



**GREEN
CLIMATE
FUND**

Meeting of the Board
6 – 8 July 2019
Songdo, Incheon, Republic of Korea
Provisional agenda item 20

GCF/B.23/02/Add.01

14 June 2019

Consideration of funding proposals - Addendum I

Funding proposal package for FP107

Summary

This addendum contains the following seven parts:

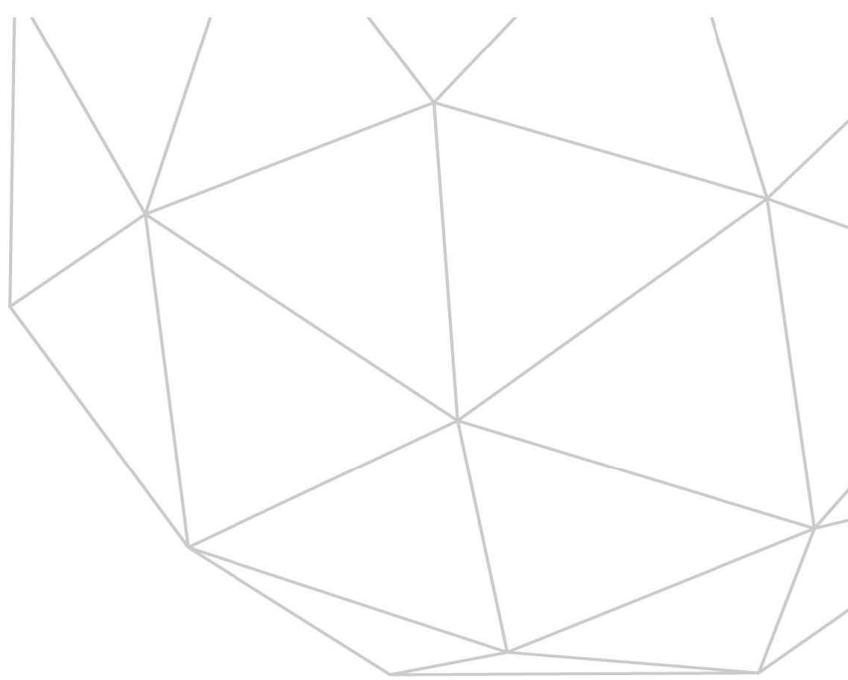
- a) A funding proposal titled “Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan”;
- b) No-objection letter issued by the national designated authority(ies) or focal point(s);
- c) Environmental and social report(s) disclosure;
- d) Secretariat’s assessment;
- e) Independent Technical Advisory Panel’s assessment;
- f) Response from the accredited entity to the independent Technical Advisory Panel’s assessment; and
- g) Gender documentation.

Table of Contents

Funding proposal submitted by the accredited entity	3
No-objection letter issued by the national designated authority(ies) or focal point(s)	78
Environmental and social report(s) disclosure	79
Secretariat's assessment	81
Independent Technical Advisory Panel's assessment	95
Response from the accredited entity to the independent Technical Advisory Panel's assessment	103
Gender documentation	106



GREEN
CLIMATE
FUND



Funding Proposal

Version 1.1

The Green Climate Fund (GCF) is seeking high-quality funding proposals.

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF's Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

Project/Programme Title: Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan

Country/Region: Kingdom of Bhutan

Accredited Entity: United Nations Development Programme

Date of Submission: 10 June 2019

Contents

Section A	PROJECT / PROGRAMME SUMMARY
Section B	FINANCING / COST INFORMATION
Section C	DETAILED PROJECT / PROGRAMME DESCRIPTION
Section D	RATIONALE FOR GCF INVOLVEMENT
Section E	EXPECTED PERFORMANCE AGAINST INVESTMENT CRITERIA
Section F	APPRAISAL SUMMARY
Section G	RISK ASSESSMENT AND MANAGEMENT
Section H	RESULTS MONITORING AND REPORTING
Section I	ANNEXES

Note to accredited entities on the use of the funding proposal template

- Sections **A, B, D, E** and **H** of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document.
- The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

Please submit the completed form to:

fundingproposal@gcfund.org

Please use the following name convention for the file name:

“[FP]-[Agency Short Name]-[Date]-[Serial Number]”

A.1. Brief Project/Programme Information		
A.1.1. Project / programme title	Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan	
A.1.2. Project or programme	Project	
A.1.3. Country (ies) / region	Kingdom of Bhutan	
A.1.4. National designated authority (ies)	Thinley Namgyel Secretary Gross National Happiness Commission (GNHC)	
A.1.5. Accredited entity	United Nations Development Programme (UNDP)	
A.1.5.a. Access modality	<input type="checkbox"/> Direct <input checked="" type="checkbox"/> International	
A.1.6. Executing entity / beneficiary	<p>Executing Entity: Gross National Happiness Commission (GNHC)</p> <p><u>Direct beneficiaries:</u> 27,598 agriculture households (118,839 people, i.e. the total population of the 8 target Dzongkhags) benefitting from sustainable land management, climate-resilient irrigation and agriculture, and climate-resilient roads (46.5% of the rural population of Bhutan)</p> <p><u>Indirect beneficiaries:</u> 58% of livelihoods of Bhutan engaged in agriculture</p>	
A.1.7. Project size category (Total investment, million USD)	<input type="checkbox"/> Micro (≤ 10) <input type="checkbox"/> Small ($10 < x \leq 50$) <input checked="" type="checkbox"/> Medium ($50 < x \leq 250$) <input type="checkbox"/> Large (> 250)	
A.1.8. Mitigation / adaptation focus	<input type="checkbox"/> Mitigation <input checked="" type="checkbox"/> Adaptation <input type="checkbox"/> Cross-cutting	
A.1.9. Date of submission	31 March 2017, 26 September 2017, 12 April 2018, 9 July 2018, 27 July 2018, 21 September 2018, 4 October 2018, 29 October 2018; 16 November 2018; 4 December 2018, 16 January 2019; 5 April 2019; 23 April 2019, 16 May 2019, 27 May 2019; 10 June 2019	
A.1.10. Project contact details	Contact person, position	Mariana Simões, Regional Technical Specialist
	Organization	United Nations Development Programme (UNDP)
	Email address	mariana.simo@undp.org
	Telephone number	+66 92 476 4223
	Mailing address	United Nations Building Rajdamnern Nok Avenue Bangkok, 10200 Thailand
A.1.11. Results areas (mark all that apply)		
<p>Reduced emissions from:</p> <p><input type="checkbox"/> Energy access and power generation (E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)</p> <p><input type="checkbox"/> Low emission transport (E.g. high-speed rail, rapid bus system, etc.)</p> <p><input type="checkbox"/> Buildings, cities and industries and appliances</p>		

(E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)

Forestry and land use

- (E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)

Increased resilience of:

Most vulnerable people and communities

- (E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)

Health and well-being, and food and water security

- (E.g. climate-resilient crops, efficient irrigation systems, etc.)

Infrastructure and built environment

- (E.g. sea walls, resilient road networks, etc.)

Ecosystem and ecosystem services

- (E.g. ecosystem conservation and management, ecotourism, etc.)

A.2. Project / Programme Executive Summary (max 300 words)

1. Given its geographic location and mountainous terrain, Bhutan is particularly vulnerable to changes in climate which affect the timing, frequency and intensity of rainfall (with consequent changes in runoff and erosional processes), as well as changes in temperatures which affect the altitude at which crops can grow and evaporation from soils. Water availability and management is challenging, with remote areas experiencing scarcity in dry years. Monsoon seasons experiencing high rainfall, flash floods and landslides have damaged existing irrigation schemes and disrupted market access for many smallholders. These impacts have a major bearing on smallholder farms in a sector that is critical for the Royal Government of Bhutan's (RGoB's) goals of food self-sufficiency and inclusive green socio-economic development.

2. These climate-induced impacts on agricultural infrastructure, production and supply place at risk 58% of the country's livelihoods, predominantly older farmers whose livelihood options are compromised. The increasing costs of recovery strain limited public resources, jeopardizing hard-won development gains within this least developed country. With only 7.8% of land arable, it is critical to ensure that the country's limited agriculture potential is resilient to climate change.

3. Consequently, the RGoB seeks support to enhance the resilience of smallholder farms to rainfall variability, as well as increases in temperature and projected increases in monsoonal rainfall. Enhancing the resilience of the population engaged in agriculture, including the transition from reactive to climate-informed planning is fundamental to meeting the RGoB's aspirations on climate resilient, low carbon development.

3. Given the specific climate change challenges confronting smallholders in vulnerable regions in Bhutan, a priority for the RGoB, the proposed project seeks **to enhance the resilience of smallholder farms to climate change, especially variation in rainfall and frequent occurrence of extreme events**, through three complementary Outputs:

- **Promote resilient agricultural practices in the face of changing climate patterns**
- **Integrate climate change risks into water and land management practices that affect smallholders**
- **Reduce the risk and impact of climate change induced landslides during extreme events that disrupt market access**

4. The proposed project will benefit more than 118,000 people in eight dzongkhags (districts) across Bhutan: Dagana, Punakha, Trongsa, Tsirang, Sarpang, Samtse, Wangdue Phodrang and Zhemgang. These sites were selected by the RGoB given their vulnerability to climate change and priority for Government in the context of their SDG targets, especially given the moderate-to-high poverty incidence rates that prevail.

5. The proposed project is fully aligned with the RGoB's national adaptation priorities as per the Nationally Determined Contribution. Further, the project is in line with RGoB's work programme with the GCF and is also in the selected Accredited Entity (UNDP) work programme. The NDA has issued a letter of no objection for this proposal.

A.3. Project/Programme Milestone

Expected approval from accredited entity's Board (if applicable)	1 April 2017
Expected financial close (if applicable)	<i>TBD [date of agreement on the FAA between UNDP and GCF]</i>
Estimated implementation start and end date	Start: 1 January 2020 End: 31 December 2025
Project/programme lifespan	16 years (Output 2) 26 years (Output 3)

B.1. Description of Financial Elements of the Project / Programme

6. Grant financing is requested from the GCF to support climate resilience in the agriculture sector, complementing related government co-financing. Bhutan is a landlocked Least Developed Country (LDC), with increasing challenges related to public debt¹. The interventions proposed do not lend themselves for revenue generation at a scale that will allow for the project activities to be financed with any other financial instrument of the GCF. While the interventions proposed will, by enhancing the resilience of beneficiaries, enable livelihoods options to thrive, they are not at a scale that allows for reflows back to the GCF. The proposed project is therefore structured as 100% grants with co-financing leveraged from the RGoB. However, as with other similar programmes financed in Bhutan, the RGoB will scale up its own financing over time as GCF funds wind down.

7. The project is also built upon USD 32.673 million in co-financing during the project period and USD 1.453 million in post-project commitments from the Gross National Happiness Commission (GNHC), the Ministry of Agriculture and Forests (MoAF) the Ministry of Works and Human Settlements (MoWHS), and the National Center for Hydrology and Meteorology (formerly the Department of Hydro Met Services under the Ministry of Economic Affairs²). Refer table below for a summary of amounts by funding source.

	MoAF	GNHC	MoWHS	NCHM	Total
A. Co-financing during the Project Period					
Cash	0.968	19.866	1.990	-	22.824
In-kind	9.052	-	0.550	0.242	9.844
Total A	10.020	19.866	2.540	0.242	32.668
B. Commitments Post-project period					
Post project O&M captured in co-financing letters	1.453	-	12.310	-	13.763
Total B	1.453	-	12.310	-	13.763
Total (A+B)	11.473	19.866	14.850	0.242	46.431

8. Ministry of Agriculture and Forests (MoAF) co-financing of USD 10.020 million will support Outputs 1 and 2 in the form of technical support, operations and maintenance (O&M) for investments during the project duration, as well as Water User Group (WUG) bylaw updates. Technical support includes extension officers involved in agriculture, livestock, forests and watershed management supporting communities to adapt irrigation, soil and water management to address climate impacts. Out of that amount, USD 9.052 million is in-kind; USD 0.968 million is committed by the Ministry for operations and maintenance during the project implementation period. In addition, USD 1.453 million has also been confirmed for O&M post project duration.

9. GNHC co-financing of USD 19.866 million will support Output 3, through work to farm roads and Gewog connectivity (GC roads), including road resurfacing, drainage and slope stabilization to improve climate resilience of the existing roads. Out of the total amount committed by the GNHC, USD 17.586 million will be in form of cash-grant; USD 2.28 million will be used for operations and maintenance (O&M) during the project implementation period. An additional USD 12.310 million has been committed for related O&M post project.

10. The Ministry of Works and Human Settlement (MoWHS) has committed USD 2.540 million (cash and in-kind) in form of staff time and costs for technical expertise related to survey and design, and geotechnical studies and tests related to road enhancement. The amount also includes monsoon restoration-related and O&M costs of USD 1.649 million that are committed for the project implementation period.

11. In-kind co-financing of USD 0.242 million committed by the National Center for Hydrology and Meteorology (formerly the Department of Hydro Met Services under the Ministry of Economic Affairs) will come in form of technical support related to hydro-met equipment.

12. Financing of USD 2 million, from the UNDP/LDCF project on *Enhancing sustainability and climate resilience of forest and agriculture landscape and community livelihoods* is considered parallel financing as activities will complement

¹ 11thFive Year Plan 2013-2018 (GNHC, 2013)

² As of July 2017, the NCHM is in the process of delinking from the Ministry of Economic Affairs as parent Ministry, with approval from the Cabinet, Royal Civil Service Commission and Ministry

activities under the GCF project. This funding will cover the updating of the Environmentally Friendly Road Construction (EFRC) standards to include climate-proofing of roads, which will be applied to the roads work (co-financing) under the proposed project. Similarly, LDCF resources will also support value chain and risk transfer analyses, of relevance to Output 1 of the GCF project.

13. The proposed budget for the GCF project is presented below³.

Output	Sub-component / Activity	GCF funding amount (USD)	GoB Co-finance (USD)	Amount for entire project (USD)	Amount for entire project (BTN ⁴)
Output 1: Promote resilient agricultural practices in the face of changing climate patterns	1.1. Developing and integrating climate risk data into crop and livestock planning at the national and sub-national levels	503,850	2,300,000	2,803,850	206,587,668
	1.2. Tailored climate information and related training to local government and farmers to interpret and apply climate risk data to local and household level agriculture planning	1,200,000	2,242,000	3,442,000	253,606,560
	1.3. Scaling up climate-resilient agriculture practices, and training local entities in community seed production and multiplication and cultivation of climate-resilient crop alternatives	1,657,924	2,573,000	4,230,924	311,734,480
Subtotal Output 1		3,361,774	7,115,000	10,476,774	771,928,708
Output 2: Integrate climate change risks into water and land management practices that affect smallholders	2.1. Enhancing climate-informed wetland and water management to support agriculture planning	601,924	133,000	734,924	54,149,200
	2.2. Establishment of climate resilient irrigation schemes and water saving technologies for smallholder farmers in 8 target dzongkhags	14,386,000	707,000	15,093,000	1,112,052,240
	2.3. Scaling up of sustainable land management (SLM) technologies to support soil and slope stabilization	2,742,724	686,000	3,428,724	252,628,384
	2.4. Capacity strengthening to farmers and extension officers on SLM technologies	454,800	200,000	654,800	48,245,664
Subtotal Output 2		18,185,448	1,726,000	19,911,448	1,467,075,489

³ The Accredited Entity (AE) fee for the proposed project is at 7% or USD 1,774,303.58. The budget figures presented in this proposal exclude the fee.

⁴ 1 USD = 73.68 BTN (UN exchange rate for November 2018)

Output 3: Reduce the risk and impact of climate change induced landslides during extreme events that disrupt market access	3.1. Slope stabilization along key sections of roads, critical for market access, and related technical capacity and knowledge products to support climate resilient road planning and construction going forward	2,500,924	20,117,000	22,617,924	1,666,488,640
	3.2. Technical capacity building to support climate-risk informed and cost-effective slope infrastructure including stabilization, drainage and road construction & maintenance	282,450	2,241,000	2,523,450	185,927,796
Subtotal Output 3		2,783,374	22,358,000	25,141,374	1,852,416,436
Project Management		1,016,598	1,469,000	2,485,598	183,138,861
Total project financing		25,347,194	32,668,000	58,015,194	4,274,559,494

B.2. Project Financing Information

	Financial Instrument	Amount	Currency	Tenor	Pricing		
(a) Total project financing	(a) = (b) + (c)	58.015	<u>million USD</u> (\$)				
(b) GCF financing to recipient	(i) Senior Loans	.....	<u>Options</u>	() years	() %	
	(ii) Subordinated Loans	.....	<u>Options</u>	() years	() %	
	(iii) Equity	.....	<u>Options</u>		() % IRR	
	(iv) Guarantees	.....	<u>Options</u>			
	(v) Reimbursable grants *	.....	<u>Options</u>			
	(vi) Grants *	25.347	<u>million USD</u> (\$)				
* Please provide economic and financial justification in section F.1 for the concessionality that GCF is expected to provide, particularly in the case of grants. Please specify difference in tenor and price between GCF financing and that of accredited entities. Please note that the level of concessionality should correspond to the level of the project/programme's expected performance against the investment criteria indicated in section E .							
	Total requested (i+ii+iii+iv+v+vi)	25.347	<u>million USD</u> (\$)				
	Financial Instrument	Amount	Currency	Name of Institution	Tenor	Pricing	Seniority

(c) Co-financing to recipient	<u>Grant</u>	1.990	<u>million USD (\$)</u>	MoWHS	n/a	n/a	<u>n/a</u>
	<u>In Kind</u>	0.550	<u>million USD (\$)</u>	MoWHS			
	<u>Grant</u>	0.968	<u>million USD (\$)</u>	MoAF			
	<u>In Kind</u>	9.052	<u>million USD (\$)</u>	MoAF			
	<u>In Kind</u>	0.242	<u>million USD (\$)</u>	NCHM			
	<u>Grant</u>	19.866	<u>million USD (\$)</u>	GNHC			
Lead financing institution: N/A							
* Please provide a confirmation letter or a letter of commitment in section I issued by the co-financing institution.							
(d) Financial terms between GCF and AE (if applicable)	<p><i>In cases where the accredited entity (AE) deploys the GCF financing directly to the recipient, (i.e. the GCF financing passes directly from the GCF to the recipient through the AE) or if the AE is the recipient itself, in the proposed financial instrument and terms as described in part (b), this subsection can be skipped.</i></p> <p><i>If there is a financial arrangement between the GCF and the AE, which entails a financial instrument and/or financial terms separate from the ones described in part (b), please fill out the table below to specify the proposed instrument and terms between the GCF and the AE.</i></p>						
	Financial instrument	Amount	Currency	Tenor	Pricing		
	Grants	N/A	<u>million USD (\$)</u>	n/a	n/a		
<p><i>Please provide a justification for the difference in the financial instrument and/or terms between what is provided by the AE to the recipient and what is requested from the GCF to the AE.</i></p>							
B.3. Financial Markets Overview (if applicable)							
14. Not applicable.							

C.1. Strategic Context

Geographical context and climate change related vulnerabilities

15. The topography of Bhutan contributes to its vulnerability to climate change. The UNFCCC identifies countries with mountainous ecosystems as among the most vulnerable in Article 4.8, as well as its 2nd, 3rd, 4th and 5th Assessment Reports, which point to a number of vulnerabilities that mountainous countries face, including their size and limited resource base, vulnerability to existing weather events such as heavy monsoonal rainfall and dry-season drought. As a least developed country, resources to reduce vulnerability in Bhutan are limited.

16. Bhutan is predominantly made up of fragile mountain ecosystems with large areas of snow and glaciers. Only 7.8% of total land is arable and 2.93% is cultivated. Besides a few areas of open valley, agricultural land is generally located along steep geographic terrain. More than 31% of agricultural land is on slopes greater than 50% resulting in soil losses of 8.6 tons/ha from traditional farming practices that are not resilient to climate-related processes such as pronounced runoff during the monsoon season, particularly after long dry periods.

17. Data from weather stations in Bhutan show clear increases (positive trends) in mean and maximum temperatures, as well decreasing (negative trends) in average rainfall between 1996-2017 (particularly during the main monsoon period), trends which are indicated to have started earlier (since 1970) according to global data⁵. Whilst average annual rainfall has seen a decline, there have been statistically significant increases in both the length of the dry season and several indices measuring extremes of daily rainfall (see Annex II: Feasibility Study).

18. Climate risk-related challenges are expected to continue and worsen with climate change. Bhutan's Second National Communication (SNC) presents projections of systemic changes in future climate. Mean annual temperature is expected to increase by 0.8-1.0°C before 2039 and by 2.0-2.4°C before 2069. Rainfall is expected to increase slightly overall (~6%) for the 2010-2039 period with a change in seasonal distribution: a decrease in winter precipitation (~2%) and an increase of 4-8% during the monsoon period (opposite to currently observed changes). For the 2040-2069 period, an overall increase of precipitation (21-25%) is expected with generally more intense monsoon seasons. Downscaled projections from locally validated high resolution GCMs⁶, indicate that daily rainfall extremes are expected to also increase, passing critical thresholds more frequently in the future (see Annex II.A Report on the Analysis of Historical Climate Change and Climate Projection for Bhutan).

19. These observations and projections highlight the increased risk of occurrence and magnitude of flash floods and landslides, which on steep slopes cause damages and limit the functioning of open irrigation channels and roads. In the near term reduced rainfall and increasing temperatures will give rise to drier periods, particularly affecting smallholder farmers, by limiting water available for planting and land preparation. Decreases in observed rainfall, increasing temperatures and reported drying of water resources give rise to increased moisture stress and have a negative effect on crop yield and the amount of land used to produce crops. These climate impacts reduce food security, where under nutrition among women and children is already a challenge to socioeconomic development, particularly in rural areas. The nutritional status for Bhutan measured in terms of stunting prevalence, while reduced from 56% in 1988, remains high at 33.5% as at 2010. And anemia affects 54.8% of women and 80.6% of children across the country.

20. Livelihood difficulties in agriculture caused by climate challenges are already resulting in growing trends of rural-urban migration of farmers, particularly men in search of off-farm employment opportunities – a trend which further exacerbates the declining crop yield in Bhutan. Studies indicate that yield per hectare has been declining at a compounded annual rate of 1.84% over the last 27 years⁷. While the overall poverty rate in Bhutan has improved, poverty continues to be a rural phenomenon. With agriculture constituting approximately 58% of livelihoods, mostly in subsistence farming with low returns⁸, the risks of projected climate change on the sector and on the country's development goals are high. Given that the average size of each smallholder farm is less than 2.5ha, household investment in land development is low. Faced with the increasing possibility of crop failure, many farmers opt to leave their land fallow, leaving the farm to pursue other opportunities in urban areas. Of the total cultivable land of 94,903ha, 26% of the agricultural land is left fallow (24,975ha)⁹.

⁵ Data from the Climate Research Unit (CRU)

⁶ NASA Earth Exchange Global Daily Downscaled Projections (NEX-GDDP)

⁷ 11th Five Year Plan 2013-2018 (GNHC, 2013)

⁸ 11th Five Year Plan 2013-2018 (GNHC, 2013)

⁹ RNR Sector 11th FYP (MoAF, 2014)

In addition to impacts on overall agricultural production, this also affects soil composition and nutrients, making restarting agricultural production more difficult.

21. *Relevant RGoB climate change strategies:* Recognizing these challenges, the objective of the Royal Government of Bhutan's (RGoB's) 11th Five Year Plan (FYP) was Self-reliance and Inclusive Green Socio-Economic Development, highlighting the need to support the agriculture sector's full potential by addressing key challenges, including adapting to the impacts climate change and addressing the climate impacts to market access. Similarly, the 12th FYP includes mainstreaming climate change into agriculture, irrigation and road access planning, stressing water and food security and a healthy eco-system, and carbon neutral & climate resilient development, towards the aim of maintaining a harmonious and sustainable society. And Bhutan's nationally determined contribution (NDC) highlights water security, climate-resilient agriculture and climate-proofing key infrastructure, such as irrigation and roads, as priority adaptation needs.

C.2. Project / Programme Objective against Baseline

Climate vulnerability baseline

22. Climate projections for Bhutan indicate increases in temperature and monsoonal rainfall, as well as extreme temperatures and increasing frequencies of extreme rainfall. Changes in the seasonal distribution are also projected, with a decrease in winter and an increase in monsoon rainfall. Increases in temperature are furthermore expected to be greater at higher altitudes. Some of these changes are apparent in weather station observations (1996-2018), including increases in temperatures and associated extremes, decreases in winter rainfall, and weak trends for increasing rainfall extremes in the central and mid-altitude western regions. There is, however, evidence for decreasing rainfall during the main monsoonal rainfall season, as well as for reductions in effective rainfall during winter, spring, and summer – see Annex II: Feasibility Study). These changes are having destructive impacts on the country's agriculture sector, including on the necessary infrastructure to support it. Current precipitation changes are further increasing pressure on limited water resources, which run dry at times. The inability of catchment areas to retain excess water during extreme rainfall events during the monsoon season has resulted in runoff and accelerated soil erosion, affecting the availability and quality of water, as well as blocking or damaging irrigation schemes on which farmers depend. Declines in crop yield and soil fertility are often consequences of erosion of top soil and runoff. Flooding and landslides have, furthermore, caused extensive damage to the road network disrupting critical market access for farming livelihoods, particularly in remote areas.

Key climate change risks and hazards

23. **Temperature change:** Temperatures in Bhutan are rising and expected to continue. Observations show that annual average temperatures have been increasing between 1996 and 2018. This is reflected in increases in mean and maximum daily temperatures, as well as decreases in minimum daily temperatures (see Annex II: Feasibility Study). Downscaled future projections from a validated set of 6 NASA NEX-GDDP models, consistent with projections in the SNC, project higher temperature increases in winter, similar to those for Southeast Asia from ensemble model simulations presented in both the Fourth (AR4) and Fifth (FAR) Assessment Report of the IPCC. Under RCP4.5 an increase of 0.8°C – 2.8°C during 2021-2100 is simulated, whereas under RCP8.5 an increase of between 0.8°C to more than 3.2°C is simulated towards the end of the century. All models show a progressive and steady increase in air temperature from 1980 to 2100, with concomitant increases in temperature extremes, as seen so far in observations.

24. Regional temperature projections indicate that average annual temperatures will rise by more than 2°C in South Asia by the mid-21st century and exceed 3°C by the late-21st century under a high-emissions scenario, compared to the 20th century, with the highest daily maximum temperatures potentially increasing by 4-5°C. IPCC's 5th Assessment states that over the mid-term (2046–2065), an increase of 2-4°C is projected for the south Asian region with the warmest temperatures concentrated in amongst others Bhutan. Mean annual temperature in Bhutan is expected to increase by 0.8-1.0°C before 2039 and by 2.0-2.4°C before 2069.

25. **Rainfall change:** Annual rainfall over Bhutan is highly variable, with nearly all 17 class A stations demonstrating an average downward trend in both winter and monsoonal rainfall between 1996 and 2018 (see Annex II: Feasibility Study). Total rainfall at stations is often dependent on their altitude. CRU data confirm this decline in rainfall over the longer-term (1970-2014). This reduction in rainfall is further reflected in negative trends (reductions) in snow areas between 2002-2010 suggesting that similar processes may be responsible for reductions at higher altitudes.

26. Negative trends in rainfall and effective rainfall are prevalent during winter, spring and summer at mid to high altitudes, which importantly are the source regions of the main rivers and streams. These trends are critical in terms of water

resource availability and suggest that the observed drying of water resources is linked to recent changes in climate. Crucially rainfall, as the basis for water resources for agriculture during the winter to summer period, is becoming scarcer.

27. Adjusted rainfall (rainfall minus potential evapotranspiration) was calculated from station data for key areas relevant for agriculture. The trends clearly demonstrate that the evaporative demand of the atmosphere has been significantly increasing over the last 23 years, decreasing the amount of rainfall available for preparation activities during pre-monsoon. It will likely no longer be feasible to plant rice without supplemental irrigation during December-February (where it was feasible before at Zhemgang) and supplemental irrigation is likely to be needed at all stations during March-May, especially given that 250 mm is needed for land preparation of pre-monsoon paddys¹⁰. These climatic changes during the dry season are expected to continue and are consistent with climate change projections, reinforcing that it will become increasingly difficult for farmers to prepare land and nurseries for rice cultivation without suitable adaptation measures. (see Annex II: Feasibility Study, and related analysis Annex II.B.)

28. In the future mean annual precipitation in Bhutan is projected to increase by ~6% in the 2010-2039 period, with an increasing amount of rainfall during the monsoon season. The upward trend and projected increase for monsoon rainfall are significantly more pronounced when compared to winter and annual rainfall trends, indicating that the majority of the increased precipitation will occur during the monsoon season. On a seasonal basis, a decrease in winter precipitation (~2%) and increase between 4-8% in the monsoon season is expected for the period 2010-2039. For the 2040-2069 period, projections indicate an increase of annual precipitation of ~21-25%, but with higher increases in the monsoon season compared to the winter season.¹¹ It is important to note however that there is significant variability across Bhutan, both in observed climate and expected changes. Changes in rainfall will be different for the southern foothills, inner and higher Himalayas; already high rainfall in the foothills will increase more than lower rainfall areas in the higher Himalayas.

29. High resolution GCMs (from the NASA NEX-GDDP dataset), whose climatologies NCHM have validated for Bhutan, further indicate that daily rainfall extremes are expected to also increase, passing critical thresholds more frequently in the future (see Annex II.A Report on the Analysis of Historical Climate and Climate Projection for Bhutan). This is consistent with the observed positive trends in indices of daily rainfall extremes seen in weather station data in the central and mid-altitude western regions, but not with observed decreases in the east (see Annex II: Feasibility Study).

30. **Changes in climate-related hazards:** The above projections underscore the risk of occurrence and magnitude of extreme events such as flash floods and landslides. Increases in monsoon rainfall will lead to the saturation of soils more frequently and potentially on a larger scale. Similarly, increases in rainfall intensity will increase the potential for flash floods, landslides and erosion of soils. The latter is already evident in central and mid-altitude western areas, with significant impacts on vulnerable communities, including high recovery costs, straining limited financial resources and placing at risk fragile development gains.

31. Not all disasters are recorded and there is no systematic database of damages and losses used to monitor trends in these events (and associated characteristics) over time. However, as a step towards recording and applying disaster data in planning, the Compendium of Climate and Hydrological Extremes in Bhutan was recently developed with support from World Bank. The purpose of the document is to inform and improve the understanding of flood risk analysis and flood hazard mapping in Bhutan through documentary data from archival of Kuensel reports from 1968 to 2017¹². Please see Annex II for a list of these events.

Key impacts of temperature changes, rainfall variability and extreme events on smallholder agricultural livelihoods

32. Observed changes are already affecting water availability and agricultural productivity for smallholders. Increasing temperatures and declining rainfall and longer dry periods contribute to crop failures and/or decreased yields, as well as more land being left fallow. Only 18% of the arable area is under assured irrigation and the remaining is dependent on monsoon rains, with total crop production therefore almost entirely dependent on rainfall variability. Projected changes in rainfall (reductions in winter rainfall and increases in extreme and seasonal rainfall during the monsoon), as well as observed decreases in seasonal rainfall, are increasing pressure on water availability both through water shortages and damages to irrigation systems. In 2013, 16,142ha of arable dry land was left fallow out of estimated 55,007ha of operational dry lands¹³. In 2016, a delayed monsoon affected over 800ha of paddy fields and paddy seedlings were

¹⁰ <https://www.r-project.org/>

¹¹ Bhutan Second National Communication (SNC), 2011

¹² National Centre for Hydrology and Meteorology (2016) Compendium of Climate and Hydrological Extremes in Bhutan since 1968 from Kuensel. ISBN No. 978 - 99936-721-7-3.

¹³ Annual statistics, DOA 2013

mostly wiped out. In 2007 Gray Leaf Spot disease in maize caused a maize harvest loss of over 50% for farmers above 1800m, and in 1996 farmers in high altitude areas lost between 80-90% of rice to rice blast epidemic. These diseases were recorded for the first time in high altitude areas, which is attributed to unprecedented favorable conditions triggered by increases in seasonal temperatures and humidity.

33. The impact of extreme events reported in the SNC include the following - In 2004, flash floods in 6 eastern dzongkhags killed 9 people, washed away 29 houses, damaged 107 houses, destroyed 268 ha of wet and dry farm loads and damaged 350 metric tonnes of maize, 126 metric tonnes of paddy, and 2000 citrus trees; In May 2009, cyclone Aila caused record breaking rainfall, with all major rivers more than doubling in size, the worst floods in over 40 years, numerous landslides and significant damage to agriculture, roads, bridges, schools, hydro projects, and other infrastructure. In 2010, landslides and flash floods damaged more than 800ha of agricultural land affecting 4165 households, damaged farm roads and irrigation channels affecting 529 households, and washed away pastureland killing over a thousand livestock¹⁴. Kuensel reports from 1968 to 2017, also note: in 2013 a flash flood damaged paddy fields, irrigation channels, farm roads, drinking water supply schemes and crops three bridges and roads; in 2014 three suspension bridges and two irrigation channels were washed away as well as approximately 250 ha of paddy field; in 2015 a flash flood washed away six wooden bridges (bazams), two drinking water pipes connecting Bajo town that was washed away and around 300 cordyceps collectors were stranded; and in 2016 a flash flood washed away more than 24 ha of cultivated paddy land and 500m long wall belonging to 30 households, almost a ha of cardamom field eroded, more than 100 meters of the Gelephu-Zhemgang highway near Chisopani bridge was washed away and more than 100m of road foundation at Jamcholing was washed away leaving people cut off from rest of the dzongkhags. Please see Annex II for the full list of recent impacts of climate extremes. Increased incidence of intense rainfall as observed in Bhutan, as well as the broader Hindu Kush-Himalaya region, are noted to cause flash floods and landslides in the eastern Himalaya and hilly regions.

Impact on water resources and ecosystems

34. Extended dry periods (which have been getting longer during the dry season – see Annex II), have impacted the effectiveness of the irrigation network in Bhutan. With less than 18%¹⁵ of cultivated agricultural land irrigated, agriculture is predominantly rain-fed and dependent on the changing monsoonal rain patterns. Water shortages have been more pronounced during the main cropping season, which coincides with the pre-monsoon season. During dry periods, drought has impacted cropland, as well as the small streams on which small scale irrigation depends, resulting in inadequate on-farm water supply, conflicts over water sharing, low labor productivity (e.g. due to time spent guarding against water theft) and low crop yields. In times of excess rainfall, flash floods and landslides block or damage irrigation schemes, disrupting flow of water to farmers through seepage-induced water loss and water conveyance losses.

35. Rainfall variability has also raised concerns for the overall health of the watersheds and of wetlands due to increased pressure on water resources during dry periods. Declines in water sources have been observed, and some efforts to remedy this trend have been ill-informed, accelerating the trend (e.g. tree plantation near wetlands). Currently 17.3% of the prime wetlands (Chhuzing) are left fallow mostly due to lack of sufficient irrigation water due to the extended dry periods (with labor shortage and human-wildlife conflict (HWC) as other key causes of the following). Wetlands are integral ecosystems within a watershed that link to the sustainable functioning of the entire watershed. In Bhutan, wetlands are the source of fresh water for domestic use, agriculture and sustainable economic development. Wetlands provide fundamental ecosystem services, such as water regulation, filtering and purification. If the wetland areas within a watershed continue to be impacted due to climate change, the overall health of the watershed can be disrupted – reducing the quality and availability of water.

Impact on soil and land resources

36. Given the steep terrain of Bhutan, the impacts of climate change on landscape conditions will be considerable. More than 31% of agriculture land is on slopes greater than 50% resulting in measured soil losses of 8.6 tons/ha from traditional farming practices. Increased precipitation during the monsoon season and resulting flooding will accelerate erosion. Factors that affect soil erosion include precipitation, temperature, and vegetation. Where rainfall amounts increase, erosion and runoff will also increase. Top soil lost due to soil erosion lead to a rapid decrease in nutrients and organic matter and therefore reduces agricultural yields, reduces water retention capacity, soil aggregate stability and workability of the soil because of increasing stoniness¹⁶. Increasing intensity of monsoon rainfall is also expected to cause greater slope instability, soil erosion and soil fertility loss, affecting the quality of soil as well as the quantity and quality of water

¹⁴ 2011 & Livestock disaster 2009-2010, DoL, MoAF

¹⁵ Bhutan water security paper, 2011

¹⁶ Measurement and analysis of soil erosion plot data for 2009 (SLMP, 2010)

and reliability of water for irrigation (due to damages to open irrigation channels), contributing to declines in agricultural productivity.

Impact on crops and agriculture practices

37. Simulations of crop suitability for a range of crops suggest that the amount of land that will be suitable for crop production will increase for a variety of crops. For all crops the extra land suitable for cultivation is at higher altitudes than at present, with some land at lower altitudes becoming less suitable¹⁷. This result is confirmed for rice in a separate study which estimated the increase in land suitability as approximately 10%. The ability to take advantage of this extra land therefore depends on having access to cleared and cultivated land at higher altitudes, which may not be possible in some cases due to access, tenure and protected areas. Given the observed decreases in winter, spring and summer rainfall, the projected decreases in winter rainfall, and the projected changes in seasonal snowmelt which provides much of the water for irrigation during spring (already glaciers are noted to be retreating rapidly and will continue to do so¹⁸), it is expected that the availability of irrigation water will be reduced due to climate change (particularly under current conditions where monsoonal rainfall has been decreasing). In particular, for smallholder farmers to adapt, this will require climate-informed crop choice, and adjustments to the crop calendar, including for instance:

- a delay in the transplanting of paddy seedlings and hence affecting overall productivity;
- spring maize may not be feasible (particularly in lowland areas (Sarpang, Samtse, Lower Zhemgang));
- the production of winter/spring vegetables may not be feasible;
- in the temperate and warm temperate AEZ, where potatoes are the main income crop, overall germination will be affected due to water stress due to reduced rainfall in winter, as well as food crops such as maize that is cultivated as main summer crops.

Infrastructure vulnerability

38. The isolated rural settlements of Bhutan, due to difficult geographical terrain, are an important characteristic feature of the farming environment. Reliable roads for market access are therefore critical. As rural roads in Bhutan are largely unpaved, they are not resilient to extreme rainfall during intense monsoon seasons or extreme events exacerbated by climate change. Rural roads often get washed away, buried, or become impassable, depending on climate conditions as illustrated by the impact of the 2016 monsoon on the rural road network¹⁹. A total of 75 farm roads were damaged together with 5 gewog connectivity roads and 3 bridges in 13 dzongkhags across the nation. Damage to the roads was mainly inflicted by landslides and intense rainfall damaging the causeway and leading to blockades of small road sections to complete cut-off of some farm roads for extensive periods, severely impacting smallholder market access. The effect of the heavy rains of the monsoon season on roads have prompted annual assessments by MoWHS to document road condition and calculate costs of needed restoration. These assessments show an upward trend in damage to roads, cumulatively estimated at over USD 24 million for 2008-2016 – both due to growing number of roads that are susceptible to such damage, as well as the increased intensity and impact of the monsoon season.

Baseline efforts and investments

39. To respond to the impacts of climate change on its most vulnerable sector, the RGoB has made significant investments in strengthening water resources and ecosystems for enhancing agricultural productivity. Expansion of the irrigation network has been prioritized in the 11th FYP, as a means to achieve national food self-sufficiency goals. Planning, construction and maintenance of the irrigation channels is largely decentralized, following the Annual Grant System (AGS) established under the 10th FYP, which gives financial autonomy in planning and implementation to local governments. The Taklai irrigation system is the largest irrigation system in the country with gross command area of over

¹⁷ CIAT; World Bank. 2017. Climate-Smart Agriculture in Bhutan. CSA Country Profiles for Asia Series. International Center for Tropical Agriculture (CIAT); The World Bank. Washington, D.C. 26 p.

Bajracharya SR, Maharjan SB, Shrestha F. The status and decadal change of glaciers in Bhutan from the 1980s to 2010 based on satellite data. *Ann Glaciol.* 2017;55(66):159–66. 20. Bates B, Kundzewicz ZW, Wu S, Palutikof J. Climate change and water. Technical paper of the Intergovernmental Panel on Climate Change. Geneva: IPCC Secretariat; 2008.

Durand Y, Giraud G, Laternser M, Etchevers P, Mérindol L, Lesaffre B. Reanalysis of 47 years of climate in the French alps (1958–2005): climatology and trends for snow cover. *J Appl Meteorol Climatol.* 2009;48(12):2487–512. <https://doi.org/10.1175/2009JAMC1810.1>.

Beniston M, Farinotti D, Stoffel M, Andreassen LM, Coppola E, Eckert N, et al. The European mountain cryosphere: a review of its current state, trends, and future challenges. *The Cryosphere.* 2018;12(2):759–94. <https://doi.org/10.5194/tc-12-759-2018>.

