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**Analytical Review of Gaps, Conflicts and Inconsistencies
in Existing Sectoral Policy, Planning and Legal Frameworks
for Developing Climate Resilient Integrated Landscape
Management and Climate Resilient Communities**



*This study is carried out with GEF-LDCF funding and supported by
UNDP project titled: "Enhancing Sustainability and Climate Resilience of
Forest and Agriculture Landscape and Community Livelihoods in Bhutan"*

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

November 2018



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ROYAL GOVERNMENT OF BHUTAN
Ministry of Agriculture and Forests
Thimphu : Bhutan



Foreword

The Ministry of Agriculture and Forests is implementing the GEF/LDCF project on "Enhancing Sustainability and Climate Resilience of Forest and Agricultural Landscapes and Community Livelihoods in Bhutan" through support from UNDP to operationalize an integrated landscape-based approach to climate change adaptation and biodiversity conservation. In order to enable strengthening policy and planning frameworks of the key national agencies for integrated forest and agricultural landscape management and climate change resilience, the Ministry as part of the project, has commissioned an analytical review and identification of gaps, conflicts and inconsistencies in existing sectoral and inter-sectoral policy, planning and legal frameworks in the context of developing climate resilient integrated landscape management and climate resilient communities.

The nexus between sustainable forest management, biodiversity conservation and the climate resilience for sustainable rural livelihoods is often not well recognized in national and local government policy and planning processes. As a result, climate change vulnerability and biodiversity losses are increasing as natural capital is eroded and fragmented. Therefore, the review focuses on climate related policies, laws and programs in the context of their implications and status as relating to vulnerability assessments, implementations aspects of policy and legal intents, monitoring and evaluation of the policy intentions and whether the existing policies adequately enable addressing climate change vulnerabilities at various levels.

This report identifies and highlights on climate change impacts and experiences and highlights on the gaps and issues related to addressing the climate specific elements and integrated landscape management. A coordinated and inclusive approach and on-ground actions remains a challenge. Further, lack of sufficient climate data and appropriate data sharing platforms limits coordination both within and between sectors. To that effect, the report presents recommendation on mainstreaming the climate and integrated landscape management into development policy and plan.

Given the complicated interactions between agriculture, forestry, soils, water, biodiversity, pasture, other land uses and climate over landscapes, achieving interrelated objectives of food security, livelihood development and climate change mitigation in isolation will be difficult. Hence, there is also an increasing recognition of the need to shift from a sector-oriented planning to an integrated landscape- based approach to incorporate the perspectives of all stakeholders, their rights and management regimes into plans, programs and policies.

A blue ink signature of Kencho Thinley.

Kencho Thinley
Chief Planning Officer



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ABBREVIATIONS

ADB	:	Asian Development Bank
APA	:	Annual Performance Assessment
ASAL	:	Arid and Semi-arid Land
BT FEC	:	Bhutan Trust Fund for Environmental Conservation
C4	:	Climate Change Coordination Committee
CBD	:	Convention on Biodiversity
CCA	:	Climate Change Adaptation
CCAP	:	Climate Change Adaptation Program
CCM	:	Climate Change Mitigation
CD	:	Customs Duty
CIDP	:	Country Integrated Development Plan
CSOs	:	Civil Society Organizations
CST	:	Climate Smart Technology
CSV	:	Climate Smart Villages
DDM	:	Department of Disaster Management
DEC	:	District Environment Committee
DES	:	Department of Engineering Services
DGM	:	Department of Geology and Mines
DoA	:	Department of Agriculture
DoFPS	:	Department of Forests and Parks Services
DRM	:	Disaster Risk Management
DT	:	Dzongkhag Tshogdu
EIA	:	Environment Impact Assessment
EIMS	:	Environmental Information management System
FAO	:	Food and Agriculture Organization
FYP	:	Fiver-Year Plan
GCCA	:	Global Climate Change Alliance
GCF	:	Green Climate Fund
GEF	:	Global Environment Facility
GLOF	:	Glacial Lake Outburst
GLS	:	Gray Leaf Spot
GNHC	:	Gross National Happiness Commission
GHG	:	Greenhouse Gas
GT	:	Gewog Tshogde
HANAS	:	High Altitude Northern Areas

ICIMOD	:	International Centre for Integrated Mountain Development
ILI	:	Integrated Landscape Initiatives
IPPC	:	International Plant Protection Convention
IWRM	:	Integrated Water Resources Management
KSLCDI	:	Kailash Sacred Landscape Conservation & Development Initiative
LCMP	:	Land Cover Mapping Project
LDCF	:	Lease Developed Country Fund
LULC	:	Land Use and Land Cover
MoAF	:	Ministry of Agriculture and Forests
MoEA	:	Ministry of Economic Affairs
MoH	:	Ministry of Health
MoHCA	:	Ministry of Home and Cultural Affairs
MoWHS	:	Ministry of Work and Human Settlement
MRG	:	Mainstreaming Reference Group
MSTCCC	:	Multisectoral Technical Committee on Climate Change
NAPA	:	National Adaptation Programme of Action
NBC	:	National Biodiversity Center
NBSAP	:	National Biodiversity Strategies and Action Plan
NCHM	:	Hydrology and Water Resources Services Division
NECS	:	National Environment Commission Secretariat
NIWRMP	:	National Integrated Water Resources Management Plan
NKRA	:	National Key Result Areas
NLFS	:	National Labour Force Survey
NSB	:	National Statistics Bureau
NSSC	:	National Soil Services Center
NWFFWC	:	National Weather Flood Forecasting and Warning Centre
PES	:	Payments for Ecosystem Services
PHCB	:	Population and Housing Census of Bhutan
PHED	:	Public Health Engineering Division's
PPD	:	Policy and Planning Division
RBC	:	River Basin Committees
RBMP	:	River Basin Management Plans
REDD+	:	Reducing emissions from deforestation and forest degradation
ROGB	:	Royal Government of Bhutan
RMA	:	Royal Monetary Authority
RNR	:	Renewable Natural Resources
RSPN	:	Royal Society for Protection of Nature
RWSS	:	Rural Water Supply Scheme

SAN	:	Sustainable Agriculture Network
SAPA	:	Sectoral Adaptation Plan of Action
SDGs	:	Sustainable Development Goals
SGP	:	Small Grants Programme
SKRA	:	Sector Key Result Areas
SLM	:	Sustainable Land Management
SNC	:	Second National Communication
ST	:	Sales Tax
SYB	:	Statistical Yearbook
UN	:	United Nations
UNCBD	:	United Nations Convention on Biological Diversity
UNDP	:	United Nations Development Programme
UNFCCC	:	United Nations Framework Convention on Climate Change
WCP	:	Wangchuck Centennial Park
WMD	:	Watershed Management Division
WWF	:	World Wildlife Fund

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EXECUTIVE SUMMARY

The RNR sector in Bhutan has been experiencing increased climate change impacts, as a result of heavy rainfall, drought, frost, hailstorms, windstorms and related land degradation. In addition to climate change impact-related losses, crop and livestock depredation by wildlife causes major production losses.

The Royal Government of Bhutan (RGOB) is implementing the GEF/LDCF project on "Enhancing Sustainability and Climate Resilience of Forest and Agricultural Landscapes and Community Livelihoods in Bhutan" through support from UNDP to operationalize an integrated landscape-based approach to climate change adaptation and biodiversity conservation. In order to enable strengthening policy and planning frameworks of the key national agencies for integrated forest and agricultural landscape management and climate change resilience, the Policy and Planning Division (PPD), Ministry of Agriculture and Forests (MOAF) as part of the project, has commissioned an analytical review and identification of gaps, conflicts and inconsistencies in existing sectoral and inter-sectoral policy, planning and legal frameworks in the context of developing climate resilient integrated landscape management and climate resilient communities.

In conducting the study, the main attention was focused on review of climate related policies, laws and programs in the context of their implications and status as relating to vulnerability assessments, implementations aspects of policy and legal intents, monitoring and evaluation of the policy intentions and whether the existing policies adequately enable addressing climate change vulnerabilities at various levels.

The policy review notes that temperatures in Bhutan are not only increasing but are projected to increase in the future while annual precipitation is expected to increase with the monsoon seasons predicted to be wetter with drier winters. The country has been experiencing significant levels of damages caused by extreme weather events such as flash floods, landslides, forest fires, windstorms, excessive rains in the recent past.

While information on climate and vulnerabilities to climate change in Bhutan is limited, available studies indicate that climate change and variability will impact on all sectors, particularly water resources, agriculture, forestry and biodiversity, energy, glaciers and GLOFs and human health. There are also issues that cut across sectors within the realm of climate change and variability that requires attention.

Globally there is increasing recognition of the need to enable climate change adaptation (CCA), climate change mitigation (CCM), and disaster risk management (DRM) explicitly in into national, sectoral, and local development strategies, policies, programs and projects.

Focus on policies is necessary as policies shapes carbon emission paths, the ability to develop sustainable adaptation and mitigation options, and to build overall adaptive capacities.

Given the complicated interactions between agriculture, forestry, soils, water, biodiversity, pasture, other land uses and climate over landscapes mean that efforts to manage any of these in isolation to achieve inter-related objectives of food security, livelihood development and climate change mitigation will be difficult. Hence, there is also an increasing recognition of the need to shift from a sector-oriented planning to an integrated landscape-based approach to incorporate the perspectives of all stakeholders, their rights and management regimes into plans, programs and policies. Therefore, a climate resilient landscape approach, one that enables the ability of the integrated spaces and its components to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, is considered as the approach that is appropriate to enable resilience of landscapes and climate resilient communities.

The review of policies, legislation and programs pursued in this context has in general highlighted the following;

- * Very few sections of existing policies address climate change and mitigation. Further these limited elements in the policies are scattered, disjointed and are not exclusively devoted to climate change adaptation and mitigation. Where climate specific policy elements are articulated, they are weak in terms of assigning responsibilities to lead in policy implementation, monitoring and evaluation.
- * Although climate change impacts and experiences across the country are considered important, an inclusive and comprehensive climate change policy and legislative framework that sets out the mandate for, a leading institution to spearhead the nation's efforts in climate change adaptation and mitigation does not exist.
- * The laws of Bhutan that relates to climate change and landscape management, provide strong legal basis for protection and sustainable management of the environment, equitable distribution of costs and benefits of conservation. However, laws do not explicitly highlight addressing climate change and the need for integrated and inclusive planning at different levels.
- * The existing guidelines, regulations and tools that are related to sectors' most vulnerable to climate describe protocols and standards to minimize environmental impacts in general. However, they do not also have explicit provisions, standards, tools or suggested technologies to enhance climate resilience of activities within the concerned sectors.
- * Addressing climate change and its impacts are more pronounced through strategies and actions plans. However, the relevant strategies do not provide clear linkages across sectors in addressing climate change, financing strategies, clear communications and reporting mechanisms and in how to integrate within the mainstream development

planning. The strategies also do not provide a programmatic approach to addressing climate change in the context of national planning and budgeting framework, national and local organizational arrangement and in the spirit of monitoring and evaluation system.

- * The frameworks for issuance of environmental clearance or development consent for projects and programs focus consideration of overall impact of proposed projects/ programs on the overall environment. However, they lack explicit safeguard measures to enhance resilience of the proposed projects or programs to climate change impacts.
- * The present state of affairs in addressing climate change is dependent on project specific needs and funds with no mainstream mechanism to identify climate change issues and vulnerabilities on a regular basis and for funding through national or sustainable programmatic sources. Additionally, sectors lack data and information on the vulnerability of sectors to the impact of climate change, natural hazards and disasters.
- * Coordination and management of strategic activities, investments on-ground actions are fragmented and scattered across different actors. Poor coordination of climate change actions from the national level to the local level remains a challenge. The Dzongkhag and Gewog levels are important existing institutional set up and best suited to address climate issues in a coordinated and inclusive approach. Forestry, an important component of landscape level climate resilience, does not have sector representation within the Dzongkhag setup up which, can potentially create a gap in addressing landscape resilience.
- * Robust observations and projections for climatic and hydrological trends into the future at national and local levels are not readily available to users including tools and technical capacities to interpret information and draw out implications for decision-making.
- * Further, the lack of sufficient climate data and appropriate data sharing platforms limits coordination both within and between sectors. Absence of suitable tools and information on current and projected natural hazards impedes proper assessment and identification of risk/exposure of existing infrastructure, communities and overall local environment to climate change impacts.

Based on the identified policy gaps, following are the recommendations:

- * There is a need for a clear and comprehensive national climate policy.
- * Integrate climate and ILM considerations into RGOB's budget allocation, procurement and in the investment appraisal by financial institutions to enable climate resilience of infrastructure.
- * Direct fiscal incentives for climate change adaptation and mitigation.
- * Strengthen collaborative planning, monitoring and evaluation of climate actions through

mainstream planning and reporting framework including the need for the common approach for local level vulnerability assessment methods.

- * Enhance awareness and enable access to context specific information on climate change and its impacts and to enhance institutional capacities for collaborative planning and development management.
- * Set up an appropriate institution to address climate issues in a coordinated and inclusive approach.
- * Overall, the DTs and GTs may be considered as the platforms for local landscape planning within which sector approaches should converge to support commonly agreed local development objectives. This could be the only entry point for instituting ILM approach within the current policy, legal and institutional arrangement in Bhutan.

1 INTRODUCTION

Bhutan's renewable natural resources (RNR) sector comprises crops, livestock, and forestry including water resources which are closely integrated at the farm level. This sector supports the livelihood of over 57.2% of the population (National Labour Force Survey, 2016) and contributes 17.37% to the national gross domestic products (Statistical Yearbook 2018). The overall poverty rate in Bhutan is estimated at 8.2% with significantly high poverty incidence in rural areas (11.9%) in which most residents are engaged in RNR sector as compared to 0.8% in urban areas (PAR, 2017).

The RNR sector is also mandated with management and conservation of natural environment in maintaining the health of the eco-system. In Bhutan too, climate is changing as elsewhere on the earth. The RNR sector is perceived to be one of the most vulnerable sectors to climate change and climate induced disasters due to the geographical location of the country in which its economy depends on climate-sensitive activities (mainly cropping, livestock farming and utilization of forest resources including water).

The RNR sector has been experiencing an increased climate change impacts, as a result of heavy rainfall, drought, frost, hailstorms, windstorms and related land degradation. In addition to climate change impact-related losses, crop and livestock depredation by wildlife causes major production losses. Evidences of such scenarios are often featured in the national newspapers and news broadcasting services, such as the cases of:

- ★ Crop-land, houses, roads, livestock and other infrastructure washed away/buried by natural calamities such as floods/erosion/landslides;
- ★ Land being left fallow for lack of sufficient irrigation water due to drying of water sources or growing population;
- ★ Crop damaged by insects/pests, wildlife and drought;
- ★ Livestock predation by wildlife, even to the extent of causing casualties in human life etc.

Based on the available statistics (2008, 2016 & 2017) of MOAF, over 7 metric tons of crops (paddy, maize, wheat, barley & potato) is being lost to wildlife annually. Every year, on an average (RNR and Agriculture Statistics 2000, 2012, 2016, 2017) some 49% of rural households experiences crop damage and livestock depredation by wildlife, 30% of rural households faces insufficient irrigation water, 16% of rural households affected by insect/pests on crops and 29% of rural households falls victim to loses due to hailstorm/windstorm, excessive rains and drought.

Climate change and other anthropogenic threats such as land conversion, forest fires,

infrastructure development and unsustainable agriculture are also placing increasing pressure on Bhutan's biodiversity and ecosystems.

To reduce climate change vulnerabilities and improve the sustainability of local livelihoods and biodiversity of the country, the Royal Government of Bhutan (RGOB) is implementing the GEF-LDCF project through UNDP titled "Enhancing Sustainability and Climate Resilience of Forest and Agricultural Landscapes and Community Livelihoods in Bhutan". The project aims to operationalize an integrated landscape-based approach to climate change adaptation and biodiversity conservation through;

- I) Improvement of institutional capacity at national, sub-national and local levels to manage forest and agricultural landscapes sustainably for enhanced climate resilience,
- II) Emplacement of governance system for biological corridors and operationalization of conservation management system in the pilot corridors; and
- III) Development of climate-resilient livelihood options for the local communities.

The nexus between sustainable forest management, biodiversity conservation and the climate resilience for sustainable rural livelihoods is not well recognized in national and local government policy and planning processes. As a result, the climate change vulnerability and biodiversity losses are increasing as natural capital is eroded and fragmented. Therefore, as part of this project activity, an assessment is carried out to identify the gaps, conflicts and inconsistencies in existing sectoral and inter-sectoral policy, planning and legal frameworks in the context of developing climate resilient integrated landscape management and climate resilient communities. The assessment has been commissioned in August 2018 under the guidance of the Policy and Planning Division (PPD), Ministry of Agriculture and Forests (MOAF).

The objective of this assignment is to strengthen policy and planning frameworks of the key national agencies for integrated forest and agricultural landscape management and climate change resilience. Based on this assessment, a set of recommendations for addressing the gaps, conflicts and inconsistencies in the policies and planning frameworks is proposed to enable development of climate resilient integrated landscape management and climate resilient communities in Bhutan. The following approaches and methodology were adopted for the study.

2 METHODOLOGY OF THE ASSESSMENT

The framework for policy gap analysis should be based on what is the intended target in terms of building landscape level climate resilience as compared to the state of affairs at present. In the absence of a clearly articulated vision on climate change and building climate resilience, the intended target for climate resilience in this case is considered best practices and approaches towards climate resilience.

