*Annex-1 (A-25-13-18, Agenda Item 11.5)*

# BTR Fact Sheet

# Kingdom of Bhutan

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# Chapter 1. National Context and Governance

## 1.1 Country Overview and Key Characteristics

### 1.1.1 Population Overview

Bhutan is among the least populated countries in Asia, with a projected population of 777,224 in 2024. According to the Environmental Accounts Statistics (2024), the annual population growth rate was 1.3%. Population density rose from 17 persons per km2 in 2005 to 20.06 persons per km2 in 2023, reflecting a gradual increase in population size. However, this distribution is uneven; Thimphu, the capital, has the highest density at 267 persons per km, while Gasa Dzongkhag has the lowest, with just 1.3 persons per km2. The crude birth rate was 15.5 per 1000 population in 2017. The infant mortality was 12 and 17.5 depending on the area of urban and rural respectively. The total fertility rate in 2017 was reported at 1.7 children per woman, while life expectancy at birth in 2017 was reported at 70.2 years by the NSB in the year 2017 population census. On the other hand, Bhutan witnesses a shrinking prime working age group (20-39 years of age) due to continuous outward migration in pursuit of greater opportunities. However, Bhutan maintains a balanced gender distribution, with 346,692 female and 380,453 male as of 2017.

### 1.1.2 Economic Structure

Bhutan is one of the world's smallest economies, with a GDP of Nu 249,388.19 million (USD 2,955.13 million), recorded in 202477. Despite this, the country has experienced significant growth, with a GDP growth of 4.88% largely due to investments in the hydropower sector. The per capita GDP increased from Nu 174,400.7 million (USD 2,066.56 million) in 2015 to Nu 229,090.40 mil- lion (USD 2,714.61 million) in 2020. However, the COVID-19 pandemic caused a substantial con- traction in economic activities, resulting in a drastic growth decline of -10.08 % in 2020. This represents a decrease of 15.83 % points compared to the growth of 5.76 % in 2019. Key sectors contributing to this economic contraction included Mining & Quarrying (-81.84 %), Hotels & Restaurants (-73.46 %), Manufacturing (-20.76 %), Construction (-20.64 %), and Transport & Communication (-14.65 %). Additionally, Finance & Insurance, Wholesale & Retail Trade, and Other Business Services also contracted, further contributing to the overall economic decline in 2020.

### 1.1.3 Natural Environment and Resources

The total forest area is estimated to be 69.71 % (2.68 million ha) of the total land area while 30.29 % (1.16 million ha) of the total land area is esti-mated for the non-forest area. Wangdue Phodrang Dzongkhag has the largest forest cover area, estimated at 258,969.43 hectares, closely followed by Zhem- gang Dzongkhag, which has approximately 223,067.45 hectares. Notably, around 94% of Zhemgang Dzongkhags' total area is under forest cover, making it the Dzongkhag with the highest percentage of forest cover. Gasa Dzongkhag has the least forest cover, with only 21%, amount-ing to a total of 65,468.32 hectares. Meanwhile, Tsirang has the smallest forest area at 54,380.94 hectares, which represents 82% of its total land area. Broadleaved Forest constitutes 67.99 % of the total forest in Bhutan with a total forest area of 1,819,649.63 ha. Coniferous forests constitute only 32.01 % of the forest area and cover an area of 856,895.79 ha.

**Figure 1. Total area by Forest and Non-Forest**

| Land Type | Area (ha) | Forest Cover (%) | MoE (%) | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Forest | 2,676,545.42 | 69.71 | 1.87 | 2,626,585.13 | 2,726,505.71 |
| Non-Forest | 1,162,854.58 | 30.29 | 1.87 | 1,141,148.78 | 1,184,560.38 |

**Figure 2. Forest Coverage by Forest Class**

| Forest Class | Forest Area (ha) | Percentage of Country Area (%) | Percentage of Forest Area (%) | MoE (%) | Lower Limit | Upper Limit |
|---|---|---|---|---|---|---|
| Broadleaved | 1,819,649.63 | 47.39 | 67.99 | 2.21 | 65.78 | 70.19 |
| Coniferous | 856,895.79 | 22.32 | 32.01 | 2.21 | 29.81 | 34.22 |

## 1.2 National Governance for Climate Change

### 1.2.1 National Lead Institutions

The Department of Environment and Climate Change (DECC) under the Ministry of Energy and Natural Resources (MoENR) is the Designated National Authority on Climate Change issues and is also the National Focal Point to the United Na-tions Convention on Climate Change (UNFCCC). The DECC, through its Climate Change Division (CCD) led the Biennial Transparency Report (BTR) formulation process with support from the Global Environment Facility channeled through the Food and Agriculture Organization (Country Of-fice-Bhutan) as the implementing agency (GEF Agency). The Bhutan Ecological Society and

Druk Consult International Private Limited were assigned to support National Thematic Working Group (NTWG) in compiling the BTR.

The Department of Forests and Park Services under the Ministry of Energy and Natural Resources is the overall REDD+ coordinator. The National Forest Monitoring System is looked after by DoFPS. Both NFI and GHG (forestry sector) inventory is carried out by DoFPS while Satellite land monitoring is carried out by both DoFPS and National Land Commission Secretariat. DoFPS and NLCS are involved together in developing periodic LULC maps, however disturbance of forest due to both anthropogenic and natural calamities is monitored solely by DoFPS leveraging on the remote sensing technologies as well as ground truthing. The institutions involved in MRV for REDD+ are DoFPS, NLCS and Department of Environment and Climate Change (DECC) at the National Level. DoFPS lead the SLMS, NFI and GHG Inventory for the preparation of FREL/FRL. Quality Assurance and Quality Control (QAQC) is carried out by the DoFPS by forming the QAQC member to review the procedure and assess the quality of the measurement. The measurement report is submitted to DECC which is further reviewed and finally submitted to UNFCCC.

