



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 Forest & Park Services Ministry of Agriculture and Forests Department of Engineering Services, Ministry of Works and Human Settlements Department of Local Governance, Ministry of Home and Cultural Affairs
Amount of Financing Requested:	9.999 million (in U.S Dollars Equivalent)

Acronyms

ADSS	Agro-met Decision Support System
AF	Adaptation Fund
ALDG	Agriculture Land Development Guidelines
ARED	Agriculture Research and Extension Division
BDWQS	Bhutan Drinking Water Quality Standards
BT FEC	Bhutan Trust Fund for Environmental Conservation
CCA	Climate Change Adaptation
CCP	Community Contracting Protocol
DES	Department of Engineering Services
DLG	Department of Local Governance
DPA	Department of Public Accounts
DRR	Disaster Risk Reduction
ESMP	Environment and Social Management Plan
FNCRR	Forest and Nature Conservation Rules and Regulations
FYP	Five Year Plan
GDP	Gross Domestic Product
GEF	Global Environment Facility
GNH	Gross National Happiness
GNHC	Gross National Happiness Commission
HDPE	Hydro-pressurized Pipe
HKH	Hindu Kush Himalayan
IEE	Initial Environmental Examination
IPCC	Inter-governmental Panel on Climate Change
KM	Knowledge Management
LDCF	Least Developed Countries Fund
LG	Local Government
MoAF	Ministry of Agriculture and Forests
MoHCA	Ministry of Home and Cultural Affairs
NAPA	National Adaptation Program of Action
NECS	National Integrated Water Resources Management Plan
NIMP	National Irrigation Master Plan
NKRA	National Key Result Areas
NWFP	Non-Wood Forest Products
PES	Payment for Ecosystem services
PHCB	Population and Housing Census of Bhutan
PRA	Participatory Rural Appraisals
RGoB	Royal Government of Bhutan
RNR	Renewable Natural Resources
RWSS	Rural Water Supply Scheme
SAPA	Sector Adaptation Plan of Action
SLM	Sustainable Land Management
WMD	Water Management Division
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 geographic area of 38,394 km². The country is almost entirely mountainous with nearly 95 percent of the country being above 600 meters altitude². The topography is rugged and steep, with elevation rising from under 200 m to above 7,500 m within a short south-north distance of some 170 kilometers (km). The country can be distinguished 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 (districts, see Figure 1). Each dzongkhag consists of gewogs, which are a block of villages and represent the smallest unit of public administration. There are altogether 205 gewogs across the country. Some of the dzongkhags are broken down into dungkhags (sub-districts) to ease geographical and logistical constraints posed on public administration. Currently, there are 16 dungkhags. Major population centers are located in the west and south. The northern region is very sparsely populated. Sixty-two per cent of the population live in rural areas and predominantly subsist on a farming system, which integrates crop agriculture, livestock rearing and forest resource use.

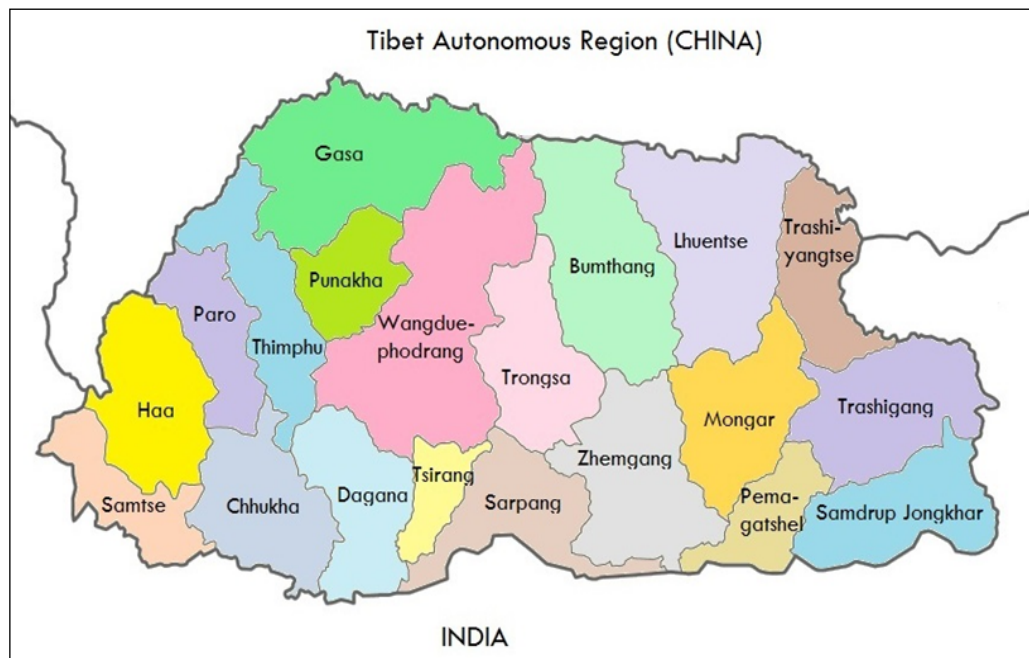


Figure 1: Administrative map of Bhutan showing the districts

The advent of the Five-Year Plan (FYP) in 1961 marked the beginning of modern development. Since then, FYPs have served as the key strategic instrument for the implementation of national development

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

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

policies and programs. The country is currently implementing the 12th FYP (November 2018-October 2023) with overall objective to create “a just, harmonious and sustainable society through enhanced decentralization.” The national development process is guided by the overarching development philosophy of “Gross National Happiness”. 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.

Bhutan’s economy is one of the smallest in the world but one that has seen impressive growth over the years. The country’s Gross Domestic Product (GDP) has grown from Nu. 72,496.64 million (US\$ 1,565.8 million) in 2010 to Nu. 167,326.82 million (US\$ 2,464.3 million) in 2018, up by about 130 percent³. The key contributing economic sectors to the GDP are renewable natural resources, which includes agriculture, livestock rearing and forestry (15.89 percent), construction (14.2 percent) and electricity and water (11.72 percent)⁴. In terms of employment, the renewable natural resources sector remains the most important economic sector although its GDP share has been falling over the years. Tourism is another sector contributing significantly to the country’s economy particularly in terms of foreign exchange and creation of jobs.

The country is endowed with an outstanding natural environment. It is dubbed as the ‘crown jewel’ of the Eastern Himalayas, a region recognized as a global biodiversity hotspot. Broadly speaking, the natural habitats range from the subtropical broadleaf forests and grasslands through temperate mountain forests to alpine meadows and scree interspersed with marshlands and various water bodies. The natural habitats are home to more than 5,600 species of vascular plants, about 200 species of mammals, 700 species of birds, and some 100 species of fish. To maintain the rich biodiversity, 42.7 percent of the country has been declared as protected areas, which include five national parks, four wildlife sanctuaries and a strict nature reserve. These protected areas are connected by biological corridors to ensure contagiousness of the natural habitats and allow wildlife movements between the protected habitats, expanding the network of natural areas under protection to more than 50 percent of the country.

Forests account for more than 70 percent of the country’s land cover – one of the highest in the world. The Constitution mandates that at least 60 percent of the country is maintained under forest cover at all times. As a result of vast tracts of forest cover, 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 data⁵. This, however, does not exempt the country from the impacts of global warming and climate change.

In fact, with a geologically fragile and young mountain ecosystem and as a least developed country, Bhutan is highly vulnerable to climate change and its impacts. Socio-economic development is hugely dependent on climate-sensitive sectors such as agriculture, hydropower, forestry, and road communication. Furthermore, as a mountainous country with a huge area of 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 multiple climate change hazards including glacial lake outburst floods, landslides, and flash floods. Reduced precipitation during winter over the recent years has given rise to increased forest fire risks and seasonal water scarcity in many areas. Rainfall

³ National Accounts Report 2019. The USD conversions are based on historical USD-BTN exchange rates prevailing in 2010 and 2018 respectively (www1.oanda.com).

⁴ The figures are for 2018 as cited in the National Accounts Report 2019.

⁵ Second National Communication to the UNFCCC, November 2011. More recent data will be available in the Third National Communication, which is currently under preparation.

pattern is becoming increasingly erratic, posing huge adversities for farmers who largely practice rain-fed agriculture. Severe events of windstorm are becoming increasingly recurrent and these have damaged numerous homes, schools, health facilities, government offices, and temples, as well as tons of crops.

Climate and Climate Change Scenarios

The climate varies considerably in Bhutan due to its characteristic of dramatic changes in topography. The southern foothills typically have subtropical climate with high humidity and heavy rainfall with several locations recording more than 4,000 mm annual rainfall. The temperature in the southern region ranges from 10°C to 25°C in winter and 20°C to 35°C in summer. The central mountains and valleys are characterized by cool winters and warm summers with temperature ranging from -5°C to 15°C in winter and 15°C to 25°C in summer. Rainfall in this region is moderate between 1,000-2,000 mm per year. The high alpine mountains and meadows have cold winters and cool summers with generally low precipitation of less than 500 mm per year primarily in the form of snow.

The summer monsoons endure from late June through late September. The moisture-laden clouds that originate in the Bay of Bengal travel north towards the Himalayas. When these clouds are blocked from traveling further 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 of the 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.

The second (SAR 1990), third (TAR 2001), fourth (AR4 2007) and fifth (AR5 2014) assessment reports produced by the Inter-Governmental Panel on Climate Change (IPCC) indicate that mountainous countries such as Bhutan, are likely to be among the countries most vulnerable to the adverse impacts of climate change. The IPCC and other climate based reports have identified a number of sources 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.

Simulated exercises using ECHAM5 and HadCM3Q0 climate models for projection of long-term climate scenarios, carried out as a part of the Second National Communication (2011), suggest the following:

- **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 (HadCM3QO/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 HadCM3QO/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 (HadCM3QO/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 HadCM3QO/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 thus 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 an in general drier winter season.

Climate Change Impacts on Water and Agriculture

As presented in the previous section, there is a projected increase in annual average rainfall in Bhutan. The additional rain, however, will mostly fall during the existing wet season of June to August when it is often not required to improve crop yields (though more evenly distributed rainfall within these months would likely reduce the incidences of yield declines due to dry spells during pollination of some crop species). Similarly, for aquifer recharge, the higher intensity of rainfall events generally leads to extra surface run-off rather than infiltration once the soil is saturated, limiting the benefits of the extra amount of projected precipitation. It is thus likely that the increases in rainfall projected between June and August by the climate models will only serve to exacerbate problems associated with erosion, landslides and floods.

Furthermore, the projected increases in rainfall variability can lead to decreases in precipitation for extended periods, causing water availability and access problems, which undermine current water distribution infrastructure and communities' abilities and rights to access water for household and agricultural requirements. Springs and small streams are the main water sources for the rural part of the country. But many of them are reportedly retreating. The updated National Adaptation Program of Action (NAPA 2012) therefore also prioritized water as a sector most likely 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 (g) Rainwater Harvesting and Drought Adaptation. The Government has also embarked on a water flagship program in the 12th FYP period to give impetus to addressing water problems including those caused by climate change.

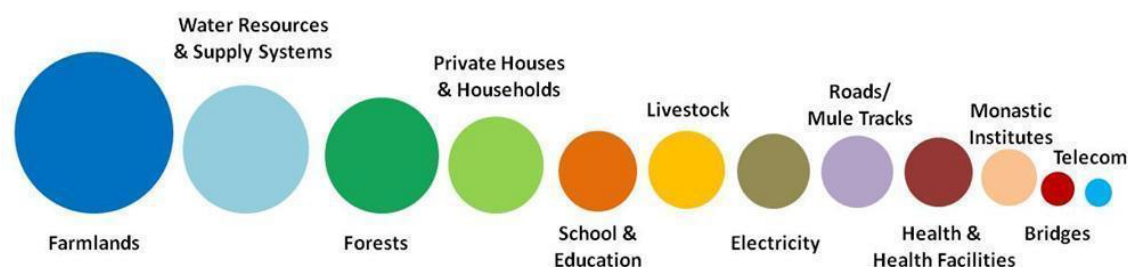
Subsistence agriculture activities in Bhutan will be affected by the projected variability in rainfall patterns and intensity. Together with geological differences, climate variability and change will have a large influence on freshwater availability, notably whether water is guaranteed year-round or water sources dry up rapidly or gradually at the onset of the dry-season. From an agricultural perspective elevation, geology and pedology play a large role in determining whether farmers have a high risk of wet season crop failure and any opportunity of dry season cultivation. The vast majority of agriculture activities are rain-fed subsistence and cash crop production and irrigated rice crops. To sustain agriculture, new sources of water must be identified locally, tapped and invigorated, and innovation is required in water storage, including water harvesting, and usage. The feasibility of dams and reservoirs is not yet adequately assessed. However, the geological conditions in Bhutan with permeable unstable soils and rock will make it technically challenging in most instances.

During the community consultations for past CCA projects⁶, communities have 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 reduce considerably in flow or cease altogether. There is thus a clear recognition by communities of the importance of reliable water resources and for the potential increased stress that climate change poses for these water sources, and related livelihood activities. Local differences in

⁶ Reference is to GEF/LDCF-NAPA II and GEF/LDCF-NAPA III projects.

Bhutan manifest as different drought, landslide and erosion vulnerabilities throughout the country, with high spatial variability existing across the country.

Participatory Rural Appraisals (PRAs) of the environmental and climate change impacts on key local livelihoods resources and assets carried out in August-September 2011 in some of the poorest gewogs in the country through the Joint Support Program⁷ also provide an insight on 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, (see Figure 2). This connotes and confirms 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: Proportional scale of environmental and climate vulnerabilities of local resources and assets

Climate Change and Gender

Climate change and its impacts are not gender neutral. Due to gender-differentiated traditional roles in society such as in agriculture, and health and nutrition of the family, women are amongst those who are likely to face the heaviest burdens from these changes and their impacts especially on agriculture and water availability. The gender assessment for the GEF/ LDCF-NAPA III project suggested that women are likely to be vulnerable in view of their roles in rural communities, which are largely confined to agricultural and domestic activities within the household while men go for off-farm non-agricultural work or conduct heavier tasks such as ploughing and firewood collection. At 54 percent, the agriculture sector accounts for the highest employment. Of this, women constitute 63.2 percent⁸, implying the importance of agricultural livelihoods for the development and well-being of Bhutanese women and, therefore, their vulnerability to climate change.

While a higher percentage of women are engaged in agriculture, surveys carried out for an in-depth assessment on climate change and gender⁹ revealed that less women (69 percent) compared to men (84 percent) were aware of climate-smart and resilient agriculture initiatives. The assessment also highlighted that rural men and women viewed coping measures to climate change differently, thus implying the importance of gender mainstreaming in climate change adaptation strategies.

Climate Change and Local Governance

⁷ Joint Support Programme, Capacity Development for Mainstreaming Environment, Climate Change and Poverty Concerns in National Policies and Programs. It was funded by the Government of Denmark, UNDP, UNEP and UNCDF.

⁸ Bhutan Labor Force Survey Report 2018, National Statistics Bureau, Royal Government of Bhutan.

⁹ The report of the assessment is currently a draft and its working title is "Gender and Climate Change in Bhutan: with emphasis on the NDC priority areas Agriculture, Energy and Waste." The assessment is supported by UNDP and the project partners are the National Commission for Women and Children and the National Environment Commission.

The Government is increasingly placing Local Governments at the center of the sustainable development agenda. The overall objective of the 12th FYP is to create a just, harmonious and sustainable society through enhanced decentralization. In keeping with this objective, in the 12th FYP, the capital resource allocation to the Local Governments made up 50% of the total budget outlay – a significant increase from the previous FYP where capital resource allocation made up 29% of the total budget outlay. The important role that the Local Governments have in climate change adaptation is highlighted below:

- CCA is often a highly localized matter. Different localities may experience different climate change challenges. Furthermore, climate change problems may differ between men and women, rich and poor, old and young, and between livelihoods. These local variations make climate change adaptation more suitable for Local Government actions. As formal institutions with the mandate for 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;
- Marginalization: mountainous communities can suffer from limited access to basic government, social and technical services including health care, education, and agricultural extension services. Hence the reinforced importance of LGs to ensure these services are available and provided;
- Given their proximity to the local communities, LGs have comparative advantages 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 the scenario of increased resource allocation to local governments, it is critical that the Local Governments have improved capacity to invest the increased resources in a sustainable manner. This among other things imply that in the current scenario of growing challenges of climate change, 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. In addition, the integrated and cross-sectoral landscape-based approach planning has been missing in operationalizing such projects. Hence, inadequate knowledge and information on such scope has greatly affected the materialization of statistical data-based and scientific recorded information in implementing water programming in the country.

To fill the gap aforementioned, this project will support strengthening of country driven capacity building for long term knowledge management and M&E for the enhancement of institutions in terms of 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 under-implementation projects in Bhutan through 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.

‘Water Inventories Mapping’ will be carried as part of the project activities wherein, the comprehensive study on watershed resources, its discharge potential and beneficiary records are compiled in view to understand the water resource landscaping in the country and to act as a point of reference to validate future study and analysis hovering the similar scope undertaken by the project under the Adaptation Fund. Information concerning the Drinking Water and Irrigation infrastructural developments coupled with its management and climate resilient/ proofing facilities have been limited and mostly anecdotal in

Bhutan. In addition, the integrated and cross-sectoral landscape-based approach planning has been missing in operationalizing such projects. Hence, inadequate knowledge and information on such scope has greatly affected the materialization of statistical data-based and scientific recorded information in implementing water programming in the country.

Project Sites

The proposed AF project will be implemented in four dzongkhags, viz. Dagana, and Paro, Tsirang and Sarpang (see Figure 3: map showing the location of the dzongkhags). It will cover 8 of the 14 gewogs in Dagana, 8 of the 10 gewogs in Paro, 3 out of the 12 in Tsirang, and 5 out of the 12 in Sarpang¹⁰. These 24 gewogs have been identified as priorities for intervention under the Government's "water flagship program." These gewogs, put together, have a total population of 53,254 and cover a total area of 1,982.63 (both about 5.6 percent of the country's total population and area).

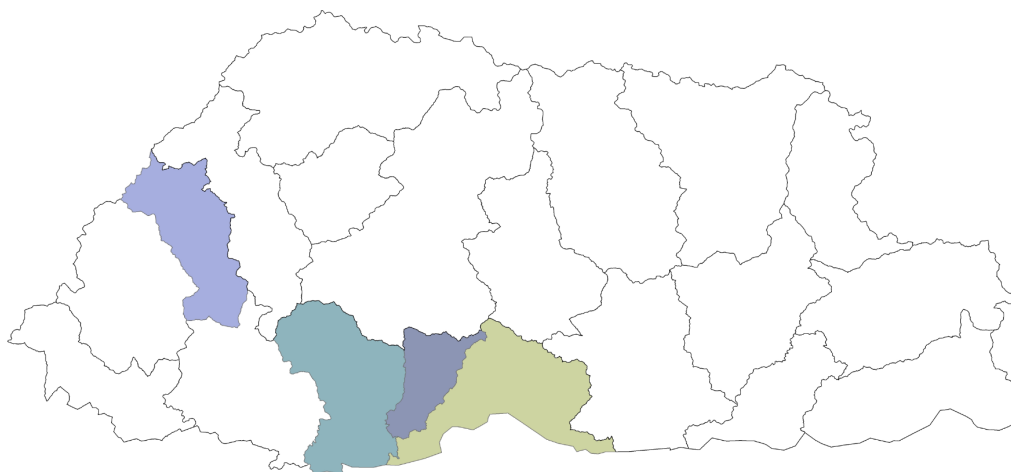


Figure 3: Map showing the location of Dagana, Paro, Tsirang and Sarpang Dzongkhags

Sl. No	Dzongkhag	Gewog	Area (km2)	Population		
				Male	Female	Total
1	Dagana	Dorona	107.7	415	337	752
2	Dagana	Drujeygang	58.30	965	977	1,942
3	Dagana	Gesarling	38.82	933	730	1,663
4	Dagana	Largyab	108.58	454	389	843
5	Dagana	Lhamoizingkha	103.95	432	364	796
6	Dagana	Tashiding	39.53	843	844	1,687

¹⁰ The concept note identified 12 Gewogs in Dagana and 5 Gewogs in Paro. However, given the changing planning dynamics and urgency to implement some of proposed activities, additional two Dzongkhags of Tsirang and Sarpang and Gewogs in Paro were added. The environmental and social safeguard has been conducted for all the proposed sites.

7	Dagana	Tshangkha	37.38	838	817	1,655
8	Dagana	Tshendagang	95.85	921	908	1,829
9	Paro	Dhopshari	36.7	1,623	1,710	3,333
10	Paro	Dokar	106.2	1,116	1,211	2,327
11	Paro	Luungyi	59.7	2,453	2,274	4,727
12	Paro	Lamgong	48.8	2,972	2,874	5,846
13	Paro	Naja	151.8	1,664	1,623	3,287
14	Paro	Doteng	191.3	651	652	1,303
15	Paro	Tsento	80	3,122	2,824	5,94
16	Paro	Wangchang	34.2	758	599	1,357
17	Tsirang	Semjong	137.6	712	600	1,312
18	Tsirang	Tsirangtoe	13.773	769	682	1,451
19	Tsirang	Phuentenchhu	136.45	665	666	1,331
20	Sarpang	Shompangkha	21	757	729	1,486
21	Sarpang	Chudzom	222	1,460	1,204	2,664
22	Sarpang	Serzhong	78	1,285	1,422	2,707
23	Sarpang	Chuzergang	21	1,262	1,237	2,499
24	Sarpang	Gelephu	54	3,314	3,143	6,457
		Total	1,982.63	30,384	28,816	53,254

Table 1: Project locations¹¹

¹¹ Source: PHCB 2017 & 12th FYP statistics

Dagana Dzongkhag

Encompassing a total area of 1,724.32 km², Dagana lies in the southwestern part of the country. The dzongkhag has a total population of 24,965 (12,956 male; 12,009 female). Of these, 81 percent make up the rural population. The mean annual household income is BTN 156,990 (USD 2,440 approx.) (GNH Survey 2015)¹². Agriculture and livestock rearing are the key sources of income. Dagana is one of the major producers of orange and cardamom in the country. The table below provides relevant vital statistics of the gewogs in Dagana:

Gewog	Population			Area (km ²)	Irrigation Scheme		No. of RWSS
	Male	Female	Total		No.	Km	
Dorona	415	337	752	107.71	13	22.80	17
Drujeygang	965	977	1,942	58.30	37	31.81	22
Gesarling	933	730	1,663	38.82	5	11.00	6
Gozhi	1,256	1,251	2,507	22.14	19	38.68	20
Karmaling	785	539	1,324	92.12	4	6.10	8
Kana	1,271	1,239	2,510	191.28	40	79.40	21
Khebisa	597	618	1,215	95.92	16	60.00	32
Largyab	454	389	843	108.58	10	25.00	21
Lhamoizingkha	432	364	796	103.95	8	20.74	9
Nichula	242	192	434	136.90	3	5.50	6
Tashiding	843	844	1,687	39.53	17	37.50	22
Tseza	554	541	1,095	594.12	16	53.92	8
Tshangkha	838	817	1,655	37.38	18	61.00	17
Tshendagang	921	908	1,829	95.85	18	44.45	48
Total	10,506	9,746	20,252	1,722.60	224	497.90	257

Table 2: Dagana statistics (source: 12th Five-Year Plan of Dagana Dzongkhag)

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

Paro Dzongkhag

Paro, situated in the northwestern part of the country, has a total area of 1,293 km². The population of the dzongkhag is 46,316 (23,941 male; 22,375 female). Rural communities constitute 74.3 percent 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, and in urban centers and peripheral areas they include tourism and small retail business.