The adaptation cycle under the UN climate change regime, includes four general components comprising of the following. Figure 1 shows a graphical presentation of the adaptation cycle under the UN climate change regime.

- I) Assessment of impacts, vulnerability and risks which requires an initial assessment of the extent to which climate change is affecting or will affect natural systems and societies;
- II) Planning for adaptation which requires identification of adaptation activities and their appraisal, including the assessing costs and benefits;
- III) Implementation of adaptation measures at national, regional and local levels through different means such as projects, programs, policies or strategies; and
- IV) Monitoring and evaluation throughout the adaptation process including use of knowledge and information gained as well as incorporating a process to ensure learning to enable successful future adaptation efforts.

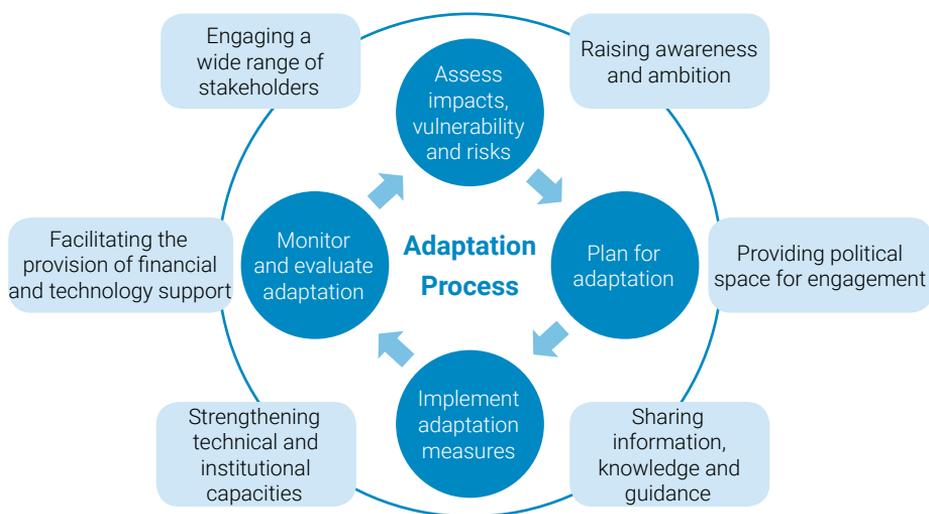


Figure 1: Adaptation cycle under the UN climate regime (<https://unfccc.int/topics/adaptation-and-resilience/the-big-picture/what-do-adaptation-to-climate-change-and-climate-resilience-mean>)

The present state of affairs is defined as the impacts of climate change as experienced by communities and policy environment in addressing the climate change impacts. Therefore, methodology of the policy review comprises of;

- I) Review of present state of climate change and its impact on the natural environment, society and the economy;
- II) Identify relevant policies that needs to be reviewed based on the key sectors that are vulnerable to climate change impacts.
- III) Following the adaptation cycle under the UN climate change regime, assess key policies that have implications on these key sectors in terms of;
 - a) National commitments to integrated landscape management and climate change resilience included in the key policies
 - b) How planning, implementation and M&E of these climate related policy elements are enabled by the policies and status of compliance.
 - c) Identify gaps in terms of planning, implementation, M&E and institutional arrangements to address climate issues from a landscape perspective.

The methodology has been implemented by reviewing of relevant policy documents, past studies and documentation of climate change, its impacts, legal frameworks and consultation with key stakeholders as follows.



The analytical summary is presented in the forms of a list of policy gaps, their implications in terms of enabling climate resilient landscapes and recommendations.

In recent years, the ILM approaches have gained popularity to address complex challenges in rural landscapes including climate change. Therefore, this analysis also includes an assessment of ILM as it is applied to address multi stakeholder interests and multi functionality of landscapes in the context of how it can potentially be adopted in Bhutan.

The overall analysis consists of review of the impacts of climate change in Bhutan, review of the policy, legal and regulatory as well as planning landscape in Bhutan in the context of climate change and in the context of adopting an ILM as a potential approach to landscape management which also addresses climate change issues.

3 OVERVIEW OF CHANGING CLIMATE SCENARIO IN BHUTAN

The most recent and comprehensive official information on climate and climate vulnerabilities come from the Second National Communication (SNC) of the Kingdom of Bhutan to UNFCCC (SNC, 2011). The SNC and various sources indicate that temperatures are not only increasing but are projected to increase in the future in Bhutan. Annual precipitation is expected to increase with the monsoon seasons predicted to be wetter and winters drier. Significant levels of damages caused by extreme weather events such as flash floods, landslides, forest fires, windstorms and excessive rains across the country are reported.

3.1. Rising Temperature

Climate model-based simulations reported in the SNC, 2011 show an increase in mean annual temperatures with the rate of increase in temperatures in winter predicted to be higher than in summers (See Table 1).

Table 1: Overall temperature outlook in Bhutan is described in the SNC document

Parameters	Simulated Changes	Source
Mean Annual Air Temperature	Increase from 13.5°C in 1980 to 17.0°C in 2069 (increase by 3.5°C based on simulations from downscaled HadCM3 climate model) and Increase from 12.0°C in 1980 to 15.5°C in 2069 (increase by 3.5°C based on simulation from downscaled ECHAM5 climate model)	SNC, 2011
Mean monsoon air temperature	Increase from 19.5°C in 1980 to 22.5°C in 2069 (increase by 3.0°C based on simulations from downscaled HadCM3 climate model) and Increase from 17.5°C in 1980 to 20.5°C in 2069 (increase by 3.0°C based on simulation from downscaled ECHAM5 climate model)	SNC, 2011
Mean winter air temperature	Increase from 6.75°C in 1980 to 10.75°C in 2069 (increase by 4.0°C based on simulations from downscaled HadCM3 climate model) and Increase from 6.5°C in 1980 to 10.0°C in 2069 (increase by 3.5°C based on simulation from downscaled ECHAM5 climate model)	SNC, 2011

Warming is observed and predicted to be more rapid in the high mountain areas than at lower elevations, with areas greater than 4000m experiencing the highest warming rates (Shrestha & Devkota, 2010)¹. The draft inception report on "Adapting to Climate Change through Integrated Water Resources Management-Project Management (ADB project BHU-8623), 2014 portrays that the average temperatures in Bhutan will not only increase but more than that it is more likely to be more extreme with hot temperature conditions².

3.2. Changes in precipitation

Most studies on climate in Bhutan report fluctuations and erratic rainfall in recent past (Climate summit, 2011; SNC, 2011). The SNC document also presents projected changes in precipitation scenario for Bhutan as follows;

¹ Data taken from National Action Plan, Biodiversity Persistence and Climate Change, National paper of Bhutan on biodiversity persistence and climate change at Climate Summit, 2011 (p 7).

² Egis Eau & RSPN/ BhWP (BHU-8623), 2014; Adapting to Climate Change through IWRM, Draft Inception Report, October 2014 (p -15).

Table 2: Observed and estimated precipitation changes (SNC, 2011)

Parameters	Zones	Temporal feature	Precis-downscaled HadCM3/A1B scenario	Precis-downscaled ECHAM5/A1B scenario
Mean Precipitation for the period 1980-2009	Rainfall in the south-west of Bhutan including Samste, Chukkha, Dagana, Tsirang and Sarpang	Annual	3,000 - 4,000 mm/year	3,000 - 4,000 mm/year
		Winter	130 - 240 mm/winter	110 - 120 mm/winter
	Rainfall in the northward districts such as Haa, Paro, Wangdue, Trongsa, Monggar and Trashigang	Annual	1,500 - 3,000 mm/year.	1,500 - 3,000 mm/year.
		Winter	10 - 140 mm/winter	20 - 100 mm/winter
	Snowfall in the cold northern fringe districts of Gasa, Paro, Thimphu, Wangdue and Bumthang	Annual	1,000 mm/year	700 mm/year
		Winter	Less than 10 mm/winter	Less than 10 mm/winter
Estimated Mean Precipitation for the period 2010-2039	Rainfall in the south-west of Bhutan including Samste, Chukkha, Dagana, Tsirang and Sarpang	Annual	3,000 - 4,000 mm/year	3,000 - 4,000 mm/year
		Winter	150 - 230 mm/year	90 - 110 mm/year
	Rainfall in the northward districts such as Haa, Paro, Wangdue, Trongsa, Monggar and Trashigang	Annual	1,500 - 3,000 mm/year	1,200 - 2,500 mm/year
		Winter	60 - 150 mm/year	30 - 110 mm/year
	Snowfall in the cold northern fringe districts of Gasa, Paro, Thimphu, Wangdue and Bumthang	Annual	1,000 mm/year	700 mm/year
		Winter	Less than 10 mm/winter	Less than 10 mm/winter
Estimated Mean Precipitation for the period 2040-2069	Rainfall in the south-west of Bhutan including Samste, Chukkha, Dagana, Tsirang and Sarpang	Annual	Exceed 4,000 mm/year	Exceed 4,000 mm/year
		Winter	Exceed 120 mm/winter	90 - 1100 mm/winter
	Rainfall in the northward districts such as Haa, Paro, Wangdue, Trongsa, Monggar and Trashigang	Annual	2,000 - 4,000 mm/year	1,500 - 4,000 mm/year
		Winter	10 - 110 mm/year	30 - 115 mm/year
	Snowfall in the cold northern fringe districts of Gasa, Paro, Thimphu, Wangdue and Bumthang	Annual	500 - 1,000 mm/year.	600 - 1,000 mm/year
		Winter	Less than 10 mm/winter	Less than 10 mm/winter

The spatial pattern of mean total annual precipitation (rainfall) according to the Precis-downscaled HadCM3/A1B and ECHAM5/A1B scenarios for Bhutan show zonal pattern of precipitation increasing with latitude from south to north and a generally slight increase in overall precipitation.

Annual precipitation is expected to increase with the monsoon season predicted to be wetter, while the winters will be drier. Already, there are significant level of damages caused by extreme weather events such as flash floods, landslides, forest fires, windstorms, excessive rains across the country.

4 VULNERABILITY TO THE IMPACTS OF CLIMATE CHANGE

About 50% of the geographical area of Bhutan is located on slopes greater than 50% (or greater than 26.6 degree slope) and about 52.45% of the geographical area lies above 2600 meters above mean sea level (Bhutan RNR Statistics, 2015) with elevations ranging from 100 m to 7000 m (SNC, 2011). Bhutan is a land-locked least developed country located in the fragile mountainous landscape of Eastern Himalayas. Its mountainous terrain and rapid variation in agro-ecological zone renders the country more vulnerable challenging associated to climate change.

4.1. Economy

The mainstay of Bhutan's economy comprises agriculture (crops, livestock and forestry), construction and electricity. In 2017, the RNR sector has contributed 17.37% to the national GDP (SYB 2018) the highest contribution, followed by construction sector 15.87%. The electricity and water supply sector accounted for the third highest contributor to national GDP (13.22%), mainly from hydro based electricity (13.20%). The RNR sector is also the leading sector in providing employment (57.2%), according to Labour Force Survey 2016 engaged in agricultural practices on a cultivated land area of just 2.75% (LULC 2016, DoFPS) of the total country's geographical areas.

The key sectors that are vulnerable to climate change as reported by Bhutan's NAPA, 2006 are water resources, forests and biodiversity, agriculture, energy, human health and glaciers which require urgent adaptation actions. Further the World Bank document, "Modernizing Weather, Water, and Climate Services: A Road Map for Bhutan, 2015" identifies key sectors of the Bhutanese economy such as hydropower (being exposed to floods and climatic risks) and agriculture (being exposed unpredictability in the timing of monsoons and prolonged drought and farmers relying mainly on rain-fed agriculture) as being vulnerable to weather and climate hazards.

4.2. Agriculture and Livestock

Overall, 57.2% of Bhutanese employed persons are engaged in agricultural activities (NLFS, 2016) practiced on 2.75% of the total land. Over 31% of the total agricultural land is situated on slopes greater than 50% (ALD Guidelines 2017, DoA). Of the 261,141 acres of cultivated areas (LULC 2016, DoFPS), 200,000 acres has been assessed to be irrigable (NIMP 2016, ADB). The national irrigation master plan has assessed that 64,000 acres are irrigated which show that only about 11% of the total cultivable land in Bhutan is irrigated. Agriculture sector

in Bhutan is highly dependent on rain-fed crops. This makes agriculture, which is one of the most important economic sectors, very vulnerable to impacts from climate change.

The National paper of Bhutan on biodiversity persistence and climate change at Climate Summit, 2011 reported the following;

- ★ Rice blast in 1995 caused by a fungus *Pyricularia grisea*, occurred on an epidemic scale in the high altitude warm temperate rice growing areas causing as high as 71 percent yield loss and loss of traditional rice varieties.
- ★ A new maize disease Gray Leaf Spot (GLS) caused by the fungus *Cercospora zea maydis* that was never reported in Bhutan, devastated the entire maize growing area in the east affecting about 3,835 households covering 4,711.76 acres of maize crop threatening the household food security and existence of about 38 traditional maize varieties.
- ★ In 1996, farmers in the high-altitude areas lost between 80% and 90% of rice to the epidemic of rice blast. In 2007, the maize harvest loss by the farmers above 1800 mean sea level is recorded at more than 50% because of the outbreak of northern corn blight disease.
- ★ The heavy summer monsoon rainfall of 2004 caused heavy landslide in the east and damaged 39 irrigation channels, affected 161 acres of wetland and 503 acres of dry land. In terms of food items, 350 million tons of maize, 126 million tons of paddy, and 2000 citrus trees were damaged. Transportation remained disrupted for many days in most of the eastern and southern Dzongkhags during the period affecting food distribution system. Climate change therefore not only affects the physical aspect of farming environment in the form of crop loss and land degradation, but also affects food distribution system and prices of the essential commodities. In the difficult geographic setting where rural settlements are scattered, the extreme events of climate change put them at more risk as they remain disconnected.

The RNR SAPA document, 2013 recognizes that at present there are very limited climate resilient varieties of crops and fodder and that selection and adaptation of crop and fodder varieties resistant to biotic and abiotic stress are limited. Farmers continue to depend on traditional varieties that are highly vulnerable to pest and disease, drought and heat stress.

The agriculture and livestock sector face the challenge of coping with reduced yields, loss of genetic resources, occurrence of pests and diseases, having to deal with unpredictable weather patterns and hence need for improved weather information and erratic rainfall/water crops and livestock.

4.3. Water for Drinking, Irrigation and hydropower

The SNC, 2011 recognizes that at a gross level, Bhutan has one of the highest per capita availability of water. Further, the NIMP 2016-ADB, estimates the combined outflow of rivers

(due to rainfall, glacial melt and snow melt) at 70,565 million cubic meter per year or 2,238 cubic meter/second corresponding to a flow of 109,000 cubic meter per capita per year, the highest in the region.

However, seasonal and spatial distribution of water is an issue. Water availability is high in monsoon when there is already too much precipitation and most of the water resources are in the valley bottoms in the rivers while settlements and agriculture areas are located on higher slopes. At these locations, streams and smaller water sources are reported to be drying up. This indicates that water balance issues are not critical at a national level, but it is at sub-basin levels and smaller sub-catchments with heavy population concentrations.

One of the visible impacts of climate change Bhutan has witnessed during the last couple of years concerns with drying up of water sources and change in precipitation and temperature patterns (SNC, 2011). The increase in demand for water during the next decade in the one hand, and the depletion of water sources on the other, could create an acute shortage of fresh drinking water and water for agriculture (Sangam Shrestha, et al, 2015)³. The final report of the 11th FYP recommends development of a comprehensive strategy/programs to address water security issues.

In urban areas, where an estimated 30% of Bhutanese population live, 57% of the population have access to drinking water supply for less than 12 hours a day (DES, MoWHS, 2012)⁴. Unreliable sources, mainly due to drying up of water sources have been the primary reason for inadequate supply. Water Supply Status and Plan document identifies that urban water supply issues are characterized by inadequate supply, unreliable supply, aging infrastructure, flooding and landslides, inadequate water treatment, drying up of sources during dry season and lack of resources (human and financial) for operation and maintenance of water supply system.

Even in the rural areas, dwindling volume of water sources are reported to be a reality. In Kangpara Geowg of Trashigang for instance about 59.29 percent of HHs in the Gewog reported decreasing volumes in their water sources in 2012 (RSPN, 2012). The same survey also indicated that 56.25 percent of surveyed households reported flood and 50 percent reported landslide/erosion events as high in terms of severity (RSPN, 2012). The survey carried out the Watershed Management Division (WMD), MoAF in 2017-18 on drying of spring sheds has reported that 34.7% of about 6,095 sources of drinking water across the country are drying up while about 2.3% of these sources have already dried up.

A study on Climate change impacts on the flow regimes of rivers in Bhutan and possible consequences for hydropower development portrays that the change in mean annual

³ Water Resources in Bhutan, Managing Water resources Under Climate Change Uncertainty, Examples from Asia, Europe, Latin America and Australia. Sangam Shrestha, et al, Springer International Publishing, Switzerland, 2015 (p-276, <https://books.google.bt/books>)

⁴ Data taken from Urban Water Supply - Status and Plan, DES, MoWHS, 2014 (p-8).

discharge available for hydropower production from 1981-2010 to 2021-2050 varies between 9% decrease and 6% increase for climate projections Echam A2 and between 13% decrease and 7% increase for climate projection Echam B1 (Stein Beldring & Astrid Voksø, 2011). Since, there is the possibility of reduced river flows, there is the risk of reduced hydrogenating potential and loss of revenues, especially during the dry winter months.

