PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

PART I: PROJECT/PROGRAMME INFORMATION

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

Acronyms

ADSS	Agro-met Decision Support System
AF	Adaptation Fund
ALDG	Agriculture Land Development Guidelines
APR	Annual Performance Reports
ARED	Agriculture Research and Extension Division
BDWQS	Bhutan Drinking Water Quality Standards
BTFEC	Bhutan Trust Fund for Environmental Conservation
CCA	Climate Change Adaptation
CCP	Community Contracting Protocol
DES	Department of Engineering Services
DLG	Department of Local Governance
DoA	Department of Agriculture
DPA	Department of Public Accounts
DRR	Disaster Risk Reduction
ESMP	Environment and Social Management Plan
FGD	Focused Group Discussion
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	High Density Polyethylene 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
MoH	Ministry of Health
MoHCA	Ministry of Home and Cultural Affairs
MoWHS	Ministry of Works and Human Settlement
NAPA	National Adaptation Program of Action
NCHM	National Centre for Hydrology and Meteorology
NEC	National Environment Commission
NIWRMP	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
TWG	Technical Working Group
WMD	Watershed 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 2017[1]) and a geographical area of 38,394 km^2. The country is almost entirely mountainous with nearly 95%of the country above 600 metres[2]. The topography is rugged and steep, with elevation rising from 200 metres to more than 7,500 metres within a short south-north distance of some 170 km. The country can be divided into three broad physiographic zones: the southern belt made up of the Himalayan foothills adjacent to a narrow belt of flatland along the Indian border; the inner Himalayas consisting of main river valleys and steep mountains; and the high Himalayas featuring alpine meadows and snow-capped mountains.

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

Figure 1: Administrative map of Bhutan showing districts

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

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

[1] *Population and Housing Census of Bhutan 2017, National Statistics Bureau, RGoB*
[2] *Atlas of Bhutan: Land Cover and Area Statistics, 1997, Ministry of Agriculture, RGoB*
[3] *National Accounts Statistics 2021, National Statistics Bureau, RGoB*

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

Bhutan is endowed with an outstanding natural environment. Bhutan is dubbed as the 'crown jewel' of the Eastern Himalayas, a region recognized as a global biodiversity hotspot. With 71% of forest cover and 51.4% of protected areas, Bhutan has maintained its rich biodiversity and water resource availability. As a result of vast tracts of forest cover[5], 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 CO_2 equivalent based on 2000 data[6]. This, however, does not exempt the country from the impacts of global warming and climate change.

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

Climate and Climate Change Scenarios

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

As a least developed country with a geologically fragile and young mountain ecosystem, Bhutan is highly vulnerable to climate change. Socio-economic development is highly dependent on climate-sensitive sectors such as agriculture, hydropower, forestry, road and communication. As a mountainous country with a huge area under snow and glaciers, and an intricate natural drainage system of several watersheds, water catchments, rivers, rivulets and streams, the country is intrinsically exposed to and impacted by climate change hazards, including glacial lake outburst floods, landslides, and flash floods. Reduced precipitation during winter in recent years has caused increased forest fire risks and seasonal water scarcity in many areas. Rainfall pattern is increasingly erratic, posing huge adversities for farmers who largely practice rain-fed agriculture. Low agriculture capacity, low access to reliable drinking water and projected floods are the weakest elements in ND-GAIN analysis of Bhutan's climate vulnerability[7]. Severe events of windstorm are increasingly recurrent, damaging numerous homes, schools, health facilities, government offices, and temples, as well as tonnes of crops.

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

[4] *National Accounts Statistics Report 2021.*
[5] *More than 70% of forest cover, one of the highest in the world*
[6] *Second National Communication to the UNFCCC, November 2011.*
[7] *ND GAIN: Notre Dame – Global Adaptation Index, https://gain.nd.edu/our-work/country-index/*

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

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

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

- ***Change in temperature***: Mean annual temperature for the 2010-2039 is projected to increase by ~0.8°C (ECHAM5/A1B scenario) to ~ 1.0°C (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 that the mean annual precipitation will see an increase over the next 30 to 60 years but with more intense and concentrated rainfall in the monsoon season and generally drier winter season.

The Impacts of Climate Change on Water and Agriculture

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

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

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

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

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

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

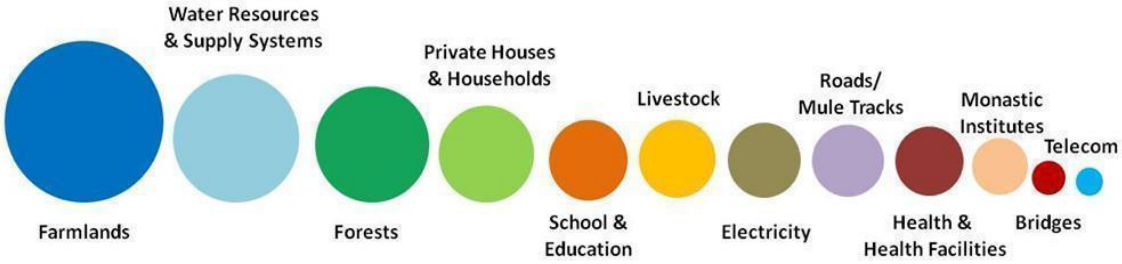
On the other hand, dryland also constitutes an important land use category in Bhutan. It is mainly practiced on mountain slopes, making it highly vulnerable to the vagaries of extreme weather events such as soil erosion and nutrient loss. Traditional crops such as maize, wheat, barley, buckwheat, millet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

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

During community consultations for past climate change adaptation projects[8], communities identified rainfall and water availability as the two principal environmental constraints on agricultural production. Many rural communities face dwindling access to water during the dry season when the largely natural springs that they rely on shrink considerably or dry up. Participatory Rural Appraisals (PRAs) of the environmental and climate change impacts on key local livelihoods resources and assets carried out in August and September 2011 in some of the

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

poorest gewogs in the country through the Joint Support Programme[9] provide an insight into climate change vulnerabilities at the local level. The PRAs revealed that farmlands were the most vulnerable of all local livelihood resources/assets, followed by water resources and supply systems (Figure 2). This indicates considerable climate change risks as the nation's socio-economic wellbeing is hugely dependent on agriculture and water resources.



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

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

Climate Change and Gender

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

While a higher percentage of women is engaged in agriculture, surveys carried out for an in-depth assessment on climate change and gender[11] revealed that fewer women than men were aware of climate-smart and resilient agriculture initiatives. The assessment also highlighted those rural men and women have different views and solutions on how to cope with climate change. This underlines the importance of gender mainstreaming in climate change adaptation strategies.

Climate Change and Local Governance

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

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

[9] *Joint Support Programme, Capacity Development for Mainstreaming Environment, Climate Change and Poverty Concerns in National Policies and Programmes.*
[10] *Bhutan Labor Force Survey Report 2021, National Statistics Bureau, RGoB.*
[11] *Gender and Climate Change in Bhutan: with emphasis on the NDC priority areas Agriculture, Energy and Waste Report 2020 by UNDP, National Commission for Women and Children and the National Environment Commission.*

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

Water Information Management

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

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

Project Sites

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

[12] *The Water Act of Bhutan 2011, RGoB*

As per the Assessment of climate risks on water resources for the National Adaptation Plan (NAP) in Bhutan report, 2021[13], Tsirangtoe, Phuentenchu and Semjong gewogs under Tsirang Dzongkhag are ranked the most water related disaster prone gewogs including water scarcity for drinking and irrigation. Similarly, insufficient water, poor water quality, existing conventional open channels leading to water loss through seepage and sources located far away from the settlements are the major challenges in identified gewogs of Paro. Further. the report also highlights issues of acute water shortage for both drinking and irrigation due to drying up of sources and existing conventional open channel leading to the loss of water to seepage in Dagana dzongkhag.

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

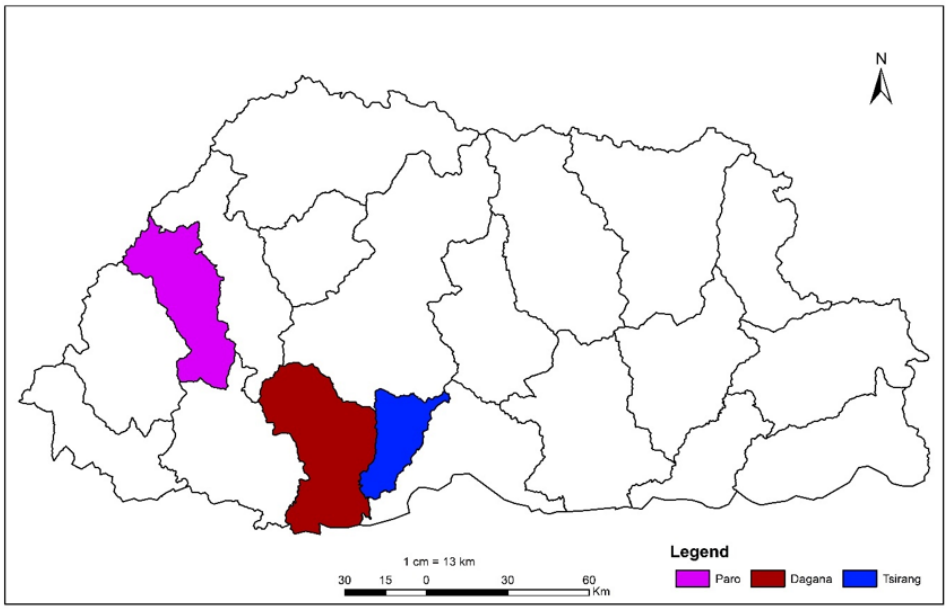


Figure 3: Map showing the location of Dagana, Paro and Tsirang Dzongkhags

Sl. No	Dzongkhag	Gewog	Area (km2)	Population		
				Male	Female	Total
1	Dagana	Drujeygang	57.47	1,748	1,804	3,552
2	Dagana	Lajab	108.58	454	389	843
3	Dagana	Tshangkha	37.38	863	844	1,707
4	Paro	Dhopshari	33.89	1,590	1,590	3,180
5	Paro	Lungnyi	59.7	2,015	2,030	4,045
6	Paro	Lamgong	48.8	1,710	1,626	3,336
7	Paro	Doteng	193.1	602	547	1,149

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

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

Table 1: Project location

Dagana Dzongkhag

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

Paro Dzongkhag

Situated in the north-western part of the country, Paro has a total area of 1,282.79 km^2. The population of the dzongkhag is 32,165 (17,058 male; 15,107 female). Rural communities constitute 74.3% of the population. The mean annual household income is BTN 201,823 (USD 3,140 approx.) and major income sources include agriculture and livestock rearing. In urban centres and peripheral areas, they include tourism and small retail business.

Tsirang Dzongkhag

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

Project Objective

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

Component 1: Adaptive management of watersheds for enhancing the resilience of the communities.

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

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

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

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

Project Components and Financing:

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

Projected Calendar:

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

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Description of Project Components

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

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

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

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

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

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

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

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

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

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

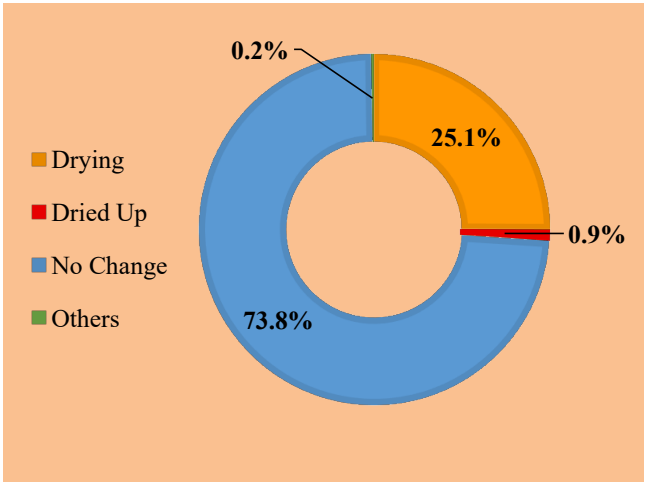


Figure 4: Status of water sources in Bhutan[15]

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

Under this component, the proposed project seeks to achieve the following outputs:
Output 1.1: Watershed management intervention measures implemented
Output 1.2: PES schemes scaled-up
Output 1.3: Water sources' recharge interventions adopted
Output 1.4: Wetland monitoring system for informed decision-making established

[15] *Status of water sources in Bhutan, WMD, MoAF*

Output 1.1: Watershed management intervention measures implemented
In the context of highly fragile ecosystems coupled with water scarcity and predicted climate change, watershed management ensures an integrated climate adaptative approach leading to soil conservation, fodder/fuel wood production, vegetation control, infiltration and water recharge besides improved access and equity for the communities.

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

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

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

To achieve this output, the following activities will be undertaken:
Activity 1.1.1: Conduct sensitization and awareness workshops (13 gewogs to be sensitized)
Activity 1.1.2: Training of community members and LG officials on the implementation of identified watershed management interventions
Activity 1.1.3: Conduct watershed assessment at the project site, including the watersheds along the proposed pipeline
Activity 1.1.4: Develop watershed management intervention measures for the proposed areas (five sites plus along the proposed pipeline; at least one plan per dzongkhag - minimum of four)
Activity 1.1.5: Implement identified intervention measures

Output 1.2: PES schemes scaled-up

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

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

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

Under this output, the following activities are foreseen for project implementation:
Activity 1.2.1: Conduct community consultations and sensitization (one per gewog)
Activity 1.2.2: Hands-on training workshops in the management of PES schemes (1 training)
Activity 1.2.3: Conduct detailed resource assessment and inventory (1 site)
Activity 1.2.4: PES scheme development and implementation based on the feasibility analysis

Output 1.3: Water sources' recharge interventions adopted

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

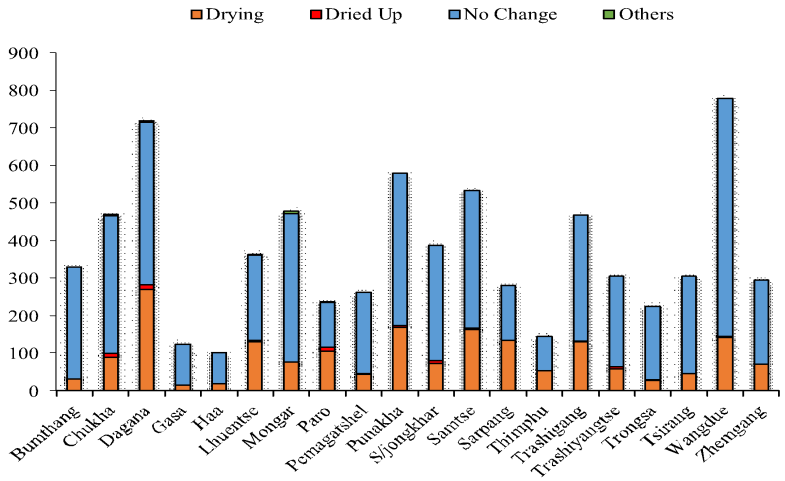


Figure 5: Status of water sources by dzongkhag

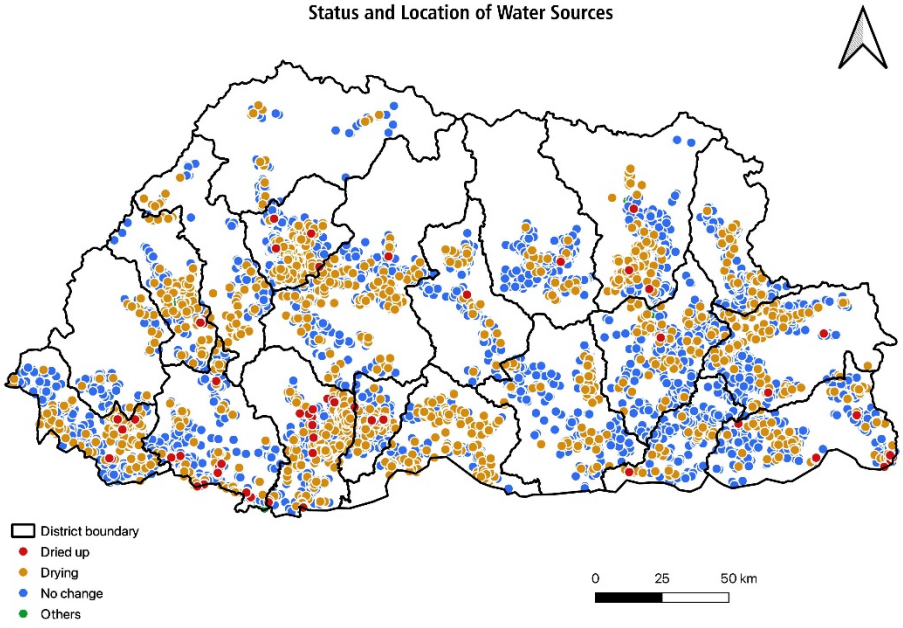


Figure 6: Map showing the location of various water sources and their status

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

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

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

up, drying, no change), the following criteria were used to select water sources from each of the three project *dzongkhags* and implement water revival activities[16]:

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

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

Table 2: List of selected water sources in the project sites proposed for revival initiative under component one [17].

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

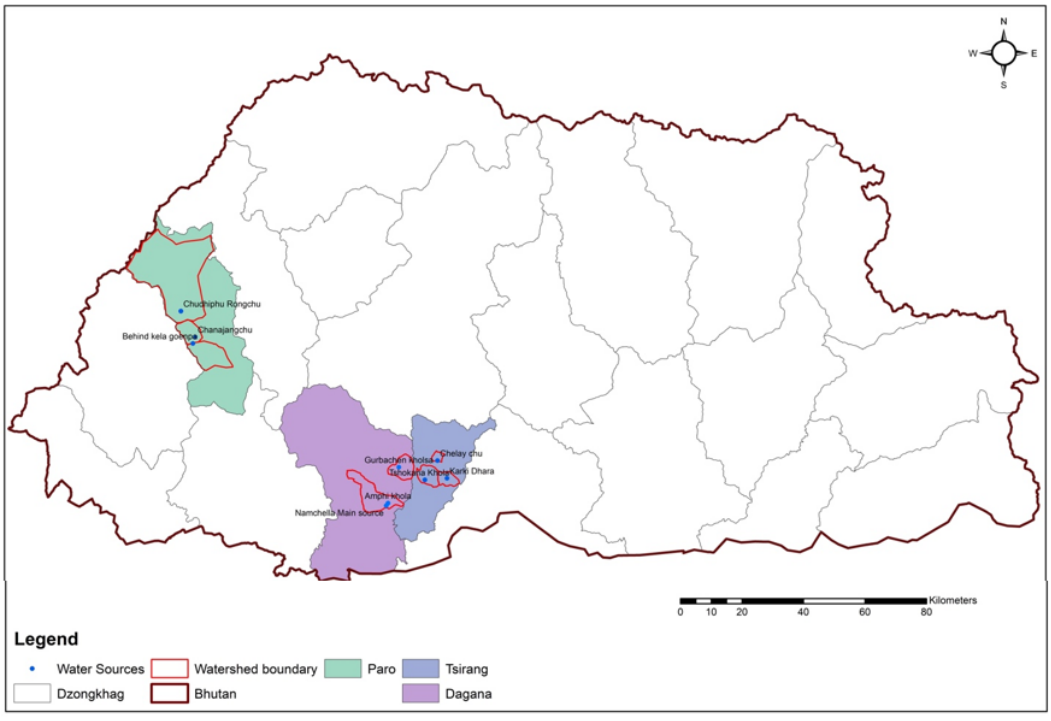


Figure 7: Location of water sources proposed for revival initiatives in the project sites

[16] *As stated above, activities will be based on the lessons learned from the experience in Lholing (Paro)*
[17] *Excerpt from water source assessment and mapping report, WMD, 2021*

The activities will be implemented by DoFPS in collaboration with LG entities and communities. DoFPS has presence in all the communities across Bhutan.

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

Activity 1.3.1: Training workshops on water source recharge interventions with field demonstrations (one per site) and awareness and sensitization (one per dzongkhag)
Activity 1.3.2: Identification of recharge areas and designing water source revival activities following the spring shed management protocol.
Activity 1.3.3: Implementation of water source revival activities.
Activity 1.3.4: Monitoring and maintenance of conservation/restoration activities.

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

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

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

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

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

Activity 1.4.1: Conduct mapping of wetlands for the project dzongkhags using remote sensing, including training
Activity 1.4.2: Field data collection and mapping (all project dzongkhags)
Activity 1.4.3: Field exercise for Data Quality Assurance and Quality Control
Activity 1.4.4: Data compilation and analysis, feeding decision-making mechanisms

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

Drinking water

As we come to think of the impact of climate change, the very first element that comes into picture is water. Erratic temperature rise and precipitation has contributed to steep rise and drop in the volume of water in rivers and springs. It is crucial to adapt to these changes wherever possible to ensure continuous availability of and access to 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 m^3/capita/year (National Integrated Water Resources Management Plan, 2016, NECS). However, issues concerning water accessibility continue to persist due to insufficient source management, inadequate infrastructure development, management and governance. Issues concerning the quality of water are also becoming more pertinent. The quantity and quality of water are further exacerbated by increasing population, 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's experience shortages. Abundant water is largely available in the form of major rivers and tributaries flowing in the low-lying river valleys and deep gorges. However, most communities are located on mountain slopes and depend on small streams, springs and lakes for drinking water. And some of these water sources are already drying. This issue of accessibility is glaring in some areas where rivers flow through the bottom of the valley while communities on the hillside face shortages. Paro and Tsirang are two such dzongkhags identified for this adaptation proposal wherein an integrated approach aims to address water-related issues at the source, infrastructure, quality and management levels. This approach will take into consideration economic, social and ecological components along with risk factors, such as climate change and increasing population.

Dzongkhag[18]	**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 (%)**
Paro	8,969	5,160	3,809	57.5
Tsirang	5,074	3,812	1,262	75.1
Total	**14,043**	**8,972**	**5,071**	**66.3**

Table 3: Current water supply scenario in targeted rural areas

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

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

In rural areas, transferring the ownership of schemes to the beneficiaries and maintaining them have been a major challenge for RWSS. Differing interpretations of policies and strategies have led to conflicting, differing and rapidly changing priorities and practices in the sector. Many

[18] *Bhutan Living Standard Survey 2017, RGoB*

beneficiaries still consider the ownership and responsibility for major maintenance and rehabilitation of rural water supplies as the responsibility of the dzongkhag or RGoB. Many implementation procedures have actually contributed to a lack of beneficiary commitment to self-management and maintenance of their own schemes.

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

Irrigation Water

Climate change poses significant risks to irrigated agriculture in general and water management in particular. Availability and management of water are becoming challenging, with remote areas experiencing water scarcity during dry seasons and monsoon seasons experiencing excessive rainfall, flash floods and landslides resulting in the damage of 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-fed 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 weather events, a major focus in building climate resilient irrigation structures and improvements in water management practices remains crucial. These interventions will help improve the sustainability of farm productivity.

Most irrigation schemes in Bhutan were constructed as earthen canals with low efficiency and little resilience to extreme events. They are susceptible 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 the effects of climate change.

With less than 18% of cultivated agricultural land irrigated, agriculture is predominantly rain-fed and exposed to the vagaries of 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 impacts cropland. And shrinking small streams on which small-scale irrigation depends result in inadequate on-farm water supply, conflicts over water sharing, low labour 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 the flow of water to fields through seepage and water conveyance losses. As a result, climate change not only negatively impacts rain-fed agriculture, but also irrigated agriculture production.

Despite considerable investments made in water resource management, there has been limited provisions made for climate change impacts. All the while, climate change has undermined several investments and jeopardized many gains made through past interventions. For instance, the government's investment in irrigation systems has not been climate-resilient, making them susceptible to floods and heavy monsoon rains. Therefore, the project seeks to install climate-proof infrastructure for drinking and irrigation water supplies, thereby enhancing and ensuring water security for every household in the two project sites. It is also expected to enhance food security by improving access to water and channeling time saved into other income-generating activities.

The project proposes to install or replicate successful irrigation systems such as HDPE pipe in Bhutan, which will replace the conventional conveyance system. Besides seepage and susceptibility to damage, the conventional irrigation system losses huge amounts of water to evapotranspiration. In addition, annual maintenance of long-distance irrigation canals requires huge amount of labor and expenses, which could otherwise be spent on income-earning opportunities. To develop climate-resilient irrigation systems, the climate change components will be mainstreamed in the irrigation planning process.

Replicating climate-resilient irrigation systems such as HDPE pipe are also expected to minimize negative environmental effects such as landslides often caused by poor maintenance of the open irrigation canal. Furthermore, 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 are used to deliver water to end users. In most cases, the pipes are buried underground. The vegetation cover will be regained on excavated sites and there is minimal effect on the arable land. Farmers can still cultivate crops with pipes running below.

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

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

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

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

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

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

In the municipalities, it is of utmost importance that the water infrastructures be built with upgraded technology to make them resilient to climate change. Today, resilience of many infrastructure 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 to have alternate supply of reliable water which is triggered by the failure of RWS schemes in supplying reliable water. In many cases, this is because of inadequate operation and maintenance of the RWS schemes due to lack of funds. This already substandard infrastructure is at a high risk of being adversely affected by climate change owing to increase in the severity of challenges to the scheme managements.

While addressing the issues mentioned in the previous section, the project will construct new RWSS, rehabilitate/renovate the existing schemes, and tap new sources for a sustainable water solution. The infrastructure should look into the future needs of the growing population,

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 at 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 the vegetation of the districts is less disturbed. To align with the BDWQS 2016, the health sector will carry out periodic water quality testing.

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

Activity 2.1.1: Construction of three Drinking Water Supply Schemes:
Major portions of the infrastructure include the construction of RWSSs which consist of constructing climate-resilient 1) intake structures and collection tank, 2) water transmission mains, 3) water distribution network, and 4) water reservoir.
The three drinking water supply schemes includes:

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

After the completion of the project, it is projected to benefit 3,168 households with a population of over 30,362.

To ensure sustainability of the schemes, formation of WUAs is proposed as part of the project which will be institutionalized and the operation and maintenance aspects of the scheme after project finalization will be integrated into local government plans.

Activity 2.1.2: Professional development of engineers in Climate-resilient water supply infrastructure
The concept of climate change remains new when it comes to building climate-resilient water supply infrastructure in Bhutan. Most of the existing water supply works (especially rural schemes) follow conventional processes. Therefore, it is of utmost importance that the engineers executing these projects are educated in the concept of climate-resilient structures. The project will support the capacity of water infrastructure engineers, particularly in the concept of adaptation to climate change, through the complete water access cycle (water source, transmission, treatment and distribution). It is foreseen that a minimum of two sessions for project dzongkhag engineers, technicians and central agencies engineers will be organized with 50% women participants.

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

The proposed activities under this output include:

Activity 2.2.1: Construction of pressurized/closed irrigation systems (gravity) - Establishment of climate-resilient irrigation scheme at Lajab
The project will support the construction of a new irrigation scheme to achieve greater climate resilience and support farmers experiencing critical water scarcity, covering a total area of 66 acres. Given that the reliance on rain-fed practices is of limited use in the face of increasing rainfall variations, the schemes will be aligned to reliable water sources. The project will also focus on integration of both drinking and irrigation water wherever possible so that participation and ownership by beneficiaries are focused through the formation of WUAs with appropriate

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

Activity 2.2.2: Re-engineering/rehabilitation or improvement of two existing irrigation systems
To enhance and ensure water security for every household, the adaptation funds will climate proof or strengthen the resilience of two existing open earthen canal irrigation schemes against extreme events, covering 884 acres. With the planned improvement of the existing irrigation systems, much of the infrastructure that is of temporary nature will be replaced by more robust, flexible and climate-resilient structures. Environmental impacts caused by overflow from open canal systems will be avoided and leakages from pipes will be reduced with the improvement of the systems through appropriate technology.

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

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

Activity 2.2.3: Scale up micro-irrigation system (drip & sprinkler)
The project will also focus on dry land irrigation with appropriate technological and institutional inputs. Sprinklers and drip irrigation allow efficient use of water and represent an adaptation strategy against scarcity of water. Small perennial streams will be tapped and water will be conveyed by gravity through pipes to provide irrigation through more efficient systems. Accordingly, adaptation resources will be used to upscale high efficiency irrigation or water saving technologies such as sprinkler irrigation and drip irrigation for high value crops such as vegetables and horticulture crops. This activity will support the installation of two drip irrigation and four sprinkler irrigation systems covering a total area of 100 acres.

Activity 2.2.4: Tailwater Management
Irrigation from tailwater management has not been given sufficient importance in Bhutan. However, due to increasing extreme events, tailwater management is becoming more popular as it helps prevent downstream negative environmental impacts. Accordingly, the project will implement tailwater management in two schemes on a pilot basis, thereby properly providing irrigation through natural channels.

Output 2.3: Innovative technologies for tapping water adopted.

The proposed activities under irrigation for this output include:

Activity 2.3.1: Build water harvesting structures or small-scale reservoirs to tap water for irrigation
Bhutan has a unimodal annual rainfall pattern, which is heavily influenced by the South-West Monsoon with rainfalls mainly during the June-September period. For the remaining months of the year, there is little or no natural precipitation to grow a second crop. One of the options to irrigate and grow crops during winter or drought period could be to collect and store surface runoff during the monsoon period and/or store water from the nearby springs and brooks. This will entail construction of farm ponds at the individual household level and relatively larger ones (reservoirs) in feasible areas for local communities.

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

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

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

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

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

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

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

WUA formation for drinking water supply

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

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

WUA formation for irrigation scheme

The National Irrigation Policy states that each WUA should have a constitution with bylaws. The constitution describes the organization of water users and bylaws specify the rules for proper use and maintenance of the irrigation system. The WUA constitution and bylaws aim to ensure

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

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

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

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

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

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

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

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

In Bhutan, only 7.8% of the total land area is arable and 2.93% is cultivated[19]. About 31% of agriculture land is situated on slopes more than 50%[20]. Farming is often carried out without any sustainable agriculture practice, leading to annual soil loss of 3-21 t per hectare[21]. The loss of topsoil poses a serious threat to food security as it significantly reduces the inherent soil fertility, soil organic matter and water retention capacity, resulting in poor land productivity and crop yield. Furthermore, as agriculture is predominantly rain-fed and dependent on monsoon rains, agriculture in Bhutan is highly sensitive and vulnerable to the impacts of climate change and climate variability[22].The IPCC[23] also warns that mountainous regions such as Bhutan will experience a crop yield decrease due to increase in water stress (either too much or too little) and land degradation.

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

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

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

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

[19] *Land Cover Mapping Project (LCMP), 2011, National Soil Services Centre, DoA, MoAF*
[20] *National Action Program to Combat Land Degradation in Bhutan (NAP), 2014, National Soil Services Centre, DoA, MoAF*
[21] *Soil Erosion Report, 2010, National Soil Services Centre, DoA, MoAF*
[22] *National Adaptation Plan of Action (NAPA), 2011, National Environment Commission (NEC), RGoB*
[23] *Intergovernmental Panel on Climate Change (IPCC), 2007*
[24] *Soil Erosion Report 2010, National Soil Services Centre, DoA, MoAF*

Between 2005 and 2020, a total of 20,633 acres of vulnerable and degraded land was restored through various SLM interventions. For the proposed project sites – Dagana Paro, and Tsirang dzongkhags – the total land area brought under SLM are 275 acres, 104 acres, and 170 acres respectively. In other words, there is a strong need to scale up SLM interventions to make land and farmers' livelihoods more resilient to climate change.

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

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

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

Output 3.1: SLM in vulnerable and degraded areas implemented

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

The primary activities proposed under this output are:

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

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

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

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

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

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

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

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

1. Paro	2. Dagana	3. Tsirang
● Rice ● Apple ● Cabbage ● Potato	● Rice ● Chilli ● Citrus	● Rice ● Chilli ● Citrus

Planned activities under this output include:

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

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

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

Activity 3.2.4: Knowledge management and communication activities.

Activity 3.2.5: Sensitization, awareness and capacity development on agro-met services for researchers, extension staff and farmers.

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

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

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

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

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

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

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

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

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

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

The following activities are proposed to achieve this output:

Activity 4.1.1: Conduct professional development programme for LGs on CCA investments, mainstreaming tools, frameworks and approaches related to irrigation, water management, SLM, CCA and gender.

Activity 4.1.2: Carry out M&E of CCA and gender mainstreaming in LG plans, programmes and activities.

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

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

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

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

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

Environmental benefits

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

Economic benefits

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

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

Social benefits

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

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

Avoidance/mitigation of potential negative impacts

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

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

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

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

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

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

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

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

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

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

In terms of irrigation technologies, the proposed interventions include HDPE pipeline and climate-smart technology which in the long run has minimal maintenance cost. Such interventions also have a high efficiency level of water usage as it reduces conveyance losses[25]. Given the mountainous terrain, piped irrigation shows more adaptive benefits compared to open conventional irrigation channels.

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

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

Hence, while upfront cost for pressurized piped irrigation schemes is higher than traditional open channels, it is increasingly proving to be the most efficient, reliable, and sustainable scheme. Interventions on irrigation financed by the GEF-LDCF and GCF are also focused on building pressurized piped irrigation which is the most suitable and resilient scheme for a highly vulnerable mountain ecosystem.

[25] *NIWRMP 2016, National Environment Commission, RGoB*

Various types of land degradation occur in Bhutan at different scales and degrees. Among the land degradation types, water induced degradation, e.g. gully, landslides & ravine formation, are more prominent and devastating. Wind and tillage erosion is also extensive as is in-situ degradation such as depletion of soil organic matter, nutrient mining, topsoil capping and subsoil compaction. All these contribute to reducing agricultural productivity and impairing the livelihoods of the people of Bhutan. Older farmers commonly report crop yield declines of 30% or more due to the soil "being tired" (SFU, 2001)[26].

