Bangladesh – India Friendship Power Company (Pvt.) Limited

(A Joint Venture of NTPC Ltd. and BPDB)

Monitoring of Environment Parameter and Implementation of Environmental Management Plan along with Engineering Activities for 2X660 MW Maitree Super Thermal Power Project at Rampal in Bagerhat District

45th Quarter Monitoring Report

Monitoring Period: May 2025 – July 2025

March 2026

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Acknowledgments

The Center for Environmental and Geographic Information Services (CEGIS) is thankful to Bangladesh-India Friendship Power Company (Pvt.) Limited (BIFPCL) for awarding the contract on "Monitoring of Environment Parameter and Implementation of Environmental Management Plan along with Engineering Activities for 2x660 MW Maitree Super Thermal Power Project at Rampal, Bagerhat" to CEGIS. This document constitutes the 45th quarterly monitoring aspects, covering all the preselected parameters and locations specified in the approved EIA studies of both Power Plant and Coal Transportation.

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Last but not least, the study team appreciates and acknowledges the concerns and perceptions of local people regarding the project, as well as their active participation during site visit.

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Abbreviations and Acronyms

AAS	Atomic Absorption Spectrophotometer
AECL	Adroit Environment Consultants Ltd.
As, Pb, Hg	Arsenic, Lead and Mercury
BCSIR	Bangladesh Council of Scientific and Industrial Research
BIFPCL	Bangladesh-India Friendship Power Company (Pvt.) Limited
BOD	Biochemical Oxygen Demand
BPDB	Bangladesh Power Development Board
CEGIS	Center for Environmental and Geographic Information Services
COD	Chemical Oxygen Demand
CPUE	Catch per Unit Effort
CSR	Corporate Social Responsibility
dBH	Diameter at Breast Height
DO	Dissolved Oxygen
DoE	Department of Environment
DPHE	Department of Public Health Engineering
EC	Electrical Conductivity
ECR	Environment Conservation Rules
EHS	Environmental Health Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPC	Engineering Procurement Construction
ESP	Exchangeable Sodium Percentage
ESP	Electrostatic Precipitator
FGD	Focus Group Discussion
FGD	Flue Gas Desulfurization
FSR	Fisheries Species Richness
GIS	Geographic Information System
GoB	Government of Bangladesh
GW	Groundwater
HS	Household Survey
IFC	International Finance Corporation
IGA	Income Generation Activities

IUCN	International Union for Conservation of Nature
Kg	Kilogram
KII	Key Informant Interview
MoPEMR	Ministry of Power, Energy and Mineral Resources
MW	Mega Watt
MSDS	Materials Safety Data Sheet
NTPC	National Thermal Power Corporation, India
PCU	Passenger Car Unit
PMU	Project Management Unit
QMR	Quarterly Monitoring Report
RRA	Rapid Rural Appraisal
SAR	Sodium Absorption Ratio
SRDI	Soil Resources Development Institute
SRF	Sundarbans Reserve Forest
TDS	Total Dissolved Solid
TH	Total Hardness
ToR	Terms of References
TSS	Total Suspended Solid
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

Units

dB	Decibel	mg	Milligram
hr	Hour	MW	Mega Watt
Kg	Kilogram	Nm	Normal Meter
Km	Kilometre	ppm	parts per million
KV	Kilo Volt	ppt	parts per trillion
KW	Killo Watt	ton/year	Ton Per Year
m	Meter	s	Seconds

Units Conversion

General Units

1°C = 274.15 K=33.8° F

1 hectare = 10-2 km2 = 2.471 acres

1 kilogram = 2.20 pound

1 kilometre = 0.62137 mile

1 liter = 0.001 cubic meter

1 meter = 3.2808 feet

1 metric ton = 1000 kg

1 mg/l ≈1 g/m3≈1 ppm (w/w)

1 mg/m3 = 1 µg /L

1 pascal = 1 N/m2= 0.01 millibar

1 square mile = 640 acre = 2.590 km2

Energy Units

1 GWyr = 8.76 x 109 kW

1 horsepower = 746 W

1 KWh = 3412 Btu

1 kWh = 859.85 kcal

1 KWh = 3.6 x 106 J

1MW=1000KW=106W

Glossary

Aman:	Group of rice varieties grown in the monsoon season and harvested in the post-monsoon season. This is generally transplanted at the beginning of monsoon from July-August and harvested in November-Dec. Mostly rain-fed, supplemental irrigation is needed in places during dry spells.
Aus:	Group of rice varieties sown in the pre-monsoon season and harvested in the monsoon season. These are broadcasted/transplanted during March-April and harvested during June-July. Generally, rain-fed, irrigation is needed for HYVT. (High yield variety) Aus.
B Aus:	Broadcast Aus
Bazar:	Market
Beel:	A saucer-shaped natural depression, that generally retains water throughout the year and in some cases seasonally connected to the river system.
Boro:	A group of rice varieties sown and transplanted in winter and harvested at the end of the pre-monsoon season. These are mostly HYV and fully irrigated, planted in December-January, and harvested before the onset of monsoon in April- May.
Haat:	A marketplace where market exchanges are carried out either once, twice, or thrice a week, however not every day.
Gear/Jaal:	Different types of fishing nets to catch fish from the water bodies.
Kutcha:	A house made of locally available materials with an earthen floor, commonly used in rural areas.
Khal:	A drainage channel usually small, sometimes man-made through which the water flows. These may or may not be perennial.
Kharif:	Pre-monsoon and monsoon growing season. Cropping season is linked to monsoon between March-October, often divided into kharif-1 (March-June) and kharif-2 (July-October).
Perennial Khal:	Water is available in the khal all year-round.
Pacca:	Well-constructed building using modern masonry materials.
Rabi:	Dry agricultural crop growing season; mainly used for the cool winter season between November and February.
Seasonal Khal:	Water is not available in the khal all year-round.
T. *Aman*:	Transplanted Aman
Upazila:	Upazila is an administrative subdivision of a District.

Executive Summary

This 45th QMR (Quarterly Monitoring Report) covers the status of EMP (Environmental Management Plan) implementation as per the recommendation of the EIA (Environmental Impact Assessment) Report of the Power Plant, vide Memo No: DoE/Clearance/5062/2011 dt. 05/08/2013, and the EIA Report of corresponding Coal Transportation, vide Memo No: DoE/Clearance/5532/2016 dt. 31/01/2018. This quarterly monitoring, covering the monitoring aspects of the monsoon season as indicated in the ToR (Terms of Reference) and the approval conditions of DoE along with valuable suggestions and recommendations from various national and international organizations, has been conducted in July 2025. assigned, In other words, the aspects can briefly be addressed as monitoring of the Environmental Compliances and monitoring of the selected environmental parameters such as ambient air quality, noise level, water quality, land resources, traffic management status, water resources management status, agricultural resources monitoring, fisheries resources, socio-economic monitoring, aquatic & terrestrial ecosystem monitoring, and the Sundarbans Reserve Forest (SRF) health monitoring.

Environmental Compliance Monitoring

The current environmental compliance monitoring activity assesses the status of EMP implementation through physical observations, investigations, and interviews/discussions with the project authority, officials, and relevant staff of the Power Plant. A comprehensive and detailed checklist was developed to evaluate the environmental compliance status of various project components, including the Environmental and Social Management System and Action Plan; Labor and Working Conditions; Community Health, Safety, and Security; Biodiversity and Sustainable Management of Living Natural Resources; Waste Management; and other relevant issues. The major findings during the 45th field visit are as follows:

- Maintenance dredging is being conducted using a dredger with a capacity of 500 cubic meters per hour to maintain the required draft for the navigability of coal ships and barges transporting coal to the Plant's jetty. The dredged materials are disposed of in a 200-acre designated pond located at the southeast corner of the Plant's premises. The accompanying water from the dredged slurry is carefully managed to ensure that only silt-free water is discharged into the river, thereby preventing sedimentation and minimizing environmental impacts.
- The Coal Supplier, under the strict directives of the Project Proponent, has implemented corrective measures such as netting to control coal dust dispersion during ship-to-ship coal transfer operations at the jetty. However, additional comprehensive actions are required to further minimize dust emissions and protect the local aquatic ecosystem. The recommended measures include: (a) installing fringing or extended netting around the ships, and (b) elongating the existing flexible coal chute to ensure more controlled and contained coal transfer.
- The Proponent is committed to use enclosed coal grabber. Primarily, the existing grabbers will be modified to a level to arrest coal from dropping and simultaneously, they will search the enclosed grabber in the market for procuring. The action will be helpful in minimizing coal and dust emissions during unloading.
- Sand and/or earth piles were found uncovered at a few places inside the plant premises and the authority has been giving utmost efforts to reduce the number of such piles as low as possible and at the same time, they have been keeping the piles covered. Though minor,

still this issue should be taken care properly to avoid health related issues of the staff, workers and officials.

- The plantation program is ongoing and is expected to achieve a milestone of 200,000 saplings by 2025. Up to April, a total of 156,000 saplings have been planted out of 300,000 reflects steady progress. During this quarter (May to July), 19,000 saplings which include fruit trees, coconut trees and medicinal plants have been planted at the open spaces of the plant premises. In total, 175,000 saplings have been planted so far out of 300,000 saplings under this plantation program.
- The environmental control measures like Flue Gas Desulphurization (FGD), FGD Waste Water Treatment Plant, Electrostatic Precipitator (ESP), Effluent Treatment Plant (ETP), Sewage Treatment Plant (STP), Solid Waste Management Plant (SWMP), etc. are in operation.
- The Proponent has installed a community grievance box outside the main entrance of the plant premises so that the affected community (if any) can easily drop their grievances in the box to be accounted and resolved the issues by the authority.

Air Quality Monitoring

It is evident from the 45th quarterly monitoring that the criteria pollutants of the ambient air quality at and around the Power Plant including the Sundarbans Reserve Forest (SRF) are under the permissible limits as per the Air Pollution (Control) Rules, 2022 and ECR, 1997. The particulate matter (PM) concentrations were recorded highest at Khan Jahan Ali Bridge (KJAB) and Chalna Bazar due to traffic and dust, while Hiron Point recorded the lowest levels owing to dense vegetation. Although SO_2 and CO levels at Hiron Point slightly increased compared to the previous quarter, they remained within standards. Most parameters remained below the national limits, except for a PM exceedance at KJAB in 2023. KJAB consistently showed the highest concentrations, whereas the lowest were observed in Hiron Point of Sundarbans. Apparently, the PM pollution peaked in 2023 but declined significantly in 2024–2025. SO_2, NO_2, CO, and O_3 were also found higher before and during construction (around 2019) and then steadily decreased during operation and remained within the national standards. Cluster analysis identified minimal pollution at Hiron Point, Akram Point, Harbaria, and the project site, while Chalna, Mongla Ghat, and KJAB experienced higher pollution due to industrial activities, with other locations showing low to moderate levels.

Noise Level Monitoring

Observed level of noise at Chalna, a commercial area located at a distance of 4 km to the north-west direction of the chimney location was recorded as 52.45 dB whereas its standard level is 70 dB (Table: 2.4). Levels of noise at Kaigar Daskati (54.41dB) situated at the Gucchha Gram (a residential area located at north-west corner of the project area), at Chunkuri-2 (51.83 dB) located at 4km south-west direction from the chimney location and at Moidara Khal (45.93) at the south-west corner of the project area did not exceed their corresponding standard limit. On the other hand, levels of noise at Shapmari (township area) are recorded as 48.33 dB respectively that denotes, the levels of noise didn't cross their corresponding standard value (55 dB) in these location (Table: 2.4). The level of noise at Barni (Gaurambha) was recorded as 54.90 dB which was 5.10 dB lower than that of its standard limit (60 dB) of noise level for this location (Table: 2.4). Harbaria, Akram Point and Hiron Points are three ecologically silent zones in the study area. Both of these locations, Harbaria (47.96 dB), Akram Point (45.50 dB) and Hiron point (49.07 dB) were not found to exceed their standard limit of noise level (std. 50 dB). The level of observed noise at Khan Jahan Ali Bridge and at the Mongla port area were recorded as 65.29 dB and 59.26 dB respectively. Whereas, the standard noise limits for Khan Jahan

Ali Bridge (a commercial zone) and Mongla port (an industrial zone) during the day are 70 dB and 75 dB, respectively. Moidara.

Water Quality Monitoring

Seasonal changes in water quality were observed due to variations in freshwater input, tidal influence, and weather conditions. pH showed no significant seasonal variation, while salinity, TDS, TH, and TSS were found highest during pre-monsoon and winter and lowest during monsoon due to dilution effect. Dissolved oxygen levels increased during monsoon and post-monsoon because of rainfall-driven mixing. COD concentrations were observed to be higher in pre-monsoon and winter but decreased during monsoon due to increased discharge. Nutrients (nitrate, sulfate, phosphate) varied with tidal and human activities but stayed within standard limits. Oil and grease exceeded natural area limits but remained within industrial standards, likely due to vessel activity. Groundwater quality stayed mostly stable and met ECR 2023 standards. DO ranged from 2.0–4.6 mg/l, salinity gradually increased at select sites, TDS peaked at 670 mg/l, and TSS remained low. Total hardness and COD were relatively high, while nutrient levels (nitrate, sulphate and phosphate), lead, and mercury complied with standards. Arsenic levels generally remained within limits, with occasional seasonal variations that exceeded them.

Land and Agricultural Resources Monitoring

The 45th monitoring soil analysis report reflects the samples collected during the 44th monitoring period, which was carried out during the last dry season. One of the key findings of this report is the decreasing trend in salinity, which is attributed to increased rainfall flushing and reduced saline water inundation. Only Chakgona and Bidyarbon show a spike in EC, but other related parameters showed a decreasing trend. The levels of organic matter have increased slightly in all locations except Chunkuri-2. Lead concentrations have increased at all locations. Cadmium concentrations, however, have decreased in two locations (Baranpara and Bidyarbon), remain unchanged in one (Baserhula) and increased in three locations. Despite these changes, both lead and cadmium concentrations remain within the maximum permissible limits for soil. Agricultural and livestock data were not collected during this monitoring field visit, as per the obligations outlined in the Terms of Reference (TOR). The next survey is scheduled for October 2025, and the findings will be incorporated into the corresponding report.

Traffic Volume and Status Monitoring

The traffic survey results reveal that the Khulna Mongla Road at Khudir Bottola continues to experience the highest traffic flow among the three monitoring locations. In comparison relatively lower traffic volume were recorded at the other two locations, namely Khulna Mongla Road at Gonai Bridge and the Power Plant Access Road at Gonabelai Bridge. The survey also suggests that overall traffic volume has decreased compared to the previous monitoring period. As the project being in its full operational phase may also be a contributing factor to the lower traffic volume in the mentioned areas comparing to the phase. During the construction stage, the frequent movement of heavy construction vehicles significantly increased to overall traffic volume.

Fisheries Resources Monitoring

Monitoring of 45-quarter for fisheries resources have been conducted at 13 sampling sites which were set at the inception stage. Out of these sites, effective samplings were done at 06 sites as fishing in other sites in the river were not observed. Amongst the effective sites, three (03) were in the river and three (03) were in the countryside (shrimp farms). The followings are the key findings of the 45th quarter monitoring in the fiscal year of 2025-26. Changes in habitat uses were observed in every past fiscal year along with the current one (as compared to the fiscal year of 2014-2015, 2015-2016, 2016-17, 2017-2018, 2018-2019, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 and 2024-25 caused mainly due to biophysical changes like tidal effect, forest erosion and vegetation coverage, seasonal variability, food availability and also fisheries management practices.

Moreover, through analyzing the type of habitat uses by different age group of fish species (based on the length-based community structure model) two types of habitats were found i.e. i) Omni Ground including Spawning, Nursery and Maturation Ground, and ii) Ground for Maturation and Feeding. Shannon-Weiner diversity index has also been observed to vary between 45-quarter with that of all previous quarters. Highest Shannon-Weiner index was found at Chalna Point (0.99) indicating high evenly distributed fish species. On the contrary, lowest evenness was found at Chandpai (0.52). However, maximum FSR was obtained at Chandpai (n=21), while very low FSR was recorded at Chalna (n=2). Among the habitats in the up-stream of the river, Moidara was rich assemblage of Harina, Mokta, Chaka and Golda Chingri, Chandpai was rich assemblage of Bagda, Golda, Harina and Chami Chingri. Fish species like Bagda and Golda attain the maximum abundance among the migratory fish species. Moreover, among the migratory species Poma was observed to migrate long distance. In this monitoring, the highest productivity was found at Chalna Point, followed by Chandpai and Moidara. The present study revealed that the highest catch susceptibility was also found in case of Chandi Jal (2.45 kg/haul).

Ecological Monitoring

The 45th monitoring visit shows steady ecological recovery across the project area. A total of 49 plant species were recorded, and the Shannon Diversity Index increased to 3.01 (up from 2.74 in 2018), indicating improving richness and evenness. Borni now holds the highest plant density, Kalekarber remains the most stable and undisturbed site, Chalkghona shows minor stress in only one guava tree, and Rajnagar continues recovering from the severe canopy loss caused by sandy soil dumping between 2020 and 2023. Plant health trends are generally positive. Most stressed species—coconut, guava, mango, and gewa—have improved across all four sites, with only isolated symptoms requiring further follow-up. Where declines occurred, they were mainly linked to human activities such as soil alteration, logging, or pruning. Bird colonies showed normal seasonal behavior, with no active nests but regular activity of herons, egrets, and common terrestrial bird.

Dolphin monitoring reflected mixed conditions: Bhadra Khal recorded the highest encounter rate, but the following day numbers dropped sharply, likely due to poison-based fishing in nearby canals and dense Hilsa netting that restricts movement. Aquatic biodiversity shows the most encouraging change. Benthos, absent in 2022, is now present across multiple sites, and both phytoplankton and zooplankton diversity increased noticeably in 2025. These gains point to improved sediment stability, stronger food-web connectivity, and a more resilient river system. Overall, vegetation is stabilizing, wildlife remains active, and aquatic ecological indicators show clear improvement. Continued control of disturbance and harmful fishing practices will be essential to maintain this positive trajectory.

Sundarbans Reserve Forest Health Monitoring

This report presents findings from the 45th tide-based ecological monitoring conducted by CEGIS across five permanent plots of the Bangladesh Sundarbans. The July–2025 assessment shows that forest structural indicators and forest-floor conditions remain consistent with long-term natural dynamics. Moderate activity of wild fauna—including crabs, mudskippers, insects, small reptiles, and signs of deer and boar movement—was recorded in all accessible plots, indicating that the habitat is functioning and ecologically active during the monsoon season. Across twelve years of data, the five core indicators—pneumatophore density, crab-hole abundance, canopy cover, light intensity, and seedling recruitment—continue to reflect responses driven primarily by sedimentation patterns, erosion processes, and hydrological conditions, rather than by industrial or atmospheric stress. Sutarkhali shows persistently high pneumatophores (194,185 → 398,576) and strong crab activity, matching its heavy 4 cm sediment load and chronic waterlogging. Koromjol remains structurally stable through most years (pneumatophores 576,733 → 340,345), with natural water-logged gaps explaining higher light levels and moderate seedling recruitment. Harbaria maintains the most balanced profile, with steady pneumatophores (212,497 → 407,648), strong crab activity, and consistently high canopy cover despite tourism pressure. Akram Point's reduced pneumatophores (171,705 → 47,322) and low seedlings reflect erosion-driven retrogression and Sundari top-dying. Hiron Point's mid-period collapse in pneumatophores (336,664 → 96,147) and seedlings (34,059 → 1,512) corresponds directly with sand deposition events. Across all sites, canopy cover stays strong (94–99 percent), light levels only increase where natural gap form, and the soil fauna remains active except in sand-affected zones. Taken together, the indicators confirm a functioning, resilient mangrove system where observed trends align with natural geomorphic processes and show no evidence of industrial emission or thermal impact.

Socio-economic Monitoring

Livelihood, health and safety, working environment, and CSR are key indicators of the social aspect considered under this study. Currently, the number of regular employees at MSTPP is 247 of which 217 are Bangladeshi while 30 are Indians. MSTPP receives grievances from the local community through local government representatives and through a social liaison officer, engaged in maintaining relations with the local communities. A grievance box has been hung at the main entrance of the plant so that the affected community members (if any) can easily drop their grievances. A market complex has been in operation in the Township Area since November 2023. It consists of 39 shops, of which 28 (approximately 72%) were allocated to project-affected people residing around the MSTPP to support income generation. However, monitoring findings reveal that only a few allottees have been able to generate the expected income from this opportunity. At present, only nine (09) shops are in operation, while 19 shops have yet to commence business. The remaining 11 shops are planned to be allotted for communication, banking, and post office-related services. It is worth mentioning that three (03) shops are currently operating outside the 2nd Gate of the MSTPP premises, providing foods and beverages, snacks, and restaurant services.

Regarding safety in the working environment, coal dust and fly ash are managed carefully. Additionally, waste management, dredged material handling, and tree plantation are ongoing, with some systems awaiting operation. To control sand and dust inside and outside the project area, the authority has initiated water spraying within the project area. Under the CSR activity, the MSTPP authority is involved in some voluntary and social activities in the project surrounding villages (i.e., medical services, installation of ROs for safe drinking water, etc.).

Along with meeting all regulatory compliance requirements, including implementing the Environmental Management Plan (EMP) and fulfilling the conditions set by the Department of Environment (DoE), the Maitree Super Thermal Power Plant (MSTPP) has also undertaken several voluntary initiatives that go beyond statutory obligations. These voluntary activities demonstrate MSTPP's commitment to the society through a proactive approach for promoting environmental awareness and education and boldness in exposing such a Key Point Installation (KPI) to the public as it bears the slogan of safeguarding environment. It is also to be mentioned here that the MSTPP has recently achieved certification under ISO 9001:2015, ISO 14001:2015, and ISO 45001:2018, demonstrating its commitment to quality management, environmental stewardship, and occupational health and safety.

1. Introduction

1.1 Background

The scope of works, as assigned, is to monitor the environmental components, social indicators, and implementation status of the EMP (Environmental Management Plan) during the construction phase of the 2x660 MW Maitree Super Thermal Power Plant. As an independent environmental monitoring agency, CEGIS was engaged in conducting the said activities by the Power Plant EIA approval condition no. 32.

The location of the 2x660 MW MSTPP project encompasses Sapmari, Katakhali, and Kaigar Daskati Mauza of Rajnagar Union under Rampal Upazila of Bagerhat District (**Figure 1.1**). The Power Plant lies between latitude 22˚ 37' 0'' N and 22˚ 34' 30'' N and longitude 89˚ 32' 0'' E and 89˚ 34' 5'' E. The Project site is about 23 km south of Khulna City and approximately 14 km from the north-west direction of the nearest tip of the Sundarbans (considering the chimney location). The location of the study area, along with the distance from World Heritage sites, are presented in **Figure 1.1**.

The study area includes: i) an Area covering a 10 km radius from the Plant location, ii) an Area within a 5 km strip along both banks of the Passur River starting from the Plant site to Hiron point (**Figure 1.2**). As per the contract, the findings of the previously formulated quarterly monitoring reports have been submitted to BIFPCL.

Monitoring environmental parameters and collecting associated data is ongoing, taking into account spatial and seasonal variations. However, the CEGIS team completed the 45th quarterly monitoring activities in July 2025, covering all the preselected monitoring parameters.

1.2 Objectives

The prime objectives of the study are:

- To monitor the important environmental and social parameters during the construction phase of the Power Plant and
- To monitor environmental compliance regarding EMP implementation during the power plant construction and its associated activities.

1.3 Criteria for Selection of Monitoring Sites/Locations

The monitoring sites have been selected considering the sensitivity and the ambiance of the surroundings likely to be impacted by the Project-related activities, which include:

- Wind speed, direction, and sensitive receptors in and around the project site were considered for monitoring the ambient air quality. Potential areas were also identified and selected for noise level monitoring likely to be impacted by the project activities. Similarly, sites for water quality monitoring were selected considering the water resources (Moidara and other nearer water bodies, Passur River from Chalna to Hiron Point) likely to be impacted by the project activities.
- Potential locations for monitoring fisheries' resources were selected, considering the fish habitats, biodiversity, migration, and production zones likely to be impacted by the project activities.
- Monitoring locations for ecosystem and biodiversity, Soil, and land resources were selected considering the induced impacts of the Project-related activities on the project's surrounding areas.

- Monitoring of socio-economic conditions of the PAPs (Project Affected Peoples) and project surrounding communities was carried out on the basis of their circumstances likely to be transformed and /or altered by the project activities.
- Locations for Sundarbans Reserve Forest (SRF) Health Monitoring were selected considering the potential access routes of coal transportation through the Sundarbans Forest area and associated activities for different phases of the power plant development and operation which might have significant effects on Sundarbans's flora and fauna.
- Monitoring aspects for Environmental compliances regarding EMP implementation status in and around the project area have been set as per suggestions made in the EIA reports and approval conditions from the DoE of both the Power Plant and Coal transportation studies, respectively, to ensure environmental sustainability and social acceptability.

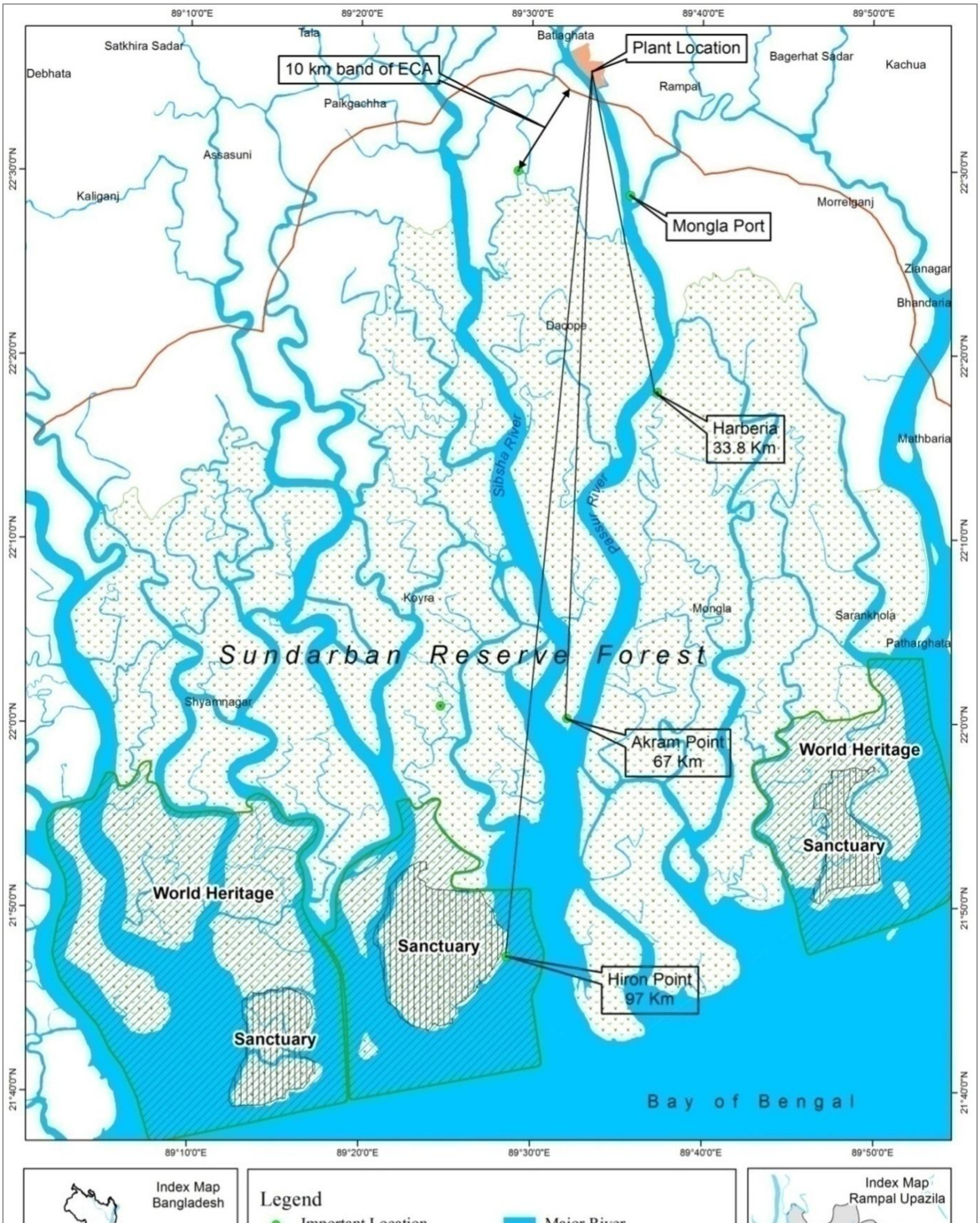


Figure 1.1: Map Showing Points of Interest in the Study Corridor

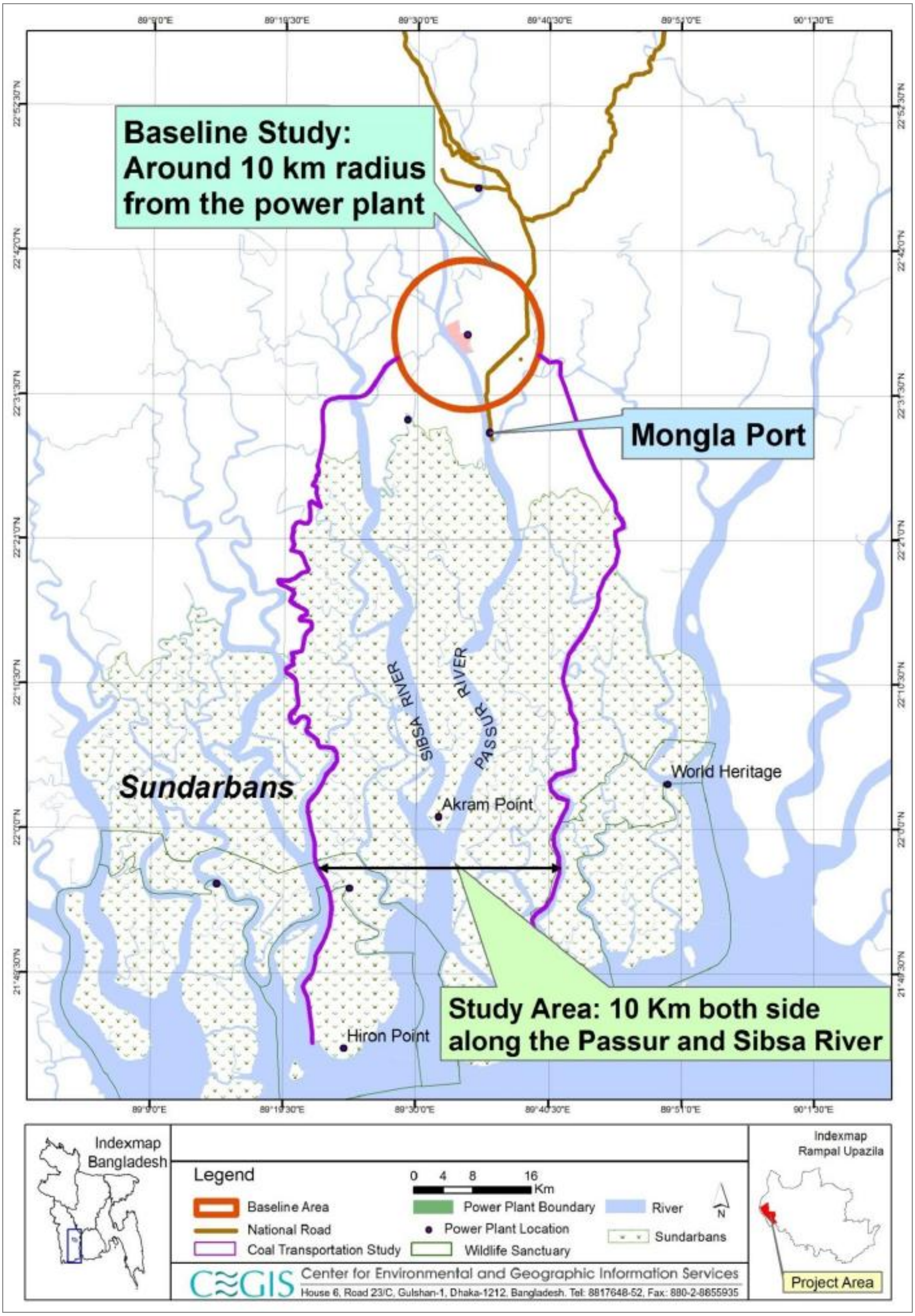


Figure 1.2: AOI of Environmental and Socio-economic Monitoring

1.4 Main Stakeholders

1.4.1 Forest Department

Monitoring of the Sundarbans Reserve Forest area needs to be addressed per the conditions set out by the DoE. Hence, permission from the Forest Department is essential to carry out the said activities. The Forest Department has been providing the consent under certain conditions i.e., keeping close communication with the Forest Department, submission of the monitoring reports to the Forest Department along with the following activities:

- Inclusion of a Soil Scientist and a Botanist in the monitoring team,
- Monitoring of regeneration in growths (seedlings), diseases, and pests (if necessary, to carry out laboratory analysis),
- Monitoring of soil nutrients (macro, micro) and heavy metals,
- Monitoring of floral diversity, species richness, and dominancy,
- Measurement of carbon content both above and below the ground level,
- Assessment of impact on canopy cover, leaves phenology, flower behavior, pneumatophore, and crab hole conditions.