The dzongkhag is divided into 10 gewogs; of which five will be covered by the project. The table below shows the five gewogs in Paro dzongkhag to be covered by the project with relevant vital statistics:

Gewog	Population			Area (km²)	Irrigation Scheme		No. of RWSS
	Male	Female	Total		No.	Km	
Dhopshari	1,623	1,710	3,333	36.7	7	18.3	-
Dokar	1,116	1,211	2,327	106.2	6	3.5	23
Luungyi	2,453	2,274	4,727	59.7	4	32.5	20
Lamgong	2,972	2,874	5,846	48.8	20	28.0	15
Naja	1,664	1,623	3,287	151.8	3	11.0	32
Shaba	3,258	2,683	5,941	76.4	18	49.5	15
Doteng	651	652	1,303	191.3	5	15.2	13
Tsento	3,122	2,824	5,94	80	22	83	17
Wangchang	758	599	1,357	34.2	8	11	6
Hoongrel	266	70	366	3.6	5	6	7

Table 3: Paro statistics (source: 12th Five-Year Plan of Paro Dzongkhag, Gross National Happiness Commission, RGoB)

Tsirang Dzongkhag

Tsirang dzongkhag is located in the south-central part of the country with elevations ranging from 400 to 2000 m above sea level. It shares its border with Wangduephodrang dzongkhag to the north, Sarpang to the east and southeast and Dagana to the west and southwest. There are twelve Gewogs namely, Barshong, Mendrelgang, Tsholingkhar, Tsirangtoe, Dunglagang, Kikhorthang, Sergithang, Rangthangling, Gosaling, Semjong, Phuentsenchu and Patsaling.

Gewog	Population			Area (km²)	Irrigation Scheme		No. of RWSS
	Male	Female	Total		No.	Km	
Tsirangtoe	769	682	1,451	13.773	34	99.5	34
Phuentsenchu	665	666	1,331	136.45	23	22.5	37
Semjong	712	600	1,312	137.6			15
Barshong	423	419	842	21.2	32	24.55	34
Dunglagang	779	767	1,546	45.9	19	34.2	19
Gosaling	925	939	1,864	9.9	7	44	23
Kikhorthang	1,099	1,046	2,145	17.80	18	35.7	42
Mendrelgang	1,276	1,231	2,507	15.5	13	25.1	21
Patsaling	567	592	1,159	170.9	6	10.5	30
Rangthangling	803	782	1,585	24.4	16	27.3	47
Sergithang	731	648	1,379	14.54	24	58	33
Tsholingkhar	892	853	1,745	30.32	4	10.1	63

Table 4: Tsirang statistics (source: 12th Five-Year Plan of Tsirang Dzongkhag, Gross National Happiness Commission, RGoB)

Sarpang Dzongkhag

Sarpang Dzongkhag is located in the south-central part of the country with an elevation ranging from 2000 to 3600 meters above the sea level. The district with an estimated area of 1,655 sq. kms has 12 Gewogs.

Gewog	Population			Area (km²)	Irrigation Scheme		No. of RWSS
	Male	Female	Total		No.	Km	
Serzhong	1,285	1,422	2,707	78	10	41.73	12
Chuzergang	1,262	1,237	2,499	21	10	29.6	5
Shompangkha	757	729	1,486	21	9	9	21
Singye	569	511	1,080	232	7	24.1	16
Samtenling	1,456	1,345	2,801	55	13	48	11
Gelegphu	3,314	3,143	6,457	54	4	8	9
Jigme Chhoeling	1,743	1,515	3,258	501	34	78.1	43
Tareythang	225	126	351	109	8	12.5	5

Unlimg	754	832	1,586	122	18	43.1	11
Dekiling	3,290	2,690	5,980	113	10	19.5	32
Chudzom	1,460	1,204	2,664	222	8	21.5	11
Gakiling	1,105	1,020	2,125	142	29	39.41	36

Table 5: Sarpang statistics (source: 12th Five-Year Plan of Sarpang Dzongkhag, Gross National Happiness Commission, RGoB)

Project Objectives:

The objective of the project is to build resilience to climate change and adaptive capacity of water-stressed communities in the Dzongkhags of Paro, Dagana, Tsirang and Sarpang.

The project comprises four components are as follows:

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

Component 2: Climate resilient water infrastructures 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 Climate Change Adaptation (CCA) mainstreaming with focus on water management at the grassroots.

Project Components and Financing:

Project/Programme Components	Expected Concrete Outputs	Expected Outcomes	Amount (US\$)
<u>Component 1:</u> Adaptive management of watersheds to enhance 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	800,000

<u>Component 2:</u> Climate resilient water infrastructures 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	6,384,697
<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>Output 3.3:</u> Agricultural disaster risk reduction and management mainstreamed	<u>Outcome 3:</u> Vulnerable agriculture land brought under SLM	1,230,055
<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 Local Governments strengthened for CCA and gender mainstreaming	<u>Outcome 4:</u> Improved sustainability through CCA mainstreaming and water governance at the local level	204,667
Project/Programme Execution cost			600,000
Total Project/Programme Cost			9,219,419
Project/Programme Cycle Management Fee charged by the IE			779,535
Amount of Financing Requested			9,998,954

Projected Calendar:

Milestones	Expected Dates
Start of Project/Programme Implementation	January 2022
Mid-term Review (if planned)	June 2024
Project/Programme Closing	December 2026
Terminal Evaluation	February 2027

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 uses by human activities, improved information systems and decision making, and linking with the most relevant level of governance. The issues related to water availability and uses 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 climate resilience of communities

In general, the watersheds in Bhutan are pristine. The good ecosystem health and relatively low human pressure in the country has contributed in the overall health of the watersheds. The strong environmental policies and good practices have succeeded in maintaining, in average in all the country, a good forest cover, with available quality water resources with slow and steady economic growth. In the past decade, however, increased developmental activities across the country is posing serious threats to the fragile mountainous ecosystems. Watersheds in Bhutan show now various degrees of degradation, with some locations showing high levels of risk.

In the current state, the issues that deteriorate the watershed in Bhutan are forest degradation, drying up of water sources, grazing, soil erosion and landslides, infrastructure development and rapid urbanization. Some of the causes of these issues are forest fire, over extraction of forest resources, illegal harvesting, poor grazing management, and farm roads with poor drainage, inappropriate land use practices, infrastructure development along with climate-related hazards such as extreme rainfall events and prolonged dry season, unstable geology and steep terrain.

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

It has therefore become paramount to manage the natural resources and the livelihood of the people living within the watersheds. With more than 60% of the population still agrarian and sensitive to climate change, adaptation becomes ever more necessary, calling for more effective management and

maintaining the overall health of their ecosystem services.

Integrated watershed management offers a holistic approach addressing these issues and enabling communities to increase their resilience to climate change. Adequate watershed management is a cornerstone that allows other interventions of the project such as development of climate resilient infrastructures and water governance to be more successful.

Past experiences of integrated watershed approaches in Bhutan showed promising results. People's understanding on addressing water issues in a holistic and collaborative way have been enhanced. The need for upstream and downstream linkages has been fostered and enabled adopting mechanisms like Payment for Ecosystem Services (PES) which not only provided a viable option to finance watersheds management but also incentivized communities for their involvement in conservation activities. Currently there are four PES schemes in Bhutan focused on protection of water source areas. The 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 to support the community members to use these funds in time of need and support poor and vulnerable community members during dire need of money. 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 promoting wise use of wetlands and water source revival activities have also been initiated. Three wetlands have been declared as Ramsar sites and few wetlands of national importance were assessed. However, wetland management has not been carried out in the project dzongkhags. Further, 6,555 water sources which are currently tapped for drinking, irrigation and industrial use were inventoried and of these, 35 % (2,317 water sources) were found to be in the drying stage (figure 4 below) and there is need to investigate the causes of drying and intervene appropriately. Therefore, WMD is seeking AF to support 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.

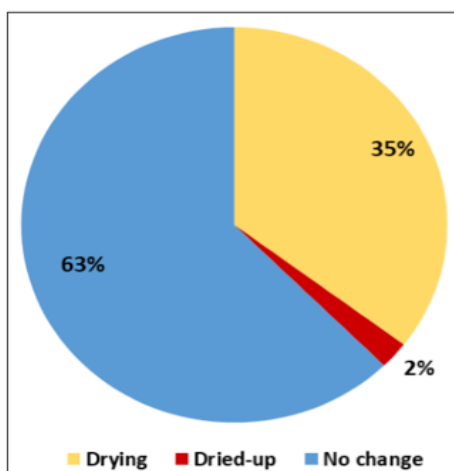


Figure 4: Status of water sources in Bhutan¹³

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,

¹³ Source: status of water sources in Bhutan, official data

the scaling-up of community-managed Payments-for-Ecosystem Services (PES) schemes, the protection of principal water sources and management of critical ecosystems such as wetlands. Further, the strategic recharge zones will be managed through the use of appropriate technologies and interventions to revive water sources and enhance ecosystem services. All those interventions shall improve the climate resilience of communities.

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

Output 1.1: Watershed management intervention measures implemented

Output 1.2: Payments-for-Ecosystem Services (PES) schemes scaled-up

Output 1.3: Water sources' recharge interventions adopted

Output 1.4: Wetland monitoring system for informed decision making established

Output 1.1: Watershed management intervention measures implemented

In a context of highly fragile ecosystems, watershed management ensures an integrated approach leading to ensuring soil conservation, fodder/fuel wood production, vegetation control, infiltration and water recharge; but also improved access and equity for the communities.

The Water Act of Bhutan 2011 and The Water Regulation of Bhutan 2014 mandate the Ministry of Agriculture and Forests (MoAF) develop and implement watershed and wetland management plans. A “roadmap” to guide the implementation of strategies aimed at improving the management of the Bhutan's watersheds was developed in 2009 and adopted by Watershed Management Division (WMD) under MoAF in 2011. It includes a strategy to focus watershed management planning initially on those watersheds requiring urgent management interventions.

Using the Guideline for Classification of Watersheds, 2016, watersheds are assessed and classified into pristine, normal, degraded or critical, with those classified as degraded or critical being scheduled for the development of management plans. WMD has undertaken the preliminary assessments of watersheds in Dagana, Sarpang, Tsirang and Paro dzongkhags and indicated communities' exposure and sensitivity to climate change while understanding on the same is limited. As such the need has been identified to carry out further assessments to comprehend the situation notably in the light of climate change and come up with appropriate interventions and measures to enhance the climate resilience of the local communities.

The prioritized project sites are Paro, Sarpang, Tsirang and Dagana dzongkhags. While Dagana has one watershed management plan developed, and watershed activities undergoing in some geogs in Sarpang and Paro, Tsirang and Paro does not have any watershed interventions carried out. The project will carry out detailed assessments of watersheds in the project dzongkhags and come up with prioritized watersheds for interventions by the midterm and implement intervention measures in at least one watershed in each dzongkhag by the end of the project. An exhaustive list of appropriate interventions will be identified, consulted and implemented. At least one training workshop per dzongkhag will be performed. Also, at least two study visits per gewog will be conducted, during the whole project duration.

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

Activity 1.1.1: Conduct community consultations and sensitizations (24 Gewogs to be consulted)

Activity 1.1.2: Training workshops (Four in total - one per project district) and study visits (2*4=8)

Activity 1.1.3: Conduct detailed watershed assessments in the project dzongkhags (minimum of four – at least one for each dzongkhag)

Activity 1.1.4: Development of watershed management intervention measures for the prioritized areas (at least one plan per dzongkhag- minimum of four)

Activity 1.1.5: Implementation of identified intervention measures

Output 1.2: Payments-for-Ecosystem Services (PES) schemes scaled-up

Payment for Ecosystem Services recognize the efforts done by upstream people that lead to the betterment of the lives of the downstream people in watersheds. Not only does a PES establish forms of collaborative management of natural resources and of the geographical space within a watershed, it also gives strong incentives towards the implementation of sustainable practices.

In Bhutan, PES initiative was started a decade ago in 2009 by WMD under Department of Forest and Park Services (DoFPS), and currently schemes are established in four dzongkhags: Paro, Tsirang, Chukha and Mongar. The main principle behind the PES scheme is to bring the beneficiaries of ecosystem services into direct contractual agreement with local communities protecting and conserving watersheds by adopting practices that ensure continuous supply of the services which in the current context is drinking water.

The recent report on PES schemes in Bhutan highlighted the benefits of PES both for securing watershed services as well enhancing the communities' bank account. 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 for improving stakeholders' awareness and knowledge (at all levels, including best resource management practices, financial management, decision making, ...) in PES benefits supporting scaling up PES schemes in the potential sites within the project dzongkhags and strengthen communities' stewardship towards watershed conservation. This will entail transformational change in proper management of natural resources by empowering communities to take charge. Further, experiences in the current sites as listed above will ensure not only stewardship but also replenishment of adequate water resources to the end-users through payment system.

Paro and Tsirang Dzongkhags currently have one PES scheme each, while there is none in Dagana and Sarpang Dzongkhags. Through this project, two more PES schemes will be explored in project sites. Actual development of the two additional PES schemes will depend on the feasibility and willingness of the stakeholders. Experience shows that providing awareness and education is the major component in the success of a PES scheme development. Therefore, awareness on PES will be conducted in other areas to educate communities on PES advantages and PES related management.

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

Activity 1.2.1: Conduct community consultations and sensitizations (one per gewog)

Activity 1.2.2: Hands-on training workshops in the management of PES schemes (4 trainings in total)

Activity 1.2.3: Conduct detailed resource assessment and inventory (one per dzongkhag)

Activity 1.2.4: PES scheme development and implementation based on the feasibility

Output 1.3: Water sources' recharge interventions adopted

According to the State of the Environment Report of Bhutan (2016), water source drying is a country-wide phenomenon. Similarly, the issues were also recorded by WMD while carrying out watershed assessments and development of management plans. Subsequently, WMD carried out assessment of drying springs and lakes that are used as drinking water sources (Refer figures 5 and 6 below) under

SPCR project. The study found out that the drying of water sources is widespread and has detrimentally affected both rural and urban population, limiting water supply for domestic consumption and irrigation.

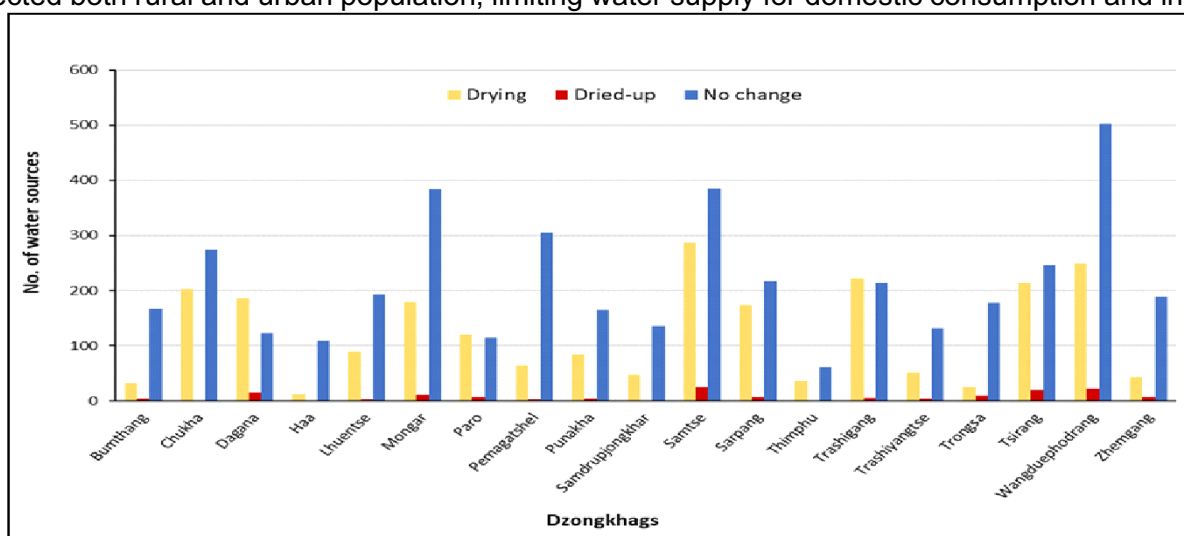


Figure 5: Status of Water Sources by Dzongkhags

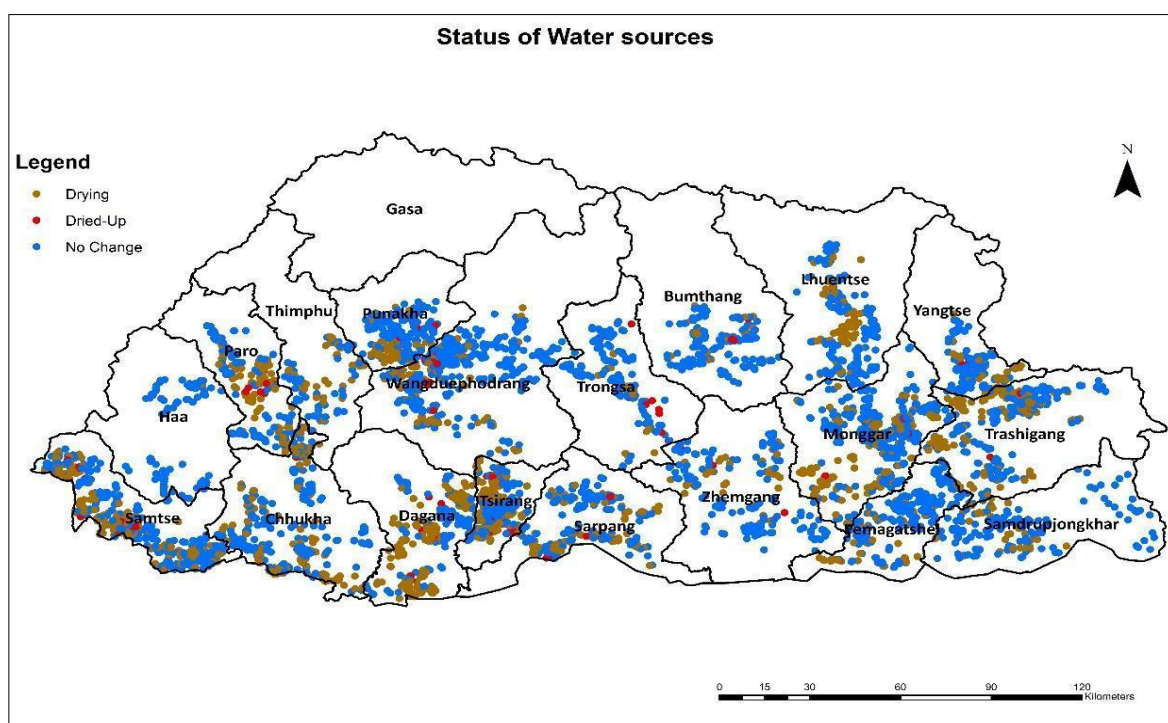


Figure 6: Map showing the location of various water sources and their status

However, at the 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 has recommended fencing the water sources, others recommended building water storage tanks and tapping from alternative sources. Thus, the interventions create further complex unintended consequences, as there is lack of interdisciplinary approach to address the core problem.

In order to understand the issue further, WMD has initiated water source studies and revival activities in Lholing under 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.

The proposed project will seek to strengthen the existing revival site in Paro and try to replicate the same in at least three more areas in other project dzongkhags through the AF support which otherwise would remain at the pilot scale.

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

Activity 1.3.1: Conduct community consultations and sensitizations (one per gewog)

Activity 1.3.2: Training workshops (at least one training workshop per dzongkhag)

Activity 1.3.3: Development of planning of intervention measures for the prioritized area
(at least one per dzongkhag)

Activity 1.3.4: Implementations of intervention action plan activities

Activity 1.3.5: 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 the watershed, 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, as well as 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 population and the lack of modern development technology (heavy dredging equipment and other land conversion technologies) had protected the wetlands. However, in the recent past, the disappearance of significant areas of wetlands was recorded especially in and around urban centers. The main drivers of change were fragmentation of large natural wetlands and impacts of climate change. Concurrently, the number of complaints on worsening quality and decrease in quantity of drinking water has seen significant rise.

WMD proposes to carry out inventory of wetlands in the selected four dzongkhags. The wetlands inventory primarily will provide the tools in implementing the Forest and Nature Conservation Rules and Regulations (FNCRR) 2017, where there are specific clearance mechanisms established to stop the conversion of significant wetlands in the country to 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 protection and management of critical wetland ecosystems and help in enhancing the resilience of communities by protecting their water sources.

Wetland mapping activities will be based on remote sensing technology, both validating existing wetland records and identify additional wetlands if needed. Data be will collected in all project sites.

The AF support would assist in establishing a reliable wetland monitoring system that would facilitate in developing plans and programs to address the vulnerability issues and maintain wetlands ecosystem functions.

Activity 1.4.1: Training workshops for capacity building of field offices (at least one per dzongkhag)

Activity 1.4.2: Conduct mapping of wetlands for the project dzongkhags using remote sensing
 Activity 1.4.3: Field data collection and mapping (all project gewogs)
 Activity 1.4.4: Data compilation and analysis, feeding decision making mechanisms

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

Drinking water

The very first element coming into picture is water which is affected by climate change. Daily rising inconsistency in temperature and precipitation has contributed to steep rise and drop in water availability in rivers and springs. It is crucial to adapt to these changes wherever possible to ensure continuous availability and/or accessibility of this vital resource.