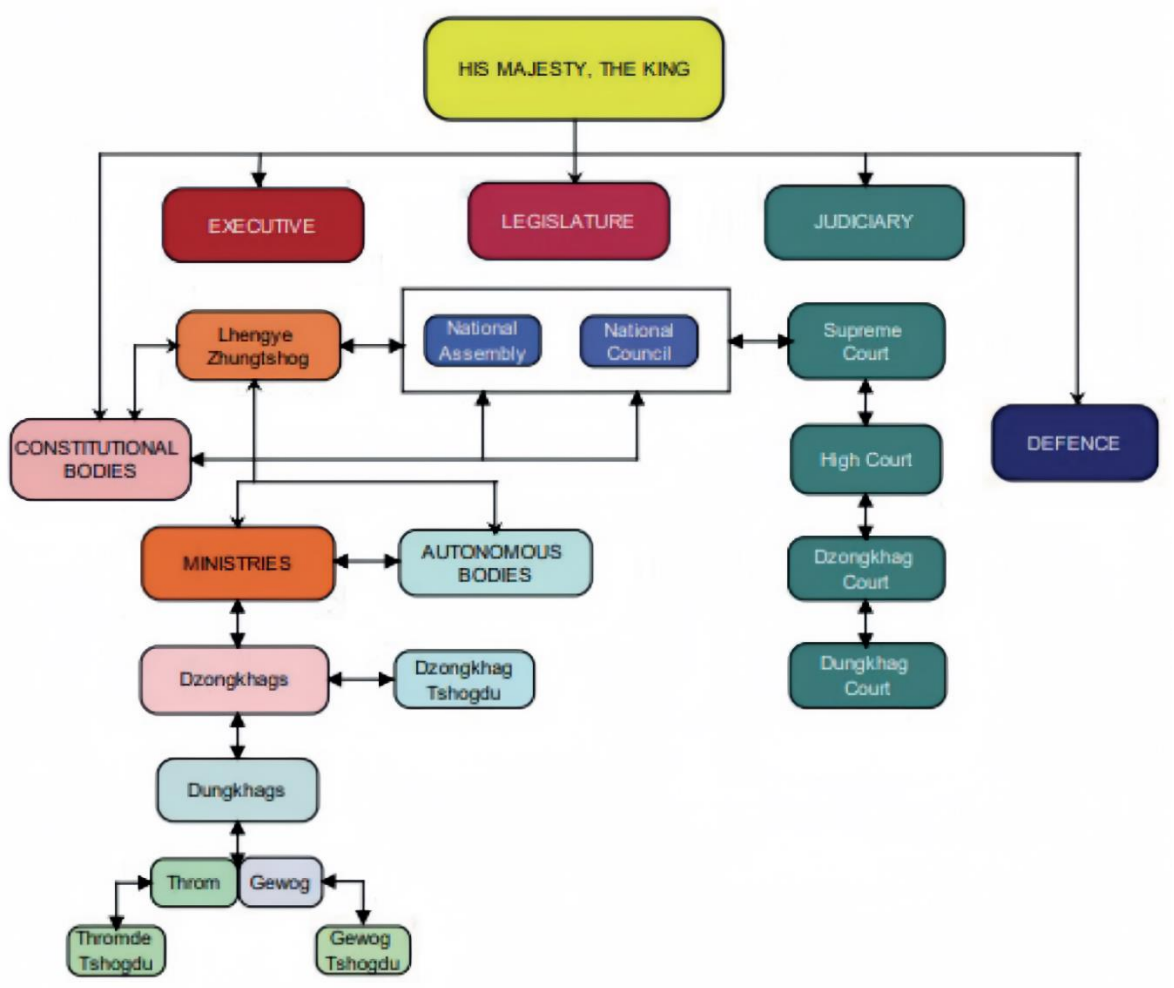


### 1.2.2 Governance Structure

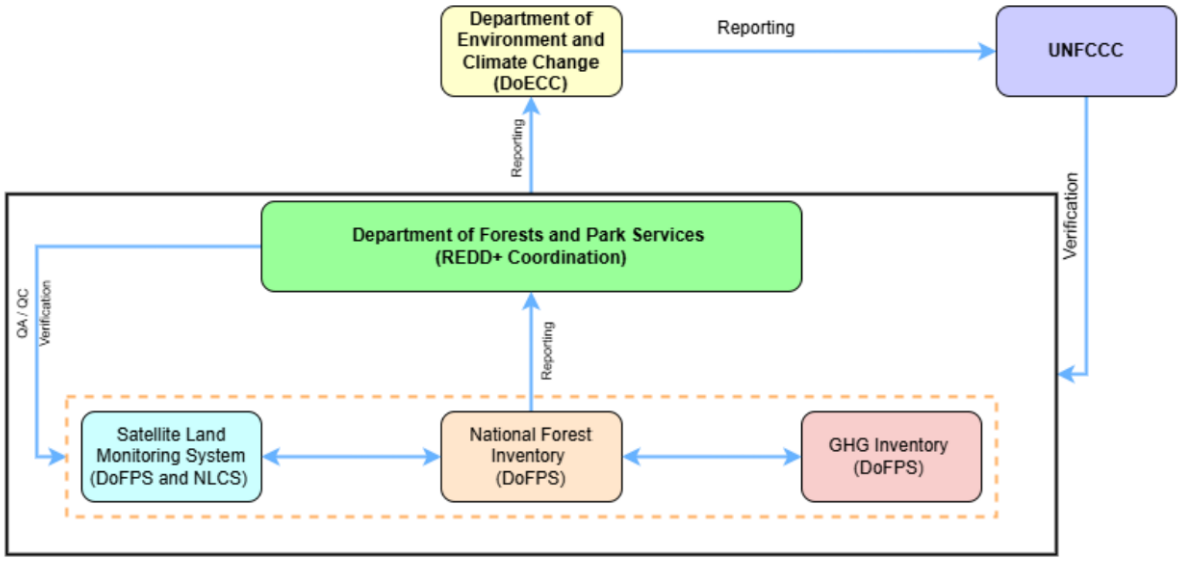
Bhutan's administrative structure is organized into the executive, legislative, and judicial branches. A Local Governance system also plays a crucial role in the country's political and administrative landscape.

