Inventory survey

•Geographical Regions and Challenges:

1. North-West: Drought-prone with arsenic contamination risk.
2. North Central: Barind Tract, facing drought, arsenic contamination, and surface water depletion.
3. North East: Prone to flash floods from Indian transboundary flows.
4. Eastern Hills: High rainfall, challenges with soil erosion, and landslides.
5. Central: Urban and industrial growth with issues of water pollution, waterlogging, and drainage congestion.
6. South East Coastal: Vulnerable to cyclones, storm surges, salinity intrusion, and coastal erosion.
7. South West Coastal: Coastal regions face challenges of cyclones, storm surges, salinity intrusion, and waterlogging due to polderization.
8. Rivers and Estuaries: Major rivers and estuaries face issues of erosion, sediment transport, flooding, and navigation.

• Biodiversity:

Positioned as a transitional zone within the Indo-Myanmar biodiversity hotspot.

Dhaka University's 1982 wildlife checklist documented 19 amphibian species, 124 reptiles, 578 birds, and 119 mammals, totalling 840 species (excluding fishes and invertebrates) (Khan, 1982; Hossain 2001; Nishat et al. 2002)

The updated 2015 checklist reported an increase to 64 amphibian species, 174 reptiles, 711 birds, and 133 mammal species, totalling 1082 species.

The Red Listing process in 2015 produced a broader consensus list, totaling 1,619 species.

•Red List Breakdown (2015):

The Red List includes 138 mammals, 566 birds, 167 reptiles, 49 amphibians, 253 freshwater fishes, 141 crustaceans, and 305 butterfly species (IUCN, 2015).

A considerable number of invertebrates expected in Bangladesh, including 31 regionally extinct species, as well as estuarine and marine fishes, are left unaccounted for.

•Changes Over Time:

The biodiversity count increased significantly from 1982 to 2015, reflecting a growing understanding of the country's diverse wildlife.

•Extinct Species:

Extinct species like rhinos, buffalo, gaur, banteng, and several birds and reptiles are excluded from the counts.

• Forests:

•Forest Allocation Aspiration: 20% geographical area to forest and tree cover (Altrell et al. 2007),.

•Forest Depletion:

Except for the Sundarbans, natural forests, including the Mixed-evergreen or Hill Forest, Mangrove Forest, Shal Forest, and Bamboo Forest, faced severe depletion.

•Forest Categories:

Total Forest Area: 12,050 km2 of mainland and coastal/estuarine forests.

•Unclassed State Forest:

Another type of forest managed by the forest department is known as unclassed state forest (Altrell et al. 2007).

•Decline Over Time:

Since the 1870s, Bangladesh's forested regions have experienced a decline.Total forest land now constitutes less than 16%, equivalent to 2.33 million hectares. The most recent update in 2021 reveals a further decrease to 14.47% of the land area, equivalent to 1.8834 million hectares.

•Forest and Tree Resources Zones:

Five major zones: Sundarbans, Coastal forests, Hill forests, Sal forests, and Village forests (including Trees outside Forests - TOF).

•Village Forests and Trees Outside Forests (TOF):

Village forests include trees in rural homesteads.

TOF is cultivated along roadsides, canals, embankments, and fallow land.

Social forestry programs and strip plantations are crucial, fulfilling 80% of timber and fuelwood demand (Barua and Kumar, 2015)

• Hydrological zones:

•Correlation Between Hotspots and Hydrological Zones:

Barind and Drought-prone areas: Northwest Hydrological zone.

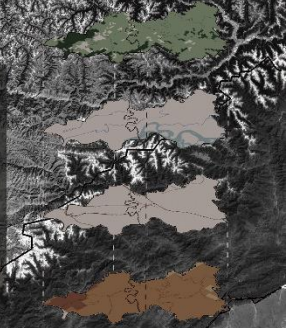
Chattogram Hill Tracts: Eastern Hills excluding Chattogram and Cox's Bazar Hydrological zone.

Coastal Zone: The coastal districts of South West, South Central, and South East Hydrological zone.

Haor and Flash Flood Areas: River Systems and Estuaries: North East Hydrological zone.

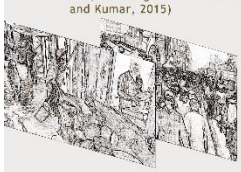
Rivers and Estuaries: district of North Central and South Central along major rivers: North and South Central Hydrological zones.

Urban areas: No specific grouping.



