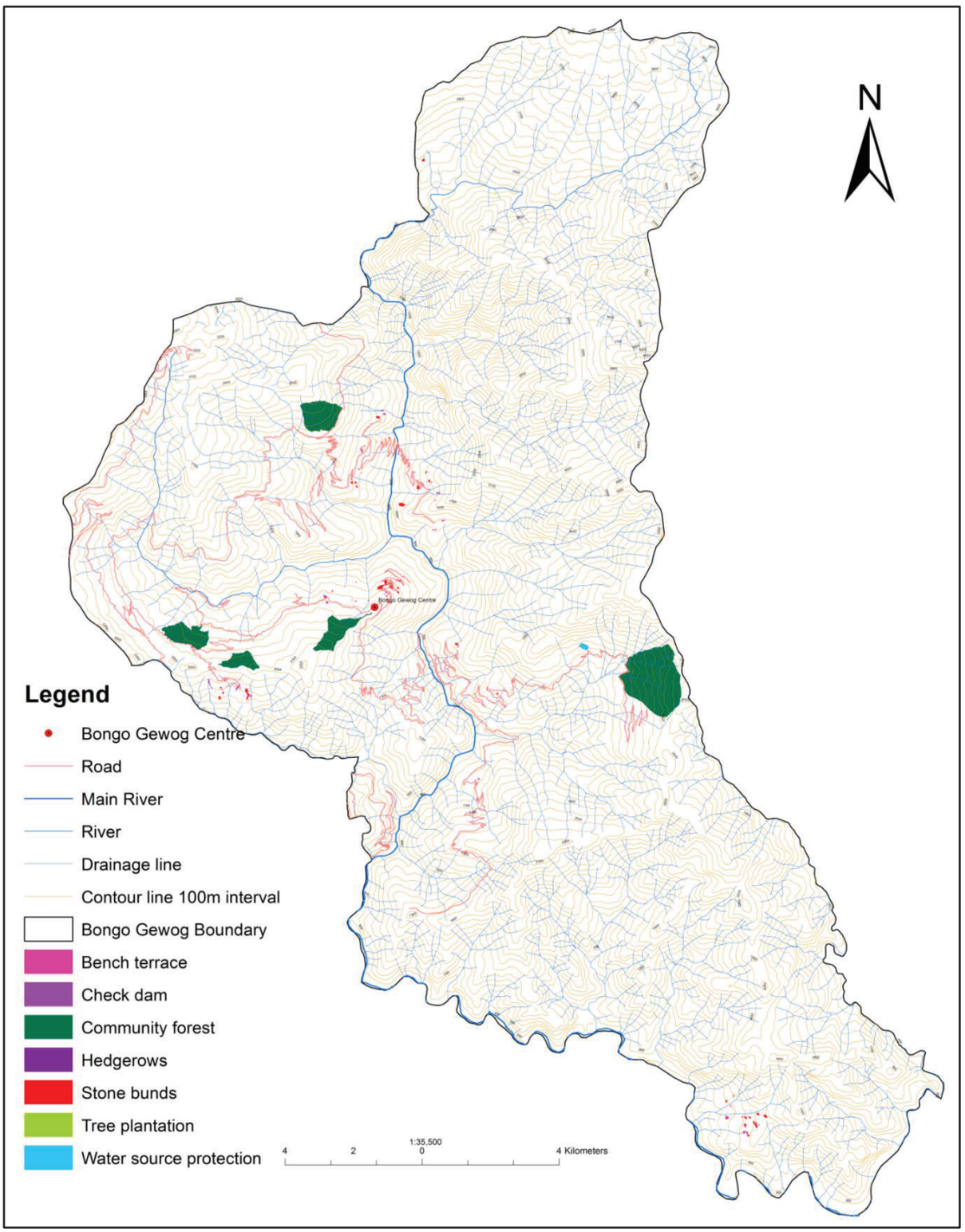

Figure 6.1.2 Map showing different SLM activities under Bongo Gewog.

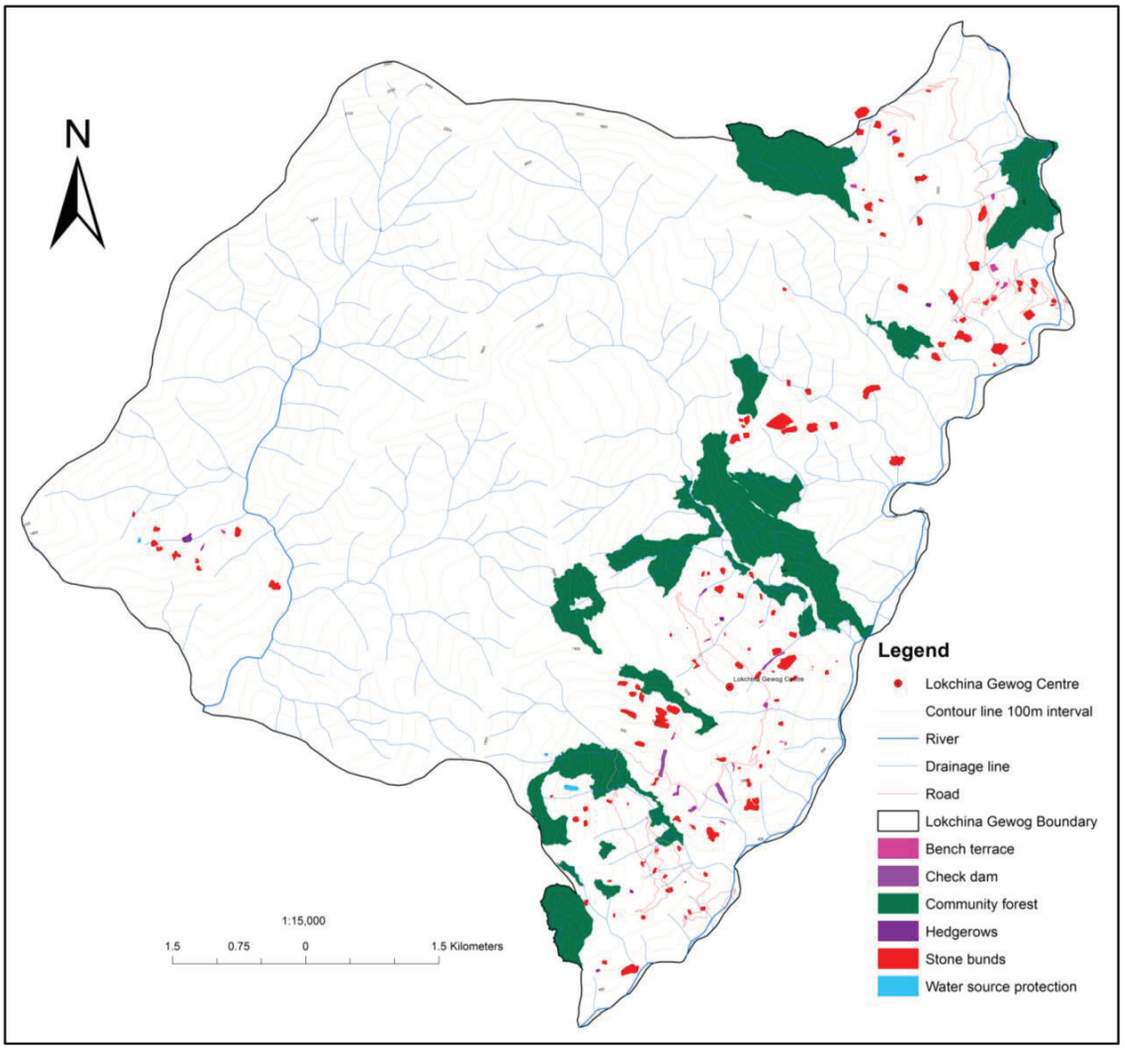

Figure 6.1.3 Map showing different SLM activities under Lochina Gewog.

Table 6.1.1 Summary of SLM activities under Phuntsholing, Bongo, and Lokchina Gewogs.

	Phuntsholing	Bongo	Lokchina	Total
SLM measure		**Area (ac)**		
Bench terrace	42.02	9.58	3.58	55.18
Hedgerows	42.87	0.21	4.37	47.46
Stone bunds	41.65	47.98	147.62	237.24
Stone bunds plus Hedgerows	12.50	0.00	0.00	12.50
Check dams	0.64	8.48	12.08	21.20
Bamboo plantation	0.45	0.00	0.00	0.45
Tree plantation	12.08	0.75	0.00	12.83
Community forest	0.00	1251.56	1285.05	2536.61
Water source protection	13.18	8.98	2.66	24.82
Total area (ac)	**165.38**	**1327.54**	**1455.36**	**2948.27**

6.1.2 SLM activities in three SLMP sites under Trashigang Dzongkhag

A total of 2187.7 ac of vulnerable land has been brought under SLM with 194.9 ac under bench terraces, 3.4 ac under contour stone bunds, 57.8 ac under orchards, 203.0 ac under bamboo plantation, 1155.5 ac under tree plantation, 37.2 ac under fodder grasses, 498.5 ac under community forest, and 37.3 ac under water source protection in the three SLMP sites of Trashigang Dzongkhag (Table 6.1.2). Except for the tree and bamboo plantations, and establishment of community forest, Radhi Gewog has the least SLM interventions compared to Lumang and Thrimshing Gewogs (Fig. 6.1.4 - 6.1.6). This is largely because the former has limited agriculture land for SLM interventions as most of them are under irrigated paddy. However, the Gewog has a huge degraded state reserve forest (SRF) where massive tree plantation (1127.5 ac) was done to stabilize it. With regard to other SLM interventions, Thrimshing Gewog has the maximum area under hedgerows (111.03 ac) while Lumang and Radhi Gewogs have the maximum area under orchard and bamboo plantation, respectively. A community forest (498.5 ac) is also been established in Radhi Gewog to sustainably harness its limited natural resources.

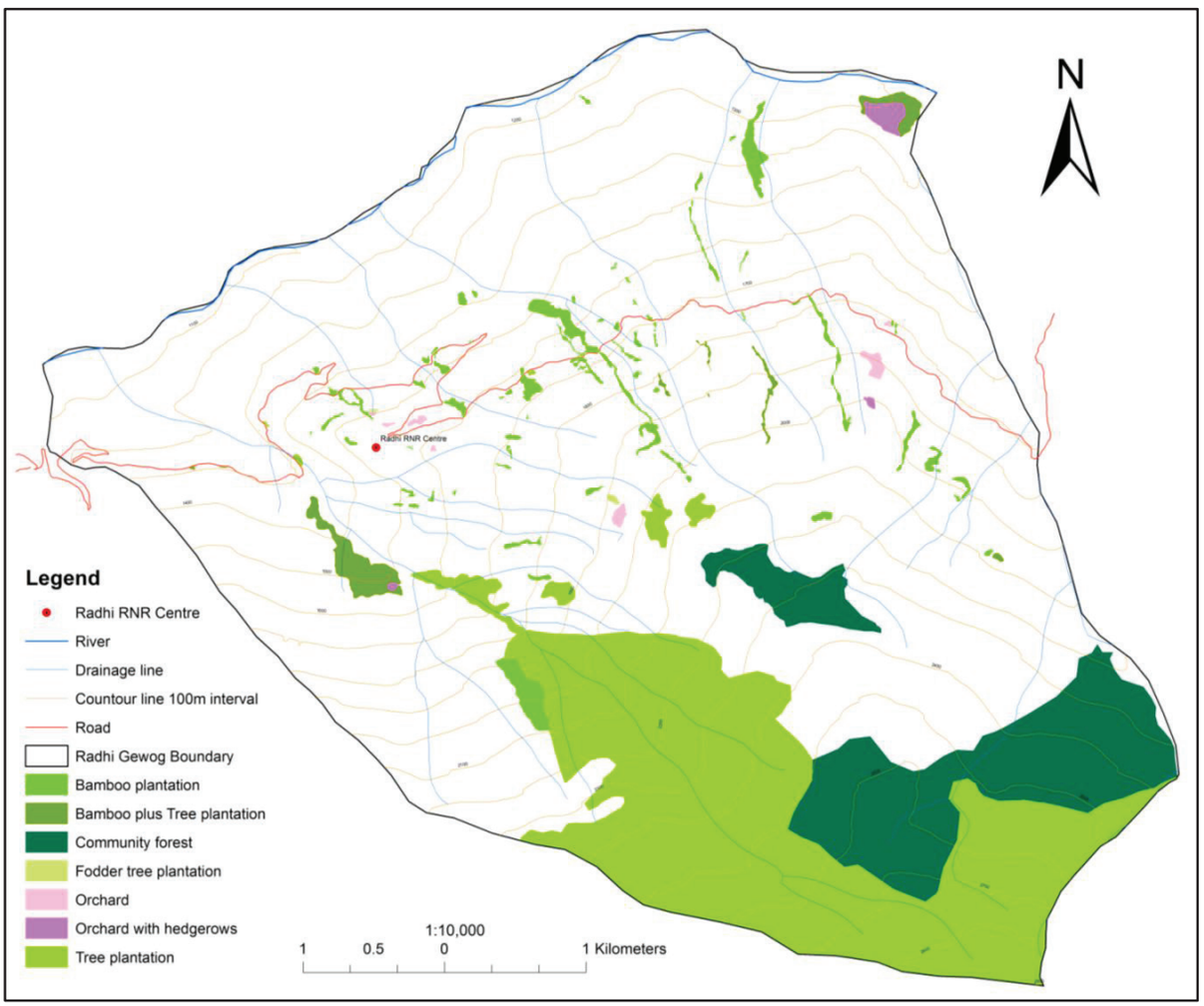

Figure 6.1.4 Map showing different SLM activities under Radhi Gewog.

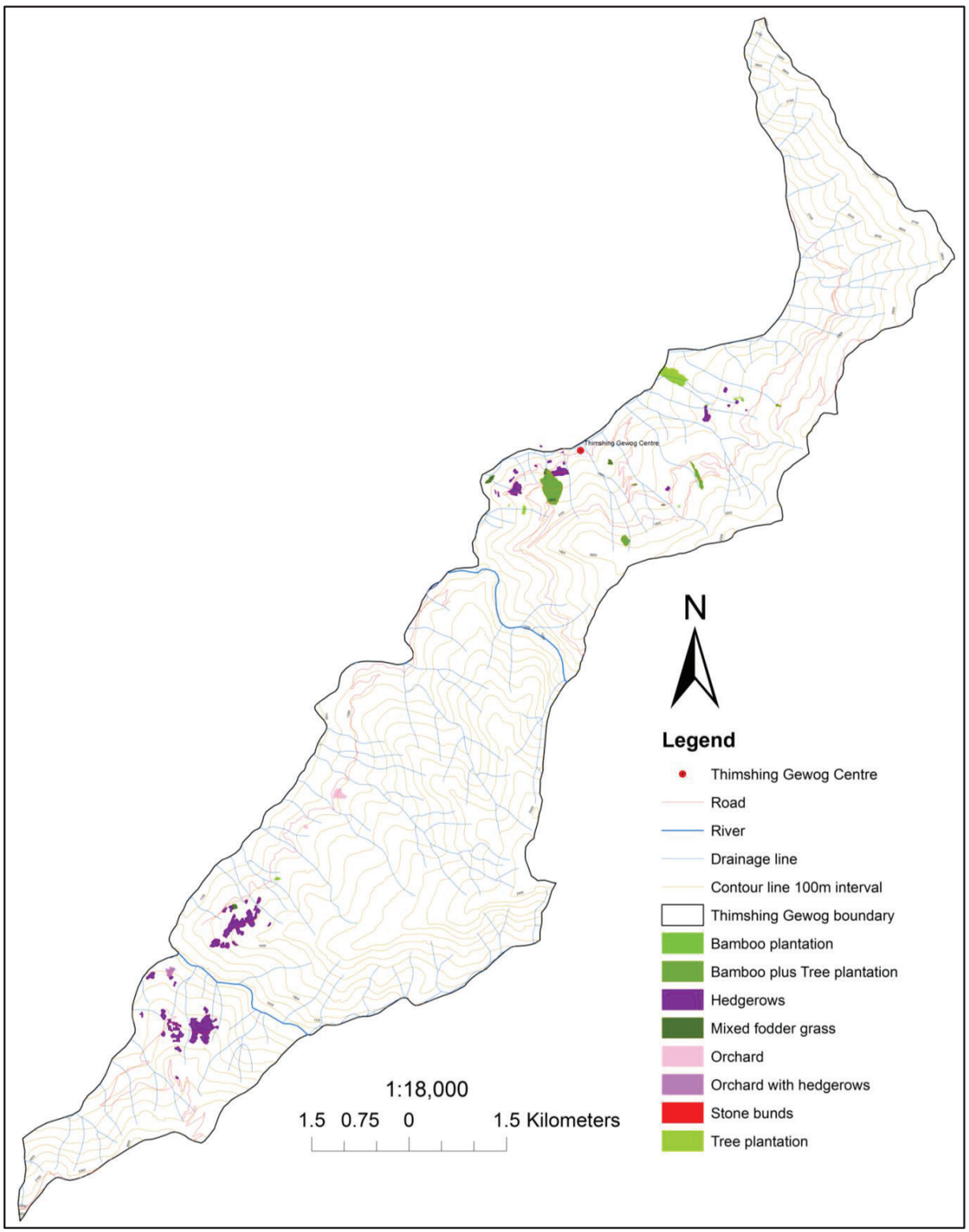

Figure 6.1.5 Map showing different SLM activities under Thrimshing Gewog.

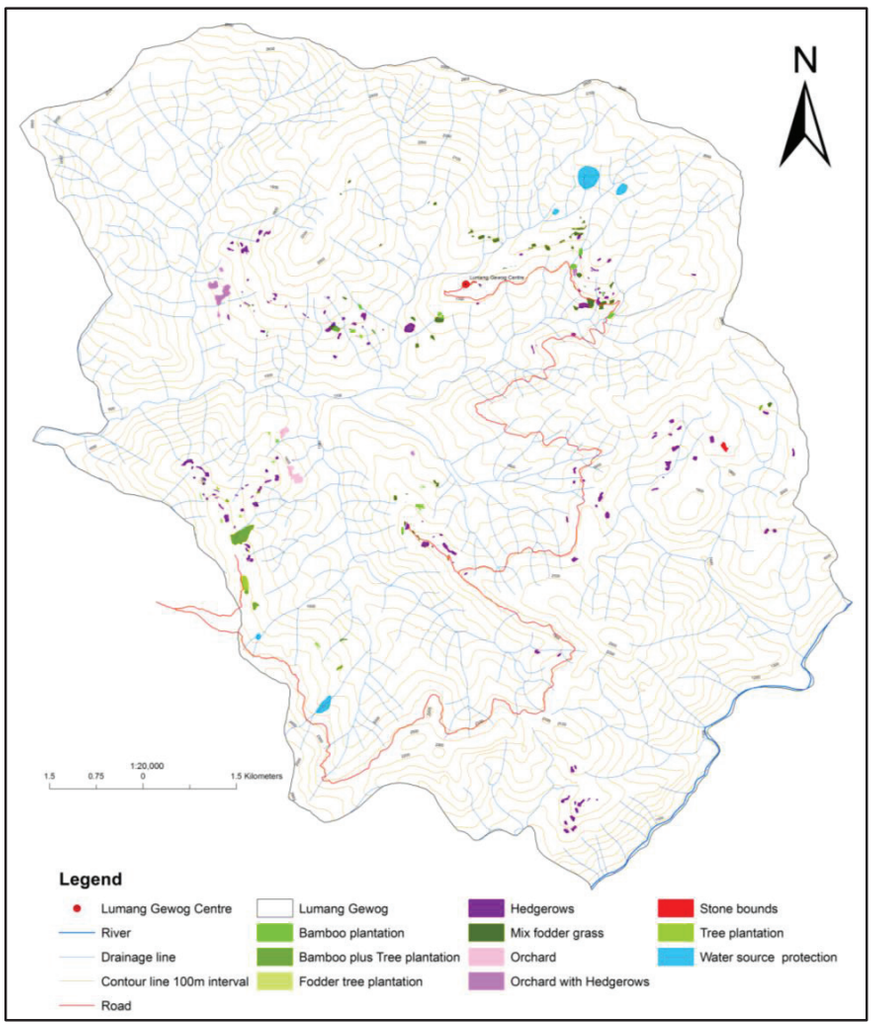

Figure 6.1.6 Map showing different SLM activities under Lumang Gewog.

Table 6.1.2 Summary of SLM activities under Radhi, Lumang, and Thrimshing Gewogs.

	Radhi	**Lumang**	**Thrimshing**	**Total**
SLM measure		**Area (ac)**		
Hedgerows	0.00	83.84	111.03	194.87
Stone bunds	0.00	2.12	1.29	3.41
Orchard	9.06	11.86	6.39	27.30
Orchard with hedgerows	11.85	15.17	3.51	30.53
Bamboo plantation	127.8	34.37	40.85	203.01
Fodder tree plantation	1.09	0.19	1.17	2.45
Tree plantation	1127.54	5.97	19.56	1153.07
Mixed fodder grass	0.00	32.02	5.18	37.20
Community forest	498.52	0.00	0.00	498.52
Water source protection	0.00	37.34	0.00	37.34
Total area (ac)	**1775.85**	**222.87**	**188.99**	**2187.72**

6.1.3 SLM activities in three SLMP sites under Zhemgang Dzongkhag

Similar to Chukha and Trashigang Dzongkhags, a total of 2548.3 ac of vulnerable land has been brought under SLM in Zhemgang Dzongkhag to combat land degradation, reduce climate change, and enhance ecosystem services (Table 6.1.3). Some of the major SLM measures implemented in the Dzongkhag include bench terracing (106.6 ac), hedgerows (96.2 ac), stone bunds (65.1 ac), orchards (301.0 ac), and bamboo plantation (34.2 ac) (Fig. 6.1.7-6.1.9). When compared among the three SLMP sites with regard to SLM measures, Nagkor Gewog has the maximum area under bench terrace (74.1 ac) and orchards (188.2 ac). Conversely, Gozhing and Bardo Gewogs have maximum area under hedgerows and stone bunds, respectively. Unlike in the other two Dzongkhags, the three SLMP sites of Zhemgang Dzongkhag have community forest to judiciously harness their natural resources.

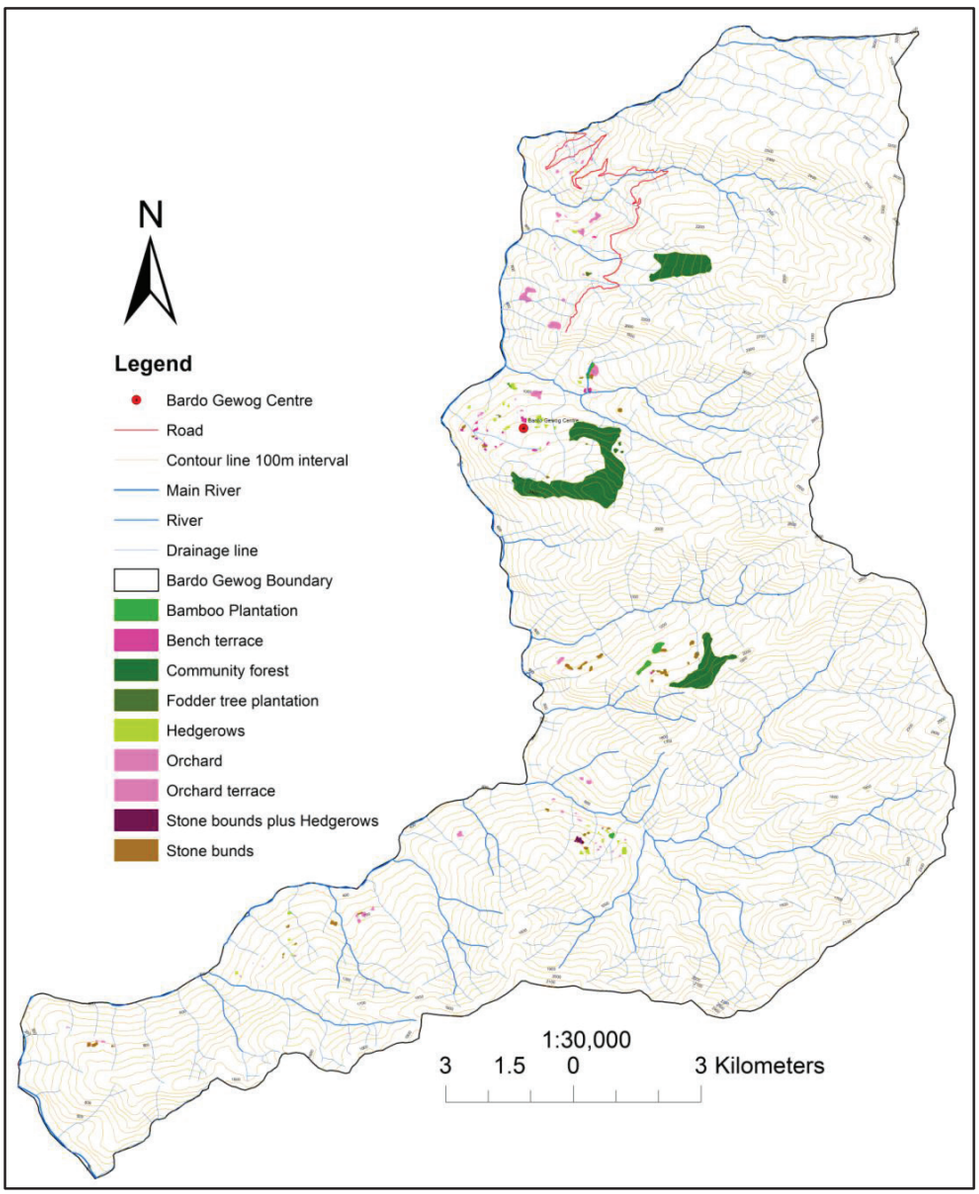

Figure 6.1.7 Map showing different SLM activities under Bardo Gewog.

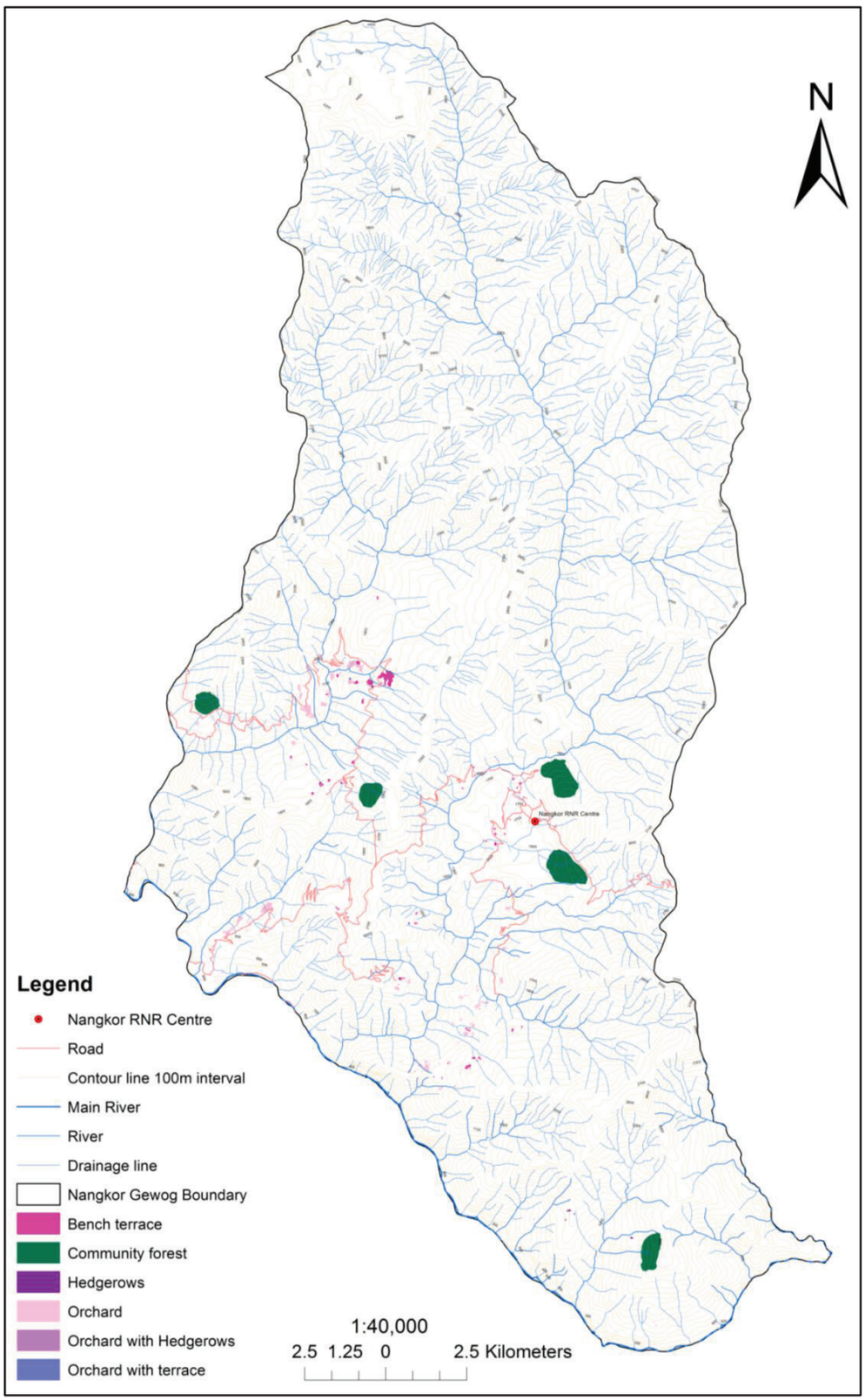

Figure 6.1.8 Map showing different SLM activities under Nangkor Gewog.

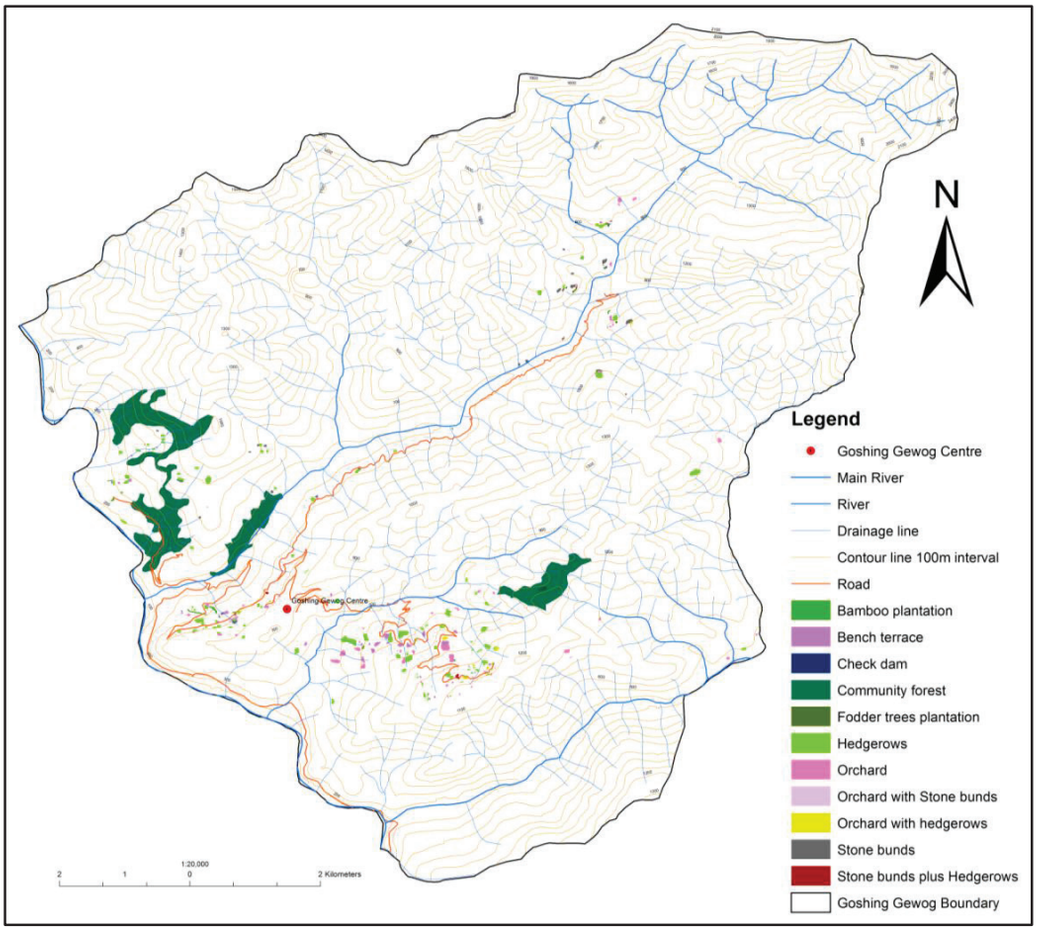

Figure 6.1.9 Map showing different SLM activities under Goshing Gewog.

Table 6.1.3 Summary of SLM activities under Nangkor, Bardo, and Goshing Gewogs.

	Nangkor	Bardo	Goshing	Total
SLM measure	**Area (ac)**			
Bench terrace	74.13	17.79	14.66	106.58
Orchard terrace	0.00	0.18	0.00	0.18
Hedgerows	5.65	34.51	55.99	96.15
Stone bunds	0.00	54.58	10.47	65.05
Stone bunds plus Hedgerows	0.00	5.10	0.29	5.39
Orchard	188.20	90.30	22.50	301.00
Orchard with hedgerows	0.76	0.00	3.39	4.14
Orchard with stone bunds	0.00	0.00	0.93	0.93
Orchard with hedgerows & stone bunds	0.00	0.00	0.62	0.62
Check dams	0.00	0.00	0.05	0.05
Bamboo plantation	0.00	29.90	4.25	34.15
Fodder tree plantation	0.00	3.37	1.49	4.85
Community forest	777.75	713.00	438.46	1929.20
Total Area (ac)	**1046.487**	**948.73**	**553.09**	**2548.31**

5.1.4 Summary of SLM measures under three SLMP pilot Dzongkhags

Through the support of SLMP, a total of approximately 7684.3 ac of vulnerable land has been brought under SLM with 2948.3 ac under Chukha Dzongkhag, 2187.7 ac under Trashigang Dzongkhag, and 2548.3 ac under Zhemgang Dzongkhag. With regard to area under specific SLM measures in the three Dzongkhags, a total of 161.8 ac was brought under bench terraces followed by 338.5 ac under hedgerows, 323.6 ac under stone bunds, 364.5 ac under orchards, 21.3 ac under check dams, 237.6 ac under bamboo plantation, 44.5 ac under fodder, 1165.9 ac under tree plantation, 4964.3 ac under community forest, and 62.2 ac under water source protection (Table 6.1.4). While SLM activities such as tree plantation, community forest, and water source protection are mostly done on SRF, all other SLM activities are implemented on private land.

Table 6.1.4 Summary of SLM activities under three SLMP Dzongkhags.

SLM measure	Chukha	Trashigang	Zhemgang	Total
	Area (ac)			
Bench terrace	55.18	0.00	106.58	161.75
Orchard terrace	0.00	0.00	0.18	0.18
Hedgerows	47.46	194.87	96.15	338.48
Stone bunds	237.24	3.41	65.05	305.70
Stone bunds plus hedgerows	12.50	0.00	5.39	17.89
Orchard	0.00	27.30	301.00	328.31
Orchard with stone bunds	0.00	0.00	0.93	0.93
Orchard with hedgerows	0.00	30.53	4.14	34.67
Orchard with hedgerows & stone bunds	0.00	0.00	0.62	0.62
Check dams	21.20	0.00	0.05	21.25
Bamboo plantation	0.45	203.02	34.15	237.61
Mixed fodder grass	0.00	37.20	0.00	37.20
Fodder tree plantation	0.00	2.45	4.85	7.31
Tree plantation	12.83	1153.07	0.00	1165.90
Community forest	2536.61	498.52	1929.20	4964.33
Water source protection	24.82	37.34	0.00	62.15
Total Area (ac)	**2948.27**	**2187.72**	**2548.31**	**7684.30**

6.2 Observation of SLM activities in the field

While mapping SLM activities, time was spent to assess the present status and performance of different SLM measures in mitigating land degradation, improving soil quality, easing workability, and enhancing rural livelihoods. In general, it was encouraging to note that most of the SLM measures, implemented by the SLMP, are doing well. Having said this, there are also some issues that need to be addressed to ensure the sustainability of SLM activities in the future. A general observation of each SLM measure in the field is provided in the following sections.

6.2.1 Bench terraces

A total of 161.8 ac of bench terraces has been constructed through support from the SLM Project (Table 6.1.4). Bench terracing is one of the main SLM measures constructed to reduce soil erosion,

improve soil fertility, conserve soil moisture, and ease workability. During the field visit, it was observed that most of the bench terraces are being used to cultivate either paddy or other crops (Fig. 6.2.1). However, some farmers have left it fallow due to lack of irrigation water, shortage of labour, and or human-wildlife conflict. It was noticed that bench terraces have managed to reduce soil erosion, increase land productivity, and ease workability. It has also helped to improve the aesthetic value of the whole landscape as they are constructed along the contour lines. In the light of rapid socio-economic development and climate change taking place, bench terracing would be one of the climate change resilient SLM measures particularly in a mountainous country like Bhutan. However, once constructed, it needs to be cultivated and maintained properly to reap the maximum benefits out of it.

Figure 6.2.1 Bench terraces used for growing paddy and other crops.

6.2.2 Alley cropping/Fodder grass hedgerows

A total of 338.5 ac of vulnerable dry land was brought under alley cropping/fodder grass hedgerows in the three pilot Dzongkhags (Table 6.1.4). Alley cropping is one of the most popular SLM measures adopted by the farmers. This is largely because it not only reduces soil erosion, conserves soil moisture, and improves soil fertility, but it also provides fodder for the cattle and eases workability after 5-10 years through formation of partial terraces. During the field visit, it was encouraging to hear what farmers had to say about these benefits and see clear signs of these benefits on the ground, such as, development of hedgerow risers, reduction in slope gradient, and plenty of fodder growing along the hedges (Fig. 6.2.2). Through increased availability of fodder from the hedgerows, farmers have managed to stall feed their cattle, thereby, helping to reduce grazing pressure in the SRF. However, the maintenance of hedgerows is not up to the mark in all the SLMP sites. Poor management has led to formation of several gaps in the hedgerows which could accelerate land degradation by forming rills and gullies. As a result, it might be counterproductive in mitigating land degradation. The other challenge with fodder grass hedgerow is that some farmers have left their agriculture fields fallow and this has wiped out the hedgerow plants due to overgrowth of weeds and other plants. Further, the stray cattle of the neighbours also browse and damage the hedgerows.

Figure 6.2.2 Napier grass hedgerows.

6.2.3 Contour stone bunds

The establishment of contour stone bunds and fodder grass hedgerows is same except that the former uses surface stones. Contour stone bund is more durable and provides more support to the upper slope than hedgerows. About 323.6 ac of vulnerable land under three Dzongkhags has been brought under contour stone bunds (Table 6.2.4). At the time of the field visit, it was noticed that establishment of stones bunds has helped to get rid of excess surface stones in addition to mitigating soil erosion, conserving soil moisture, increasing soil fertility, and easing workability (Fig. 6.2.3). Partial terraces have been formed as a result of accumulation of soil behind the stone bunds. At some sites, farmers have combined stone bund with hedgerows to grow fodder for their cattle. Although this combination makes the stone bund more resilient to soil erosion, it occupies a little more space than it usually does. Unlike hedgerows, stone bund requires very minimal maintenance. However, when the land is left fallow, the benefits of stone bunds cannot be harnessed to increase crop production through improvement of soil fertility.

Figure 6.2.3 Contour stone bunds.

6.2.4 Orchards

Recognizing citrus as one of the main cash crops of Bhutan, the SLMP established a total of 364.5 ac of citrus orchards under three Dzongkhags (Table 5.2.4). This was done through supply of improved citrus seedlings and building capacity of farmers on proper orchard management. Most of these citrus orchards are now bearing fruits and farmers are already making good cash income (Fig. 6.2.4). It was mentioned that on an average, a farmer earns roughly about Nu. 50,000 to 200,000 per year from citrus and other fruits. This has, of course, significantly helped the farmers to improve their livelihoods. However, the citrus orchards did not look healthy as they were infested by pests and diseases. In some SLMP sites like in Bongo Gewog, the citrus orchards are completely wiped off by citrus greening. To date, nothing much has been done to address these problems but sooner than later, something needs to be done to rectify these problems. Otherwise, the whole investment made by the SLMP to enhance rural livelihoods would be jeopardized. To this end, the concerned agencies should act immediately to resolve these problems before it is too late.

Figure 6.2.4 Citrus orchards.

6.2.5 Check dams

Simple and low-cost check dams (stone and log) are constructed to control gullies less than 2 m width. Gullies are recognized as one of the main types of land degradation creating a huge impact on the landscape. In order to mitigate gully erosion, the SLMP supported construction of check dams in all its pilot sites. A total of 21.3 ac of degraded land, caused by gully erosion, was stabilized. The check dam reduces the erosive power of the overland flow and traps sediments, thus, slowly stabilizing the gully. During the field visit, both log and stone check dams were found equally effective in controlling gully erosion (Fig. 6.2.5). Having said this, the log checks would require more maintenance like replacement of logs and or plantation of live cuttings to provide additional support. On the other hand, stone check dams were found in good condition in all SLMP sites, as such, do not require any major maintenance.

Figure 6.2.5 Gullies stabilized by stone and log check dams.

6.2.6 Bamboo plantation

One of the common bio-engineering measures to stabilize unstable slopes is bamboo plantation. Apart from stabilizing the slope by forming huge clumps, bamboo has other benefits (Fig. 6.2.6). It is used for building construction, fencing, and making various bamboo products. The demand for bamboo has increased over the years and as such, it has become a main source of cash income for the farmers e.g. Radhi and Goshing Gewogs. A total of 237.6 ac of marginal land was planted with bamboo rhizomes during the SLMP time to stabilize unstable slopes and enhance cash income for the farmers. Because of its multiple uses, farmers have scaled-up bamboo plantation on their own. However, bamboos are harvested randomly and this undermines the sustainability of bamboo production and its efficiency and effectiveness to stabilize unstable slopes. In this regard, farmers need to be trained on sustainable management of bamboo production. On the other hand, one of the side effects of bamboo plantation is that the thick bamboo clumps harbour few wild animals which contribute to the existing human-wildlife conflict in the area.

Figure 6.2.6 Plantation of different bamboo species.

6.2.7 Community forest

Establishment of community forest (CF) is found to be effective in managing the SRF. It empowers the local community to manage and harness the CF resources in a sustainable manner. In the effort to sustainably manage our SRF by the local communities, the SLMP brought approximately 4964.3 ac of vulnerable SRF under CF management practices (Fig. 6.2.7). The project supported the establishment of CF mainly because; firstly, it helps to prevent and reduce soil erosion due to good tree cover; secondly, it provides leaf litters and moulds for soil fertility management to the farm lands; and thirdly, it helps to protect critical water sources for drinking and or irrigation purposes. Because of some income to the community from the sale of NWFP from the CFs, farmers are able to invest a bit on SLM which otherwise is quite resource intensive. During the field visit, the CF members said that the CFs are in good condition and are being managed as per the CF management plan. They also expressed that in addition to the above benefits, accessing forest resources has also become much easier and convenient for the local communities.

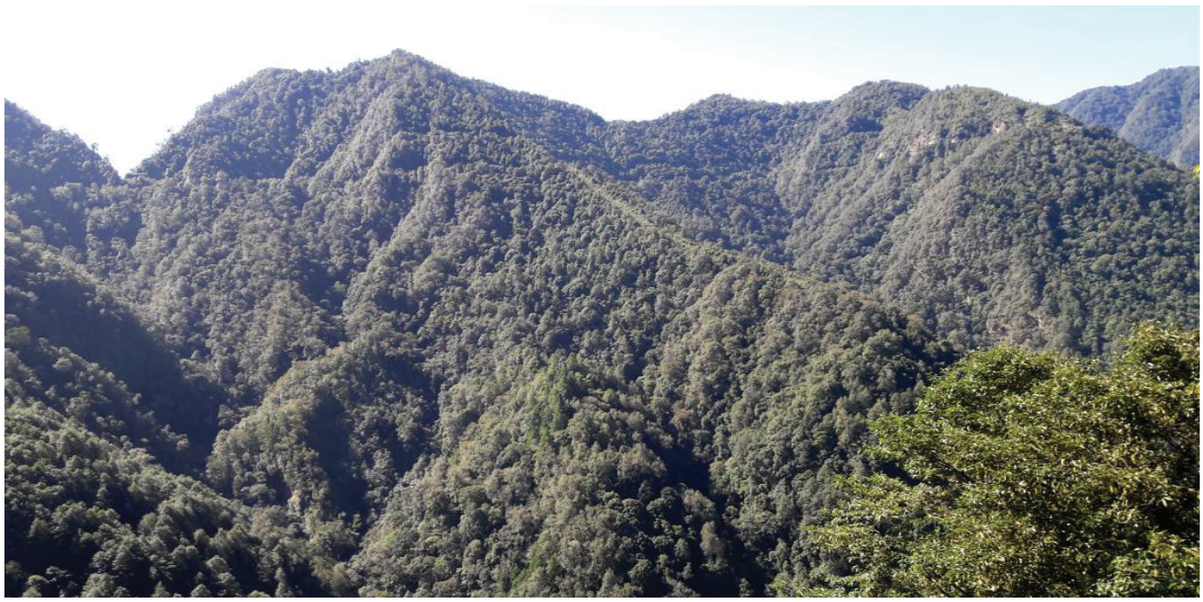

Figure 6.2.7 Establishment of community forest.