Rupper S, Schaefer JM, Burgener LK, Koenig LS, Tsering K, Cook ER. Sensitivity and response of Bhutanese glaciers to atmospheric warming. *Geophys Res Lett.* 2012. <https://doi.org/10.1029/2012GL053010>.

¹⁹ Monsoon Damage Report, MoAF, 2016

approximately 1200ha of paddy fields and was constructed in 1980s. The irrigation channel has been affected by recurrent floods, leading to costly and recurrent maintenance. In 1998, 2004 and 2010 severe floods resulted in damage at the intake section and loss of land. The 2013 rehabilitation effort of part of the Taklai irrigation system successfully converted fallow land due to water shortage to productive agriculture land with an estimated increase of 20%. As per its mandate, the Department of Agriculture (DoA) under MoAF, recently evaluated the functionality of irrigation schemes in Bhutan. The resulting Report on National Irrigation Database and Canal Alignment Mapping identified more than 1270 large networks of open gravity-fed irrigation systems. Of the 1270 schemes, 900 were surveyed and show that only 372 schemes have abundance of water, with 272 schemes getting adequate irrigation water. 27% of the total schemes suffer from either “inadequate” or “acute shortage” of irrigation water.

40. The RGoB has also made targeted investments in sustainable land management (SLM) to reduce soil erosion - to increase crop diversity and fodder availability, as well as to enhance resilience of irrigation networks (e.g. irrigation channel renovation works are often needed because of persistent slope instability issues like deep-seated landslides, mudflow areas, rock fall areas and flooding of intake areas). The USD 12 million *Sustainable Land Management Project* (SLMP) (2006-2013), funded by the Global Environment Facility (GEF), Danida and RGoB, reduced soil loss by half in intervention areas. The project included SLM measures that have both a beneficial impact on the land as well as a positive socio-economic impact on livelihoods (e.g. using fodder trees and grasses along sloping farmland as hedges – providing animal feed and minimizing sheet erosions; and citrus orchard establishment – turning previous fallow or former tseri land into productive land). Implemented by the National Soil Services Centre (NSSC) of the DoA under MoAF, the main objective of SLMP was to strengthen institutional and community capacity for anticipating and managing land degradation in Bhutan. See the SLMP Key Lessons Report for additional details, Annex VIII.

41. As a landlocked country, the RGoB recognizes that a road network is critical for market access, transit, reducing the high cost of transportation normally associated with mountainous countries, as well as to enable delivery of socio-economic services particularly to remote communities. Further, value chain analyses for climate resilient agriculture products (Annex XIII) indicate market access as a key constraint, due to interruptions related to impassable roads blocked by landslides. Bhutan’s rural road network is limited in terms of connectivity and coverage, with 53% of district roads and 86% of feeder roads being considered in poor condition and with 40% of the population having little or no road access. Approximately USD87 million annually is invested in roads, with spending prioritized for investments that maximize the road network coverage in remote areas or improve safety in particularly dangerous sections of road. Road access has improved significantly since 2005 when only 47% of Bhutanese rural households were within a 30-minute walking distance from the nearest feeder road (i.e. secondary roads connecting to major roads). Recently published data shows that 79% of households nationally live within an hour of such a road. In the 8 target Dzongkhags, 5% of households are more than 6 hours away from a road, 4% between 4 and 6 hours, 14% between one and three hours, and 77% less than one hour. 6,765 kms of farm roads (which connect villages to Gewog roads) have been constructed benefitting 76,484 households (351,826 people), but are unpaved and generally lacking critical climate resilient features such as drainage and adequate slope stabilization, corresponding to the expected magnitude of likely climate induced risks, at critical points. The UNDP/GEF/LDCF *Enhancing Sustainability and Climate Resilience of Forest and Agriculture Landscape and Community Livelihoods* project is supporting development of enhanced guidelines in the design and construction of climate-resilient road infrastructure to reduce vulnerability to climate risks.

42. Given the mounting costs of climate impacts and the increasing risks to vulnerable groups, the RGoB is committed 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. Through the UNDP/LDCF *Addressing the Risks of Climate-induced Disasters through Enhanced National and Local Capacity for Effective Actions* (2014-2018), enabling the collection of localized rainfall and temperature patterns and linking to the stability of different geological conditions, while also strengthening the National Weather and Flood Forecasting and Warning Center capacity to analyze, manage and disseminate climate information in a timely manner.

Gaps related to the baseline efforts

43. Despite the considerable investments made in water resource management, infrastructure development and soil and land management, there has been limited explicit consideration of future climate change impacts in these investments. Climate change has also served to undermine several of these investments and jeopardize many of the gains made through past interventions. For instance, RGoB’s past investment in irrigation systems and road infrastructure has not been climate resilient, causing irrigation system susceptibility to flood damage from heavy monsoon rain and lack of road access road during monsoon from landslides, erosion and flooding, while the SLMP that concluded in 2013 requires

scaling up to ensure future climate risks are accounted for. The susceptibility to flood damage of the RGoB's investment in irrigation schemes underscores that higher upfront investment in sound hydrological and geological-geotechnical investigations in light of climate risks would limit the high recurrent maintenance costs and rehabilitation needs – ensuring continuity of water access to users. Most of these irrigation schemes were constructed many years ago as earthen canals, with low technology efficiency and little resilience to extreme events. This leads to blockages, water loss through seepage, and water conveyance loss. Without adequate and/or reliable water sources, and lacking resilience to climate impacts, many of the irrigation channels constructed in the past have not fully benefited farmers.

44. Similarly, while the road network in Bhutan has increased considerably, roads were not constructed to be climate resilient, as this would have required significant additional upfront investment. The lack of climate resilient road infrastructure due to the high upfront investment has resulted in the regular disruption of road access during the monsoon, and this is expected to worsen with increasing incidence of erosion, landslides and flash floods in Bhutan with climate change. Additionally, the expansion of the hydro-met network will require support once data is in place, to analyze, tailor and package climate data to inform climate-resilient agriculture planning including crop calendar and crop choice. Lacking access to tailored climate information to inform their crop calendar and crop choice, many farmers follow the traditional practice of following the lunar-based calendar for planting and harvesting their crops, leaving them vulnerable to reduced crop yields and livestock losses related to climate impacts.

45. The RGoB's preferred long term solution for addressing the vulnerability of the population who are engaged smallholder agricultural households is to shift from costly reactive recovery based solutions in the face of extreme climate events to strengthening the resilience of households based on climate-informed planning and investments and risk reduction measures that are efficient and effective.

Key Barriers

Limited awareness, data and knowledge for climate risk informed agricultural planning and implementation

46. In order to have climate risk informed agricultural planning and implementation, it is necessary to overcome the current obstacles which include the unavailability of localized climate data; the need for greater technical and analytical capacity at hydro-met, lack of capacity of agriculture and extension agencies to provide reliable and timely climate information and apply it to crop and livestock planning through tailored agricultural advisories; and raising the capacity of farmers and extension workers to use climate information to improve agricultural practices and increase their climate resiliency.

47. Through investment in the hydromet network and strengthening of institutional capacity for data collection and analyses (UNDP/LDCF project), a critical foundation has been laid for climate informed planning. However, limited technical capacities across the hydro-met, agriculture, and extension agencies hinder the generation and use of forecasting and target advisories to support farmers with appropriate local actions. Weak institutional coordination across hydro-met and agricultural agencies also hinder collection and analysis of seasonal information for use in agricultural planning. Farmers themselves lack the capacity to apply the information to support risk-informed agricultural production. Tailoring of climate data for agriculture planning is needed, coupled with support to farmers on practices that can strengthen their resilience to the impacts of climate change. Data to assess the impacts of climate change on agriculture is also needed. Agriculture data is routinely collected by MoAF, both through biannual estimates based on sample size, as well as through ad hoc assessments following extreme events. Data is collected by extension officers posted in Gewogs using standard crop loss assessment forms. While a trend is still evident that losses are increasing over time due to extreme events and other impacts related to climate change, anomalies in the data highlight the need to improve collection methodologies for consistency. For instance, some criteria are decided based on priorities and not necessarily assessed consistently over time.

48. Furthermore, most agriculture practicing households remain heavily dependent on rainfed practices, and lack the necessary technical knowledge to increase the climate resiliency of their agricultural practices. This includes applying climate information to decisions related to the crop choice and crop calendar. Farmers in Bhutan often rely on auspicious dates, though these traditional approaches may not be consistent with changing seasonal patterns. Similarly, there is little awareness of crop diversification and climate resilient crop varieties, and a lack of availability of climate resilient seeds as rural areas do not have the necessary distribution systems to diversify away from traditional crops.

49. Local communities also lack the capacity to produce and distribute their own seeds, particularly varieties that are more climate resilient and less commonly available in markets. Beyond this, the capital required to diversify and introduce climate resilient crop varieties is also limited among the vulnerable smallholders. Other deterrents to deploying climate

resilient agricultural practices include insufficient technical knowledge on soil vulnerability, climate resilient cultivation technology, and organic farming practices. There is little awareness on organic practices reducing the need for herbicides and pesticides, with benefits to the nutrient level in the soil (as well as resulting in higher carbon sequestration), and on alternative cultivation practices including aeroponic, hydroponic and vertical gardening that could avert landslide risk related to farming on steep slopes. Finally, farmers lack the awareness of how climate risks impact across the value chains and markets for climate resilient crops.

Weak institutional and community capacities for climate resilient water and soil management

50. For climate resilient water management, it is crucial to have adequate water resource infrastructure and planning, with key barriers to this being technical and financial limitations. As per the Report on the National Irrigation Database and Canal Alignment Mapping, the limited technical capacity of engineers has led to poorly designed and constructed irrigation structures without proper planning and supervision, resulting in poor water management as this infrastructure is left vulnerable to climate risks. Support by the DoA in capacity building for scheme management was considered inadequate and hence many WUAs were not well organized resulting in poor management of irrigation schemes and early scheme failure. In addition, the lack of knowledge in implementing irrigation technologies and water harvesting techniques such as drip irrigation, sprinkler irrigation and the use of earthen check dams, ponds and storage tanks present further obstacles.

51. Insufficient technical and financial capacity in areas related to key wetlands and watersheds have also hindered climate resilient water management. The local authorities and the farmers lack the capacity and information to make informed decisions on water budgets and water resource management based on climate change impacts, impacting irrigation schemes and water harvesting. There is weak knowledge on how to account for climate risks in flood protection schemes, groundwater recharge schemes, and stream flow maintenance approaches. Moreover, there is a general lack of awareness regarding the importance of the wetlands for climate change risk management, given its central role in water resource management by providing water access and ensuring water quality. In addition, there is inadequate coordination in water-sharing arrangements between communities, and monitoring of water sources to ensure sustainable supply of water quantity and quality in light of evolving climate change risks.

52. In terms of soil and land management, increasing rainfall variation threatens agricultural land productivity through soil erosion and landslides. Although the implementation of SLM practices have been proven to be successful in the past, a lack of additional financing is impeding efforts to scale these practices up in order to mitigate the undermining effects of climate induced soil erosion and landslides on agricultural land. Barriers to climate resilient soil management also extend to the inadequate training on SLMP practices for communities and DoA extension officers, and the lack of regular monitoring of soil conditions and soil stability to support climate risk-informed policies and practices.

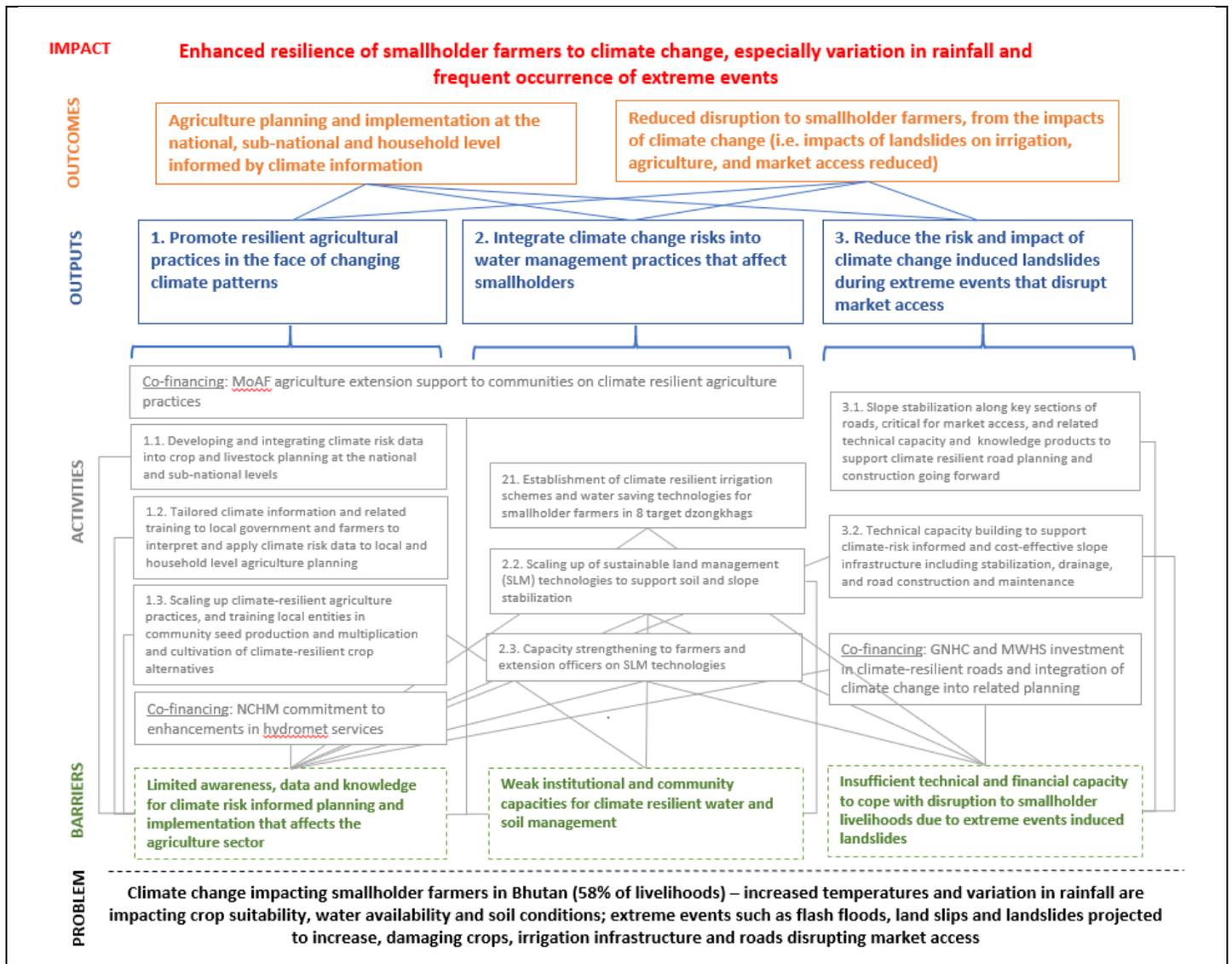
Insufficient technical and financial capacity to cope with disruption to smallholder livelihoods due to extreme events-induced landslides

53. A major climate risk for smallholders is climate-induced landslides during extreme events, which has a significant detrimental effect on agricultural livelihoods and incomes by blocking irrigation canals interrupting water flow to agriculture land and damaging roads disrupting market access. As a mountainous country, Bhutan is particularly susceptible to landslide occurrences during periods of heavy rainfall which affects the irrigation and road network, impeding agricultural production and access to markets. Most the irrigation schemes in Bhutan were constructed as earthen canals with low efficiency and little resilience to extreme events – leading to blockages, water loss through seepage and water conveyance loss. The Report on National Irrigation Database and Canal Alignment Mapping found that one of the reasons for many defunct earthen open canal irrigation schemes was damage or being washed away completely by landslides. Limited financial capacity and lack of technical knowledge in redesigning irrigation structures, through measures such as lining and concreting of present earthen irrigation canal sections, mitigation of slope instability processes and slope failure affecting canal sections and use of high-density polyethylene pipes to enhance functionality, are key barriers in achieving greater climate resiliency. Similarly, reported damages to roads following the monsoon season has increased. Although the road network has expanded, road construction has not been done in a climate resilient manner given the financial barrier of higher investment costs needed for this - the Environmentally Friendly Road Construction (EFRC) in Bhutan report estimates that roads meeting EFRC criteria cost 15-25% more than conventional roads during the construction phase. Field visits also found many roads built with insufficient financial resources, resulting in sub-standard or incomplete roads. Moreover, limited technical capacity has led to the improper construction of farm roads and insufficient monitoring of road projects resulting in high maintenance costs and impact on the environment.

54. Inadequate slope stabilization design due to weak technical capacities to account for climate risks in areas surrounding road networks are an additional obstacle contributing to the disruption of smallholder productivity and market access, as slope stabilization reduces the likelihood of landslides. The lack of technical capacity extends to climate risk informed slope assessment, and the application of climate information and potential impacts to slopes to inform planning and construction processes for irrigation and roads work. Apart from technical barriers, given that baseline investments in irrigation and roads are increasingly damaged or washed away in monsoonal rains, RGoB is not able to find extra funding to invest in climate-proofing and stabilizing slopes which represents an additional cost of climate change. Additionally, there are gaps in the collection and storage of climate change related damage, which hinders the formulation of informed policy on climate risk management.

Project objective, outcomes and impacts

55. The key problem this project proposes to address is the threat to smallholder livelihoods from the impacts climate change, particularly in rainfall variability and the occurrence of extreme events. The objective of the proposed project is **to enhance the resilience of smallholder farms to climate change, especially variation in rainfall and frequent occurrence of extreme events**. Complementing critical co-financing by the RGoB, GCF resources will be used to address gaps and barriers inhibiting climate resilience in the agriculture sector. Through a) promotion of resilient agriculture practices in the face of changing climate patterns, b) integration of climate change risks into water and land management practices that affect smallholders and c) reduction of risk and impact of climate change induced landslides, the project will support a paradigm shift away from a responsive approach to the increasing impacts of climate change on agriculture and towards enhanced resilience of smallholder farmers, as well as strengthened capacity of the institutions that support them. In combination, the project will support integration of climate change into agriculture planning at the national, sub-national and household level, while also reducing disruption to smallholder farmers caused by climate change impacts. The project is underpinned by the Theory of Change (TOC) depicted below:



56. Firstly, to address the barriers related to improving the awareness, data and knowledge for climate resilient agricultural practices, the project will promote the tailoring of climate information to support crop and livestock planning. Building on the UNDP/LDCF *Addressing the Risks of Climate-induced Disasters through Enhanced National and Local Capacity for Effective Actions* project, this will involve institutional capacity building on modeling, forecasting and effectively disseminating climate information to subnational levels to guide planning as well as the tailoring of climate information for agricultural advisories to meet smallholder needs for climate-informed decision-making related to agriculture practices. To ensure smallholder farmers get the support they need to apply climate information, training will be provided to extension officers as well as to communities. Given the escalating costs of response to climate impacts, support will be provided to improve data collection methodologies related to climate change impacts on agriculture productivity – to ensure that climate risks are accurately recorded and quantified to inform planning that is both climate-resilient and cost-efficient.

57. Another critical intervention in improving climate resilient agricultural practices involves supporting diversified and resilient smallholder productivity. This will include capacity building and training on crop diversification, and investments in community seed production and distribution to scale up diversified and resilient crop production among smallholder communities. Additionally, investments in climate-resilient practices involving alternative cultivation techniques, organic farming, and integrated pest management will also be made to support smallholders. The project will ensure training is delivered to farmers to build awareness on value chains and build capacity on agricultural marketing to promote market linkages.

58. Secondly, to address the barriers related to institutional and community capacities in water and soil management, the project will seek to scale up climate resilient practices to support sustainable water management and soil stability, and to improve smallholder agricultural productivity. A key intervention will involve water management, through improved information on climate impacts to water resources, capacity building on integrating climate resilient practices in water management and monitoring. For improving soil management, the project will scale up existing SLM practices and technologies that have been proven to enhance agricultural land resilience against soil erosion and landslides caused by rainfall variation. This will involve identifying particular SLM interventions to protect against erosion and landslides, technical assistance and training to extension officers and communities to support implementation of SLM practices, investment in SLM using bio-engineering technology in specific areas, and regular soil monitoring to inform planning and policies on soil management. Linked to both the a) weak institutional and community capacities in water and soil management and b) insufficient technical and financial capacity to cope with disruption to smallholder livelihoods due to extreme events-induced landslides barriers, the project will establish climate resilient water management infrastructure and technology through irrigation systems, dams and storage tanks are further important interventions, as well as building up technical capacity through training on climate resilient water infrastructure construction and maintenance.

59. Finally, to reduce the impact of climate-induced landslides on smallholder market access, the project will design and implement slope stabilization interventions across key sections of roads that are crucial for market access, complementing the RGoB's investment in climate resilient roads. In addition to the implementation of slope stabilization, the project will support technical training on slope stabilization studies, design, cost assessment and cost-benefit analysis. To support climate-resilient planning, the project will also review and enhance road damage collection and reporting methodology, and deliver training on post-monsoon road assessment to improve repair cost estimate capacity.

60. An integrated approach is critical to address the complex nature of the climate challenges in Bhutan's most vulnerable sector, particularly given the mountainous landscape. Adaptation support is needed to complement government investment, in order to initiate the paradigm shift from costly reactive measures to more cost-efficient climate-resilient development.

C.3. Project / Programme Description

61. Strengthening the resilience of the agriculture sector and of vulnerable farmers is fundamental to meeting the RGoB's aspirations on climate resilient, low carbon development. In light of the specific climate change challenge confronting smallholders in vulnerable regions in Bhutan, a priority for the RGoB, the proposed project seeks to:

- **Promote resilient agricultural practices in the face of changing climate patterns**
- **Integrate climate change risks into water and land management practices that affect smallholders**
- **Reduce the risk and impact of climate change induced landslides during extreme events that disrupt market access**

Below is a table summarizing the expected changes in climate and corresponding impacts, mapped to project interventions.

Expected change in climate characteristic	Corresponding change in climate hazard	Impact on agriculture	Project intervention
<p>Increase in temperature</p> <p>Decreases in average rainfall during the dry season (and currently during the monsoon season)</p>	<p>Changes in suitability (growing conditions). Increases in heat stress</p> <p>Increased evaporation and reduced water availability from rain fed sources</p>	<p>Changes in suitability of crops</p> <p>Reduced availability of water for irrigation and dryland crops at beginning of rainfall season (and currently during the monsoon season)</p> <p>Drier soils, later planting and preparation of fields.</p>	<p>Output 1 – climate information, capacity strengthening, support to farmers on climate resilient farming practices (e.g. crop choice, crop calendar)</p> <p>Output 2 – capacity strengthening, enhance climate resilience of 32 existing irrigation schemes, 4 new irrigation schemes,</p>

			water saving technologies, water harvesting
Increase in rainfall intensity (particularly during the monsoon)	Increase in risk of landslides, land slip, flash floods	Increased damages to irrigation infrastructure, crops and roads Increased soil erosion	Output 1 – climate information, capacity strengthening, support to farmers on climate resilient farming practices (e.g. hydroponics, aeroponic, vertical gardening) Output 2 – climate-resilient irrigation and SLM Output 3 – climate resilient roads and slope stabilization

62. Guided by the RGoB's adaptation priorities, the integrated project was designed closely with GNHC, MoAF, MoWHS and NCHM, in consultation with communities, civil society organizations and academia/research institutions – to ensure the project design reflects the needs of the climate sensitive agriculture sector and vulnerable smallholder farmers. The project is also consistent with detailed value chain and market analysis of selected climate resilient agriculture products (Annex XIII). Among the challenges highlighted were a) limited information on climate change impacts on value chains, b) impact of droughts, c) soil fertility and stability, d) the need to manage the increased incidence of climate change induced pests and diseases on production and e) market access challenges due to frequent blockages from landslides. Output 1 will address a) and d) through tailored climate information and climate-resilient agriculture practices. Output 2 will address b) through climate-resilient irrigation, water harvesting and support towards sustainable use of water resources, and c) through sustainable land management practices. And Output 3 will complement significant co-financing from the GNHC and MoWHS in road infrastructure to address e) though technical support towards climate-resilient roads and investment in slope stabilization.

63. The project will focus on eight Dzongkhags (districts): **Dagana, Punakha, Trongsa, Tsirang, Sarpang, Samtse, Wangdue Phodrang and Zhemgang**. These sites were specifically selected by the RGoB given their:

- Vulnerability to climate change
- Priority for government and SDG targets, especially given the moderate-to-high poverty incidence rates

64. In the eight target Dzongkhags, direct beneficiaries are 27,598 agriculture households (118,839 people) benefiting from climate information and climate resilient roads, including 3344 households (14,400 people) benefitting from enhanced irrigation, 24,000 households (103,346 people) from SLM interventions, and 15,000 households (64,591 people) benefitting from support to resilient agricultural practices. Indirectly, the project can reach 58% of livelihoods through enhanced agriculture planning.

65. The project will contribute to increased resilience of:

- Most vulnerable people and communities
- Health and well-being, and food and water security
- And Infrastructure and built environment

66. As the intervention is cross-sectoral, the Executing Entity for the project is GNHC which has a coordination role in such cases. Responsible Parties for the project are specialized departments under MoFA and MoWHS.

Output 1. Promote resilient agricultural practices in the face of changing climate patterns

(GCF Grant: USD 3.362 million, Co-financing USD 7.115 million)

67. A key building block in supporting smallholder, predominantly, subsistence farmers faced with variation and uncertainty in rainfall is the availability of climate change risk information and its use in planning and decision-making processes. This requires both the availability and application of climate change risk information at the sectoral, local and household level which, currently, is not in place in Bhutan. This project will change that status quo.

Activity 1.1. Developing and integrating climate risk data into crop and livestock planning at the national and sub-national levels

68. A critical intervention required to support decision-making is the availability of localized data and analysis, and technical capacities to apply climate information to crop and livestock planning. Doing so will provide decision-makers (local authorities to farmers) with an opportunity to take action that will minimize losses from climate impacts. To build up this capability for climate risk informed agricultural planning, GCF resources will be used to generate climate information tailored for use in decision making at the national and subnational levels. This will include strengthening capacity of hydro-met, agriculture and extension agencies in the forecasting and detection of climate change and extreme events. The GCF financed technical assistance will enable MoAF to raise awareness and technical capacities of extension workers and farmers, as well as decision-making at the farm level on appropriate actions. Providing reliable and on-time climate information to farmers can help update crop calendars, and will promote increased resilience of agriculture production. Training will also be delivered to MoAF and NCHM to collect, analyze and produce seasonal (medium-term) predictions as well as weather forecasting with sufficient precision useful for farmers to adapt to climate change and extreme weather events. GCF resources will enable capacity development to package and extend advisories to farmers for application to improve their climate resilience. This will also entail capacity building on agro-meteorology to collect and analyze seasonal predictions and strengthen coordination between NCHM and MoAF.

69. Given the increased variation and uncertainty in rainfall that now affects Bhutan, it is necessary that such risks are taken into account in the decision-making process surrounding the management of water budgets in key wetlands and watersheds. In order to do that, the first step is to ensure that capabilities are developed to model climate change impacts on the water budgets in wetlands and watersheds that are critical to support subsistence agriculture. Without this ability, the core information needed to anticipate, at an informed level, the type, range and uncertainty of risks that are likely to unfold, including where, would not be easily forthcoming. Without that knowledge base, crafting appropriate responses to support smallholders will remain challenging. In addition to the climate information generated by Output 1, this work will also be informed by the safeguards-related water monitoring captured under Output 2.

70. GCF funds will also support the review and enhancement of the crop and livestock loss collection methodology to ensure consistent data collection and analysis. Standard Operating Procedures (SOPs) will be developed to define roles and responsibilities related to collection and reporting. Related training on how to apply this information will be incorporated into capacity strengthening activities.

71. Sub-activities under this activity include:

- Training to 15 NCHM staff to a) combine local, regional/global information, disaster database and data from climate monitoring stations, b) model/forecast climate, flood, drought and water resource information (on daily to seasonal, as well as medium to long term timescales)
- Review and enhancement of crop and livestock loss methodologies for consistent tracking and measurement of losses against climate change variability and impact, and integration into planning processes
- Development of 9 tailored climate products (1 national and 8 dzongkhag level), integrating climate change impacts on agriculture and related agriculture losses to inform planning
- Training to 150 MoAF staff on application of climate impacts and related loss information in agriculture planning
- Development of Standard Operating Procedures (SOPs) for effective and timely dissemination climate and climate risk information at the national and sub-national level

Activity 1.2. Tailored climate information and related training to local government and farmers to interpret and apply climate risk data to local and household level agriculture planning

72. Climate information of Activity 1.1 will inform tailored agricultural advisories (e.g. weather bulletins, targeted agro-advisory services, crop weather outlooks, crop yield forecast, etc.). Farmers, cooperatives and government staff will be sensitized and trained in the use of climate information and related services to optimize production and limit the negative impacts of less favorable climatic/weather events. This will support communities, in particular, to adapt and optimize their farming practices to climate change and to be prepared to minimize negative impact through practices such as timely sowing, transplantation and harvesting and to anticipate frost, hail and wind and rain storms.

73. Training will be provided to farmers, cooperatives and local government officers/NGOs on how to apply climate information in farm planning for choice and timing of crop planting, irrigation and flood protection, management of livestock and pasture. The GCF project will build on the successes of the UNDP/LDCF *Addressing the Risks of Climate-induced*

Disasters through Enhanced National and Local Capacity for Effective Actions project, where the emphasis was to enhance the hydro-meteorology capacity at the national level. Drawing on this success, this project will support the building of agro-meteorology capacity of the Department of Agriculture through its line agencies (regional Agriculture Research and Development Centre), who are mandated to provide technical support to districts. Targeting these agencies will ensure institutional capacity at various level. In terms of channeling the climate information to the farmers, the existing extension support system will be used. The structural extension support system includes District Agriculture Officer (DAO) and gewog (sub-district) Agriculture Extension Officer (AEO). Their capacity will be enhanced through training. Complementary capacity development will be supported within MoAF to make climate information available to end-users in a user-friendly manner, considering needs of the recipients (e.g. lower rates of literacy in rural areas, particularly for women). This may include visual and audio media, including the use of apps, which have been proven as an effective means of communication among farmers²⁰.

74. Sub-activities include:

- Development of tailored climate information, and means of dissemination, for farmers to meet the short-term and long-term agriculture planning needs
- Annual trainings in 8 target dzongkhags designed and delivered to farmers, cooperatives and local government officers/NGOs on the application of tailored climate information to improve agriculture household planning

Activity 1.3. Scaling up climate-resilient agriculture practices, and training local entities in community seed production and multiplication and cultivation of climate-resilient crop alternatives

75. With only 18% of arable land in Bhutan irrigated²¹, most agriculture practicing households remain heavily dependent on rain-fed practices. Given increasing uncertainty in the predictability of both the timing and duration of rainfall, crop varieties that are tolerant to diseases and water will be promoted to cope with biotic and abiotic stress. Crop diversification, which is key to improving household incomes as well as food and nutrition security during the times of uncertain rainfall variation, will be supported. Traditional nutrient rich crops such as wheat, millet and other minor cereals that have been long adapted to local environmental conditions and are more climate resilient will be encouraged.

76. GCF resources will be used to finance the introduction of climate resilient cereal crop varieties. To facilitate access, the project will support the strengthening of both the formal and informal seed system in the country. Through a 'seed villages' approach, the project will provide seeds and training on multiplication (drying, harvesting and monitoring) and distribution. Once the community seeds producers (or seed village system) is activated or instituted, the National Seed Centre provides a co-ordination and oversight role to ensure they supply certified seeds to farmers. In some cases, the National Seed Center buys the seed from these groups.

77. In order to mitigate any potential conflict, the Department of Agriculture is currently developing guidelines to define roles of the various seed producers. Farmers are currently dependent on seeds provided by the Government or purchased from agribusinesses which are not always the most resilient variety, and those that tend to be are either inefficiently distributed or unaffordable. Consequently, strengthening local capacities to produce and distribute their own seeds, particularly those that are less common in the market and more resilient to drought conditions (e.g. potato, maize, cardamom, ginger and dairy) becomes critical. To ensure sustainability beyond the life of the project and address one of the key barriers (i.e. access to high-quality seeds for resilient crops), this activity will also introduce seed multiplication to small-scale farmers (both male and female) and to cooperatives. This was a successful practice demonstrated by recent LDCF-funded projects, in various parts of the world, where many women and men became trained in successful seed multiplication. Seed multiplication not only provided farmers with their own seeds, but also generated a new income stream by selling these high-quality seeds (particularly those with limited availability on the market or from the Government) to other farmers in the community.

78. Similarly, climate resilient, organic practices will also be promoted to support sustainable agriculture for the long-term. In areas where traditional farming is not advisable given soil vulnerabilities, protected cultivation technology will be purchased, and in addition, aeroponic, hydroponic and vertical gardening will be demonstrated as alternatives. Organic practices will be scaled up to reduce the inevitable high use of herbicides and pesticides to compensate for the pressures felt by smallholders from adverse weather conditions, which have knock on effects such as contamination of soil and water resources. This will include training on organic agriculture, compost production and organic pesticides, as well as

²⁰ 93% of households in the country own mobile phone, with high ownership of smartphones with enhanced 3G/4G connection; 200 subdistricts are connected with high speed optic fiber

²¹ Bhutan water security paper, 2011

provision of seeds. This is in line with the RGoB's long term vision to further develop organic agriculture in Bhutan – where the use of chemical fertilizers is already among the lowest in the world and the use of plant protection chemicals is already highly regulated. The promotion of these resilient practices will also be more conducive to maximizing the co-benefits of ecosystem services as well as realizing auxiliary benefits such as carbon sequestration. This will build on ongoing efforts to increase advocacy and awareness on climate resilient (and organic) agriculture including government sponsored efforts to promote composts and bio slurry production at the community and households level, thereby building a systemic organic seed system. The project will also specifically support the capacity development of the NSSC and National Plant Protection Centre (NPPC) on climate risk management and organic practices.

79. Indicative criteria may include vulnerability, landscape, and potential of the specific intervention, and will be further developed by MoAF during the project inception period. Prior to implementation of activities, MoAF with local offices will determine specific households, this is developed in consultation with households, informed by criteria and prioritized based on need. Technologies will be chosen based on the land and what is appropriate. For instance, the focus will be on organic practices, aeroponic, hydroponic and vertical gardening. The later three will be alternative interventions and will be targeted to farmers who have marginal land. The actual selection of these farmers will be done through consultative process with local government authority. At the household level, agreements are not required. For cooperatives, procedures will follow the Cooperative Act of Bhutan.

80. Access to local markets for the products, local processing possibilities, and export infrastructures are important for farmers. The Output will also support capacity development of farmers, cooperatives and government officers/NGOs to recognize risks, linkages and opportunities in markets and value chains for climate-resilient goods and services and to apply this knowledge through relevant skills through training and extension services. Technical assistance will be delivered to enable these key stakeholders in the sector to apply knowledge on climate risk management for value-chains through training and extension services. The support will build on government sponsored efforts to review mechanisms to link farmers (producers) of prioritized commodities directly to formal institutions, buyers/wholesalers or processors so that more favorable prices for their produce can be commanded. The interventions are also founded on the result of a detailed value chain and market analysis of selected agriculture products (see Annex XIII). In the study, climate-resilient commodities such as potato, maize, cardamom, ginger and dairy were assessed, looking at key constraints and opportunities, and recommendations were provided to improve the resilience of the crops to expected climate change pressures.

81. The planned GCF financed interventions will build on and engage with cooperatives, farmers' groups and youth entrepreneurs. RGoB has recognized cooperatives as a vehicle for socio-economic development, and transformational development. The RGoB has adopted the 2009 Cooperative Act of Bhutan 2009 and the 2010 Cooperative Rules and Regulations of Bhutan. Since the official launching of cooperative movement in Bhutan from 2010, DAMC has formally registered 40 primary cooperatives and 263 farmers' groups by the end of 10th FYP (2013). There are 754 informal farmers' groups currently in operation throughout the country in the areas of agriculture, livestock and forestry. The Bhutan Chamber of Commerce and Industry (BCCI) will also be engaged to connect farmers' produce to domestic and international markets. BCCI in its economic resource mapping has identified potential economic activities for 20 districts for intervention of private sector with rural communities.

82. Planned sub-activities that will be implemented include:

- Training in community seed production and multiplication system to scale up diversified, climate resilient crops (such as cereals, potato, cardamom, ginger, etc.)
- Investment in climate-resilient practices including cultivating alternatives such as hydroponics, aeroponic, vertical gardening; organic farming; and integrated pest-disease management, covering 161 ha
- Training delivered to farmers (2500 households, ensuring engagement of women and youth), cooperatives, and government/NGOs on climate risk management for value-chains and agricultural marketing

Output 2. Scaling up climate-resilient water and land management practices for enhanced smallholder productivity

(GCF Grant: USD 18.185 million, Co-financing USD 1.726 million)

83. The second key building block for supporting the long-term resilience of smallholder subsistence agricultural households is the management of water resources from wetlands accounting for climate change risks. This is important given that the majority of households depend on the regularity of rainfall and other surface water bodies. As climate

change impacts unfold, and the reliability of the timing, duration and intensity of rainfall diminishes, the climate change-risk informed management of wetland watersheds becomes a critical necessity.

Activity 2.1. Enhancing climate-informed wetland and water management to support agriculture planning

84. Empowering localized risk management practices calls for systemic capacities to be strengthened within relevant institutions such that pertinent climate change risk information on wetlands, and associated water budgets (availability), are available as and when required. Iterative analytical capacities need to be built up. This type of risk informed water resources monitoring, assessment and mapping will contribute significantly to ensure that current and future irrigation schemes and water harvesting technologies are both well-designed and suitable to the conditions of the target areas, accounting for projected risks as opposed to conditions at the time. It will direct future prioritization of investment needs based on a core understanding of climate change risks. Current and future irrigation investments will be better informed by wetland management guidelines to ensure appropriate levels of drawdown of water resources taking into account projected risks. The intervention will also support the Water Flagship Program²² of the Royal Government of Bhutan in the 12th Five Year Plan.

85. Informed by Activity 1.1 and the safeguards-related water monitoring of Output 2, Activity 2.1 will provide technical capacity to dzongkhag engineers on climate resilient water irrigation designs and water harvesting, as well as WUAs on the impacts of climate change and water resources, to support sustainable use and planning at the local level.

86. GCF resources will also be used to support capacity development of irrigation engineers in the dzongkhags, selected by MoAF in consultation with local offices, on irrigation technologies such as pressurized design of irrigation technology, micro irrigation technology, and the application of irrigation design software. This will be replicated through sharing knowledge and best practices with other dzongkhags, given that civil servants in Bhutan, such as trained engineers, are transferred intra dzongkhag every 5 years. This will also ensure the long-term management and maintenance of irrigation systems in the country. All training programmes will adopt a training-of-trainers approach for continuity and sustainability. Training materials will be packaged and institutionalized through in-country training institutes and colleges for continued learning or as refresher courses.

87. The proposed project will also focus on supporting established Water User Associations (WUAs) in the project area. WUAs, a traditional water-sharing arrangement practiced in most communities in Bhutan, are responsible for monitoring irrigation channels and responsible use of water resources. This will be an important element of the overall response, especially to ensure long-term sustainability of the irrigation system as well as the management of catchment area and watershed. The formation and function of WUAs is legally recognized in the Water Act of Bhutan 2011. Identifying viable future revenue streams (i.e. payment for ecosystem services, changes in the tax code, etc.) will be critical for the WUAs to effectively fulfill their role. GCF will support scale up of interventions piloted under the UNDP/GE/LDCF project *Enhancing Sustainability and Climate Resilience of Forest and Agriculture Landscape and Community Livelihoods*, namely payment for ecosystem services (PES) related to climate-resilient micro-watershed protection interventions to safeguard the sustainable supply of water quantity and quality, including water source protection. CSOs will be engaged to mobilize community towards the establishment of functional and sustainable WUAs.