The ADB TA project implemented by NECS also points out the same issue in their problem analysis for National Irrigation Master Plan and Integrated Water Resources Management plan. The report spells out that the wetter monsoon months will coincide with accelerated glacial melting, causing river flows to increase even more, particularly during the rainy season. The pattern of river flows could become more erratic, and an increased volume of sediments carried.

4.4. Forests and Biodiversity

According to the LULC-2016, DoFPS's land cover assessment, Bhutan has a total forest cover of 70.77% (excluding shrubs), comprising of 45.94% Broadleaf, 13.53% Mixed Conifer, 6.02% Fir, 2.64% Chirpine and 2.64% Blue pine. The Alpine Scrub is 3.39%, Shrubs constitute 9.74%, while cultivated agricultural land and meadows account for 2.75% and 2.51% respectively. The snow cover constitutes 5.35% and rocky outcrops 4.15% while water bodies, built up areas, non-built up areas, landslides and moraines constitute less than 1% each. The climate change impact on biodiversity includes significant changes in agriculture, forestry, wildlife and land resources. Forest zones are expected to shift northwards with climate change, faunal and avifaunal species that are tied to climate and land cover would also be expected to migrate northwards.

- ★ Within the areas of WCP, community livelihoods based on pastoralism and agriculture are indicated to be affected by new diseases, pests, and parasites and by shifting phenological and seasonal changes induced by climatic changes. As a result, vulnerability at a community level, particularly among subsistence farmers, is considered to be high (Lhendup P, et al, WWF, 2011).
- ★ A survey conducted in 2010 indicated that the productivity of *Abies densa*, *Pinus wallichiana*, *Quercus glauca* and *Quercus griffithii* forests suffered set-backs due to periodic diebacks and insect attacks. It also indicated that pests and diseases in forests and agriculture had increased over the years in general.
- ★ There were outbreaks of bark beetle in spruce forests, increased incidence of mistletoe infestation, and moisture–stress related problems in blue pine forests. In less than 16 years (1992-2008), five incidences of pine die-backs were observed (1994, 1999, 2001, 2003 & 2008) along the Paachu-Wangchu valley. A study in 2009 (Wangda et al.) found that pine die-back was strongly correlated with higher temperature and lower rainfall during the die-back incidences in the area.

- ★ Climate Change Vulnerability Assessment of WCP in 2011 deduced a warming trend in annual temperature and high levels of variability and uncertainty in annual precipitation which will lead to shifts in seasonal stream flow, ecosystems, and distributions of species depending on habitat shifts. The deterioration of ecosystem connectivity and the increase of habitat fragmentation are identified as major sources of vulnerability for both terrestrial and aquatic ecosystems (Lhendup P, et al, WWF, 2011).
- ★ Forest fire is a recurrent phenomenon. The number of forest fires increased from 34 in 2012-2013 destroying 12,175 acres of forest to 64 incidences destroying around 45,095 acres of forests during 2013-2014 (RNR Statistics, 2015). In 2016, the forest fire burnt over 21,058 acres in 72 incidences and 12,970 acres (31 incidences) in 2017 (Forest Facts & Figures, 2016 and 2017).

Occurrence of forest fires, loss of biodiversity, shifts in habitats, occurrence of pests and diseases and overall decline in ecosystem services of the environment are challenges that the forests and biodiversity sector confront. The resilience of many ecosystems will very likely be threatened by an unprecedented combination of climate change associated disturbances such as flooding, drought, wildfire, and insects, and other global change drivers including land use change, pollution, fragmentation of natural systems, and overexploitation of resources (IPCC 2007, CBD, 2009, National Paper on Biodiversity, 2011).

The National Paper on Biodiversity, 2011 indicates that pests and diseases in forests and agriculture had increased over the years in general. There were outbreaks of bark beetle in spruce forests, increased incidence of mistletoe infestation, and moisture–stress related problems in blue pine forests. It is likely that with rising temperature and erratic dry and moist periods, intensity and incidences of diseases and pests will increase. In less than 16 years (1992-2008), five incidences of pine die-backs were observed (1994, 1999, 2001, 2003 & 2008) along the Paachu-Wangchu valley. The study found that pine die-back was strongly correlated with higher temperature and lower rainfall during the die-back incidences in the area (Wangda et al. 2009, National Paper on Biodiversity, 2011).

4.5. Health Sector

The impacts in the health sector include temperature-related illness, extreme weather related health effects, water and food-borne diseases, vector-borne diseases and effects of food and water shortages. The SNC, 2011 reported moderate to significant increases in the incidence of Diarrhoea, Dysentery, Other Malaria and Typhoid for both the Thimphu and Phuntsholing regions according to the HadCM3 and ECHAM5 scenarios.

Dengue is endemic during the monsoon. Diarrheal diseases continue to be a major problem affecting the survival of children under five years of age in the country. According to the Annual Health Bulletin 2017, diarrhea incidence per 10,000 under five children in 2017 is recorded at

1448. Malaria is still posing as a grave threat to the country's population while Dengue and Chickungunya are on the rise. The incidences of vector borne diseases like piroplasmosis and helminthes infections in domestic animals have increased and are expanding into cooler areas with change in temperature and rainfall.

4.6. Glaciers and GLOF

The snow cover in Bhutan constitutes 7.44% and water bodies, built up areas, marshy areas and non-built up areas constitute less than 1% of the total area of Bhutan (LCMP, 2010). Out of the 2,674 lakes in Bhutan, 24 are identified as potentially dangerous and pose major risks to hydropower plants, farmlands and human settlements (World Bank, 2015). Bhutan National Human Development Report, 2011 identifies that Bhutan is likely to see climate impacts channeled through changes in its glaciers, such as enlarged glacial lakes, in the timing and severity of extreme climate shocks such as flash floods and drought, and in the availability of ecosystem resources and services. Water resources availability in terms of quantity, quality and timeliness emerges as one of the principal climate pressures on broader human development including health, agriculture and livelihoods (GNHC, 2011)⁵.

With GLOF and glacial meeting, it is expected that river flows derived from the glaciers would initially increase during the dry season as ice melting accelerates; this can give wrong signals to policymakers and delay climate resilience measures. In time, as the remaining glaciers disappear, dry season flows would be dramatically reduced. River flows will become more erratic as rainfall is immediately converted to runoff instead of being stored as ice.

Agriculture, livestock, water, human health, energy and overall natural resource are critical for rural poverty reduction, employment, economic growth and food security in Bhutan. Despite increasing urbanized region, 62.2% of people still reside in rural areas (PHCB, 2017) where agricultural production, processing, and related services remain as an important source of income.

Given that climate change impacts will have multiple effects on food sources, biodiversity, energy, water resources including water supply, human health, and infrastructure, the rural farmers and low-income households who have limited knowledge and resources to adapt to climate change are expected to be severely impacted.

⁵ Taken from Bhutan National Human Development Report 2011, Sustaining Progress: Rising to the Climate Challenge

Table 3: Drivers and impacts of climate change in Bhutan.

Sector	Temperature						Erratic rainfall		Other factors		
	Pests & diseases	Melting of snow	GLOF	Shift in agro-ecological regimes	Forest fires	Droughts	Land slides	Flooding	Fog	Windstorms	Hailstorms
Agriculture											
Reduced Crop production	x					x	x	x		x	x
Loss of agriculture land			x				x	x			
Disruption of irrigation systems			x								
Loss of standing crops							x	x		x	X
Human health	x					x					
Drying of water sources	x					x					
Water											
Drying of springs and water sources						x	x				
Energy											
Reduction of water volumes for hydropower		x				x					
Power system disruptions			x				x	x		x	
Infrastructure											
Loss of homes and settlements, historical and cultural monuments			x				x	x		x	
Damage to roads, bridges & communications infrastructure			x				x	x			
Health											
Disruption of water and sanitation systems			x				x	x			
Loss of lives	x		x		x						
Loss of biodiversity											
Changes in distribution of fauna				X							
Loss of species	x				x	x					
Increased establishment of invasive species				X							

Given its topography, Bhutan has a vast variation in climatic conditions. This makes it equally vulnerable to a variation of climate change impacts.

While information on climate and vulnerabilities to climate change in Bhutan is limited, available studies indicate that climate change and variability will impact on all sectors, particularly water resources, agriculture, forestry and biodiversity, energy, glaciers and GLOFs and human health. There are also issues that cut across sectors within the realm of climate change and variability that requires attention of planners and decision makers.

5 REVIEW OF INTEGRATED LAND MANAGEMENT CONCEPT

5.1. What is ILM?

An integrated landscape approach encourages stakeholders to weigh competing demands and balance trade-offs between different land uses in a given geographical area. It involves those stakeholders in a collaborative management process to achieve their multiple objectives. ILM necessarily requires that stakeholders share evidence, information and best practices, and that a shared vision for sustainably managing the landscape is articulated and agreements are made to advance the vision (Landscapes for Food and Nature).

The key elements of integrated landscape management (ILM) from Scherr et al. 2013

- ★ Shared or agreed management objectives with multiple benefits from the landscape
- ★ Field, farm and forest practices are designed to contribute to multiple objectives, human wellbeing, food and fiber production, climate change mitigation, and conservation of biodiversity and ecosystem services
- ★ Ecological, social and economic interactions among different parts of landscapes are managed to realize positive synergies among interests and actors to mitigate negative trade-offs.
- ★ Collaborative, community-engaged processes for dialogue, planning, negotiating and monitoring decisions are in place
- ★ Markets and public policies are shaped to achieve the diverse set of landscape objectives and institutional requirements.

Literature review point out that the advantages of ILM include:

- ★ Generates solutions that achieve multiple objectives at once.
- ★ Improves inter-sectoral coordination and cost-effectiveness at multiple levels.
- ★ Empowers communities through multi-stakeholder processes and inclusive governance.
- ★ Enhances transboundary and regional cooperation.
- ★ Contributes to national and regional strategies for addressing climate change.

ILM approach is one that involves collaboration among multiple stakeholders from different sectors and social groups. It involves a process for achieving sustainable landscapes and inclusive rural transformation.

The work of Tropenbos International and EcoAgriculture Partners, 2017 describes Multi-

stakeholder platforms in integrated landscape initiatives to be characterized by general aspirations of (Kusters, K., M. De Graaf and L. Buck. 2016).

- * *Shared long-term goals and action plan which comprise of;*
 - » Sharing stakeholders' ideas about the future of the landscape,
 - » Discussing what are the common interests,
 - » Addressing potential areas of conflict,
 - » Identifying shared long-term goals.
 - » Translating defined common goals into a joint medium or short-term landscape action plan,
 - » Outlining practical steps towards the long-term goals.

- * *Practices and policies that advance conservation, livelihood and production objectives by way of;*
 - » Aligning conservation practices with the interests of other stakeholders in the landscape (e.g. compensation schemes, payments for environmental services, ecotourism).
 - » Working together to promote environmentally-friendly production practices and policies
 - » Aligning conservation practices and policies with livelihood and production objectives

- * *Improved monitoring and land-use planning by;*
 - » Stakeholders jointly monitoring developments in the landscape
 - » Collaborative monitoring and planning processes (e.g. land-cover changes, land-use practices, policies and investments)
 - » Working together, combining scientific and participatory methods
 - » Leading to adaptive land use planning processes

- * *Responsive institutions in the form of;*
 - » Stakeholders keep each other informed and learn from each other. This prevents different organizations being in the same landscape to be aware of each other's activities and lead towards efficiency.
 - » Collaborative platform which enable stakeholders to align and harmonize their policies, practices, activities and inputs as stakeholders use information from other stakeholders to make decisions

Therefore, ILM is an approach to land management that supports integration across sectors and scales, increases coordination and ensures harmonization of planning, implementation and monitoring processes at the landscape, sub-national and national levels (Landscapes for People, Food and Nature)

The “Landscapes for People, Food and Nature Initiative” is a global network of more than 70 conservation, development, and agriculture organizations who champion integrated landscape management at landscape, national and international levels. The initiative, through their “White Paper to discuss the benefits of using ILM as a key means of implementation of the Sustainable Development Goals” proposes ILM as a fundamental means of implementation of the Sustainable Development Goals.

Given that 16 out of the 17 Sustainable Development Goals (SDGs) have been integrated into the 16 NKRAs (except for SDG 14 life below water), the implementation of SDGs can be considered as being fully integrated into Bhutan’s 12th national development plan. Given that the GNH pillars, covering Economic, Social, Environmental and Cultural aspects, are more integrative than the SDGs which only cover Economic, Social and Environmental, consideration of SDG targets for Bhutan will always be integrated in Bhutan’s future development plans. If ILM is a fundamental means of implementation of the SDGs, it must also be one for effective implementation of Bhutan’s Gross National Happiness (GNH) based national development plans as well.

5.2. Experience of ILM implementation

A continental review by the Landscape for People, Food and Nature Initiative identified 365 programs in Africa, Latin America and the Caribbean, and South and Southeast Asia that are utilizing methods and practices that characterize them as Integrated Landscape Initiatives (ILIs). Results from its continental reviews showed simultaneous improvements in conservation, agriculture, livelihoods, and institutional capacity and coordination by using an ILM approach (Landscapes for People, Food and Nature).

5.2.1. Shared management objective

The shared management objective aspect of IL enables multiple benefits from the landscape.

Kenya’s new constitution mandated devolved governance to the county level and requires each county to develop and implement their own County Integrated Development Plan (CIDP) and establish inclusive consultative planning processes. Turkana County Government, the first county to adopt the ILM approach, refined their planning, decision making and allocation processes for annual development and investment plans and to revise their CIDP by including a process for;

- ★ Data, evidence and trends using the Resilience Diagnostic and Decision Support Tool developed by the ICRAF Geoscience Lab to determine priority landscape and livelihoods investments;
- ★ Collectively established criteria for testing investment allocations to maximize advances toward the county's development outcomes;
- ★ Community engagement in data collection, analysis, and use in local decision making.

They used the Stakeholder Approach to Risk Informed and Evidence Based Decision Making (SHARED) method which brings together processes, evidence, experience, and tools to assist in carrying out multi-stakeholder negotiations and decision making that are more inclusive, inter-sectoral and inter-institutional.

The SHARED process has been put in place to simultaneously achieve the CIDP, Arid and Semi-arid Land (ASAL) Resilience and Sustainable Development Goals and has contributed to enhanced landscape governance within the context of official administrative boundaries.

In 2005, facilitated by Integrated Centre for Integrated Mountain Development (ICIMOD), China, India and Nepal- three surrounding countries of Mount Kailash agreed to take an integrated holistic approach towards the different conservation and development issues within this unique landscape, which includes parts of the southwestern Tibetan Autonomous Region, China, the north-western part of Nepal and north-eastern part of Uttarakhand State, India. Through the initiative (Kailash Sacred Landscape Conservation and Development Initiative, KSLCDI), parties agreed to;

- ★ Develop a common approach to transboundary landscape management by incorporating different interests of the stakeholders and considered the varied national policies and capacities of the partner institutions in each country.
- ★ Several frameworks and strategies were developed in a consultative process to guide long term cooperation, clarify ways of working together, and determine which methodologies to use and the modes of implementation.
- ★ Initial implementation phase started in 2011 and will conclude in 2017.
- ★ Agreed on five overarching objectives for the Kailash Sacred Landscape during the collaborative planning process (a. improved livelihood systems, b. improved eco-system management for sustainable services, c. access and benefit sharing, d. long term socio-ecological monitoring, and e. regional cooperation, enabling policies and knowledge management systems).
- ★ The KSLCDI transcends geographical boundaries and has evolved through a participatory and iterative process into a transboundary initiative. It involves various local and national research and development institutions working in different capacities in various regions of the three countries.
- ★ Project plans were linked to national plans in each country.

5.2.2. Contribution to multiple objectives

In the past decade cities have begun to adopt regionally focused food action plans. Calgary, Canada, adopted Calgary EATS! Food Action Plan in 2012 as part of the Imagine CALGARY 100-year urban sustainability action plan which identifies food as a critical issue for Calgarians. Based on community surveys and policy gap analyses, the CalgaryEATS! plan visualizes the development of a sustainable food system in its entirety - from production to waste disposal. Six food-related targets – 1) producing 30 % of food consumed in the City locally by 2036, 2) improving accessibility, 3) developing a secure supply by raising consumption of locally produced food to 30 percent by 2036, 4) improving environmental sustainability by sourcing 100 percent of food from “sources that practice sustainable food production” by 2036, 5) ensuring a healthy society by ensuring that all Calgarians have access to “nutritious foods;” 6) fostering community development through urban agriculture while raising urban food production to five percent of local consumption by 2036. Identified key actors involved in the food system chain and identifies specific responsibilities of various actors in supporting and furthering the objectives of the food action plan. In 2016, Alberta’s food and beverage processing sales totaled a record \$14.6 billion and the sector employed more than 22,400 Albertans, while small scale local food sales in direct-to-consumer channels (farmers’ markets, restaurants and retail) have more than doubled since 2008 and are expected to exceed \$1.2 billion in 2017 (Planning & Development Report to on Community & Protective Services, December 2017).

5.2.3. Platforms for management of ecological, social, and economic interactions for the realization of positive synergies and the mitigation of negative trade-offs through spatial analysis.