6.3 Preliminary SLM Impact Assessment using a questionnaire

6.3.1 Basic information on land degradation and SLM

As mentioned above, a simple questionnaire (Annex 1) was used to collect information on SLM and its benefits in mitigating land degradation, increasing land productivity, enhancing resilience to climate change, and ensuring continuous ecosystem services. A total of 278 farmers (82 female and 196 male) from nine SLMP sites under Chukha, Trashigang, and Zhemgang Dzongkhags were interviewed using the questionnaire.

The results are presented as per the questions in the SLM questionnaire. To set the context, farmers were first asked what soil erosion / land degradation is all about. To this, about 55% of the total

respondents said that land degradation is all about decline in soil fertility and soil quality, decrease in crop yield, and or reduction in soil depth with more surface stones. However, others said soil erosion is the decline in soil fertility and soil quality (22%), decrease in crop yield (4%), reduction in soil depth with more surface stones (1%), and formation of gullies and landslides (14%). Judging by their responses, it is quite clear that farmers have a good understanding of land degradation and its different types.

In connection to why Bhutan is very vulnerable to land degradation, about 46% of the total respondents reasoned that it is mostly because of its very dynamic and fragile landscapes, steep agriculture land, and unsustainable land management practices. However, 12% of the total respondent opined that it is largely due to Bhutan's very dynamic and fragile landscapes while 15% of the respondents said it is probably because of steep agriculture land. The rest of the respondents cited that it is solely due to frequent occurrence of natural calamities (3%), unsustainable land management (14%), and climate change impacts (11%). From this, one can conclude that farmers do understand the root causes of land degradation in the country.

With regard to the impacts of land degradation, about 53% of the total respondents mentioned that land degradation reduces the agronomic potential of the land, increases emission of soil organic carbon (SOC), and changes LULC type, thereby, affecting sustainable agriculture production, climate change, and ecosystem services. However, rest of the participants stated that land degradation impacts sustainable agriculture, climate change, and ecosystem services by decreasing land productivity (26%), causing on-site and off-site degradation (18%), and reducing land area (3%). As such, it is quite comprehensible that farmers do have good knowledge about the negative impacts of land degradation on agriculture production, climate change, and ecosystem services.

When asked how to mitigate land degradation to have minimal impacts on agriculture production, climate change, and ecosystem services, 85% of the total participants suggested that tree and bamboo plantation, proper water management, construction of civil engineering structure, and appropriate SLM measures should be carried out. However, 12% of the respondents only mentioned tree and bamboo plantation, while 3% said appropriate civil engineering structures and SLM measures could be taken up to mitigate land degradation, reduce climate change, and enhance ecosystem services. Based on these responses, it is also quite clear that farmers are aware and have adequate knowledge of different SLM measures to combat land degradation.

6.3.2 SLM activities and its impacts

In order to draw some insights into the impacts of SLM, the participants were asked whether they had carried out any SLM activities during the SLMP period. To this, about 85% of the total respondents mentioned that they had participated and benefited from the past SLMP Project. The participants said that some of the major SLM activities that they carried out included bench terracing, establishment of hedgerows, orchards, and community forests, construction of contour stone bunds and check dams, and plantation of bamboos and trees. On the other hand, the remaining 15% of the total participants said that they could not take up the SLMP activities because they were either away from the Gewog at the time or they did not have adequate land and labour to implement SLM activities.

With respect to the physical impacts of SLM activities in reducing soil erosion, improving soil fertility, and easing workability, the participants mentioned that the impacts are significant and are very much visible on the ground. Majority of them who carried out the SLMP activities said that partial terraces have been formed, surface stones have become less, and soil depth and fertility have increased (as indicated by good crop growth) due to different SLM measures like bench terracing, hedgerows, and stone bunds among others. Above all, they said, the crop production has increased and so is the ease of workability because of all these SLM measures. They also feel that their land is now stable but to make it even more stable and resilient to future land degradation risks, they said they need to better manage and scale-up the existing SLM measures.

Pertaining to SLM benefits, about 80% of the total respondents said that SLM is highly effective in combating land degradation, improving soil fertility and soil quality, increasing crop yield, easing workability, and enhancing resilience to climate change and ecosystem services. However, about 15% said it is moderate to high, while 5% of the total participants said its benefits are minimal to moderate especially with regard to increasing crop production and enhancing ease of workability. They associated decline in crop yield with terracing and this could be true because while terracing, if the fertile topsoil is not properly saved and put back after terracing, there is a high chance that soil fertility might decline drastically. In such cases, the crop yield would decrease especially in the first two to three years of terracing. The mention on decreasing the ease of workability was particularly made with respect to hedgerows. The respondents said that due to high hedgerow risers and narrow alleys between two hedgerows, it is inconvenient to plough the fields using bullocks. This is true especially on steep slopes where soil erosion is maximum and hedgerows are required to be placed little closely to effectively control soil erosion.

Although most of the participants expressed that SLM is beneficial in combating land degradation, increasing resilience to climate change, improve rural livelihoods, and ensure continuous ecosystem services, only 50% of the total respondents said they managed to scale up the SLM activities e.g. bench terracing, hedgerows, and contour stone bunds. The other 50% of the participants stated that they could not do it largely due to one or more of the following reasons: limited financial resources, small landholding, shortage of farm labour, limited knowledge on SLM (for those who did not take up SLMP activities), and no degraded land to take up SLM activities. When asked about the main challenges faced while taking up SLM activities, all the participants said that implementing SLM activities is very demanding in terms of financial requirement, labour inputs, technical know-how, management of SLM measures, and availability of time for SLM activities. Most of these challenges were rated as moderate to very demanding in implementing SLM activities.

In order to overcome these challenges, most of the participants felt that there is a need to further sensitize and build their capacity on SLM in combating land degradation, increasing resilience to climate change, improving rural livelihoods, and ensuring continuous ecosystem services. They also mentioned that it is necessary to fully mainstream SLM into government plans and policies so that adequate financial resources could be taped from the government through annual budgets to implement SLM activities. In addition, they said that government should explore funds from external donors to scale-up SLM activities beyond the SLMP sites to combat land degradation throughout the country. A

mention was also made on the need to have good SLM related policies and guidelines to foster SLM implementation in the country. A regular technical backstopping on SLM by the concerned agencies was also deemed necessary to successfully carry out SLM activities in the country. If such measures are taken care by the government, the participants said that they would like to go for more bench terracing, hedgerows, contour stone bunds, and improved orchard establishment in the near future to combat land degradation, reduce climate change, and enhance their livelihoods.

To gain some insight into the importance or benefits of SLM and what needs to done to successfully scale-up SLM activities in the country, a focus group discussion (FGD) was conducted in all nine SLMP sites. A summary of the FGD outcome from all the nine SLMP sites is provided below:

Q1 What are the importance and benefits of SLM?

Some of the key benefits of SLM pointed out by the participants are listed below:

- SLM is one of the proven technologies to mitigate land degradation and therefore, helps to stabilize and protect their limited land;
- SLM helps to increase crop production through soil fertility improvement and, thus, enhances rural livelihoods;
- SLM improves the ease of workability through bench terracing and formation of partial terraces by hedgerows and stone bunds;
- SLM enables to stall feed their cattle thereby reducing grazing pressure in the SFR; and
- SLM has the potential to reduce climate change and conserve biodiversity e.g. by stop practicing shifting cultivation.

Q2 What needs to be done to successfully scale-up SLM to combat land degradation, increase agriculture production, reduce climate change, and enhance ecosystem services in the country?

Some of the main suggestions are:

- Need to further sensitize the general public and build their capacity on SLM in relationship to land degradation, climate change, rural livelihoods, and ecosystem services;
- Mainstream SLM into government plans and policies so that adequate financial resources could be taped from the government on annual basis to support SLM activities;
- Further explore funds from external donors to scale up SLM activities in the country;
- Need to have sound SLM related policies and guidelines to foster SLM implementation in the country;
- Provide regular technical backstopping to the farmers to overcome any challenges while implementing SLM activities; and
- Address human-wildlife conflicts to encourage farmers to cultivate their land annually.

7. LESSONS LEARNT

Some of the lessons learnt while documenting and mapping of SLM activities in the nine SLMP sites include:

- The use of GEI with high spatial and temporal resolution was found to be very useful and cost effective in mapping SLM activities. Thus, for any mapping of SLM activities in the future, GEI is recommended;
- Although most of the SLM activities could be quickly mapped on-screen using GEI and GIS, it was still found necessary for ground truthing exercise to cross-check the accuracy of the SLM maps;
- Local knowledge was found to be very useful and effective in mapping SLM activities more accurately. Thus, it is important to involve as many local people as possible in the mapping exercise.
- The knowledge and experience of the Gewog SLM Planners (GSP) should be leveraged while mapping and scaling-up of SLM activities in the future;
- A need was felt that all staff involved in mapping of SLM activities should at least have a basic GIS skills. This is basically to map the SLM activities more efficiently and effectively in the field;
- Mapping of SLM activities would be much easier if it is done right after the end of the project. This is because the SLM measures would be clearly visible in the field for proper mapping; and
- Since SLM documentation and mapping involves field surveys and farmers' participation, some amount of budget should be allocated.

8. RECOMMENDATIONS

In order to facilitate scaling-up and ensure sustainability of SLM activities, the following suggestions are made:

- Advocacy and capacity building on SLM with regard to land degradation, climate change, and ecosystem services are still needed;
- SLM should be fully mainstreamed into government plans and policies so that the SLMP activities are fully taken on board after the project ends;
- Since most of the SLM interventions take several years to reap the benefits, farmers do not have the means and interest or patience to scale-up SLM activities without any incentives. In this regard, farmers need to be incentivized wherever possible to encourage and support them to take up SLM activities;
- Regular technical backstopping followed by M&E will be crucial to help farmers implement SLM activities more successfully;
- Given that most of the SLM measures e.g. hedgerows require the land to be cultivated every year; some farmers leave it fallow making the land as if no SLM interventions were undertaken before. In such cases, it is a huge wastage of time, efforts, and resources for both the government and farmers. In order to avoid such practices, stringent rules and regulations should be put in place;
- Generally, most of the SLM activities are implemented through donor supported projects. After the end of the project, no one takes the ownership of the project activities especially with regard to maintenance and scaling-up of the activities. As a result, most of these activities face

a natural death with very limited care from the farmers. In this regard, the Ministry should formally handover the SLM activities to the concerned Dzongkhag and who then should take the full responsibility to maintain and scale-up the activities where possible;

- There is a need to inculcate a sense of ownership and responsibility among the farmers to take up SLM activities because they still feel that government would do everything for them;
- The budgetary support for SLM activities during the 11th FYP was less than 1% of the Ministry's overall budget. Thus, there is a need to focus and support more on SLM activities;
- Since implementation of SLM activities takes place in the Gewogs and Dzognkahgs, budget pertaining to these activities should be directly sent to the Dzongkhags for better implementation of the SLM activities;
- Because of infrastructure development activities such as schools, hospitals and roads, not much importance is given to SLM during the planning process. As such, only few SLM activities get included in the FYP. In this regard, there is a need to include mandatory SLM indicators so that SLM activities are adequately incorporated in the FYPs.
- Due to crop depredation, farmers are forced to leave some of their agriculture land fallow. This has posed a huge challenge for the farmers to properly manage the SLM interventions e.g. hedgerows. In this regard, electric fencing should be included as part of the SLM scaling-up program to overcome this problem;
- Since SLM activities are labour intensive, it is necessary to mechanize where possible e.g. use of stone pickers for construction of stone bunds and spider machines to terrace the land. Further, the age old tradition of labour sharing should be revived and adopted as it was proven effective in addressing farm labour shortage for SLM activities;
- There is a need to take a holistic approach to address SLM by involving all concerned stakeholders;
- Agriculture Land Development Guidelines (ALDG) 2017 should be followed to maintain uniformity and standard of SLM activities in the country;
- The knowledge and experience of GSP should be leveraged while scaling-up SLM activities in the future; and
- SLM technologies and approaches should be considered as the part and parcel of the climate smart agriculture (CSA) because as of now especially within the country, CSA seems to be focusing mostly on cropping systems, organic agriculture, etc.

9. CONCLUSIONS

Establishing baseline information is crucial to facilitate efficient and effective monitoring and evaluation of any activities. Recognizing its importance, the past SLMP activities in the nine pilot sites under three Dzongkhags have been successfully documented and mapped with support from the CIF Project based at BTFEC. This SLM information shall serve as a baseline for any future planning and implementation of SLM activities in the country. Further, it is expected to form a sound basis to explore financial support for scaling up SLM activities in the future. From this exercise, the use of high resolution GEI along with GIS was found to be effective and economical in mapping past SLM activities. This is largely because the high spatial and temporal resolution of GEI enabled farmers to

demarcate the SLM sites very easily on the computer screen. As such, this saved a lot of time in mapping and also reduced ground truthing exercise. Hence, for future SLM mapping, use of high resolution GEI in the GIS environment is recommended.

Through this mapping exercise, it was found out that a total area of 7684.3 ac of vulnerable land was brought under SLM during the SLMP period from 2006 to 2013 to mitigate land degradation, increase agriculture production, reduce climate change, and enhance ecosystem services. More specifically, about 2948.3 ac under Chukha, 2187.7 ac under Trashigang, and 2548.3 ac under Zhemgang Dzongkhags were brought under SLM. With regard to the area brought under different SLM measures in three SLMP Dzongkhags, about 4964.3 ac was brought under community forest followed tree plantation (1210.4 ac), hedgerows (338.5 ac), orchards (364.5 ac), stone bunds (323.6 ac), bamboo plantation (237.6 ac), bench terracing (161.8 ac), critical water source protection (62.2 ac), and check dams (21.3 ac). In addition, other SLM related activities such as renovation of irrigation channels, construction of cattle and poultry sheds, and supply of bee hives were also support by SLMP to increase crop production and improve rural livelihoods.

From the preliminary SLM impact assessment, it is quite clear that farmers at the past SLMP sites are well aware of the importance and benefits of SLM in mitigating land degradation, increasing crop production and enhancing ecosystem services. Although some farmers find it little difficult to pinpoint the direct benefits of SLM in mitigating climate change, they do understand that SLM has the potential to increase resilience to climate change. In this regard, any future advocacy on SLM should be done with regard to land degradation, climate change, biodiversity conservation, and ecosystem services. During the assessment, it was also learnt that the technical know-how of most of the farmers on SLM was moderately high and this could be attributed to the numerous SLM training provided by the past SLMP. Further, the actual implementation of SLM activities in the field has also contributed to enhancing their knowledge and experience on SLM. However, there are few farmers who would still require further sensitization and capacity building on SLM.

With regard to the benefits of SLM, almost all the participants expressed the multiple benefits of SLM. They said that SLM might be the "silver bullet" to safeguard their limited land resources by avoiding, reducing, and reversing land degradation in the country. The participants also mentioned that SLM plays a pivotal role in achieving soil security, national food and nutrition security, water security, and energy security. The benefits of SLM measures such as bench terracing, hedgerows, stone bunds, orchards, and bamboo plantation were also specifically acknowledged. However, the participants said that they are faced with many challenges in implementing SLM activities such as lack of financial support, shortage of farm labour, limited land holding, and human-wildlife conflicts among others.

Lastly, the participants mentioned that if SLM activities were to be scale-up successfully to mitigate land degradation, increase resilience to climate change, ensure continuous ecosystem services, all these SLM related issues need to be adequately addressed. Without this, they felt that the desire to achieving land degradation neutrality by 2030 and remaining as a carbon negative country might remain as a distant dream for Bhutan.

REFERENCE

IPCC (2007) IPCC, 2007. Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the 4th Assessment Report. Cambridge Univ. Press, Cambridge, UK.

LCMP 2010. Land Cover Mapping Project. National Soil Services Centre, Department of Agriculture, Ministry of Agriculture & Forests, Royal Government of Bhutan, Thimphu.

ANNEXES

Annex 1 SLM Questionnaire

SLM Impact Assessment Questionnaire
(Oct 2017)

Date:

Respondent's Name: Age (yr): Sex: M ☐ F ☐

Chiwog: Gewog: Dzongkhag:

Q1. What do you understand by soil erosion / land degradation?

- ☐ Decline in soil fertility and soil quality
- ☐ Decrease in crop yield
- ☐ Reduce in soil depth / more surface stones
- ☐ Decrease in ecosystem services
- ☐ Others:

Q2. Why is Bhutan more vulnerable to land degradation?

- ☐ Very dynamic and fragile landscape
- ☐ More than 70% of the agriculture land is on steep slopes
- ☐ Prone to natural calamities e.g. GLOF, earthquake, and flash floods
- ☐ Unsustainable land management e.g. unsustainable farming, deforestation, overgrazing, forest fire, and poor water management
- ☐ Others:

Q3. How does land degradation affect sustainable agriculture, climate change, and ecosystem services?

- ☐ By reducing the agronomic potential of agriculture land through reduced soil fertility
- ☐ By emitting SOC into the atmosphere

☐ By changing LULC type, thus, affecting C sequestration and biodiversity

☐ By causing both on-site and off-site degradation on land and other land-based natural resources

☐ Others:

Q4. What measures can you think of to combat land degradation?

☐ Plantation (trees, bamboo rhizomes, etc.)

☐ Proper water management (surface drains and irrigation channels)

☐ Construction of civil engineering structures (check dams, retaining walls, etc.)

☐ SLM measures (terracing, hedgerows, stone bunds, climate smart agriculture, etc.)

☐ Others:

Q5. Have you undertaken any SLM measures during the SLMP Project period (2008-2012) to combat land degradation, enhance crop production, reduce climate change and enhance ecosystem services?

☐ Yes

☐ No (**Go to Q14**)

Q6. What type of SLM activities did you take up during the SLMP Project period (2008-2012)? Give details.

	SLM measure	**Area (ac)**	**Location**	**Current Status**
☐	Bench terracing			
☐	Hedgerows			
☐	Stone bunds			
☐	Orchard establishment			
☐	Orchard basin			
☐	Check dams			
☐	Bio-engineering measures			
☐	Afforestation			
☐	Private forestry			
☐	Community forest			
☐	Others			

Q7. What changes (e.g. physical) have you seen in the field due to SLM measures?

- ☐ Formation of partial terraces
- ☐ Increase in soil depth
- ☐ Reduction in surface run-off
- ☐ Improvement in soil fertility and soil quality
- ☐ Stabilization of land
- ☐ Less surface stones
- ☐ Ease of workability
- ☐ Increase in crop yield
- ☐ Others

Q8. From your experience, how beneficial do you think SLM measures are in:

Targets	Very high	High	Moderate	Minimal	None
Combating land degradation					
Improving soil fertility and soil quality					
Increasing crop yield					
Mitigating climate change					
Easing workability					
Enhancing ecosystem services					
Others:					

Q9. Have you managed to scale-up SLM activities beyond the SLMP sites? If Yes, provide details.

SLM measures	Area (ac)	Location
Bench terracing		
Hedgerows		
Stone bunds		
Check dams		
Others:		

If No, is it because of the following reason(s)?

	Reason	Ranking
☐	Limited financial resources	
☐	Limited agriculture land	
☐	Farm labour shortage	
☐	Limited technical know-how	
☐	No incentives provided	
☐	SLM not effective in combating land degradation	
☐	SLM takes away certain portion of prime agriculture land	
☐	Others:	

Q10. How demanding is to take up SLM activities in terms of:

Inputs	Very high	High	Moderate	Minimal	None
Financial requirement					
Labour input					
Technical know-how					
Time					
Others:					

Q11. What needs to be done to efficiently and effectively scale-up SLM activities in the country?

	Interventions	Ranking
☐	Further sensitize the farmers on SLM and its benefits	
☐	Build capacity of the farmers on SLM and climate smart agriculture	
☐	Properly mainstream SLM into FYPs and annual plans	
☐	Provide adequate financial support to take up SLM activities	
☐	Provide regular technical backstopping on SLM by concern agencies	
☐	Put in place proper policies/guidelines on land use & SLM/ALD	
☐	Others:	

Q12. What are your future plans to scale-up SLM activities to combat land degradation?

Q13. Any additional comments on SLM with regard to land degradation, sustainable agriculture, climate change, and ecosystem services?

Q14. Provide reason(s) why you haven't taken up any SLM activities to date (***for non-SLM adopters during the SLMP Project period***).

Q15. Any additional information?

FOCUS GROUP DISCUSSION (FGD)

Q1. What are the importance and benefits of SLM?

Q2. What needs to be done to successfully scale-up SLM to combat land degradation, increase agriculture production, reduce climate change, and enhance ecosystem services in the country?

Annex 2 Abbreviations and Glossary

ac	Acre
ALD	Agriculture Land Development
BTFEC	Bhutan Trust Fund for Environmental Conservation
CF	Community Forest
CBD	Convention on Biodiversity
CIF	Climate Investment Fund
CSA	Climate Smart Agriculture
Chiwog	Village
DoA	Department of Agriculture
Dzongkhag	District
FGD	Focus Group Discussion
FYP	Five Year Plan
GEF	Global Environment Facility
GEI	Google Earth Image
Gewog	Block
GHG	Greenhouse Gas
GIS	Geographic Information System
GPS	Global Positioning System
GSP	Gewog SLM Planner
IPPC	Intergovernmental Panel for Climate Change
LULC	Land Use Land Cover
MoAF	Ministry of Agriculture & Forests
NSSC	National Soil Services Centre
RGoB	Royal Government of Bhutan
RNR	Renewable Natural Resources
SLM	Sustainable Land Management
SLMP	Sustainable Land Management Project
SOC	Soil Organic Carbon
SRF	State Reserve Forest
UNCCD	United Nations Convention to Combat Desertification
US	United States
WB	World Bank

Annex 3 Tour Itinerary

Group A

Date	From	To	Activity
25/9/2017	Thimphu	Zhemgang	Travel to Zhemgang to document and map SLM activities in Bardo, Nangkor and Goshing Gewogs
26/9/2017	Zhemgang	Khomsher	Travel to Khomshar to document and map SLM activities in Bardo Gewog
27/9/2017	Khomshar	Stakeholder meeting	Conduct stakeholder meeting on SLM activities
28/9/2017	Khomshar	Phulabi	Travel plus document and mapped SLM activities in Phulabi
29/9/2017	Phulabi	Dunglabi	Travel plus document and mapped SLM activities in Dunglabi
30/9/2017	Dunglabi	Khomsher	Document and map SLM activities at Dunglabi and travel back to Khomsher
01/10/2017	Khomsher	Buli	Travel back to Buli to document and map SLM activities in Nangkor Gewog
02/10/2017	Buli	Stakeholder meeting	Conduct stakeholder meeting on SLM activities
03/10/2017	Buli	Nyakhar & Tshaidang	Travel plus document and map SLM activities in Nyakhar and Tshaidang
04/10/2017	Tshaidang	Shobling	Travel plus document and map SLM activities in Shobling
05/10/2017	Shobling	Buli	Document and map SLM activities at Shobbling and travel back to Buli
06/10/2017	Buli	Goshing	Travel to Goshing to document and map SLM activities in Goshing Gewog
07/10/2017	Goshing	Stakeholder meeting	Conduct stakeholder meeting on SLM activities
08/10/2017	Goshing	Amda	Travel plus documented and mapped SLM activities in Amda
09/10/2017	Amda	Goshing	Document and map SLM activities in Amda and travelled back to Goshing
10/10/2017	Goshing	Goshing	Document SLM activities
11/10/2017	Goshing	S/jongkhar	Travel to Radhi to document and map SLM activities in Radhi Gewog
12/10/2017	S/jongkhar	Radhi	Travel to Radhi to document and map SLM activities in Radhi Gewog
13/10/2017	Radhi	Stakeholder meeting	Conduct stakeholder meeting on SLM activities
14/10/2017	Radhi	Phodung	Travel plus document and map SLM activities in Phodung
15/10/2017	Phodung	Drungonpa	Travel plus document and map SLM activities in Drungonpa
16/10/2017	Drungonpa	Radhi	Document and map SLM activities in Drungonpa and travel back to Radhi
17/10/2017	Radhi	Lumang	Travel to Lumang to document and map SLM activities in Lumang Gewog
18/10/2017	Lumang	Lumang	Conduct stakeholder meeting on SLM activities
19/10/2017	Lumang	Drupkang	Travel plus document and map SLM activities in Drupkang
20/10/2017	Drupkang	Kurchilo	Travel plus document and map SLM activities in Kurchilo
21/10/2017	Kurchillo	Lumang	Document and map SLM activities at Kurchillo and travel back to Lumang
22/10/2017	Lumang	Thrimshing	Travel to Thrimshing to document and map SLM activities in Thrimshing Gewog
23/10/2017	Thrimshing	Stakeholder meeting	Conduct stakeholder meeting on SLM activities
24/10/2017	Thrimshing	Yamkhar	Travel plus document and map SLM activities in Yamkhar
25/10/2017	Yamkhar	Berdungma	Travel plus document and map SLM activities in Berdungma
26/10/2017	Berdungma	Thungkhar	Travel plus document and map SLM activities in Thungkhar
27/10/2017	Thungkhar	Thrimshing	Document and map SLM activities at Thungkhar and travel back to Thrimshing
28/10/2017	Thrimshing	Pling	Travel back to P/ling
29/10/2017	P/ling	Thimphu	Travel back to Thimphu
31/10/2017	Thimphu	Paro	Travel to Paro to attend writeshop on SLM documentation
1-4/11/17	Paro	Paro	Attend writeshop on SLM documentation
05/11/2017	Paro	Thimphu	Travel back to Thimphu

Group B

Date	From	To	Activity
13/10/17	Thimphu	Pakshikha	Travel to Pakshikha to document and map SLM activities in Bongo gewog
14/10/17	Pakshikha	Stakeholder meeting	Conduct stakeholder meeting on SLM activities
15/10/17	Pakshikha	Baikunza	Travel plus document and map SLM activities in Baikunza
16/10/17	Baikunza	Bongo	Travel plus document and map SLM activities in Baikunza
17/10/17	Bongo	Pakshikha	Travel plus document and map SLM activities in Beri
18/10/17	Pakshikha	Lokchina	Travel to Lokchina to document and map SLM activities in Lokchina gewog
19/10/17	Lokchina	Stakeholder meeting	Conduct stakeholder meeting on SLM activities
20/10/17	Lokchina	Chimuna	Travel to Chimuna Chiwog to carry out field verification of SLM activities.
21/10/17	Chimuna	Field verification	Conduct field verification in Chimuna Chiwog
22/10/17	Chimuna	Lokchina	Travel back from Chimuna
23/10/17	Lokchina	Pachu	Travel to Pachu to document and map SLM activities in Phuntsholing gewog
24/10/17	Pachu	Stakeholder meeting	Conduct stakeholder meeting on SLM activities
25/10/17	Pachu	Lingden	Travel to Lingden Chiwog to carry out field verification of SLM activities.
26/10/17	Lingden	Field verification	Conduct field verification in Lingden Chiwog
27/10/17	Lingden	Pachu	Travel back from Lingden
28/10/17	Pachu	Chilawni	Travel plus document and map SLM activities in Chilawni
29/10/17	Pachu	Thimphu	Travel back to Thimphu
31/10/2017	Thimphu	Paro	Travel to Paro to attend writeshop on SLM documentation
1-4/11/17	Paro	Paro	Attend writeshop on SLM documentation
05/11/2017	Paro	Thimphu	Travel back to Thimphu

CHAPTER 3

Evaluation Of Sustainable Land Management To Enhance Climate Resilience And Food Security In Bhutan

Abbreviations

ADB	Asian Development Bank
AF	Adaptation Fund
BTFEC	Bhutan Trust Fund for Environment Conservation
CBD	UN Convention on Biological Diversity
CIF	Climate Investment Fund
DAEO	Dungkhag Agriculture Extension Officer
DANIDA	Danish International Development Agency
DFEO	Dungkhag Forest Extension Officer
DoA	Department of Agriculture
DoR	Department of Roads
ECP	Environment, Climate Change and Poverty
ELESC	Evaluation and Learning Exercise Steering Committee
FYP	Five Year Plan
GCF	Green Climate Fund
GECDP	Gender, Environment, Climate Change, Disaster Risk Reduction and Poverty
GEF	Global Environment Facility
GEO	Global Environment Objectives
GNHC	Gross National Happiness Commission
LD	Land Degradation
LDCF	Least Developed Countries Fund
LMC	Land Management Campaign
M&E	Monitoring and Evaluation
MEA	Multilateral Environment Agreements
MoAF	Ministry of Agriculture and Forests
MSP	Mid-Scale Project

NAP	National Action Program
NAPA	National Adaptation Programme of Action
NEC	National Environment Commission
NEPA	National Environment Protection Act (2007)
NSSC	National Soil Services Centre
PDO	Project Development Objectives
RAA	Royal Audit Authority
RGoB	Royal Government of Bhutan
RNR	Renewable Natural Resources
RNR-RC	Renewable Natural Resources Research Centre
SALT	Slopping Agriculture Land Technology
SLM	Sustainable Land Management
SLMP	Sustainable Land Management Project
SPCR	Strategic Plan of Climate Resilience
ToR	Terms of Reference
UNCCD	United Nations Convention on Combating Desertification
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
US$/USD	United States of America(n) Dollar
WB	World Bank

1. Executive summary

Bhutan's majority population (70%) live in rural areas depending on subsistence farming[1]. The arable land size in contrast is only 2.93% of the country's total land area[2]. Being a mountainous country, major agriculture land is on the steep slopes. Soil erosion on the steep terrain is common in different forms and magnitude. Perhaps this could be a key factor compelling high percentage (16.7%) of rural population under poverty[3]. Climate change further intimidates vulnerability and discourages farming practices, driving towards food insecurity. Sustainable Land Management (SLM) as such is imperative to address poverty and food security in the mountainous terrain country. As such, Bhutan ever since 2005 seriously focused on SLM, Agriculture productivity and food security and made everything legally binding. Forest and Nature Conservation Act, 1995, Mines and Minerals Management Act, 1995 adopted prior to 2005 were stringent on natural resources consumption procedures and The Constitution, Land Act of Bhutan, 2007, National Environment Protection Act, 2007, further made SLM, land use for socio-economic development and environmental well-being unambiguous.

The annual reports of the National Soil Services Centre (NSSC) are clear on the SLM efforts put in by the Department of Agriculture (DoA) as the focal agency for land management. Two SLMPs have been implemented by NSSC prior 2013 and two projects are ongoing, supported by Bhutan Trust Fund for Environment Conservation (BTFEC). Bhutan National Adaptation Programme of Action (NAPA) II[4] also revisited its 2006 prioritized project list and re-prioritized eight projects linked to SLM.

This evaluation assignment on directives from the Climate Investment Fund (CIF) Evaluation and Learning Exercise Steering Committee (ELESC) selected for evaluation the 2006-2013 SLMP financed by the Global Environment Facility (GEF) through World Bank with a parallel funding from the Danish International Development Agency (DANIDA). The Project from 2006 to 2009 on a pilot scale initiated activities in three Geogs under Three Dzongkhags; Phuntsholing Geog under Chukha Dzongkhag, Nangkor Geog under Zhemgang Dzongkhag and Radhi Geog under Trashigang Dzongkhag. From 2009, the project activities expanded to two additional Geogs each in the three Dzongkhags, making

[1] RGoB & ADB, 2012. Bhutan Living Standards Survey 2012 Report. Thimphu.
[2] NEC, 2016. Bhutan Statement of the Environment. Thimphu.
[3] RGoB & World Bank, 2012. Bhutan Poverty Analysis 2012. Thimphu.
[4] NEC, 2012. Bhutan National Adaptation Programme of Action: Update of Projects and Profiles. Thimphu.

total coverage of the SLMP to nine Geogs. Primary focus of the SLMP has been to eradicate poverty by increasing agriculture productivity through SLM techniques. Main SLMP activities included;

- Community Forestry & Private Forestry establishment
- Water source protection
- Afforestation (Tree plantation) including fodder trees
- Legume cropping
- Grazing land development
- Land Management Campaign (LMC) + Slopping Agriculture Land Technology (SALT)
- Dry land terracing (Bench terracing)
- Wetland terracing
- Hedgerows plantation
- Stone bunds construction (plus Hedgerows)
- Agro-forestry
- Orchards
- Annual crops
- Check Dams
- Bamboo plantation

Purpose of this Evaluation of the SLMP was to study the current SLM practices and evaluate impacts of the past SLM Projects in Bhutan. It is envisaged that the evaluation will enhance information base on the prevailing SLM and help guide the government in scaling-up SLM projects in the face of threatening climate change, through international and domestic financial support. The evaluation reporting differs slightly from the conventional evaluation report structure. This report as desired by the CIF-ELESC reflects more of a field verification findings corresponding to the information available in the reference documents. The report does not give any rating on the project deliverables evolving around the evaluation factors; relevance, achievements, efficiency, effectiveness, and sustainability. Such ratings have already been undertaken and are referable in the World Bank Report[5].

The SLMP implementation in overall looks good in delivering its objective outputs. The project focused to reduce pressure on land resources due to inefficient utilization of land resources and increase

[5] The World Bank, 2013. Implementation Completion and Results Report (TF-55967), Report No.ICR00002867. South Asia Region.

the agriculture productivity for food security. The focus also has been to encourage demand for efficient SLM technologies, different forms of incentives and policy interventions. The SLM importance has been realized that it is indispensable. However, the rural labor shortage and human wildlife attack on crops has been challenging and SLM correlation to the climate change resilience has been silent.

A questionnaire developed to facilitate the field evaluation guides the findings from the field and it is reflected accordingly in the report. Natural landslides or mountain slope sliding in a fragile terrain is common. Man-made drivers add to the disasters. Man-made land degradation causal include; unmanaged water flow from roadside drains and human settlements, land fragmentation from ownership rifts, deforestation for timber, firewood, shifting cultivation and pastureland, quarrying and mining. Food resources shortage also is caused due to more and more fallow lands prompted by labor shortage, rural-urban migration and wildlife pests attack and diseases on crops. A SLM is anticipated to address all such natural and man-made challenges in a multi-tasking attempt. The challenges of a SLMP therefore call for being more inclusive in planning and designing of the activities; to consider beyond a direct agriculture land management techniques. Findings of the 2006-2013 SLMP evaluation include;

- The SLM importance and need understandings in the country elevated since the National Land Management Campaign initiated by the Ministry of Agriculture and Forests (MoAF) in 2005. MoAF assessed the cause of devastating floods of 2004 monsoon. Poor land management has been found to be a prominent catalytic factor for the floods. Thereon the SLM campaign was initiated.
- The flood assessment also found that land degradation of a mountain terrain country has been continuous and historical. The government and the people prior to 2004 did not have the capacity and resources to assess the causes or simply did not give much attention taking it to be a natural phenomenon.
- The NSSC on learning that there is an option to reduce such incidences, conducted the 2005 Land Management Campaign and also initiated to formulate and implement SLMPs.

- All the nine Geogs of the (2006 – 2013) SLMP fall in high poverty percentage (27% - 69%) region[6].
- Project activity deliverable results significantly differ between the 2013 World Bank Implementation Completion and Results Report and the 2017 NSSC "Documentation & Mapping SLMP activities". However, results in both the reports overly fulfill the deliverable objectives outlined in the project appraisal document.
- The SLMP activities focused on site specific needs and extended to cover livestock productivity and nearby gully check dam constructions. Dominant activities however concentrated on agriculture and forestry; community forestry, agro-forestry, orchards, bamboo and hedgerow plantation, land terracing and construction of stone bunds, etc.
- SLMP activities immensely benefitted project area farmers and SLMP now stand on high demand for replication and scaling-up in the same areas and the nearby Geogs.
- Mainstreaming SLM into national developmental plans, accessing climate funds and establishing endowment funds to sustain SLM activities is a common demand. Successive discussions, planning and documentation of mainstreaming SLM, Environment, Climate Change, Gender, and Disaster Risk Reduction is visible. The 11th Five Year Plan (11th FYP) and numerous reports as early as 2009 reflects efforts put in to mainstream these cross-sectoral factors. Only the implementation in reality seems to have taken longer time. Documentations in fact had duplicating exercises. For 11th FYP, Gross National Happiness Commission (GNHC) developed two frameworks for mainstreaming poverty, environment and climate change; (1) Framework to Mainstream Environment, Climate Change and Poverty (ECP) concerns into the Eleventh Five Year Plan (2013-2018), (2) Framework to Mainstream Gender, Environment, Climate Change, Disaster Risk Reduction and Poverty (GECDP). Not sure if it is effectively implemented.
- Lack of coordination amongst the stakeholders has been a signifying SLMP challenge. If coordinated well, SLMPs better benefit the communities and the national exchequer. Wetland terracing, Orange orchard and agro-forestry has improved family income to many in Nangkor Geog. Bamboo plantation in Radhi Geog has not only stabilized the land but it has become a source of monetary income from sales of the Bamboo. Agriculture field stability and

[6] RGoB & World Bank, 2010. Small Area Estimation of Poverty in Rural Bhutan. Thimphu.

productivity increase is significant in Phuentsholing Geog. Complimentary infrastructure development like access road, bridges, irrigation drains, storage yards and marketing space through coordinated efforts will be cost-effective and efficient in project implementation.

Common barriers to scale-up SLMPs include;

- lack of a coherent and comprehensive Climate Change Adaptation Strategy that covers SLM needs. Climate change being a pressing issue is undeniable. The international agencies like United Nations Development Programme (UNDP) have developed numerous guidebooks for preparing Low-emission climate resilient development strategies, formulating climate change scenarios to inform climate-resilient development strategies, blending climate finance through national climate funds. RGoB should utilize these guiding resources and develop a comprehensive climate change strategy focussing more on climate resilience and food security.
- very limited awareness on climate change and its potential threats to local government and community level farmers. Such exercise need to be scaled up,
- absence of incentives from the government that would accelerate research and development of innovative SLM activities and private sector initiatives,
- lack of comprehensive source of information on SLM and land resources utilization options,
- lack of enterprises that supply SLM technologies and services,
- very poor monitoring and evaluation on SLMP impacts and sustainability measures,
- lack of technical expertise and financial resources for appropriate assessments,
- awareness and capacity building on SLM technologies has been just in nine (9) Geogs when land degradation challenge is across all 205 Geogs,
- lack of examples of efficient technologies that are successfully operating in other countries, and
- lack of strategies or plans linking productivity to marketing challenges (accessibility, storage, preservation, transportation and competition across the borders). No plans have been developed how to internalize consumption of local products. Products in the season are auctioned or sold at cheaper price and purchased back at higher price in the off seasons.

The SLMP has been eye opening and beneficial. Replication and scaling-up of the SLMP in terms of area coverage and resources volume is highly demanding. High demand also is there for future SLMP capacity building activities to target grass root communities. Earlier SLMP implementation as such has

been relevant, on time, effective and efficient. Main project focus maintained closely towards the physical land stabilization and increasing agriculture products for food security. Crucial complimentary infrastructure development for agriculture produce preservation and marketing such as access roads, bridges and storage yards coherent to climate change resilience needs is a demand in future SLMPs. Although SLM activities have been relatively similar to climate change adaptation, climate change resilience knowledge had not been highlighted earlier. Bamboo plantation especially in Radhi Geog has a visible success story in protecting the land erosion and generating cash income. Such examples are good example for replication of site specific SLMP activities. Another good example of site specific story is the stone bunds construction and Hedgerows plantation in Phuentsholing Geog. The activities have been highly beneficial in stabilization of steep slope soil erosion.

2. Introduction

Bhutan's majority population (around 70%) depend on subsistence farming around 3% arable land of the country's total land area. Major framing practices is in the rural areas and agriculture land is on the steep and fragile mountain slopes. Soil erosion on the steep terrain, degrading the top soil stability and fertility is a daunting challenge to farmers across the country and climate change threat is an increasing discouragement. Lesser productivity due to poor soil moisture and top soil loss coupled with wildlife and disease attack on crops and lesser manpower in labour intensive farm works are practical field challenges to food security and poverty eradication in Bhutan. Loss of fields to landslides and land ownership fragmentation also discourage farming practices. Erratic monsoon patterns, draughts, temperature increase, moisture content changes, migration of crops and invasive species, increase of pests and diseases, etc., which are some predicted climate change impacts on the agriculture systems will be adding challenges to Bhutanese food security and livelihood. It is an established fact that subsistence farming is inevitable to address poverty. Bhutanese poverty as in 2012 in rural is 16.7% and urban is 1.8%[7]. Sustainable Land Management (SLM) as such is inevitable to prioritize and enforce for poverty eradication and food security.

A study on soil erosion rates conducted under different agro-ecological zones indicated that on an average the soil loss in Bhutan is around 21 tons per hectare annually[8]. This emphasizes more that Bhutan cannot ignore SLM practices. SLM in many ways feature to make it a top priority for a fragile mountain ecosystem country. As such the Royal Government mandated the National Soil Services Centre (NSSC) under the Department of Agriculture (DoA) to prioritize undertaking SLM implementation since 2005. The Ministry of Agriculture and Forests (MoAF) initiated a Land Management Campaign in 2005 and began to implement SLM Projects (SLMP) from 2006. The NSSC between 2006 and 2013 implemented two SLM projects and two similar projects financed by Bhutan Trust Fund for Environment Conservation (BTFEC) are ongoing. The SLM related projects implemented by NSSC are;

- Bhutan – Sustainable Land Management Project (2006 – 2013),

[7] RGoB & World Bank, 2012. Bhutan Poverty Analysis 2012. Thimphu.
[8] The World Bank, 2013. Implementation Completion and Results Report (TF-55967), Report No.ICR00002867. South Asia Region.

- PIMS 3393 LD MSP – Building capacity and mainstreaming sustainable land management in Bhutan (2007- 2009),
- Up-scaling for Sustainable Land Management to combat Land Degradation and Climate Change Mitigation (2015 – 2018), and
- Working towards achieving land degradation neutral status: "protect-sustain restore" (2017 – 2019).

In accordance to the directives of the Climate Investment Fund (CIF) Committee in Bhutan, this assignment focused on evaluation of the Global Environment Facility (GEF)/World Bank financed (US$7.66 million) Sustainable Land Management Project, SLMP ID: P087039 (2006 – 2013). A parallel financing of US$ 5.77 million to the project was granted by the Danish International Development Agency (DANIDA). With in-kind contribution from the Royal Government of Bhutan (RGoB) and the local communities, the total project budget was US$ 15.89 million.

The evaluation mission has been for 35 days spread over four (04) months (28 August – 31st December 2017) including 15 days site visits to the three pilot sites of the SLMP; Nangkor Geog in Zhemgang Dzongkhag, Radhi Geog in Trashigang Dzongkhag and Phuentsholing Geog in Chukha Dzongkhag.

2.1 The SLMP profile

Table 1: Project (2006 – 2013 SLMP) profile

Project Title:	Bhutan – Sustainable Land Management Project			
Project ID:	P087039	Project financing	*at endorsement (Million US$)*	*at project terminal (Million US$)*
L/C/TF No.:	TF-55967	GEF	7.66	7.66
Country:	Bhutan	RGoB (in kind)	1.51	1.51
Region:	South Asia	Local communities (in kind)	0.95	0.95
Lending Instrument	Grant	Parallel-financing by DANIDA (Danish International Development Agency)	5.77	5.77
Focal Area:	Land Degradation			
GEF/WB focus:	Strengthening institutional and			

	community capacity for anticipating and managing land degradation			
Executing Agency:	World Bank	Total Project Cost:	15.89	15.89
Project duration	6 years (Feb 2006 to Dec 2012, extended to June 2013			
Other Partners involved:	DANIDA	ProDoc Signature: (date project began)		17 Feb 2006
		(Operational) Closing Date:	31 Dec 2012	30 June 2013

2.2 SLMP focus

From 2006 to 2009, the SLM Project (SLMP) activities implementation on a pilot scale was initiated in three Geogs under Three Dzongkhags; Phuntsholing Geog under Chukha Dzongkhag, Nangkor Geog under Zhemgang Dzongkhag and Radhi Geog under Trashigang Dzongkhag. Since 2009, the project activities coverage has been expanded to two additional Geogs each under the three Dzongkhags making total coverage to nine Geogs. Primary focus of the SLMP has been to elevate poverty eradication by increasing agriculture productivity through SLM techniques. The factors for selection of the nine Geogs under three Dzongkhags for the SLMP were mainly on consideration of major cropping pattern, land degradation type and incidence of poverty as detailed below in Table 2.

Table 2: Background information of the selection of nine Geogs for SLMP

SLM Gewog	**Area (km2)**	**Altitude (m)**	**Forest cover (km2)**	**Agri. Land (km2)**	**Major crop grown**	**Land degradation type**	**Incidence of poverty**
Radhi	28.58	1100-2900	14.14 (50%)	8.78 (31%)	Paddy & maize	Deep seated movement plus gullies	Low
Lumang	105.69	900-3000	94.93 (90%)	4.96 (5%)	Maize	Localized deep seated movement plus surface erosion	High
Thrimshing	53.63	1000-3200	45.46 (85%)	3.55 (7%)	Maize &	Deep seated movement plus surface	Moderate

					paddy	erosion	
Phuntsholing	133.55	200-2300	98.80 (74%)	14.78 (11%)	Maize, paddy & orchard	Deep seated movement plus surface erosion	Moderate
Bongo	399.37	200-1400	342.52 (86%)	7.65 (2%)	Maize, paddy & orchard	Surface erosion	Moderate
Lokchina	71.92	400-2500	55.89 (78%)	10.26 (14%)	Maize & orchard	Surface erosion	High
Nangkor	492.56	300-4500	428.49 (87%)	4.51 (1%)	Maize, paddy & citrus	Surface erosion	Moderate
Bardo	209.69	200-3400	153.47 (73%)	6.82 (3%)	Maize & paddy	Surface erosion	High
Goshing	99.12	100-2400	84.03 (85%)	5.08 (5%)	Maize & orchard	Surface erosion	High

2.3 SLMP Implementation Arrangements and stakeholders

The Global Environment Facility (GEF) through World Bank financed the Sustainable Land Management Project (SLMP) implemented by the National Soil Services Centre (NSSC), Department of Agriculture (DoA), Ministry of Agriculture and Forests (MoAF). DANIDA provided a parallel financing of US$5.77 million and the RGoB and local beneficiary communities made in kind contributions.