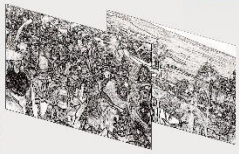
TOTAL FOREST AREA: 12,050km²

4,360km²	5,510km²		340km²	1,840km²	
•Sundarbans Mangrove Forest: Located in Satkhira, Khulna, and Bagherhat Districts. Encompasses 6,000 km2 (4,000 km2 land, 2,000 km2 water). Rich biodiversity with 334 floral and 269 faunal species.	**•Mixed-evergreen and Evergreen Forests:** Spread across Sylhet, Chittagong, Cox's Bazar, and Chittagong Hill Tracts. Approximately 4,000 km2, primarily in eastern and northeastern regions.	**•Hill Forests:** Encompass tropical evergreen and semi-evergreen forests in southeastern and eastern parts.	**•Shalbon or Sal Forest:** Concentrated in central and western parts (Dhaka, Jamalpur, Mymensingh, Tangail). Covers 300 km2, facing threats like lumber poaching, land conversion, and land grabbing.	**•Coastal Forests:** Comprise plantations from afforestation along the southern coastline and offshore islands.	**•Others** Additional categories: Homestead Forests, Countryside Forests, Village Woodlands, and Crop fields.



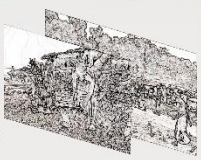
Coastal Zone:

Threatened by rising sea levels, cyclones, and salinity intrusion affecting agriculture and water sources.



Haor Region:

Faces regular flash floods affecting agriculture, fisheries, and livelihoods.

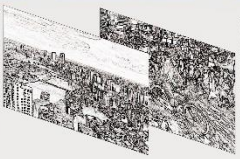


Barind and Drought Prone Areas:

Experiencing water scarcity and changing rainfall patterns affecting agriculture.

Charlands:

River islands with changing shapes due to erosion and sedimentation, present challenges for infrastructure and livelihoods.



Urban Areas:

Challenges related to rapid urbanization, waste management, water supply, and sanitation.

Floodplains and Rivers:

Threatened by changing flood patterns and river erosion affecting agriculture and livelihoods.

•Critical Hotspots:

Six critical hotspots identified by the BDP (Bangladesh Delta Plan) require special attention.

Opportunities I

• Agriculture:

•Food Production:
Fertile soil and abundant water resources in the delta facilitate multiple cropping.
Advancements in seed-fertilizer-irrigation technology contribute to intensified land cultivation.
Significant expansion in food production, especially rice.
Rice production increased from 12 million tonnes in 1973 to 36.3 million tonnes in 2018.

•Achievements in Food Self-Sufficiency:
Bangladesh successfully utilizes natural advantages for food production.
Despite delta and climate change risks, the country achieves food self-sufficiency.
Poised for rice exports due to effective population control policies.

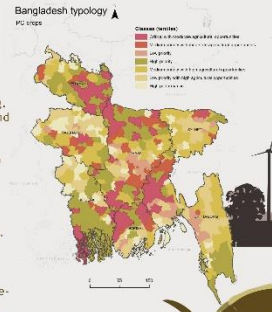
•Fisheries Resources:
An abundance of rivers, wetlands, and lakes presents opportunities for fisheries resources.
Marine fishing, especially in the Bay of Bengal, has become a significant contributor to fisheries.
Transformation in agriculture structure: decreasing crop sub-sector share, increasing fisheries share.

•Economic Adaptability and Resilience:
Value-added and employment shares of the fisheries sector are increasing.
Bangladesh showcases adaptability and resilience in the face of changing economic structures.

•Statistics:
Rice production increased from 12 million tonnes (1973) to 36.3 million tonnes (2018).
Successful utilization of natural advantages leads to food self-sufficiency.
The fisheries sector contributes significantly to value-added and employment.

•Policy Impact:
Effective population control policies contribute to the country's poised position for rice exports.

(General Economics Division, 2018; Mondal, 2010).



Opportunities II

• Renewable Energy:

Bangladesh holds significant potential for renewable energy development.

•Strategic Approach:
A comprehensive framework for advancing renewable energy initiatives in Bangladesh.

•Focus on Solar Photovoltaic (PV) Panels:
Growing acceptance of solar PV panels for providing electricity to rural households and small businesses.

•Off-Grid Solar Home Solutions:
The development of off-grid solar home solutions has reached international benchmarks.

•Exploration of Other Renewable Resources:
While solar power has made strides, the potential of other renewable resources is still in the exploratory stage.

Key Areas of Focus:
Institutional aspects.
Hydropower.
Exploration of tidal power.
Solar energy.
Financing.

