

TERMINAL EVALUATION (Final Draft)
30 September 2018 (updated on 27 Jan 2019)

**Addressing the Risks of Climate-induced Disasters through
Enhanced National and Local Capacity for Effective Actions**

UNDP PIMS ID: 4760
GEF Project ID: 4976

Country : Bhutan
Region : Asia & Pacific
Focal Area : Climate Change
GEF Agency : United Nations Development Program [UNDP]
Executing Partner : National Environment Commission Secretariat
Implementing Partners : Gross National Happiness Commission,
Ministry of Economic Affairs,
Ministry of Works and Human Settlement,
Ministry of Home and Cultural Affairs,
Ministry of Agriculture and Forests,
Phuentsholing Thromde,
Mongar Municipality,
Tarayana Foundation

Project Time frame : 01-01-2014 to 31-10-2018

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The report summarizes the terminal evaluation conducted between 06 to 22 August 2018 on achievements and key lessons of the Project executed by the National Environmental Commission Secretariat of Bhutan in collaboration with UNDP Bhutan.

Any errors of omission and commission shall remain the responsibility of the authors.

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List of Acronyms and Glossary of Bhutanese Terms

Acronyms

ABI	Association of Bhutanese Industries
ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
AWLS	Automated Water Level Station
AWP	Annual Work Plan
AWS	Automated Weather Station
BCCL	Bhutan Carbide and Chemicals Limited
BFAL	Bhutan Ferro Alloys Limited
CC	Climate Change
CBDRM	Community Based Disaster Risk Management
CCA	Climate Change Adaptation
CD	Capacity Development
CSO	Civil Society Organization
DDM	Department of Disaster Management
DES	Department of Engineering Services
DGM	Department of Geology and Mines
DHMS	Department of Hydro Meteorological Services
DM	Disaster Management
DMC	Disaster Management Committee
DMIs	Disaster Management Institutes
DoFPS	Department of Forests and Park Services
FEMD	Flood Engineering and Management Division
FFMP	Forest Fire Management Programme
FYP	Five Year Plan
GEF	Global Environment Facility
GFDRR	Global Facility for Disaster Reduction and Recovery
GHG	Greenhouse Gas Emission
GLOF	Glacial Lake Outburst Flood
GNH	Gross National Happiness
GNHC	Gross National Happiness Commission
IEEE	Institute of Electrical and Electronics Engineers
IWRM	Integrated Water Resource Management
JICA	Japan International Cooperation Agency
KAP	Knowledge, Attitude and Practice
KRAs	Key Result Areas
LDCF	Least Developed Countries Fund
LDCs	Least Developed Countries
LFA	Logframe Analysis
M & E	Monitoring and Evaluation
MoAF	Ministry of Agriculture and Forests
MoEA	Ministry of Economic Affairs
MoHCA	Ministry of Home and Cultural Affairs

MoWHS	Ministry of Works and Human Settlement
NAPA	National Adaptation Programme of Action for Climate Change
NCHM	National Centre for Hydrology and Meteorology
NEC	National Environment Commission
NECS	National Environment Commission Secretariat
NGOs	Non-Governmental Organizations
NKRAs	National Key Result Areas
NWFWC	National Weather and Flood Warning Center
PB	Project Board
PIA	Pasakha Industrial Area
PIMS	Process Information Management System
PMU	Project Management Unit
PWG	Project Working Group
RBF	Result Based Framework
RGoB	Royal Government of Bhutan
SAPA	Sectoral Adaption Plan of Action
SDGs	Sustainable Development Goals
SMART	Specific, Measurable, Achievable, Reliable, Time bound
SOPs	System Operating Procedures
SPVs	Special Purpose Vehicles
SWS	Single Window Service
TAG	Technical Advisory Group
TE	Terminal Evaluation
TOR	Terms of Reference
UN	United Nations
UNDP	United Nations Development Programme
USD	United States Dollar
WRCD	Water Resources Coordination Division

Glossary of Bhutanese Terms

Chiwog	Village or a group of few hamlets
Dzongkhag	District
Dungkhag	Sub-District
Gewog	A county, the lowest government administrative unit
Thromde	Municipality

Executive Summary

This report is the result of the terminal evaluation mission which took place from 6 to 22 August 2018. It was conducted according to the 2012 “Guidance for Conducting Terminal Evaluations of UNDP-supported, GEF financed Projects”.

A. Project Summary Table

Project Title	Addressing the Risks of Climate-induced Disasters through Enhanced National and Local Capacity for Effective Actions		
UNDP Project ID (PIMS #):	4760	PIF Approval Date:	25-06-2012
GEF Project ID:	4976	CEO Endorsement Date:	24-03-2014
ATLAS Business Unit, Award #, Project ID:	Business Unit: BHU 10 Award ID: 00076998 Project ID: 00088072	Project Document (ProDoc) Signature Date (date project began):	18 -04- 2014
Country:	Bhutan	Date project manager hired:	01-01-2012
Region:	South Asia	Inception Workshop date:	12-06- 2014
Focal Area:	Climate Change	Midterm Review completion date:	06-12-2016
GEF Focal Area Strategic Objective:	<ol style="list-style-type: none"> 1. Reduce the vulnerability of people, livelihoods, physical assets and natural systems to the adverse effects of climate change; 2. Strengthen institutional and technical capacities for effective climate change adaptation; and 3. Integrate climate change adaptation into relevant policies, plans and associated processes. 	Planned closing date:	17-03-2018
Trust Fund:	NA	If revised, proposed op. closing date:	30-10-2018
Executing Agency/ Implementing Partner:	National Environment Commission Secretariat		
Other execution partners:	Gross National Happiness Commission, Ministry of Economic Affairs, Ministry of Works and Human Settlement, Ministry of Home and Cultural Affairs, Ministry of Agriculture and Forests, Phuentsholing Thromde, Mongar Municipality, Tarayana Foundation		

Project Financing	<i>at CEO endorsement (US\$)</i>	<i>at Terminal Evaluation (US\$)</i>
[1] GEF financing:	11,491,200	11,908,005
[2] UNDP contribution:	N.A	N.A
[3] Government:	38,411,163	38,411,163
[4] Other partners:	17,709,766	15,866,309
[5] Total co-financing [2 + 3 + 4]:	56,121,229	55,877,472
PROJECT TOTAL COSTS [1 + 5]	67,612,429	67,785, 477

**estimated*

B. Project Description in Brief

The overarching goal of the project is to safeguard Bhutan’s key economic development infrastructure, to strengthen resilience against climate-induced water scarcity and in general terms to strengthen national and local capacity for natural disaster response and climate resilience.¹ This is consistent with and underpinned by several important policies and strategies governing Bhutan’s national development in addition to meeting the GEF adaptation goals of:

- i. reducing vulnerability to lives, livelihoods, physical assets and natural systems to the adverse effects of climate change;
- ii. strengthening institutional and technical capacities for effective climate change adaptation; and
- iii. integrating climate change adaptation into relevant policies, plans and associated processes.

The project Outcomes address the following key adaptation issues identified by Bhutan:

- i. Safeguarding Gewog, town and Pasakha Industrial Area (PIA) from critical landslides and flash floods while systematizing technical and institutional solutions implemented under the outcome for application nationwide;
- ii. Conducting a water resource inventory and developing adaptation solutions for increased droughts in rural areas as well as Mongar town, introducing innovative technical and development approaches, as well as strengthening local institutions to prepare and respond to climate induced disasters, including forest fires;
- iii. Climate change data captured, analyzed and disseminated for increased resilience of development activities and response to climate induced disaster, through the strengthening of the national hydromet network and early warning system. Overall national capacity for

¹The project aims to address the barriers to adaptation that include weak data collection methods, capacity constraints of the government, inadequate cross-disciplinary thinking, leading to fragmented policy making processes

climate change resilience reinforced through strengthened institutional leadership and improved knowledge for climate resilient policy development.

The project leans heavily on relevant policy and vision documents of the Royal Government of Bhutan, such as: National Forest Policy, National Environmental Strategy, Bhutan Vision 2020, Disaster Management Act of Bhutan 2013, Bhutan National Adaptation Programme of Action 2006, Intended Nationally Determined Contributions project. This ensures that the policy context of the project is endorsed by stakeholders and governments.

This project has been conceived with the objective to enhance national, local and community capacity to prepare for and respond to climate-induced multi-hazards to reduce potential losses of human lives, national economic infrastructure, livelihoods and livelihood assets.

C. Evaluation Rating Table

Evaluation Ratings:			
1. Monitoring and Evaluation	<i>Rating</i>	2. IA & EA Execution	<i>Rating</i>
M&E design at entry	S	Quality of UNDP Implementation – Implementing Agency (IA)	HS
M&E Plan Implementation	MS	Quality of Execution - Executing Agency (EA)	HS
Overall quality of M&E	S	Overall quality of Implementation / Execution	HS
3. Assessment of Outcomes	<i>Rating</i>	4. Sustainability	<i>Rating</i>
Relevance	R	Financial resources	ML
Effectiveness	S	Socio-political	ML
Efficiency	S	Institutional framework and governance	ML
Overall Project Outcome Rating	S	Environmental	L
		Overall likelihood of sustainability	ML

**Details can be found at 5.8 Further Notes on Evaluation*

Ratings for Effectiveness, Efficiency, Overall Project Outcome Rating, M&E, IA & EA Execution	Sustainability ratings:	Relevance ratings
6. Highly Satisfactory (HS): no shortcomings 5. Satisfactory (S): minor shortcomings 4. Moderately Satisfactory (MS): moderate shortcomings 3. Moderately Unsatisfactory (MU): significant shortcomings 2. Unsatisfactory (U): major shortcomings 1. Highly Unsatisfactory (HU): severe shortcomings	4. Likely (L): negligible risks to sustainability	2. Relevant (R)
	3. Moderately Likely (ML): moderate risks	
	2. Moderately Unlikely (MU): significant risks	1 Not relevant (NR)
	1. Unlikely (U): severe risks	
Additional ratings where relevant: Not Applicable (N/A); Unable to Assess (U/A)		

D. Summary of Conclusions, Recommendations and Lessons

Main Conclusions

The Project has showed evidence of its ability to support activities of national and local community disaster management both effectively and efficiently. It has achieved the intended outputs and outcomes as evidenced by the results:

- **C1:** Project design was aligned with national and district priorities in disaster management and institutional development. The activities were effectively carried out.
- **C2:** Coordination by PMU is excellent drawing upon staff resources from several departments and divisions across ministries. There was a certain level of efficiency in the organisation of staff resources to complete some sizeable activity outputs.
- **C3:** Community Engagement in the project has led to positive outcomes. The community was effectively organised.
- **C4:** The capacity level to implement the project activities was excellent at Central government levels. It effectively enhanced the capacity of the staff and updated the manuals and guidelines in the counterpart agencies.
- **C5:** A large volume of data has been effectively collected.
- **C6:** Foundation capacity development of officials, both in-country and study mission abroad, featured highly in the all project activities.
- **C7:** Work Manuals and Guidelines have been written and disseminated.
- **C8:** Many lessons were learnt on Procurement and contracting as there was limited experience at the start of the Project
- **C9:** Impact measurements of the project outcomes and outputs could be better articulated at start of project
- **C10:** Capacity at Dzongkhags was not evenly distributed, as such successes may not be easily replicable and sustainability can be difficult. Some areas (eg Phuentsholing) have competent staff who are able to absorb knowledge shared during trainings and apply them to their work. In more remote areas (eg Samtse, Monggar, Pemagatshel, Tsirang), there was limited capacity for learning, which means that new knowledge and skills are not easily developed.
- **C11:** A high level of sustainability could be made possible if successful project outputs could be replicated across different Dzongkhags, with publications of successful activities in international high impact journals. This will also strengthen capacities at the local levels. If such projects are replicated, then alternative funding from both climate and non-climate financial sources could be obtained with high impact achievement of outcomes and outputs.

Key Recommendations

The Project has certainly achieved many project outputs and outcomes. It has capacitated the central levels of RGoB and touched the lives of the local villages. It is a commendable effort. Moving forward, the departments and divisions must and should extend the success that they have achieved. The key is the sustainability factor. To ensure sustainability, there should be:

- **R1: Thematic Focused Training with Activity Based Capacity Development-** The Project training sessions covered many Disaster Management (DM) activities without one large, single focus. Given the modest resources available, it could have been more efficient and effective to focus on a single theme with project and capacity development activities under one overarching umbrella, such as Activity Based Capacity Development.
- **R2: Replication-**Replication of successful activities for present as well as future projects (for example, water filtration, weather forecasting technique transfer to flood forecasting and forest

fire; lessons in hydrological mapping; capacity development at Central level replicated to local level)

- **R3: Publication and Funding for Innovations to Enhance Resilience against Climate-Induced Risks**-Publication of success and unique innovative approaches in international high impact journals: Nature or similar journals, or publications under Springer Nature Group
- **R4: Advanced Capacity Development**-Advance capacity development changing three key pillars of success: attitudes, behaviour and commitment (ABC Principle) of officials and stakeholders; linking specific skills development specifically to a project, such as Water Transfer Pricing.
- **R5: Big Data Analytics Deployment**-Big data analytics to be deployed, starting with climate change data collected from weather stations, to help develop data models that can be used for analysis, forecasting and simulation.

For more details, please refer to *4.4 Practices in addressing issues relating to relevance, performance and success*

1.0 Introduction

1.1 Purpose of the Terminal Evaluation

The Terminal Evaluation focuses on the assessment of the achievement of project results as originally planned. It reviews the risk of non- sustainable impact. It reviews the contribution to capacity development and the continuity of that development.

1.2 Scope and Methodology

The terminal evaluation was conducted from 06 to 22 August 2018. It consisted of field visits, interviews with key informants, focus groups and desk review. The focus of the evaluation is on the delivery of the project's results as originally planned. It reviews the impact and sustainability of results, including its contribution to capacity development and achievement of global environmental benefits/goals. The evaluation is conducted from the program strategy, project design, how effectively and efficiently implemented, and management arrangements and sustainability as established in the TORs. The evaluation was linked to evidence observed in the field work and desk research to the project activities.

Data gathering and focus group techniques

Focus group discussions [FGDs] were conducted in the field from 09 to 21 August 2018.

- i. Firstly, the primary data came from face-to-face, audio-recorded semi-structured interviews with approximately 50 respondents and observational research was conducted in 3 focus group sessions to capture the context. Group psychology and negotiation skills were applied to obtain the responses from respondents.
- ii. FGD interviews consisted of conversations focusing on capturing the essence, meaning or significance of the experiences of respondents within their work environment. The FGD interviews conversations allowed the Consultant to learn about the experiences, feelings, hopes, views and opinions expressed in the words of the respondents on NAPA II.
- iii. The FGDs were kept informal, open-ended and conversational. The order of sequence for the interview questions was flexible and dynamic, and allowed follow-up questions to clarify.

One to One Interviews

These interviews were conducted with greater details, especially when asking questions or discussing topics which may be deemed as sensitive. There were 7 one-to-one interviews with a significant amount of in-depth information gathered.

Contextual Observations

Secondly, contextual observational inquiry added value to the face to face FGDs. Besides providing the context on different work place settings (individual or group setting; farmers

or contractors, government officers or farmers; workplace or outside the workplace), the Consultant could immerse into the world of officials, engineers and beneficiaries.

Sampling

This sampling did not follow any statistical method. It was dependent who came for the FGD workshops. However, it was understood that respondents were of the “right” profile. Of the 25 key respondents, 28% were female [7] whilst 72% were male [18]. Furthermore, data sampling was triangulated at all levels, namely: i) officials handling policy); ii) technical staff in the field; and iii) project beneficiaries. Through these interactions, the

The review began with a kick-off meeting coordinated by Netra Sharma of PMU, NEC-UNDP and project counterparts for various departments of RGoB. A detailed itinerary for the evaluation was then drawn up and contacts from all stakeholders were secured. The TE was carried out by an international consultant, Dr John Vong from the International Centre for ASEANA Management (ICAM), with the support of a national counterpart, Mr Yeshi Dorji.

1.3 Structure of the Terminal Evaluation Report

The report is divided into five major sections:

- **Section 1** summarizes the project together with major findings, scoping and methodology.
- **Section 2** outlines the development context and discusses the problems that the project sets out to address, the strategy adopted, operationalization arrangements and key milestones and stakeholders impacted by the Project.
- **Section 3** reports the key findings from the projects and presents under the perspectives of project strategy, project implementation and project results.
- **Section 4** reveals the main conclusions, key recommendations and important lessons.
- **Section 5** provides annexure with case studies from Mongar and Phuentsholing Thromde.

2.0 Project description and development context

2.1 Project start and duration

Project Implementation Start	: 18-04-2014
Closing Date (Original)	: 17-03-2018
Closing date (Revised)	: 30-10-2018

The project document was signed on 18 April 2014 after the endorsement on 24 March 2014. The First Project Board Meeting was held on 11 June 2014, followed by the Project Inception Workshop on 12 June 2014. The project started in April 2014 for duration of about four years ending by 30 October 2018.

2.2 Problems that the project sought to address

Bhutan is among the countries most vulnerable to climate change in the Asia-Pacific region because of its vulnerable mountain terrain and volatile ecosystems. The country is exposed to multiple hazards, glacial lake outburst floods resulting from glacial melting, flash floods, landslides, windstorms, forest fires, localized changes in rainfall patterns and increasing droughts during dry season. Climate change is projected to significantly magnify the intensity and frequency of these hazards, as has already been evidenced by for example of the glacial lake outburst flood of Luge Tsho in 1994 and more recently the high intensity cyclone Aila which caused major damages in Bhutan in 2009. **The project aims to address the barriers to adaptation that include weak data collection methods, capacity constraints of the government, inadequate cross-disciplinary thinking, leading to fragmented policy making processes.**

The key barriers that need to be addressed for optimization of adaptation impacts include:

- **Basic climate data limitation:** Bhutan's disaster preparedness hinges around insufficient hydro-meteorological data collection infrastructure. This handicaps the government's attempts to undertake scenario planning and understand the sectoral impacts of climate change for Bhutan. One of the wider implications of limited hydromet data availability is the inability for key technical ministries/departments such as the Department of Geology and Mines (DGM) and Flood Engineering and Management Division (FEMD) to integrate climate change risks into the technical assessments.
- **Limited financial resources for climate change and disaster resilience:** A small economy, limited public funds, and competing needs for other development investments, has resulted in a series of small adaptation investments that are fragmented and piecemeal in nature, compared to the magnitude of adaptation challenges to be addressed. Isolated efforts in adaptation planning and implementation has led to disproportionately higher costs while attempting to address annual accumulation of risks, instead of being able to address the risks of floods with a longer-term timeframe.
- **Limited disaster knowledge and information:** Existing knowledge on hazards, such as landslides and floods or drought, is still based on business-as-usual climate scenario. This is also in part, constrained by the limited capacity to gather information around climate variables.

As climate information and the associated capacity to analyze and disseminate it become more widely available, knowledge on both sudden and slow onset disasters will help the government put in place effective contingency plans.

- **Institutional capacity for climate and disaster resilient policy development:** Limited sharing of information between government stakeholders and fragmentation or duplication of roles and responsibilities has led to capacity constraints to address a shared challenge such as climate change. A very low institutional capacity for ‘knowledge management’ hampers evidence-based policy and strategy development for addressing climate change more structurally in Bhutan.
- **Capacity constraints in climate resilient local planning for water and disasters management:** Though a decentralized planning and governance infrastructure exists in Bhutan, there is little awareness and understanding about the possible localized impacts of climate change and variability and resulting vulnerabilities. This has also resulted in the lack of information of sector or demographic-specific vulnerability in Bhutan. Coupled with a lack of systems to share risk information, is the capacity constraints in governance that hampers the mainstreaming of climate evidence into policy planning.
- **Lack of understanding of the benefits for ecosystem-based adaptation measures:** The lack of proper awareness, basic climate data collection infrastructure and limited capacities have resulted in a knowledge gap on combined ecosystem-based management and water infrastructure development and maintenance solutions. Related to this constraint is a typically low level of awareness among planners and investors of the interdependencies inherent in adaptation.

2.3 Immediate and development objectives of the project

The project objective is therefore to: “enhance national, local and community capacity to prepare for and respond to climate-induced multi-hazards to reduce potential losses of human lives, national economic infrastructure, livelihoods, and livelihood assets”. Bhutan requires crucial support to counter immediate threats posed by climate change to vital economic infrastructure, as well as to strengthen national capacity for climate change adaptation and developing adaptation alternatives for projected prolonged periods of drought in rural areas and urban centres.

The overarching goal of the project is to **safeguard Bhutan’s key economic development infrastructure, to strengthen resilience against climate-induced water scarcity and in general terms to strengthen national and local capacity for natural disaster response and climate resilience**. This is consistent with and underpinned by several important policies and strategies governing Bhutan’s national development in addition to meeting the GEF adaptation goals:

- reducing vulnerability to lives, livelihoods, physical assets and natural systems to the adverse effects of climate change;
- strengthening institutional and technical capacities for effective climate change adaptation; and
- integrating climate change adaptation into relevant policies, plans and associated processes

2.4 Baseline Established

The objective indicators focus on mapping the institutional capacity to prepare and respond to climate change impacts. However, the subjectivity in the indicators may render it difficult to operationalize. The capacities of communities and functional nature of institutions need operationalization. It is quite possible that DM institutions can remain functional yet result in no incremental gains in capacities of its members (example: Chukha DM).

The indicators to map the capacity building could be improved and elaborated using variables such as (*level of participation, proportion of population that are not aware of disaster preparedness, level of community cohesiveness, existence of community leadership* etc.). Organizational capacities of DM institutions can be better captured using variables that capture *enrolments, management, financial management, or technical skills* etc.

Project Objective: To enhance national, local and community capacity to prepare for and respond to climate-induced multi-hazards to reduce potential losses of human lives, national economic infrastructure, livelihoods, and livelihood assets.

The baseline for Project Objective is expressed as two indicators:

O1: Local disaster management institutions functional in 16 of 20 Dzongkhags

O2: Mock-drills not widely adopted except 1 # of mock-drills under LDCF GLOF project

Objective: To enhance national, local and community capacity to prepare for and respond to climate-induced multi-hazards to reduce potential losses of human lives, national economic infrastructure, livelihoods, and livelihood assets.							
Indicator	Baseline Indicators	Expected result	Rating				
			S	M	A	R	T
Level of capacity of local communities to prepare for and respond to climate-induced risks.	Local disaster management institutions functional in 16 of 20 Dzongkhags	Communities capacity to prepare for and respond to localized climate-induced risks enhanced: - Existence of functional local disaster management institutions;	N	N	Y	Y	Y
	Mock-drills not widely adopted except 1 # of mock-drills under LDCF GLOF project;	- Adequate response to scenario-based early warning mock-drills (4 no. in Years 3 and 4, in 4 Dzongkhags)	Y	Y	Y	Y	Y
		- Availability of real-time localized weather data (measured in four sample Dzongkhags)	Y	Y	Y	Y	Y
		- Availability of seasonal water resource inventory (measured in 5-6 Gewogs)	Y	Y	Y	Y	Y
SMART: Specific, Measurable, Achievable, Relevant, Time-bound - Green: SMART criteria compliant - Yellow: possibly compliant with SMART criteria - Red: Not compliant with SMART criteria							

Outcome 1: Risk from climate-induced floods and landslides reduced in Bhutan’s economic and industrial center, Phuentsholing and Pasakha Industrial Area

There are three indicators that map the Outcome 1 of reduced risks from climate-induced disasters in Bhutan’s economically and industrially important area; Phuentsholing and Pasakha. Capturing the vulnerability and risk reduction of natural disasters is a long and difficult process. This needs further elaboration and operationalization. Thus, the objective around measurability and achievability are to be reviewed in the absence of an operational definition or boundary conditions of the loss and damage estimation.

The second indicator dealing with landslide risks also aims to achieve a reduced incidence of landslides within the project period. While the project is definitely making tangible impacts on arresting the landslides by slope stabilization and soil nailing techniques, newer and actively destabilized areas are now emerging, raising concerns on the achievability parameter of this indicator in the given timeline.

Vulnerability (and risk perception) indices are by nature static. This attribute could render them ineffective, unless used to capture snapshots at specific points in time. As static indices they are unable to respond to changes happening within the timeline. A more robust indicator will link a physical estimate (flood frequency) with socioeconomic variables that reflect poverty or deprivation (as proxy indicators for vulnerability).

Outcome 1: Risk from climate-induced floods and landslides reduced in Bhutan’s economic and industrial center, Phuentsholing and Pasakha Industrial Area.							
Indicator	Baseline	Expected result	Rating				
			S	M	A	R	T
Reduced damage from floods in the industrial hub of the country, Pasakha.	Heavy damages on some of the industrial units in Pasakha and the BFAL/BCCL residential colony. Climate-induced floods and landslides impact industrial operations and socio-economic activities	Erosion in Barsa watershed and sedimentation and flooding in Barsa river is reduced due to comprehensive mitigation measures, reducing the occurrence of floods resulting in damages by 25% Flood protection measures in place protecting lives and safeguarding economic assets from Barsachu flooding.	Y			Y	Y
Number of active and unstable landslides in Phuentsholing area	Pasakha Industrial Area, Phuentsholing Urban Area and the Phuentsholing-Thimphu Highway are among the most impacted	Four critical landslide sites in Phuentsholing, Rinchending area stabilized and contained within existing boundaries, safeguarding economic assets	Y	Y		Y	Y

<p>Vulnerability and risk perception index [AMAT 1.2.15] Proportion of men in households that perceive landslides and floods as a major concern; Proportion of women in households that perceive landslides and floods as a major concern; Proportion of industrial units that perceive floods as a major concern;</p>	<p>GNH Survey 2010 reports that 29% of the surveyed population perceive landslides as a major concern and 26% perceive floods as a major concern.</p> <p>50.9% of the interviewed Phuentsholing and Pasakha residents perceive landslides as a major concern (58.7% for male and 33.9% for female)</p> <p>49.6% Pasakha residents perceive floods as a major concern (or 55.4% for male and 36.8% for female) (based on ad hoc preliminary survey during PPG);</p>	<p>Proportion of women in households that perceive landslides and floods as a major concern reduced by 30%</p> <p>Proportion of industrial units that perceive floods as a major concern reduced by 30%</p>	Y	Y	Y	Y	Y
<p>SMART: Specific, Measurable, Achievable, Relevant, Time-bound</p> <ul style="list-style-type: none"> - Green: SMART criteria compliant - Yellow: possibly compliant with SMART criteria - Red: Not compliant with SMART criteria 							

Outcome 2: Community resilience to climate-induced disaster risks (droughts, floods, landslides, windstorms, forest fires) strengthened in at least four Dzongkhags

Indicators for Outcome 2 attempt to map the impacts in three different planes; knowledge (Inventorying), technology (practices) and resilience (additional storage).

A Knowledge Attitude-Practice (KAP) tool can offer a logically superior method to capture the behavioral, attitudinal and knowledge changes as impacts of the program. The indicators are SMART though. A possible constraint that may arise in the future is the barrier in combining qualitative insights (from water resource inventories) with quantitative statistics (additional inches/cms. of water storage created); symptomatic of problems of a mixed methods estimation.

The indicators used to map social capital (existence of operational DM institutions at district level) could be further improved by designing a more comprehensive/holistic indicator set that maps *governance, management, resource use, service delivery, financial and sustainability dimensions*. The current set of indicators though, definitely meets the SMART criteria. Our field visits suggested that community institutions with higher participation ratios, promoting thrift-associations and livelihood oriented (example: Khengkhar) score higher than singularly tasked institutions (DM institutions). The extent of co-financing (in kind/cash) offered by an institution as a proportion of the total costs could also better capture the extent of community resilience.

Outcome 2: Community resilience to climate-induced disaster risks (droughts, floods, landslides, windstorms, forest fires) strengthened in at least four Dzongkhags.							
Indicator	Baseline	Expected result	Rating				
			S	M	A	R	T

<p>Water resource inventories, water harvesting technology and additional water storage capacity available in some the most drought-prone communities of Bhutan</p>	<p>No systematic water resources inventory has taken place due to limited funds and technical capacity Several villages and urban centers in various Dzongkhags experience water scarcity in the wake of declining water availability.</p>	<p>Up-to-date community-level water resource inventory and database in place in at least four Dzongkhags, feeding into national water resources inventory /database;</p> <p>One Municipal water supply system made climate resilient, serving 6,000 beneficiaries.</p> <p>20 villages/ hamlets have adopted climate-resilient water harvesting approaches, -technology and efficient water management practices, therewith reducing water scarcity for some 420 rural households.</p>	<p>Y</p>	<p>Y</p>	<p>Y</p>	<p>Y</p>	<p>Y</p>
<p>Existence and operationalization of disaster management committees at the local level</p>	<p>The Disaster Management Act (2013) stipulates the creation of disaster management committees and formulation of disaster management plans at national and local levels, but have been established at present in four pilot Dzongkhags only.</p> <p>No community-based forest fire management plan and mechanism to systematically guide effective and coordinated forest fire management at the local level, though forest fire is a recurrent phenomenon.</p>	<p>Local-level disaster management committees (DMCs) established, capacitated and functional in at least four Dzongkhags prone to climate-induced disasters;</p> <p>Climate-induced disaster management plan developed, including for forest fire management, and integrated in local development plans and programmes in four Dzongkhags.</p>	<p>Y</p>	<p>Y</p>	<p>Y</p>	<p>Y</p>	<p>Y</p>
<p>SMART: Specific, Measurable, Achievable, Relevant, Time-bound</p> <ul style="list-style-type: none"> - Green: SMART criteria compliant - Yellow: possibly compliant with SMART criteria - Red: Not compliant with SMART criteria 							

Outcome 3: Relevant information about climate-related risks and threats shared across development sectors for planning and preparedness on a timely and reliable basis.

Outcome 3 is measured against the impacts on physical assets created and the consequent demand that arises from the creation of weather-climate-services infrastructure. As a result, these indicators meet the SMART criteria and are highly objective. The indicators mapping AWS and AWLS

infrastructure that is part of a larger node of information gathering points for the NWFVC are able to map the project progress. However, the indicators on demand generation can be further sharpened to include the *number of data products created, end user categories identified and the resolution/quality of data generated*, which can also provide snapshots of the nature of demand.

Outcome 3: Relevant information about climate-related risks and threats shared across development sectors for planning and preparedness on a timely and reliable basis.							
Indicator	Baseline	Expected result	Rating				
			S	M	A	R	T
Availability and the level of use of localized climate information.	The current network of meteorological stations is limited to 24 stations, of which only 3 are automated. Most cater to GLOF risks	Network with national coverage of minimum # 63 new real-time weather stations and # 39 new flood measurement stations	Y	Y	Y	Y	Y
Number and location of real-time weather observation, forecasting and warning stations that feed data into the NWFVC	The NWFVC is in a nascent stage supported by a small network of meteorological stations and with insufficient capacity to analyze, manage, and disseminate climate information in a timely manner.	NWFVC operational, with a core team of at least 10 members trained and established for climate data analysis, management and dissemination;	Y	Y	Y	Y	Y
Number of sectors using climate information to make their development policies and plans climate resilient	Demand for and use of localized climate information is yet unclear and undervalued Due to sector fragmentation little exchange of knowledge, lessons and experiences takes place, existing platforms are shaped around national programmes (like NAPA working group) but do not function adequately outside the framework of these programmes due to limited capacity of NECS for multi-stakeholder process facilitation and sector leadership	Climate data/ information user training provided to at least 100 staff of key data user agencies, Updated weather forecasting and localized climate information disseminated on a daily basis through web portal, media and other means At least three evidence-based policy influencing documents disseminated through NECS National climate change policy framework in place (CC adaptation and synergies), with gender segregated policies and monitoring framework	Y	Y	Y	Y	Y
SMART: Specific, Measurable, Achievable, Relevant, Time-bound - Green: SMART criteria compliant - Yellow: possibly compliant with SMART criteria - Red: Not compliant with SMART criteria							

2.5 Main stakeholders

The project has strong engagement with stakeholders from various sections of the society including, but not limited to government organizations and departments, civil society, community leaders, resource use groups and academia. The project document shows a robust analytical framework that evaluated the stakeholder engagement baseline. Prior to commencement of stakeholder discussions, a review was undertaken of existing policies, projects and legal frameworks with relevance to the proposed project as outlined in the approved PIF. **A total of 109 individuals (75 men and 34 women) and 20 industries were consulted during the preparatory phase.** Stakeholder roles and responsibilities are tabled below:

National Environment Commission Secretariat	Lead responsible agency and PMU	Output 2.2 Output 3.3
Gross National Happiness Commission Secretariat	Overall delivery and monitoring of GEF/LDCF financing and project implementation.	Cross-sector
Gewog Thromde	Implementing partner and Lead responsible agency	1.1, 1.2
Department of Geology and Mines	TA support for designing activities, site identification and Hazard mapping	Outputs 1.2, 1.3, 1.4
Department of Engineering Services	TA support for designing activities and interventions	Outputs 1.1, 2.1
Mongar Municipality	Local context support for water sector interventions in Mongar	Output 2.1
Tarayana Foundation	Implementation and Community mobilization for water sector interventions	Output 2.2
Local Communities	Ownership, Management and Feedback for interventions as ultimate beneficiaries	All
Department of Disaster Management	TA support for designing interventions	Output 2.3
Department of Forests and Park Services	TA support, Training and institutional integration of CFFM groups (Forest Fire)	Output 2.3
Department of Hydro Meteorology Services (National Center for Hydrology and Meteorology)	Technical Inputs for designing interventions	Outputs 3.1, 3.2
Dzongkhag administrations	Local knowledge and context/feedback for activities, integration of climate services evidence for local planning	Outputs 1.1, 1.2, 2.1, 2.2, 3.1, 3.2

2.6 Expected Results

Project Objective: To enhance national, local and community capacity to prepare for and respond to climate-induced multi-hazards to reduce potential losses of human lives, national economic infrastructure, livelihoods, and livelihood assets.