Therefore, the project stakeholders include;

- GEF/World Bank primary financing of the SLMP (US$7.66 million),
- DANIDA for parallel financing of US$5.77 million,
- DoA, local governments and communities for in-kind contribution and being SLMP beneficiaries,
- GNHC, main executing agency on behalf of the Royal Government of Bhutan,

- NSSC, the project implementing agency on behalf of the executing agency, GNHC and the Royal Government, and
- Local governments; three Dzongkhags and Nine Geogs, involving Geog Renewable Natural Resources (RNR) Extension Officials as project focal officials on the ground. Geog Extension Officials; Agriculture, Forest and Livestock have been the main project personnel for respective SLM activities with technical backstopping from the NSSC.
- The Royal Audit Authority (RAA) become a project stakeholder by periodical and project completion auditing.

2.4 SLMP deliverables

The SLMP to its best ability attempted to deliver activities in accordance to site specific needs. For example; main SLM need in Radhi has been Bamboo plantation to control and prevent deep seated slope movement and occurrence of gullies. In Phuentsholing, it was dryland terracing, stone bunds construction and hedgerow plantations to control gravity flow of top soil on steep slopes. In Nangkor, it was wetland terracing, orchards and agro-forestry, mainly to discourage slash and burn sifting cultivation practices. Slash and burn shifting cultivation posed fire risk and top soil erosion for vegetation and biodiversity degradation. Referencing the project appraisal document, World Bank Project Implementation Completion and Results Report and the NSSC Report on "Documentation and Mapping of SLMP activities", the project deliverables have been exceedingly achieved. Although there is significant inconsistency in the results shared by the two reports of the World Bank and the NSSC, results in both the reports show achievements beyond the targets set in the project appraisal document. The ratings in the World Bank report also show mostly satisfactory and highly satisfactory for the achievements of the project. All Project Development Objectives (PDO) and the Global Environment Objectives (GEO) were indicated fulfilled. For a quick review, project achievement data reported in the two reports are reflected below in Table 3.

Table 3: SLMP activity achievements in the nine Geogs

Dzongkhag	**Geog**	**Main activity**	**Activity achievement (in Acres)**	
			WB Report	**NSSC Report**
Chukha	Phuentsholing	• Community Forestry & Private Forestry establishment	278.0	0
		• Water source protection	14.0	13.18
		• Afforestation (Tree plantation)	74.9	12.08
		• Legume cropping	96.9	0
		• Grazing land development	173.3	0
		• Land Management Campaign (LMC) + Slopping Agriculture Land Technology (SALT)	11.5	0
		• Dryland terracing (Bench terracing)		
		• Wetland terracing		
		• Hedgerows plantation		
		• Stone bunds construction (plus Hedgerows)		
		• Agro-forestry		
		• Orchards		
		• Annual crops	132.0	42.02
		• Check Dams	9.0	0
		• Bamboo plantation	177.0	42.87
			157.0	41.65
			44.7	12.50
			279.4	0
			647.2	0
			0	0.64
			0	0.45
	Bongo	• Community Forestry & Private Forestry establishment	804.0	1251.56
		• Water source protection		
		• Afforestation (Tree plantation)		

		• Legume cropping	4.0	8.98
		• Grazing land development	143.0	0.75
		• Dryland terracing (Bench terracing)	62.8	0
		• Wetland terracing	36.3	0
		• Hedgerows plantation	32.5	9.58
		• Stone bunds construction	9.1	0
		• Agro-forestry	6.5	0.21
		• Orchards	48.5	47.98
		• Annual crops	29.1	0
		• Check dams	150.0	0
			315.3	0
			0	8.48
	Logchina	• Community Forestry & Private Forestry establishment	881.0	1285.05
		• Water source protection	8.0	2.66
		• Afforestation (Tree plantation)	111.3	0
		• Grazing land development	92.1	0
		• Dryland terracing (bench terracing)	11.0	3.58
		• Wetland terracing	7.5	0
		• Hedgerows plantation	92.7	4.37
		• Stone bunds construction	349.1	147.62
		• Agro-forestry	6.5	0
		• Orchards	0.8	0
		• Annual crops		
		• Check dams		

			413.9 0	0 12.08
Trashigang	Radhi	• Community Forestry & Private Forestry establishment • Water source protection • Afforestation (Tree plantation) • Bamboo plantation • Legume cropping • Grazing land • LMC + SALT • Orchard • Orchard with Hedgerows • Fodder tree plantation	319.5 1.3 196 0 15.2 33.0 22.0 0 0 0	498.52 0 1127.54 127.8 0 0 0 9.06 11.85 1.09
	Lumang	• Community Forestry & Private Forestry establishment • Water source protection • Afforestation (Tree plantation) • Legume cropping • Grazing land • LMC+SALT • Hedgerows plantation • Stone bunds construction • Agro-forestry • Orchards • Orchards with Hedgerows • Annual crops • Bamboo plantation • Fodder tree plantation • Mixed fodder grass plantation	1589.1 20.0 241.6 92.6 70.3 16.3 620.6 56.0 14.9 333.9	0 37.34 5.97 0 0 0 0 83.84 2.12 0

			0	11.86
			0	15.17
			609.1	0
			0	34.37
			0	0.19
			0	32.02
	Thrimshing	• Community Forestry & Private Forestry establishment	45.2	0
		• Water source protection		
		• Afforestation (Tree plantation)	13.6	0
		• Legume cropping		
		• Grazing land	159.0	19.56
		• LMC+SALT	9.1	0
		• Hedgerows plantation		
		• Stone bunds	18.8	0
		• Orchards		
		• Orchards and Hedgerows		
		• Bamboo plantation	2.0	0
		• Fodder tree plantation		
		• Mixed fodder grass	0	111.03
			0	1.29
			0	6.39
			0	3.51
			0	40.85
			0	1.17
			0	5.18
Zhemgang	Nangkor	• Community Forestry & Private Forestry establishment	741.0	777.75
		• Water source protection		
		• Afforestation (Tree plantation)	4.0	0
		• Legume cropping		
		• Dryland terracing (bench terracing)		

		• Wetland terracing	3.8	0
		• Hedgerows plantation	26.4	0
		• Stone bunds construction	6.5	74.13
		• Agro-forestry	139.2	0
		• Orchards	132.0	5.65
		• Orchards and Hedgerows	33.0	0
		• Annual crops	13.0	0
			525.9	188.20
			0	0.76
			179.4	0
	Bardo	• Community Forestry & Private Forestry establishment	1009.0	713.0
		• Water source protection	4.0	0
		• Afforestation	9.3	0
		• Legume cropping	22.0	0
		• Grazing land	26.7	0
		• Dryland terracing	22.0	17.79
		• Wetland terracing	49.0	0
		• Hedgerows plantation	128.0	34.51
		• Stone bunds construction	168.0	54.8
		• Agro-forestry	9.9	0
		• Orchards	309.0	0
		• Annual crops	145.3	90.30
		• Orchard terracing		
		• Stone unds and Hedgerows		
		• Bamboo plantation		
		• Fodder tree plantation		

			0	0
			0	0.18
			0	5.10
			0	29.90
			0	3.37
	Goshing	• Community Forestry & Private Forestry establishment	787.0	438.46
		• Water source protection		
		• Afforestation	3.5	0
		• Legume cropping		
		• Grazing land	19.5	0
		• Dryland terracing		
		• Wetland terracing	55.8	0
		• Hedgerows plantation	16.5	0
		• Stone bunds construction		
		• Agro-forestry	117.0	14.66
		• Orchards	9.5	55.99
		• Annual crops		
		• Stone bunds plus Hedgerow	493.0	10.47
		• Orchard with Hedgerows	91.5	0
		• Orchard with stone bunds		
		• Check dams	6.0	22.50
		• Orchard with Hedgerows and stone bunds		
		• Bamboo Plantation	368.7	0
		• Fodder tree plantation	58.3	0.29
			0	3.39
			0	0.93
			0	0.62
			0	0.05
			0	4.25
			0	1.49

			0	0
Capacity building		• Farmers practicing SLM techniques (1805 people in pilot Geogs) • Geogs effectively adopting land degradation prevention practices • RNR Staff, Dzongkhag Tshogdu (DT) and Geog Tshogchung (GT) members trained in multi sectoral SLM appraoches • Farmers trained in application of SLM technologies • Ex-country Master Degree • Ex-country PG Diploma • Ex-country short-term training • Ex-country seminar/workshop • Farmers in-country training • Farmers in-country study tour	1341 9 93%, 100% & 88% 17,237 9 7 64 14 16,448 789	

3. SLMP evaluation objective

The purpose of the Evaluation of the SLM Projects was to to study the current SLM practices and evaluate its impacts of the past SLM Projects in Bhutan. It is envisaged that the evaluation will enhance information base on the prevailing SLM and help guide the government in scaling-up SLM projects in the face of threatening climate change, through domestic and international financing. As such, this evaluation, it is intended to achieve the following objectives:

- Learn whether SLM projects in the country have been effective in increasing community resilience to climate change,

- Determine whether SLM projects need to be scaled-up,
- Determine opportunities to mainstream the best practices of the SLM approaches in the policies, program and plans.

4. Methodology and Scope

In accordance to the Terms of Reference the evaluation assignment has been under the guidance of the Climate Investment Fund (CIF) Evaluation and Learning Exercise Steering Committee (ELESC) and working closely with the National Soil Service Center (NSSC), Department of Agriculture (DoA). In accordance to the information needs, this evaluation report differs slightly from the conventional evaluation report structure. This report focus on the findings from the available reference documents and the field visit and does not reflect rating of the project deliverables around the evaluation factors of relevance, achievements, efficiency, effectiveness, and sustainability. Ratings of the project achievements and outcomes are referable in The World Bank Report[9]. The evaluation exercise therefore followed following steps in its assignment;

- desk review of the available reference documents,
- field visits to three pilot Geog sites to validate the information and learn on-the-ground experiences of SLM benefits, in relation to climate change and various SLM technologies deployed,
- meeting with the stakeholder officials and beneficiary farmers,
- presenting the findings of the evaluation to the stakeholders, including CIF-ELESC and the BTFEC,
- evaluation on both qualitative and quantitative information and
- framing an evaluation report.

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5. Key Findings

To meet the objective of the project to reduce the pressure on land resources due to inefficient utilization of land resources and increase the productivity for food security, multi-activity SLM project was designed and implemented. To encourage demand for efficient SLM technologies, different forms

[9] The World Bank, 2013. Implementation Completion and Results Report (TF-55967), Report No.ICR00002867. South Asia Region.

of incentives and policy interventions initiated. The barriers that contribute to unsustainable land resources identified; (i) inadequate policies and weak institutional setup; (ii) use of inefficient SLM technologies, and (iii) low level of knowledge and expertise or capabilities to make use of modern and efficient SLM technologies.

SLM importance is realized indispensable in a mountain ecosystems living and agriculture practices. However, climate change was not cconsidered and implemented in the GEF/World Bank SLMP. Understanding about the potential threats of a climate change, SLMPs without adaptation strategy remains substandard. Making SLM integral part of climate change resilience is imperative.

5.1 Desktop Review Findings

Crucial findings from the available resource materials are;

- The SLM importance and need understandings elevated since the National Land Management Campaign initiated by the MoAF in 2005 (10 – 28 July).
- Poor land management has been found to be a prominent catalytic factor for 2004 monsoon devastating floods. The floods mostly in the eastern region of the country reportedly claimed 9 lives, 29 houses, 664 acres of arable land, 39 irrigation channels and 22 bridges.[10] A photographic report[11] by His Excellency Lyonpo Sangay Ngedup, the Minister for MoAF then states, "numerous cases of flash floods, landslides, landslips, roadblocks and loss of harvest were reported in the late 1990s and early 2000". This indicates that land degradation of a mountain terrain country is continuous and historical. The government and the people until 2004 simply did not have the capacity and resources to assess the causes, effects and options to address land degradation challenges.
- After the 2005 Land Management Campaign, the NSSC implemented two SLM related projects; (1) US$15.89 million Sustainable Land Management Project (2006 - 2013), financed by the GEF/World Bank (US$7.66m) with parallel financing from DANIDA (US$5.77m), (2) UNDP/GEF, AMEPP financed US$ 1.0 million PIMS 3393 LD MSP – Building Capacity and mainstreaming sustainable land management in Bhutan project (2007 – 2009).

[10] Department of Agriculture, 2005. Land Management Campaign (10 – 28 July 2005). Field Report # 206/01. Thimphu.
[11] Ministry of Agriculture, 2005. Serving the Farming Communities – Days in the RNR Sector. Thimphu.

- NSSC also is ongoing with implementation of two SLM related projects financed by the BTFEC and RGoB; (1) Ngultrums (Nu.) 20.965 million Up-scaling for Sustainable Land Management to combat Land Degradation and Climate Change Mitigation (2015 – 2018), and (2) Nu.6.0 million Working towards achieving land degradation neutral status: "protect-sustain restore" (2017 – 2019).
- The 2013 World Bank Implementation Completion and Results Report and the 2017 NSSC "Documentation & Mapping SLMP activities" on the same project have significant discrepancy in the activity achievement data as displayed above in Table 3. However, activity achievement results in both the documents overly fulfills the deliverable objectives outlined in the project appraisal document. This convinces a successful SLMP implementation.
- The SLMP activities focused on site specific needs and extended to cover livestock productivity and gully check dam constructions. Dominant activities however concentrated on agriculture and forestry; community forestry, agro-forestry, orchards, bamboo and hedgerow plantation, land terracing and construction of stone bunds, etc. In Trashigang Dzongkhag, bamboo plantation to control deep gully soil erosions dominated the project activities. Zhemgang Dzongkhag to discourage shifting cultivation has concentrated dominantly in wet land terracing, orchards and agro forestry. Phuentsholing Geog (mainly in Bosokha, Sirina and Lingden Chiwogs) concentrated on dry land terracing, stone bunds, community forestry, agro-forestry and hedgerow plantation.
- The prodoc design itself is limited to address physical land management challenges. No space was developed for climate change resilience capacity building and complimentary infrastructures to address SLM.
- The prodoc also is not comprehensive on gender equality in SLM activity distribution and capacity building opportunities. This perhaps is noting that gender disparity is not an issue when it comes to farming practices in Bhutan.

5.2 Three Pilot Site Findings

A questionnaire developed to facilitate the field evaluation also guides the findings from the field in this report.

5.2.1 Nangkor Geog, Zhemgang

Photo: Mr. Kinley with his half cultivated and half fallow paddy field at Bumzeling, Buli

The fallow paddy field is due to water shortage in paddy plantation season. In some places in Buli, wetland terracing has been undertaken without considering water sources and irrigation needs. This is a distinctive planning deficiency in the SLMP. Other drivers for fallow land mentioned by the farmer and local leaders are wildlife and other pests, land ownership rifts and fragmentation, and labor shortage due to youth rural-urban migration.

Photo: Kikhar Chiwog Tshogpa, Ms. Leki Zangmo showing SLM success sites of Mr. Nakphela

Ms. Leki Zangmo quoting the example of Mr. Nakphela's income and livelihood improvement in Kikhar after the MoAF SLM Campaign in 2005 showed his Agro-Forestry site and paddy field terraced on his own replicating the SLM techniques. Ms. Leki Zangmo says Mr. Nakphela's family today enjoys a minimum cash income of Nu.50, 000/- (Fifty thousand) per annum (more than Nu.4000/- per month) from the sales of his agro-forestry and livestock products while rice from the terraced wetland cultivation is more than sufficient to sustain family ration for the year. The Chiwog Tshogpa confirms

that 2005 SLM Campaign and the successive SLMP was an eye opening knowledge for the farmers in her Chiwog (Kikhar and Tali villages) and the adjoining Dakpai Chiwog. Today, almost every household in her Chiwog is working to replicate wetland terracing, Orange/Mandarin and Elettaria Cardamom orchards and fodder plantations in the areas where slash and burn shifting cultivation used to dominate. The Tshogpa further confirms that water shortage is a challenge for wetland cultivation. She sees an opportunity for irrigation in some areas of Tali, Kekhar as well as in Buli if Department of Roads (DoR), DoA and Local Governments initiate a cooperative scheme of combining road side drains to an irrigation channel. The earlier SLMP did not have provisions for complimentary infrastructure development.

Photo: Aum. Rimo, wife of Mr. Nakphela, preparing for the rice transplantation

During the site visit period, Mr. Nakphela was out in Gelephu for shopping. Ms. Rimo confirms that her family income improved ever since they practiced SLM in their fields gaining the knowledge from the 2005 SLM campaign and the following SLMP. The SLMP main activities undertaken in Nagkor Geog, Zhemgang include;

- Zhobling community under Goling Chiwog according to Chiwog Tshogpa Ugyen Penjor concentrated on dry land terracing and hedgerow plantation to conserve top soil and soil moisture,
- Kekhar and Tali communities under Kekhar Chiwog according to Chiwog Tshogpa Leki Zangmo focused on wetland terracing, cash crop orchards and agro-forestry in the areas like

Namzor, Kamina, Pangyungma to avoid shifting cultivation and adopt regular farming farming practices,

- Kamjong community under Dunmang Chiwog according to the Chiwog Tshogpa Ugyen Wangdi concentrated on dry land terracing and hedgerow plantations to control topsoil slip-down on the steep terrain,
- Buli community under Buli Chiwog according to Chiwog Tshogpa Kinley Wangchuk concentrated on wetland terracing, wetland conservation and community forestry in the areas like Mepang, Sangdue, Bumdali and Buli Gonpa.
- Nyakhar community under Nyakhar Chiwog according to Chiwog Tshogpa Tshewang Dorji concentrated on community forest for water source conservation and dry land terracing with hedgerow plantation for top soil conservation and livestock fodder.

Field questionnaire feedback:

The statements hereon are collective and individual views of the interviewees that include the central government officials, Dzongkhag and the Geog officials, and the beneficiary farmers.

Relevance

- All interviewees agree that the SLMPs are very relevant in Zhemgang Dzongkhag. Large area or mountain slope slips are not significantly visible, but, landslides and sinking areas to disrupt road traffic, water supplies, irrigation and small patches of agriculture fields are frequent and common. Top soil erosion is also visible due to exposure of land surface in shifting cultivation practices. The shifting cultivation also allies high forest fire risks to degrade biodiversity and expose land surface for soil erosion. Zhemgang Dzongkhag is known for high percentage forest cover and rich biodiversity. A well designed SLM practices will secure biodiversity conservation while elevating food security and land stability for human settlements.
- Dasho Dzongda Harka Singh Tamang and Dzongkhag Agriculture Officer Mr. Phuntsho strongly recommended replication of SLMPs and expansion of its coverage to other Geogs in the Dzongkhag. They fully acknowledge the benefits that the SLMP brought in three Geogs of Nangkor, Bardo and Goshing. Both the authorities suggest that future SLMPs should expand the activities to Sonamthang under Ngala Geog, in Panbang Dungkhag. Conversion to agriculture

fields of the plains in Sonamthang is envisaged to boost agriculture produce not only for the benefit the local community but also significantly to the national food security.

- Gup Dorji Wangchuk of Nangkor Geog powerfully expressed need of SLMPs at least for two to three five year developmental plan periods. He says Buli and other communities under his Geog fully understood the values of SLM and they are looking forward to elevate their capacities to make themselves able to undertake SLM on their own in the near future. The Gup also quoted that the Buli Tsho (Lake) conservation supported by BTFEC could be mainstreamed into SLM programmes of the community for sustainability.
- The local government officials and the farmers feel that SLM is a shared responsibility and every stakeholder/individual has a role to play. While central government agencies mainstream policies and mobilize resources to implement SLM projects, local governments and beneficiary communities must prioritize SLM for effectives and long-term benefits.
- Food and shelter is a common need irrespective of age, gender and status. It is therefore a common responsibility to shoulder in accordance to individual capability. All management authorities, planners, designers, resource mobilizers, transporters, local governments, men, women, elders and children have a responsibility to contribute in their own ways and capacity to the SLM efforts.
- SLM interventions and projects shall elevate food security and livelihood for the poverty eradication and national sovereignty. The government must put in additional efforts to mobilize resources for SLMPs.
- Local governments and farmers still remain innocent about climate change. The central government must prioritize accessing climate change funds for SLMP implementation and capacity building of the local communities in understanding climate change risks and adaptation needs.

Effectiveness

- Except for missing to learn and understand climate change, the SLMP targeted to explore and innovate physical SLM techniques has been implemented effectively. The activities were implemented as planned and designed. Satisfactory deliverables were achieved in terms of physical land conversions, development and human resources capacity building.

- All the stakeholders were given equal participatory opportunities. The SLMP planning, designing and resources distribution were consulted and implemented in consensus.
- The targeted beneficiaries benefitted from conversion, improvement and protection of their land as submitted for considerations during the project planning consultation. Over the years, land management challenges and costs reduced. Except for those fields remaining fallow, yields from the cultivating fields increased improving the food resources and income for the individual families.
- Climate change was never discussed and taught. Everyone in the field is still innocent about climate change.
- Did not realize any age and gender disparity in SLMP implementation. Everyone participating in the SLMP was given equal say and opportunity.

Efficiency

- No specific comments to contribute on efficiency.
- Resources were availed by NSSC. Allocation and distribution of resources were already planned from NSSC. Local government officials and the beneficiary farmers were given the opportunity to participate in the activities as planned and designed. The activities were found beneficial. Food and per diems as expected in accordance to government rates were paid. Capacity building at local levels was availed as organized. No long-term training availing officials are available in the Dzongkhag. Therefore, no comments on the effectiveness of resources utilization.
- Knowledge on SLM techniques were efficiently imparted. Although the local government officials are transferred and representatives not elected for the coming term, farmers acknowledge they know the SLM techniques. Should the resources be made available, they can replicate the activities.
- Special need of SLMP facilities was felt not necessary. Awareness on availability of such facilities was not notified. All age and gender however were given equal treatment and opportunity.
- As usual, SLMP was notified and enforced by the government through the local government missionaries.

Coordination

- No issue of coordination was realized or reported. NSSC seem to have coordinated well the SLMP implementation. Local RNR Officials were present for supervision and monitoring on regular basis and experts from the NSSC, DoA were seen frequently visiting the sites.
- Geog Administration and the RNR Officials were available on day to day contacts. Communication between the Geog, Dzongkhag and NSSC authorities seemed efficiently coordinated. Our (farmers) needs expressed were responded on time and as with justified results.
- No partialities observed or reported.
- Lack of SLM expertise with the local officials improved over the years with trainings and technical backstopping from NSSC.

Impact

- Agriculture and livestock productivity increase is visible wherever SLM interventions reached. Family income and livelihood improved. More children could go to schools.
- Looking forward to few more rounds of SLMP to enhance the SLM preparedness and replication capacity.
- Whole of Zhemgang Dzongkhang is aware of SLMP benefits and other Geogs are expecting replication of the project in their Geogs while present three Geogs look forward to few more rounds of the SLMP. If external supports are not available specifically for SLMPs, the communities expect the government to mainstream SLM in five year developmental plans.
- Not able to relate SLMP to climate change resilience since climate change knowledge was not imparted in the SLMP implementation process.
- Neighboring Geogs and communities are pressuring the Dzongkhag Administration to mobilize SLMP for their areas in the coming years.

Sustainability

- Seeing farmers replicating SLM within their capacity, SLM is realized beneficial. Further enhancing of the capacities obviously has hope for SLM sustainability.
- The farmers in Buli, Tali, Kekhar and Dakpai were seen replicating SLM activities especially wetland terracing and orchards development.

- Encouraging commercialization and cooperative farming, improving market accessibility and connectivity, introduction of preservation and storage facilities for harvest seasons are some suggested factors for sustainability of farming practices, land utilization and food security.
- SLMPs should continue and scale up. SLMP replication is necessary in all the Geogs in the Dzongkhag. Zhemgang Dzongkhag is also known for high percentage poverty. Therefore, SLM is relevant and important for Zhemgang Dzongkhag to eradicate poverty and sustain food security. Future SLMPs need to be comprehensive and inclusive of supplementary and complimentary components like access roads and bridges, grain storage yards and transportation facilities besides the actual land stabilization and productivity increase measures considering climate resilience needs.
- More focus of capacity building and project implementation need to be transferred to local governments and beneficiary farmers for sustainability of knowledge and project impacts. The central government agencies should focus on policy matters and ground implementation right from project activity planning opportunity need to be entrusted to local governments for knowledge and capacity transfer.
- For the SLM sustainability, external supports should continue at least for two rounds of a three year term or a five year term. An endowment fund establishment with the BTFEC or other financial institutions is another option for continuous support of SLMPs.
- Heard about climate change and its risks. However, nothing is known in detail how climate change will impact the land management, food and the livelihood of the people.
- With elderly people getting old and expiring and no younger generations to inherit the indigenous knowledge, indigenous knowledge as such also has been limited. Climate change is never heard discussing in the locality and communities seem to be innocent about climate resistant crop varieties.

Climate Change

- We heard people talking climate change in the urban areas. Common sense says temperature and monsoon fluctuation could impact on crops growth and fruiting, but, it is understood this could be temporary and not necessarily every year.
- No climate change issues have been discussed in the SLMP and we remain innocent about it.

5.2.2 Radhi Geog, Trashigang

Photo: (1) Deep rooted soil erosion creating gullies had been the main challenge

(2) Retired Gup, Mr. Samdrup who was the Gup of Radhi Geog during the SLMP Tenure guided the evaluation field visit.

In Radhi, deep rooted soil erosion creating gullies and fragmenting or distorting the farmland had been the main challenge. Bamboo plantation proved an effective technology to counter the problem and major SLMP activity in Radhi Geog had been Bamboo plantation. Bamboo also generated income from sales to the construction industry. The challenge brought in by the Bamboo forest is hosting wildlife to increase human-wildlife conflict.

Photo: SLMP signboard at Rangjung and mixed plantation Afforestation at Langten, Radhi

Afforestation of Bamboo plantation, community forestry improvement, fodder trees plantation and hedgerow plantation in Pangthangwong, mainly for land erosion control, water source management and livestock fodder produce have been the dominant SLMP activity in Radhi Goeg. Agro-forestry experts from Wengkhar Agro and Horticulture Research Centre have been the supervising and monitoring the activities. According to Mr. Tashi Phuntsho, Research Officer, Wengkhar Renewable Natural Resources (RNR) Research Centre (RC) and Ex-Gup Samdrup, SLMP in Radhi is a success story because land erosion has been substantially controlled and farmers generated cash income from sale of Bamboo to nearby construction industries.

The SLMP main activities undertaken in Radhi Geog, Trashigang include;

- Bamboo plantation under Radhi, Pangthang, Pakaling, Rochey, Langten and Samtorong Chiwogs.
- Agro-forestry, fodder and Hedgerow plantation at Pangthang, Rochey, and Langten Chiwogs.
- Community forestry improvement under Pangthang, Langten, Rochey and Samtorong Chiwogs.

Field questionnaire feedback:

The statements hereon are a collective and individual views of the interviewees that include the central government officials, Dzongkhag and the Geog officials, and the beneficiary farmers.

Relevance

- All interviewees agree that the SLMPs are very relevant in Trashigang Dzongkhag. Large area slope slipping is prominent in almost all the 15 Geogs of the Dzongkhag. The Geogs of Radhi, Phongmey, Udzorong,, Thrimshing and Lumang under the Dzongkhag are severely prone to landslides, slope slips and sinking to create gullies and wash away farmlands. Even human settlement areas are prone to such disasters in many areas. Of all the 20 dzongkhags, SLMP is crucial and urgent in Trashigang Dzongkhag.
- Dr. Tshering Dorji, NSSC and Mr. Tashi Phunstho, RNRN-RC, Wengkhar states that Trashigang is the biggest Dzongkhag and the most challenging Dzongkhag when it comes to land management. The land erosion areas are too large and steep, demanding high cost technology and manpower to confront the challenges. The land erosion challenge is there in almost all the Geogs under the Dzongkhag. The NSSC gives a priority on SLMP to Trashigang Dzongkhag.
- Both ongoing BTFEC supported SLMPs are in Lumang and Thungkhar Geogs under this Dzongkhag.
- SLM interventions and projects are crucial because it is about food and shelter. Without successive SLMPs poverty in Trashigang Dzongkhag will remain.
- Local governments and farmers still remain innocent about climate change.

Effectiveness

- Climate change understanding is missing. Otherwise the SLMP has been useful, timely and beneficial, effectively implemented.
- All the stakeholders were given equal participatory opportunities. The SLMP planning, designing and resources distribution were consulted and implemented in consensus.
- The targeted beneficiaries are all covered.
- Climate change was never discussed and realized.
- Did not realize any age and gender disparity in SLMP implementation.

Efficiency

- No specific comments to contribute on efficiency.

- Resources were availed by NSSC. Allocation and distribution of resources were already planned from NSSC. Local government officials and the beneficiary farmers were given the opportunity to participate in the activities as planned and designed. The activities were found beneficial.
- Knowledge on SLM techniques was efficiently imparted. The local government officials are transferred and representatives not re-elected, but farmers have the SLM knowledge. Only resources support is necessary.
- Special need of SLMP facilities was not felt necessary and awareness on availability of such facilities not created. All age and gender were given equal treatment and opportunity.
- As usual, SLMP was notified and enforced by the government through the local government missionaries.

Coordination

- No issue of coordination was realized or reported. NSSC seem to have coordinated well the SLMP implementation. Wengkhar RNR-RC Officials were present for supervision and monitoring on regular basis and officials from the NSSC, DoA were seen frequently visiting the sites.
- Geog Administration took full ownership in implementation of the SLMP. Communication between the Geog, Dzongkhag and NSSC authorities seemed efficient. No issue of coordination was therefore observed.
- No partialities observed or reported.
- Lack of SLM expertise with the local officials improved over the years with trainings and technical backstopping from NSSC.

Impact

- Agriculture and livestock productivity increase is visible wherever SLM interventions reached. Family income and livelihood improved. More children could go to schools.
- Looking forward to more SLMPs to enhance the SLM preparedness and replication capacity.
- Whole of Trashigang Dzongkhang is aware of SLMP benefits and other Geogs are expecting replication of the project in their Geogs while present three Geogs look forward to few more rounds of the SLMP. If external supports are not available specifically for SLMPs, the communities expect the government to mainstream SLM in five year developmental plans.
- Innocent about the climate change resilience, there were no comments.

- Neighboring Geogs and communities are pressuring the Dzongkhag Administration to mobilize SLMP for their areas.
-

Sustainability

- Local governments and farmers expect further SLMPs to support SLM replication.
- Improving access road conditions for market accessibility and connectivity is a priority for augmenting food security.
- SLMPs should continue and scale up. SLMP replication is necessary in all the Geogs in the Dzongkhag. Trashigang Dzongkhag also comparatively has a higher rate of poverty. Especially under Wamrong Dungkhag and Thrimshing Dungkhag where land erosion is prominent has higher rate poverty. SLMP under Trashigang Dzongkhag therefore is unavoidable.
- More authority and ownership of capacity building and project implementation need to be transferred to local governments and beneficiary farmers for sustainability of knowledge and project impacts. While central government agencies support to mobilize external supports, national policies and plans should mainstream SLMP in the decentralized activities for implementation with ground reality.
- For the SLM sustainability, external supports should continue at least for two rounds of a three year term or a five year term. An endowment fund establishment with the BTFEC or other financial institutions is another option for continuous support of SLMPs.
- Climate change is a foreign knowledge. Nothing is known how climate change can impact land management, food and the livelihood of the people.
- Indigenous knowledge techniques have not worked well in preventing the land erosions in Radhi Geog. Bamboo plantation was not thought of until SLMP brought in the idea.

Climate Change

- It will be appreciated if future SLMPs includes capacity building to enhance climate change knowledge, particularly to make all the stakeholders able to link climate change and SLM and make the communities' climate change resilient.

5.2.3 Phuentsholing Geog, Chukha

Photo: Mr. Santabir Rai, SLMP Field Coordinator (local) and Mr.Ram Prasad Rai, Bosokha Chiwog Tshogpa at Sirina for a cooling after the field rounds in a scorching sunshine.

Phuentsholing Geog, especially in the four Chiwogs of Pachudara (Pachu valley) concentrated on dryland terracing, stone bunds, agro-forestry and orchards plantation and community forestry to prevent topsoil erosion due to gravity slip in monsoon and in storm wind.Ockrchards or cash crop plantations like Orange/mandarin and Cardamom are found not growing well where it used to thrive few years back. On explaining potential impacts of climate change to migrate species, crop bleaching and drying, farmers were agreeing that it could be some sort of an impact. However, without climate change knowledge, they are not able to confirm.

Photo: Sirina on top of the eroded slope and Bosokha far above, under the cloud lines.

Photo: Dryland terracing, stone bunds and hedgerow (fodder grass) plantation at Bosokha and Sirina.

Photo: SLMP Land terracing, orchards and agroforestry plantation and community forestry improvement in Pachudara (Pachu valley) covering four Chiwogs of Bosokha, Tashidingkha, Lingden and PachuTar.

The Gup of Phuntsholing Geog, Mr. Birkha Bahadur Rai expresses his gratitude to the government for considering successive land management projects under Phuntsholing Geog. After the SLMP from 2006 to 2013, National Adaptation Programme of Action (NAPA) II Project support for land stabilization is ongoing in Kafreytar, Rametey, Rinchhending and Pasakha under the Geog. Rametey had a minor SLMP project plantation activities and NAPA II project is supplementing at a large scale.

Photo: Downstream Toorsa-khola flood every year with billions of tons of silt contribution from upstream which includes land erosion in Bosokha, Tashidingkha, Lingden, Sirina, PachuTar, etc.

Dungkhag Forest Extension Officer (DFEO) Mr. Nima Gyeltshen confirms that community forestry improvement and agro forestry plantation of Broom bushes, Bamboo, Sal *Shorea robusta* and Champ (scientific name not traced) has improved intensively the land stabilization and water sources conservation. Dungkhag Agriculture Extension Officer (DAEO) Mr. Gem Tshering states that agriculture productivity improvement has to be supplemented with storage and preservation facilities. According to the DAEO, Phutentsholing Geog is fertile and seasonal agriculture produce come in bulk. Road accessibility in monsoon is erratic and monsoon moisture and pests decay and destroy grains fast.

The SLMP main activities undertaken in Phuentsholing Geog, Chukha include;

- Dryland terracing, stone bunds, gully checkdams constructions and fodder trees, grass hedgerows, mixed trees plantation, community forestry improvement in Serina, Bosokha, Tashidingkha, Lingden areas.
- Orange and Cardamom orchards, Broom, Sal and Champ trees plantation in Pachutar, Lingden and Tashiding Chiwogs.
- Broom and mixed trees plantation in Rametey and Rinchending.

Field questionnaire feedback:

The statements hereon are a collective and individual views of the interviewees that include the central government officials, Dzongkhag and the Geog officials, and the beneficiary farmers.

Relevance

- All interviewees agree that the SLMPs are very relevant in Chukha Dzongkhag. Large area or mountain slope slips are significantly visible in the southern foothills. In the southern region of Chukha Dzongkhag, sub-tropical foothills are fragile and large area slope slipping and landslides are common. Starting from Jumbja after Gedu, large area slides are visible from the highway to Phuentsholing. Sorchen, Rametey, Rinchending, Kafreytar, Damdara which are visible sites and in the vicinity of Phuentsholing town are highly prone to landslides in monsoon. Bongo Geog and Logchina Geog which are not visible from Phuenthsoling town or the highway are also prone to major landslides in monsoon. Dungna feeder road which connects Logchina Geog to Phuenstholing and rest of the country is blocked most monsoon season. The Pachu side of the Phuentsholing Geog gets traffic disruption in monsoon but large area sliding is not as serious as it is in Damdara, Rametey and Pasakha Chiwogs. The main challenge in Pachu valley is the poor soil moisture, fast fertility degradation and loss of topsoil to gravity flow and windstorms on the steep slopes. Terracing and stone bunds therefore are effective technologies.
- The Dungpa, Gup, Dungkhag Agriculture Extension Officer and Mr. Santabir Rai (SLMP field coordinator) plead to the government to continue SLMPs. The Dungpa and the Gup strongly feel that SLMPs need to be scaled up to heavily invest like NAPA II Project. They say it is high time government mainstream SLM into five year plans.

- Expansion of SLMP coverage within the first three Geogs and to other Geogs in the Dzongkhag is urgently needed. The SLMP benefit is fully acknowledged for land stability and agriculture productivity increase.
- Gup Birkha Bahadur Rai expressed need of SLMPs at least for two to three five year developmental plan periods in the entire stretch of his Geog. He says his Geog entirely is prone to landslides. SLMP must be comprehensive to include supplementary/complimentary facilities and infrastructures like plant nursery, cereal seed supplies, access roads, bridges, cold-storage, etc.
- The local government officials and the farmers feel that SLM is a shared responsibility and every stakeholder/individual has a role to play. While central government agencies mainstream policies and mobilize resources to implement SLM projects, local governments and beneficiary communities must prioritize SLM for effectives and long-term benefits place demand such activities in the developmental plans.
- SLM interventions and projects shall elevate food security and livelihood for the poverty eradication and national sovereignty. The government must put in additional efforts to mobilize resources for SLMPs.
- Local governments and farmers still remain innocent about climate change. The central government must prioritize accessing climate change funds for SLMP implementation and capacity building of the local communities in understanding climate change risks and adaptation needs.

Effectiveness

- Except for climate change knowledge, the SLMP explored innovative SLM techniques and implemented effectively. The activities were implemented as planned and designed. Satisfactory deliverables were achieved in terms of physical land conversions, development and human resources capacity building.
- All the stakeholders were given equal participatory opportunities. The SLMP planning, designing and resources distribution were consulted and implemented in consensus.
- The targeted beneficiaries benefitted from conversion, improvement and protection of their land as submitted for considerations during the project planning consultation. Over the years, land management challenges and costs reduced.

- Everyone in the field is still innocent on climate change.
- No age and gender disparity in SLMP implementation. Everyone was given equal say and opportunity.

Efficiency

- SLMP is felt implemented efficiently.
- Resources were availed by NSSC. Allocation and distribution of resources were undertaken as planned in the prodoc. Local government officials and the beneficiary farmers benefited participating in the project implementation. The activities were found interesting and beneficial. Food and per diems were provided in every participation in an activity. Capacity building at local levels was good.
- Knowledge on SLM techniques was efficiently imparted. Farmers acknowledge they know the SLM techniques. With resources provided, they can replicate the activities.
- SLMP was notified and enforced by the government through the local government administration mechanism.

Coordination

- No issue of coordination was realized or reported.
- Geog Administration and the RNR Officials were available on day to day contacts. Communication between the Geog, Dzongkhag and NSSC authorities seemed efficiently coordinated.
- No partialities observed or reported.
- More training expected. Earlier SLMP trainings were good and knowledgeable.

Impact

- Agriculture and livestock productivity increase is visible.
- Land stability in the areas improved.
- Water sources are stable and made clean.
- Looking forward to SLMPs.
- Whole of Chukha Dzongkhang, more so, in Phuenstholing Dungkhag SLMP is felt urgent and in an up-scaling strength.
- Not able to relate SLMP to climate change resilience.

- Communities pressure local government (Dungkhag and Geog) authorities for more SLMPs.

Sustainability

- SLM is realized beneficial. However, resources supply and capacity building support is expected for sustainability.
- Encouraging commercialization and making SLMP comprehensive to include complimentary infrastructure development is crucial.
- SLMPs should continue and scale up. SLMP replication is necessary within the three Geogs and other Geogs in the Dzongkhag. Chukha Dzongkhag has significant percentage of population under poverty. SLM therefore is relevant and important to address poverty.
- More local level capacity building necessary.
- For the SLM sustainability, external supports should continue at least for two rounds of a three year term or a five year term. An endowment fund establishment with the BTFEC or other financial institutions is another option for continuous support of SLMPs.
- Climate change and its risks are not understood in detail.
- Very limited indigenous knowledge of SLM in the communities.

Climate Change

- Innocent about climate change.
- It will be interesting if future SLMPs address climate change and resilience to its impacts.

5.2.4 Capacity building

Ground level capacity building to encourage communities practice SLM techniques seem to have intensified in all the nine Geogs. As per World Bank completion report findings, more than 17,000 people across the nine Geogs have been given opportunity to build SLM capacity. In the three pilot Geogs only more than 1800 people were trained. Feedback from the field though is not very convincing. Many farmers claim they are still innocent on SLM techniques. Most local government officials in the three pilot Geogs and officials at the Dzongkhag were transferred to their present location after the SLMP.

Although the World Bank report recorded nine (9) Masters Degree and seven (7) Postgraduate Diploma delivered by the SLMP, the Dzongkhag and Geog officials claim that it is a normal trend that long-term trainings usually are availed by central agency officials. Even ex-country short-term trainings and study

tours are availed by the central agency officials. It was commonly said the Masters Degree and PGD of SLMP perhaps have not been different, They did not realize that the Dzongkhag and Geog officials availed these long-term SLMP trainings. The suggestion was that the future SLMPs concentrate capacity building to grass root levels because the sustainability of the SLM knowledge will be more assured if capacity building is targeted where the project implementation on the ground takes place.

5.3 Common Barriers to SLM

Common barriers to implementation and scale-up SLMPs include:

- Field barriers;
  - ✓ Lack of indigenous and modern SLM knowledge and technology,
  - ✓ Lack of financial resources,
  - ✓ Lack of manpower,
  - ✓ Lack of material sources and accessibility,
  - ✓ Wildlife attack on crops,
  - ✓ Lack of working cooperation amongst the SLM implementing agencies and beneficiary communities.
- Policy barriers;
  - ✓ Lack of a coherent and comprehensive SLM and Climate Change Resilience Strategy,
  - ✓ Limited climate change and SLM capacity building efforts, especially at community level,
  - ✓ Absence of incentives for research and development of innovative SLM activities,
  - ✓ No encouragement for private sector initiatives,
  - ✓ Limited information on sources of innovative SLM resources,
  - ✓ Limited enterprises that supply SLM technologies and services,
  - ✓ Poor monitoring and evaluation, and data base on SLMP activities,
  - ✓ Awareness and capacity building on SLM technologies three (3) Dzogkhags, nine (9) Geogs,
  - ✓ Lack of international examples of efficient SLM technologies,
  - ✓ SLM projects limited to agriculture practices. SLMP need to expand beyond field productivity targets, linking productivity to marketing opportunities.

6. Conclusions and Recommendations

6.1 Conclusions

- SLMP has been eye opening and beneficial. Replication and scaling up of the SLMP in terms of area coverage and resources volume is highly demanding;
- Highly demanding that future SLMP capacity building activities target grass root communities than government officials;
- Previous SLMP implementation progress as such has been on time, regular and effective in terms of its designed deliverables. Project period got extended to June 2013 without budget implications to complete some additional activities;
- Main project focus maintained closely towards the physical land stabilization and increasing agriculture products for food security;
- Project activities, which includes; Community Forestry & Private Forestry establishment, Afforestation, Legume cropping, Grazing land development, Land Management Campaign (LMC) + Slopping Agriculture Land Technology (SALT), Dryland terracing, Wetland terracing, Hedgerows plantation, Stone bunds construction, Agro-forestry, Orchards, Annual crops, have been beneficial in terms of water sources conservation, fodder source increase and environment greening besides its main target of land stabilization and increase in agriculture produce. The project is well received by the farmers and the local governments;
- Crucial complimentary infrastructure development for agriculture produce preservation and marketing such as access roads, bridges and storage yards demanded in future SLMPs;
- Although SLM activities have been relatively similar to climate change adaptation, climate change resilience knowledge had not been there in the earlier SLMP;
- Future Wetland terracing activity need to confirmation sources of irrigation water in the activity planning;
- Bamboo Plantation especially in Radhi Geog has a visibly a success story in protecting the land erosion and generating cash income from sales of the bamboo to the construction industry. This is an good example for replication of site specific SLMP activities;

- Another good example of site specific success story is the stone bunds construction and Hedgerows plantation in Phuentsholing Geog. The activities have been highly beneficial in stabilization of steep slope fields soil erosion.
- Focus of climate change resilience in future SLMPs is welcoming.

6.2 Recommendations

Nine central recommendations for SLM sustainability and food security;

Recommendation 1: To continue advocacy and capacity building on SLM with climate change resilience knowledge. Utilize national expertise on climate change from the national climate change focal agency, National Environment Commission (NEC) or consultancy services in formulation of the climate change resilient SLMPs. Developing a climate change strategy giving major concentration on adaptation needs to be prioritized.

Recommendation 2: SLMPs to broaden its coverage in terms of area as well as activities. All 205 Geogs need SLM replication, more so, in all the eastern, central and southern Dzongkhags. Without continuous SLM activities, farmlands, settlement areas, access roads, water sources, forests, market places, communication means, every livelihood in a mountain terrain is vulnerable to land degradation disasters. SLMP activity therefore should not be restricted to agriculture farmland and forestry management. Food security effort is inclusive and need comprehensive tackling techniques. Activity components should comprehend supplementary and complimentary infrastructures and stakeholders.

Recommendation 3: Mainstreaming SLM in the national Five-Year (developmental) Plan (FYP). Agriculture for food resources is unavoidable in human development. For a landlocked country, it is even more crucial to visualize self-sufficiency in food resources. Only through a comprehensive plan and resources distribution a sustainable land management can be secured. Project based SLM visions are good but not secured.

Recommendation 4: Accessing climate funds for SLM Projects. Sustainable Land Management (SLM) is an obligatory need to fulfil all the three Rio Multilateral Environment Agreements (MEAs). Considering climate change is a causal factor for land degradation while biodiversity degradation and

desertification are risks similar to land degradation, accelerated by climate change, opportunity must be availed to access climate funds for SLMPs. United Nations Framework Convention on Climate Change (UNFCCC) has created more sources funding windows for combating climate change and enhancing developing countries capacity to build resilience to climate change impacts. The UNFCCC funding sources include Green Climate Fund (GCF), Adaptation Fund (AF) and Least Developed Countries Fund (LDCF) for NAPAs. Multinational institutions like GEF, World Bank and Asian Development Bank (ADB) also provide support for MEA related projects. Funds may be accessed for direct time-bound SLM projects or to establish an endowment fund within the country with institutions like BTFEC for continuous SLM support.