The introduction of SLM interventions brought positive impact in reducing soil erosion by 40 percent which resulted in increase in crop yield by 10%[27]. However, the challenges faced by farmers, especially households headed by elderly farmers, women and economically disadvantaged families in implementing SLM interventions are labour shortages and high cost. Therefore, to address this challenge, alternative approaches such as informal labour sharing groups and community mobilization through campaign mode were adopted which have proven successful and are being replicated in areas where SLM is rolled out through different project supports. In addition, alternative approach using machine was adopted for bench terracing from 2017 under the funding support from BTFEC, GEF-LDCF and GCF. Without mechanization, an acre of bench terracing manually requires about 147 men days which works out around Nu. 147,000/- (@Nu. 1,000 per person per day). However, with mechanization, the cost was reduced by 65% which is found to be more cost-effective in maintaining soil fertility and improving farm productivity.

Climate related extremes such as heat waves, droughts, floods, cyclones and wildfires expose the ecosystem and human systems to the current climate variability and make us vulnerable. Bhutan has also been witnessing more frequent extreme weather events causing widespread damages to crop and livelihood. For instance, the incessant and untimely rainfall that coincided with paddy harvest in the country from 16 to 21 October 2021affected 4242 households across 18 dzongkhags damaging 2698 acres of crops. According to the record maintained by the MoAF, the rainfall incurred a damage of about Nu 9,50,33,520.86[28]. The extreme weather events are projected to be more frequent into the future. These extreme weather events, climate variability and long-term climate change pose important threats to the future agriculture and food security. This necessitates the need for climate and weather services (agrometeorology). Dissemination of timely agro-advisories and early warning systems has the potential to reduce the number of fatalities cause by weather and climate related disasters and enhance the resilience of the communities.

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

[26] *Report on Agroforestry and Soil Fertility Survey in Bhutan. Soil Fertility Unit, Ministry of Agriculture, Thimphu, Bhutan.*
[27] *"Farmers' perception on soil erosion, its causes and adoption of its mitigation measures in two gewogs of eastern Bhutan.", Tshering, Jigme, et al.*

[28] *Crop damage report of 17 Dzongkhags, 2021, RGoB*

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

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

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

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

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

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

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

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

Bhutan in its first NDC outlined the 10 broad areas of priority adaptation needs. The integrated water resources management adoption of appropriate technologies, climate proofing water

distribution systems and integrated watershed and wetland management were identified as some of the adaptation measures in the water sector. The proposed project is in line with the first NDC.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The GCF financed UNDP supported project on Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan supports resilient agricultural practices in eight dzongkhags of Dagana, Tsirang, Sarpang, Punakha, Wangduephodrang, 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 and Tsirang are common and provide opportunities to seek synergy in terms of water management and sustainable land management.

In Tsirang, GCF Project covers Mendrelgang, Kilkhorthang, and Sergithang which are beyond the project scope of AF. In Dagana, two gewogs, namely Tsangka and Lajab, are common between GCF and proposed AF project. However, GCF supports are focused on sustainable land management whereas AF project proposes to build climate-resilient irrigation schemes which will maximise farm productivity in those two gewogs thus complementing both the initiatives.

Similarly, GEF-LDCF financed, UNDP supported project on "Enhancing sustainability and climate resilience of forest and agriculture landscape and community livelihoods in Bhutan" is being implemented in 12 districts, namely Wangduephodrang, Zhemgang, Sarpang, Tsirang, Thimphu, Trongsa, Bumthang, Mongar, Lhuntse, Paro, Punakha and Haa. While Tsirang and Paro districts are common, intervening *gewogs* are different. In Paro, except for some support for conservation initiatives, there are no adaptation intervention from the GEF-LDCF project. In Tsirang, GCF-LDCF project supported one irrigation scheme in Sergithang gewog while it is not included in AF proposal.

The ongoing GEF financed, UNDP supported project on ecotourism focuses on mainstreaming 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 AF.

The recently approved project concept note under the GEF-LDCF on advancing climate-resilient water sector in Bhutan covers the dzongkhags of Thimphu, Wangduephodrang, Tsirang, Sarpang and Punakha.

IFAD funded "Commercial Agriculture & Resilient Livelihood Enhancement Programme" presently concentrates on the project sites that are centric to the eastern part of Bhutan, namely Lhuntse, Trashiyangtse, Mongar, Trashigang, Pemagatshel, and Samdrup Jongkhar. These project sites are beyond the scope of the project landscape identified in the AF project.

Further, the IFAD project mostly emphasizes commercial farming practices such as crop cultivation and livestock sciences, market chain and enterprising activities including the upliftment of farmers' groups and cooperatives, with a peripheral concentration on irrigation and land development. On the other hand, the AF project solely emphasizes water and land development where adaptation measures will be integrated, where concrete activities will be carried out through the apportioned amount, which further justifies the concentrative approach in contrast to the IFAD project where commercialization has come out as a centerpiece. Moreover, the lessons learned and documented from IFAD project will be used in the implementation of AF proposal.

Since the project landscape identified in the AF project is not intervened by the IFAD programme, it is at the planning mechanism of GNHC where duplication is reduced. GNHC as the planning commission of Bhutan will ensure that the project is aligned with the national goals with no duplication.

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

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

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

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

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

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

Potential outputs include:

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

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

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

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

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

- **Participatory SLM Action Planning** – This planning methodology has enhanced community ownership and commitment; promoted inclusion of all households in decision-making process; and helped build community capacity.

- **Group approach in implementing SLM measures** – Promoting informal groups or reviving traditional labour sharing groups was found very useful in implementing SLM activities that are labour intensive, e.g., hedgerows, stone bunds, check dam construction and orchard establishment. This approach was particularly helpful to families with less labour force, women heads, aged and disabled family, and resource poor households. Besides, the approach has also generated other social co-benefits such as community cohesion and trust, exchange of experiences and benefits through collective action against conventional individual household approach

- **Reaching all versus focused approach** – One lesson learned has been with regards to reaching out project resources to all the communities and households versus focusing the interventions. The problem with reaching out project support to all is the dilution of impact due to too many activities and spreading out resources too thinly. That way, there is no visible impact or transformational change at the end of the project period. Realizing

this, a focused approach was adopted which resulted in better resource utilization and bigger impact in the field.

- **SLM best practices** – The problem with many SLM interventions is the long period needed before the impact of interventions becomes tangible and start contributing to the beneficiaries' livelihoods. Most SLM interventions take a considerable time between the initial investment and the actual benefit, which is an opportunity costs to most of the land owners, especially so to the resource poor farmers having small landholdings. Therefore, the long term SLM interventions were supported with the provision of inputs for direct short-term benefits such as improved seeds, incentives and material supports, including simple tools and implements, small labour-saving machineries, etc. matching with short term cash income generating activities.

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

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

The project will focus on strengthening the institutional, financial and human capacities for long-term management and M&E for integrated watershed management, aiming at water sources that are well protected. This will include review of existing studies and strategies, mapping the gaps and enhancing these strategies. This will include human resource development, mainly training the field staff for improved management of water sources and creating awareness and empowering communities in water management mainly through PES. Further assessments on watershed considering climate change with appropriate interventions will be carried out and information disseminated to various field officials for future adaptation measures. A reliable wetland monitoring system which is currently lacking for the project sites will be developed, taking advantage of emerging technologies for innovative solutions. This monitoring system will guide the planning process, particularly the development activities taking into consideration the vulnerability issues.

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

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

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

As for the baseline, there is a lack of technical capacity and awareness in integrating adaptation measures into the water sector, which is also one of the sectors most vulnerable to climate change. Taking this into consideration, the project will build the capacity of engineers in the

integration of climate change adaptation measures in water management planning and implementation. The project will also document the best practices of climate-resilient water management demonstrated in the project sites and the knowledge will potentially be disseminated through conferences and seminars to other parts of the country for the purpose of replication.

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

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

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

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

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

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

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

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

The TWG reviewed the 12th FYP (2018-2023) flagship programmes to achieve accessibility to reliable and safe drinking water. It was also agreed that the project sites will be selected based on the water stressed level. In September 2019, transformational adaptation interventions under each of the components were identified through a one-day consultative workshop with

involvement of relevant stakeholders (NEC, DOA, DoFPs, DLG, Dept. of Engineering Services, Dept. of Agriculture and Marketing and Cooperatives, NSSC DA & NIE). Later in February 2020, a three-day consultative write shop was conducted to compile the data and information in order to formulate the final draft proposal which was sent to the consultant and also to the AF.

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

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

Under each of the components, lead agencies have conducted stakeholder consultations, including with the LG, community leaders and community groups. A number of far-flung communities considered vulnerable groups were also consulted. It is the government's priority that such groups are considered and benefit from any form of project. In most of the meetings, the presence of women and youth was also ensured. Consultations were also the opportunity to confirm communities' sensitivity to environmental and social safeguards.

Details of consultative processes under each component are indicated below:

Component 1:
Preliminary watershed assessments were initiated in collaboration with all the stakeholders in the watershed of Paro and Dagana districts. Consultative workshops were held with all the relevant agencies at the district level to create awareness on the watershed management and to seek information on the watersheds.

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

Component 3:
Under this component, consultations were performed according to the requirements as defined by the MoAF prior to this proposal formulation. The land use mapping conducted by the MoAF has clear indications of different aspects of land use and related challenges, including at social level.

Component 4:
Regarding the formation of WUAs, consultation was held with the LG of Paro, one major project

dzongkhag. Further detailed analysis of Environmental and Social Safeguards, and Gender analysis, shall be required according to local infrastructure to be set, in line with National Regulation.

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

The participatory assessment of gender situation revealed the following;

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

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

- Formal registration of all WUAs in the project areas with enhanced participation by women. For this the project should provide capacity building of WUA office bearers in the related fields.
- The project should aim to raise the representation of women as office bearers of WUAs by 11 % to 30% by the end of the project period and
- That usage and management of water largely handled by women at the household level and by men at the dzongkhag level. There is a gap between the majority of end users of water, who are largely women at household levels and decision makers in the management of water at the community and dzongkhag levels who are largely men.
- Within the project dzongkhags, 100% of Dzongkhag Tshogdu (DT) chairperson; 75% of Deputy Chairperson, 100% of DT Secretary and 78% of members are men. The representation of women in the Gewog Tshogde (GT) is 29% as compared to 22% at the DT level. Women lack influence within existing water governance and management institutions, limiting their ability to change the redistribution of power and affect decisions. Training and capacity building would be required for women to engage in public decision-making.
- Men play a greater role in maintenance of water-related infrastructure. However, women also play a significant role in the maintenance of infrastructure at community and household levels which indicates the need for enabling participation by women capacity building for water maintenance, use of tools and equipment and in promoting improved tools and technologies in water maintenance at local levels. However, 90% of the participants view that men have enjoyed better access to training opportunities than women. Given the significant role women play in the maintenance of infrastructure at the community and local levels, the project support in terms of training opportunities in water infrastructure should include equal participation by women. Women have a greater role in the use of water for cooking, cleaning, watering livestock and kitchen gardens as compared to the greater role

of men in use of water for field irrigation. In situations where water facilities are not maintained at the local levels, women would land up facing the larger brunt of dealing with lack of water supply and hence would find more value in having skills and capacity for water maintenance. Training women on efficient and economic use of water would also enable efficient utilization of limited water resources. Therefore, the stakeholder consultations on gender proposed the inclusion of training on practical and technical measures to enable both men and women at grassroots to enhance their skills in water management. The type of skills and capacity required by the stakeholders, as identified during the stakeholder consultations included skills in:

- Water distribution and management
- Efficient/economic use of water
- New applicable technologies in water management
- Use of maintenance tools and equipment
- Plumbing and minor maintenance at HH and community level
- Climate-resilient and efficient design of water infrastructure

- Women have a higher level of control over decisions related to buying and selling of commodities. They stand very low in terms of control and access to production tools and equipment, transportation matters, information and training opportunities.
- In the project area, access and control over land resources are dominated by men indicating that men play a significantly larger role in decisions related to buying and selling of land or in terms of cultivation and use of land resources. Men also play a larger role in irrigating agriculture land except in the case of kitchen garden which is dominated by women.
- Men do have better access to financial capital over women such as in actual spending. However, the control and, therefore, for decisions related to spending, investments, borrowings or lending are dominated by women. Therefore, there is a need to enhance this capacity by including women in trainings related to book keeping.
- A survey on gender and climate change in Bhutan reported that 84% of men in Bhutan are aware of climate-smart and climate-resilient agriculture as compared to only 68% of women being aware of the same. It also reported that a higher proportion of males enjoy access to information, training and inputs related to climate smart agriculture[29]. The PPG stakeholder consultations in the project areas also observe that men have better access and control over information, tools and training. The fewer opportunities for women relative to men to obtain skill and development training limit their participation in and the benefits they may gain from the use of new water technologies. Therefore, stakeholder consultations and meetings of the project should make concerted effort in creating awareness on impacts of climate change and technologies for improved water management.

- The Gender Assessment, therefore, recommended;

  - Enhancing participation by women in project activities, particularly in training and capacity development activities; Supporting establishment of formal (registered) through capacity building and enabling formal registration of WUAs; ensuring that 30% of office bearers in these WUAs comprise women and that all trainings and workshops

[29] *Gender and Climate Change in Bhutan, CNWC, 2020*

involving local communities achieve a 30% participation by women. The training needs are identified (See gender Assessment and Action Plan in Annex 1);

- Awareness on the water act; water regulations; group formation and management; Water source sharing; conflict and dispute resolution; Labour regulations and Labour Safety; Roles and responsibilities of stakeholders in water management; Gender equity in water management; Mechanism for distribution of water; Innovations for sustainability in water management such as introduction of fees and PES mechanisms; Management of WUAs and record keeping.
- Climate resilient management and maintenance of water resources and infrastructure covering topics on water distribution and management; efficient/economic use of water; new applicable technologies in water management; use of maintenance tools and equipment; plumbing and minor maintenance at HH and community level; climate resilient and efficient design of water infrastructure.
- Facilitating women and men's equal participation in and access to benefits project activities. Support the empowerment and leadership-building of rural women, and their full and meaningful involvement in the water resources and water management. Enable rural women to participate actively in WUAs.
- Enhancing education, and conduct awareness-raising and advocacy on adaptation to climate change through climate resilient water management through training sessions and social media.
- Putting in place, a grievance redress mechanism at the start of the project to ensure a formal process for addressing concerns or complaints raised by individuals (particularly women) or groups affected by the project implementation activities. Both concerns and complaints can result from either real or perceived impacts of operations and may be filed in the same manner and handled with the same procedure. Measures should be in place to avert and mitigate conflicts arising out of project implementation including unequal distribution of water.
- Appointment of an Environmental Safeguards and Gender Expert to ensure that gender equality and safeguards are fully built into project activities. The expert will identify gaps and support in capacity building and provide training to project staff and key stakeholders. The details of gender assessment and ensuing gender action plan is annexed (Annex 1).

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

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

Table No.6 Summary of stakeholder consultations

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

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

The **"business as usual"** situation can be described as follows.

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

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

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

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

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

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

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

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

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

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

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

The project activities are mainstreamed into the existing system through alignment to the 12th FYP objectives and Water Flagship Programme. Furthermore, as per the Water Act of Bhutan 2011, any group of beneficiaries using a particular water source for their water supply needs may form a WUA to maintain the water source and to manage water supply services. In line with the Act, to ensure sustainability of the scheme, formation of WUAs is proposed as part of the project which will be institutionalized and the operation and maintenance aspects of the scheme after project finalization will be integrated into local government plans. An empirical experience evidence pointed out in one of the publications of the ADB, traditional water user groups look after the maintenance of water supply systems in rural communities[30].

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

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

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

[30] *https://www.adb.org/publications/water-securing-bhutans-future*

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

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

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

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

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

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

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

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

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

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

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

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

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

The final designs of infrastructure systems to be implemented under Component 2 will comprise finalization of community consultations and of data collection on vulnerable and marginalized households, and the validation of detailed design and survey works along the proposed alignment of the infrastructure. This is planned for the first six months of the initial implementation phase.

Nevertheless, all potential risks across all components are site and activity specific and manageable or controlled by terms and conditions defined in respective activity specific environmental clearances.

Hence, their potential negative impacts are very limited and can be readily mitigated. An Environmental and Social Management Plan (ESMP) and Grievance Mechanism are included in Annex 2, as required by the AF procedures. The ESMP provides mechanisms for tracking identified risks, or any new risks, ensuring they are properly monitored, evaluated, reported on, and addressed.

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

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

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law	✓	
Access and Equity		*Moderate risk:* *Mitigation measures/Further assessment during project implementation:* Articles of Association of WUAs to include clause on: - community exemptions for poor households in terms of financial or labour contributions to the water user groups/association. - providing equal access to new settlers Strengthen WUAs to protect rights of member households through training and definition of incentives in the articles of associations
Marginalized and Vulnerable Groups	✓	*Low risk:* *Precautionary measures:* M&E Officer and Safeguards expert to monitor that WUA articles include relevant clauses
Human Rights	✓	*Low risk:* *No further assessment required during project implementation*
Gender Equity and Women's Empowerment		*Moderate risk:* *Mitigation measures/further assessment during project implementation:* The project will fully mainstream gender, and will ensure that women and men and female and male youth equitably engage in and benefit from project activities

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
		Ensure that at least 30% of executives of WUAs supported by the project comprises of women 50% participants at training conducted through the project will comprise women and youth.
Indigenous Peoples	✓	Not applicable
Core Labour Rights		*Moderate risk:* *Mitigation measures/further assessment during project implementation:* PMU, project officers, implementing partners and organizations must ensure compliance to national laws and international agreements on labour rights
Involuntary Resettlement	✓	*Low risk:* *Precautionary measures:* - Avail clearance from all concerned agencies and consent from all affected individuals and parties
Protection of Forests and Natural Habitats		*Moderate risk:* *Mitigation measures/further assessment during project implementation:* - Only native species to be used for any plantation ior restoration works in forest areas
Conservation of Biological Diversity		*Moderate risk:* *Mitigation measures/further assessment during project implementation:* - Introduction of alien and invasive crop/plant species to. be avoided;

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
		- 30% of the lean flow from natural streams to be maintained in all natural streams where the project activities will draw surface water as per the Water Regulations and in alignment with the Water Act 2011 - Design of infrastructure for water scheme should be based on discharge measurements at the source during lean and peak rainfall seasons
Climate Change		*Moderate risk:* *Mitigation measures/further assessment during project implementation:* - Need to ensure use of climate resilient design for all water infrastructures under the project
Pollution Prevention and Resource Efficiency		*Moderate risk:* *Mitigation measures/further assessment during project implementation:* Need to avail clearance from all concerned agencies and consent from all affected individuals and parties. Compliance of the terms laid down in the clearances such as forest clearance and environmental clearance documents
Public Health		*Moderate risk:* *Mitigation measures/further assessment during project implementation:* Need to avail clearance from all concerned agencies and consent from all affected individuals and parties. The safeguards expert will monitor that the contractual arrangements include occupational health and safety provisions and that these terms and conditions are complied by contractors and site engineers. The PMU will ensure that disbursement is not made without proving compliance to these terms and conditions.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Physical and Cultural Heritage	✓	*Low risk:* *Precautionary measures:* The safeguards expert will monitor that the terms and conditions specified in cultural clearances are complied by contractors and site engineers.
Lands and Soil Conservation		*Moderate risk:* *Mitigation measures/further assessment during project implementation:* - Contractual arrangements to include proper restoration of exposed soils and access trails -Advocate use of integrated pest management practices for preventing and managing pests and promote and use bio-pesticides under the project for managing pests in paddy and vegetables

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project/programme implementation.

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

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

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

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

The responsible agencies for the components are the following:

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

Table 8: Details of Executing Entities

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

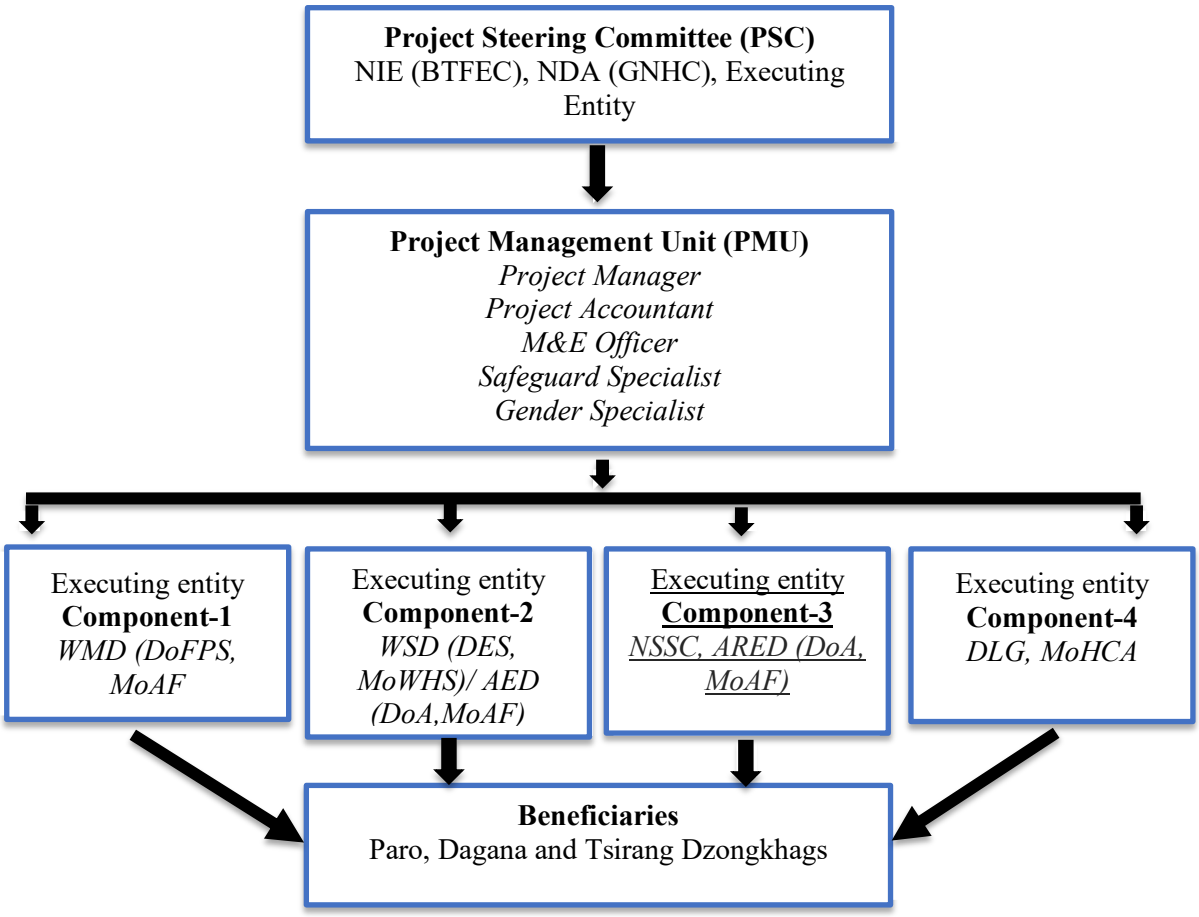


Figure 8: Project Organizational Structure

Roles and Responsibilities of Project Steering Committee

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

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

Roles and Responsibilities of Project Management Unit

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

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

Roles and Responsibilities of Executing Entities

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

Roles and Responsibilities of Beneficiaries

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

Financial Management

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

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

Fund Flow Mechanism

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

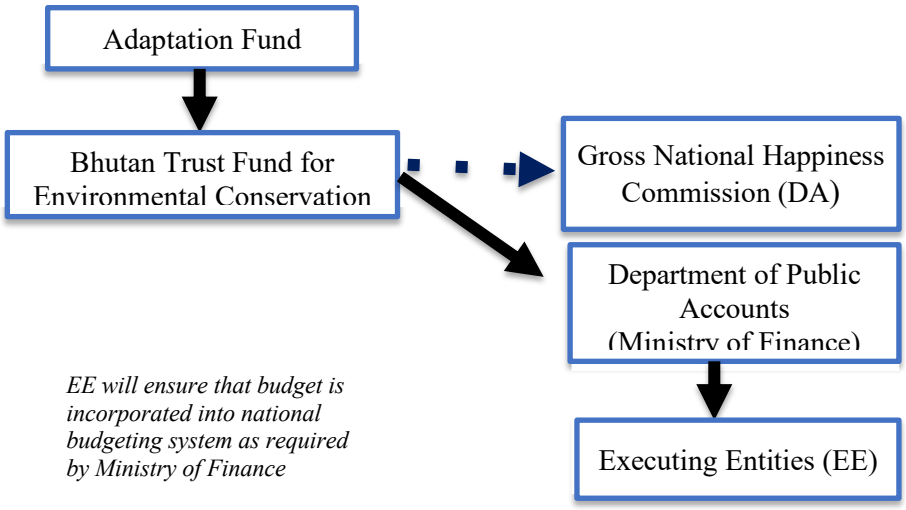


Figure 9: Flowchart showing the Fund Flow

Procurement management

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

Periodic Progress Reporting

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

Stakeholder engagement plans

Component 1: Adaptive management of waersheds to enhance the cmilate resilience of communities

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

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

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

Output	Stakeholder	Type	Role in Project
Output 2.1: Climate and disaster resilient	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.

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

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

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

Output	Stakeholder	Type	Role in Project
Output 3.1: SLM in vulnerable and degraded areas implemented	National Soil Services Centre, DoA, MoAF	Government agency	Lead role in the implementation of the activities planned for the output; coordination with various relevant agencies; technical guidance and backstopping on SLM
	Central Machinery Unit, DoA, MoAF	Government agency	Prepare machine deployment plan and mobilize machines to the *dzongkhags* for agriculture land development; timely monitoring and maintenance of machines
	Farm Machinery Corporation Limited	State-owned Enterprise	Hiring of machinery for agriculture land development (terracing)
	Private machine hiring agencies	Private enterprise	Hiring of machinery for agriculture land development (terracing)
	Agriculture Research and Development Centres, DoA, MoAF	Regional government research agencies	Technical inputs and guidance for implementation of SLM plan
	National Seed Centre, DoA, MoAF	Government agency	Arrange to supply climate-resilient seeds and seedlings; Support community-based seed production
	Private nurseries	Private Sector	Supply seeds and seedlings
	LGs	LG authorities	Mobilization of local participation. Coordination of implementation of project activities in the identified areas
	Rural Communities	Beneficiary	Participation in actual implementation of project activities
Output 3.2: Climate change information,	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

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

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

Output	Stakeholder	Type	Role in Project
Output 4.1: Institutional mechanisms in LGs strengthened for CCA and gender mainstreaming	DLG, MoHCA	Central government agency	Lead role in the implementation of the activities foreseen for the output; coordination with various relevant agencies; guidance and backstopping.
	Dzongkhag and Gewog Administrations	Sub-national/ LG authorities	Key beneficiaries; responsible for applying mainstreaming roles and responsibilities
	Central MRG/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 the RGoB since 1992. NIE has also been an executing entity for GEF/World Bank funded projects, and other global financing organizations such as Climate Investment Fund, GCF's readiness grant, and so on. Thus, all financial and project management up to the international best practices as per the Programme Operational Norms (PONs) of the NIE.

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

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

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

The National Implementing Entity:

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

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

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

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

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

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

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

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

Areas of Risk	BTFEC's operational area	Description of Risk	Severity			Risk Management Measure	Indicator
			L	M	H		
Strategic risks							
Overall economic environment	Finance & Investment	Total assurance of the economic environment would still remain uncertain as the project intends to create resilience of communities through agricultural activities that are dependent on vagaries of climate and other allied natural phenomena.		X		- Promote farm mechanization along with SLM and irrigation in the participating communities - Promote winter cropping and hybrid and climate resilient seeds. - Build the capacity of farmers on good agricultural practices and farm mechanization Community commitment to carry out agriculture will be enhanced by assured water supply for agriculture and drinking ensuring their economic activities are facilitated.	No of communities using farm machinery. Collaboration with DoA for supply of hybrid and climate-resilient seeds to farmers.
Political	Governance	All the executing agencies are government agencies and proposed plans are aligned with the existing FYP. Therefore, the project will have full political support.	X			Ensure good coordination with all stakeholders including central agencies	Meetings, communications to stakeholders
Governance	Governance	Poor efficiency in implementation due to difficulties in decision-making or to a lack of formal authority.	X			-The execution of all four components is spear-headed by mandated government agencies with established institutional human resources and capacity. -Capacity building of the communities involved.	Reports
Investments	Investment	Failure to respond to needs of the intended beneficiaries.	X			All project activities are needs-based and aligned with the 12th FYP and thoroughly deliberated and planned.	FYP reports
Corporate Image	CRS	If the project receives a negative image, this would impact BTFEC reputation	X			The agreed methodology and participatory approach ensures project ownership from the partner entities and the final beneficiaries	

Financial risks							
Financial Sustainability	Financial	Effective availability and use of financial resources during implementation. Running costs of supported activities over time.	X			-During implementation, the government will ensure financial sustainability through annual budget allocation for maintenance and other recurrent costs. -Most expensive items (notably, at irrigation level) are low maintenance. Users' associations will be set upto 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/serv-ices)	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				
Disbursemen-ts	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
Communicati-on	Communicat-ion	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
	Program Management	Implementation risks due to COVID-19	X			As per the Royal Government's health protocol, community gathering and	Reports

COVID-19		Description of risk: Due to the Covid-19 pandemic and the restrictive measures put in place may hamper the timely implementation of the projects. For instance, consultation meetings with the community and other stakeholders might be restricted. Further, travel may also be restrictive depending on the covid-19 situation in future. Since Bhutan is an import dependent country and if the Covid-19 situation persists, import of key materials for the implementation of the project may be delayed.				meetings are allowed within certain thresholds. The consultative meetings and participation can be conducted in groups while adhering to health protocols and also ensuring community participation. Imports are facilitated and given that this is a government priority project, implementing agencies can take it up with the National Covid-19 Task Force on expediting the import of materials if required. Starting from 4 July 2022, the Royal Government of Bhutan has lifted all restrictions with gradual reopening of all borders and tourism from 23rd of September 2022 without any quarantine requirements for fully vaccinated people.	
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	Administrat-ive	Lack of determination of individuals, companies or government entities that participate in the project may lead to impediments during implementation (e.g., delays in payments)	X			The NIE was established under the Royal Charter. The government as the executing agency, the project already has the legal identity and no issue is foreseen. All project stakeholders need to demonstrate they operate under a recognized legal entity.	

Table 9: Risk management matrix

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

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

The assessment included:

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

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

Table 10: Project screening and categorization (For details see Table 4, ESMP in Annex 2)

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

AF Principles	Assessment	Impact (1 -5)	Likelihood (1-5)	Significance (L/M/S/H)
HUMAN RIGHTS (1 question)	The constitution of Bhutan ensures human rights as a fundamental right to every citizen in Bhutan. Risk on this remains low.	3	1	L
GENDER EQUALITY AND WOMEN'S EMPOWERMENT (3 questions)	Due to availability to water, there could be increased agriculture activities and farm workload; Fallow lands would be cultivated; and increase in household chores. However, trend in use of more mechanization would offset the workload and overall, there would be positive impact. For instance, ferrying manure to agriculture fields, traditionally done by women are now performed by men driving power tillers. Statistics of current situation show limited participation by women in the executive role of WUAs. Women-headed households may face challenges of project accessing benefits.	3	3	M
CORE LABOUR RIGHTS (7 questions)	Contractors may not fully comply with labor laws and standards in employing workers, establishing appropriate working conditions or may adopt differential work compensation between men and women or may employ children. Inadequate arrangement of temporary worker camps could pose health and hygiene risk to workers Some project sites pass through stretches of steep slope and difficult terrain which could expose workers to safety risks.	4	2	M
INDIGENOUS PEOPLES (4 questions)	Not Applicable	1	1	L
INVOLUNTARY RESETTLEMENT (6 questions)	The layout of pipes for irrigation and drinking water passes through some private land. However, loss of land or income is not foreseen as the pipes will be laid underground. Project activities do not involve land acquisition.	4	1	L
PROTECTION OF FORESTS AND NATURAL HABITATS (5 questions)	The project activities do not pass through any protected, prohibited or restricted areas. However, clearing works for access route to transport materials along water lines may cause minor site-specific disturbances to local forest but will not involve conversion of forest land use. Also trenching work for underground layout of water pipe lines will involve disturbances forest soils although such	3	2	M

AF Principles	Assessment	Impact (1 -5)	Likelihood (1-5)	Significance (L/M/S/H)
	disturbances will be temporary and limited to pipe alignment. Some activities requiring restoration of cleared sites through plantation could potentially have adverse impacts if non-native plants are used for replantation.			
CONSERVATION OF BIOLOGICAL DIVERSITY (4 questions)	The project activities do not pass through any protected, prohibited or restricted areas Increase cultivation of high-income verities may increase risk of neglecting native verities. Withdrawal of water from natural sources without adequate environmental flow could pose risk of disturbing local aquatic life	3	3	M
CLIMATE CHANGE (3 questions)	Heavy rains and resulting local soil erosions could harm project assets.	3	2	M
POLLUTION PREVENTION & RESOURCE EFFICIENCY (9 questions)	With assured irrigation water, intensification of agriculture activities such as increased vegetable cultivation could risk farmers adopting use of limited chemical fertilizers leading to soil pollution Inappropriate waste at temporary worker camps in project sites may result in risk of limited desecration of natural landscapes Minor excavation works and ground clearance will cause limited disturbances to local soil and vegetation	3	2	M
PUBLIC HEALTH (5 questions)	Migrant workers with unknown medical and travel history could risk transmission of diseases that are not prevalent in the project areas to local communities and among project workers and staff	3	2	M
PHYSICAL AND CULTURAL RESOURCES/HERITAGE (3 questions)	Project workers form outside may not be aware of local cultural/sacred sites and may cause unintentional damages. Where cultural sites are observed in the project areas, cultural clearance are sought for project activities as a standard practice. The clearance document defines terms and conditions that enable avoidance of any harm on such assets.	3	1	L

AF Principles	Assessment	Impact (1 -5)	Likelihood (1-5)	Significance (L/M/S/H)
LANDS AND SOIL CONSERVATION (5 questions)	Clearing works for access route to transport materials along water lines as well a trenching for water lines may cause minor site-specific disturbances to soil structure. Site specific soil erosions could be triggered by heavy rainfalls on steep slopes at these sites. Weak pipe joints of water conveyance pipe and may lead to frequent burst of pipes and leakages triggering minor local soil erosions	4	2	M
Following project risk identification through participatory process and screening of the project risks by each activity and output (using 76 risk screening questions that are relevant to 15 AF ESS principle, project overall Project Risk Category has been determined as Category B since the overall significance of project risks is Moderate likely impact from such risks are minor, site specific and manageable.				M

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

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

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

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

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

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

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

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

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

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

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

Budgeted M&E Plan

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

E. Project Results Framework

Project Results	Indicator(s)	Baseline	Target(s)	Means of Verification	Risks and Assumptions
Project Objective: To build resilience to climate change and adaptive capacity of water stressed communities					
To build resilience to climate change and adaptive capacity of water stressed communities	No. of direct beneficiaries	0	36,464(19,249 male and 17,215 female)	Total number of people of the gewogs identified as project sites as per dzongkhag record.	
To build resilience to climate change and adaptive capacity of water stressed communities	No. of indirect beneficiaries	0	139,661(72,441 male and 67,220 female)	Identified dzonkhags beneficiaries for	

				project landscape activities	
To build resilience to climate change and adaptive capacity of water stressed communities	Total land area brought under effective management	0	21,252 ha (202 Ha-SLM and 21,049-watershed)		
Component 1:	Adaptive management of watersheds for enhanced community resilience to climate change				
Outcome 1: Increased watershed and ecosystem resilience in response to climate change and variability- induced stress	Total land area brought under effective watershed management	0	21,049 Ha	Total area under watershed, wetland management and spring revival in watershed management intervention report at WMD	
Output 1.1: Watershed management intervention measures implemented	No of watersheds intervened	One watershed management plan in Dagana developed	Watershed management interventions developed and implementations initiated	Record of watershed management intervention measures developed and implemented at WMD	
Output 1.2: Payments-for-Ecosystem Services (PES) schemes scaled-up	No of PES Schemes explored and established	one each PES schemes established in Paro and Tsirang	One PES scheme will be explored and established if feasible	PES agreement	Stakeholders' willingness to participate
Output 1.3: Water sources' recharge interventions adopted	No of water sources revived	One water source revival site operational in Paro	Interventions Strengthened and adopted for 9 drying water sources	Field visits and reports	Difficult terrain may escalate cost
Output 1.4: Wetlands monitoring system established for informed decision-making	No of significant wetlands inventoried and monitoring system put in place	N/A	One wetland monitoring system in place	Record of monitoring system	Limited technical knowledge

Component 2:	Climate-resilient water infrastructure for uninterrupted supply of water for drinking and irrigation				
Outcome 2: Improved access to irrigation and safe drinking water	No. of households benefitted with climate resilient 24x7 drinking and irrigation water	N/A N/A	3168 households (drinking water) 282 households (irrigation)	Annual Progress Report	

Output 2.1: Climate- and disaster-resilient drinking water infrastructure established	Number of climates and disaster resilient drinking water system constructed	0	3 water supply schemes	Annual Progress Report	Construction difficulty due to terrain.
Output 2.2: Capacity building of Engineers in Climate Resilient water supply infrastructures	Number of Engineers and technicians trained	0	30 Engineers and Technicians (50% women).	Training attendance/ Certificate	Unforeseen lockdown/ movement restriction/ covid 19 protocols
Output 2.2: Climate- and disaster-resilient irrigation infrastructure established	Number of climate and disaster resilient irrigation scheme constructed	0	3 Nos. of irrigation scheme	Annual Progress Report	Construction difficulty due to terrain.
Output 2.3: Innovative technology for tapping water adopted	No. of households with climate-smart drinking water technology adopted	0	65 acres 19 household (65 acres)		
Output 2.4: User groups in the community strengthened for effective management of irrigation and drinking water	No. of Water User Associations formed and trained.	0	6 WUA	Registration certificate	Difficult to train all project beneficiaries.