Bhutan has high per capita availability of water when assessed at the level of basins with the total outflow of the rivers estimated at 109,000 m³/capita/year (National Integrated Water Resources Management Plan, 2016, NECS). However, issues in water accessibility continue to persist due to insufficient source management, inadequate infrastructure development and issues in management and governance. Issues in water quality are also becoming pertinent. The issues in water quantity and quality are further exacerbated by increasing population and urbanization and climate change. The rugged terrain and altitudinal variations also create imbalance in water supply with some areas having abundant water while adjacent one experience shortages. The abundant water is largely available in the form of major rivers and tributaries flowing in the low-lying river valleys and deep gorges, whereas most of the communities are located along slopes and depend on smaller streams, springs and lakes for drinking some of which are already drying. This issue of accessibility is clearly visible in some areas where rivers are freely flowing in the bottom of the valley, while houses on the hill sides remain facing shortages. Paro, Dagana, Tsirang and Sarpang are four such dzongkhags in Bhutan being considered here for this adaptation proposal wherein, an integrated approach is adopted to address water related issues at the source, infrastructure, quality and management levels with consideration for economic, social and ecological components along with risk factors (such as climate change and increasing population).

Dzongkhag¹⁴	Total Households (HHs)	Total HHs with continuous flow (24*7) of water	Total HHs without continuous flow (24*7) of water	Coverage in terms of 24*7 water supply (%)
Dagana	5,974	4,437	1,537	74.3
Paro	8,969	5,160	3,809	57.5
Tsirang	5,074	3,812	1,262	75.1
Sarpang	10,536	5,956	4580	56.5
Total	30,553	19,365	11,188	63.4

Table 6: 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.

¹⁴ The data is extrapolated from BLSS 2017 survey

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

In the rural areas, transferring of scheme ownership to the beneficiaries and maintenance has been a major challenge after the construction of Rural Water Supply Scheme (RWSS). Differing interpretations of policies and strategies has led to conflicting, differing and rapidly changing priorities and practices in the sectors. Many beneficiaries still see the ownership and responsibility for major maintenance and rehabilitation of rural water supplies as being that of the dzongkhag or RGoB. Many implementation procedures have actually contributed to a lack of beneficiary commitment to the self-management and maintenance of their own schemes.

Other mitigations include strengthening the existing water transmission/ distribution lines to be more climate-resilient and durable. Also, new water supply infrastructures considered for this project will be built with adequately resilient materials to ensure long-time benefits. Furthermore, infrastructures like the Water Treatment Plant (WTP) are also being considered (wherever necessary) to enhance the drinking quality standard.

Irrigation Water

Climate change induced by global warming poses significant risks to irrigated agriculture in general and water management in particular. Water availability and management is becoming challenging, with remote areas experiencing scarcity in dry areas and monsoon seasons experiencing high rainfall, flash floods and landslides have damaged existing irrigation schemes. Climate change is already impacting spring systems across the HKH region and Bhutan is not an exception. In the case of an irrigated system, rice cultivation is mostly dependent on monsoon charged spring waters and streams fed by glacier melts. Slight delays or changes in the pattern of rainfall directly impacts both availability and amount of irrigation water. Given the seasonality of streams and spring waters and extreme events, a major focus in building climate resilient irrigation structures and improvements in water management practices remains crucial. These interventions would help in improving the sustainability of farm productivity.

Most of the irrigation schemes in Bhutan were constructed as earthen canals with low efficiency and little resilience to extreme events – leading to blockages, water loss through seepage, water conveyance loss and frequent damage by landslides. The current infrastructure is exposed to deterioration by even slight increases in river floods and landslides caused by climatic variability, mainly rainfall patterns and temperature. These systems are thus highly susceptible to climate change effects.

With less than 18% of cultivated agricultural land irrigated, agriculture is predominantly rain-fed and dependent on the changing monsoonal rain patterns. Water shortages have been more pronounced during the main cropping season, which coincides with the pre-monsoon season. During dry periods, drought has impacted cropland, as well as the small streams on which small-scale irrigation depends, resulting in inadequate on-farm water supply, conflicts over water sharing, low labor productivity (e.g. due to time spent guarding against water theft) and low crop yields. In times of excess rainfall, flash floods and landslides block or damage irrigation schemes, disrupting flow of water to farmers through seepage-induced water loss and water conveyance losses. As a result, climate change not only negatively impacts rain-fed agriculture, but also irrigated agriculture production.

Despite the considerable investments made in water resource management, there has been limited explicit consideration of future climate change impacts in these investments. Climate change has also

served to undermine several of these investments and jeopardize many of the gains made through past interventions. For instance, the government's past investment in irrigation systems has not been climate resilient, causing irrigation systems susceptible to flood damage from heavy monsoon rain. Therefore, the project seeks to install climate proof infrastructure for drinking water and irrigation water supplies, thus enhancing and ensuring water security at every household in the two project sites. It is also expected to enhance food security through improvement in accessibility to water and channeling time saved into other income generating activities.

The project proposes to install or replicate successful irrigation systems such as hydro-pressurized pipe or High-Density Polyethylene (HDPE) pipe in Bhutan replacing the conventional conveyance system. Conventional irrigation systems often lose huge amounts of water to evapotranspiration and seepage and are vulnerable to extreme climate events like heavy rainfall. In addition, annual maintenance of long-distance irrigation canals requires huge labor and expenses, which could otherwise be spent on income earning opportunities for a household. In order to develop climate resilient irrigation systems, the climate change components will be mainstreamed in the irrigation planning process.

Replicating successful irrigation systems such as hydro-pressurized pipe or HDPE pipe are also expected to minimize negative environmental effects such as landslides often due to poor maintenance of the open irrigation canal. Further, the proposed technology has improved water delivery to the end users through reduction of loss of water to evapotranspiration and seepage. The large sized HDPE pipes were used to deliver the water to end users and in most of the cases the pipes are buried under the soil. Thus, vegetation cover will regain on those excavated sites and there is minimal effect on the arable land, as farmers can still cultivate crops with pipes running below.

The irrigation component under the project will focus on only two Dzongkhags of Dagana and Paro. These two Dzongkhags were specifically selected given their vulnerability to climate change and priority for the government. As per the National Irrigation Master Plan (NIMP), 40 and 15 irrigation schemes have been prioritized for irrigation modernization in Dagana and Paro respectively. Most of those irrigation schemes are partially damaged since those schemes were either constructed in early 90s and have received very little government assistance ever since then.

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

Sl. No.	Dzongkhag	No. of Irrigation schemes	Present gross area (ac)	Likely extension area (ac)
1	Dagana	40	4227	2253
2	Paro	15	2299	730

*Table 7: The prioritized irrigation system for modernization as per NIMP.
(Modernization involves re-engineering of existing irrigation systems and their structures)*

The proposed project will be built 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

In the municipalities, it is of utmost importance that the water infrastructures be built with upgraded technology in order to make them potentially resilient to climate change. Today, resilience of many

infrastructures has reduced drastically with time factored by excessive leakages and intermittent supply. Similarly, in rural Bhutan, it is very common to see drinking-water supplies being directly managed by households in an effort to have alternate supply of reliable water which is actually triggered by the failure of RWS schemes in supplying reliable water. In many cases, this is as a result of inadequate operation and maintenance of the RWS schemes due to lack of fund. These already substandard situations are at a high risk of being adversely affected by climate change owing to the increase in severity of challenges to the scheme managements.

While addressing the issues mentioned in the previous section, the project will construct new rural water supply schemes, rehabilitate/ renovate the existing schemes, and also tap new sources for a sustainable water solution. The infrastructure should look into the future needs of population growth, increasing demands and also the need to have structures designed adequately for lean flows in the winter and increased flood risks in the monsoons, to make them climate resilient. The project includes activities aimed towards reliable supply of drinking water such as source protection, extension of pipeline to a reliable source, and construction of water reservoirs to ensure continuous supply of water. As the supply of water becomes reliable, the need for temporary extractions of surface water from multiple places gets reduced and hence the vegetation of the districts is less disturbed.

One of the objectives of this project is to also ensure that the quality of the drinking water meets the standards set by the Bhutan Drinking Water Quality Standards (BDWQS) 2016 and thus development of Water Safety Plans is proposed. Water Safety Plan (WSP) is a water supply system risk management plan that addresses all steps in the water supply chain from catchment to consumer, ensuring the safety of drinking water. Although WSPs have been implemented in the past, many are not fully functional and thus, require reinforcement. Furthermore, in order to ensure sustained supply of good drinking water, periodic water quality testing needs to be conducted which entails procurement of testing kits and reagents including training.

The activities foreseen for project implementation to achieve the output are as follows:

Activity 2.1.1: Construction and Rehabilitation of at least 6 Drinking Water Supply Schemes:

Major portion of the infrastructures include the construction of rural water supply schemes which constitutes of constructing climate resilient; 1) intake structures and collection tank, 2) water transmission mains, 3) water distribution network, and 4) water reservoir. The activities not just include construction of new structures, it also includes rehabilitation/ augmentation of the existing structures which is equally essential to ensure resilience against climate change and thereby ensuring 24x7 water supply.

Water infrastructures in urban areas also include similar types as mentioned for rural areas but in a bigger way owing to the sheer increase in the population as compared to the rural areas. In addition to the water intake, transmission, and distribution, there is a need for water treatment plants especially for the urban settlement as the quantity of water stored is relatively huge and hence there is greater chance of contamination. After the completion of the project it is projected to benefit 5,297 households with a population over 30,215.

Activity 2.1.2: Development of Water Inventory

At the end of the project, it is very essential to have a reliable inventory of the water source and water supply assets which will provide guiding/ monitoring data for future sustenance. At present, the quality of data in terms of water source and distribution is very weak which provides very minimal information regarding the water situation of the two dzongkhags. This project will ensure development of a reliable

database of the complete water scheme, starting from the source till the end user which can even be replicated in other remaining dzongkhags of the country.

Activity 2.1.3: Capacity building of Engineers in Climate Resilient water supply infrastructures

First and foremost, it is necessary to establish the knowledgeable working group in order to execute any developmental activity. The concept of climate change is fairly new when it comes to water supply infrastructures in Bhutan. Most of the existing water supply works (especially rural schemes) executed are of conventional type. Although, it might be incorrect to say that these existing structures are not climate resilient, it is for sure guaranteed that these could be improved and made much more adaptive to climate change. Therefore, it is of utmost importance that the engineers executing these projects be educated in the concept of climate resilient structures. Through this project, the capacity of the engineers will be enhanced particularly in the concept of adaptation to climate change when it comes to water infrastructures including the complete conveyance (water source, transmission, treatment and distribution). It is foreseen that a minimum of 2 sessions for at least 20 Dzongkhag engineers and technicians and central agencies engineers will be organized.

Output 2.2: Climate and disaster resilient irrigation infrastructure established

The proposed activities under this output include:

Activity 2.2.1: Construction of at least 2 pressurized/closed irrigation systems (gravity)

The adaptation fund will support construction of 2 new pipe irrigation schemes to achieve greater climate resiliency and support farmers experiencing critical water scarcity, covering a total area of 216 acres. Given that the reliance on rainfed practices is of limited use in the face of increasing rainfall variations, the schemes will be aligned towards 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 formation of Water Users Associations (WUAs) with appropriate technological and institutional inputs. By combining both drinking and irrigation water, there will be no conflict over water tapping rights and will reduce the drudgery, maintenance cost as well as reduce the investment cost.

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

To enhance and ensure water security at every household, the adaptation funds will climate proof or strengthen the resilience of four existing open earthen canal irrigation schemes against extreme events, covering 629 acres. With the planned improvement of the existing irrigation systems, much of the infrastructures that are 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.

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 for efficient use of water and represents an adaptation strategy against scarcity of water. Small perennial streams will be tapped and water will be conveyed under gravity through pipes to provide irrigation through more efficient systems. Accordingly, adaptation resources will also 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 installation of two drip irrigation and four sprinkler irrigation systems covering a total area of 100 acres.

Activity 2.2.4: Tail water management

The irrigation tail water management was not given much importance in Bhutan. However, due to increasing extreme events, the management of tail water is becoming more important in order to prevent negative environmental impacts it causes downstream of the command area. Accordingly, the adaptation fund will fund tail water management in two schemes on pilot basis to properly channel the irrigation tail water into the natural gullies.

Output 2.3: Innovative technologies for tapping water adopted

Initially, Dagana Dzongkhag had proposed for rain water harvesting in a few villages/blocks but later when the assessment was carried out the rain water harvesting approach was not found feasible and the activity was revised to “extension of source and rehabilitation of the existing water supply schemes.

Similarly, under Paro Dzongkhag, few gewogs had also been proposed for ground water extraction but when the resistivity test (Ground water assessment) was done by the Department of Geology and Mines (DGM), they recommended further study. Therefore, due to the limitation of their findings, the ground water exploration activity was dropped and later, the Dzongkhag proposed gravity water supply which the activity has been proposed under BTFEC funding.

The proposed activities under Irrigation for this output include:

Activity 2.3.1: Promote and scale up solar/electric/manual water pump for irrigation

Owing to mountainous terrain almost all the existing irrigation systems in the country are operated through gravity flow with zero use of external energy/power. However, there are many areas located close to major rivers that face irrigation water shortage and arable lands are left fallow. These areas have the potential to pump water from the nearby rivers for irrigation and bring the fallow lands into cultivation to increase crop production. With increased economic development, the demand for water has drastically increased over the past few decades putting pressure on the existing water sources. To meet the new demand for alternative water resources (pumping from rivers, groundwater, etc.) need to be identified and tapped in.

The project will therefore promote and upscale different types of water lifting devices (Solar/electric/Hydraulic ram, etc.) essentially for the diversification of water sources for irrigation. The objective of diversification of water sources is to augment the amount of water supply for irrigation by tapping more reliable sources than the existing seasonal sources. This activity will promote and install three solar/electric water pumps for irrigation to diversify the water sources in Paro.

Activity 2.3.2: 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 the rain falling 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 community level.

Adaptation resources will therefore 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 those areas where water is plenty during monsoon but become completely dry during winter although the land is fertile. Low dry season flows in rivers 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 construction of eight small-scale earthen check dams and farm ponds 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 Water Users' Association to maintain the water source and to manage water supply services.

Some sectors (farm roads and irrigation under MoAF) have already developed policy guidelines for the formation of community groups and their involvement in carrying out minor maintenance works. Besides formulation of policy guidelines and establishment of clear structural-functional linkages, need based capacity building of all relevant stakeholders is equally important for effective implementation of these guidelines and operationalization of the linkages. To this end, through this project, user groups in the community to promote local ownership will be formed and strengthened. Building the capacity of the Community Groups through sensitization and training is another area that this project would like to address.

Rural to urban migration of the population is yet another persistent problem despite so many development activities taking place at the grassroots level. One of the main reasons often cited is non-availability of the jobs in the remote areas coupled with poor basic amenities. The promotion of Community Groups along with strengthening of their capacities through this project is expected to attract educated youths and school dropouts to take up the roles of leading and managing these Community Groups.

Activities proposed under this output will cover six WUAs for drinking schemes for drinking and 23 WUAs for irrigation schemes and include:

Activity 2.4.1: Form and strengthen user groups in the community to promote local ownership and sustainability of rural drinking water

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

1. Operate and maintain drinking water schemes and distribute it uniformly among the user group
2. Rehabilitate and improve the drinking water scheme
3. Train WUA members on the operation and maintenance of the schemes.

This activity will be able to provide trainings and support to six WUAs which in return will help them to operate, maintain and sustain their schemes.

Activity 2.4.2: Form and strengthen user groups in the community to promote local ownership and sustainability of irrigation schemes

Under the Water Act of 2011, WUAs are mandated as the managers of irrigation schemes. In line with this RGoB policy, water users will have to take charge of the operation and maintenance of their scheme. The National Irrigation Policy states that each Water Users Association 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 Water Users Association (WUA) Constitution and Bylaws aim to ensure that a particular irrigation system is operated, used and maintained well and will continue to give good benefits to all water users over a long period. WUA constitution and bylaws particularly emphasize mainly on 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 and workable constitution and bylaws. The trainers assist the WUAs to establish their own constitution and bylaws which aim at improving the organization and management of their irrigation system. Almost all the community managed irrigation systems (CMIS) will have their informal and traditional groups with existing rules for organization, operation and maintenance. Each and 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 for reference. If rules are clearly written down, fully understood, accepted and followed by all water users, the irrigation system will be better used and will last longer thus benefiting all water users.

Moreover, the beneficiaries of each irrigation scheme receiving the Government support will receive Scheme Management Training toward the end of the construction period mainly to prepare the water users for operation and maintenance. It is essential that water users are fully aware of the operation and maintenance requirements of all structures. Thus, water users practice the specific operation and maintenance (O&M) requirement for provided structures specially which are new to the users and thoroughly briefed on the possible areas requiring special attention and advise them to attend to those areas periodically. Along with the training on formation of WUA and scheme management training, the WUA members are acquainted with the knowledge of banking and book keeping and the importance of monitoring and reporting about the conditions of the renovated/constructed irrigation system.

It is believed that 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. With the involvement of women in the meetings and training related to irrigation and agriculture; it means a promotion of knowledge in water administration which is inevitable. Moreover, the committee members in WUA are being dominated by the female population since more females participate in the meetings. In the process, more females 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 the 23 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.

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 cultivated¹⁵. About 31% of agriculture land is situated on slopes more than 50%¹⁶. Farming is often carried out without any sustainable agriculture practices leading to annual soil loss of 3-21 t per hectare¹⁷. 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 rainfall patterns, agriculture in Bhutan is highly sensitive and vulnerable to the impacts of climate change and climate variability¹⁸. The Intergovernmental Panel on Climate Change¹⁹, 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 future with changing temperature and precipitation patterns (refer Project Background and Context, pages 4-5). In order to address the climate change impacts, the NAPA (2011) and the Renewable Natural Resources (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 of Sustainable Land Management (SLM) Technologies to promote soil and water conservation;
- (ii) Improve weather and seasonal forecasting for farmers (Agro-meteorology)

In line with the above, promotion of SLM technology was taken up as one of the options that fit well in Bhutanese farming environment and thus proven very successful in reducing land degradation caused by anthropogenic activities. In fact, the implementation of SLM interventions, especially the contour grass hedgerows on sloppy agriculture land have found to reduce soil erosion by 50 percent²⁰ as compared to traditional farming practices. Furthermore, Bhutan being the Party to the United Nations Convention to Combat Desertification (UNCCD) has committed to work towards Land Degradation Neutrality (LDN) 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 Department of Agriculture, has implemented a number of SLM projects through funding support from various donors (GEF through the World Bank, UNDP-SGP, BT FEC, and RGoB). These projects have successfully piloted and scaled up climate smart agriculture with special focus on SLM measures. The benefits and

¹⁵ Land Cover Mapping Project (LCMP), 2011, National Soil Services Centre, DoA, MoAF

¹⁶ National Action Program to Combat Land Degradation in Bhutan (NAP), 2014, National Soil Services Centre, DoA, MoAF

¹⁷ Soil Erosion Report, 2010, National Soil Services Centre, DoA, MoAF

¹⁸ National Adaptation Plan of Action (NAPA), 2011, National Environment Commission (NEC), RGoB

¹⁹ Intergovernmental Panel on Climate Change (IPCC), 2007

²⁰ Soil Erosion Report 2010, National Soil Services Centre, DoA, MoAF

the importance of SLM technologies have been well demonstrated and 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 from 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 the period 2005-2020, a total of 20,633 acres of vulnerable and degraded land has been restored through various SLM interventions. For the proposed project sites – Dagana Paro, Sarpang and Tsirang Dzongkhags, the total land area brought under SLM are 275 acres, 104 acres, 225 acres and 170 acres respectively. This clearly indicates that very little investments are made in SLM and the farmers in these four proposed project Dzongkhags are undertaking their farming largely with very little sustainable agriculture practices in place. In other words, there is strong need to scale up SLM interventions in these project sites to make agriculture land and farmer's livelihoods more resilient to climate change impacts.

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 thereby incurring crop yield losses in addition to the damages caused by the extreme weather events. Critical adaptation measures to avert these losses mainly involve the generation of weather and climate information. Weather and climate information help farmers to make critical farm decisions and adapt to the changing climate.

The Agrometeorology Program was established under the Department of Agriculture 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 favorable climatic conditions. To support the Agrometeorology program, expansion and operationalization of the Agromet Decision Support System (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 to support decision making across a range of temporal and spatial scales. The Agrometeorology Program will also issue advisories and early warnings against climate related disaster based on climate scenarios with better lead time. Early warnings against natural disasters not only help to save the crop by adopting quick strategic planning. Dissemination of such warnings to the end users on a real time basis with the help of electronic media can become a key factor for crop production and protection.

Therefore, this project component will focus its investment on SLM and Agrometeorology services to enhance resilience of the agriculture sector so that the livelihoods and the food security in the project areas are not put at risk. In particular, the component 3 will focus downstream section of the watershed, while the Components 1 and 2 will focus upstream i.e. the watershed management and water conveyance system, which is the overall design and approach of the project.

Output 3.1: SLM in vulnerable and degraded areas implemented

In order to enhance land productivity and make agriculture landscape more resilient to climate change, this project output will seek to scale out existing SLM practices and technologies that have been proven successful and effective in reducing land degradation especially soil erosion and landslides caused by rainfall variation. This will involve promoting two main types of SLM measures – Structural measures and Vegetative measures.

The structural measures mainly include terracing, i.e., the construction of a series of level or nearly level strips (benches) running across a slope following the contour lines at certain vertical intervals to be used as chhuzhing, dryland or orchard terraces.

The vegetative measures include:

- 1) Contour hedgerow - plantation of Napier grass along the contour line to provide physical barrier, slowing and trapping soil and fast-moving water down slopes and also provides added benefits of fodder to the livestock,
- 2) Plantation of bamboo and non-invasive tree species - done in degraded areas to stabilize the slopes.

The primary activities proposed under this output are:

- Activity 3.1.1: Participatory SLM Action Planning to validate key SLM interventions (four numbers)
- Activity 3.1.2: Implementation of SLM measures – terracing (1000 Acres), contour hedgerows (500 Acres) and landslide stabilization measures (20 Acres)
- Activity 3.1.3: Technical assistance and support to communities on the implementation of SLM practices in the field (12 numbers)
- Activity 3.1.4: 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 (300 Farmers)
- Activity 3.1.5: Learning visits for extension officers on SLM & Climate Change (12 staffs)
- Activity 3.1.6: Monitoring and technical assistance to support communities in implementation of SLM and to see the work progress (12 numbers)
- Activity 3.1.7: Documentation, Knowledge Management (KM) and experience sharing platforms (three stakeholder workshops).

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

This output will support the operationalization of Agrometeorology services in the country for better climate informed digital advisory services. The climate services will be provided appropriately in 19 gewogs and four dzongkhags 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 operationalizing the Agromet Decision Support System (ADSS).

The ADSS (www.agromet.gov.bt) was formally launched by the Department of Agriculture on 16 March 2021. A Memorandum of Understanding (MoU) is in place between DoA and RIMES to enhance the institutional and technical capacity of officials of the Department of Agriculture particularly Agriculture Research and Extension Division (ARED) and agromet focals based in Agriculture Research and Development Centers, Central Programs (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 weather extremes causing damage to various agricultural systems in Bhutan.