- ✓ Communities capacity to prepare for and respond to localized climate-induced risks enhanced:
 - Existence of functional local disaster management institutions

- Adequate response to scenario-based early warning mock-drills (4 drills in Years 3 and 4, in 4 Dzongkhags)
- Availability of real-time localized weather data (measured in four sample Dzongkhags)
- Availability of seasonal water resource inventory (measured in 5-6 gewogs)

Project Outcome 1: Risk from climate-induced floods and landslides reduced in Bhutan's economic and industrial hub, Phuentsholing and Pasakha Industrial Area

- ✓ Erosion in Barsa watershed and sedimentation and flooding in Barsa river is reduced due to comprehensive mitigation measures, reducing the occurrence of floods resulting in damages by 25%;
- ✓ Reduced annual cost of riverbed dredging in Pasakha Industrial Area by 30%
- ✓ Four critical landslide sites in Phuentsholing, Rinchending area stabilized and contained within existing boundaries, safeguarding economic assets;
- ✓ Proportion of women in households that perceive landslides and floods as a major concern reduced by 30%;
- ✓ Proportion of men in households that perceive landslides and floods as a major concern reduced by 30%;
- ✓ Proportion of industrial units that perceive floods as a major concern reduced by 30%

Project Outcome 2: Community resilience to climate-induced disaster risks (droughts, floods, landslides, windstorms, forest fires) strengthened in at least four Dzongkhags

- ✓ Up-to-date community-level water resource inventory and database in place in at least four Dzongkhags, feeding into national water resources
- ✓ inventory/database;
- ✓ One Municipal water supply system made climate resilient, serving 6,000 beneficiaries. 20 villages/hamlets have adopted climate-resilient water harvesting approaches, technology and efficient water management practices, therewith reducing water scarcity for some 420 rural households;
- ✓ Local-level disaster management committees (DMCs) established, capacitated and functional in at least four Dzongkhags prone to climate-induced disasters;
- ✓ Climate-induced disaster management plan developed, including for forest fire management, and integrated in local development plans and programmes in four Dzongkhags

Project Outcome 3: Relevant information about climate-related risks and threats shared across development sectors for planning and preparedness on a timely and reliable basis.

- ✓ Network with national coverage of minimum # 63 new real-time weather stations and # 39 new flood measurement stations established;
- ✓ NWFFWC operational, with a core team of at least 10 members trained and established for climate data analysis, management and dissemination;
- ✓ Climate data and information user training provided to at least 100 staff of key data user agencies;
- ✓ Updated weather forecasting and localized climate information disseminated on a daily basis through web portal, media and other means;

- ✓ At least three evidence-based policy influencing documents disseminated through NECS National climate change policy framework in place (CC adaptation and synergies), with gender segregated policies and monitoring framework.

3.0 Findings

The NAPA II project is a large donor programme working with the RGoB to achieve local level, climate-induced disaster risk reduction and adaptation to climate change. The programme has generated outputs that are likely to contribute in achieving its impact statement of enhancing the ability of the poorest and most vulnerable people to adapt to the impact of climate and climate-induced disasters.

The achievement of the programme is related to the high level of ownership of the government systems – especially from the NEC Secretariat. It has showcased an effective model to operationalize local level climate change-induced disaster risk reduction and management processes using a blended approach led by the government systems of *Dzongkhag* and *Thromde* level and community institutions promoted by NGOs and Gewog and local levels. The programme achieved the use of participatory approaches in programme planning and management.

The design and implementation of climate change adaptation activities could be strengthened, with a more strategic approach to urban resilience, better convergence and increased capacities at provincial/*Dzongkhag* level. Monitoring and learning processes could be improved. Even so, the NAPA II project can offer a great deal of cutting-edge learning for the adaptation and disaster management communities within South Asia and around the world.

The key findings are grouped under the four broad headings of project strategy, progress towards goals, implementation and management and overall sustainability.

3.1 Project Design / Formulation

3.1.1 Analysis of LFA/Results Framework (Project logic /Strategy and Indicators)

In reviewing the effectiveness and efficiency of the programme in meeting its objectives and outcomes, the evaluation assessment reviewed the CPAP outcomes of Bhutan, outcome indicators, and the primary applicable key environment and sustainable development key result areas (KRAs). The evaluation assessment also addressed the project strategy, indicators, baseline, end of project target, source of verification and risk and assumptions. The final conclusion is that the LFA design has taken careful consideration of the CPAP outcomes and was aligned to the key environment and sustainable development KRAs. Furthermore, it is found that the LFA was prepared with in-depth thinking, accurately described end of project goals, listed the sources of verification, and correctly identified the risks and the assumptions.

The Results Based Framework (RBF) indicators were clearly described with the source of verification and end of project targets. There were 14 indicators in total, two at the outcome level, two mapped to project objectives, and the remaining indicators reflected against outputs and activities.

The project took serious consideration to stakeholder participation in project design, decision making, planning, implementation and monitoring. For example, in PIA, the stakeholders' views, such as the downstream communities, were invited to design interventions and technical discussions on structure parameters. This translated to a visible increase in confidence and ownership of project activities in the area.

The project's objective was consistent with several development priorities of RGoB and sub-national administration through the project activities. A consultative approach was followed in the development and design of project outputs and activities. This improved project ownership.

Some project activities generated unintended positive outcomes, which were unplanned at project design (for example, impact on educational and health outcomes of project beneficiaries in Mongar, Pemagatshel, Tsirang and Samtse from work done by Tarayana Foundation).

The overall objective of this programme is *'to enhance national, local and community capacity to prepare for and respond to climate-induced multi-hazards to reduce potential losses of human lives, national economic infrastructure, livelihoods, and livelihood assets in Bhutan'*. The programme has three outputs, and a summary of assessment of achievements is provided below.

The nation of Bhutan requires critical support to counter immediate and potential threats posed by climate change to economic assets and livelihoods. There is a need to strengthen national capacity for climate change adaptation and developing adaptation alternatives for floods, droughts, landslides and windstorms that take place in rural areas and urban centers.

The proposed outcomes and outputs of the Project individually address specific needs identified by NAPA. Collectively the outcomes and outputs present a comprehensive solution with adequate level of synergy to strengthen the national and local capacity for disaster and climate change resilience. The main objective of the project is to protect Bhutan's key economic development infrastructure, to strengthen resilience against climate-induced water scarcity and to increase national and local capacity for disaster management and climate resilience. This objective is consistent with and aligned to a number of national policies and guidelines governing Bhutan's national development.

In our evaluation the project design has considered the development priorities of the RGoB that provided agreement from the government and national stakeholders. The project activities were driven by measurable results. There was alignment with local planning and reinforced stakeholders' engagement and supported them on their achievement of priorities. The evidence suggested that the project increase awareness of climate change and brought the idea into planning for non-NAPA funds (for example, the Phuentsholing Municipality included flood resilience planning in Barsa river project with Asian Development Bank support).

The project design was strategically bonded with the Sustainable Development Goals of Bhutan. The high level of consistency between UN SDGs (2030), GEF strategic priorities for LDCs and locally policy frameworks brought testimony to the project design. The project was developed over the period of 2012 -2013, with endorsement from the GEF CEO received in April 2014. At

the inception phase in 2014, the project team made an extensive updated review of policies and experience from other projects and initiatives; these are documented in detail in the project document and shown here under 3.1.7. Environmental and social risk screening was conducted in the project preparation.

There were similar objectives in both the NAPA project and the Eleventh Five Year Plan (2013-2018) especially on the GEF-Adaptation goals and UNSDGs (2030). Incidentally, at a higher level 15 goals under the SDGs are integrated with the 16 National Key Result Areas (NKRA) of the 11th Five Year Plan suggesting reconciliation of national level priorities. Bhutan has promoted mitigation and adaptation measures for crop and livestock production through the national strategy on climate change adaptation of the Sectoral Adaptation Plan of Action (SAPA) (MOAF, 2014). Furthermore, during the Paris Climate Summit in December 2015, Bhutan committed to be carbon neutral, whereby emissions of greenhouse gases (GHGs) will not exceed the estimated 6.3 million tons of CO₂ sequestered in forests (NEC, 2015).

3.1.2 Risks and Assumptions

The Risks and Assumptions were identified correctly and foreseen in the LFA right from the project design.² However, the risk mitigation measures were mentioned separately in a different annex. It is recommended that risk mitigation measures should be mentioned together with risks identified, not separately. The risks and assumptions are listed by project objective and outcomes as shown below.

Project Objective: To enhance national, local and community capacity to prepare for and respond to climate-induced multi hazards to reduce potential losses of human lives, national economic infrastructure, livelihoods, and livelihood assets.

Risks

- Difficulty in coordinating various outcomes and outputs by different agencies leading to silo approach;
- Complex technical and organizational management of the processes and results.

Assumptions

- Government funding is available to sustain and consolidate the interventions after the conclusion of the project.

Project Outcome 1: Risks from climate-induced floods and landslides reduced in Bhutan's economic and industrial hub, Phuentsholing and Pasakha Industrial Area.

Risks

- Flood risk mitigation and slope stabilization measures may have a long gestation period and does not show visible results at end of project;
- Widespread geological activity fragility in the area and extreme rainfall events may trigger flood and landslides at locations not envisaged in the project;

² Project Document NAPA II published by National Environment Commission 2014

- Theft and vandalism of materials used for slope stabilization structures (for example, galvanized iron mesh used in gabion walls) by vandals, especially given the proximity contiguity of the landslide areas to the porous international borders.

Project Outcome 2: Community resilience to climate-induced disaster risks (droughts, floods, landslides, windstorms, forest fires) strengthened in at least four Dzongkhags.

Risks

- Limited in-country experience and knowhow of climate resilient water harvesting technology may lead to inappropriate technology choices;
- Local administration accords low priority in establishing and strengthening local institutions for disaster management because of heavy existing workload.

Assumptions

- Local government and administration have adequate capacity to build upon flood disaster management.

Project Outcome 3: Relevant information about climate-related risks and threats shared across development sectors for planning and preparedness on a timely basis.

Risks

- Compatibility of different elements (equipment) of the hydromet network and NWFWC;
- Support from JICA changed delayed or cancelled;
- Sectors unwilling to integrate climate risks into policies and activity designs because of more challenging complexity and likelihood of a higher budget requirements and thus in short term perceived less benefits.

Assumptions

- In-country capacity is available or built from operation and maintenance of hardware;
- Spare parts for replacement are readily available in the event of damage or dis-repair.

3.1.3 Lessons from other relevant projects incorporated into project design

During the terminal evaluation process, there was evidence that lessons from other relevant projects were considered and taken directly to support the NAPA II project design. The outcomes of the project were aligned to lesson and knowledge derived from nine projects of direct relevance and are listed below:

- UNDP/GEF/LDCF Project on Reducing Climate Change Risks and Vulnerabilities from GLOFs (2008-2013);
- Bhutan Recovery and Reconstruction Project (January 2010 to December 2011);
- World Bank/GFDRR project on Improving Disaster Management Capacity in the Kingdom of Bhutan (2012-2013);
- BTF-National Water Resources Inventory Project (2012-2014);
- Local Governance Sustainable Development Programme (in the pipeline for 2013-2018);

- ADB Bhutan Sub-regional Project for Phuentsholing (Regional Transport Development in South Asia) (2015-2017);
- JICA's project for Capacity Development of GLOF and Rainstorm Flood Forecasting and Early Warning in the Kingdom of Bhutan (2013-2015);
- Tarayana's support in poverty reduction through Self-Help Groups – support from Helvetas and ADB;
- Joint Support Programme (2008-2013).

3.1.4 Planned stakeholder participation

The project has generated strong stakeholder interest, especially at the central government agencies. In terms of project design, the proxy indicators would be the number of agencies involved in planning and attendance during the planning meetings. In the NAPA II Project Document, a total number of 19 agencies were listed along with international development partners such as JICA and World Bank and Tarayana Foundation representing the NGOs. By and large, the minutes of the meetings recorded high attendance. The proxy indicators for participation at project implementation would be output-ownership, attendance at project site meetings, capacity development activities, and additional demand of work packages. During the evaluation interviews, there were sufficient expressions of output-ownership as the project output coordinators were able to provide details of their activity output.

Capacity development featured highly during project implementation. An impressive output of the capacity training is that there was production of guidelines and updating of regulations on disaster management. There was also a demand for additional work. A case in point of Tarayana Foundation provided very positive and newsworthy feedback of their project activities performed at Mongar. The setup of water user groups is another example of stakeholder engagement. It is noted that during the project implementation phase, there was lesser involvement of JICA and World Bank which led to limited clarification. The stakeholder engagement through better communications was active in the first half of the project as attested by the NAPA II Mid Term Report. It created the necessary awareness and continuous interest.

Under Outcome 1, there were some discussions recorded with the Association of Bhutanese Industries. The scope for partnership was not defined. There could be potential collaboration on flood proofing work package, and reduce annual dredging cost, transport cost and socio-economic vulnerability. This would need negotiation skills from UNDP and PMU to bring to fruition.

Under Outcome 2, the NAPA II, Mid-Term Report recommended a functional model of stakeholder engagement that is both replicable and scalable. Documentation of impacts and political economy aspects of the model is required for promotion and wider adoption and recommendation in other programs implemented in Bhutan. In the case of DMIs that are dysfunctional due to a lack of financial resources, the project has the flexibility to innovate around systems for stakeholder engagement, such as Special Purpose Vehicles (SPVs), Single Window Service (SWS) Delivery Systems which can help to overcome the financial and governance constraints. There was little evidence to believe that this recommendation was followed through.

Under Outcome 3, there was ample evidence that capacity building of scale has taken place. This intervention holds great promise to garner stakeholder interest and participation. It is reported that more than 30 capacity building initiatives were recorded (including sponsorships for competitive tests and higher education for selected candidates) with a total spend of US\$ 0.55 million. A total of 555 males and 206 females from various stakeholder groups have undergone expert training on various aspects of climate change and disaster management till date. This is a proxy indicator for stakeholder engagement.

3.1.5 Replication approach

Replication and up-scaling are fundamental objectives of the GEF Programme as it provides the opportunity to build on best practices and lessons learned and expand the reach and impact of its grant making portfolio.³The report further alluded that many voluntary and multi-sectoral National Steering Committees (NSC) of SGP in each country play a fundamental role in contributing to upscale and replicate the best practices identified in the portfolio. As such, UNDP, government agencies and private sector and a majority of civil society organizations, have many opportunities to support the replication and up scaling of the most successful projects and practices through their networks and contacts.

The Pacific IWRM states that replication is the activity of copying the specific features of a water resource or wastewater management approach that made it successful in one setting and re-applying these as part of an Integrated Water Resource Management process in the same or another setting.⁴ Furthermore, the concepts of replication, scaling-up, and mainstreaming are being increasingly promoted as important elements of Integrated Water Resource Management (IWRM) by donors, governments, and non-governmental and community organisations.

For the NAPA II project, this may help integration and replication for scaling up the project impacts. For example, the community water harvesting and storage model under Outputs 2.1.5 – 2.1.10 have emerged as a replicable model that combines risk reduction, and water harvesting with community institutions for DM and livelihoods support. Outputs 3.1 and Output 1.2 can produce greater impact by way of integrating flood plain buffering with AWLS sensor installation through replication and or scaling up. Lastly, capacity building and mock-drills can be mainstreamed into villages and communities along the Mongar or Pasakha river (PIA) for greater benefit.

3.1.6 UNDP Comparative Advantage

UNDP Bhutan works mainly to create an enabling environment to alleviate poverty, realize SDGs and to support the Government in mobilizing global technical expertise and resource mobilization. The UNDP has been in Bhutan since 1979, although country assistance to Royal Government of Bhutan (RGoB) and the Bhutanese people started in 1973. Through this long-term partnership and experience that UNDP's support to Bhutan has evolved to meet Bhutan's development needs at different stages. UNDP's current areas of focus are:

³<https://sgp.undp.org/our-approach-153/replication-and-up-scaling.html>. Accessed on 26/08/2018.

⁴<http://www.pacific-iwrm.org/rsc/third-meeting-documents/16-Replication-Scaling-Up-Mainstreaming-cp.pdf>. Accessed on 26/08/2018

1. Economic Integration and Innovation: To reduce poverty to less than 5 per cent and multi-dimensional poverty to 10 per cent by the end of 2018.
2. Inclusive Governance: To ensure transparent, accountable and inclusive development with efficient public service delivery.
3. Climate Change Mitigation and Energy: To address emerging environmental issues into national policies, plans and programmes and to enhance human development.
4. Climate Change Adaptation and Disaster Risk Reduction: To promote policy and implementation of community-based disaster risk management and to build community resilience to climate change by diversifying livelihoods.

The Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) portfolio strengthens community resilience to climate change impacts by diversifying livelihoods, and improving climate change databases to protect communities from landslides, floods, and other natural calamities. Working with NGOs/CSOs, international partners and the government at the national and local levels, UNDP works to formulate policies and implement community-based disaster risk management projects, which includes:

- Revision of National Environment Strategy (NES)
- Disaster Resilient Construction Phase II
- Response and Recovery Preparedness
- National Adaptation Programme of Action (NAPA) II

For the NAPA II Project, the UNDP has partnered with RGoB for programme execution, with the World Bank and JICA in project planning, and with Tarayana in project implementation for water resource management. UNDP Bhutan holds a comparative advantage to help Bhutan succeed in terms of achievement of project results, given its track record as follows:

- Climate Change: With Bhutan’s glaciers receding at the rate of 30 to 60 meters per decade, UNDP helped mitigate potential disasters from Glacial Lake Outburst Floods (GLOF) in Lunana between 2008 and 2013, protecting villages and agricultural land. Through the project, 350 workers drained lake water lowering the Thorthormi Lake by five meters and averting the immediate threat of flooding.
- Disaster Management: When Bhutan was hit by Cyclone Aila in 2009, 4,614 households were affected at an estimated damage cost of USD 17 million. UNDP channelled international reconstruction efforts, ensuring support to the most vulnerable.

3.1.7 Linkages between Project and Interventions within the Sector

The Project was designed to build upon the foundations, experience and good practice from past initiatives and to seek collaboration where possible with ongoing and or new initiatives for joint learning and development of capacity for effective response to climate-induced disasters and disaster risks at national and local levels. The listings of the relevant projects are tabled below.

Project Title	Key Objectives	Key Implementing Agency(ies)	Relevant Areas
UNDP/GEF/LDCF Project on Reducing Climate Change Risks	The goal of the project is to enhance adaptive capacity to prevent climate change-induced GLOF disasters in Bhutan. The	Department of Geology & Mines, Department of Hydro-met Services,	Community-based disaster risk management, early warning system

and Vulnerabilities from GLOFs (2008-2013)	objective of the project is to reduce climate change-induced risks of GLOFs in the Punakha-Wangdi and Chamkhar Valleys.	and Department of Disaster Management	(Relevant to Outcome 2). It started the CBDRM approach in the country.
Bhutan Recovery and Reconstruction Project (January 2010-December 2011)	Support to affected communities to recover and rehabilitate in the aftermath of major disasters in 2009 particularly the Sept earthquake and Cyclone Aila	Ministry of Home & Cultural Affairs, Ministry of Economic Affairs	Community-based livelihood regeneration, capacity development for disaster response and recovery coordination. While it has contributed to building community DRR capacity, it did not have climate change concerns in the design and has ended. There is little risk of duplication.
World Bank/GFDRR project on Improving Disaster Management Capacity in the Kingdom of Bhutan (2012-2013)	Improve disaster management capacity in terms of formulation of rules and regulations, by-laws and standard operating procedures; institutional set-up at various levels; and sensitization of institutions and committees to DRM concepts and policies, coinciding with the DM Act.	Department of Disaster Management Division / MoHCA	Capacity development for disaster risk management (Relevant to Outcome 2: Co-financing source) It builds the baseline capacity of DDM at the national level.
BTF-National Water Resources Inventory Project (2012-2014)	Completion of national water resources inventory to create information for preparation of National Integrated Water Resources Management Plan	Water Resources Coordination Division	The national water resources inventory provides the basis as it provides the current snapshot of water availability against demand. (Relevant to Outcome 2: Co-financing source) LDCF will integrate GIS mapping and climate modeling as well as building local-level capacity to repeat the assessment.
Local Governance Sustainable Development Programme (in the pipeline for 2013-2018)	The project objectives are sustainable and equitable socio-economic development, conservation and sustainable management of the environment, and good governance at the local level. It is the amalgamation of JSP and LGSP into the next phase coinciding with the strategic context and period of the Eleventh FYP.	GNHC Secretariat and Department of Local Governance/ MoHCA	Capacity development for green inclusive socio-economic development and good governance at the local level. During the inception phase of the project, opportunities will be explored.

<p>ADB Bhutan Sub-regional Project for Phuentsholing (Regional Transport Development in South Asia) (2015-2017)</p>	<p>Improving transport infrastructure conditions for import/export trade through Phuentsholing, including the Pasakha access road.</p>	<p>Phuentsholing Thromde, MoWHS</p>	<p>Landslide management/ flood risk mitigation along Pasakha access road (Relevant to Outcome 1: Co-financing source)</p> <p>LDCF investment will contribute to safeguarding the ADB investment.</p>
<p>Tarayana's support in poverty reduction through Self-Help Groups – support from Helvetas and ADB</p>	<p>Local Self-Help Groups to organize local communities for carrying out activities towards poverty reduction in Mongar, Samtse, Tsirang and Pemagatshel Dzongkhags</p>	<p>Tarayana Foundation</p>	<p>This experience will help mobilize local communities into self-help groups for installation, operation and maintenance of rural water harvesting technologies (Relevant to Outcome 2: Co-financing source)</p> <p>Adaptation actions aiming at reducing vulnerability to water scarcity will be integrated into Tarayana's program</p>
<p>JICAs project for Capacity Development of GLOF and Rainstorm Flood Forecasting and Early Warning in the Kingdom of Bhutan (2013-2015)</p>	<p>Improving the capacity of NWFFWC for GLOF and rainstorm flood risk assessment; developing EWS for GLOF/rainstorm in Mangdechhu and Chamkharchhu river basins; and building emergency response capacity against GLOF/storm flood.</p>	<p>Department of Hydro Meteorological Services, MoEA</p>	<p>The design standards for the hydromet infrastructures to be installed.</p>
<p>Joint Support Programme (2008-2013)</p>	<p>Development of capacity for mainstreaming environmental, climate change and poverty concerns at national and local levels. They have also financed CBDRM activities in Sarpang and Tsirang Dzongkhags.</p>	<p>GNHC Secretariat, NEC Secretariat, and Department of Local Governance/ MoHCA</p>	<p>Capacity development of national and local governments for environment and climate mainstreaming (Relevant to Outcome 2: Co-financing source) Real-time climate risk information will be integrated into the existing capacity building and contingency plan.</p>

3.1.8 Management Arrangements

Project Board (PB): The Project Board (PB) was established to provide high-level oversight and to steer the project. The PB is chaired by the Government Secretary of the NEC and made up of senior representatives from all key national implementing agencies, UNDP and other key partner agencies. The PB is responsible for high-level management decisions and policy guidance required for implementation of the project, including recommendations and approval of project plans, budget and revisions. The PB decisions are made in accordance to standards that ensure efficiency, cost effectiveness, transparency, effective institutional coordination, and harmony with overall development policies and priorities of the Royal Government of Bhutan, UNDP and their development partners. The PB was constituted and meets regularly. The meeting minutes for all meetings made available showed that the PB has effectively provided important directions and oversight. In addition, the PB was also successful in advising the team on technical aspects of implementation especially procurement and prioritization of interventions keeping project cost considerations in view.

Technical Advisory and Project Working Groups: The TAG and PWGs offered implementation and monitoring support. The TAG comprised of a multi-disciplinary team of technical experts from various government agencies and implementing partners that offered technical advice ensuring technical specifications for civil construction works and coordination between various government departments. The PWG supported the operations thorough progress reviews and in-house M&E. Two TAG meetings were held of which minutes of the first TAG meeting was made available. Minutes of the meeting suggested in-depth technical deliberations to improve and explore technical options for optimizing the impact of resource usage. The document also gave strong collaboration between line departments and capacity enhancements with collective thinking. The meeting minutes were recorded with details.

UNDP: As the GEF implementing agency, UNDP offered substantive support services to the project, that included administration, financial reporting, procurement support, and technical advisory delivered through the regional technical advisor based in the Asia-Pacific Hub in Bangkok. Progress reports were comprehensive and timely produced. The project implementation review (PIR) covered many details and provided insights into project implementation and overall management. There were many challenges in project implementation, although the internal ratings did not reflect enough of having to overcome the barriers. There was evidence of risk management; however, the risk matrix could be improved to track and capture risks. The early delays of the project start have been reported in the project progress reports, but there are significant constraints in achieving the end result. For example, risks emerged from lack of appropriate Quality Control mechanisms and capacity constraints – Activities 2.1.1 and 2.1.2 were progressing in line with project timelines, though capacity and quality control constraints and seasonal floods in the catchment area for drinking water supply project were found to have impaired the progress of 2.1.2. These were caused by issues with contractor/service provider being unable to deliver outputs as promised. In addition, capacity constraints at service provider/ contractor's end also have been an issue in Mongar that has led to delaying the progress of drinking water scheme. Risk mitigation could have been planned much earlier with advanced reporting to PB.

Implementation Partners: There were several government agencies involved in the project and were efficiently coordinated by the National Environmental Commission Secretariat (NECS) and the Gross National Happiness Commission (GNHC). The participating agencies included Ministry of Economic Affairs, Ministry of Works and Human Settlement, Ministry of Home and Cultural Affairs, Ministry of Agriculture and Forests, Phuentsholing Thromde, Mongar Municipality, and Tarayana Foundation. The implementation partners formed the Project Working Group that held regular and quarterly meetings to review the project progress and initiate early corrective actions. Minutes of meeting of PWG Review and Planning Workshops were available. The minutes indicated effective discussions to resolve project management and coordination issues. The minutes also contained details of reviews and actions taken. The review could have highlighted emerging issues in advance (with a forecast of activities and funds usage). It is believed that the implementing partners displayed a high level of trust and transparency in the PMU-Partners interactions. There was a focus on results and activity scheduling across activities and outputs. Progress was reviewed against the objectives and targets set in the LFA. Quarterly reviews and reporting formats were written to reflect the progress achieved against targets. Our evaluation revealed all stakeholders had some level of awareness on the objectives and outcome of the project.

Project Management Unit (PMU): The PMU was led by NECS responsible for the coordination of implementing agencies for project execution in a timely manner and within budget. It facilitated project planning, that included preparation of annual work plans and project monitoring and reporting. The PMU was charged with coordinating and facilitating the procurements. As a curator, it held all the records, publications and minutes of meetings pertaining to the project.

3.2 Project Implementation

3.2.1 Adaptive management (changes to the project design and project outputs during implementation)

Early on, there were delays at the start of the project due to the bureaucratic process, where different financial year accounting for UNDP and RGoB affected the incorporation and release of budgeted funds for project activities. In addition, multi-stage approvals for project activities were required for DGM, NECSGNHC and UNDP. The back-and-forth nature of these administrative processes meant that more time was required for project activities to be green lit for implementation. In addition, delays were experienced in the procurement of resources and equipment for output activities pertaining to landslide stabilization.

As a result, the project implementation was pushed back to accommodate the delayed start, with the First Project Board Meeting held on 11 June 2014, followed by the Project Inception Workshop on 12 June 2014. The original planned closing date of 17 March 2018 was also pushed back five months to 01 October 2018. Subsequently, the PMU had to reschedule the timelines for activities in order to accomplish the project objectives and outcomes, with activities starting in 2014. Examples of adaptive management taken by the PMU are:

- Adaptive Management in Planning: Gewog (Thromde)
 - a) Engaging key stakeholders in decision making process including line departments, local expert institutions such as College for Science and Technology (CST) and local monastery;

- b) Identifying problem to be addressed and specifying objectives and tradeoffs that capture values for stakeholders –included evaluating various options for slope stabilization and gully plugs in different locations;
 - c) Identifying range of decision alternatives (soil nailing, gabion structures, check dams) from which actions are to be selected;
 - d) Projecting consequences of alternative actions, identifying key uncertainties and risks;
 - e) Accounting for future impacts of present decisions.
- Adaptive Management in Community Action: Khengkhar
 - a) Tarayana Foundation mobilized village communities by way of extensive consultation using a participatory approach (Output 2.2). The approach helped evaluate the problems systematically and explore options and choices. The communities decided to protect sources and use a network of water harvesting structures with traditional filters tapping the gravitational flow.
 - b) Source protection, along with plantations in the region are expected to reduce sedimentation and preserve water quality. Watershed protection and management through fencing (15 acres) and plantations were carried out in all water sources. This is also seen as a risk mitigation mechanism for reduced water availability in winter and offseason months.
 - c) With the success in water access and watershed management, there is increasing demand from neighboring villages for scaling up of the project given the current water shortage issues and similar pre-project status in Jurmey (320 households with a need for 4 water reservoirs) and Pimphu (19 households with needs for pipelines to complement the existing pumps and reservoirs). Around 200 households surrounding Morong have also voiced for need of similar project initiatives.

Despite the changes, the project was implemented efficiently within timeline and, in one instance, ahead of schedule. This reflects well on the PMU’s adaptive management in handling time delays. In addition, there were changes required due to additional demand for drinking water supply and handing over of projects; the budgets for these were revised accordingly.

Outcome 1:

- **Dophuchen, Samtse** Project was successfully completed in all aspects within the timeline
- **Pasakha** Flood protection work was successfully completed within 12 months, although the project time period was given to be 15 months and was initiated in 2014.

Outcome 2:

- Initially targeted for 20 villages in 4 Dzongkhags for clean drinking water supply at the cost of USD 315,000, however during the mid-term review, additional 15 villages were included which makes 35 villages. Overall cost of the project is revised to USD 350,000
- Initial project budget allocated for disaster management was USD 638,200 but was revised to USD 635,120 since climate resilient roofing of the rural homes was handed over to another agency

Outcome 3:

- N.A.

3.2.2 Partnership arrangements (with relevant stakeholders involved in the country/region)

The project has generated strong stakeholder interest and participation from national government agencies, local institutions, international development partners and NGOs. In total, 19 central government agencies were involved including:

- National Environment Commission Secretariat
- Gross National Happiness Commission Secretariat
- Phuntsholing Thromde
- Department of Geology and Mines
- Department of Engineering Services
- Mongar Municipality
- Tarayana Foundation
- Local Communities
- Department of Disaster Management
- Department of Forests and Park Services
- Department of Hydrology and Meteorology Services
- Dzongkhag administrations

The implementation partners are part of the Project Working Group and hold regular, quarterly meetings to review the project progress and initiate requisite corrective actions. Meeting minutes were shared with the reviewers. The minutes indicate effective deliberations and stock-taking to address project management and coordination challenges. Detailed reviews, action taken reports and action points are included in the notes. The review notes can also, possibly include sections that highlight emerging challenges over an advance quarter (with activity and spending forecasts). Separate discussions with the implementing partners highlighted the robust level of trust and transparency in the PMU-Implementing partner interactions. There is a strong-focus on results based planning and activity scheduling across outputs in the project. The PMU and project implementing partners review progress against the objectives and targets set in the logframe/results framework. Activities and roles are mapped against the results framework for work planning and budgeting of resources in implementation. Quarterly review and reporting formats incorporate and reflect upon the progress achieved against targets from the Results Framework.

In addition, international development partners such as JICA and World Bank and Tarayana Foundation representing the NGOs were also included as partnerships.

Outcome 1:

- There were some discussions recorded with the Association of Bhutanese Industries; however, the scope for partnership was not defined.

Outcome 2:

- NAPA @ Mid-Term Report recommended Special Purpose Vehicles (SPVs), Single Window Service (SWS) Delivery Systems to work around DMIs that are dysfunctional due to a lack of financial resources. However, there was little evidence that SPVs or SWS were utilised.

Outcome 3:

- More than 30 capacity building initiatives valued at US\$ 0.55 million were recorded, with a total of 555 males and 206 females from various stakeholder groups receiving expert training on various aspects of climate change and disaster management till date.