Component 3:	Climate-smart agriculture (CSA) through sustainable land management and informed agrometeorological services				
Outcome 3: Improved food security and livelihoods	Percentage of target households with stable and climate resilient livelihood sources	NA	Target population report food and income availability improved by 20%	Sample household survey; Midterm and end of the project impact report	All project beneficiaries participate and adopt project interventions
Output 3.1: SLM in vulnerable and degraded areas implemented	Total area brought under SLM practices	NA	500	Annual project progress report; Mid-term and end of project report	Availability of appropriate machines for land development; Willingness of the beneficiaries to take up SLM;

					No major landslide and flashfloods that would damage the investments made in SLM
	Percentage of women participants in participatory action planning and field based specialized training on SLM	NA	60% women	Gender Action Plan Monitoring Report Training Report	
Output 3.2: Climate change information, products produced and disseminated	Number of climate products generated	NA	Advisories issued on a weekly basis during critical growing periods.	Annual project report; Midterm and end of project report	Improved weather forecasting with better lead time made available by NCHM
Sensitization of agro-met services in project areas completed	Number of participants	NA	At least 50% of the participants are women	Annual project report; Midterm and end of project report	Female participant not willing to participate

Component 4:	Improved local governance for effective CCA mainstreaming with focus on water management at the grassroots				
Outcome 4: Strengthened CCA mainstreaming and water governance at the local level	Number of LGs effectively mainstreaming CCA and gender in LG plans, programmes and activities.	NA	All 13 Gewogs in the project sites have effectively mainstreamed CCA and gender in local annual and FYP	Local annual development plans; LG FYPs; Key informant interviews; Project progress reports.	Support and guidance from central agencies.

Output 4.1: Institutional mechanisms in Local Governments strengthened for CCA and gender mainstreaming in LG plans, programmes and activities	Number of LG functionaries and communities trained on CCA investment and mainstreaming tools, frameworks and approaches	Basic awareness for CCA and gender mainstreaming exists among LGs but lack tools and training for effective mainstreaming	LG functionaries including identified communities of 13 project Gewogs have been trained on CCA investment and mainstreaming tools, frameworks and approaches	Key informant interviews; Project progress reports.	Support and guidance from central agencies.

F. ALIGNMENT WITH THE RESULTS FRAMEWORK OF THE ADAPTATION FUND

Project Outcomes	**Project Outcome Indicators**	**AF Outcome**	**AF Outcome Indicators**
Outcome 1: Increased watershed and ecosystem resilience in response to climate change and variability-induced stress		AF Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress	AF Outcome Indicator 5: Ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress
Outcome 2: Improved access to irrigation and safe drinking water		AF Outcome 4: Increased adaptive capacity within relevant development sector services and infrastructure assets	AF Outcome Indicator 4.2: Physical infrastructure improved to withstand climate change and variability-induced stress
Outcome 3: Improved food security and livelihoods		AF Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	AF Outcome Indicator 6.1: Percentage of households and communities having more secure access to livelihood assets AF Outcome Indicator 6.2: Percentage of targeted population with sustained climate-resilient alternative livelihoods
Outcome 4: Improved CCA mainstreaming and water governance at the local level		AF Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	AF Outcome Indicator 3.1: Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses

			AF Outcome Indicator 3.2: Percentage of targeted population applying appropriate adaptation responses
Output 1.1: Watershed management intervention measures implemented		AF Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	AF Output Indicator 5.1: No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)
Output 1.2: Payments-for-Ecosystem Services (PES) schemes scaled-up		AF Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	AF Output Indicator 5.1: No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)
Output 1.3: Water sources' recharge interventions adopted		AF Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	AF Output Indicator 5.1: No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)
Output 1.4: Wetland monitoring system for informed decision making established.		Output 7: Improved integration of climate-resilience strategies into country development plans	Output 7.1 No. of policies introduced or adjusted to address climate change risks (by sector)
Output 2.1: Climate- and disaster-resilient drinking water infrastructure established		Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)
Output 2.2: Climate and disaster resilient irrigation infrastructure established		Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)
Output 2.3: Innovative technologies for tapping water adopted		Output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated.	8.1. No. of innovative adaptation practices, tools and technologies accelerated, scaled-up and/or replicated

Output 2.4: User groups in the community strengthened for effective management of irrigation and drinking water		AF Output 3.2: Strengthened capacity of national and sub-national stakeholders and entities to capture and disseminate knowledge and learning.	3.2.1 Number of technical committees/ association formed to ensure transfer of knowledge.
Output 3.1: SLM in vulnerable and degraded areas implemented		AF Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	AF Output 6.1: No. and type of adaptation assets (tangible and intangible) created or strengthened in support of individual or community livelihood strategies
Output 3.2: Climate change information, products and services made available and accessible		AF Output 2: Strengthened capacity of national and sub-national centers and networks to respond rapidly to extreme weather events	AF Output 3.2: No of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders.
Output 4.1: Institutional mechanisms in local level strengthened for CCA and Gender mainstreaming.		Output 3.1: Targeted population groups participating in adaptation and risk reduction awareness activities.	3.1.1: No. of news outlet in news outlets in local press and media that have covered the topic.

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	Activity 1.1.1 Conduct sensitization and awareness workshops (13 Gewogs to be sensitized)	10,790	0	0	0	0	10,790

measures implemented	Activity 1.1.2 Training of community members and LG officials on the implementation of identified watershed management interventions	0	10,790	0	0	0	10,790
	Activity 1.1.3 Conduct watershed assessment at the project site, including the watersheds along the proposed pipeline	0	5,080	0	0	0	5,080
	Activity 1.1.4 Develop watershed management intervention measures for the proposed areas (five sites plus along the proposed pipeline: at least one plan per dzongkhag- minimum of four)	0	0	11,380	0	0	11,380
	Activity 1.1.5 Implement identified intervention measures	0	0	0	130,000	142,000	272,000
	Subtotal Output 1.1	***10,790***	***15,870***	***11,380***	***130,000***	***142,000***	***310,040***
Output 1.2 Payments-for-Ecosystem Services (PES) schemes scaled-up	Activity 1.2.1 Conduct community consultations and sensitizations	2,500	0	0	0	0	2,500
	Activity 1.2.2 Hands-on training workshops in the management of PES schemes (1 training)	0	2,500	0	0	0	2,500
	Activity 1.2.3 Conduct detailed resource assessment and inventory	0	6,000	0	0	0	6,000
	Activity 1.2.4 PES scheme development and implementation based on the feasibility analysis	0	0	2,500	5,000	2,500	10,000
	Sub-total Output 1.2	***2,500***	***8,500***	***2,500***	***5,000***	***2,500***	***21,000***
Output 1.3 Water sources' recharge interventions adopted	Activity 1.3.1 Training workshops on water source recharge interventions with field demonstration (one per site) and awareness and sensitization	3,333	3,333	3,334	0	0	10,000

	Activity 1.3.2 Identification of recharge areas and designing water source revival activities following the spring shed management protocol	15,000	15,000	15,000	0	0	45,000
	Activity 1.3.3 Implementations of water source revival activities	0	45,000	45,000	45,000	0	135,000
	Activity 1.3.4 Monitoring and maintenance of conservation /restoration activities	0	0	1,250	2,500	3,000	6,750
	Sub-total Output 1.3.	***18,333***	***63,333***	***64,584***	***47,500***	***3,000***	***196,750***
Output 1.4 Wetland monitoring system for informed decision-making established	Activity 1.4.1 Conduct mapping of wetlands for the project Dzongkhags using remote sensing, including training	0	0	10,000	0	0	10,000
	Activity 1.4.2 Field data collection and mapping (all project Dzongkhags)	0	0	20,000	0	0	20,000
	Activity 1.4.3 Field exercise for Data Quality Assurance and Quality Control	0	0	0	3,000	0	3,000
	Activity 1.4.4 Data compilation and analysis, feeding decision making mechanisms	0	0	0	0	5,000	5,000
	Sub-total output 1.4	***0***	***0***	***30,000***	***3,000***	***5,000***	***38,000***
Total Component 1		**31,623**	**87,703**	**108,464**	**185,500**	**152,500**	**565,790**
Component 2: Climate resilient water infrastructures for uninterrupted supply of water for drinking and irrigation							
Output 2.1 Climate and disaster resilient drinking water infrastructure established	Activity 2.1.1. Construction of three Drinking Water Supply Schemes	2,351,067	1,763,300	1,586,970	176,330	0	5,877,667
	Activity 2.1.2. Professional Development of engineers in Climate Resilient Water Supply Infrastructure	0	0	7,500	7,500	0	15,000

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

	Activity 3.1.2 Implementation of SLM measures-terracing, contour hedgerows, stone bunding	140,000	93,334	93,333	140,000	0	466,667.00
	Activity 3.1.3 Technical assistance and support to communities on the implementation of SLM practices in the field	2,740	1,370	1,370	1,370	0	6,850.00
	Activity 3.1.4 Field -based and specialized training to farmers and agriculture extension staff on SLM technologies	10,274	0	10,274	0	0	20,548.00
	Activity 3.1.5 Monitoring and Evaluation of SLM Interventions	1,096	1,096	2,192.00	1,096.00	0	5,480
	Activity 3.1.6 Documentation, knowledge Management (KM) and experience sharing platforms.	0	0	10,958	0	16,437	27,395.00
	Sub-total Output 3.1	**157,877**	**95,800**	**121,894**	**142,466**	**16,437**	**534,474**
Output 3.2 Climate change information, products and services made available and accessible	Activity 3.2.1 Agro-met advisory bulletins appropriately packaged and disseminated timely through appropriate channels	4,401	4,401	4,401	4,401	4,401	22,005
	Activity 3.2.2 Incorporation of area specific weather and crop data in ADSS	10,000	0	10,000	0	0	20,000
	Activity 3.2.3 Professional development of agro-met focal points based in ARDCs and Central Programmes	0	21,429	0	21,429	0	42,858
	Activity 3.2.4 Knowledge management and communication activities	0	1,786	1,786	1,786	1,786	7,144

	Activity 3.2.5 Sensitization, awareness and capacity development on agro-met services for researchers, extension and farmers	10000	0	10000	0	0	20,000
	Activity 3.2.6 Development of crop suitability and feasibility maps	5000	0	5000	0	5,000	15,000
	Sub-total Output 3.2	**29,401**	**27,616**	**31,187**	**27,616**	**11,187**	**127,007**
Total Component 3		**187,278**	**123,416**	**153,081**	**170,082**	**27,624**	**661,481**
Component 4: Improved local governance for effective CCA mainstreaming with focus on water management at the grassroots							
Output 4.1: Institutional mechanism in LGs strengthened for CCA and gender mainstreaming	Activity 4.1.1. Conduct professional development programme for LGs on CCA investments, mainstreaming tools, frameworks and approaches related to irrigation, water management, SLM, CCA and gender.	20,000	20,000	20,000	15,000	0	75,000
	Activity 4.1.2. Carry out M&E of CCA and gender mainstreaming in LG plans, programmes and activities.	5000	5000	5000	3991	0	18991
	Sub-total Output 4.1	**25,000**	**25,000**	**25,000**	**18,991**	**0**	**93,991**
Total Component 4		**25,000**	**25,000**	**25,000**	**18,991**	**0**	**93,991**
Total Direct Cost		**3,358,301**	**2,547,972**	**2,109,535**	**599,523**	**198,744**	**8,814,075**
Project execution cost (PMU)		114,510	101,610	101,610	101,610	101,610	**520,950**
Total (Direct + PMU cost)		**3,472,811**	**2,649,582**	**2,211,145**	**701,133**	**300,354**	**9,335,023**
PCM Fee charged by the Implementing Entity		132,786	132,786	132,786	132,786	132,786	**663,930**
Grand total		**3,605,597**	**2,782,368**	**2,343,931**	**833,919**	**433,140**	**9,998,955**

Budget Notes

SN.	Component 1 (total $565,790)
1	Conduct sensitization and awareness workshops (13 Gewogs to be sensitized) @ $830 -$10,790
	Training of community members and local officials on implementation of identified watershed management interventions in project Dzongkhag @ $3596.7 -$10,790
	Conduct watershed assessments in the project site including the watersheds along the proposed pipeline @$846.7 - $5,080
	Development of watershed management intervention measures for the proposed areas (five sites plus along the proposed pipeline) (at least one plan per dzongkhag) @ $2,276 -$11,380
	Implementation of identified intervention measures in six sites @$45,333 -$272,000
	Sub-total - $ 310,040
2	Conduct community consultations and sensitizations in three project Dzongkhags @ $ 833.3 - $2,500
	Hands-on training workshops in the management of PES schemes - $2,500
	Conduct detailed resource assessment and inventory -$6,000
	PES scheme development and implementation based on the feasibility-$10,000
	Sub-total $21,000
3	Training workshops on water source re-charge interventions with field demonstration in six sites @ $ 1666.7 - $10,000
	Identification of recharge areas and designing water source revival activities following spring shed management protocol @ $15,000 in three Dzongkhags-$45,000
	Implementations of water source revival activities @ 22,500 -$135,000
	Monitoring and maintenance of conservation /restoration activities in three project Dzongkhags @ $2250 - $6,750
	Sub-total $196,750
4	Conduct training and mapping of wetlands for the project Dzongkhags using remote sensing $3333.3 -$10,000
	Field data collection and mapping (Drakepangtsho & Dhaptsho) @$10000 -$20,000
	Field exercise for Data Quality Assurance and Quality Control-$3,000
	Data compilation and analysis, feeding decision making mechanisms-$5,000
	Sub-total $38,000
	Component 2 (total $7,492,813)
5	Contractual services for Construction of 3 Drinking Water Supply Schemes including cost of equipment and materials (transmission lines and distribution network of approximately 106kms, intakes and reservoirs for 3 drinking water schemes: $5,877,667

	Workshops, capacity building and trainings for 30 engineers (50% woman): $15,000
	Sub-total $5,892,667
6	Contractual services for construction of pressurized/closed irrigation systems (gravity) including material costs, equipment and labor cost of 12 kms at unit cost @ $ 77,777.75 -$ 933,333
	Contractual services for Re-engineering/ rehabilitation or improvement of 2 existing irrigation systems of 11.4km @ unit cost of $49,415.2 - $ 563,333
	Procurement of equipment and capacity building for water management systems (Drip & sprinkler, tailwater) -$ 39,000
	Sub-total $ 1,535,666
7	Conduct assessment, surveys and designs of the irrigation water schemes -$ 14,000
	Form and strengthen water user associations and groups in the communities at scheme level to promote local ownership and sustainability of schemes -$ 50,480
	Sub-total $ 64,480
	Component 3 (total $661,481)
8	Participatory SLM action planning and sensitization to validate key SLM interventions in project -$ 7,534
	Contractual services including hiring of equipment and labor costs for SLM interventions-terracing, contour hedgerows and landslide stabilization measures (500 Acres)- $ 466,667
	Technical assistance and support to communities on the implementation of SLM practices in the field $ 6,850
	Field -based and specialized training to farmers and agriculture extension staff on SLM technologies to enable them to respond to climate change induced risks and impacts with more competence and knowledge -$ 20,548
	Monitoring and Evaluation of SLM Interventions -$ 5,480
	Documentation, knowledge Management (KM) and experience sharing platforms -$ 27,395
	Sub-total $534,474
9	Agro-met advisory bulletins appropriately packaged and disseminated timely -$ 22,005
	Incorporation of area specific weather and crop data in ADSS -$ 20,000
	Capacity building of agro-met focal points based in ARDCs and Central Programs (Two major trainings) -$ 42,858
	Knowledge management and communication activities - $ 7,144
	Sensitization, awareness and capacity development on agro-met services to researchers, extension and farmers -$ 20,000
	Development of crop suitability and feasibility maps - $15,000
	Sub-total $127,007
	Component 4 (total $93,991)

10	Conduct capacity development training for LGs on CCA investment and mainstreaming tools, frameworks and approaches related to irrigation, water management, SLM, CCA and gender - $75,000
	Carry out M&E of CCA and gender mainstreaming in LG plans, programs and activities -$18,991
	Project Execution Cost ($520,950)
11	Activities supervision9 $3,000 annually - $15,000
	Other project related travel costs $4,610 annually- $23,050
	Individual contract services for 4 officers for 5 years ($60,000 Plus 2*$16,000*5 =$160,000) and 1 officer through RGoB -$220,000
	PMU officer furniture -$3,000
	Procurement of IT equipment for project staffs-laptops, printers, IT accessories, software, etc - $9,900
	Stakeholder consultations and knowledge exchange programs (including US$ 100,000 for ESG safeguard and grievance redressal, Project Board meetings bi-annually-9,600, Technical Advisory Group meeting bi-annually- $9,600) with the community members and the project implementers. Capacity building of engineers, project component implementers and local government officials - $250,000
	PCM Fee charged by the Implementing Entity ($663,930)
12	Compensation/remuneration for project staffs in supporting Executing Entities and reporting to AF for the project period–($22,235/years) = $111,175
	M&E Officer ($14,243/year) - $71,215, ESG Expert ($16,122/year) - $80,610, Mid-term evaluation - $45,000, Terminal Evaluation- 40,000, In country monitoring travel ($3,000/year) - $15,000 = $251,825
	Mobility $42,680 POL & maintenance $1,800/year- $9,000, accounting software annual maintenance cost ($2,500/year)- $12,500, Office Stationery ($2,400/year) - $12,000, Utilities ($2,200/year) - $11,000, rental ($3,000/year)-$15,000 = $102,180
	Office equipment & furniture = $27,250
	NIE Capacity Building- $12,000/year = $60,000
	Semi-annual internal auditing - $25,000 and annual auditing services- $12,500 = $37,500
	Inception Workshop-$15,000, Update of mid-term review tracking tool-$10,000, Stakeholder workshop for learning, experience sharing and dissemination of learnings ($ 9,800 annually)-$49,000 =$74,000

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

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

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

A. Record of endorsement on behalf of the government[31]

Wangchuk Namgay (Mr.) *Officiating Secretary and/or Chief Program Coordinator* *Development Cooperation Division* *Gross National Happiness Commission Secretariat*	Date*: 5th August, 2022*

B. Implementing Entity certification

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 NSSC, Department of Agriculture, MoAF ● Land Act 2007, ● Bhutan Water Policy 2008 ● Water Act of Bhutan 2011 ● Water Regulation of Bhutan 2014. ● ALDG 2017. ● Labor Employment Act, 2007. ● The Local Governance Act, 2009. ● The National Gender Equality Policy 2019. 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.

[31] *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.*

Singye Dorji,
Officer In-charge
Implementing Entity Coordinator

Date: *August, 08, 2022*	Tel. and email: Landline: +975 2 339861 Mobile no: +975 17999777 email: singye@bhutantrustfund.bt
Project Contact Person: Dorji	
Tel. And Email: Landline: +975 2 339861 Mobile no: +975 77606162 email: dorji@bhutantrustfund.bt	

འབྲུག་གི་རྒྱལ་ཞབས།
རྒྱལ་ཡོངས་དགའ་སྐྱིད་དཔལ་འཛོམས་ལྷན་ཚོགས།
Royal Government of Bhutan
Gross National Happiness Commission

GNHC/DCD/AF-DA/2022-2023/ **1544** 05/08/2022

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

Subject: Endorsement for the project "Adaptation to Climate -induced Water Stresses through Integrated Landscape Management in Bhutan."

GNHCS presents its compliments to the Adaptation Fund Secretariat in its conveyance of support towards Bhutan's climate action and helping the mobilization of investments towards climate change priorities of the country.

In my capacity as the Designated Authority to the Adaptation Fund; I confirm that the above project proposal is in accordance with the Royal Government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Bhutan. It further complements the country's priorities in the water sector.

Accordingly, I am pleased to fully endorse the above project scale-up Grant Proposal with the support from the Adaptation Fund. If approved, the project will be implemented by the Bhutan Trust Fund for Environmental Conservation (BTFEC) and executed by the Department of Agriculture, Ministry of Agriculture and Forests.

Thanking you,

Yours Sincerely,

GROSS NATIONAL HAPPINESS COMMISSION ★THIMPHU : BHUTAN★

(Wangchuk Namgay)
Officiating Secretary
Designated Authority

Copy to:
1. Hon'ble Secretary, Ministry of Agriculture and Forests, for kind information.
2. Officer-In-Charge, BTFEC (NIE) for kind information.

Annex 2: Environmental and Social Assessment and Management Plan

Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan

Bhutan Trust Fund for Environmental Conservation

Table of Contents

A. Project Information

Table 1: Project information

1.	Project Title	Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan
2.	Project Grant Amount (US$)	9,998,955
3.	Grantor Agency	AF
4.	Location (Global/Region/Country)	Bhutan (Dagana, Paro and Tzirang districts
5.	Project Start Date	January 2023
6.	Project End Data	February 2028
7.	Implementing Entity (NIE)	Bhutan Trust Fund for Environmental Conservation (BTFEC)
8.	BTFEC Focal Strategic Areas	Mitigating and adapting to climate change

B. Description of Project Locations

Table 2: Project locations by Dzongkhags and gewogs

Dzongkhag	Gewogs
Dagana	Drujeygang, Lajab, Tshangkha,
Paro	Dhopshari, Lungyi, Lamgong, Doteng, Tsento, Wangchang, Shaba
Tsirang	Tsirangtoe, Phuentenchhu and Semjong

C. Description of National Policy and Legal Framework

C1. Constitution of the Kingdom of Bhutan 2008

Article 5 of the Constitution of Bhutan bestows the stewardship for environmental care as a fundamental duty of all citizens and the Government to preserve the environment, safeguard biodiversity, reduce pollution, prevent ecological degradation and promote ecologically balanced sustainable development while also pursuing sound social and ecological development for all time. It requires the government to maintain the constitutional 60% the total area under forest cover in perpetuity. It accords rights over mineral resources, rivers, lakes and forests to the state and as properties of the State, which shall be regulated by law. It prescribes that;

- All persons are equal before the law and are entitled to equal and effective protection of the law and shall not be discriminated against on the grounds of race, sex, language, religion, politics or other status (15 of Article 7) as a fundamental right.
- The State shall endeavor to preserve, protect and promote the cultural heritage of the country, including monuments, places and objects of artistic or historic interest, Dzongs, Lhakhangs, Goendeys, Ten-sum, Nyes, language, literature, music, visual arts and religion to enrich society and the cultural life of the citizens. (Article 4.1)
- All persons shall have the right to life, liberty and security of person and shall not be deprived of such rights except in accordance with the due process of law. (Article 7.1)
- A Bhutanese citizen shall have the right to equal pay for work of equal value. (Article 7.11)
- A person shall not be deprived of property by acquisition or requisition, except for public purpose and on payment of fair compensation in accordance with the provisions of the law. (Article 7.14)
- A Bhutanese citizen shall have the duty to preserve, protect and respect the environment, culture and heritage of the nation. (Article 8.2)

- The State shall endeavor to take appropriate measures to eliminate all forms of discrimination and exploitation against women including trafficking, prostitution, abuse, violence, harassment and intimidation at work in both public and private spheres. (Article 9.17)
- The State shall endeavor to take appropriate measures to ensure that children are protected against all forms of discrimination and exploitation including trafficking, prostitution, abuse, violence, degrading treatment and economic exploitation. (Article 9.18)

C2. Environmental Assessment Act (EAA) 2000

The Act guides the assessment of potential impact of projects on the environment and prescribes measures to ameliorate potential adverse impacts on environment. An environmental clearance from projects likely to adversely impact the environment is required prior to execution. The National Environment Commission (NEC) or the competent authorities delegated by the NECS are the authorities which implements the Act and issues the environmental clearances. This project will require an environmental clearance which will have to be periodically updated during project implementation. The Regulation for Environmental Clearance of Projects, 2016 outlines procedures and responsibilities for implementing and supplementing the Environmental Assessment Act, 2000 to issue environmental clearances. It ensures that the projects is implemented in compliance with the sustainable development policy of the government so that potential damage to the environment is mitigated and that the local community to benefit from the projects. The regulation mandates establishment of an environmental unit under the project, conduct public consultation, and obtain environmental clearance within the specified period.

C3. National Environmental Protection Act (NEPA) 2007

The NEPA provides measures and standards to protect environmental quality in the country. The NEC or other designated competent authorities and advisory committee members monitor the conformance to the measures and standards aiming at equitable and sustainable development.

C4. Forest and Nature Conservation Act (FNCA) 1995

This FNCA assigns the ownership of all forests in the country to the Government as SRF and any development in forests is prohibited unless permissible by law and fulfilling procedures.

If the project site is located on state reserve forest land, a forestry clearance is mandatory. Developmental activities are restricted within Protected Areas and Biological Corridors. However, the approval may also depend on the type, purpose, and location (core, multiple or buffer area) of the infrastructure, which determines the activity's environmental impact.

C5. Water Act 2011

The Water Act ensures the protection, management and conservation of all water resources in the country for enhanced efficiency, sustainability, equity. The Act bestows the trusteeship of water resources on the Government who is responsible for water protection, conservation and management. It defines drinking water as a basic human need with and that every individual shall have access to safe, affordable and sufficient water. The **Water Act and the Water Regulation of Bhutan 2014**, water use priorities are as defined as a) water for drinking and sanitation, 2) water for agriculture; 3) water for energy; 4) water for industry; 5) water for tourism and recreation, and; 6) water for other uses.

C6. Regulation on Occupational Health, Safety and Welfare (OHSW), 2012

The OHSW, 2012 which has been developed based on labour standards as identified by the International Labour Organization, establishes the standards on occupational health, safety and welfare on premises, instruments, vessels, appliances, apparatus, tools, devices, electrical safety and other hazardous conditions. In line with this regulation, a specific Regulation on Occupational Health and Safety for Construction Industry, 2012 specifies the following key provisions:

(a) Health and Safety Policy; A construction company with 12 or more construction workers must prepare a written statement of health and safety policy in accordance with relevant provisions.
(b) Provision of personal protective equipment; Suitable personal protective equipment for protection of eyes, hands, head and feet shall be provided. Equipment commonly issued in Bhutan are helmets,

gloves and work shoes used by labourers at site. Owing to the COVID spread, use of masks is also advised of workers.

(c) Electrical hazards; Take adequate measures to prevent any worker from coming into physical contact with any electrical equipment or live electrical circuit which may cause electrical hazards. Ensure that all electrical appliances and current carrying equipment used are made of sound material and are properly and adequately earthed, ensure that all temporary electrical installations at a construction work are provided with earth leakage circuit breakers.

(d) Warning signs; Display and maintain suitable warning signs at conspicuous places at a building or other construction work in Dzongkha and English.

(e) Traffic management; Barricade and install suitable warning signs and lights if the construction work is being carried on or is located where any vehicular traffic may cause danger to workers.

(f) Structure stability; Stability and protection against collapse of structures must be ensured and all temporary structures must be properly supported by the use of guys, stays, and other fixings.

(g) Illumination; Provide sufficient illumination at all times where workers are required to work or pass-through passageways, stairways and landing

(h) Stacking and storage of material; All building materials must be stored or stacked in a safe and orderly manner to avoid obstruction, ensure stability, and not endanger the worker safety

(i) Disposal of debris; Barricade and install suitable warning signs and lights to indicate presence of debris generated from construction process. Debris must not be thrown inside or outside from any height of such construction work, must be kept sufficiently moist to avoid dust, must not be allowed to accumulate and disposed of as soon as possible to avoid any hazard, without causing any danger to worker safety.

(j) Public safety; For building construction work less than 2.3m from a sidewalk or public road, a safe covered walkway must be constructed over the sidewalk for use by pedestrians.

(k) Access; A safe means of access and egress must be provided and maintained to and from every place where work is undertaken.

(l) Operation of mechanical equipment1; Mechanical equipment must be operated by a trained and competent operator, or under the supervision of one

(m) No person under 18 years of age can operate a machine or be used to signal an operator.

(n) Sanitation facilities; Safe and reliable water to worker camps must be provided. Sufficient and suitable toilets and washing conveniences must be provided with separate accommodation for females. Provision of water to accompany sanitation facilities is necessary to ensure proper cleansing and disposal of human waste.

C7. Waste Prevention and Management Regulation, 2012

This regulation emanating from the Waste Prevention Act, identifies roles of the Implementing Agency to introduce appropriate waste management system beginning from every organization level concerning collection, segregation, treatment, storage, transportation, recycling and safe disposal of solid, liquid and gaseous wastes. This regulation shall control and prohibit haphazard dumping of waste. This regulation will ensure disposal of waste at designated site and uphold initiatives to segregate, reuse and recycle. It is the Contractor's responsibility to seek the necessary permits for disposal of excavated earth and construction waste. During implementation, the contractor must ensure safe storage of construction waste to avoid public inconvenience, safely transport construction waste without spillage, and ensure that it is disposed only at the site designated by implementing agencies.

C8. Penal Code of Bhutan 2004

Aside from environmental laws and regulations, the 2004 Penal Code of Bhutan also includes a provision on environmental pollution wherein Article 409 states that a defendant shall be guilty of the offense of environmental pollution if such defendant knowingly or recklessly pollutes or contaminates the environment including air, water, and land and makes it noxious to public health and safety.

C9. Bhutan Environmental Standards 2010 (revised 2020)

The Bhutan Environmental Standards sets the minimum standards for:(i) ambient water quality, (ii) industrial effluent discharge standards, (iii) standard for sewerage effluents, (iv) ambient air quality, (v)

[1]Mechanical equipment includes any bulldozer, compactor, dumper, excavator, grader, loader, locomotive, lorry, scraper, truck and any mobile machine which is used for the handling of any material on a construction site

industrial emission standards, (vi) workplace emission standards, (vii) vehicle emission standards and, (viii) noise level limits.

The Drinking Water Quality Standards, 2016, was developed in accordance with Section 13 (f) and Section 42 (a) and (b) of the Water Act of Bhutan, 2011, with the aim of ensuring safe drinking water and to protect consumer health. The standard describes the quality parameters set for drinking water and the maximum permissible limit for each of the set parameters, in order to limit the level of contaminants in drinking water.

C10. Land Compensation Rates 2017

The land compensation rates 2017 covers compensation for land and structures falling both within urban and rural areas when acquired by the government. The land compensation rates in rural and urban areas defined by the document area applicable to the proposed projects.

C11. The National Gender Equality Policy (NGEP) 2020 explores gender equality through the lens of three domains i.e., political, social and economic. The policy aims to:

(i) Provide a coherent strategic framework for the Government's priorities on gender equality;
(ii) Strengthen accountability and operational strategies to address priority gender issues; and
(iii) Facilitate deeper collaboration across sectors and stakeholders towards a common vision of gender equality.