Foreseeing and understanding implications of potential trade-offs and making informed decisions about the best course of action is an important part of the land use planning process. Integrated analysis and planning tools are critical to finding acceptable courses of action in the near-term and that will prove sustainable in the long-term. ILM provides an integrated, evidence-based, and risk informed decision-making process that can be supported by monitoring and evaluation metrics that recognize cross sector synergies. For instance;

Mapping in the Great Lakes Region of East Africa, Peru, and the Mekong River Basin to determine how commodity- driven scenarios of agricultural development affect biodiversity and ecosystem services at regional levels through United Nations Environment Programme (UNEP) and World Conservation Monitoring Centre (UNEP-WCMC).

Work by Biodiversity International with the Volta Basin Authority in West Africa to evaluate the potential impact of conservation and management actions in the basin on ecosystems and human-wellbeing where spatial models are built around the InVEST tool set to quantify the contribution of specific ecosystem services to attainment of SDG targets around food security, health and water across a landscape which can be used to evaluate outcomes of different national land use policy and infrastructure investment scenarios.

Planning and managing at a landscape scale require specific spatial such as maps of important areas for biodiversity, agriculture and hydrology in order to plan strategically for a multifunctional landscape that capitalizes on the synergies between different land uses.

5.2.4. Collaborative, community engaged planning, management, and monitoring processes.

Ensuring the effectiveness and ongoing reliability of stakeholder management requires structuring local institutions and agreements to support and perpetuate community and stakeholder empowerment.

In 1987, El Salvador, Guatemala and Honduras came to a tri-national agreement to finance scientific analysis, regional capacity and reforestation and flood control in Trifinio, which lies along the border of three countries. After nearly 30 years of cooperation in the area, reforestation and flood control measures progressed with little success due the centralized design of the agreement that excluded local communities from having a say in the management of the area. Challenges included extreme poverty; overexploitation leading to erosion and degradation of rivers and forests; and increased climate variability.

In 2014 Climate-Smart Territory (CST) model, a type of integrated landscape management was adopted to address the gap. The model assumes that rural people depend heavily on natural resources and are therefore affected by the quality of ecosystems. The management of these resources should ensure involvement, and buy-in, of local actors operating within a geographic area. By supporting multi-stakeholder platforms, the initiative built the capacity of local peoples to improve the management of natural, human and social capital, effectively increasing climate change resilience. The input of local people, who have intimate knowledge of climate change impacts in the landscape, offered insights on how best to target investments, how to build capacity for land use planning and how to support climate change resilience on-the-ground

To enable monitoring and evaluation of impacts and changes at a landscape scale, metrics that measure multiple outcomes, including agricultural, environmental and livelihoods outcomes, across broad scales are needed.

5.2.5. Enable re-configuration of public policies, markets and investments to achieve diverse landscape objectives.

While policies, markets and financial investments create the context for ILM, ILM also shapes these conditions. Hence ILM generates to overcome political, financial, and market barriers to sustainable development. Coordinated landscape strategies and plans create synergies among actions at different levels and enable efficient use scarce financial resources, help shift market incentives towards sustainable development, reduce environmental and social

risks for businesses operating in the landscape. It provides a stable and long-term system of landscape governance, which helps create resilient institutional arrangements, decision-making processes, and underlying values in which multiple actors can pursue their individual and shared interests.

For instance, Imarisha Naivasha, Kenya were affected by poor agriculture practices, over-abstraction of water, and uncoordinated resource management which strained the environmental health of the lake Naivasha basin including the floriculture, horticulture, agriculture, and tourism industries that support the majority of the local economy

The Imarisha Naivasha Board was created to coordinate restoration by bringing diverse stakeholders together, including local government, non-governmental organizations, commercial flower growers, small scale farmers, pastoralists, community groups and citizens, to develop an integrated basin management plan and cooperate to restore the water catchment area. The stakeholders adopted the “Lake Naivasha Integrated Management Plan” laying out the goals of development in the basin and a “Sustainable Development Action Plan” outlining specific objectives to be accomplished in five-year increments.

By including all stakeholders, interventions are targeted more strategically. Coordinated response to various environmental and social risks identified synergistic investments and interventions, lowered costs for both mitigation and adaptation. Federal government support for the initiative has lowered barriers to multi-jurisdictional management and helped convene key stakeholders.

SABMiller, the world’s second largest brewer, found it needed to implement a landscape approach to secure water and its reputation in South Africa, and around the world. The company faced operational, reputational and regulatory risks to the business based on water quantity and quality concerns, including risks to its agricultural supply chain from water scarcity. They determined that the most appropriate scale to address shared risk was with local communities, governments, stakeholders and businesses involved in the water catchments and ecosystems.

The company looked “beyond the breweries”. It considered the landscape and communities where it operates to identify shared responsibilities and to craft shared solutions. They focused on establishing a farmer-led water user initiative and a groundwater monitoring process and worked with municipalities to improve water treatment facilities. Through the Public Private Partnership model based on ILM,

- ★ Water scarcity for SABMiller’s hops suppliers could increase production costs at least \$700,000 per year. This was roughly SABMiller’s cost for collaborative action.
- ★ By mitigating this risk, SABMiller contributed to the creation of 50 jobs, benefitting 900 people in a region faced with high unemployment.

- ★ This created reputational benefits and helped SABMiller nurture a local workforce that it depends on for more skilled labor in hop cultivation. The intervention also promoted local ecosystem resilience.

5.3. Institutional Support needed for ILM

Laws and regulations on natural resource rights, planning and management should support stakeholders in establishing and maintaining the structures or processes necessary to implement ILM. Land-use and development plans should be multi-sectoral in scope. However, such a cross sector approach touches upon mandates and powers of different ministries and their agencies. Hence, it will require a consolidated spatial and thematic planning policy to enable different ministries to coordinate their planning activities.

- ★ In February 2015, Colombia's President Juan Manuel Santos approved Decree No. 280, which established the creation of the Inter-Agency Commission for the Preparation and Effective Implementation of the Post-2015 Development Agenda and the SDGs including the Ministries of Foreign Affairs, Environment and Sustainable Development, and Finance, as well as the Department for Social Prosperity, the National Administrative Department of Statistics, and the National Planning Department. It reflected an acknowledgment of the cross-cutting nature of the new agenda and the inter-sectoral coordination needed to deliver it. At the same time, the country has used the SDG framework to highlight its own national priorities.
- ★ Rwanda - adopted a national landscape restoration strategy with a goal of improving rural livelihoods while enhancing forest and land resources,
- ★ Ethiopia - is overcoming chronic food insecurity with landscape approaches to agricultural restoration and water management.
- ★ Australia - National Landcare Program has mobilized over 5,000 community groups to sustainably manage Australia's productive landscapes.
- ★ Colombia - public-private partnerships for integrated watershed management are improving water quality and lowering municipal water treatment costs while also reducing business risks for food and beverage companies.
- ★ Indonesia - Adopted integrated landscape approaches to conserve forest in areas of rapid agricultural development. These programs can and should be replicated in many more countries around the world.

For ILM implementation, appropriate resource rights and tenure systems must be in place with secure property and resource access rights for individual land users to invest in long-term strategies. All stakeholders must share the power to decide how resources are used for just decisions to arise multi-stakeholder collaboration.

5.4. Finance for ILM

5.4.1. Types of investments required

Successful ILM requires the appropriate blending of asset and enabling investments and financing institutions with the experience to recognize the opportunities in both spheres.

- ★ Asset investments are considered as those that generate tangible financial, environmental or social returns including sustainable practices on-farm, restoration or protection of forests, and large-scale green infrastructure, environmentally and socially responsible enterprise. Asset investments create tangible value that is returned back to the investor or land manager.
- ★ Enabling investments - Investment that supports the process, governance or policies crucial to the development of ILM, stakeholder engagement and cooperation, appropriate legal and regulatory framework, knowledge and capacity, development of incentive mechanisms. It lays the institutional and policy foundation for asset investments by generating incentives to invest in a particular activity, often without expectation for financial returns.

Challenges in mobilization of ILM investments include short time horizons required for returns by most investors, a mismatch between investment stake and size of investment opportunities, and high investment risk versus return potential.

ILI financing often also requires appropriate market-based incentive mechanisms such as higher premiums for eco-certified products, payment for the provision of ecosystem services, or direct subsidies or taxes on certain practices and incentives at the farm level such as enhanced access to the capital to make the necessary changes.

5.4.2. Strategies for attracting investments in ILM.

- ★ Develop, quantify and communicate the ILM business cases
- ★ Establishment of enabling conditions for asset investments.
- ★ Coordinate sectoral investments at the landscape scale to achieve inclusive green growth.
- ★ Foster partnerships between financial institutions and landscape stakeholders based on mutual benefits and trust
- ★ Use public finance to reduce private risks through risk guarantees, seed capital and catalytic funding
- ★ Apply investment standards and guidelines to incentivize ILM (higher premiums for eco-certified products, payment for the provision of ecosystem services, or direct subsidies or taxes on certain practice) investments to help investors evaluate risks and to minimize

social and environmental impacts.

- * Consumers and brand manufacturers increasingly demand producers of raw materials to demonstrate sustainability through standards compliance, adherence to national regulations, and reduced greenhouse gas (GHG) emissions. The Consumer Goods Forum (CGF) with than 400 retail and brand manufacturers globally pledged in 2010 to mobilize resources within member businesses to achieve zero net deforestation by 2020. Also, the Tropical Forest Alliance (TFA) 2020 formed as a public-private partnership with the Governments of the United States, United Kingdom, Norway and the Netherlands and numerous NGOs seeks to work with private sector actors and address deforestation pressures in four key commodity value chains of palm oil, soy, pulp and paper, and beef. Therefore, production standards and certification can be used as a tool to implement ILM by the private sector. Standards and certifications demonstrate that products have been produced with sustainable practices. Standards can enable companies to evaluate environmental or social interventions beyond the farm-scale, create partnerships for shared problem-solving, and pilot ILM concepts. Commonly used production standards include the Roundtables on Sustainable Palm Oil, Soy, Biofuels, and Bonsucro (sugar), the Sustainable Agriculture Network (SAN), Rainforest Alliance Certification, Fairtrade, etc.
 - » The Rainforest Alliance worked with Olam in Ghana's Juabeso-Bia Region to apply an ILM. Thousands of cocoa farmers and community members were trained on climate-smart land-use practices for SAN certification and SAN Climate Module verification. Olam International's involvement helped achieve the scale necessary, increase productivity and income for farmers, enhance resilience of their production systems, conserve biodiversity, and reduce supply chain risks.
 - » The 36 tea purchasing member companies of The Ethical Tea Partnership (ETP) operating in Kenya, India, Indonesia, Sri Lanka and China have created the ETP Global Standard. The standards contain principles and action steps for tea estates to adopt consistent practices around social issues, such as gender, harassment, wage levels, child labour, soil management, reduction in agrochemical use, waste management, ecosystem management. The ETP standard helps producers attain international certifications such as Fairtrade, Rainforest Alliance and UTZ Certified.

A description of the investment vehicles, mechanisms and outputs for ILM investments as adapted from Elson (2012)⁶ is presented in the following figure.

⁶ Taken from Shames, Seth, Margot Hill Clarvis, and Gabrielle Kissinger. "Financing Strategies for Integrated Landscape Investment: Synthesis Report," in Financing Strategies for Integrated Landscape Investment, Seth Shames, ed. Washington, DC: EcoAgriculture Partners. 2014.

Enabling Investment				Asset Investment			
Investor	Government	Donors Philanthropists	Rights-holders Product investors, Philanthropists	Private sector companies	Philanthropists	Banks	Private investors and equity funds
Vehicle	Project Policy	NGOs, Research & policy institutions	Small business Intermediaries	Capital Expenditure Research & Development	Capital investment	Financial services	Risk-adjusted return on capital
Mechanism	Public expenditure: infrastructure Fiscal reform Regulatory reform Subsidies	Grants: Organisational & policy development Institutional reform	Enterprise Philanthropy Grants & seed funding to demonstrate validity of business model	Purchase of capital assets	Impact investment via equity, loans	Loans secured against assets	Investment via equity or loans
Output	Public Goods			Private Assets			

5.5. Implementation of ILM approach in Bhutan

Concepts	Focus	Remarks
Integrated Conservation and Development Programs (ICDP)	Biodiversity conservation projects with a rural development component	ICDPS have been implemented as components in projects supporting Parks
Community-Based Natural Resources Management (CBNRM)	Community action for natural resources management	CBNRM have been implemented as components in projects supporting Parks and in RNR integrated research actions
Integrated Natural Resource Management (INRM)	Participatory learning, action research and the integration of research and management	Applied in RNR Research Centres
The Ecosystems Approach - approach to implement the Convention on Biological Diversity (CBD) – as understood to be integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way	Interdependence between humans and ecosystems; need to operate across a range of spatial scale; need for participation in decision-making, and adaptive management	Considered in the NBSAP – considering biodiversity conservation and utilization Also considered in the Bhutan For Life

Concepts	Focus	Remarks
Landscape Ecology	Functional relationship between land units in a landscape; Co-evolution of natural and cultural subsystems over time	Incorporated in Bhutan For Life, Parks and Protected Areas
Protected Landscape Approach - from IUCN	Stewardship of people living in the landscape; Cultural and natural values of landscapes are inextricably linked; Communities living in or near these landscapes are central to sustaining landscapes	The PAs approach allows communities to live in the PAs. Overall development guidance by GNH considers culture, governance, economic development as well as culture HANAs project considering highland landscape as a territorial unit. EU funded Wang Watershed Project in Western Bhutan, Swiss funded ECRDP, IFAD funded FESZAP/SEZAP in the East 12 FYP Guidelines call for Coordination, Consolidation and Collaboration (Triple C) as fundamental principle underpinning all the goals, strategies and programs of the plan.
Farming Systems Approach – from FAO	Cross-sectoral approach to land-use planning; Conservation and development outcomes depend on the daily decisions of local land users in a farming system; Combination of individual farms that share a resource base and certain basic characteristics	Land Use Planning Project, 1990s
Area based approach	Sector based approach across group of Dzongkhags	Applied in FEZAP, SEZAP CARLEP, TFDP, ECRDP, HANAs
Dzongkhag based approach	Integrated sustainable development	ISDP, Zhemgang
SDG approach	Out of 143 SDG targets, 134 SDG targets were included in the 11th FYP, excluding targets related to SDG 14 - on Oceans and SDG 17 - on Means of Implementation.	12 FYP Guidelines: 16 NKRA are closely related with 16 of the 17 SDGs and close to 100 Targets and indicators of SDGs are integrated into the NKRA and KPIs

The concept of ILM has been implemented in bits and pieces in the past within the overall development approach in Bhutan as indicated in the above table. The RNR concept, which is slowly disintegrating, is by itself an element of ILM in the context of integrated planning. These concepts have not been able to find a strong foundation within the overall policy and planning landscape within the government.

6 REVIEW OF KEY NATIONAL POLICIES RELATED TO CLIMATE CHANGE AND ILM

Globally there is evidence of increasing climate change and the increased frequency, severity, and geographic spread of extreme weather events and natural disasters (UNISDR, 2011; IPCC, 2012), which identify the need to enable climate change adaptation (CCA), climate change mitigation (CCM), and disaster risk management (DRM) explicitly in into national, sectoral, and local development strategies, policies, programs and projects. The focus on policies are therefore necessary since development policy critically shapes carbon emission paths, the ability to develop sustainable adaptation and mitigation options, and to build overall adaptive capacity.

The working definition of resilience provided by IPCC in the context of climate change is considered as the 'ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner' (IPCC, 2012). Further the FAO defines the term "landscape" in reference to "relatively large areas of land containing mosaics of land uses and abiotic, biotic and human elements. While agriculture, forestry, soil protection, water supply and distribution, biodiversity conservation, pasture and other land uses are interlinked they are often dealt with in relative isolation of each other. A landscape approach is an integrated approach that considers and involves the perspectives, needs and interests of all stakeholders. Its purpose is not to replace sectors or force them into a single approach but rather to reinforce them by increasing their interactions with other sectors with a view of conserving the integrity of landscape components. Landscape approaches are increasingly seen as indispensable in developing sustainable land-use and livelihood strategies in rural areas (FAO, 2012). Therefore, it is an approach that integrates the management of land, water, biological resources and human interactions over space in a way that promotes sustainable and equitable development.

Complicated interactions between agriculture, forestry, soils, water, biodiversity, pasture, other land uses and climate over landscapes would mean that efforts to manage any of these in isolation to achieve inter-related objectives of food security, livelihood development and climate change mitigation will be difficult. The shift from a sector-oriented planning to a landscape-based approach will need to incorporate the perspectives of all stakeholders, their rights and management regimes into plans, programs and policies. Therefore, a climate resilient integrated landscape approach is one that enables the ability of the integrated spaces and its components to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner.

Humans and their current activities, which are guided by national and local policies, are active components of landscapes and support the full suite of landscape multi-functionality. For the purpose of enabling integrated forest and agricultural landscape management and climate change resilience, policies should enable strengthening resilience of landscapes.

6.1. Policies related key climate change vulnerable sectors and ILM

The Constitution of Bhutan: Article 5.1 of the constitution of the Kingdom of Bhutan requires every Bhutanese is to be a trustee of the Kingdom's natural resources and environment for the benefit of the present and future generations. Article 5.2 mandates the Government to secure ecologically balanced sustainable development and ensure a safe and healthy environment including the need to maintain a minimum of sixty percent of Bhutan's total land to be maintained under forest cover for all time (Article 5.3). The constitution further requires the state to apply the principles of state policy "to ensure a good quality of life for the people of Bhutan as articulated in Article 9.1 and to "Promote those conditions that will enable the pursuit of Gross National Happiness" as articulated in Article 9.2.