3.2.3 Feedback from M&E activities used for adaptive management

Specific adaptive management measures taken in response to recommendations from MTR include:

<p>Evaluation Recommendation or Issue 1: Engage community institutions in DM to reduce risks and ensure successful achievement of Outcome 1.</p> <p>Possible avenues of engagement include:</p> <ul style="list-style-type: none"> • Community engagement in trans-boundary DM through Friendship Associations and informal, CSO level dialogues in Gewog Thromde • Transboundary business associations • Broadening of agenda of current dialogue mechanisms.
<p>Management Response:</p> <p>The NAPA II Project is investing USD 4.3 million towards landslides stabilization and flood protection works, which are located near the Bhutan-India border. The project has identified vandalism from communities living across the border as a risk that could cause potential delay to the project. During the monitoring visits, it has been observed that the Indian communities living across the border have been grazing their cattle and goat in the NAPA II project areas thereby posing risks to the outcomes of the bio-engineering works.</p> <p>UNDP CO has noted the opportunity to engage community to reduce trans-boundary risks to the outcome of the project, and will advocate the implementation with IP and RPs.</p>
<p>Evaluation Recommendation or Issue 2: Regularly review and report the risks to investments and assets.</p> <p>This can help ensure that assets created by the project remain stable and functional in the face of recurring land movements and climate-induced risks.</p> <ul style="list-style-type: none"> • Land movements, if left unchecked, in the vicinity of <i>Rinchending Goenpa</i> has the potential to impact slope stabilization works undertaken by the project downstream • Scientific dredging to be planned and implemented in PIA for flood plain buffering • Capacities of Dzongkhag level CBDRM institutions can be built to monitor and report risks such as land movements near project areas <p>Revise indicator from 30% reduction in dredging costs to <i>Flood protection measures in place protecting lives and safeguarding economic assets from Barsachu flooding.</i></p>
<p>Management Response:</p> <p>Since significant investments have been made to stabilize the landslides at Rinchending areas in Phuntsholing, where state-of the art techniques have been used for the first time in Bhutan, it will be important to set a system for continuous monitoring of the movement of these slides.</p> <p>The UNDP CO also takes note of the need for scientific dredging as this activity will have to continue post project.</p> <p>The UNDP CO also takes note of the need to build a dzongkhag level CBDM institutions to protect lives and properties but also to monitor and report risks</p>

Evaluation Recommendation or Issue 3: Harmonize work streams for maximizing impact of project investments

This can help integration and replication for scaling up the project impacts. For example, the community water harvesting and storage model under

- Outputs 2.1.5 – 2.1.10 have emerged as a replicable model that combines risk reduction, and water harvesting with community institutions for DM and livelihoods support.
- Outputs 3.1 and Output 1.2 by way of integrating flood plain buffering with AWLS sensor installation can yield better impacts.

Capacity building and mock-drills be offered to communities along the Pasakha river (PIA) for optimal outputs (1.2)

Management Response:

While UNDP takes note of the benefits of maximizing impacts of the project’s investment by harmonizing work streams, setting up of an Automated Water Level Station at Barsachu in Pasakha, which was initially proposed, was found not to be feasible during feasibility assessment.

The recommendation to replicate risk reduction and water harvesting with community institutions will be propagated in the future UNDP Projects, more specifically, the NAPA III project that’s being submitted to GEF Council for approval.

The Department of Disaster Management has developed a disaster management and contingency plans for Phutsholing Thromde covering PIA detailing identifying safe site and evacuation plans.

Evaluation Recommendation or Issue 4: Promote hybrid models of last-mile service delivery through strong stakeholder linkages.

CSO-based Last Mile Service Delivery models be explored for optimizing impacts (reach and penetration of gov. sponsored programs under Outcome 2.

Management Response:

UNDP CO will advocate promoting hybrid model of last mile project delivery through CSO engagement more widely in project’s activities, particularly involving the Tarayana Foundation (TF) in achieving Project’s last mile services delivery. UNDP will encourage the government agency, of engaging TF or other CSO in similar activities in future project particularly NAPA III and GCF Project.

Evaluation Recommendation or Issue 5: Measure and quantify impacts of community engagement for capturing co-benefits of the intervention and further scaling up.

Co-benefits of water harvesting interventions such as reduction in drudgery and economic value generated for women, labor, female education enrollment, health impacts, ecosystem services, capital and credit availability and financial literacy be captured for impact assessments of Outcome 2

Management Response:

Based on the preliminary findings of MTR, a rapid impact assessment on community based adaption was commissioned to highlight positive spinoffs from the project particularly on community based water harvesting. A comprehensive quantitative and qualitative impact assessment will be undertaken towards the end of the project as part of the terminal evaluation of the project.

Evaluation Recommendation or Issue 6: Share and promote adoption of good practices in Contract and Procurement

Progress under the work packages for activities 2.1.1, 2.1.2, and 2.1.3 were adversely impacted by quality control issues with contractor/service provider being unable to deliver outputs as promised.

- Our review of the contractor-client interaction in Mongar as a part of the review of outputs 2.1.1.-2.1.3 shows the possibility of improvement in the current relationships and optimize the impacts of the intervention.
- Good practices such as tripartite review meetings between client, contractor and consultants in Phuentsholing has helped iron out constraints in time-sensitive civil construction works
- Opportunities to empanel, and award contracts to qualified contractors meeting QA standards in the project could be explored, if complying with RGoB procurement protocols.
- As an example, community members in the PIA flood plains had suggestions on the required height of the wall for effective flood proofing. A feedback loop integrating community-consultants-contractors with PMU can ensure peer scrutiny, community audit and QC along with necessary buy-in.

Management Response:

The Project Management Unit organizes quarterly review and planning workshops followed by knowledge sharing and learning field visits to project sites. Good practices particularly in dealing with contractors involved in construction of slopes stabilizations were shared with the Responsible Partners during quarterly review and planning workshop. Tripartite review meetings between client, contractor and consultants in Phuentsholing has been possible particularly during the design and study phase, since options for flood protection works were developed by Consultants in consultation with the communities of the Pasakha Industrial Areas. This was not done in the case of rehabilitation of Mongar Municipality’s water harvesting and distribution system as the design was done in-house.

While UNDP CO takes note of the opportunities to empanel, and award contracts to qualified contractors meeting QA standards in the project to ensure quality and cost effectiveness, such mechanisms are bound by thresholds specified in the RGOB procurement norms, which is very low and not applicable for huge works contracts, as the NAPA II project is implemented under full National Implementation Modality.

Evaluation Recommendation or Issue 7: Develop a Knowledge Management Strategy

The KM strategy will help identify avenues for learning, transfer of lessons and capacity building in the project under Outcome 2

- KM Strategy will assist the operationalization of awareness generation and capacity building activities under various Outcomes
- It can further ensure the sustainability and adaptability of program learnings and benefit future projects

The project generates considerable knowledge at various levels (example: training programs undertaken by officials at ADPC, RIMES etc.). Consolidating the knowledge accessed and shared under the project and converting them to appropriate products incorporating local knowledge can help develop a customized, local training program for RGoB.

Management Response:

While a specific Knowledge Management Strategy has not been developed for the project, the Project has taken steps to generate knowledge and share them periodically. As part of this exercise, all Project Managers of the Responsible Parties were trained on documenting lessons learnt during the course of implementation of the project. The training resulted into a publication called “NAPA II Experience” which was published and shared with relevant stakeholders.

The regular quarterly review and planning workshops also serves as a platform for learning, transfer of lessons and capacity building. Experiential learning opportunity through site visit after the meeting has become a practice, and this has been proven to be useful among the IP and RPs.

The PMU has plans to conduct periodic seminars to share knowledge to wider sections in the country. The first seminar was conducted in February 2017 where NCHM, DDM, PT and TF presented the experiences gained and lessons learned in implementing the Project's activities. Similar experiences-sharing seminar have been planned for second half of 2017 where DGM, WRCD, CCD and DoFPS will share lessons learned.

Advocacy posters highlighting project objectives and the three broad outcomes have been developed and showcased during the recent Tarayana Foundation fair, 28-30 April, 2017.

A specified NAPA II website hosted at nec.gov.bt (<http://www.nec.gov.bt/napaii/>) and a NAPA II Project Facebook page (<https://www.facebook.com/groups/875306682515902/>) has been created to share information and knowledge on NAPA II Project.

Videos highlighting the need for adaptation and the on-going adaptation interventions under the various components have been produced for public awareness and enhancing project's visibility. A final 15 minute video planned for production by the end of the project will highlight the concrete impacts the project has brought about from the beneficiaries' perspective.

Evaluation Recommendation or Issue 8: Adopt a CBRD approach in Capacity building based on a Training Needs Analysis

A project as complex as this would generate considerable demand for capacity building across work streams. However, it is also very pertinent to identify the 'responsibilities and respective capabilities' for customizing targeted sections.

- Capacity building of Dzongkhag level officials (Project Management) and field level staff (technical and O&M) to be taken up on priority and integrated into Water Sector interventions (Outputs 2.1.1-2.1.5). Capacity building initiatives be linked to Training Needs Assessment outputs
- Capacity is being built for DHMS and DGM on Early Warning Systems and weather forecasting. Considering the multiple sectors they cater to and the range of forecasting products they must develop, a **Weather and Climate Services blue print** can be prepared.
- Capacity building at national level for line departments (DHMS, DGM) be undertaken with the NEOC and NWFFWC to emphasize on convergence of EWS products originating from different projects (e.g. GLOF alerts, Flood alerts, Storm-Rainfall alerts)

End user studies be undertaken to understand the product requirements (seasonal forecasts, medium range and long range forecasts) for different user categories. Trainee feedback and client feedback must for QC.

Management Response:

The NAPA II Project has a strong component with identified resources on capacity building. The Project Management Unit has already commissioned a capacity needs assessment across all sectors. The National Center for Hydrology and Meteorology (NCHM) also has allocated resources under the project towards capacity building of officials involved in installation and Operations and Maintenance of hydromet infrastructure built by the project. An assessment of functionality and effectiveness of the hydromet stations set up by the NCHM is being planned by the Project Management Unit, in line with activity 3.1.4 defined in the Project Document.

Inline with the project's work plan, the NCHM has trained 78 officials (24 female and 53 male) across all climate sensitive sectors to build their understanding of weather, climate, cryosphere and hydrology applicable to their own sector.

The NEOC is currently being equipped. As defined in the DM Act 2013, the NEOC will be the nodal center for coordination of disasters, and all warning centers including National Weather and Flood Warning Center (NFWFC) will be integrated with the NEOC. Preliminary discussion between DDM and NCHM has already happened.

Based on the presentation of the draft recommendation from the MTR, the Project Board held on 25th of November, 2016, and 23rd March, 2017 allocated additional resources towards capacity building of Project and technical staff at Mongar Municipality, Department of Geology and Mines and National Center for Hydrology and Meteorology. The trainings will be undertaken in the second and third quarter of 2017 respectively.

Evaluation Recommendation or Issue 9: Request No Cost Extension for the project

- A No Cost Extension (six months) of the project is recommended. This will help to compensate for the delays in inception stage and help achieve the outputs and outcomes outlined in the project.
- The No-Cost-Extension may be best utilized to capture lessons and impacts for sharing and dissemination.

Management Response:

The UNDP CO is in agreement with the recommendation. While the project was planned for implementation from the 1st of January, 2014, the effective implementation of the project started only from 12th of June, 2014, following GEF CEO endorsement in 24th March, 2014 and Project Inception Meeting on 12th of June, 2014.

The project activities under Outcome 1 of the project are mostly civil engineering in nature. The landslides stabilization and flood protection works including for detail assessment, design and actual mitigation works are dependent on the season. While the detail assessment was done during both wet and the dry season, actual mitigation works could happen only during the dry season. The contractual works had to be planned accordingly such that the entire activities of the project would be completed by December 2017. This caused delays in implementation and completion of work packages by December 2017 will be difficult. Based on the progress made in the field, a few activities on bioengineering works will most likely spill into 2018. Bioengineering works, which entails planting trees, shrubs and grasses along the slides to stabilize them, requires time for proper growth and establishment. It also requires periodic replacement of dead plants.

The year 2018 will be an election year for Bhutan. With three rounds of elections scheduled in 2018, where public consultation and gathering will not be allowed, only few months will be available for effective project implementation. Therefore, in addition to using the project extension to capture impacts and lessons learnt for sharing and dissemination, the extension will also be used for conducting the terminal evaluation.

Given that evaluations can take between 3-8 months to finalize, it is proposed that the extension is requested until 31st December, 2018 (which is two additional months from that proposed by the MTR)

A lack of data on the needs of Dzongkhags, Gewogs and Chiwogs meant that project design and planning decisions were made at the central government level. Future projects should incorporate data-based needs for the local levels.

Further strengthening in design and implementation: a more strategic approach to climate resilience for better convergence and increased capacities at provincial/Dzongkhag level. Referencing UNDP’s Sustainable Urbanization Strategy as a guideline, this includes:

- a) Provide coordination support to provincial/Dzongkhag governments for securing and implementing support from NGOs, civil society organizations and private sector for immediate humanitarian response;
- b) Train provincial/Dzongkhag staff in crisis response and post-disaster recovery for Bhutan’s climate change context and maintain a roster of experienced consultants;
- c) Improve information management and communications involving a large number of implementing agencies with overlapping jurisdiction;
- d) Identify most affected and vulnerable social groups and support effective outreach to these communities for providing humanitarian assistance to them;
- e) Develop provincial/Dzongkhag capacities in quick assessment of humanitarian needs and assessment of recovery needs through training provincial/Dzongkhag officials in required assessment tools;
- f) Prepare recovery plans and frameworks involving different sectors and development partners and mobilize resources for implementation;
- g) Develop institutional mechanisms for securing people’s participation, particularly, women, elderly and people working in informal sectors, in recovery programmes;
- h) Promote building codes, land use plan and other risk reduction measures in recovery, and strengthen peoples’ resilience;
- i) Support collaboration between local, humanitarian and development actors so that all are contributing to assessment and strategic frameworks for recovery;

Whilst these have been carried out successfully at the central government level, the same cannot be said consistently across all provinces/Dzongkhags. It is recommended that this strategy be examined in the formulation of future project strategies.

It is necessary for a relook at how capacities should be allocated at the local and municipal level for further project activities to better allow replication and sustainability of successes. Processes for monitoring and evaluation need to be strengthened. Impact measurements of the project outcomes and outputs could be better articulated at start of project to ensure that monitoring and evaluation accurately measures project achievements.

3.2.4 Project Finance

Planned Total Budget

The Project had a total planned budget of USD 67,612,429 endorsed. Under UNDP financing, a planned USD 11,491,200 was budgeted from UNDP LDCF GEF. The details of the planned UNDP financing allocation are as follows:

GEF Outcome/ Atlas Activity	Implementing Agent	Budget Allocation	Total (US\$)
OUTCOME 1:	Phuentsholing Thromde	International Consultants	42,500
		Travel	12,000

Risks from climate-induced floods and landslides reduced in Bhutan's economic and industrial hub Pasakha Industrial Area.	DGM	Travel	102,200
		Contractual Services – Individual	57,600
		Contractual Services Companies	4,128,000
		Equipment & Furniture	90,000
		Supplies	18,000
		AV & Print Production Costs	7,500
		Training, Workshop & Conf.	177,000
		Total Outcome 1	4,634,800
OUTCOME 2: Community resilience to climate-induced risks strengthened in at least four Dzongkhags	Mongar Municipality Tarayana NECS DDM	International Consultants	106,000
		National Consultants	34,300
		Travel	97,100
		Contractual Services – Companies	465,000
		Equipment & Furniture	249,000
		Materials and Goods	229,900
		Comm. & AV Equipment	79,000
		Supplies	16,800
		IT Equipment	15,000
		AV & Print Production Costs	100,600
		Training, Workshop & Conf.	506,100
		Total Outcome 2	1,898,800
OUTCOME 3: Relevant information about climate-related risks and threats shared across climate-sensitive sectors on a timely and reliable basis.	DHMS NECS	Travel	12,000
		Travel	272,300
		Contractual Services – Companies	112,750
		Comm. and AV Equipment	19,000
		IT Equipment	3,332,000
		AV & Print Production Costs	24,500
		Training, Workshop & Conf.	312,800
		Miscellaneous Expenses	325,050
Total Outcome 3	4,410,400		
PROJECT MANAGEMENT	NECS	National Consultants	36,000
		National Consultants	20,000
		International Consultants	45,000
		Travel	32,000
		Contractual Services Companies	129,900

	Equipment & Furniture	13,500
	Supplies	30,200
	AV & Print Production Costs	80,000
	Training, Workshops & Conf.	139,500
	Professional services	15,000
	UNDP Direct Project Services	6,100
	Total Project Management	547,200
	LDCF – OUTCOMES TOTAL	10,944,000
	LDCF- PM TOTAL	547,200
	LDCF PROJECT TOTAL	11,491,200

Under Co-financing, a planned total of USD 56,121,229 was budgeted, with USD 38,411,463 from RGoB and USD 17,709,766 from other local and international partners including: ADB, Finnish Meteorology Institute, Government of India, Government of Norway, Helvetas, ICIMOD, Swiss Red Cross, Tarayana Foundation, and the World Bank. The details of the planned co-financing allocation are as follows:

RGoB Co-financing budget of USD 38,411,163 was assigned as follows:

Outcome 1

- USD 6,338,299 to construct the Fafe-Khosala bypass road under Zhemgang-Trongsang Highway
- USD 25,372,864 capital investments for expansion and industrial development in Phuentsholing Thromde

Outcome 2

- USD 1,500,000 for water resource expansion in Mongar

Outcome 3

- USD 5,200,000 department budget for DHMS to improve climate data collection and dissemination

Local and International Partners Co-financing budget of USD 17,709,766 was assigned as follows:

Outcome 1

- the Government of India provided USD 9,491,666 to construct the Damchu-Chukha bypass road (DANTAK) under Phuentsholing Thimphu Highway
- the Government of Norway provided USD 4,000,000 in DGMTA support for geotechnical studies

Outcome 2

- the World Bank/GFDRR capacity provided USD 400,000 in building and assessment for DDM at the national level
- the Swiss Red Cross provided USD 343,400 in funding for Disaster Preparedness Pilot Project
- Tarayana mobilized USD 356,000 from Helvetas; and USD 315,000 from ADB for its poverty reduction projects in Mongar, Samtse, and Pemagatshel districts. In addition, Tarayana provided USD 156,000 in-kind co-financing from its resources

Outcome 3

- the Finnish Meteorology Institute and ICIMOD provided USD 708,000 in TA support for DHMS capacity building in weather forecasting
- ADB provided USD 340,000 for Water Resource Inventory

Realized Total Budget

As of the Terminal Evaluation, an estimated total of USD 67,368,672 had been realized for the total planned budget of USD 67,612,429, which is approximately 99.64% of the total planned budget.

- In terms of project management costs, the original planned budget of USD 547,200 represented 0.809% of total planned budget, whilst the estimated realized amount of USD 547,200 represented 0.812% of total realized costs.
- In terms of realized funding, UNDP financed approximately 7.5% of the actual costs, with the remaining 92.5% coming from co-financing from local and international partners including: ADB, Finnish Meteorology Institute, Government of India, Government of Norway, Helvetas, ICIMOD, Swiss Red Cross, Tarayana Foundation, and the World Bank. This represents a good mix in terms of financing sources.
- Due to the limited financial data available, it is difficult to accurately assess the financial management for the project outputs utilizing both UNDP and co-financing funds. However, it can be reasonably assumed that most of the planned budget was realized.

Realized UNDP Financing

As of the Terminal Evaluation, an estimated total of USD 11,908,005 (with additional USD 64,216.71 funding from the Government of Australia and UNDP internal resources of USD 363,088.93) had been realized for UNDP financing (which is approximately 103.63% of the total planned UNDP financing). Due to insufficient financial data gathered, analysis was only carried out on estimates from available organizations. In general, all ministries exercised prudence in their financial management of resources, utilizing most if not all of the allocated budget without over-spending. In one case (Output 2.3 – DDM), financial resources were re-allocated from one ministry to another following the change in implement agency for the relevant project component.

Output 1.3 - DGM

- Out of the planned budget of USD 295,452.58, a total of USD 257,700.00 was realized (which is 87.22% of the planned budget). This left a remaining budget of USD 37,752.58 as of the Terminal Evaluation.

Output 2.2 - WRCD

- Out of the planned budget of USD 336,981.56, a total of USD 317,568.01 was realized (which is 94.24% of the planned budget). This left a remaining budget of USD 19,413.55 as of the Terminal Evaluation.

Output 2.3 - DOFPS

- Out of the planned budget of USD 315,850.00, a total of USD 315,850.00 was realized (which is 100% of the planned budget).

Output 2.3 - DDM

- Out of the planned budget of USD 638,200.00, a total of USD 577,864.50 was realized (which is 90.55% of the planned budget). During the course of the project, Activity 2.3.3 was handed over to DES for implementation with a transfer of USD 60,335.50. Furthermore, there were additional costs incurred for a Disaster Preparedness and Sensitization workshop costing USD 12,642 as well as SAR training, equipment and laptop procurement costing USD 44,615. This had the net change in allocation of USD 3,078.50 and left a remaining budget of USD 60,335.50 as of the Terminal Evaluation.

Output 3.2 - NCHM

- Out of the planned budget of USD 4,123,000.00, a total of USD 4,105,000.00 was realized (which is 99.56% of the planned budget). This left a remaining budget of USD 18,000.00 as of the Terminal Evaluation.

Realized Co-financing

As of the Terminal Evaluation, a total of USD 55,877,472 was estimated as realized for Co-financing (which is approximately 99.57% of the total planned Co-financing). Based on verbal communication from stakeholders, all co-financing expenses have been met; however, there were no detailed breakdown of figures maintained by the relevant agencies. Due to insufficient financial data gathered, analysis was carried out on the following estimated data. The final realized UNDP financing: co-financing ratio is an estimated 1:4.69, which is highly commendable considering Bhutan's financing constraints.

Table 3.2.4a Summary of Planned and Realized Co-Financing

Co-financing (type/ source)	Organization	Planned Budget (USD; at CEO endorsement)	Actual Realized (USD; at Terminal Evaluation)	Percentage (Actual/ Planned)
Grants	UNDP LDCF GEF	11,491,200	11,908,005	103.63%
Total UNDP Financing		11,491,200	11,908,005	103.63%
OUTCOME 1: Risks from climate-induced floods and landslides reduced in economic/industrial hubs				
Grants	Royal Government of Bhutan	31,711,163	31,711,163	100.00%
TA Support	Government of India for improving road conditions	9,491,666	9,491,666	100.00%
TA Support	Government of Norway to DGM for Geological studies	4,000,000	4,000,000	100.00%
Sub-Total Co-Financing for Outcome 1		45,202,829	45,202,829	100.00%
OUTCOME 2: Community resilience to climate-induced disaster risks strengthened				
Grants	Royal Government of Bhutan for Mongar Municipality	1,500,000	1,500,000	100.00%
Grants	World Bank/ GFDRR for DDM	400,000	400,000	100.00%
Grants	Disaster Preparedness Pilot Project (funded by Swiss Red Cross)	343,400	274,720	80.00%
Tarayana Foundation				
In-Kind	- Tarayana	156,000	104,000	66.67%
Grants	- Helvetas	356,000	300,000	84.27%
Grants	- ADB	315,000	300,000	95.24%
Sub-Total Co-Financing for Outcome 2		4,670,400	4,478,720	96.90%

OUTCOME 3: Climate information shared across climate-sensitive sectors on a timely and reliable basis				
Grants	Royal Government of Bhutan for DHMS	5,200,000	5,200,000	100.00%
Grants	ADB for Water Resources Inventory	340,000	340,000	100.00%
TA Support	Finnish Meteorology Institute and ICIMOD to DHMS	708,000	655,923	92.64%
Sub-Total Co-Financing for Outcome 3		6,248,000	6,195,923	99.17%
Total Co-Financing		56,121,229	55,877,472	99.57%
Total		67,612,429	67,785,477	99.74%
UNDP Financing: Co-Financing				1 : 4.69

**estimated*

3.2.5 Monitoring and evaluation

The monitoring and evaluation framework consisted of local monitoring and reporting as well as international independent evaluations. Both PMU and UNDP-GEF team were responsible for the preparation and submission of the following reports and evaluations: Inception Report; Annual Project Report (APR); Project Implementation Review (PIR); Quarterly Progress Reports; Periodic Thematic Reports; Mid-Term Evaluation; and Terminal Evaluation. The following table summarises the achievement of monitoring actions as of the Terminal Evaluation:

Table 3.2.5 M&E Work Plan and Budget vs Actual Cost and Completion Status

Type of M&E activity	Responsible Parties	Budget US\$ (exclude project team staff time)	Actual Cost	Time frame	Status
Inception Workshop (IW)	PMU UNDP CO UNDP HQ	5,000	U/A	Within first two months of project start up	Completed 12 June 2014
Inception Report	PMU UNDP CO	Included in the workshop budget	U/A	Immediately following IW	Completed
Measurement of Means of Verification for Project Purpose Indicators	PMU will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members	tbd	U/A	Start, mid and end of project	Completed

Measurement of Means of Verification for Project Progress and Performance (measured on an annual basis)	Oversight by UNDP CO/GEF Regional Advisor and Project Director Measurements by national implementing agencies at central and local levels	tbd	U/A	Annually prior to APR/PIR and to the definition of annual work plans	Completed
APR and PIR	PMU UNDP-CO UNDP-GEF	None	U/A	Annually	Completed 4 rounds 1 Jul 2018 21 Jul 2017 27 Sep 2016 30 June 2015
TPR and TPR report	Government Counterparts UNDP CO PMU UNDP-GEF Regional Advisor	None	U/A	Every year, upon receipt of APR	U/A
Project Board Meetings	PMU UNDP CO	None	U/A	Following Project IW and subsequently at least once a year	Completed 8 rounds
Technical Advisory Group Meetings	PMU UNDP CO	None	U/A	At least twice a year during project duration	Completed
Annual Review and Planning Meetings	PMU UNDP CO	32,000	U/A	Once a year 8,000	Completed 16 Quarterly Review and Planning Meetings
Periodic status reports	PMU	12,000	U/A	To be determined by the PMU and UNDP CO, yearly 3,000	
Technical reports	PMU Hired consultants as needed	Tbd	U/A	To be determined by the PMU and UNDP-CO	In Progress Some are being drafted e.g. Output 1.3
Mid-term External Evaluation	PMU UNDP- CO UNDP-GEF Regional Advisor External Evaluators (i.e. international/national consultants)	30,000	U/A	Two years after project implementation.	Completed 27 June 2017
Terminal Evaluation	PMU UNDP- CO UNDP-GEF Regional Advisor External Evaluators (i.e. international/national consultants)	30,000	U/A	At the end of project implementation	In Progress

Terminal Report	PMU UNDP-CO	None	U/A	At least one month before the end of the project	In Progress
Lessons learned / Knowledge Management	PMU UNDP-GEF Regional Advisor (suggested formats for documenting best practices, etc)	120,000	U/A	Yearly 30,000	Completed 13 February 2017 Seminar Proceedings at Namgay Heritage Hotel
Audit	UNDP-CO Project team	15,000	U/A	To be determined by the PMU and UNDP CO	Completed 31 December 2018 by Royal Audit Authority
Visits to field sites (UNDP staff travel costs to be charged to IA fees)	UNDP Country Office UNDP-GEF Regional Advisor (as appropriate) PMU, National Implementing Agencies		U/A	as and when necessary	Completed
TOTAL INDICATIVE COST Excluding project team staff time and UNDP staff and travel expenses		US\$ 244,000	U/A		

Overall Quality of M&E

The Results Based Framework (RBF) indicators were clearly described with the source of verification and end of project targets. There were 14 indicators in total, two at the outcome level, two mapped to project objectives, and the remaining indicators reflected against outputs and activities.

M&E design at project start up

The project objectives were in line with the GEF Focal Area objectives augmenting disaster resilience, institutional capacities and mainstreaming adaptation into policies and governance in Bhutan. Logframe assumptions reflect national priorities accurately.

Positives

- Considered different aspects of Climatic-Induced disasters.
- Correctly identified the key locations of interventions.
- Correctly engaged the departments and divisions involved.
- Correctly selected the NEC as a key partner for execution.

Considerations for Future Projects

- Many activities but lack one single focus.
- During Project Design and Planning, lack of data on the needs of Dzongkhags, Gewogs and Chiwogs since it was decided at Central Level.

- Lack of precise or accurate information and data (numbers or pictures) of the exact nature of disaster hotspots e.g. landslide movements, human settlements and their activity, soil humidity, wind velocity
- Limited capacity of Dzongkhags, Gewogs and Chiwogs, including the inability to QC at Dzongkhag level for materials and services procured – this impaired the effectiveness of community-water resource planning, and implementation, and subsequently affected proper monitoring and evaluation of procurement activities

M&E Plan Implementation

The processes for monitoring and evaluation need to be strengthened. Impact measurements of the project outcomes and outputs could be better articulated at start of project to ensure that monitoring and evaluation accurately measures project achievements.

3.2.6 Implementing Agency and Executing Agency

Overall, the project has generated strong stakeholder interest and participation from national government agencies, local institutions, international development partners and NGOs. In total, 19 central government agencies were involved with international development partners such as JICA and World Bank and Tarayana Foundation representing the NGOs. The PMU was excellent in coordinating and drawing upon staff resources from several departments and divisions across ministries. There was a high level of trust and transparency in interactions with key national implementing agencies. This was due to efficient coordination carried out by the National Environmental Commission Secretariat (NECS) and the Gross National Happiness Commission (GNHC).

UNDP: UNDP offers cross-cutting support across all work streams and outcomes as identified in the project in addition to facilitating the coordination and results based delivery. Overall, there was an appropriate focus on results. However, impact measurements of project outcomes and outputs could be better articulated at start of project. Project management was good, with adequate support from UNDP and timeliness of technical support. In terms of candor and realism in reporting, this could be improved with more details, particularly for the financials, where there was no detailed breakdown of figures maintained by relevant agencies for co-financing funds. There was evidence of risk management; however, the risk matrix could be improved to track and capture risks. For example, risks emerged from lack of appropriate Quality Control mechanisms and capacity constraints – Activities 2.1.1 and 2.1.2 were progressing in line with project timelines, though capacity and quality control constraints and seasonal floods in the catchment area for drinking water supply project were found to have impaired the progress of 2.1.2. These were caused by issues with contractor/service provider being unable to deliver outputs as promised. Finally, responsiveness to implementation issues were just in time to address barriers and obstacles in the course of the project.

NECS: The lead Implementing Partner is the NECS, which is primarily responsible and accountable for managing this project; including the governance and evaluation of project interventions, achieving project outputs, and for the effective utilization of available resources. In terms of candor and realism in reporting, this could be improved with more details, particularly for the financials, where there was no detailed breakdown of figures maintained by relevant

agencies for co-financing funds. There was evidence of risk management; however, the risk matrix could be improved to track and capture risks. The early delays of the project start have been reported in the project progress reports, but there are significant constraints in achieving the end result. For example, capacity constraints at service provider/ contractor's end have been an issue in Mongar that has led to delaying the progress of drinking water scheme. Risk mitigation could have been planned much earlier with advanced reporting to PB. Adequacy of management inputs and processes can be improved, especially greater commitment to be obtained from GNHC to provide moral support to ongoing projects. For future projects, it would be more appropriate to have greater government support to strengthen government ownership by GoB.