However, BIFPCL forwards each copy of the earlier quarterly monitoring reports to the Chief Conservator of Forest, Bangladesh Forest Department, Agargaon, Dhaka, and Conservator of Forest, Khulna Circle, Boyra, Khulna. Similarly, the 45^{th} quarterly monitoring report will also be forwarded to the same officials of the corresponding Departments.

1.4.2 Department of Environment (DoE)

The monitoring plans, indicators, parameters, and location have been selected and arranged by incorporating the suggestions and approval conditions from both the Power Plant EIA study and the Coal Transportation EIA study. The monitoring reports are also presented to the Environmental Clearance Committee of the DoE during the renewal of the site clearance. In addition, a representative from the local DoE office is involved in each monitoring visit to accompany the monitoring team.

1.4.3 Bangladesh India Friendship Power Company (Pvt.) Limited (BIFPCL)

Bangladesh India Friendship Power Company (Pvt.) Limited (BIFPCL) is the Project Proponent of the Power Project. BIFPCL's officials have assisted the study team since the beginning of the study. Furthermore, BIFPCL is currently implementing the Environmental Management Plan (EMP), ensuring environmental and social safeguarding of the Project surroundings, including the Sundarbans Reserve Forest. The Maitree Super Thermal Power Plant (MSTPP) is the operational entity of the Plant works under BIFPCL.

1.4.4 Local Community

Each social environment-monitoring program includes Project Affected Peoples (PAPs). The changes in important socio-economic indicators were examined through Focus Group Discussions (FGDs), Key informant interviews (s), and other informal discussions with the local people in different locations of the project-influenced area.

1.4.5 Major Component of Monitoring Study

The Physical, Biological, and social aspects are monitored regularly, and this quarterly monitoring report is furnished with the following subsequent chapters-

- Physical Environment covers monitoring of air quality, noise level, water quality, Soil and land resources, traffic management and the morphological study;
- Biological environment covers monitoring of fisheries resources, ecological resources, and the Sundarbans Reserve Forest (SRF) health conditions;
- Socio-economic environment covers compensation, resettlement/rehabilitation, project-related employment generation, labor and working conditions, community health, security, safety, and corporate social responsibilities.
- Environmental compliance monitoring includes Monitoring the implementation of the Environmental and Social Management System Action Plan, labor and working conditions, community health, safety, and security, and biodiversity and sustainable management of living natural resources in and around the project area.

2. Physical Environment

2.1 Air Quality

Following the recommendations of the Environmental Impact Assessment (EIA) study, quarterly air quality monitoring is being conducted to evaluate and compare environmental conditions in and around the project area, including the Sundarbans Reserve Forest (SRF), particularly along the coal transportation route. The monitoring activities are carried out at designated locations in line with the EIA findings, expert recommendations, and standard procedures and guidelines.

2.1.1 Methodology

Criteria pollutants include particulate matter (i.e. $PM_{2.5}$, PM_{10}, and SPM), SO_2, NO_2, CO, and O_3 were expected to be released during the pre-construction, construction, and operation stages of the power plant project, in accordance with the EIA study. During the EIA study, it was predicted that criteria pollutants such as particulate matter ($PM_{2.5}$, PM_{10}, and SPM), SO_2, NO_2, CO, and O_3 would be generated during different phases of the power plant, including pre-construction, construction, and operation. Monitoring locations were selected based on factors like receptor sensitivity, project activities (e.g., coal vessel movement, coal trans-shipment, power generation), and atmospheric conditions such as wind patterns, deposition, and stability classes. As planned, the Continuous Ambient Air Quality Micro-Monitoring Station (caaqMMS), AirSENCE, collected in-situ air quality data during the last post-monsoon period, measuring gaseous pollutants (NO_2, CO, O_3, SO_2) and particulate matter fractions (PM_{10} and $PM_{2.5}$).

2.1.2 Pollution Sources in the Sundarbans

The Significant contributors to air pollution in the study area consist of operation at Mongla Sea Port which involve ship loading and unloading, cargo handling, activities within the MSTPP area, emissions from cement factories engaged in material processing and clinker handling, unregulated vessel movements, and traffic from transport vehicles. These sources contribute significant quantities of air pollutants, including particulate matter ($PM_{2.5}$, PM_{10} and SPM), SO_2, NO_2, and greenhouse gases (GHGs) to the airshed of the region. An inventory of the existing emission types and sources for the study area is provided in **Table A2** of **Appendix IV**.

2.1.3 Monitoring Locations

Air quality monitoring sites were chosen based on DoE guidelines, pollution sources, and expert judgment to ensure representative coverage of the study area. **Table 2.1** provides details on each site, including coordinates, frequency, and monitoring methods. **Figures 2.1** and **Figure 2.2** illustrate field monitoring activities and the locations of monitoring sites within the study area.

Table 2.1: Air Quality Monitoring Plan

Sl. No.	Monitoring Indicators	Location ID	Locations	Coordinates	Frequency	Methods/Tools/ Techniques
1	Particulate Matter ($PM_{2.5}$, $PM_{10,}$ and SPM) SO_X, NO_X, CO and O_3.	AQ-1	South West corner of the Project boundary	89°33'34.5"E; 22°34'33.8"N	Each Quarter of the year	Continuous Ambient Air Quality Micro-Monitoring Station (caaqMMS). AirSENCE provides Concentrations for gaseous pollutants including NO, NO_2, CO, O_3, SO_2, VOC, H_2S, and CO_2 in addition to all particulate matter fractions such as PM_{10}, $PM_{2.5}$, and PM_1. Local weather and environmental data, such as wind speed and direction, noise, rainfall, and light can also be measured.
2		AQ-2	The township area near Chimney location, Mauza: Sapmari Katakhali.	89°32'3.8"E; 22°36'32.5"N		
3		AQ-3	North West corner of the Project boundary (Kaigar Daskati)	89°33'51.8"E; 22°36'1.06"N		
4		AQ-4	Barni, Gaurambha Union (4km North East from the chimney location)	89°34'37.7"E; 22°38'51.8"N		
5		AQ-5	Chunkuri-2, Bajua Union (4km South West from the chimney location)	89°34'01.1"E; 22°32'3.3"N		
6		AQ-6	Pankhali, Dacope, (4km North West from the Chimney location)	89°31'24.2"E; 22°36'6.7"N		
7		AQ-7	Mongla Port Area	89°35'50.4"E; 22°28'24.8"N		
8		AQ-8	Harbaria, Sundarbans	89°35'34.2"E 22°17'43.1"N		
9		AQ-9	Akram point, Sundarbans	89°30'54.1"E 22° '23.50"N		
10		AQ-10	Hiron Point, Sundarbans	89°27'53.2"E; 21°46'27.60"N		
11		AQ-11	Khulna city near Khan Jahan Ali Bridge	89°35'35.5"E; 22°46'36.8"N		
12		AQ-12	Project site-1 (The Township area)	89º 33´ 13.7"E 22º35´43"N		
13		AQ-13	Access road bridge area	89°35'16.49" 22°34'37.11"N		

Source: Field Survey, july, 2025

Figure 2.1: Acquisition of Ambient Air Quality Monitoring

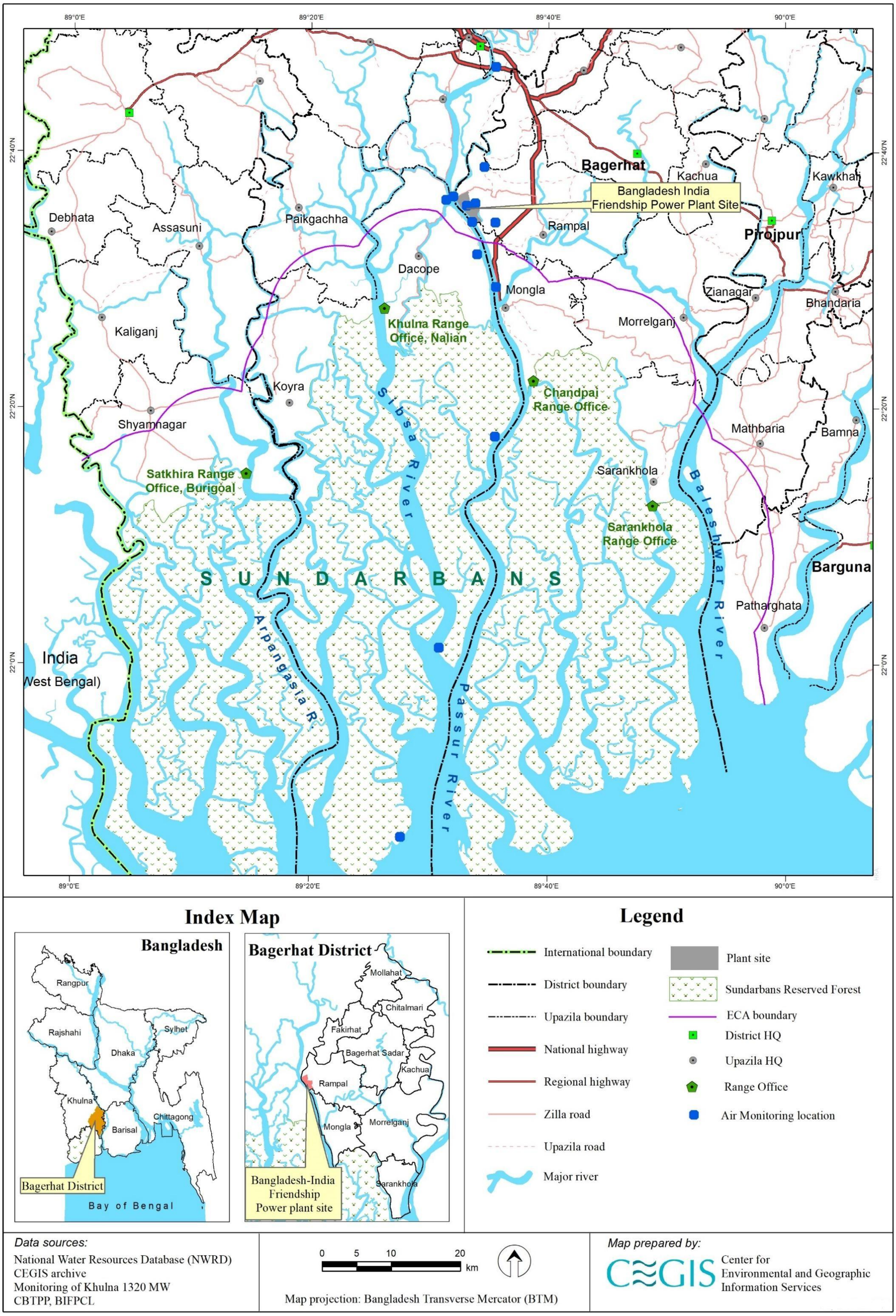


Figure 2.2: Air Quality Monitoring Locations

2.2 Status of Air Quality

Table 2.2 presents the results from the 45th monitoring quarter, indicating that all observed data remained within the permissible limits specified in the Air Pollution (Control) Rules, 2022 and the Environment Conservation Rules (ECR), 2023 for Suspended Particulate Matter (SPM). This indicates that ambient air quality in and around the project area, including the Sundarbans Reserve Forest, stayed within acceptable standards during this period. During the monitoring period, the maximum concentration of $PM_{2.5}$ (21.69 µg/m^3) was recorded at Khan Jahan Ali Bridge, while the minimum (0.93 µg/m^3) was observed at Hiron Point. Elevated $PM_{2.5}$ levels at Khan Jahan Ali Bridge may be attributed to vehicular emissions, frequent movement of heavy vehicles, and resuspension of road dust due to traffic. In contrast, the low concentration at Hiron Point reflects minimal human activity and dense mangrove vegetation, which acts as a natural air filter.

The concentrations of PM_{10} and SPM were highest at Chalna Bazar (35.08 µg/m^3 and 56.6 µg/m^3, respectively) and lowest at Hiron Point (1.22 µg/m^3 and 2.15 µg/m^3). Sulfur dioxide (SO_2) (7.01 µg/m^3) and carbon monoxide (CO) (0.65 mg/m^3) were highest at Hiron Point, while the lowest levels were observed at Sapmari and Harbaria (0.68 µg/m^3 and 0.11 mg/m^3). Nitrogen dioxide (NO_2) and ozone (O_3) were highest in Maitree Township and Sapmari, and lowest at Akram Point (2.47 µg/m^3 and 2.42 µg/m^3). Overall, air quality varied across locations due to human activities, traffic intensity, and proximity to urban areas or industrial sites. Dust from unpaved roads, vehicular emissions, and loading–unloading operations appear to be the main contributors to elevated particulate matter. Still, since all measured parameters remained within national standards, the ambient air quality can be considered satisfactory during the 45th monitoring quarter. **Table A1** in **Appendix IV** includes all monitoring data collected during the study period. Baseline emission scenarios are listed in **Table A2** of **Appendix IV**.

Table 2.2: Air Quality Monitoring Parameters and Observed Data (45th Quarterly Program)

Location	Parameters						
	$PM_{2.5}$ (µg/m^3)	**PM_{10} (µg/m^3)**	**SPM (µg/m^3)**	**SO_2 (µg/m^3)**	**NO_2 (µg/m^3)**	**CO (mg/m^3)**	**O_3 (µg/m^3)**
AQ-1	15.48	21.2	36.67	2.36	5.21	0.15	8.03
AQ-2	12.32	16.32	28.64	0.68	4.31	0.21	8.35
AQ-3	13.73	17.92	31.65	2.02	4.79	0.13	5.47
AQ-4	18.2	24.49	42.69	3.77	4.83	0.24	7.43
AQ-5	11.34	14.76	26.1	1.91	4.01	0.15	5.75
AQ-6	21.52	35.08	56.6	2.63	4.63	0.21	7.8
AQ-7	20.61	29.06	49.67	3.26	5.46	0.22	6.11
AQ-8	1.44	2.04	3.48	1.91	4.37	0.11	2.5
AQ-9	1.72	3.39	5.11	6.72	2.47	0.58	2.42
AQ-10	0.93	1.22	2.15	7.01	3.7	0.65	2.93
AQ-11	21.69	31.55	53.24	2.19	5.98	0.27	6.9
AQ-12	5.2	6.77	11.97	3.65	7.24	0.11	4.16
AQ-13	10.12	13.12	23.23	2.54	5.21	0.12	5.02
Standard * (APCR, 2022)	**65 (24 hrs)**	**150 (24 hrs)**	**200 (ECR '97)**	**80 (24 hrs)**	**80 (24 hrs)**	**5 (8 hrs)**	**100 (8 hrs)**

Source: Field survey; July 2025; Standard- Air Pollution (Control) Rules, 2022*

Seasonal Variation

During the monitoring periods, it was observed that particulate matter ($PM_{2.5}$, PM_{10} and SPM) increased during the initial phases of pre-construction and construction, followed by a gradual decrease during the operational stage. On the other hand, particulate matters concentrations found to be higher at the Khan Jahan Ali Bridge area and Mongla area compared to other monitoring sites. These levels exceeded the APCR, 2022 standards, possibly due to vehicular emissions and industrial activities. However, the concentrations of other pollutants (SO_2, NO_2, and O_3) were found to be below the standard limits set by APCR 2022. As shown in **Figure 2.3**, the concentrations of the criteria pollutants ($PM_{2.5}$, PM_{10}, SPM, SO_2, NO_2, and O_3) were lower compared to the same season in previous years. Furthermore, all measured values during the operational phase complied with the permissible limits outlined in the APCR 2022 standards. **Figure 2.3** demonstrates the seasonal variations of air quality parameters during the monsoon season.

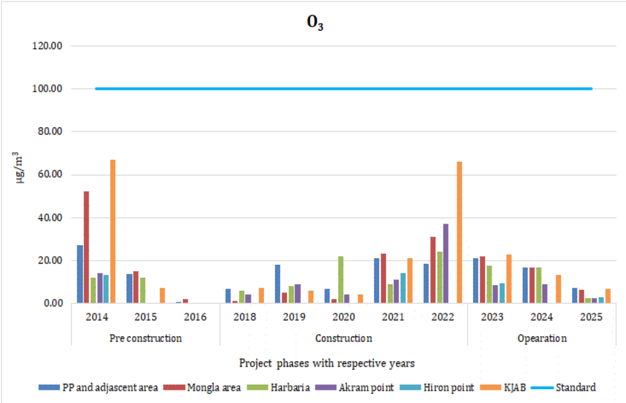


Figure 2.3: Seasonal Variation of the Air Quality Parameters

Cluster Analysis

Cluster analysis was performed to identify the grouping pattern of the criteria pollutants along with their corresponding locations. Euclidean distances were observed to measure the distances among the objects using as variables (annual average concentrations of the studied variables for every station). According to the dendrogram (**Figure 2.4**) Hiron Point (L10), Akram Point (L9), Harbaria (L8), and Project site represent the locations of minimum pollution levels . On the other hand, Chalna (L6), Mongla Ghat (L7), and Khan Jahan Ali Bridge in Khulna (L11) are subjected to higher population density and increased industrial activities among all sites whereas Moidara (L1), Shapmari (L2), Koigardashkatir char (3), Gaurambha (L4), Access-road bridge area (13) and Bajua (L5) represent lower to moderate commercial activities **(Figure 2.4).**

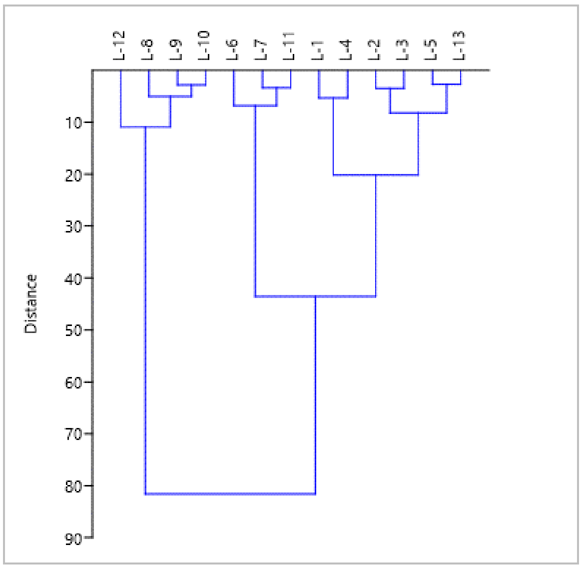


Figure 2.4: Dendrogram of the Monitoring Stations using Euclidean Distance

2.3 Noise Quality

Noise is described by a weighted sound intensity (or level), representing sound heard by the human ear and measured in decibels (dBA) units. However, engine boats, trawlers, small barges, ships plying over the waterways, birds' chirping, stormy wind, falling leaves from the trees, and the wave-breaking sound were the primary sources of noise generation in and around the Sundarbans. On the other hand, construction activities, the urban and rural vehicles, i.e., buses, trucks, local human haulers, auto-rickshaws, motorized vans, motorbikes, etc., were much noticeable outside the Sundarbans area.

Methodology

Ambient noise levels were measured during the day at eleven pre-selected locations surrounding the project and within the study area. Noise levels were recorded thrice a day (morning, afternoon, and evening) at eight locations and twice (morning and afternoon) at three locations using a KANOMAX-4431 ANSI Type II noise level meter for five minutes with an interval of 30 seconds. The noise level machine was adequately set up and calibrated following the instruction manual to ensure the standard practices (QA/QC).

Locations of Noise Level Monitoring

The monitoring locations were selected considering the sensitivity of the nearest receptors. The noise level monitoring activities in field are shown in **Figure 2.5**. Out of the selected (11) locations, three (03) locations were inside the Sundarbans (considering the coal transportation route), six (06) locations were in and around the Project site, one was at Khan Jahan Ali Bridge, and the remaining one was at Mongla Ghat area (**Figure 2.6**). Co-ordinates and the corresponding locations are mentioned in **Table 2.3.**

Table 2.3: Noise Level Monitoring Plan

SL. No.	Monitoring locations	Co-ordinates
1	South West corner of the Project boundary	89°33'34.5"E; 22°34'33.8"N
2	The township area near the Chimney location, Mauza: Sapmari Katakhali	89°32'3.8"E; 22°36'32.5"N
3	North West corner of the Project boundary (Kaigar Daskati)	89°33'51.8"E; 22°36'1.06"N
4	Barni, Gaurambha Union (4km North East from the chimney location)	89°34'37.7"E; 22°38'51.8"N
5	Chunkuri-2, Bajua Union (4km South West from the chimney location)	89°34'01.1"E; 22°32'3.3"N
6	Pankhali, Dacope, (4km North West from the Chimney location)	89°31'24.2"E; 22°36'6.7"N
7	Mongla Port Area	89°35'50.4"E; 22°28'24.8"N
8	Harbaria, Sundarbans	89°35'34.2"E; 22°17'43.1"N
9	Akram point, Sundarbans	89°30'54.1"E; 22°"23.50"N
10	Hiron Point, Sundarbans	89°27'53.2"E21°46'27.60"N
11	Khulna city near Khan Jahan Ali Bridge	89°35'35.5"E; 22°46'36.8"N

Figure 2.5: Ambient Noise Acquisition in Study Area

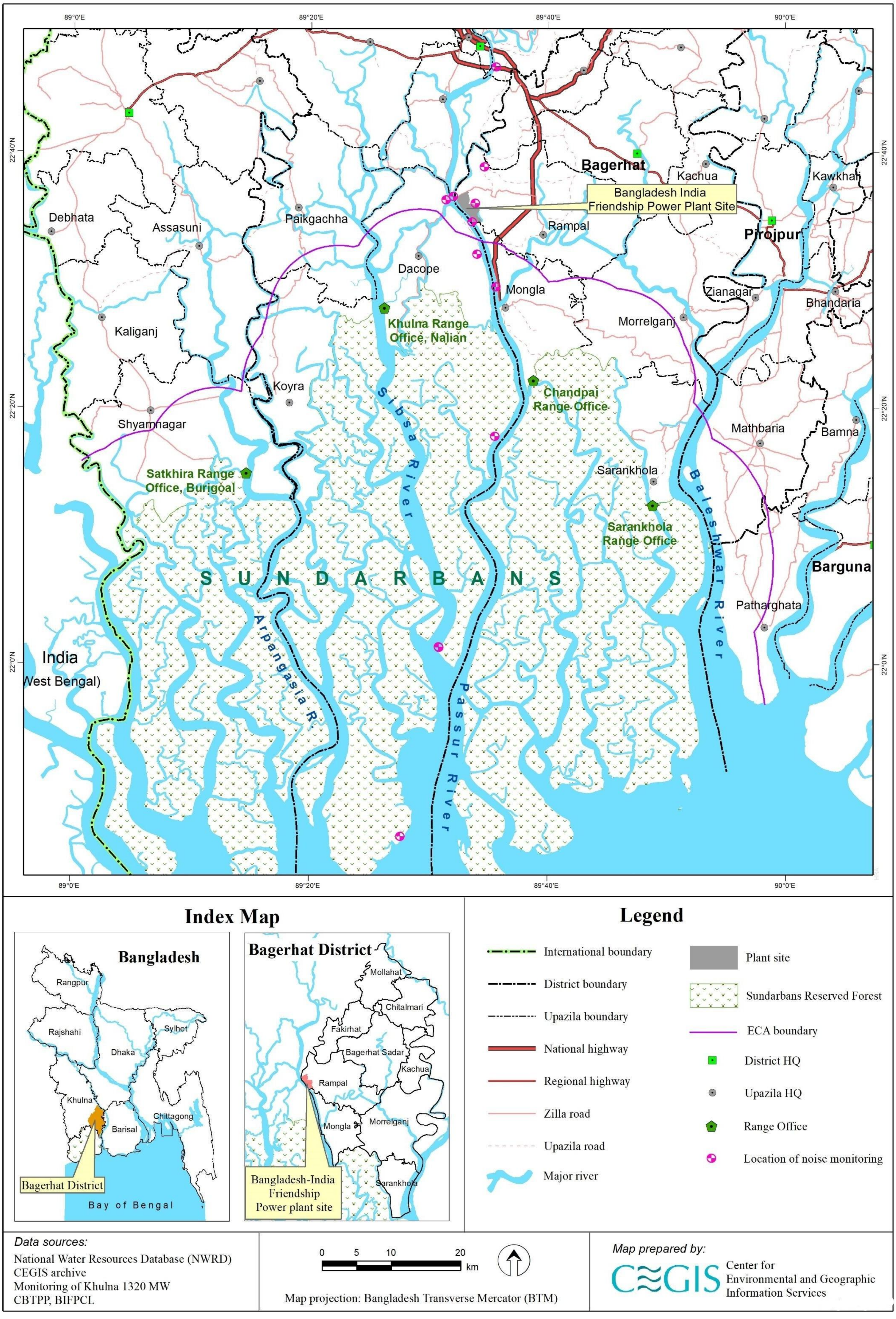


Figure 2.6: Noise Level Monitoring Locations

Noise in the Study Area

Among the sources of noise generation, engine boats, trawlers, small barges, ships plying along the waterways, birds' chirping, stormy wind, falling leaves from the trees, and the wave breaking sound were the primary sources of noise generation, in and around the Sundarbans. On the other hand, construction activities, the urban and rural vehicles, i.e., buses, trucks, local human haulers, auto-rickshaws, motorized vans, motorbikes, etc., were much more noticeable around the project area.

Status of Noise

Observed level of noise at Chalna, a commercial area located at a distance of 4 km to the north-west direction of the chimney location was recorded as 52.45 dB whereas its standard level is 70 dB. Levels of noise at Kaigar Daskati (54.41dB) situated at the Gucchha Gram (a residential area located at north-west corner of the project area), at Chunkuri-2 (51.83 dB) located at 4km south-west direction from the chimney location and at Moidara Khal (45.93) at the south-west corner of the project area did not exceed their corresponding standard limit. On the other hand, levels of noise at Shapmari (township area) are recorded as 48.33 dB respectively that denotes, the levels of noise didn't cross their corresponding standard value (55 dB) in this location. The level of noise at Barni (Gaurambha) was recorded as 54.90 dB which was 5.10 dB lower than that of its standard limit (60 dB) of noise level for this location. Harbaria, Akram Point and Hiron Points are three ecologically silent zones in the study area. Both of these locations, Harbaria (47.96 dB), Akram Point (45.50 dB) and Hiron point (49.07 dB) were not found to exceed their standard limit of noise level (std. 50 dB). The level of observed noise at Khan Jahan Ali Bridge and at the Mongla port area were recorded as 65.29 dB and 59.26 dB respectively. Whereas, the standard noise limits for Khan Jahan Ali Bridge (a commercial zone) and Mongla port (an industrial zone) during the day are 70 dB and 75 dB, respectivelyMoidara. The detailed noise level data have been attached in **Table C1, C2, C3, C4, C5, C6, C7, C8. C9, C10** and **C11** respectively in the **Appendix IV.**

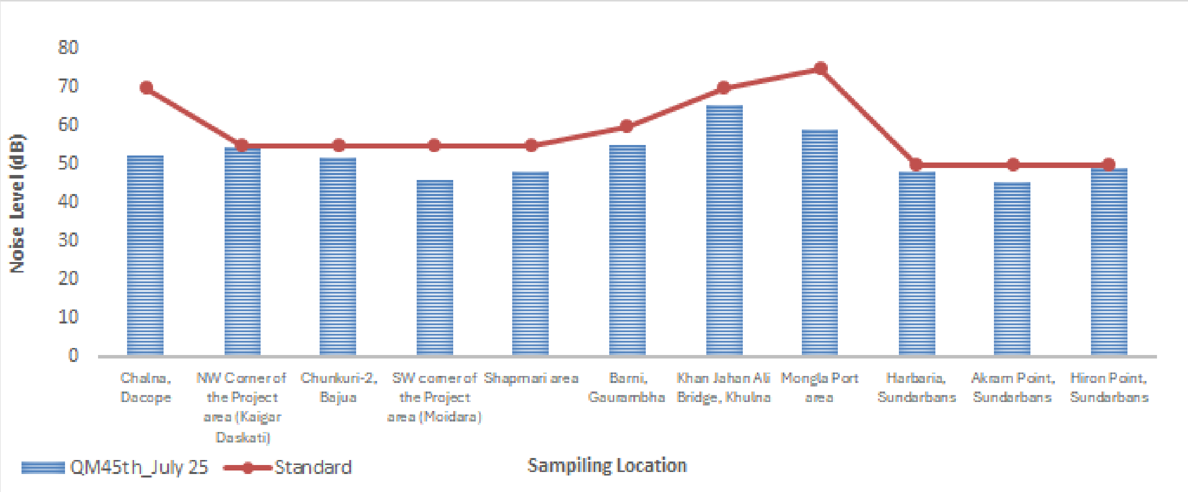


Figure 2.7: Seasonal variations of Noise Level at different monitoring locations

2.4 Water Quality

This section discusses the surface water quality around the MSTPP area along the Passur River up to Hiron Point, as well as the groundwater quality of the power plant area and in the project's adjacent area. As customary for this monitoring report, it includes water quality monitoring results (Chemical) from the 44th Quarterly Monitoring conducted in April 2025, and information on water sampling (In-situ/Physical) for the 45th Quarterly Monitoring held in July 2025. The monitoring locations for surface and groundwater sampling remain consistent across monitoring quarters, and the same parameters are checked to evaluate water quality for community use, aquatic life, and the Sundarbans Forest ecosystem.

Methodology

Sampling locations for monitoring water quality related to land development, construction, and the operation of MSTPP were selected to practically determine their contribution to the declining water quality of the Passur River. In this context, water quality parameters, sampling frequency, and evaluation criteria have been established in accordance with the conditions set by DoE, in line with their guidance under ECR 1997 and ECR 2023. Water sampling follows standard procedures, and laboratory analyses are performed in various reputable labs, including BCSIR, DPHE, RRI, and CEGIS. The details of the monitoring plan, which covers sampling locations, geographical coordinates, frequency, and analysis techniques for sampling surface and groundwater, are provided in **Tables 2.5** and **2.6,** respectively.

Sampling Procedure

Tidal variations highly influence the surface water sampling locations in the study area. Hence, temporal and spatial variations of tides are considered in surface water sampling. The surface water samples were collected 30-50m away from the riverbank and at a depth of 6 cm below the water surface during low tides or relative slag period after the low tide for all parameters except oil and grease. The non-acidified sampling bottles were rinsed with respective water samples before sampling. Acidified sampling bottles were used to collect samples of heavy metals (i.e., As, Pb, and Hg). However, all samples were preserved according to the standard protocol. The in-situ testing of water quality parameters is shown in **Figure 2.8**.