Challenges II

• Rainfall:

•Future Outlook for Bangladesh's Rainfall Pattern:
Increased variability and unpredictability are expected (General Economics Division, 2018).
Projections indicate a rise in pre-monsoon and monsoon rainfall (General Economics Division, 2018).
An overall annual increase is expected in most regions by 2030 (General Economics Division, 2018).
By 2050, southern parts and eastern hills may experience reductions in rainfall.
Higher temperature rises foresee more erratic rainfall behaviour and variations in amounts (General Economics Division, 2018).

• Sea level rise and salinity intrusion:

oProminent issues in the Bangladesh delta due to its complex geographical position.
oIPCC (2013) predicts sea level rise ranging from 0.2 meters to 1 meter for low to high emission scenarios in the Bay of Bengal by 2100.

• Cyclones :

oLow-lying areas in coastal regions are highly vulnerable to cyclones, posing threats to lives and properties.
oAlmost yearly occurrences of cyclones in the country's coastal region, with a severe cyclone every three years on average.

• Water Quality:

oWater quality in 32 rivers is significantly deteriorating, indicating a substantial risk of environmental degradation.
oContributing factors include industrialization, mechanized agriculture, urbanization, and salinization.
oAnticipated further degradation of surface water quality in Bangladesh.

•Waterlogging:

oSignificant development challenges are posed by waterlogging in both urban and rural areas.

•Urbanization and Urban Heat Island (UHI)

•Droughts :

•Drought Characteristics in Bangladesh:
Droughts are agricultural, characterised by severe moisture stress.
Drought-prone agroecological zones experience dry periods from March 24 to May 21 (32 to 48 days).
High temperatures (over 40°C) for 5 to 15 days during this period.
Some soils with limited moisture retention are susceptible to drought.

Barind Region Irrigation Project and Its Impact:
Government initiative addressing drought in the Barind region.
Successful transformation into a flourishing agricultural hub (rice, fruits, vegetables).
Significant poverty alleviation in the North-West part of Bangladesh.

Changing Drought Risk Factors:
The risk of drought shifted due to reduced surface water availability (upstream river water diversion in India).
Insufficient rainfall during the dry season impacts the water table.

Climate Change Threat to Barind Tract Agriculture:
The potential impact of climate change leading to further reduced rainfall in the dry season.
Poses a threat to agriculture in the Barind Tract (General Economics Division, 2018).

Challenges III

• Floods :

•Challenges of Recurrent Floods in Bangladesh:
Unique geography with the convergence of Ganges, Brahmaputra, and Meghna rivers forming the world's largest delta.
About 70% of the country's land is less than one meter above sea level, consisting of vast flood plains and deltas.
Monsoons, especially in highlands, and tropical storms along the coast contribute to regular inundation (20-25% of the nation).
Extreme flood events, with simultaneous peaks of major rivers, can submerge 55-60% of the country.
Climate change exacerbates the frequency and intensity of megafloods.
Human activities like dam construction in upstream countries and unplanned urbanisation in floodplains add to the challenges (General Economics Division, 2018).

• River erosion:

•River Morphology and Erosion Rates:
oHigh dynamism in river morphology with regular river bank erosion, especially along main riverbanks.
oJamuna experiences erosion at approximately 1,770 hectares per year.
oPadma River erodes about 1,298 hectares per year.
oLower Meghna erodes at a rate of 2,900 hectares per year.
oIncreasing river discharge is the primary cause of erosion.

•Changing Peak Discharge Patterns:
oFlow records of the Brahmaputra/Jamuna rivers show a rise in peak discharge over 50 years.
oPeak discharge in Jamuna occurred earlier, shifting from mid to the first week of August.
oBhairab Bazar (Meghna) experiences decreasing peak discharge, delayed to the last week of September.
oHardinge Bridge station on the Ganges observes increasing peak discharge, advancing about one day per decade.
oEscalating peak discharges of the Ganges and Brahmaputra increase the likelihood of future river erosion.

•Impact on Flood Risks:
oThe current trend of peak advancement may reduce the chances of simultaneous peaks in the Ganges and Brahmaputra, decreasing the risk of prolonged and catastrophic floods.

•Land Accretion and Net Erosion:
oSome land accretion occurs due to river movements and sediment transport.
oA total of 52,313 hectares of land were accreted during 1973-2015.
oDespite accretion, net erosion remains highest for the Brahmaputra/Jamuna River.

•Anticipated Changes and Climate Impact:
oAnticipated changes in river flow and sediment transport are influenced by the multifaceted impacts of climate change.
oExpected to further intensify the dynamics of these rivers (General Economics Division, 2018).