Renewable Energy Policy, 2011: emphasizes to incentivize communities to operate renewable energy schemes and also encourage supply and use of energy efficient appliance. Investors in renewable energy is exempted from payment of corporate or business income tax for a period of ten years applicable till the year 2025 and exemption from payment of all import duties and Bhutan sales tax on import of plants and equipment during the construction period.

Economic Development policy, 2016: Towards fulfilling its pledge of Bhutan to remain carbon neutral at all times, the policy encourages development of hydropower and alternative renewable energy projects through international mechanisms/frameworks on climate change to the extent possible. In this respect, the policy envisions co-operating with interested parties in the reduction of greenhouse gases to mitigate climate change by actively participating in the development of environmentally benign renewable energy initiatives. The Royal Government shall give priority to develop solar and wind power and its integration with the national grid and provides incentives to promote roof top solar water and space heating systems. However, the policy lack articulation of incentives for specific climate related initiatives and technologies in production, construction and services sectors.

Fiscal Incentives, 2016: Provides tax rebate of up to 15% of the up-gradation expenses for adopting modern environmentally-friendly technologies that meet the criteria, specification and standard prescribed by the law and upon letter of recommendation from NECS. Exemption on ST & CD are provided on plant & machinery for solar, wind, biogas and other renewal energy up to December 2020

It includes income tax holiday of 5 years to newly established and licensed waste management/recycling entities including scrap dealers as well as ST & CD exemption on plant and machinery for waste management/recycling industry up to December 2020 upon recommendation letter from NECS.

The policy does not specifically provide incentives for addressing climate change. However, the extent of climate resilience that the policy could address would depend on recommendations from the NECS. Hence the recommendation from the NECS becomes critical in providing incentives for climate resilience.

National Forest Policy, 2012: Integration of climate change, disaster management and new challenges and opportunities in forest governance and management is a salient feature of the policy. The policy provides for effective and integrated watershed management, maintain and improve water and watershed conditions and contribute to sustainable livelihoods through provision of watershed services. In doing so, the policy highlights also the need to manage catchment areas in an integrated and holistic manner involving both upstream and downstream stakeholders with good vegetation cover for continued supply of water and watershed services for downstream beneficiaries. The plans and programs of the DoFPS includes development and implementation of national REDD+ strategy, initiation of national forest Monitoring, Reporting and Verification (MRV), Watershed assessment, Development of a National PES framework.

Within the management of SRFs, the policy expresses the need to carry out research and generate knowledge, information and technology that support policy implementation and development including integration of climate change issues. It calls for minimizing the impacts of climate change on sustainable forest management and development through appropriate adaptation and mitigation measures. However, it is not clear on who and how sub sector adaptation and mitigation measures are adopted at central as well as at local level in a coordinated manner and who is responsible for research and knowledge management and dissemination on climate change.

This policy also calls for a landscape approach by specifying a requirement to manage Government Reserved Forest land based on forest functions at landscape level in consultation with local communities and the other key stakeholders. The policy specifies identifying parts of the landscape, among others for production, protection of cultural sites, watershed services, biodiversity, community use areas and areas with important environmental services such as riparian strips and steep or erosion prone areas. The landscape approach in this policy encompasses aspects related to forestry governance and management. There is a need to accommodate perspectives from agriculture, soil protection, water supply and distribution, pasture and other land uses, which can be ideally on-boarded through the Dzongkhag machinery as it has multi sector composition. However, the DoFPS does not

have a sectoral representation at the Dzongkhag level. This separates the Dzongkhags and the DoFPS programs through whom coordinated community engagement can be enabled in terms of climate vulnerability assessments, planning and implementation of activities to enable landscape level climate resilience.

Water Policy, 2002: recognizes floods, especially glacial lake outburst floods (GLOF) have increasingly become a threat for the country due to global warming brought about by climate change and that it will have serious impact on life, properties and future infrastructures development. The policy takes cognizance that natural flow regulating capacity of the glaciers will decrease and sustained flow of water of good quality depends on the integrity of the watershed. It emphasizes on water resources management within river basins and aquifers, including both upstream and downstream water users. It calls for an integrated approach for effective management of water resources and provides directive to protect of all forms of water resources. The policy seeks sound watershed management through extensive soil conservation, watershed area treatment, conservation of forests and increasing the forest area to reduce the incidence and intensity of floods.

It calls for a national adaptation strategy for climate change, including a national flood management and mitigation strategy, disaster management plan including forecasting, preventing, evacuating and mitigating measures to be developed for flood prone basins, institutional arrangement for water resource management, information management, human resources management and applied research and trans-boundary water issues. However, the policy does not include adequate provisions for monitoring and evaluation of the actions as desired by the policy. The role of monitoring and evaluation of programs on water resources implemented by the different sub-sectors has been assigned to Bhutan Water Partnership, which does not have a legal and operational strength to carry out these functions.

The Food and Nutrition Security policy, 2012: recognizes that climate change is likely to have a serious effect on the Bhutan's food production system in many ways. Gradual change in mean temperatures and precipitation patterns and changing pattern of flash floods and high intensity rains causing damage to irrigation channels and agricultural land are some examples. FNS policy thus calls for developing and implementing adaptation and mitigation measures for longer-term climate and environmental changes (enhance resilience to biotic and abiotic stress of agriculture and livestock production). As part of achieving higher and sustainable growth rates in the agriculture sector, the policy promulgates green and climate smart agriculture.

Climate resilient food security, agriculture and livestock productivity programs are included in the RNR sector plan and elements of sanitation and drinking water are included in health sector plan. Local actions on production, marketing and storage are implemented in local

plans and climate resilient actions implemented through central projects. Drinking water and sanitation are also included in local actions of health sector.

However, the climate smart commercial PPP farming ventures is one area where there is lack of clarity in terms of roles and responsibilities of concerned stakeholders particularly with respect to licensing, land, credit and technical support.

On disaster management, the policy provides affordable crop and livestock insurance schemes by 2018 and adequate compensation budget for disaster related losses to the farmers till such time the insurance schemes comes into effect, the Royal Government shall provide. However, insurance schemes have not been practically possible due to the inherent complications associated with viability from a business perspective. Appropriate models of insurance schemes need to be identified prior to implementation on-ground.

The framework for mainstreaming ECP requires all central and local Government agencies to formulate ECP-integrated development plans and programs and gear towards achieving a carbon neutral development. However, concrete linkage to sector plans at local level are not defined. The Mainstreaming Reference Group (MRG) actions at the central level are mainly on policy review and capacity building. While the MRG has the potential to integrate cross sector issues in sector plans at the local level its role and continuation in the sector development planning is not clear.

National Irrigation Policy, 2012: Empowers beneficiaries on planning, implementation, operation and management of irrigation and aims to pursue new approaches to sustainable irrigation infrastructure development and maintenance; As for water management, the policy aims to bring about environmentally sustainable IWRM approach in irrigation development and reliable and efficient water use for intensification and diversification of irrigated crop production. It considers inter-sectoral planning and management of water resources as a matter of principle for irrigation development and calls for promotion of appropriate conveyance technologies to reduce water wastage and awareness on proper on-farm water management. However, the policy does not provide for climate resilient designs and appropriate technologies that enable climate proofing of the irrigation infrastructure.

RWSS Sector Policy: Collaboration with other sectors such as agriculture, environment and power to promote integrated water resources management in Bhutan is considered as a highlight of the policy. However, arrangements for such integrated and planning and implementation at operational levels does not exist. The policy provides for a special fund to repair damage of water supplies through a major natural disaster so that Dzongkhags can make a special effort to make repairs within the shortest possible time.

While the formulation of all national policies has undergone a through policy formulation and

screening process, there are differences among the policies in terms of structure and content. The review finds that there is no standard policy structure and most policy documents are weak on assigning responsibilities to lead in policy implementation, monitoring and evaluation. As a result, policy intentions are often times not followed through; capacity needs are not identified and regular reporting mechanisms on status of policy implementation are not established.

Very few sections of existing policies address climate change and mitigation or prescribe ILM as a planning approach. Further these limited elements in the policies are scattered, disjointed and are not exclusively devoted to climate change adaptation and mitigation. Where climate specific policy elements are articulated, they are weak in terms of assigning responsibilities to lead in policy implementation, monitoring and evaluation.

Although climate change impacts are experienced across the country and considered important, an inclusive and comprehensive climate change policy and legislative framework that creates, or sets out the mandate for, a leading institution to spearhead the nation's efforts in climate change adaptation and mitigation does not exist.

At the moment, there is no clear national policy on climate change except for few specific projects, strategies and initiatives aimed at addressing climate change such as NAPAs, RNR SAPA, NDC, and National Strategy and Action Plan for Low Carbon Development, 2012.

6.2. Legislations related to climate change and planning

National Environment Protection Act, 2007 (NEPA): outlays principles and legal framework that has implications on forest governance and management. It requires a person taking natural resources from the environment or deriving economic benefits to ensure sustainable use and management of those resources and their ecology. Likewise, a person polluting the environment or causing ecological harm is responsible for the costs of containment, avoidance, abatement, medical compensation, mitigation, remediation and restoration. A person using or extracting natural resources shall be liable to pay for ecosystem/environmental services. The Act calls for conservation of natural resources to be based on a participatory approach aimed at achieving an equitable sharing of the costs and benefits of conservation among resource users. It also provides for promoting the use of clean energy and alternative technologies in order to reduce use of fuel wood/timber from primary forest. Such innovative practices of reducing the burden on natural resources shall be supported with incentives such as provision of:

- ★ Tax incentives for environmental services and/or manufacture of environmentally friendly products through reductions in customs and other duties for the import of environment friendly and energy efficiency technologies;
- ★ Grants or co-financing for civil society or public sector environmental protection or nature conservation projects;
- ★ Incentives for reducing, recycling and reusing waste.

The Act promulgates precautionary principle and the “no-regrets” approach to taking beneficial action to safeguard against climate change and the “polluter pays” principle as well as payment of ecosystem services to pay for use of resources and damages to the environment. It provides the right to information and the engagement of all stakeholders and requires conservation and protection of wetlands, alpine regions, watersheds, and other vulnerable ecosystems in addition to the existing protected areas.

Environment Assessment Act, 2000: requires that the Royal Government shall ensure that environmental concerns are fully taken into account when formulating, renewing, modifying and implementing any policy, plan or program and that issuance of an environmental clearance shall be prerequisite to the issuance of a development consent. Projects that do not require development consent may commence only after receiving environmental clearance.

The Biodiversity Act of Bhutan, 2003: provides for conservation and sustainable use of biochemical and genetic resources, equitable sharing of benefits from the use of genetic resources as well as transfer of technology and capacity building at national and local levels for conservation and use of biological diversity.

The Water Act of Bhutan, 2011: assigns the NEC to prepare and continuously update of a National Integrated Water Resources Management Plan (NIWRMP) for the 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 within a basin and to prepare River Basin Management Plans (RBMP). The NIWRMP shall serve as a binding guideline for the preparation of River Basin Management Plans. For the purpose of proper and effective protection and management of water resources at Dzongkhag level, the existing Dzongkhag Environment Committee shall also function as the Dzongkhag Water Management Committee. The act accords water use priorities as – 1) 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 Disaster Management Act, 2013: Establishes the National Disaster Management Authority at the central level chaired by the Prime Minister; formalizes the establishment of Dzongkhag Disaster Management Committee in all dzongkhags and sub committees at Dungkhag and gewog levels. The implementation of the Act will necessitate a great deal of capacity development for institutions at various levels, especially of local governments, non-state actors and local communities.

Local Government Act of Bhutan, 2009 and Local Government (Amendment) Act, 2014: Decentralizes approval of local plans and budgets as well as its Monitoring & Evaluation

(M&E) to local governments - the Dzongkhags, Gewogs and Thromdes exercised through the Dzongkhag Tshodus, Gewog Tshogdes and Thromde Tshogdes respectively. Therefore, activities related to climate resilience at local levels, like any other activity, will also have to be planned, approved and its implementation coordinated and monitored by local governments.

The laws of Bhutan that related to climate change and landscape management, provide strong legal basis for protection and sustainable management of the environment, equitable distribution of costs and benefits of conservation, the need for integrated and inclusive planning and different levels and for disaster management and mitigation. However, the existing Bhutanese laws do not explicitly highlight addressing climate change.

6.3. Guidelines, regulations and tools related to climate change and development planning

The National Disaster Risk Management Framework, 2006: describes seven components of: 1) appropriate institutional and legislative framework defining the mandates and inter-relationships of various organizations across sectors and administrative levels; 2) Hazard, Vulnerability and Risk Assessment to identify the probability of occurrence of various hazards in a specified future time period, as well as the intensity and area of impacts; 3) Early Warning Systems to generate advance warnings and thus improve capacity of decision makers to take required action prior to the occurrence of a disaster; 4) Disaster Preparedness Plans to prepare multi-hazard disaster preparedness and response plans at national, Dzongkhag, Dungkag (sub-division of district) Gewog and Thromde (township) levels to ensure requisite levels of preparedness and functioning of sectoral response plans; 5) Mitigation and integration of disaster risk reduction in development sectors; 6). Public Awareness and Education to establish partnerships with media and community organizations for dissemination of disaster risk management agenda and incorporation of the same in education curricula to promote a people-centric approach to mitigate disaster risks and 7) Capacity Development to create a cadre of trained and skilled professional and disaster management practitioners with requisite knowledge and capacity to initiate and implement disaster risk management programs.

Environment Assessment Guidelines, 2012: Describes generic steps and good practices in EIA. It also lays out procedures for scoping of projects, environmental impact assessment and for preparation of Environmental Management Plans. However, it lacks provisions to safeguard proposed projects from climate change impacts.

Guidelines for farm road development, 2012; Provides operational details of farm roads planning, budgeting and implementing process. However, the guidelines do not cover any specific aspects that enable assessment and integration of climate proofing of farm roads. This creates a gap in terms of integrating resilience of farms roads to climate change impacts in the future.

Bhutan Building Regulations, 2002; provides details on the legal permissions and utility connections; use of space; structural controls focusing on stability of the buildings; architectural controls focusing on traditional elements of the designs, lighting, ventilation, safety, drainage, floor space, drainage and sanitary requirements; planning controls such as height, basement, set back requirements, basement, parking and paintings. While elements related to water and sanitary management are included, the building regulations as well as codes do not have provisions for climate change such as minimizing energy consumption and conservation, climate friendly insulations, flood and land slide management in the regulations.

Regulations for Environment Clearance of Projects, 2001: The regulations provide delegation of power to relevant sectors for issuance of environmental clearances and prescribes procedure and requirements to be fulfilled prior to issue of environmental clearance. The environment assessment report format of a proposed project requires project description; alternatives to the project; information on existing environment at the project location; assessment of positive and negative impacts of the project and mitigation measures. There is scope for consideration of impacts on the project from climate change and its mitigation measures in order to enable resilience of proposed projects to impacts of climate change.

The Water Regulations of Bhutan, 2014: Requires the NEC to establish River Basin Committees (RBCs) within a basin for the purpose of proper management of water resources and to enhance its economic values through River Basin Management Plan (RBM) for the basin inclusive of details on flood risk zones and risk management plans. It also requires every Dzongkhag Administration to prepare an Integrated Water Use Management Plan for the Dzongkhag based on the NIWRMP for adoption by the Dzongkhag Tshogdu depending on changing economic activities, urbanization, farming patterns, climatic change, demographic projections and changing lifestyles in respective locations. The regulations mandate the MoEA to conduct a study on glacial dynamics for events like Glacial Lake Outburst Flood in connection with hydropower development

It requires the MoHCA to develop and maintain an efficient information dissemination system to inform the public in times of water related natural disasters and coordinate on preparedness and mitigation measures to be taken during such events. The water regulations promulgate for water eco-efficient infrastructure for both drinking water and irrigation schemes and where feasible promulgates hydropower projects to consider for multiple uses such as drinking water, irrigation and recreational purposes. This aspect reflects climate resilient intention of the regulations. However, operationalization of this intention is not specified in the RWSS policy or in the national irrigation policy.

The existing guidelines, regulations and tools that are related sectors most vulnerable to climate describe protocols and standards to minimize environmental impacts in general.

However, they do not also have explicit provisions, standards, tools or suggested technologies to enhance climate resilience of activities within the concerned sectors.

6.4. Strategies and studies related to climate change and development planning

Bhutan 2020 - A Vision for Peace, Prosperity and Happiness: Outlines the country's development goals, objectives and targets with a twenty-year perspective to maximize GNH. It enunciates Bhutan's 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. It recommends for preparation of master plans for watershed areas and introduction of EIAs for all physical infrastructure projects.

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

Nationally Determined Commitments: Bhutan has reconfirmed its target to remain carbon neutral at the COP 21 in Paris and committed to maintain a minimum of 60 percent of land area under forest cover. Based on the information from the NAPA process as well as vulnerability and adaptation assessment in the Second National Communication, other plans and programs of sectors, priority adaptation actions identified in Bhutan's NDC, are as follows⁷:

- ★ Increase resilience to the impacts of climate change on water security through Integrated Water Resource Management (IWRM) approaches.
- ★ Promote climate resilient agriculture to contribute towards achieving food and nutrition security.
- ★ Sustainable forest management and conservation of biodiversity to ensure sustained environmental services
- ★ Strengthen resilience to climate change induced hazards
- ★ Minimize climate-related health risks

⁷ Data taken from Bhutan's INDC document submitted to UNFCCC at CoP21, Paris.

