



ADAPTATION FUND

AFB/B.39-40/4
06 January 2023

Adaptation Fund Board

**MINOR REVISIONS TO PROJECT IMPLEMENTATION
ARRANGEMENTS REFLECTING THE CHANGE OF
DESIGNATED AUTHORITY TO THE ADAPTATION FUND
(BHUTAN)**

Background

1. The Adaptation Fund Board (the Board) at its thirty-ninth meeting, approved a five-year project titled “Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan” submitted by the Bhutan Trust Fund for Environmental Conservation (BT FEC) for a requested amount of US\$ 9,998,955 (Decision B.39/4).
2. The overall objective of the project is to build resilience to climate change and adaptive capacity of water-stressed communities in the districts of Paro, Dagana and Tsirang. Specifically, this will involve: adaptive management of watersheds for enhancing the resilience of the communities; climate resilient water infrastructure for uninterrupted supply of water for drinking and irrigation; climate-smart agriculture through sustainable land management and informed agro-meteorological services; and improved local governance for effective CCA mainstreaming with focus on water management at the grassroots.
3. On 24 October 2022, the secretariat received a notification from the Kingdom of Bhutan through the Ministry of Finance (MoF), informing that Mr. Wangchuk Namgay, the former Officiating Secretary of erstwhile Gross National Happiness Commission Secretariat (GNHCS) and the AF-Designated Authority of Bhutan has been transferred to the Department of Macro-fiscal and Development Finance (DMDF), Ministry of Finance and the office of DMDF is currently headed by Mr. Loday Tsheten. In his capacity as the Director of the DMDF, MoF, Mr. Tsheten is the new Designated Authority for Bhutan (Annex 1).
4. In a letter to the secretariat dated 22 December 2022, MoF through the DMDF has further advised and clarified that the appearance of MoF in the approved project document reflects the ministry’s function as DA and not as an Executing Entity and that previously the GNHCS was erroneously listed as one of the Executing Entities. The DMDF, where the DA sits, will provide strategic directions and oversee the overall implementation and achievement of the project outcomes. The approved project document has been revised to this effect (Annex 3) and sent to the secretariat through BT FEC, the National Implementing Entity.

Secretariat’s review of the notification

5. The secretariat has reviewed the clarification on the MoF’s role as DA under the approval proposal, following the institutional changes within the Bhutanese government’s own systems and arrangements.
6. Finally, the secretariat confirms that this notification has been sent by MoF, the ministry where the Designated Authority now sits in the Kingdom of Bhutan.

Recommendation

7. Therefore, the Board may consider and decide:

- (a) To approve the minor revisions in the implementation arrangements for the project “Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan” reflecting the change of Designated Authority for the Kingdom of Bhutan to the Adaptation Fund; and
- (b) To request the secretariat to draft an agreement with BTFEC as the national implementing entity for the project.

Annexes

1. Letter of notification: Change of Designated Authority (DA) to the Adaptation Fund (AF) Secretariat for Bhutan from MoF;
2. Letter of Clarification sent by the Department of Macro-fiscal and Development Finance (MoF) on MoF's roles in the Project, “Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan”; and
3. Revised project proposal.

Annex 1: Letter of notification: Change of Designated Authority (DA) to the Adaptation Fund (AF) Secretariat for Bhutan from MoF



MoF/DMDFA/AF/2022/503

24th October, 2022

Mr. Mikko Ollikainen,
 Manager of the Adaptation Fund Secretariat;
 1818 H Street NW;
 Washington DC, 20433, the USA.

Subject: Change of Designated Authority (DA) to the Adaption Fund (AF) Secretariat for Bhutan

Dear Mr. Ollikainen,


I would like to inform you that Mr. Wangchuk Namgay, the former Officiating Secretary of erstwhile Gross National Happiness Commission Secretariat (GNHCS) and the AF-Designated Authority for Bhutan has been transferred to the Department of Macro-fiscal and Development Finance (DMDF), Ministry of Finance and the office of DMDF is currently headed by Mr. Loday Tsheten.

In this regard, Mr. Tsheten in his capacity as the Director of the DMDF, MoF is the new Designated Authority for Bhutan. The following information associates the new NDA for Bhutan:

Mr. Loday Tsheten;
 Director;
 Department of Macro-fiscal and Development Finance, Ministry of Finance;
 Post box. 127, Tashichhodzong Thimphu, Bhutan.
 Email: ltsheten@mof.gov.bt
 Alternate emails: wnamgay@mof.gov.bt and/or dhendruptshering@mof.gov.bt
 Mobile No: (+975) 17171007

Please accept the assurance of my highest consideration.

Yours sincerely,


 Namgay Tshering

Copy to:

1. Director, Department of Macro-fiscal and Development Finance, Ministry of Finance.

Annex 2: Letter of Clarification on MoF's roles in the Project, "Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan."



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 དཔུང་ཁྱིམ་ལྷན་ཁག།
 DEPARTMENT OF MACRO-FISCAL AND DEVELOPMENT FINANCE
 MINISTRY OF FINANCE

MoF/D MDF/AF_DA/2022-2023/1068

22/12/2022

The Head of the Fund,
 Adaptation Fund Secretariat,
 Washington, D.C., the USA.

Subject: Clarification on MoF's roles in the Project, "Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan"

Dear Mr. Mikko Ollikainen,

Greetings from the Department of Macro-fiscal and Development Finance (D MDF), office of the Designated Authority (DA) to the Adaptation Fund. The office avails an opportunity to acknowledge the secretariat and board for approving the project submitted by Royal Government of Bhutan titled: "Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan" through Bhutan Trust Fund for Environmental Conservation (BT FEC) as the National Implementing Entity (NIE), amounting to USD 9,998,955.

As you may be aware, the DA of Bhutan has changed from erstwhile Gross National Happiness Commission (GNHC) to D MDF, MOF through letter numbered MoF/D MDF/AF/2022/509 dated 24 October 2022. Since the change of DA happened after the submission of the project, the reflection of MoF in the above project would function in the capacity as DA and not as an Executing Entity. The revised project document will be submitted by BT FEC as NIE for the project.

Therefore, we request AF Secretariat to kindly expedite the legal arrangement for the project, at the earliest, to ensure timely implementation of the project in the water scarce landscapes, the project has identified.

Thanking you,

Yours Sincerely,


 (Loday Tsheten)
 Director and Designated Authority of Bhutan.

Copy to: Secretary, MoAF and Director, BT FEC for kind information.

Annex 3: Revised project proposal



ADAPTATION FUND

PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

PART I: PROJECT/PROGRAMME INFORMATION

Project/Programme Category:	Regular Project
Country/ies:	Bhutan
Title of Project/Programme:	Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan
Type of Implementing Entity:	National Implementing Entity
Implementing Entity:	Bhutan Trust Fund for Environmental Conservation
Executing Entity/ies:	Department of Agriculture & Department of Forests & Park Services Ministry of Agriculture and Forests Department of Engineering Services, Ministry of Works and Human Settlement Department of Local Governance, Ministry of Home and Cultural Affairs Ministry of Finance
Amount of Financing Requested:	9,998,955 (in U.S Dollars) Equivalent

Acronyms

ADSS	Agro-met Decision Support System	KM	Knowledge Management
AF	Adaptation Fund	LDCF	Least Developed Countries Fund
ALDG	Agriculture Land Development Guidelines	LG	Local Government
APR	Annual Performance Reports	MoAF	Ministry of Agriculture and Forests
ARED	Agriculture Research and Extension Division	MoH	Ministry of Health
BDWQS	Bhutan Drinking Water Quality Standards	MoHCA	Ministry of Home and Cultural Affairs
BTSEC	Bhutan Trust Fund for Environmental Conservation	MoWHS	Ministry of Works and Human Settlement
CCA	Climate Change Adaptation	NAPA	National Adaptation Program of Action
CCP	Community Contracting Protocol	NCHM	National Centre for Hydrology and Meteorology
DES	Department of Engineering Services	NEC	National Environment Commission
DLG	Department of Local Governance	NIWRMP	National Integrated Water Resources Management Plan
DoA	Department of Agriculture	NIMP	National Irrigation Master Plan
DPA	Department of Public Accounts	NKRA	National Key Result Areas
DRR	Disaster Risk Reduction	NWFP	Non-wood Forest Products
ESMP	Environment and Social Management Plan	PES	Payment for Ecosystem Services
FGD	Focused Group Discussion	PHCB	Population and Housing Census of Bhutan
FNCRR	Forest and Nature Conservation Rules and Regulations	PRA	Participatory Rural Appraisals
FYP	Five-year Plan	RGoB	Royal Government of Bhutan
GDP	Gross Domestic Product	RNR	Renewable Natural Resources
GEF	Global Environment Facility	RWSS	Rural Water Supply Scheme
MoF	Ministry of Finance	SAPA	Sector Adaptation Plan of Action
HDPE	High Density Polyethylene Pipe	SLM	Sustainable Land Management
HKH	Hindu Kush Himalayan	TWG	Technical Working Group
IEE	Initial Environmental Examination	WMD	Watershed Management Division
IPCC	Inter-governmental Panel on Climate Change	WTP	Water Treatment Plant
		WUA	Water Users Association

Project Background and Context

General Country Information

The Himalayan Kingdom of Bhutan is a small land-locked country with a population of 727,145 (PHCB 2017¹) and a geographical area of 38,394 km². The country is almost entirely mountainous with nearly 95% of the country above 600 metres². The topography is rugged and steep, with elevation rising from 200 metres to more than 7,500 metres within a short south-north distance of some 170 km. The country can be divided into three broad physiographic zones: the southern belt made up of the Himalayan foothills adjacent to a narrow belt of flatland along the Indian border; the inner Himalayas consisting of main river valleys and steep mountains; and the high Himalayas featuring alpine meadows and snow-capped mountains.

Administratively, the country is made up of 20 dzongkhags (Figure 1) which is further divided into four thromdes (municipalities) and 205 gewogs.

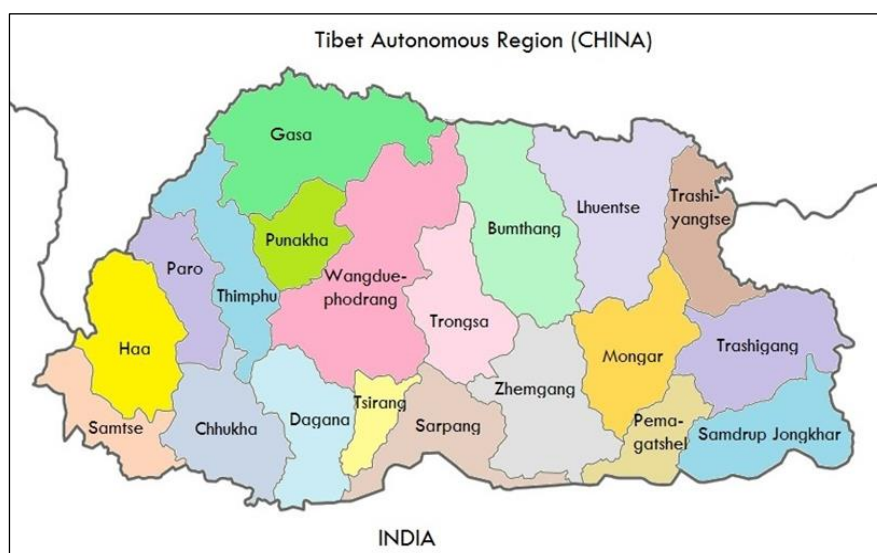


Figure 1: Administrative map of Bhutan showing districts

The country's development policies, plans and programmes are guided by the philosophy of GNH that places happiness and welfare of the citizens at the heart of the national development. This philosophy is underpinned by the four central and mutually reinforcing objectives of equitable socio-economic development, environmental sustainability, promotion and preservation of culture, and good governance. The country is currently implementing the 12th FYP (November 2018-October 2023) to create “a just, harmonious and sustainable society through enhanced decentralization.”

Bhutan's economy is one of the smallest in the world, but it has seen impressive growth over the years. The country's GDP has grown from Nu. 70,783 million (US\$ 1,548 million) in 2010 to Nu. 171,573 million (US\$ 2,344 million) in 2020, up by about 142%³. According to National Accounts Statistics 2021, the key economic sectors contributing to GDP are renewable natural resources, which includes agriculture, livestock rearing and forestry (19%), industry (34%) and

¹ Population and Housing Census of Bhutan 2017, National Statistics Bureau, RGoB

² Atlas of Bhutan: Land Cover and Area Statistics, 1997, Ministry of Agriculture, RGoB

³ National Accounts Statistics 2021, National Statistics Bureau, RGoB

services (46%)⁴. In terms of employment, the RNR sector remains the most important economic sector although its GDP share has been falling over the years. However, with the onset of Covid-19 pandemic, the economy experienced its largest contraction. The Bhutanese economy slumped to -10.08% in 2020, which is 15.83% drop compared to a growth of 5.76% in 2019.

Bhutan is endowed with an outstanding natural environment. Bhutan is dubbed as the ‘crown jewel’ of the Eastern Himalayas, a region recognized as a global biodiversity hotspot. With 71% of forest cover and 51.4% of protected areas, Bhutan has maintained its rich biodiversity and water resource availability. As a result of vast tracts of forest cover⁵, low level of polluting industrial activity and almost all electricity generated from hydropower, Bhutan is perhaps the only country in the world with net greenhouse gas (GHG) emission in negative. The net GHG emission is estimated to be -4,750.04 Gigagram (Gg) of CO₂ equivalent based on 2000 data⁶. This, however, does not exempt the country from the impacts of global warming and climate change.

Bhutan is also known to be water abundant in the region, with one of the highest reported water availability per capita. However, issues with water accessibility continue to persist across the country. This scenario of high- water availability but low accessibility exists mainly due to the impacts of climate change resulting in drying up of water sources, inadequate infrastructure development and maintenance, and issues with governance.

Climate and Climate Change Scenarios

The second (SAR 1990), third (TAR 2001), fourth (AR4 2007) and fifth (AR5 2014) assessment reports produced by the IPCC indicate that mountainous countries such as Bhutan are likely to be most vulnerable to the adverse impacts of climate change. The IPCC and other climate-based reports have identified a number of vulnerabilities that mountainous countries will face in relation to climate change and variability, including their size and limited resource base, vulnerability to existing weather events such as heavy monsoonal rain, dry season drought, tropical storms such as cyclones and restricted economic opportunities.

As a least developed country with a geologically fragile and young mountain ecosystem, Bhutan is highly vulnerable to climate change. Socio-economic development is highly dependent on climate-sensitive sectors such as agriculture, hydropower, forestry, road, and communication. As a mountainous country with a huge area under snow and glaciers, and an intricate natural drainage system of several watersheds, water catchments, rivers, rivulets and streams, the country is intrinsically exposed to and impacted by climate change hazards, including glacial lake outburst floods, landslides, and flash floods. Reduced precipitation during winter in recent years has caused increased forest fire risks and seasonal water scarcity in many areas. Rainfall pattern is increasingly erratic, posing huge adversities for farmers who largely practice rain-fed agriculture. Low agriculture capacity, low access to reliable drinking water and projected floods are the weakest elements in ND-GAIN analysis of Bhutan’s climate vulnerability⁷. Severe events of windstorm are increasingly recurrent, damaging numerous homes, schools, health facilities, government offices, and temples, as well as tonnes of crops.

Climate varies considerably in Bhutan due to its rugged topography. The southern foothills typically have subtropical climate characterized by high humidity and heavy rainfall with several

⁴ National Accounts Statistics Report 2021.

⁵ More than 70% of forest cover, one of the highest in the world

⁶ Second National Communication to the UNFCCC, November 2011.

⁷ ND GAIN: Notre Dame – Global Adaptation Index, <https://gain.nd.edu/our-work/country-index/>

locations recording more than 4,000 mm of annual rainfall. Temperatures in the southern region ranges from 10°C to 25°C in winter and 20°C to 35°C in summer. Central mountains are characterized by cool winters and warm summers with temperatures ranging from -5°C to 15°C in winter and 15°C to 25°C in summer. Rainfall in this region is moderate between 1,000 to 2,000 mm per year.

The monsoon lasts from late June to late September. The moisture-laden clouds that originate in the Bay of Bengal travel north towards the Himalayas. When these clouds are blocked by the high Himalayas, they bring heavy rainfall to the region. The monsoons play a critical role in the life of the people of this region. Most farmers are totally dependent on the monsoons for irrigation. The late onset of the monsoons can lead to drought in the region while excessive monsoon rains can result in flash floods and landslides.

Simulations using ECHAM5 and HadCM3Q0 climate models for projection of long-term climate scenarios carried out as a part of the Second National Communication (2011) suggests:

- ***Change in temperature:*** Mean annual temperature for the 2010-2039 is projected to increase by ~0.8°C (ECHAM5/A1B scenario) to ~ 1.0°C (HadCM3Q0/A1B scenario) compared to the current (1980-2009) climate. There is little or no difference between the annual and seasonal (monsoon and winter) temperature changes according to the ECHAM5/A1B scenario whereas HadCM3Q0/A1B scenario projects a slightly higher increase in mean winter seasonal temperature (~1.2°C) and a slightly lower increase in mean monsoon seasonal temperature (~0.8°C). For the 2040-2069 period, mean annual temperature is projected to increase by ~2.0°C (ECHAM5/A1B scenario) to ~2.4°C (HadCM3Q0/A1B scenario). Again, there is little or no difference between the annual and seasonal (monsoon and winter) temperature changes according to the ECHAM5/A1B scenario but HadCM3Q0/A1B scenario projects a slightly higher increase in mean winter seasonal temperature (~2.8°C) and a slightly lower increase in mean monsoon seasonal temperature (~2.1°C).
- ***Change in precipitation:*** As for changes in mean annual precipitation, both ECHAM5/A1B and HadCM3Q0/A1B scenarios project a slight increase of ~6% for the 2010-2039 period. On a seasonal basis, there is a slight decrease in winter precipitation (~2%) and an increase of 4-8% in the monsoon period. For the 2040-2069 period, the ECHAM5/A1B scenario projects an increase of ~25% in the mean total annual precipitation with a generally higher increase in the monsoon compared to the winter season. The HadCM3Q0 also projects almost a similar scenario: an increase of ~21% with a generally higher increase in the monsoon than in the winter season. The general projection is that the mean annual precipitation will see an increase over the next 30 to 60 years but with more intense and concentrated rainfall in the monsoon season and generally drier winter season.

The Impacts of Climate Change on Water and Agriculture

Climate change is a serious concern globally because of its adverse effects on the economy, ecology, and environment. Many natural systems and regions, including the HKH region, are affected by regional climate change. Climate change has been more pronounced in the mountainous region in recent decades, affecting the people and ecosystems.

In Bhutan, the impacts of climate change are all too evident and visible. The fragile ecosystems make the country highly vulnerable. As detailed in the climate change scenario, the temperature and rainfall in the country are projected to see changes as per various climate modeling studies.

Weather patterns are getting unpredictable with increasing variability in frequency, particularly with the intensity and timing of monsoon. This could be catastrophic for Bhutan since a major portion of the Bhutanese farming system is rain-fed. Dry spells are expected to get drier and wet periods are expected to get wetter in the future, making the country more vulnerable to the impact of climate change.

As a fragile mountain ecosystem, issues such as erosion, landslides and floods will exacerbate, especially with an increase in summer rainfall projected between June and August. Furthermore, the projected increase in rainfall variability can lead to decrease in precipitation for extended periods, causing irrigation water availability and access problems, which undermine current water distribution infrastructure and communities' abilities and rights to access water for household and agricultural requirements. The increase in temperature will also result in more evaporation losses. Springs and small streams are the main water sources for rural communities of the country. Many of them are reportedly drying up. The updated NAPA 2012 acknowledged water as a key sector to be severely affected by climate change with far-reaching implications relating to drought, floods, access to water and water quality. The NAPA 2012, therefore, includes actions for Rainwater Harvesting and Drought Adaptation. The government has also embarked on a water flagship programme in the 12th FYP to give impetus to address water problems, including those triggered by climate change.

The ongoing NAP formulation process has identified Water, Agriculture and Livestock, Forests and Biodiversity, Human Settlements and Climate Smart Cities, Health, Energy, Climate Services and Disaster Risk Reduction as priority sectors.

Subsistence agriculture in Bhutan will be affected by the projected variability in rainfall patterns and intensity. Rice is a staple crop in Bhutan which requires more water than any other crop, hence it is highly dependent on climatic factors such as monsoon and temperature. Since wetland farming constitutes 27.86% of the country's cultivable land, rice farming in Bhutan will be highly sensitive climate change.

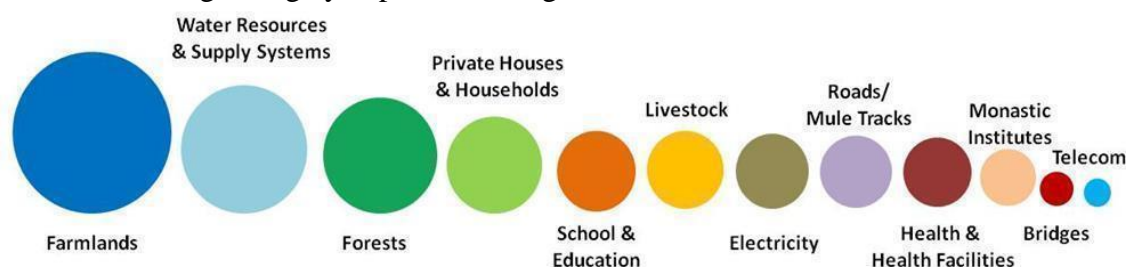
On the other hand, dryland also constitutes an important land use category in Bhutan. It is mainly practiced on mountain slopes, making it highly vulnerable to the vagaries of extreme weather events such as soil erosion and nutrient loss. Traditional crops such as maize, wheat, barley, buckwheat, millet and potatoes are grown in dryland, and the variation in temperature will reduce crop productivity and production. This further makes the country vulnerable to climate shocks through the loss of traditional genetic resources in terms of both crop species and varieties.

Then, there is higher risk of the emergence of new insects, pests and diseases with climate change. Bhutan has been witnessing more frequent extreme weather events causing widespread damage to crops and livelihoods. These are projected to be more frequent in the future. In 2021, Bhutan witnessed extensive damage to paddy and other crops due to incessant rain during the harvesting season. The incident underlined the importance of agrometeorology services.

During community consultations for past climate change adaptation projects⁸, communities identified rainfall and water availability as the two principal environmental constraints on agricultural production. Many rural communities face dwindling access to water during the dry season when the largely natural springs that they rely on shrink considerably or dry up. Participatory Rural Appraisals (PRAs) of the environmental and climate change impacts on key local livelihoods resources and assets carried out in August and September 2011 in some of the

⁸ Reference is to GEF/LDCF-NAPA II and GEF/LDCF-NAPA III projects.

poorest gewogs in the country through the Joint Support Programme⁹ provide an insight into climate change vulnerabilities at the local level. The PRAs revealed that farmlands were the most vulnerable of all local livelihood resources/assets, followed by water resources and supply systems (Figure 2). This indicates considerable climate change risks as the nation's socio-economic wellbeing is hugely dependent on agriculture and water resources.



Source: Report of the Assessment of Environment, Climate Change and Poverty Vulnerabilities and Identification of Adaptation Responses and Capacity Development Needs of the Local Governments, December 2011, Department of Local Governance, Ministry of Home and Cultural Affairs.

Figure 2: Scale of environmental and climate vulnerabilities, local resources and assets

Climate Change and Gender

The impacts of climate change are not genderneutral. Due to gender-differentiated traditional roles in agriculture, health and nutrition, women are likely to face the heaviest burdens of climate impacts. The gender assessment for the GEF/ LDCF-NAPA III project suggested that women are likely to be vulnerable because of their roles in rural communities, which are largely confined to agricultural and domestic activities within the households while men go for off-farm non-agricultural work or carry out heavier tasks such as ploughing and firewood collection. At 49.2%, the agriculture sector accounts for the highest employment in Bhutan. Of this, women constitute 57.8%¹⁰, implying the importance of agricultural livelihoods for the development and wellbeing of Bhutanese women and, therefore, their vulnerability to climate change.

While a higher percentage of women is engaged in agriculture, surveys carried out for an in-depth assessment on climate change and gender¹¹ revealed that fewer women than men were aware of climate-smart and resilient agriculture initiatives. The assessment also highlighted those rural men and women have different views and solutions on how to cope with climate change. This underlines the importance of gender mainstreaming in climate change adaptation strategies.

Climate Change and Local Governance

The government is increasingly placing LGs at the centre of the sustainable development agenda. Unlike in the previous FYPs, the capital resource allocation to LGs in the current FYP makes up 50% of the total budget outlay. The role of LGs is highlighted below:

- Climate Change Adaptation (CCA) is often a highly localized matter. Different localities may experience different climate change challenges. Furthermore, local variations make CCA more suitable for LG actions. As formal institutions with the mandate of direct delivery of public goods and services at the grassroots level, LGs are best placed to help local communities adapt to the many consequences of climate change.

⁹ Joint Support Programme, Capacity Development for Mainstreaming Environment, Climate Change and Poverty Concerns in National Policies and Programmes.

¹⁰ Bhutan Labor Force Survey Report 2021, National Statistics Bureau, RGoB.

¹¹ Gender and Climate Change in Bhutan: with emphasis on the NDC priority areas Agriculture, Energy and Waste Report 2020 by UNDP, National Commission for Women and Children and the National Environment Commission.

- Marginalization: LGs can support mountainous communities that suffer from limited access to basic government, social and technical services, including health care, education, and agricultural extension services.
- Given their proximity to the local communities, LGs have comparative advantage in terms of access to local knowledge, ability to mobilize local communities, and delivery of public goods and services to respond to climate change vulnerabilities.
- In view of increased resource allocation to LGs, it is critical that LGs have enhanced capacity to invest their resources in a sustainable manner. This, among other things, imply that it is critical that local development investments sufficiently integrate climate change adaptation and gender measures.

Water Information Management

Information concerning drinking water and irrigation infrastructural developments, coupled with its management and climate resilient/proofing facilities, have been limited and mostly anecdotal in Bhutan. While The Water Act of Bhutan 2011 empowers the NEC to coordinate with line agencies to manage water resources of the country through the Water Resources Technical Advisory Committee, there are multiple agencies involved in the governance and management of water resources, including the protection of watersheds, management and distribution of irrigation and drinking water supply. At the central level, the MoWHS is responsible for the distribution and management of drinking water and the MoAF is responsible for irrigation water and watershed management. At the local level, the Dzongkhag Engineering Division is responsible for infrastructure and water management within the *dzongkhags*. Hence, these overlapping responsibilities and roles have impeded effective implementation of water governance and management.¹² Furthermore, inadequate knowledge and information has greatly affected the materialization of statistical data-based and scientific recorded information in implementing water programmes in the country.

To fill this gap, the government is currently working on the creation of a water agency, which will be responsible for the overall management and governance of water sector. To complement this initiative, this project will support country-driven capacity building for long-term institutional knowledge management, M&E, financial system and human resource upskilling. This will include the review of pre-existing information sources, documents, best practices and lessons learnt while mapping existing knowledge gaps from other projects in Bhutan under the GCF, GEF and GEF LDCF (NAPA III) funding windows. Human resource development and associated institutional and budget support will be provided to upskill staff for improved long-term knowledge management.

Project Sites

The proposed AF project will be implemented in three dzongkhags, namely Dagana, Paro and Tsirang (Fig. 3: map showing the location of the dzongkhags). It will cover 3 of the 14 gewogs in Dagana, 7 of the 10 gewogs in Paro and 3 out of the 12 gewogs in Tsirang. These 13 gewogs have been identified as priorities for intervention under the government's "water flagship programme" due to their specific vulnerabilities exacerbated by climate change that need to be specifically addressed through targeted water and agricultural adaptation activities. These gewogs, put together, have a total population of 36,464 and cover a total area of 1,403sq km.