88. Sub-activities under this activity include:

- Training to 15 dzongkhag engineers on climate resilient water irrigation designs and water harvesting, for improved oversight of construction and long term maintenance of investments
- Training to 16 WUAs on climate change impacts to water availability and means to protect water access and water sources

Activity 2.2. Establishment of climate resilient irrigation schemes and water saving technologies for smallholder farmers in 8 target dzongkhags

89. Given that the reliance on rainfed practices is also of limited use in the face of increasing rainfall variation, GCF funds will realign four irrigation schemes towards reliable water sources to support farmers experiencing water scarcity during the dry season. Resources will also be used to strengthen the resilience of 32 existing open earthen canal irrigation schemes against extreme events, covering 5,913ha of agriculture land. This includes the introduction and upscale of pressured piped irrigation systems. Support will include redesign and realignment of the intake structures, to make them less vulnerable for unexpected and irregular peak flow and flash flooding, lining and concreting of present earthen channel

²² Related GCF proposal currently under development by RGoB and FAO

sections, mitigation of slope instability processes and slope failure affecting channels sections, use of high-density polyethylene (HDPE) pipes for unstable slope sections and other measures to enhance the functionality and sustained use of the irrigation systems. The estimated cost for new irrigation schemes is approximately USD85,978/km. The estimated cost for rehabilitation of existing schemes to withstand flash flooding is approximately USD35,158/km. The proposed project will apply designs developed under an Asian Development Bank funded project, *Adapting to Climate Change through Integrated Water Resources Management (IWRM)* (see Annex XIII.) Sites for upgrading of existing irrigation and establishment of new irrigation have been pre-determined by government, and through modeling work (please see Annex II) during project development, these sites have been confirmed of needing adaptation support in response to climate change.

90. GCF resources will also be used to procure and install water harvesting through construction of small earthen check dams and ponds (USD3,112 x 64), and earthen storage tanks as small scale reservoirs for irrigation water supply during dry periods and drought. Other water saving technologies such as drip irrigation (USD10,243 x 8) and sprinkler irrigation (USD4,675 x 24) will also be supported for high value crops such as vegetables and horticulture crops. The design for earthen check dams has been included as part of Annex XIII. Central ministries with local offices will determine specific households as relevant, this is developed in consultation with households.

91. Through these interventions in 8 dzongkhags, 8,000ha of arable land will be brought under reliable irrigation. In addition to providing irrigation for rice, a key staple, it will also benefit irrigation of dryland crop such as vegetables, citrus orchard and other fruit plants. It is estimated that 1012ha of vegetable production, 506ha of citrus and 1215ha of other fruits crops will also benefit from irrigation, which at present is dependent on rainfall.

- Upgrading of 32 existing irrigation schemes for greater climate-resilience, and realignment of 4 irrigation schemes to a reliable water source given the drying impacts of climate change, covering 6300ha
- Installation of water saving technologies, specifically 8 drip irrigation and 24 sprinkler irrigation schemes
- Building 64 small earthen check dams and ponds for water harvesting

Activity 2.3. Scaling up of sustainable land management (SLM) technologies to support soil and slope stabilization

92. To provide an opportunity for agriculture land to be resilient against the increased risk of soil erosion and landslides due to rainfall variation, which increasingly results in intense downpours, GCF resources will upscale sustainable land management practices, a proven and effective set of practices to avoid/minimize climate change induced impacts, in the eight project Dzongkhags. SLM has established a proven approach in Bhutan for community-based planning, enhancing community commitment and ownership, facilitating the inclusion of local knowledge in the decision-making and participation of all households for the sustainable use and access to natural resources. The Participatory SLM Action Planning methodology combined with related approaches (such as natural resources mapping and participatory monitoring and evaluation (M&E)) provides an interactive platform to improve implementation of SLM interventions. The approaches form an integrated system that facilitates continuous engagement and participation of the communities and other stakeholders. The promotion of collaborative working at Gewog (sub-district) level, between the Renewable Natural Resource (RNR) sectors within the Gewog SLM Planning Team, and between the Gewog administration and the teams has been enhanced by the participatory approaches, and now serves as an important driving factor for successful implementation of SLM activities.

93. Specific interventions will be defined by the Participatory SLM Action Planning process, and applied as appropriate for the project site and given the need to promote the resilience of wetlands and water sources to climate change risks. Examples may include the below, which were listed most frequently as favorable by stakeholders²³:

- Buffer zone creation: the protection of severely degraded sites to prevent further loss of land and mitigate progressive erosion and deep-seated mass movement, common during periods of extreme rainfall.
- Bench terracing: the construction of level or sloping bench terraces on steep to very steep slopes.
- Hedgerow/ally cropping, a vegetative measure, consisting of rows of Napier grass, planted along the contour line, intended to act as a physical barrier, slowing and trapping soil and fast water moving down steep slopes. This could be linked to feed and fodder development to benefit livestock as well.
- Non-invasive tree and bamboo plantation: a vegetative measure, aimed at improving the vegetative cover to reduce soil erosion, improve root mass and stabilize soil and slopes.

²³ Working the Land: Documenting the Key Lessons of Sustainable Land Management on Steep to Very Steep Slopes in Bhutan (NCCS, 2011)

- Stone check dams: a structural measure, consisting of a small stone wall with a spillway constructed in a gully or streamlet to reduce the erosive power of running water at peak flow and to retain the sediment behind the dam.
- Stone bunding: a structural measure, based on the constructions of small bunds of stones along the contour line, forming a physical barrier for soil and surface runoff.
- Citrus orchard development: a vegetative measure, involves the plantation of mandarin seedlings in a rational layout on steep to very steep slopes to diversify cash income and agriculture products, which can also diversify cash income and agriculture products.
- Water source protection: a management measure involving the protection of essential drinking and irrigation water source areas through fencing, afforestation with trees and bamboo, and, if necessary, additional mitigation measures such as drains, check dams and protection of the actual spring areas.

94. Stakeholder preference²⁴ was particularly expressed for those SLM measures that have a) beneficial impact on the land, b) address the key land-based problems of the communities and c) have a positive impact socio-economic effect (cash/livelihood), addressing the main livelihood issues of the rural communities. To the extent possible, and given the objective of the proposed project to support resilience of the agriculture sector, interventions which provide with these multiple benefits will be prioritized. Interventions will also consider the results of the wetland inventory and mapping, to ensure that activities to protect water sources are appropriate. Related training to extension officers, and the application of impact evaluation principles in will ensure regular monitoring of soil conditions following project investments. Results, based on the application of impact evaluation, will be documented with the NSSC to inform planning and policies related to climate change resilient soil management techniques in Bhutan.

95. SLM action plans are developed at the dzongkhag level. The project aims to support implementation/deployment of mixed SLM technologies covering 2380 ha in the project districts, targeting 24,000 households or 103,200 people/farmers. The district level action plans will detail technology preference/suitability at the household level, depending on physical condition of land (degree of slopes, aspect, soil types etc). Consultation for the SLM action plan will be done in the 1st year of implementation. Similar to Output 1, indicative criteria for selection of beneficiaries may include vulnerability, landscape, and potential of the specific intervention, and will be further developed by MoAF during the project inception period. Prior to implementation of activities.

96. Technologies will be chosen based on the land and what is appropriate. Based on initial consultations and knowledge of the landscape, the following assumptions are made in terms of interventions and scope: bench terracing (81 ha), terrace consolidation (32 ha), contour stone bund (324 ha), contour hedgerow (810 ha), check dam construction (810 ha), orchard terracing (60 ha), water source protection (20 ha), citrus orchard (203 ha), and land stabilization (40 ha). GCF resources will assist in both confirming and implementing measures. Any required agreements will follow existing Agriculture Land Development Guidelines. Indicative criteria for selection of beneficiaries include vulnerability, landscape, and potential of the specific intervention. MoAF with local offices will determine specific households, this is developed in consultation with households, informed by criteria and prioritized based on need.

97. This activity includes the following sub-activities:

- Identification of SLM interventions to better protect agriculture land from the impacts of climate change induced erosion and landslides, following the Participatory SLM Action Planning methodology
- Technical assistance and support to communities on the implementation of SLM practices to manage climate change risks, covering 2380 ha of arable land

Activity 2.4. Capacity strengthening to farmers and extension officers on SLM technologies

98. Activity 2.4 will support successful implementation as well as sustainability of SLM interventions, through technical capacity building. DoA extension officers, selected by MoAF, will be trained to support farmers on applying and maintaining SLM interventions. Regular monitoring and data collection will ensure sustainability of the investments, and highlight areas needing more care. Related data will be recorded, and applied to planning and policies related to soil management.

99. Sub-activities include:

- Training to 120 DoA extension officers on SLM technologies and practices to manage climate change risks

²⁴ Working the Land: Documenting the Key Lessons of Sustainable Land Management on Steep to Very Steep Slopes in Bhutan (NCCS, 2011)

- Regular monitoring (twice annually) of soil conditions and soil stability to inform planning and policies related to soil management

Output 3. Reduce the risk and impact of climate change induced landslides during extreme events that disrupt market access

(GCF Grant: USD 2.783 million, Co-financing: USD 22.358 million)

100. The third building block in strengthening the resilience of smallholder agricultural households, is to reduce the risk of climate-induced landslides during extreme events. As a mountainous country, landslides are a frequent occurrence following periods of heavy rainfall blocking access to markets for farmers. Limited access to markets, due to roads blocked by landslides, was highlighted as a challenge in value chain analyses of climate resilient agriculture products.

Activity 3.1. Slope stabilization along key sections of roads, critical for market access, and related technical capacity and knowledge products to support climate resilient road planning and construction going forward

101. GCF resources together with RGoB co-financing through the Local Development Division (LDD) of the Gross National Happiness Commission Secretariat (GNHC) will reduce the vulnerability of farming communities to climate change-induced hazards such as landslides. Resources will be directed towards climate resilient road and slope stabilization measures that will reduce the risk of roads being blocked with debris following highly intense rainfall periods. have significant economic repercussions by impeding agricultural produce from getting to markets. Enhancing the climate resilience of roads is critical to prevent floods, rockfalls, mudflows and landslides from disrupting market access. These actions include slope stabilization solutions, complemented by RGoB co-financed drainage improvements and road upgrading. GCF resources will also be directed towards developing capacity within the target Dzongkhags to integrate climate risk management into road maintenance and construction, and establish a pathway to scale up this expertise nationwide. The road sections prioritized for these risk reduction enhancements were identified by MoAF and MWHS based on their vulnerability to damage from climate change-enhanced, monsoon-related landslides and include farm roads, GC roads and main roads.

102. With Government co-financing, farm roads and GC roads in the target dzongkhags prone to frequent and intense rainfall, will be made less vulnerable to disruption. This includes a) preparation and compressing of sub grade for shape correction, b) strengthened granular sub base (GSB) to withstand increased rainfall; c) water-bound macadam (WBM), earth drains; d) lined V-shaped drain instead of earth drain for higher gradients 600X300, e) cross drainage to accommodate increased discharge, and f) bioengineering, retaining wall, crib wall and check dam for slope stabilization. More than USD15 million of government co-financing is committed to this work (see co-financing letter).

103. GCF resources are sought to complement the significant government investment by ensuring that the slopes surrounding three key main roads are stabilized to reduce the likelihood of landslides. This will enhance the resilience of the infrastructure, and reduce the vulnerability of people living in the targeted areas, and support market access. The three critical sections of main road, identified by MWHS, that are routinely impacted by landslides during the monsoon season are: Box Cutting (Thongsa-Gelephu), Reotala (Trongsa-Gelephu) and Khagochen (Sunkosh-Daga). These are also included on the list of History of Disasters and Frequently Damaged Points on the National Highways of the 2014 Data Collection Survey on Road Connectivity in the Kingdom of Bhutan (conducted by DoR and the Japanese International Cooperation Agency (JICA)). Landslides in these main road sections present a chronic problem, blocking access to larger markets for farmers. These critical sections of main road will be supported with slope stabilization interventions. The estimated additional cost of slope stabilization taking into account climate change risks is approximately USD 2.019 million. This will include subsoil drainage, toe protection, mass bioengineering and reclamation of sunken portions of the road. (Please see Annex II, page 100 for further details).

104. The RGoB and GCF financing will utilize the best practices and recommendations highlighted in the *Climate Change Vulnerability Assessment and Adaptation Report for the SASEC Road Connectivity* pilot project. Interventions will also adhere to Environmentally-Friendly Road Construction (EFRC) standards. The EFRC guidelines are currently being enhanced to include climate-resilience with support from the UNDP/GEF/LDCF *Enhancing Sustainability and Climate Resilience of Forest and Agriculture Landscape and Community Livelihoods* project. The application of EFRC standards, taking climate change risk management practices into account, will minimize impact on the surrounding environment during construction, ensure an appropriate asphalt mix and drainage to reflect the latest climate projections, and include roadside bioengineering to provide erosion control and slope stabilization. The O&M plan will be agreed with DoR and RUGs for inventions areas, and an O&M framework established for road monitoring and O&M going forward linked to infrastructure planning processes, prior to completion of roads work.

105. Planned sub-activities include:

- Conduct of technical study and design for slope stabilization interventions needed for three stretches of main road regularly incurring damages due to increased intensity of monsoon and disrupting market access to validate existing specifications that were based on roads work for similar conditions
- Slope stabilization of three sections of main road regularly incurring damages due to increased intensity of monsoon

Activity 3.2. Technical capacity building to support climate-risk informed and cost-effective slope infrastructure including stabilization, drainage, and road construction & maintenance

106. In addition to the slope stabilization works, GCF resources will also be used for capacity building of technical officers, selected by MWHS, to ensure that climate change risk management practices are employed in road planning, construction and maintenance. This will include a) training to Road User Groups on post-monsoon assessment of roads, including repair cost estimation (taking anticipated extreme events into account); b) training for MoWHS Department of Roads national and sub-national staff on climate resilience including slope stabilization methods, related designs and related cost assessments c) review of road damage data collection methodologies, cost calculation and related Standard Operating Procedures for consistent and systematic damage estimation and verification to ensure the consistent collection of road damage data and its inclusion in the centralized national disaster loss and damage database. All technical support and capacity building under this Activity will be conducted with the overall goal and purpose of mainstreaming climate resilience into planning, construction and maintenance into road infrastructure planning.

107. GCF resources will also be used to provide for training on climate change risk-informed slope assessment and slope stabilization measures to DoR technical staff, at the central and sub-regional levels. Training will include applying climate information and potential impacts to slopes, to inform road planning processes. While the DoR regularly conducts damage assessments of main roads and GC roads following the monsoon season, these results are not captured in existing national databases. GCF resources will support a review of current approaches to capturing critical pieces of data and ensure that systems are set up for storage of data. It will establish mechanisms to ensure the knowledge accrued through such data informs the policy formulation that governs the climate change risk management of critical infrastructure. Further, training will be provided to RUGs to estimate road damage to farm roads, for a more comprehensive dataset of the impact of climate events on road infrastructure. As the disaster database is public, such information will be easily accessible by other sectors, as well as the private/finance sector to inform planning and investment.

108. Planned sub-activities include:

- Technical training to 15 DoR national and sub-national engineers on slope stabilization studies, and related designs, cost assessments and cost benefit analysis to inform climate-resilient planning
- Review and enhancement of road damage collection methodology, and related SOPs for collection and reporting, to ensure consistent collection of road damage data and inclusion in national disaster loss and damage database
- Technical support to MoWHS staff on mainstreaming of climate resilience into planning, construction into road infrastructure
- Training to RUGs and local government bodies on post-monsoon assessment of farm roads, including repair cost estimation

C.4. Background Information on Project / Programme Sponsor (Executing Entity)

109. The executing entity for the project is the Gross National Happiness Commission (GNHC), which was established by the RGoB per Executive Order No. PM/01/08/895 dtd. 24/01/2008. The GNHC was established to ensure that all development policies and plans are formulated and implemented in line with the principles of GNH:

- Developing a dynamic economy as the foundation for a vibrant democracy;
- Living in harmony with tradition and nature
- Effective and good governance; and
- Investing in our people, the nation's greatest asset

110. GNHC is the central government body for coordinating and spearheading policy formulation to ensure cohesion between sectoral policies and alignment with the national development objectives and GNH. It guides and directs the

formulation of long term perspective plans to provide guidance for future development policies and plans, including the five-year development plans. The GNHC further endorses five-year development plans, as well as reviews and recommends the related allocation of resources. GNHC also ensures cross-sectoral coordination and is responsible for the resolution of issues related to effective implementation of policies and plans.

111. UNDP has a long history of partnership with GNHC both in the areas of policy support and targeted interventions at the community level. UNDP and GNHC have worked together to support to reduce poverty by focusing on rural enterprise development and supporting women and marginalized groups. UNDP partnered with GNHC to conduct vulnerability studies and is supporting GNHC to advance the implementation of SDG Goals 1, 13 and 15 based on RGoB's priorities.

C.5. Market Overview (if applicable)

112. Project investments largely apply natural materials and nature-based techniques. Related planting materials are therefore locally available. Bioengineering investments, for instance, will use species indigenous to Bhutan. Biodegradable erosion control blanket systems or biodegradable jute blankets may be needed for slope stabilization investments until the vegetation becomes established. Such materials would need to be imported, and are available from India.

113. Related to irrigation, i.e. HDPE pipes and cement, are available and manufactured in Bhutan. Similar to the above, water harvesting techniques will largely employ the use of natural materials.

C.6. Regulation, Taxation and Insurance (if applicable)

114. Any licenses or permits required for the construction elements of the project during implementation will follow the policies and processes established by the Government. For any third country import, the import license is required prior to procurement of any goods. Responsibility for obtaining any necessary clearances will be borne by the entity initiating the procurement (i.e. Implementing Partner, Responsible Party, UNDP).

Tax Considerations for UN-supported Projects

115. UN-supported activities are tax-exempt in Bhutan, for activities implemented by government partners, any import duty together with Bhutan Sales Tax is applicable.

Foreign Exchange and Insurance Policies

116. UNDP's currency hedging policy is based on the use of natural hedges (matching cash flows (i.e. revenues and expenses) in non-USD currencies) to the extent possible. UNDP Country Office bank account balances are managed not to exceed approximately one month's disbursement requirements to minimize risk.

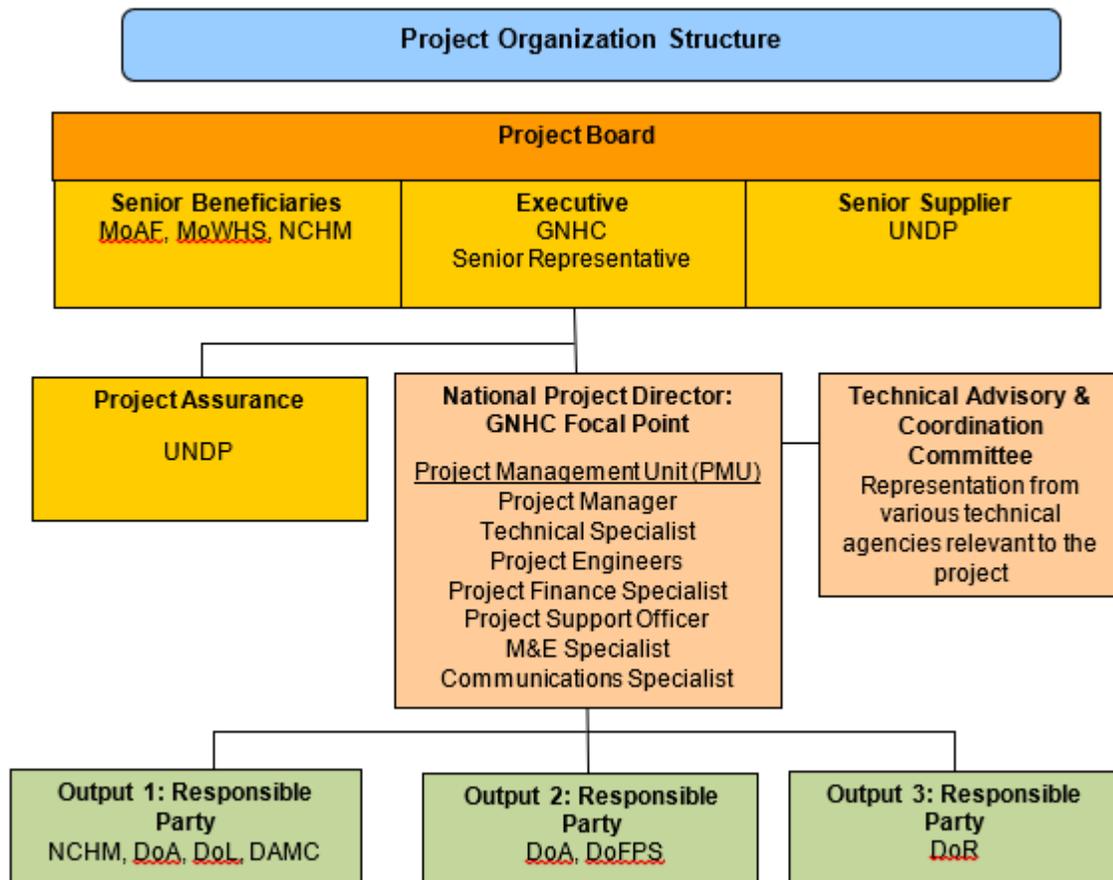
117. The RGoB signed a Standard Basic Assistance Agreement (SBAA) with UNDP in 1973. Consistent with the Article III of the SBAA, the responsibility for the safety and security of the Implementing Partner (executing entity) and its personnel and property, and of UNDP's property in the Implementing Partner's custody, rests with the Implementing Partner (executing entity).

C.7. Institutional / Implementation Arrangements

118. The project will be implemented following UNDP's National Implementation Modality (NIM), according to the Standard Basic Assistance Agreement between UNDP and the RGoB, the Bhutan One Programme 2014-2018, and as policies and procedures outlined in the UNDP POPP (see [here](#)).

119. The national executing entity - also referred to as the national 'Implementing Partner' in UNDP terminology - is required to implement the project in compliance with UNDP rules and regulations, policies and procedures, including the NIM Guidelines. These include relevant requirements on fiduciary, procurement, environmental and social safeguards, and other performance standards. In legal terms, this is ensured through the national government's signature of the UNDP Standard Basic Assistance Agreement (SBAA), together with a UNDP project document which will be signed by the Implementing Partner to govern the use of the funds. **The (national) Implementing Partner** for this project is GNHC, which is accountable to UNDP for managing the project, including the monitoring and evaluation of project interventions, achieving project outcomes, and for the effective use of UNDP resources.

Schematic of the Management Arrangements for the Proposed Project



120. The **Project Board** is comprised of the following organizations: GNHC (IP), MoAF, MoWHS, the National Center for Hydrology and Meteorology (NCHM) and UNDP. The Project Board is responsible for making, by consensus, management decisions when guidance is required by the National Project Director. In case a consensus cannot be reached within the Board, final decision shall rest with the UNDP Country Director. Project Board decisions will be made in accordance with standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. The Project Board will meet every six months.

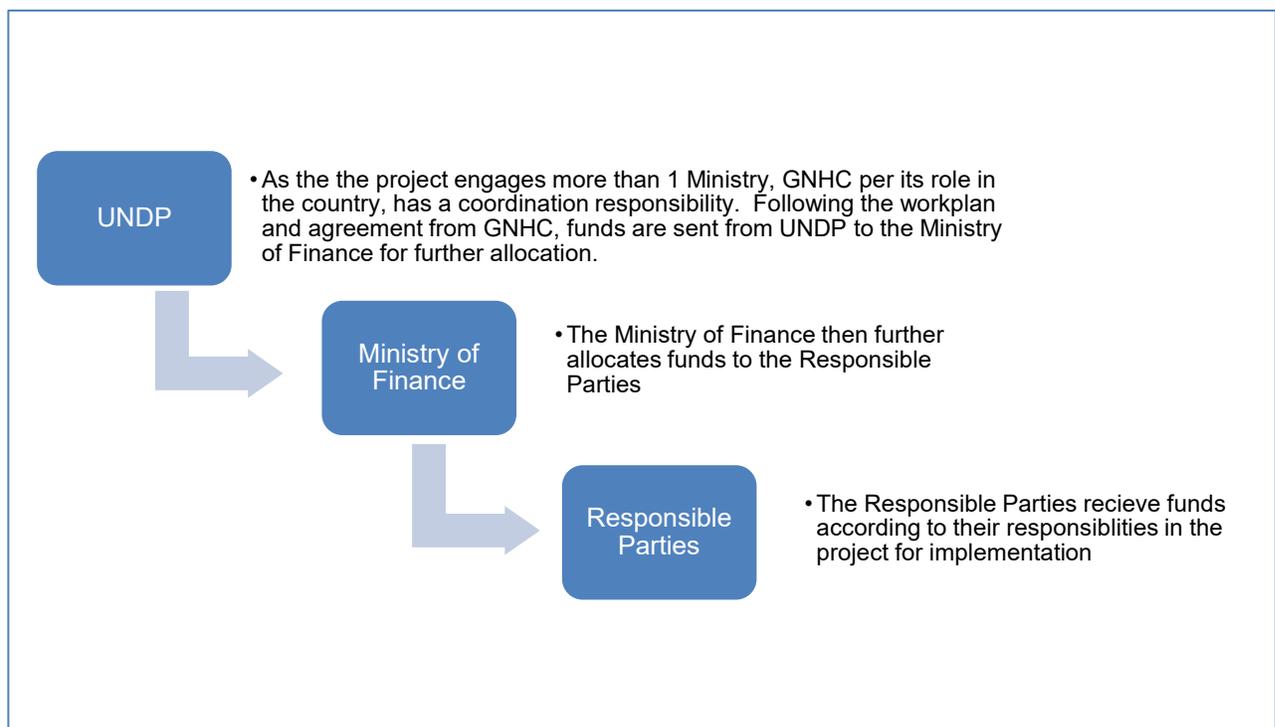
- An Executive (role represented by National Implementing Partner) that holds the project ownership and chairs the Board. The Executive will be a Senior Representative from GNHC.
- A Senior Supplier representative providing guidance regarding the technical feasibility of the project, compliance with donor requirements, and rules pertaining to use of project resources. This role will be fulfilled by UNDP in its capacity as GCF Accredited Entity;
- Senior Beneficiary representatives who ensures the realization of project benefits from the perspective of project beneficiaries; and
- The National Project Director, a Focal Point from the GNHC who is responsible for overall direction, strategic guidance, and timely delivery of project outputs.

121. The **National Project Director** will run the project on a day-to-day basis on behalf of GNHC within the parameters laid down by the Project Board. The National Project Director will end when the final project terminal evaluation report, and other documentation required by the GCF and UNDP, has been completed and submitted to UNDP. National Project Director is responsible for day-to-day management and decision-making for the project. The National Project Director's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost.

122. UNDP provides a three-tier oversight and quality assurance role involving UNDP staff in Country Offices and at regional and headquarters levels. The quality assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. Project Assurance must be independent of the Project Management function; the Project Board cannot delegate any of its quality assurance responsibilities to the Project Manager. The project assurance role is covered by the accredited entity fee provided by the GCF. As an Accredited Entity to the GCF, UNDP is required to deliver GCF-specific oversight and quality assurance services including: (i) Day-to-day oversight supervision, (ii) Oversight of project completion, (iii) Oversight of project reporting. It also includes oversight roles in relation to reporting and knowledge-management. The 'senior supplier' role of UNDP is to represent the interests of the parties that provide funding and/or technical expertise to the project (designing, developing, facilitating, procuring, implementing). The senior supplier's primary function within the Board is to provide guidance regarding the technical feasibility of the project.

123. Following national guidelines, GNHC has a coordination role as the project engages more than one Ministry. GNHC is therefore the national executing entity (implementing partner) for the project (acting on behalf of the Royal Government of Bhutan). UNDP will transfer funds to the Ministry of Finance, as per an agreed work plan with GNHC. Based on instruction from GNHC and signed annual work plans, the Ministry of Finance will then further allocate resources to Responsible Parties for implementation. The implementing partner and the Ministers of the Responsible Party agencies enter into an 'Annual Performance Agreement (APA)' with the Prime Minister based on the agreed upon annual workplan of the project. See flowchart below for the financial flow.

Financial Flow of GCF Funds Diagram



124. Please see Annex X for an indicative timetable of project implementation.

D.1. Value Added for GCF Involvement

125. While Bhutan is carbon neutral, it is experiencing disproportionate impacts climate change, particularly affecting vulnerable agriculture households. GCF resources will complement significant co-financing from RGoB. As an LDC, Bhutan has limited capacity to further stretch their contributions owing to budgetary and fiscal consolidation reasons. The nature of the beneficiaries and the level of essentiality of the service do not accommodate repayment of capital in whatever form or serviceability of a loan instrument. In order to reduce / close the existing financing and knowledge gaps and barriers to improve resilience of Bhutan's at-risk farming households (58% of the livelihoods) to climate change-induced risks, catalytic capital in the form of GCF grants are essential.

126. The design of the project is consistent with the **Nationally Determined Contribution (NDC)**, where the RGoB has highlighted mitigation and adaptation priorities including to: promote climate resilient agriculture to contribute towards achieving food and nutrition security; increase resilience to the impacts of climate change on water security through Integrated Water Resource Management (IWRM) approaches; promote climate resilient agriculture to contribute towards achieving food and nutrition security; and enhance climate information services for vulnerability and adaptation assessment and planning.

127. The RGoB fully recognizes the need for a comprehensive and cross-sectoral approach to strengthen the resilience of the agriculture sector to climate change, and the need to shift towards more climate-resilient planning given the increasing costs of responsive measures (e.g. failing irrigation schemes, crop and livestock loss, repairs to roads). This comprehensive and cross-sectoral approach is demonstrated by the theory of change for the proposed project, including the management arrangements detailed in C.7., where GNHC plays a coordinating role, and MoAF, MoWHS and NCHM would collaborate on implementation.

128. The proposed project is designed to address critical barriers to increasing climate resilience of the agriculture sector, while supporting the RGoB with a) additionality related to adaptation investments that impact the agriculture sector (i.e. climate resilient water infrastructure) b) information gaps and capacity needs for long term climate resilience and sustainability (i.e. enhancements to climate information and agriculture and road related databases) and c) application of climate information and climate-smart practices in agriculture planning (i.e. SLM, organic agriculture and alternative cultivation techniques). As the project is focused on sites with both high vulnerability and moderate to high incidence of poverty, there is great potential for transformational change for agriculture households as well as food security and national food production – in line with the RGoB's goal towards food self-sufficiency and inclusive green socio-economic development.

129. Output 2 supports strengthening the resilience of irrigation systems, which are vulnerable to the increased intensity of the monsoon season and ineffective in ensuring water access for agriculture during the dry season. Importantly, Output 2 also seeks to improve water and soil management and use, so that natural resources can continue to support agriculture production as the climate changes. Public awareness and training for communities will ensure that the link between the health of soil and water resources is understood in the context ecosystem services, and the risks of disrupting the services given their increased fragility due to changing climatic conditions. Capacity building will be provided to extension officers to ensure communities receive the support they need related to climate-resilient agriculture and SLM, and irrigation engineers will receive training to ensure construction of irrigation schemes is climate resilient.

130. Output 3 focuses on slope stabilization, to prevent landslides blocking farming communities' market access. Access to markets is a challenge as the farm roads, GC roads and main roads were not constructed in a manner to withstand climate change impacts, resulting in high costs related to loss and damage and inaccessibility sometimes for weeks at a time. Climate resilient roads not only connect farmers to markets, but also provide access by communities to emergencies services during extreme events, and service delivery of national programmes. Further, climate-resilient roads can reduce damage and loss related to climate change. The proposed project would support the RGoB to meet the high upfront costs of necessary adaptation investments, and through capacity building (i.e. training on slope stabilization measures and cost-benefit analyses to support mobilization of public resources through regular budgetary processes), ensure long term climate-resilient infrastructure planning.

131. Output 1 takes a broader look at agriculture potential including consideration for climate change projections and impacts. Tailored climate information products will be generated to inform national and sub-national agriculture sector planning, as well as agriculture bulletins for farmers to inform the crop calendar and crop choice, in order to improve crop yield and enhance resilience to climate change.

132. GCF resources will support the transition from responsive measures of addressing increasingly damaging monsoon seasons and drier dry periods that inhibit progress towards achievement of sustainable development goals, and towards climate-informed planning and climate-resilient development. The results of the project interventions include: a) agriculture planning that is informed by climate change, b) SLM measures to protect crops and thus livelihoods from landslides, c) support to farmers on climate-resilient agriculture, d) climate-resilient irrigation which not only ensures irrigation during dry periods but also ensures schemes are protected from the impacts of landslides, and critically e) support to road climate-resilient infrastructure to ensure that products from supported measures reach the market.

D.2. Exit Strategy

133. The proposed project was designed with a long term view to ensure continuity and sustainability. The sustainability of efforts to adapt crop and livestock farming, irrigation and watershed management, and the rural road network to climate change will be ensured through establishing pathways to scale to ensure that climate risk management becomes the norm across Bhutan's public sector, in cooperation with civil society. Investments will not only address the impacts of climate change currently being felt in the agriculture sector in the eight target dzongkhags, but will develop public sector and civil society capacity in a manner which embeds new responsibilities for climate risk management into mandates, roles and budgets wherever applicable, to ensure long term sustainability.

134. Climate information under Output 1 and the safeguards-related water monitoring activities under Output 2 will also generate critical data to inform planning, ensuring that infrastructure development does not disrupt the integrity of wetlands and their functionality related to long term ecosystem services. The existing irrigation schemes will be strengthened to better withstand extreme events, thereby reducing damage and related costs of maintenance and repair. Similarly, support to climate-proofing and slope stabilization of key sections of roads will reduce the mounting costs of repair that follow the monsoon season. Proposed project interventions will be monitored and documented, supporting decision-makers to make an economic case for climate-resilient planning during planning processes - improving efficient use of public resources over time. WUAs, RUGs and farmers' organizations will receive training to undertake the O&M of the improved and upgraded infrastructure beyond the project lifetime. To help with the strain on public resources, financial mechanisms and enhanced data collection for analyses are integrated into each of the outputs to support planning and sustainability. For instance, PES is explored under Output 2 to support O&M of water infrastructure, while disaster data collection is supported in Output 1 to enhance climate risk-informed and cost-efficient long term planning. O&M costs by MoAF and MoWHS for irrigation schemes and roads have been committed by government, ensuring country ownership. The government commitment covers the project duration as well as post-project O&M. An O&M plan has been developed for project interventions (please see Annex XIII).

135. Road User Groups (RUGs) have been established to ensure oversight for long term maintenance of farm roads. The 2013 guidelines for farm road development emphasizes the need for consultations with communities on the initial alignment of the farm road and formation of the RUGs, as well as identification of the RUG committee as part of a proper planning and budgeting of farm road construction by local governments. Farm roads, once constructed, will be handed over formally to RUGs through a Memorandum of Understanding (MoU) between the LGs and RUG. RUGs will take responsibility to monitor the condition of farm roads, as per the terms and conditions laid out in the MoU. RUGs will report to the local government authority if there are any concerns or needs for major repairs of farm roads. GCF support will include training to road users' groups (RUGs) to ensure they are prepared with the knowledge and skills necessary to identify potential problems for repair, preventing the need for more costly repairs in the future, and also undertake a study to see the role and impacts of RUG on the sustainability of farm roads in Bhutan. More costly repairs are reported and handled by the appropriate ministry. The project will support the RGoB to initiate the change needed to transition from responsive planning to climate-informed planning.

136. Similarly, Water User Associations or Water Users Committee (WUA/WUC), are a traditional water-sharing arrangement practiced in most of the communities in Bhutan. This will be an important element of the project to ensure long-term sustainability of the irrigation system as well as the management of catchment area and watershed. The formation and function of WUAs is legally recognized in the Water Act of Bhutan 2011.

137. The RGoB has committed to provide the necessary financing for O&M, while the RUGs/WUAs/Communities will be responsible to implement under the technical supervision and management guidance of the Ministry of Agriculture and Forest, Ministry of Works and Human Settlement & Local Governance (District Administration and Gewog Administration).

In this section, the accredited entity is expected to provide a brief description of the expected performance of the proposed project/programme against each of the Fund's six investment criteria. Activity-specific sub-criteria and indicative assessment factors, which can be found in the Fund's [Investment Framework](#), should be addressed where relevant and applicable. This section should tie into any request for concessionality made in [section B.2](#).

E.1. Impact Potential

Potential of the project/programme to contribute to the achievement of the Fund's objectives and result areas

E.1.1. Mitigation / adaptation impact potential

138. The proposed project will have both direct and indirect benefits for agriculture households and the agriculture sector. 27,598 farming households (118,839 people) will benefit from climate resilient irrigation, SLM practices, climate-resilient agriculture support and/or climate resilient roads. Successes from the proposed project interventions will be documented for further replication and upscaling, ultimately benefiting the entire agriculture sector. Project beneficiaries represent 46.5% of the rural population in Bhutan. Tailored climate information to inform climate resilient agriculture planning will benefit the entire agriculture sector, or 58% of livelihoods engaged in agriculture.

E.1.2. Key impact potential indicator

Provide specific numerical values for the indicators below.

GCF core indicators	Expected tonnes of carbon dioxide equivalent (t CO ₂ eq) to be reduced or avoided (Mitigation only)	Annual	N/A
		Lifetime	N/A
	<ul style="list-style-type: none"> Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced vulnerability or increased resilience); Number of beneficiaries relative to total population, disaggregated by gender (adaptation only) 	Total	<p><u>Direct</u>: 27,598 agriculture households (118,839 people of the project districts) will benefit from climate resilient irrigation, agriculture and roads</p> <p>Irrigation will benefit 3344 households or 14,400 people (Male: 7050, Female 7349)</p> <p>SLM interventions will benefit 24,000 households or 103,346 people (Male: 50,601, Female 52,745)</p> <p>Resilient agricultural practices: 15,000 households or 64,591 people (Male: 31,626, Female: 32,965)</p> <p><u>Indirect</u>: 58% of livelihoods benefit from climate informed agriculture sector planning</p>
		Percentage (%)	<p><u>Direct</u>: 46.5% of the rural population in Bhutan</p> <p><u>Indirect</u>: 58% of livelihoods benefit from climate-informed agriculture sector planning</p>

Other relevant indicators	N/A
---------------------------	-----

139. Beneficiary numbers are based on 2015 census information of target areas and the rural population in general. Ultimately, by focusing interventions to build resilience of the agriculture sector, the project will benefit 58% of livelihoods in Bhutan. Below is a summary, disaggregated by gender.

Dzongkhag	Resident Farming Households	Resident Farming Population ²⁵		
		Male	Female	Total
Dagana	4,206	8,352	8,569	16,921
Tsirang	2,882	6,638	6,606	13,244
Sarpang	3,592	7,210	7,378	14,588
Punakha	3,506	5,728	6,547	12,275
Zhemgang	1,877	2,553	2,854	5,407
Trongsa	1,705	3,214	3,583	6,797
Wangdi	3,961	9,161	10,191	19,352
Samtse	5,869	15,331	14,924	30,255
Total	27,598	58,187	60,652	118,839

E.2. Paradigm Shift Potential

Degree to which the proposed activity can catalyze impact beyond a one-off project/programme investment

E.2.1. Potential for scaling up and replication (Provide a numerical multiple and supporting rationale)

140. The agriculture sector is a main driver towards achievement of the RGoB's national goals of food self-sufficiency and inclusive green socio-economic development. The proposed project will support the RGoB to not only to build resilience, but also to initiate the change needed to transition from responsive measures to climate-informed planning, and from climate vulnerable agriculture practices and towards sustainable and viable agriculture.

141. Due to their potential to contribute to a national paradigm shift, eight Dzongkhags have been indicated as sites for GCF support: **Dagana, Punakha, Trongsa, Tsirang, Samtse, Sarpang, Wangdue Phodrang and Zhemgang**. These sites were based on vulnerability as well their high potential for increased agriculture production through sustainable intensification, thereby demonstrating and bringing about transformational change in the agriculture sector to enhance resilience among farming communities and households to adapt to climate change. Direct beneficiaries of the project represent 46.5% of the rural population of Bhutan. The project sites also complement ongoing initiatives related to agriculture in other priority area of the country (please see Annex II).

142. Irrigation and road infrastructure are development priorities for Bhutan, with ambitious targets set by the RGoB to expand or upgrade coverage. For instance, while the GCF project covers 32 existing schemes, a recent study of over 700 existing irrigation schemes showed that of the over 111 were found to be damaged or washed away by landslides, and for some the water source had dried up²⁶. Therefore there is great potential for the climate resilience interventions supported by GCF to be replicated and significantly upscaled. Similarly, continued investment in road construction is needed especially to reach remote communities (please see Annex II). Project results and knowledge products can inform

²⁵Agriculture Statistics 2015, Department of Agriculture, Ministry of Agriculture and Forest.

²⁶ Report on National Irrigation Database and Canal Alignment Mapping (Dept of Agriculture)

government planning and budgeting on these high up-front cost investments, to ensure not only sustainability but also cost-efficiency in light of the increasingly damaging impacts of climate change.

E.2.2. Potential for knowledge and learning

143. Each of the Outputs includes knowledge and learning. Output 2 includes training about the impact of climate change on water resources. Output 2 also includes training to DoA engineers to enable greater oversight and maintenance of irrigation works, and training to DoR staff on slope stabilization through Output 3. Output 1 supports data collection and tailored climate information for climate risk informed planning. Output 1 supports extension officers and communities to apply climate-resilient agriculture, to improve production and reduce volatility. Randomized control trials (RCTs) will document progress, building an evidence base to support further knowledge sharing and potential up scaling.