Opportunities III

• Inland Water Transport

•Geographic Advantage:
An abundance of rivers in Bangladesh provides a significant comparative advantage.

•Interconnected Districts:
Virtually all districts are interconnected through river routes.
Forms links with growth centres like Dhaka, Chattogram, and Khulna.

•Transportation Benefits:
Inland waterways offer environmentally friendly and cost-effective transportation.
Benefits both passengers and cargo.

•Social Impact:
Particularly beneficial for the rural poor.
A major source of employment in rural areas.

•Development Opportunities:
Emphasizing river transport could unlock substantial development opportunities.
Lowers transportation costs, mitigates environmental degradation, and conserves budgetary resources.

•Employment Prospects:
Enhances employment prospects for the impoverished.

(General Economics Division, 2018; Hassan and Xuefeng, 2022)

Challenges I

• Climate Change Impact in Bangladesh:

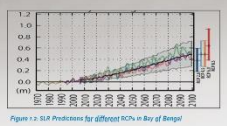


Figure 1.2: SLR Predictions for different RCPs in Bay of Bengal
Source: IPCC 2013

Sizable challenges in climate change adaptation (Huq, Karim, and Asaduzzam, 1999).
Global surface temperature increased by 0.85 °C from 1880 to 2012 (General Economics Division, 2018).
Bangladesh is vulnerable to climate change, posing threats to development (General Economics Division, 2018).
Agriculture faces a 17% decline, with a potential 61% decrease in wheat output by 2050 without rapt action (General Economics Division, 2018).
Soil salinity and flooding impact crop yields (General Economics Division, 2018).
Forestry and ecosystems, including the Sundarbans mangrove forest, are at risk.
One-meter sea level rise (SLR) could lead to economic decline (General Economics Division, 2018).
Infrastructure faces an annual depletion of 0.05% in capital stock (General Economics Division, 2018).
Health hazards, including water and vector-borne diseases, are projected to increase (General Economics Division, 2018).
The impact could result in a 1.1% to 2.0% annual GDP loss (General Economics Division, 2018).
Implementing the Bangladesh Delta Plan could potentially accelerate the average growth rate to 8.8% of GDP (General Economics Division, 2018).

2100 vision

Issues

•Poverty alleviation for better quality of life
Promoting poverty alleviation and improving the quality of life by enhancing the economy and fostering sustainable economic growth

•Optimized biodiversity to enhance human well-being.
Maximize the critical role of biodiversity in safeguarding human well-being, security, and health.

•Sustainable agriculture
Implementing sustainable agriculture practices, including agroforestry, enhancing both yield productivity and environmental conservation, fostering a harmonious balance between agricultural production and ecology

•Climate resilience to natural hazards
Enhance the robustness and adaptability to environmental challenges, including natural hazards

•Adaptation for high population density and heat stress
Adaptation strategies for high population density and heat stress in urban areas, ensuring the resilience and well-being of urban communities in the face of global warming

Aims

Creating a climate-resilient Bangladesh to reduce poverty, natural risks and vulnerability due to the adverse impacts of climate change and country development, and to help fulfil the aspiration to become an eco-friendly natural-based nation.

Ecological floating island

Due to flood disasters and other issues, we haveset up ecological floating islands, which to someextent have become places for gardens, farms, andpeople to live.

Public transportation

The complex water and land transportation-network can solve road congestion caused by-population issues and improve the efficiency ofriver transportation.

Public space

Provide more flexible leisure spaces within the city, break the sense of spatial singularity, and offer more possibilities.

Bio Infiltration Cells

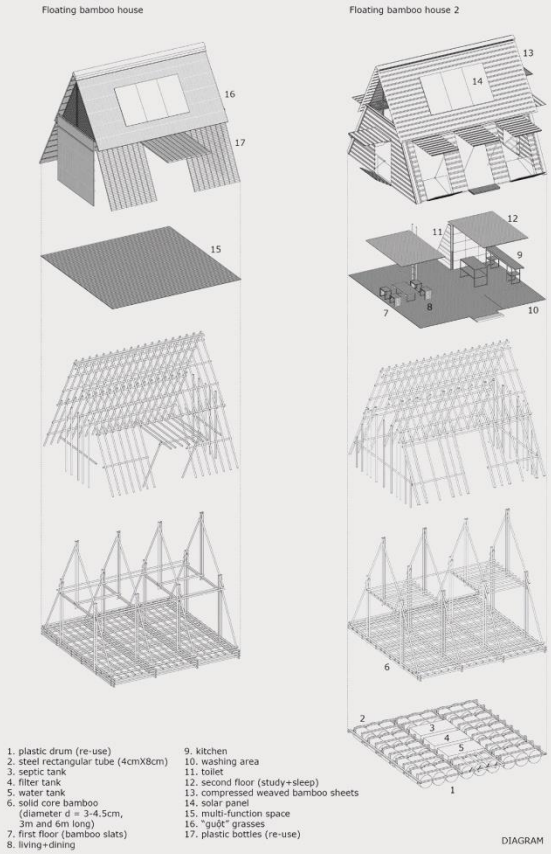
Bio infiltration cells are landscape depressions that can be used to guide rainwater runoff from impermeable surfaces. Not only that, they also have the function of purifying water. Bio infiltration cells need to have sufficient and excellent leakage bases to ensure timely infiltration of accumulated water. Rainwater gardens and ecological detention tanks are typical ecological infiltration units.