Recommendation 5: To give more capacity building focus at the grass root level. For greater SLMP impacts and sustainable food security, capacity building is more needed at the grass root level, at the Geog/Chiwog elected representatives and farmers' level. The conventional capacity building planning and designing takes place at the central government agencies and focus obviously goes to capacity building of the central agencies officials.

Recommendation 6: Regular Monitoring and Evaluation (M&E) and technical backstopping. Technical backstopping is necessary at the time of introduction of the project and the techniques and during the capacity building stage. M&E is crucial to help farmers implement SLM activities more successfully and take ownership of the activities when the project is over. Therefore, capacity building must include M&E capacity building at the local level and introduce a regular M&E system to maintain good check and balance and reliable data that will be useful for mistake corrections and scaling up projects.

Recommendation 7: Recommendation 6 prompts to make this recommendation. Decentralizating SLMP implementation. SLMP need and implementation site is in the Geogs and Chiwogs. Effectiveness and efficiency of the project implementation is expected better if the implementation ownership and authority is decentralized. Planning and budgeting for the activities is expected to be more realistic and site specific if project implementation is placed in the hands of the affected local governments and the communities. Dzongkhag can undertake the coordinating responsibilities and Geog Administration should be able to supervise the project activities.

Recommendation 8: Coordination amongst the government agencies. Land erosion does not just impact agriculture and farmlands. Land erosion is potential to impact on all types of land-use and

infrastructure. Infrastructures such as schools, hospitals, roads, irrigation, water supply, villages, all are susceptible to land erosion. However, when it comes to land management, it is seems only MoAF is undertaking the responsibility. Other agencies concentrate to only their site specific challenges. A multi-sector effort, but at the local level should be addressing the challenges in a comprehensive approach.

Recommendation 9: SLMP mechanization and farmland protection from wildlife. Rural population has been squeezed majorly to elderly citizens. Most households in the rural areas have just a couple or a single person to undertake farming responsibilities. Due to modernization opportunities in the urban areas and the wildlife attacks on the crops, youths do not take interest in farming practices. On top of it, SLM activities are all labor intensive. The hard labor in agriculture farming and wildlife guarding discourage farming interests to lead to more and more fields remaining fallow. This goes against the national policies of self-sufficiency and poverty eradication. Mechanization of SLM is therefore imperative.

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CHAPTER 4

Feasibility Study on innovative and Sustainable financing mechanism for financing climate change projects including SLM to enhance climate resilience and food security in Bhutan

1. Executive Summary

The Bhutanese economy thrives on optimal utilization of limited land and other resources. The stability and productivity of arable land, rangeland and forests are critical for the sustenance of rural economy on which 58% of the population depends for livelihood. Hydropower, which is the main driver of the economy in terms of GDP contribution (16%) and government revenue (30%), is very much dependent on sound land use and management practices in the watersheds. The mining industry, recently identified as one of the five ÔJewelsÕ by Economic Development Policy, 2016 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 geological stability considerations and environmental management needs are not incorporated in their alignment, design and construction.

Numerous policies, plans, legislations and guidelines exist that provide abundant context and guidance to stakeholders for addressing land degradation if implemented in a coordinated and effective manner. As part of its 11th FYP, the MoAF has initiated various programs that contribute to addressing the land degradation issues in varying degrees. While Bhutan strives to balance the material needs of its people and conservation of environment, threats posed by climate change have reinforced the urgency to consider various options to prevent, mitigate and adapt to the changes that is and that will take place in the country.

Notwithstanding the supportive policies and legislations to deal with climate change, particularly land degradation, Bhutan still suffers from resource limitations that is critical for addressing land degradation and other climate change effects. Establishment of an Endowment Fund is deemed to be the most appropriate response in this regard.

Bhutan is also amongst the first few priority countries rolling forward the implementation of the SDGs since its adoption in 2015. While all 17 Goals are important, Bhutan has prioritized three SDGs (Goal 1 ÐNo Poverty; Goal 13 - Climate Action; and Goal 15 ÐLife on Land) for immediate implementation. These goals were prioritized on the basis of urgency to address the issue (No Poverty), BhutanÕs commitment to the global community to remain carbon neutral at all times (Climate Action); and be a champion and world leader by show-casing BhutanÕs success in terms of biodiversity (Life on Land). Without consistent financial resources in place it will be very difficult to achieve at least four of the targets under SDG 15, namely targets 15.2, 15.3, 15.4 and 15.5. Furthermore, because of the centrality of land to other dimensions of development, BhutanÕs inability to achieve SDG 15 is also seen to impede in significant ways, the achievement of other SDGs Ðmainly SDG 6, SDG 8, SDG 9 and SDG 11.

Due to competing priorities of the government such as education, healthcare, poverty, road, hydropower, tourism, etc., financial support to agriculture, particularly to land management has been limited. The government budget allocation for SLM interventions within the agriculture sector is also 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 been allocated total budget outlay of Nu. 2,493.86 mil, averaging about Nu. 124.69 mil for each Dzongkhag and the Gewogs have total budget outlay of Nu 3,282.59 mil, forming an average of Nu. 16.01 mil/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.

Based on the assessment carried out using a set of criteria (objective of the fund, legal environment, financial sustainability and HR & institutional capacity), there are no imminent challenges foreseen that could impede successful management of an endowment fund so long as the fund is established through a separate window within the existing institution. However, securing a sustainable source of finance for capitalization will depend primarily on BTFEC's ability to raise initial capital from donors and RGoB.

Capitalization of USD 15 million is found adequate to establish the endowment fund based on the assumptions considered for cost and returns on investment. Even though its returns fall short of resource gap beginning the year 2034, initial capital of USD 15 mil. yields sustainable returns for a reasonable period of time (16 years) after which investment management could be adjusted depending on changing situations and needs.

In regards to source of fund, mobilization of fund from both external and internal sources will be crucial. Support of GEF and GCF in establishing fund is inevitable. BTFEC is eligible for continued GEF funding for climate change, biodiversity, sustainable agriculture, agroforestry and land restoration programs. The objectives of establishing the fund are also fully aligned with both the BTFEC Strategic Plan for 2015-2020 as well as the Green Climate Fund (GCF) investment priorities.

In addition to international sources, RGoB's own contribution in establishment of the fund is deemed crucial. The objectives of fund are well aligned with Bhutan's global commitments including SDGs and establishment of the fund would have far reaching impact in addressing one of the most important national priorities of ensuring food security in the country. RGoB's own contribution to the fund would be the first step that signals the commitment and ownership of the government to address challenges related to climate change including land degradation.

Moving forward, needs assessment of SLMP interventions across the country and detailed cost estimates may be conducted and produced. Cost estimation has central role to play in the financial analysis. The entire financial analysis including the resource gap and determining the initial capital required hinges on the cost that was considered in the analysis.

To fulfil the objectives of SLMPs in enhancing the rural livelihood, integrated efforts from different stakeholders is found crucial. While the NSSC's focus is on prevention of land degradation and improving land productivity using various technologies, interventions in terms of marketing and access to market needs to be improved. This is in light of marketing challenges faced by communities against the backdrop of improved yield due to SLMPs.

To promote better ownership and sustainability, farmers need to be encouraged to bear certain cost of SLMPs carried out in their land and the incentive package that is normally provided may be reviewed. This appears to be critical given the prevalence of high dependency syndrome among the beneficiaries of the erstwhile projects.

2. Introduction

Climate change and its impact on various sectors such as agriculture, water, infrastructure and hydropower have increased pressure on implementing climate resilient activities in Bhutan. Addressing challenges posed by climate change requires significant financial resources. Against the backdrop of resource constraint faced by the Royal Government of Bhutan due to competing priorities and increasing withdrawal of bilateral and multilateral donor agencies, the Royal Government and BTFEC are keen on exploring setting up of Innovative Financing Mechanism to ensure sustainable flow of fund for climate change activities.

The Royal Government and BTFEC have determined to consider the establishment of endowment fund as one of the key activities of Bhutan SPCR to be supported by CIF if the establishment of the fund is found appropriate through the study. The Royal Government and BTFEC anticipates that through such innovative financing mechanism, Bhutan can generate a sustainable flow of finance to implement SLM projects and address other climate related issues, for all times to come.

This report draws on the relevant policies and plans of the government in emphasizing the need and basis for an endowment fund. It is also based on interviews with the experts of BTFEC, NSSC, observations of on-ground implementation of SLMP projects that were implemented in 2006-2013 and the beneficiaries thereof. The objective of this report is two fold: First, it provides a clear overview of the key issues faced with respect to climate change and land degradation and the institutional arrangements that are established in Bhutan to deal with them. Secondly, it explores the possibility of establishing an endowment fund within the current set up of BTFEC using a set of feasibility criteria developed by the UNDP. The feasibility criteria were developed by UNDP based on the learnings from various climate funds in the Asia-Pacific countries. However, it is beyond the scope of this report to discuss the design and building process of the fund which may be followed upon feasibility study and decision of the BTFEC.

3. Background

3.1 Climate Change

3.1.1 Current and Expected future climate in Bhutan

Bhutan is part of the Eastern Himalayan region - an area where the impacts of climate change are often more severe than anywhere else in the world. The regionÕs glaciers have been melting at alarming rates, and it is suffering increasingly intense rainstorms that activate damaging floods and landslides. Air temperatures are rising steadily and this warming has seen Bhutan experiencing more warm weather and extreme events such as Glacier retreat posing GLOF threats, reduction in availability of water for agriculture, loss of habitat and increased incidences of pest and diseases over the recent years.

Studies suggest that rainfall pattern in Bhutan shows high variations and steady increase of 500-600 mm per year in annual precipitation from 2000 mm per year in 1980 to 2600 mm per year in 2069. Erratic monsoons are also increasingly causing windstorms and multiplying the risk of forest fires during the drier winter seasons due to reduction in winter rains. Likewise, analysis of annual mean temperature between 1980 and 2069 shows steady increase in air temperature by around 3.5 ¡C. Trend analysis of summer and winter mean air temperatures

from 2005 to 2015 shows that annual mean temperature in both temperate and subtropical regions are gradually rising[1].

Bhutan is highly vulnerable to the effects of climate change due to its geographical features. The risk is further pronounced as close to 60% of its population depends on agriculture for livelihood. Hydropower and tourism are the other two important drivers of the Bhutanese economy and these sectors also face enormous risks due to climate change. However, The RNR sector comprising of agriculture, livestock and forestry is perceived to be one of the most vulnerable sectors to climate change and climate induced disasters.

3.1.2 Institutional arrangement for climate change

Bhutan has established conducive policy support and guidance to promote environmental conservation and to pursue climate change adaptation and mitigation programs and projects.

Bhutan 2020 outlines the countryÕs development goals, objectives and targets with a twenty-year perspective to maximize Gross National Happiness (GNH). It enunciates BhutanÕs development pursuits to be carried out within the limits of environmental sustainability and without impairing the ecological productivity and natural diversity, providing the policy context for sustainable development - implicitly encompassing a path that is resilient to and mitigates climate change.

Guideline for Preparation of 12th Five Year Plan, 2016: Firmly anchored on the values of Gross National Happiness and drawing on the principles of Result Based Management, the Guideline identifies two National Key Result Areas ÐNKRA(5) and NKRA(6). NKRA(5) is about continuing to conserve BhutanÕs natural environment that provides many essential ecosystem services such as clean air & water, and natural resources required for development. NKRA(6) is about ensuring a carbon neutral development path and building capacity to respond, mitigate and adapt to climate change. It is also about building BhutanÕs resilience to disaster impacts. NKRAs are highest priority outcomes identified by the government to be achieved by the end of the five-year plan.

Eleventh Five-Year Plan (2013-2018): The overall goal of 11th FYP is to achieve Ò*self-reliance and inclusive green socio-economic development.*Ó The term Ò*green*Ó in the development goal is explained to mean Ð carbon neutral development. The plan seeks to promote carbon-neutral and environmentally sustainable development, and engenders mainstreaming of environment, climate change and disaster risk reduction as crosscutting issues along with gender and poverty reduction.

National Adaptation Program of Action (NAPA) was produced in 2006 and regarded Glacier Lake Outburst Floods as the highest priority climate induced hazard. The NAPA was reviewed and updated in 2012 to incorporate new climatic hazards such as windstorms, fire and cyclones and also to take stock of the implementation status of the priority projects.

RNR Sector Adaptation Plan of Action (SAPA, 2016): The RNR-SAPA 2016 consolidates, integrates and updates the climate change adaptation related programs, themes and actions of the RNR sector as proposed in the 11th FYP with a core objective of mainstreaming climate change adaptation into the 12th FYP. The adaptation plans of action are grouped into three core

[1] State of Climate Change Report for the RNR Sector, 2016. MoAF

themes of Agriculture and Food Security, Water Resources and, Forest and Biodiversity.

National Action Program to combat Land Degradation, 2014 was developed in recognition of the urgency of land degradation issues and in order to streamline the planning and implementation of various land management activities of different sectors in Bhutan. It replaces the erstwhile NAP 2010 and aligns with the UNCCDÕs 10-year strategic plan (2008-2018).

National Environment Strategy (NES), 1998 identifies and describes the main avenues and approaches for sustainable development. The strategy is currently under review and in the absence of a separate climate change policy, the revised NES will among other things focus on low-carbon and climate resilient development, addressing both climate change mitigation and adaptation aspects.

National Forest Policy, 2012 serves as the guiding policy framework for forest management and nature conservation. It recognizes the important role of sustainable forest management in climate change mitigation and adaptation. The policy adopts an integrated landscape-level approach to sustainable forest management.

Bhutan Water Policy, 2003 describes the approach and context of water resources management from a multi-sectorial perspective. The policy advocates integrated water resources management to address existing and emerging water issues including those arising from climate change. It identifies priorities of allocating water for drinking and sanitation, for food production for hydropower development and for industrial purposes.

The Water Act of Bhutan, 2011 assigns the NEC to prepare and continuously update the National Integrated Water Resources Management Plan (NIWRMP) for conservation, development and management of water resources. The plan shall be mainstreamed into National Policies, Plans and Programs. It also requires establishment of River Basin Committees (RBC) within a basin for the purpose of proper management of water resources and to prepare River Basin Management Plans (RBMP). The act accords water use priorities such as Ð1) water for drinking and sanitation; 2) water for agriculture; 3) water for energy; 4) water for industry; 5) water for tourism and recreation; and 6) water for other uses.

National Communications to the UNFCC: The Initial National Communication of Bhutan was produced in 2000 and the Second National Communication in 2011. These National Communications provide inventories of GHG emission and sequestration, describes climate change vulnerabilities, and outline a wide range of adaptation and mitigation options across various climate-sensitive development sectors.

In its Intended Nationally Determined Contributions (INDC) Bhutan has reconfirmed its target to remain carbon neutral at the COP 21 in Paris. Bhutan also committed itself to maintain a minimum of 60% of land area under forest cover.

National Strategy and Action Plan for Low Carbon Development, 2012 was primarily prepared in support of BhutanÕs commitment to remain carbon neutral development at the 15th Conference of Parties of the UNFCCC in Copenhagen in December 2009. It presents a long-term national strategy comprising of various scenarios analyzing development paths from 2005 until 2040. Concomitant to these scenarios, the action plan articulates a number of short and medium- term interventions under various development sectors to achieve sustainable

economic growth through green and low-carbon growth.

National Disaster Management Act, 2013 establishes the National Disaster Management Authority at the central level chaired by the Prime Minister; formalizes the establishment of Dzongkhags Disaster Management Committee in all Dzongkhags and sub-committees at Dungkhag and Gewog levels.

3.1.3 Ongoing climate change adaptation programs

There are several key adaptation initiatives that have been completed, or are underway in Bhutan. Examples include, inter-alia:

IFI and UN Supported Climate Adaptation Projects

a. National Adaptation Program of Action (NAPA) of 2006 and 2012: with 8 identified priority adaptation projects;
b. Reducing Climate Change Induced Risks and Vulnerabilities from GLOF in Punakha, Wangdi Phodrang and Chamkhar Valleys: supported by the GEF, UNDP, Austrian Government, and WWF;
c. EU GCCA: to enhance resilience of Bhutan's rural households to the impacts of climate change and natural variability;
d. High Altitude Northern Areas (HANAS): supported by the GEF, to enhance conservation management of the High Altitude Northern Areas (HANAS) landscapes
e. REDD+ Readiness Program: with support from the UN-REDD Program, World Bank FCPF window, and UNDP, UNEP, and FAO, to identify drivers of deforestation and forest degradation, forest reference emission level (FREL), quantify and valuate ecosystem services, monitor, report and verify (MRV), and fund mobilization;
f. GEF-SGP under UNDP: with 55 on-going SGP projects spread across the country;
g. UNEP (through the United Nations Development Assistance Framework): to support MDG 7 & UNDAF Outcome 5 to strengthen national capacity for environmental sustainability and disaster management;
h. GEF TRUST Fund (GEF 6): to primarily focus on alternate modes of transport, including electric vehicles, reducing threats to biodiversity and making rural livelihoods resilient to climate risks;
i. LDCF: Addressing the Risk of Climate-induced Disasters through enhanced National and Local Capacity for Effective Actions (NAPA II Project).

The following agencies support activities relating to biodiversity conservation and Climate change:

a. Bhutan Trust Fund for Environmental Conservation (BTFEC): to support climate change adaptation strategies and interventions, green sector projects, rural and community development projects, and IWRM;
b. World Wildlife Fund Bhutan: to support climate mitigation and adaptation programs and activities on biodiversity conservation for building resilience in protected areas;
c. International Centre for Integrated Mountain Development (ICIMOD): to support climate mitigation and resilience activities, such as black carbon monitoring; rural livelihoods & climate change adaptation in the Himalayas; and establishment of Bhutan climate observatory to monitor the atmospheric pollutants and cryosphere monitoring;
d. Government of Finland (eg. Endowment Fund and strengthening of hydro-meteorological services);
e. Government of Netherlands (in agriculture, renewable energy and water);

f. Swiss Development Cooperation (SDC ÐHELVETAS) (in participatory forestry, and Local Governance Sustainable Development Program on mainstreaming gender, environment, climate, disaster, and poverty).

3.2 Land Resource - Overview

Out of 38,394 km^2 of Bhutanõ3 land area, forest constitutes 70.46%, shrubs 10.81%, while cultivated agricultural land and meadows account for 2.93% and 4.10% respectively. The snow cover constitutes 7.44% while bare areas constitute 3.20%. Degraded areas, water bodies, built up areas, marshy areas and non-built up areas constitute less than 1% each[2].

The Bhutanese economy thrives on optimal utilization of limited land and other resources. The stability and productivity of arable land, rangeland and forests are critical for the sustenance of rural economy on which 58% of the population depends for livelihood[3]. Hydropower, which is the main driver of the economy in terms of GDP contribution (16%) and government revenue (30%)[4], is very much dependent on sound land use and management practices in the watersheds. The mining industry, recently identified as one of the five jewels by Economic Development Policy, 2016 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 geological stability considerations and environmental management needs are not incorporated in their alignment, design and construction.

3.2.1 Land Degradation Issues in Bhutan

Land degradation in Bhutan is attributable to multiple causes including 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.

Recurrent forest fire is reported to have significantly contributed to land degradation. Reports suggest that 239 incidents of forest fires affected 19,230.77 hac of land in five years between 2008-13. Almost all of the forest fires in the country are caused by human, either accidentally or intentionally[5].

Fuel wood being the main source of energy, especially in the rural areas has also contributed to land degradation. Fuel wood is extensively used for industrial production, agro and forestry products processing, road construction, hospitals, schools, military encampments and monasteries.

Livestock being an important economic activity among the rural communities, overgrazing is one of the factors contributing to land degradation, with much of the grazing occurring in open

[2] Bhutan Land Cover Assessment, 2010. Technical report. MoAF
[3] Statistical Yearbook, 2016. National Statistics Bureau.
[4] Annual Report 2015-16, Royal Monetary Authority (RMA)
[5] The National Action Program (NAP) to Combat Land Degradation, 2014. MoAF

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[6].

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 Ôjeri Õcultivation 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 have been environmentally challenging considering the topography and fragile geological conditions

Significant adverse impacts of mining have been felt in terms of 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. Laws and regulations pertaining to mitigation measures in the sector have not been effective due to inter-agency coordination, ambiguous institutional mechanisms for enforcement, and inadequate technical capacity within the mining companies as well as the concerned oversight agencies of the government.

Rise in forest based industries and mineral based industries in the recent years have also contributed to land degradation as these industries depend on extraction of raw materials such as wood and minerals.

In addition to direct factors for land degradation, the country has also experienced a number of threats due to 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.

3.2.2 Institutional Arrangement for Land Degradation

Numerous policies, plans, legislations and guidelines exist that provide abundant context and guidance to stakeholders for addressing land degradation if implemented in a coordinated and effective manner. The guiding documents relevant to addressing land degradation are listed in the table below:

Table: List of supporting Policies and Legislations

Existing Policies & Strategies	Existing Legislations & Supporting Regulations
National Forest Policy 2009	Forest and Nature Conservation Act 1995
Community Forest Strategy 2009	Forest & Nature Conservation Rules 2006
Plantation Strategy 2010	Forest Management Code of Bhutan 2004
National Strategy for Development of NWFP in Bhutan 2008	Forest Fire Rules 2012

[6] The National Action Program (NAP) to Combat Land Degradation, 2014. MoAF

National Human-Wildlife Conflict Strategy 2008	Mines and Mineral Management Act 1995
National Environment Strategy 1998	Environmental Assessment Act 2000
Bhutan Water Vision and Bhutan Water Policy 2007	Road Act of Bhutan 2013
National Urbanization Strategy 2008	Livestock Act 2001
National Strategy and Action Plan for Low Carbon Development	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
Biodiversity Action Plan for Bhutan 2009	Disaster Management Act 2013
National Adaptation Program of Action for Climate Change	Local Governments Act 2009
Economic Development Policy of Bhutan 2016 (Revised)	Waste Prevention and Management Act 2009
	Water Act of Bhutan 2011

Source: The National Action Program (NAP) to Combat Land Degradation, 2014. MoAF

Since land degradation issue cuts across multiple sectors many agencies have various roles to play, directly or indirectly, in line with the above mentioned policies and legislations. However, MoAF has the lead role to play as the ministry mandated with the mission to Ò*To ensure sustainable social and economic well-being of the Bhutanese people through adequate access to food and natural resources*Ó. Within the MoAF, the NSSC is the focal point for UNCCD but its influence is limited to only agricultural land management making coordination of SLM projects with other sectors difficult. Details of institutional structure and implementation roles and responsibilities with respect to addressing land degradation issues are provided in the Agriculture Land Development Guideline (ALDG), 2017.

In regards to monitoring and evaluation of LDN activities, a two-tier committee has been formed for the NAP 2014 which can also be used for the LDN. The high level NAP monitoring and coordination committee consists of 16 members while the lower Working Group has 18 members. The high level committee meets at least once in two years and is responsible for any policy and coordination issues. The Working Group members are responsible for implementation of the NAP/LDN activities. They submit annual progress report to the high level committee.

The LDN activities are also monitored and evaluated by the Royal Audit Authority both for financial and physical progress just like any other activities for each agency.

3.2.3 Ongoing Programs to combat Land degradation

As part of its 11th FYP the MoAF has initiated various programs that contribute to addressing the land degradation issues in varying degrees. The programs and activities are structured in five thematic areas[7] as below:

[7] The National Action Program (NAP) to Combat Land Degradation, 2014. MoAF

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.

3.2.4 Financial Management

Direct budget support

Against the backdrop of small economic base and limited source of revenue generation for the government, the Royal Government has always followed prudent public finance management over the past years. The Constitution of the country stipulates, Ò*the government shall ensure that the cost of recurrent expenditure is met from internal resources of the country*[8]Ó. Investment in infrastructure and farm machinery support have mostly been financed by ODA. However, due to competing priorities of the government such as education, healthcare, poverty, road, hydropower, tourism, etc., financial support to agriculture, particularly to land management has been limited. For instance, the total budget allocated to the RNR sector varied between 9-14% of the countryÕs total budget form 2008-2014. In the 11th FYP, the budget allocated for SLM activities is only 1% of the budget of the RNR sector[9]. The indicative capital

[8] The Constitution of the Kingdom of Bhutan. Article 14, Section6.

[9] Bhutan – Land Degradation Neutrality Report, 2014

outlay for MoAF in the 12th FYP is projected to be only 2.7% (Nu. 3.1 billion out of Nu. 115 billion)[10] of total capital outlay for the plan. The Royal Government's ability to finance SLM activities based on the past trend would pose enormous challenge to fulfil the target set in the Land Degradation Neutrality which sets a total LDN target of 63 km^2, warranting USD 16.00 million by the year 2040.

Donors support

ODA has always played crucial role in Bhutan's development. The share of external finance in the overall resource outlay has been at least 50% and has been consistently increasing between the 1st and 10th FYP. Only in the 11th FYP (2013-2018) has its share reduced to 27.5%. The GoI remains the main source of external funding to Bhutan ever since the start of development plans. However, the only significant external assistance received on land degradation issue was the financial assistance provided for the SLM project by the World Bank through GEF (US$ 7.66 mil) and the DANIDA (US$ 5.77 mil) in 2006 and UNDP financed project on SLM in 2007-2010.

Of late, with increase in per capita income and living standard of the Bhutanese, external assistance has started to decrease as some of the development partners have started to withdraw their support. The decline in external assistance amidst limited government revenue and increasing threats posed by climate change presents yet another challenge of securing sustainable land management.

Trust fund

The BTFEC was established in 1992 with a Royal Charter for the conservation of environment and Biodiversity. 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$ 50 M[11] 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[12].

4. Why The Endowment Fund/The Case for Endowment Fund

The indispensable value of land is highly appreciated in Bhutan, more so with the recent pressure on land emanating from advancement of development pursuits such as infrastructure development and hydropower generation. While Bhutan strives to balance the material needs of its people and conservation of environment, threats posed by climate change have reinforced the urgency to consider various options to prevent, mitigate and adapt to the changes that is and that will take place in the country. The numerous policy and legislative measures undertaken as mentioned under sections 3.1.2 and 3.2.2 are evidence to the degree of emphasis placed on the climate change and the value of scarce land resource to the Bhutanese people.

[10] Guidelines for Preparation of 12th Five Year Plan, GNHC

[11] Annual Audited Report, 2015-2016. BTFEC

[12] The National Action Program (NAP) to Combat Land Degradation, 2014. MoAF

Notwithstanding the supportive policies and legislations to deal with climate change, particularly land degradation, Bhutan still suffers from resource limitations that is critical for addressing land degradation and other climate change effects. Establishment of an Endowment Fund is deemed to be the most appropriate response in this regard. Below are some of the key rationales for setting up an Endowment Fund:

4.1 Sustainable Development Goals

In September 2015, Bhutan together with the global community adopted ÒThe *2030 Agenda for Sustainable Development Goal (SDGs)*Óin UN headquarters at New York. Bhutan is also amongst the first few priority countries rolling forward the implementation of the SDGs since its adoption in 2015. While all 17 Goals are important, Bhutan has prioritized three SDGs (Goal 1 Ð No Poverty; Goal 13 - Climate Action; and Goal 15 Ð Life on Land) for immediate implementation. These goals were prioritized on the basis of urgency to address the issue (No Poverty), Bhutanõs commitment to the global community to remain carbon neutral at all times (Climate Action); and be a champion and world leader by show-casing Bhutanõs success in terms of biodiversity (Life on Land).

Without consistent financial resources in place it will be very difficult to achieve at least four of the targets under SDG 15, namely targets 15.2, 15.3, 15.4 and 15.5[13]. **Furthermore, because of the centrality of land to other dimensions of development, Bhutanõs inability to achieve SDG 15 is also seen to impede in significant ways, the achievement of other SDGs Ðmainly SDG 6, SDG 8, SDG 9 and SDG 11.**

4.2 Land Degradation Neutrality (LDN)

In order to operationalize NAP to combat land degradation Bhutan produced its National Land Degradation Neutrality (LDN) Report in 2014 with the support of UNCCD Secretariat and the Republic of Korea. The report has set the total LDN target of 63 km^2 until 2040 which would cost USD 16 mil[14]. The report also highlights that the achievement of the target would hugely depend on availability of external funds.

4.3 Inadequate Financial Support for SLM

The government budget allocation for SLM interventions within the agriculture sector 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 been allocated total budget outlay of Nu. 2,493.86 mil, averaging about Nu. 124.69 mil for each Dzongkhag and the Gewogs have total budget outlay of Nu 3,282.59 mil, forming an average of Nu. 16.01 mil/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.

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15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world

15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development

15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species

14 Bhutan – Land Degradation Neutrality Report, 2014

It is well established that the problem of land degradation is widespread across Bhutan and there are thoroughly tested low cost SLM technologies to deal with. However, ever since the MoAF initiated the LMC in 2005, the ministry has been conducting SLM related activities on a small scale confined to few Gewogs mainly due to shortage of budget allocation. The withdrawal of external assistance from supporting Bhutanõs development activities is expected to pose increased resource constraint.

Box 1

Case Study of BTFEC Financed Projects on Sustainable Land Management

SLMP projects financed by BTFEC are proving successful as demonstrated by two projects that are implemented in the eastern region of Bhutan. BTFEC has financed two projects titled ÒUp-*Scaling Sustainable Land Management to Combat Land Degradation & Climate Change Mitigation*Ó at Jarey and Thangrong Gewogs in Lhuntshe Dzongkhag. The projects were initiated in 2015 by the NSSC. With resource outlay of Nu. 11.96 million, the project aims to promote and implement sustainable land management (SLM) practices and agro forestry principles to enhance rural livelihoods in the two Gewogs.

As of July 2017, 337 households are reported to have benefitted from SLMP interventions that include development of SLM plan, training of farmers and supply of farm tools. SLM pans were developed for 10 Chiwogs for three years. Hands on training on Napier hedgerow establishment and stone contour bund construction in dry land were conducted and 12 acres of landslide sites have been stabilized. The farmers have begun to generate income from sale of Napier slips and fodder availability have been enhanced for farmers besides additional benefits such as ease of working and more productive use of time.

The above case study indicates that SLMP interventions financed by BTFEC are proving to be beneficial in terms of combating land degradation and enhancing the livelihood of rural population. If access to increased resources are made available, combined efforts of BTFEC and NSSC have the potential to make significant differences in dealing with land degradation and enhancing food security in the country.

5. Feasibility Criteria

This section explores the possibility of establishing an endowment fund within the current set up of BTFEC using a set of feasibility criteria developed by the UNDP. The feasibility criteria were developed by UNDP based on the learnings from various climate funds in the Asia-Pacific countries. Assessment of essential components required for establishing an endowment fund are outlined below according to the criteria:

5.1 Strategic Role/Objective

The objectives of establishing an Endowment Fund are to:

- Collect, invest and channel resources sourced from international and national public finance towards climate change projects and programs including SLMPs in more efficient and effective manner;

- Provide predictable and sustainable financing of long-term interventions necessary for climate mitigation and adaptation measures including the latest SLMP technologies;
- Establish unified system of financing through improved national-level coordination of and accounting for climate finance including SLMP interventions;
- Contribute to enhancement of rural livelihood and food security of the country through SLMP interventions.

In view of the challenges faced in accessing limited resource of the government and multilateral climate finances it is evident that establishing a predictable and sustainable financing mechanism would have far reaching impact in addressing issues related to climate change activities including land degradation in Bhutan. Secondly, although the threats posed by climate change are real and its impacts are increasingly borne by majority of Bhutanõs population in rural areas, lack of coordinated and unified system of financing obscures the readiness of the state to deal with such challenges in the short run as well as in the long run.

5.2 Legal Feasibility

Experience in other countries show that a fund that is established by a law will most likely be more sustainable. When a law is required for the establishment of a fund, support from parliamentarians may be necessary depending on the existing legal framework in the country. The process of gaining the political support may also take longer. However, with a strong legal basis the process of getting the fund operational can be accelerated.

In view of the above and through consultation with the management of BTFEC, it was learned that establishment of the endowment fund through a separate window within the existing Fund would not pose political or legal challenges as the initiative is within the mandates of BTFEC. Review of the Royal Charter and the By-laws reaffirm this position:

Article III, Section 3.0 of the Royal Charter issued for establishment of BTFEC in 1996 states;

> *ÒCapital of the Trust Fund shall be constituted by contributions/grants from donor countries/organizations, and shall consist of the principal and investment incomeÓ.*

Likewise, Article III, Section 3.1 states;

> *ÒThe Trust Fund shall continue to mobilize contributions/grants from donorsÓ.*

Furthermore, Article 9, Section 9.1 of the By-laws adopted by BTFEC in 2014 states;

ÒPursuant to Article 2.2 of the Royal Charter, the BTFEC may, in addition to the six themes for field programs specified under Article 2.1 of the Royal Charter, also support programs to address ecological stressors having direct linkages and/or adverse impacts on the natural environment of Bhutan as defined in the periodic ***strategic plan****Ó.*

Although climate change activities and SLMPs are not mentioned explicitly in the Strategic Plan (2015-2020) of BTFEC, climate change related disasters and the issues posed by agriculture practices and infrastructure development on the overall state of environment and particularly on stability of land are well recognized as increasingly emerging issues. In view of

this, protecting biodiversity and improving rural livelihood through collaboration with international and national institutions including private sector and NGOs form the key strategy of BTFEC for the next five years.

5.3 Financial Sustainability

Ensuring sustainable source of finance that includes initial capital and investment income to provide for financing of climate change activities including SLMPs is one of the most important criteria considered in this study. In this regard, financial analysis comprising of three components is carried out. First is the cost analysis which contains cost estimates per year for carrying out activities related to land degradation. Second, existing baseline funding mainly from RGOB and BTFEC towards activities related to SLMPs are outlined. Comparison of the cost estimate and the baseline funding generates the Ô*Resource Gap*Õwhich is to be financed by the investment income (interest/dividend) of the fund under consideration. Lastly, the amount of upfront capital required to generate the expected amount of interests/dividends or the amount that is required to fill up the resource gap is estimated.

However, given the unavailability of data, several assumptions were made in conducting the financial analysis:

- ✓ Total cost stated in the LDN target 2040 is a realistic cost;
- ✓ Timeline follows LDN target period (until 2040);
- ✓ LDN cost divided equally into 23 years (2018-2040);
- ✓ Exchange Rate USD 1 = Nu. 65;
- ✓ Fund provided by BTFEC for the projects are divided equally into 3 years;
- ✓ 11th plan budget for SLMPs are distributed equally for each year;
- ✓ Annual Cost Inflation considered is 50% of average inflation of 2010-2015 (7%);
- ✓ Annual incremental financial support of RGoB and BTFEC is equivalent to cost escalation @ 3.5%;
- ✓ Excess return are reinvested in the same ratios as initial investment (40:60) and earns equal returns.

Based on the above assumptions, analysis of each component were conducted as below:

5.3.1 Cost

As anticipated, lack of readily available data on the total cost that will be incurred to carry out SLMPs across the nation was one of the challenges faced in carrying out the financial analysis. Even the beneficiaries of the past projects are not aware of per unit cost of SLMP interventions. This is attributable to lack of clearly mapped out information on identified land degradation hot-spots requiring SLM intervention at the national level. It was learnt form the experts of NSSC that establishing such information is a highly complex task and entails significant amount of resources. The NSSC has not been able to secure the required resources.

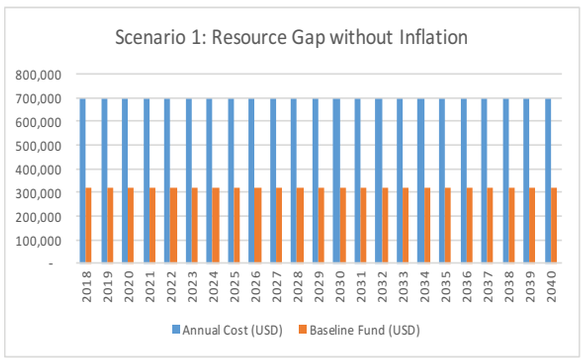
Against this backdrop, the total investment (USD 16 million) stated in the National Report on Land Degradation is adopted as the total cost that will be incurred in addressing the land degradation issues. The total area set as the target in the report is 63 km^2 , with 2040 being the deadline. Therefore, the total timeline set for financial analysis is 23 years (2018-2040). It was also learnt from the NSSC that the area stated in the LDN report is minimal as the estimates of total agricultural dry land in the country is around 712 $km^{2.}$ Given the availability of resources,

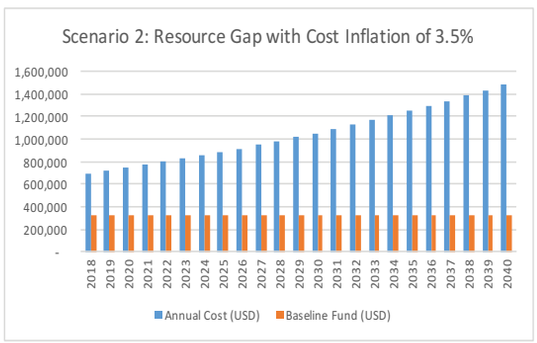
it is in the governmentÕs interest to protect the entire agricultural land with some form of SLMP interventions.

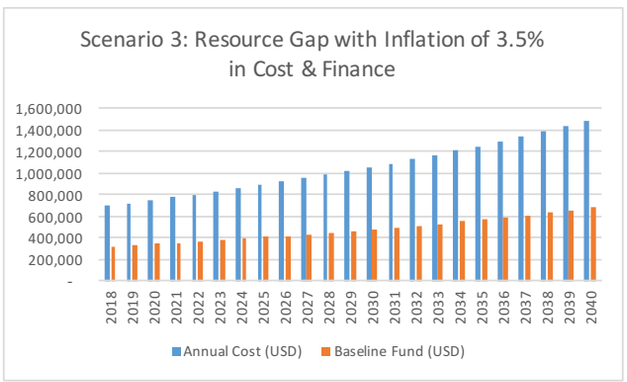
5.3.2 Baseline Funding

Two sources of existing financial support are considered in this study Ð(i) regular budget from RGoB to carry out SLMP activities by NSSC, and (ii) SLMP projects financed by BTFEC. They constitute significant share of financial support to SLMPs in the country. The total budget allocated to NSSC for SLMPs in the 11th plan was Nu. 73 million[15]. Whereas BTFEC financed three SLMP projects costing Nu. 18 million[16] for a period of three years. As mentioned in the assumptions sections, it is assumed that financial supports of at least the past magnitude will continue in the future (2018-2040).

Comparison of the cost and baseline fund yields the Ò*Resource Gap*Ó on an annual basis for the next 23 years. Three scenarios of resource gap were simulated as illustrated below:







Amongst the three scenarios, **Scenario 3** is considered to be the most realistic as it is inflation adjusted both in cost and baseline funding. While the average rate of inflation in Bhutan has not been below 7% in the past five years (2010-2015), this analysis considers inflation of only 3.5% which is only 50% of the last 5-year average inflation in the country. The deviation is considered mainly because of the fact that the cost items of SLMPs are not essential items, whereas inflation data is based on change in price of essential items in the country.

As it is evident from the above figure (Scenario 3), the resource gap also increases at the rate

[15] Administrative data, NSSC
[16] Administrative data, BTFEC

of inflation considered. The resource gap increases from USD 378,909.00 in the first year (2018) to USD 807,648.00 in the last year (2040). The total resource gap for 23 years is around USD 13 million.

As mentioned above, the annual resource gap is to be financed by the investment income (interest/dividend) generated by the initial capital of the fund under consideration.

5.3.3 Fund Capitalization

This section concerns the amount of upfront capital required to generate the expected amount of interests/dividends or the amount that is required to fill up the resource gap. Three scenarios of varying capitalization (USD 10 mil, 15 mil and 20 mil) were simulated based on baseline scenario 3. However, only two portfolio types were considered Ð40% investment in equity and 60% in fixed investment such as bonds. Higher share of investment in bonds was considered mainly due to lower risks associated with bonds even though they yield lower returns. It is also in keeping with the need to ensure consistent flow of returns for financing climate change activities in the country. Rate of return on S&P and US Treasure Bond were derived from administrative data of Finance Department of BTFEC. The returns are 10-year average returns received by overseas investment of trust fund of the BTFEC. In addition, the returns generated that are in excess of the resource gap in each year have been considered for reinvestment in the next year in the analysis.

USD 10 mil. in Mixed Investment

Scenario 3.1	Portfolio	Investment amount	Rate of Return[17]	Ratio (%)
Equity	S&P	4,000,000.00	0.07	0.40
Fixed	US Treasury Bond	6,000,000.00	0.024	0.60
		WAR	**0.042**	

* Weighted Average Rate of Return

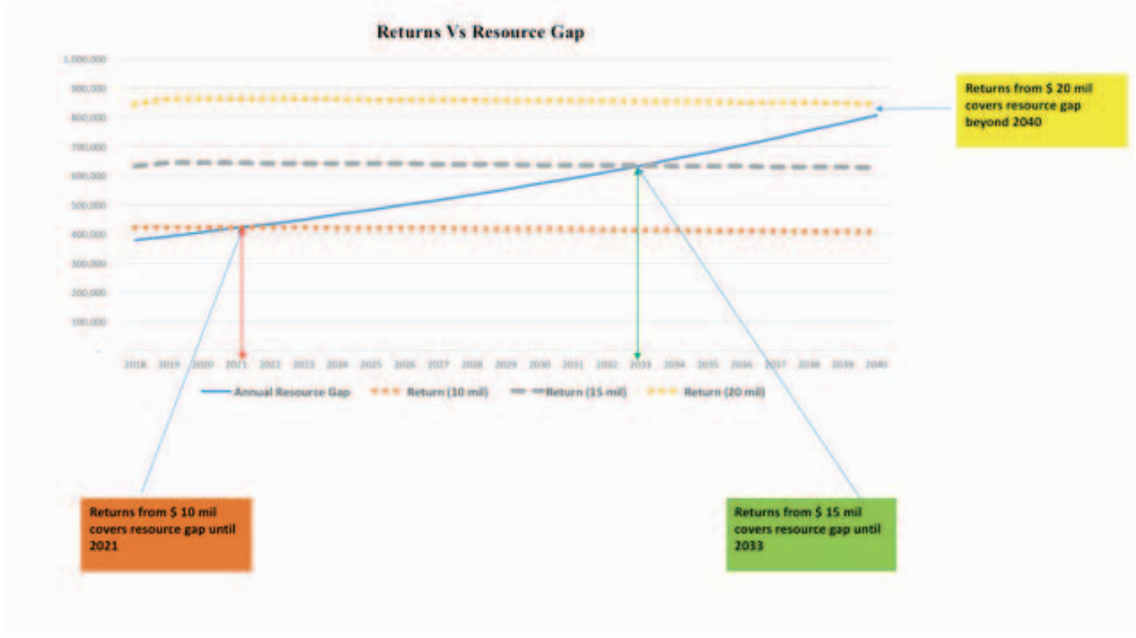
USD 15 mil. in Mixed Investment

Scenario 3.2	Portfolio	Investment amount	Rate of Return	Ratio (%)
Equity	S&P	6,000,000.00	0.07	0.40
Fixed	US Treasury Bond	9,000,000.00	0.024	0.60
		WAR	**0.042**	

USD 20 mil. in Mixed Investment

Scenario 3.3	Portfolio	Investment amount	Rate of Return	Ratio (%)
Equity	S&P	7,200,000.00	0.07	0.40
Fixed	US Treasury Bond	10,800,000.00	0.024	0.60
		WAR	**0.042**	

[17] In terms of the risk associated with investments in equity, it may be noted that standard deviation of 14.27 has been recorded by S&P as of October 2017.



As shown by the above figure, returns generated from capitalization of USD 10 mil. and 15 mil. fail to meet the resource gap on an annual basis throughout the time line considered, i.e., until 2040.

Returns from initial investment of USD 10 mil. is able to offset the resource gap until 2021. The returns are less than the resource gap beginning 2022.

Likewise, returns from initial investment of USD 15 mil. is able to offset the resource gap until 2032, but they fail to finance the resource gap beginning 2033.

The returns from capitalization of USD 20 mil. is more than able to meet the resource gap throughout the time line considered. The only caveat under this scenario, however, is the magnitude of returns in excess of the resource gap in first half of the timeline considered. In light of this caveat, Scenario 3.2 (capitalization of USD 15 million) is deemed preferable. Even though its returns fall short of resource gap beginning the year 2034, Scenario 3.2 yields sustainable returns for a reasonable period of time (16 years) after which investment management could be adjusted depending on changing situations and needs. Fund raising would also be easier under Scenario 2 as the initial capital required is less than that of Scenario 3.

5.4 Institutional & HR Capacity

Since its establishment in 1992, the BTFEC has played a vital role in providing sustainable financing for conservation of environment and biodiversity in Bhutan. BTFEC has been referred as one of the best practices of establishing NCFs around the world on account of its success in promulgating innovative financing modality and executing its leadership role in supporting biodiversity conservation. BTFEC has made significant progress over the past twenty years by increasing its initial endowment fund by 96.41% from USD 26.044 million in

1996-1997 to USD USD 51.153 million as of June 2016[18].

Since 2013, BTFEC has improved substantially in terms of governance, increased grant financing, strengthened investment and financial management and instituted monitoring and evaluation practices. The institutional capacity has been further strengthened with additional financing from GEF-World Bank and has resulted in enhanced effectiveness of program management and business operations.

In addition to developing Bylaws to supplement the Royal Charter on governance of Management Board, BTFEC established Governance and Audit Committee recently. Asset Management Committee and Technical Advisory Panel were also established to aid the decisions on management of its assets including investments and evaluation of project proposals respectively. Its investment decisions and annual activities are generally guided by Investment Policy and 5-year strategic plans respectively. A total of 15 employees including the CEO and staffs of various professional backgrounds in three divisions (Program Division, Administrative & HR Division and Finance Division) drive the operations of BTFEC.