E.2.3. Contribution to the creation of an enabling environment

144. Each Output considers the constraints of public finance to a) enhance data collection and dissemination to inform climate-resilient planning, b) ensure long term sustainability of investments in changing climatic conditions and c), and development of sustainable financial mechanisms. Under Output 2, the proposed project will support the establishment of PES schemes, to support the long term operations and maintenance of water infrastructure. Under Outputs 1 and 3, GCF will support the integration of agriculture and infrastructure loss and damage data into the national disaster database, making information accessible to all sectors. Further, under Output 3, a robust cost-benefit analysis will be undertaken to support MoWHS in making the economic case during the planning process for funding for climate-resilient roads. Under Output 1, tailored climate and disaster products will be developed to support nascent crop insurance schemes in the country. Building on the analyses conducted under the UNDP/GEF/LDCF project, this information is important for insurance as it helps to assess coverage needs and establish premiums.

E.2.4. Contribution to regulatory framework and policies

145. The RGoB recognizes the need for a comprehensive approach to sustainable development, such as the approach to be applied in the proposed project. The RGoB further stated that project progress and results will inform the implementation of 12th FYP of the country.

146. The Technical Working Committee (TWC) established for development of the proposed project will be maintained during project implementation. The TWC is made up of representation from the GNHC, MoAF (including departments responsible for agriculture development, agriculture marketing and cooperatives, livestock management, irrigation, watershed management, and farm roads), and the Department of Roads under MoWHS (Gewog roads and main roads), with support from the Department of Disaster Management (DDM) under the Ministry of Home and Cultural Affairs and the National Center for Hydrology and Meteorology (formerly the Department of Hydro Met Services under the Ministry of Economic Affairs). The regular cross-sectoral collaboration, to guide implementation of the proposed project, will also facilitate the inter-ministerial dialogue necessary for climate-resilient sustainable development. Further facilitating collaboration, and the exchange of information for planning, is the contribution across the Outputs to the centralized disaster database.

147. At the sectoral level, each output includes means to generate and document needed data to inform planning. Output 2 includes a wetland inventory and management plan to ensure development planning considers fragile wetland ecosystems and the water budget. Output 3 includes enhanced data gathering related to road conditions and analysis to enable climate-resilient infrastructure planning. And Output 1 will support farmers through climate information, agriculture marketing research and value chain analysis to inform planning – strengthening crop calendar and crop choice for agriculture livelihoods.

E.3. Sustainable Development Potential

Wider benefits and priorities

E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact

148. The proposed project has been designed to respond to government adaptation priorities, and will yield significant development co-benefits.

Economic Benefits

149. The proposed project will support farmers in moving away from farming practices that are inconsistent with changing climatic conditions and towards more viable climate risk informed agriculture practices that minimize losses and improve productivity, thereby contributing to household income and thus economic development. The RGoB also and organic agricultural products high-value niche commercial.

150. The proposed project will strengthen resilience of irrigation infrastructure and roads to the impacts of climate change, reducing loss and damage costs (including economic loss) related to climate change induced extreme events – relieving some pressure from public resources of the increasing recovery costs.

Social Benefits

151. The proposed project targets eight Dzongkhags: **Dagana, Punakha, Trongsa, Tsirang, Samtse, Sarpang, Wangdue Phodrang and Zhemgang**. The population in these eight districts constitutes 34.78% of the total population of 766,492 as of 2015²⁷. Five districts: Dagana (25.1%), Samtse (22.2%), Zhemgang (26.3%), Trongsa (14.9%) and Tsirang (14.8%), in particular, have poverty rates which exceed the national average of 12%.

152. The agriculture sector accounts for 58% of total employment. However, due to low monthly earnings compared to other major occupations, labor shortage is becoming one of the leading constraints in agriculture production. If this trend continues, it is likely that more and more people could leave their farms, which could adversely impact the goals of achieving food and nutrition security and possibly reverse the gains achieved in poverty reduction. There is evidence that rural-urban migration is becoming prominent especially amongst men and youth, thus placing increasing burden on women in agriculture. The interventions through the three project outputs will make farming less vulnerable to the impacts of climate change, improve productivity, increase income and contribute to economic empowerment of farming communities, particularly women and youth.

153. Communities sited conflict over water shortage as a climate change related issue (see Annex II). Project interventions will support climate-informed agriculture planning and practices, as well as bring greater reliability of water to agriculture households.

Environmental Benefits

154. Sustainable land management will reduce soil loss, as well as minimize sediment from entering water ways. The proposed project will also contribute to the national goal of achieving 100% organic agriculture by 2020 and ultimately contribute to Bhutan's GNH development philosophy and the global commitment to remain carbon neutral for all time. Organic fertilization compared to mineral fertilization is increases more soil organic carbon and thus, sequestering large amounts of CO² from the atmosphere to the soil. Lower greenhouse gas emissions for crop production and enhanced carbon sequestration, coupled with additional benefits of biodiversity and other environmental services, makes organic agriculture a farming method with many advantages and considerable potential for mitigating and adapting to climate change²⁸.

Development Impact

155. The timing of this project coincides with the 12th Five Year Plan. This will be the last Five Year Plan before Bhutan graduates from LDC status. GCF can support a smooth transition, by enhancing climate resilience of Bhutan's most vulnerable sector and its most vulnerable population.

156. Given the trend of feminization in the agriculture sector, the design of the project was informed by the particular risks and challenges faced by women, and project interventions were tailored to support women. Activities related to data collection support (e.g. agriculture database) will ensure the collection of sex-disaggregated data so that the impacts of climate change on women are accurately captured, so that disaster response measures and adaptation planning going forward are informed by the needs of women in agriculture in Bhutan.

²⁷www.nsb.gov.bt

²⁸<http://www.fao.org/organicag/oa-specialfeatures/oa-climatechange/en/>

E.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

E.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

157. The National Adaptation Programme of Action (NAPA) highlights that the rural poor would be hardest hit from climate change and related impacts, as they depend directly on crops and livestock. The average poverty rate in Bhutan is 12%, largely focused in rural areas, and especially in communities reliant on the agriculture sector.

158. The proposed project targets eight Dzongkhags: **Dagana, Punakha, Trongsa, Tsirang, Samtse, Sarpang, Wangdue Phodrang** and **Zhemgang**. The population in these Dzongkhags constitutes 34.78% of the total population (approx. 766,492 as at 2015). Dagana, Samste Trongsa, Tsirang and Zhemgang in particular, have poverty rates which exceed the national average of 12%.

Dzongkhag	Population (2015) ²⁹			Poverty rate ³⁰ (%)
	Total	Male	Female	
Dagana	22,307	133,826	128,052	25.10
Punakha	27,838	14,037	13,801	10.00
Trongsa	16,012	8,088	7,924	14.93
Tsirang	21,816	10,999	10,817	14.80
Sarpang	45,637	23,531	22,105	4.20
Samtse	70,618	36,344	34,274	22.20
Wangdue Phodrang	37,553	19,127	18,427	10.90
Zhemgang	21,501	10,803	10,698	26.27
Totals	263,287	256,755	246,098	15.70

159. Agriculture in Bhutan is mostly smallholder or subsistence farming. Climate change is impacting crop yield and thus livelihoods and food security. Under nutrition among women and children is already a challenge to socio-economic development, affecting mainly poorer households. The nutritional status for Bhutan measured in terms of stunting prevalence, while reduced from 56% in 1988, remains high at 33.5% as at 2010. And anemia affects 54.8% of women and 80.6% of children across the country.

160. While there is potential for improved yields through climate resilient agriculture, farmers will struggle to benefit from them, due to key constraints such as surety of the water supplied by irrigation, soil conditions and information to guide crop choice and the crop calendar. Consultations with farmers, as part of the Climate change impacts in Bhutan: challenges and opportunities for the agricultural sector Working Paper No. 191 (CGIAR, 2017), reported the following climate change impacts/concerns related to crops:

- Untimely rain during sowing and main crop development stages affecting yield
- Lack of rainfall (moisture stress);
- Cold followed by dry spells (during winter and spring);
- Warmer temperatures with more weather extremes and less snowfall over the last few years compared to a decade ago;
- Change in potato storage practice where seed potatoes have to be covered with jute rugs, blankets;
- Cereals such as barley, mustard, and millet are now being replaced by more lucrative crops such as vegetables;

²⁹ www.nsb.gov.bt

³⁰ Bhutan Poverty Analysis 2012, National Statistical Bureau, Royal Government of Bhutan

- Cabbage is now being cultivated due to changes in climate;
- Need to irrigate potato due to lack of rainfall;
- Increased incidence of mosquitoes.

161. As part of consultations for the design of the GCF proposal, communities expressed concerns for both water scarcity and extreme rainfall events. These included: disrupted market access (damage to farm roads due to poor drainage; landslides, erosion & floods); lack of access to water (damaged irrigation schemes and drying of water sources); limited capacity for effective water management; conflicts in the community due to shortage of water; soil erosion due to heavy rainfall and related limited capacity for land protection/management. Further, rainfall during the monsoon season is resulting in flash floods and landslides that are increasingly damaging property and crops.³¹

162. As detailed in C.2, there are key barriers which much be addressed in order to improve climate resilience of vulnerable agriculture households as well as the infrastructure on which they rely, these include: a) limited awareness, data and knowledge for climate risk informed agricultural planning and implementation, b) weak institutional and community capacities for climate resilient water and soil management, and c) insufficient technical and financial capacity to cope with disruption to smallholder livelihoods due to extreme events-induced landslides.

163. As an LDC, Bhutan has limited technical and financial capacity to both support agriculture households with climate resilience and to absorb the high upfront costs of enhancing resilience of critical infrastructure (roads and irrigation).

E.4.2. Financial, economic, social and institutional needs

164. A key objective of the 11th FYP is to increase food self-sufficiency. Currently the country is only 45%³² self-sufficient in rice, 47% in wheat, 40% in pulses (i.e. seeds and legumes) and less than 10% in oils. When cereals, vegetables and animal products are combined, only 60% of consumption is domestically produced. Currently the country is only 45%³³ self-sufficient in rice, 47% in wheat, 40% in pulses (i.e. seeds and legumes) and less than 10% in oils.

165. Unless the resilience of the agriculture sector to climate change is enhanced, livelihoods and food security in Bhutan will be severely undermined. Agriculture constitutes approximately 58% of livelihoods, mostly in subsistence farming with low returns³⁴. The average land holding is less than 2.5ha per household. The sector is therefore largely a small-holder farming system; and studies indicate that yield per hectare has been declining at a compounded annual rate of 1.84% over the last 27 years³⁵. This is resulting in increasing trends of seasonal migration of farmers, particularly men in search of off-farm employment opportunities – a trend which further exacerbates the declining crop yield in Bhutan.

E.5. Country Ownership

Beneficiary country (ies) ownership of, and capacity to implement, a funded project or programme

E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

166. Through its **Nationally Determined Contribution (NDC)** the RGoB has highlighted mitigation and adaptation priorities including to:

- Promote climate resilient agriculture to contribute towards achieving food and nutrition security through:
 - Organic farming and conservation agriculture
 - Development and promotion of sustainable agricultural practices
 - Integration of sustainable soil and land management technologies and approaches
- Increase resilience to the impacts of climate change on water security through Integrated Water Resource Management (IWRM) approaches including:
 - Water resources monitoring, assessment, and mapping
 - Adoption and diffusion of appropriate technologies for water harvesting and efficient use
 - Climate-proofing water distribution systems

³¹ Bhutan's Second National Communication to the UNFCCC (2011).

³² National Dietary & Food Self-Sufficiency Status, DoA 2015

³³ National Dietary & Food Self-Sufficiency Status, DoA 2015

³⁴ 11th Five Year Plan 2013-2018 (GNHC, 2013)

³⁵ 11th Five Year Plan 2013-2018 (GNHC, 2013)

- Integrated watershed and wetland management
- Promote climate resilient agriculture to contribute towards achieving food and nutrition security through:
 - Developing and introducing climate resilient crop varieties and conservation of plant genetic resources
 - Developing and institutionalizing surveillance of crop pests and diseases
 - Enhancement of national capacity to develop and implement emergency response to agricultural pest and disease outbreaks/epidemics
 - Establishment of cold storage facilities at sub-national regions
 - Improving and increasing investment in irrigation systems and management
 - Initiating crop insurance programs against climate induced extremes
 - Promotion of sustainable soil and land management technologies and approaches
- Enhancing climate information services for vulnerability and adaptation assessment and planning through:
 - Improvement of hydro-meteorological network and weather and flood forecasting to adequate levels of temporal and spatial scales
 - Development of climate change scenarios for Bhutan with appropriate resolution for mountainous situation

167. The **11th FYP and RNR Sector 11th FYP (2013-2018)** were guiding documents in the development of the GCF proposal. In line with the key objectives of the plan, the project seeks to foster transition from subsistence to commercial agriculture, ensure an enabling environment and promote private sector participation and contract farming. This is consistent with the **12th FYP** which includes mainstreaming climate change into agriculture, irrigation and road access planning, stressing water and food security and a healthy eco-system, and carbon neutral & climate resilient development, towards the aim of maintaining a harmonious and sustainable society.

168. Specific adaptation measures are detailed in the **Renewable Natural Resources (RNR) Sector Adaptation Plan of Action (SAPA)**³⁶ under the categories of Agriculture and Food Security and Water Resources. Under Agriculture and Food Security, adaptation measures include (i) develop and promote biotic and abiotic stress tolerant crop and fodder varieties (ii) improve local breeds & traditional crops that have adapted to local climatic stress and feed resources (iii) strengthen in-situ and ex-situ conservation of crop and livestock resources (iv) institutionalize surveillance and forecasting system and containment mechanism for emerging plant and animal diseases (v) diversify and integrate livestock and crop production and (vi) developing and pilot climate resilient RNR Program. Under Water Resources, adaptation measures are in the areas of (i) watershed management planning and implementation of activities in the critical watersheds (ii) conservation and use of forest and wetland ecosystem for enhancing livelihoods (iii) comprehensive water resources inventory; mapping, assessment of the quality and quantity of the major water sources for various uses (iv) rain water harvesting to prevent water shortages during dry periods and irregularities during the monsoons and (v) traditional knowledge and local perspectives in adapting to the changing climate.

169. In terms of its commitment to the **UN Convention to Combat Desertification (UNCCD)**, Bhutan has embarked on a target setting process, including the definition of national baselines, targets and associated measures to achieve Land Degradation Neutrality by 2030. The National Action Program (NAP) to combat land degradation analyses the interaction of climate change and land degradation, with degradation through poorly constructed irrigation systems and farm roads, and inappropriate farming systems being worsened by the intensification of landslides and flash floods with climate change. The GCF project's focus on improving on-farm ecological integrity and ecosystem services linked to larger biodiversity and water resources (upstream and downstream) will tackle these climate change impacts through a sustainable land management approach.

170. The project concept further supports the realization of national and sectoral policies:

- The mission of the **Business Infrastructure Policy (2014)** is to enhance availability of business infrastructure through development and management of such facilities with higher private sector participation. The policy states that the RGoB shall facilitate provision of basic infrastructure facilities, i.e. roads, power, water, and telecommunication facilities to support economic development.
- Policy goals of the **Food and Nutrition Security Policy of the Kingdom of Bhutan (2014)** include:
 - Ensure availability of safe and adequate varieties of food to meet food requirements of the population at all times

³⁶ The updated SAPA 2016 (linked to NAPA and SDG goals) is available at <http://www.moaf.gov.bt/online-rnr-sapa-and-state-of-climate-change-report-2016/>

- Ensure physical, economic and social access to safe, affordable and adequate food
- The **RNR Research Policy of Bhutan (2011)** states two major goals:
 - A prioritized programme of high-quality and relevant research undertaken for Bhutan's RNR sector
 - An efficient and effective RNR research system that produces high-quality research results and facilitates their use in the plans and programmes of MoAF

171. The **Constitution of Bhutan** and the **development philosophy of Gross National Happiness (GNH)** puts an onus on RNR research to become a part of the solution in meeting the obligation to practice sustainable development and the conservation of natural resources.

172. Further, a proposed adaptation activity included in the **National Adaptation Programme of Action (NAPA)** is to develop and introduce resistant crop and livestock varieties with greater adaptation to limited arable land and extreme temperature and rainfall events.

E.5.2. Capacity of accredited entities and executing entities to deliver

173. For the RGoB, the first comprehensive regulation on public financial management was the Financial Rules & Regulation 2001 developed by consolidating the Financial Manual 1988 and Procurement Manual 2009. Thereafter, the World Bank conducted Country Financial Accountability Assessment (CFAA) in February 2002. This is a diagnostic tool that provided information to client country governments, the Bank, and other donors on the state of public financial management (PFM) systems with recommendations for improvement. The CFAA recommendations have been implemented in the assessment of accounting and auditing standards and practices in the public sector that was carried out in collaboration with the RGoB and various stakeholders including the Royal Audit Authority; Ministry of Finance and Royal Institute of Management in April 2007.

174. In June 2010, assessment of the Public Financial Management of Bhutan was completed by using the Public Expenditure and Financial Accountability Performance Measurement Framework. The assessment was conducted by a core team from the Royal Government of Bhutan (RGoB) in consultation with the World Bank South Asia Region Financial Management Unit.

175. On the basis of the existing financial management system, the UN Bhutan, Delivering As One (DAO) and lead by UNDP followed the Harmonized Approach to Cash Transfer (HACT) modality effective 2008-2013 programme cycle. UN Bhutan became HACT compliant in 2010. The financial management system of the government was validated further through HACT Macro-Assessment in 2012. This has assessed the PFMS and feasibility of cash transfers to government IPs. This also further determined the government's Supreme Audit Institution (SAI), the Royal Audit Authority (RAA) in Bhutan has the capacity to undertake the micro-assessment, scheduled audit and special audits of government IPs. A peer review of the Royal Audit Authority's capacity has also been conducted.

176. GNHC as a government focal agency working with UNDP provides the liaising support and the RAA has been providing the micro-assessment and scheduled HACT audit services free of cost so far. A total of 51 IPs have been micro-assessed for the SP cycle 2008-2013 and 8 IPs for the SP 2014-2018. GNHC (EE), MoAF, MoWHS and MoEA as executing entity and responsible parties for activities under this project has been micro-assessed in the SP 2008-2013 cycle. Departments under the Ministries are covered under this assessment.

177. Given that the PFMS presents government's capacity and risk assessment in terms of staffing capacity, financial rules & regulation, budget implementation, cash transfers, national procurement system, reporting, auditing capacity of RAA and overall market risk of cash transfer, the executing entities identified for the GCF project implementation have the institutional set-up and are fully compliant with the HACT cash transfer requirements under UNDP project implementation and management.

178. Capacity Assessments have further been conducted specific to this project during the design phase, these are provided as part of Annex XIII. Support will be provided by UNDP, as needed, in the case that parties are unable to comply the Internal Control Finding and Recommendations.

E.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

179. The NDA established a Technical Working Committee (TWC) representing GNHC, MoAF and MoWHS to identify urgent adaptation needs, in order to shape and develop the GCF concept note and subsequent proposal. The committee had its first meeting on 28 August 2015; the committee agreed to pursue a holistic approach to addressing the climate change impacts on agriculture, namely:

- **Resilient agricultural practices in the face of changing climate patterns**
- **Integration of climate change risks into water and land management practices that affect smallholders**
- **Reduction of risk and impact of climate change induced landslides during extreme events that disrupt market access**

180. The geographic scope of the project was decided during the committee's second meeting on 30 September 2015. The committee reviewed the 11th FYP (2013-2018) priorities and MoAF planning towards meeting the overall national goals of food self-sufficiency and inclusive green socio-economic development, for which the agriculture sector is been identified as the main driver. The committee's selection was based on vulnerability to climate change impacts, population, and poverty incidence. The eight Dzongkhags selected were also considered to have high potential for cereal, horticulture and vegetable production to contribute to the 11th FYP food self-sufficiency targets. These Dzongkhags are: **Dagana, Punakha, Trongsa, Tsirang, Samtse, Sarpang, Wangdue Phodrang and Zhemgang.**

181. In June and July 2016 consultations with local governments and communities were conducted in the eight project Dzongkhags to discuss challenges related to agriculture and market access, and to further refine project activities to the needs expressed by the proposed project's ultimate beneficiaries.

182. The proposed project was designed in collaboration with government (both national and sub-national), civil society organizations, development partners and beneficiaries. In June-July 2016, consultations with local governments and communities were conducted in the eight project Dzongkhags to discuss challenges related to agriculture and market access, and to tailor project activities to the needs expressed by beneficiaries. The team consulted with over 40 stakeholders during proposed project site visits to Punackha, Dagana, Samtse, Trongsa, Zhemgang Phodrang, Tsirang and Wangdue. The stakeholders represented multiple sectors and sub-national government, specifically Dzongkhag irrigation and water management officers, livestock officers, forestry officers, agriculture officers, park and forest managers, DoR sub-national officers, local government planning officers and Gewog administrators.

183. To inform the formulation of the proposed project, area-specific assessments and surveys were directly conducted or considered from the assessments conducted for the UNDP/GEF/LDCF project:

- Local Climate Change Vulnerability Assessment and Adaptation Planning. A participatory rapid appraisal (PRA) was performed at the sub-district level raised the concerns about climate change and the need for greater awareness and capacity building. Participatory discussions and key informant interviews (KIIs) were conducted to gather information from respondents in 46 Chiwogs/villages selected from 9 Gewogs. The questionnaire assessed community-level climate change vulnerabilities.
- Roads Assessment in GCF Project Districts. Field visits were performed at nine selected GC roads in GCF targeted districts. Interviews were conducted in eight GCF Dzongkhags with local government officials like Gups, Gewog Administrative Officers, Mangmi and Tshogpas/communities. Additional information was collected from engineers from the Department of Roads (DoR) at departmental head office Thimphu and field offices. Engineers from respective sites accompanied the field visits of the targeted roads providing information on roads and enabling discussions with the local government officials and other public at the survey sites.
- Value Chain and Market Analysis of Renewable Natural Resources Products. Consultations with key stakeholders took place both in the centers and districts through focus group discussions (FGDs) and KIIs, while one-to-one consultations were held with key informants in the Dzongkhags as identified by Gewogs corresponding to commodities. FGD representation was 69% male and 32% female from 6 villages, with ages ranging from 22 to 72 years. There were nine KII's with key stakeholders: Farmer groups and key informants such as village elders and progressive farmers, government officials, local government officials, Food Corporation of Bhutan, Sersang Agriculture Exports Company, Department of Trade, Ministry of Economic Affairs, Member

of Parliaments for BBIN, trade compacts and other issues, Department of Agriculture Marketing and Cooperatives, MoAF, and Bhutan Agro-Industries Ltd.

- Crop and Livestock Compensation/Insurance against Climate-Induced Disasters. Areas were selected based on the Climate Change Vulnerability Assessment, thus benefiting from more efficient data collection, than if the assignment was standalone. The information required for climate change induced impacts on agriculture and crop loss was collected by the vulnerability assessment team. PRA techniques and key informant interviews were employed to gather information from targeted respondents in the selected Gewogs and Chiwogs. Respondents at Gewog level included RNR extension agents and health officials of that Gewog and the Gup (Gewog head) wherever possible. Chiwog-level PRA participants included local communities from selected Chiwogs, with representation of both men and women. Open-ended interviews were conducted at the Gewog center with key, relevant resource managers.
- Assessment and Integration of Social, Environmental and Gender Standards in Project Design. Based on the proposed project areas, Gewogs and villages were selected from the following Dzongkhags: Trongsa, Wagdi Phodrang, Zhemgang, Dagana, Tsirang, Sarpang, Punakha and Samtse. Interviews were conducted with the heads of households; men (41) and women (26).

184. To capture the particular challenges faced by women, specific efforts were made to consult with women's groups to collect information regarding the impacts of climate change on women. A participatory rural appraisal was conducted on the Integration of Social, Environmental and Gender Standards in the eight proposed project Dzongkhags. The assessment applied household interviews and focus group discussions. Results found that women are likely to be impacted more than men due to their current workloads such as cooking, water, vegetables production, marketing, and childcare. The GCF project will support gender mainstreaming as roles and responsibilities of rural women are increasing in the agriculture development, thus have a higher impact due to climate change. Women in the project sites are expected to be engaged more actively in planning, management of activities and leadership roles.

185. The proposal is developed with significant multi-stakeholder discussions and participation. Initial consultations around the GCF project have provided the basis for the conceptualization of the project, which was developed by specific teams and missions dedicated to the project.

186. Stakeholder engagement has been an inclusive and continuous process throughout the project development phase and the results of the consultations are reflected in the project design.

187. The community engagement report summarizes the consultations already undertaken during the design phase. A stakeholder engagement plan has been developed for the proposed project that outlines how the project will engage local stakeholders to ensure inclusion through implementation toward collaborative achievement of the project objective. There will be a regular review of the plan to ensure new stakeholders are captured in the plan as relevant. The report, as well as, the assessments mentioned above have been included as part of Annex XIII.

E.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project/programme

E.6.1. Cost-effectiveness and efficiency

188. While investments in enhanced climate resilience (e.g. irrigation schemes, SLM measures and slope stabilization) are more cost-effective over time, it has been difficult for the government to cover this investment given the development priorities of a least developed country and the recurring recovery costs of monsoon related loss and damage. Support with these high upfront costs however will result in significant long term savings for the RGoB, allowing for greater investment in development and progress towards the sustainable development goals (SDGs). Indeed, investments in disaster preparedness have been estimated to be more than four times more cost effective than disaster response.³⁷

189. Integration of climate information into planning (i.e. agriculture and roads to include drainage and slope stabilization to adapt to projected climate impacts) will enable the shift from a responsive approach, which is placing increasing pressure on public resources, towards climate-resilient and sustainable development.

³⁷ http://ec.europa.eu/echo/files/aid/countries/factsheets/thematic/disaster_risk_management_en.pdf

190. The proposed project is also strategic in its design, building on and complementing interventions of other projects and programmes.

191. The UNDP/LDCF *Addressing the Risks of Climate Induced Disasters through Enhanced National and Local Capacity for Effective Actions* is on-going from July 2014 to June 2018. This project aims 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, livelihood and livelihood assets.” The USD 11.49 million project is coordinated by NEC Secretariat in partnership with UNDP. Implementing partners include MoWHS, the Department of Geology and Mines, Ministry of Economic Affairs, Tarayana Foundation and the Department of Disaster Management, Ministry of Human and Cultural Affairs. The project supports the National Center for Hydrology and Meteorology (formerly the Department of Hydro Met Services under the Ministry of Economic Affairs) with capacity building and equipment for hydro-meteorological and weather forecasting. A clear area for complementarity is to the development of climate information products tailored to the agriculture sector, including support to applying those products in agriculture planning. Support to development of this agro-meteorological capability needs to be aligned and tuned with current support efforts to synergize investments and contribute to knowledge exchange.

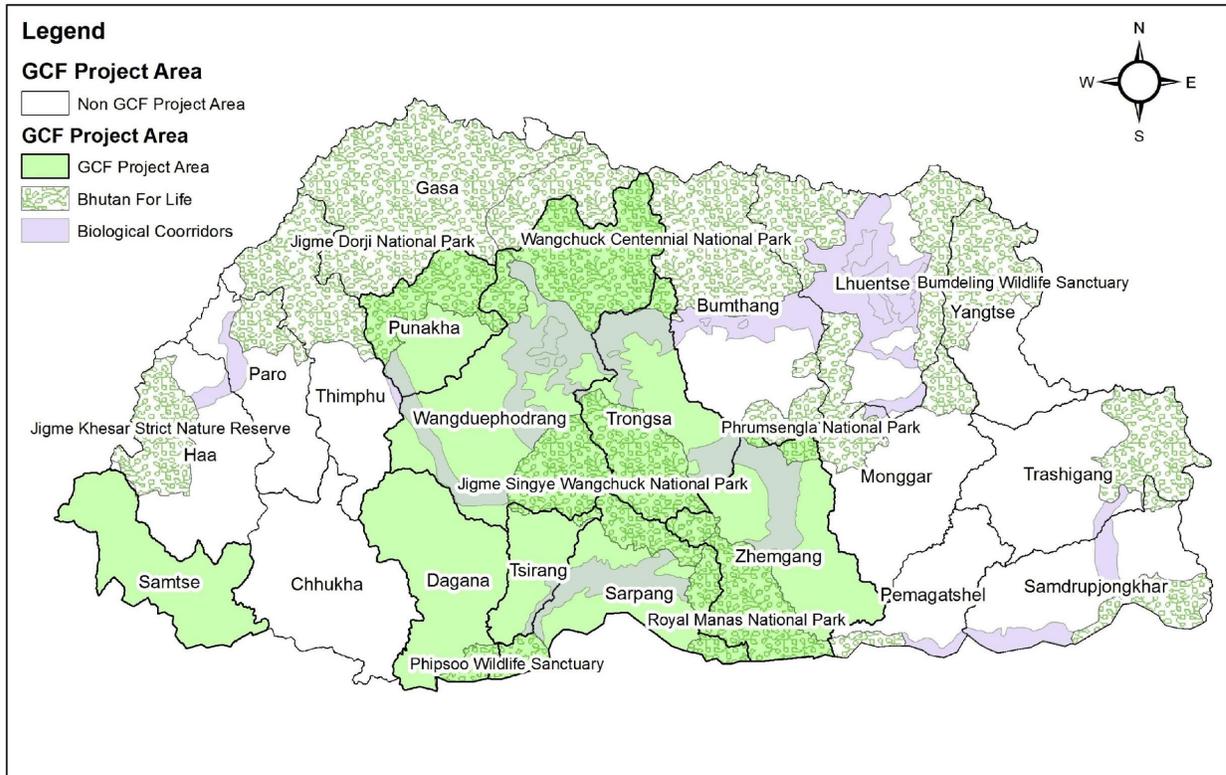
192. Similarly, the proposed project will build on the UNDP/GEF/LDCF *Enhancing Sustainability and Climate Resilience of Forest and Agricultural Landscapes and Community Livelihoods* project. The project is expected to be implemented 2017-2021 covering 12 Dzongkhags and 38 Gewogs, and has an Outcome directly linked to the proposed project. The project has four project Outcomes and seeks to operationalize an integrated landscape approach through strengthening of biological corridors, sustainable forest and agricultural systems, and building climate resilience of community livelihoods. Outcome 3, specifically, will focus on supporting climate-resilient livelihood options through diversification, SLM and climate-smart agriculture, as well as enhanced infrastructure. This Outcome will support communities and service providers to enhance climate resilience of livelihoods by optimizing and diversifying production, adding post-production value and improving sustainable access to markets.

193. The Feasibility Study, Annex II, further details the above projects, as well as others where there is potential to collaborate and maximize impact of combined resources.

194. A related initiative that forms part of the baseline is the Bhutan for Life (BFL) initiative of the RGoB, working with the World Wildlife Fund (WWF), to finance a one-time 14-year transition project to secure the climate-resilient, long-term management of Bhutan’s 19,750km² protected area (PA) system that covers 51% of the country. A comprehensive long-term climate-informed conservation plan has been developed for Bhutan’s PAs, and private, bilateral and multilateral donors are being engaged to address the 14-year gap with a “multi-party, single closing” blend financing, with the RGoB to gradually increase annual expenditures and assume full responsibility for financing the PA network at the end of the 14 years. The BFL initiative, through its Goal I that “Forest and vegetative cover within the PA System help Bhutan remain carbon neutral”, will include work on restoring forest in degraded upper catchment areas that fall inside PAs. This includes four PAs in the eight target Dzongkhags for the currently proposed project: Wangchuk Centennial National Park, Jigme Singye Wangchuk National Park, Royal Manas National Park and Phibsoo Wildlife Sanctuary, as well as biological corridors in Wangduephodrang, Trongsa, Zhemgang and Sarpang Dzongkhags (see map below for areas of complementarity). Restoration through BFL will enhance infiltration of water into the soil across a wide area, and minimize both flash-flooding and rainfall-induced slope failure through localized saturation.³⁸ The BFL related initiative will thus complement the currently proposed slope stabilization measures in the lower catchment areas where agricultural communities and farm roads are located, but will not directly address the need for climate-proofing of roads and associated slope stabilization and drainage.

³⁸ Kuenza, K. Dorji, Y. and Wangda, D. “Landslides in Bhutan”, paper presented to 2010 SAARC Workshop on Landslide Risk Management in South Asia

Potential complementarity between the proposed UNDP-supported GCF project and a related initiative, Bhutan for Life



195. Further, the project will coordinate with related initiatives currently in development, including the Water Flagship Programme being developed for GCF consideration, and the NAP Readiness (submitted to GCF and undergoing review).

E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

N/A

E.6.3. Financial viability

196. The financial analysis has been carried out in accordance with the Guidelines for the Financial Analysis of Projects of United Nations Development Program. These guidelines clearly mandate that a financial analysis of project cash flows be computed and FIRR calculated only for those proposed project activities or outputs that can reliably result in direct and quantifiable financial revenue generation (incremental earnings from baseline) or a direct and quantifiable financial savings potential to the project owners or to the project beneficiaries. These guidelines stand to ensure that GCF's minimum concession policy is always protected in the proposal.

197. In all there are 3 outputs and 9 activities that constitute this proposed project. However, only one of the Outputs (Output 3) results in direct and quantifiable savings to the Royal Government of Bhutan while the rest do not provide any direct and quantifiable benefit to the project sponsors or beneficiaries. It is only pertinent to mention here that these outputs (Output 1 and Output 2) of this proposed project result only in non-attributable savings that are of public good in nature to the larger community of the at-risk population in Bhutan. Hence, a financial modeling-based analysis has been carried out only for Output 3.

198. However, considering the GCF's minimum concession policy, this project's proposed activities from Output 1 and Output 2 have been analyzed from a macro-economic and government perspective to assess the need for GCF grant as the only feasible financial instrument to fund the project activities. Hence, taking into consideration the financial analysis

and the other factors such as the public good nature of benefits arising out of the project, climate change being the key driver, Bhutan's current economic situation, the persistent fiscal risks, IMF's cautiousness and the catalytic nature of GCF grants, the following is recommended:

- There is significant co-financing from RGoB and there is no incremental ability to stretch their contributions owing to budgetary and fiscal consolidation reasons.
- The nature of the benefits does not accommodate repayment of capital in whatever form or serviceability of a loan instrument.
- The nature of the beneficiaries and the level of essentiality of the service do not accommodate repayment of capital in whatever form or serviceability of a loan instrument.
- Hence, it is recommended that in order to reduce / close the existing financing and knowledge gaps and barriers to improve resilience of Bhutan's at-risk farming households (58% of the livelihoods) to climate change-induced risks, catalytic capital in the form of GCF grants are essential.

E.6.4. Application of best practices

199. The proposed project benefits from the lessons learned and best practices of previous efforts, and has been designed incorporating proven measures to bring about transformative impacts. A more comprehensive account of lessons learned and best practices has been articulated in the Feasibility Study, Annex II. While the proposed project will build on best practices from several projects, below are summaries related to two key interventions.

Decentralized Rural Development Project

200. Funded by the World Bank (USD7 million credit, USD5 million grant) for the period 2001-2014, the project focused on: a) improvement of farm roads and irrigation canals, b) support for improved technologies and marketing of rice, maize and potato towards the objective to improve market access and increase agricultural output for rural communities in selected areas of Bhutan to contribute to the RNR strategy of the 9th FYP. The outputs of the project include: new irrigation channels, new farm road construction, improvement of existing farm roads, bridges, power tiller track construction, construction of RNR/Gewog Centers, and trainings/demonstrations and trials for farmers. The project resulted in several impacts and measured an overall internal rate of return (IRR) of 24%³⁹, quantifiable results based on surveys include⁴⁰:

- 19% higher yield than local variety for Bajo Maap 2 and Khangma Maap (paddy); 49% higher yield than local variety for IR-64 (paddy); 17345 minitubers of potato harvested unit in 2013 from aeroponics; increase from earlier 5 tons production to 60 tons potato seeds from Phobjikha National Seed Centre (NSC) in 2012; 7 tons of G2 potato seed of Desiree variety harvested in 2014; 875 tons seed potatoes produced and marketed; 9 community maize seed production group produced 27MT of seeds in 2012 with 37% increased income as compared to 2011; 15% seed replacement (in 2011), 45% replacement (in 2012) and another 15% replacement (in 2013) done for maize (GLS disease affected areas).
- With roads and ease in marketing, intensification of vegetables and with varieties including potato was reported that contributed towards improvement in nutrition in beneficiary households. Food self-sufficiency for 12 months increased for 123.8% of households. As a significant co-benefit, the availability of farm roads and increased income from agricultural products has helped farmers to purchase household assets, as well as other assets including vehicles, power tillers, materials for house construction and improved cattle breeds.
- Market access for agricultural products improved since 2009 for 71.9% respondents (Zhemgang Dzongkhag was a notable exception as markets and consumers are not available along national main roads despite having farm road connectivity).

201. The design of the GCF project takes a similar approach in that it includes support to farmers, irrigation and road enhancement. While the World Bank project was largely development focused, the proposed project applies a climate resilience lens – supporting farmers to make climate-informed choices related to crop choice and crop calendar, applying modern irrigation techniques to protect schemes from climate change impacts and focusing on enhancing climate resilience of existing roads.

³⁹ Impact Assessment and Project completion Reporting for Decentralized Rural Development Project (WB, MoAF 2014)

⁴⁰ Impact Assessment and Project completion Reporting for Decentralized Rural Development Project (WB, MoAF 2014)

Slope Stabilization through Scaling Up of Sustainable Land Management Technologies

202. The steep slopes of Bhutan are an important characteristic of Bhutan that contribute to its vulnerability to climate change. The proposed project therefore also includes upscaling of the successful approaches employed by the *Sustainable Land Management Project (SLMP)*, a GEF-World Bank funded project of USD12 million, implemented by the NSSC under the DoA from 2006 to 2013. Through the SLMP, the SLM approach has been shown to help increase productivity of crops and livestock due to reduced soil erosion, increased cultivation areas, improved workability of soils and through enhancing fodder availability. The participatory SLM Action Planning employed by the SLMP enhanced community commitment and ownership, and facilitated the inclusion of local knowledge in decision-making related to the sustainable use and access to natural resources⁴¹. The Participatory SLM Action Planning methodology combined with related approaches (such as natural resources mapping and participatory monitoring and evaluation (M&E)) provides an interactive platform to improve implementation of SLM interventions. The approaches form an integrated system that facilitates continuous engagement and participation of the communities and other stakeholders and promotes ownership and engagement of the rural farming communities.

203. The project developed a participatory SLM action planning at the village and Gewog level in 3 pilot Dzongkhags: Chhukha, Zhemgang and Trashigang. The participatory action plans contained a wide range of SLM interventions aimed at reducing land degradation, improving soil fertility and agricultural production and enhancing vegetative cover and ultimately enhancing community livelihoods. In a scaling-up phase the SLM techniques and approaches developed in the pilot phase were rolled out in total 133 villages in the pilot Dzongkhags. SLM piloting under SLMP showed clear impact for the households on their livelihoods, additional to the more indirect environmental benefits of arresting land degradation, enhancing soil fertility and workability of the land and improving crop yield. A longer-term engagement with communities, starting from participatory action planning for SLM at village level, combined with capacity building and awareness raising and implementation support and participatory monitoring, proved successful in raising awareness of rural farmers of the need for SLM. Support to SLM requires careful packaging of long-term SLM interventions, with impacts to be felt by households in the medium- to long-term with more direct short-term impacts through support for inputs as improved seeds, tools and labor compensation. Key lessons from SLMP are documented in a series of publications, including the Participatory Action Planning Manual and Tool Kit (NSSC, 2008), Working the Land (NSSC, 2011), Participatory Approaches in SLM (NSSC, 2011), and the Bhutan Catalogue of Soil and Water Conservation Approaches and Technologies (BHUCAT)⁴².

204. Further information about these projects can be found in Annex VIII.

E.6.5. Key efficiency and effectiveness indicators

Estimated cost per t CO ₂ eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)	
<i>GCF core indicators</i>	(a) Total project financing N/A
	(b) Requested GCF amount N/A
	(c) Expected lifetime emission reductions overtime _____ tCO ₂ eq
	(d) Estimated cost per tCO₂eq (d = a / c) US\$ _____ / tCO ₂ eq
	(e) Estimated GCF cost per tCO₂eq removed (e = b / c) US\$ _____ / tCO ₂ eq
N/A	

⁴¹ Working the Land: Documenting the Key Lessons of Sustainable Land Management on Steep to Very Steep Slopes in Bhutan (NCCS, 2011)

⁴² BHUCAT is a catalogue with soil- and water conservation techniques and approaches piloted by SLMP for the steep to very steep Bhutanese slopes and agricultural practices and documented following the WOCAT documentation methodology - a best practice and standard for documentation of soil and water conservation technologies and approaches.