Floating housing

Floating house has been designed with low environmentally impactful materials and technologies that reduce its carbon footprint and lower its energy needs. It has a compact activated sludge wastewater treatment plant and when charged, the house is self-sufficient for at least seven days. It produces up to 80% of its annual energy needs.

Future vision

In the future, we hope to see a Bangladesh where transportation is more convenient, industry is cleaner, energy is more sustainable, and housing is more humane. This vision includes lush greenery in the city, clear rivers, and improved housing conditions. Meanwhile, residents can enjoy better air quality and more green spaces in the community.



1. plastic drum (re-use)
2. steel rectangular tube (4cmX8cm)
3. septic tank
4. filter tank
5. water tank
6. solid core bamboo (diameter d = 3-4.5cm, 3m and 6m long)
7. first floor (bamboo slats)
8. living+dining
9. kitchen
10. washing area
11. toilet
12. second floor (study+sleep)
13. compressed weaved bamboo sheets
14. solar panel
15. multi-function space
16. "guǐ" grasses
17. plastic bottles (re-use)

DIAGRAM

HOUSING:

Bangladesh's housing problem is mainly manifested in the expansion of urban slums and overuse of land. Sustainable urban planning can be promoted through natural solutions, including increasing urban green spaces, building rooftop gardens and promoting eco-housing. The government can formulate policies to encourage environmentally friendly buildings, provide better housing conditions for poor residents, and promote sustainable development of urban renewal projects through community participation.

IMPLEMENTATION METHOD:

Policy formulation and supervision: Formulate and implement strong environmental protection policies, supervise polluting enterprises, and promote sustainable development.
Investment and technological innovation: Invest in renewable energy projects, encourage technological innovation, and improve energy efficiency.
Community participation and education: Through community participation projects, we improve residents' environmental awareness and cultivate a sustainable lifestyle.
International cooperation: Seek international support and cooperation, obtain technical and financial support, and jointly address global environmental issues.
In the process of implementing these natural solutions, the government, enterprises, social organizations and residents need to work together to form a synergy to jointly build a greener, cleaner and more livable Bangladesh. Through these efforts, we can better balance development and environmental protection and create better living conditions for Bangladesh's future.

Identification of an area to design in the second round of the Challenge:

We are going to describe a place below: now we are not sure..