- ✦ Climate proof transport infrastructure against landslides and flash floods, particularly for critical roads, bridges, tunnel and trails
- ✦ Promote climate resilient livestock farming practices to contribute towards poverty alleviation and self-sufficiency
- ✦ Enhancing climate information services for vulnerability and adaptation assessment and planning
- ✦ Promote clean renewable and climate resilient energy generation
- ✦ Integrate climate resilient and low emission strategies in urban and rural settlements

The RNR Sector Adaptation Plan of Action (SAPA), 2013: serves as a broad framework for channeling interventions and funding to enhance resilient capacity of the sector to the impacts of the climate change. It recognizes that at present there are very limited climate resilient varieties of crops and fodder and that selection and adaptation of crop and fodder varieties resistant to biotic and abiotic stress are limited. Farmers continue to depend on traditional varieties that are highly vulnerable to pest and disease, drought and heat stress. In the face of significant impacts on the agriculture, livestock and biodiversity sectors, which provides employment to the majority of labour force in Bhutan, there is compelling need for implementation of climate resilient agriculture, livestock and biodiversity management practices. It is intended to enable implementation of RNR adaptation plans for responding to changing and uncertain climatic conditions; The SAPA identifies seven Adaptation Action Areas (AAA) as follows:

- ✦ Food Security and Poverty Alleviation;
- ✦ Forest and Biodiversity Conservation;
- ✦ Governance and Sustainability;
- ✦ Forest and Ecosystem;
- ✦ Natural Disasters and Infrastructure;
- ✦ Research, Education & Advocacy; and
- ✦ Water Resources Use, Access and Management

National Strategy and Action Plan for Low Carbon Development, 2012 has been primarily prepared in support of Bhutan's international commitment to remain carbon neutral. 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 Biodiversity Strategies and Action Plan (NBSAP), 2014 has been crafted with a vision to create enable a happy and resilient Bhutanese community, nurtured by rich spiritual and cultural traditions, valuing biodiversity and living in harmony with it. The NBSAP targets to rehabilitate priority degraded ecosystems and habitats through a landscape approach. It takes note of concern of accelerated establishment of invasive alien species (IAS) due to changing climate and native plant species such as *Potamogeton distinctus* becoming invasive impacting on reduced reduce rice yield by as high as 35 per cent. It also takes cognizance of the need to urgently understand the genetic diversity of Bhutan and its loss in the face of emerging challenges such as climate change and loss of resilient farming systems.

Out of the 20 national targets of NBSAB almost all the targets and actions reflect adaptation to climate change as indicated in targets 9, 11, 12, 13, 14 and 15. Target 10 of NBSAP aims to identify potential impacts of climate change on vulnerable ecosystems and to strengthen adaptation measures. The actions under the target include;

- ★ Developing a national network of long-term climate monitoring stations for the generation of comprehensive climate data.
- ★ Promoting inter-disciplinary research on climate change, biodiversity, and eco- systems.
- ★ Instituting a national mechanism to collate and share data and information generated from research for the development and implementation of adaptation measures and policy decisions.
- ★ Conducting systematic awareness and educational programs on the impacts of climate change on biodiversity.
- ★ Developing a policy on climate change with special focus on food security, biodiversity and water.
- ★ Developing appropriate long-term ecosystem-based adaptation measures to minimize impacts of climate change on vulnerable ecosystems, biodiversity and communities.
- ★ Strengthening implementation of immediate targeted actions for prioritized ecosystems.
- ★ Integrating long-term ecosystem-based adaptation measures into national plans and programs.

Addressing climate change and its impacts are more pronounced through strategies and actions plans. However, the relevant strategies do not provide clear linkages across sectors in addressing climate change, financing strategies, clear communications and reporting mechanisms and in how to integrate within the mainstream development planning. The strategies also do not provide a programmatic approach to addressing climate change in the context of national planning and budgeting framework, national and local organizational arrangement and in the spirit of monitoring and evolution system. Most strategic documents are structured to more towards attracting international financing for projects in priority areas

of conservation and climate change adaptation or mitigation measures.

Although National Environment Commission (NEC) houses the Climate Division, it has neither a clear mandate nor the capacity to address the linkage between climate change, biodiversity, poverty, gender, agriculture, forests, public health, disasters and extreme events, urban areas, energy, industry, transport, etc.

Similarly, the mandate of the National Biodiversity Centre (NBC), the national coordinating agency on biodiversity related issues, is currently limited to biodiversity and does not have the capacity to address climate change impacts on biodiversity. Other relevant institutions and non-governmental organizations in the country also work on biodiversity and climate change but in isolation, spelling the need to revisit and realign the existing framework to ensure that all organizations work in full clarity and in synergy for effective utilization of limited resources and enhanced delivery of results. Currently any studies or activities addressing climate change impacts on sectors are project-based and isolated. Therefore, the lack of an institutionalized program to address climate change impacts may be unsustainable and uncoordinated in addressing climate change issues.

Actual impacts of climate change are expected at the local levels and hence also the need for appropriate institutional arrangements to assess, plan and implement adaptation and mitigation. The Dzongkhag and Gewog levels are important existing institutional set up and best suited to address climate issues in a coordinated and inclusive approach. Forestry is an important component of landscape level climate resilience. However, the existence of forestry sector in the Dzongkhags has been eliminated and can potentially create a gap in addressing landscape resilience

This disconnection amongst national agencies as well as between national and local governments will hinder coordinated implementation of effective climate change as well as other development actions. There is a need to consolidate and synchronize climate and general development actions and perspectives at all levels.

The frameworks for issuance of environmental clearance or development consent for projects and programs focus consideration of overall impact of proposed projects/programs on the overall environment. However, they lack explicit safeguard measures to enhance resilience of the proposed projects or programs to climate change impacts.

6.5. Plans, Programs and Projects indented to address climate change and planning

The RGOB has and continues to undertake various efforts towards addressing the adverse impacts of climate change at the international, national and local levels. Efforts at the national level include the development of effective strategic and institutional frameworks. Notable among them include;

- ★ Existing framework to mainstream environment, climate change and poverty in to developmental plans and programs.
- ★ Established an environment, climate change and poverty mainstreaming reference group (ECPM) constituting of representative from GNHC, NECS, MoAF, UNDP and DLG which worked towards integrating these elements in to developmental plans and programs for the 11th FYP
- ★ Implementation of National Adaptation Programme of Action (NAPA) project. NAPA I project on *Reducing Climate Change Risks and Vulnerabilities from GLOFs (2008-2013)*, focused on enhancing adaptive capacity to prevent climate change-induced GLOF disasters in Bhutan (Punakha-Wangdi and Chamkhar Valleys). NAPA II, on *Addressing the Risks of Climate-induced Disasters through Enhanced National and Local Capacity for Effective Actions (2014-2018)* focused on demonstrating effective practical measures to reduce flood and landslide risks selected critical flood- and landslide- prone areas in the country; designing and building or rehabilitating systems for water harvesting, storage and distribution in selected villages and towns with water scarcity; strengthening disaster management institutions at national and local levels with training and development of community-based disaster management plans and in improving the quality, analysis and dissemination of climate information across climate-sensitive development sectors on a timely and reliable basis to aid climate change adaptation planning and to enhance preparedness and response to extreme weather events by way of expanding and upgrading the network of meteorological stations for real-time weather observation and forecasting, and strengthening the National Weather and Flood Forecasting and Warning Center with the capacity to analyze, manage and disseminate climate information in a timely manner. NAPA III on *Enhancing Sustainability and Climate Resilience of Forest and Agricultural Landscape and Community Livelihoods (On-going)* focuses on institutional capacity for integrated landscape management (ILM) and climate change resilience; emplacement of BC system governance and management system at pilot corridors and enhancing climate adaptive livelihood options of through diversification, SLM and climate-smart. However, the scope of NAPAs, is limited to addressing priority activities that are identified as urgent and immediate adaptation needs and do not necessarily ensure a continuous, progressive and iterative process to assess the vulnerability and adaptation needs across all sectors and levels in Bhutan.
- ★ The RGOB demonstrated its commitment to climate adaptation and mitigation goals by submitting the country's Intended Nationally Determined Contributions (INDCs) to the United Nations Framework Convention on Climate Change.
- ★ *Eleventh Five-Year Plan, (2013-2018)*; defines the overall goal of 11th FYP to achieve "self-reliance and inclusive green socio-economic development." It seeks to promote carbon-neutral and environmentally sustainable development, and engenders mainstreaming of environment, climate change and disaster risk reduction as cross-cutting issues

along with gender and poverty reduction. The term “green” in the development goal is explained to mean – carbon neutral development. The national planning guideline for the 11 FYP specifically identifies Environment, Climate Change and Poverty (ECP), disasters, gender and vulnerable groups as cross cutting themes along with environment, culture and good governance. For these cross cutting themes, the planning guideline specifies steps to identify vulnerabilities and options to address these vulnerabilities (Guidelines for Preparation of the Eleventh Five Year Plan, 2013-2018, p - 19). The 11 FYP planning process has intended to integrate elements of climate change in the overall development process. However, the actual plans address climate change to a lesser extent than actually intended by the planning guidelines (policy tool). It indicates a need for monitoring the compliance or implementation of mainstreaming policies and tools.

- ★ *The RNR 11 FYP*; In addition to preparation of the RNR SAPA, the plan promoted climate smart agriculture in agriculture practices by transforming the management and use of land and water resources, development of technologies and use of traditional and local knowledge. Green livestock farming practices were promoted to adapt/mitigate climate change through natural livestock production, resistant fodder varieties, stall-feeding and biogas production and continuation of ex situ and in situ conservation research activities. Critical watershed management plans were prepared and the REDD+ implemented strategy has been developed.
- ★ *The RNR 12 FYP*; has a national program on Climate Smart and Disaster Resilient Development which includes increasing area under micro irrigation, adoption of climate resilient technologies, sustainable land management, improved pasture and winter fodder, increasing forest capacity for carbon sequestration and institution of disaster management unit within MoAF. It includes establishment of an RNR Disaster Management unit and preparation of RNR Disaster Management & Contingency plan.
- ★ REDD+ Readiness project (2014 – 2018) is implemented by Watershed Management Division (WMD) to ensure sustainable management and enhancement of forest by developing REDD+ readiness strategy for Bhutan and piloting REDD+ schemes in community forests. The project is supported by World Bank through the Forest Carbon Partnership Facility with a grant of US\$ 3.8 million.
- ★ The Bhutan Recovery and Reconstruction Project (January 2010- December 2011) provided support to affected communities to recover and rehabilitate in the aftermath of major disasters in 2009, particularly the September earthquake and Cyclone Aila through community-based livelihood regeneration, capacity development for disaster response and recovery coordination. The project, funded by the UNDP-Bureau for Crisis Prevention & Recovery, Canadian International Development Agency and UN Delivering as One fund, coordinated community-based livelihood regeneration and implemented capacity development for disaster response and recovery through restoration of social and community services. The project results included;

- » Development and adoption of National Recovery and Reconstruction Plan, which provides framework for development of Dzongkhag, Gewogs/Thromdes level DM Plan in future.
- » Disaster Risk Management framework, disaster management planning guidelines and disaster risk assessment tools were developed and disseminated
- * JICA's project for Capacity Development of GLOF and Rainstorm Flood Forecasting and Early Warning in the Kingdom of Bhutan, 2013-2015 has been able to improve capacity of NWFFWC for GLOF and rainstorm flood risk assessment; developing EWS for GLOF/ rainstorm in Mangdechhu and Chamkharchhu river basins and in building emergency response capacity against GLOF/storm flood in these areas.
- * The project on Sustainable Land Management Practices implemented by the National Soil Services Center (NSSC), MoAF from 2006 to 2012 support from GEF and Danida aimed at strengthening institutional and community capacities in managing land degradation and rehabilitate degraded land in Bhutan through the uptake and adoption of sustainable land management technologies and practices. The project implemented land terracing, development of stone contour bunds, fodder development, promotion of cover crops, construction of check dams and dairy sheds and capacity building of the beneficiaries in Trashigang, Zhemgang and Chukha dzongkhags.
- * Similarly, the project on Building capacity and mainstreaming sustainable land management in Bhutan implemented by NSSC, MoAF from 2007 to 2009 built institutional capacities including that of civil societies and user groups in applying and up-taking sustainable land management technologies and practices and implemented activities to mainstream sustainable land management practices into public policies and plans.
- * GEF/DANIDA project on Enhancing Global Environmental Management in Bhutan's Local Governance implemented by the NECS in 2008-2012 supported mainstreaming the provisions of the Rio Conventions into enhanced decentralized environmental management. Through the project proposal on the establishment of regional environment offices (REOs) emerged which has been endorsed by the Commission (NEC) and has been incorporated in the 11th FYP for implementation; District Environment Committee (DEC) were set up in all the 20 districts; a web-based Environmental Information management System (EIMS) was developed and launched in 2009 based on the pressure, state and response (PSR) model. In order to validate the EIMS data on regular basis, relevant stakeholders were trained to input data into the system.
- * WB/GFDRR (Global Facility for Disaster reduction and Recovery), project (2012-2013) on Improving Disaster Management Capacity in the Kingdom of Bhutan implemented by the DDM supported formulation of rules and regulations, Disaster Management Planning Guideline, Contingency Plan Guidelines; Identified HR Capacity Development Needs for DRM in Bhutan, by-laws and SOPs; enabled institutional set-up at various levels; and

sensitization of institutions and committees to DRM concepts and policies, in line with the DM Act. Hence it provided the Baseline Capacity development for DRM in Bhutan.

- * ADB/BTF-National Water Resources Inventory Project (2012-2014) completed national water resources inventory to create information for preparation of National Integrated Water Resource Management Plan. The NECS has been able to create a snapshot of water resources in the country through the project support.
- * The High Altitude Northern Areas (HANAS), 2010-2014 through GEF and BTF, implemented by the MoAF aimed to enhance conservation management and rural livelihood of the HANAS landscapes covering 27 Gewogs in ten Dzongkhags of north western, north central and North eastern Bhutan. It also intends to mainstream conservation and sustainable forest and natural resource management approaches into national policies and plans.
- * The project on Climate Change Adaptation Program (CCAP) through European Union's (EU) Global Climate Change Alliance (GCCA), 2013-2017 aimed at enhancing resilience of Bhutan's rural households to the impacts of climate change and natural variability and to ensure to put in place climate change readiness within RNR sector of Bhutan through mainstreaming climate change into the sector. It also intends to put in place the required steps and measures towards increasingly addressing climate change in multi-sectoral and faceted manner. Under GCCA support, the RNR sector is expected to enhance resilience of rural households across all major watersheds of the Country beginning with intervention in the critical watershed of Kurichu River Basin. The concept of Climate Smart Villages (SCV) under the project and overall project interventions includes Green Livestock Farming Practices to reduce Methane gas and use of biogas; Increased On-Farm Conservation and Sustainable Utilization of Agro- Biodiversity; Efficient Irrigation Systems for Horticulture Cash Cropping through water harvesting, efficient conveyance system, water storage structures, use of groundwater, and modern irrigation technologies (drip, sprinkler); Adoption of Sloping Land Management for Horticulture and Field Crops Production practices; Increased Organic Agriculture Production; Reduction of Post-Harvest Crop Losses to enable micro- climate control for storage; Adoption of Human Wildlife Conflicts Mitigation Measures; Increasing Paddy Field Area under Efficient Irrigation Systems; Preparation of Watershed Management Plans for Kurichu River Basin; Afforestation and Reforestation in Barren and Degraded Lands, etc.
- * The ADB/BhWP/NEC project, 2014-2016 on Adapting to climate change through IWRM supported preparation of National Integrated Water Management Plan (NIWRMP) by NECS; River Basin Management Plan (RBMP) for one priority Wangchu Basin by (WMD); National Irrigation Master Plan (NIMP) by the DOA and strengthening Water resources governance through NECS.
- * The UNDP supported GEF project on "Enhancing climate resilient agriculture and food

security in Bhutan covers 8 dzongkhags and aims to bring about transformational change through outputs improved climate-resilience and enhanced productivity of agriculture sector; climate-resilient infrastructure to support market access and enhanced market analysis and skills development to improve agriculture livelihoods.

Bhutan's National Adaptation Programme of Action (NAPA, 2006) is the first and only document that focuses purely on urgent and immediate needs to address vulnerabilities to climate change in the country at the national level. NAPAs only list the country's priority adaptation needs and do not take into account the challenges and opportunities of climate change in an all rounded manner and at all appropriate levels considering adequate means of implementation (capacity, finance, technology, knowledge and awareness). Therefore, the present state of affairs in addressing climate change is dependent on project specific needs. There is no mainstream mechanism to identify climate change issues and vulnerabilities on a regular basis and funding for climate change project intervention are carried out through donor-driven projects.