3.3 Project Results

The assessment of the project results is presented here, with baselines and targets taken from the Project Logframe from NAPA II Project Document. For Ratings, the following scale is used to rate the level of achievement:

Rating Project Performance		
Criteria	Rating	Comments
1. Monitoring and Evaluation		
Overall Quality of M&E	S	Results Based Framework (RBF) indicators were clearly described with the source of verification and end of project targets. There were 14 indicators in total, two at the outcome level, two mapped to project objectives, and the remaining indicators reflected against outputs and activities.
M&E design at project start up	S	Project objectives were in line with the GEF Focal Area objectives augmenting disaster resilience, institutional capacities and have mainstreamed adaptation into policies and governance in Bhutan. The Logframe assumptions reflected national priorities accurately.
M&E Plan Implementation	MS	Processes for monitoring and evaluation needed to be strengthened. Impact measurements of the project outcomes and outputs could have been better articulated at start of project to ensure that monitoring and evaluation accurately measures project achievements.
2. IA & EA Execution		
Overall Quality of Project Implementation /Execution	HS	The Project has generated strong stakeholder interest and participation from national government agencies, local institutions, international development partners and NGOs. In total, 19 central government agencies were involved with international development partners such as JICA and World Bank and Tarayana Foundation representing the NGOs. PMU was excellent in coordinating and drawing upon staff resources from several departments and divisions across ministries.
Implementing Agency Execution	HS	There was a high level of trust and transparency in interactions with key national implementing agencies as a result of efficient coordination by the National Environmental Commission Secretariat (NECS) and the Gross National Happiness Commission (GNHC).
Executing Agency Execution	HS	As stated earlier efficient coordination by the National Environmental Commission Secretariat (NECS) and supported by Gross National Happiness Commission (GNHC) provided a high level of trust and transparency.
3. Outcomes		
Overall Quality of Project Outcomes	S	<p>Outcome 1: Satisfactory - project activities completed satisfactorily: in particular, slope stabilisation, embankment etc were completed at PIA</p> <p>Outcome 2: Satisfactory - implemented project activities generated additional demand for future follow ups</p> <p>Outcome 3: Satisfactory - achieved, with improved climate change adaptation planning apparent across Bhutan</p>

Relevance: relevant (R) or not relevant (NR)	R	Project is relevant, with project design strategically bonded with the Sustainable Development Goals of Bhutan. There was a high level of alignment between UN SDGs (2030), GEF strategic priorities for LDCs and local policy frameworks.
Effectiveness (doing the right things)	S	Project has showed evidence of its ability to support activities of national and local community disaster management correctly. It has achieved the intended outputs and outcomes as evidenced by the results.
Efficiency (doing things speedily)	S	Project was implemented efficiently within timeline and, in one instance, ahead of schedule. Project outcome and output activities' expenditure stayed within budgeted to achieve satisfactory achievement of results. However, there were some instances during the initial project period where some agencies have faced problems in terms of budget release since there are different financial years being followed by UNDP (Jan-Dec) and government agencies (June-July). Thus delayed release of fund for the project. Delays were also seen in procurement of professionals and materials for landslide stabilization projects due to lack of local expertise.
4. Sustainability		
Overall likelihood of risks to Sustainability:	ML	<p>Financial resources: ML – Majority of projects under NAPA II have built the foundation for climate resilience, To build further on this foundation, continuous funding is required to sustain the project activities that have been initiated. Funding is questionable at the moment.</p> <p>Socio-economic: ML – Due to certain traditional beliefs, villagers are still resistant to use rain water/harvested water, which they consider unfit for use. In some cases, communities are not willing to share water across boundaries due to old cultural practices.</p> <p>Institutional framework and governance: ML - Limited capacity and uneven distribution of capacity at local levels meant that successes may not be easily replicated and sustainability becomes a challenge</p> <p>Environmental: L – The foundation has been laid for environmental protection over the long term.</p>
Financial resources	ML	Limited financial resources in the future for climate change and disaster resilience may present uncertainty on sustainability after project, as project outcome and output activities have mainly focused on the setting up of foundational infrastructure, systems, training etc with no budgeted funds for follow up after project conclusion.
Socio-economic	ML	Water user groups and forest fire management groups were successfully formed and related income activities, such as saving groups started, have been positively impacted. However, there are challenges in convincing villagers to share water from locality to locality due to old beliefs and traditions. The issue of water sharing is address in the Water Act of Bhutan, 2011 and its regulation. There is a need to strengthen enforcement of the water law. More public awareness is needed: it is recommended that lessons learnt from the successes of Tarayana's work be documented and broadcast across Bhutan. This will also help erode some of the existing objections towards water sharing across localities, as the ideas and practices gain greater acceptance. Water Transfer Pricing mechanism can be considered:
Institutional framework and governance	ML	There was strong level of capacity at the Central to implement the project activities. The guidelines and manuals were updated and written and disseminated to institutionalise the knowledge. However, capacity at local levels were unevenly distributed and limited in most cases, especially at Dzongkhags.

Environmental	L	Project successfully achieved many outcomes and outputs as evidenced by indicators, laying the foundation for environmental protection. [see 5. Impact for specific achievements]
5. Impact		
Environmental Status Improvement	S	<p>Project Outcome 1</p> <ul style="list-style-type: none"> Land slide areas along Reldri School in Phuntsholing and Barsa Watershed at Pasakha were provided with protection using geotech together with bioengineering Landslide monitoring and threshold development were initiated in 6 sites along southern regions <p>Project Outcome 2</p> <ul style="list-style-type: none"> Training was provided during the project and covered 70% of the municipal office in flood protection and slope stabilization 21 forest management groups were established in Thimphu, Wangdue, Monggar, Lhuntse and Trashigang Dzongkhags at the community levels Water resource inventory carried out for 4 Dzongkhags of Monggar, Tsirang, Samtse and Pemagatshel and a national report was written 30 sources of water were identified and mapped across Dzongkhags with water flows in villages An irrigation scheme was implemented at Wangdue and Punakha Valley which was a success 5 reservoirs for water harvesting including rain water harvesting was installed in Dophuchen, Samtse 30 water user groups were formed along with group saving scheme for the maintenance of water resources A windstorm resilient roofing system guideline was developed, approved and distributed to all districts. Trainings were conducted (with the help of USAID) over 5 days to 153 people, technicians and engineers from Monggar, Phuntsholing and also students from the vocational technical institute in Sarpang <p>Project Outcome 3</p> <ul style="list-style-type: none"> Relevant information about climate related risks and threats from 6 sites along southern regions was shared with National Centre for Hydrology and Metrology
Environmental Stress Reduction	S	Man-made forest fires have decreased after the NAPA II project, with villagers taking initiatives to prevent fire and exercised caution on forest fires
Progress towards stress/status change	S	The Project laid a strong foundation for preparedness for climate-induced disasters in Bhutan, and there is now potential for long-term disaster management to be realised
Overall Project results	S	Project as designed has achieved the planned project outputs and outcomes. The capacity development increased the skills and knowledge on disaster management and climatic resilience at the Central Government and impacted the lives of the local villages. Moving forward, the departments and divisions must and should extend the success that they have achieved through replications. Sustainable funding is a prerequisite and a strategy for fund raising should be in place.

3.3.1 Overall results

The overall results are presented in the table below.

Actual Achievement Scale		
Target Achieved	Target Partially Achieved	Target Not Achieved

Project Objective: To enhance national, local and community capacity to prepare for and respond to climate-induced multi-hazards to reduce potential losses of human lives, national economic infrastructure, livelihoods, and livelihood assets.					
Indicator	Baseline	Target	Actual	Achievement Rating	Comments
Level of capacity of local communities to prepare for and respond to climate-induced risks.	Local disaster management institutions functional in 16 of 20 Dzongkhags	Existence of functional local disaster management institutions;	District Level Functional local disaster management institutions have been established in Project target sites of Samtse, Pema Gatshel, Chukha, Dagana and Phuentsholing Municipality.	S	Completed
	Mock-drills not widely adopted except 1 # of mock-drills under LDCF GLOF project;	Adequate response to scenario-based early warning mock-drills (4 no. in Years 3 and 4, in 4 Dzongkhags)	Mock drills and testing of District Disaster Management and Contingency Plans have been completed in the 4 districts (Samtse, Pema Gatshel, Chukha and Dagana) and 1 Municipality (Phuentsholing)	S	Completed
		Availability of real-time localized weather data (measured in four sample Dzongkhags)	Real time localized weather data is available for all 20 Districts of Bhutan.	S	Completed
		Availability of seasonal water resource inventory (measured in 5-6 gewogs)	Water Resources Inventory completed for all four districts of Mongar, Pema Gatshel, Tsirang and Samtse. Climate modelling of water availability projections based on two climate scenarios (RCP 4.5 & 8.5) in the above four districts completed. Water demand and water availability was also	S	Completed

			compared for the current time period (2015) and for future time period 2030		
Outcome 1: Risk from climate-induced floods and landslides reduced in Bhutan's economic and industrial center, Phuentsholing and Pasakha Industrial Area.					
Indicator	Baseline	Target	Actual	Achievement Rating	Comments
Reduced damage from floods in the industrial hub of the country, Pasakha.	<p>Heavy damages on some of the industrial units in Pasakha and the BFAL/BCCL residential colony.</p> <p>Climate-induced floods and landslides impact industrial operations and socio-economic activities</p>	<p>Erosion in Barsa watershed and sedimentation and flooding in Barsa river is reduced due to comprehensive mitigation measures, reducing the occurrence of floods resulting in damages by 25%</p> <p>Flood protection measures in place protecting lives and safeguarding economic assets from Barsachu flooding.</p>	<p>Enrichment Plantation in a total area of 17 hectares in Barsa watershed is has been done. The plantation is expected to reduce sedimentation, control erosion and landslides in Barsa river in the long run. One Automatic Weather Station and One Automatic Water Level Station are currently being installed which will help in long-term monitoring an assessment of the watershed.</p> <p>Flood protection river dykes at two critical locations in Pasakha: industrial cluster of 6 major factories and housing colony of 500 residents have been constructed. A total of 405 meters long dykes will protect beneficiaries against 1-in-30 return period floods.</p>	S	Completed
Number of active and unstable landslides in Phuentsholing area	Pasakha Industrial Area, Phuentsholing Urban Area and the Phuentsholing-Thimphu Highway are among the most impacted	Four critical landslide sites in Phuentsholing, Rinchending area stabilized and contained within existing boundaries, safeguarding economic assets	A 300m long nailed wall has been constructed to protect the Phuentsholing-Thimphu highway. More than 30 dams (gabions and sandbags) have been built for slope stabilization and an area of 16.5 hectares of naked landslides has been bioengineered to prevent erosion and re-occurrences of landslides at the 4 critical landslide sites at Rinchending-Phuentsholing.	HS	Completed
Vulnerability and risk perception	GNH Survey 2010 reports that 29% of the		Risk perception survey (to measure proportion of men in households that	MS	Completed

<p>index [AMAT 1.2.15]</p> <ul style="list-style-type: none"> • Proportion of men in households that perceive landslides and floods as a major concern; • Proportion of women in households that perceive landslides and floods as a major concern; • Proportion of industrial units that perceive floods as a major concern; 	<p>surveyed population perceive landslides as a major concern and 26% perceive floods as a major concern.</p> <p>50.9% of the interviewed Phuentsholing and Pasakha residents perceive landslides as a major concern (58.7% for male and 33.9% for female)</p> <p>49.6% Pasakha residents perceive floods as a major concern (or 55.4% for male and 36.8% for female) (based on ad hoc preliminary survey during PPG);</p>	<p>Proportion of men in households that perceive landslides and floods as a major concern reduced by 30%</p> <p>Proportion of women in households that perceive landslides and floods as a major concern reduced by 30%</p> <p>Proportion of industrial units that perceive floods as a major concern reduced by 30%</p>	<p>perceive landslides and floods as a concern reduced by 30%) carried out by CST in June-July 2018.</p> <p>Proportion of men in households that perceive landslides and floods as a major concern:43% male (2018) vs baseline 58.7% (2012) – a drop of 15.7%</p> <p>Proportion, women in households that perceive landslides and floods as a major concern: 55% female (2018) vs baseline 33.9% (2012) – an increase of 21.1%</p> <p>Proportion of industrial units that perceive floods as a major concern: 40% (2018) vs baseline 40% (2015) – a drop of 9%</p>		
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Outcome 2: Community resilience to climate-induced disaster risks (droughts, floods, landslides, windstorms, forest fires) strengthened in at least four Dzongkhags.

Indicator	Baseline	Target	Actual	Achievement Rating	Comments
Water resource inventories, water harvesting technology and additional water storage capacity available in some the most drought-prone communities of Bhutan	No systematic water resources inventory has taken place due to limited funds and technical capacity Several villages and urban centers in various Dzongkhags experience water scarcity in the	Up-to-date community-level water resource inventory and database in place in at least four Dzongkhags, feeding into national water resources inventory /database; One Municipal water supply system made	Water Resources Inventory completed for all four districts of Mongar, PemaGatshel, Tsirang and Samtse feeding into national water resources inventory/database. A national report has been written	HS	Completed

	wake of declining water availability.	climate resilient, serving 6,000 beneficiaries. 20 villages/ hamlets have adopted climate-resilient water harvesting approaches, -technology and efficient water management practices, therewith reducing water scarcity for some 420 rural households.	Municipal water supply in Mongar municipality made climate resilient benefitting 6,000 households. 37 villages have adopted climate resilient water harvesting approaches- technology and efficient water management practices (more than targeted) therewith reducing water scarcity for 1,122 households in four project districts of Samtse, Tsirang, Pema Gatsel and Mongar.		
Existence and operationalization of disaster management committees at the local level	The Disaster Management Act (2013) stipulates the creation of disaster management committees and formulation of disaster management plans at national and local levels, but have been established at present in four pilot Dzongkhags only. No community-based forest fire management plan and mechanism to systematically guide effective and coordinated forest fire management at the local level, though forest fire is a recurrent phenomenon.	Local-level disaster management committees (DMCs) established, capacitated and functional in at least four Dzongkhags prone to climate-induced disasters; Climate-induced disaster management plan developed, including for forest fire management, and integrated in local development plans and programmes in four Dzongkhags.	Local level Disaster Management Committees have been established and capacitated in the districts of Samtse, Dagana, Chukha and Pema Gatsel and Municipality of Phuentsholing. District Disaster Management and Contingency plan have been developed for 4 districts (Samtse, Dagana, Chukha and Pema Gatsel) and Municipal Disaster Management and Contingency plan for Phuentsholing Municipality. District Forest Fire Management Plans developed for the districts of Mongar. Lhuentse, Wangdue and Trashigang and Block Forest Fire Management Plans have been developed for 2 forest fire prone blocks in each of these 4 districts. The plans will be integrated and actions implemented in the 12th Five Year Plan period.	S	Completed
Outcome 3: Relevant information about climate-related risks and threats shared across development sectors for planning and preparedness on a timely and reliable basis.					

Indicator	Baseline	Target	Actual	Achievement Rating	Comments
Availability and the level of use of localized climate information.	The current network of meteorological stations is limited to 24 stations, of which only 3 are automated. Most cater to GLOF risks	Network with national coverage of minimum # 63 new real-time weather stations and # 39 new flood measurement stations	60 automated real-time weather stations (AWS) and 35 automated real-time water level stations and 4 manual flood measurement stations have been established. 9 more AWS will be completed in the period July-September 2018.	S	Completed
Number and location of real-time weather observation, forecasting and warning stations that feed data into the NWFFWC	The NWFFWC is in a nascent stage supported by a small network of meteorological stations and with insufficient capacity to analyze, manage, and disseminate climate information in a timely manner.	NWFFWC operational, with a core team of at least 10 members trained and established for climate data analysis, management and dissemination;	National Weather and Flood Warning Center (NWFFWC) has been established at the National Center for Hydrology and Meteorology (NCHM) and 9 experts from the National Centre for Hydrology and Meteorology trained on climate data analysis including for Climate Change Projection and downscaling, and Integrated Multi-Hazard Early Warning System.	S	Completed
Number of sectors using climate information to make their development policies and plans climate resilient	<p>Demand for and use of localized climate information is yet unclear and undervalued</p> <p>Due to sector fragmentation little exchange of knowledge, lessons and experiences takes place, existing platforms are shaped around national programmes (like NAPA working group) but do not function adequately outside the framework of these programmes due to limited capacity of NECS for multi-stakeholder process</p>	<p>Climate data/information user training provided to at least 100 staff of key data user agencies,</p> <p>Updated weather forecasting and localized climate information disseminated on a daily basis through web portal, media and other means</p> <p>At least three evidence-based policy influencing documents disseminated through NECS</p>	<p>142 key data users from NCHM and key data user agencies have been trained in climate data analysis.</p> <p>Updated weather forecasting and localized weather information using SMART-MET and flood warnings are shared through NCHM Facebook page, unusual weather information e-mailed to the key members of the National Disaster Management Authority and 20 District Heads. From June end, 2018 the information will be made accessible to public through NCHM website.</p> <p>4 evidence-based policy influencing documents disseminated: a) NAPA II Seminar proceedings, b) Addressing risks of climate induced disasters in Bhutan: the NAPA II experience, c) Intents, initiatives</p>	HS	Completed

	facilitation and sector leadership	National climate change policy framework in place (CC adaptation and synergies), with gender segregated policies and monitoring framework	<p>and impact: slope stabilization and flood protection works under Phuentsholing Municipality and d) Equitable and Meaningful Participation in Local Climate Adaptation and Governance in Rural Bhutan.</p> <p>National Climate Change policy has been drafted.</p>		
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For **Outcome 1**, it is safe to assume that all output activities for Outputs 1.1 and 1.2 have been satisfactorily carried out, given that the landslide-prone areas along the highway have been stabilized and river protection walls were built around the Barsa watershed, protecting both PIA and BFAL/BCCL residential colony. However, as there is lack of available data for assessment, the activity areas have been labelled U/A. Output 1.4 is unavailable for assessment due to limitations in data availability.

For **Outcome 2**, it is safe to assume that all output activities for Output 2.1 and 1.2 have been satisfactorily carried out, given that the key achievement in water supply hours for town areas is being extended to 18 hours. In addition, baseline surveys have been conducted for 570 households, the watershed management plan for Yakpugang has been developed and five water reservoirs for water harvesting have been installed in Dophuchen, Samtse. However, as there is lack of available data for assessment, some activity areas have been labelled U/A. For Output 2.3, Activity 2.3.3 Research was initiated by DDM and handed over to DES for implementation.

3.3.2 Relevance

The project is relevant, with project design strategically bonded with the Sustainable Development Goals of Bhutan. There is a high level of consistency between UN SDGs (2030), GEF strategic priorities for LDCs and local policy frameworks such as:

- a) National Forest Policy;
- b) National Environmental Strategy;
- c) Bhutan 2020;
- d) Bhutan Water and Vision;
- e) National Adaptation Plan;
- f) National Disaster Management Strategy; and
- g) Low Carbon Development Strategy.

Project objectives augment disaster resilience, institutional capacities and mainstreaming adaptation into policies and governance in Bhutan, with each objective clearly corresponding to a relevant GEF Focal Area. Different aspects of Climatic-Induced disasters were considered, and key locations for interventions were correctly identified.

3.3.3 Effectiveness

The project has showed evidence of its ability to support activities of national and local community disaster management. It has achieved the intended outputs and outcomes as evidenced by the results below. However, there remain areas to be improved in order for the outcomes to be better fulfilled. *[see Section 4 for further elaboration].*

Outcome 1: Risk from climate-induced floods and landslides reduced in Bhutan's economic and industrial center, Phuentsholing and Pasakha Industrial Area

- Land slide areas along Reldri School in Phuntsholing and Barsa Watershed at Pasakha provided with protection using geotechnical bioengineering
- Landslide monitoring and threshold development initiated in 6 sites along southern regions

Outcome 2: Community resilience to climate-induced disaster risks (droughts, floods, landslides, windstorms, forest fires) strengthened in at least four Dzongkhags

- Training provided during the project and covered 70% of the municipal office in flood protection and slope stabilization
- 21 forest management groups established in Thimphu, Wangdue, Monggar, Lhuntse and Trashigang Dzongkhags at the community levels
- Water resource inventory carried out for 4 Dzongkhags of Monggar, Tsirang, Samtse and Pemagatshel and national report was written
- 30 sources of water identified and mapped across Dzongkhags with water flows in villages
- Irrigation scheme implemented at Wangdue and Punakha Valley was a success
- 5 reservoirs for water harvesting (including rain water) installed in Dophuchen, Samtse
- 30 water user groups formed with group saving scheme for maintenance of water resources
- Windstorm resilient roofing system guideline developed, approved and distributed to all districts. Trainings were conducted (with the help of USAID) over 5 days to 153 people,

technicians and engineers from Monggar, Phuntsholing and also students from the vocational technical institute in Sarpang

Outcome 3: Relevant information about climate-related risks and threats shared across development sectors for planning and preparedness on a timely and reliable basis.

- Relevant information about climate related risks and threats from 6 sites along southern regions shared with National Centre for Hydrology and Metrology

3.3.4 Efficiency

Although there were early delays at the start of the project due to the bureaucratic process, the project was implemented efficiently within timeline and, in one instance, ahead of schedule. Flood protection mitigation works at Pasakha industrial area – building river protection wall to protect the industrial area as well as the colony – was successfully completed within 12 months, although the project time period was given to be 15 months and was initiated in 2014. Project activities were also successfully completed in all aspects within the timeline in Dophuchen, Samtse. In addition, the expenditures incurred for project activities stayed within their budgeted amounts to achieve satisfactory achievement of results.

3.3.5. Country ownership

There were similar objectives in both the NAPA project and the Eleventh Five Year Plan (2013-2018) especially on the GEF-Adaptation goals and UNSDGs (2030). Incidentally, at a higher level 15 goals under the SDGs are integrated with the 16 National Key Result Areas (NKRAs) of the 11th Five Year Plan suggesting reconciliation of national level priorities. This implies effective country ownership, as project outcomes are incorporated into national development plans. In addition, country representatives are actively involved in project design, decision making, planning, implementation and monitoring. This is evidenced through high attendances at the annual Project Implementation Reviews as well as meetings convened under the Project Board, Technical Advisory and Project Working Groups.

3.3.6 Mainstreaming

The NAPA II project has links with the following SDG goals:

- a) Project has initiated water source inventory management system across different districts and also maintaining sustainable usage through various activities. All these links to achievement of SDG Goal 6-Ensure availability and sustainable management of water and sanitation for all.
- b) Project has carried out flood, landslide and windstorm mitigation activities which links to SDG Goal 9- Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- c) Project has carried out various programmes towards the SDG Goal 11-Make cities and human settlements inclusive, safe, resilient and sustainable.
- d) The aim of the project is to take actions towards climate change and its impacts. So it directly links to SDG Goal 13-Take urgent action to combat climate change and its impacts.
- e) All the activities such as landslide and flood protection activities and forest fire management directly links to SDG Goal 15-Protect, restore and promote sustainable use of terrestrial

ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Mainstreaming of awareness of climatic-induced risks: The Project has raised the awareness and capability of climatic-induced risks. The project beneficiaries at both central and local levels were aware of the landslides, floods and forest fires. The project activities provided a sense of risk mitigation and governance that they could actually plan and do something about these climatic-induced risks that can become national disasters if not effectively mitigated. There were also specific examples of crisis recovery, in particular the stabilization of all landslide areas in Phuentsholing and Pasakha Industrial Area under Outcome 1, which has significantly reduced the occurrence of floods and landslides, as well as the establishment of forest fire management groups under Outcome 2, which has seen a marked decrease in the number of forest fires prior to the project.

Gender mainstreaming: There were project activities led and participated by women. The project recognizes the disproportionate burden and the many impacts women face because of climate change. The project identifies the role and socio-cultural constraints faced by women that make them vulnerable. Higher rates of women participation were evident in project activities, while empowerment through capacity development was revealed.

3.3.7 Sustainability

Sustainability should be considered from four perspectives: financial resources, socio-economic institutional framework and governance, and environmental:

- Financial resources: Most likely to be sustainable. Sustainability depended on continuous funding and it is imperative that funds are allocated after the project ends. The approximate budget of the project was USD 4.38 million and a balance of USD 49,952.42 is recorded as of date. The limited financial resources in the future for climate change and disaster resilience may present uncertainty on sustainability after project.
- Socio-economic-Most likely to be sustainable: Sensitivity of traditional and cultural practices affected water sharing across local communities. The water user groups and forest fire management groups were successfully formed and related income activities, such as saving groups, have been positively impacted. However, there are challenges in convincing villagers to share water from locality to locality due to old beliefs and traditions. This needs to be addressed with an attitude, behavioral and a commitment change, another key pillar of capacity development to ensure sustainability. The issue of water sharing is also addressed in the Water Act of Bhutan, 2011 and its regulation. There is a need to strengthen enforcement of the water law. More public awareness is needed: it is recommended that lessons learnt from the successes of Tarayana's work be documented and broadcast across Bhutan. This will also help erode some of the existing objections towards water sharing across localities, as the ideas and practices gain greater acceptance. There is a suggestion to consider Water Transfer Pricing mechanism:

E.g.: Monggar Dzongkhag

- 22 reservoir tanks
- 54 rainwater harvesting tanks
- 9 Water User Committees

Central Pool of Total Water Available: excess water transferred from 22 reservoir tanks and 54 rainwater harvesting tanks

Let us assume that for Jan 2019

- Water User Committee A collected 20 litres of water, used 10 litres, and transferred 10 litres of water to Central Pool. Water User Committee A receives 10 Water Transfer Credits
- Water User Committee B collected 15 litres of water, used 8 litres, and transferred 7 litres of water to Central Pool. Water User Committee A receives 7 Water Transfer Credits
- Water User Committee C collected 12 litres of water, used 7 litres, and transferred 5 litres of water to Central Pool. Water User Committee A receives 5 Water Transfer Credits

Total Amount of Water in Central Pool at Jan 2019: $10+7+5 = 22$ litres

Let us assume that for Feb 2019, there was very little rain in C's area; A & B are unaffected

- Water User Committee C only collected 5 litres of water, and needs 2 more litres
- Considering that there was excess of 22 litres from Jan 2019, C can purchase the extra 2 litres it needs, using 2 Water Transfer Credits

In this case, C is able to receive enough water for its needs, even though it did not collect enough for the month of Feb 2019.

- Institutional framework and governance-Most likely to be sustainable: Limited capacity and uneven distribution of capacity at local levels meant that successes may not be easily replicated and sustainability becomes a challenge. There was strong level of capacity at the Central to implement the project activities. The guidelines and manuals were updated and written and disseminated to institutionalise the knowledge. However, capacity at local levels were unevenly distributed and limited in most cases, especially at Dzongkhags.
- Environmental-Likely to be sustainable: The foundation has been laid for environmental protection over the long term. The project successfully achieved many outcomes and outputs as evidenced by indicators, laying the foundation for environmental protection. [see 5. Impact for specific achievements]

3.3.8 Impact

The impact can be assessed with three considerations, that of, an improvement in environmental status, environmental stress reduction and the progress towards stress change. The improvements made towards each project outcome are detailed below.

Project Outcome 1: Satisfactory

- Land slide areas along Reldri School in Phuntsholing and Barsa Watershed at Pasakha were provided with protection using geotech together with bioengineering.

- Landslide monitoring and threshold development were initiated in 6 sites along southern regions.

Project Outcome 2: Satisfactory

- Training was provided during the project and covered 70% of the municipal office in flood protection and slope stabilization.
- 21 forest management groups were established in Thimphu, Wangdue, Monggar, Lhuntse and Trashigang Dzongkhags at the community levels.
- Water resource inventory carried out for 4 Dzongkhags of Monggar, Tsirang, Samtse and Pemagatshel and a national report was written.
- 30 sources of water were identified and mapped across Dzongkhags with water flows in villages.
- An irrigation scheme was implemented at Wangdue and Punakha Valley was a success.
- 5 reservoirs for water harvesting including rain water harvesting was installed in Dophuchen, Samtse.
- 30 water user groups were formed along with group saving scheme for the maintenance of water resources.
- A windstorm resilient roofing system guideline was developed, approved and distributed to all districts. Trainings were conducted (with the help of UNAID) over 5 days to 153 people, technicians and engineers from Monggar, Phuntsholing and also students from the vocational technical institute in Sarpang.

Project Outcome 3: Satisfactory

- Relevant information about climate related risks and threats from 6 sites along southern regions was shared with National Centre for Hydrology and Metrology.

Environmental Stress Reduction: Satisfactory

- Man-made forest fires have decreased after the NAPA II project, with villagers taking initiatives to prevent fire and exercised caution on forest fires.

Progress towards stress/status change: Satisfactory

- The Project laid a strong foundation for preparedness for climate-induced disasters in Bhutan, and there is now potential for long-term disaster management to be realised.

Overall impact

The Project as designed has achieved the planned project outputs and outcomes. The capacity development increased the skills and knowledge on disaster management and climatic resilience at the Central Government and impacted the lives of the local villages. Moving forward, the departments and divisions must and should extend the success that they have achieved through replications. Sustainable funding is a prerequisite and a strategy for fund raising should be in place.

4.0 Conclusions, Recommendations & Lessons

Overall, the Project managed to achieve most of its targeted outcomes and outputs. However, there were various challenges faced in the process of project implementation under various outcomes and outputs. One central theme across various ministries and project activities was constraints in terms of available budget, manpower, resources, climate data (particularly at Gewog levels), monitoring and follow ups. There were also issues in getting approval for project activities (in two instances, components were handed over to other ministries, affecting budget and implementation), which was exacerbated by different financial year accounting for UNDP and RGoB. In addition, it was difficult to coordinate and ensure consistent capacity development at both central and local levels. Due to these various limitations, the Project mostly achieved the basic foundation in terms of skills, knowledge, equipment, infrastructure, SOPS, guidelines and reports – however, implementation has not been fully achieved. As such, replication of project successes has not been widespread.

Project Objective: Resources for NAPA II were scattered to achieve results in many different areas. It may have been better if attention was focused in a few key areas, such as flood control measures at Sarpang. For water resource management, majority of the activities were implemented downstream, which may not have solved issues originating at water sources. In terms of research and monitoring, there is a need to strengthen skills and knowledge in these areas, so that better results can be achieved. NAPA II has laid a foundation of basic skills, knowledge, and instrumentation for future projects to be built upon.

Outcome 1: Current landslide protection works are temporary in nature and may not withstand the annual monsoon season. In addition, JICA has highlighted that the slope stabilization method does not seem to be working well. Counter measures have been proposed using Japanese products for soil stabilization. Going forward, there is a need for geotechnical studies to ensure long-lasting, sturdy measures replace the temporary works in place.

Outcome 2: Activities carried out by Tarayana under Output 2.2 has had far-reaching effects on other project areas, such as Dophuchen, Samtse (Output 2.1), where five water reservoirs installed for water harvesting have brought positive changes to the villagers living in the area. In addition, the works conducted by Tarayana has unintentionally benefitted slope stabilization works under Outcome 1, as the planting of trees and fencing around water sources at Mukapari source, Kitpari source and Kheshingri source helps further stabilise both the surrounding soil and slopes. Activities have also achieved impressive positive impacts in areas of health, education, income and gender mainstreaming. Further details can be found in the report on Tarayana activities below.

Outcome 3: For NCHM, the project period was just adequate for set up of instrumentation for NWFFWC, with weather information updating recently initiated. Currently there is inconsistency in the maintenance of weather stations e.g. Gedu well maintained, Kamji fully covered with bushes. Also, data capture at the local level is not without difficulties – in the case of Output 2.2, the collection points are further than expected and GPS locations were inaccurate, plus there were double collections of data. The same issue may have cropped up for NWFFWC. All these may have affected the accuracy and reliability of data collected, and it will be some time before data sharing can be actualized.

The following pages provide reports on specific activities carried out by implementing agencies, ministries and organisations for different outcomes and outputs. These have been outlined as follows:

- Outcome/Output No. – Project area under which activities fall under
- Area of Work – Location where activities were carried out
- Focus Area – Target objective(s) of activities completed
- Situation – Summary of activities carried out and Benefits (if applicable)
- Lessons Learnt – Observations picked up during project implementation
- Gap – Challenges/Issues – Areas where project implementation met with difficulties or can be improved
- Recommendation – Suggestions for sustainability of activities after NAPA II's conclusion. It is recommended that these be integrated into future projects

Outcome 1				
Ministry/Org	Phuntsholing Thromde			
Area of Work	Barsa Watershed	PIA	Rinchending Checkpost	Omchu River
Focus Area	Landslide Protection	Mitigation Work	Slope Stabilization	Flood Protection
Situation	All and slide areas are provided with protection with the use of geotech methodology along with bioengineering. Traditional methods were also used to protect slide prone areas such as use of tarpaulin sheets	Work was successfully completed within 12months, although project time period was given to be 15 months and was initiated in 2014	Bioengineering techniques were adopted through plantation and civil engineering techniques, such as use of gabban walls, sand bags, dams and soil nailing including improvement of drainage along Thimphu-Phuntsholing highway	<p>Feasibility study was already carried out (hydrological analysis, flood protection design and installation of automated weather stations) at the upper portion of the river.</p> <p>Almost 70% of municipal office have been strengthened through capacity building training in areas including flood protection and slope stabilization</p> <p>Capacity building ex-trainings were attended in Philippines and Japan, and in-country trainings were provided through resource persons from Nepal and India.</p> <p>Benefits: Project has somehow stabilized the landslide prone area along the highway, protection of flood at the industrial estate</p>
Lessons Learnt	N.A.	N.A.	N.A.	N.A.
Gap – Challenges/Issues	The methods have somehow provided temporary solution but the slide seems to be taking place every monsoon season	There is no provision for maintenance of the river protection in the NAPA II project because within the next 1-2years,	N.A.	Difficult to understand and implement due to new technology and inadequate capacity of the implementing agencies

		there may arise a need to carry out maintenance works		
Recommendation	Going forward, there is a need for geotechnical studies need to be carried out so as to identify sturdier methods and measures, whether preventive or adaptive, that are more resilient to annual landslides during the monsoon periods.	In order to sustain the project, there is need to continue the project with additional funds to extend the river protection walls along the river The mitigation work will last over 10-15years if proper timely maintenance are carried out Meanwhile, municipal officials are carrying out the monitoring of the site before and after the monsoon seasons	If given the opportunity, municipal office will be constructing the mitigation works along the Omchu river along the main area of the city, slope stabilization along other areas since most of the areas under the municipal area and then maintenance of the existing mitigation works	Once the project progressed, the locals within the community were able to pick up the methodology and have even adopted such mitigation measures through their own initiatives.

Output 1.1, Activity 1.1.6	
Ministry/Org	FEMD
Area of Work	FEMD and Phuentsholing Municipality
Focus Area	Capacity Strengthening Support
Situation	<ul style="list-style-type: none"> Total budget allocated is USD 50,000 Provided technical backstopping to the flood protection in the field in terms of review of technical reports and design of flood protection systems Engineers were trained on flood protection and mitigation, also field visits were arranged in Indonesia and Bangkok Skills gained from the trainings were replicated to other Dzongkhag engineers
Lessons Learnt	N.A.
Gap – Challenges/Issues	<ul style="list-style-type: none"> Flood hazard measurement, flood zoning and flood modeling requires more data
Recommendation	<ul style="list-style-type: none"> Set up local data collection centre near Pasakha Industrial Area for Barsa watershed

Output 1.3	
Ministry/Org	DEGM
Area of Work	Phuntsholing, along Zhemgang- Gelephu highway, Arong and Moshi in Samdrupjongkhar
Focus Area	Mapping of Landslide, Landslide Mitigation Measures, Geological Assessment on Landslides
Situation	<ul style="list-style-type: none"> Developed technical manual which specifies feasibility study processes, research proposal for landslide study, geo-hazard and vulnerability assessment.

