

# GEF-8 PROJECT IDENTIFICATION FORM (PIF)

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## General Project Information

### Project Title

Enhancing the Climate Resilience of Urban Landscapes and Communities in Thimphu-Paro region of Bhutan (ECRUL)

### Region

Bhutan

### GEF Project ID

11109

### Country(ies)

Bhutan

### Type of Project

FSP

### GEF Agency(ies):

UNDP

### GEF Agency ID

6730

### Executing Partner

Ministry of Infrastructure and Transport (MoIT)

### Executing Partner Type

Government

### GEF Focal Area (s)

Climate Change

### Submission Date

4/11/2023

### Project Sector (CCM Only)

Climate Change Adaptation Sector

### Taxonomy

Influencing models, Convene multi-stakeholder alliances, Deploy innovative financial instruments, Strengthen institutional capacity and decision-making, Stakeholders, Type of Engagement, Partnership, Consultation, Information Dissemination, Participation, Communications, Education, Awareness Raising, Private Sector, Individuals/Entrepreneurs, SMEs, Financial intermediaries and market facilitators, Civil Society, Non-Governmental Organization, Academia, Community Based Organization, Gender Equality, Gender results areas, Knowledge Generation and Exchange, Access to benefits and services, Capacity Development, Gender Mainstreaming, Sex-disaggregated indicators, Women groups, Beneficiaries, Gender-sensitive indicators, Integrated Programs, Sustainable Cities, Urban sustainability framework, Urban Resilience, Green space, Integrated urban planning, Capacity, Knowledge and Research, Learning, Adaptive management, Theory of change, Knowledge Generation, Knowledge Exchange, Focal Areas, Climate Change, Climate Change Adaptation, Climate resilience, Private sector, Least Developed Countries, Disaster risk management, Livelihoods, Climate information, Ecosystem-based Adaptation

### Type of Trust Fund

LDCF

### Project Duration (Months)

72

### GEF Project Grant: (a)

18,048,624.00

### GEF Project Non-Grant: (b)

0.00

### Agency Fee(s) Grant: (c)

1,624,376.00

### Agency Fee(s) Non-Grant (d)

0.00

### Total GEF Financing: (a+b+c+d)

19,673,000.00

### Total Co-financing

51,375,000.00

|   |   |
|---|---|
| PPG Amount: (e)<br>300,000.00                           | PPG Agency Fee(s): (f)<br>27,000.00                 |
| PPG total amount: (e+f)<br>327,000.00                   | Total GEF Resources: (a+b+c+d+e+f)<br>20,000,000.00 |
| Project Tags<br>CBIT: No NGI: No SGP: No Innovation: No |   |

## Project Summary

Provide a brief summary description of the project, including: (i) what is the problem and issues to be addressed? (ii) what are the project objectives, and if the project is intended to be transformative, how will this be achieved? (iii), how will this be achieved (approach to deliver on objectives), and (iv) what are the GEBs and/or adaptation benefits, and other key expected results. The purpose of the summary is to provide a short, coherent summary for readers. The explanation and justification of the project should be in section B “project description”. (max. 250 words, approximately 1/2 page)

Thimphu and Paro are two of the major cities in Bhutan, and together they make up 25% of the country's population<sup>[1]</sup>. Thimphu alone represents 45%<sup>[2]</sup> of the country's GDP. These cities located on river valleys evolved with general consideration of risk, but temperature and precipitation changes now cause intense urban flooding, landslides, and forest fires affecting cities' economy, landscape and population.

The project aims to reduce the impacts of the following climate induced hazards:

- i. **Extreme temperatures** – Exposure to heat impacts water availability as a result of drying of springs/water sources, catchment degradation and reduced water recharge capacities at source which further impacts sustainable access to safe freshwater and water retention for ecosystems. Adaptation measures proposed include implementation of catchment conservation through nature-based solutions and climate proofing of urban infrastructure. Exposure to extreme cold leads to increased energy demands for heating in the building sectors. The extreme cold leads to freezing and bursting of water distribution pipes disrupting water supply systems. The project will intervene through climate proofing of water supply system, supported by digital solutions and adoption of nature-based approaches. These will complement and steer the government and private sector investments in actual infrastructure upgrades to include climate proofing features.
- ii. **Changing precipitation pattern** - The increasing wetter summers leads to flooding causing damages to infrastructure, economic losses, including the risks to human life and safety. In addition, the drier winters contribute to shortage of water for drinking and sanitation during the lean season. These hazards will be addressed through climate and geo spatial systems to promote risk informed urban planning. The threats to the infrastructures from flooding will be reduced through improving climate resilient building designs, flood early warning systems and overall enhanced preparedness.

These climate-induced risks were not anticipated when the cities were initially designed. The climate projection now suggests further intensification of climate impacts on the cities' critical infrastructure, economy and vulnerable population groups<sup>[3]</sup> i.e. those living in fragile settlements and urban poor.

Climate-induced events have made existing water management and other critical infrastructure more vulnerable to its impacts. The frequent landslides, road blockades and congested stormwater networks affect fragile human settlements, private and public assets, and livelihood activities. At macro level, roughly 45% of Bhutan's GDP is exposed to the climatic risk<sup>[4]</sup>. As a result, women, girls and other populations groups living in fragile settlements, and involved in small and informal livelihoods more vulnerable to climate change.

The proposed project is designed to transform the urban planning, management, governance, and investments of Thimphu and Paro for making them and their population resilient to climate change. The investments proposed to achieve the goal of the project include: Sustainable urban planning and design, building robust infrastructure, enhancing disaster preparedness and response, and strengthening adaptive capacity of local communities and municipal authorities. It will reduce the risk from current and projected climate change risks and impacts, especially the riverine (fluvial) and surface water (pluvial) flooding, cyclonic events and water stress on women and vulnerable groups. The project will make dedicated investments to enhance the adaptive capacity of the vulnerable communities particularly women and youth. In doing so the project will address identified institutional, technological and finance and market barriers.

The project will deliver following adaptation benefits:

- Enhance the adaptive capacity of 71,087 women and 75,211 vulnerable men to make their livelihood resilient to climate change (46% of the total urban population).
- Invest in nature-based solutions in 400 hectares of urban areas to manage climate-induced risks and stresses on water resources.
- Improve the capacity of municipalities (local government), relevant national agencies, and private sector for gender-responsive and resilient urban planning and infrastructure development with enhanced participation of the young population.
- Invest in gender-responsive and climate-resilient houses, stormwater management and water supply systems in support of developing the locally appropriate design for scaling up and fostering enterprise and market development around these resilient technologies and solutions.

The Ministry of Infrastructure and Transport will execute the project. It will collaborate with Ministry of Finance (MOF), the National Center for Hydrology and Meteorology and the Department of Environment and Climate Change as well as relevant urban agencies. To leverage specific financial and human capabilities project will also engage civil

society organizations and the private sector entities. The Thimphu Thromde (Municipality) and the municipal division of Paro District Administration will be the key responsible parties.

[1] Dzongkhag Data from National Statistics Bureau, 2022

[2] Gross National Happiness Commission, "Twelfth Five Year Plan," Gross National Happiness Commission, Thimphu, 2018.

[3] National Commission for Women and Children, Gender and Climate Assessment in selected NDC sectors, Thimphu, 2020: <https://info.undp.org/docs/pdc/Documents/BTN/signed%20project%20document.pdf>

[4] S. Mehta, "Suti Report for Thimphu City," UNESCAP, Bangkok (<https://www.unescap.org/sites/default/files/Thimphu.pdf>).

## Indicative Project Overview

### Project Objective

To strengthen the management of climate risks, and reduce the vulnerability of urban landscapes and communities to the impacts of climate change in Thimphu-Paro.

### Project Components

**1: Climate risk-informed, coordinated and inclusive planning and governance for resilient urban development.**

|                            |                   |
|----------------------------|-------------------|
| Component Type             | Trust Fund        |
| Technical Assistance       | LDCF              |
| GEF Project Financing (\$) | Co-financing (\$) |
| 5,600,000.00               | 13,400,000.00     |

Outcome:

1: Institutional coordination, stakeholder engagement and climate adaptation capacity strengthened for inclusive and climate-resilient urban planning and development.

Output:

1.1: Inter-agency mandates and functions harmonized, and institutional coordination mechanisms established and made functional to facilitate policy coherence for climate-resilient urban planning and development.

1.2: Climate and geospatial information systems established with trained urban planners to promote risk informed urban planning

1.3: Climate-resilient and gender-responsive adaptation plans prepared for Thimphu and Paro with active citizen participation and added emphasis on climate resilient entrepreneurship.

1.4: vocational training programs introduced in two colleges/technical schools for skilling/reskilling/upskilling of the construction workforce for climate-proofing standards in construction.

1.5: Innovative financing solutions for cities to invest in climate-resilient technologies and practices.

## 2: Build Resilience through gender-responsive climate adaptive approaches

|                            |                   |
|----------------------------|-------------------|
| Component Type             | Trust Fund        |
| Technical Assistance       | LDCF              |
| GEF Project Financing (\$) | Co-financing (\$) |
| 10,489,166.00              | 29,600,000.00     |

### Outcome:

2: Climate risk management measures designed and implemented for water management systems and urban infrastructure

### Output:

2.1: Climate-proofing features for the key sections of the water and stormwater management systems introduced to ensure flood risk management, safe and uninterrupted water supply and business continuity in critical urban areas

2.2: Ecosystem and nature-based solutions developed and implemented to adapt to floods, heat-island effect, and landslide and to enrich water sources, natural streams and catchments for improved infiltration, restoration and recharge.

2.3. Measures to increase climate resilience of buildings and in the design of urban spaces introduced

2.4: Ancillary rainfall threshold-based flood EWS developed on critical tributaries and integrated with the existing hydrological centralized data-based mgt. system of NCHM

## 3: Knowledge management and M&E

|                            |                   |
|----------------------------|-------------------|
| Component Type             | Trust Fund        |
| Technical Assistance       | LDCF              |
| GEF Project Financing (\$) | Co-financing (\$) |
| 763,000.00                 | 3,100,000.00      |

### Outcome:

3: Project knowledge is managed, and project results are monitored and evaluated to foster learning, adaptive management, sustainability and replication.

### Output:

3.1: Knowledge and communication products and platforms developed to analyze and disseminate best practices and project lessons.

## M&E

|                            |                   |
|----------------------------|-------------------|
| Component Type             | Trust Fund        |
| Technical Assistance       | LDCF              |
| GEF Project Financing (\$) | Co-financing (\$) |

337,000.00

2,200,000.00

Outcome:

3: Project knowledge is managed, and project results are monitored and evaluated to foster learning, adaptive management, sustainability and replication.

Output:

3.2: Project progress and results are effectively tracked and managed through monitoring and evaluation. **(M&E)**

## Component Balances

| Project Components   | GEF Project Financing (\$) | Co-financing (\$)    |
|--|----------------------------|----------------------|
| 1: Climate risk-informed, coordinated and inclusive planning and governance for resilient urban development. | 5,600,000.00               | 13,400,000.00        |
| 2: Build Resilience through gender-responsive climate adaptive approaches                                    | 10,489,166.00              | 29,600,000.00        |
| 3: Knowledge management and M&E  | 763,000.00                 | 3,100,000.00         |
| M&E  | 337,000.00                 | 2,200,000.00         |
| <b>Subtotal</b>  | <b>17,189,166.00</b>       | <b>48,300,000.00</b> |
| Project Management Cost  | 859,458.00                 | 3,075,000.00         |
| <b>Total Project Cost (\$)</b>   | <b>18,048,624.00</b>       | <b>51,375,000.00</b> |

Please provide justification



## PROJECT OUTLINE

### A. PROJECT RATIONALE

Briefly describe the current situation: the global environmental problems and/or climate vulnerabilities that the project will address, the key elements of the system, and underlying drivers of environmental change in the project context, such as population growth, economic development, climate change, sociocultural and political factors, including conflicts, or technological changes. Describe the objective of the project, and the justification for it. (Approximately 3-5 pages) see guidance here

While Bhutan is among the very few countries with net negative greenhouse gas (GHG) emissions<sup>[1]<sup>5</sup></sup>, the landlocked mountain kingdom is severely affected by global warming and remains highly vulnerable to climate change due to a combination of geographical, institutional, and social factors. Additionally, due to existing inequality the differential impact is prominent among women, the elderly population, youth, low-income families, disabled groups and people living in fragile settlements, therefore they face greater challenges in accessing resources for adaptation and quick recovery from the climate induced impacts<sup>[2]<sup>6</sup></sup>.

### Situation analysis and key drivers

The urban areas of Thimphu and Paro are facing significant climate risks due to a combination of factors such as, concentrated urbanization, limited risk informed planning capacity, fragile livelihoods of vulnerable population, and vulnerable public and private assets and infrastructure. The impact is experienced through increasingly intensified water-stress, flash floods, landslides, diseases, forest fires, windstorms, hailstorms <sup>[3]<sup>7</sup></sup>. In recognition of the many complex and urgent social, environmental and economic challenges faced by the capital city region, a multi-agency Royal Commission for Urban Development (RCUD) has been established to review and revise the Structure Plan for Thimphu; prepare a regional urban development plan for Thimphu and Paro and connected areas as well as develop plans, policies and strategies to expand urban planning and development in the rest of the country. The RCUD will further provide guidance on a Capital City Vision for the development of the Thimphu-Paro region and foster pathways for inclusive, coordinated and participatory approaches for gender-responsive and climate-resilient urban planning and development based on informed choices.

The role of the Ministry of Infrastructure and Transport (MoIT) is to develop policies and strategies, coordinates national and regional plans while that of the local governments such as the Thimphu and Paro municipal governments are responsible for overseeing urban services and infrastructure in these urban areas. Given the need for coordination across various cross sector agencies and themes, the RCUD will function as the apex body responsible for urban planning and to coordinate across various agencies (including private/corporate entities) and deliver integrated outcomes pertaining to urban development.

Urban planning in Bhutan is characterized by a three-tier planning system - at a national, regional and local level. A Spatial Planning Bill, which provides overall framework for planning, is under preparation. In the absence of specific legislation pertaining to spatial planning, urban planning in Bhutan is based on provision of the Local Government Act, 2009 which defines the roles of local governments including Thromdeys (municipal governments; and the Land Act, 2007 (which defined the land tenure and use), the National Human Settlement Strategy 2017 (which defines integrated regionally balanced development and establishes a roadmap for the development of settlements); and the Spatial Planning Standards, 2017 (which sets the minimum standards to the planning and design of future human settlements); Bhutan Building Regulation, 2018 and the Land Pooling and Readjustment Regulation, 2018.

The historical temperature data (1976-2005) shows a mean annual temperature increase of 0.8°C, with an upward trend of 1.3°C in winter and a 0.6 °C in the spring<sup>[4]8</sup>. Precipitation has also changed in the past two decades with increased variability and a declining trend<sup>[5]9</sup>. Changes in the rates of precipitation has resulted in a reduction of water availability and worsening water pollution and water scarcity<sup>[6]10</sup>. Reports suggest that Bhutan is not adequately prepared for the increasing risks of climate **events specially flooding, heat stress and cyclone** and its ranking of 94 in the ND-GAIN index indicates a need for urgent action to address these challenges<sup>[7]11</sup>.