The Policy provides a framework within which other legislation, policies, programs and practices ensure equal rights, opportunities and benefits for women and men at the family, community, and workplace and in society.

C12. Child Care & Protection Act of Bhutan 2013

The Child Care & Protection Act of Bhutan aims to institute measures to ensure children are protected against all forms of discrimination and exploitation, to promote conditions conducive in society for children as well as care, protection, guidance, counselling, treatment, development, rehabilitation, adjudication and disposition of matters related to children in conflict with the law favorably and in the best interest of the child. The use of child labour is prohibited in this project and adequate safeguards will be incorporated in the terms of contract to be signed with the contractor awarded the works.

C13. Labour & Employment Act 2007

The Act has been enacted to govern the employment and working conditions for all persons employed and working within the Kingdom of Bhutan. In the context of this project, since labourers and other stakeholders will be working directly in the project activities, terms and conditions of their employment and the work they perform and the specific work conditions they will be working in are governed by the provisions of this Act. Also, children according to this Act will not be employed in project activities which entail working in physical conditions and terrain as well as operating tools and implements which may pose a risk to their physical person (article 9). Workers also cannot be subjected to forced or compulsory labour (article 6). Workers once recruited will not be discriminated in relation to wages and working conditions (article 12) so women cannot be paid wages less than men at the worksites. Also, employers are prohibited from sexual harassment of workers (article 16). If employees need to be recruited for a year or more, they need to be provided with written contracts of employment (article 51 and 61) which will specify the duration, tasks to be done, notice period for termination of contract, wages, working hours, probation period and leave provisions.

C14. Land Act of Bhutan 2007

In this project, most of the pipeline will be aligned on government land as will the structures l. However, in the case where pipes have to be aligned across private land, the following provisions of the Act on 'Laying of service facilities' are relevant: -

- The landowner of a piece of land is bound, subject to reasonable compensation being paid to him, to allow the laying through his land of water pipes or irrigation channel, drainage pipes,

telecommunication structures, electricity poles and sub-stations or other similar installations by a Government agency or for the use of the adjoining or neighboring land if, without making use of his land, they could not be laid or could be laid only at an excessive cost. The land owner may require that his interests be taken into consideration. (Clause 275).

- The practice in vogue is that the local government seeks the permission of the landowner and negotiates access across his/her plot of land to the pipeline/channel. In most cases, the owner accords consent and the pipeline/channel is aligned. In some cases where the owner does not agree at all, or the implementing agency themselves may decide to acquire the land by cash compensation or providing government land in exchange for the affected plot.
- In exceptional cases where the installations are to be above ground, such landowner may require that a reasonable portion of his/her land, over which such installations are to be laid, be bought from him/her at a price, which will cover the value of the land and compensation for any damage arising from the sale. (Clause 276)
- In this project most of the pipelines will be buried underground and only in landslide prone areas and stream crossings, the pipeline will be installed above the ground. The practice so far is that after installation of the pipes in trenches and restoration of the excavated soil, the owner may resume use of the land for cultivation if he/she has been using the plot to grow crops.
- Where the circumstances are changed, he may require that the installations be removed to such different part of his land as may be suitable to his interest. The relevant agency shall be responsible to remove the installations. (Clause 277). The practice is that to the extent possible pipelines are aligned along the plot boundaries to permit owners the future development on their land without hindrance.
- The owner of the facilities established under Sections 275 and 276 of this Act shall be responsible to ensure that no damage is caused to the landowner by way of negligence of the management of the facilities. (Clause 278).
- In the event, private land has to be acquired; the government can do so if the land is acquired for public benefit (clause 142). The Land Act stipulates that the government pay fair compensation (clause 144) for the land or provide government land in the same village, town or gewog and dzongkhag (clause 155) of the same value as exchange for the land acquired (clause 147). If there is any property on the land, the government will pay for the immovable property on the acquired land (clause 149). Compensation to be paid will be in accordance with rates fixed by the Property Assessment and Valuation Agency (PAVA) under the Ministry of Finance (clause 151).

C15. National Policy for Persons with Disabilities 2019

The Policy aims to empower persons with disabilities, mainstream disability initiatives in plans, policies and programs in all sectors, improve access to opportunities and services for persons with disabilities, improve the socio-economic condition of persons with disabilities, promote health and living of disabled persons through sports, recreation and cultural participation and to remove stigmatization and discrimination of people towards disabled persons. This project too will encourage and make arrangements to ensure the participation of disabled persons identified during the project preparation phase in discussions and decision-making events in the course of the project implementation.

D. Description of Adaptation Fund's Social and Environmental Standards

As per the Adaptation Fund Environmental and Social Policy (ESP), 15 environmental and social principles form the basis for identifying and managing environmental and social risks. These principles are also integral part of the BTFEC's Risk Management Policy Framework. Project financing from or through BTFEC shall not be considered during the project appraisal without adequate assessment of environmental and social risks and Project Risk Management Plan.

These principles include:

Principle 1: Compliance with the Law which requires that the project shall be in compliance with all applicable domestic and international law.

Principle 2: Access and Equity which requires that the projects shall provide fair and equitable access to benefits in a manner that is inclusive and does not impede access to basic health services, clean water and sanitation, energy, education, housing, safe and decent working conditions, and land rights. The

project should not exacerbate existing inequities, particularly with respect to marginalized or vulnerable groups.

Principle 3: Marginalized and Vulnerable Groups require that the project to avoid imposing any disproportionate adverse impacts on marginalized and vulnerable groups including children, women and girls, the elderly, indigenous people, tribal groups, displaced people, refugees, people living with disabilities, and people living with HIV/AIDS. In screening any proposed project, the implementing entity is required to assess and consider particular impacts on marginalized and vulnerable groups.

Principle 4: Human Rights requires that the project shall respect and where applicable promote international human rights.

Principle 5: Gender Equality and Women's Empowerment require that the project shall be designed and implemented in such a way that both women and men 1) have equal opportunities to participate as per the Fund gender policy; 2) receive comparable social and economic benefits; and 3) do not suffer disproportionate adverse effects during the development process.

Principle 6: Core Labour Rights require the project to meet the core labour standards as identified by the International Labour Organization.

Principle 7: Indigenous Peoples lays out that the Fund shall not support projects/programs that are inconsistent with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples and other applicable international instruments relating to indigenous peoples. This principle is not relevant in Bhutan's context as all ethnic groups in Bhutan are represented at Gewog levels and there is no distinct group that are not part being represented within any gewog. Relevant matters such as community consultation and obtaining of local community or individual as may be relevant are standard requirements for any policy or development planning process in Bhutan.

Principle 8: Involuntary Resettlement require that the project shall be designed and implemented in a way that avoids or minimizes the need for involuntary resettlement. When limited involuntary resettlement is unavoidable, due process should be observed so that displaced persons shall be informed of their rights, consulted on their options, and offered technically, economically, and socially feasible resettlement alternatives or fair and adequate compensation.

Principle 9: Protection of Natural Habitats require that the project would not involve unjustified conversion or degradation of critical natural habitats, including those that are (a) legally protected; (b) officially proposed for protection; (c) recognized by authoritative sources for their high conservation value, including as critical habitat; or (d) recognized as protected by traditional or indigenous local communities.

Principle 10: Conservation of Biological Diversity require the project to be designed and implemented in a way that avoids any significant or unjustified reduction or loss of biological diversity or the introduction of known invasive species.

Principle 11: Climate Change require that the project shall not result in any significant or unjustified increase in greenhouse gas emissions or other drivers of climate change.

Principle 12: Pollution Prevention and Resource Efficiency require that the project shall be designed and implemented in a way that meets applicable international standards for maximizing energy efficiency and minimizing material resource use, the production of wastes, and the release of pollutants.

Principle 13: Public Health require project to be designed and implemented in a way that avoids potentially significant negative impacts on public health.

Principle 14: Physical and Cultural Heritage require the project to be designed and implemented in a way that avoids the alteration, damage, or removal of any physical cultural resources, cultural sites, and sites with unique natural values recognized as such at the community, national or international level.

The project should not permanently interfere with existing access and use of such physical and cultural resources.

Principle 15: Lands and Soil Conservation require the project to be designed and implemented in a way that promotes soil conservation and avoids degradation or conversion of productive lands or land that provides valuable ecosystem services.

E. Environmental and Social Impact Assessment

During the participatory assessment of proposed project activities and associated environmental and social safeguards as well as gender issues, a series of local level stakeholder consultations were held from 29th May to 13th June, 2022. Officials from the Gross National Happiness Commission (the NDA); BTFEC (the AE); UNCDF (in capacity of Advisor to BTFEC and as Lead prodoc developer); the Engineering Division of Department of Agriculture (DoA) and National Soil Service Center of DoA participated in these consultations. The Watershed Management Division (WMD) of the Department of Forests and Parks Services (DoFPS) and the Ministry of Works and Human Settlement (MoWHS) were represented by the relevant forestry divisions in the field and by the Dzongkhag Engineering Sectors respectively. Local stakeholders included representatives of local governments, community leaders and men and women from the project areas (See Section at the end for list of participants).
The assessment included:

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

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

E1: Principles/Rules of stakeholder participation:

For each consultation, following principles were adopted to ensure free and frank discussion on the project activities, associated safeguards and gender issues.

1. All community stakeholders (participants) understand the project design, activities, location of project activities and social and environmental safeguards principles including gender equity;
2. All activities discussed are part of water flagship program and local priorities related to climate change;
3. Discussions to be held in a free and frank environment;
4. Views, perspectives and interests of each participant is respected;
5. Leave no one behind

E2: Consultation Process:

During each consultation, the following process were followed:

1. Introductory remarks by the local leaders and local administrators of the concerned Dzongkhag.
2. Presentation of the project design; costs; project outcomes and outputs; major stakeholders and the importance of end-to-end interventions including catchment watershed management, climate resilient water infrastructure, social and land management by UNCDF and GNHC
3. Presentation on social and environmental safeguards, need for inclusive approach and 15 safeguards principles of Adaptation Fund as well as relevant national policy and legal framework
4. Focused Group Discussion and individual interview with local participants on project activities as well as checklist of project screening questions for each safeguard principle to provide basis for project categorization
5. Site visit to project activity locations.

Upon briefing on the project activities participants, participants were subjected to focus group discussions as well as individual opinion on risks of project activities as guided by a list of questions related to each of the 15 AF safeguards principles. The risks, impacts and vulnerable groups identified by each small group were discussed at the plenary for contextual understanding and clarity. During the consultations, vulnerable and marginalized groups are described as households characterized by isolated and dotted settlements; communities without motorable access road; households with only elderly members & without household's labour force; household with very few household members; Households with empty or no resident members; women and single parent headed households. These vulnerable groups may not be able contribute actively participate in the project such as in consultations, community labour contribution and other forms of participation and may not be included as project beneficiaries if the project considers communities to provide unskilled labour for project activities. Therefore, the project implementation will not require community contributions in the form of cash or labour during the project implementation. The O&M of water infrastructure developed by the project will be handled by WUAs which will include contributions from member households for minor maintenance. To ensure that the vulnerable members of the communities are not excluded from availing themselves of benefits, the articles of association of the WUAs will include clauses on community exemptions for such contributions from the vulnerable and marginalized groups. The articles of association of the WUAs will be developed during the project implementation with support from the PMU and dzongkhags concerned and will further stress on providing equal access to all members of the communities.

E3 Environmental and social risk screening and categorization

The results of this participatory assessments were used to determine project ESS category and to define measures to mitigate or minimize the potential risks. The risks and impacts identified by the stakeholder consultations are described in table 4. The risk matrix in table 3 has been used to assess the significance of each risk.

Table 3: Risk Matrix

Risk Matrix:

Impact						
	5	M	S	S	H	H
	4	L	M	S	S	H
	3	L	M	M	M	S
	2	L	L	L	M	M
	1	L	L	L	L	L
		1	2	3	4	5
	Likelihood					

Key for Impact and Likelihood

H = High
S = Significant
M = Moderate
L = Low

Table 4: Risks and impacts identified by the stakeholder consultations and project category

AF Principles	Risk Questions	Assessment	Impact (1 -5)	Likelihood (1-5)	Significance (L/M/S/H)
COMPLIANCE WITH THE LAW (7 questions)	Does the project risk non-compliance with Water Act of Bhutan? Does the project risk non-compliance with National Environment Protection Act? Does the project risk non-compliance with national planning process? Does the project risk noncompliance with Land Act of Bhutan? Does the project risk noncompliance with Local Governance Act? Does the project risk noncompliance with employment and labour standards laws? Does the project risk noncompliance with an applicable domestic or international law?	Most stakeholders, especially those at community and. local levels are aware of relevant legal provisions related to water.	3	1	L
ACCESS AND EQUITY (8 questions)	Will there be risk that poor will not have equal opportunities to be selected as project beneficiaries? Will there be risk that \women will not have equal opportunities to be selected as project beneficiaries? Will there be risk that minority groups will not have equal opportunities to be selected as project beneficiaries? Will there be risk that poor people will not be able to access services supported by the project? Will there be risk that women will not be able to access services supported by the project? Will there be risk that minority groups will not be able to access services supported by the project? Will there be risk that disabled people will not be able to access services supported by the project? Will there be risk that elderly people will not be able to access services supported by the project?	Poor households may not be able to participate or provide financial or labour contributions to the water user groups/association. Similarly, new settlers may face accessibility issues as they have not been members of WUAs in the past. Emergence of commercial activities could marginalize rural households.	3	2	M

AF Principles	Risk Questions	Assessment	Impact (1 -5)	Likelihood (1-5)	Significance (L/M/S/H)
MARGINALIZED AND VULNERABLE GROUPS (5 questions)	Will elderly people experience negative impacts from the project? Will displaced people will experience negative impacts from the project? Will migrant workers will experience negative impacts from the project? Will children will experience negative impacts from the project?	Marginalized and Vulnerable Groups may not be able to participate or provide financial or labour contributions to the water user groups/association. However, there are social norms that to mitigate such risks.	3	1	L
HUMAN RIGHTS (1 question)	Will children will experience negative impacts from the project?	The constitution of Bhutan ensures human rights as a fundamental right to every citizen in Bhutan. Risk on this remains low	3	1	L
GENDER EQUALITY AND WOMEN'S EMPOWERMENT (3 questions)	The project is designed by men who have not taken women's perspectives into consideration The project will result in an increased workload of tasks traditionally done by women Women will not have equal opportunities to participate and express their views on aspect of project implementation	Due to availability to water, there could be increased agriculture activities and farm workload; Fallow lands would be cultivated; and increase in household chores. However, trend in use of more mechanization would offset the workload and overall, there would be positive impact. For instance, ferrying manure to agriculture fields, traditionally done by women are now performed by men driving power tillers. Statistics of current situation show limited participation by women in the executive role of WUAs. Women-headed households may face challenges of project accessing benefits.	3	3	M
CORE LABOUR RIGHTS (7 questions)	Women or vulnerable groups will not have equal opportunities for employment in project activities The project will employ local people in conditions that may not comply with labour laws The project will employ local people in hazardous work that is different from their normal work Temporary labour from outside the project area will stay in inadequate or unhygienic accommodation	Due to difference in physical strength of men and women, contractors may adopt differential work compensation between men and women. Proposed pipeline of alignments passes through stretches of steep slope and difficult terrain in some site which could expose workers to safety risks.	4	2	M

AF Principles	Risk Questions	Assessment	Impact (1 -5)	Likelihood (1-5)	Significance (L/M/S/H)
CORE LABOUR RIGHTS (7 questions)	Temporary labour from outside the project area will have conflicts with the local population Temporary labour from outside the project area will create a risk of spreading transmissible diseases or pandemic diseases Children could be employed in project activities in contravention of the labour laws	Contractors may not fully comply with labor laws and standards in employing workers establishing appropriate working conditions such as inadequate water supply, waste management arrangements, inadequate sanitation arrangements at temporary labor camps which could pose health and hygiene risk to workers. Further, contractors may employ school children under 18 years of age during school holidays. Risks of conflict with local communities due to lack of awareness of local norms by project workers from outside the project area such as sexual harassment and disrespect to local norms may risk conflicts between local communities and project workers from outside the project areas.			
INDIGENOUS PEOPLES (4 questions)	Indigenous people have not been adequately consulted about the project Indigenous people will experience negative impacts on their traditional livelihoods Indigenous people will lose access to land or natural resources Indigenous people will experience negative impacts on their traditional culture and way of life.	Not Applicable	1	1	L
INVOLUNTARY RESETTLEMENT (6 questions)	Will households will have reduced incomes because of loss of land? Will households will suffer negative impacts from having to move their homes? Households will have reduced income because of loss of access to community land or common property resources? Will the project lead to acquisition of land for implementation of the project?	The layout of pipes for irrigation and drinking water passes through some private land. However, loss of land or income is not foreseen as the pipes will be laid underground and project does not include land acquisition. Land disputes are not foreseen. However, risk of disputes due to lack of awareness of project activity locations may arise and minor disputes may arise from water distribution arrangements.	4	1	L

AF Principles	Risk Questions	Assessment	Impact (1 -5)	Likelihood (1-5)	Significance (L/M/S/H)
	Will the project ensure right to compensation for land acquired for the project activities? Will the project lead to land disputes?				
PROTECTION OF FORESTS AND NATURAL HABITATS (5 questions)	Will the project result in conversion or disturbance of natural forest land to other uses? Will the project cause disturbances to wildlife? Will the project result in illegal harvesting of non-timber forest resources? Will the project result in increased collection of firewood or timber resources? Will the project lead to wild life poaching?	The project activities do not pass through any protected, prohibited or restricted areas. However, clearing works for access route to transport materials along water lines may cause minor site-specific disturbances to local forest but will not involve conversion of forest land use. Also trenching work for underground layout of water pipe lines will involve disturbances forest soils although such disturbances will be temporary and limited to pipe alignment. Workers may harvest non timber forest products but such collection for consumption and not for commercial purposes. Limited firewood collection for use by project workers at site will happen although timber harvesting is not foreseen. Some activities requiring restoration of cleared sites through plantation could potentially have adverse impacts if non-native plants are used for replantation.	3	2	M
CONSERVATION OF BIOLOGICAL DIVERSITY (4 questions)	Will the project damage areas that are important for biodiversity? Will the project cause change in farming practices and reduce biodiversity? Will the project result in drainage of wetlands or natural water bodies? Will the project introduce non-native species that could increase uncontrollably?	The project activities do not pass through any protected, prohibited or restricted areas Increase cultivation of high-income verities may increase risk of neglecting native verities. Irrigation and drinking water supply for the project will be drawn from natural streams. Noncompliance to environmental flow standards could pose risk of disturbing local aquatic life	3	3	M
CLIMATE CHANGE (3 questions)	Will climate change cause increased risk of climate disasters and project outputs? Will the project result in increased greenhouse gas emissions?	Heavy rains and resulting local soil erosions could harm project assets. Landslides may be triggered by bursting of water channel Burst of water pipelines during flooding events	3	2	M

AF Principles	Risk Questions	Assessment	Impact (1 -5)	Likelihood (1-5)	Significance (L/M/S/H)
POLLUTION PREVENTION & RESOURCE EFFICIENCY (9 questions)	Will the project cause increased use of agriculture chemicals? Will the project result in a risk from hazardous chemicals? Will the project result in long-term increase in flows of polluted water? Will the project result in generation of significant amounts of non-biodegradable solid waste? Will the project cause short-term environmental damage (e.g. during construction)? Will the project cause un-sustainable increase in extraction of groundwater? Will the project cause un-sustainable extraction or diversion of water from a surface water source? Will the project cause non-sustainable increase in mineral extraction?	With assured irrigation water, intensification of agriculture activities such as increased vegetable cultivation could risk farmers adopting chemical fertilizers leading to soil pollution Use of limited quantities of chemical fertilizers may pollute flow of tail end water in natural landscapes Inappropriate waste at temporary worker camps in project sites may result in risk of limited desecration of natural landscapes Minor excavation works and ground clearance will cause limited disturbances to local soil and vegetation Risk of unsustainable extraction of water is low as drawing of water is guided by e-flow requirements which is requires as per the Water and Regulations as well as specified in the environmental clearance for project activities.	3	2	M
PUBLIC HEALTH (5 questions)	Will the project lead to increase in road traffic related accidents? Will the project will result in increased use of harmful substances (e.g. alcohol)? Will the project cause people to change to less healthy or nutritious diets? Will the project result in increased transmission of diseases? Will temporary labour from outside the project area stay in inadequate or unhygienic accommodations?	Migrant workers with unknown medical and travel history could risk transmission of diseases that are not prevalent in the project areas to local communities and among project workers and staff Contractors may resort to cheaper arrangement of worker camps with inadequate water supply, waste management arrangements, inadequate sanitation arrangements at temporary labour camps which could pose health and hygiene risk to workers	3	2	M

AF Principles	Risk Questions	Assessment	Impact (1 -5)	Likelihood (1-5)	Significance (L/M/S/H)
PHYSICAL AND CULTURAL RESOURCES/HERITAGE (3 questions)	Will the project cause damage to physical cultural heritage sites? Will the project cause loss of non-physical cultural heritage? Will the project lead to disturbances to locally revered sacred sites and landscape?	Project workers form outside may not be aware of local cultural/sacred sites and may cause unintentional damages Alignment pipes and water lines to avoided passing through any local cultural assets Where cultural sites are observed in the project areas, cultural clearance are sought for project activities. The clearance document defines terms and conditions that enable avoidance of any harm on such assets.	3	1	L
LANDS AND SOIL CONSERVATION (5 questions)	Will clearing of trees or other vegetation could cause soil erosion? Will the project lead to changed farming practices that could cause soil degradation or erosion? Will the project result in changed water flows (e.g. from road drainage or river works) that could cause soil erosion? Will the project cause damage to any sensitive landscape? Will the project activities cause disturbances to existing land uses?	Clearing works for access route to transport materials along water lines may cause minor site specific disturbances to soil structure. Also trenching work. for underground layout of water pipe lines will involve disturbances forest soils but such disturbance will be temporary and limited to pipe alignment. Site specific soil erosions could be triggered by heavy rainfalls on steep slopes at these sites. Weak pipe joints of water conveyance pipe and may lead to frequent burst of pipes and leakages triggering minor local soil erosions	4	2	M
Following project risk identification through participatory process and screening of the project risks by each activity and output (using 76 risk screening questions that are relevant to 15 AF ESS principle, project overall Project Risk Category has been determined as Category B since the overall significance of project risks is Moderate likely impact from such risks are minor, site specific and manageable.					M

E4 Overview of the environmental and social impacts and risks identified as being relevant to the project

Table 5: Relevant environmental and social impacts and risks relevant to the project

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	✓	*Low risk:* As accredited entity to the AF, BTFEC abides by international and national laws. BTFEC's partners and contracted service providers are equally obliged to do the same. Relevant national and district authorities have been consulted during the proposal development process and will be partners in the project implementation. This facilitates compliance with all relevant laws and regulations. Environmental and social clearances have been obtained for project activities. ***No further assessment required during project implementation*** However, awareness and sensitization of relevant aspects of laws to be pursued during project implementation
Access and Equity		*Moderate risk:* Poor households may not be able to participate or provide financial or labour contributions to the water user groups/association. Similarly, new settlers may face accessibility issues as they have not been members of WUAs in the past. These households may face challenges of accessing project benefits. Further, emergence of commercial activities could marginalize rural households and may result in unequal benefits to communities from project assets. *Mitigation measures/Further assessment during project implementation:* Articles of Association of WUAs to include clause on: - community exemptions for poor households in terms of financial or labour contributions to the water user groups/association. - providing equal access to new settlers Strengthen WUAs to protect rights of member households through training and definition of incentives in the articles of associations Water transmission line to include T-points for all settlements to enable distribution from the main water line to member communities

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Marginalized and Vulnerable Groups		*Low risk:* Marginalized and Vulnerable Groups may not be able to participate or provide financial or labour contributions to the water user groups/association. These households may face challenges of project accessing benefits. *Precautionary measures:* M&E Officer and Safeguards expert to monitor that WUA articles include clause on: - community exemptions for poor households in terms of financial or labour contributions to the water user groups/association. - mention on providing equal access to new settlers
Human Rights	✓	*Low risk:* The constitution of Bhutan ensures human rights as a fundamental right to every citizen in Bhutan. It guarantees equal and effective protection of the law and protection against discrimination on grounds of race, sex, language, religion, politics or other status. The standard planning processes of needs assessment, design of projects and implementation are applied uniformly across the country. *No further assessment required during project implementation*
Gender Equity and Women's Empowerment		*Moderate risk:* Statistics of current situation show limited participation by women in the executive role of WUAs. Women-headed households may face challenges of project accessing benefits. *Mitigation measures/further assessment during project implementation:* The project will fully mainstream gender, and will ensure that women and men and female and male youth equitably engage in and benefit from project activities such as project asset building and availing benefits from the project. The project's gender action plan is a central element of the exit strategy. A gender assessment has been conducted which shows that women are not represented as much as men in executive of water user groups. The project will ensure that at least 30 percent of executives of WUAs supported by the project comprises of men and 50 percent participants at training conducted through the project will comprise women and youth.
Indigenous Peoples	✓	Not applicable

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Core Labour Rights		*Moderate risk:* Due to difference in physical strength of men and women, contractors may adopt differential work compensation between men and women. Contractors may not fully comply with labor laws and standards in employing workers establishing appropriate working conditions such as inadequate water supply, waste management arrangements, inadequate sanitation arrangements at temporary labor camps which could pose health and hygiene risk to workers. Further, contractors may employ school children under 18 years of age during school holidays. Proposed pipeline of alignments pass through stretches of steep slope and difficult terrain in some site which could expose workers to safety risks. Risks of conflict with local communities due to lack of awareness of local norms by project workers from outside the project area such as sexual harassment and disrespect to local norms may risk conflicts between local communities and project workers from outside the project areas. *Mitigation measures/further assessment during project implementation:* PMU, project officers, implementing partners and organizations must ensure complioance to national laws and international agreements on labour rights. In particular, the safeguards expert will monitor and that the project activities comply with; - equal pay for equal work hours to be maintained for workers in the project activities - awareness are conducted by project/local administration to contractors and local employee on labour regulations and standards - Contract package should include occupational health and safety provisions in their budget. - safety measures are implemented while implementing work and PPE and safety gears are provided and used by workers at project site. - Contractual arrangements to include proper establishment of amenities in temporary worker camps and provide proper working conditions as per labour regulations - Worker data to be maintained at site with age and identify cards.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Involuntary Resettlement	✓	*Low risk:* The Land Act 2007 and land Compensations Rates 2017 provide clear and mandatory arrangements for compensations. This project will not resettle households or families, neither in physical nor economic terms. *Precautionary measures:* - Avail clearance from all concerned agencies and consent from all affected individuals and parties
Protection of Forests and Natural Habitats		*Moderate risk:* The local territorial forest officials regularly monitor forest product movement. As a result, the project's activities are not expected to have any adverse impact on the environment or natural habitats. Some activities requiring restoration of cleared sites through plantation could potentially have adverse impacts if non-native plants are used for replantation. *Mitigation measures/further assessment during project implementation:* - Only native species to be used for any plantation ior restoration works in forest areas
Conservation of Biological Diversity		*Moderate risk:* The project activities do not pass through any protected, prohibited or restricted areas. However, some activities of Component 2, such as establishment of irrigation and drinking water involves drawing water from natural streams. This could potentially have adverse impacts on biodiversity if adequate provisions of environmental flows are not maintained. Further, due to availability of irrigation water, increased cultivation of high income varieties may increase risk of neglecting native varieties. *Mitigation measures/further assessment during project implementation:* - Introduction of alien and invasive crop/plant species. To. be avoided; - 30% of the lean flow from natural streams to be maintained in all natual steerams where the project activities will draw surface water as per the Water Regulations and in alignment with the Water Act 2011 - Design of infrastructure for water scheme should be based on discharge measurements at the source during lean and peak rainfall seasons

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Climate Change		*Moderate risk:* The entire project is designed to reduce beneficiaries' exposure and vulnerability to the effects of climate change and increase their adaptive capacity. The project will not generate any significant emissions of greenhouse gases or reduce carbon sinks capacity. Many project activities will be designed to be low-emissions, as well as adaptive – e.g. increase in vegetative cover through SLM activities and watershed management. All project components and activities will be designed to contribute to increasing local capacities to sustainably face climate change. The promotion of: i) watershed management; ii) Institutional and community capacity for water governance and climate information iii) ensuring availability or drinking and irrigation water are expected to ensure a better adaptability changing climatic conditions. However, heavy rains resulting local soil erosions could harm project assets. Landslides may be triggered by bursting of water channel *Mitigation measures/further assessment during project implementation:* Need to ensure use of climate resilient design for all iwater infrastructrure in the project such as; - Use pipes for conveyance of water to be securely embedded underground - Executing entities shall ensure the use of appropriate materials and ensure that joints are of appropriate quality. - Project contractual arrangement to include an O&M period during which any events such as burst of pipes and eventual damage to agriculture lands to be restored by the contractor during the liability period
Pollution Prevention and Resource Efficiency		*Moderate risk:* With assured irrigation water, intensification of agriculture activities such as increased vegetable cultivation could risk farmers adopting chemical fertilizers leading to soil pollution. Use of limited quantities of chemical fertilizers may pollute flow of tail end water in natural landscapes. Inappropriate waste at temporary worker camps in project sites may result in risk of limited desecration of natural landscapes. Minor excavation works and ground clearance will cause limited disturbances to local soil and vegetation. Risk of unsustainable extraction of water is low as drawing of water is guided by e-flow requirements which is required by the Water and Regulations as well as specified in the environmental clearance for project activities. *Mitigation measures/further assessment during project implementation:*

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
		The safeguards expert to monitor strategically the project activtiies, on compliance of the terms laid down in the forest clearance and environmental clearance documents and ensure periodic water quality monitoring reports for drinking water are maintained by local health center.
Public Health		*Moderate risk:* Migrant workers with unknown medical and travel history could risk transmission of diseases that are not prevalent in the project areas to local communities and among project workers and staff. Contractors may resort to cheaper arrangement of worker camps with inadequate water supply, waste management arrangements, inadequate sanitation arrangements at temporary labour camps which could pose health and hygiene risk to workers. *Mitigation measures/further assessment during project implementation:* The safeguards expert will monitor that the contractual arrangements include occupational health and safety provisions and that these terms and conditions are complied to by contractors and site engineers. The PMU will ensure that disbursement is not made without proving compliance to these terms and conditions.
Physical and Cultural Heritage	✓	*Low risk:* Project workers from outside may not be aware of local cultural/sacred sites and may cause unintentional damage. Alignment pipes and water lines may pass through any local cultural assets. Where cultural sites are observed in the project areas, cultural clearance are sought for project activities. The clearance document defines terms and conditions that enable avoidance of any harm on such assets. *Precautionary measures:* The safeguards expert will monitor that the terms and conditions specified in cultural clearances are complied by contractors and site engineers. The PMU will ensure that disbursement is not made without proving compliance to these terms and conditions.
Lands and Soil Conservation		*Moderate risk:* The project includes activities in soil conservation and SLM in the agricultural areas as well as watershed management. This includes ensuring land and soil conservation, as well as protection and enhancement of natural habitats in the project

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
		areas. The activities related to establishment of drinking and irrigation water may cause temporary minor soil erosions during the project implementation phase. *Mitigation measures/further assessment during project implementation:* - Exposed soil to be restored back into the trench after pipe layout and minor clearance sites to be restored by planting native plants. - Ensure proper joining of water pipes - Risks related to leakage of pipes, post implementation phase will be mitigated by regular monitoring of water lines by the Chusup, a member of WUA executive with responsibility for water infrastructure maintenance. The project should train Chusups in all project locations on maintenance of water lines.

E5 Description of project ESS Risks, Impacts and mitigation measures

Risks and impacts according to AF principles and associated project activities are identified and mitigation measures proposed are presented Table 6.

Table 6: Environmental and Social Risks and mitigation measures

AF Principles	**Risks**	**Impacts**	**Relevant Project activities**	**Mitigation Measures**
COMPLIANCE WITH THE LAW	1. Lack of awareness on some provisions of Water Act, Land Act, National Environment Protection Act may cause non-compliance to the provisions of the act by project beneficiaries. Lack of clarity in proportion of water allocations to different types of users at local level could cause conflicts within communities at the local level and may risk noncompliance to the Water Act.	*Negative (Social);* Community conflicts due to lack of awareness on water sharing rights and proportions	1.1.1 to 1.1.5; 1.2.4; 2.1.1; 2.2.1 to 2.2.3; 3.1.2	2. Awareness to project stakeholders, project staff, local community representatives and project contractors on relevant provisions of Water Act, Land Act, National Environment Protection Act and regulations
ACCESS AND EQUITY	2.1 Poor households may not be able to participate or provide financial or labour contributions to the water user groups/association. New settlers may face accessibility issues as they have not been members of WUAs in the past. 2.2 Emergence of commercial activities could marginalize rural households and may result in unequal benefits to communities from project assets.	*Negative (Social)* Poor households and new settlers or absentee households may face challenges of accessing project benefits. Conflicts due to lack of clarity on proportions of water allocation	2.2.1; 2.2.2; 2.4.1	2.1 Articles of association of WUAs to include clause on: - community exemptions for poor households in terms of financial or labour contributions to the water user groups/association. - mention on providing equal access to new settlers 2.2 Articles of association of WUAs to include clause defining proportion water to be allocated as well as rates of WUA fees by different categories

				such as rural household, commercial buildings or industrial establishment. Strengthen WUAs to protect rights of member households through training of WUA executives
MARGINALIZED AND VULNERABLE GROUPS	3. Marginalized and Vulnerable Groups may not be able to participate or provide financial or labour contributions to the water user groups/association.	*Negative (Social)* Marginalized and Vulnerable households may face challenges of project accessing benefits.	2.2.1; 2.2.2; 2.4.1	3.1 WUA articles include clause on: - community exemptions for poor households in terms of financial or labour contributions to the water user groups/association. - mention on providing equal access to new settlers 3.2 Water transmission line to include T-points for all settlements to enable distribution from the main water line to member communities
GENDER EQUALITY AND WOMEN'S EMPOWERMENT	4. Statistics of current situation show limited participation by women in the executive role of WUAs. Women-headed households may be not be able to fully participate in project activities and may be left out from membership and leadership roles in the WUAs.	*Negative (Social)* Women-headed households may face challenges in project accessing benefits Overall participation of women in development activities may remain weak.	2.2.1; 2.2.2; 2.4.1	4.1 Include women in training community members on water governance and management including on book-keeping 4.2 Ensure women to take leadership positions of WUAs 4.3 Encourage female workers at project sites to form a committee of their representatives to discuss their concerns and issues with the management on a weekly basis. 4.4 Provide adequate and separate sanitation facilities for men and women at project sites.