	<ul style="list-style-type: none"> • Study has come up with short term and long term solutions through reproduction of topographical maps and reports • Landslide monitoring and threshold development was initiated in 6 sites along southern regions and the information is shared with National Centre for Hydrology and Metrology • Technical report prepared but in draft stage. Findings from the report are presented to the stakeholders through workshops <p>Benefits</p> <ul style="list-style-type: none"> • Study has enhanced awareness on which areas to be targeted for mitigation measures based on scientific study • Project has strengthened the capacity of people involved in landslide
Lessons Learnt	<ul style="list-style-type: none"> • Causes of landslide is mainly due to erratic rainfall • Landslide causes risk to life, human settlements and other infrastructures, so it is important to provide priority towards its mitigation
Gap – Challenges/Issues	<ul style="list-style-type: none"> • Lack of rainfall data led to installation of equipment to record rainfall at different locations • Existing rainfall data is not adequate because 8-10 years data is required for forecasting • Study demands highly technical and scientific skills and experience • Variation of different parameters influencing landslide analysis, whose result may lead to misleading information, generalization, over or under estimation • Lack of monitoring system at landslide areas to record date and time of landslide events • Lack of budget – will future efforts be funded internally, internationally or both? • Limited knowledge about the details of landslide which leads to continuously building of walls by the stakeholders which is not effective, different landslides are caused by different phenomenon and also localized rainfall • Sustainability is a question based on the fund availability for future development and the need to collect 10 years’ data for long term landslide monitoring for forecasting
Recommendation	Collaboration with foreign institution or Capacity Development of DGM is required to make up for the current gaps in budget, technical skills, knowledge and experience. One possible solution is to approach neighbouring countries, such as India and Nepal, and seek info-sharing on landslide data. In this way, efforts in managing landslides in the region will be further strengthened through larger volume geotechnical studies and analysis.

Outcome 2	
Ministry/Org	WRCD
Area of Work	Monggar, Tsirang, Samtse and Pemagatshel
Focus Area	Windstorm Resilient Roofing System
Situation	<ul style="list-style-type: none"> • Water resource inventory carried out for 4 Dzongkhags of Monggar, Tsirang, Samtse and Pemagatshel and developed as national report • 30 water sources determined and mapped across all Dzongkhags along with water flow in the villages • Perception on house hold water supply was also carried out • Project is scaling up to other Dzongkhags of Trashigang, Dagana and Samdrupjongkhar
Lessons Learnt	N.A.
Gap – Challenges/Issues	<ul style="list-style-type: none"> • Inadequate funds • Training was provided but implementation of training is an issue

	<ul style="list-style-type: none"> Limited time (perhaps due to handover from DDM) Unavailability of data (for research?) Unavailability of participants (for research?)
Recommendation	<ul style="list-style-type: none"> Guidelines to be validated and standardized in terms of regulation for easier implementation

Outcome 2	
Ministry/Org	Tarayana Foundation
Area of Work	17 districts, 310 villages
Focus Area	Climate Resilient Water Harvesting
Situation	<ul style="list-style-type: none"> Constructed 3 water reservoirs. <ul style="list-style-type: none"> Reservoir 1. At Mukapari source Reservoir 2. At Kitpari source Reservoir 3. At Kheshingri source Provided syntax water tanks for households above and beside Mukapari source where drawing pipelines to home is not feasible (there are 30 households that still carries water from nearest sources). Installation of Rain water systems at households. Carried out tree plantation and fencing around the water sources. Provided pipelines from water reservoirs to reachable short distance households. Awareness programmes for villagers in importance and conserving trees around the water sources and refrain from planting trees and crops which require more water consumption such as banana trees, instead planting bamboo trees. <p>Benefits</p> <ul style="list-style-type: none"> Previously village children had to carry water early in the morning, waiting in line to fill their containers from a small water source while parents looked after cattle. As this took much time, children sometimes refrained from attending classes at all to avoid punishments for being late. This has changed significantly, with school attendance improving greatly. The installation of water reservoirs has improved the water availability and water quality in the area. Previously, wild animals and humans both used the same source, so there were many cases of water borne diseases cases, which has now decreased. In general, the health and sanitation of the villagers has also improved markedly, as water is now available for washing and cleaning in addition to drinking <p>Future hopes</p> <ul style="list-style-type: none"> Although water is available at the source, about 15 out of 60 households still have to carry water from the source. Tarayana has installed rainwater harvesting system in some households but the rain is scarce (only once a month during monsoon season). Therefore, villagers hope an arrangement to be accomplished to have water supply to their homes through pump system with minimal running cost. Village lands are very fertile and capable of higher crop yields given adequate water availability. Currently villagers are doing self-subsistence farming only. In future they hope to use all the farm lands to grow more vegetables for sale and boost their income. <p>Activities carried out by villagers for sustainability of the infrastructures and facilities.</p>

1. Each household has promised to plant at least 100 trees around water sources every year. There are around 60 households in the village including homes of hermits (Tsamkhang).
2. A fund raising programme has been started by villagers, where approximately Nu. 100 is collected from each household for the funding of maintenance works required for water infrastructures.
3. Following trainings by Tarayana, a few households have constructed their own rainwater harvesting facilities. In particular, Tashi Wangchuk has constructed one additional water harvesting and collecting tank apart from the one provided by Tarayana

Climate Resilient Water Harvesting

S/N	Dzongkhag	No. of reservoir tanks constructed	No. of Water User Committees formed	No. of rainwater harvesting tanks installed	No. of household beneficiaries
1.	Samtse	9	7	12	247
2.	Monggar	22	9	54	383
3.	Pemagatshe I	4	8	12	198
4.	Tsirang	8	7	31	268
	Total	36	31	109	1,096

Benefits

- Cleaning of water sources, preservation of endanger species
- Water filtration using low cost technology was adopted through locally available materials such as bamboo and other ingredients
- Decrease in communicable diseases, improvement in regular hygiene and increase of student attendance in the schools since they do not have to go far off places to fetch water
- Somewhat improved in retaining youths to stay in the villages in terms of rural urban migration
- Increase in income of the villages due to availability of water for economic activities
- Revived water source and improved access to market including microfinance
- Women involvement in decision making as most of the water user groups are lead by women and contribution of people with vulnerable sections of the society in decision making
- Lead to stabilization of slope through plantation

Lessons Learnt

- Initially, villagers were hesitant to implement new works as they were used to conventional and traditional methods, which are less efficient. After Tarayana's installation of physical works and villager involvement (through teaching and advising of new ideas and possibilities), they are confident in carrying out water management works.
- Concrete works had to be taught, as villagers have no experience in working with cement and sand
- Traditional and cultural practices are sensitive issues for the community. Strong community engagement has shown positive spin-offs such as:
 - increased school attendance for kids
 - reduced drop-out rates of girls
 - improved health status
 - reduced drudgery for women
 - increased collective aspirations
 - co-benefits in job creation

	<ul style="list-style-type: none"> • additional days of labor/livelihoods support
Gap – Challenges/Issues	<ul style="list-style-type: none"> • Unwillingness of the community to share water from each locality, difficulties in convincing the people in the villages due to old beliefs and tradition • Monsoon and landslides • High transport charges for resources
Recommendation	Replication of NAPA II project is being carried out in 6 Dzongkhags through funds from Bhutan Trust Fund for Environment Conservation. It is recommended that the lessons learnt from the successes of Tarayana’s work be documented and broadcast across Bhutan. This will also help erode some of the existing objections towards water sharing across localities, as the ideas and practices gain greater acceptance.

Output 2.1	
Ministry/Org	Mongar Municipality
Area of Work	Mongar
Focus Area	Climate-resilient water harvesting, storage and distribution systems
Situation	<p>Major Impact Water scarcity eliminated in the core town areas since 2014</p> <ul style="list-style-type: none"> • In monsoon season, the gravitational supply system in the upper location is used • In lean seasons, the pump supply system in the lower location is used • This has made water supply reliable throughout the year, even when maintenance works are required for either supply line. However, additional costs are needed for running pumps in lean season <p>Success Factors</p> <ul style="list-style-type: none"> • Lean season: uninterrupted water supply to municipal area • Hotels and restaurants could maintain proper hygiene for business operations (originally, there was a need to carry water from nearest sources) <p>Beneficiaries of the Project</p> <ul style="list-style-type: none"> • Residents and businesses establishments in core town area • Institutions: <ul style="list-style-type: none"> a. Referral hospital b. Higher and Lower Secondary Schools
Lessons Learnt	<ul style="list-style-type: none"> • Learned to implement water pumps (submersible and centrifugal) in distribution system • Learned importance of development of management plan • Staff sent for capacity building training in Philippines brought back new knowledge to be shared • Villagers extracting stones for construction above the pipelines also damaged the pipes in some areas. After discussion with DoFPS, issuance of stone extraction permits near pipelines has been stopped
Gap – Challenges/Issues	<ul style="list-style-type: none"> • First package (upper location) was delayed by first contractor • Pump implementation in supply system was hampered by lack of technical knowledge

	<ul style="list-style-type: none"> • Joints or connections in GI pipes gave away due to water pressure and needed to be welded. Factory made gaskets were unreliable and needed to be replaced • Widening of the northern East-West Highway has damaged pipelines due to land settlements in the upper location and falling debris in the lower location
Recommendation	<p>Additional works that can be implemented</p> <ul style="list-style-type: none"> • Improvements in water distribution network in core town area • Establishment of a reliable treatment plant; currently, water is just passed through sedimentation and chlorination process for treatment

Output 2.2	
Ministry/Org	WRCD
Area of Work	Mongar, Pema Gatshel, Samtse and Tsirang
Focus Area	Water Harvesting, Storage and Distribution System
Situation	<ul style="list-style-type: none"> • Building on the National Water Resources Inventory <ul style="list-style-type: none"> ○ 2014 and 2015 ○ Funded by BTFEC ○ 20 Dzongkhags covered ○ 558 measurements; average: 28; range: 11-75 ○ Gewog, stream name, GPS location and min and max flows reported • Recommended <ul style="list-style-type: none"> ○ A more comprehensive inventory ○ Review of water availability and demand ○ Use of hydrological modeling and basin delineation ○ Inclusion of climate change scenarios and time periods • Four Dzongkhags Assessed <ul style="list-style-type: none"> ○ Mongar, Pema Gatshel, Samtse and Tsirang ○ Linkage with Output 2.1: Water harvesting, storage and distribution system in the four Dzongkhags ○ Tarayana Foundation’s involvement in these Dzongkhags for local community development and to address water scarcity within the overall context of poverty reduction and sustainable livelihoods at the grassroot level <p>Upcoming Activities</p> <ul style="list-style-type: none"> • <u>Flagship Program Blueprint Preparation</u> <ul style="list-style-type: none"> ○ Blueprint Document ○ Steering Committee, Focus Group Joint Working Group meetings ○ Site visit to priority areas ○ Printing of blueprint
Lessons Learnt	<ul style="list-style-type: none"> • Most water sources located in far flung places, so actual data collection took longer than expected
Gap – Challenges/Issues	<ul style="list-style-type: none"> • DEOs mentioned extensive field survey interfered with daily responsibilities, leading to more time needed for completion • Unwanted/duplicated measurements on the same stream

	<ul style="list-style-type: none"> Inaccuracies in GPS locations, which made it hard to locate some points on the map Springs/Pond measurement points could not be validated on GIS as catchments could not be identified Household survey had inadequate sample size and cannot be used to represent entire gewog
Recommendation	<ul style="list-style-type: none"> Mapping & identifying streamlines on GIS or Google Earth & selecting a common outlet point for measurement and conducting field visits prior to measurement Coordinating with relevant stakeholders for uniform flow measurement and monitoring of progress Conducting similar inventories in other Dzongkhags Taking into account other sources (groundwater) for future projects

Outcome 2 & Output 2.3	
Ministry/Org	DDM
Area of Work	Chukha, Samtse, Dagana, Pemagatshel Dzongkhag and Phuentsholing Thromde
Focus Area	Windstorm Resilient Roofing System
Situation	<ul style="list-style-type: none"> Initial project budget of USD 638,200 was revised to USD 635,120 as climate resilient roofing of the rural homes was handed over to MoWHS Community based disaster management manual 2009 was updated Instant disaster management team was formed Procedure for contingency plan was developed Basic disaster equipments were supplied along with search and rescue trainings Community based disaster management training was attended by respective officials in Asian Disaster Planning Centre, Bangkok, Thailand
Lessons Learnt	<ul style="list-style-type: none"> Prior to NAPA II, Disaster risk management plan and Disaster management contingency plan were separate but after the project, it was combined Need to facilitate the preparation of the DM and Contingency plans Integration of DM and Contingency plans
Gap – Challenges/Issues	<ul style="list-style-type: none"> Project fund management was a problem due to different financial year of UNDP and RGoB – this caused time delays in budget incorporated and releases Administrative approval process delayed the project initially Unavailability of district officials for the disaster management plans and trainings Dependence on Dzongkhags time hindered the implementation of activities as most of DDM’s project activities have to be conducted in the Dzongkhags
Recommendation	<ul style="list-style-type: none"> More effective if field level stakeholders were involved during the initial phase of the project, which can lead to ownership of the project and its sustainability Disaster management contingency plan alone is not adequate; field people have to be involved

Output 2.3	
Ministry/Org	DoFPS
Area of Work	Trashigang and Wangdue districts

Focus Area	Forest Fire Management through Formation of Forest Fire Management Volunteer Groups
Situation	<ul style="list-style-type: none"> • 21 forest management groups established in Thimphu, Wangdue, Monggar, Lhuntse and Trashigang Dzongkhags at the community level • Budget USD 30,000 • Volunteer management groups consists of district officials, community members and other members • Basic knowledge on forest fire management, benefit to ecology and personal safety provided • Awareness created to the volunteer members: benefits of preventing forest fires and its mitigation • Training provided in terms of preparedness, first aid and personal protection through personal protective gears • Developed fire management plans • Community forest fire management group, Gewog forest fire management group and Dzongkhag forest fire management groups were established • Capacity building on fire management aspects were provided to the all the stakeholders • Trainings attended by officials: Malaysia and Bangkok (5 people), study tour to Bangkok (3 people) <p>Formation of forest fire management communities in Gewogs:</p> <p>2015-2016 Financial Year</p> <ul style="list-style-type: none"> • Thangrong gewog forest fire management community • Walagtang and Ngarpontang forest fire management community • Sershong and Shermung gewog forest fire management community • Takhambi and Tsakaling gewog forest fire management community • Yangbari and Kharnang, Chaskhar gewog forest fire management community • Yadi and Yekhar Chiwog forest fire management community • Yangla Gungdang and Tsengkhar chiwog forest fire management community <p>2017-2018 Financial Year</p> <ul style="list-style-type: none"> • Dremetse forest fire management community • Thangrong gewog forest fire management community • Minji forest fire management community • Tshengkhar forest fire management community • Dzongkhag forest fire management plan drafted and approved (Monggar and Lhuntse) <p>Benefits</p> <ul style="list-style-type: none"> • Villages: surrounding forest are saved, awareness on laws and rules related to forest resources usage. • Deepened relationship between villagers and implementing agencies as they gather to discuss regularly • Decrease in forest fire after the NAPA project • Villagers coming forward to prevent fire and are more cautious on forest fire compared to before <p>Outcomes</p> <ul style="list-style-type: none"> • Villagers are more aware of laws and rules related to intentional forest fire by them. • Villagers are made to feel the responsible in taking part to fight against forest fire. • Awareness campaign for the villagers along with discussions has reduced human made forest fire both accidental and intentional.

	<ul style="list-style-type: none"> • Villagers are more volunteering and willing to help in case any forest fire breaks out in the area. • Lemon grass oil extractors have brought their production equipment in isolated forests to the village to avoid accidental forest fires. There used to be almost one forest fire occurrence annually in the gewog. • Since the group formation only one forest fire has occurred and it was also initiated by a villager who was mentally unsound. It's been about 3 years without a forest fire in Chaskhar gewog
Lessons Learnt	<ul style="list-style-type: none"> • Implementing agencies have learned to research and learn to draft a management plan for the project • Villagers have learned how to approach forest fire battling through trainings and discussions. However, no huge drills as such have been carried out yet • Villagers were also taught how to use fire managing tools and equipments. <ul style="list-style-type: none"> ○ change of behavior of the people is essential ○ integrated approach is required for prevention of forest fire ○ cause of fire is agriculture where people burns stuff to make soil fertile and fodder plantation reducing cattle grazing ○ engagement of people for forest fire management through education and awareness creation
Gap – Challenges/Issues	<ul style="list-style-type: none"> ● Initially, villagers were reluctant to take part and join in community groups as they felt it was burdensome and added extra work to their already busy life. ● Lemon grass oil producers were intentionally setting the forest on fire to get rid of alien plants around the grass and to increase the lemon grass yield. ● During meetings and gatherings, parents would send children on vacation from colleges and schools from other places as representatives from household. Therefore, during forest fire occurrences, there is a high chance that these children are absent as they are attending schools and colleges in other places. ● Different financial year for UNDP and RGoB makes smooth transaction of funds challenging ● Managing forest fire is difficult due to rough terrain ● Fire management plan has been developed for Dzongkhag and Gewog. However, lack of budget hampers implementation ● Limited data for predictive analysis ● Tools provided through project was not adequate, so there is need of additional tools at site ● Additional services required are in terms of preparedness for forest fire, capacity building and tools including vehicles such as fire ambulance
Recommendation	<p>Activities carried out for sustainability of the project.</p> <ol style="list-style-type: none"> 1. Villagers need to be briefed and refreshed about management of the group regularly. DoFPS makes it a point to do it at least once per year before the dry season starts. 2. DoFPS recommends that the communities in high risk areas needs to be briefed and refreshed more frequently. However, lack of enough funds has hampered this, as villagers expect refreshments or lunch to be provided during trainings. 3. For sustainability, the Forest Fire Management Plan was drafted and sent to head office for approval. There is a requirement for the management plan to be reviewed every 2 years; however, the gewog forest office has not received any approval from the head office yet. <p>Additional works that can be carried out.</p> <ol style="list-style-type: none"> 1. By involving only villagers in the group, it looks like the upper administration and other agencies in gewogs are not responsible for the forest fire management. It is recommended that stakeholders such as police, schools, hospitals, gewog administrations and Dessups to be involved to form a gewog level management group. (as all current groups formed are in chiwog level) 2. Duties that are properly streamlined and allotted at the gewog level management group will immensely benefit the gewog as a whole.

	<p>Suggestions from villagers.</p> <ol style="list-style-type: none"> 1. Equipment was provided to the gewog forest office by the projects but quantity is very small. Therefore, even when villagers are interested to learn and train, the lack of adequate equipment and funds has hampered the process. There is a need for adequate equipment and trainings for villagers. 2. More importantly, water bags are found to be more useful – greater quantities are required. 3. Frequent monitoring on the activities of lemon grass oil producers will help manage fire hazard risks. 4. Household representatives attending trainings and discussions need to be staying in the village at all times, not children who come back for vacation.
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Output 2.2, 2.3	
Ministry/Org	DES
Area of Work	N.A.
Focus Area	Communication, Awareness Creation and Capacity Building
Situation	<ul style="list-style-type: none"> • Climate Change Coordination Committee (CCCC) established which was earlier Multi-sectoral Climate Change Coordination Committee (MCCC) • Lot of awareness programs created and development of 3 audio visuals on best practices
Lessons Learnt	<ul style="list-style-type: none"> • Experience sharing with other agencies and collaboration with other projects such as EU, World Bank • Capacity of local level is low, so low budget has been kept about 70:30 but for future projects, it has been revised to 60:40 (central to local) • Bottom up approach should be process for the future projects
Gap – Challenges/Issues	<ul style="list-style-type: none"> • Climate change is a difficult field where NEC tries to institutionalize other agencies towards one platform • Involved during the initial formulation of project through prioritization of the projects through different sectors but was not involved people from the local government, also prioritization of project areas where not based on scientific analysis • Need of sufficient fund to carry forward the project • For sustainability of the project, there is need to build the capacity at the local level
Recommendation	<ul style="list-style-type: none"> • One time fund provided through the project so there is question of sustainability but ensure proper utilization of funds through proper monitoring and evaluation

Activity 2.3.3	
Ministry/Org	DES
Area of Work	N.A.
Focus Area	Windstorm Resilient Roofing System
Situation	<ul style="list-style-type: none"> • Budget USD 60,335.5 • Developed guideline on Windstorm resilient roofing system • Developed Audio visual based on guideline and broadcasted through local TV channels • Trained 153 engineers, Technicians, Instructors and students of Technical Institute.

	<ul style="list-style-type: none"> Capacity building of 12 Engineers of Department of Engineering Services on “Methods of Research for Effective Disaster Risk Reduction” at ADPC, Bangkok Activity 2.3.3: Research was initiated by DDM and handed over to DES for implementation
Lessons Learnt	N.A.
Gap – Challenges/Issues	<ul style="list-style-type: none"> Inadequate fund, training was provided but the implementation is an issue Limited time (perhaps due to handover from DDM) Unavailability of data (for research?) Unavailability of participants (for research?)
Recommendation	<ul style="list-style-type: none"> Guidelines validated Guidelines standardized in terms of regulation for implementation

Outputs 3.1, 3.2	
Ministry/Org	NCHM
Area of Work	N.A.
Focus Area	NWFFWC
Situation	<ul style="list-style-type: none"> Up-graded manual weather stations to automatic hydromat stations Enhanced capacity of NCHM through various training programmes
Lessons Learnt	<ul style="list-style-type: none"> Earlier hydrology and metrology were different but during the course of the project, it was combined which has posed challenges due to territorial issues Project has made foundation for the data collection but at the moment it is under process to integrate data to Disaster Management Control Centre It would have been better if similar components of the project are given to one entity. Department of Geology and Mines have installed rain water measurement in 4 locations and the same thing is also done by NCHM Land acquisition is time consuming Installation of hydro-met station is season dependent Could have tendered out for the Calibration lab equipment as well along with AWS and AWLS Technology and skills transferred to NCHM and local vendors
Gap – Challenges/Issues	<ul style="list-style-type: none"> Lack of human resource is the biggest challenge Project has not included lab calibration due to open bidding procurement system Compromising quality of the work due to too much pressure from UNDP Sustainability of the weather stations requires manpower and budget Vandalism of equipment Rapid growth of grass in southern region of Bhutan Attacks on stations by insects and rodents Inadequate human resources for station operation and maintenance
Recommendation	<ul style="list-style-type: none"> Future tendering out for the Calibration lab equipment as well along with AWS and AWLS Clearer identification of similar components, so there is no duplication of efforts with other implementing agencies

Output 3.3

Ministry/Org	PMU
Area of Work	N.A.
Focus Area	Lead Responsible Agency
Situation	<ul style="list-style-type: none"> National Climate Change Policy has been formulated, endorsed by C4 and NEC. Capacity of 57 male staff and 32 female staff have been enhanced on climate change- adaptation and vulnerability assessments, GIS, Project management etc Produced 3 videos highlighting need for adaptation, adaptation actions implemented and impacts of adaptation actions at ground level Rapid Baseline Assessment of local preparedness and responsiveness to climate induced hazards completed Collection of case stories titled “<i>Addressing risks of climate induced disasters in Bhutan</i>” published to showcase Bhutan’s ongoing interventions in reducing the adverse impacts of climate change Documented the flood protection and slope stabilization under Phuentsholing Thromde component through publication “ <i>Intent, Initiatives and Impact</i>” by partnering with the College of Science and Technology, Rinchending. Conducted 2 rounds of Knowledge sharing workshops to share project lessons. Challenges and Good Practices with wider audience. International seminar planned for September, 2018 Project proposal for National Adaptation Plan (NAP) developed. The NAP will outline all climate change adaptation plans and programmes for middle and long term timeframe 8 rounds of Project Board and 16 rounds of Quarterly review and planning meetings successfully convened Organized field visits for Board members to provide an insight into the major field activities and better decision-making 1 Dzongkhag Environment Officer completed M.Sc.(Climate Change), Australian National University Co-funded 1 Dzongkhag Environment Officer’s Masters Programme in Environmental Management in Yale University, USA Dedicated website of NAPA II developed for disseminating Project information and outreach Facebook page on NAPA II created for enhancing project visibility Project logo developed
Lessons Learnt	N.A.
Gap – Challenges/Issues	<ul style="list-style-type: none"> Fund release with the new system has become slower Work planning between RGoB and UNDP Financial closing in June hampers smooth implementation of project
Recommendation	<ul style="list-style-type: none"> Synchronise financial year, funding dates between RGoB and UNDP so implementation is smoother

4.1 Corrective actions for the design, implementation, monitoring and evaluation of the project

Project objectives are designed broadly in line with the GEF Focal Area objectives augmenting disaster resilience, institutional capacities and mainstreaming adaptation into policies and governance in Bhutan, with each objective clearly corresponding to a relevant GEF Focal Area. (*see below Table 4.2 GEF Focal Area vs Project Objectives*). There was specific intent to ensure that project objectives and components were practical and feasible for implementation due to existing limitations in data, financial resources, knowledge, capacity and understanding. Different aspects of Climatic-Induced disasters were considered, and the key locations for interventions to take place were correctly identified.

Table 4.2 GEF Focal Area vs Project Objectives

GEF Focal Area	Project Objectives
1. Reduce the vulnerability of people, livelihoods, physical assets and natural systems to the adverse effects of climate change;	i. Safeguarding Gewog town and Pasakha Industrial Area (PIA) from critical landslides and flash floods while systematizing technical and institutional solutions implemented under the outcome for application nationwide;
2. Strengthen institutional and technical capacities for effective climate change adaptation;	ii. Conducting a water resource inventory and developing adaptation solutions for increased droughts in rural areas as well as Mongar town, introducing innovative technical and development approaches, as well as strengthening local institutions to prepare and respond to climate induced disasters, including forest fires;
3. Integrate climate change adaptation into relevant policies, plans and associated processes.	iii. Climate change data captured, analyzed and disseminated for increased resilience of development activities and response to climate induced disaster, through the strengthening of the national hydro met network and early warning system. Overall national capacity for climate change resilience reinforced through strengthened institutional leadership and improved knowledge for climate resilient policy development.

There is a clear progression in the logical framework design flow from project objectives to activities, outcomes and outputs, with strong linkages between each phase. Indicators were clearly defined and prepared using the SMART guidelines, although there exists room for improvement. In addition, the logical framework assumptions accurately reflect the national priorities of Bhutan. As such, major challenges were largely avoided during implementation. This is evidenced by the results achieved in intended outputs and outcomes.

Much attention was given to promote high levels of stakeholder involvement through consultative approaches in project design, decision making, planning, implementation and monitoring, which strengthened local confidence and ownership for project areas. There was excellent capacity at the central government level to implement the planned project activities, as all departments and divisions involved were engaged, with NEC selected as the key partner for execution.

In particular, the PMU drew upon staff resources from several departments and divisions across ministries, excellently coordinating collaborative activity efforts. Foundation capacity development of officials, both in-country and study mission abroad, also featured highly in the all project activities. The high community engagement has led to positive outcomes, for instance, on project beneficiaries in Mongar from work done by Tarayana Foundation. However, capacity at the Dzongkhag level was not evenly distributed throughout Bhutan, and such successes may not be easily replicable and difficult to sustain over the long run.

The framework for project monitoring and evaluation is sound, however, processes are currently unable to fully measure and assess achievements for some areas. This is also affected by the definition of the current impact measurements, which are broadly accurate but can be fine tuned to better fit the objectives of the project.

Corrective Action(s)

- There were many activities, but not one single focus. Going forward, a holistic, big picture approach can help to consolidate limited resources and manpower on the main goal for the Project.
- A lack of data on the needs of Dzongkhags, Gewogs and Chiwogs meant that project design and planning decisions were made at the central government level. Future projects should incorporate data-based needs for the local levels.
- There was a lack of precise or accurate information and data (numbers or pictures) of the exact nature of disaster hotspots e.g. landslide movements, human settlements and their activity, soil humidity, wind velocity.
- Further strengthening in design and implementation: a more strategic approach to urban resilience for better convergence and increased capacities at provincial/Dzongkhag level.
- It is necessary for a relook at how capacities should be allocated at the local and municipal level for further project activities to better allow replication and sustainability of successes.
- Processes for monitoring and evaluation need to be strengthened
- Impact measurements of the project outcomes and outputs could be better articulated at start of project to ensure that monitoring and evaluation accurately measures project achievements. Proposed indicators include:

Project

Capacity Building

- *level of participation*
- *proportion of population that are not aware of disaster preparedness*
- *level of community cohesiveness*
- *existence of community leadership*

Organizational Capacities of DM institutions

- *enrolments*
- *management*
- *financial management*
- *technical skills*

Outcome 1

- **Vulnerability and risk perception index [AMAT 1.2.15]**
 - *link physical estimate (e.g. flood frequency) with socioeconomic variables that reflect poverty or deprivation (e.g. value of crops affected, livestock affected, amount of consumable food destroyed)*

Outcome 2

- **Water resource inventories, water harvesting technology and additional water storage capacity available in some the most drought-prone communities of Bhutan**
 - *Knowledge Attitude-Practice (KAP) tool*
- **Existence and operationalization of disaster management committees at the local level**
 - *governance*
 - *management*
 - *resource use*
 - *service delivery*
 - *financial*
 - *sustainability dimensions*

Outcome 3

- **Number and location of real-time weather observation, forecasting and warning stations that feed data into the NWFFWC**
 - *number of data products created*
 - *end user categories identified*
 - *resolution/quality of data generated*

4.2 Actions to follow up or reinforce initial benefits from the project

Completion of Results: Project Objective – Achievement Rating: 5/6 Satisfactory

Positives: The Project has laid a strong foundation for preparedness for climate-induced disasters. This is evidenced by the foundational capacity development already completed in the writing and updating of manuals, guidelines, and SOPS for DM project activities. There is also extensive climate change data collection from weather stations, with extensive outreaches in Mongar sharing examples of frugal innovations e.g. water filtration.

Considerations for Future Projects: Although there is a large volume of climate change data collected, this has not been subjected to further in-depth analysis nor disseminated to the relevant personnel working in DM institutions. Going forward, there is a need for these data – in the form of numbers and pictures – to be shared with relevant professionals. Resources need to be allocated as well for the maintenance of equipment and hardware, such as weather stations and slopes, to ensure they continue to function optimally.

Currently, capacity development at local levels is not easily evident despite the completion of foundational capacity development. This suggests a need for future project efforts to focus on local capacity development, targeting not just technical skills, knowledge, systems and processes but also personal skills in motivation, behaviour etc. Inter-border or inter territory collaboration for DM should also be explored with neighbouring countries as well as other ASEAN countries facing similar challenges.

Completion of Results: Project Outcome 1 – Achievement Rating: 5/6 Satisfactory

Positives: Outcome 1 was achieved, with project activities completed satisfactorily - in particular, slope stabilisation, embankment etc were completed at PIA.

Considerations for Future Projects: Despite the success of Outcome 1, currently there is no landslide forecasting in place as yet, with little evidence of constant monitoring on landslides. For Output 1.4, the thresholds for landslide slope failure were determined in different geological zones, through research correlating geological instability with rainfall data from weather stations. Also, hourly data is not readily available.

These indicate that there is a need for future project initiatives to prioritise the setting up of a monitoring and evaluation system specific to landslides so as to better analyse and manage future potential hazards in landslides management.

Completion of Results: Project Outcome 2 – Achievement Rating: 5/6 Satisfactory

Positives: Outcome 2 was achieved, with implemented project activities generating additional demand for future follow ups. In particular, the activities have engaged stakeholders and communities in remote locations (such as Mongar municipality, which is well covered), which is commendable. Lots of DM training has been conducted to establish and equip the local-level DMCs. In total, more than 500 water resources at 4 Dzongkhags were mapped, with clear indication of both lowest and highest water flows. One exceptional example is Tarayana, which has done particularly well in outreaches strengthening local communities in water harvesting, and forming water user groups.

Considerations for Future Projects: The decision to use wrought iron casing versus stainless steel casing for submersible pump in the storage tanks in the municipality is of concern, as the difference in materials has impact on the long-term functioning, maintenance and eventual replacement. This requires subsequent monitoring and evaluation to either justify or question the rationale for the original decision. Also, there are concerns over local capacity development after the project's conclusion – will there be follow-up, ongoing training activities, or will they conclude as a once-off?

To check further: Further investigation is required to evaluate how successful is the implementation of the ArcSWAT model, to read closely into what has been accomplished for Chukha based on its reports, and what has been analysed for collected climate data in the form of pictures and numbers.

Completion of Results: Project Outcome 3 – Achievement Rating: 5/6 Satisfactory

Positives: Outcome 3 was achieved, with improved climate change adaptation planning apparent across Bhutan. There was a strong PMU to mobilise different departments and divisions for DM activities, which has resulted in a total of 63 weather stations set up and sending data, with weather forecasting improving significantly in terms of accuracy.