Climate projections for Bhutan suggest an increase in temperatures likely to trigger heat waves and droughts contributing to glacial and snow melt<sup>[8]12</sup>. The latter is likely to change patterns of river discharge and water availability<sup>[9]13</sup> affecting cities and towns. Flooding, triggered by increased frequency of extreme rainfall events during the monsoon, are the most significant climate-related hazard in Bhutan<sup>[10]14</sup>. Warming trends, particularly at higher altitudes during winter months, are likely to further accelerate glacial-melt which additionally threatens the water-dependent economy, especially the cities on the river valleys.

The Third National Communication to the UNFCCC<sup>[11]15</sup> presents similar projections and it notes that in the coming years, Bhutan is likely to face an increase in frequency and magnitude of extreme rain events and windstorms causing flash floods and landslides. Temperature increases are also likely to alter patterns of glacial and snow melt and cause water sources and streams to dry up.

The data analysis of the neighboring Punatsangchhu watershed can provide a reasonable proxy for the future changes under two different climate scenarios<sup>[12]16</sup> for the near term (2021-2040), medium term (2041-2060), and long term (2081-2100). Below table presents the data:

*Table 1: CMIP6 - Total annual median change related to 1850-1900 baselines for precipitation (%) and minimum and maximum temperature change (°C).*

| Scenario | Period | Precipitation (%) | Minimum Temperature. (°C) | Maximum Temperature. (°C) |
|----------|--------|-------------------|---------------------------|---------------------------|
|----------|--------|-------------------|---------------------------|---------------------------|

|          |               |      |     |     |
|----------|---------------|------|-----|-----|
| SSP2-4.5 | RCP4.5 Near   | 4.3  | 1.6 | 0.9 |
|          | RCP4.5 Medium | 8.7  | 2.1 | 1.6 |
|          | RCP4.5 Long   | 11.3 | 3   | 3.3 |
| SSP5-8.5 | RCP8.5 Near   | 4.4  | 1.7 | 1   |
|          | RCP8.5 Medium | 9.3  | 2.7 | 1.9 |
|          | RCP8.5 Long   | 25.5 | 5.2 | 4.4 |

Site-specific NASA Earth Exchange Global Daily Downscaled Projections on precipitation trends for the Punakha *Dzongkhag*, located less than 50 km away from Thimphu, comparing a 1960 to 1990 baseline suggests an increase of 9.6 % and 17.5 % for the near term and long term respectively under RCP4.5 and 12.9% and 43.1% under a RCP8.5 scenario in near term and long term respectively. Most of the increases in rainfall will be during the monsoon months (June to September) accompanied by fluctuating variability, particularly during June and July.

Data from Punakha *Dzongkhag* also shows that minimum temperatures are expected to increase significantly. The near-term projection is that an increase of 1.53°C and 1.6°C is expected under RCP4.5 and RCP8.5 respectively. The long-term projection under the RCP4.5 and RCP8.5 scenarios indicated increases of 2.55°C and 4.86°C. Increases in temperatures, have serious implications for the productivity of ecosystems, and in Bhutan, for increased glacial melt. Trends in minimum temperature<sup>[13]<sup>17</sup></sup> are projected to increase under both scenarios, with maximum increases in the winter months.

Table 2: Percent change in precipitation and minimum temperature in Punakha *Dzongkhag* as per NEX-GDDP for the near, medium, and long term compared against baseline periods of 1961 to 1990<sup>[14]<sup>18</sup></sup>.

| Site                 | RCP4.5 Near | RCP4.5 Medium | RCP4.5 Long | RCP8.5 Near | RCP8.5 Medium | RCP8.5 Long |
|----------------------|-------------|---------------|-------------|-------------|---------------|-------------|
| Precipitation        |             |               |             |             |               |             |
| Punakha              | 9.6         | 15.2          | 17.5        | 12.9        | 21.8          | 43.1        |
| Minimum temperatures |             |               |             |             |               |             |
| Punakha              | 1.53        | 2.01          | 2.55        | 1.6         | 2.48          | 4.86        |

Thimphu and Paro are among the top urban centres with the highest urban population<sup>[15]<sup>19</sup></sup> and both suffer from seasonal water scarcity. In Thimphu, uphill sources have enough water for eight months of the year, but during the winter, the water goes down to half the volume as the water level falls, and water transmission pipes freeze<sup>[16]<sup>20</sup></sup>,

disrupting water supply The municipal drinking water supply in Thimphu is characterized by shrinking sources due to reduced seasonal precipitation in winters and disruptions in water supply because of damage to water pipelines by landslides or flash floods in summer. Similarly, in Paro, four of the five springs have dried up in the past two decades [17]<sup>21</sup> causing domestic water shortage for drinking and sanitation impacting on public health, burden on women and increasing water conflicts. The drying up of springs has even led to people abandoning agriculture, directly affecting livelihoods, with more impacts on women and other vulnerable people. In Paro, where municipal water is pumped from the river, water pumping into reservoirs becomes a major challenge in the winters when river water discharge becomes very low [18]<sup>22</sup>, while in the summer, the infiltration gallery, made temporarily of sand, stone and debris dredged from the riverside, get washed away by rains and swollen river during the monsoons.

Such climate-induced urban risks in the region will have a direct impact on Bhutan's economy. Of the 20,093 industries in Bhutan in 2018, 35% are in Thimphu [19]<sup>23</sup>. Similarly, Paro has Bhutan's sole international airport making it an important hub for tourism activities. As tourism grows in Bhutan (the number of tourists arriving increased by 15% between 2018 and 2019 [20]<sup>24</sup> [21]<sup>25</sup>) the significance of the Thimphu-Paro region in Bhutan's economy grows. When livelihoods in the Thimphu-Paro region are affected by climate risks, it adversely impacts business continuity with a disrupted supply chain.

While climatic variations have caused water shortages during winter, in monsoon, the climatic impact is reversed by frequent rainfalls increasing the risks of floods and landslides. A comprehensive study with seven flood vulnerability indicators (under broad categories of social, physical, economic, and environmental attributes) categorises the Thimphu-Paro region at a moderate flood-vulnerable level. A total of 3,720 hectares have been categorized as flood-prone areas across the country, including 270 hectares in Thimphu and 349 hectares in Paro [22]<sup>26</sup>. In addition, the Ministry of Works and Human Settlement (now called Ministry of Infrastructure and Transport) has mapped the Thimphu-Paro region as flood-prone areas in 2019 [23]<sup>27</sup>. Projections show landslides major risk to Thimphu and Paro as climate change is likely to alter slope and bedrock stability through changes in precipitation and temperature [24]<sup>28</sup>. Similarly, projections show 20% probability of potentially damaging and life-threatening urban floods occurring in the coming 10 years in Thimphu and Paro [25]<sup>29</sup>, [26]<sup>30</sup>.

Dynamic and regional climate models [27]<sup>31</sup> project increased intensities of tropical storms by 2100 for the North Indian Ocean and increased frequencies of highest storm surges across the Bay of Bengal. One of such cyclone i.e. cyclone Aila in 2009 caused recorded a high rainfall of 72.5mm in Bhutan and the capital Thimphu recorded an unprecedented high flow of 661m<sup>3</sup>/s. Riverine flooding resulted in the loss of 12 lives and a total economic loss of 9.6 million Euros [28]<sup>32</sup>. District-level hazard impacts due to historical flood events in Bhutan show that infrastructure damages, which include water supply systems among other infrastructures, were recorded above average in the Thimphu

region. These unpredictable and intense weather events (intensified by unseasonal rainfall and hailstorms) also destroy crops in the peri-urban areas. In October 2021, in Paro, incessant rain damaged 793 acres of paddy fields damaging an estimated 1,945 metric tons of rice production and affecting 907 households[29]<sup>33</sup>. Paddy terraces were washed away by stormwater as the irrigation canal was too small to drain the water[30]<sup>34</sup>. This shows that inadequate climate-adaptive design of infrastructure affects the livelihood of people, particularly women depending on agriculture[31]<sup>35</sup> by posing a public risk, property damage risk, and income loss.

### **Underlying causes of vulnerability:**

#### Urban expansion of Thimphu-Paro region:

The rapid pace of urbanization in recent decades has led to an increasing concentration of people, infrastructure, and economic assets **and activities** in urban areas and the country's vulnerability to climate change is increasingly shifting to urban centres. To date, limited consideration about potential climate risks is paid in urban planning due to a lack of knowledge, **unavailability of locally suitable risk management technologies, limited financing solution** and capacity of the government at national and municipal levels. Further, it is constrained by financial and technical capacity limitation. This has led to a significant accumulation of risk, leaving assets and people exposed to the increasing livelihood losses and damages. While urban centers remain highly vulnerable to climate change impacts, their potential for innovation of adaptation solution and employment creation<sup>[32]<sup>36</sup></sup> for green and resilient development are not adequately explored.

Thimphu and Paro regions account for over a quarter of the country's urban population. Thimphu with 115,517 people in 2017 accounting for 14% of the country's population<sup>[33]<sup>37</sup></sup>. At the current rate of population growth, Thimphu's urban population is projected to grow to 186,592 by 2027. As Thimphu's population expands and rural-urban migration continues, the urban population will spill over to its areas of influence primarily to the adjacent valley of Paro, which is a major tourist and economic hub. The population of the Paro district is projected to grow from 46,316 in 2017 to 74,067 by 2047<sup>[34]<sup>38</sup></sup>. This growth is likely to be largely absorbed by Paro town and adjunct peri-urban areas. Therefore, as the population in Thimphu and Paro increases, water scarcity will intensify resulting in major public health deterioration, and risks to the livelihood and economy.

Women and vulnerable groups: Building on the evidence of climate risks, multiple reports mention that Bhutan is not fully prepared for the increasing risks of disasters caused by climate change. Bhutan ranks 94 in the ND-GAIN index which means that it is on the road to responding effectively to climate change, but the adaptation needs and urgency to act are greater<sup>[35]<sup>39</sup></sup>.

As climate risks increase, vulnerable groups in urban centers will find it hard to adapt unless knowledge, resources and skills are made available. The vulnerable groups include the elderly population, youth, low-income families, disabled groups and people living in fragile settlements<sup>[36]<sup>40</sup></sup>. The highest share of the elderly was in Thimphu which is

expected given its highest share of the country's population overall. Similarly, Paro ranked 7<sup>th</sup> in the share of the elderly population. Although the poverty rate in the Thimphu-Paro region is low compared to other dzongkhags, **Thimphu has the highest reported unemployment of 6.0%**. Urban climate risks adversely affect vulnerable groups i.e. elderly population, women, poor in their day-to-day life by causing difficulty in aspects such as public safety (for eg. surface floods), reliable access to drinking water, health risks from exposure to extreme heat and cold etc. Furthermore, vulnerable groups lack the resources and means to adapt to the effects of climate change.

Existing gender gaps in leadership, management and labour force participation [37]<sup>41</sup> (the workforce accounting for 30.7% and men accounting for 69.3%.) makes-up special vulnerability of the women. To address this, women's participation in the adaptation planning, access to information, skills and a conducive environment is required for resilient urbanization in Bhutan.

*Water Reliant Urban Economy and Inadequate Water Systems Management:* Bhutan's major economic activities are closely linked with water resources, either directly or indirectly. For example, hydropower, irrigation, industries and environmental demand all depend on the proper management of water resources. A comprehensive review study of water resources and their management in 2021 shows that although the demand for water in Bhutan has increased, climate change factors such as climate variation, deteriorating water quality, and frequent floods, further exasperated by increasing urbanisation threaten the sustainability of water resources [38]<sup>42</sup>. The study calls for serious attention to rainwater harvesting and groundwater recharge to address localized water scarcity issues.

The growth in the urban population of Thimphu at double the national growth rate of 1.3 percent, has resulted in unplanned development in peripheral areas, shortage of affordable housing, issues of clean and reliable drinking water, solid waste management, traffic congestion and pollution. For instance, Thimphu city has a daily consumption of 20,000 cumecs against a supply capacity of 30,900 cumecs from its five treatments plants and three borehole pumps delivered through 70 kms of distribution pipes. The existing infrastructure is outdated, underdeveloped, and inadequate to meet the growing demand due to rapid urbanization and expansion of the population. And it is estimated that 30 percent of water supplied is lost in distribution. Hence, inadequate water and erratic supply is the main complaint of residents in Thimphu as in Paro. Further, due to climate change, the supply of water is becoming increasingly uncertain. Climate change-induced natural disasters such as floods, **cyclones**, landslides, and droughts further exacerbate these issues by damaging the water and sewer infrastructure, leading to service disruptions and increased repair costs. Water supply from lines which are fixed to steep hillsides get washed away by landslides during monsoons. Similarly, the sewer system, built in the 90s, faces challenges of overflows and blockages during the rainy season because of sediment collection in the pipes and the dumping of garbage in sewer lines [39]<sup>43</sup>.

*Stormwater management in urban settings:* Another major form of flood risk is surface water (pluvial) flooding, which recurs every monsoon and is getting worse with changes in precipitation patterns, growth in population and infrastructure. Stormwater management systems remain inadequate in terms of coverage as well as technical design. In addition, excessive concretization with very limited use of green and resilient construction methods has caused diversions from natural watercourses, high surface run-off and overflowing of stormwater into streets and building compounds during extreme rainfall events.

The Integrated Stormwater Management Plan of Thimphu (2021-2030) prepared by MoWHS states that there is no specific guideline for stormwater drain design and construction and lack institutional arrangement for emergency response and recovery during events of urban disaster or flooding after sudden and heavy rainfall [40]<sup>44</sup>. The plan points out that the existing stormwater management system has been mostly built in an ad hoc manner and is

inadequate to meet the drainage needs of a growing urban population in a changing climate regime. It identifies numerous existing critical sections that require rectification as well as new sections that need to be built to minimize the potential threats of urban flooding and protect natural drainage features considering urban sprawl and uncertainties of climate change.