**Figure 3. Administrative Map of Bhutan**

**Fugure 4. Administrative Structure of Bhutan**




**Fugure 5. Institutional arrangements for NFMS**



## Chapter 2. National GHG Inventory and Emissions Trends

### 2.1 Overview of the National GHG Inventory

This chapter describes Bhutan's Greenhouse Gas Inventory for the inventory years 2021-2022. The inventory for the three main gases emitted, namely carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O) is estimated while carbon monoxide (CO) and nitrogen oxide (NOx) are not estimated for energy, IPPU and waste sectors as they are precursors to N2O and CO2 and it is assumed that eventually they get oxidized. However, NOx emission was estimated for manure management and others under category 3.A.

The chapter also contains information on data sources, uncertainties, and QA/QC activities carried out. The inventory is prepared in accordance with annex to decision 18/CMA.1 on the Modalities, Procedures and Guidelines for the Enhanced Transparency Framework and paragraphs 8-24 of the Annex to Decision 17/CP.8 (UNFCCC, 2002), meant for reporting of National Communications (NC) from Non-Annex I Parties to the UNFCCC and the BUR Guidelines for NAI countries. The update is consistent with capacities, time constraints, data availability and the level of support received for reporting. This inventory is organized according to the 2006 IPCC Guidelines and covers the following sectors: Energy; IPPU; AFOLU; and Waste. GHG removals by sinks occur in the AFOLU sector as a result of improved forest management and reforestation. The inventory was prepared following the 2006 IPCC Guidelines using the IPCC 2006 Software.



#### 2.1.1 National GHG Reporting Methodology

The 2006 IPCC Guidelines for National Green- house Gas Inventories provide detailed methodol-ogies to estimate emissions and sequestrations for all the sectors and sub-sectors. A system of methodological tiers has been developed by IPCC to represent different levels of methodolog-ical complexity. Tier 1 uses an IPCC default value; Tier 2 uses country specific emission factors that are based on either measurements or IPCC Tier 2 emission factors, and Tier 3 is the most demanding in terms of complexity and data re-quirements. Considering national circumstances related to data availability and efforts required to estimate emissions, the emission and sequestra-tion estimates in the inventory for Bhutan mainly uses data sourced from national statistics and default emission factors under Tier 1.

To estimate emissions in C0 equivalents, a global warming potential (GWP) is used. GWP

is a quantified measure of the globally averaged relative radiative forcing of a particular GHG . It is defined as the accumulated radiative forcing within a specific time horizon caused by emit-ting 1 kilogram (kg) of the gas, relative to that of the reference gas C0. Direct radiative effects occur when the gas itself absorbs radiation. Indirect radiative forcing occurs when chemical transformations involving the original gas produces a gas or gases that are GHGs, or when a gas influences other radiative important processes such as the atmospheric lifetimes of other gases. All calculations in the present report use the Global Warming Potential (GWP) of GHGs for 100 years presented in the IPCC Fifth Assessment Report (IPCC AR5).

In general, each method was applied based on the availability of data and analysis of key catego-ries. The collection of data and information is still a challenge when compiling the GHG inventory for Bhutan. The data and information often come from national aggregated levels, but some are collected from point or direct sources. Consider-ing the absence of national or regional emission factors, most of the calculations relied on IPCC default values and therefore uncertainty values for emission factors are relatively high.

### 2.1.2 Sectoral Emissions and Removals Trends

Bhutan recorded a total GHG emissions of 1,742.51 Gg CO2e in 2022 which includes 559.38 Gg CO2e from Energy, 673.93 Gg CO2e from IPPU, 410.18 Gg CO2e from agriculture, and 99.01 Gg CO2e from Waste. The total sequestration is estimated at 11,450.45 Gg CO2e (By forest, cropland, and grasslands) in the same year. At the same time, sequestration increased as compared to previous years due to addition of sequestration in below ground biomass, by perennial crops, including agroforestry and orchards. The net emission in 2022 was -9707.94 Gg CO2e. Emissions dropped in 2022 as compared to the reference year of 2019 owing to the COVID-19 pandemic and its impacts, as policies and measures to revive the Bhutanese economy were recently introduced.