Source: Field Survey, July 2025

Figure 2.8: Monitoring activities of water quality parameters

Table 2.4: Groundwater Quality Monitoring Plan

Sl. No.	Monitoring Parameters	Locations	Coordinates Latitude	Coordinates Longitude	Frequency	Methods/Monitoring Indicators/ Techniques
1	pH, Temperature, Salinity, DO, TDS, TH, TSS, COD, Nitrate, Sulphate, Phosphate, Arsenic, Lead, Mercury	Township Site	89.566139˚E	22.594167˚N	Quarterly	Horiba U-50 multi-meters are used for in-situ testing of physical water quality parameters. For inorganic, non-metallic, aggregate organic, and metal quality, sample preservation and laboratory analysis are done at DPHE Central Laboratory and BCSIR.
2		Rajnagar Site	89.576056˚E	22.612528˚N		
3		Kapasdanga Site	89.563000˚E	22.622528˚N		

Table 2.5: Surface Water Quality Monitoring Plan

Sl. No.	Monitoring Parameters	Sampling Locations	Coordinates Latitude	Coordinates Longitude	Frequency	Methods/Tools/ Techniques
1	pH, Temperature, Salinity, DO, TDS, TH, TSS, COD, Nitrate, Sulphate, Phosphate, Arsenic, Lead, Mercury, Oil & Grease, PAH, TOC, TC	100m u/s of Northwest Corner of the Project Site on the Passur River Left Bank	22.604167°N	89.527222°E	Quarterly	In-situ measurement (pH, Temperature, Salinity, DO) and Laboratory analysis (TDS, TH, TSS, COD, Nitrate, Sulphate, Phosphate, Arsenic, Lead, Mercury, Oil & Grease, PAH, TOC, TC).
2		100m u/s of Northwest Corner of the Project Site on the Passur River Middle	22.607222°N	89.528889°E		
3		100m u/s of Northwest Corner of the Project Site on the Passur River Right Bank	22.609361°N	89.531417°E		
4		Project Site-Jetty on the Passur River Left Bank	22.584833°N	89.543583°E		
5		Project Site-Jetty on the Passur River Middle	22.587667°N	89.546472°E		
6		Project Site-Jetty on the Passur River Right Bank	22.589333°N	89.548222°E		
7		West Corner of the Project Site on the Passur River Left Bank	22.572889°N	89.552583°E		
8		West Corner of the Project Site on the Passur River Middle	22.574611°N	89.557500°E		
9		West Corner of the Project Site on the Passur River Right Bank	22.575667°N	89.559861°E		
10		Southeast Corner of the Project Site on the Ichhamati-Moidara Confluence	22.600639°N	89.565611°E		
11		The Township Site Point on the Moidara River	22.577472°N	89.569250°E		
12		Mongla Point on the Confluence of the Passur and Ghasiakhali Rivers	22.473861°N	89.602361°E		
13		Harbaria Point of SRF Area on the Passur River	22.295250°N	89.593139°E		
14		Akram Point of SRF Area on the Confluence of the Passur and Sibsa Rivers	22.024120° N	89.514220°E		
15		Hiron Point of SRF on the Passur River	21.774183°N	89.464778°E		

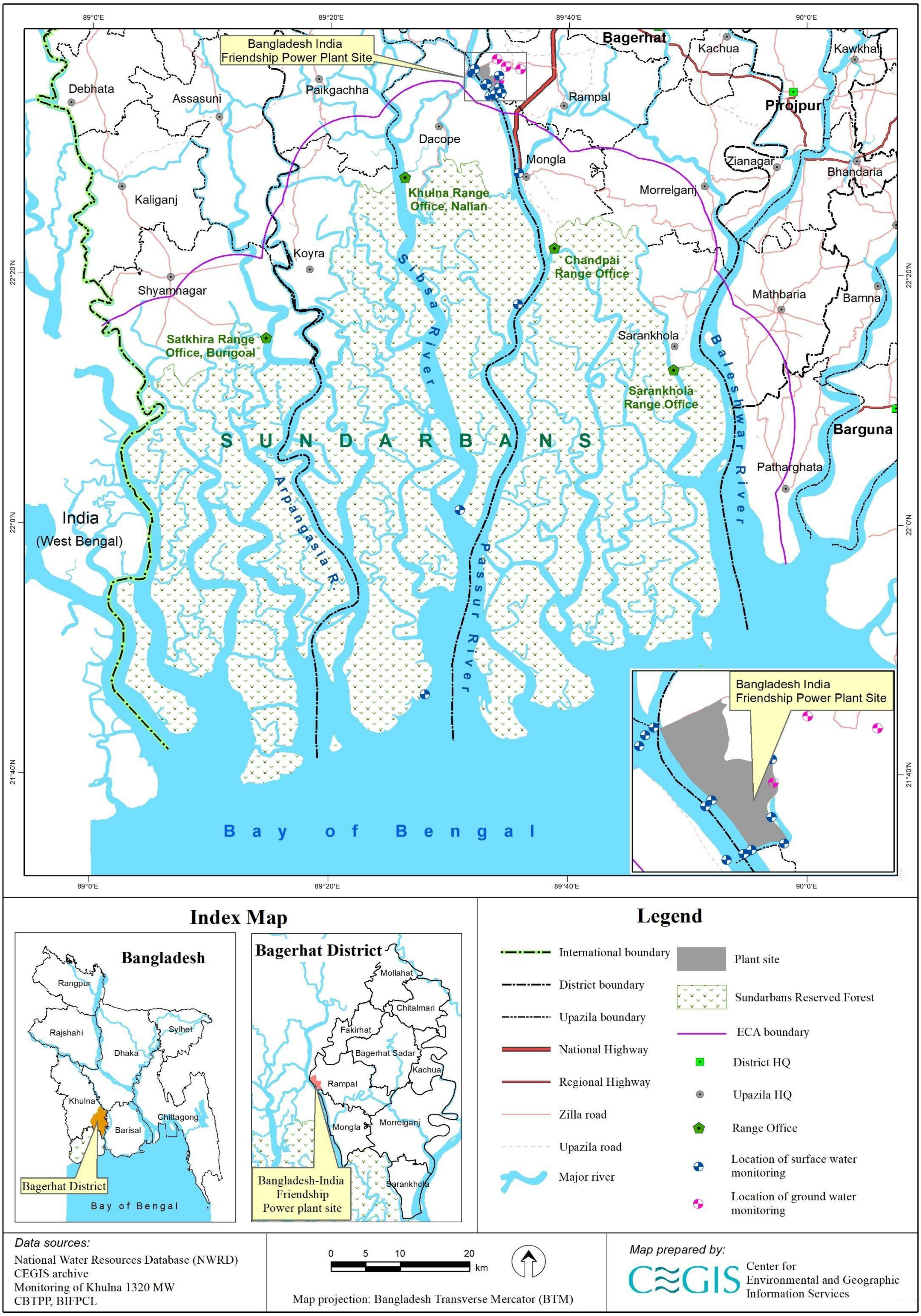


Figure 2.9: Surface Water and Groundwater Quality Monitoring Location

Water Quality Parameter Analysis Techniques/Methods

Water quality parameters were analyzed according to the American Public Health Association (APHA) procedure and standard. The analytical methods for different parameters and standards are given in **Table 2.4**. The monitoring plans both for the surface water and groundwater are attached in **Table 2.5** and **2.6.** All the monitoring locations are shown in **Figure 2.9.**

Table 2.6: Testing Methodology and Standards of Water Quality Parameter

Parameters	Methods/Measuring Tools	Unit	ECR, 2023 (Surface water)	ECR, 2023 (Groundwater)
Temperature	Horiba U-50 multi-meter	^0C	N/A	20-30
pH	Horiba U-50 multi-meter	-	6.5-8.5 (Natural area) 6.5-9.0 (Industrial area)	6.5-8.5
TDS	Horiba U-50 multi-meter	ppm or mg/L	N/A	1000
TSS	Horiba U-50 multi-meter	ppm or mg/L	25 (Natural area), 100 (Industrial area)	10
Salinity	Horiba U-50 multi-meter	ppt	N/A	N/A
DO	Horiba U-50 multi-meter	ppm or mg/L	≥5 (Natural area), ≥4 (Industrial area)	N/A
COD	Closed Reflux Method	ppm or mg/L	8 (Natural area), 5(Industrial area)	N/A
Total Hardness (as $CaCO_3$)	Titrimetric	ppm or mg/L	N/A	500
Phosphate (PO_4^{3-})	UV-VIS Spectrophotometers	ppm or mg/L	0.05 (Natural area), 0.1 (Industrial area)	N/A
Nitrate (NO_3^-)	UV-VIS Spectrophotometers	ppm or mg/L	0.3 (Natural area), 1.0 (Industrial area)	45
Sulphate (SO_4^{2-})	UV-VIS Spectrophotometers	ppm or mg/L	N/A	250
Oil and Grease	Liquid-liquid extraction with hexane, treatment with silica gel, and gravimetric determination	ppm or mg/L	0.01(Natural area), 5.0 (Industrial area)	0.01
Arsenic (As)	Atomic Absorption Spectrophotometers–Hydride Vapor Generating (AAS-HVG)	ppm or mg/L	0.001(Natural area), 0.003 (Industrial area)	0.05
Lead (Pb)	Atomic Absorption Spectrophotometers–Graphite Furnace (AAS-GF)	ppm or mg/L	0.05 (Natural area)	0.01
Mercury (Hg)	Mercury Analyzer	ppm or mg/L	0.0001(Natural area), 0.0001(Industrial area)	0.001
PAH	APHA 5310.B	mg/L	N/A	N/A
TOC and TC	APHA 5310. B	mg/L	N/A	N/A

Surface Water Quality Parameters

The selected surface water quality parameters include Temperature, pH, Dissolved Oxygen (DO), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Hardness (TH), Turbidity, Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Salinity, Nitrate (NO_3^-), Phosphate (PO_4^{3-}), Sulphate (SO_4^{2-}), Heavy Metals (As, Pb, Hg), and Oil and Grease. The parameters are categorized into four (04) groups:

- Physical and aggregate properties, i.e., pH, Temperature, Salinity, Hardness, TDS, TSS, Turbidity, Oil & Grease;
- Inorganic non-metallic constituents i.e., DO, NO3-, PO43- and SO42-;
- Aggregate organic constituents, i.e., COD;
- Heavy metals, i.e., As, Pb, and Hg.

In addition to the above, the following parameters, i.e., PAH (Polycyclic Aromatic Hydrocarbons), TOC (Total Organic Carbon), and TC (Total Carbon), are included in the monitoring study as per the recommendation of the DoE based on the coal transportation study. The monitoring results of the mentioned additional parameters are recorded twice a year and submitted to the DoE and other concerned authorities as per *condition no. 26* of the EIA approval of the coal transportation study.

Groundwater quality parameters

The groundwater quality parameters selected for monitoring include pH, Temperature, Dissolved Oxygen (DO), Total dissolved solids (TDS), Total Hardness (TH), Chemical Oxygen Demand (COD), Salinity, Nitrate (NO_3^-), Phosphate (PO_4^{3-}), Sulphate (SO_4^{2-}), and Heavy Metals (As, Pb, Hg).

Water Quality Reporting Arrangement

The water quality status of the adjacent water bodies of MSTPP and the tip to end of the Sundarbans Reserve Forest (SRF) has been observed since April 2014. To do so, all sampling points are clustered in five different sampling sites, considering the sampling points' homogeneous characteristics and the type of ecosystem touching the sample points. The clustered sample monitoring sites and the logical explanation of the clusters are presented in the following T**able 2.7.**

Table 2.7: Monitoring Sites and Characteristics

Sl. No.	Monitoring Sites	Site Characteristics
(a)	*Power plant & adjacent areas*	In these monitoring areas, 11 surface water sampling points were selected, and the values were averaged to represent the water quality status of the power plant's adjacent surface water bodies. These 11 sampling points are situated within a 1 km radius of the MSTPP boundary on the Passur and Moidara Rivers, exhibiting similar characteristics, which is also supported by previous monitoring results indicating the same water chemistry. Therefore, this study presents the clusters in a more explainable and understandable way to reflect the water quality status of the areas.
(b)	*Mongla-Passur confluence*	This monitoring site is located at least 13 km downstream of MSTPP. This point marks the confluence of the Passur River and the Mongla-Ghasiakhali Channel. The terrestrial ecosystem is predominantly characterized by agricultural lands, followed by rural settlements.
(c)	*Harbaria*	The Harbaria site is located approximately 15 km downstream from the Mongla-Passur confluence, within the Sundarbans Reserve Forest. It serves as a designated lightering point for mother vessels transporting clinker, coal, and LPG gas.
(d)	*Akram point*	Akram Point is located approximately 35 km downstream from Harbaria Point. It lies on the bank of the Sibsa River, just before it merges with the Passur River at Sibsa Point. The deep forest ecosystem entirely dominates this area.
(e)	*Hiron Point*	Hiron Point is the furthest point of this surface water monitoring scheme, located 25 km downstream from Akram Point. The site is fully exposed to the Bay of Bengal and features deep forests as well as marine habitats.

2.4.1 Monitoring Results

Status of Surface Water Quality

Parameters Tested In-situ

This section presents the in-situ tested results of water quality parameters obtained during the 45th monitoring program (July 2025, monsoon season).

In general, the Passur River water is alkaline in nature, and during this monitoring season, pH values ranged from 7.34 to 8.2 across all the monitoring sites. Meanwhile, temperatures observed during the period ranged from 28.9°C to 31.28°C at the monitored locations. This temperature range closely matches the values recorded previously for the same periods. According to Bangladesh's seasonal climate pattern, temperatures decrease to their lowest point during winter, which also applies to water temperature. The recorded temperatures show spatial variation among monitoring sites even within the same season. Conversely, the highest salinity (2.1 ppt) was recorded at Hiron Point in the Sundarbans, while the lowest value (0.1 ppt) was observed in Moidara River near Shapmari area. In the monitored river systems, the highest salinity levels are typically seen during the pre-monsoon season, followed by winter, whereas monsoon and post-monsoon periods show the lowest levels. Again, the DO values ranged between 8.6 mg/L and 5.4 mg/L during the monitoring tier, which fully complied with the ECR 2023 standard (≥5 mg/L). The seasonal variations are depicted in **Figure 2.10 2.11, 2.12 and 2.13** and the monitoring results are attached in **Table B1**, **B2**, **B3** and **B4** of **Appendix-IV.**

Parameters Tested in Laboratory

This section depicts the laboratory-tested results of water quality parameters obtained for the 44th monitoring program (April 2025, pre-monsoon season).

TDS indicates the presence of minerals such as ammonia, nitrate, phosphate, alkalis, acids, sulfates, and metallic ions, found in both colloidal and dissolved forms (Tareq M. S., et al., 2013). Concentrations of Total Dissolved Solids (TDS) in coastal surface waters can be exceptionally high due to the presence of dissolved salts, reflecting significant mineral content. Meanwhile, Total Suspended Solids (TSS), comprising inorganic and organic particles, exhibits considerable variability with rainfall, often reaching elevated levels during monsoon seasons. Total Hardness (TH), indicative of dissolved minerals such as calcium and magnesium, tends to be elevated in these coastal environments. Nevertheless, during the 44th quarterly monitoring (April 2025, pre-monsoon season), TDS levels ranged impressively from 12,900 mg/l to 23,700 mg/l, TSS from 16 mg/l to 225 mg/l, and TH from 3,600 mg/l to 5,600 mg/l, underscoring the dynamic and mineral-rich nature of these waters. The seasonal variations are depicted in **Figure 2.14, 2.15, and 2.16** and the monitoring results are attached in **B7**, **B8**, **B9** of **Appendix-IV.**

On the other hand, the nutrient concentrations i.e. Nitrate, Sulphate and Phosphate differ significantly based on geographical location, seasonal changes, and the extent of different influencing factors like tidal input, agricultural runoff, domestic waste dumping, and industrial pollution (Spencer, 1975; Kinne, 1984; Gleick, 1993; Wetzel, 2001; Rabalais, 2002), salinity intrusion etc. However, nitrate sulphate, and phosphate values were found to range between 7.3 mg/l to 2.42 mg/l, 289.61 mg/l to 221.3 mg/l, and 0.2 mg/l to 0.07 mg/l respectively. The seasonal variations are depicted in **Figure 2.18, 2.19, and 2.20** and the monitoring results are attached in **B10**, **B11**, and **B12** of **Appendix-IV.**

Heavy metals are primarily introduced into the environment through human activities. These include manufacturing industries, and agricultural practices, which often release heavy metals as pollutants. When pollutants, such as materials, minerals, waste products, and bedload sediments, are discharged, they are transported by water into river systems. Over time, these heavy metals can accumulate in rivers and estuarine environments, potentially affecting aquatic ecosystems and water quality (Gavhane et. al. 2021). During the last pre-monsoon period (44th monitoring), average Arsenic (As) concentrations near the project site and in the Sundarbans Forest ranged from 0.003mg/l to 0.006 mg/l (The seasonal variations are depicted in **Figure 2.21)**. Meanwhile, the concentrations of Lead (Pb) and Mercury were found to be <0.01 mg/l and <0.0001 mg/l, respectively, which fully comply with the surface water quality standards stated in ECR, 2023 (A2 of Schedule-2: Coastal Surface Water). The monitoring results are attached in **B13**, **B14**, and **B15** of **Appendix-IV.**

Remarks

Seasonal fluctuations in pH levels are linked to factors such as CO_2 removal through photosynthesis via bicarbonate breakdown, freshwater dilution, decreases in salinity and temperature, and the decomposition of organic matter (Rajasegar, 2003). No significant pH differences were observed, apart from spatial variation in river water. On the other hand, salinity levels were seen highest in the pre- monsoon season, followed by winter, with the lowest during monsoon and post- monsoon. Similarly, higher DO levels were observed during monsoon and post- monsoon, which may result from air mixing during heavy rain, rainfall- driven currents, and increased freshwater input. Similarly, TDS tends to increase in pre-monsoon and winter, possibly due to reduced rainfall and upstream flow, leading to less dilution (Izonfuo and Bariweni, 2001). Minerals from the Bay of Bengal could also contribute to higher TDS during these seasons. Similar patterns were noted for total hardness (TH) and total suspended solids (TSS).

Over the years, COD was found higher in pre- monsoon, followed by winter, characterized by low rainfall that increases organic matter density. During monsoon, higher discharge dilutes COD, lowering its concentration in the post- monsoon. The monitoring results are attached in **Table B5** of **Appendix-IV** and the seasonal variations are shown in **Figure 2.17.** Likewise, tidal interactions cause nitrate and sulfate levels to be higher in seawater and coastal rivers, supported by data showing increasing concentrations from downstream to upstream. These nutrient levels may result from natural mudflat efflux or human activities like agriculture and sewage discharge, with tidal cycles. The fluctuations are evident during monsoon and pre- monsoon, as freshwater runoff from agriculture, surface activities, cities, and wetlands modifies nutrient concentrations. Oil and grease levels remained below 2.0 mg/l across sites, surpassing the natural or reserved area limit of 0.01 mg/l but within the industrial limit of 5.0 mg/l. Higher levels of oil and grease in the Sundarbans may be attributed to bilge water discharges from unregulated vessels, including cargo ships, passenger launches, tourist vessels, naval ships, and fishing trawlers, which operate locally.

Status of the Groundwater Quality

In-situ tested parameters

The in-situ test results obtained up to the 45th quarterly monitoring period (July 2025: Monsoon season) are described below:

The values of pH and temperature of groundwater in the monitoring sites were observed to be complied with the drinking water quality standards as specified in ECR 2023 (6.5-8.5 and 20-30°C, respectively). The pH values during the 45th monitoring scheme varied from 6.8 to 7.8. On the other hand, the temperature range was recorded between 29.06°C and 32.08°C. No significant differences were observed in comparison to the previously observed results in the same seasons. The temperature was relatively consistent with the data from the last respective seasons. However, the seasonal variations of pH and temperature, as observed up to the 44 consecutive monitoring periods, are presented in **Figure 2.22 and 2.23** and the datasets are provided in **Table B.16** of **Appendix IV**.

Groundwater salinity levels at all monitoring sites have shown a relatively consistent trend compared to previous years during the pre-monsoon periods. Over time, groundwater salinity has gradually increased, particularly at Rajnagar and Kapashdanga compared to the project site. High groundwater extraction, salinity intrusion, and the percolation of saline water are likely key reasons for the rising salinity levels in the groundwater. During the monitoring period, salinity ranged from 0.2 ppt to 0.4 ppt. In contrast, the DO level ranged between 2 mg/l and 4.6 mg/l during the 45th quarterly tier. Slightly low DO concentrations in drinking water may only affect taste, but higher DO levels can improve water taste and cause corrosion of the supply pipes. Seasonal variations in DO and salinity concentrations are shown in **Figure 2.24** & **Figure 2.25**, and all monitoring results of salinity and DO at the selected sites are included in **Table B.17** of **Appendix-IV**.

Laboratory tested parameters

The laboratory-tested results obtained up to the 44th monitoring period (April 2025, pre-monsoon season) are described as follows:

During the monitoring quarter, the highest TDS value of mg/l was recorded near Rajnagar (670 mg/l), followed by the Project site (400 mg/l), which is below the permissible limit according to ECR 2023 (1,000 mg/l). Conversely, the TSS concentrations ranged from 1.0 mg/l to 1.7 mg/l at all monitoring locations, which is also below the allowable limit for Drinking Water in Bangladesh (TSS: 10 mg/l, ECR 2023). Additionally, the TH concentrations at the three monitoring sites varied from 190 mg/l to 300 mg/l, with the maximum value found at Rajnagar, followed by the Project site. This higher concentration of TH might be due to groundwater salinity intrusion and weathering of Ca^{2+} bearing minerals. The seasonal variation of Nitrate, Sulfate, and Phosphate is shown in **Figure 2.26**, **Figure 2.27** & **Figure 2.28** and the observed datasets are attached in **Tables B18**, and **B.19** of **Appendix IV**.

In general, the monitoring wells complied with the Bangladesh Standard during the monsoon and post-monsoon periods but crossed the ECR limit during the pre-monsoon and winter periods. During the last monitoring period the COD values were found in the range of 12 mg/l to 48 mg/l. The primary cause of the increasing COD during the pre-monsoon in the monitoring areas was the rise of organic or inorganic compounds or ions in the groundwater, like domestic sewage and industrial discharge (Sirajudeen, J., 2014). This is to be noted here that the MSTPP neither extracts ground water nor discharge untreated domestic sewage and industrial effluent. This means other sources may be responsible for the mentioned increment of COD values. The seasonal variations are shown in **Figure 2.33** and the observed dataset is attached in **Table B.19** of **Appendix IV**.

Nitrate (NO_3^-) values ranged from 1.1 mg/l to 1.4 mg/l during the last pre-monsoon period. The maximum value (1.4 mg/l) was recorded in Rajnagar area. NO_3^- concentrations were found within the permissible limit as per ECR 2023 (45 mg/l) during the monitoring period. Similarly, SO_4^{2-} concentrations also complied with the Bangladesh Standard for Drinking Water Quality (250 mg/l). The observed results ranged from 2.9 mg/l to 3.1 mg/l in the monitoring sites. The concentration of the monitoring wells never exceeded the limits for any of the monitoring periods. On the other hand, PO_4^{3-} concentrations varied between 1.4 mg/l and 2.7 mg/l during the last pre-monsoon monitoring period. PO_4^{3-} concentrations displayed minor spatial and temporal variations. The seasonal variations in the Nitrate, Sulphate, and Phosphate are depicted in **Figure 2.29**, **Figure 2.30** and **Figure 2.31**. The observed datasets are attached in **Table B.20** and **B21** of **Appendix IV**.

According to Bangladesh Standard (ECR 2023), the maximum acceptable concentration of Arsenic (As) in groundwater is 0.05 mg/l. During the last pre-monsoon season, the concentrations among all monitoring locations ranged between 0.001 mg/l and 0.055 mg/l. Exceedance in As concentration was observed at Rajnagr sampling area, which is located aerialy 2 km (approx.) away from the Groundwater sampling site in the project premises. The exceedance in As concentration might be due to two different mechanisms: oxidation of arsenic-rich pyrite by atmospheric oxygen introduced into groundwater due to lowering the water table (Das et al., 1996) and the reduction of iron hydroxide by organic matter (Seasonal variation is depicted in **Figure 2.32**). However, as the MSTPP does not withdraw any ground water so other sources may be responsible for the exceedance of Arsenic. Lead (Pb) and Mercury (Hg) concentrations were also measured, and the values were found within the permissible limit specified in ECR 2023 (0.01 mg/l for Pb and 0.0001 mg/l for Hg). The observed datasets of As, Pb, and Hg are presented in **Tables B.21**, and **B.22** of **Appendix IV**.

Remarks

During the 45th quarterly monitoring period, the groundwater pH and the temperature showed no significant seasonal changes compared with the datasets of the previously monitoring data of the same seasons. Dissolved oxygen levels fluctuated between 2 mg/l and 4.6 mg/l. Gradual salinity increases were observed, particularly at Rajnagar and Kapashdanga. Total dissolved solids (TDS) peaked at 670 mg/l in the Rajnagar area but remained within ECR 2023 limits, while total suspended solids (TSS) were low (1 mg/l to 1.7 mg/l), also compliant. Total hardness ranged from 190 mg/l to 300 mg/l, likely due to mineral weathering and groundwater extraction. Chemical oxygen demand (COD) concentrations were found to be high. Likewise, nitrate, Sulfate, and phosphate levels stayed within standards too as per the ECR 2023. Arsenic levels (0.001–0.055 mg/l) complied overall, though they exceeded limits in some seasons. Lead and mercury concentrations remained within permissible limits, found at <0.01 mg/l and <0.0001 mg/l, respectively. However, as the MSTPP does not withdraw ground water for any kind of uses so other sources may be responsible for the increased and decreased values of the mentioned parameters.