¹²The Water Act of Bhutan 2011, RGoB

As per the Assessment of climate risks on water resources for the National Adaptation Plan (NAP) in Bhutan report, 2021¹³, Tsirangtoe, Phuentschu and Semjong gewogs under Tsirang Dzongkhag are ranked the most water related disaster-prone gewogs including water scarcity for drinking and irrigation. Similarly, insufficient water, poor water quality, existing conventional open channels leading to water loss through seepage and sources located far away from the settlements are the major challenges in identified gewogs of Paro. Further, the report also highlights issues of acute water shortage for both drinking and irrigation due to drying up of sources and existing conventional open channel leading to the loss of water to seepage in Dagana dzongkhag.

In all dzongkhags, long distance from water sources and settlements at the sources and along the conventional open channel distribution is leading to pollution/contamination of water causing public health concerns. Moreover, water related conflicts are common in all water scarce communities. Effective adaptation measures with targeted water and agriculture activities in the identified 13 Gewogs, will boost agriculture production and enhance the resilience of the communities to the impacts of climate change.

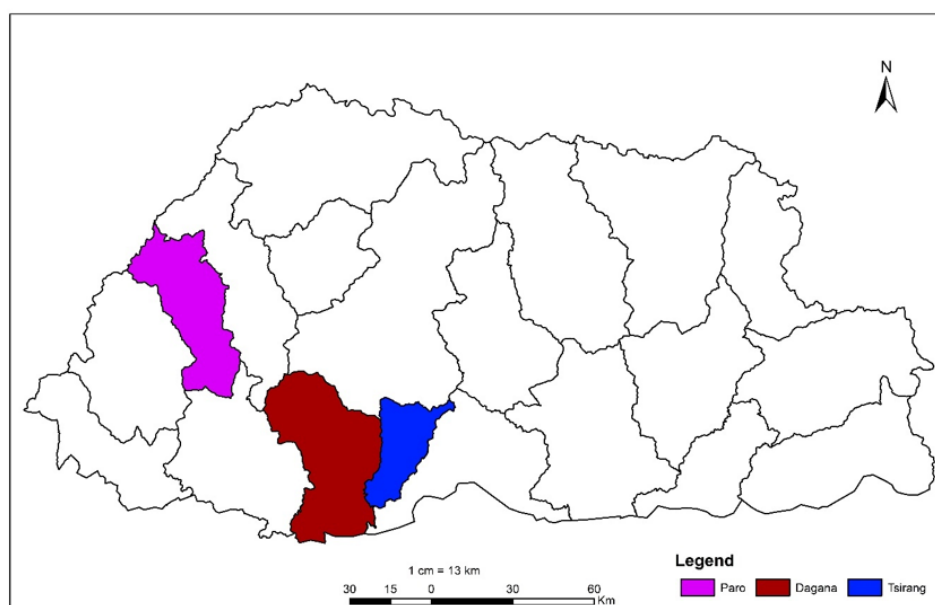


Figure 3: Map showing the location of Dagana, Paro and Tsirang Dzongkhags

Sl. No	Dzongkhag	Gewog	Area (km ²)	Population		
				Male	Female	Total
1	Dagana	Drujeygang	57.47	1,748	1,804	3,552
2	Dagana	Lajab	108.58	454	389	843
3	Dagana	Tshangkha	37.38	863	844	1,707
4	Paro	Dhopshari	33.89	1,590	1,590	3,180
5	Paro	Lungnyi	59.7	2,015	2,030	4,045
6	Paro	Lamgong	48.8	1,710	1,626	3,336
7	Paro	Doteng	193.1	602	547	1,149

¹³ Assessment of climate risks on water resources for the National Adaptation Plan (NAP) in Bhutan, 2021

8	Paro	Tsento	575.1	3,171	2,082	5,253
9	Paro	Shaba	76.4	3,258	2,683	5,941
10	Paro	Wangchang	34.2	1,666	1,645	3,311
11	Tsirang	Semjong	14.656	721	608	1,329
12	Tsirang	Tsirangtoe	31.402	778	692	1,470
13	Tsirang	Phuentenchhu	132.32	673	675	1,348
Total			1,403.00	19,249.00	17,215.00	36,464.00

Table 1: Project location

Dagana Dzongkhag

Encompassing a total area of 1,721.77 km², Dagana lies in the southwestern part of the country. The dzongkhag has a total population of 21,914 (11,314 male; 10,600 female). Of these, 81% makes up the rural population. The mean annual household income is BTN 156,990 (USD 2,440 approx.) (GNH Survey 2015)¹⁴. Agriculture and livestock rearing are the key sources of income. Dagana is one of the major producers of orange and cardamom in the country.

Paro Dzongkhag

Situated in the north-western part of the country, Paro has a total area of 1,282.79 km². The population of the dzongkhag is 32,165 (17,058 male; 15,107 female). Rural communities constitute 74.3% of the population. The mean annual household income is BTN 201,823 (USD 3,140 approx.) and major income sources include agriculture and livestock rearing. In urban centres and peripheral areas, they include tourism and small retail business.

Tsirang Dzongkhag

Tsirang Dzongkhag is located in the south-central part of the country with elevations ranging from 400 to 2,000 metres above sea level and has a total area of 528.84 km². The dzongkhag has a total population of 18,919 (9,667 male; 9,252 female). It shares border with Wangduephodrang Dzongkhag to the north, Sarpang to the east and southeast and Dagana to the west and southwest. Centrally located and known for its mild climatic conditions, Tsirang has the potential for production of all varieties of vegetables throughout the year.

Project Objective

The objective of the project is to build resilience to climate change and adaptive capacity of water-stressed communities in the districts of Paro, Dagana and Tsirang. The project comprises four components as follows:

- Component 1: Adaptive management of watersheds for enhancing the resilience of the communities.
- Component 2: Climate resilient water infrastructure for uninterrupted supply of water for drinking and irrigation.
- Component 3: Climate-smart agriculture through sustainable land management and informed agro-meteorological services.
- Component 4: Improved local governance for effective CCA mainstreaming with focus on water management at the grassroots.

¹⁴ Cited in the 12th Five-Year Plan of Dagana Dzongkhag.

Project Components and Financing:

Project/Programme Components	Expected Concrete Outputs	Expected Outcomes	Amount (US\$)
<u>Component 1:</u> Adaptive management of watersheds to enhance the climate resilience of communities	<u>Output 1.1:</u> Watershed management intervention measures implemented <u>Output 1.2:</u> Payments for Ecosystem Services (PES) schemes scaled-up <u>Output 1.3:</u> Water sources' recharge interventions adopted <u>Output 1.4:</u> Wetland monitoring system for informed decision-making established	<u>Outcome 1:</u> Increased watershed and ecosystem resilience in response to climate change and variability-induced stress	565,790
<u>Component 2:</u> Climate resilient water infrastructure for uninterrupted supply of water for drinking and irrigation	<u>Output 2.1:</u> Climate- and disaster-resilient drinking water infrastructure established <u>Output 2.2:</u> Climate- and disaster-resilient irrigation infrastructure established <u>Output 2.3:</u> Innovative technologies for tapping water adopted <u>Output 2.4:</u> User groups in the community strengthened for effective management of irrigation and drinking water	<u>Outcome 2:</u> Improved access to irrigation and safe drinking water	7,492,813
<u>Component 3:</u> Climate-smart agriculture through sustainable land management and informed agro-meteorological services	<u>Output 3.1:</u> SLM in vulnerable and degraded areas implemented <u>Output 3.2:</u> Climate change information, products and services made available and accessible	<u>Outcome 3:</u> Vulnerable agriculture land brought under SLM	661,481
<u>Component 4:</u> Improved local governance for effective CCA mainstreaming with focus on water management at the grassroots	<u>Output 4.1:</u> Institutional mechanisms in LGs strengthened for CCA and gender mainstreaming	<u>Outcome 4:</u> Improved sustainability through CCA mainstreaming and water governance at the local level	93,991
Project/Programme Execution cost			520,950
Total Project/Programme Cost			9,335,025
Project/Programme Cycle Management Fee charged by the IE			663,930
Amount of Financing Requested			9,998,955

Projected Calendar:

Milestones	Expected Dates
Start of Project/Programme Implementation	January 2023
Mid-term Review (if planned)	June 2025
Project/Programme Closing	December 2027
Terminal Evaluation	February 2028

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Description of Project Components

The project for climate resilience building in water stressed communities in Bhutan proposes an articulated approach that will lead to healthier ecosystems and improved associated services, better management of water use for human activities, improved information systems and decision-making, and linking with the most relevant level of governance. Issues related to water availability and use all along the watershed, the various components of sustainability (including at technical, financial and institutional level), and the participation of the beneficiaries are key aspects of the project.

Component 1: Adaptive management of watersheds to enhance the climate resilience of communities

Watersheds in Bhutan used to be pristine. Healthy ecosystems and relatively low human pressure in the country, backed by strong environmental policies and good practices, have succeeded in maintaining a healthy forest cover with quality water resources. In the past decade, however, increased developmental activities across the country have posed serious threats to the fragile mountain ecosystems. As a result, watersheds in Bhutan now show varying degrees of degradation with some of them showing high levels of risk.

The current problems include forest degradation, drying up of water sources, grazing, soil erosion and landslides, infrastructure development and rapid urbanization. Some of the causes of these problems are forest fire, over extraction of forest resources, illegal harvesting, poor grazing management, and farm roads with poor drainage, inappropriate land use practices, and infrastructure development, not to mention climate-related hazards such as extreme rainfall events, prolonged dry seasons, unstable geology and steep terrain.

The degraded watersheds lack resilience and have limited ability to provide ecosystem goods and services, let alone withstand shocks associated with climate change. This, in turn, increases drudgery for women and children brought about by various stresses such as the shortage of drinking water, sanitation and hygiene, and irrigation water. Further, hydropower and nature-based tourism, which are the backbone of Bhutan's economy, are jeopardized.

It has, therefore, become critical to manage the natural resources and livelihood of the people living within the watersheds. With more than 60% of the population still agrarian and vulnerable to climate change, adaptation becomes ever more necessary, calling for more effective management and maintenance of the overall health of their ecosystem services.

Integrated watershed management offers a holistic approach to addressing these issues, enabling communities to increase their resilience to climate change. Adequate watershed management is a cornerstone for the success of other interventions of the project such as development of climate resilient infrastructure and water governance.

Past experiences of integrated watershed approaches in Bhutan showed promising results. People's understanding of addressing water issues in a holistic and collaborative way has been enhanced. The need for upstream and downstream linkages has been fostered and enabled adopting mechanisms like PES, which not only provided a viable option to finance watershed management but also incentivized communities for their involvement in conservation activities. Currently, there are four PES schemes in Bhutan focusing on the protection of water source

areas. A recent report on “Review of PES Schemes in Bhutan” (WMD, 2019) indicated that PES schemes have not only enhanced the watershed ecosystem services but also improved the community exchequer, enabling the community members to use the fund for the poor and vulnerable members in times of need. The AF can support in upscaling PES schemes in the project dzongkhags to enable communities to derive benefits for their conservation initiatives.

Along with watersheds, wetland management that promotes the wise use of wetlands and water source revival activities have been initiated. Three wetlands have been declared Ramsar sites and a few wetlands of national importance were assessed. However, wetland management has not been carried out in the project dzongkhags. Further, 7,399 water sources, which are currently tapped for drinking, irrigation and industrial use were inventoried. Of these water sources, 25.1% (1,856) are found to be in the drying stage (Figure 4) prompting an investigation into the causes of drying for timely intervention. Therefore, WMD is seeking AF to upscale and strengthen these initiatives to enhance the adaptive capacities of the local communities without which wetlands and water sources in Bhutan will continue to deteriorate, impacting the ecosystem and community livelihoods.

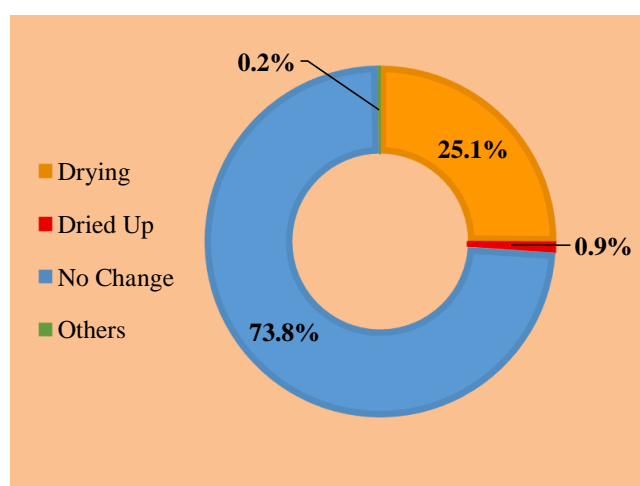


Figure 4: Status of water sources in Bhutan¹⁵

The proposed project interventions will include implementation of climate-resilient activities that are expected to facilitate transformational change. This will be done by adopting an integrated approach, including the definition and implementation of robust watershed management intervention measures, scaling-up of community-managed PES schemes, the protection of principal water sources and management of critical ecosystems such as wetlands. Further, the strategic recharge zones will be managed using appropriate technologies and interventions to revive water sources and enhance ecosystem services. All these interventions will improve the climate resilience of the communities.

Under this component, the proposed project seeks to achieve the following outputs:

Output 1.1: Watershed management intervention measures implemented

Output 1.2: PES schemes scaled-up

Output 1.3: Water sources’ recharge interventions adopted

Output 1.4: Wetland monitoring system for informed decision-making established

¹⁵ Status of water sources in Bhutan, WMD, MoAF

Output 1.1: Watershed management intervention measures implemented

In the context of highly fragile ecosystems coupled with water scarcity and predicted climate change, watershed management ensures an integrated climate adaptative approach leading to soil conservation, fodder/fuel wood production, vegetation control, infiltration and water recharge besides improved access and equity for the communities.

The Water Act of Bhutan 2011 and the Water Regulation of Bhutan 2014 mandate the MoAF to develop and implement watershed and wetland management plans. Accordingly, a roadmap to guide the implementation of strategies aimed at improving the management of Bhutan's watersheds was developed in 2009 and adopted by the WMD under the MoAF in 2011. It includes a strategy to focus watershed management planning initially on the watersheds that require urgent management interventions.

Using the Guideline for Classification of Watersheds 2016, watersheds are assessed and classified into pristine, normal, degraded, or critical. Those classified as degraded or critical are scheduled for the development of management plans. WMD has undertaken the preliminary assessments of watersheds in Dagana, Tsirang and Paro dzongkhags which indicate the communities' exposure and sensitivity to climate change even as their understanding of the threat is limited. Only Dagana has a watershed management plan but its scope is limited, not even covering the whole district. We will use the experiences gained from the current plan to efficiently plan and implement the required activities in the identified priority areas. Tsirang and Paro districts have not carried out any watershed intervention.

This component is related to three drinking water schemes and two irrigation schemes proposed under component 2. To link it to component 2, this section of the component will make a specific climate assessment in the watersheds where the sources of these schemes are located. This will help fine-tune the interventions to enhance the climate resilience of the local communities. The climate assessments will focus on the status and degradation of watersheds at the proposed sites by mid-term and allow the implementation of intervention measures by the end of the project. An exhaustive list of appropriate interventions comprising both biological measures such as plantation of appropriate plant/bamboo/grass species and physical measures such as construction of check dams and other appropriate structures will be identified, validated and implemented through participatory approach involving all the relevant stakeholders during implementation. This will involve both consultation meetings and on field assessments. While the implementation will be for the abovementioned sites, the component will take advantage of the project to sensitize *dzongkhag* and relevant local government staff on watershed management and related activities to build their capacities and empower them. Likewise, since providing periodical training is of utmost importance in watershed management, training will be provided.

To achieve this output, the following activities will be undertaken:

Activity 1.1.1: Conduct sensitization and awareness workshops (13 gewogs to be sensitized) targeting equal proportion of men and women.

Activity 1.1.2: Training of community members and LG officials on the implementation of identified watershed management interventions targeting equal proportion of men and women

Activity 1.1.3: Conduct watershed assessment at the project site, including the watersheds along the proposed pipeline

Activity 1.1.4: Develop watershed management intervention measures for the proposed areas (five sites plus along the proposed pipeline; at least one plan per dzongkhag - minimum of four)

Activity 1.1.5: Implement identified intervention measures targeting participation by equal proportion of men and women headed households

Output 1.2: PES schemes scaled-up

PES recognize the efforts made by people living upstream that lead to the betterment of the lives of people who live downstream within a watershed. Not only does PES establish forms of collaborative management of natural resources and geographical space within a watershed, it also gives strong incentives for the implementation of sustainable practices. In Bhutan, PES initiatives were started a decade ago in 2009 by WMD under the DoFPS. Today, schemes are established and successful in four dzongkhags: Paro, Tsirang, Chukha and Mongar and some of the schemes are effective since 2011. The main objective behind the PES scheme is to put the beneficiaries of ecosystem services in a direct contractual agreement with local communities that protect and conserve watersheds by adopting practices that ensure continuous supply of the services which, in the current context, is drinking water (PES Framework for Bhutan, 2015). A recent report on PES in Bhutan highlighted its benefits for securing watershed services and enhancing the communities' cash income. However, the report also indicated the need to provide further advocacy and sensitization to strengthen PES mechanisms in the country.

This project provides an opportunity to improve stakeholders' awareness and knowledge (at all levels, including best resource management practices, financial management and decision making) of the benefits of PES, scale up PES schemes in the potential sites within the project *dzongkhags* and strengthen communities' stewardship of watershed conservation. This will entail transformational change in proper management of natural resources by empowering communities to take charge. Further, experiences from the current sites listed above will ensure not only stewardship but also enhance flow regulation and quality improvement of water resources to the end users.

Paro and Tsirang dzongkhags currently have one PES scheme each, while there is none in Dagana dzongkhag. This project will explore one more PES scheme in the project landscape. The development of additional PES scheme will depend on feasibility and the cooperation of the stakeholders. Experience shows that awareness and education play a major role in the success of a PES scheme development. Therefore, awareness of PES will be conducted in other areas to educate communities on the benefits and management of PES.

Under this output, the following activities are foreseen for project implementation:

Activity 1.2.1: Conduct community consultations and sensitization (one per gewog) targeting equal proportion of men and women

Activity 1.2.2: Hands-on training workshops in the management of PES schemes (1 training)

Activity 1.2.3: Conduct detailed resource assessment and inventory (1 site)

Activity 1.2.4: PES scheme development and implementation based on the feasibility analysis involving equal proportion of men and women

Output 1.3: Water sources' recharge interventions adopted

According to the State of the Environment Report of Bhutan (2016), drying water sources is a country-wide phenomenon. This issue was also recorded by WMD while carrying out watershed assessments and development of management plans. Subsequently, WMD carried out assessment and mapping of water sources tapped by Bhutanese people (Figure 5 and 6) in 2021 (WMD, 2021). The study found that the drying of water sources is widespread and has detrimentally affected both rural and urban populations, limiting water supply for domestic consumption and irrigation.

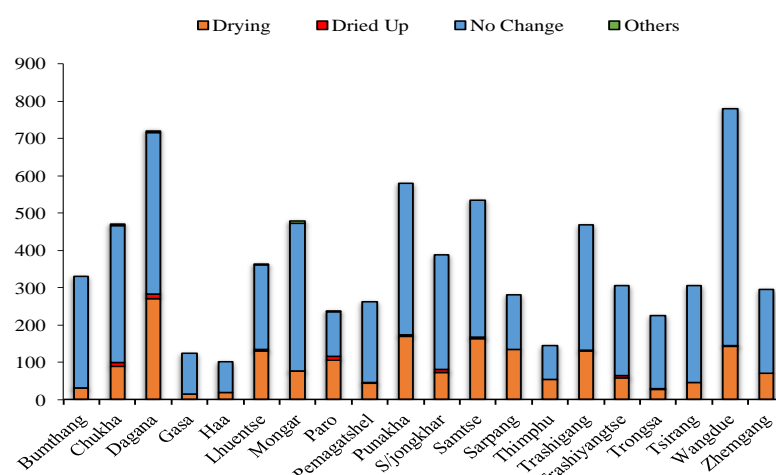


Figure 5: Status of water sources by dzongkhag

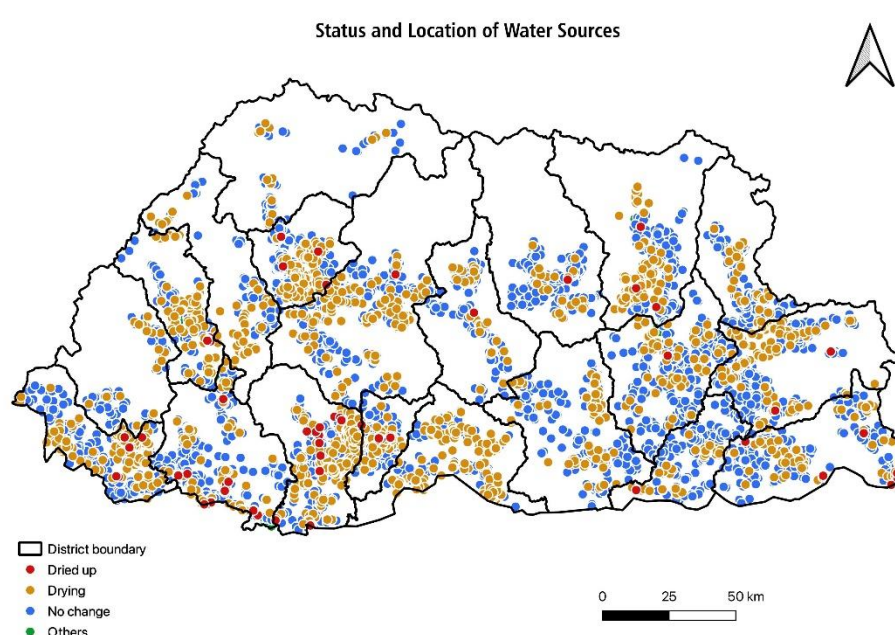


Figure 6: Map showing the location of various water sources and their status

However, at present, there is no integrated and cross-sectoral approach to combat drying water sources in the country. It is often done in unsystematic ways. For instance, some quarters have recommended fencing the water sources while others have recommended building water storage tanks and tapping from alternative sources. Thus, the interventions create complex unintended consequences, as there is lack of interdisciplinary approach to address the core problem.

To understand the issue better, WMD has initiated water source studies and revival activities in Lholing in Paro Dzongkhag using the spring-shed methodology through understanding of hydrogeology and climate impacts, and prescribing activities such as digging trenches, identifying protection areas, plantations, soil and land management activities and other bio-engineering activities.

WMD is in the process of upscaling this initiative. Building on the water source assessment and mapping study (WMD 2021), which has categorized water sources into different status (dried

up, drying, no change), the following criteria were used to select water sources from each of the three project *dzongkhags* and implement water revival activities¹⁶:

1. Water source in drying status
2. Number of users
3. Watershed in degraded condition
4. Catchment areas for proposed project activities

Sl.No	Water source name	Gewog	Dzongkhag	Water source status	No of users (HH)
1	Amphi Khola	Tashiding	Dagana	Drying	224
2	Namchella main source	Tashiding	Dagana	Drying	248
3	Gurbachen kholsa	Tsangkha	Dagana	Drying	75
4	Chanajangchhu	Lamgong	Paro	Drying	1,000
5	Chidhiphu Rongchhu	Tsento	Paro	Drying	850
6	Behind Kila Gonpa chhu	Wangchang	Paro	Drying	390
7	Karki Dhara	Doonglagang	Tsirang	Drying	68
8	Chelaychhu	Phuentenchu	Tsirang	Drying	55
9	Tshokarna khola	Tsholingkhar	Tsirang	Drying	200

Table 2: List of selected water sources in the project sites proposed for revival initiative under component one¹⁷.

The above water sources, which are all drying, are from the nearby areas of the proposed project schemes. The revival of these sources is expected to improve the overall health of the watershed in providing water provision services that uplift the livelihood of the communities and adapt to adverse impacts of climate change.

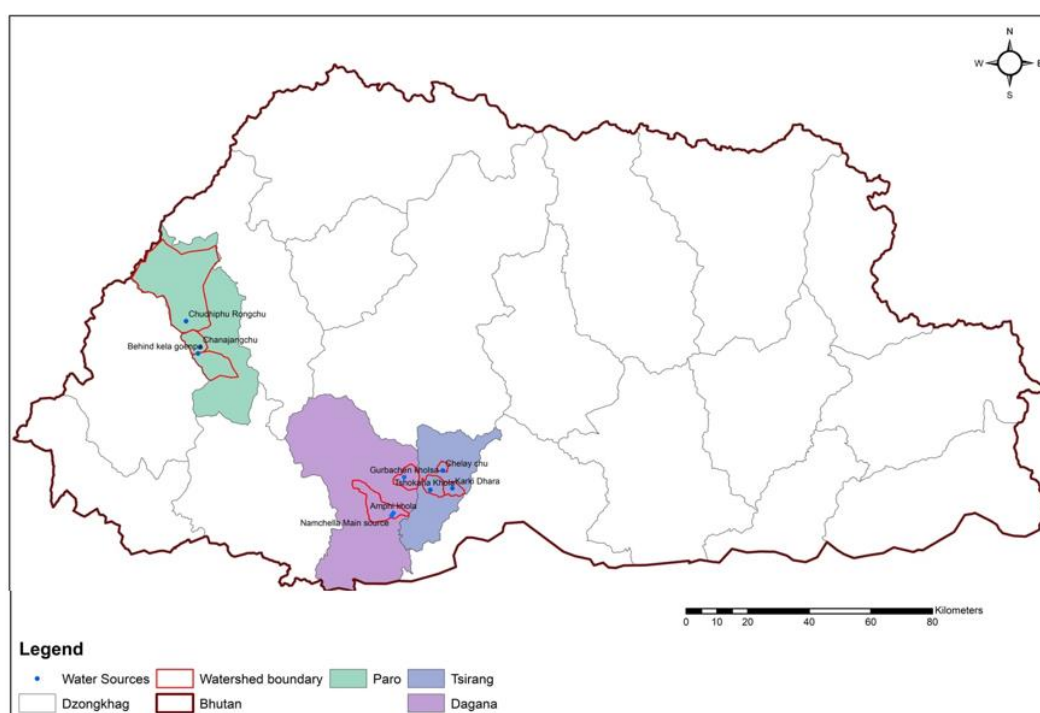


Figure 7: Location of water sources proposed for revival initiatives in the project sites

¹⁶ As stated above, activities will be based on the lessons learned from the experience in Lholing (Paro)

¹⁷ Excerpt from water source assessment and mapping report, WMD, 2021

The activities will be implemented by DoFPS in collaboration with LG entities and communities. DoFPS has field offices with staff trained to carry out water source revival activities in all gewogs and will carry out monitoring and maintenance of conservation/restoration activities. Where field staff have challenges, WMD will provide technical backstopping from the head office.

The proposed project will implement the following activities to achieve this output:

Activity 1.3.1: Training workshops on water source recharge interventions with field demonstrations (one per site) and awareness and sensitization (one per dzongkhag)

Activity 1.3.2: Identification of recharge areas and designing water source revival activities following the spring shed management protocol.

Activity 1.3.3: Implementation of water source revival activities.

Activity 1.3.4: Monitoring and maintenance of conservation/restoration activities.

Output 1.4: Wetland monitoring system for informed decision-making established

The general type of wetlands in Bhutan includes lakes, rivers, springs, ponds, marshes, peat bogs and other predominantly waterlogged areas. Functional wetlands are critical segments of watersheds as they support a high level of biological productivity and diversity. Wetlands are recognized to provide fundamental ecosystem services, such as water regulation, filtering and purification. They are also recognized to have numerous scientific, cultural and recreational values. Thus, wetland ecosystems are important for the maintenance of the broader ecosystem health.

In the past, strong cultural and traditional ethos among the Bhutanese and lack of modern technology (heavy dredging equipment and other land conversion technologies) protected the wetlands. However, in recent times, the disappearance of significant areas of wetlands was recorded, especially in and around urban centres. The main drivers of change were fragmentation of large natural wetlands and impacts of climate change. Concurrently, there has been a significant rise in the number of complaints on the worsening quality and decrease in the quantity of drinking water.