**Figure 6. National emissions and sequestration estimates**

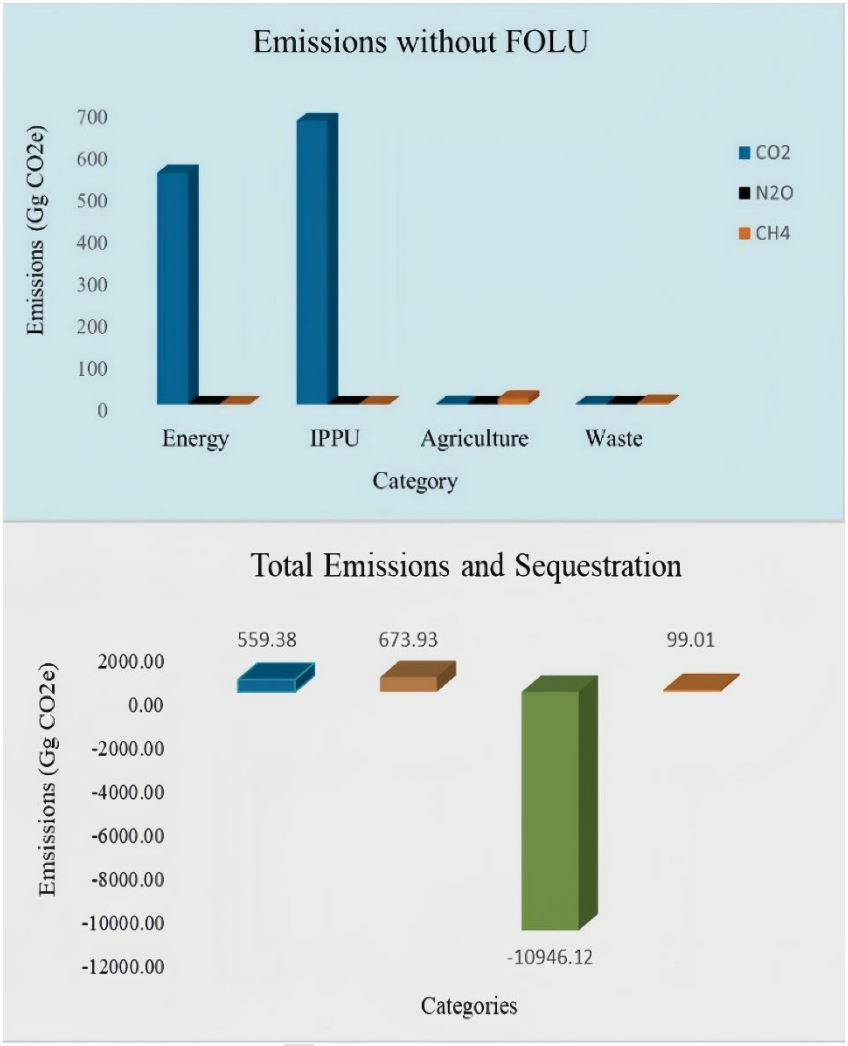



**Figure 7. National Emissions and Sequestration Estimates**

| | Emissions (Gg) | | | Emissions (Gg CO2e) |
|---|---|---|---|---|
| **Category** | **CO2** | **CH4** | **N2O** | |
| Energy | 550.44 | 0.06 | 0.03 | 559.38 |
| IPPU | 673.93 | 0 | 0 | 673.93 |
| Agriculture | 0.73 | 13.89 | 0.08 | 410.18 |
| Waste | 0.003 | 3.54 | 0 | 99.01 |
| FOLU | -11356.30 | 0.00 | 0.00 | -11356.30 |

## 2.2 LULUCF Emissions and Removals

In 2022, Land Use Land Use Change and Forestry (LULUCF) was a CO2 sink for -11356.30 Gg CO2e without non-CO2 emission from biomass burning in forest land. Sequestration was -11374.09 of Gg CO2e from Forest land; -65.02 of Gg CO2e from Cropland; -11.34 of Gg CO2e from grassland respectively while emission from Settlements was 25.93 Gg CO2e and 68.21 Gg CO2e from Other land. Emissions from the livestock sector contributed 365 Gg of CO2e corresponding to 21% of total national emissions in 2022, mainly in the form of CH4 emission from enteric fermentation (91%) and marginally in the form of N2O from manure management (9%). Emission from the Agriculture sector contributed 45.18 Gg CO2e corresponding to 2.59% of total national emissions in 2022, mainly due to CH4 emission from rice cultivation (62.31%) and marginally due to direct N2O emission from rom manure managed soils (15.96%); Indirect N2O Emissions from manure management (13.81%); indirect N2O Emissions from managed soils.

Emission from the Agriculture sector contributed 45.18 Gg CO2e corresponding to 2.59% of total national emissions in 2022, mainly due to CH4 emission from rice cultivation (62.31%) and marginally due to direct N2O emission from rom manure managed soils (15.96%); Indirect N2O Emissions from manure management (13.81%); indirect N2O Emissions from managed soils (6.29%) and due to Urea application (1.62%) of emissions from agriculture.