During the conceptualization of the ADSS, it was envisaged that the web portal would be scaled up in the remaining dzongkhags. The system needs to be upgraded and improved based on first-hand experience. Currently the 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 also should incorporate pest and disease forecasting and drought monitoring.

The activities under the project will mainly entail providing of agro-advisories in major agriculture commodities in the Adaptation Project sites. The agromet services would focus on the following main crops of the dzongkhags.

1. Paro

- Rice
- Apple
- Cabbage
- Potato

2. Dagana

- Rice
- Chili pepper
- Citrus

3. Tsirang

- Rice
- Chili pepper
- Citrus

4. Sarpang

- Rice
- Chili pepper
- Citrus

The agro-met program will be strengthened further with the enhancement of ADSS through this project and rural communities of project areas using agro-met products and services (agro-advisories) will be enhanced.

Planned activities under this output include:

Activity 3.2.1: Agro-met advisory bulletins appropriately packaged and disseminated timely

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

Activity 3.2.3: Capacity building of agro-met focal points based in ARDCs and Central Programs

Activity 3.2.4: Knowledge management and communication activities.

Output 3.3: Agricultural disaster risk reduction and management mainstreamed

Agriculture in Bhutan is vulnerable to a series of climate-induced disasters. Rural communities are often affected by floods, drought, windstorm, as well as occurrence of insect pests and diseases. Less than half of the rural household 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 agriculture drought and affects most of the farming communities especially rice and vegetable farming. The country on the other hand has recorded incidences of climate induced insect pest in the country. In 1996, rice farmers in high-altitude areas lost 80–90% of the crop production to rice blast disease. *Turcicum* leaf blight of maize in 2007 damaged more than 50% of the farmers' harvest. The outbreak of fall army worms affected 16 of the 20 districts in 2013. Also, in 2008, a severe windstorm destroyed all maize crops belonging to hundreds of households.

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

The following activities are foreseen for project implementation under this output:

Activity 3.3.1: Initiation of Climate/Farmer Field Schools to bring transformational change by enhancing response capacity to identified risks in four dzongkhags

Activity 3.3.2: Sensitization, awareness and capacity development on agro-met services to researchers, extension and farmers (10 numbers of sensitization)

Activity 3.3.3: Development of crop suitability and feasibility maps (eight maps)

Activity 3.3.4: Pest and disease forecasting services (five plant protection officials).

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 Yargye Tshogdu (DYT) or District Development Committee in 1981 and Gewog Yargye Tshogchung (GYT) or Block Development Committee in 1991, which resulted in the delegation of administrative and financial powers to the dzongkhag and gewog level respectively.

Bhutan is made up of 20 Dzongkhags (Districts), 205 Gewogs (Block) and 1044 Chiwogs (Villages). 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 local governments be established in each of the 20 Dzongkhags, comprising of: (a) Dzongkhag Tshogdu; (b) Gewog Tshogde; and (c) Thromde Tshogde. These are legislated to serve as the highest decision-making body respectively at Dzongkhag, Gewog and Thromde level, and are to be supported by Dzongkhag, Gewog and Thromde Administrations staffed by civil servants. It provides local governments with a set of administrative, regulatory, service delivery, and financial powers and functions for governance at the local level.

Component four will allow to increase to 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 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, in terms of knowledge and skills, of Local Governments to integrate climate change adaptation in local development investments; institute mechanisms for mainstreaming climate change along with other cross-cutting issues, viz. gender, environmental, disaster and poverty, in local development plans, programs and activities; institute mechanisms in Local Governments for CCA and gender mainstreaming; and strengthening Local Governments and user groups in the communities for effective management of irrigation and drinking water.

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

Strengthening Local Government institutions has been a key programme of the Royal Government of Bhutan since the commencement of decentralization process in 1981. In the new democratic system, the Local Government 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 Local Government level for mainstreaming climate change adaptation and gender needs in local development plans, programs and activities especially those concerning rural water supply schemes, agricultural irrigation systems and sustainable land management. The respective LGs will play the role of appraising local development plans, programs and activities with the lens of gender and climate change adaptation and ensuring these two issues, wherever relevant, have been mainstreamed. Through the project, Gewog-level mainstreaming mechanism for CCA and gender will be strengthened. Local Governments and communities will be sensitized and capacitated on mainstreaming CCA and gender in local development plans, programs and activities related to drinking water, irrigation and sustainable land management among others. Capacity development training for LGs on CCA tools, frameworks and approaches and M&E of CCA and gender mainstreaming in the plans, programs and activities of the respective LGs will be conducted.

The following activities are proposed to achieve this output:

- Activity 4.1.1: Conduct sensitization workshop for LGs and communities on mainstreaming CCA and gender in local development plans, programs and activities related to drinking water, irrigation and SLM
- Activity 4.1.2: Conduct capacity development training for LGs on CCA investment and mainstreaming tools, frameworks and approaches
- Activity 4.1.3: Carry out M&E of CCA and gender mainstreaming in their plans, programs and activities.

It is foreseen to implement a minimum of four sessions (trainings or workshops) per year, i.e., a minimum of 12 sessions covering the full project area.

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 which 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 in particular 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 climate change impacts 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 at the basis of sustainable natural and human systems.
- The design and implementation of integrated watershed management plans will improve habitat quality and increase biological diversity mainly as a result of protection of the watersheds. In the long run, protection of watershed will reduce incidences of drying of water sources as a result of extreme climate events like droughts.
- The establishment of PES schemes shall increase collaboration between upstream and downstream communities, opening dialogue and leading to a stronger ownership and stewardship for natural environment.
- Similarly, the formalization of Water User Associations (WUAs) shall also improve efficient utilization and management of water resources both at the source and at the level of 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.
- Replicating successful irrigation systems are also 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 reduce water losses due to uncontrolled spill overs and evapotranspiration.
- Successful SLM and climate-smart agriculture will also reduce topsoil erosion and combat land degradation, which in long run would 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 also improve planning and prevent environmental disasters. For instance, work on steep slopes for any developmental activities could be halted on the basis of objective information related to climate change and impacts on specific locations & watersheds.
- User-friendly climate information for the farmers would also increase crop productivity, which would 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 supplies of water reduce the economic burden of seeking alternatives in case of erratic water supply. In the long run, it shall also reduce vulnerability of the users from the risk of water sources drying-up.
- Increased incomes, through PES schemes, collection of NWFP and increase in agriculture productivity, will have a significant impact on reduction of poverty in vulnerable rural communities across Bhutan.

- In addition, more stable income will also improve the capacity of poorer groups to take advantage of any positive impacts of warmer climate in their locality.
- In a near future (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 non-wood forest products (NWFP) like cane, bamboo, mushroom, fiddlehead ferns and many others which are commonly harvested to supplement household income generation.
- 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 for 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 three percent of total land area.
- Watershed management also intends to decrease downstream sediment load, which can decrease Bhutan's hydro-power dams' efficiency and limit energy generation, which is one of the major exports for Bhutan.

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 being only resolved through interventions of the court. These solutions only partially contribute to social wellbeing.
- Formalization of WUAs shall lead to equitable sharing of water resources among the community members and notably at the grassroots, and make significant contribution to the same goal.
- Active participation by the community members during watershed management, PES schemes and implementation of SLM is also expected to improve social capital of the community for instance through revitalization of traditional labor 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 those whose voices are usually less heard.
- Inclusive participation in adaptation planning will also shed light to the needs of marginalized groups of people, including women, children, and the elderly.
- As such, the local climate resilience interventions that will be planned at LG level will promote the protection of economic and social rights through vulnerability reduction and support for disaster risk reduction.

Avoidance / mitigation of potential negative impacts

The BTFEC is mandated to promoting environmentally sound and sustainable development in the full range of its activities. 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 also 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.

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

For instance, the studies will improve knowledge of hydraulic dynamics between surface and groundwater, so as to guide decision making on their use. At the same time, environmental needs will be taken into consideration for the water resources management in each river basin.

As another example, SLM interventions such the establishment of contour grass hedgerow and stone bunds across the slopes will reduce soil erosion and enhance soil nutrient and soil moisture conservation. This will also help reduce sedimentation in the main river system thereby lowering the negative impacts on aquatic biodiversity and the settlements downstream.

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 center 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.

The mountainous background also explains the importance of adopting an integrated watershed approach, as uphill/downhill resources are, despite the administrative boundaries that may exist between them, intimately related.

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, where more than 60 percent of the population is still engaged in the agricultural sector.

In terms of irrigation technologies, the proposed interventions include HDPE pipeline and automated climate-smart technology which in the long run has minimal maintenance cost. Such interventions also have a high efficiency level of water usage. Also, and given the mountainous terrain, piped irrigation compared to open conventional irrigation channel shows more adaptive benefits.

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 10 years) than the HDPE pipe irrigation scheme which has a lifespan of minimum 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.

Hence, while upfront cost for pressurized piped irrigations schemes is higher than traditional open channels, it is increasingly proving to be most efficient, reliable, and sustainable scheme. Interventions on irrigation from other donors and development partners such as GEF-LDCF and GCF are also focused on building pressured piped irrigation which is the most suitable and resilient scheme for highly vulnerable mountain ecosystem.

The percentage of arable land according to RNR census of Bhutan 2019 was estimated at 2.83 percent. Hence, Sustainable Land Management (SLM) offers a holistic approach which would not only improve the soil fertility but in the long run it is proven to bring in numerous ecological benefits besides just increase in agricultural productivity. SLM technologies such as bench terracing helps retain soil and water in sloping land thus enhancing soil fertility and increased agriculture productivity and prevent land degradation. Further, bench terracing also enables farm mechanization and with gender friendly farm machineries, it also contributes to narrowing gender gap in agriculture sector. Such interventions are expected to promote youth engagement in the agriculture sector thus helping address youth unemployment issues and minimize rural-urban migration which ultimately will help contribute to achieving national food and nutrition security.

In close relationship to SLM, the proposed value-chain assessment of essential vegetables is in line with the increasing trend in vegetable cultivation in Bhutan. The proposed studies are expected to diversify income generation for rural communities and at the same time food and nutritional security for all including women, children and the elderly.

The proposal also tackles the issue of knowledge and decision making. Often there is a huge amount of climate data available, including 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 impacts of climate change and climate induced disasters can be significantly reduced.

Forming community-based groups such as Water Users Associations and formalizing such groups is also expected to increase project impact at the grassroots level. The groups are responsible for effective operations and maintenance of the interventions at the grassroot level thereby enhancing greater community ownership leading to its sustainability. The project activities are expected to be mainstreamed as a key responsibility of such community-based organizations.

Local Governance capacity building and also capacity building of engineers will improve identification of climate change impacts and ensure climate change adaptation measures are mainstreamed into local government plans and programs in terms of ensuring climate resilient infrastructure and interventions.

Further, the expected results are part of the targets set in the existing plans at national level. As an example, ensuring 24x7 safe drinking water supply for each and every household is the target set to be achieved by 2023. Yet, the available means are not sufficient to cover all needs in the country. This proposal intends to reach the set targets in four particularly needing Districts, independently of other sources of finance.

Last but not least, benefits will be produced beyond the project period as local ownership of natural resources management will be increased, notably through participatory approaches, sustainable practices put in place, equipment will be durable, and financial flows will remain through Payment-to-Ecosystem Services (PES) schemes.

Watershed management and PES give additional conservation benefits, provide incentives to communities for conservation, as sources are drying-up due to climate change and therefore, interventions are necessary to ensure recharge areas and protection of water sources and management of watershed areas.

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

The proposed project is in line with the Royal Government of Bhutan's Water Flagship Program. Taking into consideration the role of water towards sustainable socio-economic development, the Water Sector has been accorded a top priority by the Royal Government of Bhutan. Therefore, the proposed project is in line with the Government's Water Flagship Program that aims towards providing access to 24*7 safe drinking water and irrigation to both rural and urban households. Towards this, 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 the water legislation and governance.

The proposed project will contribute towards the achievement of the five of the 17 National Key Result Areas (NKRA) of Bhutan's National Development Plan i.e. 12th Five Year Plan (2018 to 2023). Those five NKRAS are:

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

The NKRA is a development outcome at the national level that will contribute towards achieving the overall objective of the 12th Five Year Plan. In total the plan identified 17 NKRAs, which are all closely aligned to the Sustainable Development Goals with their targets and indicators integrated into the 12th Five Year Plan.

Bhutan is currently working on development of its first National Adaptation Plan 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 proposed improving access to safe drinking water and sanitation and implementing integrated water resources management.

The proposed project is also in line with the National Agriculture sector's 12th Five Year Plan.

Project Component	NKRAs (2018-23)	SDGs (2015-30)	9 GNH Domains (Long term)
Component 1 Component 3	NKRA 3: Poverty and inequality reduced	Goal 1: No poverty Goal 10: Reduced inequality	Living standard Good governance
Component 1	NKRA 5: Health ecosystem services maintained	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	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	Goal 2: Zero hunger	Living standard
Component 1 Component 2 Component 4	NKRA 17: Sustainable water ensured	Goal 6: Clean water and sanitation	Living standard Health Ecological diversity and resilience

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 National Environment protection Act 2007. Other compliance requirements with regulation are described in more detail at component level:

In order 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.

- Agriculture Land Development Guidelines (ALDG) 2017 of the Ministry of Agriculture & Forests
- 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, Department of Agriculture, 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.

Further, extraction of water resources has to be in line with Water Act of Bhutan 2011, and Bhutan Drinking Water Quality Standards 2016.

The proposed irrigation activities are in line with the National Irrigation Plan, and no more review is required in that sense.

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

- Land Act 2007,
- Bhutan Water Policy 2008
- Water Act of Bhutan 2011
- Water Regulation of Bhutan 2014.
- Agriculture and Land Development Guideline 2017.

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

The DA, Gross National Happiness Commission (GNHC), is the apex planning and coordination body of the Royal Government of Bhutan. It notably ensures that any developmental activities in the country is in line with governments' priority as well as ensuring no duplication between project interventions. Any external or internal funding of any kind in Bhutan irrespective of implementing agencies has to be routed through the Commission.

The GNHC confirmed and will ensure that the current proposal is in line with the national priorities and there is no duplication and has synergy with other project interventions.

The proposed project area includes the Districts of Paro, Dagana, Tsirang and Sarpang. The initial proposed project was limited to the districts of Paro and Dagana (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 each of the two new additional Districts of Tsirang and Sarpang.

The proposed project is complementary with some of the ongoing and pipeline projects financed through GCF, GEF and GEF-LDCF.

The GCF financed UNDP project on Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan supports resilient agricultural practices in 8 Dzongkhags of Dagana, Tsirang, Sarpang, Punakha, Wangdue, Zhemgang, Trongsa and Samtse. 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. The Dzongkhags of Dagana, Tsirang and Sarang are common and provide opportunities for seeking synergy in terms of water management and sustainable land management.

The recently approved GEF and UNDP project on Ecotourism focuses on mainstream biodiversity conservation into tourism development. The project focuses on the eastern and south-central districts of Bhutan which are not within the proposed areas of the present proposal for the Adaptation Fund.

The recently approved project concept note under the GEF-LDCF on advancing climate resilience water sector in Bhutan covers the Dzongkhags of Thimphu, Wangdue, Tsirang, Sarpang and Punakha, i.e., also in other locations than the present proposal.

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 and also to allow the learning from the project are replicated in other areas in the future. The implementation of all project outputs will be based on participatory approach involving all the stakeholders and it will be geared towards knowledge management. This will ensure that the capacities of the parties involved are built as they participate in the implementation processes.

The project will seek to establish and strengthen existing knowledge management system and establish appropriate models of communications to disseminate information on climate change adaptation across areas of program implementation. The key lessons learnt and best practices will be documented for wider dissemination and policy mainstreaming. Eventually there will be an increased knowledge base on climate change adaptation for better decision making at all levels.

Further, the lessons learnt from the project will be documented and shared through meetings and publications with other communities for replication. 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 will be documented and made available for the wider reach of future project implementers. This is aimed in line to replicate and make realistic experiences, readily available to 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 (traditional) methods of technicality, so that those documents are available for national and international meetings.

The project will cover targeted communication strategy 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. The project also aims to develop project communications strategy through a consultative process, to have information reported based on it and for timely update of information and experiences so that all necessitated data are regularly compiled and delivered while reported grievances are addressed for the cyclic process of bettering the project.

Further the project will involve local people at the grassroots, such that the interaction and collaborative work experiences will enhance transfer of technical knowledge from field experts to local people, which subsequently will aid to 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.

The project will also cover long term study programs so that the existing human resources are professionally and scholastically equipped; and technically competent experts at national level are produced, tasked to develop and manage future water projects in the country. This manpower skill upgradation sustainably enables continual flow of skills and knowledge from one project to other, and build pool of national experts in realizing project goals.

Additional elements related to capacities in knowledge management in each of the 4 components include the following.

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 also creating awareness and empowering communities in water management mainly through PES. Further assessments on watershed in light of 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 particular advantage of emerging technologies for innovative solutions. This monitoring system will guide the planning process particularly the developmental activities take into consideration the vulnerability issues.

'Water Inventories Mapping' will be carried as part of the project activities wherein, the comprehensive study on watershed resources, its discharge potential and beneficiary records are compiled in view to understand the water resource landscaping in the country and to act as a point of reference to validate future study and analysis hovering the similar scope undertaken by the project under the Adaptation Fund.

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

The knowledge management under this component underscores recording of the indigenous and traditional best practices that are applied by local people in the supply of water for drinking and irrigation. Additionally, the project will involve local people at the grassroots, such that the interaction and collaborative work experiences will enhance transfer of technical knowledge from field experts to local people, which subsequently will help in meeting 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.

Further, case studies and technical reporting of the project under this component aim to 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 most vulnerable sectors to climate change. Taking this into consideration, the project will build 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 workshops to other parts of the country for the purpose of replication.

The lessons learned from involving the communities through Water user associations 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 Agrometeorological services

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

Notably, 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 as for 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 local government officials will be built particularly in mainstreaming climate change adaptation with a focus on the water sector in local governments. Local governments play a critical role in ensuring climate change adaptation measures are mainstreamed and sensitized to the local government 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.

Under each of the component, lead agencies have conducted stakeholder consultations, including with the local government, community leaders and community groups. A number of far-flung communities considered as vulnerable groups were also included. It is the government's priority that such groups are considered and benefit from any form of project. In most of the meetings, presence of women and youth were 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. Before the start of the detailed assessments to be performed under this proposal, courtesy visit is made to district administration to seek their support and apprise about the assessment and the need to carry out the same. Consultative workshop will be held with all the relevant agencies at the district level to create awareness on the watershed management and to seek information on the watersheds in the district.

Similar workshops will be held at the block/village level comprising of representatives of agencies and communities to create awareness and get their understanding on the watershed status from the local perspective.

Training on the use of guideline for watershed classification will be provided to staff at the block level, who will carry out the assessments. They will be technically backstopped by relevant line agencies and supported by knowledgeable community representatives.

Participation of the various workshops and consultations often simply depends on availability in the locality irrespective of gender, but consultations will make sure to get the perspectives of both women and men while carrying out assessments.

Component 2:

As a part of the recent consultative process held during the formulation of the national priority programs for the 12th Five Year Plan, several villages were involved and their views were incorporated in the “Water Flagship Program 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 Ministry of Agriculture and Forest prior to this proposal formulation. The land use mapping conducted by the MoAF have clear indications of different aspects of land use and related challenges, including at social level.

Component 4:

In regard to formation of Water Users Associations (WUA), an in-depth consultation was held with the local government 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.

Focus Group Discussions (FGD) were held with communities’ 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. Equality between men and women exists when both sexes are able to share equally in the distribution of power and influence; have equal opportunities for financial independence through work or through setting up businesses; enjoy equal access to education and opportunity to develop personal ambitions. A critical aspect of promoting gender equality is the empowerment of women, with a focus of 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 Water Users Association (WUA) for oversight management of drinking or irrigation water schemes amongst households using water from a facility. The office bearers of these WUAs comprise of Chairperson, Secretary and a Treasurer. Overall women representation comprises of only 11 percent of the office bearers for WUAs in the project area. Most of these WUAs are recognized by the Gewog Administrations. However, they are not formally registered and members officer bearers of these WUAs needs 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 enhance participation by women. For this the project should provide capacity building of WUA office bearers in
 - Awareness on 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
 - Record keeping.
- The project should aim to raise the representation in officer bearers of WUAs by women from 11% to 20% by 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 the Dzongkhag level, 100 percent of Dzongkhag Tshogdu (DT) chairperson; 75 percent of Deputy Chairperson, 100 percent of DTY Secretary and 78 percent of members are men. The representation of women in the Gewog Tshogde GT is 29 percent as compared to 22 percent 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 take up significant roles in 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 percent of the participants view that men have enjoy better access to training opportunities a than women. Given the significant role that women play in 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 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 limited water resources. Therefore, the stakeholder consultations in gender proposed inclusion of training on practical and technical measures to enable both men and women at grassroots to enhance their skills in water management at local level. 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 largely 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 decision 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 a dominated by women.
 - Men do have better access to financial capital over women such in 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 book keeping.
 - A survey on gender and climate change in Bhutan reported that 84 percent of men in Bhutan are aware of climate smart and climate resilient agriculture as compared to only 68 percent of women being aware of the same. It also reported that higher proportion of males enjoy access to information, training and inputs related to climate smart agriculture²¹. 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 percent of officer bearers in these WUAs comprise of women and that all trainings and workshops involving local communities achieve a 30 percent participation by women. The training needs are identified (See gender Assessment and Action Plan in Annex);
 - Awareness on water act; Water regulations; Group formation and management; Water

²¹ Gender and Climate Change in Bhutan, CNWC, 2020

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 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 a Gender Mainstreaming Specialist 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.

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

The rationale of selecting only two 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.

Local Government 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 Local Governments 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 Local Governments for CCA governance, Local Governments 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 Local Governments 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 Local Government 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 labor requirements for maintenance, which is adapted to the situation in rural Bhutan where there is already shortage of farm labor.

Component 3: The proposed land management and informed agrometeorological services are essential to agricultural activities within the watershed area. Indeed, implementation of sustainable land management practices in vulnerable and degrade areas are critical for increasing resilience of agricultural sector. In addition, making climate change information easily accessible through user-friendly products and services are key for 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 Water User Associations (WUA) 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 District level, that include multi-stakeholder dialogue, focusing on improving the status of natural resources and 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 all aligned with 12th Five Year Developmental Plan of Bhutan (2018 to 2023) and in particular aligned with Royal Government of Bhutan's priority program, Water Flagship Program Access to 24x7 Safe Drinking Water with Irrigation. Thus, all proposed activities are mainstreamed with into the existing system.