CORE LABOUR RIGHTS	5.1 Due to difference in physical strength of men and women, contractors may adopt differential work compensation between men and women. Contractors may not fully comply with labor laws and standards in employing workers establishing appropriate working conditions such as inadequate water supply, waste management arrangements, inadequate sanitation arrangements at temporary labor camps which could pose health and hygiene risk to workers. Further, contractors may employ school children under 18 years of age during school holidays. Proposed pipeline of alignments pass through stretches of steep slope and difficult terrain in some site which could expose workers to safety risks. 5.2 Risks of conflict with local communities due to lack of awareness of local norms by project workers from outside the project area such as sexual harassment and disrespect to local norms may risk conflicts between local communities and project workers from outside the project areas.	*Negative (social).* Project activities may deviate from core labour standards as identified by the International Labour Organization and Labour & Employment Act 2007. Health and Safety of workers may be compromised. Project workers may be involved in conflict with local norms.	1.3.3; 2.1.1; 2.1.2; 2.2.1; 2.2.2	5.1 Project's contractual arrangement with contractors include clauses on; - equal pay for equal work hours to for workers in the project activities - Occupational health and safety provisions in the budget for contract bidding. - safety measures are implemented while implementing work and PPE and safety gears are provided and used by workers at project site. Maintain PPE Issuance Register at sites. - Provide first aid kits for minor treatment at site throughout the construction phase - Contractual arrangements to include proper establishment of amenities in temporary worker camps and provide proper working conditions as per labour regulations, - Worker data to be maintained at site with age and identify cards. Verify labourers' age by checking their identity cards and date of birth prior to their engagement in the project. - Check salary disbursement sheets for salary amount paid. Interview labourers to verify labour wage amount received

				- Maintain Grievance Register for proper documentation of the grievance lodged and resolution dispensed. 5.2 Awareness to conducted by project/local administration to contractors and local employee on labour regulations and standards
INVOLUNTARY RESETTLEMENT	6. The layout of pipes for irrigation and drinking water passes through some private land. However, loss of land or income is not foreseen as the pipes will be laid underground and project does not include land acquisition. Land disputes are not foreseen. However, risk of minor disputes due to lack of awareness of project activity locations may arise and minor disputes may arise from water distribution arrangements.	*Negative (Social)* Project activities may be delayed	2.1.1; 2.1.2; 2.2.1; 2.2.2	6. Ensure consent on project activities from all affected individuals and parties including sectoral and agency clearances and monitor terms and conditions specified in these clearances.
PROTECTION OF FORESTS AND NATURAL HABITATS	7.1 The project activities do not pass through any protected, prohibited or restricted areas. However, minor clearing works for access route to transport materials along water lines may cause minor site specific disturbances to local forest but will not involve conversion of forest land use. Workers may harvest non timber forest products but such collection for consumption and not for commercial purposes. Limited firewood collection for use by project workers at site will happen although timber harvesting is not foreseen.	*Negative (Environmental*) Minor site-specific disturbances to local forest soils. May contribute to local forest degradation Possibility of introducing invasive species into local vegetation.	2.1.1; 2.1.2; 2.2.1; 2.2.2	7.1 Environmental and forestry clearance to be made mandatory for project activities and terms and conditions on the relevant clearances to be monitored. 7.2 Ensure proper burying of pipes, refilling of trenches and revegetation of trenched soil Disposed un-restored excavated muck safely in designated sites

	7.2 Trenching work for underground layout of water pipe lines will involve minor disturbances to forest soils although such disturbances will be temporary and limited to pipe alignment. 7.3 Some activities requiring restoration of cleared sites through plantation could potentially have adverse impacts if non-native plants are used for replantation 7.4 Improper stockpiling of construction materials may damage natural landscape conditions.			7.3 Only native species to be used for any plantation in forest areas for restoration works. No introduction of alien crop/plant species to be supported by the project 7.4 Stockpile the construction materials away from the aquatic environment that may allow for release into the environment
CONSERVATION OF BIOLOGICAL DIVERSITY	8.1 The project activities do not pass through any protected, prohibited or restricted areas. Increase cultivation of high income verities may increase risk of neglecting native crop varieties. 8.2 Irrigation and drinking water supply for the project will be drawn from natural streams. Noncompliance to environmental flow standards could pose risk of disturbing local aquatic life	*Negative (Environmental*) Native species conservation may be hampered. Reduced environmental flow into natural drainages may negative impact local biodiversity.	2.1.1; 2.1.2; 2.2.1; 2.2.2; 2.2.4; 3.1.2;	8.1 30% of the lean flow of natural streams at catchment to be maintained as e-flow in all project activities as per the Water Regulations and in alignment with the Water Act 2011. Design of the scheme should be based on discharge measurements at the source during lean and peak rainfall seasons 8.2 SLM component to encourage traditional varieties in the wet season when pest outbreaks are common of farmers consider modern varieties during dry months with advantage of the assured irrigation so that traditional crop verities and not lost
CLIMATE CHANGE	9.1 Heavy rains and resulting local soil erosions could harm project assets. Landslides may be triggered by bursting of water channel	*Negative (Economical*) Project assets may be damaged causing	2.1.1; 2.1.2; 2.2.1; .2.2.2;	9. Incorporate climate-resilient design of infrastructure and construct structures combining concrete infrastructure along with bio-

	9.2 Poor quality infrastructure design and construction may render project assets inefficient	economic losses or may not function to optimum capacity	2.2.3; 2.2.4; 3.1.2	engineering measures as a means to enhance strength and resilience of infrastructure against landslides and floods such as use of pipes supported by pillars or suspended pipes at stream crossings, reinforcement with concrete protection walls at intakes, reservoirs, bio-engineering techniques in unstable areas. 9.2 Train engineers in climate resilient designs and monitor implementation of construction of climate resilient infrastructure and train WUA office bearers on minor water infrastructure maintenance and use of tools and technologies and efficient management Project contractual arrangement to include an O&M period during which any events such as burst of pipes and eventual damage to agriculture lands to be restored by the contractor during the liability period. Carry out site specific ESIA as per activity design and prepare activity. Specific ESMP
POLLUTION PREVENTION & RESOURCE EFFICIENCY	10.1 With assured irrigation water, intensification of agriculture activities such as increased vegetable cultivation could risk farmers adopting chemical fertilizers leading to soil pollution. Use of limited quantities of	*Negative (Environmental)* Possibility of pollution of soils and reduced soil	3.1.2; 3.3.3; 3.1.4	10.1 Sustainable land malmanagement interventions to include tail end and field water management and awareness on;

	chemical fertilizers may pollute flow of tail end water in natural landscapes 10.2 Inappropriate waste at temporary worker camps in project sites may result in risk of limited desecration of natural landscapes	fertility of irrigated lands Decertation of landscapes, soil pollution and water pollution.		- long terms negative impact on loss of soil fertility through application of chemical fertilizers - benefits of sustainable soil fertility management interventions 10.2 Contractual arrangements to include proper establishment of amenities in temporary worker camps including proper waste management. - organic wastes to be disposed in pits dug near the camp and keep non-degradable wastes in sacks for transfer to waste collectors.
PUBLIC HEALTH	11. Migrant workers with unknown medical and travel history could risk transmission of diseases that are not prevalent in the project areas to local communities and among project workers and staff	*Negative (Social)* Cause community health concerns Health and Safety of workers may be compromised.	2.1.1; 2.1.2; 2.2.1; .2.2.2; 2.2.3; 2.2.4	11. Ensure project contractors at site implement health safety protocols from the start include prior medical screening protocols and maintenance of first aid kits at worker camp sites. Locate worker campsites away from local settlements.
PHYSICAL AND CULTURAL RESOURCES/HERITAGE	12.1 Project workers form outside may not be aware of local cultural/sacred sites and may cause unintentional damages 12.2 Alignment pipes and water lines may pass through cultural sites	*Negative (Social)* Unintentional desecration of local sacred/cultural sites and conflict with local communities.	2.1.1; 2.1.2; 2.2.1; .2.2.2;2.2.3; 2.2.4	12.1 Orient migrant workers on local norms and sacred sites in project locations 12.2 Where cultural sites are observed in the project areas, cultural clearance are sought for project activities. The clearance document defines terms and conditions that enable avoidance of any harm on such assets. Monitor compliance of conditions specified in cultural clearance for project

				activities. Alignment pipes and water lines through cultural sites to be avoided
LANDS AND SOIL CONSERVATION	13. The activities related to establishment of drinking and irrigation water may cause temporary minor soil erosions during the project implementation phase.	*Negative (Environmental)* Local mudslide and soil erosions	2.1.1; 2.1.2; 2.1.3; 3.1.2; 3.3.3; 3.1.4	13.1 Exposed soil to be restored back into the trench after pipe layout and minor clearance sites to be restored by planting native plants. 13.2 Contractual arrangements to include proper restoration of exposed soils and access trails. 13.3 Advocate use of integrated pest management practices for preventing and managing pests and promote and use bio-pesticides under the project for managing pests in paddy and vegetables

F. Project Environmental and Social Management Plan (ESMP)

The project level ESMP has been developed through participatory identification of mitigation measures for each identified risk

Table 7: Project Environmental and Social Management Plan (ESMP)

Risk	Mitigation Measures	Responsibility	Timing	Key Indicator	Budget (US $)
1.1: Lack of clarity in proportion of water allocations and community conflicts	1.1 Awareness to project stakeholders, project staff, local community representatives and project contractors on relevant provisions on Water Act, Land Act, National Environment Protection Act and regulations	PMU	During sensitization on the project activities in Q1 of year 1	No. of people benefited / Number of people in the participated in sensitization by stakeholder category and gender	0 (Included in project activities)

Risk	Mitigation Measures	Responsibility	Timing	Key Indicator	Budget (US $)
2.1 Poor households may not be able to participate or provide financial or labour contributions to the water user groups/association. New settlers may face accessibility issues as they have not been members of WUAs in the past. 2.2 Emergence of commercial activities could marginalize rural households and may result in unequal benefits to communities from project assets.	2.1 Articles of association of WUAs to include clause on: - community exemptions for poor households in terms of financial or labour contributions to the water user groups/association. - mention on providing equal access to new settlers 2.2 Articles of association of WUAs to include clause defining proportion water to be allocated as well as rates of WUA fees by different categories such as rural household, commercial buildings or industrial establishment. Strengthen WUAs to protect rights of member households through training of WUA executives	Dzongkhags	Year 2 onwards	All project supported WUAs are registered with concerned gewogs and WUA Articles of association are available in gewog offices All WUA Articles of association defines community exemptions and conditions of exemptions; right of access to water by all and water allocation framework	0 (Included in project activities)
3. Marginalized and Vulnerable Groups may not be able to participate or provide financial or labour contributions to the water user groups/association.	3.1 WUA articles include clause on: - community exemptions for poor households in terms of financial or labour contributions to the water user groups/association. - mention on providing equal access to new settlers 3.2 Water transmission line to include T-points for all settlements to enable distribution from the main water line to member communities	Dzongkhags	Year 2 onwards	All project supported WUAs are registered with concerned gewogs and WUA Articles of association are available in gewog offices All WUA Articles of association defines community exemptions and conditions of exemptions; right of access to water by all and water allocation framework Every community has a water distribution point	0 (included in project activities)

Risk	Mitigation Measures	Responsibility	Timing	Key Indicator	Budget (US $)
				from the main water conveyance line	
4. Statistics of current situation show limited participation by women in the executive role of WUAs. Women-headed households may be not be able to fully participate in project activities and may be left out from membership and leadership roles in the WUAs.	4.1 Include women in training community members on water governance and management including on book-keeping 4.2 Ensure women to take leadership positions of WUAs 4.3 Encourage female workers at project sites to form a committee of their representatives to discuss their concerns and issues with the management on a weekly basis. 4.4 Provide adequate and separate sanitation facilities for men and women			50% of participants at community level consultation workshop and trainings supported by the project comprise of women and youth 30% officer bearers of WUAs supported by the project are women Project sites where women workers are involved have a woman representative All project sites have separate sanitation facilities for men and women	0 (included in project activities)
5.1 Due to difference in physical strength of men and women, contractors may adopt differential work compensation between men and women. Contractors may not fully comply with labor laws and standards in employing workers establishing appropriate working conditions such as inadequate water supply, waste management arrangements, inadequate sanitation	5.1 Project's contractual arrangement with contractors include clauses on; - equal pay for equal work hours to for workers in the project activities - Occupational health and safety provisions in the budget for contract bidding. - safety measures are implemented while implementing work and PPE and safety gears are provided and used by workers at project	PMU on contract clauses Project Site engineers for supervisions SGE for monitoring Contractors to maintain records	Year 1 Year 2 onwards	PPE Issuance Register maintained at sites Worker data to be maintained at site with age and identify cards Salary disbursement sheets show equal pay for equal work	0 (included in project activities)

Risk	Mitigation Measures	Responsibility	Timing	Key Indicator	Budget (US $)
arrangements at temporary labor camps which could pose health and hygiene risk to workers. Further, contractors may employ school children under 18 years of age during school holidays. Proposed pipeline of alignments pass through stretches of steep slope and difficult terrain in some site which could expose workers to safety risks. 5.2 Risks of conflict with local communities due to lack of awareness of local norms by project workers from outside the project area such as sexual harassment and disrespect to local norms may risk conflicts between local communities and project workers from outside the project areas.	site. Maintain PPE Issuance Register at sites. - Provide first aid kits for minor treatment at site throughout the construction phase - Contractual arrangements to include proper establishment of amenities in temporary worker camps and provide proper working conditions as per labour regulations, - Worker data to be maintained at site with age and identify cards. Verify labourers' age by checking their identity cards and date of birth prior to their engagement in the project. - Check salary disbursement sheets for salary amount paid. Interview labourers to verify labour wage amount received - Maintain Grievance Register for proper documentation of the grievance lodged and resolution dispensed. 5.2 Awareness to be conducted by project/local administration to contractors and local employee on labour regulations and standards			Physical site conditions show sanitation, waste, first aid, signages facilities Proportion of workers at site who are aware of occupational health and safety provisions and standards	

Risk	Mitigation Measures	Responsibility	Timing	Key Indicator	Budget (US $)
6. Risk of minor disputes due to lack of awareness of project activity locations and minor disputes due to lack of clarity on water distribution arrangements.	6. Ensure consent on project activities from all affected individuals and parties including sectoral and agency clearances and monitor terms and conditions specified in these clearances.	PMU on ensuring and renewing sectoral and agency clearances SGE and M&E officer for compliance monitoring of terms and conditions in the clearance documents	Clearances to be availed prior to start of project implementation Clearance renewals to be based on validity of each clearance document	Environmental clearance, social clearances, sectoral clearance and consent letters from individuals who may be affected (See Section M for initial clearance and consent document)	0 (included in with 7.1)
7.1 The project activities do not pass through any protected, prohibited or restricted areas. However, minor clearing works for access route to transport materials along water lines may cause minor site specific disturbances to local forest but will not involve conversion of forest land use. Workers may harvest non timber forest products but such collection for consumption and not for commercial purposes. Limited firewood collection for use by project workers at site will happen although timber harvesting is not foreseen.	7.1 Environmental and forestry clearance to be made mandatory for project activities and terms and conditions on the relevant clearances to be monitored.	Site engineers for supervision SGE for periodic monitoring	Year 2 onwards	Environmental clearance and forest clearance are renewed without obstacles	10,000

Risk	Mitigation Measures	Responsibility	Timing	Key Indicator	Budget (US $)
7.2 Trenching work for underground layout of water pipe lines will involve minor disturbances to forest soils although such disturbances will be temporary and limited to pipe alignment. 7.3 Some activities requiring restoration of cleared sites through plantation could potentially have adverse impacts if non-native plants are used for replantation 7.4 Improper stockpiling of construction materials may damage natural landscape conditions.	7.2 Ensure proper burying of pipes, refilling of trenches and revegetation of trenched soil. Disposed un-restored excavated muck safely in designated sites 7.3 Only native species to be used for any plantation in forest areas for restoration works. No introduction of alien crop/plant species to be supported by the project 7.4 Stockpile the construction materials away from the aquatic environment that may allow for release into the environment				
8.1 The project activities do not pass through any protected, prohibited or restricted areas. Increase cultivation of high income verities may increase risk of neglecting native crop varieties. 8.2 Irrigation and drinking water supply for the project will be drawn from natural streams. Noncompliance to environmental flow standards	8.1 30% of the lean flow of natural streams at catchment to be maintained as e-flow in all project activities as per the Water Regulations and in alignment with the Water Act 2011. Design of the scheme should be based on discharge measurements at the source during lean and peak rainfall seasons 8.2 SLM component to encourage traditional varieties in the wet season when pest outbreaks are common of farmers consider modern varieties	PMU for 8.1 and DoA for 8.2	Year 1 for 8.1	Discharge measurement records at water source during lean and peak rainfall seasons for all sites E-flow calculations	0 (included in project activities)

Risk	Mitigation Measures	Responsibility	Timing	Key Indicator	Budget (US $)
could pose risk of disturbing local aquatic life	during dry months with advantage of the assured irrigation so that traditional crop verities and not lost		Year 2 onwards for 8.2	Record of native crops varieties of major cereals and vegetable crops in irrigation sites and calendar of cultivation	
9.1 Heavy rains and resulting local soil erosions could harm project assets. Landslides may be triggered by bursting of water channel 9.2 Poor quality infrastructure design and construction may render project assets inefficient	9. Incorporate climate-resilient design of infrastructure and construct structures combining concrete infrastructure along with bio-engineering measures as a means to enhance strength and resilience of infrastructure against landslides and floods such as use of pipes supported by pillars or suspended pipes at stream crossings, reinforcement with concrete protection walls at intakes, reservoirs, bio-engineering techniques in unstable areas. 9.2 Train engineers in climate resilient designs and monitor implementation of construction of climate resilient infrastructure and train WUA office bearers on minor water infrastructure maintenance and use of tools and technologies and efficient management Project contractual arrangement to include an O&M period during which any events such as burst of pipes and eventual damage to agriculture lands to be restored by the contractor during the liability period.	PMU for conducting training on climate resilient technology SGE for activity specific ESIA and ESMP	Prior to construction (year 1)	Infrastructure design are climate resilient No of engineers trained in climate resilient designs No of WUA office bearers trained on minor water infrastructure maintenance and use of tools and technologies and efficient management 1 year O&M period included in contractors contract document Site and activity ESIA report and ESMPs	Training costs included in project activity ESIA and ESMP (20,000)

Risk	Mitigation Measures	Responsibility	Timing	Key Indicator	Budget (US $)
	Carry out site specific ESIA as per activity design and prepare activity. Specific ESMP				
10.1 With assured irrigation water, intensification of agriculture activities such as increased vegetable cultivation could risk farmers adopting chemical fertilizers leading to soil pollution. Use of limited quantities of chemical fertilizers may pollute flow of tail end water in natural landscapes 10.2 Inappropriate waste at temporary worker camps in project sites may result in risk of limited desecration of natural landscapes	10.1 Sustainable land malmanagement interventions to include tail end and field water management and awareness on; - long terms negative impact on loss of soil fertility through application of chemical fertilizers - benefits of sustainable soil fertility management interventions 10.2 Contractual arrangements to include proper establishment of amenities in temporary worker camps including proper waste management. organic wastes to be disposed in pits dug near the camp and keep non-degradable wastes in sacks for transfer to waste collectors	DOA for 10.1 PMU for 10.2	Year 2 onwards for 10.1 Year 1 for 10.2	Tail end water management and SLM training provided to communities Waste management systems established in project sites	0 (included in project activities) No cost
11. Migrant workers with unknown medical and travel history could risk transmission of diseases that are not prevalent in the project areas to local communities and among project workers and staff	11. Ensure project contractors at site implement health safety protocols from the start include prior medical screening protocols and maintenance of first aid kits at worker camp sites. Locate worker campsites away from local settlements.	PMU Contractors	Throughout project period	Medical screening reports of workers Written statement of health and safety policy Availability of first aid kit at worker campsite Location of migrant worker camp sites	No cost

Risk	Mitigation Measures	Responsibility	Timing	Key Indicator	Budget (US $)
12.1 Project workers form outside may not be aware of local cultural/sacred sites and may cause unintentional damages 12.2 Alignment pipes and water lines may pass through cultural sites	12.1 Orient migrant workers on local norms and sacred sites in project locations 12.2 Where cultural sites are observed in the project areas, cultural clearance are sought for project activities. The clearance document defines terms and conditions that enable avoidance of any harm on such assets. Monitor compliance of conditions specified in cultural clearance for project activities. Alignment pipes and water lines through cultural sites to be avoided	Contractors PMU for cultural clearance SGE for monitoring	Throughout project period	Awareness of local norms and sacred sites by migrant workers Cultural clearance are renewed without obstacles	No cost
13. The activities related to establishment of drinking and irrigation water may cause temporary minor soil erosions during the project implementation phase.	13.1 Exposed soil to be restored back into the trench after pipe layout and minor clearance sites to be restored by planting native plants. 13.2 Contractual arrangements to include proper restoration of exposed soils and access trails. 13.3 Advocate use of integrated pest management practices for preventing and managing pests and promote and use bio-pesticides under the project for managing pests in paddy and vegetables	Year 2 onwards	Contractors PMU DoA	Contract documents include clause on proper restoration of exposed soils and access trails used during construction period SLM trainings and sensitization to communities include topics on integrated pest management practices and bio-pesticides	No cost
Total cost for mitigating measures					30,000

G. Monitoring of Project Environmental and Social Management Plan

The compliance to ESMP will be monitored by various entities at different stages of preparation and implementation as follows.

Monitoring at the project level.

The overall responsibility for implementing the ESMP and for monitoring the compliance of the project's environmental safeguard activities lies with the PMU. The Safeguards and Gender Expert (SGE) at the PMU shall oversee implementation of field activities relating to ESMP and coordinate with the project Dzongkhags. The ESMP compliance monitoring will also include grievances that are reported through the Grievance Redress Mechanism (GRM) and on the status of redressal of grievances reported. The grievance data should be analysed and evaluated to make policy and/or process changes to minimize similar grievances in the future. Record of each grievance that has been reported and its resolution must be recorded and reported in the progress reporting of project activities.

Monitoring at the field activity level:

Self-regulatory monitoring should be adopted by the concerned Dzongkhags. The terms and conditions included in the environment clearances for project activities must be taken care of during the implementation of individual field activities. Self-monitoring reports by the Dzongkhag Environment Officers and site engineers should be filed to the PCU on a quarterly basis and should be liable for ad-hoc inspection by the PMU.

The Dzongkhags shall be responsible for supervision of environmental compliance by the service providers for the project activities as and when they are involved or by the concerned communities as the case may be. Environmental and social mitigation measures carried out by these parties should be verified by the Dzongkhag Engineers with support from the Dzongkhag Environment Officers and must be documented. Disbursements of project activity funds by the PMU should be linked to satisfactory compliance to ESMP of specific activities.

Table 8: ESMP Monitoring Plan

Monitoring Activity	Description	Frequency	Roles and Responsibilities	Cost
Track progress of ESMP implementation	Implementation of this ESMP and or activity specific ESMPs to be monitored periodically reported to each Project Steering Committee on an annual basis.	Quarterly	PMU	None
Baseline survey for identification of vulnerable and marginalized households in project communities	A baseline survey to identify all vulnerable and marginalized households in project areas to be done so that the WUAs and can exercise consider community exemptions to such. Households in terms of contributions (labour or monetary)	First 6 months of project implementation	PMU	10,000
Annual review of ESMP implementation, GRM review and GAP implementation	Meetings and site visits	At least annually	ESG Expert	10,000
Total cost for ESMP Monitoring				20,000

H. Cost for Environment and Social Safeguards

Table 9: Overall cost for Environment and Social Safeguards

No	Cost items	Total amount (US$)
1	Cost of environmental and Safeguards and Gender Expert (6 months)	35,000
2	Cost of implementation of ESMP (Table 7)	30,000
3	Cost of ESMP Monitoring (Table 8)	20,000
	Total cost of ESS	85 ,000

I Grievance Redress Mechanism (GRM) and Process for the project

Due to the large number of stakeholders, especially the communities living within the project areas, a Grievance Redress Mechanism (GRM) that effectively collects and responds to stakeholders' concerns, suggestions and complaints is necessary as an integral part of the project. It will provide a platform and access for all affected stakeholders to lodge project implementation issues and complaints and ensure unbiased confidentiality, responsiveness and accountability to their complaints. It takes into account the availability of customary dispute settlement mechanisms among the communities as for judicial recourse.

The GRM aims to provide people who suffer adverse impacts from the project activities an opportunity to be heard and be assisted. Any affected party may file a complaint directly or through a representative with concrete evidence of authority to represent them. While anonymous complaints will not be considered, complainants can request confidentiality.

The objective of establishing GRM is to provide an effective and efficient mechanism for settlement of conflicts or grievances and to adopt measures to ensure an expeditious settlement of grievances relating to the project activities leading to effective implementation of the project. The GRM has been proposed based the following seven core principles to be adhered while dealing with grievances for its resolution.

1. ***Fairness*:** Grievances are assessed impartially and handled transparently.
2. ***Objectiveness and independence:*** The GRM operate independently of all interested parties in order to guarantee fair, objective, and impartial treatment to each case.
3. ***Simplicity and accessibility:*** Procedures to file grievances and seek action are simple enough that project beneficiaries can easily understand them.
4. ***Responsiveness and efficiency**:* The GRM is designed to be responsive to the needs of all complainants.
5. ***Speed and proportionality:*** All grievances, simple or complex, are addressed and resolved as quickly as possible in a constructive manner.
6. ***Social inclusion:*** Special attention is given to ensure that poor people and marginalized groups, including those with special needs, are able to access the GRM.
7. ***Accountability:*** Each grievance reported are, resolved or escalated to the next higher level till its resolution and proper records are maintained at each level. Progress reporting of project activities should include a reporting on grievance resolution.

It is in the interest of the project as well as the stakeholders involved for the smooth implementation of its activities. Hence, any issues, conflicts, or grievances arising out of project activities must be adequately addressed.

The GRM for the project will comprise of the following process:

(1) Receipt and Register Grievances

Any grievances related to the project activities can be reported through the concerned Tshogpa, Gewog Administration, or other authorities for its resolution to the Gewog Dzingsel Tshogpa (Gewog Dispute Resolution Committee. The channel for grievances submission can be either personal submission or through mail, e-mail, telephone, project staff or text messaging/SMS. Such submission should be recorded in writing at the Gewog.

Alternatively, any member of the Gewog Administration or officials associated with the project, its vendors/suppliers, other stakeholders and the public at large could also can lodge complaints on the website of the BTFEC (https://www.bhutantrustfund.bt/lodge-complaint). These complaints could relate to:

a. Allegations of Fraud, Malpractices or Corruption related to the project activities
b. Environmental and/or Social damages/harms caused by project activities as may be related to any of the 15 principles of the AF;

It would be preferable that the complainant, provide some contact details so that concerned authorities can contact the person for additional information, if required during investigation. However, where feedback is not required by the complainants, they may choose not to provide such details.

(2) Sorting and Processing

It is anticipated that various types of grievances will be reported wherein different follow-up actions will be required. The grievances can be categorized into four types: (a) comments, suggestions, or queries; (b) complaints relating to non-performance of the project; (c) complaints referring to violations of law and/or corruption while implementing the project activities; (d) complaints against authorities, officials or community members involved in the project management; and (e) any complaints/issues not falling in the above categories. The Gewog Administration will maintain a record of complaints by the above categories as and when such grievances are received.

(3) Acknowledgment and Follow-up

When a complaint is made or the grievance is reported, the Gewog office receiving the complaint or grievances should acknowledge its receipt and should brief the complainant, informer or aggrieved/affected person about the grievance resolution process, provide contact details and, if possible, the name of the contact person who is responsible for handling the grievance.

(4) Verification, Investigation, and Action

The concerned Gewog Administration receiving the grievance should gather adequate information about the grievance reported to determine its validity and resolving the grievance. Grievances that are straightforward (such as queries and suggestions) can be resolved quickly by contacting the complainant. Grievances that cannot be resolved by grievance receiving authorities/office at their level should be referred to a higher level for verification and further investigation. The concerned authorities/offices dealing with investigation should ensure that the investigators are neutral and do not have any stake in the outcome of the investigation. The grievance redressal will be as follows:

(a) If Gewog Administration receives the grievance from the aggrieved/affected individuals or communities, The Gewog Dzingsel Tshogpa shall try to resolve grievances within 7 working days by negotiating and mediating between the affected parties if the grievance is of such nature that Gewog Dzingsel Tshogpa can resolve it. However, any grievances warranting sanctions for violation of statutes shall not be negotiated by the Tshogpa but rather inform the concerned authorities/offices empowered to impose such sanctions and such report should be copied to the Dzongkhag Administration. In the event, the parties are not satisfied with the decision from such arrangements, the parties shall submit appeal to the Dzongkhag Administration directly with copies to the PMU and BTFEC.

(b) Upon receipt of grievance appeal the Dzongkhag Dzingsel Tshokpa (Dzongkhag Dispute Resolution Committee) shall verify and investigate, if necessary, and render its decision within 15 working days. In the event, the parties are not satisfied with the decision of the Tshokpa, the parties shall submit appeal to BTFEC.

(c) Upon receipt of grievance appeal from the Dzongkhag, the BTFEC shall activate the Complaint Management Committee of BTFEC who will pursue face to face resolution or provide a mediated resolution in the case of administrative cases or refer to the Board of BTFEC in the case of major cases. Where the Board is not able to resolve the case, it shall be forwarded to the Anti-Corruption Commission of Bhutan by the BTFEC. The BTFEC shall verify and investigate and render its resolution within 15 working days.

(d) In the event, the parties are not satisfied with the decision of the Dzongkhag GRC, the parties can also alternatively submit their grievances to the Court of Law for further adjudication as per court procedures.

(5) Monitoring and Evaluation for GRM

The grievances should be monitored to track and assess the extent to which progress is being made to resolve them. The grievance data can be analyzed and evaluated to make policy and/or process changes to minimize similar grievances in the future. Record of each grievance submitted and its resolution should be considered as part of the progress reporting of the project activities.

J Disclosure of ESMP

The stakeholders of the project and affected communities will be informed about the ESMP requirements and the need for internalizing the environmental and social requirements in the design and implementation of the project activities. The ESMP document will made available on the website of the GNHC, BTFEC and Dzongkhags of Dagana, Paro and Tsirang. Also, the hard copies will be made available at the PCU at GNHCS and the concerned Dzongkhag and Gewog Administrations.
During the implementation of the project, activity-specific mitigation plans including gender actions plans should be disclosed to all stakeholders, including affected communities and Civil Society Organizations (CSOs). Disclosure should occur in a manner that is meaningful and understandable to the affected people for their consent.

Disclosure framework for ESMP related documents

Documents to be disclosed	Frequency	Where
ESMP document	Throughout the project period.	Websites of GNHC, Dzongkhags of Dagana, Paro, Tsirang and hard copy at GNHC, Dzongkhags and Administrations
Quarterly Progress Report by the Dzongkhags	Quarterly	PMU and Dzongkhags
Minutes of Formal Public Consultation Meetings	Within two weeks of meeting	Websites of GNHC, Dzongkhags of Dagana, Paro, Tsirang and hard copy at GNHC,
Semi-annual progress report by the SGE	Semi Annual	Websites of GNHC, Dzongkhags of Dagana, Paro, Tsirang and hard copy at GNHC

K: Terms of Reference for Safeguards and Gender Expert

POST TITLE:	Safeguards and Gender Expert
PLACE OF POSTING:	Project Management Unit

The job responsibilities will include but not limited to:

- Providing support in internalizing the environmental and social issues in the project's activity planning & design and to address the potential impacts as well as to promote good practices.
- Developing a set of planning and implementation tools and guidelines for training of the officials on environmental and social safeguard. These will be used for training and as reference materials for the field staff during implementation of project activities. The training could include providing basic knowledge and information on the key environmental and social issues associated with the project activities and in relation to the 15 ES principles of AF.
- Supporting the Dzongkhags in preparing their quarterly ESS and gender action plan implementation reports.
- Prepare semi-annual report on ESS and gender action plan implementation to the PMU and annual report to the Project Steering Committee
- Any other related tasks that are proactive in nature to minimize risks arising out of environmental social issues arising from the implementation of project activities.
- Update the project ESMP and GAP during first 6 month of project implementation

Qualifications and Experience:

- Master's degree in Environmental/Planning/Social Science
- The candidate should have at least 8 years of experience out of which two to three years of professional experience in preparation of Environmental Impact Assessments (EIA) and Environmental Management Plan (EMP) and well versed with national and local environmental regulations and compliance requirements including work experience in gender mainstreaming.
- Candidates having experience in projects assisted or funded by the AF shall be given preference
- Ability to interact with and motivate/guide stakeholder to carry out due diligence for environmental, social and gender activities.
- Candidates are expected to possess good written and verbal communication and analytical skills, with ability to work with interdisciplinary team.