Characteristics特征

Region based on First level of jurisdiction (BADM data)	Geology	Physiography	Flora & Fauna	Water			Land Cover	Biodiversity		Population Density	Rising Temperatures	Urbanisation
Metric	Surface geologic units		Wildlife distribution	Trend of seasonal water quantity or flow rate of key water bodies that serve human uses. This can help to identify risk and progress related to water scarcity. 供人类使用的主要水体的季节性水量或流量趋势。这有助于识别与水资源短缺相关的风险和进展。	Past water projects (reading list)	Total suspended solids in key water bodies, biochemical oxygen demand and chemical oxygen demand to inform the capacity of stream flows to sustain aquatic life and aesthetic quality for human use. Excessive application of fertilizers and untreated domestic and industrial effluent are among the most important human induced pressures. [illegible]	Majority of land cover	Is There Any Key Biodiversity Areas (IBAT Alliance, BirdLife Zero Extinction Data)	Is There Any Protected Areas (IBAT Alliance, BirdLife Zero Extinction Data)		Nighttime Surface Urban Heat Island Intensity (SUHI) 夜间地表城市热岛强度 (SUHI)	Predicted urbanisation in 2100
Barisal	Tidal deltaic deposit. These deposits can influence coastal geomorphology, sedimentation patterns, and the development of estuarine environments. They may also impact navigation and contribute to the formation of tidal flats. [illegible]	Ganges Floodplain. The Ganges River floodplain is a large area characterized by the dynamic activity of the Ganges channel, creating a mix of soil types and a diverse landscape of ridges and basins. Seasonal flooding occurs, with variations in flood depths across the region. [illegible]	-	In the south-central region, the mean monthly streamflow varies from 1120 cumec in March to 21900 cumec in August. 在中南部地区，月平均径流量从3月份的1120立方米到8月份的21900立方米不等	Blue Gold Project, WMIP, CEIP	During 2010–2016, pH of Brahmaputra River was within the EQS, but the BOD content was higher than the EQS in the year of 2013 in dry season. 2010–2016年 [illegible] EQS (Environmental Quality Standards [illegible]) [illegible] BOD (Biochemical Oxygen Demand [illegible]) [illegible] 2013年EQS	Agriculture	Yes	No	-	-	Low
Chittagong	Estuarine deposits. These deposits often contain evidence of changes in sea level, climate, and ecological conditions. They can be important for understanding past environmental variations and may impact land use planning in coastal areas. Magnetic and gravimetric survey: hatiya trough is subsided and deepest part of Bengal Foredeep and havve a sedimentary thickness of more than 20km. The seismic survey resulted in evidence of existing commercial gas. Huge deposit of mineral sands. [illegible]	Comprise of Old Meghna Estuarine Floodplain and North Eastern hills. The Old Meghna Estuarine floodplain has a flat landscape with minimal elevation differences between ridges and basins. Man-made canals aid drainage in the southern part, and the sediments are predominantly silty and silty. Seasonal flooding is common, mainly caused by rainwater and influenced by the flow of external rivers. Some areas may stay wet throughout the dry season. [illegible]	Bear, Elephant, Deer, Python, Langur, Porcupine, Jackel, Hoolock Gibbon. The decline of forest habitats in Bangladesh over the last three decades has had a severe impact on the inland and resident vertebrate fauna. Forest tree stock has decreased by more than 50% since the 1970s, leading to a forest cover of less than 8% of the country. In 1990, the forest to population ratio was less than 0.02 ha of forestland per person, making it one of the lowest in the world. This significant reduction poses a threat to the dependence of wild animals on forests. [illegible]	In the southeast region, the mean monthly streamflow varies from 377 cumec in March to 4870 cumec in July. 在东南部地区，月平均径流从3月份的377立方米到7月份的4870立方米不等。	CEIP, CDSP 1, CDSP2, CDSP-3	During 2010–2016, the water quality of Halda River was within the EQS and can be considered as good. 2010–2016年，哈尔达河水质处于EQS范围内，水质良好。	Agriculture and Forest. Tree cover loss in the country is mostly happening in this region. 农业和林业。该国的树木覆盖损失主要发生在该地区。	Yes	No	High in population density. Some parts are <=5k 人口密度高，有些部分 <=5k	Temperature increased by 0.9°C (1.6°F) during 1980–2019. Nighttime Surface Urban Heat Island intensity (SUHI) is 1.1–2.0 1980 年至 2019 年期间，气温上升了 0.9°C (1.6°F)。夜间地表城市热岛强度 (SUHI) 为 1.1–2.0	High