Different government and local government agencies are responsible to manage the components. There are 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 Royal Government of Bhutan (RGoB) through the Ministry of Agriculture & Forests (MoAF) has long recognized the importance of Sustainable Land Management (SLM) and Agriculture Land Development (ALD) to arrest the land degradation and improve land productivity. In line with this, ALD and SLM have been identified as one of the priority programmes in the 12th FYP (2018-2023) 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 to make critical farm decisions such as planting time, what to plant, when to harvest, fertilizer and pesticide applications. Therefore, the Agrometeorology Program was established under the Department of Agriculture 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 favorable climatic conditions.

Institutional sustainability: The project's institutional arrangements are based on existing RGoB institutional systems, program management, flow of funds, and accounting and reporting. In particular, it will support RGoB's on-going efforts to strengthen capacity and organizational structures within the MoAF to systematically and effectively coordinate and better manage land degradation prevention activities and the generation of weather and climate information in Bhutan. In particular, the National Soil Services Centre (NSSC) and the Agrometeorology program within the Department of Agriculture are mandated to look after ALD and weather information respectively both during the project period and beyond.

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 centers (ARDCs) and the local governments (Dzongkhags & gewogs) are designed to promote responsiveness to the real needs and increased accountability to the farmer clients.

Fiscal sustainability: The ALD and SLM activities are already mainstreamed into central and local government plans and programs. Every year, the RGoB allocates a certain budget (though limited) to ALD and SLM interventions. 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.

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

The project was reviewed against the 15 Environmental and Social Principles of the Adaptation Fund
a. A short description of the main findings is described below.

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	✓	
Access and Equity	✓	
Marginalized and Vulnerable Groups		✓
Human Rights	✓	
Gender Equity and Women's Empowerment		✓
Core Labour Rights	✓	
Indigenous Peoples	✓	
Involuntary Resettlement	✓	
Protection of Natural Habitats	✓	
Conservation of Biological Diversity	✓	
Climate Change	✓	
Pollution Prevention and Resource Efficiency	✓	
Public Health	✓	
Physical and Cultural Heritage	✓	
Lands and Soil Conservation	✓	

Environmental Risk

Tapping of natural sources for drinking and irrigation may reduce amount of water flowing in natural channels, thus negatively impacts wildlife and aquatic fauna. For instance, waterholes for wildlife may dry up and similarly recharge of groundwater may be reduced. Drying up of key waterholes for wildlife may have a negative cascading effect on the food chain.

Social Risk

Habitat improvement as a result of watershed management plans will increase wildlife population. Significant increase in population of wildlife species such as wild boar, sambar deer, primates, porcupines, common leopard and others may damage crops cultivated nearby the watershed areas. Crop damage and livestock predation by wildlife may reduce agricultural productivity.

In trying to support continuous supply of irrigation and drinking water, clear roles and responsibilities for water distribution need to be put in place, or else it would result in water disputes. Conflicts may also arise in laying the water distribution lines.

Equal participation of men and women, inclusive of vulnerable and marginalized communities, needs to be ensured in decision making. Any participatory approach will ensure that those social power relations will be well studied and decisions will be made on a participatory basis. Equal participation will also be ensured during all kinds of capacity development opportunities. However, precautions will be taken not to increase burden on women by increasing additional responsibilities, for instance like heading a WUA.

Access to water 24/7 may also result in an increase in water wastage, which would require robust regulations and awareness programs.

In case of implementation of SLM inability to adapt to new technologies especially SLM due to various constraining factors such small landholding size, farm labor shortage, ageing farming population and others were the fundamental challenges. Further benefits of SLM are long term which often discourages the farmers in adoption of SLM. Some of the issues will be addressed though offering short-term benefits, revitalizing traditional labor sharing and mechanisms.

Wherever possible incorporation of indigenous knowledge into the new technologies will be considered to ensure high level of success in new technology adoption in terms of SLM

Proposed mitigation measures

Type of risk	Mitigation measures
Marginalized and Vulnerable Groups	Identified vulnerable and marginalized groups in the project sites through consultation Ensured vulnerable and marginalized groups in the project sites benefit from the project through a development of an inclusive project implementation plan
Gender Equality and Women's Empowerment	Encourage women participation in the execution of project At least 30% of the decision-making body at the community level are women Delegate responsibilities to women at all levels

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

As the NDA, the Gross National Happiness Commission will provide strategic directions and oversee the overall achievement of the project outcomes.

The Bhutan Trust Fund for Environmental Conservation, as NIE, will provide overall coordination on the implementation of the Adaptation Fund Project and oversee the achievement of the project outputs.

The Project Steering Committee (PSC) under the umbrella of the NIE, will provide strategic technical and financial directions to the Project Management Unit and will be the decision-making body.

A Project Management Unit (PMU) housed at GNHC 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 Adaptation Fund Project.

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

The project beneficiaries (Four Dzongkhags) are at the local government level where the actual activities will be implemented. There will be active participation of the local government 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	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 Service Centre	Department of Agriculture, Ministry of Agriculture and Forests
	Agrometeorology Program, 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
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Bhutan Trust Fund for Environmental Conservation (NIE) will sign an agreement with Gross National Happiness Commission on behalf of the executing entities. The agreement will include administrative, legal, technical and financial clauses.

Project Organizational Structure

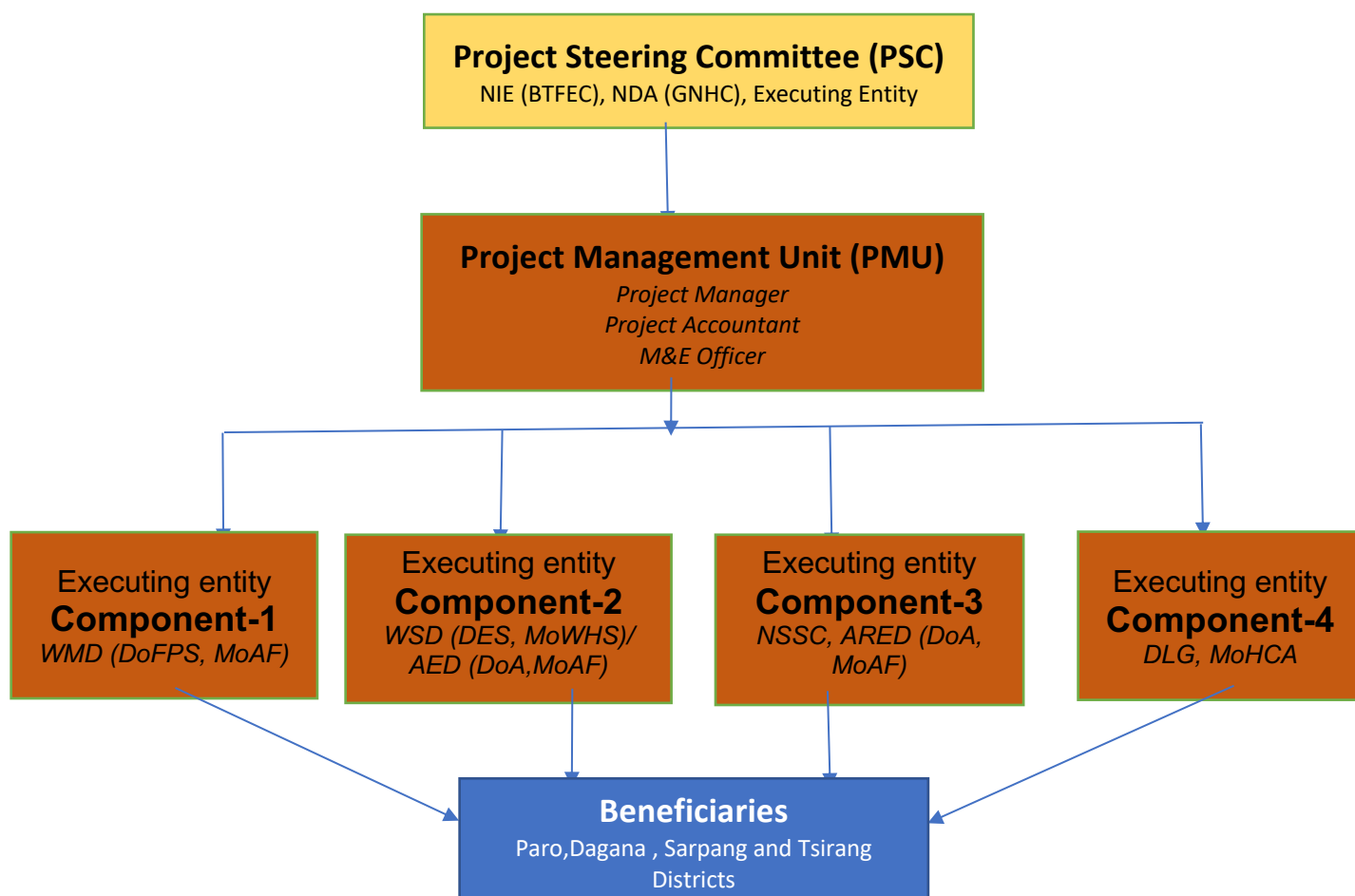


Figure 7: Project Organizational Structure

Roles and Responsibilities of Project Steering Committee

A Project Steering Committee comprising of membership from the four Executing Entities, Designated Authority, 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 with the aim of ensuring activities are implemented as planned and that they achieve expected outcomes
4. Provide guidance on the use of project resources and take measures that ensure cost effectiveness in Adaptation Fund
5. Liaise with the Royal Government of Bhutan on project implementation and provide policy guidance to the project related to the national policies in Adaptation Fund

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 program performance and progress and use of funds
4. Consolidate technical and financial reports for submission to Adaptation Fund Secretariat
5. Provide technical support to Executing Entities
6. Knowledge management of Adaptation Fund project
7. Focal point for Adaptation Fund project

Roles and Responsibilities of Executing Entities

1. Coordinate Adaptation Fund project activities within their respective project sites
2. Prepare progress reports as per Adaptation Fund report submit to NIE
3. Liaise with the NIE/PMU on projects implementation
4. Be role model for other regional Adaptation Fund projects by effectively implementing its specific project activities in effective ways
5. Ensure effective implementation of the project activities
6. Manage capital and mobilize human resources towards achievements of the concrete outputs per project

Roles and Responsibilities of Beneficiaries

1. Provide feedback on the projects impacts
2. Where applicable provide human, physical and capital resources towards full implementation of the project
3. Full participation during project implementation
4. Disseminate information and create awareness on climate change adaptation and mitigation as per the implemented projects

Financial Management:

All executing entities shall maintain their financial records in the Royal Government of Bhutan's (RGoB) 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 BTFEC maintains its all-financial records in a Sage ERP Complete and Comprehensive Program 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 generate 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.

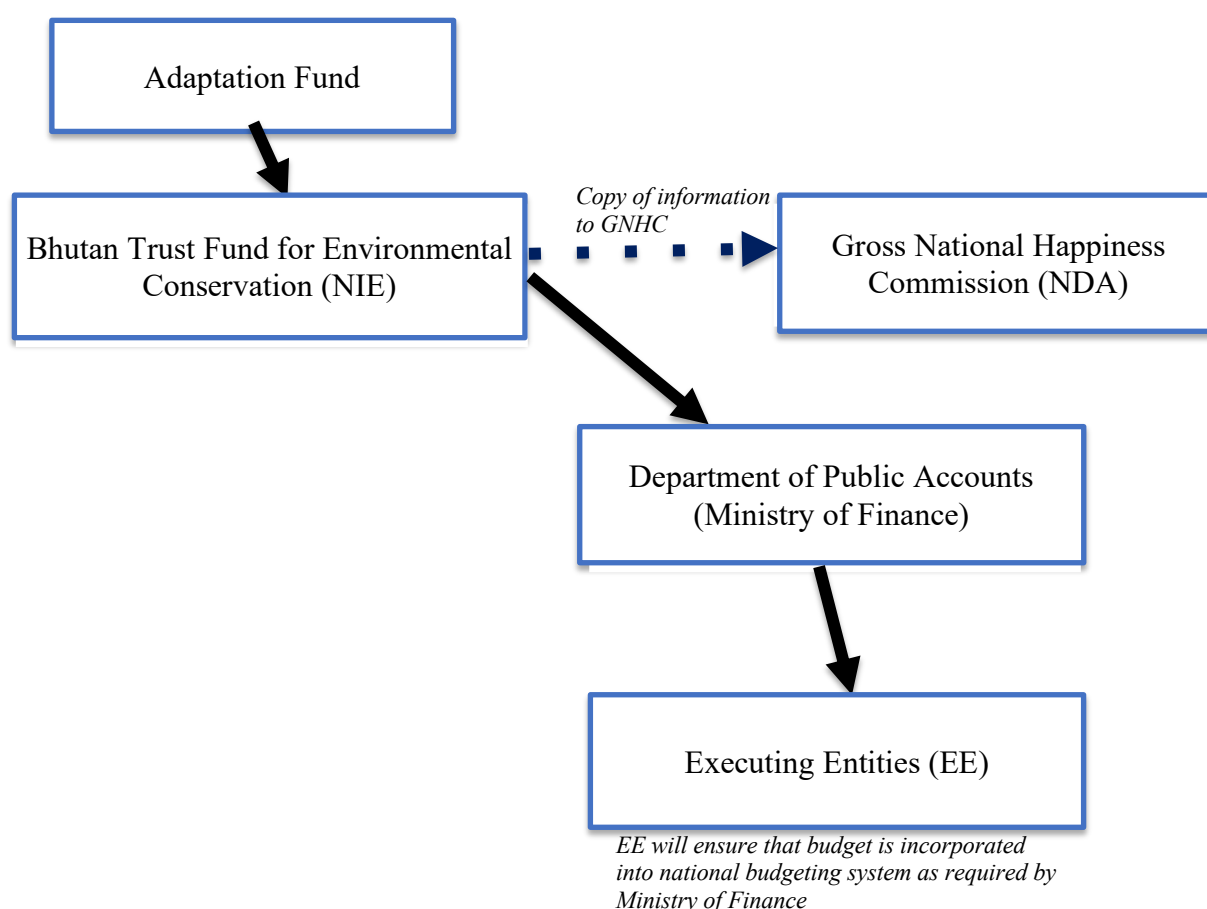


Figure 8: Flowchart Showing the Fund Flow

Procurement management

In order 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 (BTFEC) 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 quarterly basis.

All procurements will be executed as per the norms of the internationally recognized procedures.

Periodic Progress Reporting:

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

Stakeholder engagement plans

Component 1

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 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 Center 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/pvt 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	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
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Component 2: Improve climate resilient water infrastructures for uninterrupted supply of water for drinking and irrigation.

Output	Stakeholder	Type	Role in Project
Output 2.1: Climate and disaster resilient drinking water infrastructure established	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/ local government authorities	Implementation of field activities in the identified areas
	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 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.

water adopted	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/ local government 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/ local government authorities	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, Department of Agriculture (DoA), Ministry of Agriculture & Forests (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, Department of Agriculture, MoAF	Government agency	Prepare machine deployment plan and mobilize machines to the Dzongkhags for agriculture land development; timely monitoring and maintenance of machines
	Farm Machinery Corporation Limited	State Owned Enterprise	Hiring of machineries for agriculture land development (terracing)
	Private machine hiring agencies	Private enterprise	Hiring of machineries 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 enterprise	Supply seeds and seedlings
	Local Governments (LG)	Local government 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 available and accessible	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

	National Centre for Hydrology and Meteorology (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.
	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 Programs (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
	Local Governments	Local government 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
Output 3.3: Mainstreamed agricultural disaster risk reduction and management	Agriculture Research & Extension Division, DoA, MoAF	Government agency	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
	Department of Disaster Management (DDM), MoHCA	Government agency	Lead agency for disaster risk reduction
	National Centre for Hydrology and Meteorology (NCHM)	Government agency	Prepare and provide weather forecast information; Integration of weather forecasting system in agriculture decision support system (ADSS); Provide seasonal outlook forum and early warning of extreme weather events
	Agriculture Research & Development Centres, DoA, MoAF	Regional government research agency	Liaise with ARED and NCHM in implementation of agro-met activities; Incorporate crop data in the ADSS

	Central Programs (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
	Local Governments	Local government 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 Local Governments strengthened for CCA and gender mainstreaming	Department of Local Governance, 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/ local government authorities	Key beneficiaries; responsible for applying mainstreaming roles and responsibilities
	Central MRG/GNHC/NCWC	Inter-agency group/central government agency	Backstopping and guidance

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

NIE has been an autonomous grant making agency of Royal Government of Bhutan since 1996. NIE has also been executing entity for GEF/World Bank funded projects, and other global financing organizations such as Climate Investment Fund, Green Climate Fund's readiness grant, and so on. Thus, all financial and project management up to the international best practices as per the Program Operational Norms (PONs) of the NIE.

Basically, PONS lays out all required procedures of screening the project proposals against all operational and implementation risk 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 design 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 Implement Entity:

- promotes the development of a culture that supports effective risk management and innovation, and that encourages effective risk taking in line with DOE's risk appetite;
- integrates risk management into Programs, Projects and functions so that it is a fundamental part of how the DOE 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 DOE's risk appetite and project risk categorization.

Governance and Audit Committee: The Committee advises the Director and Management Team on the effectiveness of BT FEC's internal control systems, including risk management. Its terms of reference require 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 BT FEC'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 program 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 BT FEC's internal control systems, governance, risk management processes and on how well the BT FEC 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. This is done 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 economic environment would still remain uncertain as the project intends to create resilience of communities through agricultural activities that is dependent on vagaries of climate and other allied natural phenomenon.		X		Community commitment to carryout agriculture will be enhanced by assured water supply for agriculture and drinking ensuring their economic activities are facilitated	No of agreements signed with communities for their commitment for agriculture based economic activities
- Political	Governance	All the executing agencies are government agencies and proposed plans are aligned with the existing 5-year plan. 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			The execution of all four components are spear-headed by mandated government agencies with established institutional human	Reports

						resources and capacity. Capacity building of the communities involved	
-Investments	Investment	Failure to respond to needs of the intended beneficiaries.	X			All project activities are need based and aligned with the 12 th FYP and thoroughly deliberated and planned.	FYP reports
- Corporate image	CRS	Shall the project receive a negative image, this would impact BTFEC reputation	X			The agreed methodology and participatory approach ensure project ownership form 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			During implementation, the government will ensure financial sustainability through annual budget allocation for maintenance and other recurrent costs. Most expansive items (notably, at irrigation	

						level) are low maintenance. Users associations will be set in order 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
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 projects' stakeholders need to demonstrate they operate under a recognized legal entity.	

Table 6: Initial draft for 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.

The project is screened through NIE's Environment Social Safeguards (ESS) and Gender Screening tools which screens project in relation to all of the following ESS and Gender Standards:

1. Compliance with law
2. Access and equity
3. Marginalized and vulnerable group
4. Human rights
5. Gender equality and women empowerment
6. Core labor rights
7. Indigenous people
8. Involuntary resettlement
9. Protection of forests and natural habitats
10. Conservation of biological diversity
11. Climate change
12. Pollution prevention and resource efficiency
13. Public health
14. Physical and cultural resources/heritage
15. Land and soil conservation
16. Poverty alleviation
17. Disaster management capacity
18. Pest and disease management
19. Trans boundary issues

Those standards were in line with the best practices of ESS guidelines of Adaptation Fund and Green Climate Fund, to which NIE has aligned its project screening gender and ESS standards. Further the NIE has Gender Equality Strategy Framework, which is already being implemented since 2016.

The project has been screened using the ESS screening tool (See Table on Environmental and social risks screening of the project by AF and BTFEC principles) which is based on a list of risks identified against each project activity (Table on Description of project activities and identifying Environmental and Social Risks).