	<p>Expected volume of finance to be leveraged by the proposed project/programme and as a result of the Fund's financing, disaggregated by public and private sources (mitigation only)</p>
	<p>N/A</p>
<p>Other relevant indicators (e.g. estimated cost per co-benefit generated as a result of the project/programme)</p>	

F.1. Economic and Financial Analysis

205. The project relies on grant finance as (a) the proposed interventions will increase resilience of the agricultural sector in Bhutan to the impacts of climate change, (b) targets eight Dzongkhags (districts) which are both highly vulnerable to climate change and have high rates of poverty (c) does not generate revenue that lends itself to providing reflows to the GCF or the RGoB.

206. The economic analysis of the proposed project was carried out in accordance with the Guidelines for the Economic Analysis of Projects of UNDP. The economic efficiency of the investment was determined by computing the economic net present value (NPV) with an assumed 10% discount rate, and the economic internal rate of return (IRR). The activities of Output 1 (Promote resilient agricultural practices in the face of changing climate patterns) are not amenable to the conduct of a cost-benefit analysis on their own. This Output can be best understood as supporting the achievement of Output 2 (Integrate climate change risks into water management practices that affect smallholders). While the benefits cannot be separately assessed ex-ante of the project, the costs of Output 1 in any given year of project implementation are allocated to Output 2. Project Management costs similarly are not amendable to the conduct of a cost-benefit analysis on their own, while they support the achievement of each Output. These costs are distributed across Outputs based on their respective investment volume. The total cost of the project (i.e. GCF and co-financing) is therefore captured in the economic analysis, while the estimates used in the economic analysis are conservative estimates with minimum benefit values used in all the benefit calculations.

207. In Output 2 the economic benefits that are valued in the economic analysis of the project are based on the improvement of the irrigation schemes to increase agricultural productivity, i.e. the increase of paddy yield and allowing for double cropping of rice and vegetables (potatoes). The economic benefits of climate resilient road infrastructure (Output 3) are estimated as cost saved with respect to monsoon restoration cost, travel time cost, vehicle operating cost and operation and maintenance cost, as well as the gross operating surplus and labour compensation triggered by project costs in Bhutan's construction sector.

208. The economic analysis for Output 2, which assessed the net benefit from increased yield and adoption of double cropping due to irrigation indicates that the expected economic internal rate of return is 17% for this project, which exceeds 10%, the economic opportunity cost of capital. The impact of climate change on crop yields has been considered in the counterfactual (without project) scenario and in estimating the benefits of the project. Testing the sensitivity of the key assumption, i.e. the expected paddy yield increase, the adoption rate of double cropping and the expected impact on crop yields from climate change, the proposed investments are still economically feasible in case the expected paddy yield increase is only 2% (instead of 17%). In case paddy yield increase should be zero, an adoption rate of double cropping of 53% (instead of 50%) is required to make the investment economically feasible.

209. Likewise, the proposed investment related to climate resilient road infrastructure (Output 3) shows a positive Net Present Value of USD 2.3 million and an internal rate of return of 12.3%. Sensitivity testing of the main assumptions, i.e. the number of vehicles travelling per day and the speed increase as a result of the road restoration, showed that the NPV will become zero in case of a 16.2% lower traffic volume as assumed in the baseline case or a speed increase of only 11.9 kph which would be 21% lower than the baseline assumption.

210. It should be noted that the estimates used in the economic analysis are conservative estimates with minimum benefit values used in all the benefit calculations. International case studies from Asia found that paddy yield increases, as result of irrigation, are between 100-150%. However, in line with a previous impact study of an irrigation project in Bhutan, which suggested that paddy yield increase only amounted to 17%, this value was chosen to allow for a conservative estimate of Output 2. In line with secondary literature which states that double cropping is widely adopted by farmers and consultation with local experts which assume 70% of the irrigated area to be double cropped, a double cropping adoption rate of 50% of the irrigated area was assumed in Output 2. For the analysis of climate resilient road infrastructure (Output 3) conservative estimates for a number of inputs have been made to avoid the risk of overestimating effects: (1) The wider social and economic effects related to road networks have not been quantified as the roads were maintained and not newly constructed, thus it is assumed that it was already possible to travel and transport freight, but at higher travelling cost levels. Thus, changes in behaviour of the road users due to the improved road network have not been quantified. (2) The traffic volume increase over time has been limited to

50% of the national average, as the target areas are located in rural areas. (3) The benefits from higher road safety were included in the analysis.

211. The use of 10% discount rate is based on the nature of the benefits from the project. Normally for environmental goods we will like to argue for discount rate lower than the conventional 10% but because of the cost of capital in the country we cannot justify using a lower rate.

212. Other benefits such as value of improved food and nutritional security of households, improved security of agricultural livelihoods, improved agro-ecosystem and social cohesion, improved market access and marketing opportunities, reduced fatalities and accidents due to improved roads, social benefits from improved road connectivity such as better access to education or health infrastructure, and all benefits resulting from capacity development and awareness raising are not easily quantifiable and in some cases confidence in the values may be lower. The implication of ignoring these additional benefits is that the estimates of the economic IRR and NPV will be the lower bound and provide conservative estimates of the value of the project.

213. The details of the economic analysis are presented in Annex XII of this proposal.

F.2. Technical Evaluation

214. The proposal was designed in consultation with government stakeholders, technical experts and communities. To ensure technically sound project design, a Feasibility Study (Annex II) was conducted as part of the development phase of the project. The Feasibility Study reviewed the lessons learned and best practices from on-going and past efforts in different parts of Bhutan, as well as relevant studies and assessments. The key recommendations of the Feasibility Study were as follows:

- The project should focus on supporting capacity building of stakeholders and local institutions to enhance the national capacity for better understanding and mainstreaming of climate change issues into the national programs.
- The project is recommended to contribute to the reduction of the vulnerability of the agricultural sector through focus in its intervention strategies on the adaptation of more resilient water infrastructure, climate-resilient technologies, and climate-smart agricultural practices and useable tailor made seasonal weather forecasting to reduce and mitigate the risks.
- It is recommended to support and invest in the diversification and intensification of farming, adoption of climate livestock practices, the improvement of production technologies, development of irrigation, assured and reliable access and connectivity to the market.
- The agricultural sector has been and is supported by a range of projects, focusing on water, infrastructure development and agricultural production and innovative practices and it is recommended to build on these existing efforts. Best practices and lessons shared should be incorporated in the proposed project implementation and be combined with a close coordination set-up with on-going projects to maximize synergies, avoid geographic overlap and improve complementarity as well as to provide an effective knowledge exchange platform.
- The RGOBs' financial and technical capacity to invest on the development and maintenance of climate resilient infrastructure, that are key drivers of agriculture commercialization, is extremely limited. It is recommended to target interventions that will holistically support the enhancement and resilience of agriculture and food security to climate change.
- It is recommended for the project to support climate-resilient agriculture, enhance market analysis, engage in testing and assessing prudent, pragmatic and innovative weather based insurance schemes and help the RGoB to scale up pragmatic risk transfer schemes to protect the vulnerable rural communities from the severe impact on their livelihood sources.

215. These recommendations, as well as suggestions for complementarity with other projects and lessons learned/best practices from other projects, have been incorporated into the project design. Please see the Feasibility Study, Annex II, for further information.

F.3. Environmental, Social Assessment, including Gender Considerations

216. The proposed project has been screened against the UNDP's Social and Environmental Standards Procedure and deemed a Moderate Risk (World Bank/International Finance Corporation Category B) project. As such, an Environmental and Social Management Framework (ESMF) has been prepared, and is included as part of Annex VI.

217. The project does not require any land acquisition and/or resettlement.

218. All people within Bhutan are considered Indigenous People. There are many smaller ethnic groups integrated into the major ethnic groups (Ngalop, Sharchop and Lhotsampa), which themselves are not necessarily distinct or exclusive. While the project does not require an FPIC or a separate Indigenous Peoples' Planning Framework, stakeholder consultations and engagement will be informed by guidelines based on FPIC standards, which have been endorsed by the RGoB.

219. The project does however have the potential to cause moderate environmental and social impacts. These include impacts to water quality through sediment movement during mechanical water retention ponds restoration and improvement and road works. This is likely to have a beneficial impact in the medium to longer term by reducing erosion and thus impacts on water quality. Noise and air quality may also be impacted during these works. Appropriate actions are proposed to deal with these issues. The project will also result in the development of a seed bank and the project will ensure there are no genetically modified seeds/crops used and moreover, only local provenance will be used.

220. Appropriate and relevant avoidance and mitigation options have been proposed in the ESMF, which if put in place, will significantly reduce the potential impacts of the project to an acceptable level. Moreover, the project will have significant environmental and social benefits that will be achieved more generally.

221. Budgeting for environmental interventions and the application of mitigation measures to enhance positive impacts for the eight provinces in Bhutan is an investment in the future as it will reduce the environmental and social liability at local, provincial and national levels. The mitigation measures will ensure clean water, more productive soils with less chemicals, more resilient crops to the impacts of climate change, healthy ecosystems, knowledgeable communities and overall improvement in the quality of life of the population as an investment in the future of the eight provinces, which if implemented as per the project proposal, will be repaid many times over through reduced long-term operating costs of implementing the project.

222. Further, the project has developed a Grievance Redress Mechanism to deal with any concerns or issues that may arise as a result of the project. This Grievance Redress Mechanism complies with Bhutan and UNDP Safeguard procedures.

Gender Considerations

223. The growing trend of men leaving agriculture, in search of off-farm employment opportunities, is resulting in an increasing feminization of the agriculture sector.

224. Community consultations were conducted as part of the project development phase (see Annex XIII). Practical needs and priorities expressed by women were similar to men's, including drinking and irrigation water (64%), seeds and seedlings (35%), agricultural machinery (36%), electric/solar fence against wildlife incursions (50%) and entrepreneurial skills development (43%). Women's strategic priorities, however, were different from men's. Women highlighted education (53%) and health (50%) leveraging gender equality and women's empowerment while men expressed the need for farm roads (90%) and solar/electric fence (80%) to improve accessibility and combat wildlife incursion. While there have been significant improvements in education, women still lag behind men.

Literacy Rate by Area and Gender⁴³

Area	Overall Literacy Rate			Youth Literacy Rate			Adult Literacy Rate		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Urban	86.7	72.0	79.2	95.4	88.7	91.6	84.1	65.3	74.5
Rural	65.0	47.1	55.9	88.2	78.7	83.4	58.0	36.6	46.9
Total	71.6	54.7	63.0	90.4	82.2	86.1	66.0	45.2	55.3

225. Training to communities will consider the particular needs of women, as will the packaging and dissemination of tailored climate information products. Further, the training on market opportunities will incorporate the expressed need for greater entrepreneurial skills. Consultations will ensure that women’s views and needs continue to inform the project during implementation, and gender-disaggregated indicators will ensure that activities are reaching and benefiting women.

226. The project will make use of existing time use data to understand the engagement of women in various activities, ensuring women are not overburdened by project activities. Further, given the increasingly difficult farming landscape and the gender and age dynamics of the agriculture sector in Bhutan, the project promotes labor-saving technologies such as hydroponics, aeroponic and vertical farming. Farmers’ trainings, field demonstrations and awareness activities will be implemented at the village level to ensure women have the opportunity to actively participate and to ensure effective delivery of knowledge and technical practices. Technical expertise related to training activities for government and for farming communities will ensure participation of women, climate information will be tailored to the needs of women, and design of survey instruments and support to government data collection methodologies will ensure sex-disaggregated data.

227. The project is designed in line with national policies and programmes related to empowerment of women. Project implementation will be in consultation with the National Commission of Women and Children (NCWC) and the gender focal points of the GNHC and respective Ministries, to ensure the particular challenges faced by women are appropriately considered and integrated. Community consultations and trainings will make the necessary links to relevant policies and programmes related to women and women’s empowerment, so that women in communities are aware of their rights and of support available (e.g. Respect Educate Nurture Empower Women (RENEW) <http://renew.org.bt/>).

228. The project team will be expected to be knowledgeable about gender issues in the country, and to approach project activities with the required sensitivity. Related training will be provided by UNDP, and Gender Specialists at UNDP Bhutan and the UNDP regional office will provide guidance and support during implementation. A Gender Specialist will be hired under the project to further ensure that implementation is gender-responsive at key point of implementation.

229. The Gender Analysis and Action Plan developed during proposal development are included in Annex XIII.

F.4. Financial Management and Procurement

230. The financial management and procurement of this project will follow UNDP financial rules and regulations available [here](#)⁴⁴.

⁴³ Bhutan Living Standards Survey (National Statistics Bureau and ADB, 2012)

⁴⁴ In line with UNDP National Implementation (NIM) Guidelines, the Government is responsible for the management and procurement of the Project to achieve project outputs. Government regulations, rules and procedures therefore apply to project implementation to the extent that they do not contravene the principles of the Financial Regulations and Rules of UNDP. UNDP Financial Regulations section 16.05 state:

- “The administration by executing entities or, under the harmonized operational modalities, implementing partners, of resources obtained from or through UNDP shall be carried out under their respective financial regulations, rules, practices and procedures only to the extent that they do not contravene the principles of the Financial Regulations and Rules of UNDP.

231. Further guidance is outlined in the financial resources management section of the UNDP Programme and Operations Policies and Procedures available [here](#).

232. UNDP has comprehensive procurement policies in place as outlined in the 'Contracts and Procurement' section of UNDP's Programme and Operations Policies and Procedures (POPP). The policies outline formal procurement standards and guidelines across each phase of the procurement process, and they apply to all procurements in UNDP. See [here](#).

233. The project will be implemented following the National Implementation Modality (NIM) following NIM guidelines available [here](#)⁴⁵. UNDP has ascertained the national capacities of the Implementing Partner/Executing Entity by undertaking an evaluation of capacity following the Framework for Cash Transfers to Implementing Partners/Executing Entities (part of the Harmonized Approach to Cash Transfers - [HACT](#)).

234. All projects will be audited following the UNDP financial rules and regulations noted above and applicable audit guidelines and policies⁴⁶.

235. The NIM Guidelines are a formal part of UNDP's policies and procedures, as set out in the UNDP Programme and Operations Policies and Procedures (POPP). The NIM Guidelines were corporately developed and adopted by UNDP, and are fully compliant with UNDP's procurement and financial management rules and regulations.

236. The national executing entity is GNHC (acting on behalf of the Royal Government of Bhutan) - also referred to as the national 'Implementing Partner' in UNDP terminology - is required to implement the project in compliance with UNDP rules and regulations, policies and procedures (including the NIM Guidelines). In legal terms, this is ensured through the national Government's signature of the UNDP Standard Basic Assistance Agreement (SBAA), together with a UNDP project document which will be signed by the Implementing Partner to govern the use of the funds. Both of these documents require compliance. Prior to signature of the project document, all national Implementing Partners need to have undergone a Harmonized Approach to Cash Transfer (HACT) assessment by UNDP to assess capacities to implement the project. During implementation, UNDP will provide oversight and quality assurance in accordance with its policies and procedures, and any specific requirements in the Accreditation Master Agreement (AMA) and project confirmation to be agreed with the GCF. This may include, but is not limited to, monitoring missions, spot checks, facilitation and participation in project board meetings, quarterly progress and annual implementation reviews, and audits at project level or at Implementing partner level on the resources received from UNDP.

237. The Harmonized Approach to Cash Transfer (HACT) framework consists of four processes: (1) macro assessments; (2) micro assessments; (3) cash transfers and disbursements; and (4) assurance activities. Assurance activities include planning, periodic on-site reviews (spot checks), programmatic monitoring, scheduled audits and special audits. During micro-assessment, there can weaknesses identified for which actions are required to addresses the gaps. When a spot check finds that the gaps are not addressed it will mean that the level of assurance activities will have to remain higher and modalities of engaging with that implementing partner will have to be reviewed if necessary. All details are available [here](#).

238. The project will be audited in accordance with UNDP policies and procedures on audits, informed by and together with any specific requirements agreed in the AMA. According to the current audit policies, UNDP will be appointing the auditors. In UNDP scheduled audits are performed during the programme cycle as per UNDP

- Where the financial governance of an executing entity or, under the harmonized operational modalities, implementing partner, does not provide the required guidance to ensure best value for money, fairness, integrity, transparency, and effective international competition that of UNDP shall apply."

⁴⁵ In line with UNDP NIM Guidelines, the Project will be implemented following Government regulations, rules and procedures. The Government will ensure that their respective procedures do not contravene the principles of UNDP Financial Rules and Regulations.

⁴⁶ In line with UNDP NIM Guidelines, and in accordance with UNDP Policies and Procedures on audits, the Project shall be audited in accordance with HACT audit framework whereby the project can assign the national Supreme Audit Institution (SAI) to conduct financial audits.

assurance/audit plans, on the basis of the implementing partner's risk rating and UNDP's guidelines. A scheduled audit is used to determine whether the funds transferred to the implementing partner were used for the appropriate purpose and in accordance with the work plan. A scheduled audit can consist of a financial audit or an internal control audit⁴⁷.

239. GCF resources will be provided to the implementing partner, less any agreed cost recovery amount. Under UNDP's national implementation modality, UNDP advances cash funds on a quarterly basis to the implementing partner (executing entity) for the implementation of agreed and approved programme activities, in accordance with UNDP standard policies and the NIM Guidelines. The implementing partner reports back expenditure via a financial report on quarterly basis to UNDP. Any additional requirements will be as in accordance with the AMA as and when it is agreed.

⁴⁷ In line with UNDP NIM Guidelines, and in accordance with UNDP Policies and Procedures on audits, the Project shall be audited in accordance with HACT audit framework whereby the project can assign the national Supreme Audit Institution (SAI) to conduct financial audits.

G.1. Risk Assessment Summary

240. As the proposed project will build on the results and successes of existing programs, and benefits from the lessons learned from previous efforts, its design minimizes exposure to potential risks. UNDP's relationship with government partner agencies is well established, with financial and programme monitoring systems in place to provide on-going technical and other oversight. In addition, the project has been formulated based on consultations at the national and local level, and project design has been reviewed by stakeholders at all levels, including a sample of community representatives. That notwithstanding, a number of potential risks have been identified and detailed below, along with mitigation measures. Risks for the proposed project are considered low or moderate.

G.2. Risk Factors and Mitigation Measures

Please describe financial, technical and operational, social and environmental and other risks that might prevent the project/programme objectives from being achieved. Also describe the proposed risk mitigation measures.

Selected Risk Factor 1

Description	Risk category	Level of impact	Probability of risk occurring
Long term sustainability of investments (e.g. irrigation, road enhancements)	Technical and operational	Medium (5.1-20% of project value)	Low

Mitigation Measure(s)

The probability of risk is low due to mitigation measures. Implementation will actively engage local groups and associations (e.g. RUGs, WUAs) to ensure greater ownership and thus long term sustainability. Further there is strong commitment by the government as interventions support national priorities - interventions will be integrated into the 12th FYP of the 8 Dzongkhags and co-financing is being provided by government to support O&M both during project duration and post-project.

Selected Risk Factor 2

Description	Risk category	Level of impact	Probability of risk occurring
Environmental risks associated with irrigation, SLM interventions, and climate-proofing of existing roads.	Social and environmental	Medium (5.1-20% of project value)	Medium

Mitigation Measure(s)

The probability of risk is medium due to mitigation measures:

Irrigation

Water will be sourced from the small catchment areas and will not involve construction of large reservoirs or dams. The irrigation system through the proposed project will focus on pressurized system using HDPE pipes and micro irrigation system for small scale land holdings. This is expected to minimize environmental damages during and after construction. In addition, the proposed irrigation system will be laid along the existing irrigation canals which are no longer fully functional.

SLM interventions

Measures will be taken to minimize any sediment entering waterways as a result of earthworks, including to ensure activities do not occur during periods of rainfall which could significantly increase sediment discharges and erosion. All works should comply with the Erosion, Drainage and Sediment Control Plan (EDSCP).

Roads work

The proposed project will focus only on climate-proofing existing roads, which are currently unpaved and therefore vulnerable to flooding and at risk of landslides. The project will employ environmentally-friendly road construction (EFRC) standards to minimize environmental impacts. Climate proofing of roads will be done through government co-financing, while only slope stabilization of 3 sections of main road will be supported with GCF resources.

A detailed Environmental and Social Management Framework (EMSF) has been developed and attached as Annex VI.			
Selected Risk Factor 3			
Description	Risk category	Level of impact	Probability of risk occurring
Project interventions do not prevent the ongoing rural-urban migration in target communities, and declines in overall agriculture productivity continue.	Technical and operational	Medium (5.1-20% of project value)	Medium
Mitigation Measure(s)			
Project interventions are expected to increase crop yield, improve market access, and inform agriculture production through research to improve competitiveness. Communities will be engaged throughout the project, from implementation to M&E. Field officers will be recruited through the project to ensure communities and district government staff have access technical advice, and opportunities to express concerns as necessary. Through regular monitoring, success of interventions will be measured and communicated to communities to provide assurance, as well as to inspire behavior change.			
Selected Risk Factor 4			
Description	Risk category	Level of impact	Probability of risk occurring
Staff turnover or lack of technical capacity within executing entity.	Technical and operational	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
Needs assessments will be undertaken to identify any specific needs and gaps to inform design of training materials. Training programmes will apply a training-of-trainers approach for continuity. Training materials will be packaged and made available online for continued learning or as refresher courses.			
Selected Risk Factor 5			
Description	Risk category	Level of impact	Probability of risk occurring
Extreme event disrupts implementation or damages investments, resulting in delays and additional costs. Bhutan is at increased risk of climate-related natural hazards, such as landslides, flashfloods, and glacial lake outburst flood (GLOF), this could impact implementation as well as long term sustainability of investments.	Technical and operational	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
Planning of earthworks and construction activities during implementation will be timed to minimize risk to the extent possible (e.g. planning around peak monsoon periods).			
Design of investments will be risk-informed to ensure long term resilience.			
Selected Risk Factor 6			
Description	Risk category	Level of impact	Probability of risk occurring
Crop loss due to other factors, impacting project intervention attribution and results.	Technical and operational	Low (<5% of project value)	Low
Loss of agriculture crops to large mammals and primates are a serious concern in Bhutan. In a small holder mixed farming system, any loss of crop to wild animals impacts seriously on household and community food security, exposing them to risk and vulnerability to extreme climate events.			

As it pertains to this project, this can also mute the results of the project, and inhibit buy-in by communities if results cannot be accurately documented.			
Mitigation Measure(s)			
In order to enhance the risk proofing from such events, wildlife conflict mitigation technology such as environmentally-friendly, low cost electric fencing system and low cost pest management technology such as super bag to deal with storage pests, will be used to protect crops and agriculture product where appropriate.			
Other Potential Risks in the Horizon			
N/A			

H.1. Logic Framework.

Please specify the logic framework in accordance with the GCF's [Performance Measurement Framework](#) under the [Results Management Framework](#).

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level ⁴⁸						
Paradigm shift objectives						
<i>Increased climate-resilient sustainable development</i>	The proposed project, through an integrated approach will a) promote resilient agricultural practices in the face of changing climate patterns, b) integrate climate change risks into water management practices that affect smallholders and c) reduce the risk and impact of climate change induced landslides during extreme events that disrupt market access					
Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Fund-level impacts						
<i>A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions</i>	1.2 Number of males and females benefiting from the adoption of diversified, climate-resilient livelihood options (including fisheries, agriculture, tourism, etc.) ⁴⁹	Gender-disaggregated project survey, monitoring visits, progress reports, DoA Annual Renewable Natural Resource (RNR) Survey conducted by MoAF	0	Total: 25,000 Male: 12,240 Female: 12,760 (note: households not necessarily unique per intervention ⁵⁰)	<u>Irrigation</u> Total: 14,340 Male: 7,050 Female: 7,350 <u>SLM</u> Total: 103,346 Male: 50,601 Female: 52,745 <u>Resilient agricultural practices</u> Total: 64,591 Male: 31,626 Female: 32,965	Climate-resilient crops, practices and cultivation alternatives are adopted by beneficiary households
<i>A2.0 Increased resilience of health and wellbeing, and food and water security</i>	2.3 Number of males and females with year round access to reliable and safe water supply despite climate shocks and stresses ⁵¹	Monitoring visits, progress reports, Annual RNR Survey (MoAF)	0	Total: 5000 Male: 2450 Female: 2550	Total: 14,340 Male: 7,050 Female: 7,350	Landslide or flashflood events not so extreme that investments are severely damaged Engagement of WUAs for O&M

⁴⁸ Information on the Fund's expected results and indicators can be found in its Performance Measurement Frameworks available at the following link (Please note that some indicators are under refinement): http://www.gcfund.org/fileadmin/00_customer/documents/Operations/5.3_Initial_PMF.pdf

⁴⁹ Distribution between men and women based on the 2015 Agriculture Statistics for the 8 project dzongkhags

⁵⁰ i.e. farmers may benefit from all interventions, or a combination of irrigation, SLM and resilient agriculture measures, reflecting the appropriateness of interventions for the location and landscape

⁵¹ Distribution between men and women based on the 2015 Agriculture Statistics for the 8 project dzongkhags

<p><i>A3.0 Increased resilience of infrastructure and the built environment to climate change</i></p>	<p>3.1 Number and value of physical assets made more resilient to climate variability and change, considering human benefits (reported where applicable)</p>	<p>Ministry (MoAF and MWHS) assets register, monitoring visits, progress reports by executing entity</p>	<p>0</p>	<p>Climate resilience enhanced for:</p> <ul style="list-style-type: none"> • 90 km of farm roads (USD 2.970 million) • 140 km of GC roads (USD 7.214 million) • 1 section of main road (USD 0.553 million) • 16 irrigation schemes (USD 4.000 million) 	<p>Climate resilience enhanced for:</p> <ul style="list-style-type: none"> • 170.24 km of farm roads (USD 5.618 million) • 232.22 km of GC roads (USD 11.966 million) • 3 sections of main road (USD 2.019 million) • 32 irrigation schemes (USD 8.192 million) 	<p>Government commitment/co-financing is secured and applied to climate-resilient roads work in target area, and related O&M</p> <p>Landslide or flashflood events not so extreme that investments are severely damaged</p>
---	--	--	----------	--	---	---

H.1.2. Outcomes, Outputs, Activities and Inputs at Project/Programme level

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Project/programme outcomes	Outcomes that contribute to Fund-level impacts					
A6.0 Increased generation and use of climate information in decision-making	A6.2 Use of climate information, climate-informed analyses in decision-making in sectors impacted by climate change	Tools or products to inform climate resilient planning - model/forecast climate, flood, drought and water resource information (on daily to seasonal, as	0	3 tailored products to inform climate-resilient agriculture planning	9 tailored products to inform climate-resilient agriculture planning (1 per dzongkhag, 1 national level) ⁵²	Commitment of stakeholders to climate-informed planning and related data collection needs

⁵² Consistent with indicator of 12th Five Year Plan

		<p>well as medium to long term timescales)</p> <p>Annual survey by Department of Roads, (Ministry of Works and Human Settlements), including inputs from Road User Groups</p> <p>Training surveys, tracer studies</p> <p>Stronger emphasis on climate change and climate data in planning documents</p> <p>Integration of questions on use of climate information integrated into annual RNR survey</p> <p>Gender-disaggregated household surveys (project randomized control trials)</p>				
			0	1 disaster database for roads enhanced	1 (disaster database for roads enhanced)	
			0	20% of project beneficiaries receiving advisories, consider them in decision making	60% of project beneficiaries receiving advisories consider them in decision-making	

A7.0 Strengthened adaptive capacity and reduced exposure to climate risks	A7.1 Use by vulnerable households, communities, businesses and public-sector services of Fund supported tools, instruments, strategies and activities to respond to climate change and variability sectors	Annual RNR Survey (MoAF), Gender-disaggregated household surveys (project randomized control trials); progress reports	0	10% increased crop yield for 20% of beneficiaries	30% increase in crop yield for 70% of beneficiaries	Climate-resilient crops, practices and cultivation alternatives are adopted by beneficiary households
Project/programme outputs	Outputs that contribute to outcomes					
Output 1. Promote resilient agricultural practices in the face of changing climate patterns	1.1. % of beneficiaries in targeted dzongkhag accessing improved climate services	Annual RNR survey Gender-disaggregated household surveys (randomized control trials);	0	30% of project beneficiaries	70% of project beneficiaries	Households have means to access/obtain information as disseminated
	1.2. Increased institutional capacity for climate-informed agriculture planning	Surveys, tracer studies	Survey to be conducted prior to any training	Average increase of scores by 30% from baseline	Average increase of scores by 60% from baseline	Commitment of stakeholders to climate-informed planning
	1.3. Level ⁵³ of knowledge and adoption by beneficiary households of climate resilient and sustainable crop production practices	Gender-disaggregated household surveys (project randomized control trials); site visits; reports; monitoring; DoA annual agriculture survey	Level = 1	Level = 2	Level = 4	Climate-resilient crops and cultivation alternatives are adopted by beneficiary households

⁵³ Level of adoption is based on a scale where 1 = limited to no practice of climate-resilient sustainable crop production; Level 2 = households aware of practices and know how/where to get related technical support; Level 3 = households engaged with support activities and applying practices partially; Level 4 = households knowledgeable about climate-resilient practices and fully applying practices in their fields

Output 2. Integrate climate change risks into water and land management practices that affect smallholders	2.1. Change in knowledge, awareness and perception (KAP) on role of wetlands and sustainable water use	KAP Survey	Established through initial KAP survey in Year 1	20% increased over baseline	70% increase over baseline	Government commitment and dedication to carry out education and outreach activities at all levels
	2.2. Technical capacity of members of Water User Associations, Dzongkhag engineers and agriculture extension officers for climate adaptive water and soil management is enhanced	Surveys, tracer studies, institutional capacity assessments	Survey to be conducted prior to any training	Average increase of scores by 30% from baseline	Average increase of scores by 60% from baseline	Commitment of stakeholders to climate-informed planning
	2.3. Area of arable land under assured irrigation in targeted dzongkhags	Annual agriculture and RNR statistics, Project Survey, Site Visits	0	3,000 ha of farmland with reliable irrigation, schemes constructed to be resilient to the impacts of climate change	8,000 ha ⁵⁴ of farmland with reliable irrigation, schemes constructed to be resilient to the impacts of climate change	Landslide or flashflood events not so extreme that investments are severely damaged Engagement of WUAs for O&M
	2.4. Number of district level Participatory SLM Action Plan for improved livelihoods	Project progress reports, consultations, SLM Action Plans	0	4 district level Participatory SLM Action Plans	8 district level Participatory SLM Action Plans	Engagement of stakeholders/beneficiaries in participatory process

⁵⁴ Includes 4 new irrigation schemes, 32 existing irrigation schemes made more resilient to climate change and drip/sprinkler irrigation

	2.5. Number of hectares made more stable through SLM practices, to the impacts of rainfall variability and related landslides	Site visits, reports, SLMP monitoring	0	1000 ha of farmland slopes made more stable through SLM measures	2380 ha of farmland slopes made more stabilize through SLM measures	Engagement of stakeholders/beneficiaries in participatory process Landslide or flashflood events not so extreme that investments are severely damaged
Output 3. Reduce the risk and impact of climate induced landslides during extreme events that disrupt market access	3.1 Number of kilometres of farm roads and geog. connectivity roads that have been climate-proofed through upgrading and slope stabilization, and sections of main road stabilized	Annual survey by Department of Roads, (Ministry of Works and Human Settlements), including inputs from Road User Groups	0	90 km of farm roads 140 km of GC roads 1 section of main road	170.24 km of farm roads 232.22 km of GC roads 3 sections of main road	Government commitment/co-financing is secured and applied to climate-resilient roads work in target area, and related O&M
	3.2. Level ⁵⁵ of integration of climate related information in national disaster loss and damage database	DoR assessments, RUG estimates, Disaster loss and damage database	Level = 1	Level = 2	Level = 4	Government commitment to climate-informed planning related to road infrastructure
Activities	Description		Inputs		Description	
1.1. Developing and integrating climate risk data into crop and livestock planning at the national and sub-national levels	Activity 1.1. supports the integration of climate change information into planning, from the national to the household level. This will include tailoring information that is relevant to agriculture, and disseminating climate information for application in climate-resilient agriculture planning from the central to local levels. This will include combining climate and climate risk information from various sources,		International Consultants Local Consultants Contractual Services (Individual) Contractual Services (Companies)		Technical expertise and training to NCHM staff on analysis and modeling of climate information and disaster data (12 trainings, targeting 15 staff) Technical expertise and training to MoAF on application of climate and disaster data into agriculture planning (12 trainings, targeting 150 staff) Technical expertise to review crop and livestock loss methodologies,	

⁵⁵ Level of integration is based on a scale where 1 = limited to no integration; Level 2 = Impact assessment-based monitoring and documentation is collected and RUGs estimate road damages for farm roads and input into the disaster database; Level 3 = Climate relevant evidence is used to make the economic case for climate resilient road planning; Level 4 = Increased investment in climate resilient road planning options

	<p>as well as integration of actual climate impacts on agriculture.</p> <p><u>Sub-activities:</u></p> <p>1.1.1. Training to 15 NCHM staff to a) combine local, regional/global information, disaster database and data from climate monitoring stations, b) model/forecast climate, flood, drought and water resource information (on daily to seasonal, as well as medium to long term timescales)</p> <p>1.1.2. Review and enhancement of crop and livestock loss methodologies for consistent tracking and measurement of losses against climate change variability and impact, and integration into planning processes</p> <p>1.1.3. Development of 9 tailored climate products, integrating climate change impacts on agriculture and related agriculture losses to inform planning</p> <p>1.1.4. Training to 150 MoAF staff on application of climate impacts and related loss information in agriculture planning</p> <p>1.1.5. Development of Standard Operating Procedures (SOPs) for effective and timely dissemination climate and climate risk information at the national and sub-national level</p>		<p>and support with enhancements to the database</p> <p>Technical expertise for tailored products combining climate information and climate risk data (9 products – 1 national and 8 dzongkhag level products)</p> <p>Technical expertise to support development of SOPs for dissemination of climate and risk information and tailored climate information at the national and sub-national level.</p>
<p>1.2. Tailored climate information and related training to local government and farmers to interpret and apply climate risk data to local and household level agriculture planning</p>	<p>Activity 1.2 is focused on climate information tailored to farmers' needs. Special consideration will be given to ensure messages are packaged and disseminated in a manner that will reach or resonate with women and youth, particularly given changing demographics of the agriculture sector in Bhutan. Training and on application of climate information will ensure adequate support to farmers and vulnerable groups.</p> <p><u>Sub-activities:</u></p> <p>1.2.1. Development of tailored climate information, and means of dissemination, for farmers to</p>	<p>Contractual Services (Companies)</p> <p>Training, Workshops and Conferences</p> <p>Audio Visual & Print Production Costs</p>	<p>Development of materials/templates to communicate risks to farmers (e.g. weather bulletins, targeted agro-advisories, crop weather outlooks, guidance on crop calendar, crop yield forecast), complementary media will be explored including visual/audio media and apps which have proven successful in the past</p> <p>Annual training (6 workshops * 8 dzongkhags) to farmers, cooperatives and local government officers/NGOs on supporting agriculture households</p>

	<p>meet the short-term and long-term agriculture planning needs</p> <p>1.2.2. Annual trainings in 8 target dzongkhags designed and delivered to farmers, cooperatives and local government officers/NGOs on the application of tailored climate information to improve agriculture household planning</p>		<p>on application of climate information</p>
<p>1.3. Scaling up climate-resilient agriculture practices, and training local entities in community seed production and multiplication and cultivation of climate-resilient crop alternatives</p>	<p>With climate information provided under Activity 1.2, agriculture households will require support to make the changes necessary to improve their climate resilience. For instance, farming on steep slopes may no longer be safe in some areas and different cultivation measures may be required, or perhaps farmers are unsure of crop options or techniques that are more suitable given the changing climate conditions.</p> <p>Activity 1.3 is therefore focused on supporting agriculture households with investment, training and support related to climate resilient crops and practices, as well as cultivation alternatives.</p> <p>This Activities will establish seed villages for climate-resilient crops (linked to the national seed system), support with upfront investments related to cultivating alternatives for steep slopes (hydroponics, aeroponic and vertical farming), as well as pest-disease management.</p> <p>The Activity will also provide training on value chains and agriculture marketing, to support farmers to obtain a higher value for their crops, particularly as they switch for more climate-resilient and higher value crops such as cardamom and ginger.</p> <p>A major challenge for farmers in reaching markets in Bhutan is damage to the road network during the increasingly intense monsoon season. The support to market access under Output 3 is therefore critical for farmers to fully benefit from the climate</p>	<p>Salary Costs – NP staff</p> <p>International Consultants</p> <p>Local consultants</p> <p>Training, Workshops and Conferences</p> <p>Contractual Services – (Companies)</p>	<p>Annual trainings in 8 dzongkhags of extension staff on climate-resilient crops and climate resilient agriculture technologies reaching at least 120 staff</p> <p>Provision of seeds, and training to farmers, cooperatives and extension officers on related to production multiplication (drying, harvesting, monitoring) and distribution.</p> <p>Training on organic agriculture and compost production, training on certification process, incl small scale provision of organic seeds, and support to local production of organics pesticides, 30 households annually per dzongkhag</p> <p>Training to farmers on climate resilient agriculture and innovative farming techniques (2500 households)</p> <p>Procurement of materials for cultivating alternatives (greenhouses, related pipes and micronutrients ((5*district) = 40)</p> <p>Awareness raising activities about the benefits of organic farming and responsible pest management, with links to water and soil quality (Input 2.1.5.)</p> <p>Technical expertise (economist) to support RCT survey design, oversee conduct of survey and support analysis (at least 2 surveys) – to evaluate impact of interventions and to inform further upscaling/replication</p>

	<p>resilient, as well as value crops supported under this Activity.</p> <p><u>Sub-activities:</u></p> <p>1.3.1. Training in community seed production and multiplication system to scale up diversified, climate resilient crops (such as cereals, potato, cardamom, ginger, etc.)</p> <p>1.3.2. Investment in climate-resilient practices including cultivating alternatives such as hydroponics, aeroponic, vertical gardening; organic farming; and integrated pest-disease management, covering 161 ha</p> <p>1.3.3. Training delivered to farmers (2500 households, ensuring engagement of women and youth), cooperatives, and government/NGOs on climate risk management for value-chains and agricultural marketing.</p>		
<p>2.1. Enhancing climate-informed wetland and water management to support agriculture planning</p>	<p>Increased temperatures and changing rainfall patterns are resulting in drier winter seasons and wetter monsoon seasons, impacting water resources in Bhutan. To inform climate-resilient planning, quantity and projected changes to water quantity and accessibility must be considered. Informed by Activity 1.1 and by safeguards-related water monitoring, training will be provided to Dzongkhag engineers and WUAs to ensure appropriate design going forward and maintenance for long term functionality of irrigation schemes and sustainable use.</p> <p><u>Sub-activities:</u></p> <p>2.1.1. Training to 15 dzongkhag engineers on climate resilient water irrigation designs and water harvesting, for improved oversight of construction and long term maintenance of investments</p> <p>2.1.2. Training to 16 WUAs on climate change impacts to water</p>	<p>Salary costs – NP staff International Consultants Training, Workshops and Conferences</p>	<p>Training activities to support 15 engineers on climate resilient irrigation scheme design, and improved oversight of construction and long term maintenance</p> <p>Training to 16 WUAs on climate change impacts to water availability, incl introduction to revenue streams for ongoing O&M, and means to establish revenue streams to protect water access and water sources.</p>

	availability and means to protect water access and water sources		
2.2 Establishment of climate resilient irrigation schemes and water saving technologies for smallholder farmers in 8 target dzongkhags	<p>Addressing the growing challenge of water scarcity and water access for farmers, Activity 2.2 will support 4 new irrigation schemes, as well as water harvesting measures enabling farmers to cope with extended dry periods. With intensifying monsoon seasons and related landslides, existing irrigation schemes are increasing blocked disrupting water flow to farmers. 32 existing irrigation schemes will be upgraded to enhance resilience to extreme events.</p> <p>Further, the Activity will support the identification of revenue streams by exploring financial mechanisms such as PES to support long term operations and maintenance of irrigation and water harvesting investments.</p> <p><u>Sub-activities:</u></p> <p>2.2.1. Upgrading of 32 existing irrigation schemes for greater climate-resilience, and realignment of 4 irrigation schemes to a reliable water source given the drying impacts of climate change, covering 6300 ha</p> <p>2.2.2. Installation of water saving technologies, specifically 8 drip irrigation and 24 sprinkler irrigation schemes</p> <p>2.2.3. Building 64 small earthen check dams and ponds</p>	<p>Contractual Services (Individual)</p> <p>Training, Workshops and Conferences</p> <p>Contractual Services (Companies)</p>	<p>Procurement and installation related to realignment of 4 irrigation schemes, and upgrade of 32 existing irrigation schemes and water harvesting. Support will include redesign and realignment of the intake structures, lining and concreting of present earthen channel sections, mitigation of slope instability processes and slope failure affecting channels sections, use of high-density polyethylene (HDPE) pipes for unstable slope sections and other measures to enhance the functionality and sustained use of the irrigation systems.</p> <p>Investment in water harvesting through construction of small earthen check dams and ponds (64) for irrigation water supply during dry periods and drought.</p> <p>Procurement and installation of 8 drip irrigation and 24 sprinkler irrigation schemes</p> <p>Technical expertise for ESMF-related ecological, water quality and sediment monitoring, 2 assessments per year for 5 years.</p> <p>Technical expertise related to environmental safeguards monitoring and reporting - ecological monitoring, water quality monitoring, water quality sample laboratory analysis, sediment sample field testing, sediment sample laboratory analysis.</p>
2.3. Scaling up of sustainable land management (SLM) technologies to support soil and slope stabilization	<p>The country's steep terrain coupled with the increased intensity of the monsoon season, is resulting in increased incidence of landslides damaging crops. Activity 2.3 will apply the Participatory SLM Action Planning methodology to identify and implement SLM measures to protect agriculture land from erosion and landslides.</p>	<p>Salary costs – NP staff</p> <p>International Consultants</p> <p>Local Consultants</p> <p>Contractual Services (Individual)</p> <p>Contractual Services (Companies)</p>	<p>Consultations and technical support to development Participatory SLM Action Plans</p> <p>Technical expertise and support to SLM measures, informed by Participatory SLM Action Planning methodology. These will include: buffer zone creation, bench terracing, hedgerow/ally cropping, non-invasive tree and bamboo plantation, stone check dams,</p>