## Figure 8. Land use assumptions and methodologies applied

| Categories | Assumptions | Methodologies |
|---|---|---|
| **Land Categories** | | |
| Forest Land | • XC All plantations assumed to be carried out in the grassland. Hence, included as part of Grassland converted to forest land.<br>• Based on the land use and land cover change draft report (2018-2023), the gains and losses in the forest assumed to be spread equally for all calendar years.<br>• The Land Use and Land Cover Change draft report for 2018-2023 shows that forest land has gained from and loss to CL, GL, WL, SL and OL. Forest may have gained from or loss to these land categories by the same percentage for the year 2015-2017 for which there is no information for gains from specific land areas. For years outside 2015 no gains are estimated except the conversion of grassland to forest land (i.e. plantations). | • Forest area is determined by the interpolation of forest area in 2018 and 2023. Gierson and Long (1983)[99] classified Bhutan forest into 11 categories of subtropical forest, warm broad-leaved forest, cool broad-leaved forest, evergreen oak forest, chir pine forest, blue pine forest, spruce forest, hemlock forest, fir forest, juniper-rhododendron scrub forest and dry alpine scrub forest. Due to difficulty in extracting the time series data, determining the gains and losses in each category of forest land and lack of information prior land use and new forest type, this classification of forest is not used in the GHG Inventory d resulting from gains.<br>• Therefore, it has been decided to report only one category of forest land. |

| | | |
|---|---|---|
| | • The gains in forest from 2005 to 2014 are adopted FREL and FRL of Bhutan<br>• All forest land is managed<br>• Non-CO2 emission from forest fire considered as part of emission from forest | • For the land converted to forest land, both above ground and below biomass is accounted and changes in other carbon pools are assumed to be in equilibrium<br>• Emissions and removals from forest land remaining forest land have been estimated using a combination of Approach 1, 2 and Tier 1 and Tier 2. The country specific activity data, emission factor and removal factor are used for computing the emission and removals where available while IPCC defaults were used in other cases.<br>• Carbon stock change in forest land remaining forest land is estimated using Gain-Loss method (equation 2.7 in 2006 IPCC Guidelines.<br>• Non-forest land converted to Cropland are clubbed with Cropland remaining Cropland as prior land use before conversion is not known. |
| Cropland | • All land under rice ecosystems assumed to remain under same land category across the time series.<br>• All land under perennial crops assumed to remain under same land category. Hence, no losses are estimated for the crops that reached maturity/harvest cycle or bearing fruits.<br>• All conversion to cropland from non-cropland and losses to non-Cropland are assumed to occur in annual cropland excluding annual cropland under rice ecosystems.<br>• Emission and removals from the crop land remaining cropland are assumed to be zero or in equilibrium except for perennial crops which are not fruiting (non-bearing perennial crops). | • Biomass gain area estimated for non-bearing perennial crops using the default values from IPPC guidelines<br>• The emission under this land category is estimated only for forest land converted to crop land for the entire time series.<br>• Carbon dioxide emissions and removals from changes in the area of perennial woody crops (orchards) are estimated using a Tier1 approach described in IPCC Guidelines for National Greenhouse Gas Inventories |

| | | |
|---|---|---|
| Grassland | • All conversion to grassland from non-grassland and losses to non-grassland assumed to occur in managed.<br>• All grassland area assumed to be managed land<br>• All plantations assumed to be carried out in grassland and accounted as part of grassland converted to forest land | |
| Wetland | • All wetlands assumed to be managed | |
| Settlement | • All settlements assumed to be paved surfaces<br>• All land under SL is managed | |
| Other land | • All land under OL is unmanaged | |
| **Biomass Carbon Stock Change** | | |
| | • All SOC is lost when forest land is converted to other land over 20 years transition period<br>• 20% of SOC is lost when forest land is converted into settlement<br>• A default value of SOC in wetland soils 82 t C ha-1 in the 2019 IPCC supplement to 2006 IPCC Guidelines for National GHG Inventories is used for estimating SOC stock change in conversion of forest land to wetland.<br>• Carbon fraction of 0.47 is used for all carbon pools based on IPCC default values which is within the range of carbon content studied in one pocket of Bhutans's forest (Tashi et al., 2017)[100] The study found carbon centration in the range of 46.02–46.81%, which falls within the IPCC default range<br>• When the forest land is converted to the Cropland, entire biomass carbon is assumed be lost | • Emissions and removals from understory vegetation are assumed to balance out as they are generally herbaceous in nature. The carbon stock change in land converted to forest land is estimated using 2.15 of IPCC 2006 Guidelines. |

**Mineral Soil Carbon Stock Change**

- All SOC is lost when forest land is converted to other land over 20 years transition period
- 20% of SOC is lost when forest land is converted into settlement
- A default value of SOC in wetland soils 82 t C $ha^{-1}$ in the 2019 IPCC supplement to 2006 IPCC Guidelines for National GHG Inventories was used for estimating SOC stock change in conversion of forest land to wetland.
- Land use and land cover conversion in the base year (1994) are assumed to be the first year of the conversion and the transition period of 20 years is counted from 1994 to avoid introduction of new errors.

**Gains in Carbon Stock**

- Biomass gain occurs in both aboveground and below biomass
- Gain in other carbon pools (dead wood, litter and soil organic carbon) assumed to be zero or in equilibrium
- Default biomass growth rate of plantations (5 t.d.m $ha^{-1}yr^{-1}$), which is two times higher compared to annual increment in natural forest of Bhutan, which is estimated to be 2.43 t.d.m $ha^{-1}yr^{-1}$ (FRMD, 2023). Therefore, this growth factor is used both for natural forest and plantations as well as land converted to forest land.
- Annual change in living biomass in forest remaining forest is the net result of uptake due to forest growth and losses due to forest harvesting.
- Biomass growth is only estimated for the aboveground living tree biomass
- Growth of biomass in understory vegetation is not estimated due to lack of data.
- The annual increase biomass is estimated using 2.9 in IPCC guidelines, 2006 for aboveground living tree biomass.
- 2.43 t.d.m $ha^{-1}yr^{-1}$ (FRMD, 2023) is applied for estimating the gain in carbon stock in land converted to forest land