### Project baseline and key barriers

The proposed LDCF project will seek linkages and synergy with the following projects:

| Title  | Duration             | Budget in USD million | Funding Agency              | Areas for Linkage and Synergy  |
|--|----------------------|-----------------------|-----------------------------|--|
| Green and Resilient Affordable Housing Sector Project  | Nov 2021 to Dec 2027 | 30.0                  | Asian Development Bank      | , this project will seek partnership in alignment with Project Component 2 for the introduction and knowledge transfer of green and climate-adaptive building constructions and technology.  |
| Strengthening Risk Information for Disaster Resilience   | Nov 2021 to Jun 2025 | 4.2                   | World Bank                  | Coordinate for climate risk-informed planning and decision-making support and enabling policy and legal framework for the green construction industry. This aligns with Project Component 1 of this proposal.  |
| Bhutan Human Capital Recovery and Resilience Program   | Feb 2022 to Jan 2025 | 20.0                  | World Bank                  | Coordinate entrepreneurship development and skilling of the construction workforce for green and resilient buildings including the institutionalization of knowledge. This aligns with Project Component 1 of this proposal.   |
| Water Flagship Program Support Project – Pamtsho Water Supply Sub-project                      | Jan 2023 to Jun 2030 | 22.0                  | Asian Development Bank      | Seek partnership in alignment with Project Component 2 for climate adaptive water management systems. This proposal will add to the ongoing project activities relating to capacity, governance and awareness of inclusive, resilient, and sustainable water management.     |
| Advancing Climate Resilience of the Water sector in Bhutan (ACREWAS)                           | Apr 2023 to Apr 2028 | 34.1                  | Global Environment Facility | Seek coordination and partnership with Project Components 1 and 2. This project will add value to the ACREWAS project focused on Punatsangchu River Basin through localised urban efforts in the Thimphu-Paro region.  |
| Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan | 2023-2028            | 9.9                   | Adaptation Fund             | Seek partnership in alignment with Project activity on climate adaptive water management systems for Paro. This proposal will add to the ongoing project activities relating to capacity, governance and awareness of inclusive, resilient, and sustainable water management |

To improve urban resilience and to adapt to the above climate change risks and impacts, the project seeks to address the following key barriers:

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Institutional barriers: Urban governance is a relatively new concept for Bhutan, which has been fundamentally an agrarian society until a few decades ago constraining the agencies involved to adopt climate resilient urban planning. While the country developed policies and legislations on urban development with attention to environmental conservation and management of climate change impacts, they face implementation challenges due to lack of capacity, resources and coordination. The implementation and infusion of innovation for resilient development also face limited coordination among the agencies - inconsistencies and overlaps in mandates and roles of different institutions - especially to address the long-term climate risks and gender differentiated impacts. The lack of

institutional coordination, weak citizen engagement, inadequate gender-differentiated capacity for climate-smart urban planning and limited capacity to generate and use geospatial information systems hampers the use of geospatial information, and tools, for informed planning and response. This undermines the required geospatial analytics and related multi-hazard mapping which are key components for urban planning process, enhancing service delivery and ultimately informing the risk reduction and climate-induced emergency preparedness strategies. There is no systematic database of damages and losses of urban assets, waste, water distribution systems and water sources, to monitor trends in these events (and associated characteristics) over time apart, from a compiled compendium of news articles of all flood events since 1968. While the Thimphu Thromde is creating and designing a comprehensive geo-database that will provide reliable and up-to date data for planning and executing projects using satellite images, it is largely constrained by capacity as well as need for actual field surveys to facilitate informed urban planning. Paro face an even worse predicament as it does not have a municipality based geo-database nor capacitated and dedicated staff to engage with analysis of such data.. The municipal drinking water supply in Thimphu is characterized by shrinking sources due to reduced seasonal precipitation in winter months and disruptions in water supply because of damage to water pipelines by landslides or flash floods in summer. In Paro, where municipal water is pumped from the river, water pumping into reservoirs becomes a major challenge in the winters when river water discharge becomes very low, while in the summer, the infiltration gallery, made temporarily of sand, stone and debris dredged from the riverside, get washed away by rains and swollen river during the monsoons. The urgency to better protect and manage water sources is severely impaired by limited observations of water source points. Therefore, there is an urgent need for climate resilient planning and management of water sources and infrastructure. Installation of computerized tools such as SCADA to accurately monitor water supply by using sensors to pinpoint problematic areas would enhance efficiency and resiliency of critical urban services. To improve water resources management in Bhutan, tools such as remote sensing and GIS technologies are needed with comprehensive hazard information (geological, hydrological, and meteorological). While the national capacity related to fluvial early warning and prediction is on the increase, data driven and science-based approaches to manage and respond to events related to pluvial water flows from climate-induced events during the monsoon and/or cloud burst are still not well developed. Being able to predict the impact areas and being able to calculate the overall impact on these areas is an important aspect of urban resilience. Particularly when long-term predictions and modelling of water flow pathways (and obstacles to these) can be determined, as this will provide vital input to future urban development planning.

Furthermore, since the Thimphu-Paro region is located along the Paro Chu and Wang Chu rivers, effective implementation of Early Warning Systems (EWS) will play a role in adapting to the increasing frequency of floods by providing sufficient warnings on floods and concerned authorities can establish emergency response plans to ensure a quick response.

**Technological barriers:** Bhutan's ability to advance climate resilient urban planning is constrained by limited capacity to utilise data, technology and decision/risk management tools. The PIF identified four critical areas i.e. urban infrastructure, urban-specific early warning, spatial planning and housing which require development and adoption of locally appropriate technologies to become climate resilient.

The rapid urbanization of Thimphu and Paro has resulted in the conversion of agricultural land and natural vegetation into urban land uses, increasing impervious surface covers, such as roads, buildings, and pavements, which reduces infiltration and increases surface runoff, leading to soil erosion, flooding, and landslides. These trends in urbanization and land use practices degrade surrounding landscapes and watersheds within which these urban areas are nested which results in degrading ecosystems and its essential services of water discharge capacity; drainage control etc., increasing hazard risks to the urban infrastructure and settlements. The UN Committee for Development Policy in



2018 draws attention to the need for resilient urban planning in the country especially in Thimphu and Paro where the population has increased by five times in the past 20 years<sup>[41]<sup>45</sup></sup>.

This results in a high proportion of the population as well as correspondent economic activities and infrastructure in Thimphu and Paro region being exposed to climate hazards and risks as well as exacerbation of stress on ecosystem services, water and forests in particular. As urbanization continues to accelerate and rural-urban migration persists, these areas will continue to be at high risk for climate-related losses and damages with the costs likely to fall disproportionately on the most vulnerable members of society.

Limited application of Nature Based Solution (NbS) increases pluvial flood and runoff, which reduces potential for ground water recharge<sup>[42]<sup>46</sup></sup>. Intensification of riverine floods and landslides are the result of limited application of slope stabilization, greywater recycling, roadside greening, stormwater retention ponds, urban forestation. These factors also contribute to increase temperature and water stress around the cities on Wang Chu River basin. Therefore, promotion and demonstrations of ecosystem/nature-based solutions (NbS) will help the project to develop locally appropriate design principles and approaches.

Further, lack of gender-responsive technologies increase health hazards and the burden of work on women<sup>[43]<sup>47</sup></sup>. Existing flood monitoring systems are inadequate for expeditious and effective early warning for major flooding events.

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Financial and market barriers: There are additional upfront costs associated with the development of green and resilient infrastructure focused on climate-adaptive urban planning and water resource management. Green and resilient building materials are not readily available in local markets and the property owners and real estate developers, who do venture into green and resilient buildings, must procure materials from distant markets which escalates construction costs. There is a lack of green and resilient infrastructure budgeting systems by the government that would have catalyzed the market. While the National Housing Plan establishes fiscal incentives for affordable housing<sup>[44]<sup>48</sup></sup>, there are currently no incentive systems to stimulate investment in green and resilient construction. Lack of incentives for institutions and population groups to invest in resilient livelihood and infrastructure including high upfront costs associated with climate resilient technologies, and lack of supportive incentives are even more difficult for women from low socio-economic status<sup>[45]<sup>49</sup></sup>. Similarly, the urban agencies are constrained by the lack of adequate finances and financial products to invest in resilient urbanization.

The engagement of private sector, which are key of Govt. agenda, will be elaborated further during the PPG phase, and be reflected in the Stakeholder Engagement Plan. The private sector development is the core to the theory of change of the project, but further elaboration could not be possible at this stage as some of the key policies i.e. Public-Private Partnership policy and the Green Financing Roadmap are under review and at the final stage. Once they are finalized, extent and scope of private sector engagement through an appropriate

financing strategy will be furnished in the PPG phase (options of positive green / climate resilient subsidies and performance-based schemes for resilient housing among others will be reviewed in-depth). In a similar way, resilient entrepreneurship development is another core strategy of the project as a means to develop resilient urban economy. The PPG phase will map those specific areas of entrepreneurship development. Specific strategy on skills and financing solutions will be set out in the project.

Limited “public ownership” and knowledge of gender-differentiated climate change impacts: The current practice of public infrastructure development and management is featured by limited participation of vulnerable groups. The lack of civic awareness such as in the case of drainage issue being impacted by poor waste management practices<sup>[46]<sup>50</sup></sup> further contributes to the poor decision-making and exacerbating the impacts of climate change.

The cities also do not have **fit-for-purpose** planning mechanism that would allow the vulnerable people to participate in decisions made that impact their lives and livelihoods in the urban setting, and so that their priorities are reflected in the investments that make them resilient. Thus, the project proposes a more people-centric planning for resilient development as well as investment in behavioral change approaches for public ownership on the city planning and management.

## Project stakeholders

| Stakeholders   | Roles and responsibilities  |
|--|---|
| Ministry of Infrastructure and Transport (MoIT)                      | MoIT is the focal executing agency of the project that is mandated to work on physical infrastructures which this project intends to support. The Department of Infrastructure Development and the Department of Human Settlements are key for the effective implementation of this project. MoIT will be involved in the implementation of all three project components.   |
| Thimphu Thromde municipal division and Paro Dzongkhag Administration | The project is focused on the Thimphu-Paro region, therefore, the involvement of the municipalities is key for project implementation. Both municipal administrations will be executing partners delivering the project on-ground. Their responsibilities will include, supervising the physical construction activities of the project, coordinating with local communities, supporting the development of guidelines, standards, and best practices and endorsing them. Both municipalities will be involved in the implementation of all three project components. |
| Learning institutions  | Partnership with universities colleges and learning institutions such as The College of Science and Technology, College of Natural Resources and technical training institutes mainly located in the Thimphu-Paro region (while remaining flexible for partnerships in other regions) is important to institutionalize training courses. These institutions will be relevant for the achievement of Project component 1.4.  |
| UNDP   | At the request of the Government, UNDP will serve as the GEF Implementing Agency for the project. In this role, UNDP will oversee project execution and provide technical quality assurance. The project assurance and support functions will be provided by the UNDP Bhutan Country Office as well as the UNDP-GEF Unit based at the Bangkok Regional Hub. As GEF Implementing Agency, UNDP will coordinate and monitor the delivery and utilization of GEF funds and co-financing.  |
| Private companies  | Private companies working in construction or green projects will be involved in different stages of the project for capacity development and knowledge transfer. The engagement of private stakeholders is important for the achievement of Project components 1.4, 1.5, 2.1, 2.2, 2.3, 2.4 and 3.1.  |

|   |  |
|---|--|
| National Center for Hydrology and Meteorology (NCHM)          | NCHM will be engaged in activities of Project components 2.4 relating to the integration of EWS systems in tributary streams of Thimphu and Paro basins into existing hydrological centralised database management.  |
| NGO, CSO, stakeholder groups and direct beneficiaries         | NGOs, CSOs stakeholder groups (including women, youth and different ethnic groups), as well as direct beneficiaries, are/will be central actors in both the project development phase and during the implementation. Central parts of the project focus will be on gender mainstreaming, and the inclusion of women and other vulnerable groups in society including the elderly and PWDs. While the project will focus on the individual, the engagement and direction will be through the established interest groups such as NGOs and CSOs. These interest groups will play a vital role in the development of the project's Stakeholder Engagement Plan and Gender Action Plan, as well as provide input and comment on the project's social and environmental screening processes and plan development. A project grievance mechanism will also be in place. Citizen engagement, particularly women and other vulnerable groups will be pursued to the extent possible in the implementation of activities under Component 2 and the knowledge management aspects under Component 3. The implementation of output 1.4, and its vocational training will be responsive to the needs of all target individuals in Thimphu and Paro, ensuring mainstreaming of gender and youth (<36 years) perspectives throughout. |
| Advocacy and enterprise development programs and institutions | <p>Programs such as the Movers Programme and Youth Empowerment in Climate Actions Platform (YECAP) Fellowship Programme will support the achievement of Project outputs 1.2 and 1.4. The Movers Programme equips youth with the modern-day skills they need to become effective climate advocates and leaders. Similarly, the YECAP Fellowship Programme trains young leaders as climate leaders, green business creators and supporters, and enhances gender-responsive National Climate Action.</p> <p>Furthermore, enterprises such as Youth Co:Lab that supports investing in youth for gender-responsive climate actions will contribute to the achievement of Project Output 1.2. Youth Co:Lab promotes the development and adoption of policies, tools and initiatives that strengthen the operating environment for youth-led enterprises by convening dialogues among ecosystem stakeholders, facilitating knowledge exchange on the best practices and producing action-oriented research studies to guide the development of the ecosystem for youth entrepreneurship.</p>  |
| National Commission for Women and Children (NCWC)             | The NCWC will be engaged to provide support in mainstreaming gender throughout the project, support gender capacity building of project implementers and development of gender action plan in partnership with NGOs & CSOs working on and for gender equality and women's empowerment  |
| The Royal Commission for Urban Development (RCUD)             | Provide strategic direction for growth and development of urban areas and which includes developing urban planning and management policies, providing technical assistance and capacity building to local governments, and coordinating with other agencies and stakeholders involved in urban development.  |
| Bhutan Chamber of Commerce and industries                     | <p>Collaborate in implementing advocacy events on green, gender responsive and resilient construction entrepreneurship such as at national construction expositions and trade fairs,</p> <p>Support information dissemination on the project considering the gender-based differences in access to information, level of education and understanding of climate-related issues to the business communities</p>   |

The project aligns with the Climate Change Policy of the Kingdom of Bhutan 2020, which highlights the national aspiration to “protect the health, lives, livelihoods and happiness of the people of Bhutan from the adverse impacts of

climate change by building adaptive capacity and resilience to reduce vulnerability and by integrating adaptation actions into the development planning process at all levels". Further, the draft framework of 13th Five Year plan (2023-2026) further emphasizes strengthening the capacity for management of climate risks and stresses and reducing the vulnerability of urban landscape and communities to the impacts of climate change in Thimphu-Paro region. The policy reinforces the need for finance from international, national, and private sector sources as well as access of appropriate technologies for gender responsive adaptation actions.

The project will help in implementation of National Human Settlement Policy, 2019 that aims to provide a framework for planning and development of environmentally sustainable, culturally and economically vibrant and disaster resilient human settlements.

[1] The National Greenhouse Gas Inventory based on 2015 data, prepared as a part of the Third National Communication (2020), reflects a net negative GHG emission of -5,572.50 gigagram of CO<sub>2</sub> equivalent.

[2] M. S. Shrestha, et. Al "Flood Early Warning Systems in Bhutan: A Gender Perspective," ICIMOD, Kathmandu, 2016.

[3] Ngawang Chhogyel and Lalit Kumar, 'Climate Change and Potential Impacts on Agriculture in Bhutan: A Discussion of Pertinent Issues', *Agriculture & Food Security* 7, no. 1 (1 November 2018).

[4] The seasons are given by the National Center for Hydrology and Meteorology as per the following months: winter- December, January and February; spring- March, April and May; summer- June, July, August, and September; and autumn- October and November.

[5] World Bank Group, 'Bhutan - Summary | Climate Change Knowledge Portal', accessed 25 September 2022, <https://climateknowledgeportal.worldbank.org/country/bhutan>.