	<p>Previous experience in applying SLM measures in similar landscapes, provided the basis for types of intervention and the related cost estimation. These will be validated during implementation through a thorough consultation process.</p> <p><u>Sub-activities:</u></p> <p>2.3.1. Identification of SLM interventions to better protect agriculture land from the impacts of climate change induced erosion and landslides, following the Participatory SLM Action Planning methodology</p> <p>2.3.2. Technical assistance and support to communities on the implementation of SLM practices to manage climate change risks, covering 2380 ha of arable land</p>		<p>stone bunding, citrus orchard development, and water source protection. Support will also include provision, and technical guidance on planting, of seedlings and establishment of nurseries.</p> <p>Technical expertise and training to communities on benefits of SLM and maintenance of interventions (at least 16 trainings/workshops)</p>
<p>2.4. Capacity strengthening to farmers and extension officers on SLM technologies</p>	<p>Activity 2.4 is focused on successful implementation and sustainability of SLM interventions, through capacity support.</p> <p><u>Sub-activities:</u></p> <p>2.4.1. Training to 120 DoA extension officers on SLM technologies and practices to manage climate change risks</p> <p>2.4.2. Regular monitoring (twice annually) of soil conditions and soil stability to inform planning and policies related to soil management</p>	<p>Training, Workshops and Conferences</p>	<p>Training to DoA extension officers (120 officers) on benefits of SLM, monitoring, reporting and related maintenance, annually applying a training-of-trainers approach</p> <p>Technical expertise for soil stability and environmental safeguards monitoring and reporting</p>
<p>3.1. Slope stabilization along key sections of roads, critical for market access, and related technical capacity and knowledge products to support climate resilient road planning and construction going forward</p>	<p>Expanding the road network is a priority for the RGoB to improve access to both services and markets. Road construction, however, has not necessarily included climate resilient features. As a result, roads are often damaged or blocked by landslides, particularly during the monsoon season. Value chain analyses indicate as a main challenge - market access challenges due to frequent blockades from landslides. GCF resources will complement government investment to improve road surfacing and drainage, with slope stabilization measures.</p>	<p>Salary costs – NP staff International Consultants Local Consultants Contractual Services (Individual) Contractual Services (Companies)</p>	<p>Technical expertise, slope stabilization</p> <p>Slope stabilization measures to complement road investments by MOAF, MoWHS, and RGoB.</p> <p>Technical expertise, environmental safeguards</p>

	<p>Applying the enhanced EFRC guidelines, supported by the UNDP/GEF/LDCF project to include climate-resilience, Activity 3.1. will complement climate resilient roadwork funded by MOAF, MoWHS and RGoB, with investment to slope stabilization to protect market access from landslides.</p> <p><u>Sub-activities:</u></p> <p>3.1.1. Conduct of technical study and design for slope stabilization interventions needed for three stretches of main road regularly incurring damages due to increased intensity of monsoon and disrupting market access to validate existing specifications that were based on roads work for similar conditions</p> <p>3.1.2. Slope stabilization of three sections of main road regularly incurring damages due to increased intensity of monsoon</p>		
<p>3.2. Technical capacity building to support climate-risk informed and cost-effective slope infrastructure including stabilization, drainage and road construction & maintenance</p>	<p>Activity 3.2 is focused on enhancing the data and technical capacity to support climate-resilient infrastructure going forward. This includes technical training to MoAF and MoWHS staff on slope stabilization and related designs, as well as training on costing of damage through RUGs. A comparative study on climate resilient roads will support the evidence base for efficient climate resilient planning, reducing post-monsoon loss and damage over time.</p> <p><u>Sub-activities:</u></p> <p>3.2.1. Technical training to 15 DoR national and sub-national engineers on slope stabilization studies, and related designs, cost assessments and cost benefit analysis to inform climate-resilient planning</p> <p>3.2.2. Review and enhancement of road damage collection methodology, and related SOPs for collection and reporting, to ensure consistent collection of road damage data and inclusion</p>	<p>Salary costs – NP staff International Consultants Contractual Services (Individual) Training, Workshops and Conferences</p>	<p>Technical expertise and annual training to DoR (15 engineers) Technical expertise to review and enhance damage data collection and related SOPs Training to local government and RUGs (144) on costing damage</p>

	<p>in national disaster loss and damage database</p> <p>3.2.3. Technical support to mainstreaming of climate resilience road features and construction into infrastructure planning</p> <p>3.2.4. Training to RUGs and local government bodies on post-monsoon assessment of farm roads, including repair cost estimation</p>		
--	---	--	--

H.2. Arrangements for Monitoring, Reporting and Evaluation

241. Project-level monitoring and evaluation will be undertaken in compliance with the [UNDP POPP](#), the [UNDP Evaluation Policy](#).

Oversight and monitoring responsibilities:

242. The primary responsibility for day-to-day project monitoring and implementation rests with the Project Manager. The Project Manager will develop annual work plans to ensure the efficient implementation of the project. The Project Manager will inform the Project Board and the UNDP Country Office of any delays or difficulties during implementation, including the implementation of the M&E plan, so that the appropriate support and corrective measures can be adopted. The Project Manager will also ensure that all project staff maintain a high level of transparency, responsibility and accountability in monitoring and reporting project results.

243. The UNDP Country Office will support the Project Manager as needed, including through annual supervision missions. The UNDP Country Office is responsible for complying with UNDP project-level M&E requirements as outlined in the [UNDP POPP](#). Additional M&E and implementation quality assurance and troubleshooting support will be provided by the UNDP Regional Technical Advisor as needed. The project target groups and stakeholders including the NDA Focal Point will be involved as much as possible in project-level M&E.

244. A project inception workshop will be held after the UNDP project document has been signed by all relevant parties to: (a) re-orient project stakeholders to the project strategy and discuss any changes in the overall context that influence project implementation; (b) discuss the roles and responsibilities of the project team, including reporting and communication lines and conflict resolution mechanisms; (c) review the results framework and discuss reporting, monitoring and evaluation roles and responsibilities and finalize the M&E plan; (d) review financial reporting procedures and mandatory requirements, and agree on the arrangements for the annual audit; (e) plan and schedule Project Board meetings and finalize the first year annual work plan. The Project Manager will prepare the inception report no later than one month after the inception workshop. The final inception report will be cleared by the UNDP Country Office and the UNDP Regional Technical Adviser, and will be approved by the Project Board.

245. The Project Manager, the UNDP Country Office, and the UNDP Regional Technical Advisor will provide objective input to the Annual Project Report (APR) for each year of project implementation. The Project Manager will ensure that the indicators included in the project results framework are monitored annually well in advance of the APR submission deadline and will objectively report progress in the APR. The annual APR will be shared with the project board and other stakeholders. The UNDP Country Office will coordinate the input of the NDA Focal Point and other stakeholders to the APR. The quality rating of the previous year's APR will be used to inform the preparation of the next APR. The final project APR along with the terminal evaluation report and corresponding management response will serve as the final project report package.

246. An independent mid-term review (MTR) process will be undertaken and the findings and responses outlined in the management response will be incorporated as recommendations for enhanced implementation during the final half of the project's duration. The terms of reference, the review process and the final MTR report will follow the

standard templates and guidance available on the [UNDP Evaluation Resource Center](#). The final MTR report will be cleared by the UNDP Country Office and the UNDP Regional Technical Adviser, and will be approved by the Project Board. The final MTR report will be available in English.

GCF evaluation requirements:

247. An independent terminal evaluation (TE) will take place no later than three months prior to operational closure of the project. The terms of reference, the review process and the final TE report will follow the standard templates and guidance available on the [UNDP Evaluation Resource Center](#). The final TE report will be cleared by the UNDP Country Office and the UNDP Regional Technical Adviser, and will be approved by the Project Board. The TE report will be available in English.

248. The UNDP Country Office will include the planned project terminal evaluation in the UNDP Country Office evaluation plan, and will upload the final terminal evaluation report in English and the management response to the public UNDP Evaluation Resource Centre. Once uploaded to the ERC, the UNDP Independent Evaluation Office will undertake a quality assessment and validate the findings and ratings in the TE report, and rate the quality of the TE report.

249. The UNDP Country Office will retain all M&E records for this project for up to seven years after project financial closure in order to support ex-post evaluations.

250. A detailed M&E budget, monitoring plan and evaluation plan will be included in the UNDP project document and shared with GCF as part of the inception report.

251. UNDP will perform monitoring and reporting throughout the reporting period in accordance with the AMA and Funded Activity Agreement (FAA). UNDP has country presence and capacity to perform such functions. In the event of any additional post-implementation obligations over and above the AMA, UNDP will discuss and agree these with the GCF Secretariat in the final year of the project and will prepare a post-implementation monitoring plan and budget for approval by the GCF Board as necessary.

Additional Information:

252. Randomized control trials (RCTs) are included under Output 1. These surveys will document project progress, building an evidence base related to the results of project interventions to address challenges in the climate-sensitive agriculture sector and vulnerable small holder farmers.

I. Supporting Documents for Funding Proposal

- NDA No-objection Letter **Annex I**
- Feasibility Study **Annex II**
- Financial Analysis **Annex III (a)**
- Financial Analysis (excel) **Annex III (b)**
- Confirmation letter or letter of commitment for co-financing commitment **Annex IV**
- Term Sheet (including cost/budget breakdown, disbursement schedule, etc.) **Annex V**
- Social and Environmental Screening Template (SESP) **Annex VI (a)**
- Environmental and Social Management Framework (ESMF) **Annex VI (b)**
- Appraisal Meeting Report **Annex VII**
- Evaluation Report of the baseline project **Annex VIII**
- Map indicating the location of the project/programme **Annex IX**
- Timetable of project implementation **Annex X**
- Project/Programme Confirmation **Annex XI**

Additional Information

- Economic Analysis **Annex XII (a)**
- Economic Analysis (excel) **Annex XII (b)**
- Engineering Designs **Annex XIII (a)**
- Stakeholder Engagement Plan **Annex XIII (b)**
- Operations & Maintenance (O&M) Plan **Annex XIII (c)**
- Gender Assessment, Action Plan and Budget **Annex XIII (d)**
- Procurement Plan **Annex XIII (e)**
- Evidence of Internal Approval **Annex XIII (f)**
- UNDP Micro Assessments **Annex XIII (g)**
- Value Chain and Market Analysis Report **Annex XIII (h)**
- Crop and Livestock Compensation/Insurance Report **Annex XIII (i)**
- Detailed Budget **Annex XIII (j)**
- AE Fee Request Budget **Annex XIII (k)**
- LOA on UNDP Direct Project Services **Annex XIII (l)**
- Regulation on Occupational Health, Safety and Welfare **Annex XIII (m)**
- Land Pooling and Readjustment Regulation 2018 **Annex XIII (n)**
- Stakeholder Engagement and Consultation Guidelines **Annex XIII (o)**
- Analysis of historical climate and climate projection for Bhutan **Annex XIII (p)**
- Responses to GCF comments on Concept Note **Annex XIV (a)**
- Responses to GCF comments on Funding Proposal **Annex XIV (b)**

UNDP Endorsement Letter **Annex XV**

** Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.*

No-objection letter issued by the national designated authority(ies) or focal point(s)



དཔལ་ལྷན་འབྲུག་གཞུང་།
ལྷོ་ཡོངས་དགའ་སྲིད་དཔལ་འཛོམས་ལྷན་ཚོགས།
Royal Government of Bhutan
Gross National Happiness Commission



GNHC/DCD/GCF/2017/

14 March 2017

Mr. Howard Bamsey
Executive Director
Green Climate Fund
175 Art Center-daero
Yeonsu-gu, Incheon 22004
Republic of Korea

Re: **Funding proposal for the GCF by United Nations Development Programme (UNDP) regarding "Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan"**

Dear Mr. Bamsey,

We refer to the project "Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan" as included in the funding proposal submitted by UNDP to us on 8th March 2017.

The undersigned is the duly authorized representative of Gross National Happiness Commission, the National Designated Authority of Bhutan. Pursuant to GCF decision B.08/10, the content of which we acknowledge to have reviewed, we hereby communicate our no-objection to the project as included in the funding proposal.

By communicating our no-objection, it is implied that:

- (a) The government of Bhutan has no-objection to the project as included in the funding proposal;
- (b) The project as included in the funding proposal is in conformity with Bhutan's national priorities, strategies and plans;
- (c) In accordance with the GCF's environmental and social safeguards, the project as included in the funding proposal is in conformity with relevant national laws and regulations.

We also confirm that our national process for ascertaining no-objection to the project as included in the funding proposal has been duly followed. We acknowledge that this letter will be made publicly available on the GCF website.

Kind regards,


Thinley Namgyel
Secretary

P.O Box: 127, Tashichhodzong, Thimphu
PABX – 00975-2-325192/325850/325741/322503/321053. FAX- 00975-2-322928
AFD PABX – 00975-2-333230/333231/333232/333234/326777 FAX – 00975-2-326779
Website: www.gnhc.gov.bt

Environmental and social safeguards report form pursuant to para. 17 of the IDP

Basic project or programme information	
Project or programme title	Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan
Existence of subproject(s) to be identified after GCF Board approval	No
Sector (public or private)	Public
Accredited entity	United Nations Development Programme (UNDP)
Environmental and social safeguards (ESS) category	Category B
Location - specific location(s) of project or target country or location(s) of programme	Bhutan: Eight districts of Dagana, Punakha, Trongsa, Tsirang, Sarpang, Samtse, Wangdue Phodrang and Zhemgang
Environmental and Social Impact Assessment (ESIA) (if applicable)	
Date of disclosure on accredited entity's website	Wednesday, June 5, 2019
Language(s) of disclosure	English and Dzongkha
Explanation on language	Both English and Dzongkha are the official languages
Link to disclosure	http://www.bt.undp.org/content/bhutan/en/home/library/environment_energy/ESFM-for-support-climatge-resillience-and-transformational-change.html
Other link(s)	NDA website: https://www.gnhc.gov.bt/en/?page_id=3484
Remarks	An ESIA consistent with the requirements for a Category B project is contained in the ESMF.
Environmental and Social Management Plan (ESMP) (if applicable)	
Date of disclosure on accredited entity's website	Wednesday, June 5, 2019
Language(s) of disclosure	English and Dzongkha
Explanation on language	Both English and Dzongkha are the official languages

Link to disclosure	http://www.bt.undp.org/content/bhutan/en/home/library/environment_energy/ESFM-for-support-climatge-resillience-and-transformational-
Other link(s)	NDA website: https://www.gnhc.gov.bt/en/?page_id=348
Remarks	Both Social and Environmental Screening Procedure (SESP) and ESMF are available on the websites above. An ESMP consistent with the requirements for a Category B project is contained in the ESMF.
Environmental and Social Management (ESMS) (if applicable)	
Date of disclosure on accredited entity's website	N/A —
Language(s) of disclosure	N/A
Explanation on language	N/A
Link to disclosure	N/A
Other link(s)	N/A
Remarks	N/A
Any other relevant ESS reports, e.g. Resettlement Action Plan (RAP), Resettlement Policy Framework (RPF), Indigenous Peoples Plan (IPP), IPP Framework (if applicable)	
Description of report/disclosure on accredited entity's website	N/A —
Language(s) of disclosure	N/A
Explanation on language	N/A
Link to disclosure	N/A
Other link(s)	N/A
Remarks	N/A
Disclosure in locations convenient to affected peoples (stakeholders)	
Date	Wednesday, June 5, 2019
Place	NDA website: https://www.gnhc.gov.bt/en/?page_id=348
Date of Board meeting in which the FP is intended to be considered	
Date of accredited entity's Board meeting	N/A
Date of GCF's Board meeting	Saturday, July 6, 2019

Note: This form was prepared by the accredited entity stated above.

Secretariat's assessment of FP107

Proposal name:	Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan
Accredited entity:	United Nations Development Programme (UNDP)
Country/(ies):	Kingdom of Bhutan
Project/programme size:	Medium

I. Overall assessment of the Secretariat

1. The funding proposal is presented to the Board for consideration with the following remarks:

Strengths	Points of caution
Integrated approach to address multifaceted challenges of climate change, involving resilient agriculture, efficient water supply and management, agrometeorological services, resilient road infrastructure and slope stabilization. This package will meet the various needs of smallholder farmers in coping with the challenges of climate change, and strengthen the agricultural value chain.	Strong coordination needed among different government ministries and departments involved as implementing partners could be challenging at times.
GCF funding supports activities contributing to climate change adaptation, and co-financing to finance baseline activities. Clear incrementality reasoning provided, with GCF resources adding climate resilience features into existing and planned government initiatives (the Royal Government of Bhutan's Twelfth Five Year Plan).	
Solid operations and maintenance plan with financial commitment from government ministries and departments for assets and infrastructures to be built/rehabilitated during the project implementation will ensure sustainability	

2. The Board may wish to consider approving this funding proposal with the terms and conditions listed in the respective term sheet and addendum XIII, titled "List of proposed conditions and recommendations".

II. Summary of the Secretariat's assessment

2.1 Project background

3. Bhutan is a least developed country, where 58 per cent of the employed population depends on agriculture, livestock and forestry for their livelihoods. The project aims to enhance resilience of smallholder farmers in Bhutan to climate change impacts, mainly increased variability of precipitation patterns, unpredictable timing and intensity of monsoons, and prolonged drought periods followed by moisture stress on agricultural lands. These impacts have negative consequences on agricultural yields. The project will take an integrated and cross-sectoral approach for smallholder farmers to address multifaceted challenges of climate change, involving resilient agriculture, efficient water provision and management, agrometeorological services, resilient road infrastructure and slope stabilization.

4. Through this project, around 118,839 people in eight districts will directly benefit from increased access to localized climate information for agricultural planning, climate-resilient agricultural practices, increased water security and greater access to markets through resilient roads. In addition, 46.5 percent of rural population in Bhutan will be indirectly benefited through this project, through climate-informed agriculture sector planning.

5. The project is structured into three outputs:

- (a) Promote resilient agricultural practices in the face of changing climate patterns;
- (b) Integrate climate change risks into water and land management practices that affect smallholders; and
- (c) Reduce the risk and impact of climate change induced landslides during extreme events that disrupt market access.

6. The project requests USD 25 million in GCF grants, which is 44 per cent of the total project cost. Co-financing will be provided by:

- (a) The Gross National Happiness Commission (GNHC) supporting roadworks and slope stabilization;
- (b) The Ministry of Agriculture and Forests (MoAF) providing technical support and Water User Group bylaw updates;
- (c) The Ministry of Works and Human Settlements (MoWHS) providing technical expertise related to geotechnical studies and road enhancement; and
- (d) The National Centre for Hydrology and Meteorology (NCHM) providing technical support related to hydromet equipment.

7. The co-financing includes also operations and maintenance (O&M) costs for established infrastructures, including irrigation, farm roads, agromet stations and other assets to be built through this project. The GCF grant is requested to support a transition from responsive measures to climate impacts to climate-informed agricultural planning and resilient practices as adaptation measures.

2.2 Component-by-component analysis

Output 1: Promote resilient agricultural practices in the face of changing climate patterns (total cost: USD 10.5 million; GCF cost: USD 3.4 million, or 32 per cent)

8. Output 1 has two streams of action: generation and dissemination of climate information for agricultural planning and scaling up of resilient agricultural practices. For the first stream of action (activities 1.1 and 1.2), GCF funding will be used to generate tailored

agricultural advisories for local farmers; and the second stream of this output (activity 1.3) will use GCF funding to procure resilient seedlings and invest in resilient agricultural practices.

9. The need for downscaled and localized data for climate risk-informed agricultural planning for farmers is well justified in the proposal. The key to success of this activity is dissemination and uptake of the information by farmers given their low literacy rate. Through the review process, the proposal has been revised to strengthen the dissemination mechanism (now stand-alone activity 1.2) to optimize the use of the services by farmers in a “user-friendly manner”.

10. Proposed interventions for climate-resilient agriculture are assessed to be appropriate in the context of climate impacts and project sites’ topographic conditions (rugged mountain landscape with an extreme altitudinal gradient). Procuring climate-resilient crops (e.g. rice, wheat, maize, millet, potato, cardamom and ginger) that are drought-resilient will increase production yields for farmers, if combined with appropriate agronomic practices such as timely irrigation. The project will use proven and tested practices of community-based seed multiplication that will increase access to good quality seeds by farmers, thereby enhancing community ownership. Alternative farming techniques such as hydroponics and aeroponics appear to be locally sound adaptation measures considering the steep terrain of Bhutan which makes traditional farming increasingly difficult in a changing climate.

11. The project could demonstrate better how the results of activities 1.1 and 1.2 feed into the implementation of activity 1.3, and how all three activities are integrated to achieve optimal adaptation benefits for the target beneficiaries, during project implementation. Overall, each stream of action under this output is justified in a sufficient manner.

Output 2: Integrate climate change risks into water and land management practices that affect smallholders (total cost: USD 19.9 million; GCF cost: USD 18.2 million, or 91 per cent)

12. Output 2 aims to shift away from traditional rain-fed agriculture to more sustainable and resilient water provision and management for farming. It consists of four activities involving water management, climate-resilient water saving technologies and irrigation, sustainable land management, and capacity-building activities. Output 2 will bring reliable irrigation to 8,000 hectares of arable land.

13. Proposed irrigation technologies (e.g. high-density polyethylene underground pipes) are assessed to be appropriate and meet the adaptation needs of the target communities in the face of increasing landslides blocking open earth traditional irrigation channels. It is well justified that piped irrigation systems will be more resilient to blockage and debris intrusion from landslides than conventional canals, and will ensure reliable water provision during the drought period. As the coverage area is large in scale (8,000 hectares), careful monitoring is needed on potential environmental and social impacts, although project activities involve mainly rehabilitation and upgrading of existing irrigation schemes. Also, the irrigation is mainly for paddy rice, although involving some vegetables and fruits.

14. The water saving technologies proposed (drip and sprinkler irrigation) and water harvesting infrastructures (earthen storage tanks, dams and ponds) are known practices of efficient water supply and management. If sustainably operated and maintained they can bear significant benefits for the livelihoods of the beneficiaries through more reliable water supply in the face of climate change.

15. Other activities under this output, such as sustainable land management, are generally proven landscape scale measures with adaptation benefits that will improve soil water conditions and bring environmental benefits.

16. The exit strategy is clearly analysed and delineated in the annex of the O&M plan, with detailed budgeting. Sustainability is ensured with financial commitments from responsible government ministries for financing O&M during and after project implementation.

Component 3: Reduce the risk and impact of climate change induced landslides during extreme events that disrupt market access (total cost: USD 25.1 million; GCF cost: USD 2.8 million, or 11 per cent)

17. This component is proposed to upgrade farm roads and connecting roads as well as slope stabilization as an adaptation measure to address floods, landslides and mudflows that disrupt market access by farmers. It is expected to climate-proof 170 kilometres (km) of farm roads, 232 km of connecting roads and three sections of main road.

18. During the review process, estimated additional costs for climate-proofing of roads were provided with quantified unit costs and other details that justified the incrementality reasoning to a certain extent. This activity will bring public goods to rural communities in the project sites to ensure their mobility and market access. Given the potential development results, the financing structure was revisited in such a way that GCF grants support only the slope stabilization activity for protection of lands and roads against the impacts of climate change (e.g. flooding and landslides). This revision, with a reduced GCF funding amount request, was deemed satisfactory.

19. While detailed technical design studies for this activity will be conducted during the initial year of the project implementation, some of the techniques proposed for slope stabilization are assessed to be sound, such as bioengineering. The O&M of the roads will be undertaken by the MoWHS with Road User Groups. Given that the activity does not involve new construction of roads, environmental impacts are assessed to be moderate, but careful monitoring and reporting during the project implementation is required.

Component 4: Project management (total cost: USD 2.5 million; GCF cost: USD 1 million, or 41 per cent)

20. The last component is the project management for the implementation of the project. The GCF portion of the PMC is around 4 percent of the total requested GCF funding, and is compliant with the GCF policy on fees.

III. Assessment of performance against investment criteria

3.1 Impact potential

Scale: Medium/High

21. As an adaptation project, the proposal reports the expected total number of direct and indirect beneficiaries. The beneficiary selection criteria is a combination of vulnerability to climate change and poverty rate, as explained in the proposal. The target was estimated based on 2015 census information from target areas counting all the resident farming households.

22. Proposed interventions and their corresponding expected targets and indicators are in line with the GCF performance measurement framework.

23. Climate rationale and adaptation needs are elaborated and justified in a reasonable manner: Bhutan's mountainous ecosystems with steep geographic terrain (rugged mountain landscapes with extreme altitudinal gradients) make the farming communities vulnerable to increased run-off during the monsoon season. The proposal provides some evidence to show climate change impacts (increased variability of precipitation patterns and unpredictable timing

and intensity of monsoons combined with prolonged drought periods and subsequent moisture stress) on decline in yields and losses of agricultural production.

24. The proposal presents historical observations on annual rainfall for the past 21 years (1996–2017) taken from the data repository of the NCHM and compared with the data from the Climate Research Unit (with a longer-term observation covering 1970–2014). Data shows significant variability across different weather stations, but there is an overall reduction in total annual rainfall. There is a moderate increase in temperature.

25. The proposal presents a future climate projection using Providing Regional Climates for Impacts Studies (PRECIS) downscaled HadCM3Q0 and ECHAM5 models from a General Circulation Model and using projects for Regional Concentration Pathway (RCP) 4.5 and RCP 8.5. Under the RCP 4.5 scenario, the climate projection for surface temperature indicates an increase of between 0.8 °C and 1.6 °C during 2021–2050.

26. Records have been provided on extreme weather events (flooding) from 2010 and their impacts on livelihoods.

27. The proposal is expected to reach 47 per cent of the rural population in Bhutan targeting large areas of eight districts. Given the scale of the intervention, expected adaptation benefits are foreseen to be high, especially if the project implementation is successful in its integration of activities to maximize results for climate-resilient agriculture.

3.2 Paradigm shift potential

Scale: Medium

28. Paradigm shift potential is demonstrated through a shift away from farming practices that are not consistent with changing climate conditions to climate-informed agricultural planning and farming practices that are more resilient to identified climate impacts. Proposed farming techniques are proven solutions that are aligned with good practices in achieving adaptation results. Although not new or innovative, these solutions have high potential to be scaled up and replicated in other regions of the country.

29. A theory of change presented in the funding proposal proposes three lines of action (resilient agriculture, water and land management, and road rehabilitation/slope stabilization) that demonstrate a holistic and integrated approach to address the needs of smallholder farmers from production to post-harvest resilience, benefiting the whole value chain. The justification is sound and shows potential to generate substantial impacts for smallholder farmers in Bhutan.

30. The exit strategy is well elaborated in the annex on O&M planning, with co-financing committed by different government entities. The project has technical assistance and capacity-building support for each output, and it is expected that it will contribute to knowledge generation and collective learning for sustainability and continuation of the project activities.

3.3 Sustainable development potential

Scale: High

31. The proposal demonstrates high potential for sustainable development. Proposed interventions are proven solutions that were tested through other projects and are expected to be scaled up in this project (e.g. a seed multiplication system). Sustainable land management will produce positive environmental externalities on soil water dynamics, and it will reduce soil loss. Organic farming will contribute to soil health and carbon sequestration.

32. Improved soil management and organic agriculture have mitigation potential. The AE is recommended to report on mitigation co-benefits of the project during the implementation period.

33. The project will generate substantial economic and social benefits for farmers through increased agricultural production and income. This is not presented in great detail in the funding proposal, and only a few specifics are offered in the economic analysis.

34. Gender considerations have been taken into account in the project design with an aim to mainstream a women-centred approach in agricultural development. A detailed gender assessment and action plan was developed and submitted as an annex.

3.4 Needs of the recipient

Scale: High

35. Vulnerability of the country and target beneficiaries and their adaptation needs are generally explained throughout the proposal, although it could benefit from providing more details of the scale and intensity of exposure to climate risks. Vulnerability of the rural poor is acknowledged given the small-sized farm (average 2.5 hectares) and high dependence on rain-fed agriculture, which is highly affected by rainfall variability and increasing temperature.

36. The proposal elaborates the needs of the recipient from the point of view of meeting food security in the context of climate change. This is positively received given that the target beneficiaries are smallholder farmers in rural areas, and also that this objective is in line with the larger government-led Eleventh Five Year Plan from the Royal Government of Bhutan.

37. The project will deliver public environmental and economic goods in a least developed country. It will provide financial resources to overcome barriers that cannot be addressed by the market. There are currently few private sector investments in resilient agriculture in the country. Therefore, financial assistance from GCF is adequately justified.

3.5 Country ownership

Scale: High

38. The proposal shows that the project contributes to the country's nationally determined contribution and Eleventh Five Year Plan. The feasibility study further provides information on alignment and complementarity with other projects to a satisfactory extent.

39. GNHC as the executing entity (EE) is the national focal point for managing all donor funds in the country, and it therefore keeps a good track record of managing similar types of investments.

40. The proposal demonstrates that project design and site selection were done in a participatory manner with the relevant ministries through establishing a Technical Working Committee. It is also positively received that the planning was based on the national Five Year Plan, ensuring strong country ownership. The proposal also explains that consultations with local communities and beneficiaries, with a particular focus on women, have been undertaken at the design phase. Annex 13 provides a stakeholder engagement plan, and, as stated in the proposal, it will be important to regularly review and update the plan to capture new stakeholders and engage the local farmers and stakeholders throughout the project implementation process.

3.6 Efficiency and effectiveness

Scale: Medium

41. The proposal demonstrates adequate cost-effectiveness with an economic internal rate of return of 15 per cent over 16 years for outputs 1 and 2, and an economic internal rate of return of 13 per cent over 26 years for output 3. Both are above those of other projects with similar investments by the AE.

42. The funding proposal demonstrates financial adequacy and minimum concessionality. As outputs 1 and 2 will not generate sufficient financial reflows to the Royal Government of Bhutan to enable the servicing of a loan, the proposal necessitates grant funding from GCF. Output 3 will generate cost savings due to reduced impacts from landslides, but this benefit is deemed to be a public good that is better suited for a grant than a loan or other reimbursable financing. The financial analysis of output 3 demonstrates the need for GCF financing through a positive net present value (NPV) with GCF funding but a negative NPV in two alternative scenarios based on different financing sources.

43. Long-term financial viability is ensured through different mechanisms for each project component. Irrigation schemes funded under activity 2.2 are planned to be maintained by the Water User Associations, and the road infrastructure under activity 3.1 is planned to be maintained by Road User Groups. The Royal Government of Bhutan committed to finance the O&M, and a detailed O&M framework will be developed during the project implementation.

44. The AE should ensure complementarity and coherence with other ongoing projects, particularly with the Bhutan for Life World Wildlife Fund project, also approved by GCF. The proposal provides an explanation of how the Bhutan for Life project is complementary to the proposed project. As the project sites very slightly overlap in the protected areas and biological corridors, the AE should ensure that the two projects are complementary to each other to maximize benefits.

IV. Assessment of consistency with GCF safeguards and policies

4.1 Environmental and social safeguards

45. The accredited entity has screened the project as having moderate environmental and social risk and potential impacts. The screening took into account the potential adverse environmental and social impacts, particularly impairment of water quality due to sediment movement, construction, and earth-moving works. The accredited entity considered the likely overall environmental and social risks and impacts to be reversible, limited, and readily mitigated through a combination of management and technical measures. The due diligence by the GCF Secretariat confirms the moderate environmental and social risk category of the project, taking note of the results of the social and environmental screening identifying the risks and issues.

46. The AE provided the result of the Social and Environmental Screening that identified the likely environmental and social issues, risks, and potential impacts of the project. The AE also prepared an Environmental and Social Management Framework (ESMF) that further described the prevailing environmental and social context of the project, the due diligence process that will be undertaken, and the measures proposed to manage the risks and impacts. The ESMF anticipates that most of the risks and impacts will be generated from activities related to climate-resilient soil and water management, irrigation schemes and slope stabilization. Incorporated in the ESMF are the various measures to avoid, minimize and manage risks and impacts. Prior to the implementation of activities, the AE will assess the need for any additional environmental and social due diligence following the process in the ESMF, including additional baseline information. Further assessments and additional information will include relevant

environmental and social risks related to water and local hydrology, route of pipelines, affected communities and beneficiaries. The additional due diligence will inform the updating of the ESMP presented as part of the ESMF. The EMF further described national policies, laws, and regulations related to environmental and social management such as the Environmental Assessment Act and the Regulations for Environmental Clearance of Projects pertinent to environmental impacts assessment process and the Land Pooling and Readjustment Regulations providing measures to ensure access to lands for the identified interventions.

47. The ESMF identified and assessed the likely environmental and social risks and impacts of the project. The risks and impacts are expected to be moderate following the risk matrix established for the project. The environmental and social risks and impacts include mostly those likely generated by the construction activities. Among the salient risks and impacts include:

48. Erosion and sediment movement. Construction activities may increase sediment transport resulting in silt deposition through overland flow. Works on irrigation schemes and earthworks related to slope stabilization and road rehabilitation may result in sedimentation that can impair water quality of affected surface water. The likelihood and severity of this impact, however, is considered moderate owing to the engineering controls and management plans.

49. Waste generation. The interventions are expected to generate various waste streams, including potentially inert waste, contaminated sediments, and construction-related hazardous waste. The volume of the waste from construction are considered insignificant and the impacts are considered negligible. Sediment waste are considered for reuse onsite or for other alternative uses such as agriculture and other construction works. Waste from construction activities such as lubricants and fuels can potentially impair surface water quality and measures to avoid and minimize such risks are considered in the ESMP.

50. Land acquisition and loss of livelihood. While the project does not anticipate any land acquisition and displacement of people, the requirement for lands, for example, access to works and easements will need to comply with applicable national, GCF and AE requirements. No activities will be undertaken in private lands without express voluntary approval by the landowners. The project will ensure that access will not be restricted and where access to lands will be required for the construction works, these will be sought through voluntary agreements. As part of the due diligence process, community consultations will be undertaken on any potential impacts to land use. The ESMF indicates potential temporary loss of livelihood. Should there be a need, a livelihood restoration will be undertaken following the development of livelihood restoration plan.

51. Occupational health and safety. Earth-moving, civil and water conveyance and slope stabilization works may pose challenges to workers related to health and safety. The ESMF indicated that works undertaken for this project would conform to the occupational health and safety requirements of the country.

52. Others. The ESMF indicated that the project is unlikely to generate significant adverse impacts on air quality and terrestrial and aquatic ecosystems. The ESMF also identified potential impacts related to community nuisance such as ambient noise, traffic, and visual amenities during construction activities. These are considered not significant, temporary and mitigated through engineering and administrative controls. The project did not apply the relevant safeguards for indigenous peoples. The ESMF indicated that there are no expected specific ethnic minorities or populations identified as indigenous peoples in the project area. The ESMF indicated potential cumulative impact particularly related to sedimentation; however, this is considered negligible. The ESMF commits to developing and maintaining site-specific erosion,

drainage and sediment control management plan, contaminated soil disposal management plan, and livelihood restoration plan prior to the implementation of activities.

53. Included in the ESMF is the Stakeholder Engagement Plan that summarizes the consultations that have been undertaken in the course of preparing the project and undertaking due diligence. The Stakeholder Engagement Plan also identifies the stakeholders of the project and the actions for continuing engagement with the stakeholders.

54. The Gross National Happiness Commission (GNHC), as the executing entity of the project, will be responsible for the implementation of the ESMP through the contractors undertaking specific works. The ESMF and the ESMP will form part of the tender documentation. The AE and the GNHC are expected to provide specialist advice to the contractors, including monitoring the environmental and social performance of the contractors. The project management unit (PMU), the GNHC, and the AE will update the ESMP periodically and prepare any additional site-specific management plans as may be needed. The AE and the GNHC will provide updates on the project status on a regular basis to the project stakeholders. All information on the project will be in English and in Dzongkha and in other appropriate local languages.

55. The ESMF described a two-tiered project-level grievance redress mechanism that will be administered by the Project Management Unit (PMU). This will be complemented by the AE's Stakeholder Response Mechanism. The information on the project-level grievance redress mechanism will be disseminated to the communities and stakeholders of the project.

4.2 Gender policy

56. The project is expected to benefit 60,652 women which is 51 percent of the total beneficiaries. The proposal contains a comprehensive assessment and analysis of gender issues in Bhutan, in the agriculture sector as well as in relation to addressing the adverse impacts of climate change on women and men. The analysis provides insights into additional burdens inflicted on women by climate change. It also includes a gender action plan and therefore complies with the operational guidelines of the GCF Gender Policy and Action Plan.

57. The development of the funding proposal included a specific study on gender issues that has allowed the AE to identify specific concerns of women, thereby integrating actions to be addressed through the gender action plan. The assessment found that the division of labour in agriculture varies according to crops and the nature of activities between women and men, with women cultivating and marketing vegetables while men plough fields and cultivate and market cardamom. Generally, women's role is limited to agricultural activities near the household in addition to the primary responsibility of tending to household chores. Household chores are significant and add to the women's work burden and time constraints, limiting them from engaging in other productive activities. Climate change has affected agricultural productivity and production levels, further forcing men to migrate in search of jobs while women have to remain on the farms, leading to the increased trend of feminization of the agriculture sector in Bhutan. Climate change has affected water availability for crops as well as human consumption, the responsibility of which lies with both women and men. The use and need for water are different for women and for men, with women collecting water for drinking purposes while men use water for irrigating their crops. The assessment further demonstrates that while both women and men have access to and control of credit, labour and health services, men have better access to and control of forest products, agricultural machinery, renewable natural resources, training and extension services. Labour shortages are a challenge to smallholder farmers in general but are more pronounced for female heads of households. The assessment

indicated that it is relevant and critical to engage women in climate change-related interventions, in this case in the agriculture sector. Youth have also been considered as a vulnerable group to be addressed in the analysis and are included in the actions under output 2, with specific targets and indicators with data.

58. It is recommended that, while introducing and providing access to energy and labour-saving technology to women, the opportunities available should be used to sensitize and address some of the time burden issues that affect women more than men. In addition, the AE should also monitor activities closely to ensure the project will not exacerbate or create any adverse and negative impacts on women (e.g. violence against women).

59. The AE has included in the action plan some targets for the indicators and has provided specific timelines and responsibilities for each of the activities with budgets. It also has indicated that it will continue to collect sex disaggregated data throughout the implementation process. Specific indicators are also proposed to measure and track progress at the activity level. This will be incorporated into the detailed monitoring and evaluation plan, which will be developed at the start of implementation and provides concrete recommendations on how to ensure gender (including disaggregated) data continues to be collected and measured throughout implementation. The initial gender action plan for the proposed GCF project is to be further reviewed and finalized during the project inception phase. This process is recommended to ensure that targets for all activities will be confirmed and included.