WMD proposes to carry out inventory of wetlands in the selected three dzongkhags. The wetlands inventory will primarily provide tools for implementing the FNCRR 2017 by putting in place specific clearance mechanisms to stop the conversion of significant wetlands into other land use. The wetland inventory is also expected to provide the number and extent of wetlands requiring protection within the project site. The use of the inventory as a guide in forestry clearance processes will strengthen the protection and management of critical wetland ecosystems and help enhance the resilience of communities by protecting their water sources.

Wetland mapping activities will use remote sensing technology, which will validate the existing records and identify additional wetlands, if needed. Data will be collected from all project sites. The AF support will assist in establishing a reliable wetland monitoring system that will facilitate the development of plans and programmes to address the vulnerability issues and maintain wetlands ecosystem functions.

Activity 1.4.1: Conduct mapping of wetlands for the project dzongkhags using remote sensing, including training

Activity 1.4.2: Field data collection and mapping (all project dzongkhags)

Activity 1.4.3: Field exercise for Data Quality Assurance and Quality Control

Activity 1.4.4: Data compilation and analysis, feeding decision-making mechanisms

Component 2: Climate resilient water infrastructure for uninterrupted supply of water for drinking and irrigation

Drinking water

Bhutan has high per capita availability of water. At the basin level, the total outflow of the rivers is estimated at 109,000 m³/capita/year (National Integrated Water Resources Management Plan, 2016, NECS). Abundant water is largely available in the form of major rivers and tributaries flowing in the low-lying river valleys and deep gorges. However, most communities are located on mountain slopes and depend on small streams, springs and lakes for drinking water some of which are already drying. Paro and Tsirang dzongkhags are identified for this adaptation proposal wherein an integrated approach aims to address water-related issues at the source, infrastructure, quality and management levels. This approach will take into consideration economic, social and ecological components along with risk factors, such as climate change and increasing population.

Dzongkhag¹⁸	Total HHs	HHs with continuous flow (24*7) of water	HHs without continuous flow (24*7) of water	Coverage of 24*7 water supply (%)
Paro	8,969	5,160	3,809	57.5
Tsirang	5,074	3,812	1,262	75.1
Total	14,043	8,972	5,071	66.3

Table 3: Current water supply scenario in targeted rural areas

In the context of Bhutan, access to 24x7 water supply is considered as having adequate water for 24 hours from a tap, which may also be by means of storage facilities.

The common challenge faced by the dzongkhags is lack of safe drinking water supply due to non-existence or poor functionality of water treatment plants as well as inadequate water supply systems, and instances of drying up of water sources. Some towns and extended areas under municipalities are still connected to RWSS, thus supplied with untreated and unmetered water.

In rural areas, transferring the ownership of schemes to the beneficiaries and maintaining them have been a major challenge for RWSS. Differing interpretations of policies and strategies have led to conflicting, differing and rapidly changing priorities and practices in the sector. Many beneficiaries still consider the ownership and responsibility for major maintenance and rehabilitation of rural water supplies as the responsibility of the dzongkhag or RGoB. Many implementation procedures have contributed to a lack of beneficiary commitment to self-management and maintenance of their own schemes. There was no proper roles and responsibilities identified and trainings were not conducted in the formation of WUAs. Over the years, the trainings on the formation of groups are being initiated and this component would further enhance the practice of group formation with clear set of rules and responsibilities.

The project will support the formation of WUAs, build their capacities and support in the formulation of by-laws. For financial sustainability, cost for all minor O&M activities will be borne by the concerned WUAs after the project assets are completed and handed over to the

¹⁸ Bhutan Living Standard Survey 2017, RGoB

WUAs. Major maintenance which are beyond the capacity of WUAs would be borne by the LGs. Relevant agencies will continue to provide technical backstopping to WUAs.

Other activities to address water access issues include rehabilitation or reinforcing of existing water transmission/distribution lines to ensure that they are climate-resilient and durable. New water supply infrastructure identified for this project will be built with adequately resilient materials to ensure long-time benefits.

Irrigation Water

Irrigation system is mostly dependent on monsoon-fed springs and streams. Slight delays or changes in the rainfall pattern directly impacts availability of timely irrigation water. Given the seasonality of streams and spring waters and extreme weather events, a major focus in building climate resilient irrigation structures and improvements in water management practices remains crucial.

Most irrigation schemes in Bhutan constitute of earthen canals with low efficiency due to blockages, water loss through seepage and frequent damage by landslides. These systems are highly susceptible to adverse impacts of climate change contributing to low agriculture yield from the limited agriculture land. Only 18% of the agriculture land is irrigated. Further, scarcity of irrigation water creates conflicts over water sharing. Therefore, the project seeks to install climate resilient infrastructure for drinking and irrigation water supplies to enhance food and water security in the project sites.

The irrigation component under the project will focus in Dagana Dzongkhag. This dzongkhag was specifically selected given its vulnerability to climate change and as per the government priority. As per the National Irrigation Master Plan, 40 irrigation schemes have been prioritized for irrigation modernization in Dagana. Most of these irrigation schemes are partially damaged because they were constructed in the early 1990s without much assistance for maintenance.

However, for the support under the adaptation fund, these irrigation schemes were further prioritized in consultation with the dzongkhag, considering the multi-Criteria Analysis.

Dzongkhag	No. of irrigation schemes	Present gross area (ac)	Likely extension area (ac)
Dagana	40	4,227	2,253

Table 4: The prioritized irrigation system for modernization as per NIMP.

The proposed project will build upon the experience and benefits of climate-resilient technologies and practices demonstrated and key lessons learned from past irrigation support projects.

Output 2.1: Climate- and disaster-resilient drinking water infrastructure established

The project will support construction of new climate resilient RWSS in three locations specified below. The activities foreseen for project implementation to achieve the output are as follows:

Activity 2.1.1: Construction of three Drinking Water Supply Schemes:

Major portions of the infrastructure include the construction of RWSSs which consist of constructing climate-resilient 1) intake structures and collection tank, 2) water transmission mains, 3) water distribution network, and 4) water reservoir.

The three drinking water supply schemes includes:

1. Balakha Source to Tsentog, Lamgong, Lungyni and Wangchang gewogs - 42 km
2. Drakay Pangtsho source to Dopshari, Doteng and Shaba gewogs– 36 km
3. Phuentsenchu, Semjong and Tsirangtoe gewogs - 28 km

After the completion of the project, it is projected to benefit 3,168 households with a population of over 30,362. To align with the BDWQS 2016, the health sector will carry out periodic water quality testing.

To ensure sustainability of the schemes, formation of WUAs is proposed as part of the project which will be institutionalized and the operation and maintenance aspects of the scheme after project finalization will be integrated into local government plans. Vulnerable and marginalized groups or households may not be able to contribute actively or participate in the project such as in consultations, community labour contribution and other forms of participation and may not be included as project beneficiaries if the project considers communities to provide unskilled labour for project activities. Therefore, the project implementation will not require community contributions in the form of cash or labour during the project implementation. The O&M of water infrastructure developed by the project will be handled by WUAs which will include contributions from member households for minor maintenance. To ensure that the vulnerable members of the communities are not excluded from availing themselves of benefits, the articles of association of the WUAs will include clauses on community exemptions for such contributions from the vulnerable and marginalized groups. The articles of association of the WUAs will be developed during the project implementation with support from the PMU and dzongkhags concerned and will further stress on providing equal access to all members of the communities.

Activity 2.1.2: Professional development of engineers in Climate-resilient water supply infrastructure

The concept of climate change remains new when it comes to building climate-resilient water supply infrastructure in Bhutan. Most of the existing water supply works (especially rural schemes) follow conventional processes. Therefore, it is of utmost importance that the engineers executing these projects are educated in the concept of climate-resilient structures. The project will support the capacity of water infrastructure engineers, particularly in the concept of adaptation to climate change, through the complete water access cycle (water source, transmission, treatment and distribution). It is foreseen that a minimum of two sessions for project dzongkhag engineers, technicians and central agencies engineers will be organized with 50% women participants.

Output 2.2: Climate- and disaster-resilient irrigation infrastructure established

The proposed activities under this output include:

Activity 2.2.1: Construction of pressurized/closed irrigation systems (gravity) - Establishment of climate-resilient irrigation scheme at Lajab

The project will support the construction of a new irrigation scheme to achieve greater climate resilience and support farmers experiencing critical water scarcity, covering a total area of 66 acres. Given that the reliance on rain-fed practices is of limited use in the face of increasing rainfall variations, the schemes will be aligned to reliable water sources. The project will also focus on integration of both drinking and irrigation water wherever possible so that participation and ownership by beneficiaries are focused through the formation of WUAs with appropriate

technological and institutional inputs. Combining both drinking and irrigation water will reduce or eliminate conflicts over water tapping rights and will reduce labour, maintenance and investment costs.

Activity 2.2.2: Re-engineering/rehabilitation or improvement of two existing irrigation systems

To enhance and ensure water security for every household, the adaptation funds will climate proof or strengthen the resilience of two existing open earthen canal irrigation schemes against extreme events, covering 884 acres. With the planned improvement of the existing irrigation systems, much of the infrastructure that is of temporary nature will be replaced by more robust, flexible and climate-resilient structures. Environmental impacts caused by overflow from open canal systems will be avoided and leakages from pipes will be reduced with the improvement of the systems through appropriate technology.

The re-engineering/rehabilitation of existing irrigation systems includes:

1. Climate proofing of existing Budichu-Peteykha irrigation scheme
 - a. Budichu-Peteykha-Intake redesign and climate proofing of the scheme - 4.5 km
 - b. Climate proofing of distribution lines from Zinchila-Roungchhu - 2.2 km
2. Establishment of climate- and disaster-resilient pressurized irrigation system for Ambithang, Drujeygang, Dagana - 12 km

Activity 2.2.3: Scale up micro-irrigation system (drip & sprinkler)

The project will also focus on dry land irrigation with appropriate technological and institutional inputs. Sprinklers and drip irrigation allow efficient use of water and represent an adaptation strategy against scarcity of water. Small perennial streams will be tapped and water will be conveyed by gravity through pipes to provide irrigation through more efficient systems. Accordingly, adaptation resources will be used to upscale high efficiency irrigation or water saving technologies such as sprinkler irrigation and drip irrigation for high value crops such as vegetables and horticulture crops. This activity will support the installation of two drip irrigation and four sprinkler irrigation systems covering a total area of 100 acres.

Activity 2.2.4: Tailwater Management

Irrigation from tailwater management has not been given sufficient importance in Bhutan. However, due to increasing extreme events, tailwater management is becoming more popular as it helps prevent downstream negative environmental impacts. Accordingly, the project will implement tailwater management in two schemes on a pilot basis, thereby properly providing irrigation through natural channels.

Output 2.3: Innovative technologies for tapping water adopted.

The proposed activities under irrigation for this output include:

Activity 2.3.1: Build water harvesting structures or small-scale reservoirs to tap water for irrigation

Bhutan has a unimodal annual rainfall pattern, which is heavily influenced by the South-West Monsoon with rainfalls mainly during the June-September period. For the remaining months of the year, there is little or no natural precipitation to grow a second crop. One of the options to irrigate and grow crops during winter or drought period could be to collect and store surface runoff during the monsoon period and/or store water from the nearby springs and brooks. This will entail construction of farm ponds at the individual household level and relatively larger ones (reservoirs) in feasible areas for local communities.

This project will build small earthen check dams and ponds as small-scale reservoirs for irrigation water supply during dry periods. Water storage in Bhutan is clearly a necessity to meet growing water needs of urban areas as well as to supply irrigation water for agriculture (which is mostly rain-fed at present). These needs are particularly evident in areas where water is plenty during monsoon but become completely dry during winter although the land is fertile. Low water levels in rivers during the dry season already pose difficulties for different users. This is expected to worsen with climate change. Water storage will help sustain the use of limited water during the dry season, thereby increasing the area irrigated during the dry season. The strategy is to build water storage to increase year-round reliability of water. Therefore, this activity will support the construction of small-scale earthen check dams and farm ponds in Tsangkha Chewog under Tsangkha Gewog and Thasa B under Laja Gewog in Dagana.

Output 2.4: User groups in the community strengthened for effective management of irrigation and drinking water

As per the Water Act of Bhutan 2011, any group of beneficiaries using a particular water source for their water supply needs may form a WUA to maintain the water source and to manage water supply services.

The DoA has already developed policy guidelines for the formation of community groups and their involvement in carrying out minor maintenance of farm roads and irrigation channels. In addition, need-based capacity building of all relevant stakeholders will be undertaken for effective implementation. Also, user groups in the communities will be formed to strengthen local ownership.

The promotion of community groups along with strengthening of their capacities is expected to attract educated youth and school dropouts to take up the roles of leading and managing these community groups.

Activities proposed under this output will cover three WUAs for drinking water supply schemes and three WUAs for irrigation schemes and include:

Activity 2.4.1: Form and strengthen formal (registered) WUAs and groups in the communities at scheme level to promote local ownership and sustainability of schemes

WUA formation for drinking water supply

Under the Water Act of 2011, WUAs are mandated as the managers of drinking water schemes. In line with this policy of RGoB, water users will have to take charge of the operation and maintenance of their scheme including institutional members. The main objective for the formation of the WUAs are:

1. Operate and maintain drinking water schemes to ensure that every household within the association has equitable and fair access to water supply and that no person is arbitrarily denied basic daily water needs.
2. Rehabilitate and improve the drinking water scheme
3. Train WUA members constituting of 30% women on the operation and maintenance of the schemes.

WUA formation for irrigation scheme

The National Irrigation Policy states that each WUA should have a constitution with bylaws. The constitution describes the organization of water users and bylaws specify the rules for proper

use and maintenance of the irrigation system. The WUA constitution and bylaws aim to ensure that a particular irrigation system is operated, used, maintained and continues to benefit all water users over a long period. WUA constitution and bylaws particularly emphasize the following:

1. Proper operation of the irrigation system
2. Fair distribution of water
3. Timely and proper maintenance of the irrigation system

The main purpose of having the WUA constitution and bylaws is to have rules and regulations to deal with any dispute between water users. WUA constitution and bylaws will have a record of all the existing rules for the organization and management of the irrigation system and, where necessary, new rules are developed and clearly written down after thorough discussion and accepted by all the WUA members.

The training and formation of WUA focuses on framing the practical, workable and inclusive constitution and bylaws. The trainers assist the WUAs to establish their own constitution and bylaws which are aimed at improving the organization and management of their irrigation system. Almost all the community managed irrigation systems have their informal and traditional groups with existing rules for organization, operation and maintenance. Every irrigation system receiving the support of the government will have WUA being formed through training and an improved version of the existing rules accepted by all the WUA members and signed by WUA committee members (30% women) for reference. Understanding and following the rules by all the users will lead to sustainable use of irrigation system.

Moreover, the beneficiaries of each irrigation scheme will receive Scheme Management Training toward the end of the construction period mainly to prepare the water users for operation and maintenance (O&M). It is essential that water users are fully aware of the O&M requirements. Users are briefed on the O&M requirements and to specially focus on areas requiring periodic attention. Along with the training on formation of WUA and scheme management, the WUA members are acquainted with the knowledge of banking and bookkeeping and the importance of monitoring and reporting about the conditions of the renovated/constructed irrigation system.

In Bhutan, women play an important role in both irrigated and non-irrigated agriculture and a larger number of women than men are involved in un-assured irrigation water for agricultural food production in the developing countries. The involvement of women in the meetings and training related to irrigation and agriculture means promotion of knowledge in water administration which is indispensable. Moreover, the committee members in WUA are dominated by women since more women participate in the meetings. In the process, more women are educated and well-versed with the rules and regulations pertaining to operation and maintenance of the provided irrigation systems, thereby empowering the women in the decision-making process.

This activity will, therefore, provide targeted training and support required for six WUAs to undertake these duties. This will entail training in water management and maintenance of the systems, and will also address the institutional issues of registration, elections, managing contracts, banking, and auditing and use of tools and technologies and efficient use of water.

Component 3: Climate-smart agriculture through sustainable land management and informed agro-meteorological services

In Bhutan, only 7.8% of the total land area is arable and 2.93% is cultivated¹⁹. About 31% of agriculture land is situated on slopes more than 50%²⁰. Farming is often carried out without any sustainable agriculture practice, leading to annual soil loss of 3-21 t per hectare²¹. The loss of topsoil poses a serious threat to food security as it significantly reduces the inherent soil fertility, soil organic matter and water retention capacity, resulting in poor land productivity and crop yield. Furthermore, as agriculture is predominantly rain-fed and dependent on monsoon rains, agriculture in Bhutan is highly sensitive and vulnerable to the impacts of climate change and climate variability²². The IPCC²³ also warns that mountainous regions such as Bhutan will experience a crop yield decrease due to increase in water stress (either too much or too little) and land degradation.

The impacts of climate change on land and crop productivity are projected to continue in the future with changing temperature and precipitation patterns (refer Project Background and Context, pages 4-5). To address the impacts of climate change, the NAPA (2011) and the RNR Sector Adaptation Plan of Action (SAPA) 2016 have undertaken sector vulnerability assessments and identified the following key adaptation measures, among others:

- (i) Scale up SLM for soil and water conservation;
- (ii) Improve weather and seasonal forecasting for farmers (agro-meteorology)

Accordingly, the promotion of SLM technology was taken up as one of the options that fits well for the Bhutanese farming environment and thus proven very successful in reducing land degradation caused by anthropogenic activities. The implementation of SLM interventions, especially the contour grass hedgerows on sloppy agriculture land were found to reduce soil erosion by 50%²⁴ compared to traditional farming practices. Furthermore, Bhutan being party to the United Nations Convention to Combat Desertification has committed to working towards Land Degradation Neutrality by 2030 by setting LDN voluntary target of restoring and improving 61.17 sq. km (6,117 Ha) of vulnerable and degraded areas, of which about 35 sq. km (3,500 Ha) is to be brought under SLM interventions.

The National Soil Services Centre (NSSC), as the focal agency for SLM under the DoA, has implemented several SLM projects through funding support from various donors (GEF through the World Bank, UNDP-SGP, BTFEC and RGoB). These projects have successfully piloted and scaled up climate-smart agriculture with special focus on SLM measures. The benefits and the importance of SLM technologies have been demonstrated, key lessons learned and best practices are well documented and widely shared. These proven SLM technologies and best practices are now being scaled up in other areas through funding support of the on-going projects-GEF-LDCF, GCF, IFAD funded CARLEP (Commercial Agriculture & Resilient Livelihood Enhancement Program) and World Bank funded FSAPP (Food Security & Agriculture Productivity Project) covering different project sites.

Between 2005 and 2020, a total of 20,633 acres of vulnerable and degraded land was restored through various SLM interventions. For the proposed project sites – Dagana Paro, and Tsirang

¹⁹ Land Cover Mapping Project (LCMP), 2011, National Soil Services Centre, DoA, MoAF

²⁰ National Action Program to Combat Land Degradation in Bhutan (NAP), 2014, National Soil Services Centre, DoA, MoAF

²¹ Soil Erosion Report, 2010, National Soil Services Centre, DoA, MoAF

²² National Adaptation Plan of Action (NAPA), 2011, National Environment Commission (NEC), RGoB

²³ Intergovernmental Panel on Climate Change (IPCC), 2007

²⁴ Soil Erosion Report 2010, National Soil Services Centre, DoA, MoAF

dzongkhags – the total land area brought under SLM are 275 acres, 104 acres, and 170 acres respectively. In other words, there is a strong need to scale up SLM interventions to make land and farmers' livelihoods more resilient to climate change.

Similarly, increasing climate variability and continuing climate change results in productivity losses in agriculture. Insect, pest and crop diseases are often associated with changes in weather patterns, causing crop yield losses in addition to the damage caused by extreme weather events. Crucial adaptation measures to avert these losses mainly involve the generation of weather and climate information. Weather and climate information help farmers to make pivotal farm decisions.

The agro-meteorology programme was established under the DoA in 2019 to use climate information in a way that responds to user needs and assists decision-making to reduce the impacts of climate-related hazards and increase benefits from favourable climatic conditions. Expansion and operationalization of the ADSS is crucial for strengthening agro-met services in Bhutan as it would provide real-time monitoring, data analysis and comprehensive analytical tools and statistical information. The agro-meteorology programme will also issue farm advisories and early warnings against climate-related disasters based on the weather forecast of different lead time issued by the NCHM. Dissemination of such real-time warnings through different channels can become a key factor to enhance food and nutrition security.

Therefore, this project component will focus its investment on SLM and agro-meteorology services to avoid risks affecting livelihoods and food security in the project areas and enhance resilience. In particular, Component 3 will focus on the downstream section of the watershed, while Component 1 and 2 will focus on upstream, i.e., the watershed management and water conveyance system.

Output 3.1: SLM in vulnerable and degraded areas implemented

To enhance land productivity and make agriculture landscape more resilient to climate change, this project output will seek to scale up existing SLM technologies that have been proven successful and effective in reducing land degradation, especially soil erosion and landslides caused by rainfall variation. This will promote two main types of SLM measures – structural measures (bench terracing, stone bunding & check dams) and vegetative measures (contour hedgerows & bamboo plantation) which will be carried out based on the ALDG2021.

The primary activities proposed under this output are:

- Activity 3.1.1: Participatory SLM Action Planning and sensitization to validate key SLM interventions ensuring 60% of participants comprise of women
- Activity 3.1.2: Implementation of SLM measures (terracing, stone bunding, contour hedgerows).
- Activity 3.1.3: Technical assistance and support to communities on the implementation of SLM practices in the field.
- Activity 3.1.4: Field-based and specialized training to farmers and agriculture extension staff on SLM technologies ensuring 60% of participants comprise of women.
- Activity 3.1.5: Monitoring and evaluation of SLM intervention.
- Activity 3.1.6: Documentation, Knowledge Management (KM) and experience sharing platforms.

Output 3.2: Climate change information, products and services made available and accessible

This output will support operationalization of agro-meteorology services in the project areas for better climate-informed digital advisory services. The climate services will be provided appropriately to 13 gewogs where other components are implemented so that activities of this project are packaged end to end. The project will mainly support the up-scaling and operationalization of the ADSS and generation of climate products.

The ADSS (www.agromet.gov.bt) was launched by the DoA on 16 March 2021. A MoU is in place between DoA and Regional Integrated Multi-Hazard Early Warning System for Asia and Africa (RIMES) to enhance the institutional and technical capacity of officials of the DoA, particularly Agriculture Research and Extension Division (ARED) and Agro-met focals based in Agriculture Research and Development Centres, Central Programmes (National Soil Services Centre & National Plant Protection Centre) and extension officials. The capacity need is mainly to understand and provide improved agrometeorological advisory and early warning services to ensure preparedness against extremes weather causing damage to various agricultural systems in Bhutan.

The ADSS planned to scale up the web portal in the remaining dzongkhags. The system needs to be upgraded and improved based on first-hand experience. Currently, weather forecast at the dzongkhag level is integrated in the ADSS and will require the integration of gewog level weather forecast and incorporation of the cropping calendar in the system. The panel should also incorporate pest and disease forecasting and drought monitoring.

This output will also directly address disaster risk reduction (DRR) issues. Agriculture in Bhutan is vulnerable to climate-induced disasters. Rural communities are often affected by floods, drought, windstorm, as well as incidences of insect pests and diseases. Less than half of the rural households is irrigated, so the farming system is still dominated by dry-land farming. Localized drought is becoming increasingly apparent and significant. Late onset of monsoon induces drought and affects most of the farming communities, especially those focusing on rice and vegetable farming. The country, on the other hand, has recorded incidences of climate-induced insect pests. In 1996, rice farmers in high altitude areas lost 80% to 90% of the crop production to rice blast disease. *Turcicum* leaf blight of maize in 2007 damaged more than 50% of the harvest. The outbreak of fall armyworms affected 16 of the 20 districts in 2013. In 2008, a severe windstorm destroyed all maize crops of hundreds of households.

DRR includes observing, detecting, monitoring, predicting and issuing early warning of a wide range of weather, climate and water related hazards. Climate-related risk or climate-induced risks (drought, flood, windstorm, insect pest and diseases) need to be mainstreamed into Bhutanese agriculture planning and decision-making processes to avert crop losses caused by extreme weather events. The Disaster Risk Management Strategy of Bhutan 2013 highlights a pressing need for integration of DRR and CCA efforts and to have environmental and natural resource management approaches as part of DRR strategies.

The activities under the project will mainly entail providing technical advice in major agriculture commodities in the project sites. Agro-met services will focus on the main crops of the dzongkhags, as follows:

1. Paro <ul style="list-style-type: none"> • Rice • Apple • Cabbage • Potato 	2. Dagana <ul style="list-style-type: none"> • Rice • Chilli • Citrus 	3. Tsirang <ul style="list-style-type: none"> • Rice • Chilli • Citrus
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Planned activities under this output include:

Activity 3.2.1: Agro-met advisory bulletins appropriately packaged and disseminated timely through appropriate channels.

Activity 3.2.2: Incorporation of area-specific weather and crop data in ADSS.

Activity 3.2.3: Professional Development of agro-met focal points based in ARDCs and Central Programmes.

Activity 3.2.4: Knowledge management and communication activities.

Activity 3.2.5: Sensitization, awareness and capacity development on agro-met services for researchers, extension staff and farmers targeting at least 50% women.

Activity 3.2.6: Development of crop suitability and feasibility maps (eight maps).

Component 4: Improved local governance for effective CCA mainstreaming with focus on water management at the grassroots

An integral aspect of advancing good governance in Bhutan has been the gradual process of democratic governance and decentralization, the beginning of which dates back to the establishment of the Tshogdu or National Assembly in 1953, followed by the Lodey Tshogde (Royal Advisory Council) in 1965, the High Court in 1967 and the Lhengye Zhungtshog (Cabinet) in 1972. Later, the process of decentralization was enhanced to encompass local governance with the formation of Dzongkhag Yargay Tshogde (DYT) or District Development Committee in 1981 and Gewog Yargay Tshogdu (GYT) or Block Development Committee in 1991, which resulted in the delegation of administrative and financial powers to the dzongkhag and gewog levels respectively.

In keeping with the Constitution, the Local Government Act of Bhutan 2009 provides for direct participation of the people in the development and management of their own social, economic and environmental well-being through decentralization and devolution of power and authority. The Act stipulates that LGs be established in each of the 20 dzongkhags comprising: (a) Dzongkhag Tshogdu; (b) Gewog Tshogde, and (c) Thromde Tshogde. They are mandated to serve as the highest decision-making body respectively at the dzongkhag, gewog and thromde level, and are to be supported by dzongkhag, gewog and thromde administrations staffed by civil servants. It provides LGs a set of administrative, regulatory, service delivery, and financial powers and functions for governance at the local level.

Component 4 aims to increase the overall sustainability and coherence of the project by ensuring the involvement of most relevant governance institutions for climate resilience at the local level. It will also ensure that the right adaptation activities are identified, prioritized and implemented with the communities, with primary focus on development and management of water resources and rural water infrastructure, specifically drinking water and agricultural irrigation schemes.

This component will specifically develop the capacity of LGs to integrate climate change adaptation in local development investments, institute mechanisms for mainstreaming climate change along with other cross-cutting issues, namely gender, environment, disaster and poverty, in local development plans, programmes and activities; institute mechanisms in LGs for CCA

and gender mainstreaming; and strengthening LGs and user groups in the communities for effective management of irrigation and drinking water.

Output 4.1: Institutional mechanisms in LGs strengthened for CCA and gender mainstreaming

Strengthening LG institutions has been a key programme of the RGoB since the commencement of the decentralization process in 1981. In the new democratic system, the LG institutions have an increasingly important role as frontline agencies for sustainable development, facilitating direct participation of the local communities in the development and management of their own social, economic and environmental wellbeing. A robust system of local governance is also critical for the government's sustainable development policies and programmes to produce direct social, economic and environmental benefits for the local communities, especially the poor and vulnerable groups, and have a far-reaching impact.

This output will focus on strengthening the institutional mechanisms at the local level for mainstreaming climate change adaptation and gender needs in local development plans, programmes and activities, especially those concerning RWSS, agricultural irrigation systems and sustainable land management. Through the project, the gewog-level mainstreaming mechanism for CCA and gender will be strengthened. LGs and communities will be sensitized and capacitated on mainstreaming CCA tools, frameworks and approaches, and M&E of CCA and gender mainstreaming in local development plans, programmes and activities related to drinking water, irrigation and sustainable land management, among others.