L: List of participants at the stakeholder consultations

Consultation on Environment and social safeguards and Gender for project "Adaptation to Climate-Induced Water Stresses through Integrated Landscape Management in Bhutan" at Dagana from 14-15th April, 2021

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature Day 1	Signature Day 2
1	Dorji	ACFO	BTFEC	dorjiabhutantrustfund [illegible]	17909870	[illegible]	
2	Wangdi Dem	Kana [illegible]	Kana	[illegible]@gmail.com	1764137[illegible]	[illegible]	
3	Kencho Wangdi	Rape [illegible]	[illegible]	kenwangdi@gmail.com	[illegible]7614041	[illegible]	
4	Phul Maya Katwal		Kana	-	77322825	[illegible]	
5	Gopal		"		17806254	[illegible]	
6	Chador	-	Kana	-	17830556	[illegible]	
7	Tshering Yangzom	Adm Asst	Health	tyangzom2015ty@gmail.com	17948431	[illegible]	
8	Pasang Wangdi	Thromdey Thimi	Dagana	-	16900648	[illegible]	
9	Nima Tshering	-	Dagathana	championtshering@gmail.com	17599068	[illegible]	
10	Nima D Tamang	KT	"	dolma2019@gmail.com	17871028	[illegible]	
11	B. B. Tamang	Forest	Dagana	bbtamang20107@yahoo.com	17688819	[illegible]	

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature Day 1	Signature Day 2
12	Ganesh Kumar Gurung	LPO	DLS	[illegible]@dagana.gov.bt	77203880	[signature]	
13	N. B. Biswa	Asst. Geolr [illegible]	Dagana Dzongkhag	nbslama050@gmail.com	17436265	[signature]	
14	Ugyen Dorji	DRO	DES	udorji@dagana.gov.bt	17396529	[signature]	
15	Phuba	Gup	Dzeza	phuba@dagana.gov.bt	17219161	[signature]	
16	Gembo	Farmer	"	—	17659275	[signature]	
17	Choki	"	"	—	17694005	[thumbprint]	
18	Sangay Jamtsho	AMO/Offtg DAO	DDA	jamtshosonam58@gmail	17569280	[signature]	
19	Nidup Peljor	Consultant	BTFEC	ceo@bpvbhutan.com	17161656	[signature]	
20	Thinley Wangdi	BTFEC	"		17311577	[signature]	
21	Tawang Dorji	DE	Dagana	[illegible]@dagana.gov.bt	17601361	[signature]	
22	Dorji Gyeltshen	Driver	BPV	Samdeep89@gmail.com	17414956	[signature]	

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature Day 1	Signature Day 2
23	Pasang	Driver	BTFEC		77779821	[signature]	
24	Pema Wangmo	AA	BTFEC	———	17966199	[signature]	
25	Rinchen Dema	AFO	BTFEC		17419048	[signature]	
26	Duba	Desho Dzongda	Dagana				

Consultation on Environment and social safeguards and Gender for project "Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan" at Dagapela on 16th April, 2021

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature
1	Namgay Pelden	GUP,	Tashiding Gewog	npelden@dagana.gov.bt	17150511	[signature]
2	Dhan Bdr. Gurung	Gup, Lajab	Lajab Gewog	dbgurung@dagana.gov.bt	17762445	[signature]
3	Tarala	GUP	Tsezakha	tarala@dagana.gov.bt	17832026	[signature]
4	Nidup Dorji	Tshogpa	"	ndorji@gmail.com	17966493	[signature]
5	San Maya Pithakoty	"	"	SPithakoty@gmail.com	17868820	[signature]
6	Khamber Singh Tamang (Farmer)		Lajab Gewog	—	77717377	[signature]
7	Tobden Dorji	Tshogpa	Tashiding	—	17792959	[signature]
8	Ambika Dorji	public	Tashiding	—	17393624	[signature]
9	Phul Maya Gurung	Public	Lajab Geowg		17748182	[signature]
10	Sonam Thinley	Engineer	Dz. Adm. Dagana	sthinley@dagana.gov.bt	17726119	[signature]
11	Nangay Wangchuk	Engineer	Dz. Adm.	nwangchuk@dagana.gov.bt	17479737	[signature]
12	Tandin	Gup	Gozhi Gewog	[illegible]@dagana.gov.bt	177790[illegible]	[signature]
13	DORJI	ACFO	BTFEC	dorji@[illegible]	17909[illegible]	[signature]
14	Nidup Peljor	Consultant	BTFEL	ceo@bpvbhutan.com	17161656	[signature]
15	Karma Tshering	Gup	D/Saas (Drujegang)	[illegible]@dagana.gov.bt	17758335	[signature]
16	Namgay	"	Khebisa	Namgay@dagana.gov.bt	17686001	[signature]
17	Jamtsho	Tshogpa	D/Saas	Nang	17419609	[signature]
18	Ngawang	"	D/Saas		77736840	[signature]
19	Bal Bdr. Rai	T/Gogsp	T/gewog	bb[illegible]@gmail.	178[illegible]	[signature]
20	Sark Raj Rai	Gup	Dorona	srrai@dagana.gov.bt	17573605	[signature]
21	Yeshi	Farmer	Khabisa	—	17792544	[signature]
22	Choden	"	"	—	17346728	[signature]

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature
23	Mani kumar	Farmer	Dorona	—	77262295	[signature]
24	Shum Kumar	farmer (cop)	Rozele		17378067	[signature]
25	Gangi Maya Rai	Unemployed	Dorona	moyaraigangi@gmail.com	77402989	[signature]
26	Sonam Jamtsho	AHO/Dzongkhag, Dzo	DDA	jamtshosonam88@gmail	17569280	[signature]
27	B. B. Tamang	Focal person	Dagana	bbtamang21107@yh.c...	17683613	[signature]
28	N.B. Biswa	Agr. Gardufal	Dagana	nblama0310@gmail.com	17436268.	[signature]
29	Bindu Biswas	Farmer	Tsendagang	—	17573328	[signature]
30	Bsno Mongar	Farmer	Tsendagang	—	77338818	[signature]
31	Pema Wangmo Sr	Gup	Gesarling	pemawangmo@dagana.gov.bt	17500772	[signature]
32	Tshencho Zangmo	Farmer	Gesarling	—	77431727	[signature]
33	Tshering Dorji	"	"	—	77831253	[signature]

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature
34	Kinzang Tobgay	Driver	Gozhi		17603358	[signature]
35	Rinchen Wangdi	GAO	"	rwangdi@dagana.gov.bt	17341667	[signature]
36	Jamyang	DE	Dzonglung	jdorji@dagana.gov.bt	17601361	[signature]
37	Shenley Wangdi	IT	BTFEC		17311577	[signature]
38	Pema Wangmo	AA	BTFEC		17966199	[signature]
39	Pasang		BTFEC			[signature]
40	Dorji Gyeltshen	Driver BPV	BPV	Samdeng89@gmail.com	17491956	[signature]
41	Pema Dechen	NFEI	Gozhi		77470515	[signature]
42	Rinchen Deme	AFO	BTFEC	—	17419048	[signature]
43	Jigmi Dorji	caretaker	Gozhi	—	17383630	[signature]
44	Sonam Rinchen	Driver	Drujegang	—	17508842	[signature]

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature
45	Tandin Wangdi	Driver	Gesarling		17808886	[signature]
46	Purna Bdr. Shatka	Driver	Khebisa		17831268	[signature]
47	~~Dubo~~	Basho ~~Dangda~~	~~Dagana~~			

Environmental, Social and Gender Assessment for Proposed Project to Adaptation Fund on "Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan" in Paro Dzongkhags
Tsherim Resort, Paro, (20 April 2021)

Sl.	Name	Agency	Email	Contact No	Signature
1	Pema Zangmo	Dop-shari Gewog Administration		17686494	[signature]
2	Phub Gyeltshen	"		17641170.	[signature]
3	Gem Tshering	Lungnyi Gewog	gemtshering19@gmail.com	17606614	[signature]
4	Kuenzang Nima	NRDC	kuenzangnima07@gmail.com	17734651	[signature]
5	Nidup	Shaba Gewog		17999832	[signature]
6	Choncho Zangmo	Shaba Gewog		17685728	[signature]
7	Tshering Chengyal	Druk asia	Tshering Chengyal1992@gmail.com	17470083	[signature]
8	Yeshi Dorji	Agriculture Dop-Shari	Yeshidsos@gmail.com	17493924	[signature]
9	Chundu Tshering	Mangmi	Chundu Naja @gmail.com	17777363	[signature]
10	Peldon	Naja Gewog	—	77208591	[signature]
11	Ugyen Dorji	Naja Gewog	-	17859645	[signature]
12	Ugyen Tshering	Dogar Gup	uatshering27@gmail.com	17608309	[signature]
13	Chencho Gyeltshen	Shaba "	gyeltshen023@gmail.com	17607281	[signature]

	Name	Agency	Email ID	Contact No.	Signature.
14	Rinzi	Dogar Gewog		17521055	
15	Kunga	Dogar Gewog		17607244	
16	Pema Dorjchi	CDCL		17889332	
17	Passang Tshering	Langang	—	17605443	
18	Jeram Tobgyal	Planning AMCO		77246516	
19	Ngawang Dorji	E/O.		17698864	
20	Passang Tshering	Farmer	—		
21	Nidup Pelzn	BTFEC/Consultant	Leo@bpvbhutan.com	17161651	
22	Thinley Wangchi	BTFEC	thinley@bhutantrustfund.bt		
23	Yeshey Pelden	"	yeshey@bhutantrustfund.bt		
24	Singye Dorji	"	singye@bhutantrustfund.bt.		
25	Phuntsho Choden	"	phuntsho@bhutantrustfund.bt.		
26	Rinchen Wangmo	"	rinchen@bhutantrustfund.bt		
27	Nani K. Shingelkar	"	nani@bhutantrustfund.bt.		
28	Dasho Dzongrab Kinley Gyeltshen	Paro Dzongkhag			
29	[illegible]	[illegible]			
30	Dasho Dzongrab	Paro Dzongkhag			

Environmental, Social and Gender Assessment for proposed project to Adaptation Fund on "Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan" at Sarpang, 15th June 2021

Sl. No	Name	Designation	Name of Agency	Contact No.	Email Address	Signature
1	Phub Dhendup	CFO	DFO, DoFPS	17936526	pdhendup@moaf.gov.bt	
2	Lachuman Rai	Gup, Singhi	LG	17341040	—	
3	Tshering Delkar	GAO, Gelephu	Gelephu	17813499	tsheringdelkar@gmail.com	
4	Yonten Dorji	GAO, Chhuzanggang		17689197	ydorji@sarpang.gov.bt	
5	Sangay Tshering	Gup, "	Chhuzanggang	77767697	"	
6	Yeshi Wangmo	Female Woman Representative	c/gang			
7	Tshering Tenzin	Male Representative	"	17994637		
8	Sangay Dorji	SLGAO	Singye	17736869		
9	Sherab Dolkar	Pakpa	"	"		
10	Lhaing	Gup	S/ghang	17887727	lhaingblhaing1666	
11	Bhoj Raj Rai		Singye	17400474		
12	Sukh Dorji Tamang	Shompangkha	S/Kha	17756483	sukhdorjitamang@gmail.com	

Sl. No	Name	Designation	Name of Agency	Contact No.	Email Address	Signature
13	Tika Ram Gurung	LAO	S/Kha	17828358	tikaramgurung@gmail.com	
14	Kiran Rai	Tshogpa	-11-	17879268	–	
15	Kinley Rigden		11	17808585	-	
16	Pema Tshewang	Farmer	Sershong	17727745	—	
17	Peldon Lhamo	"	"	17511635	—	
18	Pema Choeda	GFP	Dz. Admin	17445873	pchoeda@sarpang.gov.bt	
19	Tshering Dorji	DPO	Sarpang	17546464	samten8016@gmail.com	
20	Hidup Pelzom	Consultant	BTFEC	—	—	
21	Singye Dorji	OiC	"	—	—	
22	Dorji	ACPO	"	—	—	
23	Rinchen Wangmo	APO	"	—	—	
24	Rinchen Dema	AFO	"	—	—	
25	Pasang	Messenger	"	—	—	
26	Chandra	Driver (Singye)				

Sl. No	Name	Designation	Name of Agency	Contact No.	Email Address	Signature
27	Harka Bdr. Ghalley	Gewog Driver	Shompangkha Gewog	17953511	—	
28	Rinchen Jamtsho	Driver	Chuzagang Gewog	77775961		

Environmental, Social and Gender Assessment for proposed project to Adaptation Fund on "Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan" at Tsirang from 9-11th June, 2021

Sl. no	Name	Designation	Agency/Gewog	Email Address	Contact Number	Signature Day 1	Signature Day 2	Signature Day 3
1	Pema Singye Dorji	GC Dzongdag	BTFEC Tsirang	singye@bhutantrustfund.bt / pemdo@tsirang.gov.bt	17999777 / 17880818			
2	Nar Bahadur Rai	CSW	Tsirangtoed	nbrai@tsirang.gov	17822577	[signature]	[signature]	
3	Dimple Thapa	CFO	Tsirang Division	dthapa@moaf.gov.bt	16901530	[signature]	[signature]	
4	Karma Wangmo	Planning Off	" Dzongkhag	karmawangmo@tsirang.gov.bt		[signature]	[signature]	[signature]
5	Tandin Tshering	Khoppkpa	Tsirangtoe		17508179 / 17243377	[signature]		
6	Tek Bahadur Rai	Tshogkpa	Tsirangtoed	—	17404289	[signature]		
7	Tenzin Wangpo	Tshogpa	Tshongsingma	—	17261351 / 176261	[signature]		
8	Nidup Tenzin	Tshogpa	Soonlapsa		17965808	[signature]		
9	Tshering Tenzin	Sr. ES III	Agriculture	tsheringtsa@gmail.com	17625570	[signature]		
10	Chetan Dorji	RO	Tsirangtoe	cedena4u@gmail.com	17832877	[signature]	[signature]	[signature]
11	Ganjaman Rai	Mangmi	Tsirangtoed	gmtsirangtoe87@gmail.com	17421399	[signature]	[signature]	
12	Nima Dorji	Gaydrung	Tsirangtoe	nimadorji22@gmail	17782618	[signature]		
13	Dhendup Tshering	Asst. Planning Officer	GNHC	dtshering@gnhc.gov.bt	17908195	[signature]	[signature]	[signature]
14	Nidup Peljor	Consultant	BTFEC	ceo@bpcbhutan.com	17161656	[signature]		
15	Sonam Lhamo	Farmer	Tsirangtoe	—	17876203	[signature]		
16	Tila Maya Subba	CSE	Tsirangtoe	tilacc.subba@gmail.com	17570576	[signature]		
17	Phuntsho Norbu	Farmer	Tsirangtoe	—	17469780	[signature]		
18	Kinley	CDG	DES/Tsirang	Kinley@tsirang.gov.bt	77195254	[signature]	[signature]	[signature]
19	[illegible]	[illegible]	[illegible]	dorjiwangdi@tsirang.gov.bt	17807474	[signature]	[signature]	[signature]
20	[illegible]	[illegible]	[illegible]	—	17242865	[signature]		
21	Tshering Lham	shopkeeper	Tsirangtoe	—	17426872	[signature]		
22	Wangchuk	Gewog Caretaker	Tsirangtoe	—	17515202	[signature]		
23	Lobzang Tshering	DHO	Tsirang	ltshering.tsirang.gov.bt	17668774	[signature]		
24	[illegible]	[illegible]	[illegible]	dorjigyeltshen@tsirang.gov.bt	17612857	[signature]	[signature]	[signature]
25	Nirmaya Kalden	Matron	Tsirangtoe CS.	nirmayakalden125@education.gov.bt	17889802	[signature]		
26	Yeshi	Principal	"	yeshi183@gmail.com	17686183	[signature]		
27	Dreme Cheten	Sr. HA	T/toe PHC	dremecheten123@gmail.com	17896262	[signature]		
28	Singye	Driver	Tsirang	—	17908502	[signature]		
29	Ugyen Lhamo	PA	"	—	17814696	[signature]		

Sl. no	Name	Designation	Agency/Gewog	Email Address	Contact Number	Signature Day 1	Day 2	Day 3
30	Pema	Dzongda	Tsirang	pema@tsirang.gov.bt	17989818	[signature]	[signature]	
31	Namgay Dorji	Dzongrab	Tsirang	ndorji@tsirang.gov.bt	17699248	[signature]	[signature]	
32	Dorji	ACFO	BTFEC		77606162	[signature]	[signature]	
33	Rinchen Wangmo	AFO	BTFEC	rinchen@bhutantrustfund.bt		[signature]	[signature]	[signature]
34	Rinchen Dema	AFO	"			[signature]	[signature]	[signature]
35	Pasang	Driver	"	pasang@bhutantrustfund.bt				
36	~~Dhendup Tshering~~	~~AFO~~	~~GNHC~~	~~dtshering@gnhc.gov.bt~~	~~174[illegible]~~			
37	Daza	NFEI	Phuentenchu	ddaza@gmail.com	77486920			[signature]
38	Chamo Choden	CSE (NCSTDF)	Phuentenchu	chodenchamo2017	17802709			[signature]
39	Monkumari Pradhan	Farmer	Phuntenchu		17674360			[signature]
40	Budha mothi Subba	Farmer	Dragatho		17236523			[signature]
41	Rinchen Ngazom	farmer	Norbuthang		17990200			[signature]
42	Hem Lal Adhikari	Tshogpa	Tashichanghu		17467339		[signature]	[signature]
43	Bir Dhoj Rai	Tshogpa	Tongshingzang		17429451			[signature]
44	Krishna lal	Tshogpa	Pelzorling		17667313			[signature]

Sl. no	Name	Designation	Agency/Gewog	Email Address	Contact Number	Signature Day 1	Day 2	Day 3
45	Dro Bdr Mafchan	Tshogpa	Sergithang		17779695		[signature]	[signature]
46	Tula Ram Kharka	"	"		17385220			[signature]
47	Naina Singh Mongar	Driver	"		17325961		[signature]	[signature]
48	Tika Maya	Farmer	"		17778338			[signature]
49	Budhi Maya	"	"		17427912			[signature]
50	Wangmo	"	"		17362350			[signature]
51	Amber Bdr Pradhan	Tshogpa	"		17650991			[signature]
52	Kinley Wangdi	Offg: GAO	"	kinleywangdi...	17777306	[signature]	[signature]	[signature]
53	Pana Bdr Rai	Tshogpa	P/chu		17749445			[signature]
54	Gom prd. Subba	Tshogpa	" "		17382708			[signature]
55	Jamphel	mangmi	" "		17724129	[signature]	[signature]	[signature]
56	Nidup Wangdi	Principal	-//-		17995677			[signature]
57	Sangay Wangdi	Sr.ES II	-//-	swangdi72@gmail.com	17675252	[signature]		
58	Cheta Gyeltshen	GAO	Phuentenchu		17289722	[signature]	[signature]	[signature]
59	Rinchen Phuntsho	Driver	Dzongkhag		17615201		[signature]	[signature]

Sl. no	Name	Designation	Agency/Gewog	Email Address	Contact Number	Signature		
						Day 1	Day 2	Day 3
60	Heman Subba	Gaydrung.	Phuentenchu Gewog.	heman.subba48@gmail.com.	77494166	[signature]		[signature]
61	Tara Devi Chhetri	Sales executive	FCB, Phuentenchu.	taradchetri11@gmail.com.	17411175.	[signature]		[signature]
62	Dawa Tshering Sherpa.	Driver.	Phuentenchu, Gewog.	sherpadawatshering7@gmail.com.	77299554.		[signature]	[signature]
63	Parsu Ram Darjee.	Care-taker.	Phuentenchu, Gewog		17976254			[signature]
64	Top Nath Acharya	Gup, Sergithang	Sergithang.	tnacharya@tsirang.gov.bt	17618813		[signature]	[signature]
65	Prem Bdr Ghalley	AEO	Dzongkhag		17692372		[signature]	
66	Indra Bdr Kararia	Tech I	Dzongkhag		17539017		[signature]	
67	Shiva Lal kasaju	Gup	Phuentench		17732 8395		[signature]	[signature]
68	Thinley Phuntsho	Driver	Tsirangtoe		17509135		[signature]	
69	Nim Dorji	CoK	Tsirangtoe		17442537		[signature]	
70	Tenzin Dorji	SF. FR-II	Biray Division				[signature]	

The following clearances and no objection letters have been obtained(documents available at BTFEC secretariat):

M Environmental clearances and consent letters for the project activities at Thasa

M1 Clearances for climate-resilient irrigation scheme at Lajab under activity 2.2.2

M1.1. Environmental Clearance for Thasa irrigation channel, Lagyab Gewog, Dagana

M1.2. Clearance from Bhutan Power Corporation for Thasa irrigation channel, Lagyab Gewog, Dagana

M1.3. Cultural Clearance for Thasa irrigation channel, Lagyab Gewog, Dagana

M1.5. Forestry Clearance from for Thasa irrigation channel, Lagyab Gewog, Dagana

M1.6. Forestry Clearance from for Thasa irrigation channel, Lagyab Gewog, Dagana

M2 Clearances for drinking water from Drakay Pangtsho source to Dopshari, Doteng and Shaba gewogs, Paro

M2.1 Environment Clearance

M2.2 Clearance from Paro airport

M3 Clearances for drinking water from Balakha Source to Tsentog, Lamgong, Lungyni and Wangchang gewogs, Paro

M3.1 Forest Clearance

M4 Clearances for drinking water scheme of Phuentenchu, Semjong and Tsirangtoe

M4.1 Environment Clearance

M5 Clearances for establishment of climate- and disaster-resilient pressurized irrigation system for Ambithang, Drujeygang, Dagana

M5.1 Forest Clearance

M5.2 No objection letter from Thuenpa Puenzhi Community Forest Group

M5.3 No objection letter from Tashi Dhargey Community Forest Group

M5.4 Individual. Consent letter from private land owners

M6 Climate proofing of existing Budichu-Peteykha irrigation scheme

M6.1 No Objection. Letter from Namleythang Farm road user groups

M7.1 Individual consent from Pema Dorji

M7 Climate proofing of existing Budichu-Peteykha irrigation scheme

M7.2Individual consent from Pema Choki

M7.3 Individual consent from Tshering Wangmo

Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan

Gender Analysis and Action Plan

Bhutan Trust Fund for Environmental Conservation

Abbreviations and Acronyms

AF	Adaptation Fund
BTFEC	Bhutan Trust Fund for Environmental Conservation
CEDAW:	Convention on Elimination of All Forms of Discrimination Against Women
DoFPS:	Department of Forest and Park Services
DPO:	Dzongkhag Planning Officers
FGD:	Focus Group Discussion
FYP:	Five Year Plan
GAP:	Gender Action Plan
GDP:	Gross Domestic Product
GGI:	Gender Gap Index
GII:	Gender Inequality Index
GNH:	Gross National Happiness
HDI:	Human Development Index
KPI:	Key Performance Indicators
MoAF:	Ministry of Agriculture and Forest
MoLHR:	Ministry of Labour & Human Resources
NCWC:	National Commission for Women and Children
NKRA:	National Key Result Areas
PHCB:	Population and Housing Census
SDG:	Sustainable Development Goals

List of Glossary

Dzongkhag:	District
Gewog:	County, consisting of a block or villages
Chiwog:	A group of households
Tshogpas:	Chiwog Representatives

Table of Content

1. Project Information

1.	Project Title	Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan
2.	Project Grant Amount (US$)	9,998,955
3.	Grantor Agency	AF
4.	Location (Global/Region/Country)	Bhutan (Dagana, Paro and Tzirang districts
5.	Project Start Date	January 2023
6.	Project End Data	February 2028
7.	Implementing Entity (NIE)	Bhutan Trust Fund for Environmental Conservation (BTFEC)
8.	BTFEC Focal Strategic Areas	Mitigating and adapting to climate change

2. Project Objective

The main objective of the project is "to build resilience to climate change and adaptive capacity of water-stressed communities in the Dzongkhags of Paro, Dagana and Tsirang". This will then support implementation of the "National Water Flagship Program".

3. Objective of Gender Analysis

The aim of gender analysis is to provide an overview on gender issues in Bhutan, highlight gender situation in the project areas, specific to water resources and water management and to recommend gender specific activities to address issues related to the project. The analysis was based on available secondary data from various studies conducted by the Royal Government of Bhutan and development partners and information collected during the project preparation phase. This gender analysis was used as a basis to prepare the Gender Action Plan (GAP) which is annexed to this report. The GAP recommends grounded and practicable gender-responsive interventions to be implemented during the implementation period of the project.

4. National laws, policies and Regulations on Gender

Bhutan is signatory to the Convention on Elimination of All Forms of Discrimination (CEDAW) and the Convention on the Rights of the Child (CRC).

Bhutan signed the Universal Declaration on Human Rights as well as the UN Charter in 1971; the Convention on the Elimination of all forms of Discrimination Against Women (CEDAW) in 1980 and ratified in 1981; The Convention on the Prevention and Combating of Trafficking of Women and Children for Prostitution of the South Asian Association for Regional Cooperation (SAARC) was signed in 2002. Being party to these international frameworks, reflect Bhutan's commitment towards realizing gender equality and empowerment. The National Commission for women and children (NCWC) was established in 2004 as the nodal agency for protecting the rights of women and children and spearheads its fulfilment to CEDAW and other regional and international conventions. It coordinates with government agencies to ensure gender equality and mainstreaming in policies and programs. For example, every ministry and Dzongkhag has a gender

focal person who is expected ensures gender equality and elimination of discrimination against women.

The Constitution of Bhutan, under Article 7, ensures fundamental rights, which are intrinsic in ensuring gender equality. Article7(15) provides that "All persons are equal before the law and are entitled to equal and effective protection of the law and shall not be discriminated against on the grounds of race, sex, language, religion, politics or other status." This provision underscores the right to equality of women. Article 7(6) provides "A Bhutanese citizen shall have the right to vote." This provision is important not only because it is a political right of women to participate in the selection of their central and local governments but more so because it empowers Bhutanese women. This right empowers women to express their freedom, a freedom that entails choice. Article 7(11) provides Bhutanese women right to equal pay for work of equal value, especially when the principle of equal pay for work of equal value around the globe remains elusive. Article 9, section 17 on Principles of State Policy states: "The State shall endeavour to take appropriate measures to eliminate all forms of discrimination and exploitation against women including trafficking, prostitution, abuse, violence, harassment and intimidation at work in both public and private spheres".

The Labour and Employment Act, 2007, provides for favorable working conditions for pregnant and nursing mothers, and equal pay for work of equal value. The Act emphasizes that there should not be discrimination based on sex against employees or job applicants in connection with recruitment, dismissal, transfer, training and demotion.

The Local Government Act 2009, similarly, does not differentiate between sexes, as all registered Bhutanese are eligible for office, if they fulfil set criteria. However, one of the criteria includes a certain level of education, which is disadvantageous for women as they are on average less educated than men.

The Penal Code of Bhutan has dedicated an entire chapter, Chapter 14, to criminalize various degrees of sexual harassment, rape, and physical and verbal abuses.

Bhutan's Inheritance Act of 1980 guarantees equal inheritance rights to men and women. Traditional inheritance practices in Bhutan favour of inheritance to daughters and as a result, proportion of rural women holding land registration titles are higher than men.

The *Loan Act of 1981* determines that women are eligible to possess land and collateral for getting a loan.

The *amended Land Act of 2007* establishes that the minimum age for registering land is 18 years for both women and men.

The *Domestic Violence Prevention Act of Bhutan, 2013,* covers the prevention of physical, sexual, psychological and economic and emotional violence.

The *Disaster Management Act, 2013* provides for establishment and strengthening of institutional capacity for disaster management, the mainstreaming of disaster risk reduction, and for integrated and coordinated disaster management focusing on community participation. It underlines the

importance of women's participation in making decisions related to disaster management and risk reduction.

The 12th FYP, with its overall for a. "Just, Harmonious and Sustainable Society through enhanced Decentralization", outlines gender responsive priorities such as: Eradicating Poverty and Reducing Inequality; Creating Productivity and gainful employment; Access to quality Health Services; Improving the quality of Education; Strengthening Democracy and Decentralization; Reducing Corruption; Improving Justice System and Promoting Gender Equality. Gender mainstreaming in national plans in Bhutan was initiated with the 10th FYP. It started with the adaptation of guidelines to mainstream gender into all planning aspects to elevation as one of the 16 National Key Result Areas for the 11th Five-year Plan. In the ongoing 12 FYP, recognized gender as a cross- cutting theme and advocates all ministries, agencies and concerned sectors to address gender gaps by integrating into their plans and programs based on gender analysis. This Plan also has "Gender Equality and Women and Girls Empowered" as a National Key Result Area with key performance indicators and targets that will measure women's representation in Parliament.

The Third National Communication of Bhutan (TNC) to UNFCC, 2019 recognizes that there are also several areas in where women are at a disadvantage compared to men, such areas being, politics and decision-making, tertiary education and economy, with rural women being more vulnerable.

The National Gender Equality Policy (NGEP) 2020 explores gender equality through the lens of three domains i.e., political, social and economic. The policy aims to:

(i) Provide a coherent strategic framework for the Government's priorities on gender equality;
(ii) Strengthen accountability and operational strategies to address priority gender issues; and
(iii) Facilitate deeper collaboration across sectors and stakeholders towards a common vision of gender equality.

Statement 5.9 of the NGEP establishes the link to climate change and envisages mainstreaming gender in all disaster and climate change related initiatives through acknowledgment of the differential impacts of disasters and climate change on women and men, and the positive roles that women can play in adaptation and mitigation efforts and to improve gender friendly infrastructure and facilities in the rural areas.

The NGEP Implementation Plan (2020) further identifies actions for statement 5.9, as follows:

i. Assess gender differentiated capacity needs and develop a gender responsive capacity-building strategy for climate change actions;
ii. Develop capacity of Gender Focal Points (GFPs, GEGs, MRGs, C4 and LGs) on mainstreaming gender and NDC targets into sectoral policies, plans, programmes and projects;
iii. Conduct a gender assessment of selected NDC sectors;
iv. Develop gender mainstreaming toolkit for selected NDC sectors; and

v. Prepare local adaptation plans including support needs, based on complete gender analysis that take into account the needs of rural women.

The National Plan of Action for Gender Equality or the NPAGE (2019-2023) outlines strategies to promote gender equality in the political, public, social and economic domains. It seeks to address gender issues across 10 critical areas and for each of these areas, the progress, gaps and challenges, as well as result- based actions are identified. Critical Area 10 of the NPAGE is 'Environment and Climate Change'. The action plan recognizes the gender dimensions of environment and climate change; acknowledges that the extensive environmental legal framework and strategies in place are not adequately gendered; and that the lack of awareness, resources and appropriate institutional framework are still an issue.

Gender Focal Points (GFPs) and *Gender and Child Focal Points (GCFPs)* have been instituted in the Ministries, Dzongkhags, CSOs and private sector with gender mainstreaming as coordinating entities and drivers for gender mainstreaming. The GFP plays very diverse roles, such as awareness-raising and sensitization on gender issues and initiatives to create gender friendly and enabling workplace. The GFPs are supported and trained by the NCWC. According to the ADB report, 83 government officials (33 women, 50 men) and 62 private sector representatives (43 women, 19 men) were appointed as GFPs as of 2015, and they were expected to participate in training on gender mainstreaming[30]. Currently, 24 GCFPs are active in 20 Districts and 4 Municipalities (7 females, 17 males), and 32 GFPs at central level (16 females, 16 males); totalling to 56 focal persons in total.[31]

5. Gender Policy of AF and BTFEC

5.1 BTFEC's Gender Equality Strategy Framework

The BTFEC's Gender Equality Strategy Framework defines the process for Gender Analysis in a project to include Gender roles and activities; access and control over resources; legal and political considerations and Social and cultural patterns. The frameworks require BTFEC's projects to be gender-sensitive in project planning, design, implementation, monitoring and post-evaluation.

5.2 Gender Policy of the Adaptation Fund

The Gender Policy of Adaption Fund recognizes that women and girls are often disproportionally affected by climate change as its negative impacts are aggravated by existing gender inequality and systemic and structural patterns of discrimination and social exclusion, which also reduce the effectiveness of sustainable development and poverty alleviation measures. The policy aims to address existing gender-based inequalities and close existing gender gaps; provide women and men with an equal opportunity to participate in, contribute to and benefit from Fund-supported activities to adapt to climate change impacts and interlinked challenges; address and mitigate against assessed potential project risks for women and men, girls and boys in relation to concrete adaptation actions financed by the Fund; contribute to addressing the knowledge and data gaps on

[30] Survey of Country Gender Profile (Kingdom of Bhutan), JICA, 2017

[31] RGoB, National Commission for Women & Children, Gender & Climate Change in Bhutan with a focus on Nationally Determined Contribution Priority Areas: Agriculture, Energy and Waste, 2020

gender-related vulnerabilities and to accelerate learning about effective gender-equal adaptation measures and strategies; meaningfully integrate the experiences, capabilities by following a gender-responsive, participatory, inclusive and fully transparent approach to stakeholder engagement for effective adaptation measures.
The policy's key guiding principles include

- *Commitment* to uphold women's human rights and to contribute to gender equality and the empowerment of women and girls strive to devote the necessary resources, capacities, technical support to implement the gender policy effectively.
- *Comprehensiveness in scope and coverage* which requires application of the policy to all its adaptation activities, operational processes through project -specific gender assessment and Gender Action Plan;
- *Accountability* through integration of quantitative and qualitative gender monitoring for project impacts and gender-disaggregated data collection
- *Competencies* through consideration of relevant gender expertise to enhance capacity to understand and implement the Fund's gender policy
- *Resource Allocation* requiring all projects and programmes to allocate and budget adequate resources for the implementation of gender integration efforts
- *Knowledge management and communications* requiring documentation and sharing of experiences and knowledge gained through implementation of gender-responsive adaptation actions

6. Overall Gender Equality Situation in Bhutan

The literacy rate for women, which stands at 63.9 percent, is lower than that for men, which is 78.1 percent in urban areas (PHCB 2017). This translates into lower levels of female participation in formal employment and high public office. The document outlines that majority of the population are still directly dependent on agriculture and as more men tend to out-migrate from rural to urban areas seeking employment and work for wages, women are mostly required to work in the field to support the children and elderly in the rural areas. Hence women are most vulnerable to the impacts of climate change and have limited capacity and resources to adapt as many settlements in the country faces acute shortages of water for drinking and irrigation exacerbated by changing monsoon patterns and decreasing snow cover.