Dhaka	Deltaic silt, deltaic sand, alluvial silt, alluvial silt and clay. These deposits influence the landforms and ecosystems of deltaic regions. Understanding their characteristics is crucial for managing sedimentation, erosion, and the sustainability of deltaic environments. Alluvial deposits can impact soil fertility, groundwater recharge, and land use planning. They are often agriculturally productive but may pose challenges in terms of stability and construction. While silt and clay particles are generally more cohesive than sand, alluvial deposits can still be vulnerable to erosion, particularly during periods of high water flow and flooding. Rapid water movement can lead to the detachment and transport of fine-grained sediment, contributing to erosion along riverbanks and floodplains. [illegible]	Comprise of Madhupur Tract, New Brahmaputra & Jamuna Floodplain, and Arial Beel. The Madhupur Tract is an upland block in central Bangladesh with a distinctive geological composition. It consists of plateau-like hillocks, has a dendritic drainage pattern, and is known for its flat valleys used for cultivation. The Madhupur jungle in the region is home to Shal trees, prized for their valuable hardwood. The Jamuna floodplain is the result of a change in the Brahmaputra's course caused by a severe flood. It has various subdivisions and features such as dyeras and chars, with diverse soil and topographical characteristics. Flooding is a significant seasonal occurrence during the monsoon. Arial Beel is a large depression characterized by heavy clays and is located between the Ganges and Dhaleshwari rivers. Seasonal flooding is primarily caused by rainwater accumulation, and the area retains its wet conditions even during the dry season. [illegible]	Langur, Otter, Jackel	Only small part of Dhaka is connected to the Haor Basin. Dhaka city has experienced water scarcity during dry months. The Bangladesh Institute of Planners says that the capital has lost 38% of its water bodies since 2010 which has created problems like rising water levels. Water bodies should cover 12–15% of Dhaka considering its population, but the coverage now is only around 5%. [illegible]	WMIP	1. The Buriganga River flows pass the southwest outskirts of Dhaka city. More than 60,000 cubic metres of toxic waste are realeased into the main water bodies of Dhaka. In 2016, the BOD of the Buriganga River was 17.08 mg/L in the dry season and 6.53 mg/L in the wet season. The cut-off value of fisheries is 6 mg/L which means the BOD in Buriganga River for both seasons exceeded the required value. 2. The Shitalakhya River which a lot of large, medium, and small-sized industries are located on both banks of the river. The BOD of the Shitalakhya River in 2016 was 19.99 and 5.49 mg/L for dry and wet seasons, respectively. 3. The Turag River faces encroachment, sand/earth filling, dumping of industrial, municipal and medical waste discharge. The BOD of the Turag River in 2016 was 30.48 and 4.84 mg/L for dry and wet seasons, respectively. [illegible]	Agriculture and Settlement 农业与聚居	Along the river (western part of Dhaka)	No	High in population density. Some parts are <=10k	Due to the water scarcity, the microclimate of Dhaka has experienced warming, urban heat island effect. Maximum temperature in Dhaka increased by 0.5°C between 1980 and 2019. Nighttime Surface Urban Heat Island intensity (SUHI) is 1.1–2.0 [illegible]	High
Khulna	Deltaic silt, tidal deltaic deposit, mangrove swamp deposit. These deposits are important for biodiversity, coastal protection, and carbon storage. Understanding mangrove swamp deposits is crucial for coastal management and conservation efforts. [illegible]	Comprise of Ganges Floodplain, Ganges Tidal Floodplain, Gopalganj Khulna Beel. The Ganges River floodplain is a large area characterized by the dynamic activity of the Ganges channel, creating a mix of soil types and a diverse landscape of ridges and basins. Seasonal flooding occurs, with variations in flood depths across the region. The Ganges Tidal Floodplain is a low-lying area with tidal rivers and creeks. It experiences variations in water composition, flooding patterns, and soil salinity across different regions within the floodplain. [illegible]	Otter, Langur, Porcupine, Python, Otter, Bear, Wild Cat, Bengal Tiger, Deer, Dolphin, Crocodile. The decline of forest habitats in Bangladesh over the last three decades has had a severe impact on the inland and resident vertebrate fauna. Forest tree stock has decreased by more than 50% since the 1970s, leading to a forest cover of less than 8% of the country. In 1990 the forest to population ratio was less than 0.02 ha of forestland per person, making it one of the lowest in the world. This significant reduction poses a threat to the dependence of wild animals on forests. [illegible]	In the south-western region, the mean monthly streamflow varies from 190 cumec in March to 7650 cumec in August. 在西南地区，月平均径流量从3月份的190立方米到8月份的7650立方米不等。	WMIP, Blue Gold Project, CEIP	During 2010–2016 of water quality observation, the Mowun River had pH within the EQS but the BOD content exceeded the EQS. [illegible]	Agriculture and Forest	Yes	Yes	High in population density. Some parts are <=1k 人口密度高，有些地区<=1k	Nighttime Surface Urban Heat Island intensity (SUHI) is 0.0–1.0	Low