The following activities are proposed to achieve this output:

- Activity 4.1.1: Conduct professional development programme for LGs on CCA investments, mainstreaming tools, frameworks and approaches related to irrigation, water management, SLM, CCA and gender.
- Activity 4.1.2: Carry out M&E of CCA and gender mainstreaming in LG plans, programmes and activities targeting 50% women participants.

It is foreseen to implement a minimum of four sessions (training or workshops) per year, i.e., a minimum of 12 sessions covering all project areas targeting 50% women participants.

B. Describe how the project provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project/programme will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund.

Bhutan is particularly vulnerable to climate change due to its geographic location and fragile mountainous terrain that invariably affect climate variability, including the frequency and intensity of rainfall, and changes in temperatures. According to the IPCC, climate change projections to 2,100 for Bhutan will lead to increases in average temperatures with relatively warmer weather at higher altitudes and during the dry season, increase in annual average precipitation, and continued spatial variation in temperatures and precipitation due to complex topography.

Expected impacts of climate change will place additional stress on ecosystem-based livelihoods and on already vulnerable groups. As such, the project will focus on local level adaptation,

increasing potential benefits for exposed or sensitive groups, and act as a force for change towards the foreseen improvements at different levels.

Environmental benefits

- The project is based on the recognition that resilient healthy ecosystems are the basis for sustainable natural and human systems.
- The design and implementation of integrated watershed management plans will improve habitat quality and increase biological diversity mainly because of protection of the watersheds. In the long run, protection of watersheds will reduce the incidences of drying of water sources because of extreme climate events like droughts.
- The establishment of PES schemes will increase collaboration between upstream and downstream communities, opening dialogue leading to a stronger ownership and stewardship of the natural environment.
- The formalization of WUAs will improve efficient utilization and management of water resources both at the source and for downstream users. WUAs will be enabled to perform systematic monitoring of the status of water availability, leading to better decision-making towards the effective recharge of catchment areas.
- Improved irrigation systems are expected to minimize negative environmental effects such as landslides often due to poor maintenance of open irrigation canals.
- Further, proposed technologies, including hydro-pressure pipes, will reduce water losses due to uncontrolled spill overs and evapotranspiration.
- SLM and climate-smart agriculture will reduce topsoil erosion and combat land degradation, which should enhance soil fertility and soil microbial biodiversity. In addition, SLM is also recorded to increase biodiversity in and around the cultivated lands.
- User-friendly climate information, products and services will improve planning and prevent environmental disasters. For instance, work on steep slopes for any developmental activities could be halted based on objective information related to climate change and impacts on specific locations and watersheds.
- User-friendly climate information for the farmers will also increase crop productivity, which will consequently reduce demand for collection for non-wood forest products (NWFPs), thereby reducing disturbance to natural habitats.
- Improved adaptation planning at LG level will improve the holistic vision of communities, on how they can build climate resilience by managing their surrounding natural resources.
- LG involvement will also strengthen the institutional channels to implement a coherent approach for the management of water all the way from source to end-users.

Economic benefits

- PES schemes are expected to provide additional income for upstream communities responsible for watershed management.
- Users will directly benefit as continuous supply of water reduces the economic burden of seeking alternatives in case of erratic water supply. In the long run, it will also reduce vulnerability of the users from the risk of water sources drying up.
- Increased incomes, through PES schemes, collection of NWFPs and increase in agriculture productivity will have a significant impact on the reduction of poverty in vulnerable rural communities across Bhutan.
- In addition, more stable income will also improve the capacity of vulnerable groups to take advantage of any positive impacts of warmer climate in their locality.

- In a few years, habitat enrichment within managed watersheds can increase biological diversity translating into increase in provisioning ecosystem services, such as: increased availability of NWFPs like cane, bamboo, mushroom, fiddlehead ferns and many others which are commonly harvested to supplement household income.
- The project will strengthen climate resilience of irrigation infrastructure, reduce loss and damage costs related to climate change induced extreme events, thereby releasing some pressure to public resources from continuously increasing recovery costs.
- The improvement of the irrigation schemes will increase agricultural productivity (including paddy yield) allowing double cropping of rice and vegetables.
- Climate-resilient irrigation will provide a flexible and more reliable water supply and promote diversification to higher value crops.
- Water harvesting will largely use natural material proving its cost effectiveness.
- The installation of climate-resilient irrigation water, SLM and climate-smart agricultural practices will increase crop productivity. By using proven technologies for terracing slopes of more than 25 degrees, sites will serve demonstration purposes for replication by other farmers. These are among the proposed solutions for Bhutan to increase arable land, which is currently only less than 3% of total land area.
- Watershed management also intends to decrease downstream sediment load, which can decrease Bhutan's hydropower dams' efficiency and limit energy generation, which is one of the country's major exports.
- Women empowerment in water governance and management which will lead to better and gender-sensitive decisions for management and protection of community and household assets, including those of vulnerable communities (participation of women is expected to increase from the current 11% to 30% through this project – Gender Action Plan, Annex 1.

Social benefits

- Women are affected by their greater vulnerability to climate risks, linked to their greater dependence on natural resources. The proposed climate resilience interventions for agriculture and natural resources proposes various social protection measures for high priority groups, including women and children.
- The proposed integrated water resources management, both for drinking and irrigation, is expected to increase water availability and dialogue among communities, reducing the number of disputes over water in the long run. There are numerous cases in Bhutan where irrigation and drinking water disputes between communities were resolved only in a court of law. These solutions only partially contribute to social wellbeing.
- Formalization of WUAs will lead to equitable sharing of water resources among the community members and notably at the grassroots and make significant contributions to enabling inclusive decisions related to water governance and management.
- Active participation by the community members during watershed management, PES schemes and implementation of SLM are also expected to improve social capital of the community, for instance, through revitalization of traditional labour sharing during SLM implementation.
- The project will also assess current policies and work towards creating more inclusive and enabling policy environment for enhancing coordination and collaboration among stakeholders, including a stronger participation of the underrepresented groups.
- Inclusive participation in adaptation planning will also shed light on the needs of marginalized groups of people, including women, children, and the elderly.

- As such, the local climate resilience interventions planned at the LG level will promote the protection of economic and social rights through vulnerability reduction and support for disaster risk reduction.
- Communities are aware of households vulnerable and marginalized. Such groups will be identified in consultation with representatives of each beneficiary community during the first six months of the project implementation. This will include households in isolated settlements; communities without motorable access road; households with only elderly members or without labour force; households with very few members; households with no resident members; women and divorcee headed households. These vulnerable groups may not have the means to actively participate in the project such as for community labour contribution and other forms of contributions. In line with the Water Act 2011 that ensures accessibility rights to all, the project will continue to ensure that the vulnerable and marginalized groups are not excluded. For this, the project implementation will not require community contributions in the form of cash or labour during the project implementation. The O&M of water infrastructure developed by the project will be handled by WUAs which will include contributions from member households for minor maintenance. To ensure that the vulnerable members of the communities are not excluded from availing themselves of benefits, the articles of association of the WUAs will include clauses on community exemptions for such contributions from the vulnerable and marginalized groups. The articles of association of the WUAs will be developed during the project implementation with support from the PMU and dzongkhags concerned and will further stress on providing equal access to all members of the communities.

Avoidance/mitigation of potential negative impacts

The BTFEC is mandated to promote environmentally sound and sustainable development in all its programmes. As such, the screening of projects for the identification of potential negative impacts is part of its internal processes and described in the following sections on Risk and on Monitoring and Evaluation.

Due to the nature of the intervention, which is specifically based on the improvement of the environment and focusing on societal benefits, and to the mandatory compliance with national regulations and standards (see section E), no negative impacts are expected. These standards are reflected in the environmental and social clearances from competent authorities at various levels (See ESMP for the clearances).

Specific studies will be conducted, in each component, to better understand the potential effects of the proposed activities, with special emphasis on environmental and social risks. Identified risks, even small, can then be associated to a mitigation proposal. This is important especially in a fragile environment with competing uses on natural resources.

A gender assessment has been carried out and Gender Action Plan has been developed (Annex 1) which will ensure that risks related to gender are managed and enable project decisions to be gender-inclusive. A minimum of 30% of women participation will be ensured in project related consultations, meetings and training.

A project level ESMP has been developed based on risks and impacts identified by the project stakeholders (Annex 2). Implementation of the ESMP will ensure the social and environmental impacts of the project are mitigated or minimized and there will be no negative environmental or social impact from the project activities.

During the first six months of project implementation, the GAP and ESMP will be revised by the Environmental Social and Gender (ESG) Expert as, by then, the designs of project activities, particularly of the drinking water and irrigation schemes would be in place and activity-specific details would emerge.

C. Describe or provide an analysis of the cost-effectiveness of the proposed project.

The proposed scope and approach were selected as they address the particular adaptation challenges that Bhutan is facing. The alternative “business as usual” scenario would be outclassed by the following points.

In the Bhutanese context, with natural resources being put at the centre of the society and of the economy, Ecosystem-based Adaptation (EbA) is the most sustainable and cost-effective way of enhancing resilience and reducing vulnerability to impacts of climate change. Not only ecosystem-based adaptation to give the basis for human systems to thrive, notably due to vigorous provisioning services, it is also expected to enhance resource management. In the case of water, sound EbA backed by an integrated watershed management approach will eventually reduce cost of water treatment processes at user ends.

Review of PES schemes in Bhutan (WMD 2019) indicate that PES schemes have:

- a. strengthened community ownership over management and governance of water source catchments.
- b. created awareness and willingness among ecosystem beneficiaries to pay for upstream watershed management.
- c. Reduced burden on government exchequer to pay for local watershed programmes.
- d. Enhanced health of watershed ecosystem
- e. Ensured sustained flow of water from water source

We currently have four successful PES schemes, which are bound by a contractual agreement between ecosystem service providers and beneficiaries. These are:

1. Yakpugang (Mongar): PES scheme between community forest management group (CFMG) and municipal water users, effective since 2011;
2. Pasakha (Chukha): PES scheme between CFMG and industries, effective since 2016;
3. Namay Nichu(Paro): PES scheme between CFMG and hoteliers, effective since 2016;
4. Thakorling & Khuchi Darachhu (Tsirang): PES scheme between Thakorling & Khuchi Darachhu watershed community and Damphu Town water users, effective since 2019.

The PES schemes under this project are proposed building on the lessons from these successful schemes.

Water is a key sector for increasing agricultural productivity as well as improving public health and hygiene. Developing climate resilient infrastructure through the use of environmentally friendly and durable infrastructure directly contributes to a transformational change for Bhutan in terms of increasing agricultural productivity, where more than 60% of the population is still engaged in the agricultural sector besides improving public health.

In terms of irrigation technologies, the proposed interventions include HDPE pipeline and climate-smart technology which in the long run has minimal maintenance cost. Such

interventions also have a high efficiency level of water usage as it reduces conveyance losses²⁵. Given the mountainous terrain, piped irrigation shows more adaptive benefits compared to open conventional irrigation channels.

Indeed, the alternative options for irrigation would be to build the schemes with conventional concrete lining or with concrete structures which is cheaper than the proposed intervention. However, this option will not be cost effective in the long run due to the following reasons:

- The concrete channel has a shorter lifespan (maximum of 10 years) than the HDPE pipe irrigation scheme which has a lifespan of minimum of 50 years.
- The concrete channel has high maintenance cost compared to pipe irrigation schemes.
- The open concrete channel is more vulnerable to climate risks offering little resilience to extreme events - leading to blockages and water loss through seepages which, in turn, can trigger catastrophic slope failures and massive landslides causing negative environmental impacts and risks. This negative impact can have a substantial environmental cost as part of the mitigation measures.

While upfront cost for pressurized piped irrigation schemes, proposed under the project, is higher than traditional open channels, it is increasingly proving to be the most efficient, reliable, and sustainable. A kilometer of climate resilient irrigation scheme to be supported by the project is estimated to cost USD 138,937/- including the cost of maintenance for the scheme lifespan of minimum 50 years. In contrast, the same length of “business as usual” conventional irrigation scheme is estimated to cost USD 202,187/- covering maintenance cost for 49 years and four times reconstruction cost to serve for 50 years. In the long term, alternative climate resilient approach works out to be 45% more cost efficient²⁶. Interventions on irrigation financed by the GEF-LDCF, EU, World Bank and GCF elsewhere in Bhutan have adopted pressurized piped irrigation which is the most suitable and resilient scheme for a highly vulnerable mountain ecosystem. By adopting climate resilient approach, the project would create a long-term saving of USD 1.6 million for total of 25.5km irrigation scheme²⁷.

Various types of land degradation occur in Bhutan at different scales and degrees. Among the land degradation types, water induced degradation, e.g. gully, landslides & ravine formation, are more prominent and devastating. Wind and tillage erosion is also extensive as is in-situ degradation such as depletion of soil organic matter, nutrient mining, topsoil capping and subsoil compaction. All these contribute to reducing agricultural productivity and impairing the livelihoods of the people of Bhutan. Older farmers commonly report crop yield declines of 30% or more due to the soil “being tired” (SFU, 2001)²⁸.

The project site farmland is dominated by dryland farming on steep slopes (20-35 degree) which remain vulnerable to soil erosion. Annually 3-21 MT/hectare of soil are washed from the conventional farming practices (*NSSC, Soil Erosion Report 2010*). Owing to the steep terrain aggravated by climate change, the formation of gullies, landslide and landslips are common. If not checked from initial stage, the gullies and landslides could lead to ravine and even must resettle the communities.

²⁵ NIWRMP 2016, National Environment Commission, RGoB

²⁶ Estimates are worked out by the technical working group for the project preparation comprising of technical experts from Agriculture Engineering Division and other technical agencies.

²⁸ Report on Agroforestry and Soil Fertility Survey in Bhutan. Soil Fertility Unit, Ministry of Agriculture, Thimphu, Bhutan.

With the project support on bench terracing, the surface run off (rill and sheet erosion) will be checked thereby retaining soil fertility and soil moisture. Further, contour grass hedgerows and contour stone bunds will reduce the surface soil erosion by 46% and increase in crop yield by 10%²⁹. Interventions will also include bio- engineering measures using live cuttings, plantation of bamboos, grasses and check-dams (log & stone).

However, the challenges faced by farmers, especially households headed by elderly farmers, women and economically disadvantaged families in implementing SLM interventions are labour shortages and high cost. Therefore, to address this challenge, alternative approaches such as informal labour sharing groups and community mobilization through campaign mode were adopted which have proven successful and are being replicated in areas where SLM is rolled out through different project supports. In addition, alternative approach using machine was adopted for bench terracing from 2017 under the funding support from BTFEC, GEF-LDCF and GCF. Without project support, an acre of bench terracing manually requires about 147 men days which works out around USD 1960/-. However, with project support, the cost of maintaining soil fertility and improving farm productivity through bench terracing will be reduced by 65%.

Climate related extremes such as heat waves, droughts, floods, cyclones and wildfires expose the ecosystem and human systems to the current climate variability and make us vulnerable. Bhutan has also been witnessing more frequent extreme weather events causing widespread damages to crop and livelihood. For instance, the incessant and untimely rainfall that coincided with paddy harvest in the country from 16 to 21 October 2021 affected 4242 households across 18 dzongkhags damaging 2698 acres of crops. According to the record maintained by the MoAF, the rainfall incurred a damage of about Nu 9,50,33,520.86³⁰. The extreme weather events are projected to be more frequent into the future. These extreme weather events, climate variability and long-term climate change pose important threats to the future agriculture and food security. This necessitates the need for climate and weather services (agrometeorology). Dissemination of timely agro-advisories and early warning systems has the potential to reduce the number of fatalities cause by weather and climate related disasters and enhance the resilience of the communities.

The proposal also tackles the issue of knowledge and decision-making. Often there is a huge amount of climate data available, including those for researchers and policy makers. However, it is not packaged in a useful way for day-to-day use at the grassroots level, for instance, by the farmers. Thus, the project is expected to develop agrometeorological services and products, which are user-friendly and easily accessible at grassroots level so that the impacts of climate change and climate-induced disasters can be significantly reduced.

Further, the expected results are part of the targets set in the existing plans at the national level. For example, ensuring 24x7 safe drinking water supply for every household is the target set for 2023. Yet, the available means are not sufficient to cover all the needs in the country.

D. Describe how the project/programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or subnational development plans, poverty reduction strategies, national communications, or national adaptation program of action, or other relevant instruments, where they exist.

²⁹ "Farmers' perception on soil erosion, its causes and adoption of its mitigation measures in two gewogs of eastern Bhutan.", Tshering, Jigme, et al.

³⁰ Crop damage report of 17 Dzongkhags, 2021, RGoB

Taking into consideration the role of water for sustainable socio-economic development, the water sector has been accorded a top priority by the RGoB. The additional feature of the current 12th FYP is the flagship programmes designed as key means to achieve NKRA through implementation of high priority programmes. “Access to 24/7 safe drinking water with irrigation” has been prioritized by the RGoB as flagship programmes in the 12th FYP and the proposed project is well aligned with the RGoB’s Water Flagship Programme. The strategies identified include declaration and protection of critical watersheds, putting in place adequate and climate-resilient water infrastructure, improving the quality of drinking water and strengthening water legislation and governance.

The proposed project will contribute to the achievement of the five of the 17 NKRA of the 12th FYP. Those five NKRA are:

- NKRA 3: Poverty eradicated and inequality reduced
- NKRA 5: Health ecosystem services maintained
- NKRA 6: Carbon neutral, climate and disaster resilient development enhanced
- NKRA 8: Food and nutrition security ensured
- NKRA 17: Sustainable water ensured

The NKRA is a development outcome at the national level that will contribute to achieving the overall objective of the 12th FYP. In 17 NKRA identified in the plan are closely aligned with the SDGs with their targets and indicators integrated into the 12th FYP. Aligned with the NKRA, there are Local Government Key Result Areas (LGKRA) at the local government level which will contribute to achieving the 12th FYP objectives. The proposed project will contribute to achieving the following LGKRA:

- LGKRA 1: Gainful employment created and local economy enhanced
- LGKRA 2: Food and nutrition security enhanced
- LGKRA 3: Community health enhanced and water security ensured
- LGKRA 6: Livability, safety and sustainability of human settlements improved
- LGKRA 9: Carbon neutral, climate and disaster resilient development enhanced
- LGKRA 10: Gender equality promoted, women and girls empowered

Bhutan is currently working on the development of its first NAP with a focus on the water sector. The proposed project will complement and supplement the implementation of ongoing assessments being carried out in the water sector. Furthermore, the proposed project is in line with the National Environment Strategy (NES) 2020. The NES 2020 based on the situational analysis and the current challenges proposes improving access to safe drinking water and sanitation and implementing integrated water resources management.

Bhutan in its first NDC outlined the 10 broad areas of priority adaptation needs. The integrated water resources management adoption of appropriate technologies, climate proofing water distribution systems and integrated watershed and wetland management were identified as some of the adaptation measures in the water sector. The proposed project is in line with the first NDC.

Bhutan submitted its 2nd NDC in June 2021 which highlights the mitigation options and outlines that the adaptation component will be identified in its NAP which is under formulation and is expected to be ready by 2022. The NAP will cover priority needs in water, agriculture, forests and biodiversity and health. Some of the priorities highlighted in the draft document include development of a database system for drinking water, strengthening and formation of WUAs, and climate proofing water infrastructure. The proposed project is built on the findings and assessment carried out for NAP formulation.

Project Component	NKRAs (2018-23)	LGKRAS (2018-23)	SDGs (2015-30)	9 GNH Domains (Long term)
Component 1 Component 3	NKRA 3: Poverty and inequality reduced	LGKRA 1: Gainful employment created and local economy enhanced LGKRA 2: Food and nutrition security enhanced LGKRA 6: Livability, safety and sustainability of human settlements improved LGKRA 9: Carbon neutral, climate and disaster resilient development enhanced LGKRA 10: Gender equality promoted, women and girls empowered	Goal 1: No poverty Goal 10: Reduced inequality	Living standard Good governance
Component 1	NKRA 5: Health ecosystem services maintained	LGKRA 9: Carbon neutral, climate and disaster resilient development enhanced	Goal 11: Sustainable cities and communities Goal 15: Life on land	Ecological diversity and resilience Good governance
Component 1 Component 2 Component 3	NKRA 6: Carbon neutral, climate and disaster resilient development enhanced	LGKRA 9: Carbon neutral, climate and disaster resilient development enhanced	Goal 7: Affordable and clean energy Goal 9: Industry, innovation and infrastructure	Ecological diversity and resilience Good governance
Component 2 Component 3	NKRA 8: Food and nutrition security ensured	LGKRA 2: Food and nutrition security enhanced LGKRA 3: Community health enhanced and water security ensured	Goal 2: Zero hunger	Living standard
Component 1 Component 2 Component 4	NKRA 17: Sustainable water ensured	LGKRA 3: Community health enhanced and water security ensured LGKRA 6: Livability, safety and sustainability of human settlements improved	Goal 6: Clean water and sanitation	Living standard Health Ecological diversity and resilience

Table 5: Alignment of project components and SDG, GNH Domain and 12FYP

E. Describe how the project/programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy of the Adaptation Fund.

The implementing entities are committed to complying with all legislation and applicable environmental and social requirements. Overall, the project activities will be within the context of requirements of the National Environment Protection Act 2007. Other compliance requirements with regulation are described in more detail at the component level:

To achieve the foreseen related to the implementation of watershed management plan, scaling up of PES schemes and wetland management, activities shall be in line with the following:

- Forest and Nature Conservation Act 1995
- Forest and Nature Conservation Rules and Regulations of Bhutan 2017
- PES Framework for Bhutan 2015
- Bhutan Drinking Water Quality Standards 2016 and Wetland Inventory Framework

All the SLM interventions, particularly terracing, will be done in line with the following guidelines and modalities.

- ALDG 2017 of the MoAF
- Implementation Modalities for Agriculture Land Development and Fallow Land Reversion, circulated to all the implementers vide letter No. DOA/ARED/Adm-01 /2019 dated 30th September 2019
- Soil Conservation Manual (SCM), 2019, of the National Soil Services Centre, DoA, MoAF

As for infrastructure for improving access to drinking and irrigation water, larger scale constructions will require environmental and social clearance starting with an Initial Environmental Examination (IEE) to the competent authority prior to the execution of the proposed activity. Further, extraction of water resources must be in line with the Water Act of Bhutan 2011 and water regulations which define environmental flow requirements and BDWQS 2016. The proposed irrigation activities are in line with the National Irrigation Plan as well as the National Water Flagship Programme.

Activities for the promotion of climate-smart agricultural practices and improvement of water governance shall be aligned with:

- The Constitution of Kingdom of Bhutan 2008, which entrusts every Bhutanese as a trustee of the Kingdom's natural resources and the environment for the benefit of the present and future generations. It is the fundamental duty of every citizen to contribute to the protection of the natural environment, conservation of biodiversity of Bhutan and prevention of all forms of ecological degradation.
- Land Act 2007, which is envisaged to manage, regulate and administer the ownership and use of land for socio-economic development and environmental well-being of the country through efficient and effective land administration, effective use of land resources and conservation of the ecosystem.
- Bhutan Water Policy 2007, aimed at sustainable management, efficient and equitable use of water resources while recognizing and preserving the environmental, social, cultural and economic value and uses of water.

- Water Act of Bhutan 2011, which ensures that the water resources are protected, conserved and/or managed in an economically efficient, socially equitable and environmentally sustainable manner.
- Water Regulation of Bhutan 2014, promulgated to enforce the objectives and purpose of the Water Act, effectively implement and enforce the Water Act by the Competent Authorities and identify roles and responsibilities of designated Competent Authorities and other relevant organizations.
- Agriculture and Land Development Guideline 2017, aimed at establishing a common approach and practices for Agriculture Land Development (ALD) across the country and assist agriculture staff and other stakeholders in planning, implementing, monitoring and evaluation of ALD programmes and activities.
- National Environment Protection Act 2007, which provides for the establishment of an effective system to conserve and protect environment through the National Environment Commission or its successors, designation of competent authorities and constitution of other advisory committees, so as to independently regulate and promote sustainable development in an equitable manner.
- National Forest Policy of Bhutan 2009, which was framed to ensure that Bhutan's resources and biodiversity are managed sustainably to produce a wide range of social, economic and environmental goods and services for the equitable benefit of all citizens and natural environment while still maintaining a minimum of 60% of the land under forest cover thereby contributing to Ministry of Finance.
- PES Framework 2015. The goal of the PES framework is to move beyond the current general enabling environment for PES in Bhutan to encourage and establish the necessary institutional arrangements for the efficient and effective design/operationalization of PES schemes across the country.
- PES field guide for Bhutan, 2015, to help implement PES schemes in the field and to promote and upscale the mechanism in Bhutan.

The project's key objective of building resilience to climate change and adaptive capacity of water-stressed communities in the target districts are relevant to all water related regulations, policies and guidelines.

During the implementation of the project, the implementing entity and other executing entities must comply with the standards of the AF. This project complies with the various laws that relate to the implementation of the project's activities, such as environmental, agricultural and water resource acts and relevant laws. Direct involvement of related line ministries and local authorities add strength to the compliance and alignment with national laws, policies and guidelines. The line agencies have been consulted during project design and development through their respective representatives in the project development task force and several consultations to ensure that activities comply with relevant national standards.

All project activities related to infrastructure will require environmental and social clearance. The project will receive either guidance or the required authorizations, clearances, licenses through different agencies at the local government level of central agencies as per the established delegation of power for environmental clearance. Such clearances will be accompanied by conditions that ensure environmental and social safeguards.

F. Describe if there is duplication of project/programme with other funding sources, if any.

The DA, MoF, is the apex planning and coordination body of the RGoB. It ensures that any development activity in the country is in line with the government's priority as well as ensuring no duplication between project interventions. Any external or internal funding of any kind in Bhutan, irrespective of implementing agencies, must be routed through the MoF.

The initial proposed project was limited to Paro and Dagana dzongkhags (concept note stage). However, due to the changing ground realities and the urgency to implement some of the key activities proposed during the concept note, it is proposed to include three gewogs in Tsirang District.