Description of project activities and identifying Environmental and Social Risks

Outputs	Activities	Risks	Impacts
Output 1.1 Watershed management intervention measures implemented	Activity 1.1.1 Conduct community consultations and sensitizations	COVID-19 pandemic protocols may restrict inclusive community consultations and participation; Risk of ownership over project activities	Inclusive community consultations may not take place

Outputs	Activities	Risks	Impacts
	Activity 1.1.2 Training Workshops	COVID-19 pandemic protocols may restrict inclusive community consultations and participation; Risk of ownership over project activities	Project activities may be delayed
	Activity 1.1.3 Conduct detailed watershed assessments in the project dzongkhags	No risks foreseen	
	Activity 1.1.4 Development of watershed management intervention measures for the prioritized areas	No risks foreseen	
	Activity 1.1.5 Implementation of identified intervention measures	Grievance related to lack of awareness on project intervention measures	Lack of project ownership by local stakeholders
		Restrictions may be imposed on some grazing areas that fall in water catchment protection interventions	Livestock rearing practices may change as pastures would be restricted for water source protection and conservations measures at water sources
		Risk of spreading pests and diseases due imported labor and planting materials for the identified interventions	Spread of pests and diseases among local communities and local vegetation
		Introduction of Alien Invasive Species (AIS) and spread of pest and diseases due to imported planting materials for watershed restoration interventions	Spread of pests and diseases within local vegetation and loss of biodiversity
		Impact on wild life in the form or restricting access to water holes, disturbance to natural habitats	Disturbance to wildlife

Outputs	Activities	Risks	Impacts
Output 1.2 Payments-for-Ecosystem Services (PES) schemes scaled-up	Activity 1.2.1 Conduct community consultations and sensitizations in each gewog	COVID-19 pandemic protocols may restrict inclusive community consultations and participation; Risk of ownership over project activities	Inclusive community consultations may not take place
	Activity 1.2.2 Hands-on training workshops in the implementation and management of PES schemes	COVID-19 pandemic protocols may restrict inclusive community consultations and participation; Risk of ownership over project activities	Project activities may be delayed
	Activity 1.2.3 Conduct detailed resource assessment and inventory in each Dzongkhag	No risks foreseen	
	Activity 1.2.4 PES scheme development and implementation based on feasibility	Lack of inclusive community participation in PES scheme development	Unequal benefits from PES
		Restrictions may be imposed on some grazing areas that fall in water catchment protection	Livestock rearing practices may change as pastures would be restricted for water source protection and conservations measures at water sources
		Risk of spreading pests and diseases due imported labor and planting materials	Spread of pests and diseases among local communities and local vegetation
		Introduction of Alien Invasive Species (AIS) and spread of pest and diseases due to imported planting materials for watershed restoration	Spread of pests and diseases within local vegetation and loss of biodiversity
		Impact on wild life in the form or restricting access to water holes, disturbance to natural habitats	Disturbance to wildlife
		COVID-19 pandemic protocols may restrict inclusive community	Inclusive community consultations may not take place

Outputs	Activities	Risks	Impacts
		consultations and participation; Risk of ownership over project activities	
Output 1.3 Water sources' recharge interventions adopted	Activity 1.3.1 Conduct community consultations and sensitizations in each gewog	COVID-19 pandemic protocols may restrict inclusive community consultations and participation; Risk of ownership over project activities	Inclusive community consultations may not take place
	Activity 1.3.2 Training Workshops	COVID-19 pandemic protocols may restrict inclusive community consultations and participation; Risk of ownership over project activities	Project activities may be delayed
	Activity 1.3.3: Conduct field works	No risks foreseen	
	Activity 1.3.4: Planning of intervention measures for the prioritized areas	No risks foreseen	
	Activity 1.3.5 implementations of intervention action plan activities	Lack of awareness on project activities and plans	Weak project ownership by local stakeholders
		Restricting access to water holes, disturbance to natural habitats	Disturbance to wildlife
		Restrictions may be imposed on some grazing areas that fall in water catchment protection	Livestock rearing practices may change as pastures would be restricted for water source protection and conservations measures at water sources
		Introduction of Alien Invasive Species (AIS) Due to imported planting materials for watershed restoration	Spread of pests and diseases within local vegetation and loss of biodiversity

Outputs	Activities	Risks	Impacts
	Activity 1.3.6: Monitoring and maintenance of conservation/restoration activities	No risks foreseen	
Output 1.4 Wetland monitoring system established for informed decision-making established	Activity 1.4.1 Training Workshops or capacity building of field offices	Pandemic norms may restrict gathering for training sessions	Project activities may be delayed
	Activity 1.4.2 Conduct mapping of wetlands for the project Dzongkhags using remote sensing	No risks foreseen	
	Activity 1.4.3 Field data collection and mapping in all project gewogs	No risks foreseen	
	Activity 1.4.4 Data compilation and analysis feeding decision making mechanisms	No risks foreseen	
Output 2.1: Climate- and disaster-resilient drinking water infrastructure established	Activity 2.1.1. Construction and Rehabilitation of Drinking Water at least 6 Supply Schemes	Disturbance to topsoil created by machineries and trucks	Minor soil erosion and land degradation in project activity sites
		Generation of solid and liquid wastes from project activities at construction sites	Minor pollution especially during the rainy season.
		End water suffer temporary disruption on drinking water supply a result of construction and rehabilitation works and temporally diversion of water supply	Temporary disruption in water supply causing health and sanitation issues

Outputs	Activities	Risks	Impacts
		Impact on wild life in the form or restricting access to water holes, disturbance to natural habitats	Disturbance to wildlife
		Risk of non-compliance to labor laws during implementation of project activities by contractors or project workers	Conflict with regulations
		Risk of non-compliance to nature conservation regulations during implementation of project activities by contractors or project workers	Degradation of natural environment and landscape through rampant collection NWFPs, firewood, medicinal; plants, fishing or hunting of wildlife
		Risk of non-compliance to local cultural norms during implementation of project activities by contractors or project workers	Conflict with regulations and local cultural norms Cultural and religious conflicts among project workers and local communities
		Minor disputes may arise among local communities and institutions on alignment of water conveyance lines through private land; on water distribution arrangements	Delay in implementation of project activities
		Vulnerable and marginalized groups and individuals (households characterize by - isolated and dotted settlements without motorable access road; with only elderly members & without household labor force; with alcoholic heads; fewer household members; Empty or no resident members; women and divorcee headed) may not be able contribute community labor contribution to the project	Vulnerable and marginalized groups may not be included as project beneficiaries

Outputs	Activities	Risks	Impacts
		Poor community members (households characterized by lack of adequate shelter; limited land holding or share croppers) may not be able contribute community labor contribution to the project	Poor community members may not be included as project beneficiaries
		Unhygienic accommodation and inadequate accommodation in labor camps for temporary labor from outside the project area may lead to health and safety of project workers	Impact on health and safety of project workers
		Increased waste from project activities and labor camps	Pollution of local water bodies and natural environment
		Risk of spreading pests and diseases within communities due to imported labor for project activities	Spreading of pests and diseases within communities
		Loss of vegetation due to land clearance during construction and establishment of camps for project activities	Minor degradation of forest natural forests
		Establishment of labor camps in culturally sensitive areas	Damage to physical cultural heritage
		alignment along rugged terrain over long distances	Infrastructure may be rendered inefficient and vulnerable to disasters due to leakages, inadequate water volume and inappropriate water pressure
		increased waste from project activities and labor camps	Pollution of local water bodies and natural environment
		Unproportionate diversion of water from natural streams for drinking and irrigation water supply	Water bodies may dry up Integrity of watersheds may be compromised
		Soil erosion from construction activities	Land degradation
		Challenge in availing consent for use of water	Delay of project activities

Outputs	Activities	Risks	Impacts
		sources or raw materials from another gewog	
		Challenges in material transport across long distance may lead to construction of haphazard development of access roads	Degradation of natural environment and landscape
		Delay in permits and clearances for project work	Delay of project activities
		Temporal variation in water supply at source due to climate change	Drinking water shortages
	Activity 2.1.2. Dev of Water Inventory	No risks foreseen	
	Activity 2.1.3. Capacity Building of Engineers in Climate Resilient Water Supply Infrastructures	No risks foreseen	
Output 2.2: Climate and disaster resilient irrigation infrastructure established	Activity 2.2.1. Construction of at least 2 pressurized/closed irrigation systems (gravity)	Disturbance to topsoil created by machineries and trucks	Minor soil erosion and land degradation in project activity sites
		Generation of solid and liquid wastes from project activities at construction sites	Minor pollution especially during the rainy season.
		End users may face temporary disruption on irrigation water supply as a result of construction works and temporary shortage diversions	Temporary disruption in water supply causing disruption to agriculture activities
		Risk of non-compliance to labor laws during implementation of project activities by contractors or project workers	Conflict with regulations
		Risk of non-compliance to nature conservation regulations during implementation of project activities by contractors or project workers	Degradation of natural environment and landscape

Outputs	Activities	Risks	Impacts
		Risk of non-compliance to local cultural norms during implementation of project activities by contractors or project workers	Conflict with regulations and local cultural norms Cultural and religious conflicts among project workers and local communities
		Impact on wild life in the form or restricting access to water holes, disturbance to natural habitats	Disturbance to wildlife
		Minor disputes may arise among local communities and institutions on alignment of water conveyance lines through private land; on water distribution arrangements	Delay in implementation of project activities
		Vulnerable and marginalized groups and individuals (households characterize by - isolated and dotted settlements without motorable access road; with only elderly members & without household labor force; with alcoholic heads; fewer household members; Empty or no resident members; women and divorcee headed) may not be able contribute community labor contribution to the project	Vulnerable and marginalized groups may not be included as project beneficiaries
		Poor community members (households characterized by lack of adequate shelter; limited land holding or share croppers) may not be able contribute community labor contribution to the project	Poor community members may not be included as project beneficiaries
		Restrictions may be imposed on some grazing areas that fall in water catchment protection	Livestock rearing practices may change as pastures would be restricted for water source protection and conservations

Outputs	Activities	Risks	Impacts
			measures at water sources
		Unhygienic accommodation and inadequate accommodation in labor camps for temporary labor from outside the project areas	Impact on health and safety of project workers
		Unhygienic accommodation and inadequate accommodation in labor camps for temporary labor from outside the project area may lead to health and safety of project workers	Impact on health and safety of project workers
		Increased waste from project activities and labor camps	Pollution of local water bodies and natural environment
		Limited loss of vegetation due to land clearance during construction and establishment of camps for project activities	Minor degradation of forest natural forests
		Establishment of labor camps in culturally sensitive areas	Damage to physical cultural heritage
		alignment along rugged terrain over long distances	Infrastructure may be rendered inefficient and vulnerable to disasters due to leakages, inadequate water volume and inappropriate water pressure
		Unproportionate diversion of water from natural streams for drinking and irrigation water supply	Water bodies may dry up Integrity of watersheds may be compromised
		Soil erosion from construction activities	Land degradation
		Challenge in availing consent for use of water sources or raw materials from another gewog	Delay of project activities
		Challenges in material transport across long distance may lead to construction of haphazard	Degradation of natural environment and landscape

Outputs	Activities	Risks	Impacts
		development of access roads	
		Delay in permits and clearances for project work	Delay of project activities
		Temporal variation in water supply at source due to climate change	Drinking water shortages
		Risk of spreading pests and diseases within communities due to imported labor for project activities	Spreading of pests and diseases within communities
	Activity 2.2.2. Re-engineering/ rehabilitation or improvement of 4 existing irrigation systems	Risk of spreading pests and diseases within communities due to imported labor for project activities	Spreading of pests and diseases within communities
		End users may face temporary disruption on irrigation water supply a result of construction works and temporally shortage diversions	Temporary disruption in water supply causing disruption to agriculture activities
		Minor disputes may arise among local communities and institutions on alignment of water conveyance lines through private land; on water distribution arrangements	Delay in implementation of project activities
		Vulnerable and marginalized groups and individuals (households characterize by - isolated and dotted settlements without motorable access road; with only elderly members & without household labor force; with alcoholic heads; fewer household members; Empty or no resident members; women and divorcee headed) may not be able contribute community labor contribution to the project	Vulnerable and marginalized groups may not be included as project beneficiaries

Outputs	Activities	Risks	Impacts
		Poor community members (households characterized by lack of adequate shelter; limited land holding or share croppers) may not be able contribute community labor contribution to the project	Poor community members may not be included as project beneficiaries
		Risk of non-compliance to labor laws during implementation of project activities by contractors or project workers	Conflict with regulations
		Risk of non-compliance to nature conservation regulations during implementation of project activities by contractors or project workers	Degradation of natural environment and landscape
		Risk of non-compliance to local cultural norms during implementation of project activities by contractors or project workers	Conflict with regulations and local cultural norms Cultural and religious conflicts among project workers and local communities
		Unhygienic and inadequate accommodation in labor camps for temporary labor from outside the project area may lead to health and safety of project workers	Impact on health and safety of project workers
		Increased waste from project activities and labor camps	Pollution of local water bodies and natural environment
		Risk of spreading pests and diseases within communities due to imported labor for project activities	Spreading of pests and diseases within communities
		Limited loss of vegetation due to land clearance during construction and establishment of camps for project activities	Minor degradation of forest natural forests
		Establishment of labor camps in culturally sensitive areas	Damage to physical cultural heritage

Outputs	Activities	Risks	Impacts
	Activity 2.2.3. Scale up micro-irrigation system (drip & sprinkler)	No risks foreseen	
	Activity 2.2.4. Tail water management	No risks foreseen	
Output 2.3: Innovative technologies for tapping water adopted	Activity 2.3.1. Promote and scale up solar/electric/manual water pump for irrigation (pumping from rivers, groundwater)	Excessive ground water abstraction may cause drop on water table during operation and management phases	Decrease inground water table and disturbance to hydrologic cycle
		safety risk associated with pump maintenance	Injury to workers in pump maintenance such as through electric shock
		Risk of spreading pests and diseases within communities due to imported labor for project activities	Spreading of pests and diseases within communities
	Activity 2.3.2. Build water harvesting structures or small-scale reservoirs to tap water for irrigation	Contamination water through collection surfaces	Health hazards
		Risk of spreading pests and diseases within communities due to imported labor for project activities	Spreading of pests and diseases within communities
Output 2.4: User groups in the community strengthened for effective management of irrigation and drinking water	Activity 2.4.1: Form and strengthen user groups in the community to promote local ownership and sustainability of rural drinking water	The lack of formal registration of WUAs and absence of their legal status could lead to unsustainable and inefficient management of water resources and infrastructure	Unsustainable management of water resources and infrastructure
		COVID-19 pandemic protocols may restrict inclusive community consultations and participation; Risk of ownership over project activities	Inclusive community consultations may not take place Project activities may be delayed

Outputs	Activities	Risks	Impacts
		Weak capacity for climate resilient design and management of water sources and infrastructure	Increased risk of climate disasters causing damage to project output
	Activity 2.4.2: Form and strengthen user groups in the community to promote local ownership and sustainability of irrigation schemes	The lack of formal registration of WUAs and absence of their legal status could lead to unsustainable and inefficient management of water resources and infrastructure	Unsustainable management of water resources and infrastructure
		COVID-19 pandemic protocols may restrict inclusive community consultations and participation; Risk of ownership over project activities	Inclusive community consultations may not take place Project activities may be delayed
		Weak capacity for climate resilient design and management of water sources and infrastructure	Increased risk of climate disasters causing damage to project output
Output 3.1 SLM in vulnerable and degraded areas implemented	Activity 3.1.1 Participatory SLM action planning to validate SLM interventions	COVID-19 pandemic protocols may restrict inclusive community consultations and participation; Risk of ownership over project activities	Inclusive community consultations may not take place
	Activity 3.1.2 Implementation of SLM measures – terracing (1000 Acres), contour hedgerows (500 Acres) and landslide stabilization measures (20 Acres);	No risks foreseen	
	Activity 3.1.3: Technical assistance and support to communities on the implementation of SLM practices in the field (12 Nos)	No risks foreseen	
	Activity 3.1.4: Field-based and specialized training to farmers	No risks foreseen	

Outputs	Activities	Risks	Impacts
	and agriculture extension staff on SLM technologies to enable them to respond to climate change induced risks and impacts with more competence and knowledge (300 Farmers);		
	Activity 3.1.5: Learning visits for extension officers on SLM & Climate Change (12 staff)	No risks foreseen	
	Activity 3.1.6: Monitoring and technical assistance to support communities in implementation of SLM and to see the work progress (12 Nos)	No risks foreseen	
	Activity 3.1.7: Documentation, Knowledge Management (KM) and experience sharing platforms (3 Nos of workshops)	No risks foreseen	
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	No risks foreseen	
	Activity 3.2.2: Incorporation of area specific weather and crop data in ADSS	No risks foreseen	
	Activity 3.2.3: Capacity building of agro-met focal points	No risks foreseen	

Outputs	Activities	Risks	Impacts
	based in ARDCs and Central Programs		
	Activity 3.2.4: Knowledge management and communication activities	No risks foreseen	
Output 3.3 Agricultural disaster risk reduction and management mainstreamed	Activity 3.3.1 Initiation of Climate/ Field Schools to bring transformational change by enhancing response capacity to identified risks	No risks foreseen	
	Activity 3.3.2 Sensitization, awareness and capacity dev on agro-met services to researchers, extension and farmers	COVID-19 pandemic protocols may restrict inclusive community consultations and participation; Risk of ownership over project activities	Inclusive community consultations may not take place
	Activity 3.3.3 Development of crop suitability and feasibility maps	No risks foreseen	
Output 4.1: Institutional mechanisms in Local Governments strengthened for CCA and gender mainstreaming	Activity 4.1.1: Conduct sensitization workshop for LGs and communities on mainstreaming CCA and gender in local development plans, programs and activities related to drinking water, irrigation and SLM	COVID-19 pandemic protocols may restrict inclusive community consultations and participation; Risk of ownership over project activities	Inclusive community consultations may not take place
	Activity 4.1.2: Conduct capacity development training for LGs on CCA investment and mainstreaming tools, frameworks and approaches;	COVID-19 pandemic protocols may travel activities	Project activities may be delayed
	Activity 4.1.3: Carry out M&E of CCA and gender mainstreaming in their plans,	No risks foreseen	

Outputs	Activities	Risks	Impacts
	programs and activities		

Environmental and social risks screening of the project by AF and BTFEC principles

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
1	COMPLIANCE WITH THE LAW				
1.1	Risk of delay in project activities due to delay in obtaining permissions and clearances for project activities	Construction activities for drinking and irrigation water infrastructure (Activity 2.1.1; 2.2.1)	M	L	M
1.2	Risk of delay in project activities due to delay in obtaining consent to extract water from another local jurisdiction	Construction activities for drinking and irrigation water infrastructure (Activity 2.1.1; 2.2.1)	M	M	M
1.3	Risk of delay because of need for compliance with COVID - 19 pandemic norms	Community consultations and sensitizations, Trainings and planning workshops (Activities 1.1.2; 1.2.2; 1.3.2; 4.1.2)	M	L	M
1.4	Risk of non-compliance to labor laws during implementation of project activities by contractors or project workers	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.1; 2.2.2)	L	M	M
1.5	Will there be risk that project does not comply with pollution control laws	None			
1.6	Degradation of natural environment and landscape through rampant collection NWFPs, firewood, medicinal; plants, fishing or hunting of wildlife and non-compliance to nature conservation regulations	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.1; 2.2.2)	L	M	M
	OVERALL RATING ON COMPLIANCE WITH THE LAW		M	M	M
2	ACCESS AND EQUITY				
2.1	Poor people will not have equal opportunities to be	None			

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
	selected as project beneficiaries				
2.2	Women will not have equal opportunities to be selected as project beneficiaries	None			
2.3	Indigenous minority people will not have equal opportunities to be selected as project beneficiaries	None			
2.4	Poor people will not be able to access services supported by the project	None			
2.5	Women will not be able to access services supported by the project	None			
2.6	Indigenous minority people will not be able to access services supported by the project	None			
2.7	Disabled people will not be able to access services supported by the project	None			
2.8	Elderly people will not be able to access services supported by the project	None			
2.9	Buildings constructed by the project will not have access for disabled people	None			
2.10	COVID-19 pandemic protocols may restrict inclusive community consultations and participation; Risk of ownership over project activities	Community consultations and sensitizations, Trainings and planning workshops (Activities 1.1.1; 1.2.1; 1.2.4; 1.3.1; 2.4.1; 2.4.2; 3.1.1;3.3.2;4.1.1)	M	M	M
2.11	Lack of inclusive community participation in PES scheme development leading to unequal benefits from PES	PES scheme development and implementation (Activity 1.2.4)	M	M	M
2.12	Lack of awareness on project activities and plans leading to weak project ownership by local stakeholders	Community consultations and sensitizations, Trainings and planning workshops (Activities 1.1.5; 1.3.5)			

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
2.13	Disruption of temporary access to water may cause health and sanitation issues to end users due to rehabilitation or construction of drinking water supply infrastructure	Construction activities for drinking water supply and rehabilitation works (Activity 2.1.1; 2.2.1; 2.2.2)	M	M	M
	OVERALL RATING ON ACCESS AND EQUITY		M	M	M
3	MARGINALIZED & VULNERABLE GROUPS				
3.1	Elderly people will experience negative impacts from the project	None			
3.2	Disabled people will experience negative impacts from the project	None			
3.3	Refugees or displaced people will experience negative impacts from the project	None			
3.4	Migrant workers will experience negative impacts from the project	None			
3.5	Children will experience negative impacts from the project	None			
3.6	Lack of inclusive community participation in PES scheme development leading to unequal benefits from PES	PES scheme development and implementation (Activity 1.2.4)	M	M	M
3.7	Vulnerable and marginalized groups may not be included as project beneficiaries if the project considers communities to provide unskilled labor for project activities. Vulnerable and marginalized groups and individuals (households characterize by - isolated and dotted settlements without motorable access road; with only elderly members & without household labor force; with alcoholic heads; fewer household members; Empty	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.1; 2.2.2)	M	M	M

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
	or no resident members; women and divorcee headed) may not be able contribute community labor contribution to the project				
	OVERALL RATING ON MARGINALIZED & VULNERABLE GROUPS		M	M	M
4	HUMAN RIGHTS				
4.1	Implementation of the project will result in violation of human rights of any people?	None			
	OVERALL RATING HUMAN RIGHTS	None			
5	GENDER EQUALITY & WOMEN'S EMPOWERMENT				
5.1	The project is designed by men who have not taken women's perspectives into consideration	None			
5.2	The project will result in an increased workload of tasks traditionally done by women	None			
5.3	Women will not have equal opportunities to participate and express their views on aspect of project implementation	Community consultations and sensitizations, Trainings and planning workshops (Activities 1.1.1; 1.1.2; 1.2.1; 1.3.1;1.3.2; 2.4.1; 3.3.2; 4.1.1; 4.1.2)	M	M	M
5.4	Lack of inclusive community participation in PES scheme development leading to unequal benefits from PES	PES scheme development and implementation (Activity 1.2.4)	M	M	M
5.5	Lack of awareness on project activities and plans leading to weak project ownership by local stakeholders	Community consultations and sensitizations, Trainings and planning workshops (Activities 1.1.5; 1.3.5)			
5.6	Households characterized by women or divorcee headed or single parents may not be included as project beneficiaries if the	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation	M	M	M

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
	project considers communities to provide unskilled labor for project activities	schemes (Activity 2.1.1; 2.2.1; 2.2.2)			
	OVERALL RATING ON GENDER EQUALITY & WOMEN'S EMPOWERMENT		M	M	M
6	CORE LABOUR RIGHTS				
6.1	Women or vulnerable groups will not have equal opportunities for employment in project activities	None			
6.2	The project will employ local people in conditions that may not comply with labor laws	None			
6.3	Safety risk associated with pump maintenance such and injury or workers in pump maintenance from through electric shock	Ground water extractions (Activity 2.3.1)	L	L	L
6.4	Unhygienic accommodation and inadequate in labor camps for temporary labor from outside the project area may lead to health and safety of project workers	Construction and Rehabilitation of Drinking Water Schemes/ pressurized/closed irrigation systems/ (gravity)/ Re-engineering/ rehabilitation or improvement (Activity 2.1.1; 2.2.1;2.2.2)			
6.5	Temporary labor from outside the project area will have conflicts with the local population	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.2)	M	M	M
6.6	Temporary labor from outside the project area will create a risk of spreading HIV or other transmissible diseases	None			
6.7	Children could be employed in project activities in	None			

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
	contravention of the labor laws				
	OVERALL RATING ON CORE LABOUR RIGHTS		M	M	M
7	INDIGENOUS PEOPLES				
7.1	Indigenous people will not be adequately consulted about the project	None			
7.2	Indigenous people will experience negative impacts on their traditional livelihoods	None			
7.3	Indigenous people will lose access to land or natural resources	None			
7.4	Indigenous people will experience negative impacts on their traditional culture and way of life	None			
7.5	People who are not indigenous minority will come to live, work or visit indigenous community areas.	None			
	OVERALL RATING ON INDIGENOUS PEOPLES	None			
8	INVOLUNTARY RESETTLEMENT				
8.1	Some households will have reduced incomes because of loss of land	None			
8.2	Households will suffer negative impacts from having to move their homes	None			
8.3	Households will have reduced income because of loss of access to community land or common property resources	None			
8.4	Land acquisition will be carried out without adequate consultation with the land users	None			
8.5	Land users will have the right to compensation but there will be no funds to pay compensation	None			