However, in view of the recent BTFEC's accreditation process to be the national implementing agency for donors such as GCF and Adaptation Fund, major additional functions and responsibilities on the existing capacity of the secretariat are anticipated. In response to this, BTFEC intends to recruit full time dedicated team to manage the national implementing agency projects[19].

Based on the above assessment, there are no imminent challenges that could impede successful management of an endowment fund so long as the fund is established through a separate window within the existing institution.

5.5 Source of Fund

Donor analysis carried out by BTFEC recently as part of its fund raising strategy points to multiple potential sources of funds that could be explored and mobilized to fulfil the objectives of the endowment fund under consideration. The donor analysis report contains detailed information on current and new bilateral, multilateral, foundation and corporate donors with the highest possibility of supporting BTFEC with endowment and project-based funding during 2016 Ð2020 and beyond. Significant potential donors for the endowment fund include sources such as Adaptation Fund, GEF and GCF.

GEF was the co-founder of BTFEC with the largest financial contribution of USD 10 million to its endowment fund in 1996 and continues to support BTFEC in significant ways in terms of capacity building and fund raising programs. BTFEC is eligible for continued GEF funding for climate change, biodiversity, sustainable agriculture, agroforestry and land restoration programs.

The GCF has identified 5 investment priorities which will deliver major climate change mitigation and adaptation benefits. Establishment of the endowment fund is considered to deliver urgently needed, cost-effective and measureable climate adaptation and resilience benefits and results for Bhutan. The objectives of establishing the fund are fully aligned with both the BTFEC Strategic Plan for 2015Ð2020 as well as the Green Climate Fund (GCF)

[18] Annual Report 2015-2016, BTFEC

[19] Minutes of the 43rd BTFEC Board Meeting held on 30th April, 2016.

investment priorities.

In addition to international sources, RGoB has a vital role to play in establishment of the fund. Despite significance of land to various developmental aspirations and increased vulnerabilities due to climate change, budgetary support of the RGoB has remained lukewarm as discussed in the preceding sections. The objectives of fund are well aligned with BhutanÕs global commitments including SDGs and establishment of the fund would have far reaching impact in addressing one of the most important national priorities of ensuring food security in the country. Channeling the resources secured from international sources towards climate change projects and programs including SLMPs through a unified system would also minimize a lot of inefficiencies inherent in the normal budgetary allocations. In deed, RGoBÕs own contribution to the fund would be the first step that signals the commitment and ownership of the government to address challenges related to climate change including land degradation.

Besides, possibility of incentivizing industries adopting environment-friendly technologies may be explored. Industries in Bhutan are subject to high standard environmental regulations which entails adopting technologies that comes at relatively higher costs. On the other hand, the prevailing industrial loans in the financial market do not differentiate or recognize environment-friendly initiatives taken by the private sector. Against this backdrop, possibility of providing credit with concessional interest rates needs to be explored. In so doing, private sector will be encouraged to cooperate with the broader policy objective of climate mitigation measures and is expected to bear positive externality in the long run. However, this will entail close coordination and policy coherence between major stakeholders such such as the RMA, NEC, GNHC, BTFEC and BCCI.

6. Recommendations

i. **Needs assessment of SLMP interventions across the country and detailed cost estimates may be conducted and produced.** Cost estimation has central role to play in the financial analysis. The entire financial analysis including the resource gap and determining the initial capital required hinges on the cost that was considered in the analysis. Currently, there are no clearly mapped out information on identified land degradation hot-spots requiring SLM intervention at the national level. In the absence of such data, aggregate cost stated in the LDN target was adopted in the analysis. A detailed needs assessment of SLMP interventions with cost estimates and a specific action plan would be helpful not only in producing a more robust financial analysis but would serve as an essential reference point in rolling out the SLMP programs in the future.

ii. **In light of wide gap between resource gap and the annual returns projected under Scenario 3.3, Scenario 3.2 (capitalization of USD 15 million) is preferred option.** Even though its returns fall short of resource gap beginning the year 2034, Scenario 3.2 yields sustainable returns for a reasonable period of time (16 years) after which investment management could be adjusted depending on changing situations and needs. Fund raising would also be easier under Scenario 2 as the initial capital required is less than that of Scenario 3.

iii. The alternative option may be to create endowment fund with USD 10 million until 2021 after which the fund becomes sinking fund that would be sufficient to cover financing of climate change activities for around ten years.

iv. While there are no imminent challenges found in establishing an endowment fund using the set of criteria as discussed under Section 5, securing a sustainable source of finance for capitalization will depend primarily on BTFEC's ability to raise initial capital from donors and RGoB.

v. **Support of GEF and GCF in establishing fund is inevitable.** BTFEC is eligible for continued GEF funding for climate change, biodiversity, sustainable agriculture, agroforestry and land restoration programs. The objectives of establishing the fund are also fully aligned with both the BTFEC Strategic Plan for 2015-2020 as well as the Green Climate Fund (GCF) investment priorities.

vi. **In addition to international sources, RGoB's own contribution in establishment of the fund is deemed crucial.** The objectives of fund are well aligned with Bhutan's global commitments including SDGs and establishment of the fund would have far reaching impact in addressing one of the most important national priorities of ensuring food security in the country. RGoB's own contribution to the fund would be the first step that signals the commitment and ownership of the government to address challenges related to climate change including land degradation.

vii. **Possibility of incentivizing industries adopting environment-friendly technologies with concessional rates may be explored.** Close coordination and policy coherence between major stakeholders such such as the RMA, NEC, GNHC, BTFEC and BCCI is crucial in this regard.

viii. **To fulfil the objectives of SLMPs in enhancing the rural livelihood, integrated efforts from different stakeholders is found crucial.** While the NSSC's focus is on prevention of land degradation and improving land productivity using various technologies, interventions in terms of marketing and access to market needs to be improved. This is in light of marketing challenges faced by communities against the backdrop of improved yield due to SLMPs. Similarly, externalities caused by infrastructure development activities in the rural areas such as road construction needs to be mindful of the impacts on agriculture land as very often poor drainage systems are found to have caused flashfloods eroding farmlands.

ix. **In terms of creating awareness and capacity development in future expansion, NSSC may capitalize on people already trained in the erstwhile projects.** Considering this will not only save resources, but would also be an effective tool in selling the value proposition of SLMPs to other farmers of rest of the country.

x. **To promote better ownership and sustainability, farmers may be encouraged to bear certain cost of SLMPs carried out in their land and the incentive package that is normally provided may be reviewed.** This appears to be critical given the prevalence of high dependency syndrome among the beneficiaries of the erstwhile

project. Even after having acquired the necessary skills and resources, people are found to be refusing to scale up SLMPs on their own initiative. At the least, people needs to be made aware of per unit cost of SLMPs.

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Annexure1: LDN Target setting for Bhutan (*Source: LDN Report 2015, MoAF)*

Negative trends	**Area (km^2)**	**Corrective measures**	**LDN target**		**Investments required (M USD)**
			Area (km^2)	**Time (year)**	
Conversion of forests into other land use; declining productivity & early stage of declining productivity	1016.05	Reforestation with native species in open areas Avoid further productivity decline through various means & maintain SOC at 50 ton/ha	25.00	2035 2030	3.85 0.50
Stable but stressed forest due to harvesting of forest products especially timber	1456.94	Promote wood substitute products with subsidy and avoid further decline in productivity		2030	1.50
Declining productivity of shrubs & meadows from overgrazing + stable but stressed areas	778.20	Promote improved pasture Promote improved breeds	0.50	2025 2030	1.75 0.50
Land degradation due to erosion processes & declining productivity in cropland	25.40	Implement SLM measures as identified in the NAP Avoid further LD and maintain SOC at least at 50 ton/ha	35.07	2025	4.00
Disturbance of wetlands & water bodies	19.67	RAMSER Framework	1.83	2040	1.90
Land degradation in artificial area	0.91	Plantation in open areas	0.10	2035	0.50
Land degradation in bare and other areas	877.88	Restoration/reclamation of degraded areas	0.50	2035	1.50
Total			**63**		**16**

Annexure 2: Scenarios of Investment Returns

USD 10 mil. in Mixed Investment

Scenario 3.1	Portfolio	Investment amount	Rate of Return	Ratio (%)
Equity	S&P	4,000,000.00	0.07	0.40
Fixed	US Treasury Bond	**6,000,000.00**	0.024	0.60
		WAR	**0.042**	

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Initial Endowment	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**	**10,000,000**
Return	422,200	424,028	423,545	422,945	422,320	421,673	421,003	420,310	419,592	418,850	418,081	417,285	416,462	415,610	414,728	413,815	412,870	411,892	410,880	409,832	408,748	407,626	406,464
Annual Cost	378,909	392,170	405,896	420,103	434,806	450,025	465,775	482,078	498,950	516,414	534,488	553,195	572,557	592,596	613,337	634,804	657,022	680,018	703,819	728,452	753,948	780,336	807,648
Re-investments	43,291	31,857	17,649	2,842	-12,486	-28,352	-44,772	-61,768	-79,358	-97,564	-116,407	-135,910	-156,095	-176,987	-198,610	-220,989	-244,152	-268,126	-292,939	-318,620	-345,200	-372,711	-401,184
Annual Closing	**10,043,291**	**10,031,857**	**10,017,649**	**10,002,842**	**9,987,514**	**9,971,648**	**9,955,228**	**9,938,232**	**9,920,642**	**9,902,436**	**9,883,593**	**9,864,090**	**9,843,905**	**9,823,013**	**9,801,390**	**9,779,011**	**9,755,848**	**9,731,874**	**9,707,061**	**9,681,380**	**9,654,800**	**9,627,289**	**9,598,816**

USD 15 mil. in Mixed Investment

Scenario 3.2	Portfolio	Investment amount	Rate of Return	Ratio (%)
Equity	S&P	6,000,000.00	0.07	0.40
Fixed	US Treasury Bond	**9,000,000.00**	0.024	0.60
		WAR	**0.042**	

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Initial Endowment	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**	**15,000,000**
Return	633,300	644,040	643,934	643,350	642,725	642,078	641,409	640,715	639,998	639,255	638,486	637,691	636,867	636,015	635,133	634,220	633,275	632,297	631,285	630,238	629,153	628,031	626,870
Annual Cost	378,909	392,170	405,896	420,103	434,806	450,025	465,775	482,078	498,950	516,414	534,488	553,195	572,557	592,596	613,337	634,804	657,022	680,018	703,819	728,452	753,948	780,336	807,648
Re-investments	254,391	251,870	238,038	223,247	207,919	192,054	175,633	158,638	141,047	122,842	103,998	84,496	64,311	43,419	21,796	-584	-23,747	-47,721	-72,533	-98,215	-124,795	-152,305	-180,778
Annual Closing	**15,254,391**	**15,251,870**	**15,238,038**	**15,223,247**	**15,207,919**	**15,192,054**	**15,175,633**	**15,158,638**	**15,141,047**	**15,122,842**	**15,103,998**	**15,084,496**	**15,064,311**	**15,043,419**	**15,021,796**	**14,999,416**	**14,976,253**	**14,952,279**	**14,927,467**	**14,901,785**	**14,875,205**	**14,847,695**	**14,819,222**

USD 20 mil. in Mixed Investment

Scenario 3.3	Portfolio	Investment amount	Rate of Return	Ratio (%)
Equity	S&P	7,200,000.00	0.07	0.40
Fixed	US Treasury Bond	**10,800,000.00**	0.024	0.60
		WAR	**0.042**	

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Initial Endowment	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**	**20,000,000**
Return	844,400	864,053	864,323	863,755	863,131	862,484	861,814	861,121	860,403	859,661	858,892	858,096	857,273	856,421	855,539	854,626	853,681	852,703	851,691	850,643	849,559	848,437	847,275
Annual Cost	378,909	392,170	405,896	420,103	434,806	450,025	465,775	482,078	498,950	516,414	534,488	553,195	572,557	592,596	613,337	634,804	657,022	680,018	703,819	728,452	753,948	780,336	807,648
Re-investments	465,491	471,883	458,427	443,652	428,325	412,459	396,039	379,043	361,453	343,247	324,404	304,901	284,716	263,824	242,201	219,822	196,659	172,685	147,872	122,191	95,611	68,100	39,627
Annual Closing	**20,465,491**	**20,471,883**	**20,458,427**	**20,443,652**	**20,428,325**	**20,412,459**	**20,396,039**	**20,379,043**	**20,361,453**	**20,343,247**	**20,324,404**	**20,304,901**	**20,284,716**	**20,263,824**	**20,242,201**	**20,219,822**	**20,196,659**	**20,172,685**	**20,147,872**	**20,122,191**	**20,095,611**	**20,068,100**	**20,039,627**

Consolidated Returns vs Resource Gap

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Annual Resource Gap	378,909	392,170	405,896	420,103	434,806	450,025	465,775	482,078	498,950	516,414	534,488	553,195	572,557	592,596	613,337	634,804	657,022	680,018	703,819	728,452	753,948	780,336	807,648
Return (10 mil)	422200	424027.7636	423545.0185	422945.1269	422320.0064	421672.828	421002.9909	420309.7091	419592.1624	418849.5016	418080.8477	417285.2909	416461.8896	415609.6693	414727.6212	413814.7015	412869.8296	411891.8871	410879.7167	409832.1203	408747.858	407625.6466	406464.1577
Return (15 mil)	633300	644040.4056	643933.9523	643349.9476	642725.4979	642078.3479	641408.5119	640715.2302	639997.6835	639255.0227	638486.3688	637690.812	636867.4107	636015.1904	635133.1423	634220.2226	633275.3507	632297.4082	631285.2378	630237.6414	629153.3791	628031.1677	626869.6788
Return (20 mil)	844400	864053.0476	864322.886	863754.7684	863130.9895	862483.8677	861814.033	861120.7513	860403.2046	859660.5438	858891.8899	858096.3331	857272.9318	856420.7115	855538.6634	854625.7437	853680.8718	852702.9293	851690.7589	850643.1625	849558.9002	848436.6888	847275.1999

CHAPTER 5

Sustainable Land Management Program Learning Experience visit to Tajikistan

1. SUMMARY

Recognizing the devastating impacts of climate change on Tajikistanõs economy and their vulnerable communities and biosphere, an initiative was undertaken to address these challenges through the development of Strategic Programme for Climate Resilience (SPCR) in 2012 with six investment components built under different Pilot Programme for Climate Resilience (PPCR) financed through Climate Investment Fund (CIF).

SPCR represents a solid framework to achieve Sustainable Land Management as one of their key investment components to build climate-resilience of vulnerable sectors of the economy and vulnerable communities across the country responding to the priorities of SDGs. Given the climate-induced risks that we are also facing similar to Tajikistan and in order to manage our limited land and land based resources, the Sustainable Land Management (SLM) has been identified as an important programme to be supported through CIF fund and included under the PPCR.

This programme is being implemented by the Bhutan Trust Fund for Environmental Conservation (BTFEC) and the National Soil Services Center (NSSC), Ministry of Agriculture and Forests. In the process of pilot programme implementation, one of the requirements is to initiate experience sharing and learning from the countries where the SLM is being implemented successfully.

2. Background

Tajikistan is one of the PPCR countries that implemented PPCR projects effectively to increase climate resilience, food security and landõs health. As Tajikistan has successfully implemented SLM projects, the Bhutanese delegation visited Tajikistan as part of learning the best practices of PPCR implementation and use the lessons learnt where ever possible in our context. The program is also to promote South-South Cooperation. The visit was made from 16th to 26th June 2018 involving representatives from different agencies who are relevant to the project starting from implementation till reporting and monitoring

The team comprised officials from Gross National Happiness Commission (CIF National Focal Point and agency coordinating SPCR preparation and implementation); Prime Ministerõs Office (Responsible for Government Performance Management); National Soil Service Center (CIF E&L SLM evaluation implementing partner) and Bhutan Trust Fund for Environmental Conservation (CIF E&L coordinating agency).

Team Members:

1. Dr. Karma Dema Dorji, Programme Director, NSSC ĐTeam Leader
2. Dr. Tshering Dorji, Principal Land Management Officer, NSSC
3. Mr. Haka Drukpa, SF&PNM Officer, NSSC
4. Mr. Nim Tshering, Chief Program Officer, GPMD

5. Mr. Gyeltshen, Dy. Chief Officer, GNHC
6. Mr. Ugyen Lhendup, Chief Programme Officer, BTFEC
7. Ms. Sonam Wangmo, Administration/Procurement Officer, BTFEC

Objective of the visit:

i. Learn the best practices of the PPCR/SPCR implementation and its benefits
ii. Attend the High Level International Conference on International Decade for ÒWater for Sustainable DevelopmentÓ 2018 Ð2028.

Source of funding: ***Climate Investment Fund (CIF)***

Coordinator: Bhutan Trust Fund for Environment Conservation (BTFEC)

During the entire trip, the team had extensive interactions with different implementing partners and project beneficiaries at different sites and noted that the SPCR and in particular the SLM has greatly influenced the farming communities increase their livelihood and resilience capacity to climate induced effect through various interventions such as formation of water user associations (WUA), pasture Development Association (PDA), Pasture Union (PU), Sweet Water Association (SWA) and Intensive Orchard Development (IOD) among others.

3. Climate Resilience Programs in Tajikistan

As climate change was likely to pose significant risks to human welfare, economic activity and the environment in Tajikistan, developing a climate resilient program was one of the ways of coping with the changing environment. As such, the Government of Tajikistan conceptualized the Pilot Program for Climate Resilience(PPCR) and Strategic Planning for Climate Resilient (SPCR) with funding support from Asian Development Bank (ADB), World Bank (WB), European Bank of Reconstruction & Development (EBRD) and Government of Tajikistan. The PPCR/SPCR programs were built on National Adaptation Program of Action (NAPA) and other relevant country studies and strategies.

In phase one, Tajikistan implemented the Pilot Program for Climate Resilience(PPCR)from 2009 to 2010. The program was more of a preparatory phase where baseline and other related data were collected, capacity of the people were built, information and education shared and some tools for monitoring were developed. The total budget was US$ 1.5 million. Under this phase, the following activities were successfully undertaken.

i. Review of institutional arrangements and capacity needs
ii. Raising awareness of climate change in Tajikistan
iii. Climate Science and Impact Modeling Partnership
iv. Options for enhancing the climate resilience of the energy sector

v. Analysis of sustainable land management approaches
vi. River basin approaches to climate resilience

In order to achieve specific outcomes, Tajikistan implemented Strategic Planning for Climate Resilient (SPCR) in phase two from 2011 and officially ended in May 2018. The total budget was approximately US$ 50 million. The following are the projects implemented under this program:

i. Building Capacity for Climate Resilience
ii. Improvement of Weather, Climate and Hydrological Service
iii. Climate Science and Modeling Programme
iv. Enhancing the Climate Resilience of the energy sector
v. Sustainable Land Management
vi. Building climate Resilience in the Pyanj River

Tajikistan has successfully implemented both the PPCR and SPCR. The project activities were implemented all across the country. The program had allowed Tajikistan to demonstrate climate risk and resilience programs for integration into core development planning and implementation. It has also provided incentives for scaling up of actions and initiated transformational change. The Program was officially closed in May 2018.

3.1. Sitorai Yovon and Obshoron Water User Associations:

Under the ÒSLM-based tools for improving communitiesÕlivelihood in the context of global climate changeÓcomponent, the team visited the Yovon district and met with people involved in the Sitorai Yovon and Obshoron Water User Associations (WUAs) and visited water canal sites.

In general, Tajikistan has good water resource, however, up until the recent times, water resource was poorly managed leading to land degradation and inequitable distribution of water resource. In order to help address poor water management practices and land degradation problems, several Water User Associations (WUAs) were established across the country. There are 207 registered WUAs across the country by 2007 and its legislation was framed. However, about 60% of the WUAs failed mainly due to the failure in following proper process or procedure in making use of the infrastructure. With support from SPCR project, the WUAs were revived and made functional. WUA members register and pay nominal fees and service charge of US$ 5/h/year. to get water and its service. The members also pay water fee which is determined based on the type of crops and area of land to be irrigated.

WUAs are non-governmental organizations under the government supervision through agencies such as Agency for Land Reclamation and Water Department in every district. The Sitorai Yovon WUA service about 1954 hectares of land. As per the Sitorai Yovon and Obshoron

WUAs, crop production increased after the establishment of the WUAs and over the yearsÕ membership increased as the community realizes the benefit of being a member of the WUA.

Lesson learnt: Water can be best utilized and managed through formation of water user associations. With proper coordination and cooperation, associations function well and provide effective services to the community.

Observations made: Through formation of such associations, livelihoods of the communities can be enhanced immensely. With the availability of water on time and in the required quantity, crop yields are improved besides other benefits such as protecting land from degradation, crop diversification. However, it was observed that construction of open irrigation channels may not be all that effective in conserving water especially on a hot/warm day, as water could be lost through evaporation and through seepages if not constructed well. With the requirement to pay membership fees and the annual taxes to the association, it would be difficult to get the poorer section of the community with limited capacity mainstreamed in the process.



3.2. Small scale investments program in SLM

The team visited two project sites in Khovaling district. The projects implemented in this district relate to the "Implementation of project activities on reducing carbon and gas emissions, SLM small scale investments" program. The orchard established on slopes by a group of 25 households allowed farmers to utilize barren land for orchard farming. The fruits from the orchard were sold in the local market and the income generated had enhanced their livelihood options. Through this initiative, the land is protected and managed by the farmers themselves effectively and efficiently.

The district has also instituted Efficient utilization of water resources through the formation of Water User Associations (WUA). The establishment of WUA has led to equal and just distribution of water in the community. The farmers could use their land for cultivation and therefore managed the land voluntarily.

Lesson learnt: Land has been managed through various small scale activities at the community level. In this manner, community takes the ownership of the program.

Observations made: With improvement in the ground cover through establishment of orchard, the extent of surface soil erosion apparently reduced significantly, however, water supply was a problem as the site was not supplied or connected with proper irrigation infrastructure and it completely depended on stored water. Water scarcity could hamper the long term sustainability of the orchard established at this site. Further, in the absence of proper post harvest techniques and marketing procedures for the farm products, the probability of the products getting perished before it reaches the market is quite high. Marketing of the farm products are done by the farmers themselves.

3.3. Efficient utilization of water resource

Under the "Enhanced land productivity through application of various SLM technologies" program in Kulob district, the team had the opportunity to visit an orchard which with the support from the project had drip irrigation facility. The project had also supported to fence the orchard farm. The orchard was established by a group of 15 households.

Lesson learnt: Use of appropriate technology where it is most fit

3.4. Efficient Water management through Water User Association

The Obi Shirin WUA has been running for the past six years and the main purpose of its establishment was to address water management and land degradation problems. In some part of the district due to steep slopes, soil erosion is severe while in other areas water logging a huge problem. The WUA initially started off with just 215 households registered and now after about six years, the membership increased to 815 households after learning about the benefits of being a WUA member. The old infrastructure built during the time of Soviet Union, was revived and rehabilitated with funding support from the Project. The membership fee for this WUA was kept minimum at the initial stages of 30 Somoni/ha/yr (USD 1=9.2 Somoni) and now increased to 60

Somoni/ha/yr. The Association pay a tax of 39% to the government and it is monitored by the government. The approval to establish WUA is sought from the government.

Lesson learnt: In a resource stressed area, it is through collective efforts that the maximum use of the resources can be achieved.

3.5. Land management through pasture management

In order to minimize land degradation through over grazing and also to enhance the livelihood of the communities in Fayzobod district where 52% of its population are dependent on livestock, pasture development was initiated with the support from the project through formation of union.

The Project assisted with the establishment of four pasture unions across the district. The main purpose of establishing these unions was to help people understand the impacts of climate change and accordingly manage their animal and pasture resource. A thorough needs assessment was carried out before establishing the Unions in order to determine human and infrastructure requirements. Land certificate from the government for pasture development was the prerequisite as the state owns the land. Citizens do not have the ownership of the land in Tajikistan. Infrastructures such as bridges and roads were constructed to ease the movement of the livestock and equipment such as excavator and earth movers were procured to help with the construction of the roads and bridges and to hire out to cover the running cost of the Union offices with a manger and few support staff.

Over the last few years with the construction of the livestock bridges and roads, about 700 hectares of land have been brought under pasture development. The livestock management plan included grazing calendar among other things. Controlled grazing allowed 12 heads of livestock per hectare to graze in an area thus keeping within the carrying capacity of the land. The number of livestock per head is also controlled and improved breeds replaced about 50% of the local breeds. Veterinary services are also provided to the Union members and 260 households are members to this Union. The activities like poultry farming is also being integrated within the program with the involvement of women groups.

Lesson learnt: Efficient pasture management program has been functioning well. Such initiative contributed to land utilization and its management.

Observation made: Various activities such as establishment of veterinary center and poultry farming with the engagement of women groups, hiring of machines, pasture management techniques and approaches are well integrated in the process. However, infrastructure like the bridges that are constructed over the streams/rivers to ease the moment across the pasture land are not full climate resilient infrastructure. The bridges are built out of logs, which did not look robust enough to withstand the high volume of river or stream or withstand the weight of winter snows.


4. Brief Tajikistan SPCR

The team had the opportunity to interact with the officials of ESSR and the PPCR Secretariat representative who made a brief presentation on the overall structure and implementation of their PPCR and SPCR. It was informed that formulation of their SPCR was initiated in 2008 and completed in 2012 with the total outlay of $ 40 million where 75% was mobilized through grant and 25% on loan from World Bank, Asian Development Bank and Global Environment Fund. Every investment component of their SPCR is being developed through different PPCR financing window and all six investment component is being consolidated under the SPCR as the single programme. It is quite interesting to note that the objective of each investment component is aligned with the donor objective unlike in our case where all investment components are aligned with our 12th FYP, SDG, NDC NAP, NAPA and other International goals and commitments.

Chaired by the Coordinator, PPCR project, the team had a breif meeting to discuss on the project. A brief presentation on the structure, implementation and its outcomes was made by the PPCR/SPCR team. The projects have multiple benefits that had built the capacity for climate resilience; Improved the weather, climate and hydrological service delivery; Climate science modelling developed;Enhanced the climate resilience of the enrtgy sector; Enhanced land management & agriculture, Developed climate resilience in the Pyanj river basin.

The total cost of the project was approximately US$ 50 million, of which 75% is grant and 25% is loan.

5. The High Level International Conference on International Decade for "Water for Sustainable Development", 2018 – 2028.

The team from Bhutan also got the opportunity to attend the High Level Water Conference while in Dushanbe, Tajikistan. The main objectives of the Conference were to discuss the ways on how the Member States, relevant UN bodies, the specialized agencies, the regional commissions and other organizations of the UN system, as well as other relevant partners, including the private sector can contribute to the Decade in order to support the implementation of the 2030 Agenda for Sustainable Development. It was also aimed to facilitate discussion on the importance of specific means of implementation, including monitoring, financing, capacity development, access to technology and partnership with the private sector and civil society.

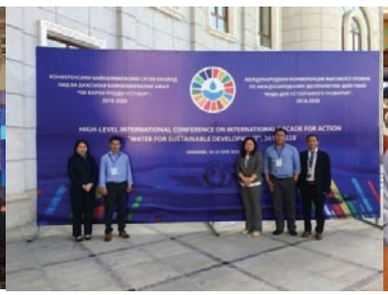
One of the objectives of the high-level international conference on the international decade for action ÒWater for Sustainable DevelopmentÓ 2018-2028, was to involve a wider range of stakeholders, communities and major groups in the process of discussing the ways of achieving SDG 6 and other water-related goals, awareness-raising on the Water Decade, gathering ideas and best practices, pursuing advocacy, networking and promoting partnerships and action on implementation of solutions to water-related issues.

The main objectives of the Conference were to discuss the ways on how the Member States, relevant UN bodies, the specialized agencies, the regional commissions and other organizations of the UN system, as well as other relevant partners, including the private sector can contribute to the Decade in order to support the implementation of the 2030 Agenda for Sustainable Development. It was also aimed to facilitate discussion on the importance of specific means of

implementation, including monitoring, financing, capacity development, access to technology and partnership with the private sector and civil society.

Outcome of the conference:

i. Leaders and representatives from 172 countries acknowledged the importance of water, its management and conservation.
ii. Endorsed the ÒWater Action Decade 2018-2028Ó


6. Conclusion:

As Bhutan prepares to implement its PPCR/SPCR programs, it was an advantage that a team comprising of officials from Government and a donor visited a country where PPCR/SPCR has been successfully completed. The visit provided first-hand experiencesand learnings on the different aspects of PPCR/SPCR implementation. The team could visit to some of the SPCR sites and interacted with communities and officials in the fields. Issues and challenges were also learnt. The following are the experiences and learnings from the visit:

i. Land is a state property in Tajikistan. As a result of it, the implementation of PPCR/SPCR was conducive and effective.
ii. Land productivity has enhanced through application of SLM technologies.
iii. Efficient and effective water management materialized through the formation of Water User Associations.
iv. In Tajikistan model, any activity that contributes either directly or indirectly to land utilization and management has been included in SPCR program.

7. Reflection:

From the lessons learnt from Tajikistan, as Bhutan implements the SPCR program, firstly, it will be valuable to take stock of all ongoing activities related to land utilization and management executed by various agencies. This will include activities such as land development management, pasture development and management, utilization of barren land for agriculture, water catchment management, and so on. Secondly, in order to make Bhutan's SPCR program more wholestic, if need be, revise the SPCR document and desigh it to be more inclusive.

CHAPTER 6

Report on Study visit to KEHATI-Indonesian Biodiversity Foundation, Indonesia

Executive Summary

The team for the evaluation and learning visit comprised of representations from key national stakeholder of land management in Bhutan. The representatives were from National Land Commission, Gross National Happiness Commission, Department of Local Governance, and National Soil Service Center led by Bhutan Trust Fund for Environmental Conservation. Yayasan Keanekaragaman Hayati Indonesia (KEHATI) otherwise known as the Indonesian Biodiversity Foundation was selected as an institution to lead the delegates from Bhutan to their project sites in Jakarta, West and Central Java, Indonesia. The hosts institute was chosen as it operates and functions has a non-profit, grant-making foundation similar to Bhutan Trust Fund for Environmental Organization. Further, KEHATI had many successful green projects implemented at grassroots level and also they had been pioneer institution in developing green index, which is now being used in Indonesian stock market.

KEHATI has been very instrumental in addressing environmental challenges through meaningful engagement of the local communities. The visiting team also noticed strong community ownership of all programs. Some part of the success in engagement of local communities in bringing about transformation changes can be attributed to KEHATIsÕ three key principles of assessment on deciding to engage local communities. There principles are 1) Assessment of institutional setup, 2) Community capacity, management and available human resources, and 3) Community portfolio. Further, in all community based projects KEHATI had a component on community capacity development including basics like book and record keeping training for community based organizations. In choosing group leaders too, KEHATI had always researched for a local champion, somebody with strong influence and maybe popular, who can lead the community strategically. Such strategy seems to be very successful in what KEHATI has done over the past three decades. BTFEC may explore options of engaging directly with local communities in building their capacity and subsequently entrusting them to implement projects for solving environmental issues at their community. Thus, capacity development of local community can be an important component for BTFEC supported projects.

Another unique feature in KEHATI led green projects was that there is a strong livelihood component in all their projects. For instance, in Brebes, mangrove reforestation has been very successful and the reforested area has now become a local tourism hotspot. In addition, the local community has integrated aquaculture and local textile dyeing industry into their ecotourism project. Similarly, in Eastern Indonesia, KEHATI has successfully promoted underutilized sorghum varieties, which has better performance than rice in drier climates. Such livelihood program also seems to be playing a vital role in ensuring sustainability of the projects. BTFEC may explore infusing alternative income generation for the local communities as one of the key criteria for project proposal assessment.

In financial front, KEHATI leverages on their existing endowment fund for seeking funds from other multilateral and bilateral donors. In certain cases, a single donor may not be in position to support entire project area, thus during such times KEHATI commits certain amount to attract funding from numerous other sources. Thus, Bhutan Trust Fund for Environmental Conservation (BTFEC) can extend explore possibility for such partnerships, just like BTFEC support to Bhutan for Life. In many of the places the team visited, at the end of project completion the performance of the project was able to produce tangible benefits and the communities received funds from both provincial and central government for project up scaling.

KEHATI experienced that majority of donors are not willing to add onto already existing endowment funds. However, establishment of new endowment fund with its set of objectives has been successful. For instance, the Blue ABADI Fund has set up under this modality and has been quite successful till date. Thus, BTFECÕs goal of establishing separate endowment fund for supporting sustainable land management practices is very possible and may interest the donors.

KEHATI is also engaged in numerous crowd funding sources for raising funds. Besides raising funds KEHATI uses these platforms for advocacy and informing the public on key environmental issues. BTFEC may explore similar options while exploring potential fund source for an endowment fund for sustainable land management for Bhutan.

KEHATI has also been proactively engaging with numerous national and multinational companies in implementing their CSR. Through KEHATIs experience and technical expertise they were able to successfully liaise with local community organizations in implementing numerous CSRs. BTFEC may also research into this arena with hydropower companies in Bhutan.

BTFEC in collaboration with GNHC and other relevant agencies in the country may explore possibility for Debt-for-Nature swap deal with international banks or other key developmental partners in Bhutan.

BTFEC is already an accredited entity for Adaptation Fund (AF) and is in the process of getting accredited to Green Climate Fund (GCF). In coming years such accreditation has potential to boost confidence of other multilateral donors to work in partnership with BTFEC.

In all KEHATI led projects another key feature is that the central or the provincial government is always in the loop. In their case this has been very helpful to synergize their priorities with the government priorities. Through such complementary partnerships, many projects like Mangrove reforestation has been able to secure support from the central and provincial government for infrastructure development in the project areas. The young local leader of the community was also awarded the most prestigious PresidentsÕaward for their contribution to the local community.

1. Introduction

Under the CIF funded project on ÒEvaluation of Sustainable Land Management and Innovative Financing to Enhance Climate Resilience and Food Security in Bhutan,Óan E&L provision has been kept to facilitate an exchange visit for innovative financing mechanisms. However, this was not implemented, earlier, as there was a need for other priority areas to be covered. In the initial stage of the project implementation, it was speculated that the budget fund would not be sufficient; therefore, the exchange study visit for E&L was stalled.

Since the fund utilization, especially for the national consultants, was way below the estimated expenses, which was initially foreseen, BTFEC has been able to save USD 46,000. This saving would allow BTFEC to take up the stalled activity and complete this as per the inception report submitted to the CIF.

Therefore, BTFEC proposes to send a team of eight or more officials from relevant agencies, whose works are related to the Sustainable Land Management and policy implementation for building up climate resilience Bhutanese communities, to Indonesia to Evaluate and Learn about activities being implemented by KEHATI Foundation.

KEHATI Foundation was established in Jakarta on 12 January 1994 as a non-profit organization that manages independent grants that facilitates various conservation and sustainable use of biodiversity in Indonesia. It acts as a catalyst to find innovative ways to manage and utilize Indonesia's biodiversity in a sustainable manner. It also supports various parties to save Indonesia's biodiversity from various activities and policies that can destroy Indonesia's biological wealth for sustainable use and activities related to the climate resilience among the communities. The mission of this organization is:

ÒTo achieve biodiversity conservation by means of building strategic alliance to secure community empowerment to promote the end of pleasure of public policy advocacy, mobilize resource support, encourage shared learning, and enhancement participation of society.Ó

BTFEC feels there is a lot that we can learn from KEHATI Foundation. The Foundation has also have expressed its willingness to share its experiences with us. In the meantime, it will be an opportunity for BTFEC to share its experience on our evaluation and learning experience on Sustainable Land Management that was undertaken through CIF with the Foundation.

Team Members

Sl. No.	Name	Designation/Agency
1	Rabi Chandra Dahal	Communications Officer, Bhutan Trust Fund for Environmental Conservation
2	Kuenzang Tshering	Monitoring & Evaluation Officer, Bhutan Trust Fund for Environmental Conservation
3	Thinley Wangdi	IT Officer Bhutan Trust Fund for Environmental Conservation
4	Bijay Pradhan	Senior Survey Engineer, National Land Commission of Bhutan
5	Chandra Bdr Sunwar	Land Registrar, National Land Commission of Bhutan
6	Sangita Pradhan	Senior GIS Technician, National Soil Service Center, Ministry of Agriculture and Forests
7	Gyeltshen	Sr. Planning Officer Gross National Happiness Commission
8	Sonam Tashi	Program Officer, Department of Local Governance
9	Rinzin Norbu	Research Officer, Department of Local Governance

2. Purpose

The visit is intended for Evaluation and Learning (E&L) on various activities being implemented by KEHATI Foundation in securing the community empowerment and participation of the society to be more climate resilience. Further, the visit will look into type of innovation being carried out in resource mobilization for interventions.

2.1 Objectives:

1. To evaluate and learn Approaches, Methods, and Tools used for community empowerment by studying program and project design that facilitate transformational change;
2. To capture and compare tools and approaches used in bringing about sustainable and climate resilient activities to the communitiesÕ doorsteps;
3. To evaluate involvement of local stakeholdersÕ engagement in the areas of resource mobilization and their participations;
4. To study and understand the synergy and complementarity among activities undertaken by KEHATI in the empowerment of the communities for policy advocacy and implementation of sustainable interventions; and
5. Evaluating the role of Leadership in communities in bringing about the transformational change if any.

3. Expected Outcomes

1. Documented the Approaches, Methods, and Tools for bringing about transformational changes in community;
2. Documented the various activities of interventions for sustainable development and community resilience;
3. Identified the local stakeholder engagements for the resource mobilizations and their participations;
4. Studied and documented the synergy and complementarity policy advocacy and sustainable interventions; and
5. Documented the role type of leadership in communities for transformational changes.

Source of funding: Climate Investment Fund (CIF)

Coordinator: Bhutan Trust Fund for Environment Conservation (BTFEC)

4. Innovative Financing in Indonesia: KEHATI case

4.1 Institutional Background

Yayasan Keanekaragaman Hayati Indonesia (KEHATI) otherwise known as the Indonesian Biodiversity Foundation was established in 1994 as a non-profit, grant-making foundation. The organization was created to mobilize and manage resources to be channeled to other parties in the form of grants, facilitations, consultations, and other assistance to support various programs in biodiversity conservation and utilization in a fair and sustainable manner.

A Memorandum of Understanding was signed by the Indonesian Government represented by the State Ministry of Environmental Affairs, the US Government represented by the USAID and KEHATI in 1995, prior to the set-up of KEHATIÕs endowment fund. Once KEHATI was established to have met the criteria for grant funding a cooperative agreement was signed with USAID in 1995. USAID signed for the period of 1995-2005 with an endowment fund amounting to US$16.5 million with US$3.5 million as start-up operating fund for KEHATI.

KEHATIÕs endowment fund is invested in stocks and bonds and is managed by a professional Fund Manager, with the support of KEHATIÕs Investment Committee, consisting of experts in the fields of investment, capital market and banking.

KEHATIÕs program is categorized into regular program and special program. The regular program is focused on 1) Forest ecosystem, 2) Coastal and small island ecosystem, 3) Agriculture ecosystem, and 4) Education and awareness. The special programs are 1) Revamping Indonesian Sustainable Palm Oil plantation, 2) Blue Abadi Fund, 3) The Tropical Forest Conservation Act (TFCA) in Sumatera, and 4) The Tropical Forest Conservation Act (TFCA) in Kalimantan.

Picture: Experience Sharing at KEHATI Office (Jakarta)

4.2 KEHATIÕs Programs

KEHATI finances its programs through fund generated through endowment fund, capital market, multilateral and bilateral agencies, debt-for-nature swaps, philanthropic contribution, corporation and multi-donors. KEHATIÕs endowment fund is still making major contribution to the functioning of their programs. Further, in order to embrace and provide a ground for business society to participate in biodiversity conservation efforts and sustainable development, KEHATI has developed a type of investment, which can be regarded as green investment, in the form of KEHATI Mutual Fund, and another one called KEHATI Sustainable and Responsible Investment Index (KEHATI SRI Index). In 2011, U.S. and Indonesia agreed US $28.5 Million Debt Swap to Protect BorneoÕs Tropical Forests The Nature Conservancy and World Wildlife Fund (WWF) are partnering with the Indonesian and U.S. Governments for debt-for-nature swap agreement that will result in a new $28.5 million investment to help protect tropical forests in three districts of Kalimantan, Indonesian Borneo. The districts of Berau and Kutai Barat in East Kalimantan province and Kapuas Hulu in West Kalimantan province each contain carbon-rich tropical forest and vast biodiversity under threat from unsustainable natural resource extraction. These forests can serve as examples of sustainable development to the rest of Indonesia and the world. KEHATI is also one of the key implementers of the program under this funding. GEF, USAID and DFID were some of the key bilateral and multilateral donors for KEHATI. They also receive funding from multi-donors like Walton Foundation and philanthropic like Ford Foundation. KEHATI is also actively engaged into implementing CRS of companies like HSBC and Star Energy Geothermal. KEHATI also is does funding raising through crowd funding, which they believe serves two key purposes like raising fund and at the same time such programs are being used as a means of fulfilling their mission on creating environmental awareness.

KEHATI prioritizes the capability and independence of the community in fulfilling their own needs. Having adequate strategies in managing resources, decision-making, and conflict resolution minimizes dependency on external donors. In all of the KEHATI implemented programs and projects capacity development of local community is considered key in achieving community independence and sustainability.

Picture: Promotion of local coffee from project sites

On the climate and disaster resilience front, KEHATI has been involved in numerous projects like mangrove ecosystem restoration, promotion of bamboo plantation for maintaining area under forest in Jakarta, sustainable plan oil plantation and promoting numerous alternative livelihood programs throughout Indonesia. Few programs the team visited were discussed in detail in subsequent pages.

In all of the project sites, the team visited, KEHATIÕ program implementer has a local champion leading the community. For instance, management of more than 120 ha of community land under in the heart of Jakarta has been led by a popular Indonesian martial artist. The elderly manÕ influence seems to have played a key role in gaining support from the provincial and central government. Further, in all the sites visited, KEHATIÕ project has been embedded with income generation for the local. Thus, conservation goal has been successfully achieved through active engagement of local. The locals also actively participated into all those programs it they have financial incentive of participation in through community groups. When tangible impacts of the project were produced, in case of Mangrove restoration project in Pandansari village, the success of the project were up scaled through financial support from the provincial government and numerous other international and donors.

Picture: Mr. Babe, the local leader at Sanggabhuana Bamboo Community program (Above) and Mr. Udjo, running the Nature Conservation program at Bandung (Right)

4.3 Tropical Forest Conservation Act (TFCA) for Kalimantan

The TFCA is a partnership project of Government of Indonesia and Government of USA with The Nature Conservancy (TNC) and WWF as swap partner and KEHATI as program administrator. The TFCA Kalimantan agreement is administered by the KEHATI. As a program administrator, KEHATI disburse grants to local implementers like NGOs and work with forest-dependent communities to conserve tropical forests, protect natural resources and wildlife, and improve livelihoods. This debt-for-nature swap agreement, signed in 2011, promotes sustainable forest resource management, biodiversity conservation, and community development.

The main objective of the project is to provide incentives for forest-dependent communities to conserve tropical forests by improving local livelihoods, focusing in areas such as community development, conflict resolution in forest management, and ecotourism. The projects are also expected to support conservation efforts of near-extinct animals in Kalimantan, including rhinoceros, Irrawaddy dolphins, and orangutans.

TFCA Kalimantan has outline the key objectives as:

1. Protecting biodiversity; rare and endangered species and ecosystem (including wildlife corridors and essential ecosystem);
2. Enhancing benefits to forest-dependent communities from sustainable natural resources;
3. Support emissions reductions at the target district level; and
4. Contribute to the cross fertilization of ideas and sharing of program experiences

Current the program is being implemented by 54 grantees, which were NGOs, CBOs, community groups, villagers and concessioners in nine districts of Kalimantan province. Key project activities under implementation were:

1. Species conservation: Orangutan, Bekantan, Sumatran Rhino, Banteng Borneo, Irrawaddy Dolphin;
2. Within the ecosystem of forest and non-forest areas, national parks, community conserved area, concessioner's area, watershed management, wildlife corridor and sanctuary, mangrove, and karst
3. Alternative livelihood and economic incentive on production of: mangrove products (body scrub powder, jam, syrup), organic honey, ecotourism, weaving on natural dye plant. Some of the products like scrub powder, jam, syrup and honey are already being sold by the locals.

Picture: Natural Salted Honey & other income generation for locals in TFCA Kalimantan

4.4 TFCA Sumatera

Under three TFCA agreements, IndonesiaÕs debt payments are reduced in exchange for activities that conserve tropical forests in Sumatra and Kalimantan. The TFCA Sumatera is implemented under same modality as TFCA Kalimantan.

The main purpose of the project is to contribute to conservation of tropical forest biodiversity to support sustainable development in Sumatra. TFCA Sumatera has outline the key objectives as:

1. Policy and Institutional Strengthening
2. Landscape protection
3. Conservation of endangered species
4. Promotion of social welfare and livelihood through social enterprises

The local villages, NGOs and CBOs are heavily involved in the project implementation. Through the funding support from TFCA Sumatera, localsÕcapacity to manage tourism industry were enhanced, more than 1500 ha of forests receive customary user right decree from central government and provincial governments. More than 48,000 ha of forests in West Sumatera was allocated as village forests and 40 community based forest management (CBFM) groups established.

More than 23,400 ha of critical forest landscape is restored through Social Forestry programs like Community Forestry, Village Forest Customary Forest and CBFM. To reduce Orangutan foraging on farmersÕcrops more than 17 ha of their habitat was restored and has successfully reduced impacts of wildlife on the crop productivity.

For conservation of keystone species like tiger, rhino and elephant, the fund improved patrolling capacity, established collaborative patrolling, and supported numerous research and development on species focused studies.