Bhutan's Human Development Index (HDI) value increased from 0.572 to 0.607, between 2010 and 2015, which was an increase of 0.6%[1]. The HDI value of 0.607, placed the country under the medium human development category, positioning it at 132 out of 188 countries and territories[2] However, with respect to Gender Inequality Index (GII), Bhutan's stood at 0.477 ranking it 110th out of 159 countries in 2015. The GII reflects gender-based inequalities in three dimensions: reproductive health, empowerment and economic activity[3]. Women hold only 8.3 % of parliamentary seats, 5.8% of adult women have at least a secondary level of education compared to 13.4% of their male counterparts. For every 100,000 live births, 148 women die from pregnancy

[1] *UNDP 2016,Briefing Note Bhutan Human Development Report*
[2] *Ibid*
[3] *Ibid*

related causes and the adolescent birth rate is 21.4 births per 1000 women of ages 15-19. Female participation in the labour market is 58.7% compared to 78.3% for men[4]

The National Gender Equality Policy, 2019 recognizes that gender differences are visible in climate change vulnerability, participation in climate change decision-making and action, and diverse levels of benefit-sharing. As male out-migration increases, the responsibilities and roles of women become more difficult and working conditions deteriorate. The policy also recognizes that women in Bhutan perform 71 percent of unpaid household and care work. Because of all their roles and responsibilities, rural women are more vulnerable to the effects of climate change, and they are more affected than men when climate- induced disasters hit.

The 2015 Labour Force survey reported that there were 159,919 women labor contributors compared with 184,574 men with the labor force participation rate of 71.2 percent for males and 55.9 percent for females. The quality of jobs held by women tends to be inferior to that of men, as women work in low-paying sectors such as agriculture and forestry, which accounts for 30.5 percent of female work-force. NCWC's Bhutan Gender Policy Note 2013 states that a number of analyses consider household and community factors affecting girl's participation and performance, including housework responsibilities and incidence of early pregnancies. Although women account for 35.3 percent of the total civil service, only 10 percent (25 women to 228 men) hold executive and specialist positions.

6.1 Employment by gender

Agriculture sector employs the majority of Bhutanese population (58 percent). Over 30 percent of those engaged in agriculture are women (See Table 3).

Table 3. Percentage share of employed persons by major activity and gender, 2018

Major Economic Activity	**Male**	**Female**	**Total**
Agriculture and Forestry	27.5	30.5	58.0
Mining and quarrying	0.5	0.1	0.5
Manufacturing	2.8	3.7	6.5
Electricity, Gas and Water Supply	0.6	0.2	0.8
Construction	1.5	0.3	1.8
Whole Sale and Retail Trade	3.2	4.6	7.8
Hotels and Restaurants	1.1	1.2	2.3
Transport, Finance and Communications	3.3	0.3	3.7
Financial Intermediation	0.5	0.2	0.7
Real Estate, Renting and Business Activities	0.7	0.3	0.9
Public Administration and Defense Activities	7.4	1.8	9.2
Education	1.7	1.6	3.3
Health and Social Work	2.9	1.9	4.0
Private Households and Employed Persons	0.0	0.5	0.6
Total	**53.6**	**46.6**	**100.0**

Source: MoLHR, Labour Force Survey, 2018

[4] *Ibid*

6.2 Representation of women in the civil service

Although women account for 35.3 percent of the total civil service, only 10 percent (12 out of 128) of the positions in executive and specialist category are held by women (See Table 4).

Table 4: Civil Servants by Ministries, Position and Gender

Ministries	Ex & ES		P & M		S & S		OS	
	M	W	M	W	M	W	M	W
Ministry of Agriculture and Forest	39	4	439	104	1542	469	261	10
Ministry of Health	11	1	248	129	419	365	95	29
Ministry of Finance	9	1	212	136	365	150	53	22
Ministry of works and human settlement	9	0	167	39	228	124	103	9
Ministry of Home and Cultural Affairs	9	1	110	39	238	147	49	11
Ministry of Information and Communications	6	0	101	49	207	75	50	4
Ministry of Economic Affairs	12	0	141	62	134	90	49	2
Ministry of Labour and human Resources	7	1	107	48	118	74	31	4
Ministry of Education	4	2	90	42	26	45	23	5
Ministry of Foreign Affairs	10	2	75	29	23	26	34	5
Total	**116**	**12**	**1690**	**677**	**3300**	**1565**	**748**	**101**
Proportion of women	**10%**		**26%**		**32%**		**11%**	

Source: Annual report, 2019, RCSC. Ex = Executive, ES = Executive Specialist, P&M = Professional & Management category, S&S = Supervisory and Support Category, OS = Operational category; W = Women; M = Men)

6.3 Representation of women in political decision-making bodies

Bhutan has given due importance to increasing women's participation in development activities, elected offices and decision-making positions. Key legal and policy frameworks have been adopted to ensure women's full and equal participation in the political, civil, economic, social, and cultural life. The National Plan of Action for Gender (NPAG), which was implemented in the 10th Five-Year Plan, reinforced the promotion of women's participation in politics, and identified interventions and targets for enhancing women's participation in politics. The 12th Five-Year Plan, which was launched in 2018, has "Gender Equality and Women and Girls Empowered" as a National Key Result Area with key performance indicators and targets that will measure women's representation in Parliament and local government. Women's rights to equal political and public participation, and the broader principle of gender equality, form a critical component in several declarations, conventions and other international norms.

The first national conference for women, held in 2014, stated that in the 2016 local government elections and 2018 parliamentary elections, the number of elected women should be increased by reserving 20 to 50 seats for women parliamentarians. Reserving seat for women were not taken well by many men and women and hence the government is now focused on education, creating awareness, and conducive capacity building for women to contest in elections. Although the proportion of women representation in political sphere has seen some increase since 2008, the proportion of representation are much lesser than actual proportion of women in the. Population.

Table 5: Women's representation in the National Assembly and National Council, 2008-2018

Year	2008			2013			2018		
	Total	No. of Women	Women (%age)	Total	No of Women	Women (%age)	Total	No of Women	Women (%age)
National Assembly (elected)	47	4	8.5	47	4	8.5	47	7	14.9
National Council (elected)	20	4	20	20	0	0	20	2	10
National Council (appointed)	5	2	40	5	2	40	5	2	40
National Council (Total)	25	6	24	25	2	8	25	4	16
Parliament (Total)	72	10	13.8	72	6	8.3	72	11	15.3

Source: Statistics from Election Commission of Bhutan, 2018

6.4 Women in the Judiciary

While women's representation in the judiciary has increased over the years, the ratio of women to men judges decreases at higher levels in the system. At the initial stages of the judicial career the gender gap is narrower with 47 percent of women registrars. However, the gaps become wider at the higher positions with women consisting of only 25 percent of *Drangpon Rabjams (Asst. Judge)* and 22 percent of *Drangpons (Judge)*.

Table 6: Proportion of Men and Women Drangpons

Post	Men	Women	Total
Supreme Court Justices including the Chief Justice of Bhutan	4	1	5
High Court Including the Chief Justice of High Court	7	0	7
Registrar General	1	0	1
Dzongkhag Drangpons (District Judge)	21	6	27
Dungkhag Rabjams (Sub district Asst. Judge)	17	0	17
Drangpon Rabjams (Asst. Judge)	6	2	8
Court Registrars	9	8	17
National Judicial Commission	3	1	4

Source: Royal Court of Justice, 2019

6.5 Access to education

Monastic education, which was imparted solely to male population pre-1950s, provided an undue advantage to males in religious and politico-social areas.

With modern education system gaining its foothold in Bhutan, increasing number of girls have had access to education despite several impediments like girl child having to stay back at home to look after younger siblings, take care of the house, domestic animals and old and sick. Furthermore, parents preferred male child leaving the house to go for higher education and matrilineal inheritance pattern obliged property holder to stay back and take care of the inheritance which generally were women. However, over the last few decades, enrollment levels have increased significantly for girl child with virtually equal participation by girls and boys.

Table 7: Growth in School Education Enrolment (2008-2020)

Year	Female	Male	Total
2008	77585	79527	157112
2009	81468	82794	164262
2010	84962	85443	170405
2011	86873	87074	173947
2012	89428	88931	178359
2013	86482	85909	172391
2014	86641	85752	172393
2015	86331	85071	171402
2016	85580	83980	169560
2017	84803	83289	168062
2018	84643	82465	167108
2019	84738	82048	166786
2020	87051	83755	170806

(Source: Annual Education Statistics 2020)

The school enrolment data show that the female students comprised of 49 percent in 2008 (77585 females out of 157,112 students). This has improved to 51 percent in 2020 (87,051 of 170,806 om 2020. Table 8 show that enrolment o females students in higher education relate to Science, Technology, Engineering and Mathematics (STEM) has improved from 31 percent in 2015 to 41 percent in 2020.

Table 8: Student enrolment trend in the Higher Education (STEM subjects) in Bhutan

	2020		2019		2018		2017		2016		2015	
Institute	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**
College of Science &Technology	277	717	272	666	272	788	204	317	285	662	222	566
College of Natural Resources	547	422	558	433	320	347	639	681	204	317	149	389
Gyalpozing College of IT	112	143	122	142	40	39	40	41	0	0	0	0
Jigme Namgyal Engineering College	206	488	223	498	290	599	261	565	261	565	180	557
Faculty of Nursing & Public Health	236	250	245	224	228	201	186	151	186	151	213	209
Faculty of Traditional Medicine	34	45	38	53	35	54	36	47	36	47	24	40
Faculty of PG Medicine	21	28	14	22	9	21	0	0	0	0	0	0
Reldri Academy of Health Sciences	0	0	26	6	35	17	36	17	36	17	0	0
Sub-total	**1433**	**2093**	**1498**	**2044**	**1229**	**2066**	**1402**	**1819**	**1008**	**1759**	**788**	**1761**

Source: (*State of Higher Education of Bhutan, 2020)*

7. Gender Assessment in project area

The legal and political considerations and Social and cultural patterns are captured through secondary data sources. The project preparation process carried out a participatory gender

assessment in the project areas to assess Gender roles and activities; access and control over resources.

7.1 Stakeholder consultations and participatory assessment

Project specific stakeholder consultation meetings were organized in April, 2021 in all the three Dzongkhags – Paro, Tsirang and Dagana. Participants comprised of relevant Dzongdas (Governors), Dzongrabs (Deputy Governors), Planning Officers, Dzongkhag Environment Officers, Dzongkhag Engineers, Gender Focal persons of the three districts, Dzongkhag Agriculture Officers, Territorial Forestry officials, local government representatives, representatives of the rural and urban communities comprising of men and women and officials from the BTFEC. Consultations focused the background of the proposed project, project components and activities, BTFEC and AF standards, discussion on water governance and institutes, water source and watershed management, installation of climate resilient water infrastructure and management, enhancement and efficient sustainable supply and distribution as well as utilization of water and gender roles in project activities. The consultations identified opportunities and challenges of mainstreaming gender into project activities. These consultations were held in the following locations as follows (See Table 9). The check list of participatory data collection and discussions on gender roles is presented in Annex 1 and the list of participants in these consultations is presented in Annex 3.

In June, 2022 local stakeholder consultations were further held in project gewogs to include actual beneficiary communities and stakeholders. In these consultations, issues related to the project activities, gender and social and environmental risks specific to project activities were identified and mitigation measures discussed. These consultations enabled identification of gender issues that need project interventions were identified. These interventions form main components of gender action plan.

Table 9: Location of stakeholder consultations and participating Gewogs

Dzongkhag	Gewogs	Location of consultations, dates and Remarks
Dagana	12 Gewogs of Dorona, Drujeygang, Gesarling, Gozhi, Kana, Khebisa, Largyab, Nichula, Tashiding, Tseza, Tshangkha, Tshendagang, Karmaling and Lhamoizingkha	*Location and date*; Dagana Dzongkhag for Kana and Tsesa gewogs from 14-15 April, 2021 Gozhi Gewog cente for other 10 gewogs on 16th April, 2021
	Drujeygang	*Location and date:* Aibumthang chiwog on. 9th June, 2022 *Participants:* Community leaders; Dzongkhag officials; Communities; Stakeholder agencies
	Lajab	*Location and date*; Thasa Chiwog on 10th June, 2022 *Participants:* Community leaders; Dzongkhag officials; Communities; Stakeholder agencies

	Tsangkha	*Location and date*; Tsangkha gewog center on 11th June 2022 *Participants:* Community leaders; Dzongkhag officials; Communities; Stakeholder agencies
Paro	Dhopshari, Dokar, Lamgong, Naja and Shaba	Location; Dopshari from 20th to 21st April, 2021
	Doteng, Dopshari, Lamgong and Tsento gewogs	*Location and date*; *Dopshari Gewog Center on* 30th May, 2022 *Participants:* Community leaders, Dzongkhag officials and Stakeholder agencies
	Dopshari, Lungnyi and Wangchang and Dopshari	*Location;* Dopshari Gewog Center 31st May, 2022 *Participants:* Community leaders, Dzongkhag officials; Communities; Stakeholder agencies
	Dopshari and Doteng	*Location;* Dopshari Gewog Center on 1st June, 2022 *Participants:* Community leaders, Dzongkhag officials; Communities; Stakeholder agencies
	Doteng	*Location;* Doteng Gewog Center on 1st June, 2022 *Participants:* Community leaders, Dzongkhag officials; Communities; Stakeholder agencies
	Lamgong	*Location;* Lamgong Gewog Center on 2nd June, 2022 *Participants:* Community leaders, Dzongkhag officials; Communities; Stakeholder agencies
	Tsento	*Location;* Tsento gewog center, Jitshiphu on 2nd June, 2022 *Participants:* Dzongkhag officials; Communities; Stakeholder agencies
	Lungnyi	*Location;* Community center of Lungnyi on 3rd June, 2022 *Participants:* Community leaders; Dzongkhag officials; Communities; Stakeholder agencies

	Wangchang	*Location;* Wangchang Gewog Center on 3rd June, 2022 *Participants:* Community leaders; Dzongkhag officials; Communities; Stakeholder agencies from local and central level
	Shapa	*Location;* Shapa Gewog Center on 3rd June, 2022 *Participants:* Community leaders; Dzongkhag officials; Communities; Stakeholder agencies from local and central level
Tsirang	Triangtoe, Phuentenchhu and Semjong	*Location;* Tsirang toe Gewog center for Tsirangtoe on 9th June, 2021 Phuentenchhu Gewog center for Phuentenchhu and Semjong Gewogs on 11th June, 2021 Tsirang Dzongkhag was not included in the project concept note. It has been added upon recommendations by the GNHC and upon acceptance by the Adaptation Fund in May, 2021. Out of the 12 gewogs the Dzongkhag prioritized inclusion of these three gewogs in the project. Component 2 of the project will focus on drinking water supplies in Tsirang
	Public Consultation at Phuentenchu Gewog Center, Tsirang Dzongkhag	*Location;* Phuentenchu Gewog Center, on 7th June 2022 *Participants:* Community leaders; Dzongkhag officials; Communities; Stakeholder agencies from local and central level
	Tsirangtoe	*Location;* Tsirangtoe Gewog Center on 7th June 2022 *Participants:* Community leaders; Dzongkhag officials; Communities; Stakeholder agencies from local and central level

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. Women's empowerment is vital to sustainable development and the realization of human rights for all"[5] During these consultations, Focus Group Discussions (FGD) were held with and among different groups of stakeholders 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.

7.2 Demography by Gender

The proportion of male and female population in the project areas is 53 percent and 47 percent respectively as compared to 51 percent and 48 percent at the national level (See Table 10). The proportion of female population in the project area is slightly lesser than the proportion at the national level.

Table 10: Population in the project area

Sl. No	Dzongkhag	Gewog	Population		
			Male	**Female**	**Total**
1	Dagana	Drujeygang	1,748	1,804	3,552
2		Lajab	454	389	843
3		Tshangkha	863	844	1,707
4	Paro	Dhopshari	1,590	1,590	3,180
5		Lungnyi	2,015	2,030	4,045
6		Lamgong	1,710	1,626	3,336
7		Doteng	602	547	1,149
8		Tsento	3,171	2,082	5,253
9		Shaba	3,258	2,683	5,941
10		Wangchang	1,666	1,645	3,311
11	Tsirang	Semjong	721	608	1,329
12		Tsirangtoe	778	692	1,470
13		Phuentenchhu	673	675	1,348
Total project area population			19,249	17,215	36,464
% of Male & Female population (Project area)			53	47	

Source; PHCB, 2017

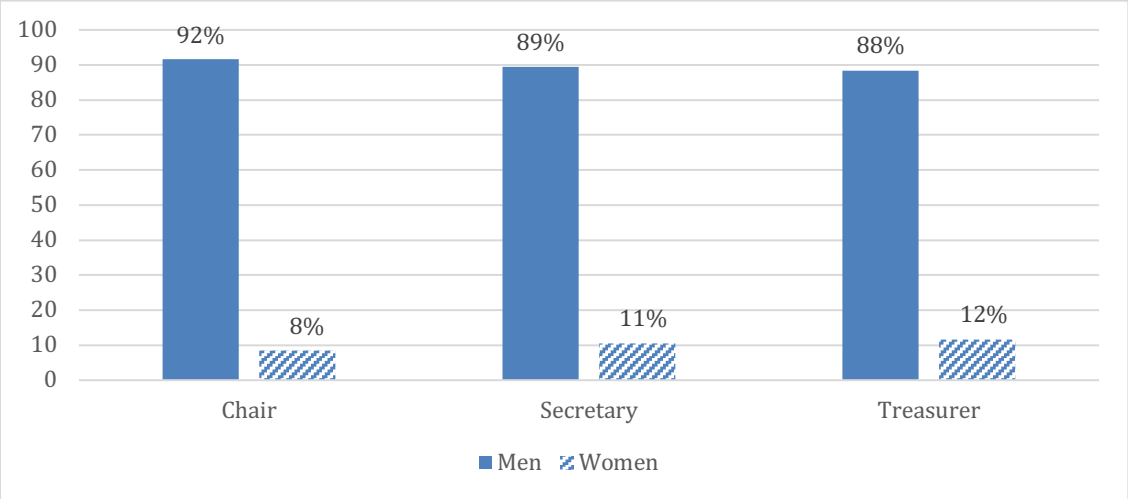
[5] *Ampumuza, C. et al., 2008, Women Empowerment through tourism, Wageningen University, The Netherlands*

The participatory assessment of gender situation revealed the following;

7.3 Participation in water governance

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 (See Figure 1).

Figure 1: Proportion of women representation in the executive committee of Water Users Association



Source, Field Data collected during stakeholder consultations, June, 2021

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. The project should support formal registration of all WUAs as per the Water Regulations of Bhutan, 2014 and ensure with the following information;

- Name and address of the WUA;
- Names of the Chairperson and office bearers (and gender)
- List of users with irrigable land holdings and household members of each user;
- Length and flow volume of the water facility;
- The date of construction and the last maintenance done on the water facility;
- Name and location of the irrigation or drinking water source;
- Whether the Association is for drinking water, irrigation or both; and
- List of other commercial users, if any.

The project should aim to raise the representation in officer bearers of WUAs by women from 11% to 30% by end of the project period.

As per the Bhutan Water Regulations, the WUAs are expected carry out functions related to Protection and conservation of its water source; equitable and fair access to water supply; hear and decide on disputes between or amongst its members relating to water and infrastructure use;

Maintain records its members, mechanism for distribution of water, of minutes of its meetings and decisions, books of accounts on the money received and disbursements; made by the Association; Adopt measures for the efficient use of water and determine and adopt water user fees that commensurate with the services; Appoint water guard and coordinate with other Gewogs of authorities.

RWSS Policy, 2014 recognizing that equal opportunities for participation and benefits to the poor, marginal and vulnerable groups are essential for reducing disparities in services and ensuring maximum benefits and impact of facilities, these groups will be identified during the planning of schemes and efforts made to ensure that these groups have access to and benefit from improved water supply and sanitation facilities.

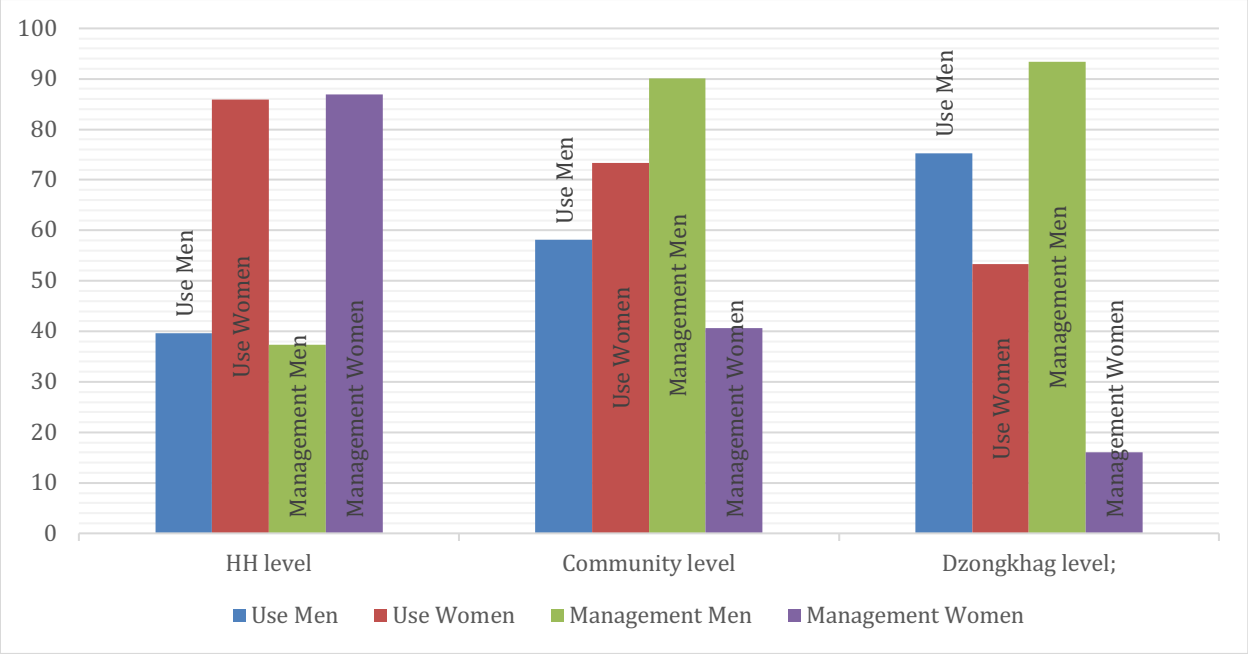
During participatory assessment of gender roles and capacities, the stakeholders identified the need to enable higher level of participation by women in governance and management institutions. Hence, it is proposed that the project should support enabling formal registration of all WUAs in the project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

7.4 Water use and management

During the participatory assessment of gender roles in the project areas, participants viewed that usage and management of water largely handled by women at the household level and by men at the Dzongkhag level (See Figure 2 & Table 11). However, at the community level, water usage is mostly handled by women while management is handled largely by men which indicates a disconnect between water users and water managers. This indicates the need for engaging more women in water management roles at the community level. It also indicates that 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.

Figure 2: Proportion of roles in water use and management at different levels



Source, Field Data collected during stakeholder consultations, June, 2021

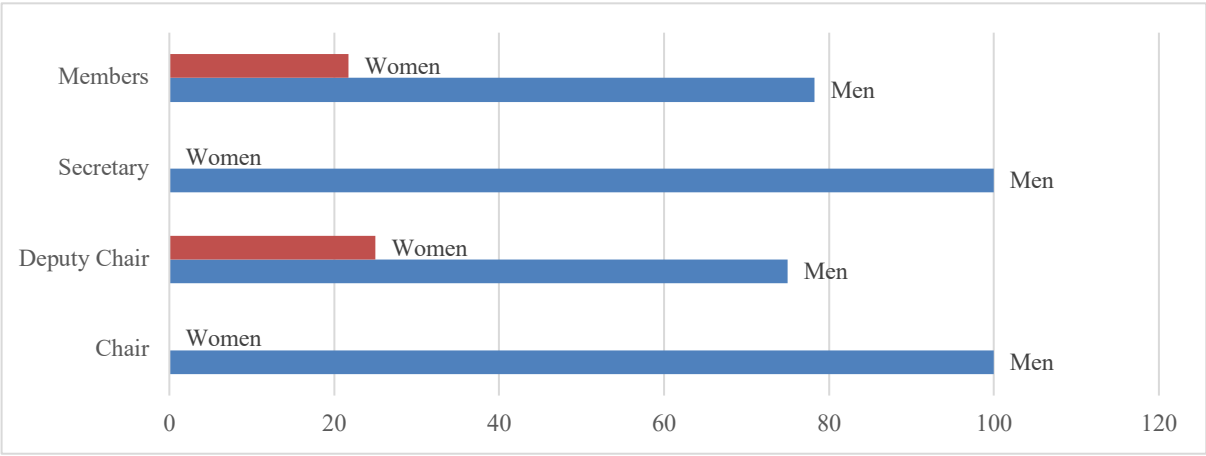
Table 11: Water usage and management at different levels

Levels	**Use**		**Management**	
	Men	Women	Men	Women
Household level	40	86	37	87
Community level	58	73	90	41
Dzongkhag level	75	53	93	16

Source, Field Data collected during stakeholder consultations, June, 2021

Within the project Dzongkhags the Dzongkhag level, 100 percent of Dzongkhag Tshogdu (DT) chairperson; 75 percent of Deputy Chairperson, 100 percent if DTY Secretary and 78 percent of members are men (See Figure 3).

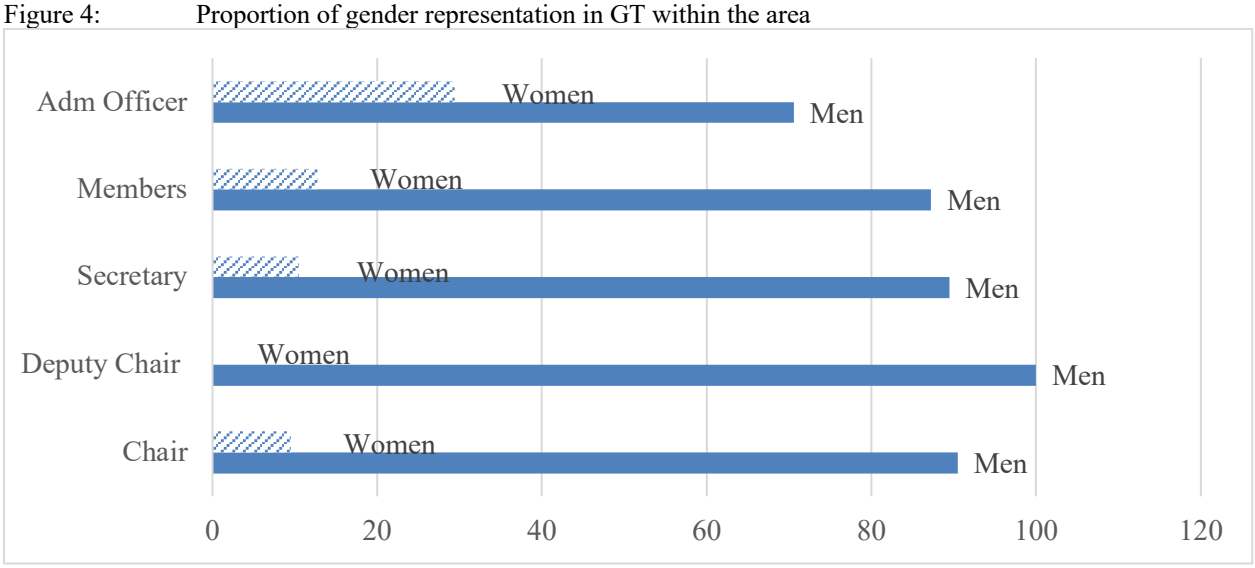
Figure 3: Proportion of gender representation at the DT in the project area



Source, Field Data collected during stakeholder consultations, June, 2021

The situation is still skewed towards men at the Gewog level within the Gewog Tshogde (GT). The representation of women in the GT is 29 percent as compared to 22 percent at the DT level.

Figure 4: Proportion of gender representation in GT within the area



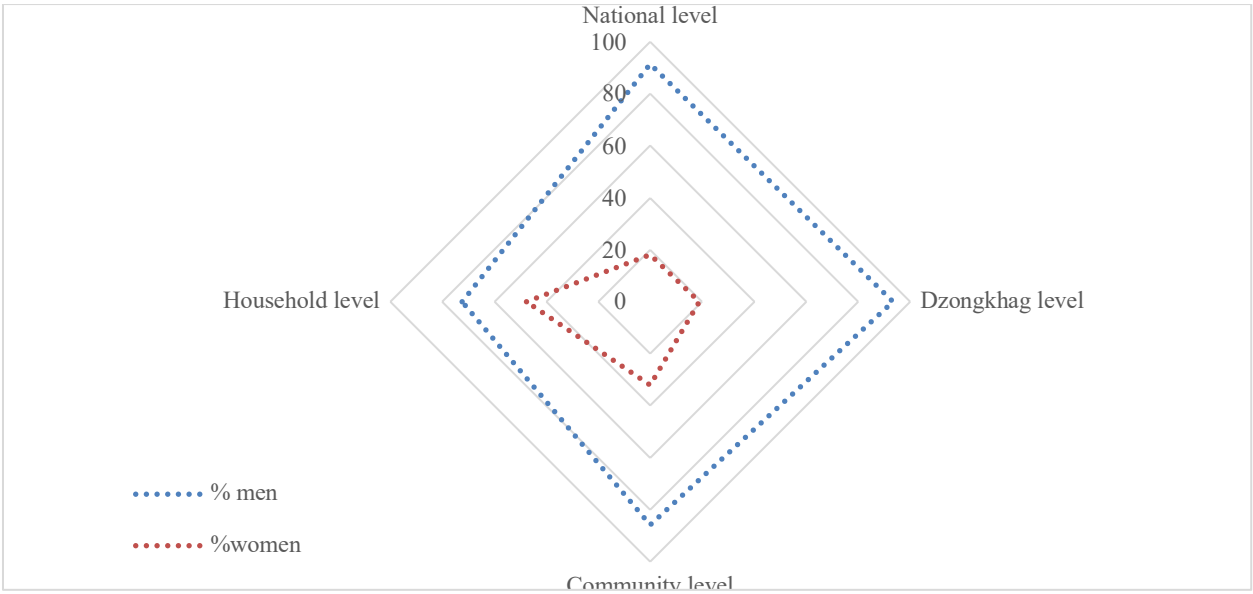
Source, Field Data collected during stakeholder consultations, June, 2021

The study showed that there is an urgent need to empower and build the leadership of female farmers, and to enhance their communication skills—so as to strengthen their voice and decision-making abilities in (local) governance and farming decisions, including those related to CSA/CRA.

7.5: Gender roles in water related activities

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.

Figure 5: Role in maintenance of water infrastructure



Source, Field Data collected during stakeholder consultations, June, 2021

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 (See Table 12). 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.

Table 12: Gender roles identified by participants in use of water at local level

	Gender roles	
Use of water/Gender	% men	%women
Use of water for cooking	13	95
Use of water for cleaning	15	97
Use of water for livestock	58	67
Use of water for gardening	23	86
Use of water for field irrigation	85	45
Participation in meetings related to water at Dzongkhag level	92	31
maintenance of water infrastructure at catchment level	61	5
- at catchment level	72	2
- at field water distribution lines	56	3
- at Household water connections	42	12
- at main water conveyance lines	74	4
Engaged the most in water related conflicts	42	18
Engaged the most in conflict management/resolution	61	5

Engaged the most in Implementation of water related projects and activities in the village	48	4
Engaged the most in Trainings on water resources	42	10
Engaged the most in WUA meetings	22	22

Source; Field Data collected during stakeholder consultations, June, 2021 and June, 2022

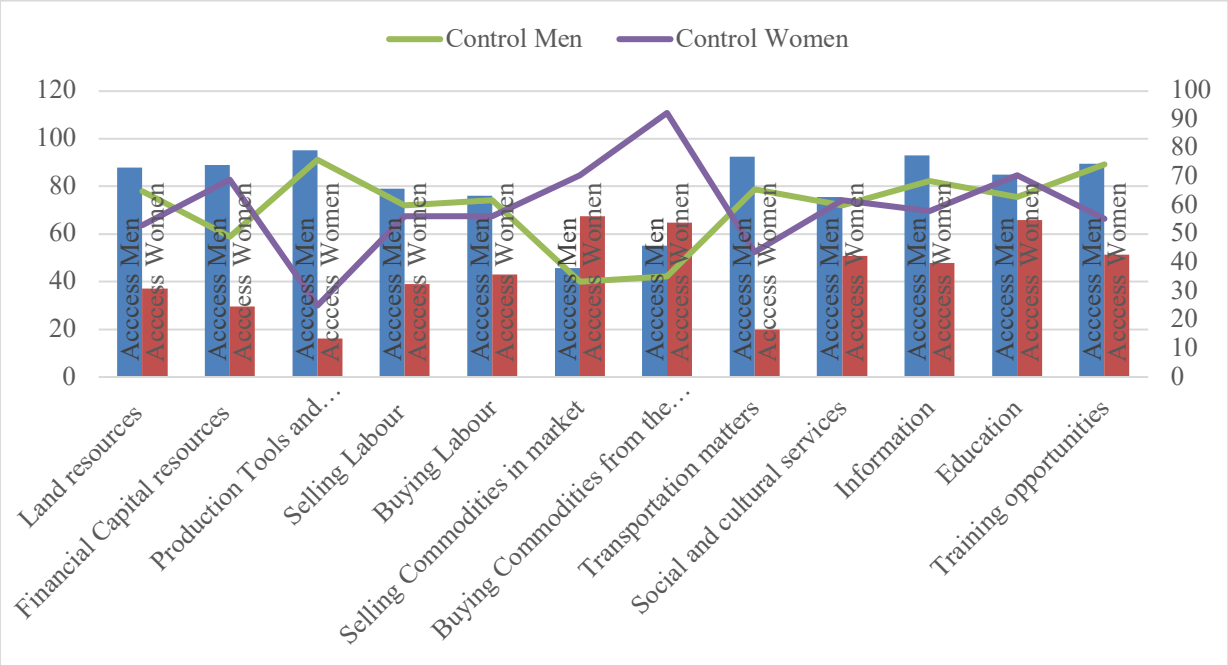
Women lack influence within existing water governance and management institutions, limiting their ability to change the redistribution of power and affect decisions. Training and capacity building would be required for women to engage in public decision making.