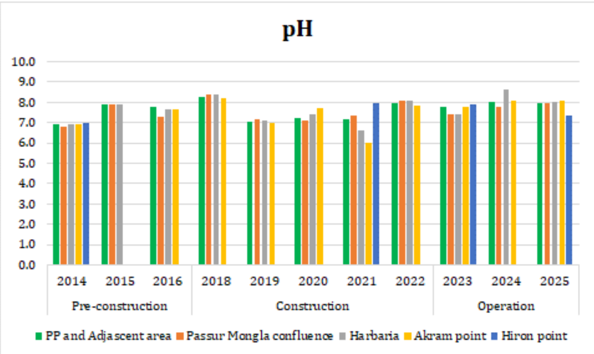


Figure 2.10: Seasonal variations in pH concentrations

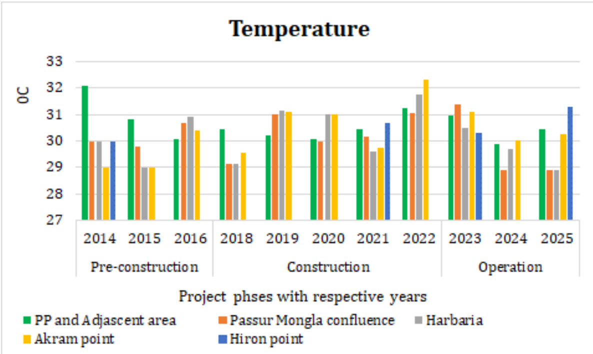


Figure 2.11: Seasonal variations in Temperature

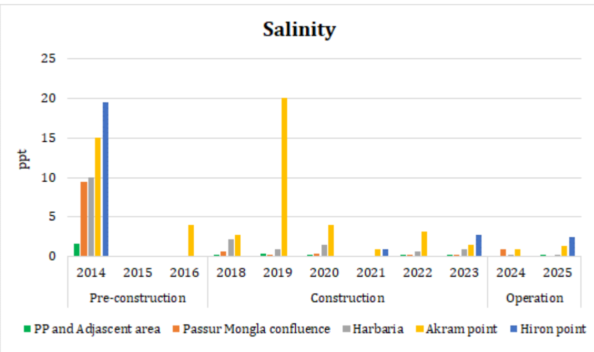


Figure 2.12: Seasonal variations in Salinity concentrations

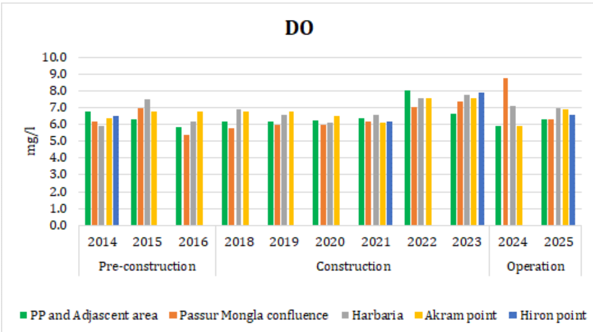


Figure 2.13: Seasonal variations in DO concentrations

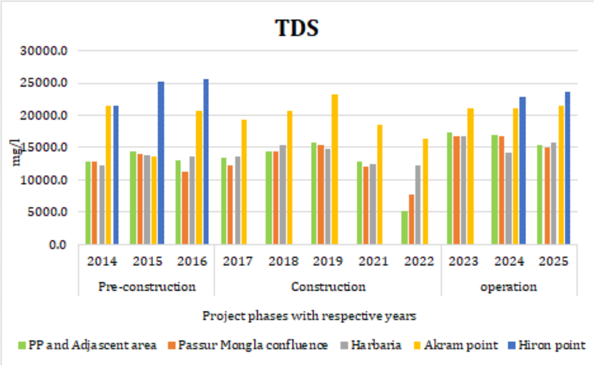


Figure 2.14: Seasonal variations in TDS concentrations

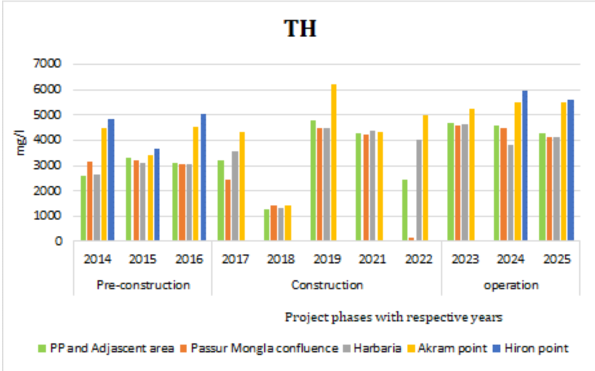


Figure 2.15: Seasonal variations in TH concentrations

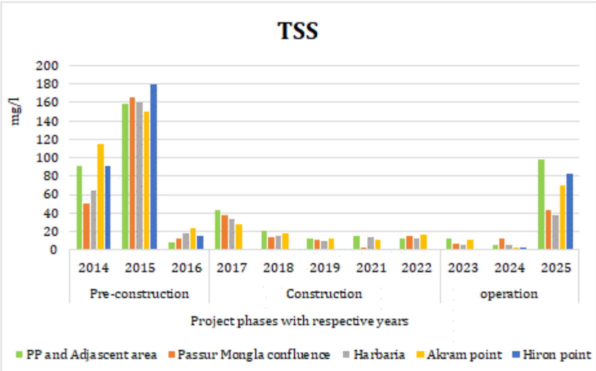


Figure 2.16: Seasonal variations in TSS concentrations

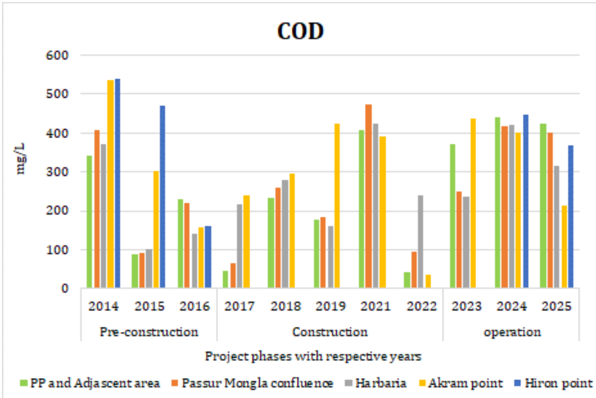


Figure 2.17: Seasonal variations in COD concentrations

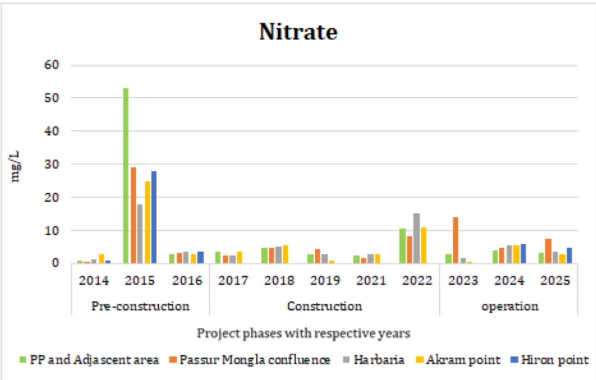


Figure 2.18: Seasonal variations in Nitrate concentrations

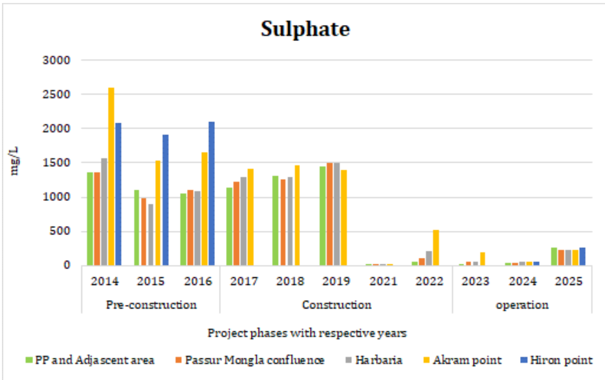


Figure 2.19: Seasonal variations in Sulphate concentrations

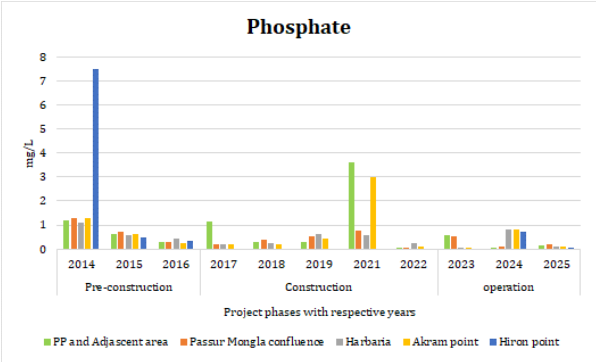


Figure 2.20: Seasonal variations in Phosphate concentrations

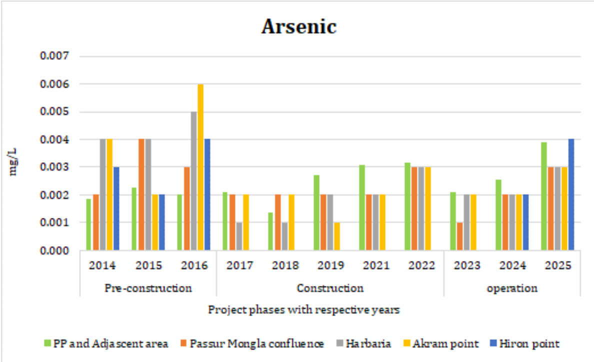


Figure 2.21: Seasonal variations in Arsenic concentrations

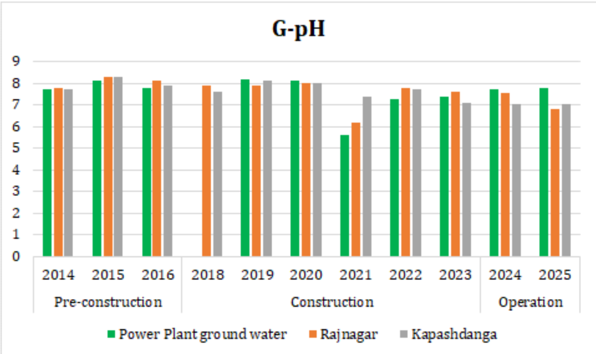


Figure 2.22: Seasonal variations in G-pH concentrations

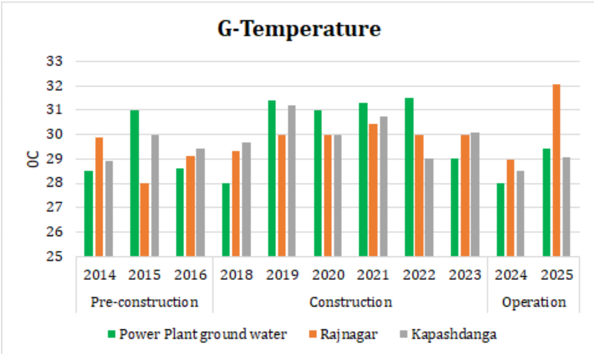


Figure 2.23: Seasonal variations in G-Temperature

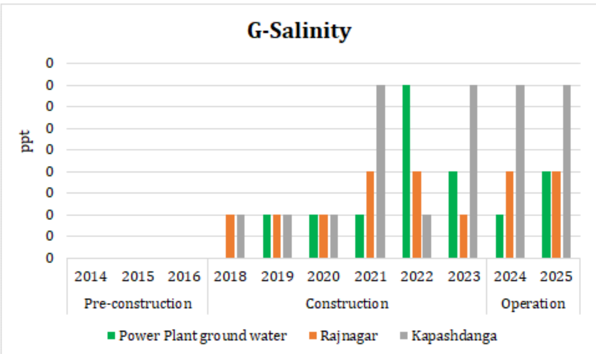


Figure 2.24: Seasonal variations in G-Salinity concentrations

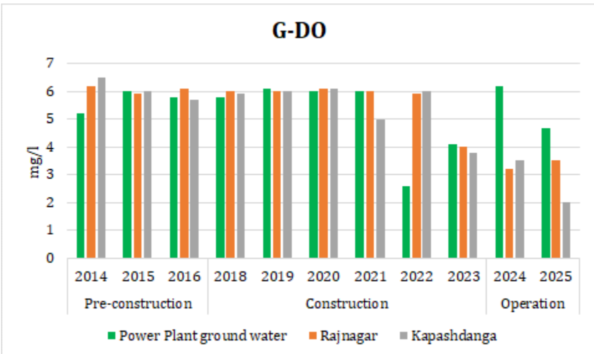


Figure 2.25: Seasonal variations in G-DO concentrations

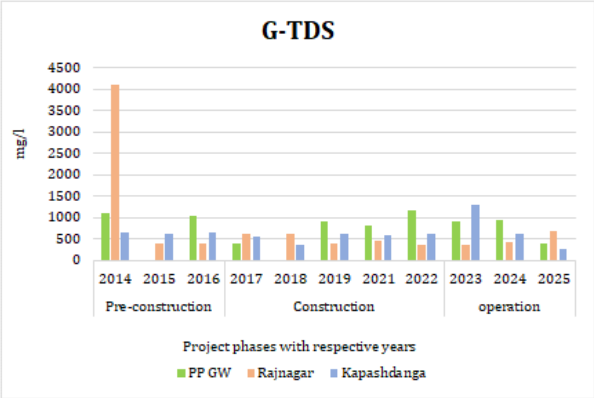


Figure 2.26: Seasonal variations in G-TDS concentrations

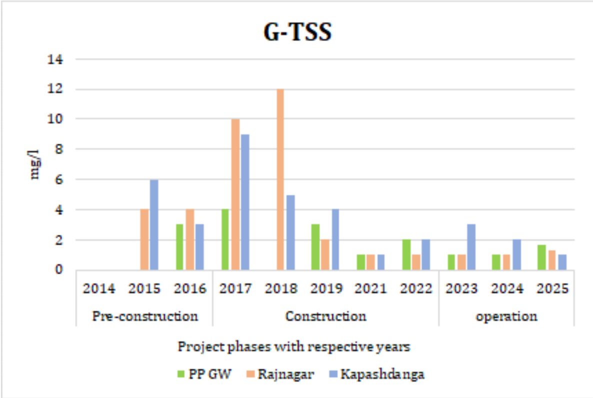


Figure 2.27: Seasonal variations in G-TSS concentrations

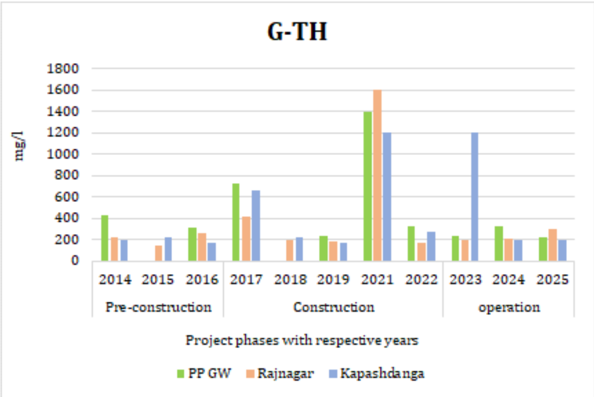


Figure 2.28: Seasonal variations in G-TH concentrations

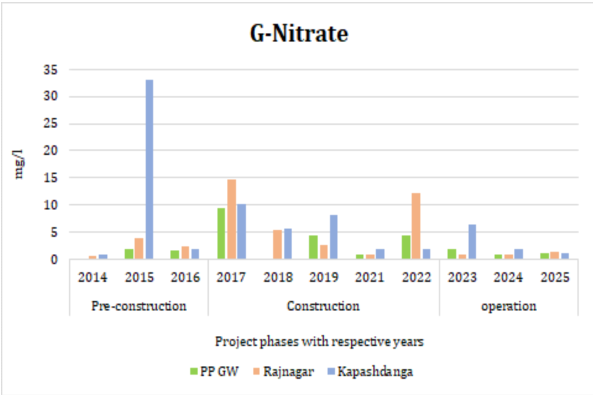


Figure 2.29: Seasonal variations in G-Nitrate concentrations

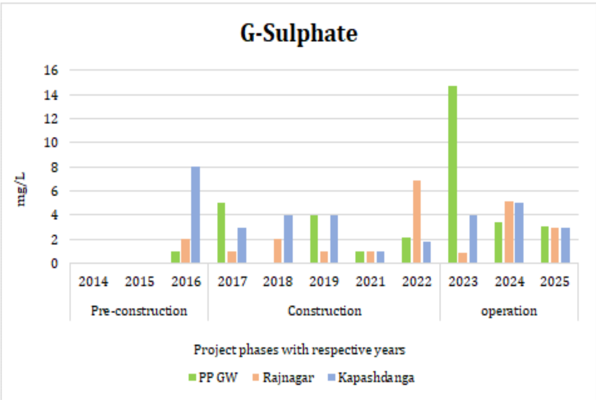


Figure 2.30: Seasonal variations in G-Sulphate concentrations

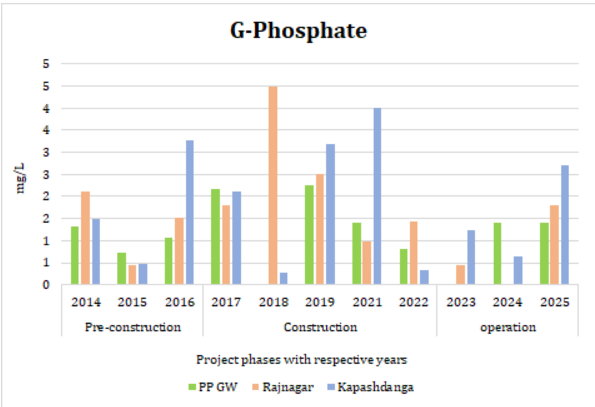


Figure 2.31: Seasonal variations in G-Phosphate concentrations

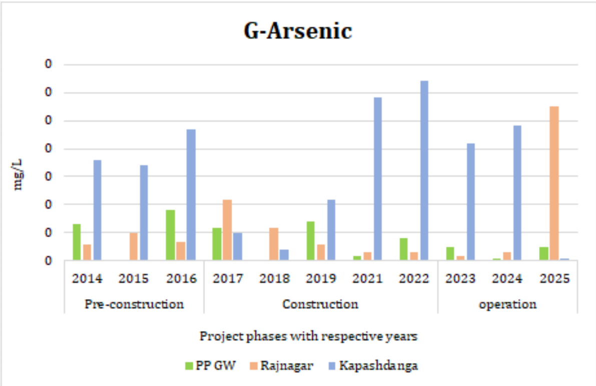


Figure 2.32: Seasonal variations in G-Arsenic concentrations

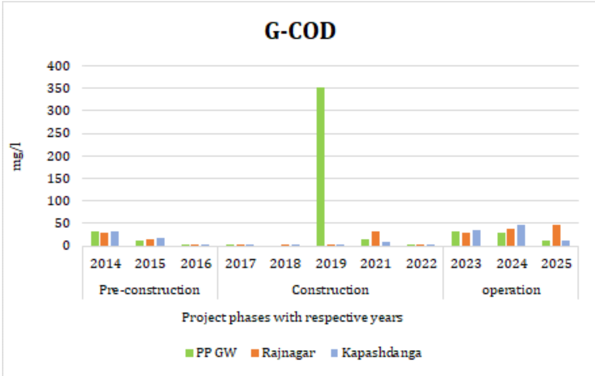


Figure 2.33: Seasonal variations in G-COD concentrations

2.5 Land and Agricultural Resources Monitoring

Monitoring of selected indicators is very crucial for better management of land resources in the study area. Plot/land use, soil fertility/nutrient status, soil contamination with heavy metals and soil salinity have been considered as the major indicators for land resources monitoring. It is also assumed that during the operation phase of the power plant, fly ash and other air borne pollutants may get deposited on the surrounding agriculture land, which ultimately will pollute the study area soil. Before that (during pre-construction and construction stage), only natural phenomena are responsible to alter soil parameters.

2.5.1 Sampling Frequency

The frequency of monitoring for land resources data collection has been considered twice a year. Accordingly, the soil samples were collected during the 44th monitoring field visit and sent immediately to the laboratory for analysis. The analysis data have been incorporated into this monitoring report.

2.5.2 Monitoring Indicators

The continuous monitoring has given an opportunity to observe seasonal change along with spatial change of selected indicators of sampling plots. The selected indicators are soil reaction (pH), soil salinity (EC), Organic matter (OM), base cations-Ca, Mg, K and Na, status of macro nutrients (N, P and S), status of micro nutrients (B, Fe, Mn and Zn) and presence of heavy metals (Pb and Cd). Sodium absorption ratio (SAR), exchangeable sodium percentage (ESP) can be calculated from the analysed data. It can also be mentioned that the structural change of soils in the sampling plots may also be identified from these data.

The formula to calculate SAR is given below, with concentration expressed in milli equivalents per liter (meq/L) analysed from a saturated paste soil extract.

ESP is the sodium absorbed on soil particles as a percentage of the Cation Exchange Capacity (CEC). It is calculated as

$$SAR = \frac{[Na^+]}{\sqrt{\frac{1}{2}([Ca^+]+[Mg^+])}} \quad \text{and} \quad ESP = \frac{[Na^+]}{CEC} X\ 100$$

CEC is often estimated as the major exchangeable cations, including hydrogen. Both cation and CEC are expressed as meq/100g. ESP can also be calculated as:

$$ESP = \frac{[Na^{+}]}{[Ca^{2+}+Mg^{2+}+Na^{+}+K^{+}]} X\ 100$$

ESP is used to characterise the sodicity of soils only, whereas SAR applies to both soil and soil solution or irrigation water

Location

The selected mauzas are Baranpara of Batiaghata Upazila, Chunkuri-2 of Dacope Upazila, Kapalirmet of Mongla Upazila, Chakgona, and Basherhula of Rampal Upazila. **Table 2.8** states the sampling locations with their corresponding coordinates. The locations of collected soil samples are presented in **Figure 2.34**.

Table 2.8: Land Resources Monitoring Plan

Site No.	Location	Coordinates		Sampling Frequency	Methods/ Tools/Techniques/ parameters
		Northing	Easting		
1	Baranpara, Batiaghata; Khulna	22°37′57.0″	89°30′59.1″	Half yearly (April and October)	In situ field sampling and Laboratory Testing in SRDI (Plot use, Soil fertility, and nutrient, Chemical properties of soil (pH, Pb, Cd), Crop production, and damage)
2	Chunkuri-2, Bajua; Dacope, Khulna	22°34′51.0″	89°32′20.0″		
3	Kapalirmet, Mongla; Bagerhat	22°32′18.9″	89°36′8.8″		
4	Chakgona, Rampal, Bagerhat	22°34′18.3″	89°34′25.3″		
5	Basherhula, Rampal, Bagerhat	22°36′14.0″	89°34′25.0″		
6	Bidyarbon, Mongla, Bagerhat	22° 33′42.0″	89°34′ 40.0″		

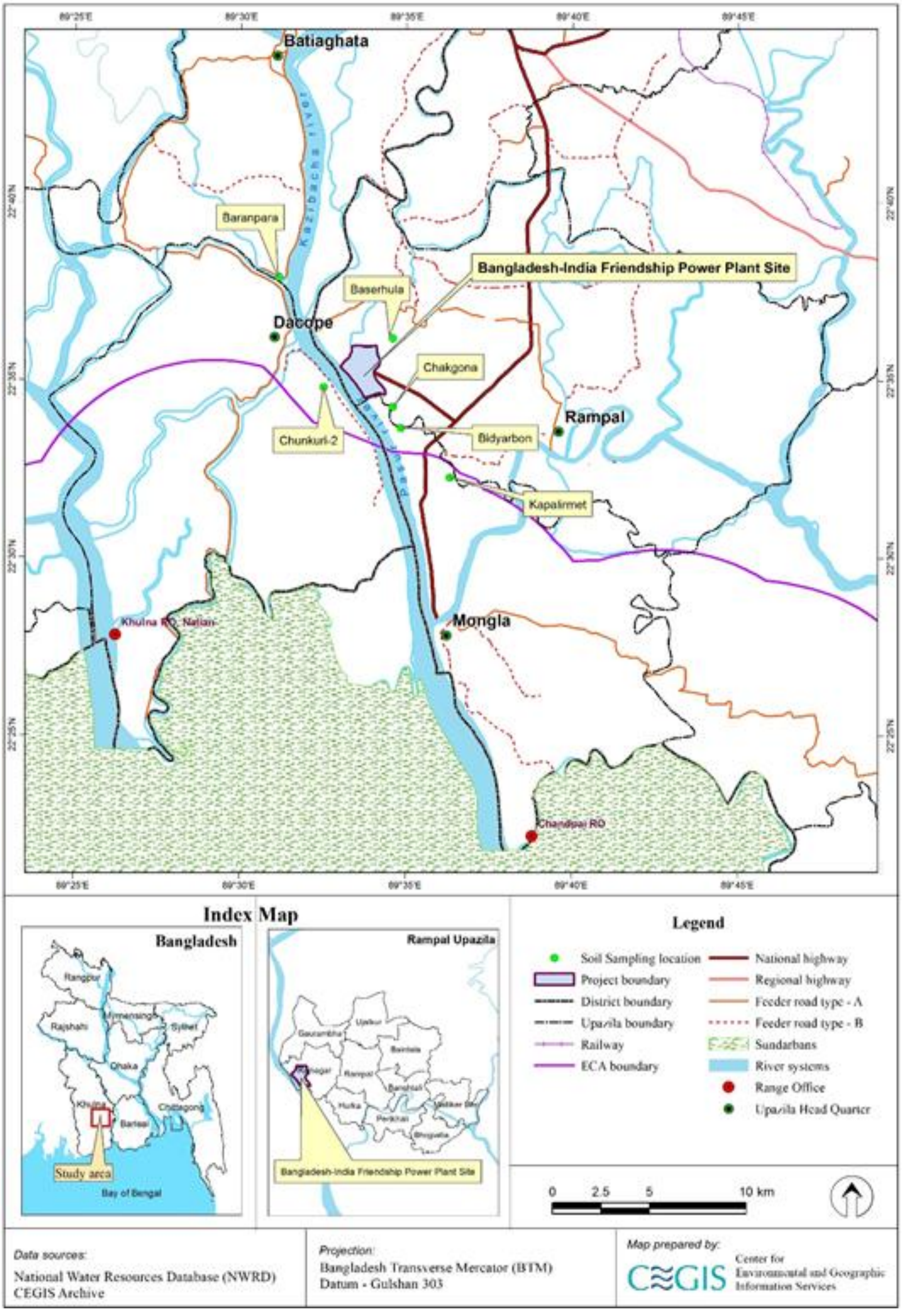


Figure 2.34: Land and agricultural resources monitoring locations

2.5.3 Process of Soil Sample Collection

Plot Selection

Monitoring plots were selected at the very beginning of this study. Expert's judgement along with plot owner's opinion was taken into consideration for this selection. Upazila Agriculture Officers of Batiaghata and Dacope of Khulna, Rampal and Mongla of Bagerhat District and Senior Scientific Officer of Soil Resource Development Institute (SRDI) of Khulna were contacted for collecting expert's judgement. Wind speed and wind direction were considered as potential local factor for the monitoring purpose. All the selected plots were characterized as medium high land (F_1), which are normally flooded in the range of 30-90 cm and remain inundated for more than two weeks to few months during the flood period.

Soil Samples Collection

Standard procedure was maintained during the collection of soil samples. In every plot, minimum three pits were dug through augur to collect composite sample. Each plot had three composite samples, top soil (0-15 cm), sub soil (15-30 cm) and sub stratum (30-45 cm). Soil samples were preserved in an air-tight plastic bag for laboratory analysis.

Laboratory Analysis

Collected soil samples have been handed over to the SRDI, Dhaka for laboratory analysis. The analysis data and report are incorporated with this monitoring (45th monitoring) report.

2.5.4 Status of soil quality of monitoring plots

Soil quality (dry season) of the monitoring plots is given below:

Monitoring Plot-1 (Baranpara)

Soil fertility and health in the study area are closely tied to the levels of salinity. According to the latest soil chemical analysis, overall salinity has decreased; all related parameters (EC, SAR, ESP) have decreased after last year's jump. This drop may be attributed to the quick recession and rainwater flush during the monsoon and early post-monsoon periods. In terms of monovalent and divalent cations, only sodium concentrations have increased, while potassium, magnesium and calcium levels have decreased. The decrease in sodium is particularly helpful for both soil fertility and plant health. Additionally, pH levels have dropped following a rise last year.

Topsoil organic matter has increased significantly compared to the previous dry season, with nitrogen and sulfur levels showing a similar rise. This may also be a consequence of submergence. Phosphorus, however, is the only macronutrient that has decreased this year.All macro-nutrient concentrations (Zinc, iron, and manganese) have increased at this monitoring location. Boron has decreased for the second consecutive year. Lead concentration has increased, while cadmium levels have decreased for the second consecutive year. Despite these changes, both lead and cadmium remain within the maximum permissible limits for soil.

Monitoring Plot-2 (Chunkuri-2)

Soil conditions have improved in terms of salinity compared to the previous monitoring. All salinity-related parameters (EC, SAR, ESP) have decreased. Among the monitored base cations, only Potassium showed a slight increase, while the remaining cations (sodium, calcium, and magnesium) concentrations have decreased. The pH level remains similar, but it is still acidic. In contrast, topsoil organic matter has decreased compared to the last dry season, with all macronutrient concentrations following a similar trend. As for micronutrients (B, Fe, Mn, and Zn), all have shown a decreasing trend after last year's rise. Both lead and cadmium concentrations have increased for the second consecutive year; however, both remain within the permissible limits for soil.

Monitoring Plot-3 (Kapalirmet)

This monitoring plot was used for fish cultivation during the pre-monsoon and post-monsoon periods. Previously, decreasing salinity was typical in this area due to leaching and the continuous lentic nature of the ecosystem. However, during this monitoring, conditions changed as EC, SAR, and ESP levels decreased as all base cations (Na, K, Ca and Mg) concentrations had dropped. The pH has also shown a downward trend.

Organic matter has increased since last year’s decline, and similar increases are evident for other macronutrients, including nitrogen and sulphur. In contrast, phosphorus levels have decreased this year. Among the micronutrients, boron (B) and iron (Fe) concentrations have dropped during this monitoring period. In contrast, Zinc (Zn) and manganese (Mn) levels have increased. Both lead and cadmium concentrations have increased for the second consecutive year; however, both remain within the permissible limits for soil.

Monitoring Plot-4 (Chakgona)

Overall salinity in the area has decreased, following the increase observed last year. Concentrations of sodium, potassium, and magnesium have declined, while those of calcium have increased. Soil pH has also decreased slightly. Organic matter has increased since last year’s decline, and similar increases are evident for other macronutrients, including nitrogen and sulphur. In contrast, phosphorus levels have decreased this year, which may be attributed to erosion.

Among the micronutrients, all showed a decreasing trend following last year’s decline. Notably, zinc (Zn) and iron (Fe) have decreased for the second consecutive year. Both lead and cadmium concentrations have increased for the second consecutive year; however, both remain within the permissible limits for soil.

Monitoring Plot-5 (Basherhula)

Overall salinity (EC) levels in the study area have decreased to about half of the previous level. However, several related parameters show an increasing trend, which may be linked to higher concentrations of base cations, particularly sodium (Na), potassium (K), and calcium (Ca). In contrast, magnesium (Mg) has decreased this year after increasing in the previous monitoring period.

Organic matter content has increased approximately threefold compared to the last dry-season monitoring. Nitrogen and sulphur concentrations have followed this increasing trend, while phosphorus has shown the opposite pattern, decreasing this year. Among the micronutrients, iron (Fe) and manganese (Mn) have decreased, whereas boron (B) and zinc (Zn) have increased. Lead (Pb) has increased during the current monitoring period, while cadmium (Cd) concentrations remain unchanged.

Monitoring Plot-6 (Bidyarbon)

One portion of the monitoring plot is directly exposed to the riverbank, which increases the risk of rapid washout and soil erosion during the monsoon season. This exposure also indicates heightened vulnerability to storm surges and riverside salinity intrusion during extreme weather events. Overall soil salinity (EC) has shown a slight increase for the second consecutive year. Among the measured cations, only potassium has increased for the second consecutive year. In contrast, sodium, calcium, and magnesium, after increasing last year, now show a decreasing trend. Soil pH has also decreased slightly. The concentrations of key fertility indicators, including organic matter, nitrogen, and sulphur, have increased, while phosphorus has declined, suggesting the influence of good agricultural practices. Boron levels have decreased following a two-year rise, whereas other micronutrients, including iron, manganese, and zinc, have increased. Lead concentration has increased after two years of decrease, while cadmium has decreased for the second consecutive year. Importantly, both lead and cadmium concentrations remain within the maximum permissible limits for soil.

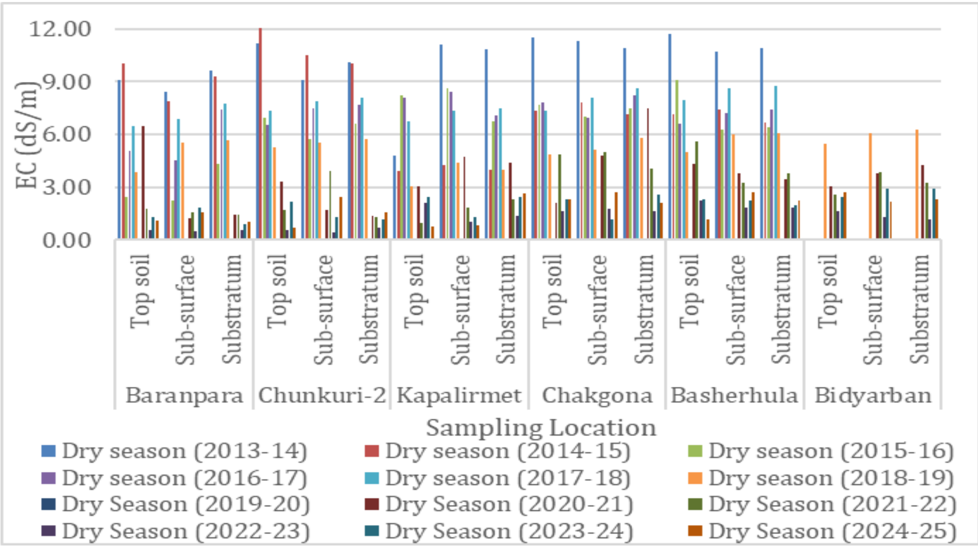


Figure 2.35: Changes of EC (dS/m) in dry seasons in sampling locations throughout the monitoring period

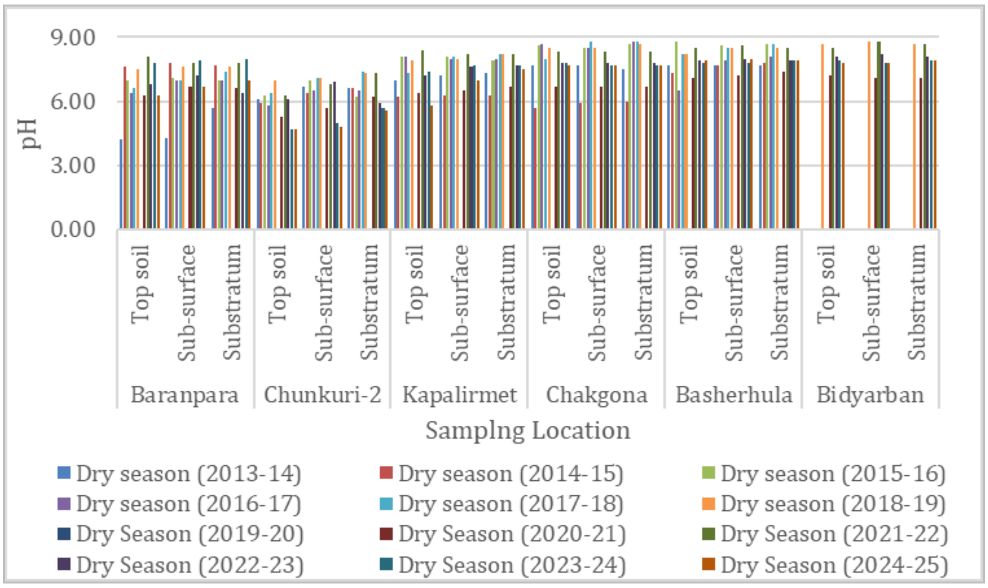


Figure 2.36: Changes of pH in dry seasons in sampling locations throughout the monitoring period

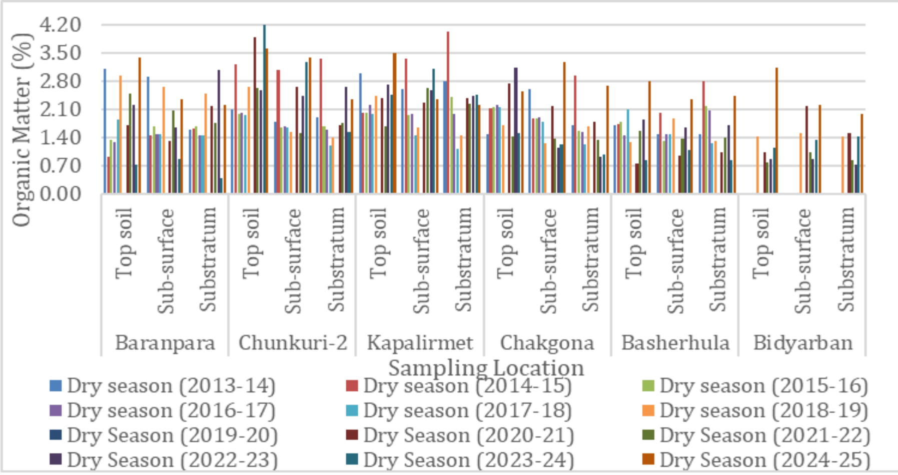


Figure 2.37: Changes of Organic matter (%) in dry seasons in sampling locations throughout the monitoring period

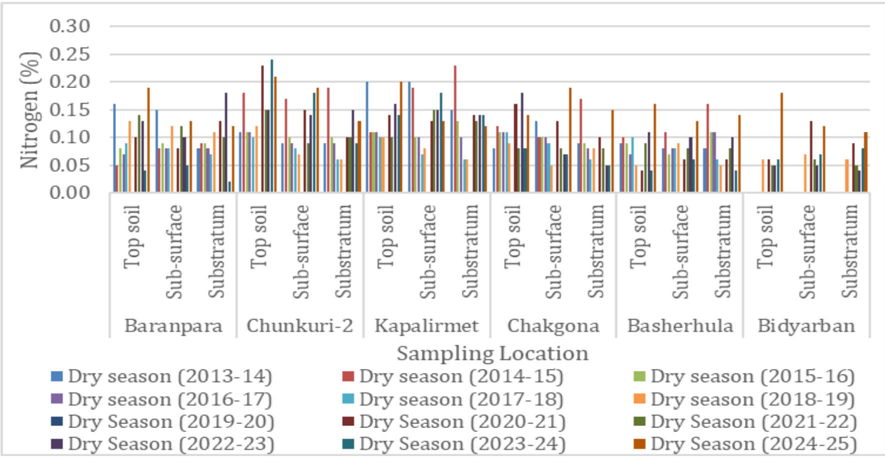


Figure 2.38: Changes of Nitrogen (%) in dry seasons in sampling locations throughout the monitoring period

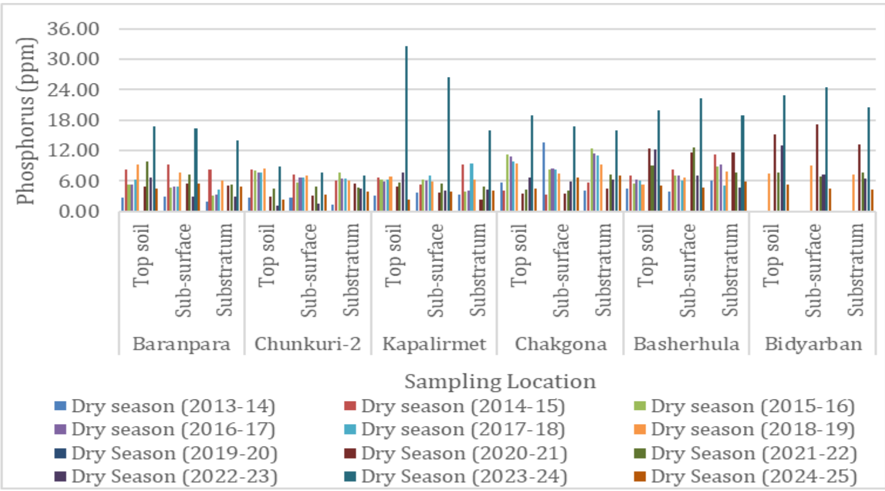


Figure 2.39: Changes of Phosphorus (ppm) in dry seasons in sampling locations throughout the monitoring period