60. Responsibility for delivery of the action plan rests with MoWHS, MoAF and the United Nations Development Programme (UNDP) as indicated in the action plan. However further and continuous support will be provided through the gender specialists at UNDP country office in Bhutan and the UNDP regional office in Bangkok. This will be provided during implementation. A gender specialist will also be hired under the project to further ensure that implementation is gender responsive.

4.3 Risks

4.3.2. Overall programme assessment (medium risk):

61. The funding proposal requests a GCF grant of USD 25.3 million, accounting for 44 per cent of the total financing. The total project cost is USD 58 million with co-financing by way of grants and in-kind contributions from the Royal Government of Bhutan. There is no co-financing from the AE; and

62. As stated in the feasibility study, this funding proposal has been developed as an outcome of consultations and there is geographic overlap with other donor-funded projects in six Dzongkhags in the eight targeted areas of the funding proposal. This funding proposal will support the application of agro-meteorological information at the Dzongkhags level, whereas the Global Environment Facility-Least Developed Countries Fund project is focusing on the development of crop insurance pilots at the specific Gewogs level close to protected areas and biological corridors. In addition, there is another GCF-funded project (FP050). It is recommended that the government together with the AE/EE closely monitor the ongoing/pipeline projects to maximize synergies and improve complementarity.

4.3.3. AE/EE capability to execute the current programme (medium risk):

63. The AE, UNDP, has an extensive track record in partnering with the GNHC in the areas of policy support and targeted interventions at the community level; and

64. The GNHC is the EE for the project. The EE has experience in coordinating and spearheading policy formulation to ensure cohesion among sectoral policies and alignment with national development objectives. The result of the capacity assessment of the EE indicated that the risk level for “Organisational structure and staffing” and “using the government financial management system on direct implementation of project activities” is “Significant” as the GNHC has a lack of experience in direct implementation of projects with funds flowing through GNHC. The EE has been focusing more on the oversight and review of other government agencies, which directly implement projects. For this project, while GNHC is responsible for providing strategic guidance, decision-making and day-to-day management, it is also coordinating with various responsible parties (e.g. NCHM and the Department of Agriculture) for each output. Comfort can also be derived from the fact that the EE has a suitable accounting system and financial reporting system in place and support from the AE is available in the country.

4.3.4. Programme specific execution risks (medium risk):

65. Guidelines for construction of climate-resilient road infrastructure: the Department of Agriculture is currently developing guidelines, which should be completed by mid-2019. Completion of the guidelines will influence implementation of the relevant activities in the funding proposals. Any delay in the development of the guidelines could also impede implementation of the project activities. It is recommended that the AE and EE closely work with the Department of Agriculture to ensure timely development of the guidelines and implementation arrangements; and

66. Natural hazards and damages by wild animal: the AE has identified the risk of natural hazards and large mammals and primates damaging pre-existing and/or project activities. As for the natural hazards and extreme weather events, avoiding the monsoon periods for the earthworks and construction has been suggested as a mitigation measure. Regarding the depreciation of livestock and agricultural crops because of wildlife, environmentally friendly, low-cost electric fencing systems or pest management technology were suggested. According to the “Crop and Livestock Compensation/Insurance against Climate-induced Disasters and Wildlife Incursions Report” submitted by the AE, private livestock insurance and private crops insurance were recommended. The capacity assessment of the EE stated that the Royal Government of Bhutan’s Property Management Manual does not require the insurance of assets apart from vehicles. Therefore, the EE is currently at risk of financial loss of its assets in the event of loss, theft and/or damage. It is recommended that the AE ensure adequate insurance coverage is available for the project to cover any potential damage during construction and implementation of the project.

67. The AE has provided a financial analysis for activity 3 (slope stabilization and road construction and maintenance) as the only component that can clearly result in direct and quantifiable financial cost savings for the Government. The financial analysis shows that if debt financing is arranged there is a negative NPV, demonstrating the financial unviability, whereas with the GCF grant financing (USD 3.3 million), the project could achieve its financial viability resulting in positive NPV with the financial internal rate of return of 6.47 per cent (weighted average cost of capital of 5.41 per cent); and

68. An economic analysis for the project has also been provided with a 10 per cent discount rate over a 16-year period for output 2 and a 26-year period for output 3. Although there is some potential income generation from the seed multiplication activity in output 1, given the overall supporting nature of the activities foreseen, the cost of output 1 and project management have been allocated to output 2. For output 2, the economic analysis results in positive NPVs under different scenarios with the assumption of paddy rice yield increase, the adoption of double cropping and the expected impact on crop yields from climate change. The

analysis for output 3 also shows a positive NPV with the economic internal rate of return of 12.3 per cent. This analysis is based on the assumption that the Government will commit for the O&M cost beyond the six-year project duration.

4.3.5. GCF portfolio concentration risk (low risk):

69. In case of approval, the impact of this proposal on the GCF portfolio risk remains non-material and within the risk appetite in terms of concentration level, results area or single proposal.

4.3.6. Compliance (medium risk):

70. Under clause 4.11 of the accreditation master agreement (AMA), UNDP is required to prepare and submit funding proposals reflecting the scope of their contractual due diligence obligations conducted pursuant to clause 4.05. These include, inter alia, anti-money-laundering and countering terrorist financing due diligence and risk mitigation. However, the funding proposal does not contain information on the outcome of first-level due diligence conducted by UNDP in this regard. Given that the Secretariat relies on the due diligence undertaken by AEs, Compliance has requested that UNDP incorporate an anti-money-laundering and countering terrorist financing due diligence summary within the funding proposal; and

71. Compliance evaluation of the information contained in the funding proposal did not identify any red flags. Furthermore, the outcome of enhanced due diligence (i.e. sanctions/adverse media screening) conducted on relevant parties mentioned in the funding proposal produced satisfactory results.

Summary risk assessment		Rationale
Overall programme	Medium	The project success will depend on timely co-financing from the Royal Government of Bhutan. The accredited entity and executing entity are relied upon to coordinate with other projects that are being implemented in the same areas to avoid duplication and enhance complementarity
Accredited entity/executing entity capability	Medium	
Project-specific execution	Medium	
GCF portfolio concentration	Low	
Compliance	Medium	

4.4 Fiduciary

72. The EE, GNHC, is required to implement the project in compliance with UNDP rules, regulations, policies and procedures, including the national implementation modalities guidelines. The EE is accountable to UNDP for managing the project, including the monitoring and evaluation of project interventions, achieving project outcomes, and for the effective use of resources.

73. The AE, UNDP, has ascertained the national capacities of the EE by undertaking an evaluation of its capacity following the Framework for Cash Transfers to Implementing Partners/Executing Entities. UNDP deems the EE to be fully compliant with the harmonized approach to cash transfer requirements under UNDP project implementation and financial management.

74. A Project Board, responsible for making management decisions, will be established for the project. It will comprise GNHC, MoAF, MoWHS, the NCHM, and UNDP. A National Project Director will run the project on a day-to-day basis on behalf of GNHC within the parameters laid down by the Project Board. The National Project Director's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost.

75. During implementation, UNDP will provide oversight and quality assurance in accordance with its policies and procedures, and any specific requirements in the AMA and project confirmation to be agreed with GCF. As AE, UNDP is required to deliver GCF-specific oversight and quality assurance services including: (i) day-to-day oversight and supervision; (ii) oversight of project completion; and (iii) oversight of project reporting.

76. UNDP will transfer funds to the Ministry of Finance, as per an agreed workplan with GNHC. Based on instruction from GNHC, the Ministry of Finance will then further allocate resources to responsible parties.

77. The project will be audited in accordance with UNDP policies and procedures on audits, informed by and together with any specific requirements agreed in the AMA. According to the current audit policies, UNDP will appoint the project auditors.

78. The GCF project budget includes a cost of USD 656,813, the cost of UNDP support services. We understand that these services will be carried out by UNDP based on the request from the Royal Government of Bhutan, and they cover technical, operational and procurement support. GCF Secretariat recommends that a portion of this cost be borne by the co-financiers as opposed to GCF funding the total cost of this budget line.

4.5 Results monitoring and reporting

79. As an adaptation project, the intervention is expected to improve infrastructure assets valued at approximately USD 30.35 million and to affect the resilience and livelihoods of approximately 118,839 direct beneficiaries as reflected per the gender-disaggregated metrics of relevant GCF impact and outcome indicators.

80. Overall, the funding proposal and logframe accurately and consistently apply the GCF funding-level (impact and outcome) results management framework and the performance measurement framework indicators. The project also has built-in results management project indicators and data collection that can inform progress reporting, reflecting both infrastructure and access but also behavioural change aspects.

81. Under section C.8, the implementation timetable should have been reflected in the funding proposal (see annex X) and will need to be revisited in funding activity agreement negotiation to ensure feasibility of the proposal and sequencing of the timeline for proposed activities and procurements/construction.

82. The funding proposal theory of change would benefit from further details that outline the risks and assumptions and reflect on the causal pathways within the intervention.

83. Regarding section H.1, overall, the logic framework is considered to comply with GCF standards.

84. Under section H.2, the funding proposal has incorporated randomized control trials as a means of verification and in an effort to apply impact evaluation methodologies, which will

generate evidence for attribution of results from GCF proceeds. The Secretariat would very much welcome further focus in section H.2 that goes beyond generic AMA and project management references to include details related to impact evaluation (as the midterm or final evaluation) and data collection expectations (sampling, frequency, sequencing, tools/methodologies, etc.).

4.6 Legal assessment

85. The Accreditation Master Agreement was signed with the Accredited Entity on 5 August 2016, and it became effective on 23 November 2018.

86. The Accredited Entity has provided a certificate confirming that it has obtained all internal approvals and it has the capacity and authority to implement the project.

87. The proposed project will be implemented in the Kingdom of Bhutan, country in which GCF is not provided with privileges and immunities. This means that, amongst other things, GCF is not protected against litigation or expropriation in this country, which risks need to be further assessed. The Secretariat submitted a draft of the privileges and immunities agreement to the Government of Bhutan on 9 December 2015. The agreement is currently under consideration of the Government of Bhutan.

88. The Heads of the Independent Redress Mechanism (IRM) and Independent Integrity Unit (IIU) have both expressed that it would not be legally feasible to undertake their redress activities and/or investigations, as appropriate, in countries where the GCF is not provided with relevant privileges and immunities. Therefore, it is recommended that disbursements by the GCF are made only after the GCF has obtained satisfactory protection against litigation and expropriation in the country, or has been provided with appropriate privileges and immunities.

89. In order to mitigate risk, it is recommended that any approval by the Board is made subject to the following conditions:

- (a) Signature of the funded activity agreement in a form and substance satisfactory to the Secretariat within 180 days from the date of Board approval; and
- (b) Completion of legal due diligence to the satisfaction of the Secretariat.

Independent Technical Advisory Panel's assessment of FP107

Proposal name:	Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan
Accredited entity:	United Nations Development Programme (UNDP)
Project/programme size:	Medium

I. Assessment of the independent Technical Advisory Panel

1.1 Impact potential

Scale: Medium

1. Bhutan is a small country with mountainous terrain, located in South Asia. Due to its geographic positioning in the Eastern Himalayan region, it is subject to high rainfall variability under monsoon conditions as well as a high annual average rainfall. Bhutan's high-altitude mountainous range exhibits much colder temperature zones, which restrict agricultural production, while crop agriculture appears increasingly more suitable in the lower altitude hills and valleys. The agriculture sector is important for the rural population; about 70 per cent of the population is dependent on agriculture (involving crop production, animal husbandry and forestry subsectors) for its livelihood. The crop subsector is dominated by subsistence-level smallholder producers.

2. The funding proposal package presents observation-based meteorological datasets for less than 20 years (starting in 1996). Despite having such limited observational datasets, a thorough analytical review of the past climatology of Bhutan has been presented. In doing so, the proponent used internationally maintained datasets for hindcast analyses, scientifically acceptable analytical tools and methods. It is found that the average surface temperature has been exhibiting a change in Bhutan. Likewise, the total annual rainfall is also exhibiting a slight change in the eastern region and a more prominent change in the western mid-mountain and low altitude ranges. There is also a significant inter-annual variability in rainfall and evidence of the occurrence of high rainfall events. The pre-monsoon drier seasons are becoming exceedingly drier due to diminishing seasonal rainfall availability over time. These phenomena have been giving rise to sudden floods and landslides during high rainfall events and agricultural droughts, with increasing potential evapo-transpiration (ET_0) during low-rainfall winter and pre-monsoon seasons. Such evidence clearly highlights that the Bhutanese agriculture sector is indeed highly vulnerable to climate change.

3. The funding proposal presents climate projection data, derived from outputs of general circulation models and by applying a statistical downscaling method using the PRECIS model to resolve projection results for Bhutan. Under a high emission scenario, subregional temperature projections for the South Asian window suggest that a warming of 2 °C and 3 °C are expected by the mid- and late twenty-first century, respectively, compared with the temperatures for the twentieth century. The model-based projections are comparable with regional projections using similar models that are often cited by the Inter-governmental Panel on Climate Change (IPCC). The same model-based projections suggest that the mean annual precipitation in Bhutan is likely to increase by 10 per cent for the period 2010-2039, with a corresponding increase by 20 per cent for the period 2040-2069. The projections also indicate that winters in

future will be drier by 5 per cent with respect to the already extremely low share of 2 per cent of annual precipitation, while monsoons will be wetter by 11 per cent in the long term.

4. Despite the fact that available general circulation models are not reliable enough to project rainfall data in South Asian monsoon influenced areas, the analyses on the trends during monsoon and non-monsoon seasons are strong and support the IPCC's region-wide findings. Even if the data are not directly used for hydrological planning purposes, the trends are quite indicative of sharp rainfall episodes during the monsoon leading to frequent landslides and higher ET_0 , which in turn lead to drought in the winter and pre-monsoon seasons. The proposal claims that rainfall episodes above the threshold of 50 millimetres of rainfall in any given day will increase, which can be considered as a scientific indicator suggesting an increase in landslides and flash floods in mountainous terrain.

5. The above findings warrant immediate actions so that:

- (a) Farmers receive adequate climate information and advisories regarding imminent climate-driven weather anomalies;
- (b) Measures are taken to protect the existing irrigation infrastructure networks from landslides in the eight target districts; and
- (c) The adaptive capacity of road networks that connect farms with markets is enhanced.

While the first objective can only be met by enhancing climate information systems and institutional capacity regarding such services, the latter two objectives can be of great significance towards maintaining production, especially in non-monsoon seasons, and to connect farms to a marketing value chain, even under climate change. If these cannot be achieved, Bhutanese agriculture cannot continue to provide sustainable livelihoods for the majority of the rural population in the eight vulnerable target districts.

6. The project is structured into three outputs:

- (a) Promote resilient agricultural practices in the face of changing climate patterns;
- (b) Integrate climate change risks into water and land management practices that affect smallholders; and
- (c) Reduce the risk and impact of climate change induced landslides during extreme events that disrupt market access.

7. The potential impacts of the project are all in line with the GCF performance measurement framework. Through this project, an estimated 118,839 people representing 27,598 households in eight districts will directly benefit from increased access to localized climate information for agricultural planning, climate-resilient agricultural practices and greater access to markets through resilient roads. The number of beneficiaries represents more than 46.5 per cent of the rural population of Bhutan. It is estimated that, over 50 per cent of the beneficiaries are women. Despite such impressive numbers in relation to beneficiaries, it is also found that 24,000 households will benefit from soil and land management practices, while only a small fraction of the beneficiary households will benefit from irrigation. Therefore, the climate related impact potential is likely to only be "medium".

8. The project proposes a budget of USD 58.02 million, of which USD 25.347 million is requested from GCF as a grant, which is 44 percent of the total project cost. The GCF grant is requested to support the transition from responsive measures to climate impacts to climate-informed agricultural planning and resilient practices as adaptation measures.

9. There is substantial co-financing committed from various national institutions. Co-financing will be provided by:
- (a) The Gross National Happiness Commission, supporting roadwork and slope stabilization;
 - (b) The Ministry of Agriculture and Forests, providing technical support and Water User Group (WUG) bylaw updates;
 - (c) The Ministry of Works and Human Settlements, providing technical expertise related to geotechnical studies and road enhancement; and
 - (d) The National Centre for Hydrology and Meteorology, providing technical support related to hydro-meteorological equipment.

The co-financing covers operations and maintenance (O&M) costs for established infrastructure, including irrigation, farm roads, agrometeorological stations and other assets to be built through this project.

10. If the project is implemented fully, despite the institutional coordination challenge, it offers significant impact potential. Such positive impacts, as contemplated, may even be further consolidated if the proposed policy interventions are ensured through the various national institutions, and, simultaneously, if the design criteria developed and implemented in the construction of roads and irrigation infrastructure could be mainstreamed in future construction of similar infrastructure throughout Bhutan. In view of such prospects, the impact potential of the project appears “medium”.

1.2 Paradigm shift potential

Scale: Medium

11. The project is not an innovative one in terms of activities and approach. However, it promises a shift away from business as usual agricultural production systems to informed, decision-led production systems, complemented by resilience building in the production stage up to marketing of agricultural products to optimize income from value chains. The approach is to integrate production with sustained participation in value chains with actions that are designed to reduce vulnerability at various stages. For the agriculture sector in Bhutan, the integrated approach itself may be considered as something novel, which could lead to a shift in the existing paradigm.

12. There exists some replication potential, since the project benefits only 8 out of 20 districts (i.e. Dzongkhags) in the country. Therefore, it will be possible to expand project ideas in other parts of the country. The project indicates that the meteorological data will be used towards generating agricultural advisories, the creation of such knowledge products will enable the farmers to shift from a responsive modality to a planned production system. However, without having proper data handling and in-house analytical capacities, including modelling capacities to generate agricultural advisories with adequate lead time, realization of achieving such an objective seems unrealistic within the time frame of the project.

13. The proposed sustainable land management and slope stabilization techniques are already tested. Buried pipe irrigation instead of open channel earthen irrigation in unstable terrain offers a modest paradigm shift in engineering terms. The knowledge gathered through the implementation of such an approach may be useful in future for mainstreaming such structural design elements for the construction of irrigation schemes and roads. Particular references may be made to road construction in mountainous terrains and also irrigation

schemes where there might be acute ET_0 related loss of top-soil moisture that imposes restrictions on the expansion of agriculture.

14. There is a theory of change, which justifies the need for three streams of activities to achieve the overall objective of the project. Since a significant proportion of the investment will go for resilience building in infrastructure, the project appears to be mindful of the need for operation and maintenance (O&M), which is highlighted in the O&M plan for the project. To facilitate implementation, the project has a technical assistance component, which allows project and institutional personnel to find opportunities for capacity-building in the implementation of various activities. The success of all these activities will also depend on strong coordination within the various institutions involved as well as among the various components of the project.

15. The anticipated potential in stakeholder-level learning from the issuance of weather advisories may be realized if the dissemination in remote mountainous terrain is properly designed and executed, following the initial hurdle of data acquisition and subsequent processing of advisories. However, the potential for knowledge and learning cannot be undermined. Despite the provisions created for monitoring and evaluation through the activation of WUGs for irrigation-related activities and Road User Groups (RUGs) for the maintenance of road networks, it remains a major challenge how the newly created participatory local level groups will perform – without which the potential for learning and replication can never be satisfactory.

16. Part of the opportunity for knowledge and learning will likely be realized where relevant institutions are supported with knowhow and training. There is significant potential for a contribution to the creation of an enabling environment, which will likely lead to informed decision-making in agricultural practices. The latter can be quite handy under climate change, where informed agricultural planning may help avoid crop losses during future occurrences of weather-related extreme events. Moreover, even without climate change, the early warning efforts and changes in the irrigation system and road maintenance could contribute to the creation of an enabling environment for agricultural production.

17. The project does not plan to address changes in the prevailing regulatory framework. However, it intends to develop improved maintenance guidelines for both the irrigation system and road management, which eventually will lead to an improved monitoring regime. It is claimed that early warning-related data handling will contribute to changes in the regulatory framework and policies. However, the funding proposal package does not indicate how this will be achieved in the long run. The project time-line appears limited (i.e. six years) to meaningfully contribute in this aspect of the project.

18. There is an exit strategy. It is heartening to see that the relevant national institutions have committed to cover the O&M far beyond the completion of the project. However, the potential for expanding the project's impact without equally increasing the cost base appears low. The majority of the GCF finance goes to enhancing the irrigation schemes, but the target for expanding irrigation is rather low. Such a situation does not necessarily excite external actors to replicate such measures, with or without climate change, in other countries, especially when there is high competition for leveraging grant financing from GCF. Similarly, the cost involvement for slope stabilization indicates that further expansion will remain limited without increasing the level of investment in future.

19. Overall, the independent Technical Advisory Panel (iTAP) finds the paradigm shift potential as “medium”.

1.3 Sustainable development potential

Scale: High

20. The project is well suited to deliver various elements of sustainable development for Bhutan in line with the Sustainable Development Goals (SDGs). The following deserve special mention:

- (a) SDG 2 (zero hunger): *end hunger, achieve food security ... and promote sustainable agriculture* by removing barriers to irrigation and promoting resilient agricultural practices;
- (b) SDG 5 (gender equality): *empower women and girls* by supporting an agricultural production system that has equal participation of women and the strengthening of which will empower women;
- (c) SDG 9 (industry, innovation and infrastructure): *build resilient infrastructure* by making irrigation and marketing infrastructure of the target districts resilient to weather-related extreme events and subsequent landslides in the mountains; and
- (d) SDG 15 (life on land): *protect, restore and promote sustainable use of terrestrial ecosystems ...* by halting and reversing land degradation in the mountainous agro-ecosystem of Bhutan.

21. Since the project is intended to provide support services to smallholder farmers, it is likely that their economic conditions will be strengthened due to project interventions. Moreover, the project will link the beneficiary farmers with value chains of cash crops, such as vegetables and fruits, which will help them move beyond subsistence agriculture and gain financially. The transformative process, as designed in the project, will help rural smallholder farmers in economic terms.

22. Bhutan has been going through an overall transformative agricultural process, which aims at shifting subsistence-based crop production to export- and consumer-oriented agricultural production, and establishing value chains so that remote production areas are better linked with larger markets to gain economically. Emphasis is given to crop diversification, from cereal-based production systems to diversified high-value crop production and marketing. The project, if approved, will help the Royal Government of Bhutan to achieve this overarching goal.

23. Although the geographic targeting does not fully justify all the selected areas, most of these target districts exhibit high incidences of poverty. Therefore, this project is likely to contribute to poverty reduction in the target areas. The Royal Government of Bhutan has embraced the concept of Gross National Happiness. By addressing the issue of poverty, the Royal Government of Bhutan will further contribute to Gross National Happiness, especially by ameliorating and/or reducing the prevailing social tension over diminishing water resources by ensuring greater availability of irrigation water despite extreme landslide episodes in the target areas. Since the target demographic groups are poor rural smallholder farmers, assured water for irrigation during the water-scarce months will help these target groups immensely and allow for their social and economic empowerment.

24. It is claimed that the farmers will be provided with training on topsoil management by the application of various agronomic practices. In a mountainous terrain, any reduction in topsoil erosion not only helps restoration of the ecosystem, but it also contributes to the ecosystem by reducing sedimentation on the beds of small streams and mountainous rivers.

25. Bhutanese agriculture has already experienced a feminization of the production system. Therefore, a boost in the production system is translated into a contribution to bringing gender

equity to the society. It is likely that the project will strengthen women's causes. The project has considered a women-centric approach to agricultural development, which will benefit women crop producers representing smallholder households in the eight target districts.

26. The outcomes of components 2 and 3 are in line with published national development visions. Not only are these aspects in alignment with the Twelfth Five Year Plan for Bhutan, but they are also mentioned in the sustainable development framework of the country.

27. Given the mandate of the project, it appears that it has a significantly high sustainable development potential.

1.4 Needs of the recipient

Scale: High

28. The proposal claims that the country, particularly its agricultural sector, is vulnerable to climate change. It is reported that crop failures due to a shortage of water in the drier seasons, with the backdrop of increasing ET_0 and landslide-led difficulties in maintaining open channel irrigation systems as well as ensuring timely marketing of perishable items, have resulted in a lack of confidence among smallholder producers in the affected districts of Bhutan. This has led to drastic measures such as gradual out-migration of male farmers and reduced on-farm income potential in affected regions.

29. The proposal refers to Royal Government of Bhutan's submission of national communications to the United Nations Framework Convention on Climate Change, where the country and its population are presented as highly vulnerable to climate change.

30. There are statistics that suggest that a significant proportion of Bhutanese people are struggling to maintain nutrition. Despite of the fact that Bhutan's gross domestic product has been growing steadily, its status as a Least Developed Country (LDC) cannot be overlooked. Moreover, the country is dependent on international exchanges for cereal and other commodities.

31. Moreover, reconstruction of deteriorated irrigation systems due to landslides as well as sudden losses of access to markets due to landslides on road networks has resulted in gradually increasing costs for servicing such infrastructure by the Royal Government of Bhutan. Bhutan's spending on maintenance of road and irrigation infrastructure has been increasing over the years, which may be linked with the aftermath of recent occurrences of floods and other extreme weather events. However, as an LDC, such expenditures reduce opportunities to invest in other development sectors. Bhutan's intention to receive international financing to strengthen such vulnerable infrastructure is therefore fully understandable. The facts presented above clearly highlight the needs of the recipient people and the country.

32. Bhutan needs to strengthen its relevant institutions so that better services may be provided, with or without climate change. The need for strengthening early warning systems and provisions for advisories cannot be overemphasized.

33. The coveted goal of achieving happiness for all in Bhutan depends on fast track financing in many of the sectors, perhaps more importantly in the agricultural subsector. As such, Bhutan's need to be a recipient of international financing is high. Bhutan is still an LDC. Therefore, the grant financing requested is fully justified. In view of the above facts, the iTAP finds the needs of the recipient to be "high".

1.5 Country ownership

Scale: High

34. National strategies to address climate change exist for Bhutan. The project is in alignment with policies highlighted in relevant documents.
35. The United Nations Development Programme (UNDP) is the accredited entity (AE), and it is active in Bhutan. From the available documentation, there is little information to justify whether UNDP Bhutan would be the most appropriate entity to promote resilient agriculture in the country. The executing entities are appropriately chosen, having the right national mandate to contribute to the project. They have adequate institutional set-ups to drive various project elements and activities. The successful implementation of the project will perhaps depend on a strong project management unit with close supervision and coordination roles on the part of the AE.
36. The national designated authority has been duly involved in the process of designing the project. The national designated authority established a Technical Working Committee that represents key personnel of the potential executing entities. Women and farmer groups have been engaged in the consultation processes during the formulation of the project. There exists a community engagement report to provide evidence of ownership of various primary stakeholders.
37. At least two non-governmental organizations have been involved in the consultation process. In sharp contrast, a large number of government institutions have been represented in the consultative process. Ideally, a more inclusive consultation process could have been followed to truly represent a balanced consultation.
38. Despite such observations, the overall country ownership is still found to be considerably “high”.

1.6 Efficiency and effectiveness

Scale: Medium

39. The project’s cost is estimated at USD 58.02 million, of which USD 25.347 million (i.e. 43.6 per cent) is sought as a grant from GCF. The co-financing ratio therefore is significantly high (i.e. 1:1.3). The majority of the planned outcomes are in the form of public good, mostly designed to benefit the rural smallholders, which is laudable. Since Bhutan is an LDC, its claim for full concessionality is well justified.
40. The project proposal clearly indicates that, other than the investments for achieving output 3 of the project, the other outputs (i.e. output 1 and output 2) are likely to result in non-attributable savings. In section F of the funding proposal, economic analysis for output 2 is also presented. However, such presentations of economic analysis are output specific. If investments in a few components of the projects are treated independently, positive net returns for those elements will be obtained. The proposal did not attempt to present a complete cost-benefit analysis-based efficiency for the entire project, especially in the form of analyses on financial as well as economic rates of return.
41. Based on the available data, as presented, an assessment of the financial and economic viability of the project remains uncertain. However, the positive net present values, at least on certain outputs, are indicative of the creation of incremental income among project beneficiaries. In the backdrop of losing hope in crop agriculture in the affected areas/districts due to climate change-related factors, even if an investment brings benefits in the form of greater food security, social harmony and incremental income to poor smallholder farmers, it is perhaps acceptable to take a risk on an investment where GCF may participate and remove investment barriers in an LDC.

42. It is expected that, if the capital investments are made under this project with GCF support and the O&M issues are managed through the participatory approach (i.e. the engagement of WUGs and RUGs), the Royal Government of Bhutan will be able to save the recurrent maintenance costs and re-invest towards future sustainability of the system. The letter of support from national agencies to cover the O&M costs beyond the project timeline is praiseworthy. However, any future attempt to take the project ideas outside the target areas might face financing struggles.

43. The activities envisaged for the project appear to be well thought out, in view of a few known hazards. However, the effectiveness will depend on how various assumptions play out together. For example, an effective monitoring system can hardly be expected by forming and subsequently engaging inexperienced local groups in the form of WUGs and RUGs. Again, in an institutional setting where there is no long-term time series meteorological datasets, one does not expect efficient delivery of agro-climatic advisories within the short time line of the project. However, the structural measures considered in the project, including the sustainable land management measures and slope stabilization techniques, have been tested somewhat and found to be effective in previous projects.

44. In view of the above analyses, the efficiency and effectiveness of the project as a climate change project for GCF financing appears to be “medium”.

II. Overall remarks from the independent Technical Advisory Panel

45. The iTAP recommends the Board approve the project.

46. The iTAP recommends the following for successful implementation of the project:

- (a) Ensure a stronger supervisory and coordination role is played by the accredited entity in order to ensure complementarity of various components and involvement of different key stakeholder institutions of the project; and
- (b) Given that new grassroots-based organizations such as Water User Associations and Road User Groups will monitor and maintain water (i.e. irrigation) and road infrastructure, the project should develop guidelines of participation and supervision of their performance involving national institutions. A failure to guide the processes might reduce the effectiveness of the application of such newly constituted grassroots-based participatory organizations, which in turn may adversely affect overall maintenance of critically important infrastructure.

Response from the accredited entity to the independent Technical Advisory Panel's assessment (FP107)

Proposal name: Supporting Climate Resilience and Transformational Change in the
Agriculture Sector in Bhutan

Accredited entity: United Nations Development Programme

Impact potential

The medium rating is noted.

The project will further strengthen the capacities of the government to fully mainstream climate change risks into design, planning, and implementation of resilient irrigation and road works. The statement recognizing the immediate action and urgency of interventions proposed is appreciated. Regarding observed data, we would just like to take this opportunity to stress that historical data is a challenge for many LDCs. While Bhutan was able to present 20 years of data, this may not be the case for other LDCs and the climate modeling required for specific sites is challenging to provide for most vulnerable countries.

Paradigm shift potential

The medium rating is noted.

The project addresses adaptation priorities for Bhutan, which is impacted by changing rainfall patterns, and faces increased risk of landslides. To adapt infrastructure to changing climatic conditions is critical to reduce the burden of recovery to extreme events and protect sustainable development gains.

Through the project, enhancements to disaster data collection and analysis will support the government to assess business-as-usual development investment against the loss and damage to agriculture, irrigation schemes and the road network resulting from changing precipitation patterns and increased risk of landslides. In this way, an economic case can be made for increasing the cost base to cover the higher upfront investment in climate resilient development, as the long-term savings in loss and damage can be quantified. In addition, capacity building activities with MoAF and MWHS will be implemented with a view towards mainstreaming climate resilience into planning. Climate-proofing and sustained capacities for climate resilient planning going forward engenders a shift away from the business as usual development and advances a paradigm shift in the country.

Sustainable development potential

The high rating is noted.

Needs of the recipient

The high rating is noted.

Country ownership

The high rating is noted.

Efficiency and effectiveness

The medium rating is noted.

The financial analysis and economic analysis were carried out following related UNDP guidelines, assuming conservative benefits and full project costs (GCF and co-financing). With positive results yielded for both, the project is financially viable, and will lay the groundwork for greater climate resilience for agriculture as well as irrigation and road infrastructure planning.

A challenge in Bhutan for appropriately costing climate impacts and climate-informed planning is a lack of disaster data. Project interventions address this challenge by supporting data collection and analysis (see also above on paradigm shift). Project activities are underpinned by the need to mainstream climate resilience and enhance coordination across sectors in planning processes, to support climate resilient planning and investment going forward.

Regarding engagement of local entities, the project enables ownership and awareness raising, for sustained adaptation processes and benefits as climate risks evolve. It should be noted that water user associations (WUAs) and road user groups (RUGs) are not expected to repair major damage, but rather monitor and report, as well as repair minor damages. Community engagement is important for long-term sustainability of the project infrastructure supported by strong government commitments on O&M.

Overall remarks from the independent Technical Advisory Panel:

UNDP appreciates iTAP's assessment of the project, and the time and support made available by iTAP members to UNDP in the lead up to this recommendation for Board approval.

Regarding the specific recommendations by iTAP for project implementation:

- stronger supervisory and coordination role to be played by the accredited entity

This is well noted and will be further discussed with the government. UNDP already applies a three-tier oversight and quality assurance role involving UNDP staff in Country Offices and at regional and headquarters levels. The quality assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring functions. UNDP's work is anchored in its role as an integrator across policy, programmatic and organizational silos. Therefore, UNDP's assurance role not only ensures that appropriate project management milestones are managed and completed, but it is also focused on the complementarities of various components and involvement of different key stakeholder institutions needed for the project to succeed.

- develop guidelines of participation and supervision of water user association (WUA) and road user group (RUG) performances involving national institutions

The project includes capacity building activities for WUAs and RUGs. Existing guidelines will be reviewed and discussed with government for enhancement as necessary to ensure WUAs and RUGs have the ongoing support and oversight needed from national institutions.



Gender Assessment, Action Plan and Budget

Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan

I. Introduction

This gender assessment aims to provide an overview of the gender situation in Bhutan, with a specific focus on supporting climate resilience and transformational change in the agriculture sector, identifying gender issues that are relevant to the project, and examining potential gender mainstreaming opportunities at the policy and project level. The assessment is based on available data from studies conducted by the Royal Government of Bhutan (RGoB), UN agencies, and multilateral development banks; and includes:

- Undertaking a desk review on gender studies conducted for Bhutan
- Conducting stakeholder consultations and engaging potential female beneficiaries of the project and incorporating feedback into the design of the proposed project
- Incorporating information and lessons learned from past studies and assessments on gender in Bhutan; and
- Integrating gender considerations in the project indicators, targets and activities, identifying women as leaders and decision-makers.

II. Gender and Climate Change Related Risks in Bhutan

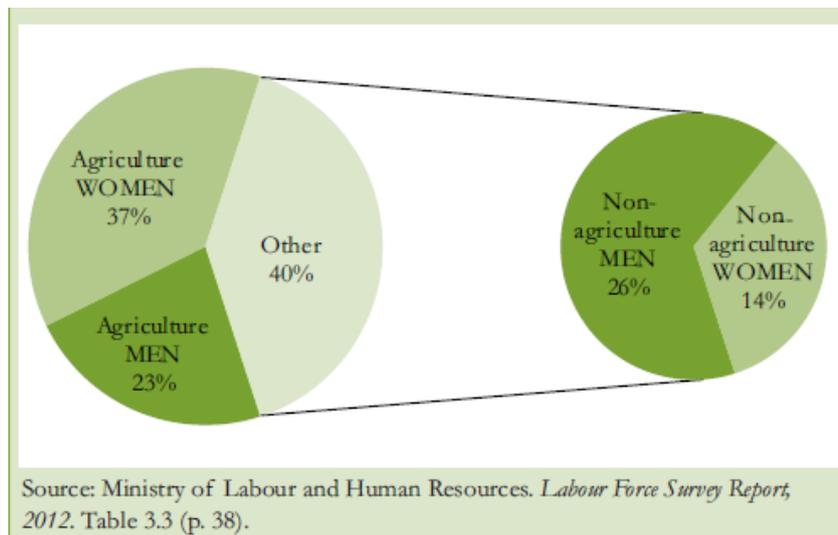
The RGoB recognizes climate change as one of the priorities for addressing sustainable and equitable socioeconomic growth, preservation and promotion of culture and environmental development through good governance. The 11th Five Year Plan (2013-2018) places climate change and gender as cross-sectoral issues, mainstreaming for achieving self-reliance and inclusive green socioeconomic development. Owing to diverse geographical features and unique geological complexities, Bhutan is extremely vulnerable to climate change-induced disasters such as Glacial Lake Outburst Floods (GLOF), erratic and extreme rainfall pattern inducing flash floods and, landslides, seasonal droughts, wind and hailstorms affecting property and lives of the people. For example, in 2016, Bhutan experienced excessive rainfall in the southern parts of the country resulting significant damages to the road and urban infrastructures incurring significant losses to public finance and people's livelihoods. These climate-induced disasters have significant negative social and environmental impacts on the lives and livelihoods of the people of Bhutan, particularly, the poor and other vulnerable local communities.

Climate change and its impacts are not gender neutral. Due to gender differentiated roles in the society and traditional and culture-induced marginalization, women are amongst those, who are likely to face the heaviest burdens from these changes and benefits less from policies, programmes and projects that address their issues. Women must be recognized as critical actors in climate change adaptation processes, with their knowledge, needs and priorities informing the design, implementation and monitoring of the climate change and natural resources projects.

The agriculture sector is especially vulnerable to climate change. Longer drought periods are causing acute shortages of water critical for crops and resulting in crop loss, and more intense monsoon seasons

are damaging crops and the infrastructure needed for market access by farmers. In Bhutan, more women are engaged in agriculture than men – a trend that is growing as men are increasingly leaving farms in search of off-farm work and often referred to as *feminization of agriculture sector*. As women’s role in agriculture grows, the necessity and urgency of ensuring that climate change responses are gender-sensitive also grows.

Percentage of Women Engaged in Agriculture in Bhutan



III. Existing Gender Inequality in Bhutan

While significant progress has been toward gender equality in Bhutan, several challenges remain.

The Gender Inequality Index (GII) reflects gender-based inequalities in three dimensions: reproductive health, empowerment and, economic activity. Reproductive health is measured by maternal mortality and adolescent birth rates; empowerment is measured by the share of parliamentary positions held by women and attainment in secondary and higher education by each gender, and economic activity is measured by the labor market participation of women and men. The GII can be interpreted as the loss of human development due to inequality between women and men achievements in the three dimensions.

Bhutan has a GII value of 0.457, ranking 97 out of 155 countries in the 2014 index. In Bhutan, 8% of parliamentary positions are held by women and 34% of adult women have reached at least a secondary level of education compared to 34.5 percent of men counterparts. For every, 100, 000 live births, 120 women die from pregnancy-related causes; and the adolescent birth rate was 40.9 births per 1,000 women of aged 15-19 years. Women participation in the labor market is 67 percent compared to 77 percent for men.

Bhutan’s GII for 2014 relative to selected countries and groups

	GII value	GII rank	Maternal mortality ratio	Adolescent birth rate	Female position in parliament (%)	Population with at least secondary education (%)		Labor force participation rate (%)	
						Women	Men	Women	Men
Bhutan	0.457	97	120	40.9	8.3	34.0	34.5	66.7	77.2
Nepal	0.489	108	190	73.7	29.5	17.7	38.2	79.9	87.1

South Asia	0.536	-	183	38.7	17.5	29.1	54.6	29.8	80.3
Medium HDI	0.506	-	168	43.3	18.8	34.8	55.3	37.5	79.8

**Maternal mortality rate is expressed in the number of deaths per 100, 000 live births and an adolescent birth rate is expressed in the number of births per 1,000 women aged 15-19 years.

The Gender Development Index (GDI) based on the sex-disaggregated Human Development Index (HDI) defines as a ratio of female to male HDI. The Gender Development Index measures gender inequalities in three basic dimensions of human development: health (measured by women and men’s life expectancy at birth); education (measured by expected years of schooling for children and mean years for men and women aged 25 years and older); and command over economic resources (measured by estimated Gross National Income (GNI) per capita for women and men). Amongst 161 countries, the 2014 women HDI value for Bhutan was 0.572 in contrast to 0.638 for men resulting in a GDI value of 0.897¹.

Bhutan’s GDI value and its components relative to selected countries and groups

	Life expectancy at birth		Expected years of schooling		Mean years of schooling		GNI per capita		HDI value		F-M ratio
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	GDI value
Bhutan	69.7	69.2	12.8	12.6	2.0	4.1	5,733	8,418	0.572	0.638	0.897
Nepal	71.1	68.2	12.5	12.2	2.3	4.5	1,956	2,690	0.521	0.574	0.908
South Asia	69.9	67.1	10.8	11.3	3.7	6.9	2,198	8,827	0.525	0.655	0.801
Medium HDI	70.6	66.8	11.5	11.8	4.9	7.3	3,333	9,257	0.574	0.667	0.861

The Bhutan Gender Equality Diagnostic of Selected Sectors summarizes the key points pertaining to gender equality and women’s position in Bhutan. Related to the critical sector of agriculture, the report highlights that female farmers face additional challenges in increasing agricultural productivity and related earnings. This is in part due to limited education and knowledge about alternatives, the heavy workload related to agriculture work and limited decision-making power. The ratio of women to men in tertiary education, women’s executive role in the local Governance, girls’ unemployment and framing gender sensitive policy are some of the key constraints and challenges. Amongst the rural men and women, differences arise in productive, family health, and socio-political roles, access to and control of land and natural resources and benefits and women’s participation and decision-making at various levels.