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

7.6 Access control over resources

Figure 6: Access and control over resource by gender



Source, Field Data collected during stakeholder consultations, June, 2021

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.

Access to information and training with respect to technology improvements defines who has access to water supplies. Where women have not been trained in the appropriate use of new technologies introduced to improve irrigation systems, they may not only fail to benefit from the improved availability of water. Moreover, if the water supply breaks down and cannot be re-instated quickly due to dependence on men, they may have to shoulder the additional burden of carrying water for uses such as cleaning, cooking, sanitation.

In general proportion of rural women holding land registration titles are higher than men. However, 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 (See Figure 6). 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 agriculture[6]. The PPG stakeholder consultations in the project areas also observe that men have better access and control over information, tools and training (See figure 6). 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.

7.7 Seasonal farming activities

Overall, men and women bear equal responsibilities in agriculture and households work within the farming population. Major works taken up mostly men include ploughing, construction & maintenance works and income earning non-farm contract works. Major works dominated by women include land preparation, farm yard manure and leaf litter collection. Other than these, most of the seasonal agriculture activities are carried out by both men and women (See Table 13). Peak season for agriculture activities happen during Spring, summer and autumn seasons. Among the farming communities, winter season is in the period with minimal farming activities whereby

[6] Gender and Climate Change in Bhutan, CNWC, 2020

communities are mostly engaged in either orange harvesting in warmer areas or are engaged in winter crops and vegetable cultivation. For most farmers, winter is characterized by lighter and more festive occasions such as rituals, pilgrimage and marriage ceremonies where men and women participate.

Table 13: Seasonal farming activities by gender roles

Seasonal activities	Seasons	Men (%)	Women (%)	Both (%)
Ploughing	Spring, Summer, winter	90	1	9
Construction & maintenance works	Winter	95	5	0
Contract work	Winter	67	0	33
Field clearing and weeding	Spring	12	37	51
Firewood collection	Winter, Autumn	29	7	63
Food processing/drying	Autumn	0	42	58
Plantation of potatoes, chili, fruit and fodder trees, vegetables, maize	Spring	14	24	62
Gardening	Spring, Summer, Autumn, winter	6	44	50
Guarding against wildlife depredation	Autumn	0	0	100
Harvesting paddy, cardamom, apple, pulses, maize, millet, vegetables	Autumn	7	6	88
Harvesting vegetable, maize, potatoes	Summer	0	3	97
Land and soil development	Spring	34	16	50
Land preparation, FYM, litter collection	Winter	11	58	32
Marketing of farm produce	Autumn	19	32	49
Orange harvesting	Winter	47	0	53
Orchard Management	Spring	38	0	62
Rituals/pilgrimage/Marriage	Winter	5	5	90
Sale of potatoes, chilies, maize	Summer	0	40	60
Sowing of paddy, vegetables, chilies, pulses, cardamom, millet	Summer	4	17	79
Weeding	Spring, Summer, Autumn	7	44	50
Winter crops and vegetable cultivation	Winter	14	8	78
All activities		20	18	62

Source; Field Data collected during stakeholder consultations, June, 2022

8. Recommendations and Action Plan

8.1 General Recommendations

1. **Enhance participation by women in project activities, particularly in training and capacity development activities:** Support establishment of formal (registered) WUAs through capacity building and enabling formal registration of WUAs. Ensure 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 at two levels;
    - **Governance and management covering topics on** 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; Water source protection; 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.

2. **Formal registration of all WUAs** in the project areas with enhance participation by women.

3. **Facilitate women and men's equal participation in and access to benefits from 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.

4. **Plan project activities such as trainings and consultations involving farming communities in winter season.**

5. **Enhance education, and conduct awareness-raising and advocacy** on adaptation to climate change through climate resilient water management through training sessions and social media.

6. **Grievance redress mechanism in place:** This mechanism must be put in place at the start of the project and approved by the Project Steering Committee 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.

7. **Appointment of a Gender Mainstreaming Specialist:** The project should hire a Gender Mainstreaming specialist who will have the knowledge of the local context and can work closely with the participating communities 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. It will be equally important to empower all team members in the PMU to be able to mainstream gender into their work areas. The project should invest in several technical gender trainings aiming to enable the team to proactively and effectively integrate gender into all workstreams. All standard procedures of the project should be streamlined to review gender aspects throughout the course of the project implementation.

8.2 Specific Recommendation

Gender Assessment findings	Recommendations	Project Activity linkage
Demography 51 percent male and 49 percent female	Participation in and benefits from project activities to be targeted to men and women in equal proportions	By ensuring that membership to farmer groups and associations supported by the project ensure increased participation by women; Access to and benefits from projects capacity building activities, technology dissemination and inputs are targeted towards benefiting women by ensuring that at least 50 percent of beneficiaries are women. Activity 1.1.1 Conduct sensitization and awareness workshops (13 Gewogs to be sensitized) Activity 1.1.2 Training of community members and local officials on implementation of identified watershed management interventions Activity 1.1.5 Implementation of identified intervention measures Activity 1.2.1 Conduct community consultations and sensitizations Activity 1.2.4 PES scheme development and implementation based on the feasibility Activity 2.1.1. Construction and Rehabilitation of at least 3 Drinking Water Supply Schemes Activity 2.2.1. Construction of pressurized/closed irrigation systems (gravity)
Over 30 percent of population engaged in agriculture are women	Field-based and specialized training to farmers that include at least 50 percent of women beneficiaries.	Activity 3.1.1: Participatory SLM action planning and sensitization to validate key SLM interventions 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

Gender Assessment findings	Recommendations	Project Activity linkage
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.	The project should support formal registration of all WUAs as per the Water Regulations of Bhutan, 2014;	Activity 2.4.1 Form and strengthen water user associations and groups in the communities at scheme level to promote local ownership and sustainability of schemes
Usage and management of water largely handled by women at the household level. At the community level, water usage is mostly handled by women while management is handled largely by men. There is a disconnect between water users and water managers. Overall women representation comprises of only 11 percent of the office bearers (executives) for WUAs in the project area. 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. There is a need for engaging more women (end users) in water management and decision making roles at the community and dzongkhag levels (dominated by men)	Project should aim to raise the representation in officer bearers of WUAs by women from 11% to 30% by end of the project period.	Activity 2.4.1 Form and strengthen water user associations and groups in the communities at scheme level to promote local ownership and sustainability of schemes
While men play a greater role in maintenance of water related infrastructure, women also take up significant roles in maintenance of infrastructure at community and household levels. There is 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. Women have limited access to technical maintenance and management of water infrastructure and remain to face the brunt of water shortages when minor maintenance is needed. Access to information and training with respect to technology improvements defines who has access to water supplies. Where women have not been trained in the appropriate use of new technologies introduced to improve irrigation systems, they may not only fail to benefit from the improved availability of water. Moreover, if	Training on water infrastructure, use of tools and technologies and efficient use of water with 50% women participants	No specific activity in the project. \ Activity 3.2.2 Incorporation of area specific weather and crop data in ADSS Activity 3.2.5 Sensitization, awareness and capacity development on agro-met services to researchers, extension and farmers

Gender Assessment findings	Recommendations	Project Activity linkage
the water supply breaks down and cannot be re-instated quickly due to dependence on men, they may have to shoulder the additional burden of carrying water for uses such as cleaning, cooking, sanitation		
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 (See Figure 6). Therefore, there is a need to enhance this capacity by including women in trainings related book keeping.	Trainings related book keeping targeted to women	Activity 4.1.1. Conduct capacity development training for LGs on CCA investment and mainstreaming tools, frameworks and approaches related to irrigation, water management, SLM, CCA and gender.
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 agriculture 7 . The PPG stakeholder consultations in the project areas also observe that men have better access and control over information, tools and training (See figure 6). 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.	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. At least 50% participation by women in stakeholder consultations and meetings of the project	Activity 4.1.2. Carry out M&E of CCA and gender mainstreaming in LG plans, programs and activities.

9. Impact of project on people

Currently men and women spend significant amount of their time in making water available, both for domestic and irrigation purpose, and its management. With successful implementation of the project, population will be benefited in the following ways:

- Readily available water for domestic as well as irrigation. This will minimize need to clear and clean the water source, repairing pipelines etc., and saving time for agriculture and non-agriculture activities contributing to better income and livelihoods.
- Women can invest more time in their family's welfare and help work in fields and additional time to take care of their children, prioritize their health and hygiene and focus on economic empowerment activities. Improved health and enhanced economy will improve their living standard. This will also help them in engaging in many meaningful activities and significant participation in local discussions empowering women.

[7] Gender and Climate Change in Bhutan, CNWC, 2020

11 Gender Action Plan

No	Gender gaps	Mitigation Measure	Responsibility	When	Key Indicator	Budget (US$)
1	WUAs exist informally, with limited capacity and with very poor representation by women who are majority of end users of water	Establish formal registration of 50 WUAs (at least 6 WUAs)	Dzongkhag engineering section	year 1	100% of households and local institutions are enlisted as members of WUA 30% of office bearers (executives) are women WUA data on available at the Gewog office	Covered under activity 2.4.1
2	Women have limited access to technical maintenance and management of water infrastructure and remain to face the brunt of water shortages when minor maintenance is needed	Training on water infrastructure, use of tools and technologies and efficient use of water (1 Training session at each project site @ 6 * US 3000 per training)	Dzongkhag engineering section	Year 2	50 % of participants are women	Together with activity 2.4.1 18,000
3	Limited awareness on water governance women empowerment in water governance. 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	Training 50 community members on water governance and management at local level including on book-keeping (6 participants from each of the 6 WUAs comprising of 30% women) 1 Training session at each project site @ 6 * US 3000 per training	Dzongkhag engineer, DAO, Dzongkhag Environment Officer, section	year 2	90 women trained in water governance and management 30% of WUAs supported by the project are women	Together with activity 2.4.1 And Activity 4.1.1. 18,000

No	Gender gaps	Mitigation Measure	Responsibility	When	Key Indicator	Budget (US$)
	enhance this capacity by including women in trainings related to book keeping.					
4	Majority of farming population comprise of women.	Field-based and specialized training to farmers on sustainable agriculture practices and SLM technologies, technical assistance to support communities (and Documentation, Knowledge Management (KM) and experience sharing platforms should be targeted towards benefiting women	DAO	Year 1,2,3	At least 50 percent of beneficiaries are women.	Covered under Activity 3.1.1 & Activity 3.1.4
5	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 agriculture [8] . The PPG stakeholder consultations in the project areas also observe that men have better access and control over information, tools and training (See figure 6). The fewer opportunities for women relative to men to obtain skill and	Stakeholder consultations and meetings of the project should make concerted effort in engaging women when creating awareness on impacts of climate change and technologies for improved water management.	Activity lead	Thought the project	At least 50% participation by women	Covered under Activity 4.1.1. and Activity 4.1.2.

[8] Gender and Climate Change in Bhutan, CNWC, 2020

No	Gender gaps	Mitigation Measure	Responsibility	When	Key Indicator	Budget (US$)
	development training limit their participation in and the benefits they may gain from the use of new water technologies.					
6	There is a need to mainstream overall gender concerns in the project activities	Appoint a Gender Specialist to; - Plan ensuring involvement of women in trainings and consultations involving farming communities in winter season. - Enhance education, and conduct awareness-raising and advocacy on adaptation to climate change through climate resilient water management through training sessions and social media. - Enable grievance redress mechanism within the project at the start of the project and approved by the	PMU	6 months Thought the project spread over	Revise GAP GAP implementation monitoring and reporting	35,637
7	Revise the GAP during first 6 months of project implementation (1 consultation with stakeholders @ U$ 3000)					3000
	Total cost of GA in Nu. (Excluding cost activity costs)					**58,437**

12. GAP Compliance Monitoring

The overall responsibility for implementing the GAP and for monitoring the compliance of the project's GAP activities lies with the PMU through coordinating with the Dzongkhag Engineering Section and the Gender Focal Person at each Dzongkhag. The Safeguards and Gender Expert (SGE) at the PMU shall oversee implementation of field activities relating to GAP and coordinate with the project Dzongkhags. He/she will be responsible for overall monitoring of compliance and in reporting on overall GAP implementation to the Project Manager. The GAP compliance monitoring will also include grievances that are reported through the Grievance Redress Mechanism (GRM) and on the status of redressal of grievances reported. The grievance data should be analysed and evaluated to make policy and/or process changes to minimize similar grievances in the future. Record of each grievance that has been reported and its resolution must be recorded and reported in the progress reporting of project activities.

The Terms of Reference and costing for the SGE has been built in the Environmental and Social Safeguards document.

Annex 1: Field data collection format for gender roles

Your Gender Male/Female (tick); Your Gewog; ----------

Activity profile by gender

Question	Level	Men	Women
Who manages water at	National		
	Dzongkhag		
	Community		
	Household		
Who collects water at	National		
	Dzongkhag		
	Community		
	Household		
Who uses water at	National		
	Dzongkhag		
	Community		
	Household		
Who is responsible for maintaining water infrastructure	National		
	Dzongkhag		
	Community		
	Household		
Who pays for water when there is a cost involved?			
Who mostly uses water for	Cooking		
	Cleaning		
	Livestock		
	Gardening		
	Field Irrigation		
Participation in meetings related to water	National level		
	Dzongkhag level		
	Community level		

Access and Control Profile by gender

Resources/Services	Access		Control	
	Men	Women	Men	Women
Land resources				
Financial Capital resources				
Production Tools and machineries resources				
Selling Labour				
Buying Labour				
Selling Commodities in market				
Buying Commodities from the market				
Transportation matters				
Social and cultural services				
Information				
Education				
Training				

What capacity building needs in relation to water resource management

	Level	Capacity needs
Men	Dzongkhag/Geowg	
	Community	
	Household	
Women	Dzongkhag/Gewog	
	Community	
	Household	

Annex 2: Water gender governance data collection format

Water Governance Data of ____Dzongkhag

DT Profile by Gender

Position	Name	Gender (M/F)	Contact no
Thrizin			
Dy. Thrizin			
Secretary			
		Male (Number)	Female (Number)
Other Members			
Member			

GT Profile by gender

Name of Gewog; ----------

Position	**Name**	**Gender (M/F)**	**Contact No**
Thrizin			
Dy. Thrizin			
Secretary			
Admin Officer			
Member data		**Male (Number)**	**Female (Number)**
Tshokpa			

Water User Association's Profile by gender

Gewog Name;----------

Name of WUA	Chair (M/F)	Secretary (M/F)	Treasurer (M/F)	No of male members	No of female members

Annex 3: List of participants at the stakeholder consultations

Consultation on Environment and social safeguards and Gender for project "Adaptation to Climate-Induced Water Stresses through Integrated Landscape Management in Bhutan" at Dagana from 14-15th April, 2021

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature Day 1	Signature Day 2
1	DORJI	ACFO	BTFEC	dorjiebhutantrustfund	17909870		
2	Chuwang Dem	Kana Lung	Kana	Chuwang2@gmail.com	17641374		
3	Kencho Wangdi	Range Officer	Forest	kenwangdi@gmail.com	77214041		
4	Phul Maya Katwal		Kana	–	77322825		
5	Gopal		"		17806254		
6	Chador	–	Kana	–	17830556		
7	Tshering Yangzom	Adm Asst	Health	tyangzom2015ty@gmail.com	17948431		
8	Pasang Wangdi	Thonday Thimi	Dagana	–	16800648		
9	Nima Tshering	–	Dagana Thromde	championtshering@gmail.com	17599068		
10	Nima D Tamang	AT	"	dtama2019@gmail.com	17871023		
11	B.B. Tamang	Forest	Dagana	bbtamang2010@yahoo.com	17688819		

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature Day 1	Signature Day 2
12	Ganesh Kumar Gurung	LPO	DLS	gkgurung@dagana.gov.bt	77203880		
13	N.B. Biswa	Offtg. Gewog Forest	Dagana Drungkhag	nbbiswa@gmail.com	17436266		
14	Ugyen Dorji	DRO	DES	udorji@dagana.gov.bt	17396529		
15	Phuesba	Gup	Dorona	phuesba@dagana.gov.bt	17119161		
16	Gembo	Farmer	"	—	17659275		
17	Choki	"	"	—	17694005		
18	Sonam Jamtsho	AMO/Offtg DAO	DDA	jamtshosonam83@gmail	17567280		
19	Nidup Peljor	Consultant	BTFEC	ceo@bpvbhutan.com	17161656		
20	Thinley Wangdi	BTFEC	"		17311947		
21	Tawang Dorji	DE	Dzongkhag	dorji@dagana.gov.bt	17601361		
22	Dorji Gyeltshen	Driver	BPV	samdeeng89@gmail.com	17491906		

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature	
						Day 1	Day 2
23	Pasang	Driver	BTFEC		77779821	[signature]	
24	Pema Wangmo	AA	BTFEC		17966199	[signature]	
25	Rinchen Dema	AFO	BTFEC		17419048	[signature]	
26	Dubba	Dasho Dzongda	Dagana				

Consultation on Environment and social safeguards and Gender for project "Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan" at Dagapela on 16th April, 2021

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature
1	Namgay Peldon	Gup.	Tashiding Gewog	npeldon@dagana.bt	17150511	[signature]
2	Dhan Bdr. Gurung	Gup, Laja	Lajab Gewog	dbgurung@dagana.gov.bt	17762445	[signature]
3	Tamla	GUP	Tsangkha	tamla@dagana.gov.bt	17832076	[signature]
4	Nidup Dorji	Tshogpa	"	ndorji@gmail.com	17966493	[signature]
5	San Maya Pithakoty	"	"	spithakoty@gmail.com	17868820	[signature]
6	Khamber Singh Tamang (Farmer)		Lajab Gewog	—	77717377	[signature]
7	Tobden Dorji	Tshogpa	Tashiding	—	17792959.	[signature]
8	Ambika Dorji	public	Tashiding	-	17393624	[signature]
9	Phul Maya Gurung	Public	Lajab Geowg		17748182	[signature]
10	Sonam Thinley	Engineer	Dz. Adm. Dagana	sthinley@dagana.gov.bt	17726119	[signature]
11	Namgay Wangchuk	Engineer	Dz. Adm.	nwangchuk@dagana.gov.bt	17479737	[signature]

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature
12	Tashi	Gup	Gesarling	[illegible]	77790098	[signature]
13	Dorji	ACPO	BTFEC	[illegible]	17909620	[signature]
14	Nidup Peljor	Consultant	BTFEC	ceo@bpvbhutan.com	17161656	[signature]
15	Karma Tshering	Gup	D/Sams Dungsam	[illegible]	17758335	[signature]
16	Namgay	〃	Khebisa	[illegible]	17686001	[signature]
17	Jamtsho	Tshogpa	D/Sams	Nang	17419609	[signature]
18	Ngawang	〃	D/Sams		77736840	[signature]
19	Bal Bdr Rai	T/Gogpa	T/gang	[illegible]	17881577	[signature]
20	Suk Raj Rai	Gup	Dorona	srrai@dagana.gov.bt	17573605	[signature]
21	Yeshi	Farmer	Khebisa	—	17792544	[signature]
22	Choden	〃	〃	—	17346728	[signature]

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature
23	Mani Kumar	Farmer	Dorona	—	77262295	[signature]
24	Shum Kumar	farmer (cap)	Rogde		17375067	[signature]
25	Gangi Maya Rai	Unemployed	Dorona	mayaraigangi@gmail.com	77402939	[signature]
26	Sonam Jamtsho	AHO/ Offtg DPO	DDA	jamtshosonam88@gmail	17569280	[signature]
27	B. B. Tamang	Focal person	Dagana	[illegible]	17685619	[signature]
28	N. B. Biswa	Asst. Gardener	Dagana	nblama030@gmail.com	17436268	[signature]
29	Buda Bir Gurung	Farmer	Tsendagang	—	17573328	[signature]
30	Bis Maya Mongar	Farmer	Tsendagang	—	77338618	[signature]
31	Pasang Wangmo Sr	Gup	Gesarling	[illegible]	17500772	[signature]
32	Tshencho Zangmo	Farmer	Gesarling	—	77431727	[signature]
33	Tshering Dorji	〃	〃	—	77831253	[signature]

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature
34	Kinzang Yuddav	Driver	Gozhi		17603358	
35	Rinchen Wangdi	GAD	"	rwangdi@degama.gov.bt	17341654	
36	Jamyang	DE	Dzongkhag	jdorji@dagana.gov.bt	17601361	
37	Shirley Wangdi	IT	BTFEC		17311577	
38	Pema Wangmo	AA	BTFEC		17866199	
39	Pasang		BTFEC			
40	Dorji Gyeltshen	Driver BPV	BPV	Samdeng89@gmail.com	17491956	
41	Pema Dechen	NFEI	Gozhi		77470515	
42	Rinchen Deme	AFO	BTFEC	—	17419048	
43	Jigme Dorji	caretaker	Gozhi	—	17353630	
44	Sonam Rinchen	Driver	Drujegang	—	17501854	

Sl.No	Name of Participant	Designation	Agency	Email ID	Contact Number	Signature
45	Tandin Wangdi	Driver	Gelyong Ling		17808886	
46	Pema Bdr. Sligtha	Driver	Khebisa		17831266	
47	~~Dorbo~~	~~Dasho Dzongda~~	~~Dagana~~			

Environmental, Social and Gender Assessment for Proposed Project to Adaptation Fund on "Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan" in Paro Dzongkhags

Tsherim Resort, Paro, (20 April 2021)

Sl.	Name	Agency	Email	Contact No	Signature
1	Pemba Zangmo	Dop-shari Gewog Administration		17686494	
2	Phub Gyeltshen	"		17641170.	
3	Gem Tshering	Lungnyi Gewog	gemtshering19@gmail.com	17606634	
4	Kuenzang Nima	NBSC	kuenzangnima07@gmail.com	17734671	
5	Nidup	Shaba Gewog		17999832	
6	Choncho Zangmo	Shaba Gewog		17685728	
7	Tshering Chengyen	Druk asia	tsheringchengyen1997@gmail.com	17470083	
8	Yeshi Dorji	Agriculture Dop-Shari	yeshidso5@gmail.com	17493974	
9	Chundu Tshering	Mangmi	chundu.naja@gmail.com	17777363	
10	Peldon	Naja Gewog	—	77208591	
11	Ugyen Dorji	Naja Gewog	—	17859645	
12	Ugyen Tshering	Dogar Gup	ugyentshering27@gmail.com	17608309	
13	Chencho Gyeltshen	Shaba "	ggyeltshen0123@gmail.com	17607281	

	Name	Agency	Email ID	Contact No.	Signature.
14	Rinzi	Dogar Gewog		17521055	
15	Kunga	Dogar Gewog		17607244	
16	Pema Wangchuk	CDCL		17889332	
17	Passang Tshering	Langang	—	17608443	
18	Jamyang Tobgyal	Planning AMCO		77248517	
19	Ngawang Dorji	EO.		17698864	
20	Passang Tshering	Farmer	—		
21	Nidup Pelzo	BTFEC/Consultant	ceo@bpvbhutan.com	17161651	
22	Thinley Wangchi	BTFEC	thinley@bhutantrustfund.bt		
23	Yeshey Pelden	"	yeshey@bhutantrustfund.bt		
24	Singye Dorji	"	singye@bhutantrustfund.bt.		
25	Phuntsho Chaden	"	phuntsho@bhutantrustfund.bt.		
26	Rinchen Wangmo	"	rinchen@bhutantrustfund.bt		
27	Nani K. Shingethan	"	ncuri@bhutantrustfund.bt.		
28	Dasho Dzongrab Kinley Gyeltshe	Paro Dzongkhag			
29	[illegible]	[illegible]			
30	Dasho Dzongrab	Paro Dzongkhag			

Environmental, Social and Gender Assessment for proposed project to Adaptation Fund on "Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan" at Sarpang, 15th June 2021

Sl. No	Name	Designation	Name of Agency	Contact No.	Email Address	Signature
1	Phub Dhendup	CFO	DFO / DoFPS	17936526	pdhendup@moaf.gov.bt	
2	Lachuman Rai	Gup, Singhi	LG	17341040	—	
3	Tshering Delkar	GAO, Sershong	Sershong	17813499	tsheringdelkar@gmail.com	
4	Yonten Dorji	GAO, Chhuzanggang		17689197	ydorji@sarpang.gov.bt	
5	Sangay Tshering	Gup, "	Chhuzanggang	77767697	"	
6	Yeshi Wangmo	Female woman Representative	c/gang			
7	Tshering Tenzin	male Representative	"	17911657		
8	Sangay Dorji	SrGAO	Singye	17976864		
9	Sherab Choden	Tshogpa	"	"		
10	Lhaing	Gup	S/Shong	17887727	lhaingbhaing1@g	
11	Bhoj Raj Rai		Singye	17404474		
12	Suk Dorji Tamang	Chiwog Tshogpa	S/Khg	17756483	sukdorjitamang@gmail.com	

Sl. No	Name	Designation	Name of Agency	Contact No.	Email Address	Signature
13 / 27	Tika Ram Gurung	UAO	S/Kha	17928353	tagurung@gmail.com	
14 / 28	Kiran Rai	Tshogpa	-11-	17879268	—	
15 / 29	Kinley Yangzom		"	17803505	-	
16 / 30	Pema Tshewang	Farmer	Sershong	17727749	—	
17 / 31	Pelden Lhamo	"	"	17511635	—	
18 / 32	Pema Choeda	GFP	Dz. Admin	17445873	pchoeda@sarpang.gov.bt	
19 / 33	Tshering Dorji	DPO	Sarpang	17546464	samten806@gmail.com	
20 / 34	Hidup Peljor	Consultant	BTFEC	—	—	
21 / 35	Sangye Dorji	OiC	"	—	—	
22 / 36	Dorji	ACPO	"	—	—	
23 / 37	Rinchen Wangmo	APSO	"	—	—	
24 / 38	Rinchen Dema	AFO	"	—	—	
25 / 39	Pasang	Messenger	"	—	—	
26 / 40	Chandra	Driver (Singye)				

Sl. No	Name	Designation	Name of Agency	Contact No.	Email Address	Signature
27	Harka Bdr Ghalley	Gewog Driver	Chongarghly Gewog	17753511	—	[illegible]
28	Kinchen Jamtsho	Driver	Churgang Gewog	77775961		[illegible]

Environmental, Social and Gender Assessment for proposed project to Adaptation Fund on "Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan" at Tsirang from 9-11th June, 2021

Sl. no	Name	Designation	Agency/Gewog	Email Address	Contact Number	Signature Day 1	Signature Day 2	Signature Day 3
1	~~Dasho~~ Pema Singye Dorji	~~C.C~~ Dzongdag	~~BTFEC~~ Tsirang	~~singye@bhutantrustfund.bt~~ pema@tsirang.gov.bt	~~17999777~~ 17789818			
2	Nar Bahadur Rai	GAO	Tsirangtoed	nbrai@tsirang.gov	17822577	[illegible]	[illegible]	
3	Dimple Thapa	CFO	Tsirang Division	dthapa@moaf.gov.bt	16901530	[illegible]	[illegible]	
4	Karma Wangmo	Planning Off	Dzongkhag	carmawangmo@tsirang.gov.bt	17508779	[illegible]	[illegible]	[illegible]
5	Tandin Tshering	Khopkha	Tsirangtoe		~~77293377~~	[illegible]		
6	Tek Bahadur Rai	Tshogkpa.	Tsirangtoed.	—	17404289	[illegible]		
7	Tenzin Wangpo	Tshogpa	Tshongsingma	—	17261351. ~~176261~~	[illegible]		
8	Nidup Tenzin	Tshogpa	Soontapsa	—	17965808	[illegible]		
9	Tshering Tenzin	Sr ES III	Agriculture	tsheringten@gmail.com	17625570	[illegible]		
10	Chelen Dorji	RO	Tsirangtoe	ceelen94@gmail.com	17832877	[illegible]	[illegible]	[illegible]
11	Ganjaman Rai	Mangmi	Tsirangtoed	gmtsirangtoe87@gmail.com	17421399	[illegible]	[illegible]	
12	Nima Dorji	Gaydrung	Tsirangtoe	nimadorji27@gmail	17752618	[illegible]		
13	Dhendup Tshering	Asst. Planning Officer	GNHC	dtshering@gnhc.gov.bt	17908195	[illegible]	[illegible]	[illegible]
14	Nidup Peljor	Consultant.	BTFEC	ceo@bpcbhutan.com	17161656	[illegible]		

Sl. no	Name	Designation	Agency/Gewog	Email Address	Contact Number	Signature		
						Day 1	Day 2	Day 3
15	Sonam Lhamo	Farmer	Tsirangtoe	—	17876203			
16	Tila Maya Subba	CSE	Tsirangtoe	tilacc.subba@gmail.com	17570576			
17	Thuntsho Norbu	Farmer	Tsirangtoe	—	17469780.			
18	Kinth	CDE	DES/Tsirang	Kinth@tsirang.gov.bt	77495254			
19				dorjiwangdi@tsirang.gov.bt	17807474			
20				—	17242865			
21	Tshering Lham	shopkeeper	Tsirangtoe	—	17426872			
22	Wangchuk	Gewog Caretaker	Tsirangtoe	—	17515202			
23	Dabzang Tshering	DHO	Tsirang	Hahering.tsirang gov.bt	17668774			
24				dorjigyeltshen@tsirang.gov.bt	17617857 17889802			
25	Nirmaya Kalden	Mahout	Tsirangtoe CS.	nirmayakalden1as@education.gov.bt.				
26	Yeshi	Principal	"	yeshiss3@gmail.com	17686183			
27	Dorme chetem	Sr. HA	Tsirangtoe PHC	dormechetem3@gmail.com	17896262			
28	Singye	Driver	Tsirang	—	17908502			
29	Ugyen Lhamo	PA	"	—	17814496			

Sl. no	Name	Designation	Agency/Gewog	Email Address	Contact Number	Signature		
						Day 1	Day 2	Day 3
30	Pema	Dzongda	Tsirang	pema@tsirang.gov.bt	17989818			
31	Namgay Dorji	Dzongrab	Tsirang	ndorji@tsirang.gov.bt	17699248			
32		ACFO	BTFEC		77606162			
33	Rinchen Wangmo	APO	BTFEC	rinchen@bhutantrust.bt				
34	Rinchen Dema	AFO	"					
35	Pasang	Driver	"	pasang@bhutantrust.bt				
36	~~Dhendup Tshering~~	~~AFO~~	~~GNHC~~	dtshering@gnhc.gov.bt	17			
37	Daza	NFEI	Phuentsholing	ddaza@gmail.com	77486920			
38	Chimi Choden	CSE (NCSTFE)	Phuentsholing	choden.lhamo2017	17802709			
39	Monkumari Pradhan	Farmer	Phuntsholing		17674366			
40	Budha mothi Subba	Farmer	Dragaitho		17236523			
41	Rinchen Ngazom	farmer	Norbuthang		17990200			
42	Hemlal Adhikari	Thogpa	Tashichholing		17467339			
43	Sir Dhoj Rai	Tshogpa	Tsongdingang		17429451			
44	Krishna lal	Tshogpa	Pulgorling		17667313			

Sl. no	Name	Designation	Agency/Gewog	Email Address	Contact Number	Signature Day 1	Signature Day 2	Signature Day 3
45	Dro Bdr Mafchan	Tshogpa	Senjang		17779695		[signature]	[signature]
46	Tula Ram Kharka	"	"		17383220			[signature]
47	Naina Singh Manger	Driver	"		17325961		[signature]	[signature]
48	Tika Maya	Farmer	"		17778338			[signature]
49	Budhi Maya	"	"		17427912			[signature]
50	Wangmo	"	"		17382350			[signature]
51	Amber Bdr Pradhan	Tshogpa	"		17650998			[signature]
52	Kinley Wangdi	Offtg. GAO	"	kinleywangdi[illegible]	17777306	[signature]	[signature]	[signature]
53	Para Bdr Rai	Tshogpa	P/chu		17749445			[signature]
54	Gom Prd. Subba	Tshogpa	" "		17382708			[signature]
55	Samphel	mangmi	" "		17724129	[signature]	[signature]	[signature]
56	Nidup Wangdi	Principal	-"-		17995677			[signature]
57	Sangay Wangdi	Sr.ES II	-"-	swangdi72@gmail.com	17675252	[signature]		
58	Cheta Gyeltshen	GAO	Phuntsho		17289722	[signature]	[signature]	[signature]
59	Rinchen Phuntsho	Driver	Dzongkhag		17615201		[signature]	[signature]
60	Heman Subba	Gaydrung.	Phuentecholu Gewog.	heman.subba48@gmail.com	77494166	[signature]		[signature]
61	Tara Devi Chhetri	Sales executive	FCB, Phuentsholing.	taradchetri11@gmail.com	17411175.	[signature]		[signature]
62	Dawa Tshering Sherpa.	Driver.	Phuentsholing, Gewog.	sherpadawatshering76@gmail.com	77299554.		[signature]	[signature]
63	Parsu Ram Darjee.	Care-taker.	Phuentsholing, Gewog		17976754			[signature]
64	Top Nath Acharya	Gup, Senjang	Senjang.	tnacharya@tsirang.gov.bt	17618813		[signature]	[signature]
65	Prem Bdr Ghalley	AE	Dzongkhag		17692372		[signature]	
66	Indra Bdr Koirala	Tech I	Dzongkhag		17539017		[signature]	
67	Shiva Lal Kararia	Gup	Phuentsholing		17732 8395		[signature]	[signature]
68	Thinley Phuntsho	Driver	Tsirangtoe		17509135		[signature]	
69	Nim Dorji	Gok	Tsirangtoe		17442537		[signature]	
70	Tenzin Dorji	SE. AR-II	Biray Division				[signature]	