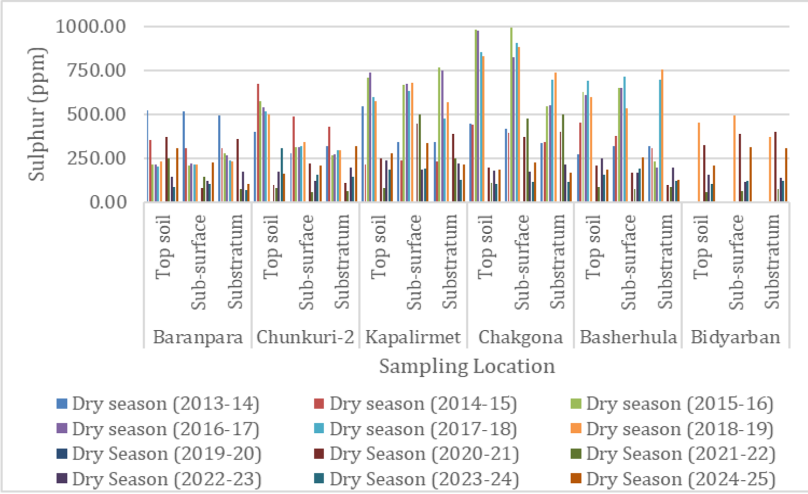


Figure 2.40: Changes of Sulfur (ppm) in dry seasons in sampling locations throughout the monitoring period

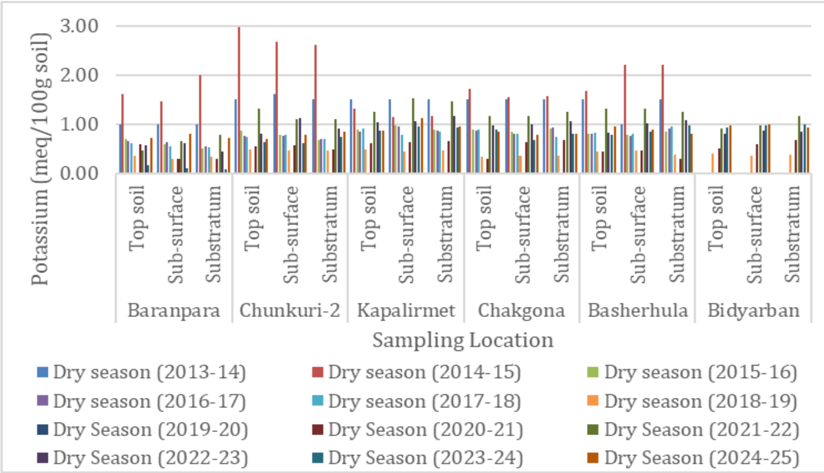


Figure 2.41: Changes of Potassium (meq/100g) in dry seasons in sampling locations throughout the monitoring period

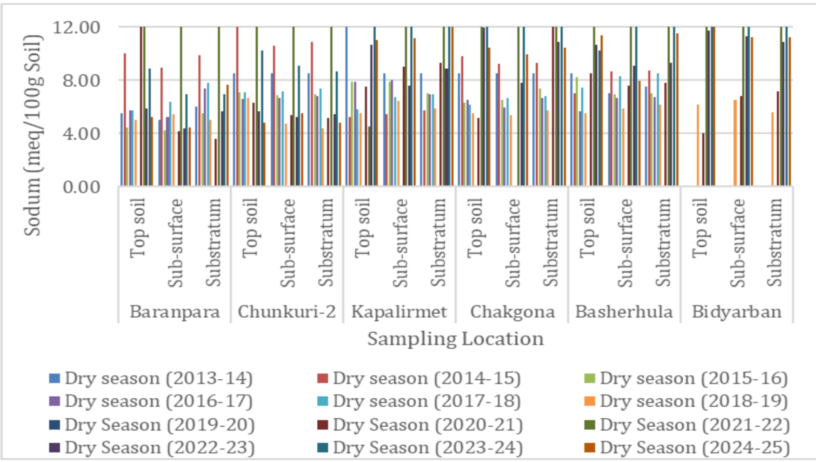


Figure 2.42: Changes of Sodium (meq/100g) in dry seasons in sampling locations throughout the monitoring period

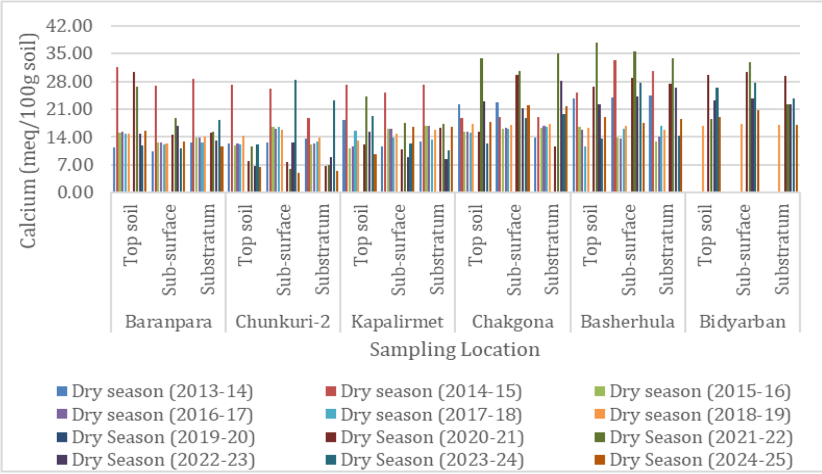


Figure 2.43: Changes of Calcium (meq/100g) in dry seasons in sampling locations throughout the monitoring period

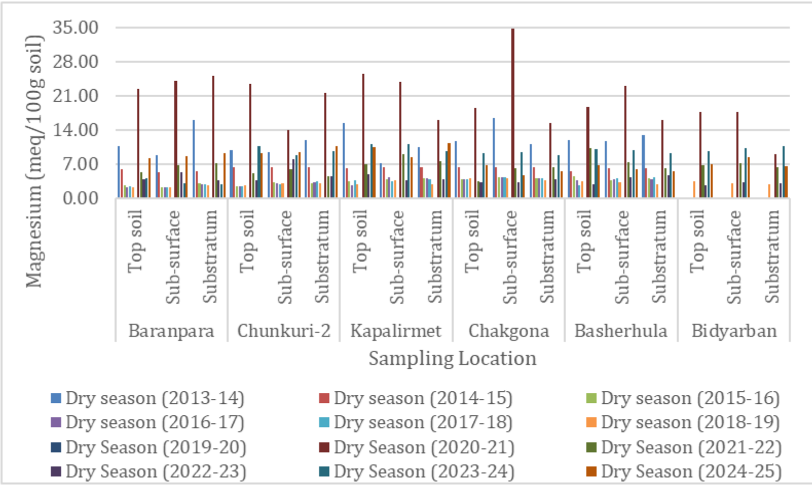


Figure 2.44: Changes of Magnesium (meq/100g) in dry seasons in sampling locations throughout the monitoring period

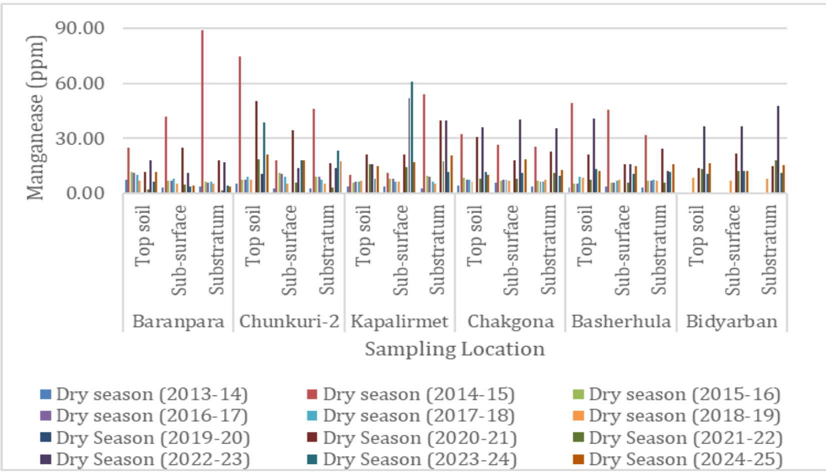


Figure 2.45: Changes of Manganese (ppm) in dry seasons in sampling locations throughout the monitoring period

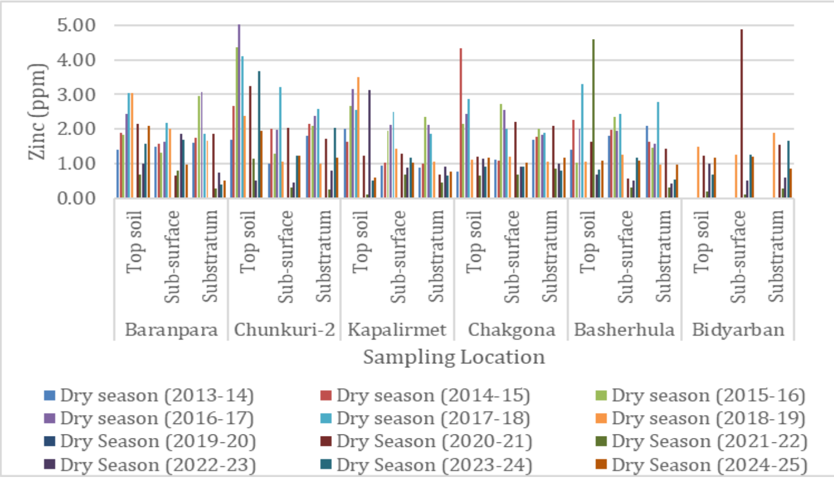


Figure 2.46: Changes of Zinc (ppm) in dry seasons in sampling locations throughout the monitoring period

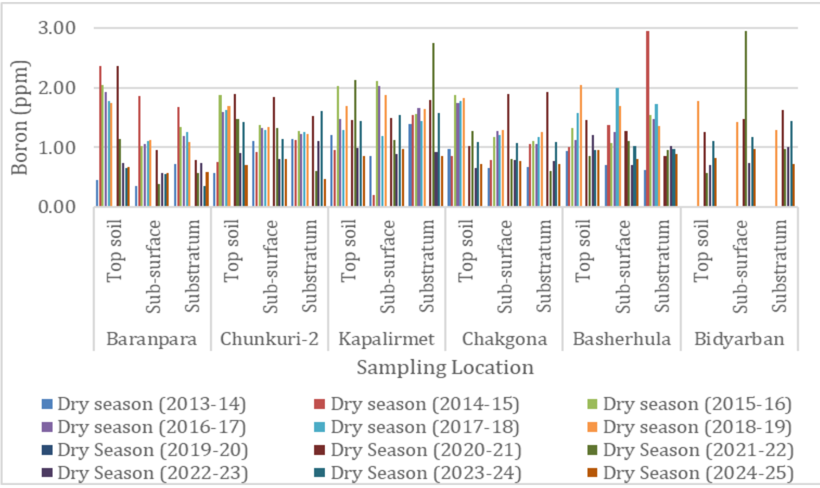


Figure 2.47: Changes of Boron (ppm) in dry seasons in sampling locations throughout the monitoring period

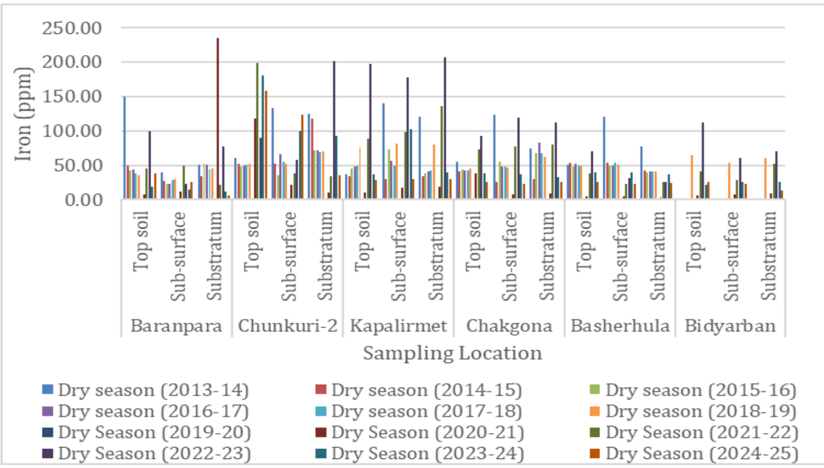


Figure 2.48: Changes of Iron (ppm) in dry seasons in sampling locations throughout the monitoring period

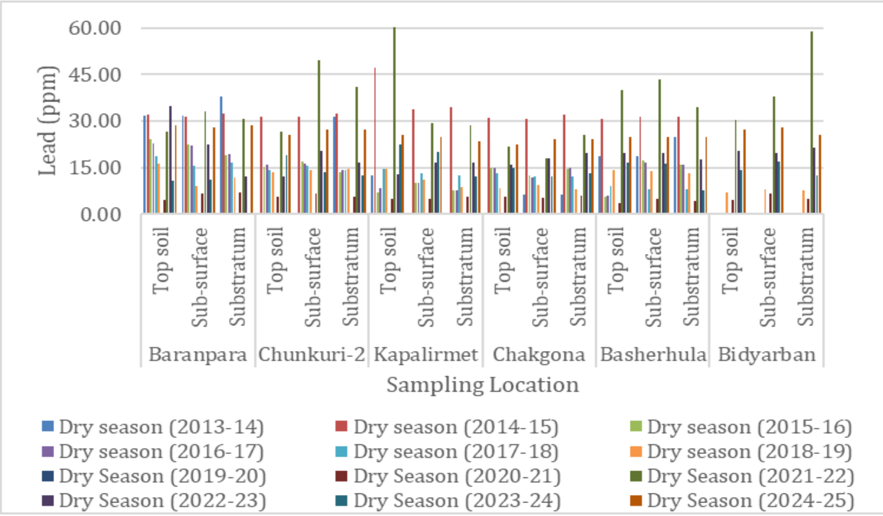


Figure 2.49: Changes of Lead (ppm) in dry seasons in sampling locations throughout the monitoring period

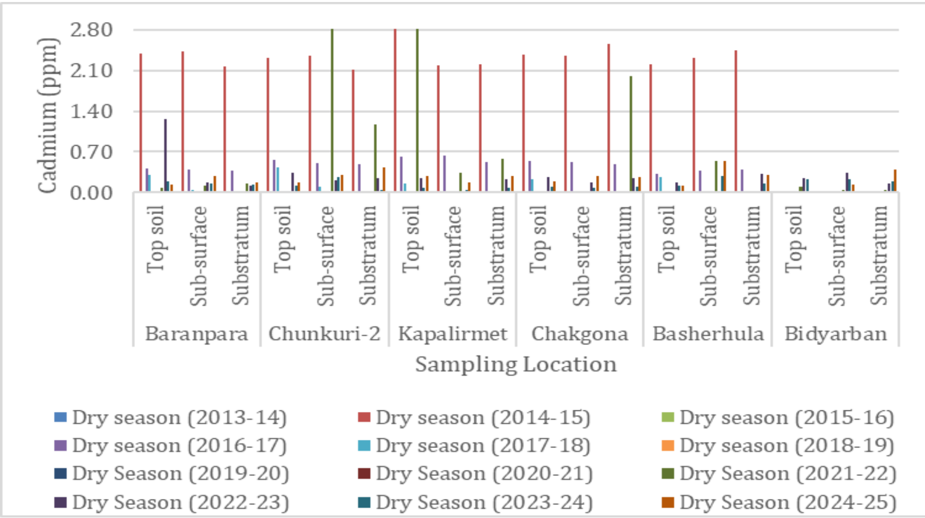


Figure 2.50: Changes of Cadmium (ppm) in dry seasons in sampling locations throughout the monitoring period

2.6 Transportation Monitoring

The traffic survey for this 45th monitoring was conducted from August 01st to August 03rd, 2025 on two weekends and one weekday at three pre-selected locations around the project site. Weather was sunny on the days when the survey was conducted. The selected sites were Khudir Bottola and Gonai Bridge at Khulna Mongla Road and Gonabelai Bridge at Power Plant access road presented in the **Figure 2.51.**

2.6.1 Methodology

Traffic surveys were carried out at three distinct periods (morning - 7:00 AM to 10:00 AM, noon-12:00 PM to 2:00 PM, and evening- 17:00 PM to 19:00 PM) to understand the nature of traffic flow and traffic load on the preselected locations during different phases of the day. Vehicles were categorized based on the available vehicle types around the project area.

2.6.2 Traffic Volume Calculation

The survey results were used to compute the traffic volume of these roads in the Passenger Car Unit (PCU). PCU is a matrix used in Transportation Engineering, to assess traffic-flow rate on roadways. A PCU is essentially the impact that a mode of transport has on traffic variables (such as headway, speed, density) compared to a single car. While calculating the traffic volume in PCU, vehicle conversion factors suggested by the Roads and Highway Department of Bangladesh were used, as mentioned in **Table 2.9**.

Table 2.9: Factors Used for PCU Calculation

Vehicle type	Factor
Bus	2.5
Minibus/Truck	2
Car/Microbus/Zeep	1
CNG	0.5
Rickshaw/Auto Rickshaw	0.8
Tempo/Human hauler	0.6
Motorcycle	0.3
Bicycle	0.2
Push Chart	4

Source: Roads and Highway Department, Bangladesh

2.6.3 Results of Monitoring

The summary results of vehicular movements at three different locations in **Table 2.10** show that, according to the Passenger Car Unit (PCU) per hour, the Khulna-Mongla Highway receives the most significant number of vehicles compared to other surveyed roads.

Table 2.10: Calculated PCU in Three Locations at Three Different Periods

Location	7:00 AM to 10:00 AM	12:00 PM to 2:00 PM	05:00 PM to 07:00 PM
Khulna Mongla Road at Khudir Bottola	974	1100	532
Khulna Mongla Road at Gonai Bridge	178	218	289
Power Plant access road at Gonabelai Bridge	108	71	63

Source: Field Survey, July 2025

The results reveal that, the Khulna Mongla Road at Khudir Bottola continues to experience the highest traffic flow among the three monitoring locations. In comparison relatively lower traffic volume were recorded at the other two locations, namely Khulna Mongla Road at Gonai Bridge and the Power Plant Access Road at Gonabelai Bridge. The survey also suggests that overall traffic volume has decreased compared to the previous monitoring period. When comparing the current monitoring period with the previous one, a decrease in the overall traffic volume was observed. This reduction can partly be attributed to the survey schedule, as the present round of monitoring was carried out on two weekends and a single weekday, when traffic movement is naturally lighter compared to typical weekdays. In addition to this temporal factor, the project being in its full operational phase may also be a contributing factor to the lower traffic volume in the mentioned areas. During the construction stage, the frequent movement of heavy construction vehicles contributed significantly to overall traffic volume. However, with construction activities being completed, such vehicle movement has declined, resulting in comparatively lower traffic levels within the survey areas. Detailed findings and calculations from the traffic volume surveys are attached in **Tables E.1**, **E.2,** and **E.3** of **Appendix IV.**

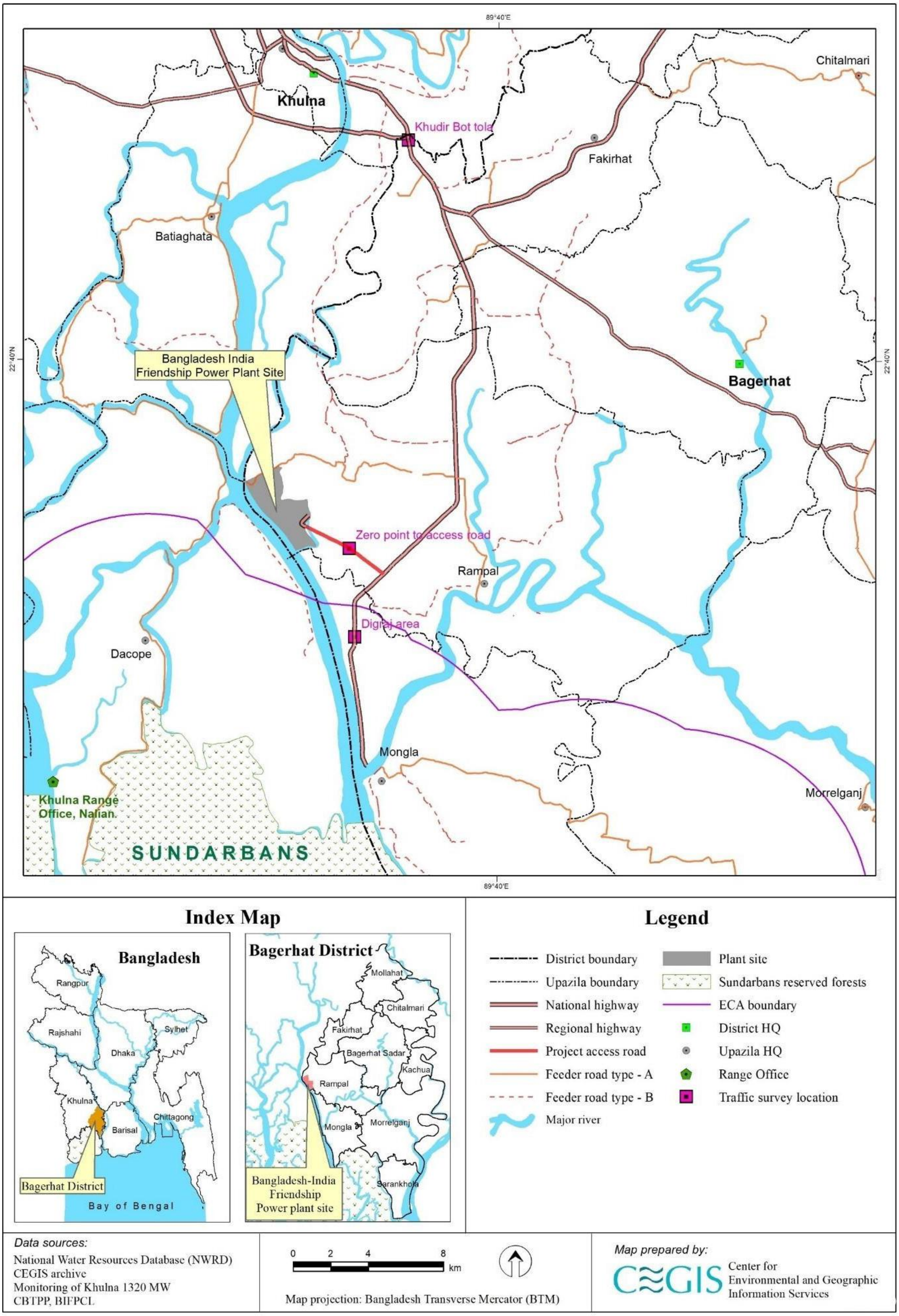


Figure 2.51: Locations of Traffic Survey Sites

3. Biological Environment

Biological resources include all living organisms within an ecosystem that interact with one another as well as with the concerned physical environment. The biological resources have been categorized into three major types e.g. fisheries resources, ecological resources, and Sundarbans Reserve Forest (SRF), and are being monitored in every quarter of the year to understand the changes in the functionality of the ecosystem in and around the project area as well as in the Sundarbans Reserve Forest are.

3.1 Fisheries Resources

Developing a fine monitoring plan, assessing the impacts of the project on fisheries resources, the impact on fish production and fish biodiversity during the project implementation, as well as suggesting possible mitigation and enhancement measures for increasing benefits of the positive impacts, are the prominent considerations for the fisheries resources monitoring. The monitoring activities as well as results of the previously conducted 44 nos. of quarters for the sessions of 2014-15, 2015-16, 2016-17, 2017-18, 2018-2019, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 as well as of 2024-25 was completed and reported earlier. This chapter contains the findings of the 45th -quarter and a comparison with the earlier 44 quarters.

3.1.1 Methodology

Location of Monitoring Sites

During the period, the monitoring activities were carried out in the 13 pre-selected locations, among which 10 locations were selected for capture fish habitat, and the remaining three (03) sites were selected for shrimp/fish farms (culture fish habitat). Sampling sites for capture fishery were selected based on the available fishing grounds upstream, midstream, and downstream of the Passur River system. Sampling sites for culture fishery (shrimp/fish farms) were selected considering the project influence area. The fisheries resource monitoring locations are provided in **Table 3.1** and also shown in **Figure 3.1**.

Table 3.1: The Sampling Locations for Monitoring of Fisheries Resources

Sampling Site	Capture Habitat Location	Sampling Site	Capture Habitat Location
A	Akram Point	F	Chandpai
B	Haldikhali	G	Jongra
C	Charaputia	H	Mongla Port
D	Bhodra	I	Moidara
E	Harbaria	J	Chalna Point, Batiaghata
Sl. No.	**Culture Habitat Location**	**Sl. No.**	**Culture Habitat Location**
1	Bhekatkhali Khal, Rajnagar	3	Chunkuri-2
2	Kapasdanga-Muralia		

Selection of Parameters

According to ToR, five major components were selected for fisheries resources monitoring, such as fish habitat status, fish migration, fish diversity, shrimp/fish farm practices, and fish production. Fish habitat status was monitored by investigating habitat classification based on length frequencies of different fish species, the sensitivity of fish diversity, and survival success of varying life stages of fish. Fish migration status was monitored by assessing the diversity of migratory fish species, migration pattern, migration purpose, period, extent of migration, etc. Species evenness, species richness, and community structure were investigated to monitor fish diversity. Shrimp/fish farm practice was observed by viewing stocking patterns, growth, and mortality rates. Fish production monitoring was divided into capture and shrimp/fish farm production.

Fish Habitat Status

Fish habitat status was monitored by applying a numerical habitat model based on the habitat classification and sensitivity of fish diversity and survival success of different life stages to abiotic and biotic factors. Fish habitat classification was analysed by calculating Euclidean Distance among sampling sites. Moreover, the similarities in species composition among the sites were analysed using the Jaccard Index (JI) to estimate the extent of similarity between pairs of data sets.

Fish Migration

Migratory species were identified from the sampling sites by analysing the common species found in the catch assessment survey and based on the IUCN list.

Fish Diversity

Fish diversity was surveyed by the Catch Per Unit Effort (CPUE) method. The fish individuals were counted according to the length of each species in the samples. Diversity was estimated by analysing the Shannon-Weiner Index, which ranges from 0 to 1. Fish species richness (FSR) was analysed using the Simpson's Index, which generates two values. The first one includes values from 0 to 1 expressing normalization scores for species richness status, and the second one contains values from 01 to values equal to the total number of species found in the sample, which suggests how many species are dominant in this fish community. Fish community structure has also been analysed by counting the length-wise fish individuals.

Fish-Shrimp Culture Practice

Three farms within the direct impact zone of the power plant were surveyed to monitor shrimp/fish farms. The stocking pattern of the shrimp/fish farm is the central issue for successful production because of the natural genetic resources from the wild source of the Passur River System. Moreover, the mortality rate should be minimized to get more economic output from the farms. So, stocking patterns, mortality rates, and their causes were surveyed intensively.

Fish Production

Riverine fish production was surveyed through CPUE. Information on the species-wise production of shrimp/fish farms was collected from the selected farms for the last catch.

3.1.2 Status of Monitoring

Followed by the quarter monitoring of the 2014-15, 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 and 2024-25 (up to 44th quarter monitoring), 45th quarterly monitoring (May to July) of 2025-26 was started in July and ended in August 2025. No fishing activities were observed at Akram Point (A), Haldikhali (B), Charaputia (C), Bhadra (D), Harbaria (E), Jongra (G) and Mongla (H) point during the field visit in this quarter monitoring because of fishing pass restriction in the Sundarbans.

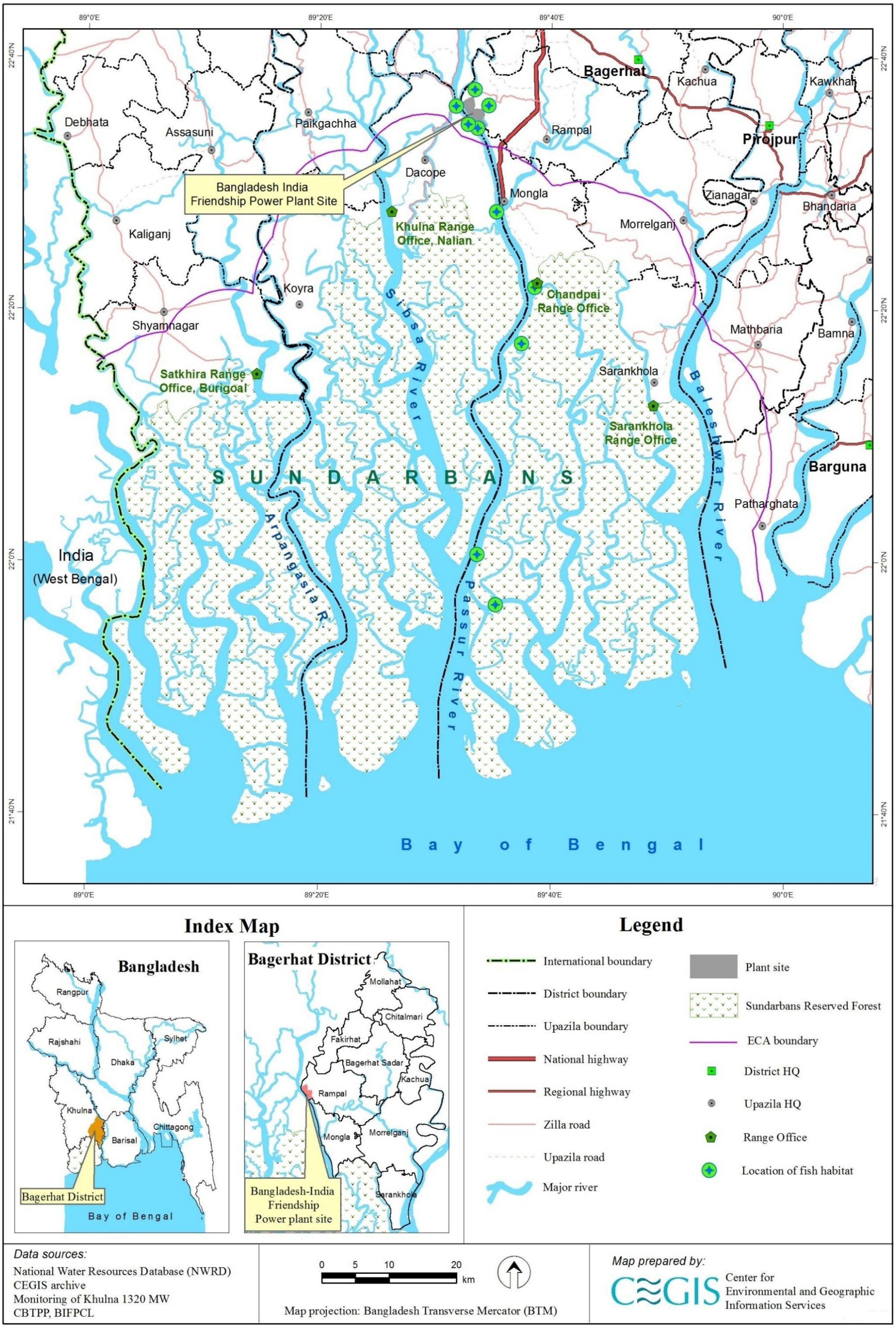


Figure 3.1: Fisheries Resources Monitoring Locations

Fish Habitat Status

Fish habitat status has also varied in the view of habitat classification and habitat use patterns of different life stages of fish species.

Habitat classification

Habitat classification was analyzed by using the length-wise distribution of different fish species in the sampling sites. The length of different life stages of fish species was identified and evaluated from the literature review. Linkage distance was calculated with the similarity in distribution. The entire stretch of the Passur River System consists of three significant behavioral habitats. The sampling sites were classified based on the abundance of different life stages of fish species in those habitats. The following tables show the classification of seven (07) sampling sites for 1st to 15th quarter monitoring and ten (10) sampling sites from the 16th to 44th quarter monitoring according to the ToR with respect to habitat uses for previous quarters of fisheries monitoring (**Table 3.2)**.