| Carbon Stock Loss | | |
|---|---|---|
| | • Wood removal-timber harvesting<br><br>• Fuelwood collection - Carbon stocks lost through consumption of fuelwood from the residential sector are assumed to be collected as whole tree<br><br>• Forest disturbance - During the fire disturbance, there is no change in DOM and herbs and shrubs carbon pools. Forest damaged by fires is not generally accompanied by land use change but remains as forest land and they regrow within one to two years<br><br>• The average biomass expansion factor of Bhutan's forest is 1.561 and average wood density is 0.553. | • The entire volume of round timber and firewood harvested from the forest are considered as instantaneous emission and no separate estimates are made for harvested wood products due to lack of technical capacity.<br><br>• Both CO2 emission (as part of disturbance) and non- CO2 emission from forest fire disturbance is estimated using IPCC default emission and combustion factor<br><br>• Annual loss in biomass due to harvesting and forest disturbance is estimated using equation 2.11 of IPCC 2006 guidelines<br><br>• Loss in carbon stock due to wood removals is estimated using equation 2.12 of IPCC 2006<br><br>• Country specific biomass conversion and expansion factor is applied to estimate the loss of carbon from the round timber. The instantaneous loss of carbon is assumed for aboveground biomass and loss of belowground biomass, dead wood, litter and soil carbon is assumed to be zero due to lack of data.<br><br>• The loss of carbon stock due to fuel wood removal is estimated using equation 2.13 of IPCC 2006<br><br>• Any wood removed from fire damaged area are accounted and included as part of wood removal and therefore no separate estimation of CO2 emission from fire is carried out in this inventory |

## Chapter 3. NDC Implementation Status and Tracking Information

### 3.1 NDC Overview and Mitigation Targets

#### 3.1.1 National GHG Mitigation Target

Bhutan is already carbon neutral and has achieved the goal for net zero emissions at least until 2047-48 per Bhutan's Long-Term Low Greenhouse Gas Emission and Climate Resilient Devel-opment Strategy (LTS)-2023. Bhutan first pledged to remain carbon neutral in 2009 during COP 15 and reaffirmed its commitment through the sub- mission of Intended Nationally Determined Contribution (INDC) to the Paris Agreement in September 2015. With the submission of enhanced Nationally Determined Contribution (NDC2.0) in 2021, Bhutan reiterated its commitment to maintain its carbon neutral status.

Bhutan's NDC target is to maintain the carbon neutral status whereby quantifiable information is based on National GHG inventories. It is a multi-year target, and uses 2020 as base year in line with the BUR submitted in 2022. The methodology used for the development of the Forest Ref-erence Emission Level (FREL) and Forest Reference Level (FRL) which estimates the carbon sink is consistent with National GHG Inventories. To support the target of maintaining carbon neutral-ity, Bhutan has prepared sectoral Low Emission Development Strategies, the National REDD+ Strategy and Action Plan and other sectoral plans, and programs with the implementation period of at least until 2030.

#### 3.1.2 AFOLU Targets

Not specified.

### 3.2 Summary of NDC Progress and Achievement

#### 3.2.1 AFOLU Unconditional Target

Not specified.

#### 3.2.2 AFOLU Conditional Target

The mitigation measures include the implementation of activities listed above from 2021 to 2030. With the exclusion of emission reduction potential from the hydropower generation and alternative renewable energy programs, the cu-mulative mitigation potential from the implementation of Low Emission Development Strategies for food security human settlement,

industries and surface transport, and energy efficiency and conservation measures is 16,673.88 Gg C02e from 2021 to 2030, while the total projected GHG emission during the same period is 42,928.99 Gg C02e (including LULUCF).

Nevertheless, it is important to note that the achievement of the mitigation measures and targets will depend on the level of technical and financial support available for implementation from the international community, and is therefore conditional on support received as stated in the NDC document.

### 3.3 AFOLU Mitigation Policies, Measures, and Plans

- Forest conservation and management under the National REDD+ Strategy
- Low Emission Development Strategy for Food Security (LED-FS)
- Low Emission Development Strategy for
- Human Settlement (LEDS-HS)
- Low Emission Development Strategy for Industries
- Low Emission Development Strategy for Surface Transport
- Waste Management
- Generation of clean and alternative renewable energy

### 3.4 Sectoral Summary of NDC Implementation (Emissions/Removals)

Not specified.

### 3.5 Paris Agreement Article 6 and Use of ITMOs

#### 3.5.1 Background and Developments

Intention to use cooperative approaches that involve the use of ITMOs under Article 6 towards NDCs under Article 4 of the Paris Agreement, as applicable: Bhutan views cooperative approaches in market and non-market mechanisms under Article 6 of the Paris Agreement as an important instrument to raise mitigation ambition with environmental integrity while promoting sustainable development and welcomes the opportunity to participate on cooperative approaches.

#### 3.5.2 Illustrative Cases

Not specified.

# Chapter 4. Means of Implementation: Finance, Technology, Capacity

## 4.1 Needs for Implementation

### 4.1.1 Financial Support Needs

Bhutan outlines the need for financial support through its strategic national policies and plans aimed at sectors and specific areas of need. Bhutan's 13th Five-Year Plan (FYP) is a strategic framework for sustainable development, with an emphasis on climate-resilient development that integrates low-emission strategies across sectors while decoupling GDP growth from greenhouse gas emissions and enhancing community and ecosystem resilience. The total outlay for the 13th FYP is projected at BTN 512.283 billion. While Bhutan's development agenda integrates climate change-related concerns and issues into its strategic plans and policies, its domestic resources are constrained and estimated at BTN 327.34 billion of the available BTN 456.34 billion for the plan period. Bhutan will still require levelling global partnerships and climate financing mechanisms if it is to transition to a low-carbon, climate-resilient economy as targeted and committed, to the amount of 55.93 billion from deficit financing and BTN 125 billion from grants.