Local community were trained in ecotourism product developments, hospitality and running of cooperatives. Alternative energy sources were also installed through micro and pica hydro-power plants. A training center and center for NTFP is established to promote HHBK (coffee, rubber, jernang, cinnamon and agarwood. Currently 6 private companies also engaged in the local conservation program through their CSR. All these activities are expected to build strong foundations for local involvement in biodiversity protection, sustainable use, and conservation policy-making.

The local were mostly dedicated grantees but low capacity in administrative matters like bookkeeping, recording and reporting. Thus, capacity development of the local partners was reported to be crucial in realizing the project goals in almost all of KEHATIÕs program. Currently, establishment of a separate local endowment fund for TFCA Sumatera is also underway.

It is learned that the program is well integrated with different investment components whereby social enterprise will be playing not only the crucial role in sustaining the investment made for the future but enhancing the livelihood of the communities at the larger stage and engagement of private sector development. Integration of such investment component under single program is within the scope of not only the sustainable land management but well integrated within the countryÕs Strategic Program for Climate Resilience which was also supported by the Climate Investment Fund (CIF) and endorsed as well.

Picture: CEO of KEHATI discussing innovative financing mechanisms in place at their organization

4.5 KEHATI Green Index/SRI-KEHATI

In June 2009, Indonesia Stock Exchange (IDX) with KEHATI launched a new Index referring to the practices of sustainable and responsible investment (SRI) named as the SRI-KEHATI Index. The

Index is established as an additional investment guideline for investors by establishing a benchmark on stocks price of Listed Companies with excellent practices on supporting their sustainability through methods that concern about the environment, social and good corporate governance. The new Index is expected to enhance the exposure on Listed Companies that have performed their environmental and social responsibilities as well as good corporate governance. In the selection of stocks included in the SRI-KEHATI Index, the KEHATI Foundation also takes into consideration the inputs from the Committee Board of SRI-KEHATI Index. Every twice a year, that is on the first Trading day on February and August, the stocks listed in the SRI-KEHATI Index will be reviewed and changed by the IDX and KEHATI Foundation.

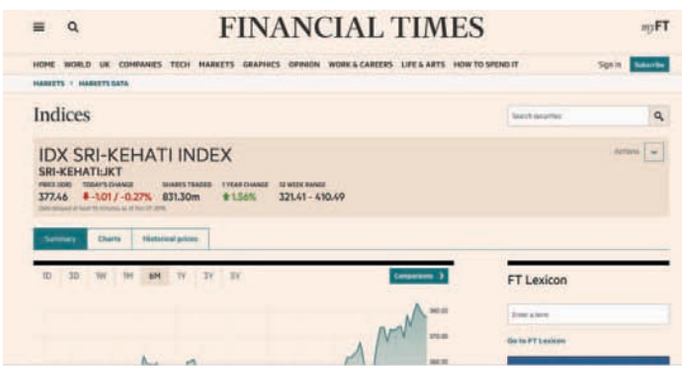
Picture: KEHATIÕs Investment Specialist presented on SRI Index

The Purpose of SRI-KEHATI Index:

1. To boost the implementation of sustainable development for businesses in Indonesia, particularly by companies listed in the Indonesia Stock Exchange;
2. To be the assessment benchmark of companyÕs performance in terms of concern for the environment, social issues and good corporate governance;
3. To be the barometer for quality of environment and natural resources in Indonesia;
4. To be the green investment benchmark of Indonesian Stock Market, as well as facilitator for the development of green fund products such as ETF, Index Fund, etc.; and
5. To encourage the adoption of sustainable investment practice by capital market investors.

Currently, there are six SRI-KEHATI Index-based mutual funds in the market:

1. Premier Exchange-Traded Fund/ETF SRI-KEHATI by Indopremier Investment Management
2. Reksadana Indeks RHB SRI-KEHATI by RHB Asset Management
3. Reksadana Indeks Simas SRI-KEHATI by Sinarmas Asset Management
4. Reksadana Indeks Insight SRI-KEHATI Likuid by Insight Investment Management
5. Reksadana Indeks AYERS Equity Index SRI-KEHATI by AYERS ASIA Asset Management
6. Reksadana Indeks BNP Paribas SRI-KEHATI by PT BNP Paribas Investment Partners



Picture: Screen shot of SRI-KEHATI Index on 12:20 pm on 10 December 2018

4.6. Blue Abadi Fund

The primary purpose of the Blue Abadi endowment fund is to provide a secure and steady long-term flow of fund to ensure that marine ecosystems and species of the BirdsÕHead Seascape (ÒBHSÓ) are sustainably managed and protected by local environmental stewards, providing benefits to local communities.

The BHS is comprised of the entire territorial waters of West Papua and part of the territorial waters of Papua, as well as the terrestrial areas. Priority sites within the BHS include:

1. The Kaimana multiple-use local marine conservation area;
2. Raja AmpatÕs multiple-use local marine conservation area;
3. The Tambrauw local marine conservation area; and
4. Teluk Cendrawasih National Park

Blue Abadi Fund is a special program under KEHATI with a separate endowment fund for Papuan communities, governments, and local partners protect their coastal and marine ecosystems, thereby protecting the single greatest reservoir of tropical marine species on the planet, while enhancing food security, livelihoods, and their traditional way of life. This is a separate endowment fund targeting to establish fund of US$ 40 million. The funding support is being sought for both sinking and contribution specific towards endowment fund. The committed were:

1. Walton Family Foundation: $7.25M ($4.75M disbursed)
2. Global Environment Facility: $2.60M ($2.6M disbursed)
3. MacArthur Foundation: $3.0M ($3.0 M disbursed)
4. Nia Tero: $5M (initial disbursement expected by end 2018)
5. TNC matching donor: $0.5M (disbursement expected by end 2018)
6. USAID: $5M (sinking funds disbursed to CI)

KEHATI also identified other potential funders like:

1. Leonardo DiCaprio Foundation $1.5M
2. Tiffany and Co Foundation--$1.5M
3. TNC $3M fundraising commitment
4. Domestic Funders

The endowment fund will be made available through annual grants (US$ 1,000 to 25,000) and multi-year grants (US$ 25,000 to 500,000). The first grant is targeted for supporting local Indonesian institutions operating in the BHS based on prioritization criteria and latter grant with larger amount is to support Papuan civil society organizations, including non-profits, community groups, religious organizations, business cooperatives, and traditional councils, operating in the BHS.

The governing body for the fund has three different advisory committees; 1) Science and Conservation Advisory Committee, 2) Investment Advisory Committee, and 3) Local Representative Committee. The trust agreement was signed in December, 2017.

For brining transformational changes in the resource constraint country like Bhutan, there is need to have sustainable financing mechanism established. As experience by KEHATI in funding raising for Blue ABADI Fund majority of the donors were less interested in providing fund for KEHATIÕ core endowment fund that was established in 1995. However, it was noted that many key donors were willing to contribute to new endowment funds with specific targets like in this case the endowment fund for Blue ABADI Fund is specifically for this project rather than supporting other objectives of KEHATI.

In the advisory committee Local Representative Committee for Blue ABADI Fund was initiated. This was to ensure the active engagement of local stakeholders and also to ensure tangible benefits to the targeted communities. The committee here has three representatives from the project sites.

4.7 Indonesia Sustainable Palm Oil (ISPO) Program

The Indonesian Sustainable Palm Oil (ISPO) system is a policy adopted by the Ministry of Agriculture on behalf of the Indonesian Government. The aim is to improve the competitiveness of the Indonesian Palm Oil in the global market and to reduce greenhouse gases emissions and draw attention to environmental issues.

The Indonesian government faces challenges with respect to its legitimacy over the governing of palm oil in both the domestic and the international arena. In the domestic arena, the lack of coordination between Indonesian ministries and the slow implementation of the Indonesian Sustainable Palm Oil (ISPO) certification scheme form a challenge. At the same time, in the international arena the legitimacy of the Indonesian government with respect to the governing of palm oil is contested by the EU.

Figure 1. Oil Palm Plantation Areas Owned by Company and Smallholders
Source: Direktorat Jenderal Perkebunan (2017)

While ISPO certified company plantations reach 2.037.918 ha, ISPO certified-smallholder plantations are only 3.631 Ha. The small number of certified-smallholder plantations indicates an issue between smallholder plantations and certification policy. To include local communities in oil palm industry development is a strategy of Indonesian Government to alleviate poverty in rural areas and improve economic gap across Indonesia. However, given their limited capital and knowledge on good agricultural practices, the introduction of certification scheme can make oil palm smallholders more vulnerable to be marginalized from market. Therefore, to understand smallholdersÕ readiness toward ISPO certification is crucial to be conducted for an inclusive and well-targeted national policy. Thus, with support from UKaid and other donors, KEHATI is working closely with Smallholder Palm Oil Plantation to meet the Indonesian Sustainable Palm Oil (ISPO) standard, a mandatory public certification scheme for sustainable Indonesian palm oil set up in 2011 by the Indonesian government. More than four million Indonesians are directly employed and other 12 million, is reported to be, indirectly employed by the palm oil industry.

4.8 Sanggabhuana Bamboo Community program

More than 120 ha of land area in the heart of Jakarta city has been managed by the community. The land is registered as community land and the management team lead by an elderly person is responsible for day-to-day management of the area.

Picture: Using bamboo for riverside protecting (Above) & filtering wastewater feeding aquaculture ponds (right)

Apart from KEHATIÕs financial and technical support towards the communityÕs green initiative, the role of influential people within a community is also seen as a huge contributing factor. For instance, the community leader for the group is a popular Indonesian martial artist. Not only are

they nominated and entrusted with such responsibilities by the community members, but their commitment towards taking such efforts to the next level is key in achieving success, not matter how small. The local leaderÕs contributions are seen mostly as pro bono and heartfelt and covers activities ranging from ecotourism to engagement of unemployed youth.

The green area is being used as recreational site with walking trails, natural wastewater treatment facilities, youth initiated solid waste management facility, integrated agroforestry and many others. Through agroforestry adoption and management, the community has planted more 23 species of native bamboo to reduce topsoil erosion. Aquaculture and apiculture were managed to generate revenues for daily management of the green areas and some part of revenue generated is also being used for plantation of bamboo for soil conservation. The community through youth initiatives is also involved in recycling non-biodegradable waste while degradable wastes are composted and used for Avogadro orchards. The non-degradable waste was incinerated and ash remains were buried during road black toppings.

Integration and harmonization of inherent local knowledge with modern technology is exhibited as an excellent method to address environment conservation, which also promotes use of locally available resources that safeguard quality of the ecosystem.

With passionate local leaders even a limited funding support from local donors, they were able to protect more than 120 ha of green tropical forested area at the heart of capital city of Indonesia. It is an example of success story of a local initiatives with larger global impacts.

4.9. Community Managed Mangrove Ecosystem in Brebes

The community around Pandasari beach has been moving inland over the past decades due to sea water incursion and rise in water level in erstwhile aquaculture and salt production ponds. There were also out migration of local from these areas to other cities in Indonesia and sea abrasion made life difficult for the locals.

Picture: Mangrove reforestation to protect coastal areas from sea abrasion

However, in the past few years, numerous donors including KEHATI have intervened through reforestation of mangrove forest. As of today more than 200 ha land has become a comfortable place to live for over two million mangroves. The result is now the Pandansari Brebes mangrove forest is one of the new tourist attractions that attract tourists from outside the region. The idea to plant mangroves originated from a young figure named Mashadi who was assisted by Kelombok KBL Mangrove Sari to prevent abrasion around Pandansari beach. The community leader has also received the highest national order of recognition from President of Indonesia in 2016.

Picture: Entry point to walking train into reforested Mangrove (Above) & Walking trail into Mangrove forest

The large expanse of the Mangrove forests provides an ideal setting for ecotourism, which in turn promises better livelihoods. One lesson that can be drawn from this is that environment conservation must not come at the cost of livelihoods of the community members, for there are certain areas where

conservation efforts can also provide an alternative source for income for them. For Bhutan too, there is need to assess and prioritize our conservation efforts so that they go hand-in-hand with green business ventures without sacrificing one over the other.

The positive outcome from conservation efforts in the mangrove community can not only be seen in the revival of natural ecosystem of that area, but also in the improved livelihood of the community members. Apart from increased harvest from aquaculture and the community also benefit from increasing the ecotourism business.

Local community has a mangrove area management group (Desa Wisata Mangrove Pandansari), which manages the restored area from reforestation of mangrove forest and all tourism entities in the area. The successful implementation of such community resilience project has attracted interest from both provincial and central government. With the funding from provincial government basic infrastructure like road to the bean ecotourism facilities has been improved over the past few months. The community has also been able to receive financial support from many donors for up scaling interventions to reduce sea water abrasion of the coastal area. The local are also involved in diversification of tourism products like local fabric dyeing techniques, showcasing local musical instruments and many other agro-based products.

4.10 Nature Conservation program in harmony with culture in Bandung

The culture shows at Bandung from native bamboo musical instrument (Angklung) is an example of nature conservation program went in harmony with the local culture, and succeeded in creating a sustainable environmental program that could be felt by the surrounding community. The facility is family business with a mission to establish a unique Sundanese arts community. The basic idea is to make bamboo an element that gives many dominating characters, therefore, many objects are produced from bamboo, such as show chairs, musical instruments to the stage of the show. Unexpectedly, the art performances shown here made a deep impression on the audience.

Mr. Udjo family has established relationship with nearby communities in supplying their main raw material, bamboo. Different species of bamboo were grown by the communities following the principles of sustainable management. Sustainable bamboo plantation in the area has reported numerous environmental benefits like water sources protection and reduce pressure on natural bamboo forest.

Picture: Bamboo harvested from local community through sustainable bamboo management to be used for local tourism culture shows

Besides environmental benefits, the local community is able to generate income through sale of raw materials to the arts facility.

The promotion of indigenous culture that is environment friendly holds huge promise of increased tourist attraction (as is the case for Bhutanõ worldwide popularity). Such products can guarantee increased returns, not only in terms of revenue generation but also in preserving the environment and culture of the people.

Picture: Cultural program in Bandung using sustainably managed bamboo products

The Bamboo musical instrument has become somewhat of a national icon in Indonesia and it's musical show not only generates income from visiting tourists but also provides avenues of employment for local community. Bhutan can adopt takeaways from that initiative with respect to promoting our indigenous culture and making them popular on the global stage.

5. Lesson Learnt

Building community capacity

The visiting team noticed strong community ownership of all programs. KEHATI has three key principles of assessment while deciding to engage local communities. They are 1) Assessment of institutional setup, 2) Community capacity, management and available human resources, and 3) Community portfolio. In choosing group leaders KEHATI advises community to identify a local champion, somebody with strong influence and maybe popular, who can lead the community strategically. Bhutan Trust Fund for Environmental Conservation (BTFEC) since its inception has been major share of grants has been made ministry level. Even the grants made to local implementing agencies like various national parks were not able to secure active engagement of the local communities. BTFEC may explore options of engaging directly with local communities in building their capacity and subsequently entrusting them to implement projects for solving environmental issues at their community. Thus, capacity development of local community can be an important component for BTFEC supported projects.

Leveraging on existing endowment fund to seek additional support

KEHATI leverages on its existing endowment fund for seeking funds from multilateral and bilateral donors. In certain cases, a single donor may not be in position to support entire project area, during such times KEHATI commits certain amount to attract funding from numerous other sources. Thus, Bhutan Trust Fund for Environmental Conservation (BTFEC) can extend/explore possibility for such partnerships, just like BTFEC support to Bhutan for Life. In many of the places the team visited, at the end of project completion the performance of the project was able to produce tangible benefits and the communities received funds from both provincial and central government for project up scaling.

Promotion of livelihood for local was key to success of green projects

In all the projects there were balance approach by KEHATI in terms of achieving their conservation and socio-economic goals. The visiting team agreed that this was one of the key ingredients for ensure active engagement of the local communities and project beneficiaries. BTFEC may explore infusing alternative income generation for the local communities as one of the key criteria for project proposal assessment.

Establishing separate endowment funds with specific objectives

KEHATI experienced that majority of donors are not willing to add onto already existing endowment funds. However, establishment of new endowment fund with its set of objectives has been successful. For instance, the Blue ABADI Fund has set up under this modality and has been quite successful till date. Thus, BTFEC's goal of establishing separate endowment fund for supporting sustainable land management practices is very possible and may interest the donors. Although development of green investment or Green Trust Fund may be considered as one of the best approach to conserve carbon-rich forest and vast biodiversity which are under threat, there is a risk for Royal Government of Bhutan as it may divert the support that the Government is receiving from our traditional donors as well as climate financing windows like the GCF and the GEF in implementing our national plan and priorities.

Numerous advantages of getting ISO certified

KEHATI is an ISO certified organization, and the team was told that their status of having ISO certification was key for them to be receiving funds from donors like UKaid. BTFEC getting accredited to Adaptation Fund and hopefully accredited to Green Climate Fund may present itself as a credible entity to channel the funds from other donors.

Use of crowd funding as a means of advocacy

KEHATI is also engaged in numerous crowd-funding sources for raising funds. Besides raising funds KEHATI uses these platforms for advocacy and informing the public on key environmental issues. BTFEC may explore similar options while exploring potential fund source for an endowment fund for sustainable land management for Bhutan.

Assisting corporations with their Corporate Social Responsibility (CSR)

KEHATI has also been proactively engaging with numerous national and multinational companies in implementing their CSR. Through KEHATIs experience and technical expertise they were able to successfully liaise with local community organizations in implementing numerous CSRs. BTFEC may also research into this arena with hydropower companies in Bhutan.

Opportunity for Debt-for-Nature swap deal

BTFEC in collaboration with GNHC and other relevant agencies in the country may explore possibility for Debt-for-Nature swap deal with international banks or other key developmental partners in Bhutan.

6. Annexure: Detail Travel Itinerary

Date	Program
24.11.2018	Travel: Paro to Bangkok
25.11.2018	Travel: Bangkok to Jakarta
26.11.2018	Experience sharing and introduction to KEHATI Program and their innovative financing mechanisms
27.11.2018	Site visit to Sanggabhuana community in South Jakarta dealing with urban issues such as trash management, bamboo farming, management of nearby river ecosystem, and growing creative economy
28.11.2018	Site visit to Mangrove Community Group and village in Brebes to see the mangrove forest, related climate issues, and community's economic activities and empowerment centered around it (including building community's resilience)
29.11.2018	Site visit in Bandung (West Java) to see bamboo farming and end-to-end applications (including growing community's creative economy); watching Bamboo musical performance in the afternoon
30.11.2018	Arrive in Jakarta and wrap up session at KEHATI Office
1.12.2018	Jakarta to Bangkok
2.12.2018	Bangkok to Paro

Details Itinerary for each day

JAKARTA ITINERARY			
26-Nov-18	DAY 1: Sharing Session @ KEHATI Office		
09.00	Opening Day 1		
09.00 - 09.15	Welcome Speech (KEHATI)	Bp. Riki Frindos	KEHATI Office
09.15 - 09.30	Introduction of Attendees, Meeting Objectives	Bhutan Team	KEHATI Office
09.30 - 10.00	KEHATI Overview: Various Financing Programs	Bp. Riki Frindos	KEHATI Office
10.00 - 10.30	Discussion: KEHATI Programs (PPB)	Bp. Rony Megawanto	KEHATI Office
	15 minute Coffee Break		
10.45 - 11.15	Discussion: Tropical Forest Conservation Action (TFCA) Kalimantan	I. Puspa D Liman	KEHATI Office

11.15 - 11.45	Discussion: Tropical Forest Conservation Action (TFCA) Sumatera	Bp. Samedi	KEHATI Office
	Lunch Break		
13.00 - 13.45	Sharing of Bhutan Activities	Bhutan Team	KEHATI Office
13.45 - 14.15	Discussion: KEHATI Green Index/SRI-KEHATI (Green Investment)	Bp. Indra Gunawan	KEHATI Office
14.15 - 14.45	Discussion: Blue Abadi Fund (Seascape Conservation Fund)	I. Gita Gemilang	KEHATI Office
	15 minute Coffee Break		
15.00 - 15.30	Discussion: ISPO Program (Sustainable Palm Oil Program)	Bp. Irfan Bakhtiar	KEHATI Office
15.30 - 16.00	Wrap Up & Closing		
18.30 - 20.00	Group Dinner	KEHATI	TBA

JAKARTA ITINERARY			
27-Nov-18	DAY 2: Field Trip to Sanggabuana Community (Jakarta)	(by bus)	
06.00 - 08.00	Breakfast & Briefing: Trip Preparation	Hotel	KEHATI
08.00 - 09.00	Going to Sanggabhuana Community Center	Bus	KEHATI
09.00 - 10.30	Welcome Ceremony and Program Introduction	Community Center Hall	Head Of Community Center/KEHATI
10.30 - 12.00	Community Center Tour	Walking tour	KEHATI - Head Of Community Center
12.00 - 13.30	Lunch	Community Center Hall	KEHATI - Head Of Community Center
13.30 - 14.30	Discussion	Community Center Hall	KEHATI - Head Of Community Center
14.30 - 20.00	End Program, Travel to Brebes	Bus	Dinner on the way to Brebes
20.00 - 20.30	Arrive at Brebes, Hotel Check In		KEHATI
20.30	Program Ends		
Site visit to Sanggabhuana Key learnings: community in South Jakarta dealing with urban issues such as trash management, bamboo farming, management of nearby river ecosystem, and growing creative economy			

BREBES ITINERARY			
28-Nov-18	DAY 3: Field Trip to Brebes Mangrove Community	(by bus)	
06.00 - 08.00	Breakfast & Briefing: Trip Preparation	Brebes Hotel	KEHATI
08.00 - 09.00	Travel to Pandansari Villages	Bus	KEHATI
09.00 - 10.00	Welcome Ceremony and Program Introduction	Mangrove Ecotour Jetty	KEHATI - Mangrovesari Community Group
10.00 - 12.00	Mangrove Track Visit	Traditional Boat	KEHATI - Mangrovesari Community Group
12.00 - 13.30	Lunch	Community Center Hall	KEHATI - Mangrovesari Community Group
13.30 - 14.30	Discussion	Natural Batik and Culture Hall	KEHATI - Mangrovesari Community Group
14.30 - 20.00	End Program, Travel to Bandung	Bus	Dinner on the way to Bandung
20.00 - 20.30	Arrive at Bandung, Hotel Check In		KEHATI
20.30	Program Ends		
Key learnings: Site visit to Mangrove Community Group and village in Brebes to see the mangrove forest, related climate issues, and community's economic activities and empowerment centered around it (including building community's resilience)			

BANDUNG ITINERARY			
29-Nov-18	DAY 4: Field Trip in Bandung, Bamboo Program and Performance	(by bus)	
06.00 - 08.00	Breakfast & Briefing: Trip Preparation	Bandung Hotel	KEHATI
08.00 - 09.00	Travel to Saung Angklung Udjo	Bus	KEHATI
09.00 - 10.00	Welcome Ceremony and	Saung Angklung Udjo	KEHATI - Saung

	Program Introduction		Angklung Udjo
10.00 - 12.00	Sharing Session with Expert: Bamboo Program	Saung Angklung Udjo	KEHATI - Saung Angklung Udjo
12.00 - 13.30	Lunch	Saung Angklung Udjo	KEHATI - Saung Angklung Udjo
13.30 - 17.00	Saung Angklung Udjo : Community Tour	Walking Tour	KEHATI - Saung Angklung Udjo
17.00 - 20.00	Saung Angklung Udjo : Bamboo Musical Performance	Saung Angklung Udjo	KEHATI - Saung Angklung Udjo
20.00 - 21.00	End Program, Travel back to Jakarta	Bus	Dinner on the way to Jakarta
Key learnings: Site visit in Bandung to see bamboo farming and end-to-end applications (including growing community's creative economy); watching Bamboo musical performance in the afternoon			

CHAPTER 7

Report on National Stakeholder Workshop on Sensitization and Mainstreaming of Sustainable Land Management (SLM)

Abbreviation

AKRA	Agency Key Result Area
ALDG	Agriculture Land Development Guidelines
APA	Annual Performance Agreement
ARDC	Agriculture Research and Development Centre
BTFEC	Bhutan Trust Fund for Environmental Conservation
CIF	Climate Investment Funds
DAO	Dzongkhag Agriculture Officer
DoA	Department of Agriculture
DPO	Dzongkhag Planning Officer
FYP	Five Year Plan
GCF	Green Climate Fund
GDG	Gewog Development Grant
GEF	Global Environmental Facility
GNHC	Gross National Happiness Commission
HWC	Human-wildlife Conflict
IWP	Individual Work Plan
KPI	Key Performance Indicator
LDCF	Least Developed Countries Fund
LDN	Land Degradation Neutrality
LG	Local Government
MoAF	Ministry of Agriculture and Forests
NAP	National Action Programme
NSSC	National Soil Services Centre
RGoB	Royal Government of Bhutan
SDG	Sustainable Development Goals
SLM	Sustainable Land Management
SRF	State Reserve Forest
UNCCD	United Nations Convention to Combat Desertification
WB	World Bank

Workshop Background

The Gross National Happiness Commission (GNHC) has entrusted Bhutan Trust Fund for Environmental Conservation (BTFEC) to undertake the project "Evaluation of Sustainable Land Management (SLM) and Innovative Financing to Enhance Climate Resilience and Food Security in Bhutan" funded by Climate Investment Funds (CIF).

The BTFEC in collaboration and with technical inputs from the National Soil Services Centre (NSSC), Ministry of Agriculture & Forests (MoAF), conducted a detailed impact assessment and mapping of past SLM activities in nine sites under Trashigang, Zhemgang, and Chhukha Dzongkhags. To have further insights, an external consultant carried out an evaluation of the SLM interventions in the same sites.

A separate task to come up with innovative financing mechanism to finance SLM projects and other climate change adaptation projects was also carried by another external consultant.

The findings from various SLM impact assessment studies were shared during two regional workshops conducted in Phuntsholing (21-23 January 2018) and SamdrupJongkhar (26-28 January 2018). The workshop provided forum for sharing field experiences on SLM and also identified major issues and challenges of SLM. Measures to address SLM challenges and mainstream SLM into government plans and policies were also discussed.

The respective Dzongkhag Agriculture and Planning Officers of 20 Dzongkhags, staffs of Agriculture Research and Development Centres (ARDCs), SLM adopters, and farmers from upcoming GEF/LDFC pilot Dzongkhags have attended the workshops.

The outcomes from the grassroots level stakeholder workshop were further deliberated during the national stakeholder workshop conducted at Lobesa on 1st and 2nd March 2018. Head of agencies from various departments of Royal Government of Bhutan attended the national stakeholder workshop. The workshop was organized with following objectives and expected outcomes.

Workshop Objectives

1. To create awareness and sensitize policy makers, implementers, donors, CSOs on SLM;
2. Agree on mechanism to mainstream SLM with NKRAs, AKRAs, LGKRA, and IWP/APA;
3. Highlight SLM as one of the key factors in contributing to climate resilience; increased crop production and enhanced ecosystem services; thereby improving livelihood at all levels; and
4. Agree on financing mechanism for scaling up SLM activities.

Expected outcomes of the workshop

1. Policy makers, implementers, donors and CSOs sensitized on SLM and its benefits;
2. SLM mainstreaming mechanism identified at all levels and agreed;
3. Stakeholders sensitized on SLM as one of the key factors in increasing climate resilience, crop production and ecosystem services; and
4. Financing mechanism agreed for SLM.

Sustainable land management in Bhutan

To set the context the experts from NSSC presented background on SLM initiatives in the country since 1980s. Technical details of SLM interventions were shared to the participants. Need for SLM in Bhutan, lessons learnt and challenges that the NSSC faced in implementing past SLM projects were also discussed. In-depth presentations were also made on National Action Program (NAP) to combat land degradation, which was developed in 2010. NSSC's upcoming plan for SLM interventions was also shared.

The outcomes from the past two grassroots level consultation workshop were presented. On behalf of GNHC, PD of NSSC also presented SLM and its linkage to SDG, NKRAs, AKRAs and LGKRAs. Through these linkages it was obvious that SLM was the key to mitigating land degradation, increasing agriculture productivity, reducing effects of climate change, improving livelihood, and reducing poverty.

Challenges for Effective SLM Implementation

NSSC has not been involved in implementation of SLM activities carried out by National Environment Commission (NEC) and UNDP under NAPA II. However, NSSC is working closely with these partners under NAPA III interventions. Since SLM cuts across all sectors, achieving a desired level of collaboration and partnership with relevant agencies has been a challenge. Such challenges have impeded putting NAP into action. For instance, the need to construct new farm roads following environmental friendly road construction as mentioned in NAP was often not considered due to insufficient budget. In the recent years NSSC has also noticed low level of participation from livestock and forestry extension agents for SLM interventions.

It is still unclear which agency should take the lead in mainstreaming land management as land is cross-sectorial. Therefore, all land stakeholders such as NLC, MoAF, MoWHS, MoEA, and GNHC should come together to discuss how land management should be taken forward,

Farm labour shortage, which is fuelled by limited population of reproductive aged group in certain rural areas and rural-urban migration was highlighted as a serious concern in successful implementation of SLM activities.

Lack of clear SLM or land use policy has been identified as a major challenge for SLM mainstreaming.

Recommendations

Securing and ensuring active public participation was highlighted as a key to mainstreaming SLM, given the decentralization process happening at the national level. However, there was a common consensus to further enhance the capacity of field extension agents and general public on SLM and SLM planning process so that SLM can be prioritised and get incorporated into LG plans. Unless this has been done adequately, getting SLM mainstreamed into LG plans would be daunting.

Other way of mainstreaming SLM is to follow top-down approach by allocating budget for SLM. However, before resorting to such measures, the current challenges faced in mainstreaming SLM at LG level needs to be thoroughly studied and adequately addressed.

Green Bhutan Corporation Limited (GBCL) offered to partner with NSSC in combating land degradation through its plantation program. However, GBCL is finding it difficult to go for large-scale plantation e.g. at landscape level due to land ownership and grazing right issues. Thus, to overcome this problem, GBCL will have to come up with mechanisms or strategies in consultation with the concerned stakeholders.

Similarly, the Department of Local Governance (DLG) has also offered NSSC to use their online gewog data collection system for gathering any SLM related information. If this online database is found to be suitable, NSSC need not come up with a new database to collect the SLM information.

Land degradation issues addressed at early stage could reduce lots of financial implications. For instance, construction of farm roads following EFRC guidelines would not only ensure eco-friendly roads but also reduce financial costs in mitigating land degradation due to poor road construction.

There was also a common consensus among the participants that the workshop should come up with good arguments and justifications to convince the decision makers to make desired policy changes.

The urgent need for long-term study data showing the benefits of SLM was raised both during the national as well as during the grassroots level workshops.

One way to mainstream SLM will be by creating awareness on the SLM linkages with local and national agriculture targets to the gewog officials. But more than this, the general public needs to be sensitised on SLM, as they are the ones who would

prioritise and include SLM in the Gewog Plans. Once the SLM gets incorporated in the LG plans and APA, including SLM activities into Gewog staff's IWPs becomes pretty straightforward. However, the Gewog staffs need to facilitate the public to prepare SLM plans with simple and realistic SLM indicators such as increase in crop yield or area of fallow land brought under cultivation through SLM interventions. Lack of broader policy framework for SLM or land development was identified as a missing link for mainstreaming SLM. In this regard, a thorough review on the coverage of SLM issues and role of NSSC in the National Land Act needs to be done so that the new land use policy addresses all these policy gaps. The land use policy would then determine how to go about with the mandates of NSSC, which currently has to align its activities and outputs with that of the department of agriculture. Such policy would also take SLM beyond the domains of arable land and department of agriculture in combating land degradation in the country.

Further, the policy would trigger more collaboration between NSSC and its partners and pave ways for developing appropriate strategies, guidelines, rules and regulations to successfully implement SLM. This would inevitably help NSSC and other relevant stakeholders to generate more tangible impacts on the ground in terms combating land degradation, increasing crop productivity, enhancing resilience to climate change, conserving biodiversity, and ensuring ecosystem services in the country. .

Given the current institutional set up and mandates, mainstreaming and implementing SLM beyond the agriculture land seem challenging for NSSC. This is largely because SLM is cross-sectorial task, and it requires coordinating, collaborating, and working closely with stakeholders both within and outside the Ministry of Agriculture and Forests. To this end, the workshop felt that there is a need to broaden up NSSC's mandates either by upgrading it to a full-fledged department or an autonomous agency. However, it was cautioned that a proper assessment needs to be done about the pros and cons of upgrading NSSC so that it does not undermine the present institutional set ups. .

One of the immediate advantages of upgrading NSSC would be the Centre will have the national mandate to coordinate, collaborate, and work together with relevant stakeholders both within and outside its ministry. It can also pursue to mainstream SLM into government plans and plans more objectively. Further, NSSC can tactically strategies its plans and activities to achieve both national and international goals and objectives. The Centre would also have the liberty to explore both internal and external funding windows to seek financial support for SLM activities. However, the immediate challenge in upgrading NSSC would be the Centre would not have the chance to work directly with the extension agents as they fall directly under DoA. In other words, everything will be routed through DoA and this would increase the turnaround time in delivering the SLM services. In addition, with LG act requiring extension agents to be reporting to the elected LG leaders, this might also pose a challenge in securing support of the field extension agents. However, these challenges could be overcome through close consultation with DoA and LG and come up with a proper implementation modalities.

Development of land use or SLM policy would then eventually foster a higher level of coordination and collaboration with NSSC which would enable the Centre to spear-head SLM mainstreaming and implementation of SLM activities.

Need for continuous capacity building on SLM for both central agencies like NSSC and grassroots like LG staff was found crucial in scaling-up SLM activities. Such capacity building in the form of basic training or refresher course would also serve as a SLM sensitization program, which in long-run would be crucial for SLM mainstreaming. Keeping ARDCs in loop, in capacity building programs, would ensure sustainability in capacity building.

Another sustainable way of financing SLM, as suggested, was establishing a 'matching fund' where gewog and head agencies like NSSC can make equal contribution for SLM activities. This could be one way of ensuring sustainable way of supporting SLM activities.

Highlighting SLM linkages with land degradation, biodiversity and carbon sequestration would also assist in establishing linkages with key stakeholders. This was identified as another way of mainstreaming SLM. Linking SLM with loss of arable land, biodiversity loss, and food and nutritional security could be another way to emphasize the need to mainstream SLM into government plans and policies. .

Need assessment pertaining to SLM at local level has to be conducted. NSSC could also work on developing national SLM target through active participation of LG officials and head agencies. Through such activity, need for SLM intervention could be properly mapped and argument for need for SLM at national level would be convincingly justified.

Conclusion

Programme directors, chiefs, and senior officials from relevant agencies attended the two-day workshop. The Experts from NSSC carried out sensitization on SLM through presentation, by highlighting the main activities and outcomes of past SLM projects from across the country. Officials from NSSC also presented National Action Programme (NAP) to combat land degradation, linkages of SLM to SDG, NKRAs, AKRAs and LGKRAs. The Agriculture Land Development (ALD) Guidelines 2017 was also presented and in-depth discussion was held as part of the sensitization programme. Report on feasibility of instituting an endowment fund for climate resilience activities including SLM as a separate financing window under BTFEC was also discussed. Those presentation highlighted SLM as the key to increasing resilience to climate change, enhancing crop production, and ensuring continuous supply of ecosystem services.

Various mechanisms for SLM mainstreaming was identified through group discussion and then thoroughly debated while it was presented to the forum. The key step in mainstreaming SLM was through development of overarching SLM or land use policy. Development of such policy has to be built on the existing legal frameworks like Land Act, 2007, and Local Governance Act. With national land use policy put in place, NSSC would then have a clearer picture as to how to take SLM forward, especially in the light of SLM mainstreaming, upgrading institutional set up, scaling up SLM beyond arable land, and securing financial resource.

Annexure I: List of participants

Name of the Participants	Designation	Agency	Email Address	Contact Number
Mr.Kado Zangpo	CFO	DLG, MoHCA	kadozangpo@mohca.gov.bt	17620085
Mr. Yeshey Lotay	Executive Engineer	DDM, MoHCA	ylotay@mohea.gov.bt	17119980
Mr.TsheringTashi	Agr. Officer	ARDC, Samtenling, DoA	tashtshering2@gmail.com	17549901
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Dr.PemaChoephyel	Director	BTFEC	pema.choephyel@bhutantrustfund.bt	17114026
Mr.SingyeDorji	CFO	BTFEC	singye@bhutantrustfund.bt	17999777
Mr.KuenzangTshering	M &E Officer	BTFEC	kuenzang@bhutantrustfund.bt	17305161
RinchenWangmo	APO	BTFEC	rinchen@bhutantrustfund.bt	17819540
RinchenDema	AFO	BTFEC	rinchendema@bhutantrustfund.bt	17419048

Annexure II: Workshop Program

Day 1 (01/03/2018)		
Time	**Activity**	**Responsibility**
8:30-9:00 am	Registration	BTFEC/NSSC
9:00-9:15 am	Welcome address	Dr. Karma DemaDorji, NSSC
9:15-9:35 am	Opening remarks	Director, BTFEC
9:35-9.45 am	Presentation on workshop objectives &outcomes	Dr.TsheringDorji, NSSC
9.45-10:30 am	**Group photo followed by tea/coffee break**	BTFEC/NSSC
Chair: Director (BTFEC)		
10:30-10:50 am	Presentation on SLM background	Dr.TsheringDorji, NSSC
10:50-11:15 am	Presentation on National Action Programme (NAP) for Combating Land Degradation	Mr.HakaDrukpa, NSSC
11:15-11:45 am	*Discussion*	
11:45-12:05 pm	Presentation on Agriculture Land Development Guidelines 2017	Dr.TsheringDorji, NSSC
12:05-12:30 pm	*Discussion*	
12:30-1:00 pm	Presentation on SLM linkage to SDGs, NKRAs, AKRAs, and LGKRAs	Dr. Karma DemaDorji, NSSC
1:00-2:00 pm	**Lunch Break**	
2:00-3:00 pm	*Discussion*	
3:00-5.00 pm	**Group Work-** Establish SLM linkage to land degradation, sustainable agriculture, climate resilience, biodiversity conservation, ecosystem services, etc. and identify mechanism to mainstream SLM into government plans & policies. **(Tea/coffee – self serve)**	NSSC
Day 2 (02/03/2018) - Chair: Program Director, NSSC		
9:00-9:15 am	Recap of Day I	Rapporteur (BTFEC & NSSC)
9:15-9: 30 am	Group work presentation	Different Groups
9:30-10:00 am	*Discussion*	
10.00-10:30	Presentation on challenges, benefits & opportunities of	Mr.KuenzangTshering,

am	SLM at grassroots level - output of the two SLM stakeholder workshops	BTFEC
10:30-11:00 am	**Tea/coffee break**	
11:00-11:25 pm	Presentation on innovative financing for scaling up SLM activities	Mr.SingyeDorji, BTFEC
11:25-11:50 pm	*Discussion*	
11:50-1.00 pm	**Group Work-** Way forward for SLM to combat land degradation, ensure sustainable agriculture, increase climate resilience, conserve biodiversity, & improve ecosystem services.	NSSC
1:00-2:00 pm	**Lunch Break**	
2:00-3:00 pm	Continue Group Work **(Tea/coffee - self serve)**	NSSC
3:00-3:20 pm	Group work presentation	Different Groups
3.20-3.50 pm	*Discussion*	
3:50-4:15 pm	Closing remark	Director, BTFEC
4:15-4:30 pm	Vote of thanks	Dr. Karma DemaDorji, (PD), NSSC
4:30-5:00 pm	TA/DA disbursement	BTFEC

CHAPTER 8

Stakeholder Consultation Workshop on SLM

Executive Summary

Sustainable land management (SLM) is key to poverty alleviation, food and nutritional security, safeguarding agro-ecological services and combating climate change. In Bhutan, continuous land degradation across the country threatens livelihood of more than 60 percent of the population depending on agriculture. This highlights Bhutan's urgent need to work towards sustainable land management (SLM). SLM initiatives in Bhutan were carried out since 1980s; however, major push for SLM was renewed after flash floods across the country in 2004. In line with this the Gross National Happiness Commission (GNHC) has entrusted Bhutan Trust Fund for Environmental Conservation (BTFEC) to undertake the project "Evaluation of Sustainable Land Management (SLM) and Innovative Financing to Enhance Climate Resilience and Food Security in Bhutan," funded by Climate Investment Fund (CIF).

The Bhutan Trust Fund for Environmental Conservation (BTFEC) in collaboration and with technical inputs from the National Soil Services Centre (NSSC), Ministry of Agriculture and Forests, conducted a detailed impact assessment and mapping of past SLM activities in nine sites under Trashigang, Zhemgang, and Chukha Dzongkhags. To have further insights, an external consultant carried out an evaluation of the SLM interventions in the same sites. In addition, GNHC has also conducted independent assessment of the past SLM interventions. A separate task to come up with innovative financing mechanism to finance climate change mitigation measures including SLM was also carried by an external consultant.

The findings of the above assessments were shared during two regional workshops conducted in Phuntsholing between 21 and 23 January 2018 and Samdrup Jongkhar between 26 and 28 January 2018. Dzongkhag Agriculture and Planning Officers of 20 Dzongkhags, staff of Agriculture Research and Development Centres (ARDCs), SLM adopters, and potential SLM farmers of GEF/LDFC pilot Dzongkhags have attended the workshops.

Technical experts from NSSC had presented technical aspects of SLM. They also shared upcoming plans for SLM and emphasized its linkage with nationally prioritized Sustainable Development Goals (SDGs) and UNFCCD's Land Degradation Neutrality (LDN) goals. Participants were also informed on the details of recently introduce Agriculture and Land Development (ALD) guidelines; which was launched with the vision for enhancing agriculture production, ensuring continuous supply of agro-ecosystem services, making farming attractive source of livelihood, enhancing socio-economic development and ensuring environmental wellbeing.

In order to ensure sustainable funding for climate related mitigation measures including SLM, the consultant recommended an institution of USD 15 million as an endowment fund. Global Environmental Facility (GEF) and Green Climate Fund (GCF) were identified as some potential funding sources while contribution from Royal Government of Bhutan was also found crucial.

Overall, the past SLM interventions have produced visible tangible impacts on livelihood of the farming communities in all project sites. SLM interventions were reported to have significantly reduced soil erosion, eased workability on steep terrain, increased fodder availability through hedgerows, fallow lands were brought under cultivation, and eventually culminated in increase of

agriculture and livestock productivity. Farmers also reported additional income generation sources through various SLM interventions like orange plantation, sale of broom grass from hedgerows, sale of Napier grass rhizomes, and sale of bamboo. Farmer also reported that it was the first time that they had hands-on-training on SLM technologies.

On the other hand there were also numerous challenges in maximizing the benefits of SLM interventions. Lack of comprehensive national land use policy and inability to implement National Action Programme (NAP) in combating land degradation has hindered mainstreaming of SLM activities into national plans and policies. Decision makers at LG level have also voiced the challenges in implementing activities beyond their dzongkhag targets and annual performance agreements (APA). Thus mainstreaming SLM was found as the key to address these issues. Further, ALD guidelines developed by MoAF to address land degradation issues still largely remained unknown and most of the stakeholder were not informed adequately.

Farmers and decision makers at grassroots level have also demanded concrete long-term results from past SLM sites. Only with such available information, the implementers will be convinced to take up or mainstream SLM at local level. There was a common consensus that in general there is still lack of clear understanding on the long-term benefits of SLM interventions.

Other challenges at grassroots level were shortage of farm labour, lack of ownership of SLM sites by SLM adopters, limited landholdings, free grazing by stray cattle, limited or no incentives for SLM adopters, limited human and financial resources, crop damage by wildlife, and difficult terrain. Another key issue with past SLM interventions was that SLM s main target was to mitigate land degradation with less focus on integration of SLM activities with other farming activities.

Thus to move forward with SLM, rigorous awareness and advocacy at all levels of decision-makings was recommended. It was found as precursor to mainstreaming SLM in national plans and policies. It could be done through establishment of demonstration sites in all 20 dzongkhags using existing farmers groups or involving proactive citizens. Long-term monitoring of these sites then might help in gathering concrete evidence of SLM benefits.

Development of comprehensive national land use policy, implementation of NAP for combating land degradation and increasing level of awareness on ALD guideline were suggested as some of the key measures to address mainstreaming issues.

Incorporating the short-term benefits in SLM techniques were also recommended, as it would encourage the new SLM adopters. However, to achieve long-term goals SLM should be integrated with horticulture, improving market accessibility, mitigating human-wildlife conflicts, capacity building and sustainable financial supports. Shortage of farm labour could be, to some extend, addressed with farm mechanization. Thus assistance is needed for farm mechanization. A SLM management plan was suggested to developed in all SLM sites in collaboration with the local beneficiaries for ensuring sense ownership.

1. Background

The Gross National Happiness Commission (GNHC) has entrusted the Bhutan Trust Fund for Environmental Conservation (BTFEC) to undertake the project "Evaluation of Sustainable Land Management (SLM) and Innovative Financing to Enhance Climate Resilience and Food Security in Bhutan," funded by Climate Investment Fund.

The BTFEC in collaboration and with technical inputs from the National Soil Services Centre (NSSC), Ministry of Agriculture and Forests, conducted a detailed impact assessment and mapping of past SLM activities in nine sites under Trashigang, Zhemgang, and Chhukha Dzongkhags. The assessment was done in order to come up with appropriate recommendations in taking SLM forward in terms of combating land degradation, increasing resilience to climate change, and enhancing continued ecosystem services.

To have further insights, an external consultant carried out an evaluation of the SLM interventions in the same sites. A separate task to come up with innovative financing mechanism to finance SLM projects and other climate change adaptation projects was also carried by another external consultant.

NSSC has gathered a comprehensive data and information on the SLM interventions in the three Dzongkhags, in a form of maps, assessment and evaluation reports, and innovative financing mechanisms, which was shared with various stakeholders for information, knowledge and policy change for better and effective SLM practices in the country.