Table 3.2: Classification of Habitat Use

Monitoring Quarter	Type of Habitat Use
1st (April, 2014)	• Grazing Ground • Grazing and Breeding Ground
2nd (July 2014)	• Grazing Ground • Spawning and Nursery Ground
3rd (October, 2014)	• Grazing Ground • Grazing and Breeding Ground • Spawning, Nursery, and Grazing Ground
4th (January, 2015)	• Grazing Ground • Grazing and Breeding Ground • Spawning, Nursery, and Grazing Ground
5th (April, 2015)	• Grazing Ground • Nursery Ground • Spawning and Nursery
6th (August 2015)	• Grazing, Breeding Ground • Spawning and Nursery Ground
7th (October, 2015)	• Grazing Ground, • Nursery Ground and • Growing and feeding
8th (January 2016)	• Nursery and Feeding Ground • Growing and feeding
9th (April, 2016)	• Spawning and Nursery Ground • Feeding and Growing Ground
10th (July 2016)	• Nursery Ground • Feeding and Breeding Ground
11th (October, 2016)	• Breeding and Spawning Ground • Feeding and Grazing Ground
12th (January, 2017)	• Grazing and Spawning Ground • Nursing Ground
13th (April, 2017)	• Grazing and Feeding Ground

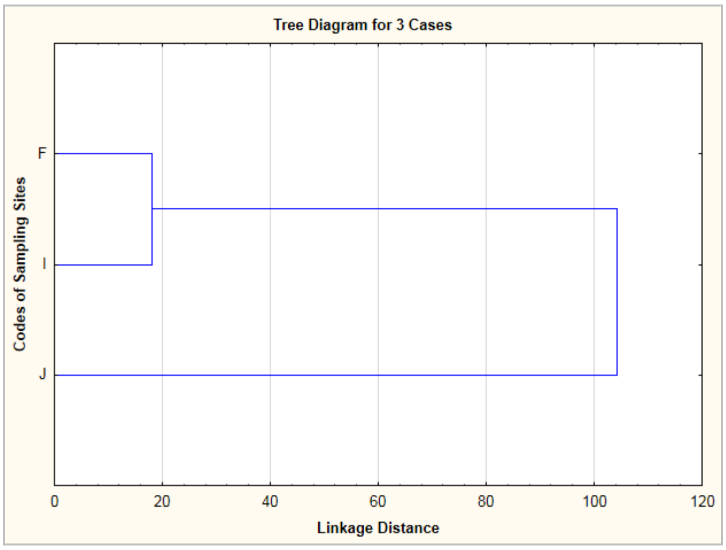
Monitoring Quarter	Type of Habitat Use
	• Nursing Ground
14th (October 2017)	• Grazing and Feeding Ground • Nursing Ground
15th (January, 2018)	• Grazing and Feeding Ground • Nursing Ground
16th (April, 2018)	• Feeding ground • Growing ground • Nursing ground
17th (July 2018)	• Spawning and Nursery Ground • Nursery Ground with Feeding and Growing Capacity • Growing and Feeding Ground • Omni-ground
18th (November 2018)	• Ground for Maturation • Omni-Ground: Nursery and Feeding Ground/Migratory Route; Ground for Maturation; Growing and Maturation Ground; Maturation Ground for Juveniles
19th (February, 2019)	• Ground for Feeding • Omni-Ground, including Nursery Ground and Ground for Maturation
20th (April, 2019)	• Ground for Feeding and Maturation • Omni-Ground, including Nursery Ground and Ground for Maturation
21st (July 2019)	• Ground for Feeding and Maturation • Omni-Ground, including Nursery Ground and Ground for Maturation
22nd (November 2019)	• Spawning and Nursery Ground • Omni-Ground, including Feeding and Maturation Ground
23rd (February, 2020)	• Nursery Ground • Spawning ground • Ground for maturation and feeding
25th (July 2020)	• Nursery Ground • Ground for maturation and feeding
26th (November 2020)	• Nursery Ground • Omni-Ground, including Spawning and Nursery Ground, and Maturation Ground
27th (January, 2021)	• Nursery Ground • Omni-Ground, including Spawning and Nursery Ground, and Maturation Ground
28th (April, 2021)	• Spawning and Nursery Ground • Ground for Maturation and Feeding
29th (September 2021)	• Nursery Ground • Ground for Maturation and feeding
30th (November 2021)	• Feeding Ground • Omni Ground, including Nursery ground, and Maturation and Feeding Ground
31st (February, 2022)	• Nursery Ground • Maturation and Feeding Ground

Monitoring Quarter	Type of Habitat Use
32nd (May, 2022)	• Spawning and Nursery Ground • Maturation Ground
33rd (July 2022)	• Spawning and Nursery Ground • Feeding and Maturation Ground
34th (October, 2022)	• Feeding Ground • Ground for Maturation
35th (January, 2023)	• Spawning and Nursery Ground • Ground for Maturation and Feeding
36th (Jun, 2023)	• Spawning and Nursery Ground • Omni Ground, including Nursery Ground, Maturation, and Feeding Ground
37th (Sep, 2023)	• Spawning and Nursery Ground • Omni Ground, including Nursery Ground, Maturation, and Feeding Ground
38th (Nov, 2023)	• Feeding Ground • Omni Ground, including Spawning, Nursery, and Maturation Ground
39th (Feb, 2024)	• Feeding and Maturation Ground • Omni Ground, including Spawning, Nursery, and Maturation Ground
40th (May, 2024)	• Nursery and Feeding Ground • Omni Ground, including Spawning, Nursery, and Maturation Ground
41st (July, 2024)	• Growing and Maturation Ground • Nursing and feeding ground
42nd (Oct, 2024)	• Growing and Feeding Ground • Maturation Ground
43rd (February, 2025)	• Spawning and Nursery Ground • Omni Ground, including Nursery, Feeding, and Maturation Ground
44th (April, 2025)	• Spawning and Nursery Ground • Omni Ground, including Spawning, Nursery, and Maturation Ground

The sampling sites were divided into two major classes- a) Omni Ground including Spawning, Nursery and Maturation Ground, b) Ground for Feeding and Maturation. The classification of functional habitat based on different life stages of fishes is shown in **Figure 3.2**. The classification of the functional habitats from 2014-15 to 2024-25 is attached in (**Figure D.1 of Appendix-IV).**

a) Omni Ground including Spawning, Nursery and Maturation Ground: The sampling sites, Chandpai (F) and Moidara (I) were found to support primarily the length groups of <2cm, 2-3cm and 3-5 cm of available fish species. The sampling sites reveal to be used as spawning and nursery ground of available fish species. The sampling sites were also found small numbers length group of 5-10cm, 10-20cm and >25cm of fish species, indicating maturation of the age-group fishes.

b) Ground for Maturation and Feeding: The sampling sites, Chalna (J) was found to considerably to length groups of 5-10cm, 10-20cm and >25cm of available fish species, indicating maturation of the age-group fishes. Field findings depict that the mentioned sites may be used as maturation and feeding ground of the fishes.



(Note: Life stages are identified through the length measurement of the fish individuals)

Figure 3.2: Habitat Classification based on Different Life Stages of Fish Species

The dendrogram showed Euclidean distances among the JI (Jaccard Coefficient Index) indices, which are the inverse of the JI values. It was found that the length-wise distribution relationship varied with the seasons and the year-to-year. In this quarterly monitoring in 2025-26, the JI value between Chandpai (F) and Maidara (I) sampling sites was the highest (Figure 3.3), which indicates the maximum similarity in species occurrence between the two sites out of the three (03) sampling sites of available fishing. Jaccard Coefficient of similarity of the habitats from 2014-15 to 2024-25 is shown in (**Figure D.2 of Appendix IV**).

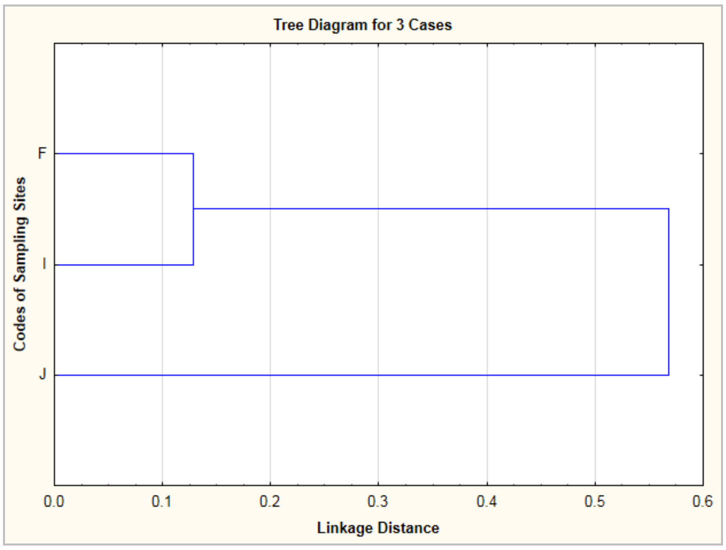


Figure 3.3: Dendrogram Showing Similarity in Binary Species Composition in Seven Sampling Sites

Fish Diversity

Shannon-Weiner Index

In this monitoring year of 2025-26, species evenness also varies among the sampling sites. The highest Shannon-Weiner index was found at Chalna Point (0.99), indicating the most evenly distributed fish species. On the contrary, the lowest evenness was found at Chandpai (0.52) shown in **Table 3.3**. It has also been found that both the number of fish species found in in-situ catch and the evenness of their distribution within the sampling sites show high variation with the changing seasonal and yearly bio-physical conditions and even fishing effort. The Shannon-Weiner Index of the earlier quarters from 2014-15 to 2024-25 is shown in **Table D.1 of Appendix IV.**

Fish Species Richness (FSR)

Fish species richness was identified through Simpson's Index[1]. Considerable differences are noticed in the fish species richness (FSR) in different habitat classes (**Table 3.4** and **Figure 3.4**). In this monitoring phase, species richness varies with the sampling sites. Maximum FSR was obtained at Chandpai (F) (n=21), while very low FSR was recorded at Chalna Point (J) (n=2). Fish species richness in the earlier quarters from 2014-15 to 2024-25 is shown in **Table D.2 and Figure D.3 in Appendix IV**. Among the habitats at down-stream and Mid-stream of the Passur River system, no fishing were observed due to fishing restriction by the Forest Department of Bangladesh. In the upstream of the river, Moidara was rich assemblage of Harina, Mokta, Chaka and Golda Chingri, Chandpai was rich assemblage of Bagda, Golda, Harina and Chami Chingri. The occurrence of fish species from 2014-15 to 2024-25 is shown in **Table D.4 and Table D.5 in Appendix IV.**

Table 3.3: Site Wise Species Diversity using Shannon-Weiner Index

Sampling Site	Species Number	Shannon-Weiner Index	Sampling Site	Species Number	Shannon-Weiner Index
A	-	-	F	21	0.52
B	-	-	G	-	-
C	-	-	H	-	-
D	-	-	I	19	0.64
E	-	-	J	2	0.99

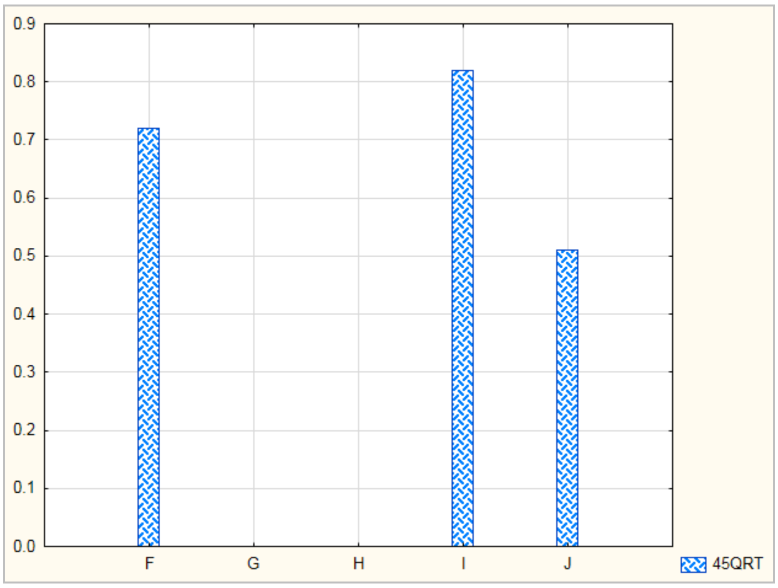
**According to Shannon-Weiner Index, 0-0.30: Low diversity/equally distribution (VH); 0.31-0.50: Moderate Diversity (M); 0.51-0.80: High Diversity (HD) and 0.80-1.0: Very High Diversity (VHD).*

Table 3.4: Site Wise Rich Species Number

Sampling Site	No. of Rich Species	Sampling Site	No. of Rich Species
A	-	F	4
B	-	G	-
C	-	H	-
D	-	I	5
E	-	J	2

Source: Field Survey, July, 2025

[1]Simpson's index is a method to calculate the community characteristics of fish in a particular habitat. It is mainly used to know about the species richness of a particular habitat to tell how many species are rich in their abundance. The value of this index ranges from 0 to 1. There is other kind of value which is described in the methodology section. The second value is mainly used to measure the species richness in the sampling sites.



(FSR is identified through Simpson's Index)

Figure 3.4: Site-wise Fish Species Richness (FSR) in the Passur River System

Fish Community Structure

The fish community structure was analyzed by counting the length-wise fish individuals (**Figure 3.5**). The following **Figure 3.5** shows that Fry are dominant at Chandpai and Moidara sites. Adults are observed in dominance at Chalna Point. The length-wise distribution of fish species in this quarter is shown in **Table D.6 in Appendix IV**. The length-wise fish individuals in different sampling sites from 2014-15 to 2024-25 are shown in **Figure D.4 of Appendix IV.**

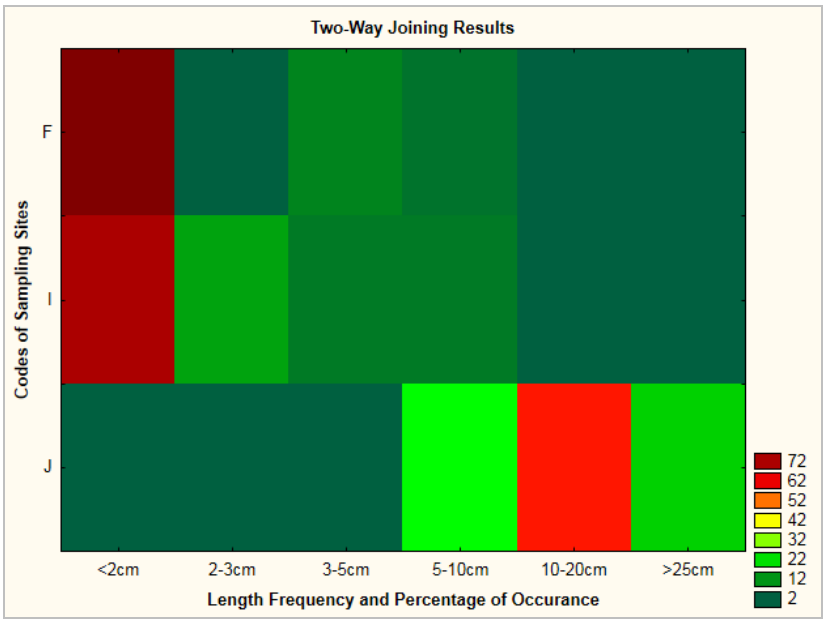


Figure 3.5: Habitat Distribution of Different Life Stages of Fish Species

Note: N.B.: Colour ranges from deepest green to deepest red. 0-4.99% Occurrence signifies Deepest Green; 5-9.99%-Shaded Green; 11-14.99%-Normal Green; 15-19.99%-Light Green; 20-24.99%; 25-29.99%-Lightest Green; 30-34.99%; 35-39.99%; 40-44.99; 45-49.99; 50-54.99-Light Magenta; 55-59.99-Deep Magenta; 60-64.99%; 65-69.99%; 70-74.99%; 75-79.99%-Light Red; 80-84.99%-Deep Red; 85-89.99%; 90-94.99%; 95-100%-Deepest Red.

Fish Migration

Migratory Species Diversity

Migratory species were identified by analyzing the common species available in regular catch from the sampling sites. Fish species like Bagda and Golda attain the maximum abundance among the migratory fish species observed during the 45th quarter monitoring period. The relative abundance of the migratory species is given below in **Figure 3.6**.

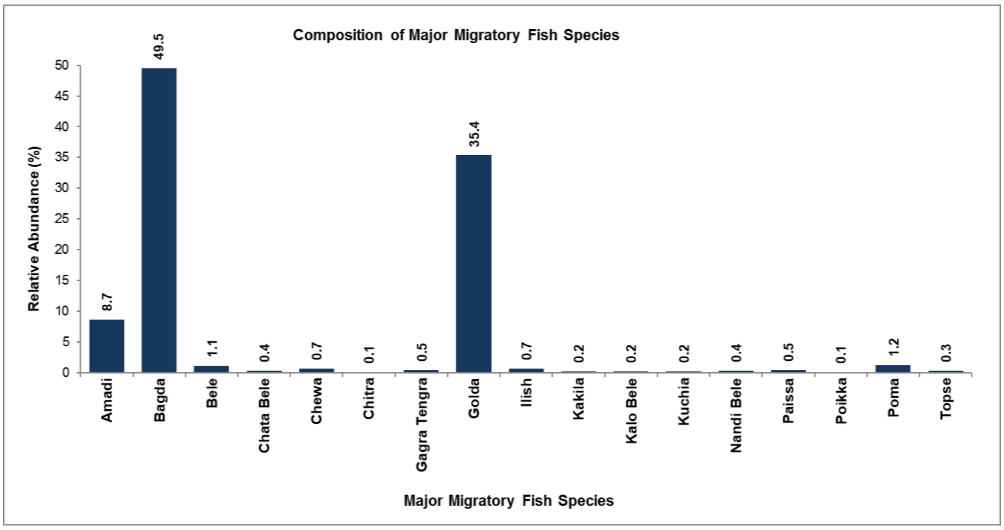


Figure 3.6: Relative Abundance of Major Migratory Fish Species in Sampling Sites

Migration Extent, Time and Purpose

In-situ catch showed interesting patterns in fish migration for different purposes, as mentioned in the following table, all along the sampling sites. Among the migratory species, Poma was supposed to migrate long distances (**Figure 3.7**). The purpose, timing, and extent of migration for migratory fish species from 2014-15 to 2024-25 are shown in **Table D.7 and Table D.8 of Appendix IV.**

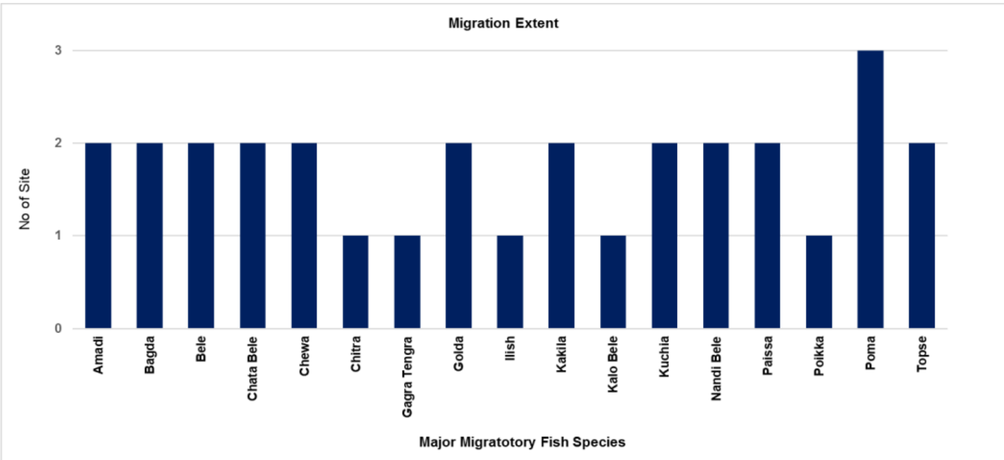


Figure 3.7: Migration Extent of Major Migratory Fish Species in Sampling Sites

Shrimp/Fish firm

Three farms are situated in the direct impact zone of the power plant and were surveyed to monitor shrimp/fish aquaculture. The stocking pattern of the shrimp/fish farm is one of the significant issues for successful production because of the natural genetic resources from the wild source of the Passur River System. Moreover, maximization of the growth rate and minimization of the mortality rate should be ensured for getting more economical output from the farms. So, stocking patterns, growth rates, mortality rates, and their causes were surveyed intensively**.**

Stocking Pattern

It is reported by the farmers of the shrimp farms that maximum stocking in case of *Bagda* was found at Rajnagar gher followed by Kapashdanga and Chunkuri-2. In case *Paissa*, the stocking density was highest at Rajnagar followed by Chunkuri-2 (**Table 3.5**).

Table 3.5: Stocking Pattern of Fish/Shrimp Farm

Name of shrimp farm	Name of species	Stocking Density (No/ha)	Stocking date
Rajnagar (42.09 ha)	Bagda	7128	May to July, 2025
	Rui	83	
	Mrigal	71	
	Grass Carp	36	
	Paissa	356	
	Golda	119	
	Horina	11879	
	Kakra	2376	
Kapashdanga-Muralia (115.7ha)	Tilapia	1993	May to July, 2025
	Rui	6646	
	Catla	5333	
	Mrigal	2558	
	Bagda	5186	
Chunkuri-2 (6.07ha)	Bagda	4942	May to July, 2025
	Harina	8237	
	Paissa	66	

Source: CEGIS Field Survey, July 2025

Shrimp/Fish Growth and Mortality Rate

During the 45th quarterly monitoring period, the maximum mortality rate was observed in Chunkuri-2 (**Table 3.6**).

Table 3.6: Growth Rate and Mortality of Fish/Shrimp

Monitoring Quarters	Growth and mortality rates	Gher No.		
		1	2	3
1st QM	Growth Rate (cm/day)	0.3	0.3	0.2
	Mortality (%)	15-20	30-35	25-30
2nd QM	Growth Rate (cm/day)	0.2	0.3	0.2
	Mortality (%)	40	94	25
3rd QM	Growth Rate (cm/day)	0.25	0.25	0.2
	Mortality (%)	50	10	65
4th QM	Growth Rate	-	-	-
	Mortality (%)	-	-	-
5th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	30	-	10
6th QM	Growth Rate (cm/day)	0.18	0.14	0.15
	Mortality (%)	25	20	50
7th QM	Growth Rate (cm/day)	0.2	0.15	0.25
	Mortality (%)	60	100	20
8th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
9th QM	Growth Rate (cm/day)	-	0.21	0.17
	Mortality (%)	-	15	30
10th QM	Growth Rate (cm/day)	0.2	0.3	0.15
	Mortality (%)	20	40	30
11th QM	Growth Rate (cm/day)	0.2	0.25	0.2
	Mortality (%)	60	50	30
12th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
13th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	30	10	25
14th QM	Growth Rate (cm/day)	0.03	0.38	0.02
	Mortality (%)	50	35	25
15th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
16th QM	Growth Rate (cm/day)	0.28	0.42	0.4
	Mortality (%)	-	-	-
17th QM	Growth Rate (cm/day)	0.38	0.3	0.2
	Mortality (%)	80	70	50
18th QM	Growth Rate (cm/day)	-	0.3	-
	Mortality (%)	-	80	-
19th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
20th QM	Growth Rate (cm/day)	0.35	0.45	0.34
	Mortality (%)	50	80	40
21st QM	Growth Rate (cm/day)	0.38	0.44	0.36

Monitoring Quarters	Growth and mortality rates	Gher No.		
		1	2	3
	Mortality (%)	-	-	-
22nd QM	Growth Rate (cm/day)	0.35	0.45	0.37
	Mortality (%)			
23rd QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
25th QM	Growth Rate (cm/day)	0.38	0.48	0.32
	Mortality (%)	-	-	-
26th QM	Growth Rate (cm/day)	0.42	0.45	0.38
	Mortality (%)	35	30	90
27th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
28th QM	Growth Rate (cm/day)	0.41	0.35	0.39
	Mortality (%)	20	90	30
29th QM	Growth Rate (cm/day)	0.38	0.42	0.4
	Mortality (%)			
30th QM	Growth Rate (cm/day)	0.36	0.44	0.37
	Mortality (%)	-	-	-
31st QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
32nd QM	Growth Rate (cm/day)	0.36	0.43	0.33
	Mortality (%)	-	-	-
33rd QM	Growth Rate (cm/day)	0.39	0.42	0.37
	Mortality (%)	20	25	60
34th QM	Growth Rate (cm/day)	0.38	0.41	0.35
	Mortality (%)	22	25	29
35th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
36th QM	Growth Rate (cm/day)	0.34	0.39	0.37
	Mortality (%)	15	20	15
37th QM	Growth Rate (cm/day)	0.38	0.33	0.34
	Mortality (%)	10	30	15
38th QM	Growth Rate (cm/day)	0.41	0.32	0.36
	Mortality (%)	-	60	-
39th QM	Growth Rate (cm/day)	0.35	0.39	0.38
	Mortality (%)	80	30	40
40th QM	Growth Rate (cm/day)	0.35	0.38	0.34
	Mortality (%)	80	25	20
41st QM	Growth Rate (cm/day)	0.31	-	0.28
	Mortality (%)	80	-	70
42nd QM	Growth Rate (cm/day)	0.35	-	0.32
	Mortality (%)	-	-	-
43rd QM	Growth Rate (cm/day)	-	-	-

Monitoring Quarters	Growth and mortality rates	Gher No.		
		1	2	3
	Mortality (%)	40	30	35
44th QM	Growth Rate (cm/day)	0.12	0.09	0.11
	Mortality (%)	80	40	70
45th QM	Growth Rate (cm/day)	0.15	0.2	0.14
	Mortality (%)	20	25	70

Fish Production

Capture Fish Production

The present study found the highest catch susceptibility for Chandi Jal (2.45 kg/haul), as shown in **Table 3.7**. The highest production was observed at Chalna Point, followed by Chandpai and Moidara, as shown in **Table 3.8**. Fish production in the earlier quarters is shown in **Table D.3 in Appendix IV.**

Table 3.7: Total Catch in Different Gears in the Sampling Sites

Site	Habitat	Gear Name/Type	Haul Duration (hr)	No of Haul	Kg/haul
A	Confluence	-	-	-	-
B	Haldekhali Khal	-	-	-	-
C	Charaputia Khal				
D	Bhodra Khal	-	-	-	-
E	Passur River	-	-	-	-
F	Shela River	Chandi Jal	2.5	2	1.75
		Chandi Jal	3.0	2	1.75
		Chandi Jal	1.5	1	2.45
G	Jongra Khal	-	-	-	-
H	Passur River	-	-	-	-
I	Passur River	Behundi Jal	2.25	4	0.40
		Khepla Jal	2.5	14	0.05
		Khepla Jal	1.5	8	0.24
J	Passur River	Chandi Jal	1.5	3	0.60
		Chandi Jal	2.0	4	0.37
		Chandi Jal	2.5	5	0.28
		Chandi Jal	3.0	9	0.10

*Source: Catch assessment survey, CEGIS; July 2025; * Weight of Fry is not considered for catch assessment*

Table 3.8: Total Catch in the Sampling Sites

Sampling Site	Total Catch (kg)	Sampling Site	Total Catch (kg)
A	-	F	5.55
B	-	G	-
C	-	H	-
D	-	I	4.17
E	-	J	9.45

**Average Weight 0.15kg/mud crab and average weight 0.6 kg/mud eel ** Weight of Fry is not considered for catch assessment*

Culture Fish Production

During the 45th quarter monitoring phase, maximum shrimp/fish farms production was observed in Kapashdanga gher as shown in **Table 3.9.** Shrimp/fish production in the previous monitoring quarters (2014-15 to 2024-25) is shown in **Table D.9 and Table D.10 of Appendix-IV.**

Table 3.9: The Present Catch in Three (03) Sampling Ghers

Sampling Site	Species	Total Catch (ton)
1	Bagda	0.60
	Rui	0.50
	Mrigal	0.30
	Grass Carp	0.20
	Paissa	0.60
	Horina	0.50
	Kakra	0.20
	Sub-Total=	***2.36***
2	Tilapia	1.00
	Rui	2.30
	Catla	1.30
	Mrigal	0.90
	Bagda	0.80
	Sub-Total=	***6.30***
3	Bagda	0.04
	Harina	0.10
	Paissa	0.01
	Sub-Total=	***0.15***

Source: CEGIS field survey, July 2025

3.2 Ecological monitoring

3.2.1 Indicators Selection

Ecological indicators were chosen to assess potential project impacts on both terrestrial and aquatic systems. Vegetation composition, diversity, and canopy cover reflect plant health, biomass productivity, and overall ecosystem stability. These factors are influenced by environmental changes such as temperature, soil quality, humidity, and human activity. Birds serve as key indicators of terrestrial habitat quality local nesting patterns reflect resident species health, while the presence of migratory birds signals broader habitat suitability. For aquatic ecosystems, dolphins act as primary indicators of water quality and aquatic environment health. Monitoring of their occurrence helps detect ecological changes caused by pollution, siltation, or habitat degradation.

3.2.2 Rationale for Selection of Monitoring Locations

Four homesteads were selected to monitor terrestrial ecosystem indicators within the study area. Site selection was based on wind direction and spatial distribution relative to the project boundary. Additionally, the Sundarban Reserve Forest lies to the south of the project. Moreover, several monitoring indicators are already being observed within the forest to assess the forest condition too.

a. *Description of the Selected Homesteads*

The Rajnagar homestead is located about 2.5 km east of the project's upper northeast boundary. It lies within a damp area surrounded by small swamps, where the surface soil has low water retention capacity. As a result, grass and herbaceous growth are sparse. The selected homestead in Kalekarber village is relatively higher in elevation and remains mostly flood-free. It is situated approximately 1.8 km east of the project's middle-east boundary. Chalkghona village lies about 0.5 km south of the project's southeast boundary. The chosen homestead here is positioned between the Moidara River on its northern side and saline shrimp farms to the south. Shallow ditches and peripheral waterbodies in this area support the growth of salt-tolerant plant species. Borni village is located roughly 3.0 km north of the project's northeast boundary. The sampled homestead sits near the central part of the village and, like Rajnagar, is dominated by planted tree species with similar soil characteristics.

3.2.3 Plant Diversity Monitoring Report

Survey Method

Vegetation assessment was carried out through a stratified random quadrat survey across four homestead locations Rajnagar, Borni, Kalekarber, and Chalkghona. The survey mainly focused on canopy and sub-canopy vegetation. Data were collected from 16 quadrats using standard field methods. Species presence, number of individuals, and distribution were recorded to determine species density, frequency, and overall diversity.

Results and Diversity Assessment

A total of 49 plant species belonging to 27 families were identified during this monitoring period, comprising 609 individual plants. The Shannon–Wiener Diversity Index (H′) was calculated at 3.01, reflecting a moderately high and improving plant diversity compared to 2.74 in November 2018. This increase suggests natural regeneration and enrichment of homestead vegetation through local planting and species recruitment over time.

3.2.4 Site-wise Composition and Density

At Rajnagar, 61 individuals were recorded representing a mix of both native and planted homestead species such as *Phoenix sylvestris*, *Hibiscus tiliaceus*, *Lannea coromandelica*, and *Acanthus ilicifolius*. The presence of Hargoja and Gewa indicates local adaptation to slightly moist soil conditions. Despite earlier disturbances from sandy soil dumping, vegetation density appears to be recovering, contributing positively to local canopy development. In Borni, vegetation was comparatively dense, with 72 individuals recorded, the highest among all sites. Dominant species include *Acrostichum aureum*, *Euphorbia tirucalli*, Areca catechu, and *Azadirachta indica*. Although this site is occasionally disturbed by branch cutting for electric line maintenance, regeneration remains strong. The high density and balanced mix of native and introduced species indicate a well-established and resilient plant community. Kalekarber supported 49 individuals, showing a balanced structure dominated by *Swietenia mahagoni*, *Musa sp.*, and *Excoecaria agallocha*. This site shows consistent regeneration with a good mix of shade-providing and fruit-bearing trees. The relatively even distribution across quadrats suggests uniform growth and minimal disturbance, consistent with canopy stability recorded in the 2025 vegetation cover assessment. At Chalkghona, 43 individuals were recorded. Although occasional firewood collection still occurs, the presence of both mangrove-associated (*Excoecaria agallocha*, *Avicennia officinalis*) and homestead species (*Ficus hispida, Tamarindus indica, Psidium guajava*) indicates a mixed and adaptive vegetation profile. The moderate density combined with regenerating seedlings supports a stable canopy structure and healthy floristic composition. The plant species composition is attached in **Table F1of Appendix IV**.