The proposed project is complementary with some of the ongoing and pipeline projects financed through GCF, GEF and GEF-LDCF and details of lessons learned and best practices and synergies is provided in Table 6 below

Table 6: Details of completed, ongoing and pipeline projects including lessons learnt, best practices and synergies/overlaps

Sl.No	Name of the project	Source of Funding	Description of the project	Location	Project Status	Synergies/ Overlaps	Best Practices	Lessons learnt
1	Addressing the Risks of Climate-induced Disasters through Enhanced National and Local Capacity for Effective Actions	GEF-LDCF-NAPA II	The overarching goal of the project is to safeguard Bhutan's key economic development infrastructure, to strengthen resilience against climate-induced water scarcity and in general terms to strengthen national and local capacity for natural disaster response and climate resilience.	Phuntsholing Thromde (Rinchending landslide stabilization) Mongar (Drinking water supply in municipality)	Completed in 2019	Both NAPA II and proposed AF are adaptation projects. However, NAPA II focused on land stabilization and AF will focus on the water sector. NAPA II project supported a drinking water supply scheme for water scarce Mongar town and this project sites are in different districts.	Soil nailing and adoption of various bioengineering technologies in slope stabilization. Piloting Payment for Ecosystem Services (PES)	Sequencing of project activities to be considered through better coordination. PES schemes in Bhutan have: a. strengthened community ownership over management and governance of water source catchments. b. created awareness and willingness among ecosystem beneficiaries to pay for upstream watershed management. c. Reduced burden on government exchequer to pay for local watershed programmes. d. Enhanced health of watershed ecosystem e. Ensured sustained flow of water from water source

Sl.No	Name of the project	Source of Funding	Description of the project	Location	Project Status	Synergies/ Overlaps	Best Practices	Lessons learnt
2	Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan	GCF	The project mainly supports interventions to integrate climate change risks into water and land management practices that affect smallholders and in reducing the risk and impact of climate change-induced landslides during extreme events that disrupt market access.	<p>Tsirang (Mendrelgang, Kilkhorthang, and Barshong)</p> <p>Dagana (Khebisa,Dorona), Punakha, Trongsa</p> <p>Punakha</p> <p>Sarpang</p> <p>Samtse</p> <p>Wangduephodrang</p>	Ongoing	<p>The dzongkhags of Dagana and Tsirang are common and provide opportunities to seek synergy in terms of water management and sustainable land management.</p> <p>In Tsirang, GCF Project covers Mendrelgang, Kilkhorthang, and Sergithang which are beyond the project scope of AF. In Dagana, two gewogs, namely Tsangka and Lajab, are common between GCF and the proposed AF project. However, GCF supports the sustainable land management practices especially on bench terracing, hedgerows and contour stone bunds construction whereas AF project proposes to build climate-resilient irrigation schemes which will maximize farm productivity in those two</p>	<p>Nine tailored climate products (8 Dzongkhag level and 1 at National level) to be rolled out. The dissemination of farm advisories through various climate products will help the communities in reducing climate induced risk.</p> <p>SLM technologies supported through GCF address land degradation and mitigate the climate change induced extreme events. The technologies promoted are</p> <ol style="list-style-type: none"> 1. Bench terracing 2. Contour hedgerows 3. Contour stone bund 4. Landslide stabilization 	<p>The climate products will help in customizing farm advisories of prioritized crops identified in this project through a landscape approach.</p> <p>Agriculture and livestock productivity increase is visible wherever SLM interventions reach.</p> <p>Smallholder farmers' livelihood improved and income enhanced. More children could go to schools.</p> <p>Considering the positive impacts of these interventions, SLM technologies need to be upscaled in the areas not supported through other projects.</p> <p>Adoption of climate resilient HDPE irrigation</p>

Sl.No	Name of the project	Source of Funding	Description of the project	Location	Project Status	Synergies/ Overlaps	Best Practices	Lessons learnt
						gewogs thus complementing both the initiatives.	(Plantations & Check dams) 36 climate resilient irrigation schemes supported in the GCF project areas.	pipe over conventional open irrigation channels
3	Enhancing sustainability and climate resilience of forest and agriculture landscape and community livelihoods in Bhutan	GEF-LDCF-NAPA III	The project aims to operationalize an integrated landscape approach through strengthening of biological corridors, sustainable forest and agricultural systems, and build climate resilience of community livelihoods.	Wangdue Phodrang, Zhemgang, Sarpang, Thimphu, Trongsa, Bumthang, Mongar, Lhuntse, Punakha and Haa, Paro (Tsento), Tsirang (Phuentenchu, Sergithang)	Ongoing	While Tsirang and Paro districts are common, intervening <i>gewogs</i> are different. In Paro, except for some support for conservation initiatives, there are no adaptation interventions from the GEF-LDCF project. In Tsirang, GCF-LDCF project supported one irrigation scheme in Sergithang gewog which is not included in the AF proposal.	First ever climate change adaptation and biodiversity conservation project. Building climate resilient pressurized piped irrigation schemes. Piloting climate proofing of gewog connectivity roads. Success stories in bench terracing as effective land management technology in mountain areas.	Delay in execution of project activities due to delay in procurement of equipment, which should be well planned in the AF project. Adoption of climate resilient HDPE irrigation pipe over conventional open irrigation channels.

Sl.No	Name of the project	Source of Funding	Description of the project	Location	Project Status	Synergies/ Overlaps	Best Practices	Lessons learnt
4	Advancing Climate Resilience of Water Sector in Bhutan-ACREWAS	GEF-LDCF	The project will focus on advancing the climate-resilience of the water sector in Bhutan adopting river basin approach.	Thimphu, Wangdue Phodrang, Tsirang, Sarpang and Punakha.	Pipeline	The project will complement this project by collaborating in water governance aspects.	NA	NA
5	Commercial Agriculture & Resilient Livelihood Enhancement Programme (CARLEP)	IFAD	IFAD project mostly emphasizes commercial farming practices such as crop cultivation and livestock sciences, market chain and enterprising activities including the upliftment of farmers' groups and cooperatives, with a peripheral concentration on irrigation and land development.	Lhuntse, Trashiyangtse, Mongar, Trashigang, Pemagatshel, and Samdrup Jongkhar.	Ongoing	On the other hand, the AF project solely emphasizes water and land development where adaptation measures will be integrated, where concrete activities will be carried out through the apportioned amount, which further justifies the concentrative approach in contrast to the IFAD project where commercialization has come out as a centrepiece.	Agriculture land development supported through CARLEP	Farmers were able to convert fallow land into cultivable land due to agriculture land development. Farm mechanization feasible due to land development.

Synergies between these projects were ensured through consultative process between the projects in implementation to inform each other of the best practices emerging out of the projects. MOF as the central coordinating agency ensured proper coordination between projects by leveraging the existing practice such as national and annual implementation performance agreement of the agencies.

Overall, as NDA and DA to GCF and AF respectively, the MOF ensures that the projects are coordinated systemically through better collaboration and non-duplication, ensured mostly through the PMU coordination.

G. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

Knowledge management will be an important part of the project to ensure the sustainability of climate change adaptation goals. The project will ensure that information and knowledge accumulated and produced within the project will be documented and made available for wider communication and dissemination of project lessons and experiences to support the replication and scaling-up of project results.

The project seeks to establish and strengthen existing knowledge management system and establish appropriate models of communications to disseminate information on climate change adaptation across areas of programme implementation. The key lessons learnt and best practices will be documented for wider dissemination through various platforms such as meetings, social media and publications.

Knowledge exchange mechanisms through study visits will be promoted among communities and organizations as well as capacity building to understand and implement adaptation measures will be fostered.

Potential outputs include:

- Evaluation material, disseminating lessons learned and key results of the project;
- Improved data management;
- Improved interpretation and dissemination capacity;
- Policy information sharing and mainstreaming;
- Cross-cutting capacity building (other capacity will have to be built into relevant components);
- Success stories or stories of change.

Through this knowledge management activity, the project will ensure that the information and knowledge culminated or gathered during the implementation of the project are documented and made available for the wider reach of future project implementers. This is aimed at replicating and making realistic experiences readily available for scaling-up of similar project results in the future. Further, case studies and technical reporting of the project aim to capture the lesson learnt and best practices notwithstanding the indigenous methods of technicality, so that those documents are available for national and international meetings.

The project will develop targeted communication strategy through consultative process for the systemic documentation of project process and its functional achievements, which will be published and shared emanating from the project activities and knowledge sharing events through platforms such as social media and the official website and government portals.

Further, the project will involve local people at the grassroots so that the interaction and collaborative work experiences will enhance transfer of technical knowledge from field experts to local people, which will subsequently help meet the skill requirements of local people for future project maintenance. The project will be realized through the recruitment of available national manpower so that the knowledge and its management is well scoped during the implementation of project activities.

Key lessons learned from the past and ongoing SLM projects which were considered during project design and will be adopted during project implementation include:

- **Participatory SLM Action Planning** – This planning methodology has enhanced community ownership and commitment; promoted inclusion of all households in decision-making process; and helped build community capacity.
- **Group approach in implementing SLM measures** – Promoting informal groups or reviving traditional labour sharing groups was found very useful in implementing SLM activities that are labour intensive, e.g., hedgerows, stone bunds, check dam construction and orchard establishment. This approach was particularly helpful to families with less labour force, women heads, aged and disabled family, and resource poor households. Besides, the approach has also generated other social co-benefits such as community cohesion and trust, exchange of experiences and benefits through collective action against conventional individual household approach
- **Reaching all versus focused approach** – One lesson learned has been with regards to reaching out project resources to all the communities and households versus focusing the interventions. The problem with reaching out project support to all is the dilution of impact due to too many activities and spreading out resources too thinly. That way, there is no visible impact or transformational change at the end of the project period. Realizing this, a focused approach was adopted which resulted in better resource utilization and bigger impact in the field.
- **SLM best practices** – The problem with many SLM interventions is the long period needed before the impact of interventions becomes tangible and start contributing to the beneficiaries' livelihoods. Most SLM interventions take a considerable time between the initial investment and the actual benefit, which is an opportunity costs to most of the land owners, especially so to the resource poor farmers having small landholdings. Therefore, the long term SLM interventions were supported with the provision of inputs for direct short-term benefits such as improved seeds, incentives and material supports, including simple tools and implements, small labour-saving machineries, etc. matching with short term cash income generating activities.

Additional elements related to knowledge management in each of the four components are included below.

Component 1: Adaptive management of watershed for enhancing resilience of community

The project will focus on strengthening the institutional, financial and human capacities for long-term management and M&E for integrated watershed management, aiming at water sources that are well protected. This will include review of existing studies and strategies, mapping the gaps and enhancing these strategies. This will include human resource development, mainly training the field staff for improved management of water sources and creating awareness and

empowering communities in water management mainly through PES. Further assessments on watershed considering climate change with appropriate interventions will be carried out and information disseminated to various field officials for future adaptation measures. A reliable wetland monitoring system which is currently lacking for the project sites will be developed, taking advantage of emerging technologies for innovative solutions. This monitoring system will guide the planning process, particularly the development activities taking into consideration the vulnerability issues.

Component 2: Climate-resilient water infrastructure for uninterrupted supply of water for drinking and irrigation.

This component will collect data on indigenous and traditional best practices applied by local people in the supply of water for drinking and irrigation. Additionally, the project will involve communities to increase interaction and collaborative work experiences and enhance transfer of best practices and technical knowledge from field experts to local people. This will increase local capacities in delivering future project operations and maintenance. The project will recruit local manpower to ensure knowledge and its management is well adapted to local and community needs.

Further, case studies and technical reporting of the project under this component will capture the lessons learnt and best practices from the implementation of the project. The climate angle perspectives and narratives will be documented so that related information and statistics will be made available for the benefit of future projects.

As for the baseline, there is a lack of technical capacity and awareness in integrating adaptation measures into the water sector, which is also one of the sectors most vulnerable to climate change. Taking this into consideration, the project will build the capacity of engineers in the integration of climate change adaptation measures in water management planning and implementation. The project will also document the best practices of climate-resilient water management demonstrated in the project sites and the knowledge will potentially be disseminated through conferences and seminars to other parts of the country for the purpose of replication.

The lessons learned from involving the communities through WUAs will be documented. This will be used to increase awareness among the communities on good practices of water management.

Component 3: Climate-smart agriculture through sustainable land management and informed agro-meteorological services

This component will ensure that lessons learnt from GEF-LDCF (NAPA III) project and the GCF programming in the agricultural sector are available to project implementors in the sector. The implementation of this component will also holistically compile all relevant information related to agro-meteorology and sustainable land management to serve future projects.

SLM related activities also contribute to the overall national target set forth in the Land Degradation Neutrality objectives of the UNCCD. Hence, SLM related information will have a national reach in terms of the knowledge components.

Component 4: Improved local Governance for effective Climate Change Adaptation (CCA) mainstreaming with focus on water management at the grassroots.

Under this component, capacities of the LG officials will be built, particularly in mainstreaming climate change adaptation with a focus on the water sector in LGs. LGs play a critical role in ensuring that climate change adaptation measures are mainstreamed and sensitized to the LG officials. Lessons learned from this project will be taken forward to inform national planning processes and incorporated in future climate change adaptation projects. Further, LG through this exchange of knowledge will help to integrate activities aimed at increasing climate resilience into other socio-economic activities.

H: Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy of the Adaptation Fund.

The project is designed based on extensive engagements with stakeholders at all levels across the project landscape. The NIE in collaboration with DA formed a Technical Working Group (TWG) representing BTFEC, MOF, MoAF and MoWHS to identify the broad components to address the urgent adaptation needs. A concept note was developed during a three-day national consultative workshop held in August 2019 including representatives from DA, NIE and relevant entities. The four components were identified in alignment with National Key Result Areas of 12th FYP.

The TWG reviewed the 12th FYP (2018-2023) flagship programmes to achieve accessibility to reliable and safe drinking water. It was also agreed that the project sites will be selected based on the water stressed level. In September 2019, transformational adaptation interventions under each of the components were identified through a one-day consultative workshop with involvement of relevant stakeholders (NEC, DOA, DoFPs, DLG, Dept. of Engineering Services, Dept. of Agriculture and Marketing and Cooperatives, NSSC DA & NIE). Later in February 2020, a three-day consultative write shop was conducted to compile the data and information in order to formulate the final draft proposal which was sent to the consultant and also to the AF.

Further in 2021, community consultation and ES &G risk assessments in four districts (Paro, Dagana, Tsirang & Sarpang) were carried out followed by three rounds of national level consultative meetings. The Consultative meetings were held to address the comments received from AF review panel with the help of UNCDF's consultant. The proposal was also finalised during the meeting.

A series local consultation and project site assessment (covering social, environment and gender aspects) was conducted from 29 May to 5 June in Paro and 6 to 13 June 2022 in Tsirang and Dagana for local stakeholders, community leaders, women and men beneficiaries. The representative from the national institutes, MOF, BTFEC, DoA and NSSC participated in the consultation. The WMD, MoWHS were represented by the forestry officials in the field and Dzongkhag Engineering sectors. Local stakeholders included representatives and project beneficiaries of LG, community leaders, men and women of project sites.

Under each of the components, lead agencies have conducted stakeholder consultations, including with the LG, community leaders and community groups. A number of far-flung communities considered vulnerable groups were also consulted. It is the government's priority

that such groups are considered and benefit from any form of project. In most of the meetings, the presence of women and youth was also ensured. Consultations were also the opportunity to confirm communities' sensitivity to environmental and social safeguards.

Details of consultative processes under each component are indicated below:

Component 1:

Preliminary watershed assessments were initiated in collaboration with all the stakeholders in the watershed of Paro and Dagana districts. Consultative workshops were held with all the relevant agencies at the district level to create awareness on the watershed management and to seek information on the watersheds.

Component 2:

As a part of the recent consultative process held during the formulation of the national priority programmes for the 12th Five Year Plan, several villages were consulted and their views were incorporated in the "Water Flagship Programme Access to 24x7 Safe Drinking Water with Irrigation - 2019" on which Component 2 is based. Besides, the specific context (ground situation) and the difficulties faced by communities in terms of water for drinking and irrigation were also studied.

Component 3:

Under this component, consultations were performed according to the requirements as defined by the MoAF prior to this proposal formulation. The land use mapping conducted by the MoAF has clear indications of different aspects of land use and related challenges, including at social level.

Component 4:

Regarding the formation of WUAs, consultation was held with the LG of Paro, one major project dzongkhag. Further detailed analysis of Environmental and Social Safeguards, and Gender analysis, shall be required according to local infrastructure to be set, in line with National Regulation.

FGDs were held with community representatives of the project dzongkhags and gewogs to understand gender roles and challenges in water and water resources management at different levels. These FGDs were held in the context of understanding that "Gender Equality implies a society in which women and men enjoy the same opportunities, outcomes, rights and obligations, in all spheres of life. A critical aspect of promoting gender equality is the empowerment of women, with a focus on identifying and redressing power imbalances and giving women more autonomy to manage their own lives.

The participatory assessment of gender situation revealed the following;

- All gewogs in the project area have a practice of establishing a WUA for oversight management of drinking or irrigation water schemes among households using water from a facility. The office bearers of these WUAs comprise chairperson, secretary and a treasurer. Overall, women representation comprises only 11% of the office bearers of WUAs in the project area. Most of these WUAs are recognized by the gewog administrations. However, they are not formally registered and officer bearers need training in water governance, management and water dispute resolutions.

During participatory assessment of gender roles and capacities, the stakeholders identified the need to enable higher level of participation by women in governance and management institutions. Hence, it is proposed that the project should support enabling;

- Formal registration of all WUAs in the project areas with enhanced participation by women. For this the project should provide capacity building of WUA office bearers in the related fields.
- The project should aim to raise the representation of women as office bearers of WUAs by 11 % to 30% by the end of the project period and
- That usage and management of water largely handled by women at the household level and by men at the dzongkhag level. There is a gap between the majority of end users of water, who are largely women at household levels and decision makers in the management of water at the community and dzongkhag levels who are largely men.
- Within the project dzongkhags, 100% of Dzongkhag Tshogdu (DT) chairperson; 75% of Deputy Chairperson, 100% of DT Secretary and 78% of members are men. The representation of women in the Gewog Tshogde (GT) is 29% as compared to 22% at the DT level. Women lack influence within existing water governance and management institutions, limiting their ability to change the redistribution of power and affect decisions. Training and capacity building would be required for women to engage in public decision-making.
- Men play a greater role in maintenance of water-related infrastructure. However, women also play a significant role in the maintenance of infrastructure at community and household levels which indicates the need for enabling participation by women capacity building for water maintenance, use of tools and equipment and in promoting improved tools and technologies in water maintenance at local levels. However, 90% of the participants view that men have enjoyed better access to training opportunities than women. Given the significant role women play in the maintenance of infrastructure at the community and local levels, the project support in terms of training opportunities in water infrastructure should include equal participation by women. Women have a greater role in the use of water for cooking, cleaning, watering livestock and kitchen gardens as compared to the greater role of men in use of water for field irrigation. In situations where water facilities are not maintained at the local levels, women would land up facing the larger brunt of dealing with lack of water supply and hence would find more value in having skills and capacity for water maintenance. Training women on efficient and economic use of water would also enable efficient utilization of limited water resources. Therefore, the stakeholder consultations on gender proposed the inclusion of training on practical and technical measures to enable both men and women at grassroots to enhance their skills in water management. The type of skills and capacity required by the stakeholders, as identified during the stakeholder consultations included skills in:
 - Water distribution and management
 - Efficient/economic use of water
 - New applicable technologies in water management
 - Use of maintenance tools and equipment
 - Plumbing and minor maintenance at HH and community level
 - Climate-resilient and efficient design of water infrastructure
- Women have a higher level of control over decisions related to buying and selling of commodities. They stand very low in terms of control and access to production tools and equipment, transportation matters, information and training opportunities.

- In the project area, access and control over land resources are dominated by men indicating that men play a significantly larger role in decisions related to buying and selling of land or in terms of cultivation and use of land resources. Men also play a larger role in irrigating agriculture land except in the case of kitchen garden which is dominated by women.
- Men do have better access to financial capital over women such as in actual spending. However, the control and, therefore, for decisions related to spending, investments, borrowings or lending are dominated by women. Therefore, there is a need to enhance this capacity by including women in trainings related to book keeping.
- A survey on gender and climate change in Bhutan reported that 84% of men in Bhutan are aware of climate-smart and climate-resilient agriculture as compared to only 68% of women being aware of the same. It also reported that a higher proportion of males enjoy access to information, training and inputs related to climate smart agriculture³¹. The PPG stakeholder consultations in the project areas also observe that men have better access and control over information, tools and training. The fewer opportunities for women relative to men to obtain skill and development training limit their participation in and the benefits they may gain from the use of new water technologies. Therefore, stakeholder consultations and meetings of the project should make concerted effort in creating awareness on impacts of climate change and technologies for improved water management.
- The Gender Assessment, therefore, recommended;
 - Enhancing participation by women in project activities, particularly in training and capacity development activities; Supporting establishment of formal (registered) through capacity building and enabling formal registration of WUAs; ensuring that 30% of office bearers in these WUAs comprise women and that all trainings and workshops involving local communities achieve a 30% participation by women. The training needs are identified (See gender Assessment and Action Plan in Annex 1);
 - Awareness on the water act; water regulations; group formation and management; Water source sharing; conflict and dispute resolution; Labour regulations and Labour Safety; Roles and responsibilities of stakeholders in water management; Gender equity in water management; Mechanism for distribution of water; Innovations for sustainability in water management such as introduction of fees and PES mechanisms; Management of WUAs and record keeping.
 - Climate resilient management and maintenance of water resources and infrastructure covering topics on water distribution and management; efficient/economic use of water; new applicable technologies in water management; use of maintenance tools and equipment; plumbing and minor maintenance at HH and community level; climate resilient and efficient design of water infrastructure.
 - Facilitating women and men's equal participation in and access to benefits project activities. Support the empowerment and leadership-building of rural women, and their full and meaningful involvement in the water resources and water management. Enable rural women to participate actively in WUAs.
 - Enhancing education, and conduct awareness-raising and advocacy on adaptation to climate change through climate resilient water management through training sessions and social media.
 - Putting in place, a grievance redress mechanism at the start of the project to ensure a

³¹ *Gender and Climate Change in Bhutan, CNWC, 2020*

formal process for addressing concerns or complaints raised by individuals (particularly women) or groups affected by the project implementation activities. Both concerns and complaints can result from either real or perceived impacts of operations and may be filed in the same manner and handled with the same procedure. Measures should be in place to avert and mitigate conflicts arising out of project implementation including unequal distribution of water.

- Appointment of an Environmental Safeguards and Gender Expert to ensure that gender equality and safeguards are fully built into project activities. The expert will identify gaps and support in capacity building and provide training to project staff and key stakeholders. The details of gender assessment and ensuing gender action plan is annexed (Annex 1).

The table below lists the project stakeholders consulted during the project formulation. (Participants list in Annex 3a to 3k)

Sl #	Date of Consultation	Programme	Outcome of Consultation	Stakeholders involved/Consulted
1	5-7 August 2019	National Consultation on Adaptation Fund Proposal Development Workshop.	Concept note developed.	MOF, MoWHS, DoA, NSSC, WMD,DLG, BFL, BTFEC,WMD, and DoFPs
2	10-12 February 2020	Three-day National Writeshop for Project Proposal Formulation.	Full-blown project proposal initiated.	NEC, DoA, DoFPS,DLG,DES, DAMC, BTFEC & MOF
3	1 April 2021	Stakeholder Consultation in Dagana and Paro <i>dzongkhags</i> .	Preparation for field trip for ESG Assessment.	MOF, MoWHS, DoA, NSSC, WMD, DLG, BTFEC and National Consultant
4	7-18 April 2021 for Dagana, 20-21 April 2021 for Paro	Community consultation and ES&G Risk Assessment for Paro, Dagana, Tsirang and Sarpang.Annexed ES&G Risk assessment.	Community consultation and ES&G Risk Assessed.	NEC, DoA, DoFPS, DLG, DES, DAMC, NSSC, MOF and National Consultant
5	13 July 2021	National Consultation meeting among MOF, BTFEC and other relevant Stakeholders.	National level Consultation carried out.	UNCDF, MOF, WMD, NSSC, DoA, WoWHS, DoA, DLG & BTFEC
6	4 February 2022	Virtual Discussion on Adaptation Fund Activities with National Stakeholders MoWHS/MoAF	Activities finalization.	MoWHS, MoAF, national consultant, BTFEC, UNCDF and MOF
7	10 February 2022	Virtual consultation among National and Local Stakeholders	Activities finalization	Sarpang Dzongkhag Adminstration, Shompangkha, Serzhong Gup, Chuzergang GAO, MoWHS, BTFEC, UNCDF and MOF
8	11 February 2022	Virtual consultation on Tsirang Adaptation Fund Activities among national and local stakeholders	Consultation held for activities finalization.	Tsirang Dzongkhag Adminstration, MoWHS, MoAF, BTFEC, UNCDF and MOF
9	22 March 2022	Virtual Consultation among key National Stakeholders for Irrigation and Drinking Activities	Irrigation and Drinking Activities finalization.	MoWHS, MoAF, BTFEC, UNCDF & MOF
10	29 May -5 June for Paro and 6 -13 June 2022 for Tsirang and Dagana	Community consultations for project activities and ESS for the project	Community consultations for project activities undertaken.	NEC, DoA, DoFPS, DLG, DES, DAMC, NSSC, MOF and National Consultant
11	20 June 2022	Adaptation Fund Consultation with sectors to finalize Budget and Activities	Budget finalization	WSD/DES, MoWHS, WMD/DoFPS, AED, DoA, NSSC, PS, UNCDF, BTFEC & MOF

Table No.6 Summary of stakeholder consultations

I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

The rationale for selecting only three dzongkhags is to deliberately create a critical mass of activities in the beneficiary areas, ensuring both focus and impact at the level of entire watersheds. The project size ensures that upscale at district level is feasible while also allowing activities to be financially independent from other sources of finance.

The “**business as usual**” situation can be described as follows.

Climate and meteorological changes are already affecting the regional ecosystems, as demonstrated by significant losses in the size and distribution of Himalayan glaciers and reduced availability of water for irrigation, agriculture, hydropower and domestic use. Climate-related threats, which will increase in the coming decades, demonstrate the clear need for strategic planning and regional adaptation practices notably in rural areas and for the agricultural sector, particularly vulnerable to climate change.

With about 69% of the population employed in the agricultural sector restrained in less than 3% of the country suitable for agriculture, with water sources drying, there is a need for efficient and sustainable natural resource management. Many adaptation strategies for the agricultural sector are constrained by a lack of information on locally-specific climate change impacts.

LG officials have basic general understanding of climate change but lack the knowledge of the significance of climate change adaptation and how it can be implemented. As mainstreaming climate change adaptation involves additional initial costs, the current mindset of the LGs in general is to not mainstream climate change adaptation and gender needs in local development investments ignoring the fact the long-term costs of not mainstreaming are higher. Without the AF support to strengthen the capacity of LGs for CCA governance, LGs will continue to plan and implement local development investments without mainstreaming CCA and gender aspects. This will result in wasteful and unsustainable local development investments.

There are number of national policies, legislations and plans related to water resources management that need to be implemented at the local level. A coordinated approach is required to implement them. Furthermore, standards and guidelines are in place for development and management of RWSS and irrigation systems. The capacity of LGs and communities need to be developed to employ these standards and guidelines effectively. Finally, localized water scarcities have led to water disputes between communities and individuals. These water disputes are often referred to central government agencies due to lack of capacity within the LGs to resolve them.

Further to the benefits considered in section B (social, environmental, economic) and C (cost effectiveness), each component shows clear additionality.

Component 1: By addressing water issues from source to downstream users, the project ensures continuous availability of water resources. The approach is also expected to revive drying water sources and also protected water sources from degradation (business as usual case). As they regulate and filter water, wetland ecosystems need specific for ensuring continuous supply of quality water. The wetland inventory is expected to inform on the number and extent of wetlands that need protection within and outside the protected areas in Bhutan.

Component 2: Improving resilience of water related infrastructure is vital for delivering water from the source to the users. Component 2 will ensure delivery of water with required quality as a basic prerequisite for health, hygiene and human activity, including agriculture. Further, the proposed technical solutions are justified by low labour requirements for maintenance, which is adapted to the situation in rural Bhutan where there is already shortage of farm labour.

Component 3: The proposed land management and informed agro-meteorological services are essential to agricultural activities within the watershed area. Indeed, implementation of sustainable land management practices in vulnerable and degraded areas are critical for increasing resilience of agriculture sector. In addition, making climate change information easily accessible through user-friendly products and services are key to reducing vulnerability and breaking down the climate data in useable forms by the grassroots communities.

Component 4: Water governance can be improved through the formation of the WUAs with the goal of strengthening community-based initiatives and improve community preparedness for adapting to climate change. Integration of adaptation issues in the planning enhance resilience prospects for the future.

Overall, the project offers a holistic adaptation approach at the district level, which include multi-stakeholder dialogue, focusing on improving the status of natural resources thereby ensuring quality ecosystem services, allowing productive sectors to have the means for efficiency and resilience, and giving the opportunity for communities to engage in meaningful development planning processes.

J. Describe how the sustainability of the project/programme outcomes has been taken into account when designing the project/programme.

The project activities are mainstreamed into the existing system through alignment to the 12th FYP objectives and Water Flagship Programme. Furthermore, as per the Water Act of Bhutan 2011, any group of beneficiaries using a particular water source for their water supply needs may form a WUA to maintain the water source and to manage water supply services. In line with the Act, to ensure sustainability of the scheme, formation of WUAs is proposed as part of the project which will be institutionalized and the operation and maintenance aspects of the scheme after project finalization will be integrated into local government plans. An empirical experience evidence pointed out in one of the publications of the ADB, traditional water user groups look after the maintenance of water supply systems in rural communities³².

Different government and LG agencies are responsible for managing the components. There is a set of qualified and capable human resources to execute the task. The agencies have strong governance and financial systems and adequate due diligence will be exercised to conduct the overall management of the project/programme.