[6] International Centre for Integrated Mountain Development, 'Bhutan Climate Change Handbook' (Bhutan Media and Communications Institute, 2016).

[7] University of Notre Dame, "Bhutan," ND-GAIN Index, n.d.. [Online]. Available: <https://gain-new.crc.nd.edu/country/bhutan>. [Accessed 8 February 2023].

[8] The World Bank Group and Asian Development Bank, 'Climate Risk Country Profile: Bhutan', 2021.

[9] Anirudha Mahagaonkar et al., 'Glacier Environment and Climate Change in Bhutan—An Overview', *Journal of Climate Change* 3, no. 2 (2017): 1–10.

[10] The World Bank Group and Asian Development Bank, 'Climate Risk Country Profile: Bhutan', 2021.

[11] National Environment Commission Royal Government of Bhutan, "Third National Communication to the UNFCCC.", 2020.

[12] Source: UNDP/ ACREWAS Climate analysis 2022

[13] Minimum temperatures have increased globally three times faster than maximum temperatures and therefore are a better index of temperature change.

[14] T. Dorji and T. B. Tamang, "Analysis of Historical Climate and Climate Projection for Bhutan," National Center for Hydrology and Meteorology, Thimphu, 2019.

[15] National Statistics Bureau of Bhutan, "Rural-urban migration and urbanization in Bhutan," National Statistics Bureau of Bhutan, Thimphu, 2018.

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[17] G. Acharya, "Water shortage a national concern," Kuenselonline, 2 January 2021. [Online]. Available: <https://kuenselonline.com/water-shortage-a-national-concern/>. [Accessed 6 March 2023].

[18] Monthly water discharge data from 2014 to 2019 at Paro Bondey water monitoring station show that the water discharge varied from a high of 74.5 m<sup>3</sup>/sec in August to a low of less than 9 m<sup>3</sup>/sec in February.

[19] Gross National Happiness Commission, "Twelfth Five Year Plan," Gross National Happiness Commission, Thimphu, 2018.

[20] The World Bank, "International tourism, number of arrivals - Bhutan," The World Bank, 2020. [Online]. Available: <https://data.worldbank.org/indicator/ST.INT.ARVL?locations=BT>. [Accessed 17 February 2023].

[21] Number of tourists dropped in 2020 due to Covid-19 pandemic which is an outlier in the historical trend.

[22] Source: Map of flood-prone areas by National Environment Commission, 2016, cited in Flood Hazard Assessment Report of Thimphu Dzongkhag (undated) prepared by the Flood Engineering and Management Division, Department of Engineering Services, Ministry of Works and Human Settlement.

[23] Ministry of Works and Human Settlement, "Flood Hazard Assessment of Thimphu Dzongkhag," n.d.. [Online]. Available: [https://www.mowhs.gov.bt/wp-content/uploads/2019/02/Thimphu\\_Dzongkhag.pdf](https://www.mowhs.gov.bt/wp-content/uploads/2019/02/Thimphu_Dzongkhag.pdf). [Accessed 10 February 2023].

[24] <https://www.thinkhazard.org/en/report/635-bhutan-thimphu/LS>

[25] <https://www.thinkhazard.org/en/report/635-bhutan-thimphu/UF>

[26] <https://www.thinkhazard.org/en/report/629-bhutan-paro/UF>

[27] Unnikrishnan, A. S., et. al. (2006). Sea Level Changes along the Indian coast: Observations and Projections Current Science India, 90: 362-36, Emanuel, K. 2005. Increasing destructiveness of tropical cyclones over the past 30 years. Nature 436:686-688

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[31] Majority of women depended on agriculture (58.7%) as per the LFS 2022

[32] Unemployment, especially among youth, has emerged as a major challenge for modern Bhutan and has further grown in the recent years due to the impacts of the COVID-19 pandemic.

[33] This was 15.9% over Thimphu Structural Plan's (2002-2027) 2017 population projection.

[34] Dzongkhag Population Projections of Bhutan, 2017-2047, National Statistics Bureau.

[35] University of Notre Dame, "Bhutan," ND-GAIN Index, n.d.. [Online]. Available: <https://gain-new.crc.nd.edu/country/bhutan>. [Accessed 8 February 2023].

[36] While the vulnerable urban inhabitants in general area know, analysis of climate related impacts on these groups have not been undertaken for the Thimphu/Paro regions nor for Bhutan in general. To create a general overview of reported flood related damages and impact on people the National Centre for Hydrology and Meteorology compiled in 2016 a compendium of all of flood related news articles since 1968 and did a follow up in 2021 covering the period 2017-2021. Unfortunately no analysis of the impacts on specific populations groups based on the news reported data was done. Thus, the risks, the impacted populations, the general extent of the damage etc. are known in broad terms and hence can be recognized as issues that need to be addressed. However, specifics on the scale and scope of the impacts area have yet to be determined.

<https://www.nchm.gov.bt/attachment/ckfinder/userfiles/files/campendium.pdf> and

<https://www.nchm.gov.bt/attachment/ckfinder/userfiles/files/Compendium%20of%20extreme%20events%20vol2.pdf>

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[44] "National Housing Policy," Ministry of Works and Human Settlement, 2019.

[45] Dorji, Lham. Et. Al, "Challenges Facing Micro and Small Businesses Owned and Operated by Women in Bhutan" National Statistics Bureau, 2018

[46] More about UNDP's study in this area can be found here: <https://www.undp.org/bhutan/right-intervention-encourages-behavior-change-waste-segregation>

## B. PROJECT DESCRIPTION

### Project description

This section asks for a theory of change as part of a joined-up description of the project as a whole. The project description is expected to cover the key elements of good project design in an integrated way. It is also expected to meet the GEF's policy requirements on gender, stakeholders, private sector, and knowledge management and learning (see section D). This section should be a narrative that reads like a joined-up story and not independent elements that answer the guiding questions contained in the PIF guidance document. (Approximately 3-5 pages) see guidance here

The project objective is to strengthen the management of climate risks and reduce the vulnerability of urban landscapes, vulnerable population to the impacts of climate change in the Thimphu-Paro region. The Theory of Change for the project is that IF an integrated approach of improved coordination, capacities and tools combined with strategic tangible interventions in key sectors are provided THEN the households, businesses and local government entities in the Thimphu-Paro region will become more resilient to climate-induced urban risks BECAUSE the urban areas are better able to adapt to climate change and mitigate climate-induced climate risks in the future.

As a result the adaptive capacity of 71,087 women and 75,211 vulnerable men to make their livelihood resilient to climate change will be enhanced; 400 hectares of urban areas will be managed for climate-induced risks and stresses on water resources; capacity of local government, national agencies, and private sector for resilient urban planning and infrastructure development will be improved; geospatial and climate data based modeling and decision-making facilitate long-term climate risks mitigation in Thimphu and Paro; and enterprises and markets developed around climate resilient technologies and solutions and climate adaptation green jobs promoted.

These results are based on a subset of assumptions including: Climate-induced urban risks can be mitigated by appropriate planning and management of water resources, infrastructure, and geospatial information; the improved coordination and capacity building of relevant stakeholders will lead to effective implementation of climate resilient urban planning; and the adoption of innovative technologies for monitoring and early warning systems will enhance the preparedness and response to climate-induced risks.

The changing development context of Bhutan offers critical enablers that will help the project to achieve its objective. Enhancing the capacity of Local government including the municipalities is a core priority of the key performance indicator of the upcoming 13th Five Year Plan. Further both Urbanization and Resilient infrastructure have received renewed attention in the same plan. The Government is, as part of 13th FYP is also developing a separate strategy on digitization and technology to accelerate attainment of the development priorities. On-going reforms in the financing landscape such as fiscal decentralization, Public-Private-Partnership policy, focus on private sector growth, ease of accessing finances for small businesses would enable the project to develop tailor made financing solutions for the municipalities and the central government to solve the financing constraints. The country already has a network of technological universities, research institutions and the private sector entities, which would further enable the project to leverage their capacity to support developing the technological proposed solutions.

This will be achieved through the following three components: (1) Gender differentiated climate risk-informed, coordinated and inclusive planning, and governance for gender-responsive resilient urban development established; (2) nature-based solutions and gender-responsive climate resilient technologies introduced; and (3) Knowledge management and gender-responsive M&E system set up. The project's Theory of Change is illustrated in Annex H: Theory of Change.

The expected outcomes and outputs under each of the project components are briefly described below:

#### **Project Component 1: Gender-differentiated climate risk-informed resilient urban development.**

**Outcome 1:** *Institutional coordination, stakeholder engagement and climate adaptation capacity strengthened for inclusive and climate-resilient urban planning and development.*

GEF/LDCF funding: 5,600,000; Co-financing: 13,400,000

The project will build on the institutional coordination efforts initiated by the RCUD and will foster the institutional capacity for adoption of inclusive and gender responsive climate resilient urban planning and management pathways at the national level with specific focus on the Thimphu-Paro region. This will involve conducting a comprehensive review of existing national, district, and municipal institutional arrangements to assess their functionality, leading to the development of a participatory framework for inter-agency coordination to facilitate policy coherence across multiple sectors. The project will also establish climate and geospatial information systems and provide training to urban planners in risk-informed urban planning. Additionally, it aims to prepare climate-resilient and gender-responsive adaptation plans for Thimphu and Paro, exploring the collaborative role of different stakeholders, including women, private sector, civil society organizations, and media in supporting green and resilient buildings. The project further aims to introduce vocational training programs in two colleges/technical schools to upskill the construction workforce for climate-proofing standards in urban planning, as well as designing municipal financing solutions for promoting climate-resilient technologies and practices. This will involve reviewing existing fiscal and non-fiscal incentives, developing a robust incentive system with the Ministry of Infrastructure and Transport, and stimulating private sector investment in green and climate resilient construction technology. Partnerships with women-owned companies and enterprises will also be explored and prioritized, and advocacy events for green and resilient construction entrepreneurship will be developed. The following outputs will be delivered:

*Output 1.1: Inter-agency mandates and functions harmonized, and institutional coordination mechanisms established and made functional to facilitate policy coherence for climate-resilient urban planning and development.*

Currently, there is a lack of coordination and overlaps in mandates between institutions for the required coordinated efforts on climate-resilient urban planning. While upcoming projects such as GEF's 'Advancing Climate Resilience of the Water Sector in Bhutan (ACREWAS)', 2023- 2028 also aim to strengthen institutions in support of climate-resilient water management; its focus is mainly on the water sector and not on the needs of urban centres of Thimphu-Paro region. Although collaboration with existing and upcoming projects is relevant, this project will add value by streamlining institutional coordination and its functions for climate-resilient urban planning with focus on the urban areas of Thimphu-Paro region.

The project will support a comprehensive review of existing national, district and municipal institutional arrangements, mandates and functions, and an assessment of how these arrangements are functioning leading to an analysis of gaps, inconsistencies, and overlaps in the context of gender-responsive and climate-resilient urban development. To address the gaps, a strategy and operative framework for inter-agency coordination will be developed in a participatory manner. This framework will be used to facilitate policy coherence across multiple sectors that have stakes in urban land use and development. Identified changes to the inter-agency mandates and institutional coordination mechanisms, including that of the Royal Commission for Urban Development will be formalized and implemented at all levels within Government. This will close the current gaps in coordination as well as capacitate the agencies to make evidence-based decisions. To ensure that project implementers and stakeholders have an adequate understanding of gender, gender-differentiated impacts of and vulnerabilities to climate change, as well as the gaps in knowledge and capacities, sensitization workshops will also be organized that will include knowledge sharing on gender and climate nexus in the context of urban development. This output will also deliver participatory functional analysis to facilitate clarification of mandates, address the current functional gaps, including associated skills as well as for the application of data-based planning and decision-making tools.

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**Output 1.2:** Climate and geospatial information systems established with trained urban planners to promote risk informed urban planning.

Presently, climate-adaptive urban planning and development, for example, development of existing stormwater management systems are mostly built in an ad hoc manner. The use of centralized tools such as remote sensing, GIS technologies, comprehensive hazard information (geological, hydrological, and meteorological) are limited. While various donor-funded projects are involved in specific sectoral climate adaptation interventions (see Project Rationale section) and climate and geospatial information systems that can be used by urban planners to plan specific local interventions do not exist. This project will develop the information system and capacitate urban planners with knowledge and procedural steps for climate-adaptive urban planning solving the current ad hoc interventions.

The project will support the design and operationalization of multi-dimensional climate and geospatial information system which will capture and produce sex-disaggregated data and information accessible by relevant agencies to inform planning and decision-making. The project will coordinate with World Bank's project on "Strengthening Risk Information for Disaster Resilience" in identifying and addressing gaps in the current management of relevant data and information and geospatial information systems to ensure climate risk-informed planning and decision-making capacities are enhanced, and an enabling policy and legal framework is established for resilient urban planning and development for relevant sector such as the construction industry, water sector etc.

As such, the project will provide essential computerised tools such as SCADA to accurately monitor water supply by using sensors to pinpoint problematic areas that would enhance efficiency and resiliency of critical urban services. This system will be installed and operated in Thimphu Thromde, Paro municipality and the Ministry of Infrastructure and Transport. An operation and management manual for the information systems will be developed and user training will be conducted to familiarize planners, engineers, environment officers and other potential users from relevant agencies with a focus on using the information systems for climate-informed gender-responsive urban planning. Furthermore, a reference group led by the NCWC (including representation from the national women's machinery/CSO working with/for gender equality and women's empowerment) will be formed that will function as a core group of national experts for technical guidance in mainstreaming gender, climate adaptation and environmental sustainability in urban planning and budgeting systems. This group will be involved in the development of data systems for climate risk informed urban planning and delivery of training. The formation and operationalization of the mainstreaming reference group will build on the lessons from the work on dzongkhag (district) level mainstreaming reference groups carried out through the UNDP/GEF/LDCF project on "Enhancing Sustainability and Climate Resilience of Forest and Agricultural Landscapes and Community Livelihoods"<sup>[1]<sup>51</sup></sup> where it focuses on making national, local institutions and individuals better prepared and able to respond to climate change-induced and other disaster risks.

**Output 1.3:** Climate-resilient and gender-responsive adaptation plans prepared for Thimphu and Paro with active citizen participation and added emphasis on climate resilient entrepreneurship

A problem with ad hoc interventions (as is the current situation) related to climate-adaptive urban planning is that it negates to consider the impact of interventions from the perspective of different gender and vulnerable groups. This project will prepare climate-resilient and gender-responsive adaptation plans that will add value to the climate and geospatial information systems to make informed decisions that caters to different gender and vulnerable groups.



For inclusive and climate-adaptive development, the RGoB's Gross National Happiness Commission guidelines also instruct agencies at the Dzongkhag and Gewog (block) levels to mainstream cross-cutting issues including the environment, climate, gender etc.). The project will explore the collaborative role that women and other key populations and stakeholders (private sector, civil society organizations, women's groups, media) can render in gender-responsive climate-resilient urban development and improving the public amenities and utilities including stormwater management and water supply systems (linkage to Component 2). The project will support Thimphu Thromde and Paro municipalities to develop and implement detailed climate-resilient, gender-responsive adaptation plans based on sound gender analysis and evidence from the climate and geospatial information systems. This will also include a strategy to catalyze entrepreneurship in green and resilient buildings for their respective jurisdictions with particular attention to engaging women and other vulnerable groups as equal partners to create an inclusive and gender-responsive adaptation plan.