3.2.5 Comparative and Diversity Trends

Comparing the four sites, Borni currently holds the highest plant density (72 individuals), while Rajnagar shows signs of gradual recovery following prior soil disturbance. Kalekarber and Chalkghona remain relatively stable with balanced species composition. The overall increase in Shannon Index from 2.74 (2018) to 3.01 (2025) highlights an improvement in species evenness and richness, indicating ecological recovery and enrichment of vegetation structure across homesteads. Species such as *Acrostichum aureum, Excoecaria agallocha*, and *Swietenia mahagoni* showed wide distribution and higher frequency, suggesting dominance and adaptability across multiple sites. In contrast, species like *Khaya anthotheca, Avicennia officinalis*, and *Erythrina ovalifolia* occurred with low frequency, reflecting local rarity or limited planting.

3.2.6 Plant health

Plant health surveys around coal-based power plants are crucial for understanding pollution stress, maintaining ecosystem integrity, and protecting surrounding natural vegetation from gradual decline. Over time, this stress weakens plant resistance to pests and diseases, alters community composition, and leads to biodiversity loss (Tripathi & Gautam, 2007). Consider particular plants in four locations to track their health; ongoing observation reveals trends in their condition.

Rajnagar

In Rajnagar, plant health monitoring focused on the dominant vegetation within settlement areas, which include fruit-bearing species like coconut, date palm, palm, sapodilla, and guava, along with mangrove species such as gewa (*Excoecaria agallocha*) and Sundari (*Heritiera fomes*). Coconut trees initially showed a high level of disease incidence, with 10 individuals affected during the baseline period. That number dropped as conditions stabilized but spiked again in 2023 when sandy soil was dumped across the area, reaching 15 affected trees by 2024. As the soil settled, present monitoring shows visible stress symptoms disappeared and the coconut population began recovering. Date palms had persistent issues from the pre-construction phase. Several showed disease symptoms early on, and three died following the new soil dumping. Guava and mango species were highly sensitive to soil disturbance—most died after the sandy fill was introduced, except for one surviving guava (down from two at the baseline). Sapodilla showed occasional leaf yellowing but major decline lastly. Among the mangrove trees, Sundari was directly logged during 2023, while gewa remained unaffected. Overall, the pattern shows that plant health declines in Rajnagar were mainly driven by anthropogenic disturbance, especially soil dumping and vegetation clearance, rather than natural disease outbreaks.

Kalekarber Dighi

In Kalekharber, about 92 plant species were selected for monitoring from the pre-construction stage. The overall health status has remained stable, with very limited signs of stress or decline. Only one date palm (khejur) was lost due to logging activity. Coconut trees, which had shown some stress during the baseline phase, have since shown a steady recovery. In 2019, two coconut trees were damaged by a thunderstorm but have likely recovered, showing no current signs of disease. Other monitored species have remained healthy throughout, with no notable symptoms of stress or disease. Guava trees, which were recorded as unhealthy in eight individuals during the baseline assessment, have also improved significantly over time. Overall, the plant community in Kalekharber shows resilience, and no major anthropogenic or natural pressures are currently affecting the selected species.

Borni

In Borni, monitoring covered a mix of timber, mangrove, and fruit tree species, focusing on ten dominant species within the settled vegetative area. Most of the observed trees were gewa (*Excoecaria agallocha*) and mahogany (Swietenia macrophylla), both of which have remained healthy. In the initial phase, three out of eighteen gewa trees showed disease symptoms, but all have since recovered with no current signs of stress. One coconut tree was lost earlier due to a thunderstorm, but no further decline has been observed among other coconuts. Jam (*Syzygium sp*.) and mango trees had leaf-related issues in the early phase, such as yellowing and partial defoliation, but have since recovered. Overall, the dominant vegetation in Borni is stable and shows no ongoing health problems.

Chalkghona

In Chakgona, about 129 individual plants from eight selected species were monitored. Most showed stable health conditions. Mango trees, which previously had leaf-related issues, have recovered. Gewa (*Excoecaria agallocha*) has shown no signs of stress or disease from the beginning. During the recent visit, one guava tree showed dry leaf symptoms. Overall, the plant community in Chakgona appears healthy, with only this single guava showing potential concern. Thunder storm and lack of soil nutrient causes death and other disease in the study location.

However the observed dataset for the proportion of healthy and unhealthy plants at the selected homesteads are attached in **Table F2** of **Appendix IV**,

Figure 3.8: Dead date palm in kalekharber

Figure 3.9: Leaves to dry recovered at Chakghona

3.2.7 Vegetation Canopy Status

Methodology

Canopy cover was measured from four corners (north, south, east, and west) of each selected homestead area using a densitometer. The assessment aimed to understand vegetation growth and canopy health changes over time. The baseline year (2014) reflected early plantation stages when most sites had young seedlings that gradually matured with time. Changes in canopy density were influenced by both natural regeneration and various anthropogenic activities.

Results and Site-wise Observations

At Rajnagar, canopy cover fluctuated significantly through the study period. It started at 19% in 2014, improved slightly in 2016, but declined drastically to only 3% by 2023. The drop was mainly caused by dumping of sandy soil in and around the homestead, which buried seedlings and weakened soil conditions for root growth. However, a strong recovery was noticed in 2025, reaching 20%, suggesting that vegetation regenerated naturally once the disturbances were reduced. The overall vegetation condition here can be described as moderately improved but still recovering from past degradation. In Borni, canopy cover remained relatively stable, ranging between 16% and 24% over the years. The lowest point appeared in 2015 due to branch cutting under the electric line that crosses the site. Despite such periodic trimming, the vegetation showed resilience and steady improvement, reaching 24% in 2024 and maintaining that through 2025. The site demonstrates moderate human interference but good natural regeneration potential, indicating fairly stable vegetation health.

Kalekarber showed the most consistent canopy performance among all sites. From 2014 to 2025, the canopy cover remained within 22–25%, reflecting well-developed and mature vegetation with minimal disturbance. The site's stability suggests that it has maintained favorable ecological conditions and good seedling recruitment throughout the monitoring period. Kalekarber represents the healthiest and most stable vegetation cover within the study area. At Chalkghona, the canopy cover began at 18% in 2014, increased to 26% in 2017, and then slightly declined before stabilizing between 20–24% in the later years. Occasional branch cutting for firewood was identified as the main cause of these fluctuations. Despite such activities, the site maintained a balanced canopy structure, and natural regrowth helped sustain vegetation density. Overall, vegetation health at Chalkghona remains stable with manageable human pressure.

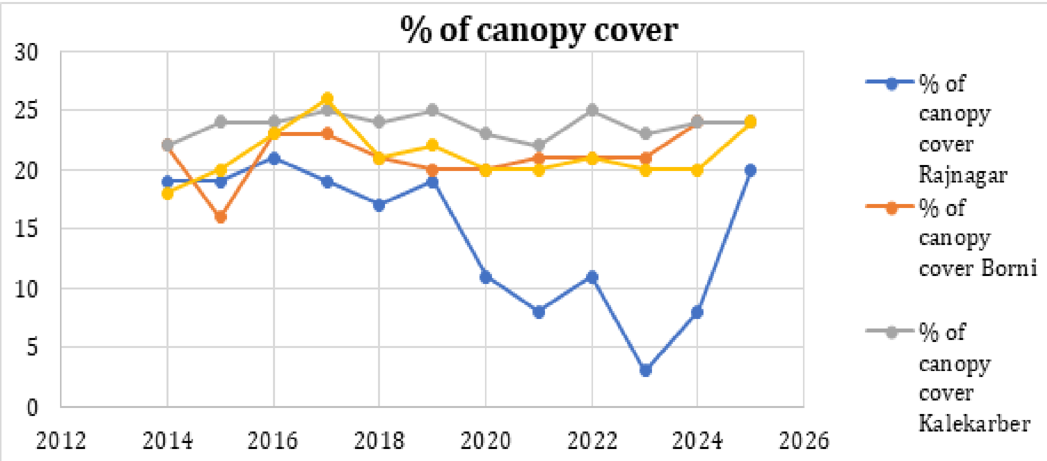


Figure 3.10: Site-specific trends of Canopy cover

Comparative Assessment

Comparing the four sites reveals clear differences in canopy stability and disturbance levels. Kalekarber maintained the highest and most stable canopy cover throughout the observation period, indicating strong ecological balance and minimal interference. Both Borni and Chalkghona maintained moderate canopy density, though occasional human activities, such as pruning for electric line clearance and firewood collection, slightly affected their cover. In contrast, Rajnagar experienced the most pronounced fluctuations, particularly between 2020 and 2023, when sandy soil dumping caused severe canopy loss. However, its notable recovery by 2025 demonstrates good regeneration potential when pressures are reduced.

Overall, the pattern indicates that while natural regrowth can compensate for moderate disturbances, heavy physical soil alteration or excessive cutting has a more lasting effect on canopy health. Continuous monitoring and community engagement to control such disturbances are essential for maintaining long-term vegetation stability across all sites.

3.2.8 Bird Habitat

Local birds and their nesting behavior

Bird nests were not observed at the homestead areas during the July visit, which isn't unusual for this time of year. Even without nests, the continued use of these spots by herons, egrets, cormorants, and other regulars shows the colonies are still holding their ground.

Figure 3.11: Tailor Bird at Khalekharber

Figure 3.12: Blue throated Barbet at Borni

The photos attached back up what we saw in the field: steady foraging, group roosting, and repeated site use. These are good signs. They suggest the birds are keeping their traditional range and that the habitat still supports them outside the core breeding months. Overall, the 45th monitoring round confirms an active bird presence, even if nesting wasn't underway. However, **Table F4** of **Appendix IV** represent the bird nest monitoring datasheet over the monitoring periods.

3.2.9 Aquatic Health Monitoring

The aquatic health monitoring focused on assessing the ecological condition of riverine habitats through observations of dolphin occurrence, encounter rates, and associated human activities. River dolphins, particularly the Ganges River Dolphin (*Platanista gangetica*) and Irrawaddy Dolphin (*Orcaella brevirostris*), are recognized as bioindicators of aquatic ecosystem health (Smith et al., 2006; Behera et al., 2014). Their presence reflects adequate prey availability, suitable water depth, and good water quality, whereas their absence may indicate ecological stress or anthropogenic disturbance.

Study Area

Two designated dolphin sanctuaries were monitored Dangmari (near Karamjol) and Bhadra Khal (within the Sundarbans) along with Passur, Chadpai, and Shella River sections. These rivers form part of a dynamic hydrological system interconnected through tidal channels and freshwater inflows, supporting diverse fish and dolphin populations. Notably, Passur and Shella rivers host a large number of Hilsa fishing nets, reflecting intensive fishing activity that could influence dolphin movement and prey availability.

Dolphin Encounter Rate

A comparison between survey data from 45th and 44th QMP revealed clear spatial and temporal variations in dolphin sightings (**Table 3.10)**

Table 3.10: Dolphin Encounter Rate (km/hr)

Sl. No.	River/Canal	August 24	August 25
1	Passur	0.22	0.17
2	Chadpai	0.36	0.58
3	Dangmari	0.91	0.31
4	Bhadra	4.43	0.00

On August 24, Bhadra Khal recorded the highest encounter rate (4.43 dolphins/km/hr), reaffirming its ecological importance as a dolphin hotspot. However, on August 25, no dolphins were observed there, while slight increases were recorded in Chadpai and slight decreases in Passur and Dangmari. Dolphin sighting distribution are illustrated in following figures.

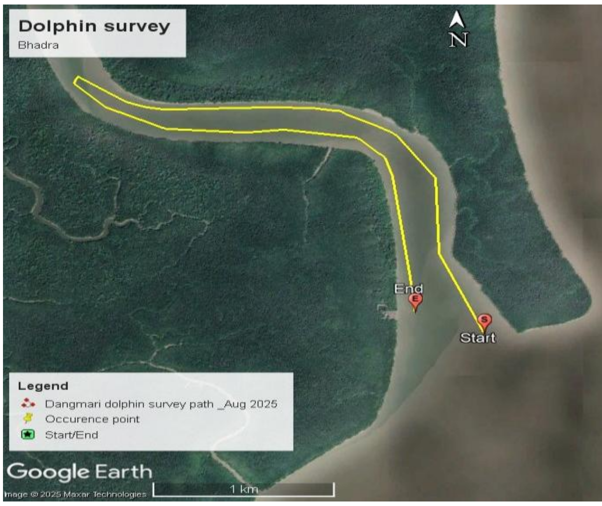


Figure 3.13: Dolphin sighting at Bhadra

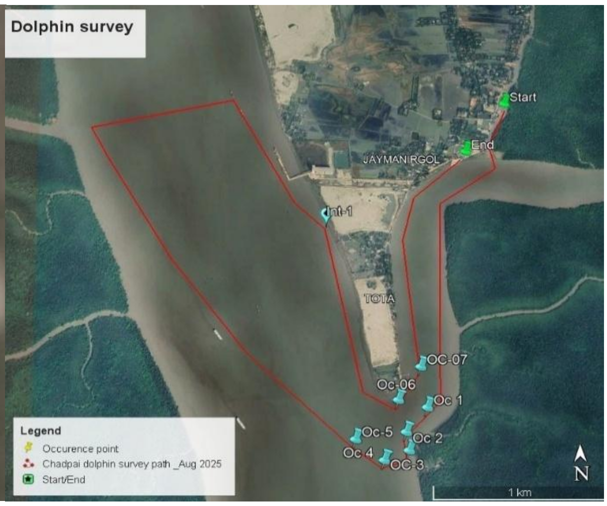


Figure 3.14: Dolphin sighting at Chadpai

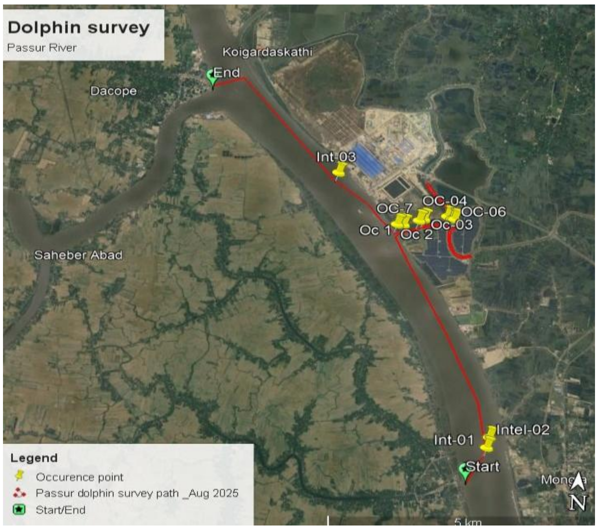


Figure 3.15: Dolphin sighting at Passur

Figure 3.16: Dolphin sighting at Dangmari

The absence of dolphins in Bhadra Khal likely indicates localized disturbance, corroborated by local fishermen who reported poison-based fishing in adjacent connecting canals. Such practices are known to cause fish mortality, prey scarcity, and contamination of aquatic food webs, leading to dolphin displacement or mortality. Similar cases of dolphin decline due to poisoning and unsustainable fishing have been reported from other South Asian River systems (Wakid & Braulik, 2009; Kelkar et al., 2016). Additionally, the dense concentration of Hilsa fishing nets in the Passur and Shella rivers may have restricted dolphin movement and access to prey. Continuous boat traffic, engine noise, and net entanglement risks could also deter dolphins from using these areas actively, contributing to the lower encounter rates observed.

Ecological Implications

The variation in encounter rates highlights the sensitivity of dolphin populations to short-term environmental and human-induced changes. The data suggest that poisoning incidents and intensive fishing pressure are immediate concerns for aquatic health in the surveyed zones. Regular water quality monitoring (DO, BOD, turbidity, salinity, ammonia, and heavy metals), along with strict control of illegal fishing practices and awareness-building among local fishers, is essential to maintain the ecological integrity of these dolphin habitats. Dolphin observation Datasheet is attached in **Table F3** of **Appendix IV**.

3.2.10 Status of benthos and planktons in river systems

Phytoplankton

A total of 52 phytoplankton species were recorded from the monitored locations during January 2025. Sampling was conducted at Eight monitoring stations: Confluence area, Harbaria, Hiron Point, Akram Point, Jetty site, and Moidara River. Species richness and abundance varied notably across sites. The highest abundance and species diversity were observed at Moidara River and Harbaria, where multiple genera such as *Leptocylindrus*, *Coscinodiscus*, *Pleurosigma*, *Aphanizomenon*, *Fragilariopsis* and *Raphidiopsis mediterranea skuja* were recorded in high numbers.

Across all sites, the dominant species were Oscillatoria princeps, Coscinodiscus granii Gough, Coscinodiscus excentricus, Raphidiopsis mediterranea skuja, Leptocylindrus sp., and Aphanizomenon flos-aquae. At the Jetty site, Raphidiopsis mediterranea skuja and Oscillatoria princeps showed very high abundance, indicating nutrient-rich conditions. At Hiron Point, the system was dominated by Lyngbya confervoides, Rhizosolenia setigera, and Asterionellopsis glacialis, with exceptionally high cell densities, reflecting strong bloom-forming tendencies. At the inland freshwater-influenced location (Koigordaskathi), Pleurosigma angulatum, Aphanizomenon flos-aquae, and Microcystis were dominant.

Zooplankton

Two main zooplankton groups were recorded among those the dominant Species were recorded as Calanus sp. (widely present at Harbaria, Hiron Point, Akram Point), *Brachionus rubens* (Harbaria and Jetty site), *Brachionus calyciflorus* (Moidara River) and Shrimp larvae (Khalkerber and Koigordaskathir char). Zooplankton abundance was highest at Hiron Point and lowest at the Confluence and inland pond. A complete species composition and abundance list is presented in the following **Table 3.11** and **Table 3.12**

Table 3.11: Summary of Phytoplankton and Zooplankton Abundance

Sl. No.	Location	Phytoplankton		Zooplankton	
		Name of the Species	No. of Individuals (n/L)	Species	No. of Individuals (n/L)
1	Mongla Ghashiakhali Confluence	*Oscillatoria princeps*	372		
2		*Polychaeta (benthos) also present*	434		
3	Harbaria	*Leptocylindrus sp*	67	*Calanus sp.*	43
4		*Carteria sp.*	104	*Brachionus rubens*	38
5		*Coscinodiscus granii Gough*	124		
6		*Pleurosigma sp.*	73		
7		*Cymatopleura sp.*	56		
8		*Radiofilum sp*	45		
9		*Coscinodiscus excentricus*	110		
10		*Closteriopsis sp.*	72		
11		*Raphidiopsis mediterranea skuja*	56		
12	Hiron Point	*Lyngbya confervoides*	982	*Calanus sp.*	79
13		*Rhizosolenia setigara*	789		
14		*Oscillatoria princeps*	678		
15		*Asterionellopsis glacialis*	789		
16		*Coscinodiscus excentricus*	456		
17	Akram Point	*Coscinodiscus granii Gough*	120	*Calanus sp.*	32
18		*Thalassionema sp.*	80		
19		*Pleurosigma angulatum*	72		
20		*Coscinodiscus excentricus*	88		
21		*Alexandrium catenella*	96		
22	Jetty Site	*Raphidiopsis mediterranea skuja Oscillatoria princeps*	897	*Brachionus rubens*	22
23		*Coscinodiscus granii Gough*	450		
24		*Nitzschia lorenziana*	456		
2526		*Homoeothrix sp.*	76		
27		*Coscinodiscus granii Gough*	345		
28		*Ulnaria sp.*	234		
29	Maidhara River	*Proboscia alata*	456	*Brachionus calyciflorus*	67
30		*Raphidiopsis mediterranea skuja*	789		
31		*Eucampia sp.*	456		
32		*Coscinodiscus sp.*	567		
33		*Fragilariopsis oceanica*	345		

Sl. No.	Location	Phytoplankton		Zooplankton	
		Name of the Species	No. of Individuals (n/L)	Species	No. of Individuals (n/L)
34		*Leptocylindrus sp.*	234		
35		*Aphanizomenon flos-aquae*	567		
36		*Guinardia sp.*	345		
37		*Coscinodiscus granii Gough*	675		

Table 3.12: Summary of Benthos Abundance

Sl. No.	Location	Name of the Species	No. of Individuals (n/L)
1	Hiron point	Polychaeta	987
2		Unidentified	234
3	Moidara River	Snail	35
4	Akram point	Mollusc	890

The system shows high phytoplankton productivity, especially at Moidara, Jetty, and Hiron Point, indicating nutrient-rich water. Cyanobacteria (Oscillatoria, Lyngbya, Raphidiopsis) remain dominant, reflecting stable warm, nutrient-loaded conditions. Zooplankton diversity is low but shows strong presence of Calanus and Brachionus, key indicators of estuarine productivity. Benthos groups (polychaeta, molluscs, shrimp larvae) indicate healthy sediment–water interaction.

Table 3.13: Summary Comparison of Ecological Parameters

Component	Before operation (2022)	After operation (2025)	Overall Change
Benthos (species presence)	0 species detected at all sites	Multiple groups detected: Polychaeta, Mollusc, Snail, Shrimp larvae, unidentified groups	Strong increase; benthic community re-established
Benthos abundance	0 n/L	20–987 n/L depending on site (highest at Hiron Point)	Major positive shift; indicates stable sediment & improved conditions
Phytoplankton – total species	47 species (all sites combined)	Higher richness at all sites 52species: 7–12 species per site	Increase in diversity and spread across river
Phytoplankton – dominant species	Closteriopsis longissimi, Coscinodiscus granii, Raphidiopsis mediterranea	Same dominant species persist & new taxa like Proboscia, Fragilariopsis, Microcystis	System becoming more productive and diverse
Zooplankton – species	Only 2 species: Calanus sp., *Brachionus rubens*	3 and more species: Calanus sp., *Brachionus rubens, B. calyciflorus* shrimp larvae	Clear expansion of zooplankton community
Zooplankton abundance	Very low; detected only at 3 sites	Widespread; 22–79 n/L across multiple sites	Increased food-web activity
Overall ecological condition	Low diversity, no benthos, early recovery stage	Strong biological recovery: benthos return, rich phytoplankton, diverse zooplankton	Significant positive ecological improvement

The monitoring results shows a clear ecological improvement compared to 2022. Benthos, which was completely absent earlier, is now established across most locations with high densities, especially Polychaeta and molluscs. Phytoplankton richness increased at almost every site, with both diatoms and cyanobacteria contributing to higher productivity. Zooplankton also expanded from only two species in 2022 to multiple taxa in 2025, including larvae that indicate active recruitment. Together, these changes point to a more stable, nutrient-supported, and ecologically resilient river system.

3.3 Sundarbans Forest Health Monitoring

Monitoring ecological parameters such as pneumatophore density, crab hole abundance, canopy cover, seedling recruitment, and light availability is essential for assessing the health and resilience of mangrove forests. Pneumatophores, for example, are critical for soil aeration; however, their density often declines under conditions of elevated salinity or sedimentation (Kathiresan & Bingham, 2001). Crab burrows, on the other hand, are strong indicators of soil turnover and nutrient cycling, and shifts in their abundance may point to habitat degradation or pollution stress (Nagelkerken et al., 2008). Canopy cover and light intensity are equally important, since they regulate the microclimate within mangrove stands; moreover, they directly influence seedling establishment, biodiversity composition, and forest regeneration dynamics (Alongi, 2009; Friess et al., 2012). Seedling density itself is a vital measure, as it reflects the forest's capacity to recover from disturbances and sustain long-term productivity (Ellison, 2000). In this way, monitoring these parameters together offers an integrated picture of ecosystem health, and, given the potential risks from upstream industrial activities, they provide an early-warning system to detect stress before irreversible degradation occurs (Rahman et al., 2017; Gain et al., 2017). Monitoring these parameters offers a comprehensive picture of ecosystem health and resilience, enabling timely management interventions. Ensuring the ecological integrity of the Sundarbans requires a strong and regular forest health monitoring program, especially where industrial development is expanding nearby.

3.3.1 Methodology

Permanent Sample Plot (PSP) Establishment and Layout

Following a detailed survey, five representative sites were selected for establishing permanent sample plots: Sutarkhali, Karamjal, Harbaria, Akram Point, and Hiron Point (see **Figure 3.18**). Four of these locations are situated along the Passur River—Karamjal, Harbaria, Akram Point, and Hiron Point—while the fifth, Sutarkhali, is located near the forest office and provides an additional ecological contrast (**Table 3.14**). These sites were chosen to capture ecological variability across the Sundarbans landscape, considering factors such as proximity to industrial influence, coal transportation routes, prevailing wind direction, tidal regimes, and the diversity of vegetation assemblages.

At each site, one permanent plot was established and divided into three subplots, positioned progressively from the riverbank at distances of 40 m, 100 m, and 150 m inland. This gradient design allows for the assessment of changes in forest structure and regeneration dynamics along a river–forest transect. The subplots thus provide a standardized framework for monitoring key ecological parameters—such as pneumatophore density, crab hole abundance, canopy cover, seedling density, and light intensity—under varying levels of hydrological and anthropogenic influence.

Sampling Design of Permanent Sample Plots (PSPs)

At each study site, a transect line was established perpendicular to the river or canal bank to systematically capture vegetation gradients. Along this transect, three circular nested subplots with a radius of 12.62 meters were positioned at 100-meter intervals to maximize the collection of tree species (**Figure. 3.17**). Given the variation in species composition across the Sundarbans Reserve Forest, the plots were arranged from the river or canal edge toward the denser upper-slope forest zone. The first subplot was deliberately located 40 meters from the ecotone to avoid areas affected by riverbank erosion. Within each subplot, four smaller quadrates were delineated to facilitate detailed measurements of tree density, regeneration, and structural parameters (**Figure 3.19**).

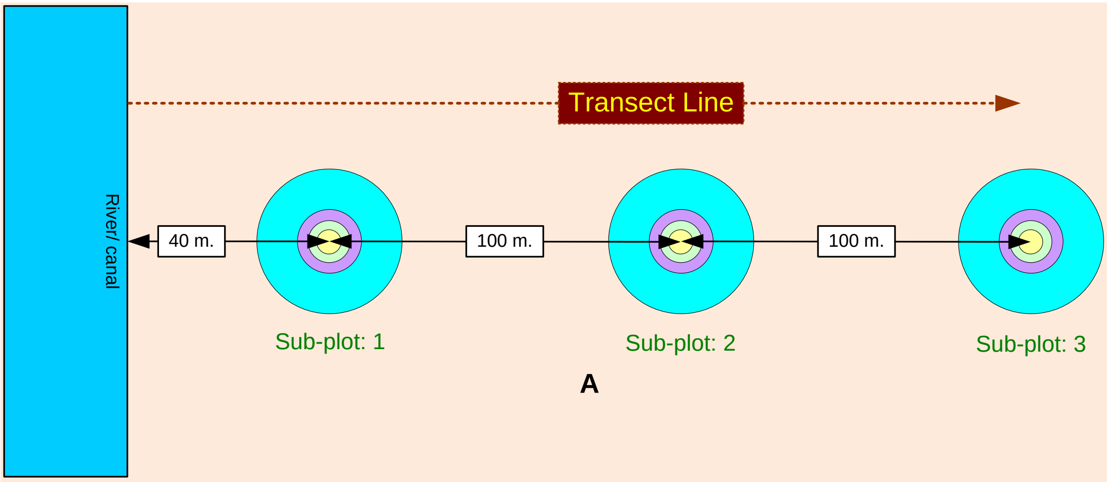


Figure 3.17: Layout of the subplots and transect line perpendicular from ecotone (river or canal bank)

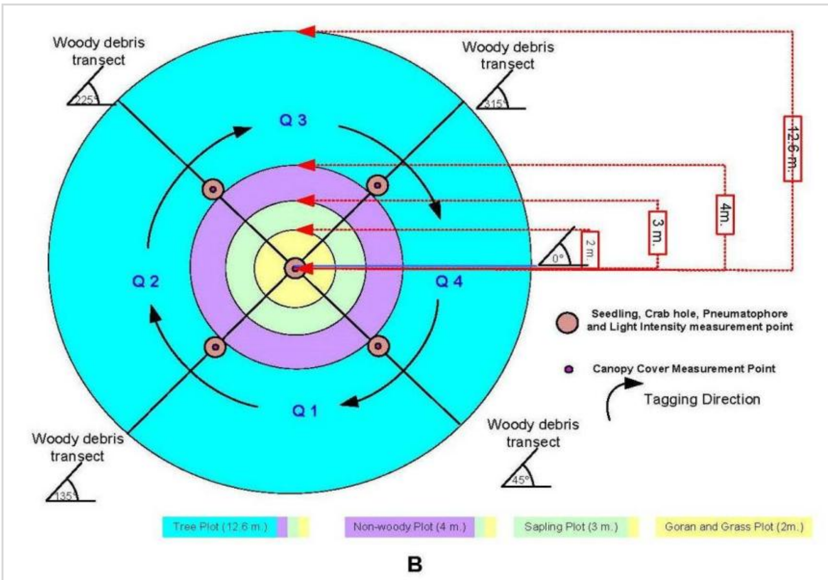


Figure 3.18: Layout of the survey activities in each subplot

Table 3.14: General Description of Permanent Sampling Plots (PSPs)

Transect	Plot	Range	Compartment No.	GPS ± (m)		Soil Description	Plot Location Notes
				Latitude (N)	Longitude (E)		
Sutar khali	1	Khulna	32	22.4981	89.4875	Hard Clay	Just opposite from Sutar Khali Forest Station and 40m SW from Sutar Khali Canal
	2	Khulna	32	22.4973	89.4871	Hard Clay	Just opposite from Sutar Khali Forest Station and 140m SW from Sutar Khali Canal
	3	Khulna	32	22.4965	89.4866	Hard Clay	Just opposite from Sutar Khali Forest Station and 240m SW from Sutar Khali Canal
Karamjal	1	Chandpai	31	22.4253	89.5943	Hard Clay	Plot center 40m west from Passur River
	2	Chandpai	31	22.4252	89.5934	Hard Clay	Plot center 140m west of Passur River
	3	Chandpai	31	22.4226	89.5925	Hard Clay	Plot center 240m west of Passur River
Herbaria	1	Chandpai	29	22.2061	89.5924	Hard Clay	40m west of Passur River
	2	Chandpai	29	22.2962	89.5917	Hard Clay	140m west of Passur River
	3	Chandpai	29	22.2962	89.5908	Muddy	240m west of Passur River
Akram	1	Khulna	17	22.0187	89.5134	Hard Clay	40m east of Shibsha River
	2	Khulna	17	22.0180	89.5140	Clay	140m east of Shibsha River
	3	Khulna	17	22.0168	89.5145	Hard Clay	240m east of Shibsha River
Hiron	1	Khulna	44	21.9166	89.2333	Sandy	350m east from Gogari Canal
	2	Khulna	44	22.1833	89.5000	Sandy	40m north of the Bay of Bengal
	3	Khulna	44	21.7775	89.4598	Hard Clay	648m southeast of Shibsha River

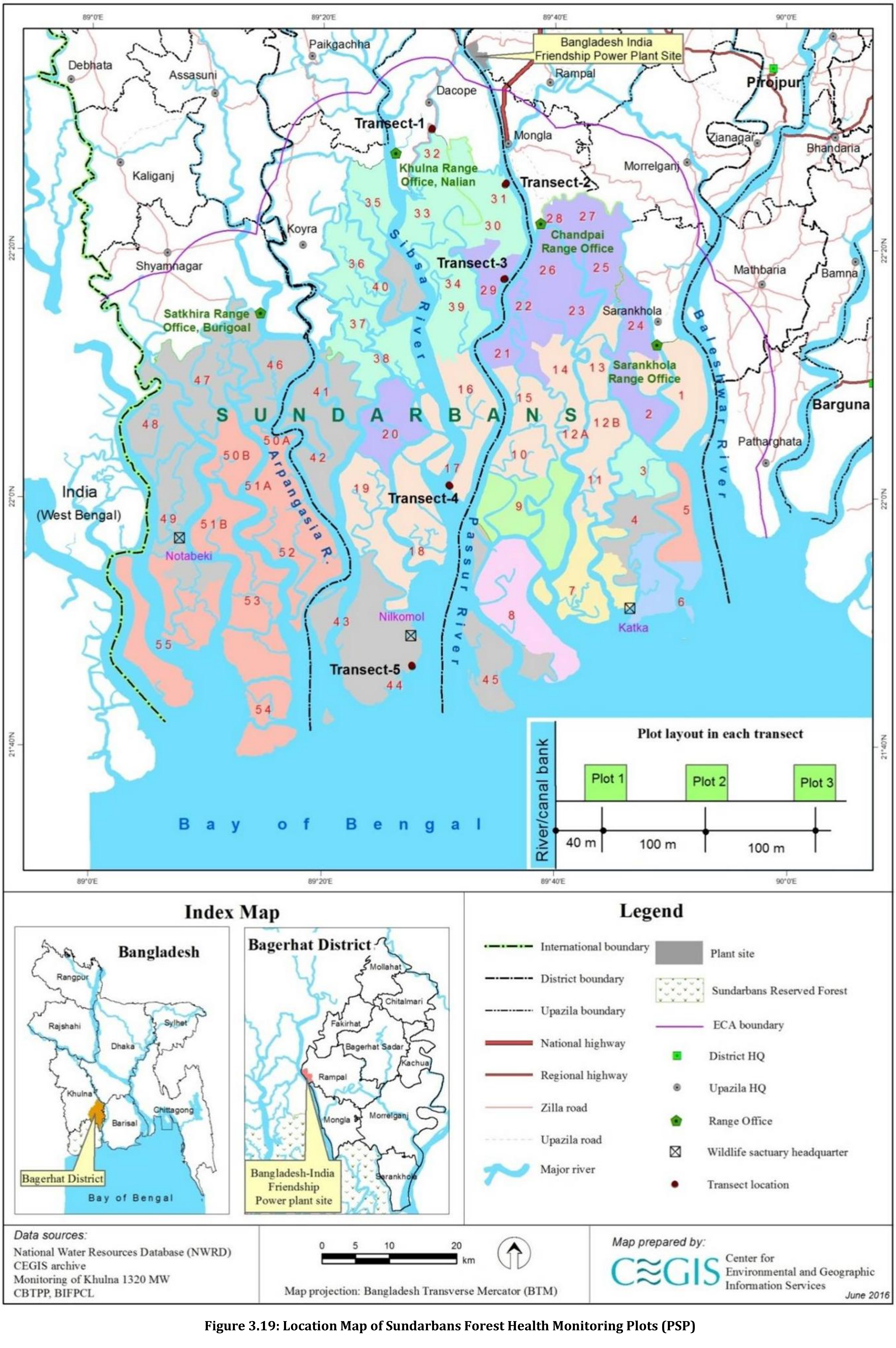


Figure 3.19: Location Map of Sundarbans Forest Health Monitoring Plots (PSP)

Tree Growth

Within each 12.62-meter radius plot, all trees are recorded during every field visit. Trees are included if they reach a diameter at breast height (DBH) greater than 5 cm and have a lean angle above 45°. For each recorded tree, height and diameter are measured (**Figure 3.20**). If any sapling within the plot attains tree status (DBH > 5 cm), it is also recorded and added to the dataset to track growth dynamics.