In this regard, a two level stakeholder workshops i.e. one at regional and another at national levels has been planned to exchange information and knowledge on SLM. The regional stakeholder workshop was conducted in two regions. For the western and central region, it was conducted in Phuntsholing from 21-23 January 2018 and in Samdrup Jongkhar from 26 to 28 January 2018. The respective Dzongkhag Agriculture and Planning Officers of 20 Dzongkhags, staff of Agriculture Research and Development Centres (ARDCs), SLM adopters, and potential SLM farmers of GEF/LDFC pilot Dzongkhags attended the two workshops. Workshops were conducted with objectives and expected outcomes as mentioned below.

Workshop Objectives

- Provide opportunity to share field experience on SLM,

- Understand the importance and benefits of SLM,
- Discuss issues and challenges of SLM,
- Recommend measures to address SLM challenges, and
- Contribute to mainstreaming SLM into government plans and policies.

Workshop output

- Participants sensitized on SLM and SLM related topics,
- Participants acknowledge and appreciate the benefits of SLM,
- Knowledge gained through experience sharing among the stakeholders,
- Common SLM challenges identified and recommendations made, and
- Field experiences on SLM consolidated for the national SLM stakeholder workshop,
- List of policy gaps for incorporation into the national policy.

2. Sustainable Land Management in Bhutan

SLM is a multi-sectorial issue as it is key to poverty alleviation, food security, ecosystem services and combating climate change. Given the limited arable land area, SLM is the only option for improving food and nutrition security for increasing global population.

Around 69 percent of Bhutan s population depend on agriculture, with only three percent of the country s total land being arable and feasible for agriculture. Furthermore, majority of the agriculture land is located on steep and fragile terrains. The rugged terrains coupled with increasing impact of climate change with high precipitation during monsoon, soil erosion and other forms of land degradations are prevalent throughout the country. A study on soil erosion rates conducted by NSSC under different agro-ecological zones indicated that on an average the soil loss is around 21 tons per hectare annually. Bhutan therefore is with no option, but to utilize limited arable land optimally and meaningfully through mechanisms such as SLM practices. This is also one major reason for SLM to feature as top priority in the country s subsequent five year socio-economic plans.

SLM also helps in combating climate change through maintaining soil Carbon. Direct result of SLM reduces soil erosion, which in turn has also numerous benefits in maintaining soil nutrient cycles and biodiversity. Thus SLM by definition requires a holistic approach and not just focusing on mitigation of degraded landscapes.

In Bhutan, continuous land degradation across the country, poses huge challenge to the limited three percent arable land. This highlights Bhutan s need to work towards SLM through climate smart agricultural practices and improving traditional land use practices like *tseri* cultivation, water management, free grazing and others. SLM project initiatives in Bhutan were carried out

since 1980s; however, major push for SLM was renewed after major flash floods across the country in 2004.

Most of the SLM activities were focused on planting fodder grass as hedgerows, contour stone bunds, combined hedgerows and stone bunds, bench terracing, orchard terrace, check dams, buffer zones, soil fertility management, water management, etc. So far almost 385 acres of vulnerable land has been brought under SLM. NSSC also produced Landuse-Landcover (LULC) map and prepared National Adaption Programme (NAP) for action for combating land degradation.

3. Documentation and Mapping of SLM Sites

Lack of proper research and documentation of SLM projects implemented in the country was one of the major bottlenecks in scaling up similar SLM interventions. The only SLM evaluation document was a terminal evaluation report prepared by GEF/World Bank for SLM projects in 2004. The downside of this evaluation was, it was done a decade ago and only in few areas. The need for proper documentation to have baseline information is key for monitoring, evaluation and also used for strategic planning in future. Thus NSSC has documented SLM initiatives in all nine previous SLM sites. Each site was well documented and mapped with total acres of each SLM activities using spatial mapping tools.

4. Agriculture and Land Development (ALD) Guideline

The main objective of ALD guideline was to emphasize SLM for enhancing agriculture production, ensuring continuous supply of agro-ecosystem services, making farming attractive source of livelihood, enhancing socio-economic development, and ensuring environmental wellbeing. It would also reduce land degradation, increase resilience and combat climate change. In addition, ALD guideline aims to bring fallow lands under cultivation, make agricultural land feasible for mechanization, contribute towards national food and nutritional security and contribute towards achieving global agreement and Sustainable Development Goals (SDGs). ALD guideline is also expected to bring in standard SLM approaches, clear guidelines to land developers, proper documentation, monitoring and evaluation of SLM activities, to increase efficiency and effectiveness of ALD measures.

Technical experts from NSSC also presented various support schemes for to kick-start any SLM practices or land development as per ALD guideline. However, officials from NSSC emphasized that proposal has to come from field extension officers working in collaboration with local community and then proceed forward to Department of Agriculture (DoA). Detailed explanation of ALD technologies (bench terracing, orchard terracing, surface stone collection, terrace consolidation, fodder grass hedgerows, contour stone bunds, orchard basin, check dams) were also discussed in detail.

5. Tentative Plan for SLM Activities in 12th Five Year Plan (FYP)

Upcoming 12 FYP (2018 to 2023) is set to achieve SDG 1, 13 & 15 while all planned activities of NSSC were aligned to achieve outcomes of SGD 15 (life on earth). Thus linkage between objectives of 12 FYP and MoAF s AKRA and KPIs were discussed. NSSC mentioned that SLM related activities are well linked to SDGs to NKRA 6 (Carbon neutral, climate and disaster resident development enhanced) and AKRA (enhanced climate smart and disaster resilient development) of MoAF.

The key role that SLM plays in achieving the national targets of reducing land degradation, increasing agriculture productivity and ultimately curbing rural-urban migration were also highlighted. MoAF have also proposed implementation of ALD guideline as a flagship programme in 12FYP for achieving above-mentioned goals. Within ALD guideline, bench terracing was proposed as one of the key activities during 12 FYP.

Bhutan has also became a party to UNCCD s convention of Land Degradation Neutrality (LDN) and in order to fulfil the objectives, project sites at Jaray, Thangrong, and Wangphu were supported through BTFEC funding. Bhutan is also one of the pioneer LDN countries in the world and only LDN country in the region. Thus, SLM activities in the country will be carried out as per the principles and guidelines of LDN. Three main indicators to be used for LDN were land productivity, LULC change and Carbon stock above/below ground.

Representative from GNHC also shared entry points to incorporate SLM into 12th FYP and reminded participants that this was a timely workshop to ensure SLM issues in their locality are mainstreamed into government plans and policies. Main areas of mainstreaming SLM in 12 FYO can be in two key area results namely: 1. Enhance food and nutrition security, and 2. Carbon neutral, climate & disaster resident development enhanced.

6. Innovative financing strategies to support climate change mitigation activities

The need for an endowment fund is to achieve SDG 15, land degradation neutrality (LDN) goals, and address inadequate financial support for SLM activities across the country. Feasibility study was done based on assessing objectives, legal feasibility, financial sustainability, institutional and human resource (HR) capacity and potential source of fund. No legal issues, no imminent HR and institutional capacity issues were found. On the other hand, BTFEC with credible governance and experience was reported as a capable institution to take up the task. So, USD 15 million was recommended based on assessment to above-mentioned criteria. The benefits of SLM activities are often long-term, and it poses huge challenge to mainstream SLM. So, to ensure SLM mainstreaming and financing, NSSC and BTFEC proposed for an institution of an endowment fund.
GEF and Green Climate Fund (GCF) could be potential sources, while RGoB contribution was found to be critical co-funding source. Consultant also recommended need for cost estimations for SLM interventions across country. Yearly estimated cost would help to plan the sustainability of the fund use in coming years. In addition, the need to enhance livelihood options for local communities with SLM interventions was recommended to promote ownership of SLM sites.

7. Impacts of Past SLM Project

Assessments of past SLM project impacts were carried out by GNHC and NSSC. BTFEC also hired a third party evaluator for assessing impacts of SLM in pilot project sites at Radi, Phuntsholing, and Logchina gewogs.

NSSC reported that in most of the cases, local communities have immensely benefited from SLM activities. Advantages of each of the SLM technologies were shared in detail with the most relevant before and after pictures, financial figures, etc. From the past experience SLM activities had led to an increase in crop production and enhanced livelihood of communities in all the SLM sites. Reduction in surface erosion was also recorded in all the sites, which could also have other numerous ecological benefits.

Consultant also highlighted benefits of bamboo plantation, which has become source of income generation for the farmers. Bamboo plantations were also found to be more effective than stonewalls.

GNHC reported that SLM projects implemented in pilot dzongkhags like Chukha, Tarshigang, and Zhemgang were analysed though interview with beneficiaries, meeting with stakeholders, focus group discussions and field visits. SLM interventions were found to have enhanced rural livelihoods, increased crop production, increase in use of fallow lands, and the beneficiaries has learnt techniques of SLM. Overall, SLM has generated positive social and environmental impacts.

The case of SLM project site in Radhi was highlighted both for positive and negative results. Major SLM project was carried out in Radi since 2009 and was motsly targeted to wetlands. The SLM interventions implemented phase by phase and has been successful to some extend. However, mass movement of land is still the biggest issue in Radi.

Another example of land management was to consolidate small terraces to ease workability of farm machines. Consolidation of small terrace initiative by Dzongkhag Agriculture at Trashi Yangtse was able to bring in some fallow land and dry lands under cultivation and it was noted that the need for farm labour was also reduced from 16 person/acre to 12 person/acre through this project. This was mainly due to mechanization of farmlands. So far, there wasn't any significant drop of rice production through terrace consolidation works.

SLM adopters from various projects sites also participated in the workshop. They were given an opportunity to present the impacts and challenges in implementing SLM interventions in their locality. As expected, farmers noticed reduction in topsoil erosion through SLM interventions like hedgerows, and contour stone bunds. In most of the cases, it was the first time for the farmers to implement scientifically proven techniques in their fields. So, hands-on-training on SLM techniques have improved their knowledge and capacity in land management. In many cases SLM techniques has also been attributed to reduce steepness of the slope. It has eased the workability of their farmlands. Almost all of the SLM implemented sites reported that SLM interventions have enhanced their income earning opportunity. For instance, orange plantation in Bardo Gewog has provided farmers with additional source of income. Planting fodder grass as hedgerows has improved fodder grass availability and enhanced dairy productivity. In Jarey

Gewog, they were also able to earn additional income through sale of Napier grass rhizomes to neighbouring areas, in the second and third year of project period. Overall farmers noticed increase in soil fertility and rise in crop productivity in the SLM intervened sites. Farmers opinion on SLM impacts in each SLM project sites was summarized in the table below.

Sl. No.	SLM sites	SLM Impacts
1	Nangkor, Zhemgang	- Reduced surface erosion
2	Bardo, Zhemgang	- Farmers learnt new SLM techniques - Hedgerows reduced top soil erosion - Reduced slope of the terrain - Orange plantation increased income generation
3	Goshing, Zhemgang	- Visible impacts of reduced top soil erosion
4	Phuntsholing, Chukha	- Learnt using A-frame for making contour stone bunds - SLM increased soil fertility on steep slopes - Stopped *tseri* cultivation - Plantation of broom-grass as hedgerow created income generation opportunity
5	Logchina, Chukha	- Learnt SLM techniques for the first time - Noticed improvement in soil fertility - Reduced erosion - Reduced steepness of the slope - Enhanced agriculture productivity and income generation
6	Bongo, Chukha	- Halted *tseri* cultivation - Increased soil fertility which resulted in higher maize yield - Reduced slope degree - Easy access to fodder grass increased dairy productivity - Increased income generation opportunities
7	Jarey, Lhuentse	- Through SLM techniques like hedgerows and stone bunds some area of degraded land was also stabilized - Received free agricultural tool - Grass from hedgerows also increased fodder availability - Farmers also sold Napier grass cutting/rhizomes in subsequent years and generated cash income. E.g. DAO Lhuentse, mentioned that in first year they bought Napier grass for hedgerows and later in 2nd and 3rd year they were able to sell each rhizome for Nu 2 to neighbouring SLM sites.

Sl. No.	SLM sites	SLM Impacts
8	Thangrong, Mongar	- Noticed increased crop yield - Easy access to fodder crops increased dairy productivity - SLM eased the workability of steep terrain - The first year was difficult but from second year onwards SLM interventions worked well.

8. Lessons learnt from past SLM: Challenges

8.1 SLM intervened sites were left unused

NSSC during their assessment of previous SLM sites reported that some SLM intervened sites were not used due to lack or irrigation, farm labour shortage and human wildlife conflicts. Such difficulties have prevented local farmers from using the SLM intervened sites for agricultural purposes. Assessment of SLM sites by GNHC till 2014 has also found that some terraced lands were left fallow in certain sites. GNHC also attributed to these challenges due to limited budget for irrigation schemes in SLM introduced sites.

8.2 Lack of comprehensive national policy

Lack of national policy related to land development and management has resulted into SLM activities not being mainstreamed. As a result no budget was allocated.

8.4 SLM technological challenges

Consultant pointed out that in case of Radi Gewog, bamboo plantation exacerbated Human Wildlife Conflict (HWC) issues as it provided perfect hiding place for wild animals. Other also reported SLM-technical issues like stone-bunds creating safe environment for rodents (e.g. in Thridangbi in Mongar). Farmers also complained about land space between two hedgerows were very narrow and inconvenient for farming. One of the participants also reported increased in pest incidences for the crops due to hedgerows.

8.5 Lack of proper documentation

During the assessment of past SLM impacts, consultants have come across limited documentation on past SLM interventions. So, it was challenging for an impacts assessment due to change in project implementing personals, and it was almost difficult to locate those people. Without the project implementing personals and proper documentation, it was difficult to ascertain project impacts in some cases.

8.6 Limited land holding

Limited land holding per household often poses challenges for farmers to use the available farmlands for implementing new SLM technologies. Some of the poor households with limited landholdings didn□t feel safe to venture into implementing SLM technologies. They also do not

want lose any cultivable area for any other land management interventions. Partly it could be blamed for not fully understating the long-term benefits of SLM interventions.

8.7 Shortage of farm labour

Shortage of farm labour in rural areas was another major concern. Most of the rural areas has elderly population and often more female population over male. Since SLM implementation at the beginning is labour intensive, limited farm labour severely hampers implementation progress at grassroots level. *Gungtongs* (empty households) has also further exacerbated the situation of labour shortage. Loss of labour force & feminization of rural labour due to rural urban migration might result in acute shortage of farm labour in coming years.

SLM activities were often found to be resource and labour intensive such that most of the farmers cannot afford. In additional, hedgerow plantation coincides with farming activities of farmers cannot effort to spare labour on any SLM activities.

8.8 Free grazing by cattle

Free grazing by stray cattle especially during winter months was also blamed for low success rate in most of the previous SLM sites. Thus the slow rate of success further created doubt and concern over SLM success and finally resulted in low SLM adoption by the local communities.

8.9 Limited incentives for SLM adopter

Farmer also reported limited farming tools and fodder sapling/rhizomes for SLM sites. Such limited resources were reported to have discouraged them to take up SLM activities. Inadequate incentives and higher cost involved in SLM has resulted in low level of participation from local farmers. They were expecting the government to provide them with farm machineries for their SLM sites, both for ease of working and to address the farm labour shortage.

8.10 Lack of ownership of SLM sites

Assessment of previous SLM sites by GNHC has reported that lack of ownership and accountability by local communities has resulted in poor maintenance of SLM sites. For instance check-dams for controlling water related erosion in some cases were severely damaged. Further it was reported that majority of SLM sites were found to be not in good shape due to lack of ownership from the community. NSSC and consultants also reported similar concerns through their assessment of past SLM intervened sites.

8.11 Lack of coordination among development sectors

Combating land degradation is a multi sectorial issue, which requires high level of integrated approach. However, farmers and GNHC have reported damage of SLM sites by farm road constructions in several past SLM sites. Such challenges could be avoided with proper coordination and planning with various developmental sections both at local government and head agencies. Participants at the LG level informed that for instance, till 11 FYP, it was not clear who should be taking the lead in SLM at LG level. NSSC informed that NAP for

combating land degradation for SLM clearly defines roles of every agency for SLM but challenges have been to put into action. Issues like loss of arable land to developmental activities like road, town, mining & quarry, logging, etc., to some extent could be solved by implementation of the NAP.

Lack of coordination between experts at Ministry and dzongkhag, and decision makers at gewog level has sometimes has confused the farmers. Often too many developmental interventions were implemented without proper coordination among various implementers. This could be attributed to lack of systematic planning and coordination, eventually, in case of SLM it has resulted in not receiving required priority.

8.12 Mainstreaming SLM is a challenge

NSSC shared their experiences that SLM firstly doesn't get priory at local government level and at times when it get approved at lower level it is a challenging task to get on the national priority list. For DAOs representatives, from their field experiences in general SLM benefits are long-term thus difficult to convince farmers and LG officials to take up any SLM activities as a part of their planned activity.
Representatives of DPOs also highlighted that in general public only proactively propose short-term outcome oriented activities for their annual or FYP and thus SLM doesn't get highlighted into dzongkhag or national plans. This could be due to immediate tangible results of other developmental activities over SLM activities. Land being common resources, there is less care for its management and thus no body takes the responsibility for its sustainable management. This was also cited as one of the main reasons for not having mainstreamed SLM issues.

8.13 Less awareness on long-term benefits of SLM

Participants cited that majority of farmers and even some decision makers look for short-term and immediate benefits from SLM initiatives, which is often very minimal. Thus it is a challenge to convince farmers to take up SLM. Limited awareness by decision makers at LG level in terms of benefits of SLM and SLM technologies was one of the root causes for it being not mainstreamed into national policies and plans. Scattered coverage of past SLM sites, at national level, could also be partly responsible for low level for awareness. There was a consensus among the participants that there is a long way to go for awareness on benefits of SLM and then understanding its linkage to climate change. Only through such understanding, decision makers and farmers would view SLM as a key to improve their resilience against climate change.

8.14 Limited human resources and financial support

DPOs and DAOs cited that in reality they have too many issues to be mainstreamed and at the same time, they have to attend to many other ad-hoc government activities. Thus, single person trying to mainstream every developmental issue is a challenge with limited human resources at LG level. Further due to decentralization, there are too many tasks to be conducted by local government officials, so there isn't enough financial or human resource to complete all the activities.

Some other challenges for successful implementation of SLM are lack of resources, both HR and technical capacity at local level. Despite all the HR capacity building from the government, participants from the local government cited that there is still not enough capacity at the LG level.

The representative of DPOs reminded everyone the need to mainstream SLM should come from local government. However lack of enough funds to mainstream SLM is still a challenge. Thus funding is required from the government until LG can sustainably manage the SLM sites. Lack of financial support for SLM has often resulted in limited coverage and left out far and remote areas. This was due to high cost involved in monitoring far and very remote places and with less frequency of monitoring it severely affected the project outcomes.

8.15 Natural factors

One of the major challenges faced while implementing SLM activities were steep terrain of arable land. Working on steep slopes requires huge labour force and eventually increases cost of the project. In addition, the steep slopes and poor soil quality was often attributed for not being able to achieve timely SLM outcomes.
Natural forces sometimes severely hamper the success of SLM activities. For example, SLM in Radi was targeted to stabilize the paddy fields. However, mass movement of land is still the biggest issue. Research specific to the issue of Radi would be key to understanding the problem.

8.16 Human-wildlife conflicts

In some SLM sites farmers were not able to continue cultivating due to crop damage by wild animals. When farmers cannot compete against the wild animals, the SLM intervened sites were left fallow. Thus, resources spent for SLM interventions don't get translated into expected outcomes.

8.17 Inclusiveness of vulnerable groups

Some of the participants shared concerns over negligence of minority and vulnerable groups during SLM project interventions. Decision made by few influential and majority groups might result in low participation by the community. This in long-term will have negative effect on the sustainability of the SLM interventions.
Some households in remote rural areas are poor and vulnerable to all kinds of economic and climate shocks. Such households lack capacity to take up SLM even with current level of support from the government. So, how to include them into future SLM projects is still a question.

8.18 Alternative Income Generation Sources

In certain cases participants reported that due to availability for short-term benefits of off-farm activities, people often ignore land management. For instance, many households in Salamjee have left their land for off-farm activities. However, after successful implementation of integrated land management, some of the households have returned and they are having a higher standard of living today. Lack of awareness on long-term benefits of land management might also have contributed to such challenges.

8.19 Limited scope of SLM

Lack of integrated approach in past SLM approaches, e.g. integration of agroforestry, improved cattle breed and short-term income generation opportunity from SLM was lacking. SLM during their inception also need to account for challenges due to invasive species like snails in Gyelpozhing that might pose challenge to crops in SLM sites. Some of the specific challenges faced by previous SLM adopters are summarized in table

Sl. No.	SLM sites	SLM Challenges
1	Nangkor, Zhemgang	SLM intervened sites were in the middle of the forested area thus human-wildlife conflict (HWC) posed huge challenge in using the land after the project period
2	Bardo, Zhemgang	SLM activities require continues financial support from the government till community could ensure sustainable way of financing
3	Goshing, Zhemgang	- Limited area coverage by SLM projects - Farmers believe around 40 percent of the land area still needs to be brought under SLM
4	Phuntsholing, Chukha	- Labour shortage - Lack of farm machineries to deal with heavy boulders in certain SLM sites - Other biggest challenge was to bring whole community together for SLM implementation.
5	Logchina, Chukha	- SLM sites were affected by new farm road construction - Some private land where SLM were implemented was found to be excess land (not registered under tharm) and categorized as government land during recent national land survey - Labour shortage - Lack of farm machineries
6	Bongo, Chukha	- Lack of awareness on SLM techniques among local farmers - Difficult to gather community for SLM activity - Labour shortage Lack of farm machineries
7	Jarey, Lhuntse	- Labour shortage - Free grazing by stray cattle - Low level of interest from farmers for SLM techniques as it often reduces the land area available for cultivation.

Sl. No.	SLM sites	SLM Challenges
8	Thangrong, Mongar	- The first year was found difficult but from second year onwards SLM interventions worked well - Even through SLM activities were planned through participatory planning, it had been difficult to bring them forward to work together on SLM activities

8.21 Case study on Challenges faced by Small Terrace Consolidation at Trashi Yangtse

As requested by farmers to Dzongkhag Agriculture office of Trashi Yangtse, consolidation of small terracing was started to ease the workability of farm machines in the rice fields. For this the DAO found that lack of technical expertise in consolidating terraces in absence of any technical guidelines was a major challenge. In addition lack of suitable machine for terrace consolidation was another hurdle.

Limited working period was another challenge. In winter months no developmental activities were allowed in the project sites, as the area is core roosting habitat for Black-necked cranes. At the same time in summer months local can't afford to skip crop-growing season for any developmental activities. Thus, within that short period terrace consolidation has to be done and also allow some buffer time to stabilize the freshly cut areas or else the terrace might leak during paddy cultivation. However, with support from the farming community and LG the task was successfully executed.

9. Lessons learnt from past SLM: Best Practices

NSSC as a leading agency in SLM implementation had a vast field experience. NSSC found that bottom-up planning approach was essential in empowering local communities that also helped in installing sense of ownership for the post project period. Formation of farmers group through creation of effective bylaws for labour sharing has been effective in addressing farm labour shortage to some extends. One of the most important lessons learned was to balance short-term and long-term SLM interventions. Realizing short-term benefit was often found to be the foremost encouraging factor for the farmers to adopt SLM.

In case of SLM activities like small terrace consolidation at Trashi Yangtse, involvement of LG and formation of a committee headed by an elderly person enabled project to be implemented without any conflicts. Involvement of local community, LG and following cultural protocol of starting a new task was effective in gaining farmers trust and confidence in the new project.

Samdrup Jongkhar Initiative (SJI) also experienced that involvement of proactive citizens and using them, as an example to implement any kind of technologies at grassroots level, has been found successful. Through such means local community believes in words from their fellow village man than somebody outside their community.

10. Lessons learnt from past SLM: Recommendations

10.1 Need for further sensitization and awareness on SLM

Lack of awareness on significance on land management especially awareness on long-term benefits of SLM was reported to be minimal at all levels of decision-making. The common consensus was to have a robust awareness at all levels of decision making to ensure that SLM received priority at national policies and plans.

One way of creating such awareness was to support experience-sharing visits by farmers to previous SLM implemented sites. This would immensely encourage them to take up the SLM strategies in their local area. Involvement of proactive citizens in kick-starting any SLM activities would enhance project success, which in long run would encourage other community member to do the same.

Need was felt for wide media coverage on SLM technologies, stepwise procedures for each of these technologies and long-term benefits of SLM. Rigorous advocacy programmes should first target farmers and LG officials. This was in due consideration that upcoming 12 FYP will have almost 50 percent national budget allocated to LG level.

The representatives DPOs also recommended that various government sectors to have all the advocacy programme conducted at one go so that farmers are not bothered every time with too many advocacy programmes from various sectors. It would also enhance collaboration and partnership among the various development agencies.

NSSC has covered almost every district since 2005 though annual land management campaigns. During annual campaign an area equivalent to 50 acres was selected for implementation SLM activities as a part of SLM advocacy programme. However, DAOs representative felt the need to have SLM demonstration sites in each of the 20 dzongkhags for more effective awareness. In addition such demonstration sites could serve as nursery to supply saplings and Napier grass rhizomes for new SLM sites. Targeting already functional farmers group or proactive citizens could be entry point for establishment of a demonstration site.

10.2 Sharing Evidence on benefits from past SLM activities

Urgent need was felt to have an evidence of SLM impacts in terms of tons of rice or maize productivity increased as result of the SLM interventions. Such evidences are required for the farmers to easily comprehend the benefits of SLM. NSSC informed the gathering that database on SLM benefits will be taken care in coming FYP as per the ALD guidelines.

Participants also recommended the need for maintaining database on SLM interventions across the country by a single agency. This was suggested to avoid duplication of the similar tasks by various agencies. NSSC reminded the participants that they have been working towards compilation of national data so that it is also useful to measure and report fulfilment of LDN objectives. This is expected to be sorted out by 12 FYP.

10.3 Long-term monitoring of SLM sites is required

Director of BTFEC and the representatives of DPOs also recommended the need for long-term monitoring and constant monitoring of SLM sites in order to have concrete evidence to convince new SLM adopters. This would also ensure that impacts of SLM are properly documented. From the past experiences, strict follow up from both SLM implementing agencies and beneficiaries was found crucial for achieving the intended project outcomes.

10.4 Short-term benefits from SLM needs to be incorporated

Most SLM intervention has long-term benefits. Thus, it was found difficult in educating farmers on these benefits. So, incorporation of any possible short-term benefits into SLM technologies would encourage farmer to take up SLM. Need to give some importance to short-term SLM benefits were agreed by the workshop participants.

10.5 Mainstreaming

One of the major challenges was mainstreaming SLM into national policies and plans. One of the DAOs suggested that higher decision-making body could issue an executive order just to kick-start the mainstreaming. However, in long-run common consent was to have rigorous advocacy programme at all levels of decision making as a precursor to mainstreaming SLM.

NSSC requested DAOs and DPOs to encourage local communities to protect and manage land for achieving long-term agricultural and poverty reduction goals. SLM activities have to be reflected into their annual plans or proposed an activity for upcoming 12 FYP, in order for NSSC to assist them. Thus, NSSC urged local communities to ensure that requirement for SLM are highlighted and mainstreamed into the planned activities. Urgent need to mainstream SLM into national plan and policies was also highlighted by GNHC in their SLM impact assessment study.

The government officials at LG level raised the concern that SLM needs to be incorporated as per mainstream policies and plan; otherwise it will be difficult for the field offices to undertake extra responsibilities beyond annual performance agreement (APA), that they sign with the government. The concerns were shared by many of the participants. NSSC and GNHC recommended the officials to ensure that SLM related activities were listed into Individual Work Plan (IWP) and Annual Performance Agreement (APA) in relation to fulfilment of dzongkhag agricultural targets. NSSC recommended everyone to work towards incorporating SLM related activities in the upcoming 12FYP plan so that mainstreaming will be successfully achieved.

Director of BTFEC reminded importance of strategic planning, capacity building and awareness in relation to SLM. Most of the planning officers at the workshop still cited importance of submission of SLM issues from local communities for easy incorporation in annual national plans or FYP.

10.6 Capacity building needed

SLM related training and capacity building was provided for extensions agents of livestock, agriculture and foresters since 2005 to fill in technical gap at LG level. MoAF in the past has also instituted soil units at all regional research centres. However, need for capacity building and hands-on-training for SLM was still cited as an urgent need. BTFEC director mentioned that BTFEC would be willing to help SLM related capacity building for any of DPO if necessary. An external consultant through independent assessment of previous SLM sites also recommended the need for capacity building at grassroots level.

Assessment of past SLM sites by GNHC has also recommended the need to support continuous capacity building and advocacy programmes for SLM. GNHC also recommended dzongkhags to take the lead in exploring SLM issues with technical backstopping from NSSC and then scaling it up using past experiences.

10.7 SLM technologies have to be site specific

Due to mountainous nature of the terrain, land degradation is major issue across the country and often land degradation is site specific. Thus, members recommended that choice of SLM technology should be agreeable to the local area of SLM intervention. This would also maximize the project impacts in long run.

DAO representatives also requested to the government to make sure any new technology for SLM has to be adaptable to difficult terrain, remoteness of the areas and also user-friendly. E.g. small and light built power tiller were found to be easier to use for female labour force than the heavy-build ones.

Some participants also pointed out that thorough cost-benefit analysis should be done before implementing SLM on certain steep slopes, as at times cost of mitigation measures might outweigh the possible long-term benefits.

10.8 Addressing farm labour shortage

Shortage of farm labour in rural areas was reported as a major stumbling block for SLM activities. To this forming labour sharing groups and creating effective bylaws to some extend solved farm labour shortages. However in long run reviving community vitality can be one of the ways to address the address labour shortage. There was also common consent that push for farm mechanization to some extends may reduce labour shortage. However, in such scenarios the farmlands should be suitable for easy use of farm machines.

10.9 Challenges for implementing ALD guidelines

There was common understanding on requirement of awareness on ALD guidelines, which was launched in 2017. It was found important to sensitize local government leaders like Gup as they have the upper hand in planning developmental activities. For instance, many farmers and LG officials believed that SLM interventions like terracing done as per ALD required landowner to convert land use type as wetlands, which was not true.

There were also concerns raised over eligibility criteria for securing incentives through implementation of the guidelines. NSSC reminded that the guideline was only launched in 2017 and is a living document. The feedback and concerns will be discussed during separate forum after a year or so.

10.10 Widening scope of SLM

SLM interventions across the country used various land management techniques. The participants also proposed the need for SLM to consider possible land reclamation and to bring fallow land under cultivation. Use of state reserve forest (SRF) for agriculture was also implied for increasing food productivity and enhancing national food security. NSSC informed that to some extend ALD guidelines will take care of these issues. NSSC also informed the participants that NSSC is also looking forward to scaling up proven SLM at watershed and landscape level.

10.11 Way forward of achieving LDN targets

To achieve national LDN targets, NSSC will move beyond SLM project sites. For fulfilling LDN and national SDG targets, NSSC will focus on sensitization and capacity building on SLM, enhance institutional capacity in ARDCs, push for proper land use policies, mainstream SLM into plans and policies, implement NAP to combat land degradation, scale up SLM activities beyond project sites, follow ALD guideline for implementing SLM, and also focus on land degradation research across the country.

10.12 Need for multi sectorial approach for SLM

Since SLM is a crosscutting issue representatives of DPOs highlighted need for proper coordination among various development sectors. NSSC reminded that as per National Action Plan (NAP) to combat land degradation, every agency has to implement their part, as MoAF and NSSC alone won't be able to achieve NAP objectives. If NAP gets implemented, coordination issues among various development sectors, up to some extend, would be addressed. For instance threats posed by extensive network of farm roads on land degradation could be minimized.

10.13 Funding Mechanism for SLM

Sustainable sources of funding for SLM activities were explored and an external consultant has carried out the assessment of establishing endowment fund as discussed in previous section. Since the benefits of SLM activities are often have long-term and it poses huge challenge to mainstream SLM, so for ensuring SLM, NSSC and BTFEC proposed for an institution of an endowment fund. NSSC also clarified that the funding source that they were seeking will be to fund new SLM sites only. So, the SLM site afterwards has to be sustained through efforts by local communities. However, there should be an adequate budget for follow up on SLM sites based on need and urgency.

In this regard, some of the field personals expressed their concern over fund not being able to generate impact at grassroots level due to consumption of funds by fund managing offices. Thus request was made by participants to explore option of directly incorporating external fund into RGoB plans instead of having another office managing endowment fund for SLM.

Some of the participants also pointed out urgent need to have separate budget for SLM activities in national planned activities. Allocation of certain amount of annual RGoB budget for SLM should be considered as an investment for achieving national targets like food and nutritional security, and to make the communities more climate resilient.

If proper awareness is being created on benefits of SLM, participants also see and opportunity to allocate certain amount of budget, Gewog Development Grants (GDG), for maintaining the SLM sites at the gewog level.

10.14 Need for comprehensive national land use policy

NSSC from their past SLM experiences felt an urgent need to have comprehensive land use policy. If such policies were developed then it would be easier in mainstreaming SLM. Participants also reported need for uniform implementation guidelines for adoption of SLM programmes. Thus they proposed MoAF to come with clear-cut uniform guidelines.

10.15 Need for continuous financial support from government

Representative from Zhemgang informed that SLM activities were being carried out in dzongkhag for the past years. However Zhemgang needs further financial support as it being one of the poorest dzongkhags, and have the most rugged terrain. E.g. Sonamthang under Zhemgang with land area of more than 300 acres is reported to be having too many stones, which impedes agriculture productivity. So, this could be one of the potential SLM project sites with support from NSSC and BTFEC. To this, there was collective understanding that for BTFEC to fund projects, the proponents have to follow BTFEC procedures.

10.16 Addressing sustainability of SLM sites

Once SLM activities gets implemented in a certain area, it needs some time to exhibit tangible benefits to community and the environment. Thus, during that lag period NSSC requested LG to do as much as possible to maintain the SLM sites which were started since 2005. For example, Salamjee land management committee was reported to be one of the best examples where local community has successfully taken ownership of the SLM sites and benefited the locals. GNHC also advocated need for strict and timely monitoring of the SLM intervened sites was also need to ensure sustainability.

10.17 Identifying entry points of SLM

NSSC suggested one 'way forward' for SLM could be to identify priority of SLM need in all 20 dzongkhags. And then mainstream SLM at local government and integration of SLM with other farming activities, rigorous monitoring and evaluation would be a way forward for SLM in Bhutan. Other entry points identified earlier were to target functional farmer's group and to engage proactive citizens in adopting the SLM interventions.

10.18 Need for integrated SLM approach

10.18 Need for integrated SLM approach

There was common agreement on implementation of past SLM, where the focus on land management wasn't been able to achieve desired level of outcomes. Thus, everybody at the workshop requested for SLM implementers to have more integrated approach.

SLM in long run should be able to achieve climate and ecosystem related goals. However, in short-term it should be able to address urgent needs of the farmers. For instance in Phuntsholing Gewog, shift in range of cardamom cultivation was noticed. In such cases SLM should also take care of addressing impacts of climate change on the main cash crop of the local community.

Many SLM adopters and assessment studies found that SLM has enhanced dairy and agriculture productivity. However, the locals had limited market accessibility to take advantage of enhanced productivity. Establishing linkage between enhanced crop productivity to market accessibility was commended to be considered as a component of future SLM approaches.

In some areas, crop damage by wildlife was cited as one of the main reasons for leaving the SLM intervened sites as fallow. Thus integrating Human-Wildlife Conflict (HWC) management mitigation measures with SLM were recommend for maximizing benefits of SLM.

Participants also suggested SLM to be an integrated package with electric fencing, horticulture, soil fertility, irrigation, and agricultural activities. For instance, promotion of growing winter crops in SLM sites was recommended to protect the hedgerows and other SLM activities from stray cattle. Exploring options for post harvest technology, branding local grown farm products to ensure sustainability of the SLM was highlighted as some other avenues for integrated SLM approach. Thus, SLM should come as an integrated package with adequate machineries, tools and all required materials needed to encourage the farmers at the very beginning of any SLM interventions.

An example of success story of integrated SLM was the case study of Salamjee. As of 2015 through introduction of productive breeds, stall-feeding, piggery and addition of fishery, it has greatly enhanced livelihood of the community. By 2015, increase in crop diversity and productivity was noticeable and horticulture became main source of income. There was reduction in number of unproductive breeds and stalled free grazing. From seven households in 2006, some households returned which increased the total household number to 18 (as of 2015). It was started with a vision to exploring low cost SLM technologies, finding ways to convince farmers to take up SLM and improve linkage between various sectors like livestock rearing, crop production and rural-urban migration.

Another possible issue to be integrated into SLM was water management, as water is often one of the key elements responsible for land degradation if not managed properly.

10.19 Planned SLM activity for 12 FYP

GNHC informed that for upcoming 12 FYP six dzongkhags, namely; Lhuentse, Mongar, Zhemgang, Trongsa, Sarpang, and Haa were selected as project sites for implementing more than 40 SLM related activities through funding from GEF/LDCF.

10.20 Need develop SLM management plan

For every SLM intervened sites, participants suggested to have clear boundary demarcation and also develop management plan engaging local communities. This would help in ensuring sustainability of the SLM sites.

11. Opportunities through SLM

SLM is a multi-pronged tool for improving climate resilience and achieving national commitment in fulfilling SDG and LDN goals. Further it would also enhance community vitality through reviving community labour sharing mechanism. It also provides opportunity to land management as key to enhancing livelihood of both rural and urban population. It also offers avenue for re-cultivation of fallow lands, encourage farm mechanization, making farming attractive, thus curbing rural urban migration. It can also be a platform for encouraging implementation of climate smart agriculture. It was agreed that SLM is also vital for industries of national importance like hydropower and tourism.

12. Conclusion

One of the main objectives of the workshop was to bring in grassroots level decision makers, and experts from agencies in head offices to share their experience on SLM. The farmers from previous SLM sites who attended the workshop shared their field experiences in implementing SLM interventions. Thus the workshop provided a platform for everyone to share his or her experiences. At the end of the both workshops, all participants were thoroughly sensitized on SLM and SLM related topics. In addition, the presentations on technical details on SLM by NSSC have clearly educated the participants on various aspects of SLM. Upcoming SLM plans for 12 FYP were also shared by GNHC and NSSC.

Another target of the workshop was to emphasize the significance of SLM for fulfilling national SDG and LDN targets. There was also interactive group work session where participants from various backgrounds worked together to map the importance of SLM at local, national and global level. This proved as an excellent tool to further highlight the significance of SLM.

During the workshop challenges faced by policy makers, planners, and farmers were shared through open and informal discussions. Farmers, Dzongkhag Agriculture Officers, and Planning Officers shared challenges faced by them in SLM implementation. Similarly at the policy making level, GNHC and NSSC shared the challenges faced at their ends.

Some of the major challenges at policy level were not being able to apply NAP for combating land degradation. The aim of this programme was to ensure multi-sectorial approach to combating land degradation. In 2017, ALD guideline was launched by MoAF, which offers

workable guidelines for land management. However, during the workshop majority of the stakeholder were not aware of the details of the document. There were also many issues raised pertaining to eligibility criteria for availing benefits through these guidelines. NSSC mentioned that it is still a working document and they will deliberate on the issues submitted by the participants.

Noticeable impacts of past SLM interventions were reported by assessment studies conducted by GNHC, NSSC and an independent external consultant hired by BTFEC. Easing workability of steep slopes, reduced erosion, increased agriculture and dairy productivity and creating additional income sources were some of the reported impacts. Farmers participating in the workshop also agreed with the assessment report findings.

However, due to lack of comprehensive national land policy, mainstreaming SLM in national priority of developmental activities has been difficult. Without mainstreaming, it was difficult for any agency to have any activity related to SLM, as there isn't any financial, technical or human resources support. Lack of awareness on benefits of SLM also came out as one of the main reasons for giving less priority to SLM. Thus, NSSC and GNHC urged LG officials and also the farmer to work towards mainstreaming SLM into their upcoming plans.

In addition, SLM being pursued only as mitigation measures to combat land degradation was not well received by the stakeholder. Everyone requested that SLM has to be an integrated approach inclusive of linking farm products with market accessibility and integration of SLM with other income generating activities.

Other challenges were lack of ownership to previous SLM sites, lack of coordination among development agencies like farm road cutting through SLM sites, un-used SLM intervened sites, lack of farm machineries to carry out SLM activities among and many others.

NSSC is looking also forward to scale up proven SLM interventions at landscape and watershed level. Thus, to achieve this key recommendations from the stakeholders were to pursue rigorous awareness and advocacy on significance of SLM, creating database to provide concrete evidence of benefits of SLM, work towards mechanism of mainstreaming SLM, continue support of capacity building, mechanization of farmland to address labour shortage, come out with sustainable funding mechanism for SLM, push for comprehensive national land use policy and to pursue SLM as an integrated approach.