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
8.6	Minor disputes may arise among local communities and institutions on alignment of water conveyance lines through private land and on water distribution/allocation arrangements leading to delay in implementation of project activities	Construction activities for drinking and irrigation water infrastructure (Activity 2.1.1; 2.2.1; 2.2.2)	L	L	L
	OVERALL RATING ON INVOLUNTARY RESETTLEMENT		L	L	L
9	PROTECTION OF FORESTS & NATURAL HABITATS				
9.1	Challenges in material transport across long distance may lead to construction of haphazard development of access roads and degradation of natural environment and landscape	Construction activities for drinking and irrigation water infrastructure (Activity 2.1.1; 2.2.1)	M	L	M
9.2	Minor degradation of forest natural forests due to loss of vegetation through to land clearance during construction and establishment of camps for project activities	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.1; 2.2.2)	L	L	L
9.2	Disturbance to wildlife in the form or restricting access to water holes, disturbance to natural habitats	Implementation of watershed management and water source recharge activities (Activities 1.1.5;1.2.4; 1.3.5; 2.1.1;2.2.2)	L	M	M
9.3	Unproportionate diversion of water from natural streams for drinking and irrigation water supply	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.1)	M	M	M
9.4	Project will result in increased hunting of protected species of wildlife	None			

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
9.5	Project will result in unsustainable increase in wild capture fishing	None			
9.6	Project will result in unsustainable increase in firewood collection or timber cutting	None			
9.7	Project will result in unsustainable increase in collection of non-timber forest products	None			
9.8	Change in livestock practices due to restriction in grazing areas for water source protection and conservations measures	Watershed management, PES and water source recharge activities (Activities 1.1.5; 1.2.4; 1.3.5; 2.2.1)	M	L	M
9.9	Degradation of natural environment and landscape through rampant collection NWFPs, firewood, medicinal; plants, fishing or hunting of wildlife and non-compliance to nature conservation regulations	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.1; 2.2.2)	M	L	M
	OVERALL RATING ON PROTECTION OF FORESTS & NATURAL HABITATS		M	M	M
10	CONSERVATION OF BIOLOGICAL DIVERSITY				
10.1	Project will damage areas that are important for biodiversity	None			
10.2	Changed farming practices will reduce biodiversity	None			
10.3	Project will result in drainage of wetlands or natural water bodies	None			
10.4	Introduction of Alien Invasive Species (AIS) due to imported planting materials for watershed restoration	Implementation of watershed management and water source recharge activities (Activities 1.1.5; 1.2.4;1.3.5)	M	L	M
10.5	Disturbance to wildlife in the form or restricting access to	Implementation of watershed management and	L	M	M

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
	water holes, disturbance to natural habitats	water source recharge activities (Activities 1.1.5;1.3.4)			
	OVERALL RATING ON CONSERVATION OF BIOLOGICAL DIVERSITY		M	M	M
11	CLIMATE CHANGE				
11.1	The project supports activities that will not be sustainable because of climate change	None			
11.2	Weak capacity for climate resilient design and management of water sources and infrastructure could lead to increased risk of climate disasters causing damage to project output	Conducting capacity building for LGs on CCA tools, frameworks and approaches (Activity 2.4.1;2.4.2)	M	M	M
11.3	Project will result in increased greenhouse gas emissions	None			
11.4	Drinking water shortages in project areas as a result of temporal variation in water supply at source caused by to climate change	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.1)	M	M	M
	OVERALL RATING ON CLIMATE CHANGE		M	M	M
12	POLLUTION PREVENTION & RESOURCE EFFICIENCY				
12.1	The lack of formal registration of WUAs and absence of their legal status could lead to unsustainable and inefficient management of water resources and infrastructure	Formation and strengthen user groups in the community to promote local ownership and sustainability of rural water and irrigation schemes (Activity 2.4.1; 2.4.2)	M	M	M
12.2	Project will cause a long-term increase in air pollution that is harmful to human health	None			
12.3	Project will cause a long-term increase in air pollution	None			

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
	that is not harmful to human health				
12.4	Project will cause increased use of agriculture chemicals	None			
12.5	Project will result in a risk from hazardous chemicals	None			
12.6	Project will result in long-term increase in flows of polluted water	None			
12.7	Generation of solid and liquid wastes from project activities at construction sites and labor camps that can lead to pollution of local water bodies and natural environment	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.1)	M	M	M
12.8	Project will cause short-term environmental damage (e.g. during construction)	None			
12.9	Project will cause non-sustainable increase in extraction of groundwater	None			
12.10	Project will cause non-sustainable extraction or diversion of water from a surface water source	None			
12.11	Project will cause non-sustainable increase in mineral extraction	None			
12.12	Minor pollution of soils and surface water at project activity sites due to generation of solid and liquid wastes, especially during the rainy season	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.1; 2.2.2)	L	M	M
12.13	Disruption of temporary access to water may cause disruption in agriculture activities and reduced production diversion of water during construction and rehabilitation of irrigation water supply infrastructure	Construction and Rehabilitation of irrigation Water Supply Schemes (Activity 2.1.1; 2.2.1; 2.2.2)	L	M	M
12.14	Long distance and terrain between water source and end user catchment may render Infrastructure for	Construction of Drinking Water Supply Schemes and irrigation	M	M	M

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
	water supply inefficient due to leakages, inadequate water volume and inappropriate water pressure	schemes (Activity 2.1.1; 2.2.1)			
	OVERALL RATING ON POLLUTION PREVENTION & RESOURCE EFFICIENCY		M	M	M
13	PUBLIC HEALTH				
13.1	Public health hazards through contamination of water through collection surfaces of rain water harvesting structures	Rain water harvesting (Activity 2.3.2)	M	M	M
13.2	ProJet will result in increased use of harmful substances (e.g. alcohol)	None			
13.3	Project will cause people to change to less healthy or nutritious diets	None			
13.4	In increased transmission of diseases within communities due to imported labor for project activities	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 1.1.5; 1.2.4; 2.1.1; 2.2.1; 2.2.2; 2.3.1; 2.3.2)	M	M	M
13.5	Disruption of temporary access to water may cause health and sanitation issues to end users due to rehabilitation or construction of drinking water supply infrastructure	Construction activities for drinking water supply and rehabilitation works (Activity 2.1.1; 2.2.1; 2.2.2)	M	M	M
	OVERALL RATING ON PUBLIC HEALTH		M	M	M
14	PHYSICAL AND CULTURAL RESOURCES/HERITAGE				
14.1	Damage to physical cultural heritage due to establishment of labor camps in culturally sensitive areas	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.1; 2.2.2)	M	L	M

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
14.2	Project will cause loss of non-physical cultural heritage	None			
14.3	Project will change the appearance of any place that is famous for its natural beauty	None			
14.4	Cultural and religious conflicts from non-compliance to local cultural norms during implementation of project activities by contractors or project workers	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.1; 2.2.2)	L	M	M
	OVERALL RATING ON PHYSICAL AND CULTURAL RESOURCES/HERITAGE		M	M	M
15	LANDS AND SOIL CONSERVATION				
15.1	Clearing of trees or other vegetation could cause soil erosion	None			
15.2	Minor soil erosion and land degradation in project activity sites due to disturbance to topsoil created by machineries, trucks and construction materials	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.1)	L	M	M
15.3	Changed water flows (e.g. from road drainage or river works) could cause soil erosion	None			
15.4	Project can cause damage to any sensitive landscape	None			
	OVERALL RATING LANDS AND SOIL CONSERVATION		L	M	M
16	POVERTY ALLEVIATION				
16.1	Project will not give priority to poor people to be selected as project beneficiaries	None			
16.2	Project does not include provisions to identify poor households that need assistance from the project	None			

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
16.3	Poor households will not benefit from the project as much as non-poor households	None			
16.4	Lack of inclusive community participation in PES scheme development leading to unequal benefits from PES	PES scheme development and implementation (Activity 1.2.4)	M	M	M
16.5	Change in livestock practices due to restriction in grazing areas for water source protection and conservations measures	Watershed management, PES and water source recharge activities (Activities 1.1.5; 1.2.4; 1.3.5; 2.2.1)	M	L	M
16.6	Disruption of temporary access to water may cause disruption in agriculture activities and reduced production diversion of water during construction and rehabilitation of irrigation water supply infrastructure	Construction and Rehabilitation of irrigation Water Supply Schemes (Activity 2.2.1; 2.2.2)	L	M	M
16.7	Poor community members (households characterized by lack of adequate shelter; limited land holding or share croppers) may not be able to contribute community labor to the project activities and may not be included as project beneficiaries if the project considers communities to provide unskilled labor for project activities.	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.1; 2.2.2)	M	L	M
	OVERALL RATING on POVERTY ALLEVIATION		M	M	M
17	DISASTER MANAGEMENT CAPABILITY				
17.1	Project will result in increased risk of loss of life from natural disasters	None			

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
17.2	Infrastructure may be rendered inefficient and vulnerable to disasters due to leakages, inadequate water volume and inappropriate water pressure as a result of alignment along rugged terrain over long distances	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 2.1.1; 2.2.1)	M	M	M
17.3	Project outputs could be damaged by natural disasters	None			
	OVERALL RATING ON DISASTER MANAGEMENT CAPABILITY		M	M	M
18	PESTS AND DISEASE MANAGEMENT				
18.1	Farming activities supported by the project could be affected by crop pests	None			
18.2	Farming activities supported by the project could be affected by livestock diseases	None			
18.3	Risk of spreading pests and diseases within communities due to imported labor for project activities	Construction and Rehabilitation of Drinking Water Supply Schemes and irrigation schemes (Activity 1.1.5; 1.2.4; 2.1.1; 2.2.1; 2.2.2; 2.3.1; 2.3.2)	M	M	M
18.4	Risk of spreading pests and diseases within the local vegetation through imported planting materials	Implementation for watershed management and water source recharge activities (Activities 1.1.5; 1.2.4; 1.3.5)	M	L	M
	OVERALL RATING ON PESTS AND DISEASE MANAGEMENT		M	M	M
19	TRANS BOUNDARY ISSUES				
19.1	People engaged in activities related to the project cross international boundaries illegally	None			

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
19.2	Project will affect water flows across an international boundary	None			
19.3	Project will cause air or water pollution that crosses an international boundary	None			
19.4	Project will have other negative impacts across an international boundary.	None			
	OVERALL RATING ON TRANS BOUNDARY ISSUES	None			

Following project risk identification through participatory process and screening of the project risks by each activity, project overall Project Risk Category has been determined as Category B. However, the principles on Human Rights, Indigenous People and Transboundary issues are not triggered through the participatory risk assessment. Project categorization has been done based on significance of risks on the 16 principles that have been triggered.

ESS risk categorization

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
1	OVERALL RATING ON COMPLIANCE WITH THE LAW	Risk of delay in project activities due to delay in obtaining permissions and clearances, delay in obtaining consent to extract water from another local jurisdiction; Risk of delay because of need for compliance with COVID - 19 pandemic norms; Risk of non-compliance to labor laws during implementation of project activities by contractors or project workers; Degradation of natural environment and landscape through rampant collection NWFPs, firewood, medicinal; plants, fishing or hunting of wildlife and non-compliance to nature conservation regulations. (Activities 1.1.1;1.1.4; 1.1.2; 1.2.1;1.2.2; 1.2.4; 1.3.1;1.3.2; 1.3.3; 1.4.1; 3.1.1; 4.1.1; 4.1.3; 4.2.2; 2.1.1; 2.2.1; 2.2.2;2.2.3; 2.3.1; 2.3.2;2.3.3; 2.3.4)	M	M	M
2	OVERALL RATING ON ACCESS AND EQUITY	COVID-19 pandemic protocols may restrict inclusive community consultations and participation ; Risk of ownership over project activities Lack of inclusive community participation in PES scheme	M	M	M

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
		development leading to unequal benefits from PES; Lack of awareness on project activities and plans leading to weak project ownership by local stakeholders; Disruption of temporary access to water may cause health and sanitation issues to end users during rehabilitation or construction of drinking water supply infrastructure ((Activities 1.1.1;1.1.4; 1.1.2; 1.2.1;1.2.2; 1.2.4; 1.3.1;1.3.2; 2.1.1 1.3.3; 1.4.1; 3.1.1; 4.1.1; 4.1.3; 4.2.2)			
3	OVERALL RATING ON MARGINALIZED & VULNERABLE GROUPS	Lack of inclusive community participation in PES scheme development could lead to unequal benefits from PES; Vulnerable and marginalized groups may not be included as project beneficiaries if the project considers communities to provide unskilled labor for project activities; Vulnerable and marginalized groups and individuals (households characterize by - isolated and dotted settlements without motorable access road; with only elderly members & without households labor force; with alcoholic heads; less household members; Empty or no resident members; women and divorcee headed) may not be able contribute community labor contribution to the project ((Activity 1.2.4; 2.1.1; 2.2.1; 2.2.2)	M	M	M
4	OVERALL RATING ON HUMAN RIGHTS	None			
5	OVERALL RATING ON GENDER EQUALITY & WOMEN'S EMPOWERMENT	Women will not have equal opportunities to participate and express their views on aspect of project implementation; Lack of inclusive community participation in PES scheme development leading to unequal benefits from PES; Lack of awareness on project activities and plans leading to weak project	M	M	M

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
		ownership by local stakeholders; Households characterized by women or divorcee headed or single parents may not be included as project beneficiaries if the project considers communities to provide unskilled labor for project activities ((Activities 1.1.1;1.1.4; 1.1.2; 1.2.1;1.2.2; 1.2.4; 1.3.1;1.3.2; 1.3.3; 1.4.1; 3.1.1; 2.1.1; 2.2.1; 2.2.2 4.1.1; 4.1.3; 4.2.2)			
6	OVERALL RATING ON CORE LABOUR RIGHTS	Safety risk associated with pump maintenance such and injury or workers in pump maintenance from through electric shock; Temporary labor from outside the project area will have conflicts with the local population ((Activity 2.1.1; 2.2.2; 2.3.1)	M	M	M
7	OVERALL RATING ON INDIGENOUS PEOPLES	None			
8	OVERALL RATING ON INVOLUNTARY RESETTLEMENT	Minor disputes may arise among local communities and institutions on alignment of water conveyance lines through private land and on water distribution/allocation arrangements leading to delay in implementation of project activities (Activity 2.1.1; 2.2.1; 2.2.2)	L	L	L
9	OVERALL RATING ON PROTECTION OF FORESTS & NATURAL HABITATS	Challenges in material transport across long distance may lead to construction of haphazard development of access roads and degradation of natural environment and landscape; Minor degradation of forest natural forests due to loss of vegetation through to land clearance during construction and establishment of camps for project activities; Disturbance to wildlife in the form or restricting access to water holes, disturbance to natural habitats; Unproportionate diversion of water from natural streams for drinking and irrigation water supply; Change in livestock practices due to restriction in grazing areas for water source protection and conservations	M	M	M

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
		measures; Degradation of natural environment and landscape through rampant collection NWFPs, firewood, medicinal; plants, fishing or hunting of wildlife and non-compliance to nature conservation regulations (Activity 1.1.5;1.3.4; 1.2.4; 2.1.1; 2.2.1; 2.2.2; 2.3.1; 2.3.2;2.3.3; 2.3.4)			
10	OVERALL RATING ON CONSERVATION OF BIOLOGICAL DIVERSITY	Introduction of Alien Invasive Species (AIS) due to imported planting materials for watershed restoration; Disturbance to wildlife in the form or restricting access to water holes, disturbance to natural habitats (Activities 1.1.5;1.3.4)	M	M	M
11	OVERALL RATING ON CLIMATE CHANGE	Weak capacity for climate resilient design and management of water sources and infrastructure could lead to increased risk of climate disasters causing damage to project output; Drinking water shortages in project areas as a result of temporal variation in water supply at source caused by to climate change (Activity 2.1.1; 2.2.1;4.1.2)	M	M	M
12	OVERALL RATING ON POLLUTION PREVENTION & RESOURCE EFFICIENCY	The lack of formal registration of WUAs and absence of their legal status could lead to unsustainable and inefficient management of water resources and infrastructure; Generation of waste from project activities and labor camps that can lead to pollution of local water bodies and natural environment; Minor pollution of soils and surface water at project activity sites due to generation of solid and liquid wastes, especially during the rainy season; Disruption of temporary access to water may cause disruption is agriculture activities and reduced production due to diversion of water during construction and rehabilitation of irrigation water supply infrastructure; Long distance and terrain between water source and end user catchment may render water supply infrastructure inefficient due as a	M	M	M

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
		result of to leakages, inadequate water volume and inappropriate water pressure (Activity 2.1.1; 2.2.1; 2.2.2; 2.2.3; 2.3.1; 2.3.2;2.3.3; 2.3.4; 4.2.1)			
13	OVERALL RATING ON PUBLIC HEALTH	Public health hazards through contamination of water through collection surfaces of rain water harvesting structures; Increased transmission of diseases within communities due to imported labor for project activities; Disruption of temporary access to water may cause health and sanitation issues to end users due to rehabilitation or construction of drinking water supply infrastructure (Activity 2.1.1; 2.2.1; 2.2.2;2.2.3; 2.3.1; 2.3.2; 2.3.3; 2.3.4)	M	M	M
14	OVERALL RATING ON PHYSICAL AND CULTURAL RESOURCES/HERITAGE	Damage to physical & cultural heritage due to establishment of labor camps in culturally sensitive areas; Cultural and religious conflicts from non-compliance to local cultural norms during implementation of project activities by contractors or project workers (Activity 2.1.1; 2.2.1; 2.2.2;2.2.3; 2.3.1; 2.3.2;2.3.3; 2.3.4)	M	M	M
15	OVERALL RATING LANDS AND SOIL CONSERVATION	Minor soil erosion and land degradation in project activity sites due to disturbance to topsoil created by machineries, trucks and construction materials (2.1.1; 2.2.1; 2.2.2;2.2.3; 2.3.1; 2.3.2;2.3.3; 2.3.4)	L	M	M
16	OVERALL RATING On POVERTY ALLEVIATION	Lack of inclusive community participation in PES scheme development leading to unequal benefits from PES: Change in livestock practices due to restriction in grazing areas for water source protection and conservations measures; Disruption of temporary access to water may cause disruption is agriculture activities and reduced production diversion of water during construction and rehabilitation of irrigation water supply infrastructure; Poor community members (households characterized by lack of	M	M	M

No	Principles and Project risks	Triggered by	Impact	Likelihood	Significance
		adequate shelter; limited land holding or share croppers) may not be able contribute community labor contribution to the project activities and may not be included as project beneficiaries if the project considers communities to provide unskilled labor for project activities (Activities 1.1.5; 1.2.4; 2.1.1; 2.2.1; 2.2.2)			
17	OVERALL RATING ON DISASTER MANAGEMENT CAPABILITY	Infrastructure may be rendered inefficient and vulnerable to disasters due to leakages, inadequate water volume and inappropriate water pressure as a result of alignment along rugged terrain over long distances (2.1.1; 2.2.1))	M	M	M
18	OVERALL RATING ON PESTS AND DISEASE MANAGEMENT	Risk of spreading pests and diseases within communities due to imported labor for project activities; Risk of spreading pests and diseases within the local vegetation through imported planting materials (Activity 1.1.5; 1.3.4; 2.1.1; 2.2.1; 2.2.2; 2.2.3; 2.3.1; 2.3.2; 2.3.3; 2.3.4)	M	M	M
19	OVERALL RATING ON TRANS BOUNDARY ISSUES	None			
	Overall Project Risk Category	B (Most project risks are minor, site specific and manageable)	M	M	N

Environment and Social Management Plan (ESMP) has been generated which will then be monitored and evaluated during the course of project implementation in the matrix below (See Annex 1)

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

The Bhutan Trust Fund for Environmental Conservation (BT FEC) approach to monitoring, reporting and evaluation is explained in its Monitoring and Evaluation Manual & Handbook. 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 BT FEC shall hire M&E Officer, on contract, to be responsible for the 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 visited conducted
- Semi-annual M&E reported 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 contract 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.