Furthermore, capacity building efforts to train staff in the areas of predictive modelling, early warning systems and developing appropriate weather products have led to significant competitiveness in departments.

A National Weather and Flood Warning Center (NFWFC) has been set up within DHMS to strengthen the capacity of weather forecasting and warning. There is a need to plan and implement a master blue print to integrate data products from different forecasting platforms.

Considerations for Future Projects: Although there is data collected from 63 weather stations, the current data analysis is not extensive enough for greater insights on patterns in weather conditions. Also, there is limited data sharing and practice drills, which further impedes future preparedness for weather hazards. Going forward, it is recommended that data collected is shared with data analysts and more regular practice drills to be scheduled.

4.3 Proposals for future directions underlining main objectives

Based on the evaluation of the current Project's objective and outcomes, as well as drawing on the experiences of other GEF projects, the greatest concern is that of sustainability. Whilst DM activities have been successfully launched and foundational capacity has been built, it is important to ensure that there are adequate follow ups so as to capitalise on completed activities. To promote sustainability, the following recommendations are suggested:

Recommendation 1: Thematic Focused Training with Activity Based Capacity Development

Instead of having 2-3 training activities under one theme, it would have been better if one single large training project was formulated to target the root issue, rather than spreading resources thinly to deal with the various downstream activities. For example, instead of having one training workshop where various DM activities are covered (eg landslide, flood protection, water harvesting), it would be better to focus on one theme (eg landslide) and the targeted participants are government staff, local DM committee members and contractors who are working on landslide protection works and activities. In addition, it is recommended that training workshops be a mix of classroom teaching, where knowledge is shared, and field work, where participants get hands-on practice on how to set up landslide protection works for example.

Skills development needs to be linked specifically to a project to ensure that training is relevant and timely, that is, it can be immediately applied to deliver results under the planned project. An example of a skill that is relevant is Water Transfer Pricing, which will accurately assign costs to various components under the project and allow budgeting to be more reflective of real costs incurred. This can be considered for future projects as well as future DM training.

Responsible: All the agencies involved in unique activities of the project

Recommendation 2: Replication

Replication of successful activities for present as well as future projects (for example, water filtration, weather forecasting technique transfer to flood forecasting and forest fire; lessons in hydrological mapping; capacity development at Central level replicated to local level). During the evaluation, there were a number of successful activities recorded that are worthy of replication. For instance, the general techniques developed for water filtration and weather forecasting could have been applied to flood forecasting and forest fire management, given the similarities in targeted outcomes to be achieved. Similarly, the robust capacity development at the central level of the

Government of Bhutan should be replicated at municipal levels, where the foundational capacity laid requires further development for sustained DM resilience.

For future projects, these dual purposes could be implemented by updating local level officials and field staff on successful lessons learnt during the course of project implementation. This can be achieved through classroom and practical trainings, recordings of success stories or even actual visits to successful pilot sites, depending on budget availability. Funding for these can be acquired through climate change related sources as well as other non-climate related sources.

Responsible: All the agencies involved in unique activities of the project

Recommendation 3: Publication and Funding for Innovations to Enhance Resilience against Climate-Induced Risks

In Recommendation 2, replication focused on repeating successful practices nationally within Bhutan. Given the success of uniquely innovative approaches discovered by Bhutan, it is recommended that these be published in international high impact journals such as Springer Nature. Apart from serving as a record for future climate adaptation projects in Bhutan, this can help draw governments, international organisations, academics and researchers to participate and collaborate in climate change adaptation projects in Bhutan. Examples include:

- Outcome 2, Tarayana Foundation, Climate Resilient Water Harvesting:
 - Construction of water reservoirs
 - Provision of syntax water tanks for households above and beside Mukapari source where drawing pipelines till home is not feasible
 - Installation of rain water systems for households
 - Planting of trees and fencing around the water sources
 - Provision of pipelines from water reservoirs to reachable households within short distances
 - Awareness programmes for villagers on: the importance of conserving trees around water sources, refraining from planting trees and crops which require more water
- Output 2.1, Mongar Municipality, Climate-resilient water harvesting, storage and distribution systems:
 - Water scarcity eliminated in core town areas since 2014 due to dual supply system
 - a) Monsoon season, gravitational supply system in upper location is used
 - b) Lean seasons, pump supply system in lower location is used
 - c) This has made water supply reliable throughout the year, even when maintenance works are required for either supply line. Additional costs are needed for running pumps in lean season

Apart from publication in international journals, it is advised that these innovations be submitted concurrently as proof and evidence of concept to both climate and non-climate funds. This can help draw funding, which is key considering the financial limitations Bhutan faces, and has the added benefit of being targeted to promote DM activities for climate resilience.

Responsible: All the agencies involved in unique activities of the project

Recommendation 4: Advanced Capacity Development

Generally, the project has seen improvements in attitude and behaviour across the various communities. However, to ensure long-lasting commitment whilst building on the foundational capacity development laid (in terms of technical skills, knowledge, processes, systems and equipment), there needs to be advanced capacity development. This focuses on changing the attitudes, behaviour and commitment of local communities in Bhutan – in other words, the motivation to carry on with DM activities over the long term. Without the right motivation, it is difficult for sustainable climate change resilience to take root and flourish in Bhutan. Successful motivation was observed in the following:

- Outcome 1, Omchu River, Flood Protection: Initially, villagers within the community found it difficult to understand and implement protective works due to new technology and inadequate capacity of the implementing agencies. However, once the project progressed, they were able to pick up the methodology and have even adopted such mitigation measures through their own initiatives.
- Output 2.3, Trashigang and Wangdue districts, Forest Fire Management through Formation of Forest Fire Management Volunteer Groups: Initially the villagers were reluctant to take part and join in community groups as they felt it to be more burdensome and extra work to their already busy lives. However, awareness campaigns as well as discussions have successfully engaged villagers, making them feel responsible in taking part in the fight against forest fires. As a result, they are more willing to volunteer to help out in the event of a forest fire break out in the area. In Chaskhar Gewog, only one forest fire has occurred in close to 3 years (which was initiated by a villager who was of unsound mind).

In both examples, the key factor in ensuring successful motivation which led to prolonged commitment was villager ownership. When villagers are actively engaged through awareness, training, discussions – and more importantly, involved in decision-making processes – they demonstrate enthusiasm and the willingness to carry on mitigation works, even initiating their own activities at the local level.

Responsible: Phuntsholing Thromde, DGM and Department of Forests

Recommendation 5: Big Data Analytics Deployment

In recent years, big data analytics has increasingly been applied for climate change management, with various applications such as:

- Google Earth Engine (World; used publicly available satellite imagery to track and identify environmental damages over years and decades)
- Global Forest Power (World; tracks forest cover, forest fires, deforestation)
- Surging Seas (US: accurate sea levels, flood warnings, action plans, sea level patterns, historical data etc)

UN itself has a Global Pulse programme called ‘Data for Climate Change’, which uses big data and data science from the private sector to achieve its climate change goals.

The value in big data analytics is its potential in generating real-time or near real-time predictions with high accuracy, particularly changes in weather patterns. This can help climate change experts to identify and implement the right solutions to target predicted changes. Given that Bhutan has

collected its own climate change data from weather stations, it is recommended that big data analytics be deployed to help develop data models that can be used for analysis, forecasting and simulation. It is suggested that this be included for further development under future projects, with remaining funding (where available) under Outcome 3 to be channelled for this purpose. Additional funding may be secured through climate and non-climate sources, as highlighted earlier.

Responsible: Major agencies involved in the project such as NEC, DDM, DGM and NCHM

4.4 Practices in addressing issues relating to relevance, performance and success

Lessons learnt from the good practice observed for the Project have been consolidated into 7 key lessons as follows:

Lesson 1: Sustainability and Replication of Good Practices - Replication of Successful DM Activities

Going forward, there should be a singular focus on sharing and replicating successful DM activities across Bhutan so as to drive DM efforts as a whole to be more productive and effective. For example, the water filtration done by Tarayana is worthy of publication and replication.

Lesson 2: Activity Based Capacity Development for Sustained Knowledge

To ensure there is a consistent and effective capacity development, there is a need for Activity Based Capacity Development (ABCD) which is taken to mean:

- i) The Project is designed with capacity development, and
- ii) The Project activities must be carried out with on-the-job training all through, not a generic and piece meal approach to training.

The project has many examples of successful ABCD over the course of its implementation, namely:

- Outcome 1, Phuntsholing Thromde, Omchu River, Flood Protection: Almost 70% of municipal office have been strengthened through capacity building training in areas including flood protection and slope stabilization. Capacity building ex-trainings were attended in Philippines and Japan, and in-country trainings were provided through resource persons from Nepal and India.
- Output 1.1, Activity 1.1.6, FEMD and Phuentsholing Municipality, Capacity Strengthening Support: Provided technical backstopping to the flood protection in the field in terms of review of technical reports and design of flood protection systems, with engineers trained on flood protection and mitigation. Also, field visits were arranged to Indonesia and Bangkok, with the skills gained from trainings replicated to other Dzongkhag engineers
- Output 2.1, Mongar, Climate-resilient water harvesting, storage and distribution systems: Staff were sent for capacity building training in Philippines and brought back new knowledge to be shared, including how to implement water pumps (submersible and centrifugal) in distribution system
- Activity 2.3.3, DES, Windstorm Resilient Roofing System: Capacity building of 12 Engineers of Department of Engineering Services on “Methods of Research for Effective Disaster Risk Reduction” at ADPC, Bangkok
- Output 3.3, PMU: Capacity of 57 male staff and 32 female staff have been enhanced on climate change- adaptation and vulnerability assessments, GIS, Project management etc

In these examples, capacity development activities were carried out through on-the-job training directly relevant to the targeted output and outcome results. This is a key positive benchmark that should be replicated and applied in future projects in Bhutan.

Lesson 3: Systematic Knowledge Application – Training Curriculum, Methodology and Assessments

The end result of every capacity development activity must be recorded. There would be documentary records of the training objective, training methodology, manuals and guidelines, and assessment of competency at differing levels. These will contribute to the technical development of skills, knowledge, systems and process equipment necessary to implement DM at the local levels in Bhutan. If necessary, in most vocational training, there is a key pillar – to change the attitude, behaviour and commitment towards work – to ensure long term sustainability of knowledge acquired.

Lesson 4: Data and Information - Needs-Driven Monitoring, Sharing and Analytics

The Project has started continuous collection of weather data. The weather forecasting has improved markedly. There is a need now to use the data to forecast other climate-induced risks, such as landslides, forest fire, pest attacks, and human activity in the identified hot spots. This data will be very important especially for Bhutan which is quickening its development. Data needs to be shared with and analysed by agencies that have a responsibility to manage DM. Even though the data may be imperfect as with most data scientists will know the process of data “cleaning” and validation. So, the department that owns the data should allow other agencies and external data scientists to use the data for disaster prevention and management. Specifically, there is a need to validate the ArcSWAT model and to assess what has been done in Chukha from the available reports. In addition, there is a need for geotechnical studies to be carried out, particularly for the landslide areas around Phuentsholing and Pasakha Industrial Area.

Lesson 5: DM Equipment, Hardware Procurement, Funding for Maintenance, Replacement

There is a need for funding plans to be put in place for both maintenance of existing hardware as well as replacement of damaged equipment, for example, weather stations and galvanized iron mesh used in gabion walls. With regards to existing equipment, there are concerns over the decision to use wrought iron casing versus stainless steel casing for submersible pumps in the storage tanks at municipal level. There is a need to evaluate the sturdiness and durability of these pumps going forward, as well as the expenses to be incurred in terms of maintenance and replacement. For procurement contracts, it is recommended that clauses be inserted to include maintenance based on TCO.

Lesson 6: Communication with Impact

This successful practice can be communicated via publication of Bhutan’s best DM practices in high impact international academic journals, such as those under the Springer Group, Inderscience and IEEE. The publication serves to communicate to a wider world, thereby attracting funding from non-traditional development partners of climatic finance.

Lesson 7: Inter-border and Regional Cooperation

It is worthy of consideration to collaborate with its immediate neighbouring countries as well as other ASEAN countries in the area of DM activities. This is a practice commonly used by UNDP,

which has been found to be an excellent platform for DM best practices to be shared, learnt and replicated from successful cases in other countries. For instance, government officials from Timor-Leste visited Bangladesh and Lao in 2016 to share information adoption and adaptation of best practices.

Main Conclusions

The Project has showed evidence of its ability to support activities of national and local community disaster management both effectively and efficiently. It has achieved the intended outputs and outcomes as evidenced by the results:

- **C1:** Project design was aligned with national and provincial priorities in disaster management and institutional development. The activities were effectively carried out.
- **C2:** Coordination by PMU is excellent drawing upon staff resources from several departments and divisions across ministries. There was a certain level of efficiency in the organisation of staff resources to complete some sizeable activity outputs.
- **C3:** Community Engagement in the project has led to positive outcomes. The community was effectively organised.
- **C4:** The capacity level to implement the project activities was excellent at Central government levels. It effectively enhanced the capacity of the staff and updated the manuals and guidelines in the counterpart agencies.
- **C5:** A large volume of data has been effectively collected.
- **C6:** Foundation capacity development of officials, both in-country and study mission abroad, featured highly in the all project activities.
- **C7:** Work Manuals and Guidelines have been written and disseminated.
- **C8:** Many lessons were learnt on Procurement and contracting as there was limited experience at the start of the Project
- **C9:** Impact measurements of the project outcomes and outputs could be better articulated at start of project
- **C10:** Capacity at Dzongkhags was not evenly distributed, as such successes may not be easily replicable and sustainability can be difficult. Some areas (e.g. Phuentsholing) have competent staff who are able to absorb knowledge shared during trainings and apply them to their work. In more remote areas (e.g. Samtse, Monggar, Pemagatshel, Tsirang), there was limited capacity for learning, which means that new knowledge and skills are not easily developed.
- **C11:** A high level of sustainability could be made possible if successful project outputs could be replicated across different Dzongkhags, with publications of successful activities in international high impact journals. This will also strengthen capacities at the local levels. If such projects are replicated, then alternative funding from both climate and non-climate financial sources could be obtained with high impact achievement of outcomes and outputs.

5.0 Attachment

5.1 Terms of Reference

INTRODUCTION

In accordance with UNDP and GEF M&E policies and procedures, all full and medium-sized UNDP support GEF financed projects are required to undergo a terminal evaluation upon completion of implementation. These terms of reference (TOR) sets out the expectations for a Terminal Evaluation (TE) of the **Addressing the Risks of Climate-induced Disasters through Enhanced National and Local Capacity for Effective Actions** (PIMS 4760)

The essentials of the project to be evaluated are as follows:

PROJECT SUMMARY TABLE

Project Title:	Addressing the Risks of Climate-induced Disasters through Enhanced National and Local Capacity for Effective Actions			
GEF Project ID:	4976		<i>at endorsement</i> <i>(Million US\$)</i>	<i>at completion</i> <i>(Million US\$)</i>
UNDP Project ID:	4760	GEF financing:	11,491,200	11,491,200
Country:	Bhutan	IA/EA own:		
Region:	South Asia	Government:	53,350,829	
Focal Area:	Climate Change	Other:	1,189,000	
FA Objectives, (OP/SP):	1. Reduce the vulnerability of people, livelihoods, physical assets and natural systems to the adverse effects of climate change; 2. Strengthen institutional and technical capacities for effective climate change adaptation; and 3. Integrate climate change adaptation into relevant policies, plans and associated processes.	Total co-financing:	54,539,829	
Executing Agency:	National Environment Commission Secretariat	Total Project Cost:	66,031,029	
Other Partners involved:	Gross National Happiness Commission, Ministry of Economic Affairs, Ministry of Works and Human Settlement, Ministry of Home and Cultural Affairs, Ministry of Agriculture and Forests, Phuentsholing Thromde, Mongar Municipality, Tarayana Foundation	ProDoc Signature (date project began):		18 -04- 2014
		(Operational) Closing Date:	Proposed: 31-10-2018	Actual:

OBJECTIVE AND SCOPE

The project was designed with the objective to enhance national, local and community capacity to prepare for and respond to climate-induced multi-hazards to reduce potential losses of human lives, national economic infrastructure, livelihoods and livelihood assets. The project has been designed to address the immediate and urgent climate change adaptation needs prioritized through the update of the NAPA undertaken in 2011, involving review and updating of the earlier NAPA produced in 2006. It has three broad outcomes.

The first outcome is focused on demonstrating effective practical measures to reduce flood and landslide risks in Phuentsholing and the adjoining industrial estate of Pasakha, which are the economic and industrial hubs of the country as well as among the most critical areas that are recurrently besieged by floods and landslides. This outcome is devoted to systematic assessment and mapping of geo-hazard risks in four other critical flood- and landslide-prone areas in the country in order to build the information base for planning flood and landslide risk mitigation in those areas, as well as in other areas that are vulnerable to similar risks.

The second outcome is aimed at enhancing community resilience to climate-induced risks. This includes designing and building or rehabilitating systems for water harvesting, storage and distribution in selected villages and towns which face water scarcity, community-level water resources inventory to create the information base for water resource management, and strengthening disaster management institutions at national and local levels with training and development of community-based disaster management plans.

The third outcome is dedicated to 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. This involves 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.

The TE will be conducted according to the guidance, rules and procedures established by UNDP and GEF as reflected in the UNDP Evaluation Guidance for GEF Financed Projects.

The objectives of the evaluation are to assess the achievement of project results, and to draw lessons that can both improve the sustainability of benefits from this project, and aid in the overall enhancement of UNDP programming.

EVALUATION APPROACH AND METHOD

An overall approach and method⁵ for conducting project terminal evaluations of UNDP supported GEF financed projects has developed over time. The evaluator is expected to frame the evaluation effort using the criteria of **relevance, effectiveness, efficiency, sustainability, and impact**, as defined and explained in the [UNDP Guidance for Conducting Terminal Evaluations of UNDP-supported, GEF-financed Projects](#). A set of questions covering each of these criteria have been drafted and are included with this TOR (*fill in [Annex C](#)*) The evaluator is expected to amend, complete and submit this matrix as part of an evaluation inception report, and shall include it as an annex to the final report.

The evaluation must provide evidence-based information that is credible, reliable and useful. The evaluator is expected to follow a participatory and consultative approach ensuring close engagement with government counterparts, in particular the GEF operational focal point, UNDP Country Office, project team, UNDP GEF Technical Adviser based in the region and key stakeholders. The evaluator is expected to conduct a field

⁵ For additional information on methods, see the [Handbook on Planning, Monitoring and Evaluating for Development Results](#), Chapter 7, pg. 163

mission to Thimphu, Mongar, Trashigang, Phuntsholing, Chukha, Pemagatshel, Dagana, Samtse including the following project sites:

1. Khenkhar, Chaskhar, Uzarong and Mongar Municipality in Mongar (Tarayana, DoFPS and MM sites),
2. Wamrong and Lamsarong in Trashigang (DGM sites)
3. Rinchending, Pasakha and Phuntsholing in Chukha (PT sites).
4. Lotakuchu- Singye in Samtse and Samtse Dzongkhags (DDM)
5. Selected Hydromet stations across the country, en route to project sites (NCHM)

Interviews will be held with the following organizations and individuals at a minimum: Phuntsholing Thromde, Mongar Municipality, Department of Geology and Mines, Department of Engineering Services, Tarayana Foundation, Department of Forests and Park Services, Department of Disaster Management, National Centre for Hydrology and Metrology, and the National Environment Commission Secretariat .The evaluator will review all relevant sources of information, such as the project document, project reports – including Annual APR/PIR, project budget revisions, midterm review, progress reports, GEF focal area tracking tools, project files, national strategic and legal documents, and any other materials that the evaluator considers useful for this evidence-based assessment. A list of documents that the project team will provide to the evaluator for review is included in [Annex B](#) of this Terms of Reference.

EVALUATION CRITERIA & RATINGS

An assessment of project performance will be carried out, based against expectations set out in the Project Logical Framework/Results Framework (see [Annex A](#)), which provides performance and impact indicators for project implementation along with their corresponding means of verification. The evaluation will at a minimum cover the criteria of: **relevance, effectiveness, efficiency, sustainability and impact**. Ratings must be provided on the following performance criteria. The completed table must be included in the evaluation executive summary. The obligatory rating scales are included in [Annex D](#).

Evaluation Ratings:			
1. Monitoring and Evaluation	<i>rating</i>	2. IA & EA Execution	<i>rating</i>
M&E design at entry		Quality of UNDP Implementation – Implementing Agency (IA)	
M&E Plan Implementation		Quality of Execution - Executing Agency (EA)	
Overall quality of M&E		Overall quality of Implementation / Execution	
3. Assessment of Outcomes	<i>rating</i>	4. Sustainability	<i>rating</i>
Relevance		Financial resources	
Effectiveness		Socio-political	
Efficiency		Institutional framework and governance	
Overall Project Outcome Rating		Environmental	
		Overall likelihood of sustainability	

PROJECT FINANCE / COFINANCE

The Evaluation will assess the key financial aspects of the project, including the extent of co-financing planned and realized. Project cost and funding data will be required, including annual expenditures. Variances between planned and actual expenditures will need to be assessed and explained. Results from recent financial audits, as available, should be taken into consideration. The evaluator(s) will receive assistance from the Country Office (CO) and Project Team to obtain financial data in order to complete the co-financing table below, which will be included in the terminal evaluation report.

Co-financing (type/source)	UNDP own financing (mill. US\$)		Government (mill. US\$)		Partner Agency (mill. US\$)		Total (mill. US\$)	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
Grants								
Loans/Concessions								
• In-kind support								
• Other								
Totals								

MAINSTREAMING

UNDP supported GEF financed projects are key components in UNDP country programming, as well as regional and global programmes. The evaluation will assess the extent to which the project was successfully mainstreamed with other UNDP priorities, including poverty alleviation, improved governance, the prevention and recovery from natural disasters, and gender.

IMPACT

The evaluators will assess the extent to which the project is achieving impacts or progressing towards the achievement of impacts. Key findings that should be brought out in the evaluations include whether the project has demonstrated: a) verifiable improvements in ecological status, b) verifiable reductions in stress on ecological systems, and/or c) demonstrated progress towards these impact achievements.⁶

CONCLUSIONS, RECOMMENDATIONS & LESSONS

The evaluation report must include a chapter providing a set of **conclusions, recommendations** and **lessons**.

IMPLEMENTATION ARRANGEMENTS

The principal responsibility for managing this evaluation resides with the UNDP CO in Bhutan. The UNDP CO will contract the evaluators and ensure the timely provision of per diems and travel arrangements within the country for the evaluation team. The Project Team will be responsible for liaising with the Evaluators team to set up stakeholder interviews, arrange field visits, coordinate with the Government etc.

EVALUATION TIMEFRAME

The total duration of the evaluation will be **30** days over a time period of 12 weeks according to the following plan:

Activity	Timing	Completion Date
Preparation	3 days	02-07-2018
Evaluation Mission	15 days	30-07-2018
Draft Evaluation Report	10 days	20-08-2018
Final Report	2 days	14-9-2018

⁶A useful tool for gauging progress to impact is the Review of Outcomes to Impacts (ROtI) method developed by the GEF Evaluation Office: [ROtI Handbook 2009](#)

EVALUATION DELIVERABLES

The evaluation team is expected to deliver the following:

Deliverable	Content	Timing	Responsibilities
Inception Report	The evaluators provide clarifications on timing and method and <u>joint work plan with the local Consultant</u>	No later than 2 weeks before the evaluation mission: 02-07-2018	Evaluator submits to UNDP CO
Presentation	Initial Findings	End of evaluation mission: 31-07- 2018	To project management, UNDP CO
Draft Final Report	Full report, (per annexed template) with annexes	Within 3 weeks of the evaluation mission: 20-08-2018	Sent to CO, reviewed by RTA, PCU, GEF OFPs
Final Report*	Revised report	Within 1 week of receiving UNDP comments on draft: 14-09-2018	Sent to CO for uploading to UNDP ERC.

*When submitting the final evaluation report, the evaluator is required also to provide an 'audit trail', detailing how all received comments have (and have not) been addressed in the final evaluation report. See [Annex H](#) for an audit trail template.

QUALIFICATION AND EXPERIENCE

The International Consultant must present the following qualifications and experience:

- Minimum 10 years of relevant professional experience in Climate Change Adaptation, Environmental Science, Sustainable Development, Energy Management, Development Studies or relevant discipline, or other closely related field, or other closely related field;
- A Master's degree in Environmental Science, Climate Change Adaptation, Sustainable Development, Energy Management, Development Studies or relevant discipline, or other closely related field, or other closely related field.
- Knowledge of and/or experience with UNDP and/or GEF;
- Previous experience with results-based monitoring and evaluation methodologies;
- Previous experience in evaluation of projects related to Climate change adaptation, Sustainable Development, Energy or other related projects
- Experience working in South East Asia;
- Demonstrated understanding of issues related to gender and (Climate Change Adaptation); experience in gender sensitive evaluation and analysis;
- Excellent communication skills in written and spoken English is a must
- The consultant **should not** have participated in the project preparation and/or implementation and should not have conflict of interest with project related activities.

A separate National Consultant will be recruited to support the international evaluator, who will be the team leader. The International Consultant will be required to work with the National Consultant as a team to complete the evaluation.

Criteria for selection

A combined scoring method will be used to evaluate the offers. Technical Evaluation Criteria will be weighted a maximum of 70%, and combined with the price offer which will be weighted a maximum of 30%.

Criteria	Weight	Max. Point
Technical The technical assessment will be based on the following criteria: <ol style="list-style-type: none"> 1. Technical competency of the Consultant; 2. Experience of the Consultant; 3. Quality of technical proposal 	70	30 25 15
Sub-total A. (Technical)		70
Financial	30	30
Sub-Total B.(Financial)		30
Total (A+B)		100

EVALUATOR ETHICS

Evaluation consultants will be held to the highest ethical standards and are required to sign a Code of Conduct (Annex E) upon acceptance of the assignment. UNDP evaluations are conducted in accordance with the principles outlined in the [UNEG 'Ethical Guidelines for Evaluations'](#).

PAYMENT MODALITIES AND SPECIFICATIONS

%	Milestone
10%	Upon submission and approval of inception report
40%	Following submission and approval of the 1ST draft terminal evaluation report
50%	Following submission and approval (UNDP-CO and UNDP RTA) of the final terminal evaluation report

APPLICATION PROCESS

Individual consultants are invited to submit applications together with their CV for these positions. The application package should contain:

- a) Letter of Confirmation of Interest and Availability using the template provided by UNDP
- b) A current and complete C.V. in English and Personal History Form (P11 form)
- c) Financial proposal indicating the total cost of the assignment (including daily fee, *per diem* and travel costs).
- d) A brief proposed methodology on how you will approach and complete the assignment

UNDP applies a fair and transparent selection process that will take into account the competencies/skills of the applicants as well as their financial proposals. Qualified women and members of social minorities are encouraged to apply.

ANNEX A: PROJECT LOGICAL FRAMEWORK

<p>Bhutan CPAP Outcomes The project directly corresponds to the following outcomes as defined in the UNDAF - Bhutan One UN Programme (2014-2018): ⇒ <u>UNDAF Outcome 1</u>: By 2018, sustainable and green economic growth that is equitable, inclusive, climate and disaster resilient and promotes poverty reduction, and employment opportunities particularly for vulnerable groups enhanced. ⇒ <u>Output 1.1</u>: Policies and studies for integrated natural resource management, climate change adaptation/mitigation and poverty-environment nexus developed. ⇒ <u>Output 1.2</u>: National and local institutions and individuals are better prepared and able to respond to and reduce climate change-induced and other disaster risks.</p>					
<p>Outcome Indicator (CPAP 2008-2012) ⇒ 1.1 - % of government expenditure / budget allocation for environment + disaster risk reduction ⇒ 1.2 - No. of trained District Disaster Response Teams in place; and No. of Dzongkhags, geogs and municipalities with Disaster Management Plans (incl. cont. plans) in place</p>					
<p>Primary Applicable Key Environment and Sustainable Development Key Result Area ⇒ National and local institutions and individuals are better prepared and able to respond to and reduce climate change-induced and other disaster risks</p>					
<p>Applicable SOF (e.g. GEF) Strategic Objective and Programme ⇒ Least Developed Countries Fund (LDCF) National Adaptation Programme of Action (NAPA)</p>					
<p>Applicable SOF (e.g. GEF) Expected Outcomes: N/A</p>					
<p>Applicable SOF (e.g. GEF) Outcome Indicators: N/A</p>					
Project Strategy	Indicator	Baseline	End of Project Target	Source of Verification	Risk/ Assumption
<p><u>Project Objective:</u> To enhance national, local and community capacity to prepare for and respond to climate-induced multi-hazards to reduce potential losses of human lives, national economic infrastructure, livelihoods, and livelihood assets.</p>	<p>Level of capacity of local communities to prepare for and respond to climate-induced risks.</p> <p>Availability of climate information and the level of their use for preparedness and reduction of impacts</p>	<p>- Local disaster mgt institutions functional in 16 of 20Dzongkhags - Mock-drills not widely adopted except 1 # of mock-drills under LDCF GLOF project;</p> <p>- No real-time localized weather data available to local institutions and communities</p>	<p>Communities capacity to prepare for and respond to localized climate-induced risks enhanced :</p> <p>- Existence of functional local disaster mgt institutions; - Adequate response to scenario-based early warning mock-drills (4 no. in Years 3 and 4, in 4 Dzongkhags) - Availability of real-time localized weather data (measured in four sample Dzongkhags) - Availability of seasonal water resource inventory</p>	<ul style="list-style-type: none"> ▪ Mid-term and Terminal Evaluation Reports; ▪ Project Progress Reports; ▪ Government reports; ▪ On-line materials (website, electronic reports). ▪ Bhutan Broadcasting Corporation ▪ DHMS web portal ▪ Success rate and evaluation report of mock-drills 	<p><u>Risks:</u></p> <ul style="list-style-type: none"> ▪ Difficulty in coordinating the various outcomes and outputs implemented by different agencies, leading to silo approach; ▪ Complex technical and organizational management of the processes and results. <p><u>Assumption:</u></p> <ul style="list-style-type: none"> ▪ Government funding is available to sustain and consolidate the interventions after the conclusion of the project.