The project will use the following bases to ensure long-term sustainability of outcomes:

RGoB commitment and ownership:

The Water Act of Bhutan 2011 designates MoAF as the Competent Authority on irrigation, watershed and wetland management. It is responsible for the development of irrigation systems and management of watersheds throughout the country. The Engineering Division of the ministry provides engineering services to local administrations for design and development of

³² <https://www.adb.org/publications/water-securing-bhutans-future>

irrigations systems. The WMD under the DoFPS is tasked to categorize watersheds, prepare management plans, and implement them in collaboration with the stakeholders.

Likewise, MoWHS is responsible for the overall planning, implementation and management of infrastructure for drinking water supply and wastewater for the thromde in collaboration with local governments. It assesses strengths and shortfalls for water supply maintenance and identifies remedial measures. It is mandated to prepare its development plans in consultation with local governments. Like the MoH, it is mandated to mainstream water resources management into its policies, plans and programmes. As such, both the ministries are mandated to secure adequate budget to meet annual maintenance and recurring costs for all kinds of irrigation and drinking water supply schemes.

The RGoB through the MoAF has long recognized the importance of SLM and ALD to arrest the land degradation and improve land productivity. In line with this, ALD and SLM have been identified as priority programmes in the 12th FYP of the MoAF. Similarly, the MoAF has also recognized the importance of timely and user-friendly weather and climate information. Weather and climate information help farmers make critical farm decisions such as planting time, what to plant, when to harvest, fertilizer and pesticide applications. Therefore, the Agro-meteorology Programme was established under the DoA in 2019 to transform climate data into climate information in a way that responds to user needs and assists decision-making to reduce the impacts of climate-related hazards and increase benefits from favourable climatic conditions.

Institutional sustainability: The project's institutional arrangements are based on existing RGoB institutional systems, programme management, flow of funds, and accounting and reporting. In particular, it will support RGoB's ongoing efforts to strengthen capacity and organizational structures within the MoAF and MoWHS to systematically and effectively coordinate uninterrupted supply of drinking and irrigation water for better management of land degradation activities including the generation of weather and climate information in Bhutan. In particular, the NSSC and the agro-meteorology programme within the DoA are mandated to look after ALD and weather information respectively both during the project period and beyond. The project will support the formation of WUAs, build their capacities and support in the formulation of by-laws.

Participatory action planning and community ownership: The participatory village level action planning and implementation through farmers' groups and community approach will stimulate ownership of the project interventions. Furthermore, the project investment in capacity development will ensure achievement of project results and the sustainability beyond the implementation period.

Extension and technical support services: Extension and technical support services from the regional agriculture research and development centres (ARDCs) and the LGs are designed to promote responsiveness to the real needs and increased accountability to the farmer clients. Through this project as part of the knowledge sharing the capacity of all the relevant officials will be enhanced which will be an added advantage for inhouse capacity.

Fiscal sustainability: All infrastructure development and maintenance, including ALD and SLM initiatives, are mainstreamed into central and LG plans and programmes. Every year, the RGoB allocates a certain budget to all the government agencies where ALD and SLM interventions are part of their regular activities. This ensures post-project sustainability as the government can take over project activities to scale up and replicate in other areas once the project phases out. For

infrastructure, cost for all minor O&M activities will be borne by the concerned WUAs after the project assets are completed and handed over to the WUAs. Major maintenance which are beyond the capacity of WUAs would be borne by the LGs. Relevant agencies will continue to provide technical backstopping to WUAs.

K. Provide an overview of the environmental and social impacts and risks identified as being relevant to the project / programme.

The entire project was administered through a participatory screening for environmental and social risks against the 15 principles outlined in the AF's Environmental and Social Policy.

Each participatory risk screening session started with an introduction about BTFEC and status of the proposed project, and overview of AF and BTFEC's ESS policies and need for participatory ESS risk assessment. Upon briefing on the project activities, the participants were asked to identify risks and impacts including vulnerable groups associated with the project activities by each category of AF ESS principles in smaller groups. Colour coded pieces of chart papers were used to collect the perspective of each small group. The risks, impacts and vulnerable groups identified by each small group were discussed at the plenary for contextual understanding and clarity.

The project is not expected to generate any significant environmental/social impacts or risks. Component 1 of the project entails wetland monitoring and management interventions, establishment of PES and adoption of water sources' recharge interventions. These overall watershed interventions will strengthen and improve health of water catchments for component 2 under which climate and disaster-resilient drinking and irrigation water schemes will be established with adoption of innovative technologies and strengthening of community water user groups for inclusive governance and efficient management of these assets. It is under this component that most of the limited and moderate environmental and social risks are foreseen.

Not all of the project activities can be completely specified in this full proposal. The reasons for this are: (i) The design for drinking water and irrigation schemes as well as detailed alignment survey data are not available yet. Due to this, volumes and of water extraction from the sources and volumes of soil exposure through trenching of laying pipes or number of trees that need to be cleared for pipe alignments are not available yet; (ii) While vulnerable and marginalized groups are defined the exact number of such households and groups could only be estimated. The community consultations have defined how to ensure inclusivity and project benefits to such groups and individual households. However, who will be considered the list of beneficiaries of exemptions from community contributions can only be validated and finalized when implementation is ensured and about to start. This, to avoid duplication of time and resources needed for final identification.

Component 3 activities will entail SLM in vulnerable and degraded areas, enabling climate change and disaster information at local levels which entails none or minimal risk and Component 4 of the project on strengthening institutional mechanisms in local governments for climate change adaptation and gender mainstreaming pertains to conducting capacity development for LGs on CCA investment and mainstreaming tools, frameworks and approaches related to irrigation, water management, SLM, CCA and gender enabling overall mainstreaming of project efforts into local level development planning and approaches. These activities are related to a low risk profile with respect to social and environmental impacts.

The process for final designs of infrastructure systems to be implemented under Component 2, SLM interventions under Component 3 and watershed interventions under Component 1 will comprise of community consultations, detail surveys, data collection on vulnerable and marginalized households, identification of specific site-based intervention measures and the validation of detailed design works. Identification of SLM activities would be guided by an Agriculture Land Development Guideline³³. This is planned for the first six months of the initial implementation phase. After emergence of site and activity specific details, the Environmental and Social Management Plan (ESMP) will be revised. The environmental/social and gender expert will coordinate assessment of risk based on 15 AF principles and update the ESMP. Accordingly, the project will also renew activity specific environmental clearances.

During project preparation phase and based on available information on activities, potential risks across all components are site and activity specific and manageable or are controlled by terms and conditions defined in respective activity specific environmental clearances. Hence, their potential negative impacts are very limited and can be readily mitigated. An ESMP and Grievance Mechanism are included in Annex 2, as required by the AF procedures. The ESMP provides mechanisms for tracking identified risks, or any new risks, ensuring they are properly monitored, evaluated, reported on, and addressed.

A gender assessment is provided (Annex 1) in line with the Gender Policy of the Fund and has been used in the design and fine-tuning of the activities so that gender is fully integrated. The gender analyses will be carried out during implementation to further develop the activities so that they promote gender equality and women's and men's resilience to climate change. Further, the ESMP will be revised under coordination of the ESG Expert during the first six months of the project implementation.

³³ https://www.doa.gov.bt/wp-content/uploads/2021/05/Agriculture-Land-Development-Guideline_2017.pdf

Table 7: Overview of the environmental and social impacts and risks identified as being relevant to the project (See Table 5 of ESMP for details)

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law	✓	<p><i>Low risk:</i> As accredited entity to the AF, BTFEC abides by international and national laws. BTFEC's partners and contracted service providers are equally obliged to do the same. Relevant national and district authorities have been consulted during the proposal development process and will be partners in the project implementation. This facilitates compliance with all relevant laws and regulations. Environmental and social clearances have been obtained for project activities.</p> <p>Compliance with the law is mandatorily addressed through requirement for valid environmental clearance for all project activities. Environment clearance includes attachment on forest clearance, community clearance, individual clearance and all affected stakeholders. The clearance documents contain terms and conditions to be implemented by the project. Compliance to these terms and conditions and validity of the clearances are monitored by respective competent authorities</p> <p><i>No further assessment required during project implementation</i> However, awareness and sensitization of relevant aspects of laws to be pursued during project implementation</p>
Access and Equity		<p><i>Moderate risk:</i> Poor households may not be able to participate or provide financial or labour contributions to the water user groups/association. Similarly, new settlers may face accessibility issues as they have not been members of WUAs in the past. These households may face challenges of accessing project benefits. Further, emergence of commercial activities could marginalize rural households and may result in unequal benefits to communities from project assets.</p> <p><i>Mitigation measures/Further assessment during project implementation:</i> Articles of Association of WUAs to include clause on:</p> <ul style="list-style-type: none"> • community exemptions for poor households in terms of financial or labour contributions to the water user groups/association. • providing equal access to new settlers <p>Strengthen WUAs to protect rights of member households through training and definition of incentives in the articles of associations.</p>

		Water transmission line to include T-points for all settlements to enable distribution from the main water line to member communities
Marginalized and Vulnerable Groups		<p><i>Low risk:</i> Marginalized and Vulnerable Groups may not be able to participate or provide financial or labour contributions to the water user groups/association. These households may face challenges of project accessing benefits.</p> <p><i>Precautionary measures:</i> M&E Officer and Safeguards expert to monitor that WUA articles include clause on:</p> <ul style="list-style-type: none"> - community exemptions for poor households in terms of financial or labour contributions to the water user groups/association. - mention on providing equal access to new settlers
Human Rights	✓	<p><i>Low risk:</i> The constitution of Bhutan ensures human rights as a fundamental right to every citizen in Bhutan. It guarantees equal and effective protection of the law and protection against discrimination on grounds of race, sex, language, religion, politics or other status. The standard planning processes of needs assessment, design of projects and implementation are applied uniformly across the country.</p> <p><i>No further assessment required during project implementation</i></p>
Gender Equity and Women's Empowerment		<p><i>Moderate risk:</i> Statistics of current situation show limited participation by women in the executive role of WUAs. Women-headed households may face challenges of project accessing benefits.</p> <p><i>Mitigation measures/further assessment during project implementation:</i> The project will fully mainstream gender, and will ensure that women and men and female and male youth equitably engage in and benefit from project activities such as project asset building and availing benefits from the project. The project's gender action plan is a central element of the exit strategy. A gender assessment has been conducted which shows that women are not represented as much as men in executive of water user groups.</p> <p>The project will ensure that at least 30 percent of executives of WUAs supported by the project comprises of men and 50 percent participants at training conducted through the project will comprise women and youth.</p>

Indigenous Peoples	✓	<p>Not applicable</p> <p>The World Bank's operational manual describes indigenous communities, in general as communities who self-identify and are identified by others as members of a distinct cultural group with an indigenous language, different from the national language or with presence of customary social and political institutions and characterized by primarily subsistence-oriented production. The UN, Department of Economic and Social Affairs define indigenous people as groups with social, cultural, economic and political characteristics that are distinct from those of the dominant societies in which they live. In Bhutan, there are no community groups who self-identify and are identified by others as distinct in terms of culture, language, social and political institutions.</p>
Core Labour Rights		<p><i>Moderate risk:</i></p> <ul style="list-style-type: none"> • Due to difference in physical strength of men and women, contractors may adopt differential work compensation between men and women. • Contractors may not fully comply with labor laws and standards in employing workers establishing appropriate working conditions such as inadequate water supply, waste management arrangements, inadequate sanitation arrangements at temporary labor camps which could pose health and hygiene risk to workers. Further, contractors may employ school children under 18 years of age during school holidays. • Proposed pipeline of alignments passes through stretches of steep slope and difficult terrain in some site which could expose workers to safety risks. • Risks of conflict with local communities due to lack of awareness of local norms by project workers from outside the project area such as sexual harassment and disrespect to local norms may risk conflicts between local communities and project workers from outside the project areas. <p><i>Mitigation measures/further assessment during project implementation:</i></p> <p>PMU, project officers, implementing partners and organizations must ensure compliance to national laws and international agreements on labour rights. In particular, the safeguards expert will monitor and that the project activities comply with;</p> <ul style="list-style-type: none"> - equal pay for equal work hours to be maintained for workers in the project activities - awareness are conducted by project/local administration to contractors and local employee on labour regulations and standards - Contract package should include occupational health and safety provisions in their budget. - safety measures are implemented while implementing work and PPE and safety gears are provided and used by workers at project site. - Contractual arrangements to include proper establishment of amenities in temporary worker camps and provide proper working conditions as per labour regulations - Worker data to be maintained at site with age and identify cards.

Involuntary Resettlement	✓	<p><i>Low risk:</i> The Land Act 2007 and land Compensations Rates 2017 provide clear and mandatory arrangements for compensations. This project will not resettle households or families, neither in physical nor economic terms.</p> <p><i>Precautionary measures:</i></p> <ul style="list-style-type: none"> - Avail clearance from all concerned agencies and consent from all affected individuals and parties
Protection of Forests and Natural Habitats		<p><i>Moderate risk:</i> The local territorial forest officials regularly monitor forest product movement. As a result, the project's activities are not expected to have any adverse impact on the environment or natural habitats. Some activities requiring restoration of cleared sites through plantation could potentially have adverse impacts if non-native plants are used for replantation.</p> <p><i>Mitigation measures/further assessment during project implementation:</i></p> <ul style="list-style-type: none"> - Only native species to be used for any plantation for restoration works in forest areas
Conservation of Biological Diversity		<p><i>Moderate risk:</i> The project activities do not pass through any protected, prohibited, or restricted areas. However, some activities of Component 2, such as establishment of irrigation and drinking water involves drawing water from natural streams. This could potentially have adverse impacts on biodiversity if adequate provisions of environmental flows are not maintained. Further, due to availability of irrigation water, increased cultivation of high-income varieties may increase risk of neglecting native varieties.</p> <p><i>Mitigation measures/further assessment during project implementation:</i></p> <ul style="list-style-type: none"> - Introduction of alien and invasive crop/plant species. To. be avoided; - 30% of the lean flow from natural streams to be maintained in all natural streams where the project activities will draw surface water as per the Water Regulations and in alignment with the Water Act 2011 - Design of infrastructure for water scheme should be based on discharge measurements at the source during lean and peak rainfall seasons
Climate Change		<p><i>Moderate risk:</i> The entire project is designed to reduce beneficiaries' exposure and vulnerability to the effects of climate change and increase their adaptive capacity. The project will not generate any significant emissions of greenhouse gases or reduce carbon sinks capacity. Many project activities will be designed to be low-emissions, as well as adaptive – e.g. increase in vegetative cover through SLM activities and watershed management. All project components and activities will be designed to contribute to increasing local capacities to sustainably face climate change. The promotion of: i) watershed management; ii) Institutional and community capacity for water governance and climate information iii) ensuring availability of drinking and irrigation water are</p>

		<p>expected to ensure a better adaptability changing climatic conditions. However, heavy rains resulting local soil erosions could harm project assets. Landslides may be triggered by bursting of water channel</p> <p><i>Mitigation measures/further assessment during project implementation:</i> Need to ensure use of climate resilient design for all water infrastructure in the project such as;</p> <ul style="list-style-type: none"> - Use pipes for conveyance of water to be securely embedded underground - Executing entities shall ensure the use of appropriate materials and ensure that joints are of appropriate quality. - Project contractual arrangement to include an O&M period during which any events such as burst of pipes and eventual damage to agriculture lands to be restored by the contractor during the liability period
Pollution Prevention and Resource Efficiency		<p><i>Moderate risk:</i></p> <ul style="list-style-type: none"> • With assured irrigation water, intensification of agriculture activities such as increased vegetable cultivation could risk farmers adopting chemical fertilizers leading to soil pollution. • Use of limited quantities of chemical fertilizers may pollute flow of tail end water in natural landscapes. • Inappropriate waste at temporary worker camps in project sites may result in risk of limited desecration of natural landscapes. • Minor excavation works and ground clearance will cause limited disturbances to local soil and vegetation. • Risk of unsustainable extraction of water is low as drawing of water is guided by e-flow requirements which is required by the Water and Regulations as well as specified in the environmental clearance for project activities. <p><i>Mitigation measures/further assessment during project implementation:</i> The safeguards expert to monitor strategically the project activities, on compliance of the terms laid down in the forest clearance and environmental clearance documents and ensure periodic water quality monitoring reports for drinking water are maintained by local health center.</p>
Public Health		<p><i>Moderate risk:</i> Migrant workers with unknown medical and travel history could risk transmission of diseases that are not prevalent in the project areas to local communities and among project workers and staff. Contractors may resort to cheaper arrangement of worker camps with inadequate water supply, waste management arrangements, inadequate sanitation arrangements at temporary labour camps which could pose health and hygiene risk to workers.</p> <p><i>Mitigation measures/further assessment during project implementation:</i> The safeguards expert will monitor that the contractual arrangements include occupational health and safety provisions and that these terms and conditions are complied to by contractors and site engineers. The PMU will ensure that disbursement is not made without proving compliance to these terms and conditions.</p>

Physical and Cultural Heritage	✓	<p><i>Low risk:</i></p> <p>Project workers from outside may not be aware of local cultural/sacred sites and may cause unintentional damage. Alignment pipes and water lines may pass through any local cultural assets.</p> <p>Where cultural sites are observed in the project areas, cultural clearance are sought for project activities. The clearance document defines terms and conditions that enable avoidance of any harm on such assets.</p> <p><i>Precautionary measures:</i></p> <p>The safeguards expert will monitor that the terms and conditions specified in cultural clearances are complied by contractors and site engineers. The PMU will ensure that disbursement is not made without proving compliance to these terms and conditions.</p>
Lands and Soil Conservation		<p><i>Moderate risk:</i></p> <p>The project includes activities in soil conservation and SLM in the agricultural areas as well as watershed management. This includes ensuring land and soil conservation, as well as protection and enhancement of natural habitats in the project areas. The activities related to establishment of drinking and irrigation water may cause temporary minor soil erosions during the project implementation phase.</p> <p><i>Mitigation measures/further assessment during project implementation:</i></p> <ul style="list-style-type: none"> - Exposed soil to be restored back into the trench after pipe layout and minor clearance sites to be restored by planting native plants. - Ensure proper joining of water pipes - Risks related to leakage of pipes, post implementation phase will be mitigated by regular monitoring of water lines by the Chusup, a member of WUA executive with responsibility for water infrastructure maintenance. The project should train Chusups in all project locations on maintenance of water lines.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project/programme implementation.

As the DA, the MOF will provide strategic directions and oversee the overall implementation and achievement of the project outcomes. The BT FEC, as NIE, will provide overall coordination on the implementation of the AF Project and oversee the achievement of the project outputs.

The PSC will provide strategic technical and financial directions to the PMU and will be the decision-making body. PMU housed at the DoA, MoAF, will coordinate with the Project Executing Entities for the smooth implementation of the project activities. The PMU will be responsible for the overall management of this AF Project.

The Project Executing Entities (one Entity for each of the four components) will execute the activities in collaboration with the LGs of the three dzongkhags. They will be responsible for the day-to-day execution of the project activities, their supervision and reporting.

The project beneficiaries (three dzongkhags) are at the local level where the actual activities will be implemented. There will be active participation of the LG functionaries and community in the project implementation.

The responsible agencies for the components are the following:

Project Component	Executing Entity	Parent Organization
Component 1 Adaptive management of watershed for enhancing resilience of community	Watershed Management Division	Department of Forest and Park Services, Ministry of Agriculture and Forests
Component 2 Improve climate-resilient water infrastructures for uninterrupted supply of water	Agriculture Engineering Division	Department of Agriculture, Ministry of Agriculture and Forests
	Department of Engineering Services	Ministry of Works and Human Settlements
Component 3 Strengthen climate-smart agriculture through sustained land management and informed agrometeorological services	National Soil Services Centre	Department of Agriculture, Ministry of Agriculture and Forests
	Agrometeorology Programme, Agriculture Research and Extension Division	Department of Agriculture, Ministry of Agriculture and Forests
Component 4: Improved local governance for effective CCA mainstreaming with focus on water management at the grassroots	Department Local Governance	Ministry of Home and Cultural Affairs

Table 8: Details of Executing Entities

BTFEC (NIE) will sign an agreement with the MoF on behalf of the executing entities. The agreement will include administrative, legal, technical and financial clauses.

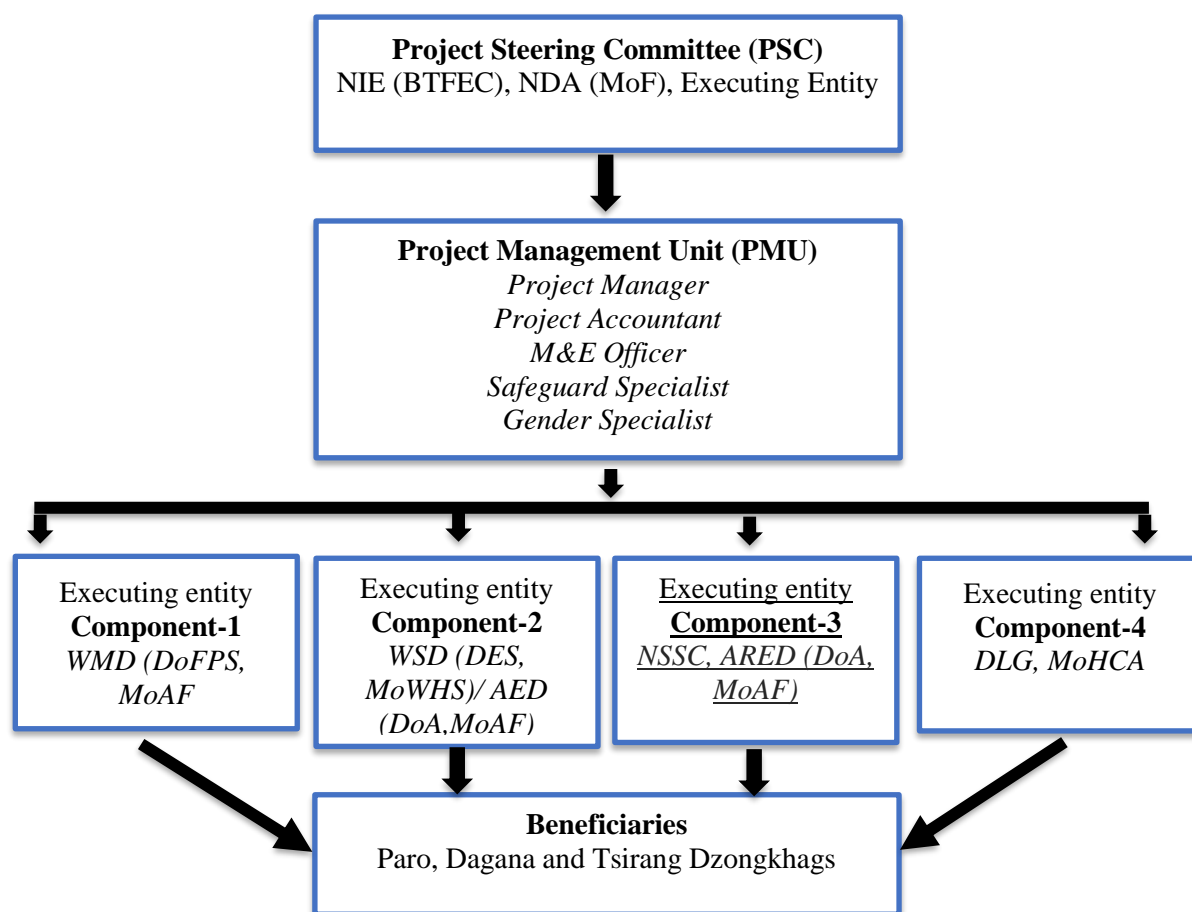


Figure 8: Project Organizational Structure

Roles and Responsibilities of Project Steering Committee

A PSC comprising members from the four Executing Entities, DA, beneficiaries and the NIE shall be established.

1. Supervise all aspects of project implementation and disbursement of funds to the executing entities
2. Review and approve project activities for each executing entity
3. Review project and project status reports to ensure that activities are implemented as planned and that expected outcomes are achieved
4. Provide guidance on effective and efficient utilization of resources.
5. Liaise with the RGoB on project implementation and seek policy guidance

Roles and Responsibilities of Project Management Unit

The PMU's key functions will include but not be limited to:

1. Strategic planning, review, and coordination
2. Liaise with Executing Entities on the smooth implementation of activities
3. Monitor physical and financial progress of the activities.
4. Consolidate physical/technical and financial reports for submission to DA and NIE
5. Provide technical support to Executing Entities
6. Knowledge management of AF project

Roles and Responsibilities of Executing Entities

1. Coordinate the implementation of project activities within their respective project sites
2. Ensure effective and timely implementation of the project activities
3. Ensure effective and efficient utilization of resources
4. Prepare and submit physical/technical and financial progress reports to PMU
5. Liaise with the NIE/PMU on projects implementation

Roles and Responsibilities of Beneficiaries

1. Active participation in project consultation meetings and implementation.
2. Disseminate information and create awareness on climate change adaptation and mitigation as per the implemented projects
3. Provide constructive feedback during project implementation to Executing Entities
4. Take ownership of infrastructures built and ensure maintenance and management of the same.

Financial Management

All executing entities shall maintain their financial records in the RGoB's accounting system - ePEMS. As such, all executing entities are government agencies and all financial records shall be maintained in the ePEMS accounting software following RGoB's Budget, Finance & Accounting Manuals 2016 with distinct Project Letter of Credit (PLC) or Financing Item Code (FIC). The executing entities shall submit their periodic financial reports to the NIE.

At the Implementing Entity level, the BT FEC maintains its all-financial records in a Sage ERP Complete and Comprehensive Programme for Accounting Control (Sage ERP ACCPAC) accounting software and all accounting records shall be maintained in the same software. Financial reports to be submitted to the AF shall be data generated by this software.

Fund Flow Mechanism

Once the project is approved, based on the agreed disbursement schedule, the funds shall be transferred to the NIE's bank account maintained with Bhutan National Bank Limited, Thimphu Main Branch, via Royal Monetary Authority of Bhutan. Upon ensuring proper budget incorporation by respective implementing entities, the NIE shall disburse the fund to the Department of the Public Accounts (DPA), Ministry of Finance, Thimphu, Bhutan. The DPA, after fulfilling all the requirements, shall disburse the fund to the respective executing entities.

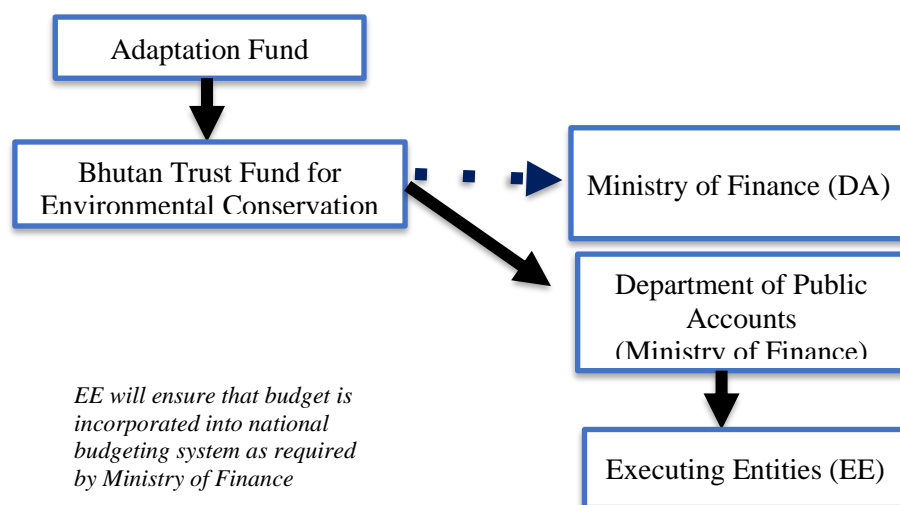


Figure 9: Flowchart showing the Fund Flow

Procurement management

To manage all procurement activities, the NIE will act as the procurement coordinator for the project. All procurement pertaining to the executing entities shall follow RGoB procurement rules and guidelines while the NIE shall follow its (BT FEC) procurement rules and guidelines.

The executing entities and the NIE shall prepare procurement plan for the entire project period. However, during the implementation, the entities shall plan procurement on an annual basis and shall report on a quarterly basis.