Underscoring Bhutan's commitment to sustain- able and climate-resilient growth on the one hand, and the Paris Agreement and global cli- mate action on the other, Bhutan has developed its National Adaptation Plan (NAP), the NDC 2.0, and corresponding Low-Emission Development Strategy (LEDS), LTS, and roadmaps for specific and critical sectors. Figure 9 shows climate-related plans and strategies with the total finance required to achieve the targets.

**Figure 9. National Plans and Finance Needed**

| Sector | Amount |
|---|---|
| Summary of Bhutan's 13th Five-Year Plan | BTN 512.283 billion |
| Water | USD 204.896 million |
| Agriculture & Livestock | USD 95.215 million |
| Forest and Biodiversity | USD 48.470 million |
| Human Settlements | USD 13,088,922,705. |
| Health | USD 19.661 million |
| Energy | USD 486.086 million |
| Climate Services and Disaster Risk Reduction | USD 1.300 million |
| Industries | USD 3.2 million |
| Surface Transport | USD 3222.00 million |
| Waste Management | Not Available |
| Long Term Low GHG Emission & Climate Resilient Strategy | USD 1145.55 Million (by 2025)<br>USD. 2105.57 Million (by 2030)<br>USD 3233.7 Million (by 2050) |

### 4.1.2 Technology Development and Transfer Needs

Bhutan faces significant gaps in its technological capacity to effectively manage climate change issues, primarily due to limited institutional frameworks, technical expertise, and access to advanced, context-specific solutions and finances. The last Technology Needs Assessment (TNA) was carried out in 2013. There is a critical need to update and draft a systematic and comprehensive TNA to identify and prioritize technologies tailored to Bhutan's unique socio-economic and environmental conditions. While not comprehensive, technology needs for Bhutan broadly include sustainable infrastructure and urban development (e.g. green building systems), renew- able energy and energy efficiency technologies, climate-resilient agriculture and food systems, sustainable transport systems, climate observation and early warnings, industrial efficiency and emission reduction technologies, natural re- source management monitoring and policy sup- port tools, water resource management technologies, financial mechanisms, and market-based solutions, etc.

More importantly, the Technology Needs Assessment must focus on building a sectoral understanding of existing and emerging technologies, as well as identifying those that align with Bhu- tan's development and climate resilience goals. This includes fostering cross-sectoral awareness and technical knowledge to enable informed decision making and targeted adoption of effective, context-appropriate solutions. Further to that, the TNA process should entail adequate engagement of private sector actors, communities, and other non-public entities to identify specific technology needs and advance the adoption of sustainable technologies.

### 4.1.3 Capacity-building Needs

Skills Assessment for NAP: Bhutan carried out a skills assessment to evaluate the country's read- iness to implement the National Adaptation Plan. The evaluation identified technical, managerial, and participatory skills required for effective adaptation planning, implementation, and monitoring under the NAP framework across central agencies, local governments, the private sector, and non-profit organizations. Key constraints also included a lack of inter-agency coordination for data sharing and adaptation planning, insufficient institutional memory due to high turnover, limited training mechanisms, absence of a consolidated capacity development strategy that integrates climate adaptation into broader policy frameworks.

Capacity Building Initiative for Transparency: As part of the improvement plan of the last Biennial Update Report, the capacity-building initiative for the transparency project is being implemented to enhance the institutional and technical capacities of Bhutan to meet the transparency requirements outlined in the Paris Agreement.

Bhutan's capacity-building needs are at individual, institutional and systems levels. At the individual level, building skills and fostering knowledge are essential. From technical skills and scientific knowledge across sectors to navigating international climate financing platforms and pathways need targeted training programmes. Sector-specific research and development and data gaps need to be addressed. At the institutional level, the focus lies on improving collaboration across sectors and coordination among agencies. At the systemic level, creating an enabling environment through economic incentives, regulatory frameworks, and cohesive policies is essential to strengthen the overall capacity for climate action. Given the gaps and challenges at all levels, it warrants a comprehensive capacity needs assessment across all sectors with sufficient engagement of private sectors, academia, civil societies, and vulnerable groups.

## 4.2 Support Received (4.2.1 Financial Support Received, 4.2.2 Technology Development and Transfer Received, 4.2.3 Capacity-building Received)