		- No community-level seasonal water resources inventory available	(measured in 5-6 gewogs)		
Project Strategy	Indicator	Baseline	End of Project Target	Source of Verification	Risk/ Assumption
<u>Outcome 1:</u> Risk from climate-induced floods and landslides reduced in Bhutan's economic and industrial center Phuentsholing and Pasakha Industrial Area.	Reduced damage from floods in the industrial hub of the country, Pasakha. Number of active and unstable landslides in Phuentsholing area Vulnerability and risk perception index [AMAT 1.2.14] Proportion of men in households that perceive	Climate-induced floods and landslides impact industrial operations and socio-economic activities in several parts of the country, of which Pasakha Industrial Area, Phuentsholing Urban Area and the Phuentsholing-Thimphu Highway are among the most impacted; Floods in the past (1996, 1998 and 2000) have incurred heavy damages on some of the industrial units in Pasakha and the BFAL/BCCL residential colony. River dredging is carried out annually to remove excessive silt during the monsoons but is only an interim and partial measure. Existing large active landslides are common in the Phuentsholing area, despite past stabilization measures. GNH Survey 2010 reports that 29% of the surveyed population perceive landslides as a major concern and 26%	Erosion in Barsa watershed and sedimentation and flooding in Barsa river is reduced due to comprehensive mitigation measures, reducing the occurrence of floods resulting in damages by 25% Reduced annual cost of riverbed dredging in Pasakha Industrial Area by 30% Four critical landslide sites in Phuentsholing-Rinchending area stabilized and contained within existing boundaries, safeguarding economic assets Proportion of men in households that perceive landslides and floods as a	<ul style="list-style-type: none"> ▪ Project progress and evaluation reports; ▪ Government 11th Five Year Plan review report(s); ▪ Results of the risk perception survey ▪ Barsa watershed management plan ▪ Landslide stabilization technical design and construction reports ▪ Government and PIA damage assessment reports in the event of flood disaster; ▪ Geo-hazard assessment reports and maps. ▪ Research findings on thresholds developed for slope stability and climatic conditions; ▪ Media reports; 	<u>Risks:</u> <ul style="list-style-type: none"> ▪ Flood risk mitigation and slope stabilization measures may have a long gestation period and not show visible results by the end of the project period; ▪ Widespread geologic fragility in the area and extreme rainfall events may trigger flood and landslide problems at levels and in areas not envisaged in the project. ▪ Theft/ vandalism of materials used for slope stabilization structures (e.g. galvanized iron mesh used in gabion walls) by miscreants, especially given the proximity/ contiguity of the landslide areas to the porous international border.

	landslides and floods as a major concern; proportion of women in households that perceive landslides and floods as a major concern; proportion of industrial units that perceive floods as a major concern;	perceive floods as a major concern; 50.9% of the interviewed Phuentsholing and Pasakha residents perceive landslides as a major concern, and 49.6% perceive floods as a major concern (based on ad hoc preliminary survey during PPG); 30% of the surveyed industrial units in Pasakha perceived landslides as a major concern, and 20% perceived floods as a major concern - based on ad hoc preliminary survey during PPG; Interventions to reduce the risks from climate-induced floods and landslides are piecemeal and partial and not integrated in local planning processes.	major concern reduced by 30% Proportion of women in households that perceive landslides and floods as a major concern reduced by 30% Proportion of industrial units that perceive floods as a major concern reduced by 30%		
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Output 1.1: Pasakha Industrial Area protected from climate-induced floods through watershed management measures, river bank protection works and development of flood buffer zones

Output 1.2: Climate-induced landslide risk in four critical areas in Phuentsholing-Rinchending area reduced through Integrated slope stabilization measures

Output 1.3: Integrated geo-hazard assessment and mapping carried out in four critical landslide- and flood-prone areas in Bhutan, using data standards compatible with the national database

Output 1.4: Thresholds for landslide slope failure determined in different geological zones, through research correlating geological instability with rainfall data from weather stations

Project Strategy	Indicator	Baseline	End of Project Target	Source of Verification	Risk/ Assumption
<u>Outcome 2:</u> Community resilience to climate-induced disaster risks (droughts, floods,	Water resource inventories, water harvesting technology and additional water	Bhutan Water Policy (2003) specifies assessment and inventory of national water resources as a special area of	Up-to-date community-level water resource inventory and database in place in at least four	▪ Project progress reports;	<u>Risk:</u> Limited in-country experience and know-how of climate-resilient water harvesting

<p>landslides, windstorms, forest fires) strengthened in at least four Dzongkhags.</p>	<p>storage capacity available in some the most drought-prone communities of Bhutan</p> <p>Existence and operationalization of disaster management committees at the local level</p>	<p>attention for informed water resources management. However, no systematic water resources inventory has taken place due to limited funds and technical capacity;</p> <p>Several villages and urban centers in various Dzongkhags experience water scarcity. Simulation undertaken in the Second National Communication process project declining non-seasonal rainfall in 11 out of 20 Dzongkhags between 2010-2039;</p> <p>The Disaster Management Act (2013) stipulates the creation of disaster management committees and formulation of disaster management plans at national and local levels, but have been established at present in four pilot Dzongkhags only.</p> <p>Forest fire is a recurrent phenomenon, destroying around 6,000 ha of forests annually. The national forest fire management strategy has been approved recently but there is no community-based forest fire management plan and mechanism to</p>	<p>Dzongkhags, feeding into national water resources inventory/database;</p> <p>One Municipal water supply system made climate resilient, serving 6,000 beneficiaries;</p> <p>20 villages/ hamlets have adopted climate-resilient water harvesting approaches, -technology and efficient water management practices, therewith reducing water scarcity for some 420 rural households.</p> <p>Local-level disaster management committees (DMCs) established, capacitated and functional in at least four Dzongkhags prone to climate-induced disasters;</p> <p>Climate-induced disaster management plan developed, including for forest fire management, and integrated in local development plans and programmes in four Dzongkhags.</p>	<ul style="list-style-type: none"> ▪ Government 11th Five Year Plan review report(s); ▪ Project evaluation reports. ▪ Water resources inventory report and database. ▪ Local-level disaster management plans. 	<p>technology may lead to inappropriate technology choices</p> <p><u>Risk:</u> Local administrations allocate low priority to establishing and strengthening local institutions for disaster management, because of existing high workload</p> <p><u>Assumption:</u> Local Governments and administrations have adequate existing capacity to build upon for disaster management</p>
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		systematically guide effective and coordinated forest fire management at the local level.			
<u>Output 2.1:</u> Climate-resilient water harvesting, storage and distribution systems designed, built or rehabilitated in at least four Dzongkhags and one municipality					
<u>Output 2.2:</u> Community-level water resource inventory completed, maintained, and used for water resource management planning in at least four Dzongkhags					
<u>Output 2.3:</u> Disaster management institutions at various levels established and trained in four Dzongkhags for better preparedness and response to climate-induced disasters					
<u>Outcome 3:</u> Relevant information about climate-related risks and threats shared across development sectors for planning and preparedness on a timely and reliable basis.	Availability and the level of use of localized climate information. Number and location of real-time weather observation, forecasting and warning stations that feed data into the NWFFWC; Number of sectors using climate information to make their development policies and plans climate resilient	The current network of meteorological stations is limited to 24 stations, of which only 3 are automated. Existing infrastructure for climate risk warning is highly GLOF-risk related. The NWFFWC is in a nascent stage supported by a small network of meteorological stations and with insufficient capacity to analyze, manage, and disseminate climate information in a timely manner. Demand for and use of localized climate information is yet unclear and undervalued	Network with national coverage of minimum # 60 new real-time weather stations and # 45 new flood measurement stations established. NWFFWC operational, with a core team of at least 10 members trained and established for climate data analysis, management and dissemination; Climate data/ information user training provided to at least 100 staff of key data user agencies, e.g. disaster management, agriculture, forestry, hydropower, civil aviation, road transport, and tourism, and local government institutions. Updated weather forecasting and localized climate information disseminated on a daily	<ul style="list-style-type: none"> ▪ Project progress reports; ▪ Government 11th Five Year Plan review report(s); ▪ Project evaluation reports; ▪ Meteorological data and records; ▪ Day-to-day broadcast of weather reports and forecasts. ▪ Web portal analysis ▪ Interviews with policy staff of different sectors and inventory/analysis of new policy documents on relevant sectors 	<u>Risks:</u> <ul style="list-style-type: none"> ▪ Compatibility of different elements (equipment) of the hydromet network and NWFFWC ▪ Support from JICA changed, delayed or cancelled <u>Assumptions:</u> <ul style="list-style-type: none"> ▪ In-country capacity is available or built for operation and maintenance of the hardware; ▪ Spares are readily available in the event of damage or disrepair. <u>Risk:</u> Sectors unwilling to integrate climate risks into policies and activity designs, because of more challenging complexity and likely higher budget requirements and thus in the short-term less perceived benefits

		<p>Due to sector fragmentation little exchange of knowledge, lessons and experiences takes place, existing platforms are shaped around national programmes (like NAPA working group) but do not function adequately outside the framework of these programmes due to limited capacity of NECS for multi-stakeholder process facilitation and sector leadership</p>	<p>basis through web-portal, media and other means</p> <p>At least three evidence-based policy influencing documents disseminated through NECS</p> <p>National climate change policy framework in place (CC adaptation and synergies), with gender segregated policies and monitoring framework</p>		
<u>Output 3.1:</u> Enhanced quality, availability and transfer of real-time climate data in all Dzongkhags for climate resilient development planning and local disaster management					
<u>Output 3.2:</u> Increased effectiveness of National Weather and Flood Forecasting and Warning Center (NWFFWC) through improved capacity to analyze, manage and disseminate localized climate information in a timely manner					
<u>Output 3.3:</u> Policy makers and development professionals have systematic access to evidence-based information on climate risks and hazards through cross-government knowledge sharing and coordination mechanisms					

ANNEX B: LIST OF DOCUMENTS TO BE REVIEWED BY THE EVALUATORS

GEF Project Information Form (PIF), Project Document, and Log Frame Analysis (LFA)
Project Implementation Plan
Implementing/Executing partner arrangements
List and contact details for project staff, key project stakeholders, including Project Boards, and other partners to be consulted
Project sites, highlighting suggested visits
Mid Term Review (MTR) Report
Annual Project Implementation (APR/PIR) Reports
Project budget and financial data
Project Tracking Tool, at baseline, at mid-term, and at terminal points
UNDP Development Assistance Framework (UNDAF)
UNDP Country Programme Document (CPD)
UNDP Country Programme Action Plan (CPAP)
GEF focal area strategic program objectives
Quarterly progress reports and work plans of the various implementation task teams
Audit reports
Oversight mission reports
All monitoring reports prepared by the project
Financial and Administration guidelines used by Project Team

ANNEX C: EVALUATION QUESTIONS

(Note: This is a generic list, to be further detailed with more specific questions by CO and UNDP GEF Technical Adviser based on the particulars of the project. Refer to Annex 4 of the TE Guidance for a completed, sample evaluation criteria matrix)

This Evaluation Criteria Matrix must be fully completed/amended by the consultant and included in the TE inception report and as an Annex to the TE report.

Evaluative Criteria Questions	Indicators	Sources	Methodology
Relevance: How does the project relate to the main objectives of the GEF focal area, and to the environment and development priorities at the local, regional and national levels?			
•	•	•	•
•	•	•	•
Effectiveness: To what extent have the expected outcomes and objectives of the project been achieved?			
•	•	•	•
•		•	•
Efficiency: Was the project implemented efficiently, in-line with international and national norms and standards?			
•	•	•	•
•	•	•	•
Sustainability: To what extent are there financial, institutional, social-economic, and/or environmental risks to sustaining long-term project results?			
•	•	•	•
Impact: Are there indications that the project has contributed to, or enabled progress toward, reduced environmental stress and/or improved ecological status?			
•	•	•	•
•	•	•	•

ANNEX D: RATING SCALES

<i>Ratings for Effectiveness, Efficiency, Overall Project Outcome Rating, M&E, IA & EA Execution</i>	<i>Sustainability ratings:</i>	<i>Relevance ratings</i>
6. Highly Satisfactory (HS): no shortcomings 5. Satisfactory (S): minor shortcomings 4. Moderately Satisfactory (MS): moderate shortcomings 3. Moderately Unsatisfactory (MU): significant shortcomings 2. Unsatisfactory (U): major shortcomings 1. Highly Unsatisfactory (HU): severe shortcomings	4. Likely (L): negligible risks to sustainability 3. Moderately Likely (ML): moderate risks 2. Moderately Unlikely (MU): significant risks 1. Unlikely (U): severe risks	2. Relevant (R) 1. Not relevant (NR)
<i>Additional ratings where relevant:</i> Not Applicable (N/A) Unable to Assess (U/A)		

ANNEX E: EVALUATION CONSULTANT CODE OF CONDUCT AND AGREEMENT FORM

Evaluators:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people’s right not to engage. Evaluators must respect people’s right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders’ dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study imitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

Evaluation Consultant Agreement Form⁷

Agreement to abide by the Code of Conduct for Evaluation in the UN System

Name of Consultant: _____

Name of Consultancy Organization (where relevant): _____

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at *place* on *date*

Signature: _____

⁷www.unevaluation.org/unegcodeofconduct

ANNEX F: EVALUATION REPORT OUTLINE⁸

- i.** Opening page:
 - Title of UNDP supported GEF financed project
 - UNDP and GEF project ID#s
 - Evaluation time frame and date of evaluation report
 - Region and countries included in the project
 - GEF Operational Program/Strategic Program
 - Implementing Partner and other project partners
 - Evaluation team members
 - Acknowledgements
- ii.** Executive Summary
 - Project Summary Table
 - Project Description (brief)
 - Evaluation Rating Table
 - Summary of conclusions, recommendations and lessons
- iii.** Acronyms and Abbreviations
(See: UNDP Editorial Manual⁹)
 - 1.** Introduction
 - Purpose of the evaluation
 - Scope & Methodology
 - Structure of the evaluation report
 - 2.** Project description and development context
 - Project start and duration
 - Problems that the project sought to address
 - Immediate and development objectives of the project
 - Baseline Indicators established
 - Main stakeholders
 - Expected Results
 - 3.** Findings
(In addition to a descriptive assessment, all criteria marked with (*) must be rated¹⁰)
 - 3.1** Project Design / Formulation
 - Analysis of LFA/Results Framework (Project logic /strategy; Indicators)
 - Assumptions and Risks
 - Lessons from other relevant projects (e.g., same focal area) incorporated into project design
 - Planned stakeholder participation
 - Replication approach
 - UNDP comparative advantage
 - Linkages between project and other interventions within the sector
 - Management arrangements
 - 3.2** Project Implementation
 - Adaptive management (changes to the project design and project outputs during implementation)
 - Partnership arrangements (with relevant stakeholders involved in the country/region)

⁸The Report length should not exceed 40 pages in total (not including annexes).

⁹ UNDP Style Manual, Office of Communications, Partnerships Bureau, updated November 2008

¹⁰See Annex D for rating scales.

- Feedback from M&E activities used for adaptive management
 - Project Finance
 - Monitoring and evaluation: design at entry (*), implementation (*), and overall assessment (*)
 - Implementing Agency (UNDP) execution (*) and Executing Agency execution (*), overall project implementation/ execution (*), coordination, and operational issues
- 3.3 Project Results
- Overall results (attainment of objectives) (*)
 - Relevance (*)
 - Effectiveness (*)
 - Efficiency (*)
 - Country ownership
 - Mainstreaming
 - Sustainability: financial resources (*), socio-economic (*), institutional framework and governance (*), environmental (*), and overall likelihood (*)
 - Impact
4. Conclusions, Recommendations & Lessons
- Corrective actions for the design, implementation, monitoring and evaluation of the project
 - Actions to follow up or reinforce initial benefits from the project
 - Proposals for future directions underlining main objectives
 - Best and worst practices in addressing issues relating to relevance, performance and success
5. Annexes
- ToR
 - Itinerary
 - List of persons interviewed
 - Summary of field visits
 - List of documents reviewed
 - Evaluation Question Matrix
 - Questionnaire used and summary of results
 - Evaluation Consultant Agreement Form
 - Report Clearance Form
 - *Annexed in a separate file:* TE audit trail
 - *Annexed in a separate file:* Terminal GEF Tracking Tool, if applicable
-

ANNEX G: EVALUATION REPORT CLEARANCE FORM

(to be completed by CO and UNDP GEF Technical Adviser based in the region and included in the final document)

Evaluation Report Reviewed and Cleared by

UNDP Country Office

Name: _____

Signature: _____ Date: _____

UNDP GEF RTA

Name: _____

Signature: _____ Date: _____

ANNEX H: TE REPORT AUDIT TRAIL

The following is a template for the evaluator to show how the received comments on the draft TE report have (or have not) been incorporated into the final TE report. This audit trail should be included as an annex in the final TE report.

To the comments received on (date) from the Terminal Evaluation of (project name) (UNDP PIMS #)

The following comments were provided in track changes to the draft Terminal Evaluation report; they are referenced by institution (“Author” column) and track change comment number (“#” column):

Author	#	Para No./ comment location	Comment/Feedback on the draft TE report	TE team response and actions taken

5.2 Itinerary

TE Itinerary Schedule (Actual and Completed)					
Date	Activity	Meeting Venue	People	Discussion	Further comments
6/8/2018 Monday	Arrived in Thimpu at 10.30 am. Picked up by Suwish. Checked into City Hotel				
	Met Mr. Yeshi (National Consultant) to confirm the Inception Report	City Hotel Lobby			
7/8/2018 Tuesday	Meeting with Project Counterparts from the RGoB	NECS Conference hall.	Netra, Tashi, Dema, Gita	Counterparts presented project outcomes and outputs (Output 1.3; Output 2.2, 2.3; Outcome 3)	Dept Engineering Services; Geology and Mines Disaster Management; Forestry; Water Resources; Tarayana Foundation, National centre for Hydrology and Metrology
	Revised Inception Report based on inputs from the Townhall Meeting				
	Sent 2nd Draft Inception Report to NAPA II Project staff				
8/8/2018 Wednesday	Sent a news article to Netra and UNDP, regarding Planet Labs, funded by IFC, for monitoring climate risks events				Netra requested Counterpart Staff to contact Planet Labs for information
	Meeting UNDP Project Staff	UNDP Office		Discussed itinerary	
9/8/2018 Thursday	Check Weather Stations	Along Phuntsholing-Thimphu Highway			

	Inquire on NAPA Projects	Chukkha Admin Office			
	Met with Govinda Sharma, Chief Urban Planner, Mr. Chencho, Engineer	Phuontsholing Municipality		Positive feedback	
10/8/2018 Friday	Met with field officer, Tarayana and other people, Dophu Chen, Samtse	Phuntsholing-Samtse		Positive feedback	
	Evaluated several sites for Slope Stabilisation projects	Phuntsholing			
11/8/2018 Saturday	Return from Phuntsholing to Thimpu	Phuntsholing to Thimpu			
12/8/2018 Sunday	Reading Project Reports				
13/8/2018 Monday	Discuss Windstorm Projects	Ms Gita, Risk Reduction Section, Dept of Engineering Services			
	Discuss capacity development of FEMD Engineers	Ms Thinly Choden, FEMD Division			
	Discuss with Monggar Municipality	Mr. Tshering Phuntsho, Project Engineer		Water Supply to Monggar town	
14/8/2018 Tuesday	Met with the Tarayana Team implementing NAPA II Projects	Roseleen Gunung, PassangTobgay, Jamyang Phuntso and field officers			
	Met with water beneficiaries at Kengkhar	Kengkhar community		Water reservoir by Tarayana	
15/8/2018 Wednesday	Meeting at DGM, Ministry Economic Affairs	Tashi Tenzin, JamyangChophel		NAPA II	
	Meeting at Dept Disaster Management	Ms Sonam Deki		DM	

	Meeting with RMA Bhutan	Dasho Penjore, Governor Yangchen Tshogyel, Dy. Governor		NAPA II and Economy	
	Met DoFPS, Monggar and Chaskhar	Mr. Norbu Wangdi, Dy.Chief Forest Officer, DoFPS Office and Mr. Ugyen Dechen, Sr. Forest Officer, Chaskhar		Forest Fire Management in the community	
16/8/2018 Thursday	Met Forest & Park Services	RAM BDR MONGGAR		Forest Fire Management	
17/8/2018 Friday	Met PMU Team	Netra Sharma, Tenzin Wangmo, PhuntshoTobgay		Project implementation	
	Met Water Resources	Jigchen Norbu		Water Resource Division	
	Met Dept Hydro & Met	Dema Yangzom		National Centre for Hydrology and Metrology	
	Met Royal University Bhutan	NidupDorji, Vice Chancellor Andu Dukpa, President		Environment and Education	
18/8/2018 Saturday	Survey along Thimphu-Wangdue Highway	YeshiDorji, National Consultant		Site visit related to landslide and soil erosion	
19/8/2018 Sunday	Writing Report				
20 Aug 2018 Monday	Met Tourism Council	Ms ChhimeyPem, Director		Tourism and Environment	
21 Aug 2018 Tuesday	Met GNH Commission	Mr Rinchen Wangdi, Director		NAPA II project - Shortfalls and successes	
	Met JICA	Koji YAMADA, EizoSeko, Krishna Subba		NAPA II project and JICA	
22 Aug 2018 Wednesday	Presented the Preliminary Evaluation Report	PMU and Stakeholders		Received much feedback	Will incorporate feedback in the first draft by 31 Aug

5.3 List of persons interviewed

Date	Name	Title
PhuntsholingThromde (Municipal)		
9/8/2018	Mr. Govinda Sharma	Chief Urban Planner
	Mr. Chencho	Project Engineer
Dophuchen, Samtse		
10/8/2018	Mr. Namgay Doya	Assistant Field Officer, Tarayana Foundation
Ministry of Works and Human Settlement		
13/8/2018	Mrs. Gita Maya Sunwar	Risk Reduction Section Department of Engineering Services
	Mrs. Thinley Choden	Flood Engineering and Management Division Department of Engineering Services
	Tshering Phuntsho, Project Engineer	Monggar Municipality
Tarayana Foundation		
14/8/2018	Mrs. Roseleen Gurung	N.A.
	Mr. JamyangPhuntsho	N.A.
	District Focal Officers	
	Water Beneficiaries	Kengkhar, Monggar
Department of Geology and Mines, Ministry of Economic Affairs		
15/8/2018	Mr. Tashi Tenzin	N.A.
	Mr. Jamyang	Mining Engineer
	Mr. Norbu Wangdi	DoFPS, Monger Division
	Mr. Ugyen Dechen and beneficiaries	Chaskhar Gewog
Department of Disaster Management		
16/8/2018	Mrs. Sonam Deki	Project Manager
Department of Forests and Park Services, Ministry of Agriculture and Forests		
16/8/2018	Mr. Ram Bahadur Mongar	N.A.
	Mr. Kinley Tshering	N.A.
Climate Change Division, National Environment Commission, PMU		
17/8/2018	Mrs. Tenzin Wangmo	Project Director
	Mr. Netra Binod Sharma	Project Support Officer
	Mr. Sonam Dargay	Project Officer
	Mr. TshewangDorji	Senior Environment Officer
Water Resource Coordination Division, NEC		
17/8/2018	Mrs. JigchenLhazomNorbu	N.A.
National Centre for Hydrology and Metrology, Ministry of Economic Affairs		
17/8/2018	Mrs. Dema Yangzom	N.A.
	Project Engineers	
Gross National Happiness Commission		
21/8/2018	Mr. Rinchen Wangdi	Director
JICA		
21/8/2018	Koji Yamada	Resident Chief
	Mr. EizoSeko	Project Formulation Advisor
	Mr. Krishna Subba	Senior Program Officer

5.4 Summary of field visits

9/8/2018 to 18/8/2018

5.4.1 Visit to Gedu Weather Station

- Located above the Phuntsholing-Thimphu highway, adjacent to Gedu College of Business studies,
- Well fenced with proper signed board of NAPA II project.
- Automatic weather station

5.4.2 Visit to Kamji Weather Station

- Located within the premise of Kamji Central School along the slope
- Automated weather station
- Station is fully covered with bushes

5.4.3 PhuntsholingThromde (Municipal)

Meeting with Mr. Govinda Sharma, Chief Urban Planner and Mr. Chencho, Project Engineer, 9/8/2018

- Involved in flood protection work such as mitigation work at Pasakha industrial area by building river protection wall to protect the industrial area as well as the colony
- The work as successfully completed within 12months although the project time period was given to be 15 months and was initiated in 2014
- There is no provision for maintenance of the river protection in the NAPA II project because within the next 1-2years, there may arise a need to carry out maintenance works
- In order to sustain the project, there is need to continue the project with additional funds to extend the river protection walls along the river
- The mitigation work will last over 10-15years if proper timely maintenance are carried out
- In the meanwhile municipal officials are carrying out the monitoring of the site before and after the monsoon seasons
- The other project areas are slope stabilization near Rinchending checkpoint, west of Reldri School, below Rinchending Gompa and near old hospital area, where bioengineering techniques were adopted through plantation and civil engineering techniques such as use of gabban walls, sand bags, dams and soil nailing including improvement of drainage along Thimphu-Phuntsholing highway
- If given the opportunity, municipal office will be constructing the mitigation works along the Omchu river along the main area of the city, slope stabilization along other areas since most of the areas under the municipal area and then maintenance of the existing mitigation works
- For the flood protection along Omchu river, feasibility study was already being carried out such as hydrological analysis, flood protection design and installation of automated weather station at the upper portion of the river
- Trainings provided through the project have covered almost 70% of the municipal office towards capacity building such as flood protection and slope stabilization
- Capacity building ex-trainings were attended in Philippines and Japan. While in-country trainings were provided through resource person from Nepal and India.
- Approximate budget of the project was USD 4.38 million and the balance remaining from the project is Nu.3.6 million as of now.
- **Challenges:** difficult to understand and implement due to new technology and inadequate capacity of the implementing agencies
- **Transfer of technology:** Once the project progressed, the locals within the community were able to pick up the methodology and have even adopted such mitigation measures through their own initiatives.

- **Benefit:** Project has somehow stabilize the landslide prone area along the highway, protection of flood at the industrial estate

5.4.4 Visit to Dophuchen, Samtse

Mr. NamgayDoya, Assistant field officer, Tarayana, 10/8/2018

- Installed 5 number of water reservoir for water harvesting including rain water harvesting, however with the increase in demand for water in the localities, there is need to increase the water tank capacity to at least 16,000 liters
- The project was successfully completed in all aspects within the timeline
- It has brought positive changes to the lives of the people living in the locality

5.4.5. Visit to landslide area below old hospital, Rinchening Gompa, along Reldri School in Phuntsholing and Barsa Watershed at Pasakha, 11/8/2018

- All the land slide areas are provided with protection with the use of geotech methodology along with bioengineering
- The methods have somehow provided temporary solution but the slide seems to be taking place every monsoon season
- On top of geotech methodology, traditional methods were also used to protect the slide prone area such as use of tarpaulin sheets
- Barsa watershed is mainly provided with walls along the stream to protect the Pasakha industry and the industrial colony

5.4.6 Risk Reduction Section, Department of Engineering Services, Ministry of Works and Human Settlement, Mrs. Gita Maya Sunwar, 13/8/2018

- Project involved in development of windstorm resilient roofing system guideline
- The guideline was approved and distributed to all the districts
- Trained 153 people, technicians and engineers from Monggar, Phuntsholing and also students from the vocational technical institute in Sarpang
- Trainings were provided combined with UNAid for 5 days
- **Challenge:** Inadequate fund, training was provided but the implementation is an issue
- **Forward:** Validate the guideline and make it standard in terms of regulation for implementation

5.4.7 Flood Engineering and Management Division, Department of Engineering Services, MoWHS, Mrs. ThinleyChoden, 13/8/2018

- Project involved in capacity development of Flood Engineering and Management Division
- Provided technical backstopping to the flood protection in the field in terms of review of technical reports and design of flood protection systems
- The total budget allocated is USD 50,000
- Engineers were trained on flood protection and mitigation, also field visits were arranged in Indonesia and Bangkok
- The skills gained from the trainings were replicated to other Dzongkhag engineers
- Flood hazard measurement, flood zoning and flood modeling requires more data

5.4.8 Tarayana Foundation, Mrs. Roseleen Gurung, Mr. JamyangPhuntsho and all the district focal officers, 14/8/2018

- Output is climate resilient water harvesting
- Initially targeted for 20 villages in 4 Dzongkhags for clean drinking water supply at the cost of USD 315,000, however during the mid-term review, additional 15 villages were included which makes 35 villages. So the overall cost of the project is USD 350,000

- Prior to initiation of the project, community people were consulted on the aspects of how things have changed over the years
- Conducted training on water resource management and conservation to the Geog officials, students and monks
- About 30 water user groups were formed along with group saving scheme maintenance of the water resources
- Water sources were found to be scarce due to developmental activities and climate change
- Soil properties of the specific areas were determined by the National Soil service center and check dams were constructed wherever possible
- Water harvesting methods and storage water tanks were provided through the project
- Water management rules and regulations are in place so that community can manage themselves
- Project lead to cleaning of water sources, preservation of endanger species
- Water filtration using low cost technology was adopted through locally available materials such as bamboo and other ingredients
- The project has lead to decrease in communicable diseases, improvement in regular hygiene and increase of student attendance in the schools since they do not have to go far off places to fetch water
- Somewhat improved in retaining youths to stay in the villages in terms of rural urban migration
- Increase in income of the villages due to availability of water for economic activities
- Revived water source and improved access to market including microfinance
- Women involvement in decision making as most of the water user groups are lead by women and contribution of people with vulnerable sections of the society in decision making
- Project also lead to stabilization of slope through plantation
- Replication of NAPA II project is being carried out in 6 Dzongkhags through funds from Bhutan Trust Fund for Environment Conservation
- **Lessons:** traditional and cultural practices are sensitive to the community
- **Challenges:** Unwillingness of the community to share water from each locality, difficulties in convincing the people in the villages due to old beliefs and tradition

5.4.9 Department of Geology and Mines, Ministry of Economic Affairs, Mr. Tashi Tenzin and Mr. Jamyang, Mining engineer, 15/8/2018

- Activities carried out under this project are mapping of landslide, landslide mitigation measures, geological assessment on the landslides
- Technical report prepared but in draft stage
- The findings from the report are presented to the stakeholders through workshops
- The focus of the project was to carry out technical assessment of 4 landslide prone areas (Phuntsholing, box cutting along Zhemgang- Gelephu highway, Arong and Moshi in Samdrupjongkhar) and to come up with landslide monitoring and threshold
- Developed technical manual which specifies feasibility study processes, research proposal for landslide study, geo-hazard and vulnerability assessment.
- Landslide causes risk to life, human settlements and other infrastructures, so it is important to provide priority towards its mitigation
- Causes of landslide is mainly due to erratic rainfall
- Study has come up with short term and long term solutions through reproduction of topographical maps and reports
- Landslide monitoring and threshold development was initiated in 6 sites along southern regions and the information is shared with National Centre for Hydrology and Metrology
- Study has made awareness on which areas should the mitigation measures should be put in place based on scientific study
- Project has strengthened the capacity of the people involved in landslide

- **Challenges:** Lack of rainfall data lead to installation of equipments to record rainfall at different locations, even the existing rainfall data is not adequate because there is need of 8-10 years data for forecasting, study demands highly technical and scientific where there is lack of skills and experience, limitation due to variation of different parameters influencing landslide whose result may lead to misleading information, lack of monitoring system at landslide area, lack of budget, limited knowledge about the details of landslide which leads to continuously building of walls by the stakeholders which is not effective, different landslides are caused by different phenomenon and also localized rainfall
- Sustainability is a question based on the fund availability for future development

5.4.10 Department of Disaster Management, Mrs. Sonam Deki, Project Manager, 16/8/2018

- Responsible for outcome 2 and output 2.3 of the project
- Project was a success in terms of capacity building and development of guidelines
- Project was implemented in 4 districts and 1 municipality
- It would have been more effective if field level stakeholders were involved during the initial phase of the project which can lead to ownership of the project and its sustainability
- **Lesson:** Just development of disaster management contingency plan is not adequate but have to involve field people
- Prior to NAPA II, Disaster risk management plan and Disaster management contingency plan were separate but after the project, it was combined
- Community based disaster management manual 2009 was updated
- Instant disaster management team was formed and the procedure for contingency plan was also developed
- Initially project budget allocated was USD 638,200 but was revised to USD 635,120 since climate resilient roofing of the rural homes was handed over to MoWHS
- Basic disaster equipments were supplied along with search and rescue trainings
- Community based disaster management training was attended by respective officials in Asian Disaster Planning Centre, Bangkok, Thailand
- **Challenges:** project fund management was a problem due to different financial year of UNDP and RGoB and also the bureaucratic process which has delayed the project initially, unavailability of district officials for the disaster management plans and trainings

5.4.11 Department of Forests and Park Services, Ministry of Agriculture and Forests, Mr. Ram Bahadur Mongar and Mr. Kinley Tshering, 16/8/2018

- Involved in forest fire management through formation of forest fire management volunteer groups in Trashigang and Wangdue districts
- The volunteer management groups consists of district officials, community members and other members
- Basic knowledge on forest fire management, benefit to ecology and personal safety were provided to the people
- Awareness was created to the volunteer members in terms of benefit of preventing forest fires and its mitigation
- Training was provided in terms of preparedness, first aid and personal protection through personal protective gears
- Personal protective gears were provided but is not adequate
- Developed fire management plans
- Community forest fire management group, Gewog forest fire management group and Dzongkhag forest fire management groups were established
- Capacity building on fire management aspects were provided to the all the stakeholders

- Trainings were attended by officials in Malaysia and Bangkok (5 people) and study tour to Bangkok (3 people)
- **Benefits:** decrease in forest fire after the NAPA project, villages coming forward to prevent fire and are more cautious on forest fire compared to earlier period
- Most fire are manmade in Bhutan
- 21 forest management groups established in Thimphu, Wangdue, Monggar, Lhuntse and Trashigang Dzongkhags at the community level
- Tools provided through project was not adequate, so there is need of additional tools at site
- Additional services required are in terms of preparedness for forest fire, capacity building and tools including vehicle
- Budget USD 30,000
- **Lessons:** change of behavior of the people is essential, integrated approach is required for prevention of forest fire, cause of fire is agriculture where people burns stuff to make soil fertile and fodder plantation reducing cattle grazing, engagement of people for forest fire management through education and awareness creation
- **Challenges:** Different financial year for UNDP and RGoB makes smooth transaction of fund, managing forest fire is difficult due to rough terrain, lack of transportation, lack of fire ambulance, fire management plan has been developed for Dzongkhag and Gewog but lack of budget hampers its implementation, limited data for predictive analysis

5.4.12 Climate Change Division, National Environment Commission, PMU, Mrs. Tenzin Wangmo, Project Director, Mr. Netra Binod Sharma, Project Support Officer, Mr. Sonam Dargay, Project Officer and Mr. TshewangDorji, Senior Environment Officer , 17/8/2018

- Involved for communication, awareness creation and capacity building
- Climate change is a difficult field where NEC tries to institutionalize other agencies towards one platform
- Climate Change Coordination Committee (CCCC) established which was earlier Multi-sectoral Climate Change Coordination Committee (MCCC)
- Lot of awareness programs created and development of 3 audio visuals were developed on best practices
- **Lessons:** Experience sharing among other agencies and collaboration with other projects such as EU and World Bank
- Involved during the initial formulation of project through prioritization of the projects through different sectors but was not involved people from the local government, also prioritization of project areas where not based on scientific analysis
- One time fund provided through the project so there is question of sustainability but ensure proper utilization of funds through proper monitoring and evaluation
- Capacity of local level is low, so low budget has been kept about 70:30 but for future projects, it has been revised to 60:40 (central to local)
- Bottom up approach should be process for the future projects
- Need of sufficient fund to carry forward the project
- For sustainability of the project, there is need to build the capacity at the local level

5.4.13 Water Resource Coordination Division, NEC, Mrs. Jigchen Hazom Norbu, 17/8/2018

- Water resource inventory carried out for 4 Dzongkhags of Monggar, Tsirang, Samtse and Pemagatshel and developed as national report
- 30 sources of water was determined and mapped across all Dzongkhags along with water flow in the villages
- Perception on house hold water supply was also carried out
- Project is scaling up to other Dzongkhags of Trashigang, Dagana and Samdrupjongkhar

5.4.13 National Centre for Hydrology and Metrology, Ministry of Economic Affairs, Mrs. Dema Yangzom and project engineers , 17/8/2018

- Lack of human resource is the biggest challenge
- Project has not included lab calibration due to open bidding procurement system
- Compromising quality of the work due to too much pressure from UNDP
- It would have been better if similar components of the project are given to one entity as such Department of Geology and Mines have installed rain water measurement in 4 locations and the same thing is also done by NCHM
- Up-graded the manual weather stations to automatic hydromat stations
- Enhanced the capacity of NCHM through various training programmes
- Earlier hydrology and metrology were different but during the course of the project, it was combined which has posed challenges due to territorial issues
- Project has made foundation for the data collection but at the moment it is under process to integrate data to Disaster Management Control Centre
- Sustainability of the weather stations requires manpower and budget

5.4.14 Gross National Happiness Commission, Director , 21/8/2018

- NAPA I & II were under the NEC for coordination and monitoring
- NAPA III is under GNHC as PMU where NEC can remain as part of the sector
- NAPA II was not focused, resources were scattered, no tangible area
- Major focused area such as Sarpang flood control would have been much beneficial
- Most activities are carried out at the down-stream level and not at the source which is a problem
- NAPA III will be focusing in 12 districts at the central region
- All NAPA projects does not have linkages
- Irrigation scheme carried out at Wangdue and Punakha valley was a big success
- NAPA II for Phuntsholing municipality is a major beneficiary however there is not much of proper research being carried out which is not sustainable
- There is also not much of effective monitoring

5.4.15 JICA, Mr. Krishna Subba, Senior Program Officer, Mr. EizoSeko, Project formulation advisor and Resident Chief, 21/8/2018

- Soil stabilization- the method seems to be not working rather there is need of proper study
- Slope management plan was developed for 450 sites across the country along with inventory but the technical transfer will be carried out by next year
- Slope counter measures to be carried out using Japanese products for soil stabilization
- Glacial lake outburst information integrated to Japanese satellite

5.4.16 Mr. Tshering Phuntsho, Project Engineer, Mongar, Municipal (13/8/2018)

5.4.16.1 Activities and Programs being carried out through NAPA II Project

1. Rehabilitation of GI pipeline 4 inch from Yakpugang (old treatment plant) to Kadam reservoir. (Upper location)
2. Construction of new GI pipeline 4 inch involving pump and gravitational distribution system. (lower location).
3. Water shed management plant developed

5.4.16.2 Beneficiaries of the Project

1. Residents and businesses establishments in core town area.
2. Institutions:

- c. Referral hospital
- d. Higher and Lower Secondary Schools

5.4.16.3 Impacts of the Project

1. Water scarcity eliminated in the core town areas since 2014.(Gravitational supply system of upper project is used in monsoon season and in lean season the lower pump supply system is used, thus making the water supply reliable throughout the year. Even in cases of maintenance required of either supply line.)
2. Additional cost needed for running pumps in lean season.