Entrepreneurships will be developed around the critical issues of urban biodiversity conservation, green-space maintenance, expansion and zoning as well as nature-based solutions for urban resilience. The role of youth, will be strengthened for the above activities.

The activities under this output will be closely linked to the project knowledge management work (Component 3) and will be an expansion of the project stakeholder engagement plan and gender action plan which will be developed as part of the PPG phase.

*Output 1.4: Vocational training programs introduced in two colleges/technical schools for skilling/ reskilling/upskilling of the construction workforce for climate-proofing standards.*

Currently, there is a lack of vocational training programs on building human resources that can execute climate-resilient interventions in urban planning. While projects such as the World Bank's "Bhutan Human Capital Recovery and Resilience Project" support vocational training on resilience of certain sectors post COVID-19, it does not, specifically focus on the required vocational training to develop a workforce fit to execute climate-resilient interventions in urban planning. Building on the synergies, cross-learning from past and ongoing projects on human resource capacities in the country, specific approaches towards inclusive trainings and capacity building relevant for urban resilience will be identified and pursued by this project.

To improve national and local capacity for public investment decision-making towards an integrated approach for gender-responsive climate change adaptation, watershed management, and urban planning and development in Bhutan, training and education will be institutionalized to ensure the long-term sustainability of the project-developed training and project-facilitated learning. The project will pursue the establishment of a program for urban planning professionals (public and private) to heighten the use of tools and techniques such as simulation modelling, remote sensing, and the use of analytical software. The program shall also enable participants to review, through software models such as InVest, different performance indicators related to watershed functions, GHG emissions, carbon sinks, local economies, land use profitability, and employment generation. Although not fully reliant upon this, the use of open software sources, decision-making systems and models will be promoted. Based on the training and materials developed, the developers will also prepare video recordings of their training. and these, including the training materials, will be packaged into Massive Open Online Courses (MOOCs) and will be accessible online via the project Knowledge Hub. For enrollment in the program, efforts will be made to engage women and youth through the design

of gender-friendly training materials to address barriers to women and youths' engagement. In addition to the development of a gender-responsive climate resilient urban planning program, a program on urban design, including the design of buildings, slope stabilization, open spaces, rainwater harvesting systems, drainage, and spillover solutions etc., will also be introduced.

Similarly, the project will strengthen existing vocational training programs in the area of green, gender-friendly and resilient construction technology such as permeable paving of building compounds, rooftop rainwater harvesting, and wastewater reuse/recycling. The project will coordinate with the World Bank's "Bhutan Human Capital Recovery and Resilience Program" to coordinate entrepreneurship development and skilling of the construction workforce for green and resilient building and the institutionalization of knowledge. A review of existing vocational training programs will be carried out from a gender and climate adaptation perspective followed by a detailed needs assessment of the training and training capacity of training service providers in the government, civil society organizations and private sector. This needs assessment will also build on findings from the gender assessment in technical and vocational education conducted by the Ministry of Industry, Commerce and Employment and the World Bank. Accordingly, existing vocational training programs will be strengthened, and training of trainers designed and delivered through a collaborative approach involving civil society organizations and the private sector. The skilled construction workforce from these training programs will be used, to the extent possible, in the implementation of the improved stormwater management planned under this project, thus allowing them to apply and hone the acquired skills. A tracer survey will be integrated into the vocational training programs to keep track of the application of the training skills by women and men and assess the effectiveness of the training programs (with gender disaggregated information). As with the above, as part of the project's stakeholder engagement and the gender action plan (to be fully developed during the PPG phase), the project will ensure that women and youth equally participate in and benefit from the vocational training programs by addressing the barriers to their meaningful participation.

To materialize these courses and learning programs, partnerships with learning institutions such as university colleges, (College of Science and Technology and College of Natural Resources) and technical training institutes mainly located in the Thimphu-Paro region while remaining flexible for partnerships in other regions will be sought for institutionalizing the capacity development activities. The institutional program delivery will be a key driver in creating the long-term capability of Bhutan to train government staff and practitioners, and private sector actors from all over Bhutan, in climate change and gender-responsive urban planning, and climate adaptive watershed planning and management, and the tools needed for preparing holistic integrated planning. Through the project, this capacity will be accessible to planners for the development or revisions of existing or future plans and strategies related to urban development, planning and resilience.

**Output 1.5: Innovative financing solutions for cities to invest in climate-resilient technologies and practices.**

Currently, there are no municipal financing solutions that focus on promoting climate-resilient technologies and practices in urban areas in the Thimphu-Paro region and there are limited incentive schemes for the private sector (especially small and medium enterprises) to invest in such technologies and practices. The project will support the identification and design of appropriate and innovative financing solutions for scaling of climate-resilient technologies and practices in both the public and private sectors in Bhutan. It will build on financial and budgetary work done within the Government through the SDG financing initiatives, Gender Responsive Planning and Budgeting and other interventions such as the BIOFIN programme to review and identify the options for leveraging Government funds and budget restructuring based on cost-benefit analysis ecosystem watershed services essential for climate risk reduction in the urban areas.

The project will review existing and potential fiscal and non-fiscal incentives within the prevailing policy and legal framework and support the development and implementation of a robust incentive system with the Ministry of Infrastructure and Transport. The fiscal and non-fiscal incentives will stimulate private sector investment in green, gender responsive and resilient construction technology, and help inform the government to broaden the incentives established in the National Housing Policy. This could include types of performance-based payment modalities related to the development of resilient and affordable housing. Furthermore, incentives to encourage women-owned enterprises to explore investment in such areas and allow more female engagement in technology-assisted construction is given priority. Such mechanisms will be further defined during the PPG phase. This will include an in-depth cost analysis of the historic climate change-related damages and gender-differentiated impacts to make reliable cost estimates of future damages in a business-as-usual scenario. The equally important aspects of taxation models which would include focused users' pay principle, as well as fully account for the cost of environmental damage and/or use of resources will also be explored. Different forms of redistribution models could also be pursued. The full scope of the project's taxation-related work will be developed during the PPG phase and will be examined and pursued at both the national and municipal levels. In addition, the project will further develop the ongoing Payments for Ecosystem Services (PES) initiatives and establish a national framework through which future local PES schemes can be developed.

During the PPG process, the private sector will be further consulted through a series of workshops, to facilitate establishing key private sector partnerships that will be maintained throughout the project's implementation phase. These partnerships would not only focus on the vocational training under output 1.4 and the engagement in the project's on-the-ground gender-responsive urban resilience work under component 2, but also their engagement in potential PES schemes benefitting stakeholders and habitats in the watersheds of the Thimphu and Paro regions. Finally, the project will develop and implement advocacy events on green, and resilient construction entrepreneurship, for example at national construction expositions and trade fairs, in collaboration with the Bhutan Chamber of Commerce and Industries (BCCI) and individual private enterprises. Efforts will be made to ensure information dissemination on the project considering the gender-based differences in access to information, level of education and understanding of climate-related issues.

## **Component 2: Build Resilience through gender-responsive climate adaptive approaches.**

**Outcome 2:** *Climate risk management measures designed and implemented for water management systems and urban infrastructure.*

GEF/LDCF funding: 10,489,166; Co-financing: 29,600,000

The Ministry of Works and Human Settlement (MoWHS) have carried out a flood hazard assessment of Thimphu Dzongkhag in 2019 and developed a flood management plan for Paro Dzongkhag and an Integrated Storm Water Management Plan (2021-2030) for Thimphu Thromde. Drawing on these assessments and plans, this outcome aims to improve gender-responsive flood disaster preparedness through early warning systems, build climate resilience of urban stormwater management systems to reduce surface water flooding and mitigate riverine flood risks using ecosystem/nature-based/hybrid solutions. Without these interventions, urban communities in Thimphu and Paro particularly women and other vulnerable groups will remain increasingly vulnerable to potential riverine flood disasters and will continue to experience surface water flooding year after year perhaps with more frequency and intensity. This will have huge economic and social impacts in particular, for women and urban poor such as daily wage

labourers, who -- for lack of land -- tend to live in areas exposed to flood risk and are likely to be severely impacted in the event of a flood disaster. The project will seek coordination and cross-learning with GEF's "Advancing Climate Resilience of the Water sector in Bhutan (ACREWAS)" to adapt relevant knowledge and add value to the ACREWAS project that is focused on Punatsangchu River Basin.

The project will build the capacity for and introduce climate-proofing of the pluvial water flow management within the urban setting ensuring water absorption and slowdown water release of rainwater during torrential downpour events, thereby lessening pressures on the stormwater management systems. The design of the stormwater drainage system will also be revisited and solutions, including nature-based solutions for a more optimized and climate-adaptive system, will be developed and introduced. This will include innovations targeting resilient affordable housing in the most vulnerable areas of Thimphu and Paro. The project will review the design of water drainage systems to guide the development of solutions that will help reduce hazard risk exposure. The project will design locally determined and gender-responsive climate adaptation solutions for most vulnerable target areas within Thimphu and Paro based on exposure to pluvial and/or fluvial flooding during the monsoon season or the expected increase in extreme climate events including cyclones. The specific areas of intervention will be identified during the PPG phase. Intervention areas will consider water flow parameters while developing the holistic approach bringing various design elements and solutions into play to optimize the overall water absorption runoff slow down and overall water management, including water retention. A combination of structural and nature-based design solutions will embed the flood risk reduction strategy of the target urban areas. Emerging cities in Bhutan can greatly benefit from the urban resilient practices and approaches undertaken by the project and this Outcome will contribute towards scaling up the NBS solutions to other urban cities and its local governments.

Output 2.1: Climate-proofing features for the key sections of the water and stormwater management systems introduced to ensure flood risk management, safe and uninterrupted water supply and business continuity in critical urban areas.

The existing stormwater drains in Thimphu and Paro towns are generally in poor condition, undersized for the runoff received and prone to blockages from solid waste. Domestic greywater and effluents are discharged to stormwater drains which ultimately discharge untreated into adjacent streams and rivers.

The existing stormwater management systems in urban areas have been mostly built in an ad hoc manner and are inadequate to meet the drainage needs of a growing urban population in a changing climate scenario. The Department of Engineering Services of the MoWHS has developed an Integrated Storm Water Management Plan (ISWMP) for Thimphu Thromde (2021-2030) while for Paro a technical assessment of the existing stormwater management system is yet to be carried out.

This project will support the implementation of the plan by improving stormwater management system. This will be done in a selected number of existing critical sections of the stormwater drainage system in Thimphu Thromde. The main infrastructure investments and related works on the stormwater management system in both Thimphu Thromde and Paro municipalities will be carried out through the government funding as part of co-financing to this project. The specific source/s of co-financing will be fully determined during the PPG phase but is expected to be a combined mix of Government financing through existing programs and donor-funded projects/programs. The project will introduce important aspects of climate-resilient innovative solutions to influence this work ensuring that the project-identified solutions become part of the new normative practice. This introduction of an improved stormwater management system will serve as part of the training of government engineers, private engineers, contractors, technicians, and other relevant persons who have a role in the design, construction and management of the stormwater management system (linked to component 1.1.4). In the case of Paro municipality, a technical assessment of the existing

stormwater management system and future needs would be carried out, based on which a climate responsive ISWMP for Paro municipality will be developed upon which structural rectification along with the necessary training will be carried out to build climate resilience of the stormwater management system. The technical assessment will also take into consideration the climate risk scenarios to make the system more robust and resilient.

Closely linked with stormwater management, the project will seek to improve water supply management by introducing improvements in key water supply systems that will serve as a template for future replication. Improved water supply management through the use of advanced tools such as SCADA systems will enable centralised and efficient water management.

Both improved stormwater management systems and water supply management that takes climate change risks into account will enhance urban resilience and enable safety and business continuity for businesses and urban dwellers including women and other vulnerable groups.

Output 2.2: Ecosystem and nature-based solutions identified, adopted and implemented for improved infiltration, restoration and recharge.

A comprehensive review study of water resources and their management in 2021 pointed out the need to consider rainwater harvesting (to address water demand) and groundwater recharge (to address localized water scarcity issues). Deteriorating infiltration and recharge capacity of catchments due to changing precipitation and temperature patterns is causing the retreat and drying up of water sources. The existing municipal water supply system of Thimphu is mostly dependent on natural streams while that of Paro is dependent on natural streams as well as riverside infiltration. This project will support the development and implementation of ecosystem/nature-based solutions to conserve and enrich water sources and catchments to improve their water yielding, infiltration and recharge capacity. Opportunities to establish watershed services-based Payments for Ecosystem Services (PES) scheme will be explored for the implementation and management of EbA/NbS interventions through upstream communities, building on lessons learnt and gaps identified from similar PES schemes supported through the ongoing UNDP/GEF/LDCF project on “Enhancing Sustainability and Climate Resilience of Forest and Agricultural Landscapes and Community Livelihoods.”

Flood risk management to protect important public infrastructure and vulnerable communities will be carried out using ecosystem/nature-based solutions such as roadside greening and landscaping, slope stabilization of critical sites, and ecosystem-based adaptation intervention at the catchment level. MoWHS has carried out a Flood Hazard Assessment of Thimphu Dzongkhag and prepared a Flood Management Plan for Paro Dzongkhag. These documents identify critical areas of mitigation and recommend measures for enhanced flood defense, for example, preservation and restoration of natural wetlands in Paro for flood management. This project will support the design and implementation of site-specific nature-based solutions from detailed field investigations. The project will build on the findings and recommendations of the above assessments and lessons from the UNEP/GEF Regional Project on Building Climate Resilience of Urban System through Ecosystem-based Adaptation. Gender-based analysis and information from communities will also be collected in addition to the above to provide comprehensive information on the impacts of floods and aid in the development of gender-responsive nature-based solutions. Concurrently, training, preferably on-the-job training and essential technological support will be provided to the agencies involved in carrying out the flood risk management. Furthermore, the involvement of local stakeholder groups, women, youth and local businesses will be engaged in designing technological and nature-based solutions as to instigate ownership and develop value chains for adaptation solutions in the target urban areas.

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Similarly, solutions such as slope stabilization of critical sites, greywater recycling, roadside greening, stormwater retention ponds, urban forests to lower temperature and revival of inner-city river streams and building footbridges across Wang Chu river flowing through Thimphu will serve as adaptation measures for water scarcity issues and adaptation to riverine floods. The adoption of NbS is to encourage the priority of green and sustainable solutions to urban infrastructure against concretization. Furthermore, the promotion of green and disaster-resilient buildings (for eg. buildings with elevated floors to reduce flooding risks) is a response to adaptation against urban climate risks. Integration of these interventions will improve water governance, reduce water-related conflicts, improve water catchment degradation, protect urban infrastructure, avoid public health risks, and improve the adaptation of vulnerable groups.

Output 2.3: Measures to increase climate resilience of buildings and design of urban spaces introduced.