7 GENERAL POLICY GAPS WITH RESPECT TO CLIMATE RESILIENCE AND INTEGRATED LAND MANAGEMENT

Gaps/Barriers	Solutions
Policies for climate resilience and ILM	
<ul style="list-style-type: none"> * Adaptation and mitigation agendas are addressed through different policies, discussed in policy debates that rarely linked or coordinated and led by distinct ministries; * Policies supporting conventional agriculture practices predominate over those supporting climate-smart agricultural strategies; * Overall, existing policies and legislations are relatively weak on dealing with climate change issues. There are a number of policies in the country addressing the environment, forests, biodiversity, food security, etc. While the environment is considered a crucial pillar of the national development philosophy of gross national happiness, the specific concerns of climate change and its impact on the environment in particular is lacking; * An inclusive and comprehensive climate change policy and legislative framework that creates, or sets out the mandate for a leading institution to spearhead the nation's efforts in climate change adaptation and mitigation does not exist. 	<ul style="list-style-type: none"> * An inclusive and comprehensive climate change policy and legislative framework that creates, or sets out the mandate for, a leading institution to spearhead the nation's efforts in climate change adaptation and mitigation should be instituted. * For ILM approach, policies need to require sectors to work together within a place based development objective rather than sector based objectives.
<ul style="list-style-type: none"> * Most policy documents are weak on assigning responsibilities to lead in policy implementation, monitoring and evaluation. As a result, policy intentions are often times not followed through; capacity needs are not identified and regular reporting mechanisms on status of policy implementation are not established. 	<ul style="list-style-type: none"> * For ILM approach policy documents should assign responsibilities to lead in policy implementation, monitoring and evaluation and engage stakeholders in monitoring and evaluation of policy implementation.

Gaps/Barriers	Solutions
<ul style="list-style-type: none"> * The Economic Development policy, 2016 lacks articulation of incentives for specific climate related initiatives and technologies in production, construction and services sectors. 	<ul style="list-style-type: none"> * Addressing climate change will require incentives for specific climate related initiatives and technologies in production, construction and services sectors. This would also motivate investments to be directed to ILM based initiatives
<ul style="list-style-type: none"> * Fiscal Incentives, 2016 does not specifically provide incentives for addressing climate change. * The extent of climate resilience that the policy could address would depend on recommendations from the NECS. Hence the recommendation from the NECS becomes critical in providing incentives for climate resilience. 	<ul style="list-style-type: none"> * Appropriate market-based incentive mechanisms such as higher premiums for eco-certified products, payment for the provision of ecosystem services, or direct subsidies or taxes on certain practices and incentives at the farm level to attract investments into ILIs
<ul style="list-style-type: none"> * National Forest Policy, 2012 is not clear on who and how sub sector adaptation and mitigation measures are adopted at central as well as at local level in a coordinated manner and who is responsible for research and knowledge management and dissemination on climate change. 	<ul style="list-style-type: none"> * There is a need to accommodate perspectives from agriculture, soil protection, water supply and distribution, pasture and other land uses, which can be ideally on-boarded through the Dzongkhag machinery as it has multi sector composition. However, the DoFPS does not have a sectoral representation at the Dzongkhag level. This separates the Dzongkhags and the DoFPS programs through whom coordinated community engagement can be enabled in terms of climate vulnerability assessments, planning and implementation of activities to enable landscape level climate resilience.
<ul style="list-style-type: none"> * Water Policy, 2002 does not have adequate provisions for monitoring and evaluation of actions as desired by the policy. The role of monitoring and evaluation of programs on water resources implemented by different sub-sectors has been assigned to Bhutan Water Partnership which does not have legal and operational strength to carry out these functions. 	<ul style="list-style-type: none"> * The role of monitoring and evaluation of programs on water resources implemented by different sub-sectors may be assigned to Bhutan legal entities and engage landscape level stakeholders for credibility and legitimacy.

Gaps/Barriers	Solutions
<ul style="list-style-type: none"> * The Food and Nutrition Security policy, 2012 does not provide clarity on climate smart commercial PPP farming ventures in terms of licensing, land, credit, and technical support. * On disaster management, the policy provides affordable crop and livestock insurance schemes by 2018 and adequate compensation budget for disaster related losses to the farmers till such time the insurance schemes comes into effect. 	<ul style="list-style-type: none"> * There is need to clarify on the roles and benefits of different stakeholders in pursuing climate smart commercial PPP farming ventures such is roles in licensing, providing access to land, access to credit, and technical support. * Insurance schemes have not been practically possible due to the inherent complications associated with viability from a business perspective. Appropriate models of insurance schemes need to be identified prior to implementation on-ground.
<ul style="list-style-type: none"> * National Irrigation Policy, 2012 does not provide for climate resilient designs and appropriate technologies that enable climate proofing of irrigation infrastructure as well as its linkage to other forms of water management beyond irrigation 	<ul style="list-style-type: none"> * The NIP, as a policy for major water infrastructure within the country ma recognize the need for climate smart designs and the need for practical coordination with other water management functions such as drinking water, sanitation and hydropower development. Such a policy requirement would enable integration of land scape components such as drinking water, hydropower and irrigation to work with a common objective of enhancing landscape-based livelihood and ecosystem improvements.
<p>Legislations relevant to climate change and ILM</p>	
<ul style="list-style-type: none"> * The laws of Bhutan provide strong legal basis for protection and sustainable management of the environment, equitable distribution of costs and benefits of conservation, the need for integrated and inclusive planning at different levels and for disaster management and mitigation. * However, the existing laws do not explicitly highlight addressing climate change or for implementation of ILM. 	<ul style="list-style-type: none"> * Integrated planning and sustainable management of the environment, equitable distribution of costs and benefits of conservation are prescribed in the laws. However, institutional arrangement and sector-based mandates obscure the implementation in a coordinated fashion as development objectives are guided by sector objectives and not by common area or landscape based development objectives.

Gaps/Barriers	Solutions
Regulatory and Planning landscape for ILM	
<ul style="list-style-type: none"> ★ The existing guidelines, regulations and tools that are related sectors most vulnerable to climate describe protocols and standards to minimize environmental impacts in general. However, they do not also have explicit provisions, standards, tools or suggested technologies to enhance climate resilience of activities within the concerned sectors or for integrated planning by location. 	<ul style="list-style-type: none"> ★ There is a need for explicit provisions, standards, tools or suggested technologies to enhance climate resilience of activities within the concerned sectors or for area based integrated planning with Dzongkhag development objective as a platform for integrated planning.
<ul style="list-style-type: none"> ★ While addressing climate change and its impacts are more pronounced through strategies and actions plans, the relevant strategies do not provide clear linkages across sectors in addressing climate change, financing strategies, clear communications and reporting mechanisms and in how to integrate within the mainstream development planning. The strategies also do not provide a programmatic approach to addressing climate change in the context of national planning and budgeting framework, national and local organizational arrangement and in the spirit of monitoring and evolution system. Most strategic documents are structured to more towards attracting international financing for projects in priority areas of conservation and climate change adaptation or mitigation measures. ★ The frameworks for issuance of environmental clearance or development consent for projects and programs focus consideration of overall impact of proposed projects/programs on the overall environment. 	<ul style="list-style-type: none"> ★ National development strategies do not have areas or landscape-based development approach and hence do not provide conducive environment for ILM. National development strategies should incorporate the need to embrace area based development objectives rather than sector based objectives to embrace ILM approach. ★ The frameworks for issuance of environmental clearance require explicit safeguard measures to enhance resilience of the proposed projects or programs to climate change impacts. In addition, environment clearance procedure could also include criteria landscape based common objectives and collaborative planning among landscape stakeholders.

Gaps/Barriers	Solutions
<ul style="list-style-type: none"> * Bhutan's National Adaptation Programme of Action (NAPA, 2006) is the first and only document that focuses purely on urgent and immediate needs to address vulnerabilities to climate change in the country at the national level. NAPAs only list the country's priority adaptation needs and do not take into account the challenges and opportunities of climate change in an all rounded manner and at all appropriate levels considering adequate means of implementation (capacity, finance, technology, knowledge and awareness). Therefore, the present state of affairs in addressing climate change is dependent on project specific needs. There is no mainstream mechanism to identify climate change issues and vulnerabilities on a regular basis and funding for climate change project intervention are carried out through donor-driven projects. 	<ul style="list-style-type: none"> * Addressing climate change issues in the past have mostly been considered on a project-based approach. Hence integration of climate change aspects in mainstream development planning has not received adequate attention. Program based approach to addressing climate change should be considered to enable identify climate change issues and vulnerabilities on a regular basis within national and local level development planning.
<ul style="list-style-type: none"> * Coordination and management of strategic activities, investments on-ground actions are fragmented and scattered across different actors. Poor coordination of climate change actions from the national level to the local level remains a challenge. There are a number of institutions working on climate change and related fields in the country, currently there is weak coordination and linkage between stakeholders as well as with donors and amongst donors. 	<ul style="list-style-type: none"> * Actual impacts of climate change are expected at the local levels. The Climate Change Coordination Committee (C4) at the national level while coordinate matters related to climate change in making recommendations to the NEC, should also consider local climate issues and provide advice on local level actions to be undertaken through local C4 forums.

Gaps/Barriers	Solutions
<ul style="list-style-type: none"> * The existing policies and strategies of Bhutan relating climate to change lacks financing plans that highlights the costs and expected source for funding to implement the climate change elements that are considered as priority. Further, the overriding importance of socio-economic development and poverty eradication in the country and limited resources has resulted in low level of attention at all levels resulted for long term climate change programs. This would affect building climate resilience of the overall land scape ecosystems and communities. Funding for climate change interventions through donor-driven projects by itself is not sustainable. The lack of an effective national finance mechanism to mobilize and direct funds for climate change adaptation and mitigation would constrain implementation of climate change policy intentions. 	<ul style="list-style-type: none"> * Climate financing specifically, and financing for ILM approach in general would require specific strategies that enabling conditions for asset ND leverage investments.

8 CONCLUSIONS AND RECOMMENDATIONS

8.1. Given that the existing policies and legislation are relatively weak on dealing with climate change issues and that there is a need for an inclusive and comprehensive climate change policy and legislative framework that creates, or sets out the mandate for a leading institution to spearhead the nation's efforts in climate change adaptation and mitigation. In addition, the policy should have a clear and comprehensive implementation framework to ensure that the needed funds are mobilized and are channeled into programs that address the most vulnerable social groups and regions. The current initiative and effort to develop a national climate policy is a timely opportunity to engage all stakeholders at national and local levels in highlighting the likely impacts of different climate change adaptation scenarios. The policy should enable planning and program implementation on climate change at national and local levels through a comprehensive and cohesive national climate change strategy and should enable:

- ★ Research and capacity development on climate change whereby the NEC can coordinate support for research and capacity development, with all relevant institutions, including developing capacity of technical staff and awareness at the local government level, as well as the tertiary education and civil society. Research proposals and small studies on climate change in Bhutan should be funded.
- ★ Better coordination among stakeholders and donors. In the area of climate change, the NEC could take a lead role for donor coordination, in cooperation with the GNHC. This would be in line with the recommendations of the “2005 Good Governance Plus” exercise to establish inter-agency coordination mechanisms to minimize duplications.
- ★ Promotion of climate change mainstreaming into sector and local development plans, programs and policies to ensure that development activities are implemented, keeping in mind potential impacts of climate change or potential impact on the such development activities.
- ★ Options of securing climate change finance from the various international funding sources while at the same time capacity for drawing climate funds from domestic sources explored and promoted.
- ★ The media and conservationists to educate citizens on climate change and hold policy makers accountable for policies that have a negative impact on the environment. Policy makers should be informed on climate change issues and be accountable for the environmental impact of any initiatives executed under

their leadership, be it hydro-power projects, large-scale farming, or industrial development.

- ★ Strong monitoring and evaluation arrangements on climate change policy intentions.
- ★ Regular vulnerability and adaptation (V&A) assessments in the process of mainstream development planning that covers human settlements, critical infrastructure and mapping of vulnerable populations and areas. Mapping vulnerable areas and populations will help mainstream climate change by providing information to planners at different levels.

8.2. Enabling climate resilience of infrastructure through policy and regulation is not a mandatory requirement within the existing policy framework. With increased evidence of flooding, damage to infrastructure in rural and urban settlements, transportation networks coupled with lack of capacity for landslides and flood assessment, priority for interventions in flood risk assessments and adaption/mitigation planning are important elements of enabling landscape resilience.

- ★ RGOB's budget release process could include integration of climate resilient designs in infrastructure development activities such as irrigation, farm roads, highways, drinking water and building activities.
- ★ The private sector's incentives to adapt are shaped by the policy and regulatory environment. Government actions can facilitate climate-resilient infrastructure by adding regulatory requirements to consider climate risks in infrastructure development and maintenance.
- ★ Screening and factoring climate risks into public investments can be integrated by way of implementing mandatory requirements in government procurements to demonstrate consideration of climate risks when investing in or commissioning infrastructure or supplies.
- ★ Public financial institutions, through the RMA regulations, may be mandated to require screening their investments and to ensure that physical climate risks are addressed in their investment projects through provision of lower interest rates, favorable tenure or access modalities for their credit facilities when climate risks are considered, and climate proofing is addressed in credit proposals.
- ★ Public financial institutions, through the RMA regulations, may be mandated to require screening their investments and to ensure that physical climate risks are addressed in their investment projects through provision of lower interest rates, favorable tenure or access modalities for their credit facilities when climate risks are considered, and climate proofing is addressed in credit proposals
- ★ Facilitate participation and engagement of private sector in addressing climate

change actions by requiring the private sector to account for climate risks when submitting tenders for Government projects.

- * ILM financing should be motivated by way of;
 - » developing, quantifying and communicating the ILM business cases
 - » Coordinating sectoral investments at the landscape scale to achieve inclusive green growth.
 - » Fostering partnerships between financial institutions and landscape stakeholders based on mutual benefits and trust
 - » Using public finance to reduce private risks through risk guarantees, seed capital and catalytic funding
 - » Applying investment standards and guidelines to incentivize ILM such as premium for eco-certified products, payment for the provision of ecosystem services, or direct subsidies or taxes on certain practice.

8.3. To boost integrated climate change implementation plans, Bhutan will need to continue leveraging more financial support from not only the international community but also from public funds in the national budget, private sector as well as non-governmental agencies. Increased taxation on vehicle imports, and green taxes is an initiative in this direction. However, how revenue from such taxes will be allocated to climate change related actions is not clear. The establishment of a National Climate Change Fund could be considered to ensure resources for different climate change initiatives are made available, preferably for landscape level initiatives.

While the Fiscal Incentives, 2016 provides tax rebate of up to 15% of the up-gradation expenses for adopting modern environmentally friendly technologies that meet the criteria, specification and standard prescribed by the law and upon letter of recommendation from NECS. The policy does not specifically provide incentives for climate change. The extent of climate resilience that the policy could address would depend on recommendations from the NECS. The recommendation from the NECS becomes critical in providing incentives for climate resilience. A guideline as to how the recommendation from NECS can be drawn would ensure that climate resilient initiatives receive targeted incentives and incorporating the voice of landscape stakeholders in such criteria would encourage landscape based incentives.

8.4. Where climate specific policy elements are articulated, they are weak in terms of assigning responsibilities to lead in policy implementation, monitoring and evaluation. Climate change related performance indicators are included in the sector development plans. In the absence of a programmatic approach to climate change, an overall picture of climate change interventions is not clear. The integration of climate change in 11 FYP

has not taken place to the extent intended by the planning guidelines (policy tool) or achievements have not been captured for lack of appropriate linkages with reporting at program levels. There are also many projects that have been implemented by government institutions, NGOs and academic institutions relating to climate change. These projects do not have coordinated direction towards a common goal/objective in terms of climate change and landscape (or area based) development approach. Independently, specific projects have specific objective that relate to climate change. However, there is no monitoring mechanism that provide for convergence of such project objectives towards an overall climate change objective at the Dzongkhag or national levels. Most of the interventions related to climate change are based on institutional mandates - water is a classic example where urban water supply, rural water supply, land slides and flooding, catchment protection all of which are implemented by different agencies with each objective in line with sector mandates – calling for the need to have a coordinated and programmatic approach. Such a coordination can be brought about through an ILM approach. The existence of the CCC at the national level is an initiative towards this direction. However, such arrangements are weakened by the lack of strong monitoring and evaluation arrangements as well as linkage to local level coordination.

The role of monitoring and evaluation of programs related climate change implemented by the different sub-sectors should be assigned to entities with legal and operational strength to carry out these functions. For instance, the chair of institutional entities for climate changes such as the CCCC and Dzongkhag Environment Committees may be made responsible for delivery on climate change initiatives that can be monitored through their APAs.

- 8.5. Due to the limited level of awareness and access to context specific information on climate change and its impacts, local development challenges and opportunities, there is need to enhance institutional capacities to strengthen the process to tackle climate change and are based development issues faced by stakeholders. The specific areas that need to be addressed include research and assessment, collaborative planning, joint monitoring, extension and policy development. Concerted efforts must also be channeled into educating the whole country on the impacts of climate change and ILM approach. This will ensure the country's preparedness against the impacts of climate change through awareness and strengthened capacities of all the stakeholders to bring about area based or land scape-based development.
- 8.6. Recognizing that actual impacts of climate change are expected at the local levels, namely the Dzongkhag and Gewog levels which are important existing institutional set up best suited to address climate issues in a coordinated and integrated manner, there is a need to rethink including the presence of forestry sector at the Dzongkhag and

Gewog levels since it is an important component of landscape level climate resilience. The Dzongkhag and Gewog levels are important existing institutional set up and best suited to address climate issues in a coordinated and inclusive approach. Forestry is an important component of landscape level climate resilience. However, the existence of forestry sector in the Dzongkhags has been eliminated and can potentially create a gap in addressing landscape resilient actions.