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					
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 management				
<u>Output 1.1:</u> Watershed management intervention measures implemented	No of watershed management intervention measures	One watershed management plan in Dagana developed	Detail watershed assessments done in five gewogs in all project site dzongkhags	Record of watershed management intervention measures developed	Priority of field agencies in core activities
<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	Two PES scheme will be explored and established if feasible	Field visits and reports	Willingness from communities or ecosystem services users to participate is there
<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 in four sites	Field visits and reports	Limited technical knowledge, 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 infrastructures for uninterrupted supply of water for drinking and irrigation				
<u>Outcome 2:</u> Improved access to irrigation and safe drinking water	No. of households connected with climate resilient 24x7 drinking and irrigation water	N/A N/A	3,350 households (drinking water) 599 households (Irrigation)	Annual Progress Report	The baseline data provided by LGs are reliable; The local implementers (local governments and contractors) have the requisite capacity
<u>Output 2.1:</u> Climate- and disaster-resilient water infrastructure established	Number of climate smart and disaster resilient water system constructed	0	6 water supply schemes	Annual Progress Report	
<u>Output 2.2:</u> Climate- and disaster-resilient irrigation infrastructure established	Area under assured irrigation;	0	945 acres	Annual Progress Report	
<u>Output 2.3:</u> Innovative technology for tapping water adopted	Total coverage area with climate-smart irrigation technology adopted; No. of households with climate-	0 0	100 acres 100 household	Annual Progress Report	

	smart drinking water technology adopted				
Output 2.4: User groups in the community strengthened for effective management of irrigation and drinking water	No. of Water User Associations trained	0	29 WUA trained	Annual Progress Report	
Component 3:	Climate-smart agriculture (CSA) through sustainable land management and informed agrometeorological services				
<u>Outcome 3:</u> 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
<u>Output 3.1:</u> SLM in vulnerable and degraded areas implemented	Total area brought under SLM practices	NA	1500 acres	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

Output 3.2: Climate change information, products and services made available and accessible	Percentage of population using agro-meteorological products and Services	NA	60% of project beneficiaries	Annual project report; Midterm and end of project report	Improved weather forecasting with better lead time made available by NCHM
Output 3.3: Agricultural disaster risk reduction and management mainstreamed	Public awareness strategy exists to stimulate a culture of disaster resilience, with outreach to rural communities	NA	Climate field school established in the project areas	Project report	
Component 4:	Improved local governance for effective CCA mainstreaming with focus on water management at the grassroots				
Outcome 4: Improved CCA mainstreaming and water governance at the local level	Number of Local Governments with improved capacity for CCA mainstreaming and water governance	Not known but can be said to very low			
Output 4.1: Institutional mechanisms in local governments strengthened for CCA and gender mainstreaming	Number of LGs effectively mainstreaming CCA and gender in local development investments	Basic awareness for CCA and gender mainstreaming exists among LGs but lack tools	All 19 LGs in the project sites have effectively mainstreamed CCA and gender in	Local annual development plans; Upcoming LG FYPs; Key informant	High-level support, and central guidance and backstopping are available.

		and training for effective mainstreaming	their local annual development plan and upcoming FYP	interviews ; Project progress reports.	
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F. Alignment with the Results Framework of the Adaptation Fund

Project Outcomes	Project Outcome Indicators	AF Outcome	AF Outcome Indicators
<u>Outcome 1:</u> Increased watershed and ecosystem resilience in response to climate change and variability-induced stress		<u>AF Outcome 5:</u> Increased ecosystem resilience in response to climate change and variability-induced stress	<u>AF Outcome Indicator 5:</u> Ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress
<u>Outcome 2:</u> Improved access to irrigation and safe drinking water		<u>AF Outcome 4:</u> Increased adaptive capacity within relevant development sector services and infrastructure assets	<u>AF Outcome Indicator 4.2:</u> Physical infrastructure improved to withstand climate change and variability-induced stress
<u>Outcome 3:</u> Improved food security and livelihoods		<u>AF Outcome 6:</u> Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	<u>AF Outcome Indicator 6.1:</u> Percentage of households and communities having more secure access to livelihood assets <u>AF Outcome Indicator 6.2:</u> Percentage of targeted population with sustained climate-resilient alternative livelihoods
<u>Outcome 4:</u> Improved CCA mainstreaming		<u>AF Outcome 3:</u> Strengthened	<u>AF Outcome Indicator 3.1:</u>

and water governance at the local level		awareness and ownership of adaptation and climate risk reduction processes at local level	Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses <u>AF Outcome Indicator 3.2:</u> Percentage of targeted population applying appropriate adaptation responses
Project Outputs	Project Output Indicators	AF Outputs	AF Output Indicators
<u>Output 1.1:</u> Watershed management intervention measures implemented		<u>AF Output 5:</u> Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	<u>AF Output Indicator 5.1:</u> No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)
<u>Output 1.2:</u> Payments-for-Ecosystem Services (PES) schemes scaled-up		<u>AF Output 5:</u> Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	<u>AF Output Indicator 5.1:</u> No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)
<u>Output 1.3:</u> Water sources' recharge interventions adopted		<u>AF Output 5:</u> Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	<u>AF Output Indicator 5.1:</u> 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 database established for informed decision-making			No of significant wetlands inventoried and monitoring system put in place
Output 2.1: Climate- and disaster-resilient drinking water infrastructure established			Number of climate smart and disaster resilient water system constructed
Output 2.2: Climate and disaster resilient irrigation infrastructure established			Area under assured irrigation
Output 2.3: Innovative technologies for tapping water adopted			Total coverage area with climate-smart irrigation technology adopted; No. of households with climate-smart drinking water technology adopted
<u>Output 2.4:</u> User groups in the community strengthened for effective management of irrigation and drinking water		<u>AF Output 6:</u> Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	No. of Water User Associations trained
<u>Output 3.1:</u> SLM in vulnerable and degraded areas implemented		<u>AF Output 6:</u> Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	<u>AF Output 6.1:</u> No. and type of adaptation assets (tangible and intangible) created or strengthened in support of individual or community livelihood strategies
Output 3.4: Climate change information, products and services		<u>AF Output 2:</u> Strengthened capacity of national and sub-national	<u>AF Output 2.2:</u> No. of targeted institutions with increased capacity to minimize

made available and accessible		centers and networks to respond rapidly to extreme weather events	exposure to climate variability risks (by type, sector and scale)
Output 3.5: Mainstreamed agricultural disaster risk reduction and management			<u>AF Output 2:</u> Strengthened capacity of national and sub-national centers and networks to respond rapidly to extreme weather events
<u>Output 4.1:</u> Institutional mechanisms at local level strengthened for CCA mainstreaming in local development plans and activities related to drinking water, irrigation and sustainable land management			Number of LGs effectively mainstreaming CCA and gender in local development investments

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 community consultations and sensitizations	10,800	0	0	0	0	10,800
	Activity 1.1.2 Training Workshops	8,000	8,000	0	0	0	16,000
	Activity 1.1.3 Conduct detailed watershed assessments in the project dzongkhags	8,000	9,600	0	0	0	17,600
	Activity 1.1.4 Development of watershed management intervention measures for the prioritized areas	0	0	24,000	0	0	24,000
	Activity 1.1.5 Implementation of identified intervention measures	0	0	0	0	274,400	274,400
	Subtotal Output 1.1	26,800	17,600	24,000	0	274,400	342,800

Output	Activities	Budget (USD)					
		Year 1	Year 2	Year 3	Year 4	Year 5	Total per Activity
Output 1.2 Payments-for-Ecosystem Services (PES) schemes scaled-up	Activity 1.2.1 Conduct community consultations and sensitizations	10,800	0	0	0	0	10,800
	Activity 1.2.2 Hands-on training workshops in the management of PES schemes	0	11,200	0	0	0	11,200
	Activity 1.2.3 Conduct detailed resource assessment and inventory	0	24,000	0	0	0	24,000
	Activity 1.2.4 PES scheme development and implementation based on the feasibility	0	0	24,000	9,600	0	33,600
	Sub-total Output 1.2.	10,800	35,200	24,000	9,600	0	79,600
Output 1.3 Water sources' recharge interventions adopted	Activity 1.3.1 Conduct community consultations and sensitizations (one per gewog)	10,800	0	0	0	0	10,800
	Activity 1.3.2 Training Workshops (at least one per dzongkhag)	6,400	14,400	14,400	0	0	35,200

Output	Activities	Budget (USD)					
		Year 1	Year 2	Year 3	Year 4	Year 5	Total per Activity
	Activity 1.3.3 Development of planning of intervention measures for the prioritized area	0	8,800	0	0	0	8,800
	Activity 1.3.4 Implementations of intervention action plan activities	0	0	189,051	0	0	189,051
	Activity 1.3.5 Monitoring and maintenance of conservation /restoration activities	0	0	0	20,000	20,000	40,000
	Sub-total Output 1.3.	17,200	23,200	203,451	20,000	20,000	283,851
Output 1.4 Wetland monitoring system for informed decision-making established	Activity 1.4.1 Training Workshops for capacity building of field offices	10,800	0	0	0	0	10,800
	Activity 1.4.2 Conduct mapping of wetlands for the project Dzongkhags using remote sensing	0	16,000	0	0	0	16,000
	Activity 1.4.3 Field data collection and mapping	0	0	40,000	0	0	40,000
	Activity 1.4.4 Data compilation and analysis,	0	0	0	14,400	0	14,400

Output	Activities	Budget (USD)					
		Year 1	Year 2	Year 3	Year 4	Year 5	Total per Activity
	feeding decision making mechanisms						
	Sub-total output 1.4	10,800	16,000	40,000	14,400	0	81,200
	Contingency	0	0	0	0	12,549	12,549
Total Component 1		65,600	92,000	291,451	44,000	306,949	800,000

Component 2: Climate resilient water infrastructures for uninterrupted supply of water for drinking and irrigation							
Output 2.1 Climate and disaster resilient drinking water infrastructure established	Activity 2.1.1. Construction and Rehabilitation of atleast 6 Drinking Water Supply Schemes	600,000	1,000,000	1,000,000	898,000	0	3,498,000
	Activity 2.1.2. Development of Water Inventory	0	0	10,000	0	0	10,000
	Activity 2.1.3. Capacity Building of Engineers in Climate Resilient Water Supply Infrastructures	0	0	12,500	12,500	0	25,000
	Sub-total Output 2.1	600,000	1,000,000	1,022,500	910,500	0	3,533,000
Output 2.2: Climate and disaster resilient	Activity 2.2.1. Construction of at least two pressurized/closed irrigation systems (gravity)	155,000	258,000	258,000	277,700	155,000	1,103,700

irrigation infrastructure established	Activity 2.2.2. Re-engineering/ rehabilitation or improvement of four existing irrigation systems	175,000	291,000	291,000	233,000	175,000	1,165,000
	Activity 2.2.3. Scale up micro-irrigation system (drip & sprinkler)	26,000	44,000	44,000	35,000	26,000	175,000
	Activity 2.2.4. Tail water management	0	0	7,000	6,000	0	13,000
	Sub-total Output 2.2	356,000	593,000	600,000	551,700	356,000	2,456,700
Output 2.3 Innovative Technologies for tapping water adopted	Activity 2.3.1. Promote and Scale up solar/electric/manual water pump for irrigation	24,000	40,000	40,000	32,000	24,000	160,000
	Activity 2.3.2. Build water harvesting structures or small-scale reservoirs to tap water for irrigation	4,000	7,000	7,000	5,000	4,000	27,000
	Sub-total Output 2.3	28,000	47,000	47,000	37,000	28,000	187,000
Output 2.4: User groups in the community strengthened for effective management	Activity 2.4.1 Form and strengthen user groups in the community to promote local ownership and sustainability of rural drinking water	0	8,000	8,000	8,000	8,000	32,000

of irrigation and drinking water	Activity 2.4.2 Form and strengthen user groups in the community to promote local ownership and sustainability of irrigation scheme	0	8,000	8,000	8,000	8,000	32,000
	Sub-total Output 2.4	0	16,000	16,000	16,000	16,000	64,000
	Contingency					143,997	143,997
Total Component 2		984,000	1,656,000	1,685,500	1,515,200	543,997	6,384,697

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 to validate key SLM interventions	7,534	0	0	0	0	7,534
	Activity 3.1.2 Implementation of SLM measures-terracing, contour hedgerows and landslide stabilization	221,781	221,781	221,781	221,781	12,877	900,001
	Activity 3.1.3 Technical assistance and support to communities on the implementation of SLM practices in the field	1,370	1,370	1,370	1,370	1,370	6,850
	Activity 3.1.4 Field -based and specialized training to framers and agriculture extension staff on SLM technologies to	5,137	5,137	5,137	5,137	0	20,548

	enable them to respond to climate change induced risks and impacts with more competence and knowledge						
	Activity 3.1.5 Learning visits for extension officers on SLM and Climate change	0	34,247	0	0	0	0
	Activity 3.1.6 Monitoring and technical assistance to support communities in implementation of SLM and to see the work progress	1,096	1,096	1,096	1,096	1,096	5,480
	Activity 3.1.7 Documentation, knowledge Management (KM) and experience sharing platforms (three stakeholder workshops)	5,479	5,479	5,479	5,479	5,479	27,395
	Sub-total Output 3.1	242,397	269,110	234,863	23,863	20,822	1,002,055
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	1,429	1,429	1,429	1,428	1,428	7,143
	Activity 3.2.2 Incorporation of area specific weather and crop data in ADSS	11,430	0	5,715	0	5,715	22,860
	Activity 3.2.3 Capacity building of agro-met focal points based in ARDCs and Central Programs (Two major trainings)	0	21,429	0	21,429	0	42,857

	Activity 3.2.4 Knowledge management and communication activities		3,572			3,571	7,143
	Sub-total Output 3.2	12,859	26,430	7,144	22,857	10,714	80,004
Output 3.3 Agricultural disaster risk reduction and management mainstreamed	Activity 3.3.1 Initiation of Climate / farmer Field Schools to bring transformational change by enhancing response capacity to identified risks in four dzongkhags.	10,714	10,714	10,714	10,714	0	42,856
	Activity 3.3.2 Sensitization, awareness and capacity development on agro-met services to researchers, extension and farmers	9,523	9,523	9,523	0	0	28,569
	Activity 3.3.3 Development of crop suitability and feasibility maps	10,000	0	10,000	0	0	20,000
	Activity 3.3.4 Pest and diseases forecasting services (5 plant protection officials trained)	14,285	0	14,285	0	0	28,570
	Sub-total Output 3.3	44,522	20,237	44,542	10,714	0	119,995
	Contingency	0	0	0	0	28,000	28,000
	Total Component 3	299,778	315,777	286,529	268,434	59,536	1,230,054

Component 4: Improved local governance for effective CCA mainstreaming with focus on water management at the grassroots							
Output 4.1: Institutional mechanism in Local Governments strengthened for CCA and gender mainstreaming	Activity 4.1.1. Conduct sensitization workshop for LGs and communities on mainstreaming CCA and gender in local development plans, programs and activities related to drinking water, irrigation and SLM	20,000	20,000	15,000	15,000	0	70,000
	Activity 4.1.2. Conduct capacity development training for LGs on CCA invest tools, frameworks and approaches.	20,000	20,000	15,000	15,000	5,000	75,000
	Activity 4.1.3. Carry out M&E of CCA and gender mainstreaming in their plans, programs and activities.	10,000	20,000	10,000	10,000	5,000	55,000
	Sub-total Output 4.1	50,000	60,000	40,000	40,000	10,000	200,000
	Contingency					4,667	4,667
Total Component 4		50,000	60,000	40,000	40,000	14,667	204,667
Total Direct Cost		1,399,378	2,123,777	2,303,480	1,867,634	925,149	8,619,418
Project execution cost (PMU)		105,500	152,600	152,600	132,600	56,700	600,000
Total (Direct + PMU cost)		1,504,878	2,276,377	2,456,080	2,000,234	981,849	9,219,418
PCM Fee charged by the Implementing Entity ²²		204,033	120,147	157,296	128,445	169,615	779,536
Grand total		1,708,911	2,396,524	2,613,376	2,128,679	1,151,464	9,998,954

²² Please see detailed Budget for PCM fee

Budget Notes

SN.	Component 1 (total \$800,000)
1	Consultation and sensitization workshop for communities of 24 gewogs@\$450 – (\$10,800) Hand-on training workshop and study visits 4 trainings@\$4,000- (\$16,000) Conduct detailed water assessment in four dzongkhags @\$4,400 – (\$17,600) Develop watershed management interventions in four dzongkhags@\$6,000 – (\$24,000) Implement invention measures in four dzongkhags @\$68,600 – (274,400) Sub-total - \$342,800
2	Consultation and sensitization workshop for communities of 24 gewogs@\$450 – (\$10,800) Hand-on training workshop in the management of PES schemes 4 trainings@\$2,800- (\$11,200) Conduct detailed resource assessment and inventory on per dzongkhag @\$6,000 – (\$24,000) Develop 2 PES Scheme @\$16,800 – (\$33,600) Sub-total \$79,600
3	Consultation and sensitization workshop for communities of 24 gewogs@\$450 – (\$10,800) Training workshop 4 trainings@\$8,800- (\$35,200) Develop four intervention measures plan @\$2,200 – (\$8,800) Implement interventions in four dzongkhags@\$47,263 – (\$189,051) Monitoring and restoration in four dzongkhags@\$10,000 – (\$40,000) Sub-total \$283,851
4	Capacity building of four field staff@\$2,700 – (\$10,800) Mapping of wetlands in four dzongkhags@\$4,000 – (\$16,000) Data collection four in four dzongkhags@\$10,000 – (\$40,000) Data compilation and analysis in four dzongkhags@\$3,600 – (\$14,400) Sub-total \$81,200 Contingency \$12,549
	Component 2 (total \$6,384,697)
5	Contractual services for construction of drinking water schemes including cost of equipment and materials (transmission lines and distribution network of approximately 122kms, intakes and reservoirs for 6 drinking water schemes: \$ 2,624,250

6	Workshops, capacity building and trainings, data collection for engineers: \$35,000
7	Contractual services for construction of irrigation systems including material costs, equipment and labor cost of 14 kms at unit cost @ \$ 73,806 (\$1,033,284)
8	Contractual services for rehabilitation and improvement of irrigations systems (24.8 km @ unit cost of 46,967)- \$\$1,164,782
9	Procurement of equipment and capacity building for water management systems (13 systems-tail water, water harvesting structures, etc)
10	Conduct assessment, surveys and designs of the irrigation and drinking water schemes
11	Community consultations, sensitization workshops, travel for the staff and local leaders \$ 64,000
12	Contingency fund -\$143,997
	Component 3 (total \$1,230,054)
13	Contractual services including hiring of equipment and labor costs for SLM interventions- (\$856,164)
14	Consultation workshops and meeting for a participatory SLM action planning –(\$ 7,534)
15	Capacity development of 500 heads for three days –(\$27,397)
16	Organize mass hedge campaign 25 acres/year @\$8,767 –(\$43,836)
17	Consultation workshop on planning. Budgeting & Progress reporting annually@5,479-(\$27,397)
18	Exchange visits for Extension Officers 10 heads@\$3,427 – (\$34,247)
19	Monitoring and field documentation semi-annually@\$1,096/year –(\$5,479)
20	Contingency - \$28,000
	Component 4 (total \$204,667)
21	workshops and meetings with local government officials

22	capacity building of the local government officials
23	consultancy services for conducting M & E of CCA activities in the local governments
24	Contingency - \$4,667
	Project Execution (\$600,000)
25	Individual contract services for 3 officers for 5 years (3*\$16,000*5)
26	PMU staff travel costs
27	PMU vehicle (\$40,000), PMU officer furniture (\$3,000)
28	Project board meetings (\$5,000)
29	Stakeholder consultations and knowledge exchange programs with the community members and the project implementers. Capacity building of engineers, project component implementers and local government officials
30	Printing of reports, publication, lessons learned, completion and mid-year reports
31	Post-graduate program in water engineering/management (2*\$100,000)
32	Procurement of IT equipment for project staffs-laptops, printers, IT accessories, software, etc
33	Maintenance of equipment including vehicle and IT equipment
	PCM Fee charged by the Implementing Entity (779,536)
34	Compensation/remuneration for project staffs in supporting Executing Entities and reporting to AF for the project period—(\$22,235/years) = \$111,175
35	M&E Officer (\$14,243/year) - \$71,215, ESG Expert (\$16,122/year) - \$80,610, Mid-term evaluation - \$30,000 and Terminal assessment - \$40,000, In country monitoring travel (\$15,000/year) - \$75,000 = 296,825

36	Mobility \$58,285, 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 = \$117,785
37	Office equipment & furniture = \$27,250
38	NIE Capacity Building- \$20,000/year = \$99,000
39	Semi-annual internal auditing - \$25,000 and annual auditing services- \$12,500 = \$37,500
40	Stakeholder Workshop for learning and experience sharing and dissemination of learnings (\$18,000*5) = \$90,000

Budget breakdown details:

	Project Execution Cost						
	Activities	Year-1	Year-2	Year-3	Year-4	Year-5	Total
Project management Unit	Travel, workshops and conferences	4,600	4,600	4,600	4,600	4,600	23,000
	Contractual services- Individual	48,000	48,000	48,000	48,000	48,000	240,000
	Equipment and Furniture	43,000	0	0	0	0	43,000
	IT equipment	9,900	0	0	0	0	9,900
	Trainings and Capacity Building and Knowledge Management	0	100,000	100,000	80,000	0	280,000
	Subtotal project execution cost- PMU	105,500	152,600	152,600	132,600	52,600	595,900
	Contingency	0	0	0	0	4,100	4,100

	Total Execution cost	105,500	152,600	152,600	132,600	56,700	600,000
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	Activities	Year-1	Year-2	Year-3	Year-4	Year-5	Total
PCM Fee charged by the Implementing Entity	Contractual services	20,417	21,326	22,235	23,144	24,053	111,175
	Monitoring & Evaluation (includes ESG compliance)	42,881	44,121	75,361	46,601	87,862	296,826
	Administrative expenses	69,485	9,200	12,700	13,200	13,200	117,785
	Office Furniture and Equipment	25,750	0	1,500	0	0	27,250
	NIE Capacity Building	20,000	20,000	20,000	20,000	19,000	99,000
	Auditing services	7,500	7,500	7,500	7,500	7,500	37,500
	Capacity Building of EE and Knowledge Management	18,000	18,000	18,000	18,000	18,000	90,000
	Total Implementing Cost	204,033	120,147	157,296	128,445	169,615	779,536

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

Schedule date	Jan - Dec 22	Jan- Dec 23	Jan- Dec 24	Jan- Dec 25	Jan- Dec 26	Total
Direct cost	1,399,378	2,123,777	2,303,480	1,867,634	925,149	8,619,418
Execution cost	105,500	152,600	152,600	132,600	56,700	600,000
NIE cost	204,033	120,147	157,296	128,445	169,615	779,536
Total cost	1,708,911	2,396,524	2,613,376	2,128,679	1,151,464	9,998,954

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

- A. Record of endorsement on behalf of the government²³** *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

<i>Rinchen Wangdi (Mr.) Director (NDA to Adaptation Fund) Gross National Happiness Commission Secretariat</i>	<i>Date: July, 28, 2021</i>
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- B. Implementing Entity certification** *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

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:

- 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
- Implementation Modalities for Agriculture Land Development and Fallow Land Reversion, circulated to all the implementers vide letter No. DOA/ARED/Adm-01 /2019 dated 30thSeptember, 2019
- Soil Conservation Manual (SCM), 2019 of the National Soil Services Centre, Department of Agriculture, MoAF
- Land Act 2007,
- Bhutan Water Policy 2008
- Water Act of Bhutan 2011
- Water Regulation of Bhutan 2014.
- Agriculture and Land Development Guideline 2017.
- Labor Employment Act, 2007.
- The Local Governance Act, 2009.
- The National Gender Equality Policy 2019.

²³₆. 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.

and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.



Singye Dorji,
Officer In-charge
Implementing Entity Coordinator

Date: August, 09, 2021

Tel. and email:
Landline: +975 2 339861
Mobile no: +975 17999777
email: singye@bhantrustfund.bt

Project Contact Person: Singye Dorji

Tel. And Email:
Landline: +975 2 339861
Mobile no: +975 17999777
email: singye@bhantrustfund.bt



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Royal Government of Bhutan
Gross National Happiness Commission



Ref: GNHC/DCD/AF/2021/20160

28th July, 2021

Letter of Endorsement by the Royal Government of Bhutan

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: afbsec@adaptation-fund.org
Fax: 202 522 3240/5

Subject: Endorsement for the Fully-Developed Project Proposal on "Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan"

In my capacity as Designated Authority for the Adaptation Fund in Bhutan, I confirm that the above project proposal is in accordance with the national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Bhutan. The proposal is due for resubmission between 2nd and 9th August 2021 for technical review, prior to the Adaptation Fund Board Meeting. Further the Designated Authority is fully aware of the inclusion of two districts namely: Tsirang and Sarpang, in addition to the pre-identified project landscape covering Paro and Dagana districts during the Concept Note stage. This is regarded based on the need of the country and the programming cycle.

Accordingly, I am pleased to endorse the above fully-developed project grant proposal with support from the Adaptation Fund. If approved, the project will be implemented by Bhutan Trust Fund for Environmental Conservation and executed by Gross National Happiness Commission Secretariat.

Sincerely,

Rinchen Wangdi (Mr.)
Designated Authority to the Adaptation Fund,
Director, Gross National Happiness Commission Secretariat

P.O Box: 127, Tashichhodzong, Thimphu

PABX – 00975-2-325192/325850/325741/322503/321053. FAX- 00975-2-322928

AFD PABX – 00975-2-333230/333231/333232/333234/326777 FAX – 00975-2-326779

Website: www.gnhc.gov.bt