Bhutanese buildings are characterized by use of materials that provide poor insulation which make them less capable to retain heat during cold winters and are susceptible to heat loss during the summer; use of unreinforced masonry or timber frames that make them vulnerable to earthquakes; limited ventilation leading to poor indoor air quality and high levels of humidity; constructed on steep slopes or near rivers, making them vulnerable to waterlogging and flooding. In general Bhutanese building practices lack incorporation of climate-resilient design principles.

There is limited knowledge of climate adaptive approaches to urban infrastructure, such as buildings and urban spaces. Currently practiced structural solutions focus on concrete defenses and barriers may not always serve the purpose of a climate-adaptive approach given that they reduce percolation, and the designs do not often consider climate risks that the region is likely to face in the future. Most interventions focus on specific aspects of building, construction and urban designs. For instance, the ADB funded Green and Resilient Affordable Housing Sector project has a construction focus on incorporating gender-inclusive features; enhanced safety against earthquake and fire hazards; and resource efficiency, into the building designs, as well as making greater use of locally available materials<sup>[2]<sup>52</sup></sup>. It will also engage in the development of climate- and disaster-resilient building designs. However, it differentiates itself in that it does not have a specific water related climate adaptation focus making output 2.3 highly relevant in that it will address the water related aspects of the Bhutan green building design 2013 guidelines<sup>[3]<sup>53</sup></sup>.

Climate change-induced natural disasters such as floods and landslides damage the water and sewer infrastructure, leading to service disruptions and increased repair costs. Water supply from lines which are fixed to steep hillsides get washed away by landslides during monsoons. Similarly, the sewer system, built in the 90s, faces challenges of overflows and blockages during the rainy season because of sediment collection in the pipes and the dumping of garbage in sewer lines. Furthermore, private sector construction is also unable to benefit fully from informed decisions regarding current and future risks, including climate-related risks.

Through this Output, interventions would focus on resilient retrofitting of affordable housing buildings, aspects of “flood evasion” as well as water harvesting and water retention. This output will work closely with National Housing Agency for review and revision of the Bhutan building codes and building guidelines to ensure that the legal base for

climate-resilient buildings is in place enabling upscaling of project interventions beyond the duration of the project. The project will explore various financing solutions to attract public and private investments for upscaling resilient technology that the project will experiment and innovate through demonstration.

The project will furthermore, under this output focus on the introduction of green, and climate resilient construction technology in the urban space such as permeable paving for sidewalks and parking spaces, rainwater harvesting, and wastewater reuse/recycling. Public and private sector engagement, particularly with women-owned enterprises will be sought as appropriate, including for small-scale solutions and installations suited for affordable housing, building complexes and/or community areas. In addition, the project will increase the integration of urban greening adjacent to roads, sidewalks, and smaller open urban areas.. This will at the same time create a cooling effect and increase biodiversity and livability in the urban setting. The improved urban design will include adaptation aspects such as gender and disabled-friendly alternative access for pedestrian evacuation during an emergency and adopting climate-smart technologies. Involvement of local stakeholder groups (including women, youth and schools), as well as local businesses will be sought. Also, the project's technical interventions, and the associated guidelines will be used in connection with the vocational training under output 1.4 and will be disseminated through the knowledge management pathways established under output 3.1 The project's on-the-ground work will set the foundation for local government staff, practitioners and stakeholders to continue and improve on the interventions such as through the innovative financial schemes to be developed under output 1.5 which will become a key vehicle for upscaling the role out of the project's innovations. And this project will identify institutions, businesses and property owners for partnerships to adopt and implement green and resilient building technology, methods, and practices for affordable housing. An initial list of sites and partners targeted for project interventions will be identified during the PPG phase. The specific source/s of co-financing will be fully determined during the PPG phase but is expected to be a combined mix between Government financing through existing programs as well as donor funded projects/programs.

*Output 2.4.: Ancillary rainfall threshold-based flood EWS developed on critical tributaries and integrated with the existing hydrological centralized data-based management system of NCHM.*

There is a gap in the past and ongoing interventions related to early warning systems in the Thimphu-Paro region. Flood Hazard Map has been completed for sections of Pa Chhu, Do Chhu for a return period for 25 years, incorporating 2050 climate change projections. Flood Hazard Maps were also generated for some extent of Thimphu Chhu, and Olarongchu and Chubachu streams. The project funded by the Government of Japan related to the enhancement of the existing early warning systems for floods in Thimphu and Paro, cover only the main river courses and not the tributary streams, some of which have a history of causing severe flash floods.

The project will expand on the coverage of early warning systems (EWS) to critical tributaries streams of Thimphu and Paro River basin focusing on areas categorized as flood-prone (see Project Rationale section). A potential coordinating project can be Government of Japan's "Capacity Enhancement of Meteorological Observation, Forecasting and Flood Warning for Disaster Preparedness and Response in Thimphu and Paro River Basins" (February 2020 to March 2023) adding to the coverage of flood monitoring and early warning systems.

Under this Output a detailed hydrological and flood risk assessments of the tributary streams of the Thimphu and Paro river basins will be conducted. Documented findings from these assessments will be used to design ancillary flood early warning systems for critical tributary streams that have a history of causing floods. Furthermore, the project will build the capacity of the National Center for Hydrology and Meteorology (NCHM) and the relevant Ministries and its staff enabling them to determine and prepare short-term and long-term models for pluvial water flows within the urban areas. Providing early warnings and predictions of water flow and water level rise in affected areas and ensuring

that everyone within the urban setting has access to the information can assist in minimizing local property damage. The strengthened capacity of NCHM and relevant Ministries on pluvial water flows within the urban areas and on EWS in Thimphu and Paro will enable upscaling the application of similar hydrological and flood risk assessments to other urban areas across Bhutan. In addition, understanding, through modelling the water flow pathways, the obstacles to these, and the impact of different degrees of a downpour will become essential to ensure holistic and resilient urban development planning. Attention will be given to the needs of women and other vulnerable groups such as PWD in the design of the early warning systems and their dissemination. An operations and maintenance manual for the early warning systems will be developed, and training will be provided to staff and relevant community members. Specific training areas will be assessed during the PPG phase. Project co-financing will be pursued for the establishment of water monitoring stations in broader Bhutan and the scope of the engagement will be identified during the PPG phase.

### **Component 3: Knowledge management, gender-responsive monitoring and evaluation**

***Outcome 3:** Gender responsive knowledge and communication products developed and platforms instituted to analyze and disseminate best practices and project lesson*

*GEF/LDCF funding: Proposed GEF financing 1,100,000; estimated Co-financing: 5,300,000: Estimated Baseline Finance: Donor and other project*

Emerging cities in Bhutan can greatly benefit from the urban resilient practices and approaches undertaken by the project and this Outcome will contribute towards the knowledge exchange and participation of these emerging urban cities and its local governments. Without this outcome, there will be little knowledge sharing and learning from the project activities and their results for adaptive management and reinforcement of project results. In addition, gender-disaggregated knowledge dissemination will be pursued through the project's capacity development training. It is expected that the project's interventions and results would inform, provide incentives, and guide other emerging urban centres in the country to develop and implement gender-responsive urban resilient interventions. The knowledge management of component 1.4 will become a key driver for knowledge dissemination and learning as it will create the long-term capability of Bhutan to train government staff and practitioners, including private sector actors, in climate change and gender-sensitive urban planning and climate adaptive watershed planning and management.

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***Output 3.1:** Knowledge and communication products and platforms developed to analyze and disseminate best practices and project lessons.*

Projects such as this one that aims to establish a momentum in the market and improve the institution(s) that faces risks of the public and relevant stakeholders not having access to the status of project activities and wealth of knowledge generated during and after the duration of the project. Without effective communication, the outputs of the project may not help to build future actions in the relevant field. With various ongoing UNDP and Government programs, effective communication and dissemination of knowledge products is key for future planning and sustenance of knowledge.



The project will ensure that the project-generated information and knowledge products will remain accessible to relevant users by integrating them into the website or knowledge platforms of the relevant institution(s) including UNDP's knowledge management platforms. The project will create and maintain an online repository of project-generated information and knowledge as well as relevant external resources. The project's knowledge management will include (i) documentation of processes, best practices, lessons learnt, and impact stories describing the theory of change and (ii) knowledge dissemination products that include learning/training modules, policy briefs, technical notes, and learning events for students, local government officials, etc. A knowledge, attitude and practice (KAP) survey will also be conducted in the first year of the project and reconducted at the mid and end of the project to assess the transformation in knowledge, attitude and practice of the project stakeholders. All communication and knowledge products will ensure gender-responsive languages, sex-disaggregated data and gender-related information on the project's processes, lessons and impacts. Furthermore, the project will develop a detailed gender-responsive communication strategy and action plan, which will identify the key target groups and outline the communication targeting these individual groups. Especial attention will be given to gender-differentiated knowledge on climate change, level of education and access to social media and other communication platforms. The communication strategy will outline its use of media, including social media and how these will be used in bringing targeted messaging and information to the intended target groups particularly women and other vulnerable groups. The strategy will have an associated budget ensuring that the project's communication outreach, which would include project-developed publications, videos, podcasts and infomercials, will be adequately funded during the full project period. The project's stakeholder engagement plan will have a separate section on how different stakeholder groups are/could be involved in the project's communication.

Output 3.2: Project progress and results are effectively tracked and managed through monitoring and evaluation.

Periodic project progress reports and implementation reports will be prepared, in accordance with UNDP and GEF guidelines, to keep track of the project results with the indicators and targets outlined in the project results framework. These reports will inform the gender-disaggregated project results including progress towards gender mainstreaming and stakeholder engagement. Annual reviews and monitoring missions will be conducted to ensure project activities are on the right course and appropriate timely adaptive measures are taken. In keeping with GEF and UNDP requirements, a project Mid-term Review will be undertaken to assess the extent to which project activities have progressed, examine the prospect of achieving the planned project results and recommend any course corrections or modifications including gender-based implementation necessary to ensure the achievement of the project results within the lifetime of the project. A Terminal Evaluation will also be carried out, no later than three months before project closure, to assess project efficiency and effectiveness, achievement of the project results, relevance and sustainability of the results, and project impacts, and come up with recommendations on project design, implementation, and reinforcement of project results. Both the mid-term and terminal evaluations will be carried out to ensure that the project is on track to achieve gender targets as well as evaluate gender-differentiated impacts, challenges and experiences. The monitoring of the project activities and regular interactions with the project stakeholders, as well as the project's reporting i.e. Result Oriented Annual Report of UNDP, and GEF annual Project Implementation Reports (PIR), etc., the mid-term review and terminal evaluation will be embedded in the project's M&E Framework, which will be developed during the PPG phase. Measures will be taken to ensure that the project's M&E framework is gender responsive and comprehensive to assess the impact of the project on all target individuals including women and other vulnerable groups.

The following table explains how the project will generate global environmental and adaptation benefits through this GEF project (additionality).

| Baseline  | Alternative  | Additionality   |
|---|--|---|
| <b>Project Component 1</b>  |  |   |
| Royal Commission for Urban Development has been set up and tasked with coordination function. However, meaningful coordination requires support with decision-making tools to facilitate policy coherence among the key sectors engaged in urban development and investments.   | By building on ongoing and past initiatives and anchoring onto the existing institutional framework for urban development the data analytics, decision-making support and planning tools and methods will enable effective coordination and policy coherence across the sectors in the target urban areas. A strategic inter-government and private sector stakeholder engagement plan that will converge efforts from different institutions towards gender-responsive and climate-adaptive urban planning. | An institutionalized and integrated approach to climate-adaptive urban design with clear roles and responsibilities of institutions fa policy coor herence. The coordinated effort will translate into future urban-wide planning decisions that are taken with gender-responsive urban adaptation as a priority supported by climate risk information system.  |
| There are a number of initiatives that have undertaken assessments of climate induced disasters in urban contexts. However, locally calibrated data is still limited, and tools and methods are not available to address data limitations, generate data and undertake risk assessments that can feed into planning and decision making.  | Climate and geospatial information systems with gender disaggregated information where appropriate will help generate data analytics to feed into urban planning and decision-making to incentivize climate resilient investments  | The climate and geospatial information systems will not be limited to the scope of the project. Cross-sectors, such as academics, can utilize the system for planning and innovative solutions (for eg. risk assessments, relief plans, solutions to specific hazard risks etc.). Cross-sectoral efforts will ultimately converge to coherent and consolidated local adaptation efforts.  |
| Limited incentive schemes to catalyse the private sector towards climate-resilient urban development.   | Incentive schemes for green, gender-friendly, and climate resilient construction technology will (i) push the public and private sectors to develop similar services in the market, (ii) communicate the government’s priority that will attract both the public and private sectors to explore modalities for green, gender responsive and resilient construction technology. This will also encourage women-owned businesses and enterprises   | The public and private sectors will be incentivised to create business models and offer services on green, gender-friendly and resilient construction technology. This will incentivize the market development for green and climate resilient technologies, such as availability of green construction services, the introduction of new technologies, an increase in the availability of green building materials etc.<br><br>This in turn will make the shift from primary concrete material-based solutions towards more robust and environment-friendly solutions. |
| While the projects at the baseline have focused on disaster preparedness, green and resilient affordable housing sector etc., there is a lack of courses offered for the government and private sector on climate adaptive urban planning, and the related construction skills and services for the private sector (for example, nature-based solutions design and construction expertise). | Learning courses co-developed with learning institutions will institutionalize knowledge beyond the project duration and help generate the cadre of urban planners and engineers with adequate knowledge and skills for climate resilient technologies and design solutions.   | For the relevant public sector, climate-informed urban planning will be part of the regular training required to fulfil their tasks.<br><br>For the young and professional workforce, courses offered via learning institutes will serve as a pathway to career development in green, gender-friendly and resilient construction. This will capacitate both public and private future workforces to work with gender and environment-friendly green technology.   |
| No climate-resilient and gender-responsive adaptation plan prepared for Thimphu and Paro.   | Climate-resilient and gender-responsive adaptation plan prepared for Thimphu and Paro.   | Aligned with RGoB’s Gross National Happiness Commission’s recommendations, gender-responsive adaption plans will institute a participatory approach to urban planning and design that are responsive to the needs and priorities of men and women. This increases workforce participation in and benefits from climate-adaptive initiatives.  |
| <b>Project Component 2</b>  |  |   |
| Ad hoc and mostly reactive implementation of stormwater drainage systems and limited capacities to improve them.  | A participatory approach to improved stormwater drainage systems will guide both the government and private sector in its planning, design, implementation, operation and maintenance stages. Effective introduction coupled with capacity development will institutionalize the new approaches geared towards intensified projected flooding. The approach will also ensure gender perspectives in the design and implementation of improved drainage systems.  | The improved stormwater management system can serve as a nationally replicable model through technical and implementation guidelines. It will make the focus regions climate adaptive by managing surface run-offs which can be replicated in other areas of the country which will amplify the benefits.   |
| While regional projects such as “Regional Project on Building Climate Resilience of Urban System through Ecosystem-based Adaptation in the Asia-Pacific” promote nature-based solutions, there is a lack of focused localized effort in integrating nature-based solutions for climate  | A participatory approach to demonstrating gender-responsive nature-based solutions to adapt to heat-island effect, floods, landslide and water stress will introduce and institutionalize the knowledge for nature based solutions as well as ecosystem based approaches at the catchment  | The public and private sectors will no longer see concretization as the primary solution to urban infrastructure. This will incentivize the adoption of environment-friendly nature-based solutions.  |

|  |  |   |
|--|--|---|
| adaptive urban planning. Similarly, there have been one-off activities from different pilot projects.  | level within which the target municipalities are located   |   |
| <b>Project Component 3</b>   |  |   |
| While multiple projects are working on climate-related activities in Bhutan, knowledge about project learnings, and awareness activities that reach the public, are not widely disseminated. | Various means of knowledge and communication products (UNDP platforms, social media, newsletters etc.) will effectively help information dissemination taking into consideration the gender-differentiated level of understanding, access to information and level of education. | Increased awareness among stakeholders (including at the local level) and beneficiaries are crucial for the long-term effective use and adoption of green, gender-friendly and resilient technologies. Understanding and awareness will improve public ownership and public behaviour which, in turn, reduces environment-harming activities such as littering in drains and sewage networks. |

[1] The project is due to conclude by the end of 2023.