Bhutan Key Facts: Women and Agriculture

- The population consists to 49% of women and to 51% of men; 62% of the women work in agriculture
- The division of labor by gender is not rigidly fixed, as men and women can take over each other’s tasks, with few exceptions, and this may vary by ethnicity;
- 70% of the land is owned by women;
- The majority of the population follows matrilineal heritage giving women an advantage in ownership of land and livestock;
- Women considerably contribute to house-hold income through farm and non-farm activities;
- Women interact closely with the natural resource environment as users of wild plants and forest products;
- As managers of home gardens, women are both managers of bio-diversity as well as providers of variety to family meals;
- Based on the assumption of a gender-equitable social system, gender-segregated data are not readily available.²

¹ Bhutan Human Development Report 2015, UNDP

² Fact Sheet Bhutan. Women in Agriculture, Environment, and Rural Production. FAO.

According to the Concluding Observations of the Committee on the Elimination of Discrimination Against Women: Bhutan (2009)³, Bhutan’s level of urbanization is low and poverty disproportionately affects women to men, in large part due to difficulties of access due to the topography of Bhutan. Many households lack access to town services being several hours walk from the nearest road head, and compounded by weak transportation structure.⁴ Accelerated growth since the 1960s has occurred in Bhutan as it opened to the wider world and planned development commenced. With development in the infrastructure, hydropower, agricultural, manufacturing, communications and retail industries, Bhutan is in a significantly different place to that of only decades prior. While many positive steps have occurred in poverty reduction and gender parity, new challenges are present. Poverty levels remain high, especially in rural areas, resulting in increased rural-urban migration and therefore impacting the capacity of urban settlements to provide basic services. In rural areas, migration affects the availability of people for the labor force in agricultural activities. This is felt particularly by women who have been less likely to migrate and now predominate in the rural and agricultural labor force.⁵

In the context of agriculture and rural livelihoods, the report denotes that:

- Of the population that is rural, most households depend at least in part on crop, livestock, and forest products for subsistence and income;
- Challenges in the agriculture sector include low productivity, low technology, inaccessible markets, and labor shortages;
- The Eleventh Five Year Plan continues efforts of the Tenth Five-Year Plan to shift from subsistence to commercial production;
- Available data provides little insight into the functioning of rural households, particularly from a gender perspective;
- Women predominate in the rural and agricultural labor force;
- With the addition of household and community requirements, the work burdens of rural women are particularly heavy;
- The common assumption that inheritance practices benefit women needs validation;
- Limited information is available about women’s access to other production resources (labor, extension, and finance);
- Cooperatives, farmers’ groups, and other self-help groups provide means to increase women’s options;
- Domestic violence is more prevalent in rural areas and affects women’s economic activities as well as their quality of life;
- Efforts to bring extension services closer to local communities have benefitted both women and men; and
- The National Plan of Action for Gender aims to increase the number of women extension workers and the participation of women farmers in training.⁶

A key challenge in quantifying the differing needs of women is in part due to the minimal data and the fast changing social and economic situation in the country. This is recognized by both the RGoB and by

³ Concluding Observations of the Committee on the Elimination of Discrimination Against Women: Bhutan 2009 (CEDAW/C/BTN/CO/7)

⁴ *Ibid.*

⁵ Bhutan Gender Equality Diagnostic of Selected Sectors (ADB, 2014)

⁶ Bhutan Gender Equality Diagnostic of Selected Sectors (ADB, 2014)

non-governmental organizations (NGOs).⁷ The following sub-sections explore areas of gender labor roles in agriculture, access to resources, education, health, political participation and gender-based violence in greater detail, informed by focal area-specific studies and consultations conducted with communities during development of the proposal.

Gender Division of Labor in Agriculture

Women in the agriculture sector manage households and pursue multiple livelihood strategies, with activities including: producing agricultural crops, tending animals, processing and preparing food, working for wages in agricultural or other rural enterprises, collecting fuel and water, engaging in trade and marketing, caring for family members and maintaining their homes. Many of these activities are unpaid, yet integral to the wellbeing of rural households.⁸

Based on community consultations conducted during development of the proposed GCF project, the division of tasks between men and women vary by crops and the nature of activities. Although, both men and women cultivate agricultural crops, 72 percent of women cultivate and market vegetables while 97 percent men plough fields and, 83 percent men cultivate and market cardamom. And women market cereals, vegetables, fruits, livestock products (milk, cheese and butter), and homemade products. Generally, women’s role is limited to agricultural activities near the household, while men may seek off-farm non-agricultural work. This is consistent with existing time use survey information:

Table 2. Agricultural production and marketing activities by gender

Production and marketing activity	Men	Women	Both
Land preparation(n=100)	38	19	43
Ploughing (n=97)	96.9	0	3.1
Cultivate cereals (n=61)	6.6	19.7	73.8
Paddy seedling transplant(n=10)	20	60	20
Weeding(n=29)	3.4	34.5	62.1
Cultivate fruits (n=14)	28.6	7.1	64.3
Cultivate vegetables(n=101)	1	72.3	26.7
Kitchen gardening(n=101)	1	80.2	18.8
Cultivate cardamom(n=20)	60	5	35
Harvest cereals(n=43)	4.7	7	88.4
Market cereals(n=6)	16.7	50	33.3
Market vegetables(n=90)	23.3	46.7	30
Market cardamom(n=23)	82.6	4.3	13
Market fruits(n=13)	30.8	30.8	38.5
Market livestock products(n=28)	3.6	89.3	7.1
Market processed home-made products(n=9)	0	77.8	22.2

With the additional household and community requirements, rural women bear heavy workload burdens. A shortage of labor was one of the major constraints reported by farmers.⁹ Labor shortages were most acute for smaller farmers seeking to commercialize and particularly felt by female-headed households. Further, the labor time that women (with or without spouses) can allocate to work in the fields is restricted by the competing demands of household and community responsibilities, and the overall work burden they carry. A strict gender division of tasks in agriculture was not evident. Some tasks may be allocated by gender, while others may be performed by both men and women. In addition,

⁷ Concluding Observations of the Committee on the Elimination of Discrimination Against Women: Bhutan 2009 (CEDAW/C/BTN/CO/7)

⁸ Fact Sheet Bhutan. Women in Agriculture, Environment, and Rural Production. FAO

⁹ Bhutan Gender Equality Diagnostic of Selected Sectors (ADB, 2014)

men and women to a large extent take over from each other.¹⁰ Common labor performed by women includes collection of firewood, crop cultivation, vegetable gardening, yak herding, traditional weaving using vegetal dyes and other handicraft. In addition, women are tasked with activities related to housekeeping, agriculture, animal husbandry and cottage industry, and play an important role equal to men in rural economics. Men, on the other hand are largely engaged with preparing land (e.g. plowing), construction, trading and other business or manual activity. Gender division of labor in livestock management is mixed with women tending to smaller stock, particularly poultry, while men tend to focus on grazing for larger animals.¹¹

Regarding water collection, 45 percent of women collect drinking water while 65 percent men source irrigation water, 63 percent and 41 per cent men collect fuel wood and fodder, respectively and 45 per cent grazes cattle. Women were overwhelmingly engaged in food preparation (89 percent) and cooking, family health and childcare (77 percent), household work and family health and hygiene (83 percent).

Regarding natural resource management, women have traditionally provided much of the labor. Seed management, crop cultivation, and farmer-to-farmer exchanges ensure women play a pivotal and leading role in the field and in their communities. With emerging environmental problems however, the ill-effects of forest degradation have resulted in longer work hours for rural women both in the fields and in secondary household tasks such as travelling farther for fuelwood.

Women bear substantial responsibilities for many aspects of production and domestic marketing and export agricultural goods. However, women's access to agricultural marketing services, including finance is, constrained by social and traditional factors. This, in turn, hampers their capability and efficiency in the agricultural development.¹²

Access to resources

While land inheritance is perceived to favor women in Bhutan, legal control and decision-making related to use of land is unclear¹³. The language about ownership used in both the Inheritance Act, 1980 and the Land Act of Bhutan, 2007 suggest that the land is regarded as a family asset rather than an individual¹⁴. Based on consultations conducted during design of the GCF proposal, benefits accrued from land seem to be equally shared between men and women. Men have better access to and control of forest products, agricultural machinery, Renewable Natural Resources (RNR) training and extension services. Both men and women have equal access to and control of credits, labor, health and education services. Regarding livestock benefits, women had better access to and control. The benefits accrued from agriculture and, forestry activities were equally shared between men and women, while benefits from an off-farm contract, business and farm labor accrued more to men.

Limited access to finance has been identified as an issue in several studies of agriculture and cottage and small industry. Rural areas are particularly underserved by the formal banking systems, where banks are few, access is difficult, and products are not well-adapted to small savers and borrowers. Cooperatives, farmers' groups, and other self-help groups provide means to increase women's options. These groups provide a means for delivering and receiving inputs and for enhancing productivity, outputs, and income. Registration under the Cooperatives Act, 2001 (as amended in 2009) provides such groups with a juridical personality and thus certain protections, as well as the ability to apply for

¹⁰ Fact Sheet Bhutan. Women in Agriculture, Environment, and Rural Production. FAO.

¹¹ Fact Sheet Bhutan. Women in Agriculture, Environment, and Rural Production. FAO.

¹² Bhutan Gender Equality Diagnostic of Selected Sectors (ADB, 2014)

¹³ Bhutan Gender Equality Diagnostic of Selected Sectors (ADB, 2014)

¹⁴ Bhutan Gender Equality Diagnostic of Selected Sectors (ADB, 2014)

loans and access services.¹⁵

Regarding ownership and inheritance, women and men have equal legal status. In conjunction, women also hold equal rights to receive family benefits, bank loans, mortgages, and other forms of financial credits.

Women and Inheritance in Bhutan

With respect to inheritance, the traditional practice of the matrilineal family system in western and central Bhutan allows land to be inherited through the daughter, while in the south the system is usually patrilineal. While the matrilineal inheritance patterns in western and central Bhutan imply more social freedom for women and the recognition of women’s economic contribution, they also present women with responsibilities to care for their parents, resulting in their limited economic and social choices (Draft National Plan of Action for Gender 2006.) Property rights are also guaranteed in the Draft Constitution. The Constitution also guarantees the rights to culture and religion. Traditional culture and social norms in Bhutan do not restrict women’s participation in socioeconomic development. The laws do not restrict equal opportunities of participation in sports and cultural activities.¹⁶

Based on the Gross National Happiness concept, the *Bhutan 2020: A Vision for Peace, Prosperity and Happiness* report outlines a “vision of development that emphasizes the ability of all to realize their potential; equitable sharing of the benefits of development; and opportunities for all to share in decisions that affect their lives, livelihoods, and families. This vision cannot be attained without ensuring that women have equitable access to self-realization, development benefits, and participation in decision-making”.¹⁷ Decisions are largely made jointly by women and men and in multiple areas such as spending of money earned from kitchen gardening and farm labor. Women are free and able to independently make decisions.¹⁸

Education

Although remarkable progress has been made to bridge gender gaps in education (gender parity index 1.02)¹⁹ indicating no significant gender inequality, significant differences still remain in the literacy gap between men and women.

Literacy Rate by Area and Gender²⁰

Area	Overall Literacy Rate			Youth Literacy Rate			Adult Literacy Rate		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Urban	86.7	72.0	79.2	95.4	88.7	91.6	84.1	65.3	74.5
Rural	65.0	47.1	55.9	88.2	78.7	83.4	58.0	36.6	46.9
Total	71.6	54.7	63.0	90.4	82.2	86.1	66.0	45.2	55.3

**Health and Education (6 years and above)²¹

Bhutan has been closing the gender gap in school enrolment figures in the recent years, though girls continue to have a slightly lower ratio than boys. Access to primary education has grown rapidly over the recent years. Progress has been made towards gender parity at primary and secondary levels, but

¹⁵ Bhutan Gender Equality Diagnostic of Selected Sectors (ADB, 2014)

¹⁶ Concluding Observations of the Committee on the Elimination of Discrimination Against Women: Bhutan 2009 (CEDAW/C/BTN/CO/7)

¹⁷ Bhutan Gender Equality Diagnostic of Selected Sectors (ADB, 2014)

¹⁸ Fact Sheet Bhutan. Women in Agriculture, Environment, and Rural Production. FAO

¹⁹ 11th Five Year Plan, Main Document Volume 1, Gross National Happiness Commission

²⁰ Bhutan Living Standards Survey (National Statistics Bureau and ADB, 2012)

²¹ <http://www.nsb.gov.bt/publication/files/pub7ps7846bs.pdf>

attainment of gender parity at the tertiary education levels remains a challenge. The transition of females from primary to secondary to tertiary levels and greater female enrolment into technical, professional and vocational institutions need to be further promoted. The RGoB has been emphasizing the necessity of basic primary education and the need for both male and female teachers at schools.²²

Limitations to gender parity and fewer females in schools are attributed to:

- Non-availability of secondary schools within a short walking distance;
- Non-availability of female caretakers at the boarding facilities;
- Traditional belief and attitude that boys need education more than girls; and
- Teenage pregnancy and early marriage.

In order to address this disparity, focused educational programmes (i.e. alternative schooling, out-of-school programmes, incentivized programmes) have been developed, however despite these efforts, enrolment levels between rural and urban areas, and those in different income groups still exists.²³ The literacy rate of rural women, however, has increased with the introduction of non-formal education. UNDP continues to be a key development partner of the RGoB in gender mainstreaming promoting gender equality and women’s empowerment in policies, programmes and projects.

An important consideration is the wide literacy gap between youth and adults (see above table). As men are increasingly leaving the agriculture sector in pursuit of off-farm employment, so too are youth – labor in the agriculture are therefore increasingly female and older. This education gap was further reflected in consultations conducted during the design of the proposed project. When asked about needs, 53% women expressed the need for improved education and skills development. Education is a driving force towards gender equality – empowering women to make rational social, economic and political decisions.

Health

Women’s life expectancy at birth (66.2) is higher than that of men (66). The RGoB has undertaken several measures to enhance women’s health status. Emphasis has been placed on the quality and coverage of health services. Health care services in Bhutan are based on integrated primary health care and referral curative systems. With the overall goal to reduce maternal/neonatal mortality/morbidity during pregnancy, and childbirth, a plan of action for safe motherhood programme has been prepared. The Royal Government of Bhutan has also taken steps to bring legal reforms in the health sector, especially in reproductive health.²⁴

Despite this, provision of health services is not in itself enough to improve the health of women. As per the Concluding Observations of the Committee on the Elimination of Discrimination Against Women: Bhutan 2009 “women are married at a relatively young age, and there is a tendency to bear children soon after marriage, women tend to remain silent even within the family on their health problems, especially in reproductive health, and the lack of gender disaggregated data and research on women’s health affects quality of health programmes. Factors contributing to the high mortality of women include the risks of childbirth and women’s limited access to knowledge, food, and care. Early marriage and pregnancy, low literacy, and inadequate family planning services also undermine the health status of women. Access to health care in general, and maternal health care in particular, can be difficult for rural women, given that as child bearers they are more prone to health risks than men. Royal

²² *Ibid*

²³ *Ibid*

²⁴ *Ibid*

Government of Bhutan strategies to decentralize the health system have been implemented to mitigate this significant obstacle”.²⁵

The health sector has targeted rural women for the delivery of social services, including health, education, drinking water and sanitation. Also in the health sector, initiatives are being taken towards safe motherhood, reproductive health, and the services of female community health volunteers. The character of the Bhutanese economy poses a formidable challenge for integrating the rural economy with the national economy – the lack of adequately developed infrastructure and general inaccessibility hinders the implementation of development activities. Scattered settlements, especially in the hilly areas, further complicate the delivery of public services. Due to limited mobility, economic opportunities are more limited for women than men. Also in terms of social development, rural areas are lagging behind.

Political participation

Decision-making on political activities at the *Gewog* and *Dzongkhag* are inclined toward men than women, as men dominate participation. In general, women are poorly represented in decision-making at *Gewog*, *Dzongkhag* and national levels (e.g. only 14 percent of female representatives from 2008-2013 and 7 per cent in the current Parliament (2013-2018))²⁶.

This is consistent with community consultations conducted during development of the proposed project, where only 26 percent of women participated in local meetings. The overall low participation is believed to be linked to the wide gender gap arising in education.

The RGoB seeks to address issues of inequality through a) the implementation of poverty reduction measures, b) public awareness campaigns, and c) institutional measures for an effective enforcement of the legal provisions that are in place.

Political Participation

Women have equal rights and are increasingly seeing opportunities to represent the Royal Government of Bhutan at the international level, and participate in the work of international organizations on an equal level. Bhutanese women have led and participated in many Royal Government of Bhutan delegations to international conferences. Two women were appointed in 2003 as Secretaries to the Royal Government of Bhutan – as Foreign Secretary and Finance Secretary respectively. The Foreign Secretary has since been appointed as the Chairperson of the Anti Corruption Commission. In the Ministry of Foreign Affairs, there is a higher women’s representation in grades 4-8 [36 per cent] and grades 9-13 [39 per cent] than at lower grades 14-17 [7 per cent].²⁷

The 10th FYP Guidelines in line with the decentralization policy to include grassroots in all levels of planning development activities encouraging women’s involvement in planning and implementing community development projects.

Gender-based Violence

Domestic violence exists in Bhutan and affects rural women’s economic activities as well as their quality of life. A recent national survey found that 26 per cent of rural women aged 15 to 49 had experienced domestic violence at some point in their lives. Of great concern is the extent to which domestic violence

²⁵ Concluding Observations of the Committee on the Elimination of Discrimination Against Women: Bhutan 2009 (CEDAW/C/BTN/CO/7)

²⁶ *Improving Women’s Participation in Local Governance*, Institute for GNH Studies, Royal University of Bhutan.

²⁷ Concluding Observations of the Committee on the Elimination of Discrimination Against Women: Bhutan 2009 (CEDAW/C/BTN/CO/7)

was condoned by women, including younger women, educated women, and women in all regions. Among rural women aged 15–49, 72 percent believe that a man is justified in beating his wife or partner for any one of these reasons: neglect of children, going out without telling him, arguing with him, refusing sex, or burning food. This level of tolerance of domestic violence suggests a lack of exposure to contrary views from political leaders, educational institutions, or other members of the community. During the period of the National Plan of Action for Gender (2008-2013), violence against women was the area of action that received the most attention and follow-up. This included the enactment of the Domestic Violence Prevention Act, 2013.²⁸

IV. Legal and Administrative Framework Protecting Women and Protecting Gender Equality

The RGoB is committed to mainstreaming gender equality and women’s empowerment. The RGoB considers women in development an integral part of the 10th Five Year Plan (2009-2013) by ensuring equal opportunities to men and women. UNDP supported the ‘National Action Plan for Gender (NAPG) 2008-2013 to promote gender equality and women’s empowerment. The action plan identified seven critical areas; good governance, economic empowerment, combating violence against women, education and training, health, prejudices and stereotypes and, aging mental health and disabilities. The action plan progressed in terms of conducting studies identifying challenges and gaps, sensitization on gender equality and women’s empowerment and, creating an enabling legal environment by enacting Domestic Violence Prevention Act in 2013. The 10th FYP progressed with increased data and statistics on gender, collaboration with the Civil Society Organization (CSO) working on the issues of women, mainstreaming gender in national policy and implementation and, promoting awareness on gender equality through media discourses. The formulation of the NPAG was led by the GNH Commission and the National Commission for Women and Children (NCWC), in consultation with government gender focal points and other stakeholders. The NPAG identified seven critical areas for action and provided a background analysis and a results-based action plan for each one:

- Good governance;
- Employment;
- Education and training;
- Health;
- Aging, mental health, and disabilities;
- Violence against women; and
- Prejudices and stereotypes.

It is recognized that institutional structures are required in order to promote and implement action of gender equality issues. Summarizing key points from the 11th FYP, the GNH Commission, the National Commission of Women and Children, and Local Governments acknowledge the following key elements:

- The responsibility of all ministries and agencies to address gender equality had been recognized;
- The National Commission of Women and Children has a strategic policy and advisory role in support of gender equality;
- The network of gender focal points is a key mechanism for increasing attention to gender equality issues; and

²⁸ Bhutan Gender Equality Diagnostic of Selected Sectors (ADB, 2014)

- Local governments also have an important role in addressing gender equality issues.²⁹

During the 11th FYP, a gender quality diagnostic study of the selected sectors; education, urban, environment, energy, transport, agriculture, labor and employment including private sectors are planned. Gender enabling environment through an enactment of Gender Equality Law, implementation of Gender Responsive Planning and Budgeting strategy, gender mainstreaming across sectors and effective implementation of gender policy and laws will be monitored. In addition, the Eleventh Five-Year Plan targets a more gender friendly environment for women’s participation. Under the governance pillar of the gross national happiness framework, four performance indicators related to the environment for women’s participation are specified:

- Draft legislation to ensure quota for women in elected offices including the Parliament and local government bodies - draft legislation and present to the Parliament.
- Ratio of females to males in tertiary education – ensure at least 90% female to male ratio in tertiary education.
- Female youth unemployment - reduce female unemployment from 7.2% to less than 5%.
- Agencies with gender sensitive policies and/or gender mainstreaming strategies - at least 20 agencies implementing gender sensitive policies and/or gender mainstreaming strategies. (Gross National Happiness Commission, 2013. Eleventh Five-Year Plan, 2013–2018, pp. 76–77).³⁰

UNDP assisted the RGoB in mainstreaming gender in development policy, programmes and plans since 2005 and has recently worked with the National Commission for Women and Children (NCWC) and Respect, Educate, Nurture and Empower Women (RENEW). NCWC coordinates, monitors and reports on international conventions e.g. CEDAW and women and children’s rights to the Government to inform policy and legislations and RENEW seeks to prevent violence against women by counselling, advice and economic empowerment of women.

In collaboration with UN Women, UNDP addresses gender-mainstreaming issues through Gender Responsive Governance Programme, Women in Politics and, Gender Responsive Budgeting Programme in partnership with NCWC, Department of Local Governance and Ministry of Finance. Under governance, significant progress was achieved in identifying factors and challenges inhibiting women's participation in governance, creating awareness on politics, and building capacity for aspiring women leaders. Under education, provision of scholarship for girls from disadvantaged families, girls-friendly school infrastructures and, boarder facility and, Early Childhood Care and Development Centre and extended classrooms were created.

The National Adaptation Programme of Action (NAPA) 2006 revised in 2012 prioritises 8 urgent and immediate adaptation needs. Amongst others are Disaster Risk Reduction and Management- planning disaster management interventions and providing emergency medical services to vulnerable communities. In 2012, Bhutan launched its Carbon Neutral Strategy as a follow-up to the carbon neutral commitment pledged by the Government during the Copenhagen UNFCCC-COP15 Meeting in 2009. With the support of UNDP-Low Emission Capacity Building Programme, the Government is undertaking the design of NAMAs, LEDS and MRV across a number of key sectors; transport, waste, housing and, industry. To mainstream gender equality into the design process, a rapid gender capacity needs assessment was developed and implemented in 2013. Its recommendations are expected to

²⁹ Bhutan Gender Equality Diagnostic of Selected Sectors (ADB, 2014)

³⁰ Bhutan Gender Equality Diagnostic of Selected Sectors (ADB, 2014)

enable effective integration of gender equality into Bhutan’s national strategies and the implementation of NAMAs and LEDs.

Bhutan signed the Convention on Elimination of All Forms of Discrimination Against Women (CEDAW) on July 17, 1980 and ratified it on August 31, 1981.³¹ This led to the establishment of National Women’s Association of Bhutan (NWAB) with the mandate on addressing issues related to women and monitoring and reporting mechanisms. In order to further strengthen the national institutions, NCWC was instituted in 2004. This was followed by the institutionalization of several non-governmental organisations like RENEW and Tarayana Foundation.

Bhutan also ratified the Convention on the Rights of the Child (CRC) in 1990 and presented its initial report to the Committee on the Rights of the Child on 5th June 2001.³² In the past five years, as a reaffirmation of its commitment to protection of its citizens’ rights, and in particular women’s and children’s rights, Bhutan has signed and ratified several international and regional conventions and treaties, including the: SAARC Convention on Prevention and Combating Trafficking in Women and Children for Prostitution 2002; SAARC Convention on Regional Arrangement for the Promotion of Child Welfare in South Asia 2002; SAARC Code for Protection of Breast Feeding and Young Child Nutrition 2004; and the two Optional Protocols to the CRC on the involvement of children in armed conflict and sale of children, child prostitution and child pornography 2005.³³ The Constitution of the Kingdom of Bhutan makes a strong statement on the equal rights of all citizens, regardless of sex, and the Principles of State Policy include a commitment to the creation of a state free of discrimination, and to take measures to eliminate discrimination against and exploitation of women.³⁴

The Labor and Employment Act 2007 protects women's social safety in the workplace against work and sex-related abuse and gender discrimination with respect to salary.

Human Rights and Fundamental Freedoms for Women. The Constitution of the Kingdom of Bhutan guarantees basic human rights and fundamental freedoms to every citizen. The Constitution also provides for effective remedy and enforcement of these rights. The Supreme Court is empowered, under its extraordinary jurisdiction, to protect fundamental rights by issuing various forms of writs. Promotion and protection of human rights is also one of the directive principles of state policy.

National Commission for Women and Children. The National Commission for Women and Children established through a special government order in 2004 is the national mechanism for coordinating and monitoring activities related to women and child rights, and reporting to treaty bodies. The Commission has a cross-sectoral and mixed representation of eleven members from the government, law enforcement, judiciary, social sector, civil society, including the media and the business sector.

The Constitution of the Kingdom of Bhutan is the supreme law that charges gender equality as “fundamental rights of all Bhutanese citizens to be treated equal and effective protection under the law and shall not be discriminated against on the ground of race, sex, language, religion, politics or another status”.

Major sources of state policy promoting attention to equality of citizenship rights and enjoyment of life by all citizens.

³¹ Committee on the Elimination of Discrimination Against Women. Seventh Periodic Report of States Parties: Bhutan. 2007

³² Committee on the Elimination of Discrimination Against Women. Seventh Periodic Report of States Parties: Bhutan. 2007

³³ *Ibid.*

³⁴ Bhutan Gender Equality Diagnostic of Selected Sectors (ADB, 2014)

Constitution of the Kingdom of Bhutan

Fundamental rights (Article 7):

15. All persons are equal before the law and are entitled to equal and effective protection of the law and shall not be discriminated against on the grounds of race, sex, language, religion, politics or other status.

Fundamental duties (Article 8):

5. A person shall not tolerate or participate in acts of injury, torture or killing of another person, terrorism, abuse of women, children or any other person and shall take necessary steps to prevent such acts.

Principles of State Policy (Article 9):

3. The State shall endeavour to create a civil society free of oppression, discrimination and violence, based on the rule of law, protection of human rights and dignity, and to ensure the fundamental rights and freedoms of the people.

17. The State shall endeavour to take appropriate measures to eliminate all forms of discrimination and exploitation against women including trafficking; prostitution, abuse, violence, harassment and intimidation at work in both public and private spheres.

Bhutan 2020: A Vision for Peace, Prosperity and Happiness

The main development objectives include three that are particularly relevant:

- Human development: To maximize the happiness of all Bhutanese and to enable them to achieve their full and innate potential as human beings.
- Balanced and equitable development: To ensure that the benefits of development are shared equitably between different income groups and regions and in ways that promote social harmony, stability and unity and contribute to the development of a just and compassionate society.
- Governance: To further develop our institutions, human resources and system of governance in ways that enable us to enlarge opportunities for people at all levels to participate more fully and effectively in decisions that have a bearing on their lives and livelihoods and the future of their families, communities and the nation.

Sources: Constitution of the Kingdom of Bhutan. 2008; and Planning Commission.

1999. Bhutan 2020: A Vision for Peace, Prosperity and Happiness. Part 2, pp. 12–15.³⁵

V. Gender Analysis and Recommendations

The gender analysis undertaken at the onset and design of this project acts as an entry point for gender mainstreaming throughout implementation. The gender analysis, through stakeholder engagement and consultation enabled:

- Engagement, development and input into the design of the project and the approach moving forward;
- Demonstration of the need for gender-disaggregated data and indicators to establish a baseline in which to measure improvements and identify areas of focus; and
- Establishment of recommendations to incorporate into the Gender Action Plan.
- This participatory, bottom-up approach was well-received by beneficiaries and stakeholders, as it allowed the identification and prioritization of tailor-made interventions, enabling the project to address issues over a wide range of environmental gradients and agronomic and cultural setting.

The project is designed in line with national policies and programmes related to empowerment of women, and implementation will ensure a consultative process that is sensitive to their particular challenges. Addressing gender dimensions within the project design and implementation, this proposal works to identify and integrate interventions to provide gender responsive and transformative results. As women are key players in supporting climate resilience and transformational change in the agriculture sector.

³⁵ Bhutan Gender Equality Diagnostic of Selected Sectors (ADB, 2014)

UNDP in partnership with the RGoB will continue to mainstream gender equality and women's empowerment in the policy, programmes and project's design and implementation. Specifically, the project design will integrate the below:

- Growing role of women in agriculture, ensuring participation of women in community consultations to ensure adequate response to expressed needs and challenges
- Tailor capacity building needs to women and girls in ensuring equal participation and decision-making from local governance to national level (e.g. entrepreneurial/business skills as expressed during consultations);
- Ensure project supports are directed to women and men's practical and strategic needs and priorities that would bring transformational change in the gender relations and shift more powers to women;
- Ensure access to information on markets, pricing policy and climate through innovative information communication mechanisms to reach women;
- To reduce negative impacts on women (e.g. workload, health), through project intervention on promotion and training on energy and labor saving technologies;
- Conduct qualitative assessments on the gender-specific benefits from the project interventions and incorporate in the mid-term report, and terminal evaluation;
- Ensure that good practices and lessons learnt from promoting gender equality in climate change adaptation evidenced through the project are shared effectively amongst stakeholders and inform policy/decisions at national and sub-national levels.
- Identification of gaps in gender equality through the use of sex-disaggregated surveys enabling monitoring and analysis of project benefits to women
- Advocacy and awareness is adjusted to most effectively reflect gender-specific differences. Strategies used in the project are then tailored, taking into account such differences;
- Inclusion of a Gender Specialist position / provision of advice within the project to implement gender related activities.

During project implementation, qualitative assessments will be conducted on the gender-specific benefits that can be directly associated to the project. This will be incorporated in the annual Project Implementation Report, Mid-Term Report, and Terminal Evaluation. Indicators to quantify the achievement of project objectives in relation to gender equality will include men and women who had access to affordable solutions, number of men and women employed from the jobs created by the project, training opportunities, knowledge management and information dissemination.

VI. Proposed Gender Action Plan

Bhutan: Supporting Climate Resilience and Transformational Change in the Agriculture Sector

This Gender Action plan provides suggested entry points for gender-responsive actions to be taken under each of the Activity areas of the project. In addition, specific indicators are also proposed to measure and track progress on these actions at the activity level. This can be incorporated into the detailed M&E plan which will be developed at the start of implementation, and provides concrete recommendations on how to ensure gender (including disaggregated data) continues to be collected and measured throughout implementation. Below is the initial gender action plan for the proposed GCF project, to be further reviewed and finalized during the project inception phase.

The project activities are executed by government entities, the project team will work with the gender focal points within the IP and RPs, as well as with the National Commission of Women and Children (NCWC), with technical support from UNDP (for example, UNDP developed a gender indicator handbook that will be utilized to plan and track activity level results). The NCWC monitors the progress of the institutes based on the gender indicator handbook through the gender focal points of the various agencies. Given the specific challenges faced by women, the project team will be expected to be knowledgeable about gender issues in the country, and to approach project activities with the required sensitivity. Related training will be provided by UNDP, and Gender Specialists at UNDP Bhutan and the UNDP regional office will provide guidance and support during implementation. UNDP will provide quality assurance of the deliverables by the IP and the RP.

A Gender Specialist will also be hired under the project to further ensure that implementation is gender-responsive. Further, technical expertise related to training activities for government and farming communities will ensure participation of women, climate information will be tailored to the needs of women, and design of survey instruments and support to data collection methodologies to government will ensure sex-disaggregated data.

The project is designed in line with national policies and programmes related to gender and empowerment, and implementation will ensure a consultative process that is sensitive to the particular challenges of women in Bhutan. Consultations with communities and trainings will make the necessary links to these policies and programmes so that women are aware of their rights and related support available (e.g. RENEW <http://renew.org.bt/>).

1.2. Tailoring of climate information to support crop and livestock planning and agriculture households	1.2.1. Development of tailored climate information, and means of dissemination, for farmers to meet the short-term and long-term agriculture planning needs	Ensure access to information on markets, pricing policy and climate through innovative information communication mechanisms to reach women	Baseline: 0 Target: N/A Indicator(s): Tailored climate information and dissemination considers women’s priorities as well as challenges (e.g. differing levels of literacy)	PMU, MoAF, UNDP	200,000
	1.2.2. Annual trainings in 8 target dzongkhags designed and delivered to farmers, cooperatives and local government officers/NGOs on the application of tailored climate information to improve agriculture household planning	Tailor capacity building needs to women and girls in ensuring equal participation and decision-making from local governance to national level	Baseline: 0 Target: 50% women Indicator(s):	PMU, MoAF, UNDP	75,000
1.3. Scale up climate-resilient agriculture for diversified, resilient smallholder productivity	1.3.1. Training in community seed production and multiplication system to scale up diversified, climate resilient crops (such as cereals, potato, cardamom, ginger, etc.)	Identification of gaps in gender equality through the use of sex-disaggregated surveys enabling monitoring and analysis of project benefits to women	Baseline: 0 Target: N/A Indicator(s): -Sex and age disaggregated data on success of livelihood adoption, RCTs -documentation of results, best practices, etc. for further application	PMU, MoAF, UNDP	200,000
	1.3.2. Investment in climate-resilient practices including cultivating alternatives such as hydroponics, aeroponic, vertical gardening; organic farming; and integrated pest-disease management, covering 161 ha	Ensure that good practices and lessons learnt from promoting gender equality in climate change adaptation evidenced through the project are shared effectively amongst stakeholders and inform policy/decisions at national and sub-national levels.			
	1.3.3. Training delivered to farmers (2500 households, ensuring engagement of women and youth), cooperatives, and government/NGOs on climate risk management for value-chains and agricultural marketing.	To reduce negative impacts on women (e.g. workload, health), through project intervention on promotion and training on energy and labor saving technologies, ensuring use of existing time use data to ensure women are not overburdened by project activities.	Baseline: 0 Target: 50% women Indicator(s): -men and women receiving support on cultivation alternatives -men and women receiving information and support on markets, pricing and climate	PMU, MoAF, UNDP	200,000

		<p>Ensure access to information on markets, pricing policy and climate through innovative information communication mechanisms to reach women;</p> <p>Tailor capacity building needs to women and girls in ensuring equal participation and decision-making from local governance to national level (e.g. entrepreneurial/business skills as expressed during consultations)</p> <p>Growing role of women in agriculture, ensuring participation of women in community consultations to ensure adequate response to expressed needs and challenges. Consultations will make the necessary links to policies and programmes focused on empowerment and safety of women, so that communities are aware of their rights and of related support available (e.g. Respect Educate Nurture Empower Women (RENEW) http://renew.org.bt/).</p>			
Output 2. Scaling up climate-resilient water and land management practices for enhanced smallholder productivity					
2.1. Wetland and water management adapted to changing climatic conditions	<p>2.1.1. Training to 15 dzongkhag engineers on climate resilient water irrigation designs and water harvesting, for improved oversight of construction and long term maintenance of investments</p> <p>2.1.2. Training to 16 WUAs on climate change impacts to water</p>	Tailor capacity building needs to women and girls in ensuring equal participation and decision-making from local governance to national level	<p>Baseline: 0 Target: 30% women Indicator(s): Women engaged in training related to climate resilient water and irrigation designs, water harvesting and related O&M</p>	PMU, MoAF, UNDP	75,000

	availability and means to protect water access and water sources				
Activity 2.2. Establishment of climate resilient irrigation schemes and water saving technologies	<p>2.2.1. Upgrading of 32 existing irrigation schemes for greater climate-resilience, and realignment of 4 irrigation schemes to a reliable water source given the drying impacts of climate change, covering 6300 ha</p> <p>2.2.2. Installation of water saving technologies, specifically 420 drip irrigation and 200 sprinkler irrigation schemes, covering 1700ha</p> <p>2.2.3. Building 64 small earthen check dams and ponds, and 100 earthen tanks for water harvesting</p>	Support growing role of women in agriculture, ensuring participation of women in community consultations to ensure adequate response to expressed needs and challenges	Baseline: 0 Target: 50% women Indicator(s): Women with reliable water access for agriculture	PMU, MoAF, UNDP	100,000
2.3. Scale up of sustainable land management (SLM) technologies to support soil and slope stabilization	<p>2.3.1. Identification of SLM interventions to better protect agriculture land from the impacts of climate change induced erosion and landslides, following the Participatory SLM Action Planning methodology</p> <p>2.3.2. Technical assistance and support to communities on the implementation of SLM practices to manage climate change risks, covering 2380 ha of arable land</p>	<p>Support growing role of women in agriculture, ensuring participation of women in community consultations to ensure adequate response to expressed needs and challenges</p> <p>Tailor capacity building needs to women and girls in ensuring equal participation and decision-making from local governance to national level</p>	Baseline: 0 Target: 50% women Indicator(s): -Application of the bottom-up Participatory SLM approach will ensure active consultation and input by communities, including women, in identifying and implementing SLM practices	PMU, MoAF, UNDP	300,000
2.4. Capacity strengthening to farmers and extension officers on SLM technologies	2.4.1. Training to 120 DoA extension officers on SLM technologies and practices to manage climate change risks	Tailor capacity building needs to women and girls in ensuring equal participation and decision-making from local governance to national level	Baseline: 0 Target: 30% women Indicator(s): Women engaged in training on SLM technologies and related monitoring	PMU, MoAF, UNDP	25,000

	2.4.2. Regular monitoring (twice annually) of soil conditions and soil stability to inform planning and policies related to soil management				
Output 3: Reduce the likelihood of climate induced landslides during extreme events that disrupt market access					
3.1. Slope stabilization along key sections of roads, critical for market access	<p>3.1.1. Conduct of technical study and design for slope stabilization interventions needed for three stretches of main road regularly incurring damages due to increased intensity of monsoon and disrupting market access to validate existing specifications that were based on roads work for similar conditions</p> <p>3.1.2. Slope stabilization of three sections of main road regularly incurring damages due to increased intensity of monsoon</p>	Tailor capacity building needs to women and girls in ensuring equal participation and decision-making from local governance to national level	Baseline: 0 Target: 30% women Indicator(s): Women engaged in training related to slope stabilization	PMU, MoWHS, UNDP	40,000
3.2. Technical capacity building to support climate-risk informed and cost-effective slope infrastructure including stabilization, drainage and road construction & maintenance	<p>3.2.1. Technical training to 15 DoR national and sub-national engineers on slope stabilization studies, and related designs, cost assessments and cost benefit analysis to inform climate-resilient planning</p> <p>3.2.2. Review and enhancement of road damage collection methodology, and related SOPs for collection and reporting, to ensure consistent collection of road damage data and inclusion in national disaster loss and damage database</p>	Tailor capacity building needs to women and girls in ensuring equal participation and decision-making from local governance to national level	Baseline: 0 Target: 30% women Indicator(s): Training seeks active engagement of women	PMU, MoWHS, UNDP	150,000



	<p>3.2.3. Training to RUGs and local government bodies on post-monsoon assessment of farm roads, including repair cost estimation</p>				
--	---	--	--	--	--

Abbreviations: DoA: Department of Agriculture; PMU: Project management unit; AMD: Agriculture Marketing Division; MoE: Ministry of Economic Affairs; MoAF: Ministry of Agriculture and Forest; MoEA: Ministry of Economic Affairs; MoH: Ministry of Health; MoWHS: Ministry of Works and Human Settlement; NOP: National Organic Programme; DoFPS: Department of Forest and Park Services; NEC: National Environment Commission; NPPC: National Plant Protection Centre; NSSC: National Soil Service Centre; DoL: Department of Livestock; NBC: National Biodiversity centre; CNR: College of Natural Resources; RDTC: Rural Development Training Centre.