5.4.16.4 Physical progress of the project 100%

5.4.16.5 Financial progress 100%

5.4.16.6 Success factors.

1. Lean season water supply to the municipal area is uninterrupted.
2. Hotels and restaurants could maintain proper business and hygiene (initially they needed to carry water from nearest sources)

5.4.16.7 Lessons learned

1. Learned to implement water pumps (submersible and centrifugal) in distribution system.
2. Learned the importance of development of management plan.
3. For capacity building staffs were sent for training in Philipines.

5.4.16.8 Issues and Challenges

1. First package (upper location) of the work was delayed by first contractor.
2. Pump implementation in supply system was hampered by lack of technical knowledge.
3. The joints or connections in GI pipes gave away due to water pressure therefore it needed to be welded instead, the gaskets where needed to be replaced since the factory made was non-reliable product.
4. Widening of northern East-West Highway has damaged the pipes lines by land settlements in upper locations and falling debris in lower location.
5. Villagers extracting stones for construction above the pipelines also has damaged the pipes in certain location. However discussion Department of Forest the issuance of permits of extracting stones near pipelines been stopped.

5.4.16.9 Sustainability of the project

Watershed management plan developed.

1. Frequent monitoring of pipelines and infrastructures.

5.4.16.10 Additional works that can be implemented

1. Improvements in water distribution network in core town area.
2. Reliable treatment plant establishment can also be seen as additional project that can be carried out. Right now the water is just passed through sedimentation and chlorination process as treatment.

5.4.17 Tarayana Foundation, Kengkhar, Monggar, Tashi Wangchuk, Shopkeeper of community shop initiated by Tarayana, Dorji Gyeltshen, Farmer, Kinzang Wangdi, Wood Craftsman, Pema Thinley, Farmer, Rinchen Dorji, Water supply Management group member, Thukten Thinley, Farmer.

5.4.17.1 Activities and programmes

1. Construction of 3 water reservoirs.
 - Reservoir 1. At Mukapari source.
 - Reservoir 2. At Kitpari source.
 - Reservoir 3. At Kheshingri source.
2. Provided syntax water tanks for households above and beside Mukapari source where drawing pipelines till home is not feasible.(there are 30 households which still carries water to their homes from nearest source)
3. Installation of Rain water systems at households.
4. Carried out tree plantation and fencing around the water sources.
5. Provided pipelines from water reservoirs to reachable short distance households.
6. Awareness programmes for villagers in importance and conserving trees around the water sources and refrain from planting trees and crops which require more water consumption such as banana trees, instead planting bamboo trees.

5.4.17.2 Outcomes of the project

1. Previously the children were to carry water early in the morning waiting for turns in line to fill their containers while parents had to look after cattle. The water at source was small so it took lots of productive time to fill the containers, thus the children used to get late for school and sometimes fearing teachers they refrained from attending classes at all. However the situation has changed as school attendance has improved comparatively of village children.
2. The installation of water reservoirs has improved the water availability and water quality in the area. Previously without such infrastructure wild animals and human used the same source so there was lot of water borne diseases cases too.
3. Health and sanitation of the people in the village is also improved comparatively as water is available not only to drink but for washing and cleaning as well.

5.4.17.3 Future plan expectations.

1. Although water is available at source about 15 out of 60 households still has to carry water from the source. Tarayana foundation has installed rainwater harvesting system in some households but the rain is scarce (it rains once in a month properly in monsoon season in the area). Therefore villagers expect an arrangement to be accomplished to have water supply to their homes through pump system with minimal running cost.
2. The village lands are very fertile and it almost grows any vegetables provided there is adequate water availability. Currently the villagers are doing vegetable farming just for self-consumption only therefore they expect to use all the farm lands to grow vegetables and cash in from it to boost their income.

5.4.17.4 Activities carried out by villagers for sustainability of the infrastructures and facilities.

4. Every year each household had promised to plant at least 100 trees around water sources, there are around 60 households in the village including homes of Hermits (Tsamkhang).
5. Villagers had formed a fund raising programme where they have collected about Nu. 100 from each household and are hopeful to use the fund to do any maintenance of the infrastructures.
6. As taught by Tarayana Foundation, few household has constructed their own rainwater harvesting facilities. (Tashi Wangchuk has constructed one additional water harvesting and collecting tank along with the one Tarayana foundation provided)

5.4.17.5 Issues and problems faced.

1. Initially the villagers were hesitant to implement any tasks as they were habituated in using conventional and traditional inefficient methods to do any work. Now as Tarayana Foundation not only carried out physical works but also involved villagers by teaching, advising them of new ideas and possibilities they are confident of carrying out any works related to water management.

2. Concrete works had to be taught to villagers as they had no experience in working with cement and sand.

5.4.18 Department of Forests and Park Services, Chaskhar, Monggar, Mr. Norbu Wangdi, Deputy Chief Forest Officer, Monggar Division, Mr. Ugyen Dechen, Sr. Forest Ranger, Chaskhar gewog, Mr. Neten, Farmer, Chortong Village, Pangdungsingma, Mr. Rinzin Dorji, Farmer, Phishing village.

5.4.18.1 Activities and programmes.

Formation of forest fire management communities in Gewogs.

(2015-2016 Financial Year.)

1. **Thangrong gewog** forest fire management community.
2. **Walagtang and Ngarpontang** forest fire management community.
3. **Sershong and Shermung gewog** forest fire management community.
4. **Takhambi and Tsakaling gewog** forest fire management community.
5. **Yangbari and Kharnang, Chaskhar gewog** forest fire management community
6. **Yadi and Yekhar Chiwog** forest fire management community.
7. **Yangla Gungdang and Tsengkhar chiwog** forest fire management community.

(2017-2018 Financial Year.)

8. **Dremetse** forest fire management community
9. **Thangrong gewog** forest fire management community
10. **Minji** forest fire management community
11. **Tshengkhar** forest fire management community
12. **Dzongkhag forest fire management plan drafted and approved (Monggar and Lhuntse)**

5.4.18.2 Outcomes of the project.

1. Villagers are more aware of laws and rules related to intentional forest fire by them.
2. Villagers are made to feel the responsible in taking part to fight against forest fire.
3. Awareness campaign for the villagers along with discussions has reduced human made forest fire both accidental and intentional.
4. The villagers are more volunteering and willing to help in case any forest fire breaks out in the area.
5. The lemon grass oil extractors have brought their production equipments to the village from the isolated forests to avoid accidental forest fires. Initially there was almost one forest fire occurrence in a year in the gewog.
6. Since the group formation only one forest fire has occurred and it was also initiated by a villager who was mentally unsound. Its been about 3 years without a forest fire in Chaskhar gewog.

5.4.18.3 Beneficiaries of the Project

1. Villagers are benefitted directly by the project as the surrounding forest are saved plus they also got awareness on laws and rules related to forest resources usage.
2. The project has also deepened the relationship between villagers and implementing agencies as they discuss and gather regularly.

5.4.18.4 Lesson learned

1. The implementing agencies have learned to research and learn to draft a management plan for the project.
2. Villagers have learned how to approach forest fire battling through trainings and discussions. However, no huge drills as such have been carried out yet.
3. Villagers were also taught how to use fire managing tools and equipments.

5.4.18.5 Issues and Challenges.

1. Initially the villagers were reluctant to take part and join in community groups as they felt it to be more burdensome and extra work to their already busy life.
2. The lemon grass oil producers were intentionally setting the forest on fire to get rid of alien plants around the grass and increase the yield.
3. During meetings and gatherings parents would send their children who were on vacation from colleges and schools from other places as representative from household therefore during the forest fire occurrence there was chance of these children to be absent and attending schools and colleges in other places.

5.4.18.6 Activities carried out for sustainability of the project.

4. The villagers need to be briefed and refreshed about management of the group regularly, however DoFPS makes sure to do it atleast once before the dry season starts.
5. Also, the DoFPS thinks that the communities in high risk areas needs to be briefed and refreshed more frequently however lack of enough funds has hampered this as villagers at least expects refreshments or lunch during the gathering.
6. For sustainability the **Forest Fire Management Plan** was drafted and sent for approval to head office. There is requirement for management plan to be reviewed every 2 year however the gewog forest office has not received any approval from the head office yet.

5.4.18.7 Additional works that can be carried out.

3. By involving only villagers in the group it looks like the upper administration and other agencies in gewogs are not at all responsible for the forest fire management, therefore there is requirement for stakeholders such as police, schools, hospitals, gewog administrations and Dessups to be involved and form a gewog level management group. (as all current groups formed are in chiwog level)
4. Proper streamlined and allotted duties in gewog level management group will immensely benefit the gewog to be conducive for everyone.

5.4.18.8 Communities formed in Chaskhar Gewog

1. There are basically 3 communities:
 1. **Yangbari and Kharnang** forest fire management community
 2. **Pam Dungsingma** forest fire management community
 3. **Gumdari** forest fire management community

These communities comprise of at least 50 members - one person each from a household in respective villages (however, the number of members will depend upon number of households in the village). Within themselves there are chairman, secretary and coordinators appointed whose sole responsibility are to be the first in response to the forest fire occurrence and inform the community members.

5.4.18.9 Suggestions from villagers.

5. There is equipment provided to the gewog forest office by the projects but the numbers of equipment is very small therefore even when villagers are interested to learn and train the lack of adequate equipment and funds has hampered the process. Therefore, there is need for adequate equipment and trainings to the villagers.
6. More importantly water bags are found to be more useful therefore there is requirement of it in more numbers.
7. Monitoring activities of lemon grass oil producers needed frequently.

8. The one attending training and discussion needs to be the one living in the village in all times not children who just stay in village for vacation.

5.4.19 Preliminary presentation to Project Board and other stakeholders, 22/8/2018

- NCHM- project period was just adequate for set up of instrumentation
- DGM- project time period was too short to carry out forecasting and there is lack of communication which lead to NAPA III not being in picture for DGM
- Disaster management- project period is 4 years which mainly focused on capacity building
- Need to focus more into challenges and issues including ground realities
- Land slide and flood mitigation works at Phuntsholing should appear well in report
- Report should consider benefits of project such as water harvesting technology
- Replicable was not possible due to shortage of time for the project
- Recommendation should follow situation, gap and then concrete recommendations
- Sustainability should appear at the conclusion
- Institutional mandates are different for different stakeholders which lead to not forecasting forest fire, landslide, flood and weather
- This is terminal evaluation and not post evaluation
- Compared what has been achieve and not based on project document
- Some of the recommendations can be integrated into 5 year plans of the government

5.5 List of documents reviewed

Project

- GEF Project Information Form (PIF), Project Document, and Log Frame Analysis (LFA)
- Project Implementation Plan
- Implementing/Executing partner arrangements
- List and contact details for project staff, key project stakeholders, including Project Boards, and other partners to be consulted
- Project sites, highlighting suggested visits
- Mid Term Review (MTR) Report
- Annual Project Implementation (APR/PIR) Reports
- Project budget and financial data
- Project Tracking Tool, at baseline, at mid-term, and at terminal points
- UNDP Development Assistance Framework (UNDAF)
- UNDP Country Programme Document (CPD)
- UNDP Country Programme Action Plan (CPAP)
- GEF focal area strategic program objectives
- Quarterly progress reports and work plans of the various implementation task teams
- Audit reports
- Oversight mission reports
- All monitoring reports prepared by the project
- Financial and Administration guidelines used by Project Team

Additional

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5.6 Evaluation Question Matrix

Evaluative Criteria Questions	Indicators	Sources	Methodology
Relevance: How does the project relate to the main objectives of the GEF focal area, and to the environment and development priorities at the local, regional and national levels?			
<ul style="list-style-type: none"> Is the project relevant the GEF biodiversity and climate change focal area? 	<ul style="list-style-type: none"> Existence of a clear relationship between the project objectives and GEF biodiversity focal area 	<ul style="list-style-type: none"> Project documents GEF focal areas strategies and documents 	<ul style="list-style-type: none"> Documents analyses GEF website Interviews with UNDP and project team
<ul style="list-style-type: none"> Is the project relevant to Bhutan's environment and sustainable development objectives? 	<ul style="list-style-type: none"> Degree to which the project supports national environmental objectives Degree of coherence between the project and national priorities, policies and strategies Appreciation from national stakeholders with respect to adequacy of project design and implementation to national realities and existing capacities Level of involvement of government officials and other partners in the project design process Coherence between needs expressed by national stakeholders and UNDP GEF criteria 	<ul style="list-style-type: none"> Project documents National policies and strategies Key project partners 	<ul style="list-style-type: none"> Documents analyses Interviews with UNDP and project team
<ul style="list-style-type: none"> Is the project addressing the needs of target beneficiaries at the local and regional levels? 	<ul style="list-style-type: none"> Strength of the link between expected results from the project and the needs of relevant stakeholders Degree of involvement and inclusiveness of stakeholders in project design and implementation 	<ul style="list-style-type: none"> Project partners and stakeholders Needs assessment studies Project documents 	<ul style="list-style-type: none"> Documents analyses Interviews with relevant stakeholders
<ul style="list-style-type: none"> Is the project internally coherent in its design? 	<ul style="list-style-type: none"> Level of coherence between project expected results and project design internal logic Level of coherence between project design and project implementation approach 	<ul style="list-style-type: none"> Program and project documents Key project stakeholders 	<ul style="list-style-type: none"> Document analysis Key interviews

<ul style="list-style-type: none"> How is the project relevant with respect to other donor-supported activities? 	<ul style="list-style-type: none"> Degree to which program was coherent and complementary to other donor programming nationally and regionally 	<ul style="list-style-type: none"> Documents from other donor supported activities Other donor representatives Project documents 	<ul style="list-style-type: none"> Documents analyses Interviews with project partners and relevant stakeholders
<ul style="list-style-type: none"> Does the project provide relevant lessons and experiences for other similar projects in the future? 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Data collected throughout evaluation 	<ul style="list-style-type: none"> Data analysis
Effectiveness: To what extent have the expected outcomes and objectives of the project been achieved?			
<ul style="list-style-type: none"> Has the project been effective in achieving the expected outcomes and objectives? Objective: To enhance national, local and community capacity to prepare for and respond to climate-induced multi-hazards to reduce potential losses of human lives, national economic infrastructure, livelihoods, and livelihood assets. Outcome 1: Risk from climate-induced floods and landslides reduced in Bhutan's economic and Phuentsholing and Pasakha Industrial Area Outcome 2: Community resilience to climate-induced disaster risks (droughts, floods, landslides, windstorms, forest fires) strengthened in at least four Dzongkhags Outcome 3: Relevant information about climate-related risks and threats shared across development sectors for planning and preparedness on a timely and reliable basis. 	<ul style="list-style-type: none"> Objective: Level of capacity of local communities to prepare for and respond to climate-induced risks. Outcome 1: <ul style="list-style-type: none"> Reduced damage from floods in the industrial hub of the country, Pasakha. Number of active and unstable landslides in Phuentsholing area Vulnerability and risk perception index [AMAT 1.2.15] Outcome 2: <ul style="list-style-type: none"> Water resource inventories, water harvesting technology and additional water storage capacity available in some the most drought-prone communities of Bhutan Existence and operationalization of disaster management committees at the local level Outcome 3: <ul style="list-style-type: none"> Availability and the level of use of localized climate information. 	<ul style="list-style-type: none"> Project documents Project team and relevant stakeholders Data reported in project annual and quarterly reports 	<ul style="list-style-type: none"> Documents analysis Interviews with project team Interviews with relevant stakeholders

	<ul style="list-style-type: none"> - Number and location of real-time weather observation, forecasting and warning stations that feed data into the NWFFWC - Number of sectors using climate information to make their development policies and plans climate resilient 		
<ul style="list-style-type: none"> • How is risk and risk mitigation being managed? 	<ul style="list-style-type: none"> • Completeness of risk identification and assumptions during project planning and design • Quality of existing information systems in place to identify emerging risks and other issues • Quality of risk mitigations strategies developed and followed 	<ul style="list-style-type: none"> • Project documents • UNDP, project team, and relevant stakeholders 	<ul style="list-style-type: none"> • Document analysis • Interviews
<ul style="list-style-type: none"> • What lessons can be drawn regarding effectiveness for other similar projects in the future? 		<ul style="list-style-type: none"> • Data collected throughout evaluation 	<ul style="list-style-type: none"> • Data analysis
Efficiency: Was the project implemented efficiently, in-line with international and national norms and standards?			
<ul style="list-style-type: none"> • Was project support provided in an efficient way? 	<ul style="list-style-type: none"> • Availability and quality of financial and progress reports • Timeliness and adequacy of reporting provided • Level of discrepancy between planned and utilized financial expenditures • Planned vs. actual funds leveraged • Cost in view of results achieved compared to costs of similar projects from other organizations • Adequacy of project choices in view of existing context, infrastructure and cost • Quality of results-based management reporting (progress reporting, monitoring and evaluation) • Occurrence of change in project design/ implementation approach (i.e. restructuring) when needed to improve project efficiency 	<ul style="list-style-type: none"> • Project documents and evaluations • UNDP Project team 	<ul style="list-style-type: none"> • Document analysis • Key interviews

	<ul style="list-style-type: none"> • Cost associated with delivery mechanism and management structure compare to alternatives 		
<ul style="list-style-type: none"> • How efficient are partnership arrangements for the project 	<ul style="list-style-type: none"> • Specific activities conducted to support the development of cooperative arrangements between partners • Examples of supported partnerships • Evidence that particular partnerships/linkages will be sustained • Types/quality of partnership cooperation methods utilized 	<ul style="list-style-type: none"> • Project documents and evaluations • Project partners and relevant stakeholders 	<ul style="list-style-type: none"> • Document analysis • Interviews
<ul style="list-style-type: none"> • Did the project efficiently utilize local capacity in implementation? 	<ul style="list-style-type: none"> • Proportion of expertise utilized from international experts compared to national experts • Number/quality of analyses done to assess local capacity potential and absorptive capacity 	<ul style="list-style-type: none"> • Project documents and evaluations • UNDP • Beneficiaries 	<ul style="list-style-type: none"> • Document analysis • Interviews
<ul style="list-style-type: none"> • What lessons can be drawn regarding efficiency for other similar projects in the future? 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Data collected throughout evaluation 	<ul style="list-style-type: none"> • Data analysis
Sustainability: To what extent are there financial, institutional, social-economic, and/or environmental risks to sustaining long-term project results?			
<ul style="list-style-type: none"> • Are there social or political risks that may threaten the sustainability of project outcomes? 	<ul style="list-style-type: none"> • Major institutional changes, technical solutions, legal framework amendments get strong support at policy and decision-making levels 	<ul style="list-style-type: none"> • Project documents • Bhutan laws, regulations, policies and procedures relating to NAPA II 	<ul style="list-style-type: none"> • Document analysis • Interviews
<ul style="list-style-type: none"> • Is there evidence financial resources are committed to support project results after the project has closed? 	<ul style="list-style-type: none"> • Major project endeavors (financial instruments, institutional arrangements, infrastructure support) will get financial support and be maintained without GEF funding 	<ul style="list-style-type: none"> • Project documents • Financial data if available 	<ul style="list-style-type: none"> • Document analysis • Interviews
Impact: Are there indications that the project has contributed to, or enabled progress toward, reduced environmental stress and/or improved ecological status?			
<ul style="list-style-type: none"> • Has the project demonstrated progress in changing attitudes and behaviour towards climate change adaptation? 	<ul style="list-style-type: none"> • Percentage of happy and successful beneficiaries • Degree of change in behavior towards environmental protection, climate change adaptation 	<ul style="list-style-type: none"> • Reports • Field assessment for evidence • Talking to beneficiaries 	<ul style="list-style-type: none"> • Focus group discussion • Field observations • Review of project reports and documents

5.7 Questionnaire used and summary of results

QUESTIONNAIRE USED

A) Relevance

Is the project relevant the GEF biodiversity focal area?

- How does the project support the GEF biodiversity focal area and strategic priorities?

Is the project relevant to the Bhutan's environment and sustainable development objectives?

- How does the project support the environment and sustainable development objectives of Bhutan?
- Is the project country-driven?
- What was the level of stakeholder participation in project design?
- What was the level of stakeholder ownership in implementation?
- Does the project adequately take into account the national realities, both in terms of institutional and policy framework in its design and its implementation?

Is the project addressing the needs of target beneficiaries at the local and regional levels?

- How does the project support the needs of relevant stakeholders?
- Has the implementation of the project been inclusive of all relevant stakeholders?
- Were local beneficiaries and stakeholders adequately involved in project design and implementation?

Is the project internally coherent in its design?

- Are there logical linkages between expected results of the project (log frame) and the project design (in terms of project components, choice of partners, structure, delivery mechanism, scope, budget, use of resources etc)?
- Is the length of the project sufficient to achieve project outcomes?

How is the project relevant with respect to other donor-supported activities?

- Does the GEF funding support activities and objectives not addressed by other donors?
- How do GEF-funds help to fill gaps (or give additional stimulus) that are necessary but are not covered by other donors?
- Is there coordination and complementarities between donors?

Does the project provide relevant lessons and experiences for other similar projects in the future?

- Has the experience of the project provided relevant lessons for other future projects targeted at similar objectives?

B) Effectiveness

Has the project been effective in achieving the expected outcomes and objectives?

- **Objective:** To enhance national, local and community capacity to prepare for and respond to climate-induced multi-hazards to reduce potential losses of human lives, national economic infrastructure, livelihoods, and livelihood assets.
- **Outcome 1:** Risk from climate-induced floods and landslides reduced in Bhutan's economic and Phuentsholing and Pasakha Industrial Area
- **Outcome 2:** Community resilience to climate-induced disaster risks (droughts, floods, landslides, windstorms, forest fires) strengthened in at least four Dzongkhags
- **Outcome 3:** Relevant information about climate-related risks and threats shared across development sectors for planning and preparedness on a timely and reliable basis.

How is risk and risk mitigation being managed?

- How well are risks, assumptions and impact drivers being managed?
- What was the quality of risk mitigation strategies developed? Were these sufficient?
- Are there clear strategies for risk mitigation related with long-term sustainability of the project?

What lessons can be drawn regarding effectiveness for other similar projects in the future?

- What lessons have been learned from the project regarding achievement of outcomes?

- What changes could have been made (if any) to the design of the project in order to improve the achievement of the project's expected results?

C) Efficiency

Was project support provided in an efficient way?

- Was adaptive management used or needed to ensure efficient resource use?
- Did the project logical framework and work plans and any changes made to them use as management tools during implementation?
- Were the accounting and financial systems in place adequate for project management and producing accurate and timely financial information?
- Were progress reports produced accurately, timely and responded to reporting requirements including adaptive management changes?
- Was project implementation as cost effective as originally proposed (planned vs. actual)?
- Did the leveraging of funds (cofinancing) happen as planned?
- Were financial resources utilized efficiently? Could financial resources have been used more efficiently?
- Was procurement carried out in a manner making efficient use of project resources?
- How was results-based management used during project implementation?

How efficient are partnership arrangements for the project?

- To what extent partnerships/ linkages between institutions/ organizations were encouraged and supported?
- Which partnerships/linkages were facilitated? Which ones can be considered sustainable?
- What was the level of efficiency of cooperation and collaboration arrangements?
- Which methods were successful or not and why?

Did the project efficiently utilize local capacity in implementation?

- Was an appropriate balance struck between utilization of international expertise as well as local capacity?
- Did the project take into account local capacity in design and implementation of the project?
- Was there an effective collaboration between institutions responsible for implementing the project?

What lessons can be drawn regarding efficiency for other similar projects in the future?

- What lessons can be learnt from the project regarding efficiency?
- How could the project have more efficiently carried out implementation (in terms of management structures and procedures, partnerships arrangements etc...)?
- What changes could have been made (if any) to the project in order to improve its efficiency?

D) Sustainability

Are there social or political risks that may threaten the sustainability of project outcomes?

- What is the likelihood that institutional and technical achievements, legal framework, policies and governance structures and processes will allow for the project results to be sustained? Are there key institutional and governance risks to sustainability?

Is there evidence financial resources are committed to support project results after the project has closed?

- What is the likelihood that any required financial resources will be available to sustain the project results once the GEF funding is over?

E) Impact

Has the project demonstrated progress towards these impact achievements?

- How has the project benefitted citizens at the local and municipal level?
- How has the project increased the happiness of citizens at the local and municipal level?
- How has the project changed behavior towards environmental protection, biodiversity conservation at the local and municipal level?

5.8 Further Notes on Evaluation

Measurement	Rating	Achievement
Project Strategy		Project objectives are in line with the GEF Focal Area objectives augmenting disaster resilience, institutional capacities and mainstreaming adaptation into policies and governance in Bhutan. Logframe assumptions reflect national priorities accurately.
Completion of Results	Objective Achievement Rating: 5/6 Satisfactory	<p>Positives</p> <ul style="list-style-type: none"> ✓ The Project has laid a strong foundation for preparedness for climate-induced disasters ✓ Foundational capacity development, Manuals, guidelines, SOPs, Manuals., SOPs were written and or updated ✓ Extensive data collection eg weather stations ✓ Outreach in Mongar extensive, examples of frugal innovations eg water filtration <p>Considerations for Future Projects</p> <ul style="list-style-type: none"> • Data (numbers and pictures) management needs to be shared to relevant professionals • Equipment and Hardware maintenance eg weather stations, slopes • Capacity development at local levels, not easily evident • Sustained development not supported by ABC Principles (Attitude Behaviour and Commitment on top of skills, knowledge, systems and process equipment) • Inter-border or inter territory collaboration for DM

Measurement	Rating	Achievement
Completion of Results	Outcome 1 Achievement Rating: 5/6 Satisfactory	<p>Positives</p> <ul style="list-style-type: none"> ✓ Several activities (slope stabilisation, embankment) have been done at PIA ✓ Project Outcome was achieved ✓ Project activities were completed satisfactorily <p>Considerations for Future Projects</p> <ul style="list-style-type: none"> • Landslide forecasting not in place as yet • Constant monitoring on landslides not evident • Output 1.4: Thresholds for landslide slope failure determined in different geological zones, through research correlating geological instability with rainfall data from weather stations. • Hourly data not available
	Outcome 2 Achievement Rating: 5/6 Satisfactory	<p>Positive progress</p> <ul style="list-style-type: none"> ✓ Project has engaged stakeholders, communities, remote locations. Commendable ✓ Mapped more than 500 water resources at 4 Dzongkhags - lowest and highest water flows

		<ul style="list-style-type: none"> ✓ Tarayana is exceptional in outreach to local communities eg water harvesting, forming water user groups ✓ Project outcomes were achieved ✓ Project Activities were implemented and generated additional demand ✓ Well covered in Mongar municipality ✓ Lots of training has been done <p>Considerations for Future Projects</p> <ul style="list-style-type: none"> • Decision to use wrought iron casing versus stainless steel casing for submersible pump in the storage tanks in the municipality • Local capacity development <p>To check further</p> <ul style="list-style-type: none"> ❖ Evaluate implementation of ArcSWAT model ❖ Read closely into reports on Chukha, what has been done? ❖ Data in pictures and numbers, what has been analysed?
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Measurement	Rating	Achievement
Completion of Results	Outcome 3 Achievement Rating: 5/6 Satisfactory	<p>Positives</p> <ul style="list-style-type: none"> ✓ Improved climate change adaptation planning ✓ Strong PMU to mobilise different departments and divisions ✓ Weather stations set up. 60 stations ending data. ✓ Weather forecasting has become significantly more accurate ✓ Capacity building efforts for the staff on predictive modeling, early warning systems and developing appropriate weather products have led to significant competitiveness in departments ✓ A National Weather and Flood Forecasting and Warning Center (NWFFWC) set up within DHMS to strengthen the capacity of weather forecasting and warning ✓ A blue print to integrate data products from different forecasting platforms needs to be planned and implemented <p>Considerations for Future Projects</p> <ul style="list-style-type: none"> • Data analysis not extensive enough • Data sharing limited • Practice drills limited
Project Design	Rating: 5/6 Satisfactory	<p>Positives</p> <ul style="list-style-type: none"> ✓ Considered different aspects of Climatic-Induced disasters ✓ Correctly identified the key locations of interventions ✓ Correctly engaged the departments and divisions involved. ✓ Correctly selected the NEC as a key partner for execution

		<p>Considerations for Future Projects</p> <ul style="list-style-type: none"> • Many activities, but lack one single focus • During Project Design and Planning, lack of data on the needs of Dzongkhags, Gewogs and Chiwogs. Decided at Central • Lack of precise or accurate information and data (numbers or pictures) of the exact nature of disaster hotspots eg landslide movements, human settlements and their activity, soil humidity, wind velocity • Limited capacity of Dzongkhags, Gewogs and Chiwogs
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Measurement	Rating	Achievement
Sustainability	Rating: 3/4 Moderately Likely	<p>Positives</p> <ul style="list-style-type: none"> ✓ Foundational skills and knowledge ✓ Manuals institutionalised ✓ Data bases set up ✓ Water user Groups can continue <p>Considerations for Future Projects</p> <ul style="list-style-type: none"> • Lack evidence of mass replication of successful activities • Communication and international publication of good practices (impact journals). Enhance knowledge management for development in Bhutan to be strengthened. • Impact assessments appears patchy • Water filtration done by Tarayana is worthy of publication and replication • Formalised training curriculum based on manuals • Funding plan for replacement of hardware • Funding plan for regular equipment hardware maintenance • Procurement (Contracts to include maintenance based on TCO) • Whilst there were observed improvements in Attitudes and Behaviours, there exists challenges in terms of Commitment (a key pillar of capacity building) • Lack of a capacity development plan or a training plan for officials at Dzongkhags • Publication in high impact journals

5.9 EVALUATION CONSULTANT CODE OF CONDUCT AGREEMENT FORM

Evaluators/Consultants:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study limitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

Evaluation Consultant Agreement Form¹¹

Agreement to abide by the Code of Conduct for Evaluation in the UN System

Name of Consultant: _____ **Name of Consultancy Organization** (where relevant): _____

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at *(place)* on *date* Signature: _____

¹¹ www.undp.org/unegcodeofconduct

5.10 Evaluation Report Clearance Form

(to be completed by CO and UNDP GEF Technical Adviser based in the region and included in the final document)

Evaluation Report Reviewed and Cleared by

UNDP Country Office

Name: _____

Signature: _____ Date: _____

UNDP GEF RTA

Name: _____

Signature: _____ Date: _____