[2] <https://www.adb.org/projects/54355-001/main>

[3] <https://www.moit.gov.bt/wp-content/uploads/2014/05/Bhutan-GREEN-Building-Design-Guidelines-PDF-for-website-FI.pdf>

## Coordination and Cooperation with Ongoing Initiatives and Project.

Does the GEF Agency expect to play an execution role on this project?

Yes

If so, please describe that role here. Also, please add a short explanation to describe cooperation with ongoing initiatives and projects, including potential for co-location and/or sharing of expertise/staffing

The project will be implemented following the modality for Country Office support to National Implementation Modality (NIM). The PPG will be directly implemented by UNDP. During the project formulation phase utilising PPG, UNDP will engage the government to carefully assess and jointly determine the scope and extent of the CO support to the implementation of the project (i.e. CO support to NIM or any other third-party engagement in execution). The proposal for CO support to NIM will be discussed and agreed to with GEF Sec during the PPG phase.

The project will seek coordination with ongoing projects as described in the table below.

| Title   | Duration             | Budget in USD million     | Funding Agency              | Areas for Linkage and Synergy   |
|---|----------------------|---------------------------|-----------------------------|---|
| UNDP/GEF Project on Enhancing Sustainability and Climate Resilience of Agricultural and Forest Landscapes and Community Livelihoods | Oct 2017 to Oct 2023 | 13.967                    | Global Environment Facility | Build on lessons related to mainstreaming reference groups and watershed services-based PES schemes. This aligns with Project Component 2 of this proposal.   |
| UNEP/ GEF Regional Project on Building Climate Resilience of Urban System through Ecosystem-based Adaptation in the Asia-Pacific    | Dec 2019 to Nov 2023 | Total: 6.0<br>Bhutan: 1.0 | Global Environment Facility | Build on lessons related to EbA/NbS for the reduction of climate risks and vulnerabilities. The new project will be localized with a focus on the Thimphu-Paro region. This aligns with Project Component 2 of this proposal. |

|  |                      |     |                       |  |
|--|----------------------|-----|-----------------------|--|
| Promotion of Renewable Energy and Energy Efficient Technologies in the Building Sector | Jul 2020 to Jun 2023 | 1.1 | Government of Austria | Build on lessons from the project to demonstrate and promote energy efficiency in buildings. This aligns with Project Component 2 where climate-adaptive and resilient buildings in urban spaces are introduced. |
|--|----------------------|-----|-----------------------|--|

Furthermore, there have been ongoing efforts in nature-based solutions such as rainwater harvesting concentrated in certain areas of Bhutan. For example, the Small Grants Program of the Bhutan Foundation and UNDP's SGP is supporting an enterprising women's group in Chubjekha village in Paro to install nine roof rainwater harvesting systems for agricultural use<sup>[1]</sup><sup>54</sup>. Similar one-off projects have been implemented after concluding that rainwater harvesting is a cost-effective solution to freshwater access within the difficult landscape of Bhutan, where otherwise, freshwater access can be several kilometres from the settlement<sup>[2]</sup><sup>55</sup>. In water scarce Dechenling Gewog in Pema Gatshel, the Royal Society for Protection of Nature through the UNDP Small Grants Programme has experimented with hybrid rooftop rainwater harvesting. As a part of the project, Zabo system experimented with 39 water collection trenches/ponds around the Peling-Tsho lake for groundwater recharge. This project will expand on the previous efforts of nature-based solutions. It will also build on the knowledge and experiences of women to strengthen gender-based urban planning and resilience building.

[1] Bhutan Foundation, "More than 30 acres of land are left fallow due to water scarcity.," Bhutan Foundation, 3 September 2021. [Online]. Available: <https://www.bhutanfound.org/bhutan-foundation-supports-rainwater-harvesting-system-in-chubjekha-village-in-paro/>. [Accessed 11 February 2023].

[2] K. Choden, "Lhuentse: Rainwater Harvesting," Bhutan's National Newspaper, 2009. [Online]. Available: [https://www.raonline.ch/pages/bt/dev/btdev\\_rain01.html](https://www.raonline.ch/pages/bt/dev/btdev_rain01.html). [Accessed 11 February 2023].

## Core Indicators

Explain the methodological approach and underlying logic to justify target levels for Core and Sub-Indicators (max. 250 words, approximately 1/2 page)

## META INFORMATION – LDCF

|  |  |  |
|--|--|--|
| LDCF <b>true</b>   | SCCF-B (Window B) on technology transfer<br><b>false</b> | SCCF-A (Window-A) on climate Change adaptation<br><b>false</b> |
| Is this project LDCF SCCF challenge program?<br><b>false</b>   |  |  |
| This Project involves at least one small island developing State(SIDS).<br><b>false</b>                          |  |  |
| This Project involves at least one fragile and conflict affected state.<br><b>false</b>                          |  |  |
| This Project will provide direct adaptation benefits to the private sector.<br><b>false</b>                      |  |  |
| This Project is explicitly related to the formulation and/or implementation of national adaptation plans (NAPs). |  |  |

**false**

This project will collaborate with activities begin supported by other adaptation funds. If yes, please select below

|                    |                 |   |
|--------------------|-----------------|---|
| Green Climate Fund | Adaptation Fund | Pilot Program for Climate Resilience (PPCR) |
| <b>false</b>       | <b>false</b>    | <b>false</b>                                |

This Project has an urban focus.

**true**

This project will directly engage local communities in project design and implementation

**true**

This project will support South-South knowledge exchange

**false**

This Project covers the following sector(s)[the total should be 100%]: \*

|   |         |
|---|---------|
| Agriculture   | 0.00%   |
| Nature-based management   | 20.00%  |
| Climate information services  | 20.00%  |
| Coastal zone management   | 0.00%   |
| Water resources management  | 20.00%  |
| Disaster risk management  | 30.00%  |
| Other infrastructure  | 0.00%   |
| Tourism   | 0.00%   |
| Health  | 0.00%   |
| Other (Please specify comments)<br>Policies, capacity building, KM. | 10.00%  |
| Total   | 100.00% |

This Project targets the following Climate change Exacerbated/introduced challenges:\*

|                  |                                       |                                |                 |
|------------------|---------------------------------------|--------------------------------|-----------------|
| Sea level rise   | Change in mean temperature            | Increased climatic variability | Natural hazards |
| <b>false</b>     | <b>true</b>                           | <b>true</b>                    | <b>true</b>     |
| Land degradation | Coastal and/or Coral reef degradation | Groundwater quality/quantity   |                 |
| <b>false</b>     | <b>false</b>                          | <b>false</b>                   |                 |

## CORE INDICATORS – LDCF

|   | Total          | Male      | Female    | % for Women |
|---|----------------|-----------|-----------|-------------|
| CORE INDICATOR 1<br>Total number of direct beneficiaries  | 146,298        | 75,211.00 | 71,087.00 | 48.59%      |
| CORE INDICATOR 2<br>(a) Area of land managed for climate resilience (ha)<br>(b) Coastal and marine area managed for climate resilience (ha) | 400.00<br>0.00 |           |           |             |
| CORE INDICATOR 3<br>Number of policies/plans/ frameworks/institutions for to strengthen climate adaptation                                  | 3.00           |           |           |             |
| CORE INDICATOR 4<br>Number of people trained or with awareness raised   | 200            | 100.00    | 100.00    | 50.00%      |
| CORE INDICATOR 5  | 0.00           |           |           |             |

Number of private sector enterprises engaged in climate change adaptation and resilience action

## Risks to Project Preparation and Implementation

Summarize risks that might affect the project preparation and implementation phases and what are the mitigation strategies the project preparation process will undertake to address these (e.g. what alternatives may be considered during project preparation—such as in terms of consultations, role and choice of counterparts, delivery mechanisms, locations in country, flexible design elements, etc.). Identify any of the risks listed below that would call in question the viability of the project during its implementation. Please describe any possible mitigation measures needed. (The risks associated with project design and Theory of Change should be described in the “Project description” section above). The risk rating should reflect the overall risk to project outcomes considering the country setting and ambition of the project. The rating scale is: High, Substantial, Moderate, Low.

| Risk Categories        | Rating   | Comments   |
|------------------------|----------|--|
| Climate                | Moderate | Extreme weather events, such as heavy rainfall, floods and landslides can damage infrastructure, disrupt drinking water supply and stormwater management systems and increase the risk of waterborne diseases during the implementation of the project. The project implementation team will carefully plan the timeline, coordinate and execute in close consultation with all the relevant experts and stakeholders to avoid the adverse impact of extreme weather conditions. Please see the project’s pre-SESP for details.                            |
| Environment and Social | Moderate | The overall risk is that the projected climate-resilient urban development project will not be wholly inclusive and will have unanticipated negative consequences. This could result from the insufficient engagement of vulnerable groups, inadequate consideration of gender balance, and inability to effectively design and implement infrastructure and nature-based solutions. If project operations are not carried out appropriately, there is also a risk of environmental damage and public health hazards. To mitigate these risks, the project |

|                          |          |   |
|--------------------------|----------|---|
|                          |          | <p>team will prioritize stakeholder engagement and inclusion, conduct proper assessments of environmental impact and seismic hazards, and collaborate closely with local experts to ensure that standard of infrastructure and nature-based solutions are designed and implemented appropriately, providing equal employment opportunity to women and the vulnerable group. Please see the project's pre-SESP for details.</p>  |
| Political and Governance | Moderate | <p>The project may face changes in government priority shaped by the political landscape. Given that the project is focused on Thimphu and Paro region with localized interventions, a severe impact on project execution from the national political scenario is unlikely.</p>   |
| Macro-economic           | Moderate | <p>The national macroeconomic situation could hamper investment and economic activities to generate income. This will significantly impact the engagement of private sectors and market catalysation of green and resilient construction. This could also relate to the materialisation of co-finance. Further, increase in costs due to inflation/cost of material/transport etc. may affect escalate the overall project cost. All activities of the project are mainly designed to capacitate all stakeholders. While macro-economic factors may temporarily hamper investments, the institutionalised knowledge will encourage the market to uptake the intended project outcomes as the investment cycle grows. Co-financing letter from the Ministry of Finance provides sovereign assurance. To mitigate overall project</p> |

|  |          |   |
|--|----------|---|
|  |          | cost escalation, the PPG could allocate a contingency in the project costing  |
| Strategies and Policies                                      | Moderate | Strategies and policies are not being implemented effectively. All project activities will be closely designed within the strategic and policy framework of the central government. In the implementation aspects, the project activities will be closely coordinated with respective municipalities for effective implementation.  |
| Technical design of project or program                       | Moderate | Lack of local awareness and technical skills to design as well as construct resilient infrastructures which this project intends to resolve. The project intends to capacitate and institutionalise skills required for climate-adaptive urban planning and climate-resilient construction. With an expert pool, the project activities will be closely enacted with relevant stakeholders to deliver the technical aspects of the project as intended.   |
| Institutional capacity for implementation and sustainability | Moderate | The capacity of local institutions limits upskilling and knowledge transfer to be institutionalized. All project activities of the project will be closely acted on in coordination with the relevant government and private stakeholders. Supporting the institutions from the early stages of the project (for example, during the design of improved stormwater management systems, evaluation of best nature-based solutions for site-specific flood control etc.) will better prepare the institution to carry forward the activities and institutionalize them. High turnover of government staff who will be managing the various project components. To minimize the project risks due to staff turnover, the project |



|   |          |   |
|---|----------|---|
|   |          | will hire a manager to be stationed with the focal government institution to ensure continuity and smooth transition in case of staff turnover.   |
| Fiduciary: Financial Management and Procurement | Moderate | Non-compliant and unmanaged financial and procurement activities. All project activities will strictly follow the policies and guidelines of GEF, UNDP and the executing agency.  |
| Stakeholder Engagement                          | Moderate | The risk of inadequate stakeholder participation is that essential stakeholders' perspectives, and requirements are not sufficiently considered, resulting in ineffective or unsustainable project outcomes. The project ensures inclusive and effective involvement of stakeholder groups throughout the project cycle to assist in minimizing the risk of inadequate stakeholder engagement and provide more effective, equitable, and sustainable project outcomes. Please see the project's pre-SESP for details.   |
| Other   |          |   |
| Financial Risks for NGI projects                |          | Not applicable  |
| Overall Risk Rating                             | Moderate | The proposed approaches may fail to address the complex and interconnected climate risks and vulnerabilities of the urban city and its stakeholders, resulting in suboptimal or unsustainable outcomes. The project team will adopt a comprehensive and integrated approach that stresses participative and adaptive management, risk-informed decision-making, and capacity-building can reduce total program risk. At the same time, it raises the prospects of achieving sustainable and resilient urban development. Please see the project's pre-SESP for details. |

### C. ALIGNMENT WITH GEF-8 PROGRAMMING STRATEGIES AND COUNTRY/REGIONAL PRIORITIES

Describe how the proposed interventions are aligned with GEF- 8 programming strategies and country and regional priorities, including how these country strategies and plans relate to the multilateral environmental agreements.

Confirm if any country policies that might contradict with intended outcomes of the project have been identified, and how the project will address this.

For projects aiming to generate biodiversity benefits (regardless of what the source of the resources is - i.e., BD, CC or LD), please identify which of the 23 targets of the Kunming-Montreal Global Biodiversity Framework the project contributes to and explain how. (max. 500 words, approximately 1 page)

This project is aligned with LDCF priority areas. Some of the LDCF priority areas that the project addresses are strengthening institutional capacity and capacity-building efforts at all levels, enhancing gender responsive tools and metrics as enablers for adaptation impact, strengthening innovation & adaptation impact and strengthening innovation & private sector engagement. The project also aligns with the GEF-8 Climate Change Adaptation Programming Strategy to facilitate transformational adaptation in developing countries, towards achieving the Paris Agreement's global goal of adaptation<sup>[1]<sup>56</sup></sup>. The project will work on three of the themes highlighted in GEF-8 CCA Programming Architecture, namely water (theme 2), nature-based solutions (theme 3), and early warning and climate information systems (theme 4), while also fostering conditions for enabling transformational adaptation through the emphasis on the three key levers: (1) policy coherence and mainstreaming of gender-responsive climate adaptation, (2) strengthened governance for adaptation, and (3) knowledge exchange and collaboration. The project will contribute to GEF-8 Sustainable Cities Integrated Program by working with diverse stakeholders to build nature-positive, inclusive and climate-resilient urban landscapes, and to GEF-8 Climate Change (mitigation) focal area by promoting nature-based solutions.