### Figure 10. Detailed Finance, Technology, and Capacity Building Received

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Strengthening institutional and technical capacities for enhanced transparency in implementation and monitoring of Bhutan?s Nationally Determined Contribution (NDC) (CBIT) (MSP) | 2021-2026 | ongoing | DECC, MoENR | GEF | Grant | | $1,776,000.00 | ✓ | ✓ | | Cross Sector | |
| Developing Climate Resilient Communities through appropriate Adaptation and Mitigation Intervention | Oct 2021 – 2023 | Completed | Tarayana Foundation | GEF/SGP | Grant | $45,900.00 | $45,900.00 | ✓ | ✓ | | Cross Sector | |
| Bhutan for Life | 01.01.2017 - 01.01.2031 | Ongoing | NCD | GCF/WWF/ LDCF/ RGOB | Grant | | $378,010.00 | ✓ | ✓ | ✓ | Forestry | |
| Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan | 2020-2025 | ongoing | DMDF, MoF | GCF | Grant | | $25,340,000.00 | ✓ | ✓ | | Agriculture | Agriculture and Forestry |
| Bhutan for Life Programme | 2019-2032 | Ongoing | DoFPS | GCF | Grant | $3,636,916.46 | $26,500,000.00 | ✓ | | | Cross Sector | |
| Adaptation Planning Support for Bhutan (NAP Readiness Project) | 2019-2023 | Completed | DECC (NECS) | GCF | Grant | | $2,700,000.00 | ✓ | ✓ | | | |
| Renewable Energy for Climate Resilience Project | Dec 2022-Dec 2025 | Ongoing | DOE, MoENR | ADB | Grant | | $18,260,000.00 | ✓ | ✓ | ✓ | Energy | Renewable energy generation - solar |
| Green and Resilient Affordable Housing Sector Project | Dec 2021 - Dec 2027 | Ongoing | MoF | ADB | Grant | | $12,000,000.00 | ✓ | ✓ | ✓ | Infrastructure (Human Settlement) | Water, Urban Infrastructure |
| Green and Resilient Affordable Housing Sector Project | Dec 2021 - Dec 2027 | Ongoing | MoF | ADB | Concessional Loan | | $24,000,000.00 | ✓ | | | | |
| Green and Resilient Affordable Housing Sector Project | Dec 2021 - Dec 2027 | Ongoing | MoF | ADB | TA | | $1000,000.00 | | ✓ | | | |
| Water flagship Programme Support Project | Nov-22 | Ongoing | MoIT | ADB | Grant | | $12,200,000.00 | ✓ | ✓ | ✓ | Multi Sector | Urban water supply, Irrigation, Rural water supply services |
| Bhutan REDD+ Readiness | Jul 2017 - Jun 2022 | Completed | WMD/ DoFPS | World Bank | Grant | $1,007,490.49 | $4,800,000.00 | ✓ | ✓ | ✓ | Forestry, Environment, Land and Water | |
| Green and Resilient Growth Development Policy Credit | May 23-2022 | Ongoing | MOF | World Bank | Loan | | $52,500,000.00 | ✓ | ✓ | ✓ | Cross Sector | |
| Strengthening Risk Information for Resilience Project | Jul 2021 - Jun 2025 | Ongoing | | World Bank | Grant | | $3,510,000.00 | ✓ | ✓ | ✓ | Cross Sector | Transport, Multi-hazard, climate and hydromet services |
| Food Security and Agriculture Productivity (FSAPP) | 2017-2025 | ongoing | DoA, MoAL | World Bank | Grant | | $8,000,000.00 | ✓ | ✓ | | Agriculture | Agriculture, Biodiversity and cross cutting |
| Preparation of Strategic Programme for Climate Resilience (SPCR) | 2017-2021 | Completed | GHNC | World Bank | Grant | | $1,500,000.00 | ✓ | ✓ | | | |
| Living Landscapes: Securing High Conservation Values (HCVs) | 2020-2028 | Ongoing | DoFPS, RSPN, Tarayana | IKI - Germany | Grant | | Euro 8,873,998.00 | ✓ | ✓ | ✓ | Multi Sector | Energy, agriculture, forestry, water and sanitation, eco-tourism, sustainable land management |

| Project Title | Project Duration | Status | Implementing Agency | Funding | | | | Type of Funding | | | Sectoral Scope | Sub-Sector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Source | Financial Instrument | Disbursed Amount | Committed Amount | Financial Support | Capacity Building | Technology Support | | |
| Strengthening REDD+ & Watershed Management in Bhutan (BTN-RS-004) | Nov 2020 -May 2023 | Completed | WMD/ DoFPS | GCF /UNOP | Grant | $350,000.00 | $595,000.00 | ✓ | ✓ | ✓ | Forestry | Forestry, Watershed & Agroforestry |
| Enhancing Sustainability and Climate Resilience of Forests and Agriculture | Oct 2017-2023 | Ongoing | GNHCS | GEF/ LDCF/ SCCF | Grant | $4,899,806.00 | $13,900,000.00 | ✓ | ✓ | ✓ | Agriculture and Forest | Agriculture, Livestock & Forestry |
| Advancing Climate Resilience of the Water Sector in Bhutan | Aug 2023-2028 | Ongoing | DoA, BCTA, MoIT, DLGDM, NCHM | GEF Trust Fund/ LDCF | Grant | | $9,032,420.00 | ✓ | ✓ | ✓ | Water | Watershed, water Infrastructure |
| Sustainable Low-emission Urban Transport System | Mar 2018-Feb 2021 | Completed | MOIC | GEF | Grant | | $2,639,726.00 | ✓ | ✓ | ✓ | Transport | |
| National Adaptation Programme of Action (NAPA 3) | 2017 - 2022 | Completed | DOST | GEF-LDCF | Grant | | $1,224,000.00 | ✓ | ✓ | | Agriculture | |
| Enhancing sustainability and climate resilience of forest and agriculture landscape and community livelihood (NAPA III) | 2018-2023 | ongoing | DPBP. MoF | GEF | Grant | | $13,900,000.00 | ✓ | ✓ | | Agriculture | Agriculture and Forestry |
| Mainstreaming Biodiversity into the Tourism Sector in Bhutan (ecotourism) | 2021-2026 | ongoing | DoT, MoICE | GEF | Grant | | $4,800,000.00 | ✓ | ✓ | | Multi Sector | Biodiveristy and Tourism |
| Small Grant Programme (SGP) during GEF Operational Phase 5, 6, 7 | 2010-2024 | ongoing | UNDP | GEF | Grant | | $1,900,000.00 | ✓ | ✓ | | Cross Sector | |