Characteristics特征

Region based on First level of jurisdiction (BADM data)	Geology	Physiography	Flora & Fauna	Water			Land Cover	Biodiversity		Population Density	Rising Temperatures	Urbanisation
Mymensingh	young gravelly sand, alluvial silt, marsh clay and peat. Young gravelly sand can impact groundwater recharge, aquifer characteristics, and may be relevant in construction activities. Understanding their distribution is essential for land use planning. These deposits may be more susceptible to erosion, especially in areas with high-energy processes such as fast-flowing rivers or coastal zones experiencing strong wave action. Human activities and changes in land use can further increase erosion risk. Marsh clay and peat are important for understanding wetland ecosystems, carbon sequestration, and past environmental conditions. They are also relevant in land reclamation and restoration projects. [illegible] [illegible]	Comprise of Old Brahmaputra Floodplain and North-Eastern Terrace Land. The old river channel, now known as the Old Brahmaputra, is narrower and experiences seasonal flooding, with levees preventing spillage. The floodplain itself has a gentle landscape with broad ridges and depressions, and the flooding characteristics vary between the depressions and ridges. [illegible]	Elephant	A part of Mymensingh is connected to the Haor Basin which stores 30 cubic kilometers of water. The 2022 historic floods brought that number up to 47 cubic kilometers. [illegible]	WMIP	The Shitalakhya River which a lot of large, medium, and small-sized industries are located on both banks of the river. The BOD of the Shitalakhya River in 2016 was 19.99 and 5.49 mg/L for dry and wet seasons, respectively. [illegible]	Agriculture	Along the river (western part of Mymensingh) [illegible]	No	-	-	Low
Rajshahi	barind clay residuum, alluvial silt. These deposits influence soil fertility and agricultural practices in the Barind Plateau. Understanding their composition is crucial for sustainable land use and agriculture. [illegible]	Comprise of Barind Tract, Karatowa Bangali Floodplain. The Barind Tract is a significant area in Bangladesh characterized by its higher elevation, unique geological features, and the ability to remain flood-free during the monsoon season. It plays a role in the landscape and is classified into different types of land based on its elevation. [illegible]	Dolphin	In the northwest region, the mean monthly streamflow varies from about 417 cumec in March to about 7370 cumec in August. [illegible]	GK Project	During 2011–2016, pH of the Karatoa River and the DO content was around the EQS. Both the BOD contents was highly over. [illegible]	Agriculture	Along the river (eastern part of Rajshahi) [illegible]	No		Nighttime Surface Urban Heat Island intensity (SUHI) is 0.0–1.0 [illegible]	Low
Rangpur	young gravelly sand, old gravelly sand. These deposits can impact groundwater recharge, aquifer characteristics, and may be relevant in construction activities. Understanding their distribution is essential for land use planning. These deposits may be more susceptible to erosion, especially in areas with high-energy processes such as fast flowing rivers or coastal zones experiencing strong wave action. Human activities and changes in land use can further increase erosion risk. [illegible]	Comprise of Old Himalayan Piedmont Plain and Tista Floodplain. The first one is characterized by an old, gently sloping plain formed by the deposition of sands and gravels from rivers. The landscape has changed over time, with evidence of past river courses and uplift, and it plays a significant role in the geography of the northwestern part of the country. The Tista floodplain is a large region with seasonal flooding during the monsoons. It includes a part that represents the ancient floodplain of the Tista River, and it is characterized by three major rivers, with the flooding affecting a relatively narrow stretch of land. [illegible]	-	In the northwest region, the mean monthly streamflow varies from about 417 cumec in March to about 7370 cumec in August. [illegible] 417 cumec [illegible] 7370 cumec [illegible]	Barind Region	During 2011–2016, all water quality parameters of the Dhaleshwar River were within the EQS.	Agriculture	Along the river (eastern part of Rangpur)	No	-	-	Low
Sylhet	marsh clay and peat, alluvial silt and clay. These deposits are important for understanding wetland ecosystems, carbon sequestration, and past environmental conditions. They are also relevant in land reclamation and restoration projects. While silt and clay particles are generally more cohesive than sand, alluvial deposits can still be vulnerable to erosion, particularly during periods of high water flow and flooding. Rapid water movement can lead to the detachment and transport of fine-grained sediment, contributing to erosion along riverbanks and floodplains. [illegible]	Comprise of Surma-Kushiyara floodplain and Sylhet basin. The Surma-Kushiyara floodplain is an area in eastern Bangladesh that includes flat lands along rivers, small hills, and piedmont areas near Sylhet. The topography consists of broad ridges and basins, with heavy silts on ridges and clays in basins. This region is prone to flash floods during different seasons, and the flooding can vary in terms of extent and depth, with normal flooding being shallow on ridges and deep in basins. [illegible]	Hoolock Gibbon, Bear, Jackel, Elephant, Bear, Porcupine, Deer, Otter 长臂猿、熊、豺狼、大象、熊、豪猪、鹿、水獭。	A part of Sylhet is connected to the Haor Basin which stores 30 cubic kilometers of water. The 2022 historic floods brought that number up to 47 cubic kilometers. [illegible]	Haor Basin	During the 2010–2016, Surma River had good pH and DO content but the BOD content was much over the EQS in the year of 2013 to 2016. [illegible]	Agriculture	No	No	-	Nighttime Surface Urban Heat Island intensity (SUHI) is 0.0–1.0	Low