Periodic Progress Reporting

The respective executing entities, using the NIE's prescribed reporting formats, shall submit periodic progress reports (both technical and financial) to the PMU. The NIE with endorsement from the NDA shall submit reports to the Adaptation Fund Secretariat. All reporting will be supervised by the MoF. The grant agreements to be signed with the RGoB (MoF on behalf of executing entities) shall specify all terms and conditions fulfilling all reporting standards.

Stakeholder engagement plans

Component 1: Adaptive management of watersheds to enhance the climate resilience of communities

Output	Stakeholder	Type	Role in Project
Output 1.1 Watershed management plan implemented	Watershed Management Division	Government agency	Lead role in the facilitation and implementation of the activities foreseen for the output; coordination with various relevant agencies; technical guidance and backstopping.
	Department of Agriculture	Government Agency	Technical inputs and guidance for watershed management plan implementation.
	Department of Livestock	Government Agency	Technical inputs and guidance for watershed management plan implementation.
	Forestry Field Agencies (Territorial Divisions, Protected Areas)	Regional government agencies	Support in facilitation and implementation of the activities
	Dzongkhag and Gewog Administrations	Local government agencies	Mobilization of local participation. Coordination of implementation of field activities in the identified areas
	Local communities/pvt sector	Individual/local group	Participation and provide feedbacks, supplies of tools/machineries
Output 1.2 Payments for Ecosystem Services schemes scaled-up	Watershed Management Division	Government agency	Lead role in the implementation of the activities foreseen for the output; PES sensitization of stakeholders; mediation between service providers and service beneficiaries; facilitation of PES process; guidance and coordination in development of PES agreements.
	Department of Agriculture	Government Agency	Technical inputs and guidance
	Department of Livestock	Government Agency	Technical inputs and guidance
	Dzongkhag and Gewog Administrations	local government agencies	Mobilization of local participation; local-level coordination and monitoring; local-level mediation, verifying activities implementation and facilitation of the PES process.
	Community Forest Management Group	Community group	Participate in the PES process, ecosystem service provider; and implementation of terms and conditions as per PES agreement.
	Water users and water user's association	Individuals/Local community group	Participation in PES process; Monitoring and verification of PES activities, provides PES incentives

Output 1.3 Water sources protected & recharge interventions adopted	Watershed Management Division	Government agency	Lead role in the facilitation and implementation of the activities foreseen for the output; coordination with various relevant agencies; technical guidance and backstopping.
	Department of Agriculture	Government Agency	Technical inputs and guidance
	Department of Livestock	Government Agency	Technical inputs and guidance
	Department of Geology and Mines	Government Agency	Technical inputs and guidance
	National Centre for Hydrology and Meteorology	Government Agency	Technical inputs and guidance
	Forestry Field Agencies (Territorial Divisions, Protected Areas)	Regional government agencies	Support in facilitation and implementation of the activities
	Dzongkhag and Gewog Administrations	Local government agencies	Mobilization of local participation. Coordination of implementation of field activities in the identified areas
	Local communities/private sector	Individual/local group	Participation and provide feedbacks, supplies of tools/machineries
Output 1.4 Wetland inventoried for informed decision making & its management	Watershed Management Division	Government agency	Lead role in the facilitation and implementation of the activities foreseen for the output; coordination with various relevant agencies; technical guidance and backstopping.
	Department of Agriculture	Government Agency	Technical inputs and guidance
	Department of Livestock	Government Agency	Technical inputs and guidance
	Forestry Field Agencies (Territorial Divisions, Protected Areas)	Regional government agencies	Support in facilitation and implementation of the activities
	Dzongkhag and Gewog Administrations	LG agencies	Mobilization of local participation. Coordination of implementation of field activities in the identified areas
	Local communities/private sector	Individual/local group	Participation and provide feedback, supplies of tools/machinery

Component 2: Improve climate-resilient water infrastructure for uninterrupted supply of water for drinking and irrigation.

Output	Stakeholder	Type	Role in Project
Output 2.1: Climate and disaster resilient drinking water	Water and Sanitation Division, Department of Engineering Services	Government agency	Lead role in the implementation of the activities foreseen for the output; coordination with various relevant agencies; technical guidance and backstopping.
	Local Government (Paro & Dagana)	Sub-national/ LG authorities	Implementation of field activities in the identified areas

infrastructure established	Local Community	Beneficiaries	Participation in effective operation, maintenance and management of completed schemes
Output 2.2: Climate and disaster resilient irrigation infrastructures established	Agriculture Engineering Division, Department of Agriculture	Government agency	Lead role in the implementation of the activities foreseen for the output; coordination with various relevant agencies; technical guidance and backstopping. Initiating survey, design and oversight & monitoring
	Agriculture Research Development Centres (ARDCs)	Regional Offices	Technical backstopping in survey & design, and oversight & monitoring
	Local Government (Paro & Dagana)	Sub-national/ local government authorities	Mobilization of local participation; local-level coordination and monitoring; survey, design and implementation of the irrigation schemes.
	Local community	Beneficiaries	Participation in effective operation, maintenance and management of completed schemes
Output 2.3: Innovative technologies for tapping water adopted	Water and Sanitation Division, Department of Engineering Services	Government agency	Lead role in the implementation of the activities foreseen for the output; coordination with various relevant agencies; technical guidance and backstopping.
	Agriculture Engineering Division, Department of Agriculture	Government agency	Lead role in the implementation of the activities foreseen for the output; coordination with various relevant agencies; technical guidance and backstopping. Initiating survey, design and implementation of major irrigation schemes.
	Local Government (Paro & Dagana)	Sub-national/ LG authorities	Implementation of field activities in the identified areas
	Local Communities	Beneficiaries	Participation in effective operation, maintenance and management of completed schemes
Output 2.4: User groups in the community strengthened for effective management of irrigation and drinking water	Dzongkhag and Gewog Administrations	Sub-national/LG	Mobilization of local participation; local-level monitoring and backstopping; local-level mediation and facilitation of formation of WUAs.
	National Environment Commission	Central government agency	Policy and legislation-related guidance; legalization of WUAs
	Department of Agriculture, MoAF	Central government agency	Technical support, coordination and guidance in the formation of WUAs

	Department of Engineering Services, MoWHS	Central government agency	Technical support, coordination and guidance in the management of RWSS
	Local communities/user groups	Communities	Key beneficiaries; participation in WUAs; maintenance of RWSS and irrigation systems

Component 3: Strengthen Climate-smart Agriculture through Sustainable Land Management and Agro-meteorology Service

Output	Stakeholder	Type	Role in Project
Output 3.1: SLM in vulnerable and degraded areas implemented	National Soil Services Centre, DoA, MoAF	Government agency	Lead role in the implementation of the activities planned for the output; coordination with various relevant agencies; technical guidance and backstopping on SLM
	Central Machinery Unit, DoA, MoAF	Government agency	Prepare machine deployment plan and mobilize machines to the <i>dzongkhags</i> for agriculture land development; timely monitoring and maintenance of machines
	Farm Machinery Corporation Limited	State-owned Enterprise	Hiring of machinery for agriculture land development (terracing)
	Private machine hiring agencies	Private enterprise	Hiring of machinery for agriculture land development (terracing)
	Agriculture Research and Development Centres, DoA, MoAF	Regional government research agencies	Technical inputs and guidance for implementation of SLM plan
	National Seed Centre, DoA, MoAF	Government agency	Arrange to supply climate-resilient seeds and seedlings; Support community-based seed production
	Private nurseries	Private Sector	Supply seeds and seedlings
	LGs	LG authorities	Mobilization of local participation. Coordination of implementation of project activities in the identified areas
	Rural Communities	Beneficiary	Participation in actual implementation of project activities
Output 3.2: Climate change information, products and services made	Agriculture Research & Extension Division (ARED), DoA, MoAF	Government agency	Lead agency for planning, coordination and implementation of agro-met plans; generation of agro-advisories; coordinate and implement climate research in agriculture using modeling and simulation tools; be focal point for GIS and RS for the Department
	NCHM	Government agency	Prepare and provide weather forecasts (24x7) information. Monitoring of extreme weather events. Coordinate National Climate Outlook Forums (NCOF), National Framework for Climate Services and WMO Climate Services activities.

available and accessible	Agriculture Research & Development Centres, DoA, MoAF	Regional government research agency	Liaise with ARED and NCHM in implementation of agro-met activities; develop and validate crop calendar in the ADSS
	Central Programmes (NSSC, NPPC), DoA	Government agency	Liaise with ARED and NCHM in implementation of agro-met activities; incorporate soil and plant protection data in the ADSS
	DDM, Agriculture, Research & Extension Division, DoA, MoAF	Government agency	Lead agency for disaster risk reduction; lead agency for planning, coordination and implementation of agro-met plans; issuance of early warning system; Be the focal point for collection and management of crop damage data and come up with timely contingency plans
	Central Programmes (NSSC, NPPC), DoA, MoAF	Government agency	Liaise with ARED and NCHM in implementation of agro-met activities; incorporate soil and plant protection data in the ADSS
	LGs	LG authority	Facilitate Climate Field School; Validation of crop data; Communication of farm advisory to the users
	Rural Communities	Beneficiary	Participate in Climate Field School and actual use of climate and weather services

Component 4: Improved local governance for effective CCA mainstreaming with focus on water management at the grassroots.

Output	Stakeholder	Type	Role in Project
Output 4.1: Institutional mechanisms in LGs strengthened for CCA and gender mainstreaming	DLG, MoHCA	Central government agency	Lead role in the implementation of the activities foreseen for the output; coordination with various relevant agencies; guidance and backstopping.
	Dzongkhag and Gewog Administrations	Sub-national/ LG authorities	Key beneficiaries; responsible for applying mainstreaming roles and responsibilities
	Central MRG/MoF/NCWC	Inter-agency group/central government agency	Backstopping and guidance

Table 9: Stakeholder engagement

B. Describe the measures for financial and project/programme risk management.

NIE has been an autonomous grant-making agency of the RGoB since 1992. NIE has also been an executing entity for GEF/World Bank funded projects, and other global financing organizations such as Climate Investment Fund, GCF's readiness grant, and so on. Thus, all financial and project management up to the international best practices as per the Programme Operational Norms (PONs) of the NIE.

PONS lays out all required procedures of screening the project proposals against all operational and implementation risks, including financial risks. For each of the risk identified during the project proposal development, a risk management plan will be developed, including Environmental and Social Safeguards Management Plan.

Risk management is an essential element of good governance and an integral aspect of good management practice, and risk management is a shared responsibility. The NIE & EE are accountable for the overall implementation of the NIE's Risk Management Policy, and staff and managers are responsible for ensuring that risk management is integrated into all aspects of activities, including project design and implementation. The NIE's Risk Management Policy is designed to build institutional capacity for risk management that applies to project oversight and implementation.

Roles and responsibilities for financial and project risk management are outlined below.

The National Implementing Entity:

- Promotes the development of a culture that supports effective risk management and innovation, in line with NIE's risk policy which is in alignment with AF's risk policy;
- Integrates risk management into programmes, projects and functions so that it is a fundamental part of how the NIE works;
- Ensures that risks are managed effectively, which includes identifying, analyzing, responding to, reviewing and reporting on risks;
- Assigns accountability to staff for managing risks within their areas of responsibility, levels of authority and competence; and
- Allows for the systematic review of risk management to ensure its effectiveness and adherence to NIE's risk appetite and project risk categorization.

Governance and Audit Committee: The Committee advises the Managing Director and Management Team on the effectiveness of BTFEC's internal control systems, including risk management. Its TOR requires it to ensure that the policy is working effectively and that risk is being properly managed. It also reviews internal and external audit reports, and provides advice on the independence, effectiveness and quality of BTFEC's internal audit functions.

The Secretariat: The Secretariat is responsible for ensuring that risks are managed effectively and reported. They are to ensure that responsibility is allocated for keeping risk registers up to date and for taking appropriate mitigation actions. They are responsible for ensuring that risks related to their office's objectives are identified, analyzed and appropriately addressed.

Project Management Unit (PMU): The PMU informs the NIE on risk and performance management, develops and updates project and programme risk management tools, coordinates risk management activities, facilitates the identification and evaluation of risks, and maintains NIE's risk management framework, ensuring that it is relevant and that it supports NIE's mandate.

Internal Auditor: The Internal Auditor provides assurance to management regarding the effectiveness of BTFEC's internal control systems, governance, risk management processes and on how well the BTFEC is meeting its objectives. It also contributes to the assessment of risk management processes, the effectiveness of risk responses and the completeness and accuracy of risk reporting.

External Audit: The Royal Audit Authority (RAA) as the Supreme Audit Institution (SAI) of Bhutan is responsible to audit and report on the economy, efficiency and effectiveness in the use of public resources as per Article 25.1 of the Constitution of the Kingdom of Bhutan. Appointed by His Majesty the King on recommendation of the Prime Minister, the Chief Justice of Bhutan, the Speaker, the Chairperson of the National Council and the Leader of the Opposition Party, the Auditor General (AG) heads the Supreme Audit Institution for a period of five years or until attaining the age of sixty-five years, whichever is earlier.

The RAA, as an external audit independently assess the effectiveness of risk management and risk identification and control processes, including mitigation actions. Evaluations inform all stakeholders about the quality and effectiveness of policies, strategies and operations, and the efficiency of their implementation.

Financial and project risks and management measures are identified below. However, a risk may be handled, the actions must be documented and kept on file, via the Risk Register.

Areas of Risk	BT FEC's operational area	Description of Risk	Severity			Risk Management Measure	Indicator
			L	M	H		
Strategic risks							
Overall economic environment	Finance & Investment	Total assurance of the economic environment would still remain uncertain as the project intends to create resilience of communities through agricultural activities that are dependent on vagaries of climate and other allied natural phenomena.		X		<ul style="list-style-type: none">- Promote farm mechanization along with SLM and irrigation in the participating communities- Promote winter cropping and hybrid and climate resilient seeds.- Build the capacity of farmers on good agricultural practices and farm mechanization Community commitment to carry out agriculture will be enhanced by assured water supply for agriculture and drinking ensuring their economic activities are facilitated.	No of communities using farm machinery. Collaboration with DoA for supply of hybrid and climate-resilient seeds to farmers.
Political	Governance	All the executing agencies are government agencies and proposed plans are aligned with the existing FYP. Therefore, the project will have full political support.	X			Ensure good coordination with all stakeholders including central agencies	Meetings, communications to stakeholders
Governance	Governance	Poor efficiency in implementation due to difficulties in decision-making or to a lack of formal authority.	X			<ul style="list-style-type: none">-The execution of all four components is spear-headed by mandated government agencies with established institutional human resources and capacity.-Capacity building of the communities involved.	Reports
Investments	Investment	Failure to respond to needs of the intended beneficiaries.	X			All project activities are needs-based and aligned with the 12 th FYP and thoroughly deliberated and planned.	FYP reports
Corporate Image	CRS	If the project receives a negative image, this would impact BT FEC reputation	X			The agreed methodology and participatory approach ensure project ownership from the partner entities and the final beneficiaries	
Financial risks							
Financial Sustainability	Financial	Effective availability and use of financial resources during implementation. Running costs of supported activities over time.	X			<ul style="list-style-type: none">-During implementation, the government will ensure financial sustainability through annual budget allocation for maintenance and other recurrent costs.-Most expensive items (notably, at irrigation level) are low maintenance. Users' associations will be set up to ensure local sustainability.	
Cost escalations	Financial	Depending on inflation variation in the region, cost escalation could be foreseen, however, following the past trend of US\$ appreciating against BTN (national currency), forex gain could offset	X				
Operational risks							
Procurement (goods/services)	Procurement	NIE and executing agencies have well established procurement norms adapted as part of the World Bank procurement processes, therefore, no risk is foreseen	X				

Disbursements	Financial	Delays in disbursements	X			NIE and executing agencies have well established service delivery schedule and standards to ensure timely disbursement, therefore, no risk is foreseen.	Semi-annual work plan and budget and monitoring reports
Communication	Communication	Lack of communication re: project activities and results	X			The NIE's communication with AF and as well with the project executing agencies can be well executed as the project will have a designated communication officer.	Communication activities
Planning and reporting (stakeholder consultation)	Program Management	Lack of accountability internal systems	X			The NIE has an established periodic planning and reporting schedule through a designated focal person for each component. Further, the project has established stakeholder engagement plan defining specific roles and responsibilities of all stakeholders	Reports
COVID-19	Program Management	Implementation risks due to COVID-19 Description of risk: Due to the Covid-19 pandemic and the restrictive measures put in place may hamper the timely implementation of the projects. For instance, consultation meetings with the community and other stakeholders might be restricted. Further, travel may also be restrictive depending on the covid-19 situation in future. Since Bhutan is an import dependent country and if the Covid-19 situation persists, import of key materials for the implementation of the project may be delayed.	X			As per the Royal Government's health protocol, community gathering and meetings are allowed within certain thresholds. The consultative meetings and participation can be conducted in groups while adhering to health protocols and also ensuring community participation. Imports are facilitated and given that this is a government priority project, implementing agencies can take it up with the National Covid-19 Task Force on expediting the import of materials if required. Starting from 4 July 2022, the Royal Government of Bhutan has lifted all restrictions with gradual reopening of all borders and tourism from 23rd of September 2022 without any quarantine requirements for fully vaccinated people.	Reports
Organizational							
Technical capacity	Program management	All agencies involved have adequate and qualified human resources. Certain specific technical capacity may be required for enhancement of knowledge and skills for enhancement of project implementation	X			Capacity building programs will be put in place as part of the project, to reinforce specific aspects in terms of capacity.	
Information Technology	Knowledge management	Lack of capacity related to poor IT systems	X			Both at NIE and Executing levels, the information technology facilities are well established.	
Legal identity	Administrative	Lack of determination of individuals, companies or government entities that participate in the project may lead to impediments during implementation (e.g., delays in payments)	X			The NIE was established under the Royal Charter. The government as the executing agency, the project already has the legal identity and no issue is foreseen. All project stakeholders need to demonstrate they operate under a recognized legal entity.	

Table 10: Risk management matrix

C. Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy of the Adaptation Fund.

During the participatory assessment of proposed project activities and associated environmental and social safeguards as well as gender issues, a series of local level stakeholder consultations were held from 29th May to 13th June, 2022. Officials from the Ministry of Finance (the DA); BTFEC (the NIE); UNCDF (in capacity of Advisor to BTFEC and as Lead Prodoc developer); the Engineering Division of DoA and National Soil Service Center of DoA participated in these consultations. The WMD of the DoFPS and the MoWHS were represented by the relevant forestry divisions in the field and by the Dzongkhag Engineering Sectors respectively. Local stakeholders included representatives of local governments, community leaders and men and women from the project areas (*See Section L of Annex 2 and Annex 3*).

The assessment included:

1. Consultation of key stakeholders, and vulnerable groups, including gender
2. Assessment of project sites and activities in compliance with the Environmental and Social Policy and Gender Policy.

Furthermore, participants at these consultations were subjected to focus group discussions as well as individual opinion on risks as guided by a list of questions related to the 15 AF safeguards principles. The results of these participatory assessments were used to determine project ESS category and to define measures to mitigate or minimize the potential risks. This is present in Table 10.

Table 11: Project screening and categorization (For details see Table 4, ESMP in Annex 2)

AF Principles	Assessment	Impact (1 -5)	Likelihood (1-5)	Significance (L/M/S/H)
COMPLIANCE WITH THE LAW (7 questions)	Lack of awareness on some provisions of Water Act, Land Act, National Environment Protection Act may cause non-compliance to the provisions of the act by project beneficiaries. Lack of clarity in proportion of water allocations to different types of users at local level could cause conflicts within communities at the local level and may risk noncompliance to the Water Act.	3	1	L
ACCESS AND EQUITY (8 questions)	Poor households may not be able to participate or provide financial or labour contributions to the water user groups/association. Similarly, new settlers may face accessibility issues as they have not been members of WUAs in the past. Emergence of commercial activities could marginalize rural households.	3	2	M
MARGINALIZED AND VULNERABLE GROUPS (5 questions)	Marginalized and Vulnerable Groups may not be able to participate or provide financial or labour contributions to the water user groups/association. However, there are social norms that to mitigate such risks	3	1	L
HUMAN RIGHTS (1 question)	The constitution of Bhutan ensures human rights as a fundamental right to every citizen in Bhutan. Risk on this remains low.	3	1	L

AF Principles	Assessment	Impact (1 -5)	Likelihood (1-5)	Significance (L/M/S/H)
GENDER EQUALITY AND WOMEN'S EMPOWERMEN T (3 questions)	Due to availability to water, there could be increased agriculture activities and farm workload; Fallow lands would be cultivated; and increase in household chores. However, trend in use of more mechanization would offset the workload and overall, there would be positive impact. For instance, ferrying manure to agriculture fields, traditionally done by women are now performed by men driving power tillers. Statistics of current situation show limited participation by women in the executive role of WUAs. Women-headed households may face challenges of project accessing benefits.	3	3	M
CORE LABOUR RIGHTS (7 questions)	Contractors may not fully comply with labor laws and standards in employing workers, establishing appropriate working conditions or may adopt differential work compensation between men and women or may employ children. Inadequate arrangement of temporary worker camps could pose health and hygiene risk to workers. Some project sites pass through stretches of steep slope and difficult terrain which could expose workers to safety risks.	4	2	M
INDIGENOUS PEOPLES (4 Qs)	Not Applicable	1	1	L
INVOLUNTARY RESETTLEMEN T (6 questions)	The layout of pipes for irrigation and drinking water passes through some private land. However, loss of land or income is not foreseen as the pipes will be laid underground. Project activities do not involve land acquisition.	4	1	L
PROTECTION OF FORESTS AND NATURAL HABITATS (5 questions)	The project activities do not pass through any protected, prohibited or restricted areas. However, clearing works for access route to transport materials along water lines may cause minor site-specific disturbances to local forest but will not involve conversion of forest land use. Also trenching work for underground layout of water pipe lines will involve disturbances forest soils although such disturbances will be temporary and limited to pipe alignment. Some activities requiring restoration of cleared sites through plantation could potentially have adverse impacts if non-native plants are used for replantation.	3	2	M
CONSERVATIO N OF BIOLOGICAL DIVERSITY (4 questions)	The project activities do not pass through any protected, prohibited or restricted areas. Increase cultivation of high-income varieties may increase risk of neglecting native varieties. Withdrawal of water from natural sources without adequate environmental flow could pose risk of disturbing local aquatic life	3	3	M

AF Principles	Assessment	Impact (1 -5)	Likelihood (1-5)	Significance (L/M/S/H)
CLIMATE CHANGE (3 questions)	Heavy rains and resulting local soil erosions could harm project assets.	3	2	M
POLLUTION PREVENTION & RESOURCE EFFICIENCY (9 questions)	With assured irrigation water, intensification of agriculture activities such as increased vegetable cultivation could risk farmers adopting use of limited chemical fertilizers leading to soil pollution Inappropriate waste at temporary worker camps in project sites may result in risk of limited desecration of natural landscapes Minor excavation works and ground clearance will cause limited disturbances to local soil and vegetation	3	2	M
PUBLIC HEALTH (5 questions)	Migrant workers with unknown medical and travel history could risk transmission of diseases that are not prevalent in the project areas to local communities and among project workers and staff	3	2	M
PHYSICAL AND CULTURAL RESOURCES/HERITAGE (3 questions)	Project workers form outside may not be aware of local cultural/sacred sites and may cause unintentional damages. Where cultural sites are observed in the project areas, cultural clearance are sought for project activities as a standard practice. The clearance document defines terms and conditions that enable avoidance of any harm on such assets.	3	1	L
LANDS AND SOIL CONSERVATION (5 questions)	Clearing works for access route to transport materials along water lines as well a trenching for water lines may cause minor site-specific disturbances to soil structure. Site specific soil erosions could be triggered by heavy rainfalls on steep slopes at these sites. Weak pipe joints of water conveyance pipe and may lead to frequent burst of pipes and leakages triggering minor local soil erosions	4	2	M
Following project risk identification through participatory process and screening of the project risks by each activity and output (using 76 risk screening questions that are relevant to 15 AF ESS principle, project overall Project Risk Category has been determined as Category B since the overall significance of project risks is Moderate likely impact from such risks are minor, site specific and manageable.				M

D. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

The project results as outlined in the project results framework will be monitored and evaluated periodically during the project implementation to ensure the project results are achieved effectively. Project level monitoring and evaluation will be undertaken in compliance with the BTFEC requirements as outlined in its Monitoring and Evaluation Manual & Handbook. While these BTFEC requirements are not outlines in this project document, BTFEC will work with relevant project stakeholders to ensure that BTFEC M&E requirements are met in a timely fashion and to high quality standards. Additionally mandatory AF specific M&E requirements will be undertaken in accordance with the AF Evaluation Framework and other relevant AF policies. The results of M&E will be to provide project updates, risk assessments and any project change required. In

summary, M&E will provide answers to questions, in a systematic way, on the progress and success of the project and its partners in achieving the desired outcomes and outputs.

The BTFEC will hire a dedicated M&E Officer for the project who will be responsible for data collection, compilation, and monitoring and reporting of the project, as well as operational support and additional assistance in the design and implementation throughout the project, adjusting project outcomes and activities according to a changing context. It is important to remain flexible to and learn from inevitable unforeseen changes in the operational landscape using an adaptive management approach. The M&E officer will also monitor and ensure compliance to AF's environmental, social and gender safeguards and policies.

Reporting will take place on a quarterly and annual basis in accordance with Adaptation Fund standards. The monitoring and reporting plan involve an iterative approach to collecting data and improving the project design. The project will commence following an inception workshop with local and national stakeholders, the NIE team and the M&E team assigning and clarifying the project purpose, project roles and responsibilities, and addressing any outstanding barriers to implementation.

The project's comprehensive M&E framework will meet and exceed AF's Minimum Standards on Environmental and Social Safeguards approved in November 2013 and revised in March 2016, the Adaptation Fund's policy, and drawing on the NIE's safeguards formalized under the Accreditation process.

Considering all existing standards, including but not limited to, M&E Manual, ESS and Gender Equity, the key outputs for Monitoring and Evaluation (M&E) are:

- Semi-annual M&E visits conducted
- Semi-annual M&E reports prepared
- External evaluator hired for conducting mid-term evaluation
- Terminal evaluation conducted by NIE and external evaluator

In addition, under the supervision of the NIE's Governance and Audit Committee (GAC), an internal auditor shall be contracted to carry out the following tasks:

- Objectively assess IT and/or operational processes
- Assess the EE's risks and the efficacy of its risk management efforts
- Ensure that the EE is complying with relevant laws and statutes
- Evaluate internal control and make recommendations on how to improve
- Identifying shortfalls or gaps in processes
- Promote ethics and help identify improper conduct
- Assure safeguards
- Investigate fraud
- Communicate the findings and recommendations

On annual basis, an external audit shall be conducted by the RAA with an objective to:

- providing reasonable assurance that they are presented fairly and in conformity with applicable accounting principles/standards that they reflect true representation of the expenditure incurred and financial position.
- expressing an opinion on the effectiveness of the design and operation of project.
- reducing information risk that financial reports are biased, misleading, inaccurate, incomplete, and contain material misstatements.