13. Annexure I: List of Workshop Participants

Phuntsholing 21-23, January 2018
Participant List

Sl/no	Name of participants	Designation	Dzongkhag/Gewog
1	Dorji Gyeltshen	DOA	Tsirang
2	Passang dorji	HRO	Wangdue
3	Gyeltshen	DPO	Haa
4	Rinzin lhamo	AMCO	Punakha
5	Chedup Dorji	DPO	Bumthang
6	Dorji Wangmo	Farmer	Zhemgang
7	Leki Wangchuk	Farmer	Zhemgang
8	Phuntsho	DAO	Zhemgang
9	Santa Bir Rai	Farmer	Chukha
10	Kinzang Chopel	ADAO	Samtse
11	Tenzin Lhedup	Farmer	Zhemgang
12	Phub Tshering	ADAO	Punakha
13	Lhendup Dorji	Farmer	Zhemgang
14	Pema Dechen	Farmer	Zhemgang
15	Chandra kumar Rai	ADAO	Bumthang
16	Tshering Peldon	Sr. As iii	Sarpang
17	Tshering N Penjor	CDAO	Gasa
18	Tashi Dhendup	ADAO	Gasa
19	Choeki Wangchuk	ADAO	Gasa
20	Sonam Dhendup		Haa
21	Tenzin Chedup	Tshogpa	Zhemgang
22	Dawa Zangmo	SLMP focal	Bango
23	Ratna Bdr Monger	SLMP focal	
24	Phul Maya Rai	SLMP Adapter	logchina
25	Sar Maya Rai	SLMP Adapter	Serina/Pling

26	Yeshi Zangpo	AS	Wangdue
27	Saha Bir Rai	CDAO	Chhukha
28	Yeshi Choden	Farmer	Haa
29	Ugyen Wangmo	Farmer	Haa
30	Tshechu Wangmo	Farmer	Haa
31	Karchung	Sr. DAO	Haa
32	Jamyang Phuntsho	AMCO	Thimphu
33	Lhakpa Tshering	AMCO	Zhemgang
34	Sonam Jamtsho	PO	Dagana
35	Passang Tshering	DAO	Dagana
36	Phub Dem	Participant	NEC
37	Wangdi Gyelpo	DPO	Chhukha
38	Tashi	DPO	Samtse
39	Sahadar Thapa	DPO	Tsirang
40	Dhodo	DAO	Thimphu
41	Karma Rinchen	AEO	Paro
42	Sonam Zangpo	DAO	Wangdue
43	Jigme Wangchuk	Sr. AO	NOP

Samdrup Jongkhar 26-28, January 2018
Participant List

Sl/no	**Name of the Participants**	**Designation**	**CID No/ email**
I. Lhuntse			
1	Mr.Dorjee	Sr.DAO	dorjee@lhuntse.gov.bt
2	Ms. Sangay Choden	Farmer	10206000615
3	Ms.Sonam Wangmo		10601001342
4	Ms. Yeshey Pelden		10602000636
5	Ms. Pempa Zangmo		10602001337
6	Ms.Thuji Lhamo		10607000916
7	Ms. Sangay Lhamo		10607000642
II. Mongar			
8	Mr.Thinley	DPO	thinlay@mongar.gov.bt
9	Mr.Khampa	Sr.DAO	khampa@mongar.gov.bt
10	Mr.Birkha Bdr.Tamang	RO	birkhartamang82@gmail.com
11	Mr.Phuntshola	Farmer	
12	Mr. Jigme Dorji		
13	Mr. Kezang Thinley		10714001949
14	Mr.Phuntsho		10714000713
15	Ms.Choki Wangmo		10714001098
III. Trongsa			

16	Mr.Karma Chewang	DCDAO	kchewang@trongsa.gov.bt
17	Mr.Phuntsho Rinzin	DPO	rinzin@trongsa.gov.bt
IV. Trashigang			
18	Mr.Dorji Duba	DPO	dduba@trashigang.gov.bt
19	Mr.D.C Bhandari	DAO	dcbhandari@trashigang.gov.bt
20	Mr. Dorji	Farmer	10309002069
21	Mr.Ugyen Dorji		11506003563
V. Trashiyangtse			
22	Mr.Sonam Thinley	DPO	sthinley@trashiyangtse.gov.bt
23	Mr.Yeshi Dorji	Farmer	11602001760
24	Ms.Kuenzang Peldon	Dy.CAO	11001001297
VI. Samdrup Jongkhar			
25	Ms.Karma Dema	PO,SJI	karmad@sji.bt
26	Mr.Sonam Phuntsho	Offtg.DAO	sphuntsho@samdrupjongkhar.gov.bt
27	Mr.Ngawang Chophel	Sr.PO	nchophel@samdrupjongkhar.gov.bt
28	Ms.Sanga Choden	Sr.ES	sanga@moaf.gov.bt
29	Ms.Kelzang Choden	Farmer	11102004194
30	Ms.Melam Zangmo		11102006021
31	Mr.Karma Thinley		11102007155
32	Mr.Pema Wangdi		11102007533
33	Mr.Tshering Gyalpo		11107000838
34	Mr. Kinley Wangchuck	BBS	
VII. Pema Gatshel			
35	Mr.Tshering Dorji	ADAO	tdorji@pemagatshel.gov.bt
36	Mr.Kinley	DPO	kinley@pemagatshel.gov.bt
VIII. Sarpang			
37	Mr.Ugyen Dorji	DPO	udorji@sarpang.gov.bt
38	Mr.Chorten Gyeltshen	Offtg. DAO	chortengyeltshen555@gmail.com

13. Annexure II: Workshop Programme Schedule

Venues& Dates

	Western& Central Region	**Eastern Region**
Venue	Phuntsholing, Hotel Druk	Samdrup Jongkhar, Thromde Conference Hall
Date	21-23 Jan 2018	26-28 Jan 2018

PROGRAM SCHEDULE
(Western& Central Region)

DAY 1 (21 Jan 2018)

Time	**Program**	**Responsibility**
8.30 am	Registration	BTFEC
9.00 am	Welcome Remarks	GNHC
9.15 am	Opening Remarks	Director, BTFEC
9.30 am	Introduce workshop program and its objectives	NSSC
10.0 am	**Tea / Coffee Break followed by Photo Session**	
	Chair, Director, BTFEC	
10.30 am	BTFEC's mandates and services	BTFECS
10.50 am	Key findings from past SLM assessment done by GNHC	GNHCS
11.05 am	**Q & A - Session**	
11.20 am	Overall status of SLM activities in the country (2005- to date)	NSSC
11.40 am	Agriculture Land Development Guidelines - 2017	NSSC
11.55 am	Up-coming SLM activities during the 12th FYP	NSSC
12.25 pm	**Q & A - Session**	
1.00 pm	**Lunch Break**	
2.00 pm	Documentation & mapping of SLMP activities	NSSC
2.20 pm	Impacts of SLMP and its activities plus way forward	Yeshey Penjor, Consultant
2.40 pm	**Q & A - Session**	
3.10 pm	Innovative financing strategies to support climate change mitigation activities including SLM	Tandin Dorji, Consultant

3.30 pm	**Q & A - Session**	
4.00 pm	Wrap-up of DAY 1	Chair

DAY 2 (22 Jan 2018)

Chair, Director, BTFEC		
9.0 am	Recap of DAY 1	Rapporteur
9.15 am	Share experience on SLM from Nangkor Gewog	Representative from Nangkor Gewog
9.25 am	Share experience on SLM from Bardo Gewog	Representative from Bardo Gewog
10.15 am	Share experience on SLM from Goshing Gewog	Representative from Goshing Gewog
10.30 am	**Tea / Coffee Break**	
11.00 am	Share experience on SLM from Phuntsholing Gewog	Representative from Phuntsholing Gewog
11.15 am	Share experience on SLM from Lokchina Gewog	Representative from Lokchina Gewog
11.30 am	Share experience on SLM from Bongo Gewog	Representative from Bongo Gewog
11.45 am	**Discussion**	
12.15 pm	Share experience on the overall implementation of SLM activities in the Dzongkhag (DAOs)	Representative of DAOs
12.30 pm	Share experience on incorporating SLM activities in the Gewog and Dzongkhag FYPs (POs)	Representative of POs
12.45 pm	Share experience on SLM by ARDCs	Representative from ARDCs
1.00 pm	**Lunch Break**	
2.00 pm	**Discussion**	
2.30 pm	**GROUP WORK**	NSSC, BTFEC & GNHC
4.45 pm	Wrap-up Day 2	Chair

DAY 3 (23 Jan 2018)

Chair - Director, BTFEC		
9.0 am	Recap of Day 2	Rapporteur
9.15 am	Continue Group Work	NSSC, BTFEC & GNHC
11.00 am	**Tea / Coffee Break**	
11.30 am	Group Work Presentation - GROUP I	Representative of Group I
11.45a m	Group Work Presentation - GROUP II	Representative of Group II
12.15 pm	Group Work Presentation -GROUP III	Representative of Group III
12.30	Group Work Presentation - GROUP IV	Representative of Group IV

pm		
1.00 pm	**Lunch Break**	
2.00 pm	Consolidate group work outputs	All
3.00 pm	Wrap-up Day 3	Chair
3.15 pm	Closing of the Workshop	Director, BTFEC
3.30 pm	Disburse DA/TA to the participants	CFO, BTFEC

***Participants List (*(West & Central Region)**

Sl #	**Participants**	**No.**	**Remarks**
1	Dzongkhag Agriculture Officer	14	Haa, Paro, Thimphu, Gasa, Punakha, Wangue, Tsirang, Chukha, Sarpang, Samtse, Dagana, Trongsa, Bumthang & Zhemgang
2	Dzongkhag Planning Officer	14	
3	SLM adopters from SLMP sites in Zhemgang and Chukha Dzongkhags	12	2 each from Nangkor, Bardo, Goshing, P/ling, Bongo, & Lokchina Gewogs
5	GEF/LDCF Pilot Dzongkhags	12	3 each from Haa, Sarpang, Trongsa, & Zhemgang Dzongkhags
6	ARDCs	3	1 Soil focal staff from ARDC Bhur, Bajo, & Yusipang
	Total	**55**	

PROGRAM SCHEDULE
(Eastern Region)

DAY 1 (26 Jan 2018)

Time	**Program**	**Responsibility**
8.30 am	Registration	BTFEC
9.00 am	Welcome Remarks	GNHC
9.15 am	Opening Remarks	Director, BTFEC
9.30 am	Introduce workshop program and its objectives	NSSC
10.0 am	**Tea / Coffee Break followed by Photo Session**	
Chair - Director, BTFEC		
10.30 am	BTFEC's mandates and services	BTFECS
10.50 am	Key findings from past SLM assessment done by GNHC	GNHCS
	Q & A - Session	
11.20 am	Overall status of SLM activities in the country (2005- to date)	NSSC

11.40 am	ALDG 2017	NSSC
11.55 am	Up-coming SLM activities during the 12th FYP	NSSC
12.25 pm	**Q & A - Session**	
1.00 pm	**Lunch Break**	
2.00 pm	Documentation and mapping of SLMP activities	NSSC
2.20 pm	Impacts of SLMP and its activities plus way forward	Mr. Yeshey Penjor, Consultant
2.40 pm	**Q & A - Session**	
3.10 pm	Innovative financing strategies to support climate change mitigation activities including SLM	Mr. Tandin Dorji, Consultant
3.30 pm	**Q & A - Session**	
4.00 pm	Wrap-up of DAY 1	Chair

DAY 2 (27 Jan 2018)

9.0 am	Recap of DAY 1	Rapporteur
9.15 am	Share experience on SLM carried out during the national land management campaign	Representative from Orong Gewog
9.25 am	Share experience on SLM from Ramjar Gewog	Representative from Ramjar Gewog
10.15 am	Share experience on how SLM was adopted in resettled areas e.g. Khineydrang	Representative from Kheynidrang
10.25 am	Share experience on consolidation of existing terraces	Representative from T/Yangtse
10.35 am	**Tea / Coffee Break**	
11.00 am	Share experience on SLM from past SLMP sites (Radhi, Thrimshing, & Lumnag Gewogs)	Representative from the 3 sites
11.20 am	Share experience on SLM from BTFEC SLMP sites (Thangrong and Jarey)	Representative from the 2 sites
11.40 am	**Q & A - Session**	
12.10 pm	Share experience on the overall implementation of SLM activities in the Dzongkhag (DAOs)	Representative of DAOs
12.25 pm	Share experience on incorporating SLM activities in the Gewog and Dzongkhag FYPs (POs)	Representative of Planning Officers
12.40 pm	Share experience on SLM from ARDC	Representative from ARDC Wengkhar
1.00 pm	**LUNCH BREAK**	
2.00 pm	**Q & A Session**	
2.30 pm	**GROUP WORK**	
4.45 pm	Wrap-up Day 2	Chair

DAY 3 (28 Jan 2018)

Chair - Director, BTFEC		
9.0 am	Recap of Day 2	Rapporteur

9.15 am	Continue Group Work	NSSC, BTFEC & GNHC
11.00 am	**Tea / Coffee Break**	
11.30 am	Group Work Presentation - GROUP I	Representative of Group I
11.45am	Group Work Presentation - GROUP II	Representative of Group II
12.15 pm	Group Work Presentation -GROUP III	Representative of Group III
12.30 pm	Group Work Presentation - GROUP IV	Representative of Group IV
1.00 pm	**Lunch Break**	
2.00 pm	Consolidate group work outputs	All
3.00 pm	Wrap-up Day 3	Chair
3.15 pm	Closing of the workshop	Director, BTFEC
3.30 pm	Disburse DA/TA to the participants	CFO, BTFEC

***Participants List (*(Eastern Region)**

Sl#	**Participants**	**No.**	**Remarks**
1	Dzongkhag Agriculture Officer	6	Lhuntse, Mongar, T/Yangtse, Trashigang, P/Gathsel, and S/Jongkhar
2	Dzongkhag Planning Officer	6	
3	SLM adopters from SLMP sites	9	3 each from Radhi, Thrimshing & Lumang Gewogs
4	SLM adopters from BTFEC SLM Project sites	6	3 each from Thangrong and Jarey
	Other SLM adopters	10	2 each from Yangtse, Orong, Khineydrang, and Ramjar
5	GEF/LDCF Pilot Dzongkhags	8	4 each from Mongar and Lhuntse
7	ARDC	3	3 staff from ARDC Wengkhar
	Total	**48**	

CHAPTER 9

Regional Training Workshop on Sustainable Land Management Technologies Wangduephodrang

Abbreviations

ALD	Agricultural Land Development
ARDC	Agriculture Research and Development Centre
BTFEC	Bhutan Trust Fund for Environmental Conservation
CBD	UN Convention on Biological Diversity
CIF	Climate Investment Funds
CMU	Central Machinery Unit
CSO	Civil Society Organization
E&L	Evaluation & Learning
FYP	Five-Year Plan
GEF	Global Environment Facility
GNHC	Gross National Happiness Commission
IOD	Intensive Orchard Development
LD	Land Degradation
LG	Local Government
LDN	Land Degradation Neutrality
NAP	National Action Program
NAPA	National Adaptation Programme of Action
NEC	National Environment Commission
NSSC	National Soil Services Centre
RGoB	Royal Government of Bhutan
RNR	Renewable Natural Resources
RNR-RC	Renewable Natural Resources Research Centre
SALT	Slopping Agriculture Land Technology
SDG	Sustainable Development Goals
SLM	Sustainable Land Management
SLMP	Sustainable Land Management Project
UNCCD	United Nations Convention to Combating Desertification
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
US$/USD	United States of America (n) Dollar
WUA	Water User Associations
WB	World Bank

Background

Bhutan is predominantly an agrarian country with majority of the population living in rural areas and subsisting mainly on agriculture, livestock rearing, and use of a wide range of forest products. Further, agriculture and forest landscapes are critical for the protection of many watersheds that feed the country's hydropower industry. In addition, sustainable management of agriculture, grazing and forestlands has immense bearing on the Bhutanese economy.

However, there is immense pressure on land as usable land resource is limited – about 7 percent or 664,000 acres of the total land is arable – owning to difficult and high mountain terrain and vast areas of snow and barren rocks. Thus slope farming is challenging, characterized by soil erosion, poor soil fertility status, soil moisture stress, and labour intensive. Low crop productivity, subsistence farming, low cash income, rural poverty, rural-urban migration, fallow land, and youth unemployment are all in one way or the other related

to land and its management.

In the same time the forests are increasingly under pressure from anthropogenic factors such as forest fires, excessive use of natural resources, overgrazing, unsustainable agricultural practices, poor irrigation system, excessive collection of forest products, mining, industrial development, urbanization, and infrastructure development without consideration of environmental safeguards are some of the causes of land degradation.

In addition, the adverse effects of climate change have also aggravated to the land degradation posing new challenges to the sustainability of existing land-use systems, making adaptation critical. Strong evidences suggest that Sustainable Land Management (SLM) can help reduce vulnerability and thus increase adaptability and the coping range of the poor. In particular, SLM can help restore soil fertility, improve water availability, and increase livestock productivity that simultaneously conserve natural resources base and enhance food security.

With increasing population and rapid socio-economic development taking place in the country, the competition for good agricultural land from various other sectors is slowly forcing more marginal lands to be brought under cultivation to meet the food demand. On the contrary, huge areas of agriculture land are left fallow due to land degradation, low land productivity, farm labour shortage, wildlife depredation, and scarcity of water for irrigation. With all these challenges impacting food security goal and ecosystem services delivery, implementation of properly planned SLM is critical to bring more agricultural land under sustainable production. Further, SLM would also facilitate to ease farm labour shortage through mechanization, mitigate land degradation, and enhance agro-ecosystem services.

Applied SLM practices include hedgerows, check dams, stone bunds, terraces, bamboo, and planted trees to retain soil and water. Even if the impact of projected climate extremes is less than forecast, these SLM interventions will still enhance farmers' livelihoods by conserving soil and moisture, which makes agricultural production less variable, and diversifying agricultural income. As a result, SLM represents a preventive and cost-effective approach to climate change with a positive long-term impact on rural landscape and farmers' livelihoods.

Access to knowledge about SLM (both past and potential), enabling policies, and supporting institutions is critical to develop viable strategies for adaptation to climate change. Information dissemination on the policies like Agriculture Land Development (ALD) guidelines is important to ensure these strategies are acceptable and realistic. Finally, the implementation of adaptation strategies requires resources, including financial capital, social capital, human resources, and natural resources.

With the bottom up approach adopted for planning process for the local governments, the farmers and other stakeholders are made aware of the prevalence of land degradation, its severity and its eventual impacts. However, it is important to understand: Has addressing land degradation issues gained adequate attention over the years, or is it even considered important? How strongly do land degradation issues feature in the 12 FYPs of the local governments (Dzongkhags and gewogs)?

Rationale, Objectives, and Outcome

To strengthen the enabling environment for Sustainable Land Management (SLM) while ensuring broad-based political and participatory support for the process, involvement of the local leaders in mainstreaming it to the plans and policy is imperative.

Aligning to the CIF's requirement of Evaluation and Learning (E&L), a four-day training was organized to

disseminate the updated SLM technologies to local leaders, farmers, and Dzongkhag Agriculture Officers of Wangdue, Tsirang and Dagana districts comprising 32 participants (refer Annexure for program and participants details). The participants had a hands-on-training on SLM technologies. It was an avenue for the participants to interact and have discussion on challenges and opportunities on how to mainstream SLM into gewog plans and policies.

The National Soil Services Centre (NSSC) under Department of Agriculture, Ministry of Agriculture and Forests has initiated and undertaken number of projects and programs to combat land degradation and bring vulnerable land under SLM, ensure sustainable agriculture and contribute to national food security, enhance rural livelihood, and conserve the environment. However, land degradation continues to be one of the environmental and social issues. SLM intervention was submitted to be considered as one of the flagship programmes to the Gross National Happiness Commission (GNHC) – the planning commission, however, the SLM didn't get to the flagship programme in the country's 12th Five Year Plan (FYP).

To ensure that the agricultural, forest and other terrestrial land uses of Bhutan are sustainable, productive systems that maintain ecosystem productivity and ecological functions while contributing directly to the environmental, economic and social well-being of the country, training local leaders, the grassroots implementer of the planned FYPs – enhancing their capacity for assessing, monitoring and documenting land resources – is crucial. In the same time the participants are equipped with knowledge on best practices for promoting SLM in the country, develop project ideas, concepts for SLM and mainstream into the Gewog and Dzongkhag programmes, the local leaders were selected for the training.

At the training the participants learned about SLM technologies, understood the impact of SLM interventions through an on-site visit to Salamjee, Dagana Dzongkhag and discussed the importance of mainstreaming of SLM in Gewog plans and policies. The local leaders agreed to work in collaboration with the Extension Officers; include SLM in the Gewog plans and policies; and develop funding mechanism for SLM programmes and projects in their respective constituencies.

Introduction to BTFEC and its funding windows

The Bhutan Trust Fund for Environmental Conservation (BTFEC) is legally and administratively an independent grant making organization established in perpetuity under the Royal Charter of 1996. The BTFEC was established in 1992 with the financial support from Global Environment Facility (GEF), Multi-lateral donors, and World Wildlife Fund (WWF) as a long-term sustainable financing mechanism for biological diversity and ecosystem conservation. The BTFEC's thrust as spelled out in the Royal Charter is "promotion of social welfare through environmental conservation of the forests, flora, fauna, wildlife, diverse ecosystems and biodiversity in Bhutan".

BTFEC has made vital contribution in the areas of environmental conservation and management, natural resource management, cleaner technology and land-use planning, rural livelihood, human-wildlife conflict, field research, environmental education, green transport, waste management, plantation and reforestation, biodiversity assessment of various flora and fauna, conservation of endangered species, eco-tourism, with special attention to the legal and institutional framework for environmental and natural resource management.

Initiatives were also taken to establish facilities such as ecological park, environment resource centre, greenery park, door-to-door waste management services, development of hot springs, solid waste management, zero waste project, rural livestock and agricultural crop insurance, recovery plan for white-bellied heron, development of compact onsite sanitation technology, and fuel efficient stoves and rice

cookers in schools and monasteries. Further, BTFEC grants strengthened resource monitoring, patrolling, and service delivery in National Parks and Reserves, and enhanced management effectiveness and sustainability of these parks. With the successful implementation of its first Strategy Plan of 1997, and second Strategy plan 2010-15, the BTFEC is currently implementing its third Strategy Plan 2015 – 2020.

BTFEC's mission is "*To promote the socio-economic welfare of Bhutanese citizens by funding conservation of their flora, fauna, diverse eco-system and biodiversity; and addressing the adverse effects of development on Bhutan's natural environment."*

And its vision is "*All citizens champion their natural heritage of healthy forests, clean waterways, diverse flora and fauna and intact ecosystems and takes personal responsibility for maintaining a green and healthy environment for themselves and future generations."*

The BTFEC is a legally and administratively autonomous entity governed by its Management Board (in effect its Board of Trustees). Royal Charter 1996 entrusts full governance and fiduciary oversight to the Management Board. The Royal Charter decrees governance through a six-member Management Board including representation from non-government and private sectors. The Board also determines investment strategy and annual spending.

The management board decides on policy issues reviews and approves project proposals, and work plans. The Board has a Chairman and a Member Secretary. The Chairman is selected by consensus from among the members appointed by the government. The Director is the Chief Executive Officer who implements the Board's decisions and, through powers delegated by the Board, manages the day-to-day activities of the BTFEC. Fulltime employees of the Secretariat support the Director.
As a non-profit, the BTFEC is exempt from Bhutanese income tax, payment of customs and import duties and excises taxes on equipment purchased for carrying out activities and programmes that are approved by its Board. The Fund also has a US non-profit status of 501(c) 4 in recognition of its operation in the interest of Bhutan's social welfare and of the exclusive use of net earnings for charitable purposes.

Agencies of the Royal Government of Bhutan, National NGOs/ CSOs/CBOs, and Bhutanese individuals are eligible for the grant. Proposals received directly from grass roots communities are desired. When submitted by government and CSOs, proposals that enhance community involvement in conservation will be prioritized Co-financing is desired, but our support do not displace other donor funding.

There are three funding windows.

1. **Project Feasibility and Preparatory Grant**

This grant is intended to encourage grantees and help them to develop full-blown project to access the MB-grant. This will help those grantees who do not have capacity to develop proposal but has good concept. Each grantee can avail maximum of Nu 150,000 upon approval of the concept note to conduct feasibility studies.

2. **Small grant**

Small Grants, not exceeding Ngultrum 400,000 per grant are approved by the Secretariat. Small Grants are accepted on a rolling basis throughout the year until the maximum of six grants in a year.

3. **MB-Grant**

The projects approved by the Management Board is referred to as MB-Grant, where a grant shall not exceed Ngultrum 15 million, and the proposed implementation period do not exceed three years.

From June 2017, BTFEC instituted grant making based on thematic areas through "Request for Proposal" (RFP) on annual basis. This approach is used to address a specific conservation issues. It is expected to supplant the existing system of funding a large number of dispersed projects.

The RFP describes the conservation issues based on research with subject experts, relevant stakeholders and interactions with target populations. It will include expected outcomes of project funding, total allocated budget and funding cycle, relevant resources, the proposal format, descriptions of the processes for assistance with proposal preparation, final proposal review and approval, and funding terms and expectations.

Why is SLM important to Bhutan?

Sustainable Land Management (SLM) contributes to the National Key Result Areas. It contributes specifically to the Agency Key Result Areas (AKRA) of food and nutrition security for the 12th FYP through enhancement of crop productivity.

While SLM contributes to the achievement of several sustainable development goals (SDGs), the SDG 15, Life on Land and its Target 15.3 in particular, is the most relevant to the efforts made in combating land degradation. Also as a member country of the United Nations Convention to Combat Desertification (UNCCD) and a pilot country for Land Degradation Neutrality (LDN), Bhutan is responsible for contributing to climate change mitigation and adaptation through SLM.

As a mountainous country, agriculture in Bhutan remains highly sensitive and vulnerable to climate change impacts. Recognizing soil as the largest terrestrial soil organic carbon (SOC) storage, Bhutan's Intended Nationally Determined Contribution (INDC) specifically declares soil and land development as a means to both mitigate and adapt to climate change and enhance continuous ecosystem services.

Land terracing, alley cropping, and contour stone bunds are some of the SLM technologies that are followed in Bhutan. Recognizing the vulnerabilities of steep slope agriculture, as early as the 5th FYP, SLM efforts were supported by the government with cash incentives. For example, government paid Nu 300 and Nu 200 per acre for land terracing and construction of contour stone bunds, respectively. However, due to shift in the developmental priorities of the government, over the years, SLM incentives were stopped and along with this, farmers' land development efforts slowly dwindled by 7th FYP.

With the devastating impacts of the 2004 flash flood incidence in the entire eastern region of the country, the focus on SLM was heightened with various programmes and projects aiming to promote SLM, especially in vulnerable agriculture land, to mitigate soil erosion and other forms of land degradation. Although the 11th FYP emphasised the importance of SLM to address land degradation problems, the scope was limited due to resource constraints. However, during the 12th FYP, SLM programme is set to receive high priority to increase crop production and help alleviate rural poverty while also addressing land degradation problems and related issues in the country.

With increasing population and rapid socio-economic development taking place in the country, the competition for good agricultural land from various other sectors is slowly forcing more marginal lands to be brought under cultivation to meet the food demand. On the contrary, huge areas of agricultural land are left fallow due to land degradation, low land productivity, farm labour shortage, wildlife depredation, and scarcity of water for irrigation. With all these challenges impacting food security goal and ecosystem

services delivery, properly planned SLM is critical to bring more agricultural land under sustainable production. Further, SLM would also facilitate to ease farm labour shortage through mechanization, mitigate land degradation, and enhance agro- ecosystem services.

SLM Technologies

SLM is the sustainable development of arable land, through change in landform, for enhanced agriculture production and continuous agro-ecosystem services. In Bhutan, eight different SLM technologies have been identified as follows:

I. Bench terracing,
II. Consolidation of existing small terraces,
III. Orchard terracing,
IV. Removal of surface stones from agriculture fields,
V. Contour stone bunds,
VI. Orchard basin,
VII. Alley cropping, and
VIII. Check dam.

The participants learned that all these SLM technologies have been tried and proven to be effective in mitigating soil erosion, increasing soil fertility, easing workability, promoting farm mechanization, and/or enhancing agriculture production thereby helping to increase rural livelihoods, enhance resilience against climate change, conserve biodiversity, and ensure sustainable agro-ecosystem services.

Bench terracing

Bench terracing is a soil conservation measure consisting of a series of level or nearly level strips (benches) running across a slope following the contour lines at certain vertical intervals. The level strips supported by steep banks or risers made of earth or rocks are used for cultivation. Bench terraces can be constructed either manually or by using machinery. The major benefits of terracing are conservation of soil and water through reduced surface runoff and soil erosion, enable farm mechanization, and intensification of crop production

Consolidation of existing small terraces

Consolidation of terraces is the merging of existing small bench terraces into large terraces to enable farm mechanization, agriculture feminization, and crop intensification. Currently, most of the existing bench terraces are very narrow and are not feasible for farm mechanization. Since farm mechanization and crop intensification are slowly picking up in the country, these narrow bench terraces need to be consolidated into bigger terraces wherever feasible.

Orchard terracing

Orchard terracing is also another form of bench terracing but for a given slope its bench width is much narrower than the fully levelled bench terrace. A strip of undisturbed land is also kept, for steeper slopes, between the terraces to increase the stability of the terrace risers. As such, orchard terraces are more stable than other bench terraces. The main advantage of orchard terracing is that it enables better orchard management by increasing the ease of irrigation, fertilization, tree pruning, and fruit harvesting compared to the conventional orchard.

Removal of surface stones from agriculture fields

Although surface stones (< 25.6 cm diameter) on cultivated lands have multiple benefits such as reducing rainfall impacts, control surface erosion, and conserve soil moisture, they are usually regarded as nuisance for agriculture farming. This is largely from the workability point of view, as high percentage of surface stones would hinder tillage operation, farm mechanization, and demand lots of farm labour input. Hence,

removal of surface stones using small machines is justifiable in agriculture lands that are feasible for farm mechanization and has potential for large-scale farming.

Contour Stone bunds

Contour stone bund is a single line of stones that is laid along the contour line. It is recommended only in agriculture fields that have plenty of surface stones (>20%). Construction of contour stone bunds not only helps to get rid of the excess surface stones and gravels but also reduces the slope gradient through formation of partial terraces in few years time. As such, it helps to reduce soil erosion, conserve soil moisture, and increase soil fertility. In some cases, a strip of fodder grasses is planted at the base of the stone bund to further stabilize it and provide fodder for the cattle.

Orchard basin

Orchard basin literally means a basin constructed around a tree or plant for better orchard management. It is mainly constructed to increase the ease of irrigation and fertilization. Orchard basins also help to control surface runoff, conserve soil moisture, and improve soil fertility.

Alley Cropping

Alley cropping is an agro-forestry practice designed to enable permanent farming of sloping agriculture land on a sustainable basis. Essentially, it consists of planting hedgerows of nitrogen-fixing shrub species along the contour lines of sloping land at intervals determined by the slope. The hedgerows create a live barrier that traps sediments and reduce surface runoff. With time, as the sediments build up behind the hedges, the area between the hedgerows develops into a flat alley suitable for growing crops.

Check dam

Check dams are simple physical structures designed to reduce gully erosion by runoff in agriculture fields. By providing periodic steps, check dams reduce the velocity of the overland flow, arrest the sediments, and safely discharge the water (and perhaps debris) via a spillway. While stone check dam is constructed using stones log check dams are constructed with multiple layers of a single row of logs placed across the gully bed.

Field Visit to SLM site in Salamjee

The participants were taken to Salamjee village in Tshangkha Gewog, Dagana Dzongkhag to take note of successful SLM practices. This site utilized the intervention approach used for a sustainable land management project supported by the RNR-RDC Bajo and UNDP/GEF Small Grants Program. The RNR-RDC Bajo was involved in developing the methodology in Salamjee. The intervention approach consisted of community planning; learning and applying SLM practices on-farm and in vulnerable common areas; and the development of a savings fund. The three-year project of sustainable farmland management project was implemented by Salamjee Phashing Zinchong Tshogpa and was completed in 2009.

The objective SLM work in Salamjee was to study the effect of soil erosion and surface run-off control through plantation of different fodder grass and legume species on the contour bunds. It was a multi-stakeholder team approach comprising of researchers, Dzongkhag extension, Donor and the community in rehabilitating degraded farmland.

This site was well selected within the intention to serve as a demonstration site for the community to continue with remaining works on their own. Additionally, the community would benefit from this site providing them with live planting materials and seeds. The efforts of rehabilitating the small patch of degraded farmland had, today, created visible impact and community's compliments.

Project snapshot

Grantee	Salamjee Phashing Zinchoung Tshokpa
Location	Salamjee, Tshangkha Gewog, Dagana Dzongkhag
Area of work	Land Degradation
Grant Amount (UNDP/GEF)	US$ 21,356.00
Co-Financing Cash	US$ 7,365.00
Co-Financing in-kind	US$ 17,936.00
Start Date	8/2006
End Date	10/2009

As shared by the community group representatives, the major problem of Salamjee village was land degradation that has taken place in various forms such as landslides, gully formation, sheet and rill erosions and declining soil fertility. The main causes of the degradation were steep slope, exposed soil after land preparation and high intensity rainfall, lack of awareness by the community on the issues of land degradation process and limited technical know-how to counteract the problem.

As the village is remotely located, the farmers lacked know-how on land rehabilitation on the fast deteriorating valuable land. The long-term strategy of the project was to institutionalize farmland rehabilitation as part of farming system for sustaining the process in future. The immediate strategy was to implement the activity that minimizes the land degradation problems in the village and work on developing strategies to prevent such problems in the future.

The key aspect of the approach was to apply the concepts and principle of participation, decentralization and empowerment. This bottom-up approach allowed the community to design a project that directly addressed their issues. The multi-disciplinary team consisting of researchers (forestry, water management, horticulture, livestock, and soil science) and extensions (agriculture, forestry and livestock sector) was formed to assist the Salamjee Community to sustain their livelihood sources, and facilitate the planned activities for collective management of farmland in the village.

The project took up capacity building and institutional development as an important component throughout the project period. Some of the trainings provided included:

- Development of local sustainable land management institution;
- Land Management Technologies;
- Citrus Nursery Raising and Management;
- Patch and T-budding on citrus;
- Promotion of nutritional diet through backyard kitchen gardening;
- Nursery raising and management;
- Tree plantation and management;
- Promoting the plantation of native species of edible shoot bamboos;
- Farmers study tour and awareness on SLM activities;
- Pest disease identification and their control measures;
- Workshop on forest resource mapping; and
- Pasture development and management.

Methodologies engaged for the training were:

- Awareness on causes and types of land degradation
- Pictorial presentation of available land management technologies

- Group work/discussions and presentation of land management problems
- Role-play games
- Field visit and site verification in the village and field practical
- Active participation of the community in developing the whole scenario

Available technologies presented to the farmers include:

- Use of A-frame and T-Frame
- Alley cropping/hedgerow plantation
- Contour plantation
- Stone wall
- Strip plantation
- Bench terracing
- Brush layering
- Boundary plantation
- Diversion channel
- Conservation Farming
- Multi- story cropping
- Maize trash line
- Gully treatment using different check dams

Technologies selected by the farmers were:

- Use of A-frame and T-frame
- Alley cropping/hedgerow plantation
- Stone wall
- Contour plantation
- Strip plantation
- Boundary plantation
- Diversion channel
- Gully treatment
- Conservation farming through orchard development
- Maize trash line
- Multi story system

One community representative shared that selection of effective technology as per the needs of the area, and hands-on training were effective in making farmers understand the basic concept on use of every land management technologies. Active community participation in the whole process was our key step for achieving the goal. Indigenous knowledge and local ideas were highly respected and blended with the new ideas, so as not to intervene and discourage them with the imported technologies.

Keeping in view the main objectives as sustainable land management programme, the focus was also given on crop diversification to build up the livelihood of the rural farmers and generate the cash income. Although the climate is conducive for growing various vegetables, they were left with very limited choices of vegetables available in the village. Farmers used to depend on vegetables either bought from market (Damphu or Sunkosh) or collected from the forest. The vegetable promotional programme was initiated almost parallel with the land management activities. The farmers were trained on growing of different vegetable varieties in their backyard kitchen gardening. Different varieties of vegetables were introduced to the village and the seeds were distributed to the individual farmers. The farmers were also trained on growing of the winter vegetables with the use of the polytonal. The group was also briefed on management aspects of the vegetables such as irrigation, mulching and weeding.

It was observed a strip of State forest running between the upper and lower Salamjee. Before the SLM intervention, the area was covered with bushes without any good trees cover. Seeing the potential of this area as green belt for preventing landslides in future, farmers plant trees in this area. As such, the plantation initiated with planting of two to three hundred tree saplings annually training the groups on planting techniques and management. The seedlings were supplied from RC Bajo. The plantation not only rehabilitates the areas but in turn, the community benefits from the plantation in the end. Today, the forest caters the needs of the community such as fodder, fuel-wood, timber and other non-timber forest products.

The participants learned that Salamjee sustainable land management group had a greater contribution in successful completion of this farmland management project. During the implementation phase of the project, community contributions were maximized in terms of labour contribution to carry out all the physical activities. So if their labour contribution is converted in terms of man-days, just to carry out contouring and constructing stone risers the total of 414 labours per household for three years have been utilized, which excludes plantation, nursery management, and other physical works that requires intensive labours. Besides this The Salamjee Phashing Zingchoung Tshogpa also handled all the administrative and financial power of the project and functioned as a decentralized administrative body.
Their active participation from planning, until implementation, in a collective approach has led to become one of the successful and exemplary farmland management sites in the country.

Practical demonstration on SLM technologies

Bhutan annually losses 29 Mt/Ha of fertile top soil to land degradation, and if not managed properly it will be a very serious threat in the future. Although land is the most important natural capital, investment on sustainable land management practice has been carried out on a very small scale. Bhutan's topography is such that every factor contributes to land degradation; in addition the current rate of urban development encroaching into the potential farmland threatens the livelihoods of every Bhutanese who directly and indirectly depends on farming.

It is time the government realize the significance of sustainable land management and there is a need to come to an understanding whereby every sector not just the Ministry of Agriculture and Forests should consider the implications of land degradation while implementing developmental activities. The National Soil Services Centre (NSSC) under the Department of Agriculture, MoAF since its establishment has been promoting sustainable land management technologies to combat land degradation. The NSSC has now in place the Agriculture Land Development (ALD) guidelines and National Action Program (NAP), which will be the guiding document for the country on its combat with land degradation.
With an aimed to educate and train the local leaders in all aspects of sustainable land management (SLM) who then can share the knowledge with the farmers in their respective localities, at the same time use the knowledge in sustainable crop production and combating land degradation, practical demonstration was held.

Participants were introduced to various measures and technologies related to SLM practices in degraded agriculture lands and community forests. Practical exercises were organised to provide hands-on-training to the participants. The practical demonstration included A-frame making and its usage, hedgerow plantation, check dam construction, and brush layering.

Introduction to ALD guidelines

The participants were introduced to the guiding principles, purpose, objectives, ALD implementation

arrangements, and ALD framework. At the same time, ALD implementation arrangements, the institutional structure and roles and responsibilities of different agencies involved are clearly spelled out. Similarly, under the ALD framework, the six stages of ALD framework cycle were explained.

The agriculture sector, in Bhutan, accords high priority for food self-sufficiency and it is incorporated as the overarching objective for agriculture development since the 5th Five Year Plan (1981-1987). The agriculture sector's development policy shifted from food self-sufficiency to food security since 8th FYP (1997-2002). In addition to food security, the government also focused on nutrition security and as such, food and nutrition security was the main agriculture development policy of the Ministry of Agriculture and Forests (MoAF) during the 11th FYP (2013-18). However, all along these plan periods, limited land resources, steep and rugged terrain, land degradation, and low land productivity continued to remain as major challenges in achieving the sector's objectives and goals.

Even as the country intends to gradually shift from subsistence agricultural farming to commercial farming; small land holdings, inability to mechanize farms, drudgery, shortage of farm labours, land degradation, and low land productivity continue to remain as a major challenge. These factors attribute in making agriculture farming unattractive especially for youths who aspire to take up agricultural farming as a vibrant enterprise. Further, rural to urban migration reduces rural farming population and increases pressure on the ever-reducing rural habitants in producing food for the rapidly growing urbanites. To address the issue, concerned agencies have made various attempts in the recent past to make agriculture farming an attractive source of livelihoods.

Considering the urgency, the MoAF has identified and prioritized Agricultural Land Development (ALD) as the key intervention in addressing food shortage, poverty, land degradation, and climate change and incorporated it into the mainstream planning process in the 12th FYP. Different forms of land development activities such as terracing and consolidation of existing small terraces have been implemented by different agencies, both within and outside the MoAF, to combat land degradation, improve soil fertility, ease workability, and enhance crop productivity. However, in absence of a standard guideline for ALD, it has been difficult for the government to follow and enforce a uniform standard for different ALD programs and activities across the country.

In view of the above facts, ALD Guidelines was developed based on a set of guiding principles and is anticipated that all the ALD efforts will now be more focussed, standardized, and effective in addressing issues that confront sustainable agriculture production, such as, land degradation, fallowing of agriculture land, difficulty in farm mechanization, poor farm feminization, and low inherent soil fertility. Sustainable ALD is also expected to directly contribute to achieving land degradation neutrality (LDN), national food and nutritional security, and poverty alleviation in the country. At a regional or global scale, it is anticipated to help in reducing global warming, conserving natural environment, and enhancing ecosystem services.

Guiding principles of ALD

- Ensure effective and sustainable use of agriculture land;
- Make agriculture farming an attractive source of livelihood;
- Safeguard food and nutrition security;
- Protect agriculture land from conversion to other land uses;
- Enhance socio-economic development while ensuring environment wellbeing; and
- Reduce land degradation, conserve biodiversity, and increase resilience to climate change.

Purpose of ALD

- To establish a common approach and practice for ALD across the country;

- To assist agriculture staff and other stakeholders in planning, implementing, monitoring and evaluation of ALD programs and activities; and
- To guide planners and policy makers for informed decision-making with regard to ALD.

Objectives of ALD

- To make agriculture land feasible for farm mechanization and thereby promote commercial farming;
- To contribute towards enhancing national food and nutrition security;
- To make agriculture land more resilient to climate change;
- To help reduce rural-urban migration and youth unemployment; and
- To contribute towards achieving targets set by Global Agreements and SDG goals.

The NSSC, making the presentation, touched upon full support and cost sharing schemes. Under the full support scheme, all costs involved in the proposed ALD activities shall be borne by the government. In cost sharing scheme, beneficiaries are required to share certain portion of the total cost, in cash or kind, for developing their agriculture land e.g. if the government provides machinery support, the beneficiary should provide labour support. However, the fuel cost may be covered from area development projects or Dzongkhag/Gewog development grants. Detailed cost-sharing modalities for different ALD technologies were also discussed.

The participants were also informed about their roles as follows:

Roles of Dzongkhag Administration

a) Provide ALD services (e.g. clearances, demarcation, etc.) within its jurisdiction;
b) Approve Dzongkhag machines (e.g. bull dozer, and backhoe) for ALD activities on priority basis. However, if machines are not available, Dzongkhags should formally write to DoA for necessary machinery support.
c) Conduct quarterly monitoring of ALD activities at the field level;
d) Submit physical and financial progress reports to ARDC on quarterly and annual basis;
e) Compile approved ALD activities from Gewog's AWP&Bs and submit to ARDC; and
f) Resolve issues and disputes amongst the beneficiaries and target communities in close consultation with the relevant sectors and agencies.

Roles of Gewog Administration

a) Review and validate the ALD application and other relevant documents;
b) Coordinate and conduct feasibility study by the ALD committee with technical backstopping from ARDC/NSSC depending upon the nature of ALD activities;
c) Carry out design and layout and make budget estimates for the proposed ALD activities;
d) Incorporate proposed ALD activities in the AWP&B and implement it;
e) Form BVG to oversee the implementation of ALD activities;
f) Carry out monitoring of ALD activities on regular basis;
g) Submit progress report on quarterly and annual basis to the Dzongkhag; and
h) Execute agreement with the proponent.

Roles of Proponents

a) Ensure approval is sought for all ALD activities
b) Submit a duly filled ALD application form along with other relevant documents to the Gewog Administration
c) Shall agree to the terms and conditions specified under the support scheme of this guidelines

d) Ensure utilization of developed ALD sites for agriculture purposes as per the terms and conditions.

Scaling up SLM: Issues and Challenges

The Royal Government has prioritized investment in sustainable land management as one of the means to protect and manage biodiversity and ecosystem services in Bhutan. A number of dedicated projects are currently under implementation, including by the National Soil Services Centre, "Working towards Achieving Land Degradation Neutral Status 'Protect-Sustain-Restore'," with a resource outlay of Nu 6 million funded by BTFEC. Similarly in 2015 NSSC initiated a project with BTFEC grant in Jarey under Lhuentse, and Thangrong in Mongar with budget outlay of Nu 11.965 million. The project aims to promote and implement SLM practices and agro-forestry principles to enhance rural livelihoods. These among other projects undertaken in different parts of the country have already proved to be beneficial in terms of combating land degradation and enhancing the livelihood of rural population.

However, there are number of challenges and issues while undertaking and mainstreaming SLM into plans and policies. Some of the prominent issues highlighted at the training workshop were:

- **Small landholding and labour shortage:** Small farm landholdings, and labour shortage are some key factors that constrain the progress of SLM activities in the field. Owing to lack of knowledge, their use of available resources in many cases is characterised by inappropriate technologies and methods. These smallholder farmers must be given much more effective support to enable them to adopt and scale up SLM at wider scale.

- **Inadequate financial support/government budget allocation for SLM:** Though land degradation is of great concern for Bhutan, coordinated efforts to address the issue has been lacking over the decades. In fact, lack of public investment in SLM has been one of the key reasons why SLM could not be spread out at landscape level despite having well proven technologies and approaches.

- **Awareness raising and capacity development:** Many local leaders, extension officers, researchers, policy-makers and decision-makers are insufficiently informed with respect to the ALD, its context, and the impacts of SLM. Major efforts in information and training will be necessary if SLM practices are to achieve a breakthrough.

- **Profitability:** Production benefits are the primary interest of land users, and have direct consequences for livelihoods in small-scale subsistence farming. Most SLM don't come with integrated farming and market for the farm produce.
- **Participation and community involvement:** Successful implementation of SLM often requires close cooperation between neighbours or members of a village community, truly so for terracing and terrace consolidation where consent is required to avoid conflict. Larger landholders don't allow machineries to pass through their properties nor take part in SLM interventions.

- **Planning for sustainable land management:** Overall planning, taking account of on-site and off-site interactions, need to be given sufficient attention. Participatory mapping of degradation and conservation coverage is essential, in order to visualise the extent and effectiveness of achievements that support sustainable land management. It is also a prerequisite for proper planning of investments in SLM. The local leaders do not have adequate knowledge on SLM.

- **Enabling environment:** An enabling environment (both policies and legal frameworks which are

in place) should be nurtured for sustainable land management to thrive best. Indirect measures such as infrastructure, access to machineries from Central Machinery Unit, and favourable prices for agricultural products, indirectly contribute to sustainable use of natural resources contributing to SLM.

Lesson learnt and way forward

Investment in rural areas and sustainable land management is a local concern, a national interest and a global obligation. Thus it must be given priority at the local level to increase income, to improve food security and to contribute to poverty reduction; and at the national level to help alleviate hunger and malnutrition, to reduce poverty, to protect the world's climate, to safeguard natural resources and ecosystem services, and in many cases to preserve cultural heritage. The training concluded with following recommendations:

- **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. Providing information, imparting knowledge, and exchanging experience play a key role in each of these steps.

- **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 sustainable land management initiatives. Participatory planning of SLM activities is seen as a core element to ensure sustainability at the grassroots level. Other aspect of sustainability is to integrate and support cash income generating activities or enterprises such as horticulture crops, livestock farming and community forests. Cash income generated through these enterprises can be partly ploughed back into land management. Mainstreaming SLM into local and national plans, programs and policies will be another key factor to ensure long term sustainability.

- **Improving Stakeholders Coordination:** A critical factor that determines efficiency and effectiveness of SLM implementation is a strong coordination among all the stakeholders -Government, Local Government, Extension Officers and Citizens. The local leaders henceforth will coordinate with the extension officers and the farmers in prioritizing and framing SLM plans in the Gewogs and Dzongkhags.
- **Knowledge Management:** There is a need for investment in documenting and evaluating SLM practices and in assessing their impact on ecosystem services. Scattered knowledge about SLM needs to be identified, documented and assessed in a thorough and interactive review process that involves the joint effort of land users, technical specialists, and researchers. Documented knowledge about SLM practices must be made broadly available for land users, decision-makers, etc., to provide a basket of options for informed decision-making at different levels.

- **Research:** Many SLM practices and approaches have been documented. Their sustainable effect and practical implementation have also been confirmed in many cases at the local level. But there is a great need to clarify their impact in different contexts and to adapt and optimise them under different conditions. Additional new technologies need to be developed.

- **Use of CMU machineries and seeking clearance:** If the ALD is to be implemented properly, there should be proper management system for the government machineries. If there are no enough machines, government should procure more. For the forestry and environmental clearance, NSSC will consult the relevant agencies and amend the guidelines accordingly. Monitoring of the CMU machine operators is crucial and will be conducted and streamlined in consultation with the CMU.

- **Public awareness:** The local leaders will allocate budget for awareness program, and the central body like NSSC will conduct SLM awareness campaign in association with the local governments.

Annexure:

Training Workshop Program

Day 1:	**Program**
08.30	Registration of participants
09.00	Welcome remarks
09.05	Workshop opening remarks by Director BTFEC
09.20	Group photo session
09.40	Tea break
10.10	BTFEC presentation (funding windows)
10.50	Presentation on why SLM in Bhutan
01.00	Lunch break
02.00	Presentation on SLM & SFM technologies
03.30	Tea break
04.00	SLM documentaries & Discussion
Day 2:	**Program**
Field visit to Salamji, Tsirang Dzongkhag (to see successful SLM technologies and to interact with the beneficiaries)	
Day 3:	**Program**
09am-05pm	Practical demonstration on SLM technologies (A frame making, running contour line, Hedgerow/stone bund/terracing/Check-dam construction (log & stone)
Day 4:	**Program**
09.00	Presentation on ALD guidelines
10.30	Tea break
11.00	Group work (how best the SLM interventions could be mainstreamed into Gewog plans)
01.00	Issues and challenges foreseen in scaling –up SLM intervention
02.30	Recommendations and way forward
04.00	Closing & Bills disbursements

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