- 8.7. Assessment of vulnerabilities and adaptation are done by both the MoH and MoAF. However, there is no accepted common approach for local level vulnerability assessment methods or for science-based planning. Identification of vulnerabilities are based on project specific studies as a result of which there is no way of identifying and including vulnerabilities to climate change in the regular planning process across local institutions. Instead of carrying out such exercise on a sectoral and project basis, it would enable building coordinated capacities based on ground realities if such assessments are coordinated at the local levels on overall local development plans (or landscape plans) and at national level on the overall national development plan. The need for project and sector-based vulnerability assessments can continue based on needs of the sectors and projects but could such approach could be integrated with assessments for overall development plans. However, there is a need to establish scientific methodologies and capacities for local level integrated approach including climate vulnerability assessment.
- 8.8. To fulfill the need for a mainstream mechanism to identify climate change issues and vulnerabilities on a regular basis, the National Statistical Bureau's (NSB) information systems could capture climate data such as change in temperature, rainfall, climate events, greenhouse gas emissions by source and sequestration by sink.

Such information would not only enable climate integrated planning at all levels to but would also strengthen national level reporting to UNFCCC in the future. The NSB could coordinate with several agencies such the NCHM, NECS, MoAF, MoWHS, the DDM, CSOs and other related agencies to collate information at the national level.

At a more technical level, the NCHM could be considered as the coordination body to generate climate information that are beyond the technical scope of national statistics. This could include robust observations and projections for climatic and hydrological trends into the future at national and local levels; tools and technical capacity to interpret information and draw out its implications for decision-making; and facilitation of forums that help to manage interdependencies by safely sharing information between infrastructure operators, both within and between sectors. Such tools and information should enable improving risk decision-making by ensuring data on projected natural hazards is made available and accessible through awareness and capacity building

programs of relevance to decision makers, field implementers and to communities by undertaking risk assessments that identifies the exposure of existing infrastructure, communities, crops and overall local environment to climate change at different levels.

8.9. Area development approaches have been attempted in the past through Wang Watershed Project in the West; the IFAD and World Bank projects in the East (FEZAP, SEZAP CARLEP and TFDP); Swiss Funded ECRDP in the central part and GEF/BTFEC funded HANAH in the north. The World Bank project on DRDP in the West and Southern part also embraced a similar approach. While these project-based area development approaches resulted in significant impact in terms of poverty alleviation, conservation and increase in productivity, they have not been able to bring about significant changes in terms of enabling ;

- ★ Shared or agreed management objectives with multiple benefits from the landscape
- ★ Designing and inculcating practices that contribute to multiple objectives, human wellbeing, food and fiber production, climate change mitigation, and conservation of biodiversity and ecosystem services
- ★ Enhancing ecological, social and economic interactions among different parts of landscapes
- ★ Collaborative, community-engaged processes for dialogue, planning, negotiating and monitoring decisions and
- ★ Influencing markets and public policies that achieve diverse set of landscape objectives and institutional requirements

The implementation of ISDP project at Dzongkhag level in Zhemgang in the early 1990s has resulted in significant improvement in defining Dzongkhag development objective and capacity for integrated planning.

Therefore, it is recommended that overall, the DTs and GTs may be considered as the platforms for local landscape planning within which sector approaches should converge to support commonly agreed local development objectives. This could be the only entry point for instituting ILM approach within the current policy, legal and institutional arrangement in Bhutan. Sector based support should be geared towards enhancing the stakeholder wide defined development objective of Dzongkhags (territory base landscapes) with room for cross-dzongkhag collaborations. Practically, this would mean that sector planning guideline would be influenced by the local development plans as opposed to the present practice of local plans following sector guidelines. However, such an approach should be preceded by capacity building for science based and collaborative planning at the Dzongkhag levels.

9 ANNEXURES

Annex 1. Matrix of policy gaps analysis, recommendations and actions

Policies	Gaps/Conflicts/Inconsistencies	Implications and recommended actions
<p>Existing policies and legislation are relatively weak on dealing with climate change issues. Climate related policy provisions are scattered, disjointed and are not exclusively devoted to climate change adaptation and mitigation based on locations.</p> <p>Where climate specific policy elements are articulated, they are weak in terms of assigning responsibilities to lead in policy implementation, monitoring and evaluation.</p> <p>The institutional arrangements such as CCCC and Dzongkhag Environment Committees are weakened by the lack of strong monitoring and evaluation arrangements</p>	<p>A programmatic approach to climate change adaptation and mitigation is not realized.</p> <p>A clear national policy on climate change may be adopted which includes implementation arrangements with defined periods for M&E responsibilities.</p> <p>Consolidate and synchronize climate actions and perspectives at all levels with appropriate and workable monitoring mechanism that provide for convergence of isolated climate initiatives and projects towards an overall national common climate change objective.</p> <p>The role of monitoring and evaluation of programs related climate change implemented by the different sub-sectors should be assigned to entities with legal and operational strength to carry out these functions. For instance, the chair of institutional entities for climate changes such as the CCCC DECs may be made responsible for delivery on climate change initiatives that can be monitored through their APAs.</p> <p>Concerted efforts must be channeled into educating the whole country on the impacts of climate change and ensure availability of location specific challenges and opportunities. This would enable climate resilient and landscape based planning. NCHIM could be considered as the coordination body to generate climate information that are beyond the technical scope of national statistics. This could include robust observations and projections for climatic and hydrological trends into the future at national and local levels; tools and technical capacity to interpret information and draw out its implications for decision-making; and facilitation of forums that help</p>	
<p>Overall national climate change related policies in the context of ILM</p>	<p>Robust observations and projections for climatic and hydrological trends into the future at national and local levels are not readily available to users including tools and technical capacities to interpret information and draw out implications for decision-making; climate data sharing platforms and forums that help to manage interdependencies both within and between sectors; tools and information to</p>	

<p>enable improving risk decision-making; information on projected natural hazards of relevance to decision makers, program implementers, local communities and on assessments that identifies the exposure of existing infrastructure, communities, crops and overall local environment to climate change at different levels.</p>	<p>to manage interdependencies by safely sharing information between infrastructure operators, both within and between sectors. Such tools and information should enable improving risk decision-making by ensuring data on projected natural hazards is made available and accessible through awareness and capacity building programs of relevance to decision makers, field implementers and to communities by undertaking risk assessments that identifies the exposure of existing infrastructure, communities, crops and overall local environment to climate change at different levels.</p>
<p>The existing policies and strategies of Bhutan relating climate to change lacks financing plans that highlights the costs and expected source for funding to implement the climate change elements that are considered as priority. Climate change interventions are funded mostly through donor-driven projects which by itself is not sustainable.</p> <p>The lack of an effective national finance mechanism to mobilize and direct funds for climate change adaptation and mitigation would constrain implementation of climate change policy intentions. Further, the overriding importance of socio-economic development and poverty eradication in the country and limited resources has resulted in low level of attention at all levels for long-term climate change programs. This would affect building climate resilience of the overall landscape ecosystems and communities.</p>	<p>Continue leveraging more financial support from not only the international community but also from public funds in the national budget, private sector as well as non-governmental agencies.</p> <p>Establish clarity on how climate and energy related tax revenue such as taxation on vehicle imports, and green taxes will be allocated to climate change related actions on ground.</p> <p>Establishment a National Climate Change Fund to ensure resources for different climate change initiatives are made available in a timely manner in the long run.</p> <p>Public financial institutions, through the RMA regulations, may be mandated to require screening their investments and to ensure that physical climate risks are addressed in their investment projects through provision of lower interest rates, favorable tenure or access modalities for their credit facilities when climate risks are considered, and climate proofing is addressed in credit proposals.</p> <p>Facilitate participation and engagement of private sector in addressing climate change actions by requiring the private sector to account for climate risks when submitting tenders for Government projects.</p>

Policies	Gaps/Conflicts/Inconsistencies	Implications and recommended actions
	<p>There is no mainstream mechanism to identify climate change issues and vulnerabilities on a regular basis and there is no accepted common approach for local level vulnerability assessment methods. Identification of vulnerabilities are based on project specific studies as a result of which there is no way of identifying and including vulnerabilities to climate change in regular planning process across local institutions.</p> <p>The National Statistical Bureau's information system does not capture climate data such as change in temperature, rainfall, climate events and greenhouse gas emissions by source and sequestration by sink.</p> <p>The process for issuance of environmental clearances for projects programs covers environmental aspects but do not cover climate aspects. This would lead to infrastructure projects and programs being planned and implemented without integration of climate resilient designs and eventually result into less climate resilient infrastructure.</p> <p>The policy considers the need to address linkages with Bhutan's commitments to Regional and International Agreements, Conventions and Instruments related to forest are reflected in forestry plans, programs. However, it is not clear as to who should be responsible for this.</p>	<p>The need for project and sector based vulnerability assessments can continue based on needs of the sectors and projects but could be integrated with assessments for overall development plans.</p> <p>Meanwhile establish scientific methodologies and capacities for local level integrated climate vulnerability assessment in the context of Bhutanese ecosystem landscape which would enable local levels vulnerability assessments on overall local development plans and at national level on the overall national development plan.</p> <p>The National Statistical Bureau's (NSB) information systems could capture climate data such as change in temperature, rainfall, climate events, greenhouse gas emissions by source and sequestration by sink to enable climate integrated planning at all levels and strengthen national level reporting to UNFCCC in the future.</p> <p>Environment screening and clearance process should factor climate risks into public investments by implementing mandatory requirements to demonstrate consideration of climate risks when seeking environment clearance for projects – be it public or private.</p> <p>Within the organizational structure of the DoFPS, a functional unit may be created to ensure that Bhutan's commitments to Regional and International Agreements, Conventions and Instruments related to forest are reflected in forestry plans, programs and that they are implemented and reported.</p>

<p>EDP, 2016</p>	<p>Encourages development of hydropower and alternative renewable energy projects to reduce greenhouse gases</p> <p>Allocates priority to solar and wind power and provides incentives to promote roof top solar water and space heating systems</p> <p>However, the policy lack articulation of incentives for specific climate related initiatives and technologies in production and services sectors</p>	<p>Economic development initiatives could consider provision of incentives in climate resilient technologies in production, construction and service sectors since these sectors comprise of significant proportion of GDP</p>
<p>Fiscal Incentives, 2016</p>	<p>Tax rebate of up to 15% of the up-gradation expenses for adopting modern environmentally friendly technologies that meet the criteria, specification and standard prescribed by the law and upon letter of recommendation from NECS. The policy does not specifically provide incentives for climate change.</p>	<p>The extent of climate resilience that the policy could address would depend on recommendations from the NECS. The recommendation from the NECS becomes critical in providing incentives for climate resilience. A guideline as to how the recommendation from NECS can be drawn would ensure that climate resilient initiatives receive targeted incentives.</p>
<p>NFP, 2012</p>	<p>The National Forestry Policy of Bhutan prescribes landscape approaches to planning and implementation of forestry program. The landscape approach in this policy encompasses aspects related to forestry governance and management. It also prescribes for effective coordination mechanisms between the Department of Forest and other stakeholders for implementing crosscutting issues.</p>	<p>There is a need to accommodate perspectives from agriculture, soil protection, water supply and distribution, pasture and other land uses.</p> <p>Participation of local communities in the preparation and implementation of plans related to forest management units, protected area management and local forest management may be constrained by the lack of forestry sector in the Dzongkhags and Gewogs. This separates the Dzongkhags and the DoFPS programs through whom coordinated community engagement can be enabled in terms of climate vulnerability assessments, planning and implementation of activities to enable landscape level climate resilience.</p> <p>The presence of forestry in the existing Dzongkhag and Gewog level planning as well as implementation of mainstream development plan may be considered.</p>

Policies	Gaps/Conflicts/Inconsistencies	Implications and recommended actions
	<p>The policy calls for minimizing or reduction in impacts of climate change on sustainable forest management and development through appropriate adaptation and mitigation measures. It is not clear on who and how sub sector adaptation and mitigation measures will be adopted at central as well as at local level in a coordinated manner and who is responsible for research and knowledge management and dissemination on climate change.</p>	<p>A menu of technologies options for adaptation and mitigation of climate change impacts on sustainable forest management may be developed.</p> <p>Specific roles and responsibilities for planning, implementing, monitoring and evaluation of appropriate adaptation and mitigation of climate change impacts on sustainable forest management may be drawn for national and local levels.</p>
	<p>Within the management of GRFs, the policy expresses the need to carry out research and generate knowledge, information and technology that support policy implementation and development including integration of climate change issues. However, it is not clear on who and how sub sector adaptation and mitigation measures are adopted at central as well as at local level in a coordinated manner and who is responsible for research and knowledge management and dissemination on climate change.</p>	<p>NCHM could be considered as the coordination body to generate technical climate change information.</p>
FNS Policy, 2014;	<p>Recognizes the role of sustainable forest management for food, fodder and fuel</p> <p>As part of FNS policy implementation the RNR sector has included commercial PPP farming ventures. However, there is lack of clarity in terms of roles and responsibilities of concerned stakeholders particularly with respect to licensing, land, credit and technical support.</p>	<p>Policy implementation aspects to include roles and responsibilities with timelines for M&E.</p>

	<p>The RNR sector identifies affordable crop and livestock insurance schemes to integrate disaster management. However, insurance schemes have not been practically possible due to the inherent complications associated with viability from a business perspective.</p>	<p>Appropriate models of insurance schemes need to be identified prior to implementation on-ground.</p>
<p>Water Policy, 2002;</p>	<p>Calls for a national adaptation strategy for climate change, including a national flood management and mitigation strategy, disaster management plan including forecasting, preventing, evacuating and mitigating measures to be developed for flood prone basins, institutional arrangement for water resource management, information management, human resources management and applied research and trans-boundary water issues.</p> <p>However, the policy does not include adequate provisions for monitoring and evaluation of the actions as desired by the policy. The role of monitoring and evaluation of programs on water resources implemented by the different sub-sectors has been assigned to Bhutan Water Partnership, which does not have a legal and operational strength to carry out these functions.</p>	<p>The role of monitoring and evaluation of programs related climate change implemented by the different sub-sectors should be assigned to entities with legal and operational strength to carry out these functions. For instance, the chair of institutional entities for climate changes such as the CCCC and MRGs may be made responsible for delivery on climate change initiatives that can be monitored through their APAs.</p>
<p>National Irrigation Policy, 2012</p>	<p>Calls for promotion of appropriate conveyance technologies to reduce water wastage and awareness on proper on-farm water management. However, the policy does not provide for climate resilient designs and appropriate technologies that enable climate proofing of the irrigation infrastructure.</p>	<p>RGOB's budget release process could include integration of climate resilient designs in infrastructure development activities such as irrigation, farm roads, highways, drinking water and building activities.</p>

Policies	Gaps/Conflicts/Inconsistencies	Implications and recommended actions
RWSS Sector Policy	<p>While all national policies documents have undergone a through policy formulation and screening protocol, there are differences among the policies in terms of structure and content. The review finds that there is no standard policy structure and most policy documents are weak on assigning responsibilities to lead in policy implementation, monitoring and evaluation. As a result, policy intentions are oftentimes not followed through; capacity needs are not identified and regular reporting mechanisms on status of policy implementation are not established.</p>	
Environment Assessment Guidelines, 2012	<p>Describes generic steps and good practices in EIA. It also lays out procedures for scoping of projects, environmental impact assessment and for preparation of Environmental Management Plans. However, it lacks provisions to safeguard proposed projects from climate change impacts.</p>	<p>National policies to include implementation arrangements with defined periods for M&E responsibilities.</p> <p>Environment screening and clearance process should factor climate risks into public investments by implementing mandatory requirements to demonstrate consideration of climate risks when seeking environment clearance for projects – be it public or private.</p>
Guidelines for farm road development, 2012	<p>Provides operational details of farm roads planning, budgeting and implementing process. However, the guidelines do not cover any specific aspects that enable assessment and integration of climate proofing of farm roads. This creates a gap in terms of integrating resilience of farms roads to climate change impacts in the future.</p>	<p>The national budget release process as well as public procurement should include assessment of climate resilient designs and provisions in approval of releases and allocation of public works.</p> <p>National policies and guidelines should include implementation arrangements with defined periods for M&E responsibilities.</p>

<p>Bhutan Building Regulations, 2002</p>	<p>Provides details on the legal permissions and utility connections; use of space; structural controls focusing on stability of the buildings; architectural controls focusing on traditional elements of the designs, lighting, ventilation, safety, drainage, floor space, drainage and sanitary requirements; planning controls such as height, basement, set back requirements, basement, parking and paintings.</p> <p>Building regulations as well as codes do not have provisions for climate change such as minimizing energy consumption and conservation, climate friendly insulations, flood and land slide management in the regulations.</p>
<p>Regulations for Environment Clearance of Projects, 2001</p>	<p>Provides delegation of power to relevant sectors for issuance of environmental clearances and prescribes procedure and requirements to be fulfilled prior to issue of environmental clearance. The environment assessment report format of a proposed project requires project description; alternatives to the project; information on existing environment at the project location; assessment of positive and negative impacts of the project and mitigation measures.</p> <p>There is scope for consideration of impacts on the project from climate change and its mitigation measures in order to enable resilience of proposed projects to impacts of climate change.</p>

Policies	Gaps/Conflicts/Inconsistencies	Implications and recommended actions
The Water Regulations of Bhutan, 2014	It requires the MoHCA to develop and maintain an efficient information dissemination system to inform the public in times of water related natural disasters and coordinate on preparedness and mitigation measures to be taken during such events. The water regulations promulgate for water eco-efficient infrastructure for both drinking water and irrigation schemes and where feasible promulgates hydropower projects to consider for multiple uses such as drinking water, irrigation and recreational purposes. This aspect reflects climate resilient intention of the regulations. However, operationalization of this intention is not specified in the RWSS policy or in the national irrigation policy.	

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