From the perspective of Sustainable Development Goals (SDGs), the project will contribute to SDG 11- making cities and human settlements inclusive, safe, resilient and sustainable, and SDG 13- taking urgent action to combat climate change and its impacts. The cross-cutting SDGs are SDG 5 – Gender equality and women's empowerment, SDG 15 – Biodiversity, forests, desertification and SDG 3 – Good health by a reduction in waterborne diseases (improved urban infrastructure) and well-being of the beneficiaries.

The project will also contribute to the Beijing Declaration and Platform for Action, a strategic area on women and the environment and responds to para 21, “disaster risk reduction and climate change” of the advanced list of issues prior to reporting by the UN Convention on Elimination of Discrimination Against Women (CEDAW) for the RGoB's 10<sup>th</sup> periodic report.

At the country level, the project is in line with Bhutan's development policies and the following key national/regional strategies and plans (listed in chronological order):

- (1) Bhutan National Adaptation Programme of Action (NAPA) 2006: This project aligns with the vulnerability sectors identified in the NAPA document, mainly relating to natural disaster & infrastructure risks in human settlements: urban, suburban and rural settlements (pg. 8, NAPA).
- (2) National Disaster Management Strategy 2015, specifically concerning the implementation of priority action 2 - strengthening risk governance system and priority action 4 - strengthening disaster management capabilities. This strategy contributes to the national implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030.
- (3) Economic Development Policy 2016: The project aligns with the national aspiration of a carbon-neutral and climate-resilient economy enunciated in the Nationally Determined Contributions.
- (4) The Climate Change Policy of the Kingdom of Bhutan 2020: This provides policy guidance for the achievement of a climate-resilient and carbon-neutral economy that contributes to GNH and reaffirms its commitment to remain carbon neutral first announced at COP 15 and reiterated in the First and Second Nationally Determined Contributions to achieve the global targets set out in the Paris Agreement.

- (5) National Environment Strategy (NES) 2020: The project will contribute to several of the NES strategic objectives, in particular: strategic objective 2 - enhance disaster preparedness and response; strategic objective 4 - promote environmentally friendly and climate-resilient roads and infrastructure; strategic objective 7 - ensure green, sustainable settlements; strategic objective 20 - prevent damage from flood disasters; and strategic objective 22 - ensure efficient use of water resources.
- (6) Third National Communication to the UNFCCC 2020: The project will contribute to the vulnerability and adaptation assessment in the fields of water resources, urban planning and infrastructure development, and disasters.
- (7) Second Nationally Determined Contribution 2021: Specifically concerning the implementation of the Low-Emission Development Strategy for Human Settlements through the promotion of energy-efficient and green building technology.
- (8) Thimphu-Paro Strategic Prospectus and Regional Strategy 2022: This provides the vision and a cohesive and holistic framework for the spatial development of the Thimphu-Paro region including resilience against geohazards and climate change. Enhancement of the natural environment and resilience against disasters feature among the ten themes for the spatial development of the region.
- (9) National Gender Equality Policy 2020: The policy provides policy guidance for mainstreaming gender in all climate change and disaster risk reduction interventions, and involvement of women and girls as equal partners in all climate-related decision-making and actions
- (10) National Human Settlement Strategy, 2017

[\[1\]](#) The global adaptation goal is articulated in Article Seven of the Paris Agreement as “enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring adequate response to the context of the temperature goal...”

## D. POLICY REQUIREMENTS

### **Gender Equality and Women’s Empowerment:**

We confirm that gender dimensions relevant to the project have been addressed as per GEF Policy and are clearly articulated in the Project Description (Section B).

Yes

### **Stakeholder Engagement**

We confirm that key stakeholders were consulted during PIF development as required per GEF policy, their relevant roles to project outcomes and plan to develop a Stakeholder Engagement Plan before CEO endorsement has been clearly articulated in the Project Description (Section B).

Yes

### **Were the following stakeholders consulted during project identification phase:**

Indigenous Peoples and Local Communities: Yes

Civil Society Organizations: Yes

Private Sector: Yes

### **Provide a brief summary and list of names and dates of consultations**

Prior to finalization of the PIF, a multi-stakeholder Task Force was established to facilitate incorporating the concerns of stakeholders into the design of PIF. As of PIF submission, four rounds of Task Force Meetings were held. Further, specific consultations were held with stakeholders at the level of Thimphu and Paro Municipalities as well as with civil societies. Overall, these consultations engaged 115 individuals comprising of 35 women and 80 men. A summary of discussions and list of participants of these consultations is presented in Annex H.

(Please upload to the portal documents tab any stakeholder engagement plan or assessments that have been done during the PIF development phase.)

### Private Sector

Will there be private sector engagement in the project?

Yes

And if so, has its role been described and justified in the section B project description?

Yes

### Environmental and Social Safeguard (ESS) Risks

We confirm that we have provided indicative information regarding Environmental and Social risks associated with the proposed project or program and any measures to address such risks and impacts (this information should be presented in Annex D).

Yes

Overall Project/Program Risk Classification

|     |                             |     |    |
|-----|-----------------------------|-----|----|
| PIF | CEO<br>Endorsement/Approval | MTR | TE |
|-----|-----------------------------|-----|----|

Medium/Moderate

## E. OTHER REQUIREMENTS

### Knowledge management

We confirm that an approach to Knowledge Management and Learning has been clearly described in the Project Description (Section B)

Yes

## ANNEX A: FINANCING TABLES

### GEF Financing Table

Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

| GEF Agency | Trust Fund | Country/<br>Regional/<br>Global | Focal Area | Programming of Funds | Grant / Non-Grant | GEF Project Grant(\$) | Agency Fee(\$) | Total GEF Financing (\$) |
|------------|------------|---------------------------------|------------|----------------------|-------------------|-----------------------|----------------|--------------------------|
|------------|------------|---------------------------------|------------|----------------------|-------------------|-----------------------|----------------|--------------------------|

|                                 |      |        |                |                         |       |                      |                     |                      |
|---------------------------------|------|--------|----------------|-------------------------|-------|----------------------|---------------------|----------------------|
| UNDP                            | LDCF | Bhutan | Climate Change | LDCF Country allocation | Grant | 18,048,624.00        | 1,624,376.00        | 19,673,000.00        |
| <b>Total GEF Resources (\$)</b> |      |        |                |                         |       | <b>18,048,624.00</b> | <b>1,624,376.00</b> | <b>19,673,000.00</b> |

### Project Preparation Grant (PPG)

Is Project Preparation Grant requested?

true

PPG Amount (\$)

300000

PPG Agency Fee (\$)

27000

| GEF Agency                   | Trust Fund | Country/<br>Regional/<br>Global | Focal Area     | Programming<br>of Funds | Grant / Non-<br>Grant | PPG(\$)           | Agency<br>Fee(\$) | Total PPG<br>Funding(\$) |
|------------------------------|------------|---------------------------------|----------------|-------------------------|-----------------------|-------------------|-------------------|--------------------------|
| UNDP                         | LDCF       | Bhutan                          | Climate Change | LDCF Country allocation | Grant                 | 300,000.00        | 27,000.00         | 327,000.00               |
| <b>Total PPG Amount (\$)</b> |            |                                 |                |                         |                       | <b>300,000.00</b> | <b>27,000.00</b>  | <b>327,000.00</b>        |

Please provide justification

### Sources of Funds for Country Star Allocation

| GEF Agency                 | Trust Fund | Country/<br>Regional/<br>Global | Focal Area | Sources of Funds | Total(\$)   |
|----------------------------|------------|---------------------------------|------------|------------------|-------------|
| <b>Total GEF Resources</b> |            |                                 |            |                  | <b>0.00</b> |

### Indicative Focal Area Elements

| Programming Directions    | Trust Fund | GEF Project Financing(\$) | Co-financing(\$)     |
|---------------------------|------------|---------------------------|----------------------|
| CCA-1-2                   | LDCF       | 18,048,624.00             | 51375000             |
| <b>Total Project Cost</b> |            | <b>18,048,624.00</b>      | <b>51,375,000.00</b> |

### Indicative Co-financing

| Sources of Co-financing      | Name of Co-financier | Type of Co-financing | Investment Mobilized   | Amount(\$)           |
|------------------------------|----------------------|----------------------|------------------------|----------------------|
| Recipient Country Government | Ministry of Finance  | Other                | Investment mobilized   | 21700000             |
| Recipient Country Government | Ministry of Finance  | In-kind              | Recurrent expenditures | 29600000             |
| GEF Agency                   | UNDP                 | Grant                | Investment mobilized   | 75000                |
| <b>Total Co-financing</b>    |                      |                      |                        | <b>51,375,000.00</b> |

Describe how any "Investment Mobilized" was identified

The total amount of co-financing for the project is expected to be USD 51,375,000 and will be derived through investment mobilized and in-kind co-financing types. USD 21,775,000 of this co-financing comes from Investment mobilized categories. "Investment Mobilized", which does not fall under other GEF co-financing categories as described in the GEF policy. These mobilized investments are from the current (or planned) projects implemented/to be implemented in Bhutan that support the overall objectives of the ECRUL Project. UNDP will also provide USD 75,000 in co-financing towards the project management cost. The details of these investments mobilized co-financing along with the co-financing letters will be obtained during the PPG stage and submitted with the CEO Endorsement Package.

The co-financing, identified at the PIF, is pegged at the ratio of 1:2.5, which is set at a lower limit inclusive of the co-financing solely from the government entities. However, the detailed co-financing data will be worked out in the PPG phase which will comprise of co-financing from private sectors and relevant agencies as the Stakeholder Engagement Plan firms up. Hence it is expected that there will be an increase of the co-financing ratio at the project submission. The full Agency co-financing will also be determined at this time.

## ANNEX B: ENDORSEMENTS

### GEF Agency(ies) Certification

| GEF Agency Type        | Name                   | Date      | Project Contact Person                      | Phone | Email                 |
|------------------------|------------------------|-----------|---|-------|-----------------------|
| GEF Agency Coordinator | Pradeep Kurukulasuriya | 4/10/2023 | Aishath Azza, Regional Technical specialist |       | aishath.azza@undp.org |

### Record of Endorsement of GEF Operational Focal Point (s) on Behalf of the Government(s):

| Name          | Position | Ministry            | Date (MM/DD/YYYY) |
|---------------|----------|---------------------|-------------------|
| Loday Tsheten | Director | Ministry of Finance | 3/20/2023         |

## ANNEX C: PROJECT LOCATION

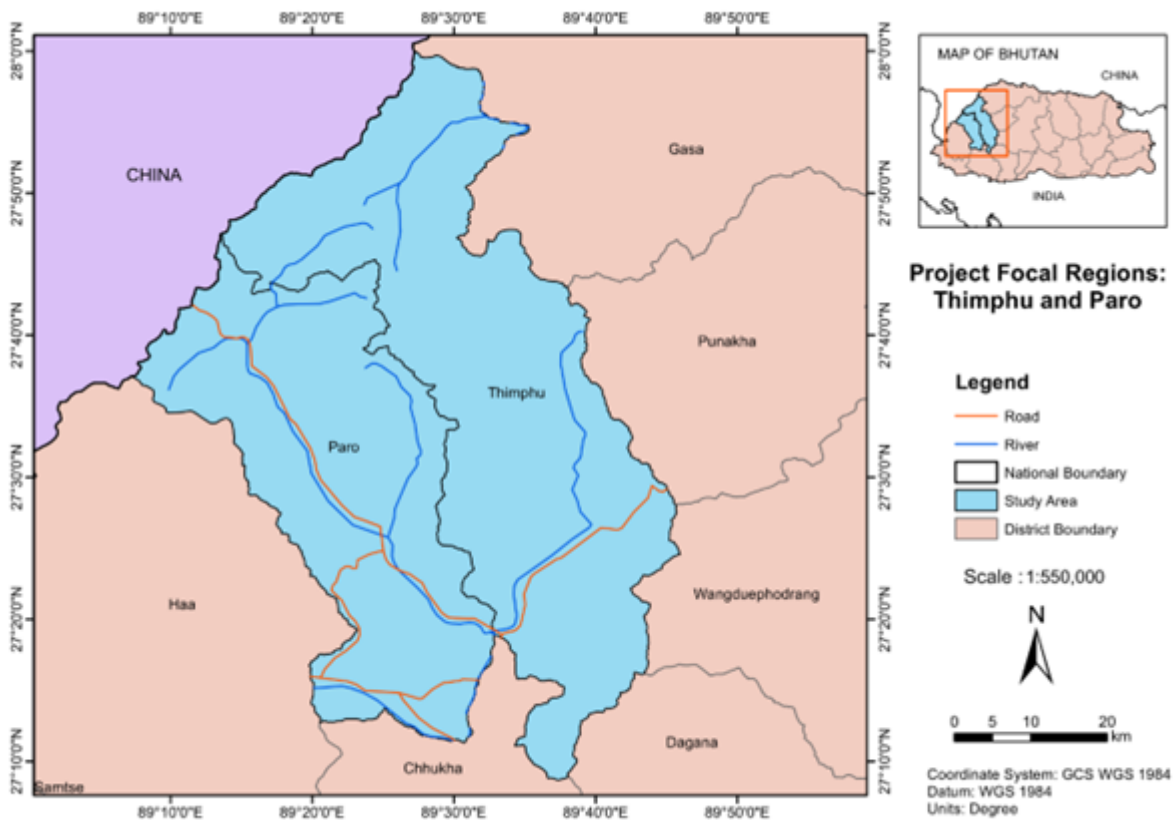
Please provide geo-referenced information and map where the project interventions will take place

### AC.1 Georeferenced information

A project in Bhutan addressing adaptation to climate-induced urban risk in Thimphu and Paro districts. The country and district GeoName ids are provided.

- Country: Bhutan (1252634)
- Districts: Thimphu (1337293), Paro (1337286)

### AC.2 Project map



### ANNEX D: ENVIRONMENTAL AND SOCIAL SAFEGUARDS SCREEN AND RATING

(PIF level) Attach agency safeguard screen form including rating of risk types and overall risk rating.

Title

6730 Bhutan Urban Resilience Project PRE-SESP Final 3103 2023

### ANNEX E: RIO MARKERS

| Climate Change Mitigation | Climate Change Adaptation | Biodiversity      | Land Degradation  |
|---------------------------|---------------------------|-------------------|-------------------|
| No Contribution 0         | Principal Objective 2     | No Contribution 0 | No Contribution 0 |

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ANNEX F: TAXONOMY WORKSHEET

Please refer to the annex uploaded in the GEF portal Roadmap section