Budgeted M&E Plan

Sl. no	Activity	Responsibility	Budget (US\$)
1	Inception Workshop	BT FEC	15,000
2	Project Board Meetings Bi-annually	BT FEC, PMU	9,600
3	Adaptation fund secretariat learning missions/site visits	BT FEC, AF Secretariat	NA
4	Mid-term review tracking tools to be updated before Mid-Term Review	BT FEC, MoAF, MoWHS,	10,000
5	Mid-term review	BT FEC	45,000
6	Terminal Evaluation of the project	BT FEC	40,000
7	Addressing social and environmental grievances	Implementing entities, PMU and BT FEC	to be charged to project budget
8	Technical Advisory Group meetings (bi-annually).	Implementing entities, PMU and BT FEC	9,600
9	Supervision and monitoring of activities	PMU, BT FEC	30,000

E. Project Results Framework

Project Results	Indicator(s)	Baseline	Target(s)	Means of Verification	Risks and Assumptions
Project Objective: To build resilience to climate change and adaptive capacity of water stressed communities					
To build resilience to climate change and adaptive capacity of water stressed communities	No. of direct beneficiaries	0	36,464(19,249 male and 17,215 female)	Total number of people of the gewogs identified as project sites as per dzongkhag record.	
To build resilience to climate change and adaptive capacity of water stressed communities	No. of indirect beneficiaries	0	139,661(72,441 male and 67,220 female)	Identified dzonkhags beneficiaries for project landscape activities	
To build resilience to climate change and adaptive capacity of water stressed communities	Total land area brought under effective management	0	21,252 ha (202 Ha- SLM and 21,049-watershed)		
Component 1:	Adaptive management of watersheds for enhanced community resilience to climate change				

<u>Outcome 1:</u> Increased watershed and ecosystem resilience in response to climate change and variability-induced stress	Total land area brought under effective watershed management	0	21,049 Ha	Total area under watershed, wetland management and spring revival in watershed management intervention report at WMD	
<u>Output 1.1:</u> Watershed management intervention measures implemented	No of watersheds intervened	One (Dagana)	Watershed management interventions developed and implementations initiated	Record of watershed management intervention measures developed and implemented at WMD	
<u>Output 1.2:</u> Payments-for-Ecosystem Services (PES) schemes scaled-up	No of PES Schemes explored and established	one each PES schemes established in Paro and Tsirang	One PES scheme will be explored and established if feasible	PES agreement	Stakeholders' willingness to participate
<u>Output 1.3:</u> Water sources' recharge interventions adopted	No of water sources revived	One water source revival site operational in Paro	Interventions Strengthened and adopted for 9 drying water sources	Field visits and reports	Difficult terrain may escalate cost
<u>Output 1.4:</u> Wetlands monitoring system established for informed decision-making	No of significant wetlands inventoried and monitoring system put in place	N/A	One wetland monitoring system in place	Record of monitoring system	Limited technical knowledge

Component 2:	Climate-resilient water infrastructure for uninterrupted supply of water for drinking and irrigation				
<u>Outcome 2:</u> Improved access to irrigation and safe drinking water	No. of households benefitted with climate resilient 24x7 drinking and irrigation water	N/A N/A	3168 households (drinking water) 282 households (irrigation)	Annual Progress Report	
<u>Output 2.1:</u> Climate- and disaster-resilient drinking water infrastructure established	Number of climates and disaster resilient drinking water system constructed	0	3 water supply schemes	Annual Progress Report	Construction difficulty due to terrain.
<u>Output 2.2:</u> Capacity building of Engineers in Climate Resilient water supply infrastructures	Number of Engineers and technicians trained	0	30 Engineers and Technicians (50% women).	Training attendance/ Certificate	Unforeseen lockdown/ movement restriction/ covid 19 protocols

Output 2.2: Climate- and disaster-resilient irrigation infrastructure established	Number of climate and disaster resilient irrigation scheme constructed	0	3 Nos. of irrigation scheme	Annual Progress Report	Construction difficulty due to terrain.
Output 2.3: Innovative technology for tapping water adopted	No. of households with climate-smart drinking water technology adopted	0	65 acres 19 household (65 acres)		
Output 2.4: User groups in the community strengthened for effective management of irrigation and drinking water	No. of Water User Associations formed, trained and formally registered with Gewog Administrations. Proportion of households and local institutions enlisted as members of WUA Proportion of women WUA office bearers (executives) WUAs are governed by inclusive Articles of association which are available in gewog offices	0 0 11% No	6 WUA 100% 30% Yes	Registration certificate WUAs register maintained at Gewog Office WUAs register maintained at Gewog Office All WUA Articles of association defines community exemptions and conditions of exemptions; right of access to water by all and water allocation framework	

Component 3:	Climate-smart agriculture (CSA) through sustainable land management and informed agrometeorological services				
Outcome 3: Improved food security and livelihoods	Percentage of target households with stable and climate resilient livelihood sources	NA	Target population report food and income availability improved by 20%	Sample household survey; Midterm and end of the project impact report	All project beneficiaries participate and adopt project interventions
Output 3.1: SLM in vulnerable and degraded areas implemented	Total area brought under SLM practices	NA	500	Annual project progress report; Mid-term and end of project report	Availability of appropriate machines for land development; Willingness of the beneficiaries to take up SLM; No major landslide and flashfloods that would

					damage the investments made in SLM
	Percentage of women participants in participatory action planning and field based specialized training on SLM	NA	60% women	Gender Action Plan Monitoring Report Training Report	
Output 3.2: Climate change information, products produced and disseminated	Number of climate products generated	NA	Advisories issued on a weekly basis during critical growing periods.	Annual project report; Midterm and end of project report	Improved weather forecasting with better lead time made available by NCHM
Sensitization of agro-met services in project areas completed	Number of participants	NA	At least 50% of the participants are women	Annual project report; Midterm and end of project report	Female participant not willing to participate

Component 4:	Improved local governance for effective CCA mainstreaming with focus on water management at the grassroots				
Outcome 4: Strengthened CCA mainstreaming and water governance at the local level	Number of LGs effectively mainstreaming CCA and gender in LG plans, programmes and activities.	NA	All 13 Gewogs in the project sites have effectively mainstreamed CCA and gender in local annual and FYP	Local annual development plans; LG FYPs; Key informant interviews; Project progress reports.	Support and guidance from central agencies.
Output 4.1: Institutional mechanisms in Local Governments strengthened for CCA and gender mainstreaming in LG plans, programmes and activities	Number of LG functionaries and communities trained on CCA investment and mainstreaming tools, frameworks and approaches	Basic awareness for CCA and gender mainstreaming exists among LGs but lack tools and training for effective mainstreaming	LG functionaries including identified communities of 13 project Gewogs have been trained on CCA investment and mainstreaming tools, frameworks and approaches	Key informant interviews; Project progress reports.	Support and guidance from central agencies.

F. ALIGNMENT WITH THE RESULTS FRAMEWORK OF THE ADAPTATION FUND

Project Outcomes	Project Outcome Indicators	AF Outcome	AF Outcome Indicators
Outcome 1: Increased watershed and ecosystem resilience in response to climate change and variability-induced stress		AF Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress	AF Outcome Indicator 5: Ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress
Outcome 2: Improved access to irrigation and safe drinking water		AF Outcome 4: Increased adaptive capacity within relevant development sector services and infrastructure assets	AF Outcome Indicator 4.2: Physical infrastructure improved to withstand climate change and variability-induced stress
Outcome 3: Improved food security and livelihoods		AF Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	AF Outcome Indicator 6.1: Percentage of households and communities having more secure access to livelihood assets AF Outcome Indicator 6.2: Percentage of targeted population with sustained climate-resilient alternative livelihoods
Outcome 4: Improved CCA mainstreaming and water governance at the local level		AF Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	AF Outcome Indicator 3.1: Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses AF Outcome Indicator 3.2: Percentage of targeted population applying appropriate adaptation responses
Output 1.1: Watershed management intervention measures implemented		AF Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	AF Output Indicator 5.1: No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)
Output 1.2: Payments-for-Ecosystem Services (PES) schemes scaled-up		AF Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	AF Output Indicator 5.1: No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)
Output 1.3: Water sources' recharge interventions adopted		AF Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	AF Output Indicator 5.1: No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)

Output 1.4: Wetland monitoring system for informed decision making established.		Output 7: Improved integration of climate-resilience strategies into country development plans	Output 7.1 No. of policies introduced or adjusted to address climate change risks (by sector)
Output 2.1: Climate- and disaster-resilient drinking water infrastructure established		Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)
Output 2.2: Climate and disaster resilient irrigation infrastructure established		Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)
Output 2.3: Innovative technologies for tapping water adopted		Output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated.	8.1. No. of innovative adaptation practices, tools and technologies accelerated, scaled-up and/or replicated
Output 2.4: User groups in the community strengthened for effective management of irrigation and drinking water		AF Output 3.2: Strengthened capacity of national and sub-national stakeholders and entities to capture and disseminate knowledge and learning.	3.2.1 Number of technical committees/ associations formed to ensure transfer of knowledge.
Output 3.1: SLM in vulnerable and degraded areas implemented		AF Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	AF Output 6.1: No. and type of adaptation assets (tangible and intangible) created or strengthened in support of individual or community livelihood strategies
Output 3.2: Climate change information, products and services made available and accessible		AF Output 2: Strengthened capacity of national and sub-national centers and networks to respond rapidly to extreme weather events	AF Output 3.2: No of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders.
Output 4.1: Institutional mechanisms in local level strengthened for CCA and Gender mainstreaming.		Output 3.1: Targeted population groups participating in adaptation and risk reduction awareness activities.	3.1.1: No. of news outlet in news outlets in local press and media that have covered the topic.

LIST OF TABLES FOR REPORTING ADAPTATION FUND CORE IMPACT INDICATORS

Adaptation Fund Core Impact Indicator “Number of Beneficiaries”	
Date of Report	5 th September 2022
Project Title	Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan

Country	Bhutan			
Implementing Agency	Bhutan Trust Fund for Environmental Conservation			
Project Duration	01 January 2023-31 December 2028			
	Baseline (<i>absolute number</i>)	Target at project approval (<i>absolute number</i>)	Adjusted target first year of implementation	Actual at completion
Direct beneficiaries supported by the project	0	36,464 (19,249 male; 17,215 female)		
<i>Female direct beneficiaries</i>		17,215		
<i>Youth direct beneficiaries</i>		6,828		
Indirect beneficiaries supported by the project	0	1,39,661 (72,441 male, 67,220 female)		
<i>Female indirect beneficiaries</i>		67,220		
<i>Youth indirect beneficiaries</i>		17,669		

Adaptation Fund Core Impact Indicator “Assets Produced, Developed, Improved, or Strengthened”	
Date of Report	5 th September 2022
Project Title	Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan.
Country	Bhutan
Implementing Agency	Bhutan Trust Fund for Environmental Conservation
Project Duration	01 January 2023-31 December 2028

	Baseline	Target at project approval	Adjusted target first year of implementation	Actual at completion
Sector (Agriculture and water management)				
Targeted Asset 1) Health and Social Infrastructure 2) Physical asset <i>(produced/improved/strengthened)</i> a. <i>Number of Climate resilient Rural Drinking Water Supply Produced</i> b. <i>Number of Climate resilient irrigation schemes Produced</i>	 0 0	 3 1		
Changes in Asset <i>(Quantitative or qualitative depending on the asset)</i> a. <i>Length of Climate resilient Rural Drinking Water Supply produced</i> b. <i>Length of Climate resilient irrigation schemes produced</i> c. <i>Length of Climate resilient irrigation schemes strengthened</i>	 0 0 0	 106 KM 9 KM 16.5 KM		

Adaptation Fund Core Impact Indicator “Natural Assets Protected or Rehabilitated”				
Date of Report	5 th September 2022			
Project Title	Adaptation to Climate-induced Water Stress through Integrated Landscape Management in Bhutan			
Country	Bhutan			
Implementing Agency	Bhutan Trust Fund for Environmental Conservation			
Project Duration	01 January 2023-31 December 2028			
	Baseline	Target at project approval	Adjusted target first year of implementation	Actual at completion
Natural Asset or Ecosystem <i>(Land and Water)</i>				
Change in state 1. Area brought under Sustainable Land Management practices (ha) 2. Areas of watershed rehabilitated/protected.	0 0	202 Ha 21,049 Ha		
Total number of natural assets or ecosystems protected/rehabilitated		21,251 Ha		

G. Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

Detailed implementation budget per Component:

Output	Activities	Budget (USD)					
		Year 1	Year 2	Year 3	Year 4	Year 5	Total per Activity
Component 1: Adaptive management of watersheds to enhance climate resilience of communities							
Output 1.1 Watershed management intervention measures implemented	Activity 1.1.1 Conduct sensitization and awareness workshops (13 Gewogs to be sensitized)	10,790	0	0	0	0	10,790
	Activity 1.1.2 Training of community members and LG officials on the implementation of identified watershed management interventions	0	10,790	0	0	0	10,790
	Activity 1.1.3 Conduct watershed assessment at the project site, including the watersheds along the proposed pipeline	0	5,080	0	0	0	5,080
	Activity 1.1.4 Develop watershed management intervention measures for the proposed areas (five sites plus along the proposed pipeline: at least one plan per dzongkhag- minimum of four)	0	0	11,380	0	0	11,380
	Activity 1.1.5 Implement identified intervention measures	0	0	0	130,000	142,000	272,000
	Subtotal Output 1.1	10,790	15,870	11,380	130,000	142,000	310,040
	Output 1.2 Payments-for-Ecosystem Services (PES) schemes scaled-up	Activity 1.2.1 Conduct community consultations and sensitizations	2,500	0	0	0	0
Activity 1.2.2 Hands-on training workshops in the management of PES schemes (1 training)		0	2,500	0	0	0	2,500
Activity 1.2.3 Conduct detailed resource assessment and inventory		0	6,000	0	0	0	6,000

	Activity 1.2.4 PES scheme development and implementation based on the feasibility analysis	0	0	2,500	5,000	2,500	10,000
	Sub-total Output 1.2	2,500	8,500	2,500	5,000	2,500	21,000
Output 1.3 Water sources' recharge interventions adopted	Activity 1.3.1 Training workshops on water source recharge interventions with field demonstration (one per site) and awareness and sensitization	3,333	3,333	3,334	0	0	10,000
	Activity 1.3.2 Identification of recharge areas and designing water source revival activities following the spring shed management protocol	15,000	15,000	15,000	0	0	45,000
	Activity 1.3.3 Implementations of water source revival activities	0	45,000	45,000	45,000	0	135,000
	Activity 1.3.4 Monitoring and maintenance of conservation /restoration activities	0	0	1,250	2,500	3,000	6,750
	Sub-total Output 1.3.	18,333	63,333	64,584	47,500	3,000	196,750
Output 1.4 Wetland monitoring system for informed decision-making established	Activity 1.4.1 Conduct mapping of wetlands for the project Dzongkhags using remote sensing, including training	0	0	10,000	0	0	10,000
	Activity 1.4.2 Field data collection and mapping (all project Dzongkhags)	0	0	20,000	0	0	20,000
	Activity 1.4.3 Field exercise for Data Quality Assurance and Quality Control	0	0	0	3,000	0	3,000
	Activity 1.4.4 Data compilation and analysis, feeding decision making mechanisms	0	0	0	0	5,000	5,000
	Sub-total output 1.4	0	0	30,000	3,000	5,000	38,000
Total Component 1		31,623	87,703	108,464	185,500	152,500	565,790
Component 2: Climate resilient water infrastructures for uninterrupted supply of water for drinking and irrigation							
Output 2.1 Climate and disaster resilient drinking water	Activity 2.1.1. Construction of three Drinking Water Supply Schemes	2,351,067	1,763,300	1,586,970	176,330	0	5,877,667

infrastructure established	Activity 2.1.2. Professional Development of engineers in Climate Resilient Water Supply Infrastructure	0	0	7,500	7,500	0	15,000
	Sub-total Output 2.1	2,351,067	1,763,300	1,594,470	183,830	0	5,892,667
Output 2.2: Climate and disaster resilient irrigation infrastructure established	Activity 2.2.1. Construction of pressurized/closed irrigation systems (gravity)-Lajab	532,000	373,333	28,000	0	0	933,333
	Activity 2.2.2. Re-engineering/ rehabilitation or improvement of two existing irrigation systems	225,333	152,100	169,000	16,900	0	563,333
	Activity 2.2.3. Scale up micro-irrigation system (drip & sprinkler)	6,000	6,000	6,000	6,000	6,000	30,000
	Activity 2.2.4. Tailwater management	0	4,500	4,500	0	0	9,000
	Sub-total Output 2.2	763,333	535,933	207,500	22,900	6,000	1,535,666
Output 2.3 Innovative Technologies for tapping water adopted	Activity 2.3.1. Build water harvesting structures or small-scale reservoirs to tap water for irrigation	0	0	8,400	5,600	0	14,000
	Sub-total Output 2.3	0	0	8400	5600	0	14000
Output 2.4: User groups in the community strengthened for effective management of irrigation and drinking water	Activity 2.4.1 Form and strengthen formal/registered WUAs and groups in the communities at scheme level to promote local ownership and sustainability of schemes	0	12,620	12,620	12,620	12,620	50,480
	Sub-total Output 2.4	0	12620	12620	12620	12620	50480
Total Component 2		3,114,400	2,311,853	1,822,990	224,950	18,620	7,492,813
Component 3: Climate-smart agriculture through sustainable land management and informed agro-meteorological services							
Output 3.1 SLM in vulnerable and degraded areas implemented	Activity 3.1.1 Participatory SLM action planning and sensitization to validate key SLM interventions	3767	0	3767	0	0	7,534.00
	Activity 3.1.2 Implementation of SLM measures-terracing, contour hedgerows, stone bunding	140,000	93,334	93,333	140,000	0	466,667.00
	Activity 3.1.3 Technical assistance and support to communities on the	2,740	1,370	1,370	1,370	0	6,850.00

	implementation of SLM practices in the field						
	Activity 3.1.4 Field -based and specialized training to farmers and agriculture extension staff on SLM technologies	10,274	0	10,274	0	0	20,548.00
	Activity 3.1.5 Monitoring and Evaluation of SLM Interventions	1,096	1,096	2,192.00	1,096.00	0	5,480
	Activity 3.1.6 Documentation, knowledge Management (KM) and experience sharing platforms.	0	0	10,958	0	16,437	27,395.00
	Sub-total Output 3.1	157,877	95,800	121,894	142,466	16,437	534,474
Output 3.2 Climate change information, products and services made available and accessible	Activity 3.2.1 Agro-met advisory bulletins appropriately packaged and disseminated timely through appropriate channels	4,401	4,401	4,401	4,401	4,401	22,005
	Activity 3.2.2 Incorporation of area specific weather and crop data in ADSS	10,000	0	10,000	0	0	20,000
	Activity 3.2.3 Professional development of agro-met focal points based in ARDCs and Central Programmes	0	21,429	0	21,429	0	42,858
	Activity 3.2.4 Knowledge management and communication activities	0	1,786	1,786	1,786	1,786	7,144
	Activity 3.2.5 Sensitization, awareness and capacity development on agro-met services for researchers, extension and farmers	10000	0	10000	0	0	20,000
	Activity 3.2.6 Development of crop suitability and feasibility maps	5000	0	5000	0	5,000	15,000
	Sub-total Output 3.2	29,401	27,616	31,187	27,616	11,187	127,007
Total Component 3		187,278	123,416	153,081	170,082	27,624	661,481
Component 4: Improved local governance for effective CCA mainstreaming with focus on water management at the grassroots							
Output 4.1: Institutional mechanism in LGs strengthened for CCA	Activity 4.1.1. Conduct professional development programme for LGs on CCA investments, mainstreaming tools, frameworks and approaches	20,000	20,000	20,000	15,000	0	75,000

and gender mainstreaming	related to irrigation, water management, SLM, CCA and gender.						
	Activity 4.1.2. Carry out M&E of CCA and gender mainstreaming in LG plans, programmes and activities.	5000	5000	5000	3991	0	18991
	Sub-total Output 4.1	25,000	25,000	25,000	18,991	0	93,991
Total Component 4		25,000	25,000	25,000	18,991	0	93,991
Total Direct Cost		3,358,301	2,547,972	2,109,535	599,523	198,744	8,814,075
Project execution cost (PMU)		114,510	101,610	101,610	101,610	101,610	520,950
Total (Direct + PMU cost)		3,472,811	2,649,582	2,211,145	701,133	300,354	9,335,023
PCM Fee charged by the Implementing Entity		132,786	132,786	132,786	132,786	132,786	663,930
Grand total		3,605,597	2,782,368	2,343,931	833,919	433,140	9,998,955

Budget Notes

SN.	Component 1 (total \$565,790)
1	Conduct sensitization and awareness workshops (13 Gewogs to be sensitized) @ \$830 -\$10,790
	Training of community members and local officials on implementation of identified watershed management interventions in project Dzongkhag @ \$3596.7 -\$10,790
	Conduct watershed assessments in the project site including the watersheds along the proposed pipeline @\$846.7 - \$5,080
	Development of watershed management intervention measures for the proposed areas (five sites plus along the proposed pipeline) (at least one plan per dzongkhag) @ \$2,276 -\$11,380
	Implementation of identified intervention measures in six sites @\$45,333 -\$272,000
	Sub-total - \$ 310,040
2	Conduct community consultations and sensitizations in three project Dzongkhags @ \$ 833.3 - \$2,500
	Hands-on training workshops in the management of PES schemes - \$2,500
	Conduct detailed resource assessment and inventory -\$6,000
	PES scheme development and implementation based on the feasibility-\$10,000
	Sub-total \$21,000
3	Training workshops on water source re-charge interventions with field demonstration in six sites @ \$ 1666.7 - \$10,000

	Identification of recharge areas and designing water source revival activities following spring shed management protocol @ \$15,000 in three Dzongkhags-\$45,000
	Implementations of water source revival activities @ 22,500 -\$135,000
	Monitoring and maintenance of conservation /restoration activities in three project Dzongkhags @ \$2250 - \$6,750
	Sub-total \$196,750
4	Conduct training and mapping of wetlands for the project Dzongkhags using remote sensing \$3333.3 -\$10,000
	Field data collection and mapping (Drakepangtsho & Dhaptsho) @\$10000 -\$20,000
	Field exercise for Data Quality Assurance and Quality Control-\$3,000
	Data compilation and analysis, feeding decision making mechanisms-\$5,000
	Sub-total \$38,000
Component 2 (total \$7,492,813)	
5	Contractual services for Construction of 3 Drinking Water Supply Schemes including cost of equipment and materials (transmission lines and distribution network of approximately 106kms, intakes and reservoirs for 3 drinking water schemes: \$5,877,667
	Workshops, capacity building and trainings for 30 engineers (50% woman): \$15,000
	Sub-total \$5,892,667
6	Contractual services for construction of pressurized/closed irrigation systems (gravity) including material costs, equipment and labor cost of 12 kms at unit cost @ \$ 77,777.75 -\$ 933,333
	Contractual services for Re-engineering/ rehabilitation or improvement of 2 existing irrigation systems of 11.4km @ unit cost of \$49,415.2 - \$ 563,333
	Procurement of equipment and capacity building for water management systems (Drip & sprinkler, tailwater) -\$ 39,000
	Sub-total \$ 1,535,666
7	Conduct assessment, surveys and designs of the irrigation water schemes -\$ 14,000
	Form and strengthen water user associations and groups in the communities at scheme level to promote local ownership and sustainability of schemes -\$ 50,480
	Sub-total \$ 64,480
Component 3 (total \$661,481)	
8	Participatory SLM action planning and sensitization to validate key SLM interventions in project -\$ 7,534
	Contractual services including hiring of equipment and labor costs for SLM interventions-terracing, contour hedgerows and landslide stabilization measures (500 Acres)- \$ 466,667
	Technical assistance and support to communities on the implementation of SLM practices in the field \$ 6,850

	Field -based and specialized training to farmers and agriculture extension staff on SLM technologies to enable them to respond to climate change induced risks and impacts with more competence and knowledge -\$ 20,548
	Monitoring and Evaluation of SLM Interventions -\$ 5,480
	Documentation, knowledge Management (KM) and experience sharing platforms -\$ 27,395
	Sub-total \$534,474
9	Agro-met advisory bulletins appropriately packaged and disseminated timely -\$ 22,005
	Incorporation of area specific weather and crop data in ADSS -\$ 20,000
	Capacity building of agro-met focal points based in ARDCs and Central Programs (Two major trainings) -\$ 42,858
	Knowledge management and communication activities - \$ 7,144
	Sensitization, awareness and capacity development on agro-met services to researchers, extension and farmers -\$ 20,000
	Development of crop suitability and feasibility maps - \$15,000
	Sub-total \$127,007
	Component 4 (total \$93,991)
10	Conduct capacity development training for LGs on CCA investment and mainstreaming tools, frameworks and approaches related to irrigation, water management, SLM, CCA and gender - \$75,000
	Carry out M&E of CCA and gender mainstreaming in LG plans, programs and activities -\$18,991
	Project Execution Cost (\$520,950)
11	Activities supervision \$3,000 annually - \$15,000
	Other project related travel costs \$4,610 annually- \$23,050
	Individual contract services for 4 officers for 5 years (\$60,000 Plus 2*\$16,000*5 =\$160,000) and 1 officer through RGoB -\$220,000
	PMU officer furniture -\$3,000
	Procurement of IT equipment for project staffs-laptops, printers, IT accessories, software, etc - \$9,900
	Stakeholder consultations and knowledge exchange programs (including US\$ 100,000 for ESG safeguard and grievance redressal, Project Board meetings bi-annually-9,600, Technical Advisory Group meeting bi-annually- \$9,600) with the community members and the project implementers. Capacity building of engineers, project component implementers and local government officials - \$250,000
	PCM Fee charged by the Implementing Entity (\$663,930)
12	Compensation/remuneration for project staffs in supporting Executing Entities and reporting to AF for the project period-(\$22,235/years) = \$111,175
	M&E Officer (\$14,243/year) - \$71,215, ESG Expert (\$16,122/year) - \$80,610, Mid-term evaluation - \$45,000, Terminal Evaluation-40,000, In country monitoring travel (\$3,000/year) - \$15,000 = \$251,825

	Mobility \$42,680 POL & maintenance \$1,800/year- \$9,000, accounting software annual maintenance cost (\$2,500/year)- \$12,500, Office Stationery (\$2,400/year) - \$12,000, Utilities (\$2,200/year) - \$11,000, rental (\$3,000/year)-\$15,000 = \$102,180
	Office equipment & furniture = \$27,250
	NIE Capacity Building- \$12,000/year = \$60,000
	Semi-annual internal auditing - \$25,000 and annual auditing services- \$12,500 = \$37,500
	Inception Workshop-\$15,000, Update of mid-term review tracking tool-\$10,000, Stakeholder workshop for learning, experience sharing and dissemination of learnings (\$ 9,800 annually)-\$49,000 =\$74,000

D. Include a disbursement schedule with time-bound milestones.

Schedule date	Jan-Dec23	Jan-Dec24	Jan-Dec 25	Jan-Dec26	Jan-Dec27	Total
Direct cost	3,358,301	2,547,972	2,109,535	599,523	198,744	8,814,075
Execution cost	114,510	101,610	101,610	101,610	101,610	520,950
NIE cost	132,786	132,786	132,786	132,786	132,786	663,930
Total cost	3,605,597	2,782,368	2,343,931	833,919	433,140	9,998,955

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government³⁴

<i>Loday Tsheten (Mr.) Director Department of Macro-Fiscal and Development Finance (DMDF) Ministry of Finance</i>	Date: 5 th August, 2022
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B. Implementing Entity certification

<p>I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans with reference to the following acts, rules, guidelines, etc:</p> <ul style="list-style-type: none"> • Forest and Nature Conservation Act 1995, • Forest and Nature Conservation Rules and Regulations of Bhutan 2017, • PES Framework for Bhutan 2015, • Bhutan Drinking Water Quality Standards 2016 and Wetland Inventory Framework. • Agriculture Land Development Guidelines (ALDG) 2017 of the Ministry of Agriculture & Forests <p>Implementation Modalities for Agriculture Land Development and Fallow Land Reversion, circulated to all the implementers vide letter No. DOA/ARED/Adm-01 /2019 dated 30th September, 2019</p>	<ul style="list-style-type: none"> • Soil Conservation Manual (SCM), 2019 of the NSSC, Department of Agriculture, MoAF • Land Act 2007, • Bhutan Water Policy 2008 • Water Act of Bhutan 2011 • Water Regulation of Bhutan 2014. • ALDG 2017. • Labor Employment Act, 2007. • The Local Governance Act, 2009. • The National Gender Equality Policy 2019. <p>and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.</p>
<p><i>e-signature in pdf copy</i></p> <p><i>Karma Tshering, PhD. Managing Director Implementing Entity Coordinator</i></p>	
Date: September, 05, 2022	Tel. and email: Landline: +975 2 339861 Mobile no: +975 1716 2393 email: karma@bhantrustfund.bt
Project Contact Person: Dorji, Landline: +975 2 339861, Mobile no: +975 77606162 email: dorji@bhantrustfund.bt	

³⁴ Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