Figure 3.20: Mangrove structure monitoring by team members by DBH and Height measurements

Seedling

Within each PSP, seedlings (height ≤ 1.37 m), herbs, and climbers were assessed inside a circular plot with a 1-meter radius. The number of individuals of each species was counted, and their condition was recorded. For consistency, counts were taken at five fixed locations within each subplot: one at the subplot centre and four at the centre points of woody debris transects oriented at 45°, 135°, 225°, and 315°. All live individuals within these circles were recorded, providing data on regeneration and understory composition.

Pneumatophores

The total number of living pneumatophores was also counted within a 1-meter-radius circle that cantered each of the five subplot points. Four points have been placed in the middle of the four woody debris transects that face 45°, 135°, 225°, and 315°. The first point has been placed in the centre of each subplot.

Crab Hole

Crabs play an important role in mangrove ecosystems by processing litterfall and enhancing soil fertility. To estimate their density, crab burrow abundance was used as an indicator. Burrows were counted within a 1-meter radius circle placed at the centre of each subplot, as well as at the midpoint of the four woody debris transects.

Canopy Cover

The canopy cover percentage was estimated using a spherical densitometer, a gridded convex mirror that provides a rapid way to measure canopy cover. The densitometer was held at elbow height and 30 to 40 cm away from the body to avoid the head being visible in the mirror (**Figure 3.21**). After leveling the instrument with the level bubble, the dots that had not been occupied by the canopy were systematically counted. The meter readings for each subplot have been taken at four different locations: north, south, east, and west. The canopy cover was calculated as the average of these measurements.

Figure 3.21: Canopy cover and sapling status inside the plot at Karamjol

Leaf Area Index

Leaf Area Index (LAI) is a key indicator of forest structure, as it reflects how green leaves regulate canopy-level processes like light interception, photosynthesis, and evapotranspiration. In this monitoring phase, LAI was assessed using a digital light meter to record both open-canopy light intensity (Io) and under-canopy light intensity (I). These values were then applied to the standard formula:

LAI = loge (I/Io) / –K

where K represents the canopy light extinction coefficient, taken as 0.5. LAI values range from 0 (bare ground with no canopy) to 10 (dense canopy cover). By directly measuring light penetration with a light meter, this approach provides a reliable estimation of canopy density and variation across the monitoring plots. (Bioscience, 2016).

Biomass and carbon stock estimation

Aboveground biomass of tree and sapling was estimated by using Chave, et al., (2005) allomatric equation. Komiyama et al., (2008) equation was used to estimate belowground biomass.

AGB (kg) = $\rho \times \exp(-1.349 + 1.980 \ln(dbh) + 0.207 \times (\ln(dbh))^2 - 0.0281(\ln(dbh))^3$

BGB (kg) = $0.199 \times (\rho)^{0.899} \times (dbh)^{2.22}$

Where, ABG = above ground biomass; BGD = belowground biomass; DBH = diameter at breast height.

After calculating biomass, carbon content was calculated based on the assumption that carbon content is 50 percent of the dry woody biomass (Brown 1997).

Leaf phenology and phonological behaviour

Phenological events such as leaf emergence, leaf shedding, flowering, fruiting, and propagule drop are sensitive to environmental stressors, including air pollution. Because of this, phenological patterns can serve as effective bio-indicators of overall forest health. During each field visit, these events were systematically observed and recorded within all permanent sample plots through direct visual monitoring.

3.3.2 Monitoring Result of SRF Health

Sutarkhali

Sedimentation was the most notable feature across all subplots. During our full-moon tide visit, water overflowed into the forest floor and a small canal, depositing sediment. Being adjacent to settlements, the area also faces soil erosion from human activities, further intensifying sedimentation. This has affected seedling density, pneumatophores, and crab activity. Sundari trees showed leaf discoloration from disease, though recovery from top-dying was visible. Bird activity and phenological response appeared healthy.

Karamjol

Heavy litterfall from Kakra trees covered the forest floor on the wet, rainy survey day. Crab activity was high and Kakra seedlings were present. Plastic waste was concentrated in some areas. Mature Baen and Kakra stands (34–40 ft tall) along a small creek restricted new regeneration. Pneumatophores were reduced or dead, likely due to dense mature stands and reduced species diversity. A monitor lizard was observed.

Harbaria

Seeds of Sundari, Kakra, and Golpata were abundant on the forest floor, with signs of germination. In the second subplot, Sundari showed recovery from top-dying. Raptors like Brahminy Kite and White-bellied Sea Eagle were frequent, indicating good prey availability. During the very high tide, crab and fish activities were visible in the third subplot.

Akram Point

Signs of retrogression and bank erosion were evident, with Sundari mortality occurring within and around the plots. Seedling density was low, and salinity intrusion appeared to hamper regeneration. In the third subplot, Gewa trees showed pathogenic attack symptoms.

Hiron Point

The first subplot showed sand deposition and the formation of a new water channel. Sundari seedlings were emerging within existing Gewa and Goran patches. Deer and wild boar signs were present, and bird activity was notably high. In the second and third plots, fish and crab activities were observed during the tidal cycle.

3.3.3 Monitoring results of the Forest health indicators

Pneumatophore Density

Across the twelve-year record, the numbers show a forest responding directly to sediment supply, waterlogging and geomorphology—not industrial influence. Sutarkhali is the clearest example. Pneumatophores rise sharply in the early baseline years, from 194,185 to 460,017, then remain consistently high through the construction period (473,156 → 444,550 → 338,159). Even in the operational phase the values stay elevated, fluctuating between 351,201 and 398,576 before dipping slightly to 331,890 in year twelve. This behaviour matches the known sediment trend: nearly four centimetres of new deposition in recent years. Trees simply push out more aerial roots to breathe. The numbers reflect stress from waterlogging, but they also show resilience. The system is compensating, not collapsing.

Koromjol follows a different shape. The first four baseline years range from 576,733 to 670,237—remarkably strong for a semi-disturbed zone near settlements. During the construction years the pneumatophore count stabilises around the mid-500,000s, before dropping into the 240,000–310,000 band in later operational years as new natural water-logged patches formed. Those openings in Byne and Kakra weren't failures. They match classic mangrove gap dynamics where canopy breaks create moisture pockets, triggering natural stand restructuring.

Harbaria sits almost textbook-stable across all stages. It begins at 212,497, rises steadily to 405,660 by the fifth year, then fluctuates moderately through construction (275,688–319,463) and recovers to 328,124 and 407,648 during operation. For a high-tourism zone, maintaining this shape shows exceptional buffering capacity. The forest floor is intact, oxygen exchange is stable, and the stand is adjusting naturally to monsoon-driven water levels each year.

Akram Point shows the opposite geomorphic influence. Its values rise slightly in early years (68,080 → 171,705), but then decline through construction and operation, ending at just 47,322. This matches a site where retrogression and erosion dominate. As banks peel away, roots get exposed, pneumatophore fields become patchy, and Sundari shows top-dying symptoms. These patterns reflect physical shoreline retreat, not any thermal or chemical stress.

Hiron Point behaves exactly as expected under sand deposition pressure. The dataset rises early (145,605 → 336,664), then collapses abruptly during high sand years (25,6139 → 96,147), and stabilises in the mid-200,000s during operation. Sand buries roots, weakens respiration, and reduces pneumatophore counts. The signal is purely geomorphic. Together these numbers describe a forest responding to hydrology and sediment—not to industrial emissions or wastewater.

Crab-Hole Density

Crab-hole counts mirror soil health and organic turnover, and across the dataset the system remains active. In Sutarkhali, values fluctuate between 118,000 and 174,000 during the baseline period, dip briefly during construction (122,345), then recover strongly during operation, peaking at 225,999 before settling at 209,093 in year twelve. Even under heavy sediment pressure, the soil community is functioning. Koromjol holds a moderate but healthy band. Early years range from 63,623 to 89,786; construction rises toward 149,178; and operational values stabilise between 53,475 and 96,659. These numbers show a mixed-use zone retaining full soil-fauna activity despite human proximity.

Harbaria continues its reputation as a stable site. Crab-hole counts climb from 141,983 to 229,399 in the baseline, then shift into a consistent 105,905–155,293 zone in construction, finishing the operational period at 126,828. Despite intense tourist pressure, its soil community remains productive. Akram Point stands out clearly. It holds the highest crab-hole numbers almost every year: 263,204 → 352,946 during baseline and construction, then 297,937 to 231,516 during operation. This surge reflects fresh mud exposure caused by erosion—a condition that crabs thrive in. This is a positive ecological signal, not a warning.

Hiron Point shows the opposite trend. Early numbers are low (21,509–30,462), rise briefly during mid-baseline (91,618), then decline again to just 18,957 by year twelve. Sand deposition explains the pattern: crabs can't burrow in coarse or unstable substrates. Overall, the soil fauna remains vigorous across the forest. Nothing suggests chemical suppression or thermal impact.

Canopy Cover

The canopy numbers are consistently high , signalling a forest free from atmospheric stress. Sutarkhali remains above 97 percent almost the entire period, touching 99.2 percent at several points. Even with strong root stress belowground, the crown stays intact. That's classic for sediment-driven impacts—roots struggle, but foliage remains full. Koromjol is equally strong. It starts at 93.8 percent and climbs into the 98–99 percent range through construction and operation. Any minor reductions come from natural regeneration gaps, not dieback.

Harbaria holds one of the most uniform canopy patterns in the entire dataset. Every value stays between 94 and 99 percent for twelve years. If air pollutants or heat stress from industry were stripping leaves, this site would show it first. Instead, it remains the most stable crown structure in the record. Akram Point shows a gentler trajectory: rising from 86 percent to 94 percent during construction, dipping slightly in operation and ending at 88 percent in year twelve. This mirrors Sundari top dying and shoreline retreat—not industrial influence.

Hiron Point remains high (97–98 percent) except in the final operational years when sand pulses reduce cover. The decline to 94.9 percent reflects physical burial, not atmospheric stress. Across all locations, the canopy record is unambiguous: the forest is not experiencing emission-driven defoliation.

Light Intensity

The light intensity trends directly mirror expected canopy behaviour. Sutarkhali's values fall from 4.01 to 2.60 during peak canopy closure, then rise again during natural gap formation years (4.75 in year nine). These shifts are consistent with sediment-driven structural changes.

Koromjol shows irregular peaks (up to 9.12 in the sixth year and 8.78 in the tenth) where new waterlogged gaps formed. These aren't stress gaps—they're natural moisture-driven openings. Harbaria displays moderate variations (2.0–6.8), matching minor canopy adjustments typical of a heavily visited but structurally stable site. Akram Point maintains low light (1.44–2.41), consistent with a retreating stand where crowns pull inward and suppress understory illumination. Hiron Point shows spikes during sand-wave years (4.35 and 4.31), demonstrating how physical disturbance briefly opens the understory. Together, the light data reinforce that canopy structure is changing only through geomorphology—not pollution.

Seedling Dynamics

Sutarkhali's counts rise from 383,564 in year five to 267,167 in year ten, dip to 100,373 in year eleven, then climb back to 192,542 in year twelve. These shifts match sedimentation cycles and gap openings. Koromjol remains strong, with recruitment peaking at 401,071 and stabilising around 150,000–238,000 later. Waterlogged gaps are clearly supporting new regeneration. Harbaria also performs well, peaking at nearly 299,000 seedlings in year ten, then settling at 184,549. This matches its stable canopy and healthy soil structure. Akram Point remains low (43,290 → 43,502), consistent with erosion pressures and Sundari decline. Hiron Point declines severely (34,059 → 1,512), which is exactly what sand deposition pressure does: it smothers propagules and suppresses germination.

3.3.4 Time series analysis

The forest health interpretation summary for the Sundarbans near the Rampal region is supported by scientific monitoring studies and ecological literature. Baseline years showed stable forest-floor aeration, high biological activity, and dense canopy cover typical of mature, undisturbed mangroves (Kathiresan & Bingham 2001). During construction, ecological changes like sediment accretion, waterlogging, erosion, and sand deposition explained local variations. For instance, increasing pneumatophores at Sutarkhali align with sedimentation processes; Koromjol and Harbaria maintained canopy and crab activity consistent with natural gap regeneration cycles (Ellison 2000; Krauss et al. 2008). Akram Point showed erosion-driven Sundari top-dying, backed by known responses of Heritiera fomes to hydrological and salinity stress (Rahman et al. 2015). Similarly, at

Hiron Point, sand deposition influenced root exposure and canopy light availability (Gopal & Chauhan 2006).

In the operational phase, canopy cover and crab-hole density remain indicators of a functioning mangrove ecosystem with no pollution signature such as leaf scorch or systematic thinning (UNESCO 2017; Ashton & Macintosh 2002). In addition, light intensity changes correspond with natural geomorphological effects rather than emissions. Overall, the sites' trajectories—high sedimentation at Sutarkhali, regeneration gaps at Koromjol, stable canopy at Harbaria, retrogressive top-dying at Akram Point, and sand deposition at Hiron Point—reaffirm natural ecological dynamics without measurable industrial impact. Key references supporting this interpretation include Kathiresan & Bingham (2001) on mangrove biology and sedimentation; Gopal & Chauhan (2006) on Sundarbans biodiversity conservation; Ellison (2000) and Krauss et al. (2008) on mangrove gap dynamics and regeneration; Rahman et al. (2015) on Sundari decline linked to salinity stress; Ashton & Macintosh (2002) on mangrove crabs as ecosystem engineers; and the UNESCO (2017) Sundarbans World Heritage conservation report providing ecological and atmospheric context.

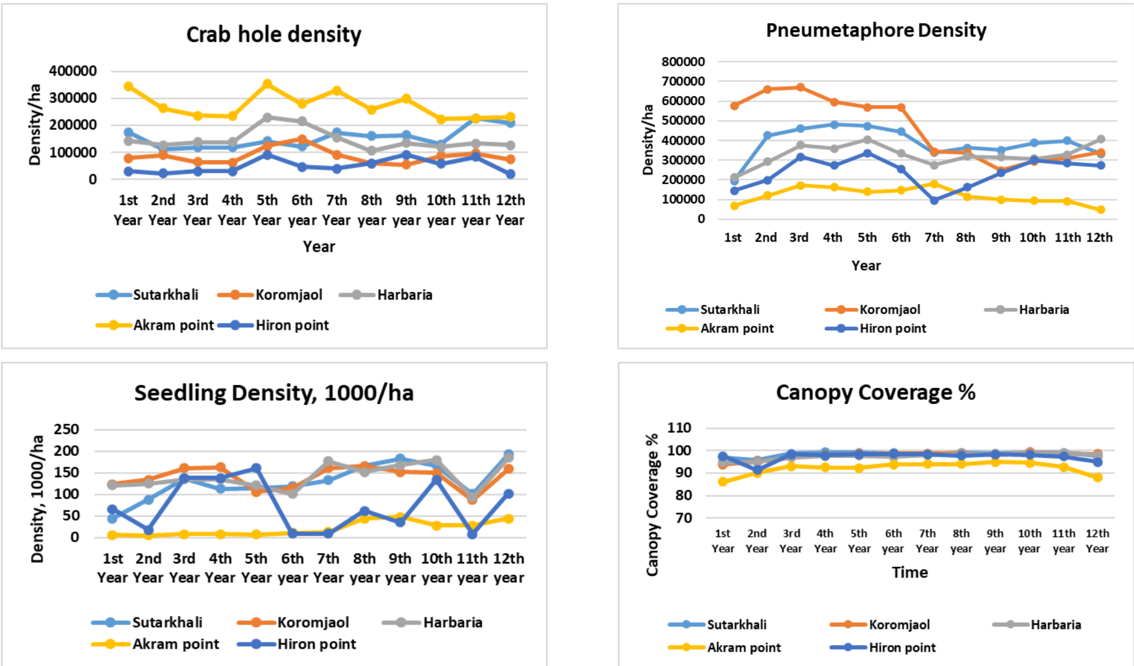


Figure 3.22: Time series analysis of pneumatophore, seedling, crabhole density, and canopy coverage among 5 monitoring plots

Carbon density

The carbon stock analysis for Sutarkhali, Koromjol, Harbaria, Akram Point, and Hiron Point from 2017–2025 displays important trends, particularly where severe geomorphological disturbances altered sampling plots and carbon dynamics. Hiron Point: This site experienced major tree mortality due to heavy sand deposition, which suffocated roots and dramatically reduced carbon stock. After the destructive wave action destroyed the original monitoring plot, a new site was established in 2023. The graph shows a marked drop in total carbon, reflecting the loss of mature biomass and subsequent plot relocation within a more stable area.

Akram Point: Persistent riverbank erosion led to the first plot falling into the river, forcing a change of monitoring location. Carbon stock here dropped as soil-sensitive species died when soil structure was compromised, consistent with sediment intrusion and hydrological stress. Erosion also reduced above-ground biomass, as depicted by fluctuating and lower carbon stocks from the original to the new plot.

Sutarkhali, Koromjol, and Harbaria: These sites maintained generally higher and more stable carbon stocks. Sutarkhali showed steady carbon accumulation, though fluctuations are visible, potentially due to sedimentation-regeneration cycles. Koromjol's slight increase reflects natural recovery and gap-phase dynamics in mangrove forests. Harbaria remained consistent, indicating resilience despite possible tourism pressures.

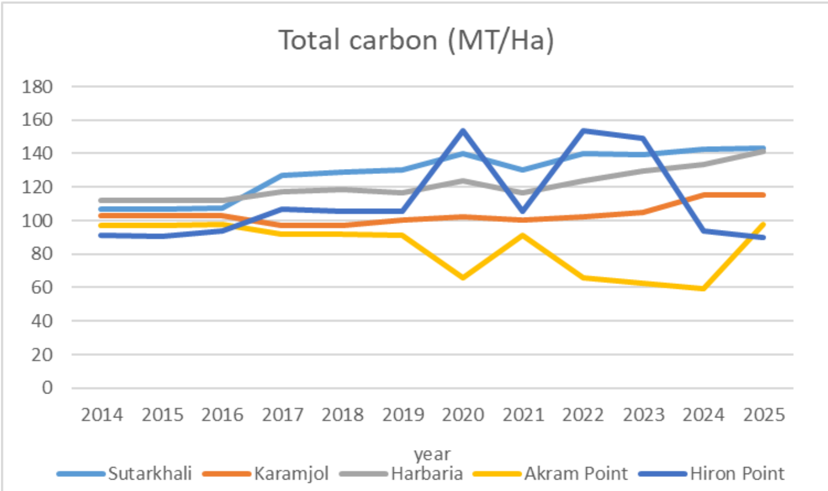


Figure 3.23: Time series carbon stock in five plots

Hiron Point and Akram Point plots required replacement due to physical destruction from waves and erosion, directly impacting carbon stocks through loss of mature trees and soil changes. The new plots, initiated after site destruction, started with lower carbon stocks, corresponding to younger or regenerating vegetation. Across all five plots, patterns in carbon stock illustrate responses to natural ecological drivers: sand deposition at Hiron Point, erosion at Akram Point, and relatively undisturbed conditions at Sutarkhali, Koromjol, and Harbaria, aligning with healthy mangrove ecosystem processes.

Phenological Behaviour

From the last visit, Phenological behaviour of major mangrove species was summarized in **Table 3.15**.

Table 3.15: Phenological Behaviour of Major Mangrove Species in the PSPs

Species	Months											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Leafing												
Sundari												
Gewa												
Amor												
Goran												
Kakra												
Passur												
Leaf Shedding												
Sundari												

Species	Months											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Gewa												
Amor												
Goran												
Kakra												
Hental												
Passur												
Lata Sundari												
Flowering												
Sundari												
Gewa												
Keora												
Baen												
Amor												
Hetal												
Goran												
Kakra												
kalilata												
Passur												
Jhanagarjan												
Fruiting												
Sundari												
Gewa												
Goran												
Kakra												
Amor												
Urmoi												
Sanagarjon												
Passur												
Seed/Popagule dropping time												
Sundari												
Gewa												
Goran												
Kakra												
Passur												
Golpata												

Source: CEGIS field visit, July 2025

The 45th monitoring shows a pattern that fits very well with the monsoons. During the period, most of the species including Sundari, Gewa, Goran, Kakra, Amor and Passur are not showing active leaf flushing. Leafing naturally slows down at this time because high rainfall and prolonged tidal flooding shift the tree's energy toward root aeration rather than new leaf production. Leaf shedding is irregular but present in several species, especially in older leaves of Sundari, Kakra and Lata Sundari, which is common during mid-monsoon when soil remains saturated. Flowering activity is almost absent in all observed species except Amor and Kakra, which again matches the normal cycle because almost all mangrove species complete flowering by April–June. Fruiting remains visible in some species such as Goran, Kakra, Amor and Passur, which typically carry developing fruits or propagules into the monsoon period. Early propagule dropping is also normal for Goran, Kakra and Passur in July, especially in areas with stronger tidal flushing.

When this 45th QM record is compared with published phenology from the Bangladesh Sundarbans, the timing aligns almost perfectly. Studies by Wahid et al. (2007), Iftekhar & Saenger (2008), and the Bangladesh Forest Department phenology records all describe July as a low-leafing, low-flowering, moderate-fruiting and early propagule-dropping month. These references note that Sundari and Gewa flush leaves mainly in late winter to early monsoon (Feb–May), flower from April to June, and fruit from June through the monsoon. Goran and Kakra are also known to continue fruiting into July, while propagule fall typically begins mid-monsoon, a pattern that matches the present observation precisely.

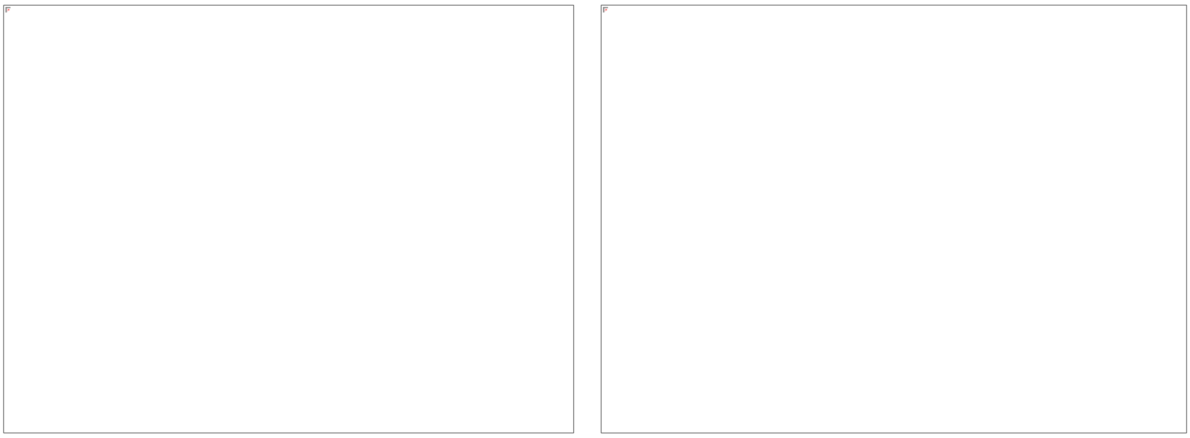


Figure 3.24: Phonological behaviour (Sundari & Kakra) observed during this monitoring period

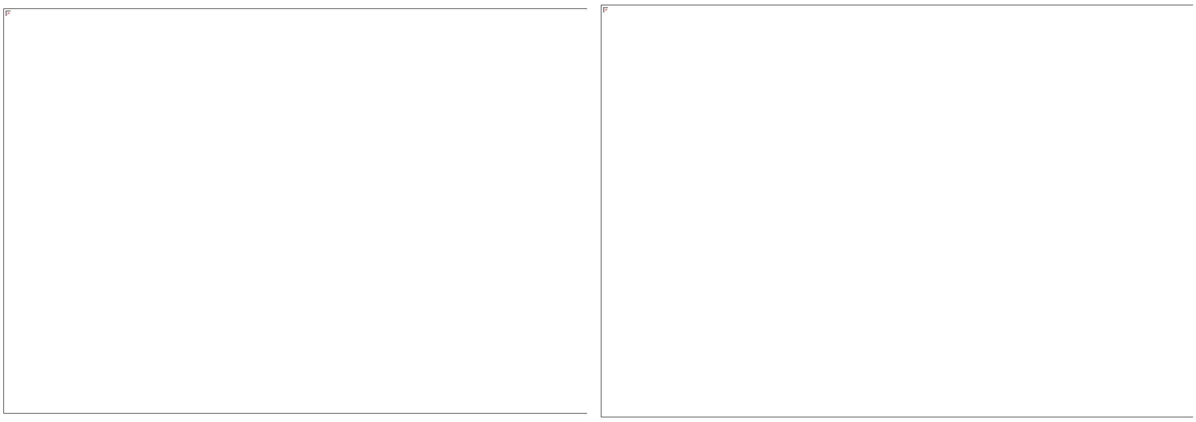


Figure 3.25: Presence of wildlife sign in PSP during field visit

4. Social Environment

4.1 Introduction

Social safeguards refer to the measures intended to mitigate unexpected negative impacts of the development projects. The current purview is the social safeguard monitoring, which is a follow-up study that is being conducted following the conditions imposed by DoE under the umbrella of Environmental Clearance Certificate (ECC), and the measures prescribed under the Environmental Management Plan (EMP) of the Environmental Impact Assessment (EIA) of the MSTPP.

The objective of the social safeguard monitoring is to ensure compliance during the project's pre-construction, construction and operation phases. The project is in operation phase now though there are some small-scale construction and maintenance activities. At this outset, to cover the impact and compliance aspects the social safeguard monitoring was bounded under the following broader headings, such as impacts on livelihoods, working environment, health and safety, Corporate Social Responsibility (CSR), safe water supply system, and MSTPP induced development. Additionally, the Corrective Action Plan (CAP) has been suggested in addressing the non-compliance or partial compliance issues based on the findings of the safeguard monitoring.

4.1.1 Methodology

This monitoring was conducted by collecting social data using different social tools like informal consultations i.e., Rapid Rural Appraisal (RRA) and formal consultations i.e., Key Informant Interviews (KIIs), Focus Group Discussions (FGDs), and physical observations. The social data available in the project premises were collected from the project office through a KII with the Community Liaison Officer (CLO) of the MSTPP. A checklist was used to collect necessary data from this surveys/interviews. The data sources involve local stakeholders, LGIs representatives, onsite project workers, MSTPP officers. The data collection points include MSTPP premises, Zero Point, Kapasdanga, Barni, Kalikharber, Chalkgona, Shidamkhali and Kathamari villages. The monitoring locations are shown in **Figure 4.1**.

4.1.2 Findings of Social Safeguard Monitoring

Impact on Livelihoods

At present, the MSTPP employs 247 personnel, comprising both officers and staff, all are appointed on a regular basis in line with the approved organogram. The breakdown of the employees is attributed in the following table (Table 4.1). Among the employees, the vast majority, approximately 87.9% are recruited from Bangladesh, while the remaining portion comes from the Indian counterpart. In other terms, only about 12.1% of the workforce is recruited from NTPC, India, around 5.3% from BPDB, and the majority are recruited through the general recruitment process, which places strong emphasis on engaging local people from the surrounding areas. Finally, gender disaggregation in employment at the MSTPP indicates a very low level of female representation, with only about 1.62% of the personnel being women. In addition to the core power plant workforce, a substantial number of contractual personnel from various categories, such as laborers, technicians, teachers, and health workers are engaged in the plant premises. A significant number of country personnel are also employed at the BIFPCL Head Office in Dhaka. Overall, the above statistics clearly indicate that the MSTPP plays an important role in supporting the livelihoods of the country people, both directly and indirectly.

Table 4.1: Employment Distribution of BIFPCL Project Office at Rampal

Employee Status	NTPC (Indian)	BPDB	BIFPCL permanent (Bangladeshi)
Male	30	13	200
Female	0	0	4
Total	**30**	**13**	**204**

Source: BIFPCL Office, May-July 2025

The findings of social monitoring indicate that, as the MSTPP has progressed toward the operational stage, a noticeable decline in employment opportunities has emerged. At this stage, the authority primarily requires skilled and technical workers, who are scarcely available in the locality. While the local community recognizes this reality, they have also constructively shared their concerns and suggestions regarding the recruitment process for non-technical and support service staff, reflecting their interest in inclusion and engagement of the local people. (i.e., gardeners, cooks, drivers, cleaners etc.) through third party contractors.

A market complex was constructed in the Township Area and began operations in the first week of November 2023. The complex consists of a total of 39 shops, of which 28 (approximately 72%) were allocated to project-affected people residing around the MSTPP to support income generation. However, monitoring findings reveal that only a few allottees have been able to generate the expected income from this opportunity. At present, only nine (09) shops are in operation, while 19 shops have yet to commence business. The remaining 11 shops are planned to be allotted for communication, banking, and post office-related services. The shop allotment status of the market complex is presented in **Table 4.2**. It is worth mentioning that three (03) shops are currently operating outside the 2nd Gate of the MSTPP premises, providing food and beverage, snack, and restaurant services.

Table 4.2: Status of Shops near BIFPCL Market Complex

Sl. No.	Market Complex Particulars	Nos. of Shops	Sl. No.	Market Complex Particulars	Nos. of Shops
1	Total number of shops constructed	39	4	No. of shops in operation	09
2	Total number of shops allocated	28	5	No. of shops await operation	19
3	Shops to be allocated for other purposes	11	-	-	-

Source: BIFPCL Office, July 2025.

The local people engaged in the project dependent livelihood activities, such as non-motorized vehicle operator, food and beverage supplier, mobile recharge operator, vegetable/fish/meat supplier have expressed their satisfaction in this regard. To keep further impact on the livelihood of the people and as a part of the Corporate Social Responsibility (CSR), the MSTPP authority has been performing diversified activities including capacity building and material distribution to the PAPs. The authority has planned to do so in near future in a more comprehensive and participatory way depending on the local demand. To make it more effective and to achieve the expected goal of livelihood restoration for the PAPs, required fund may be raised through the stipulated three (03) paisa profit per unit power generation.

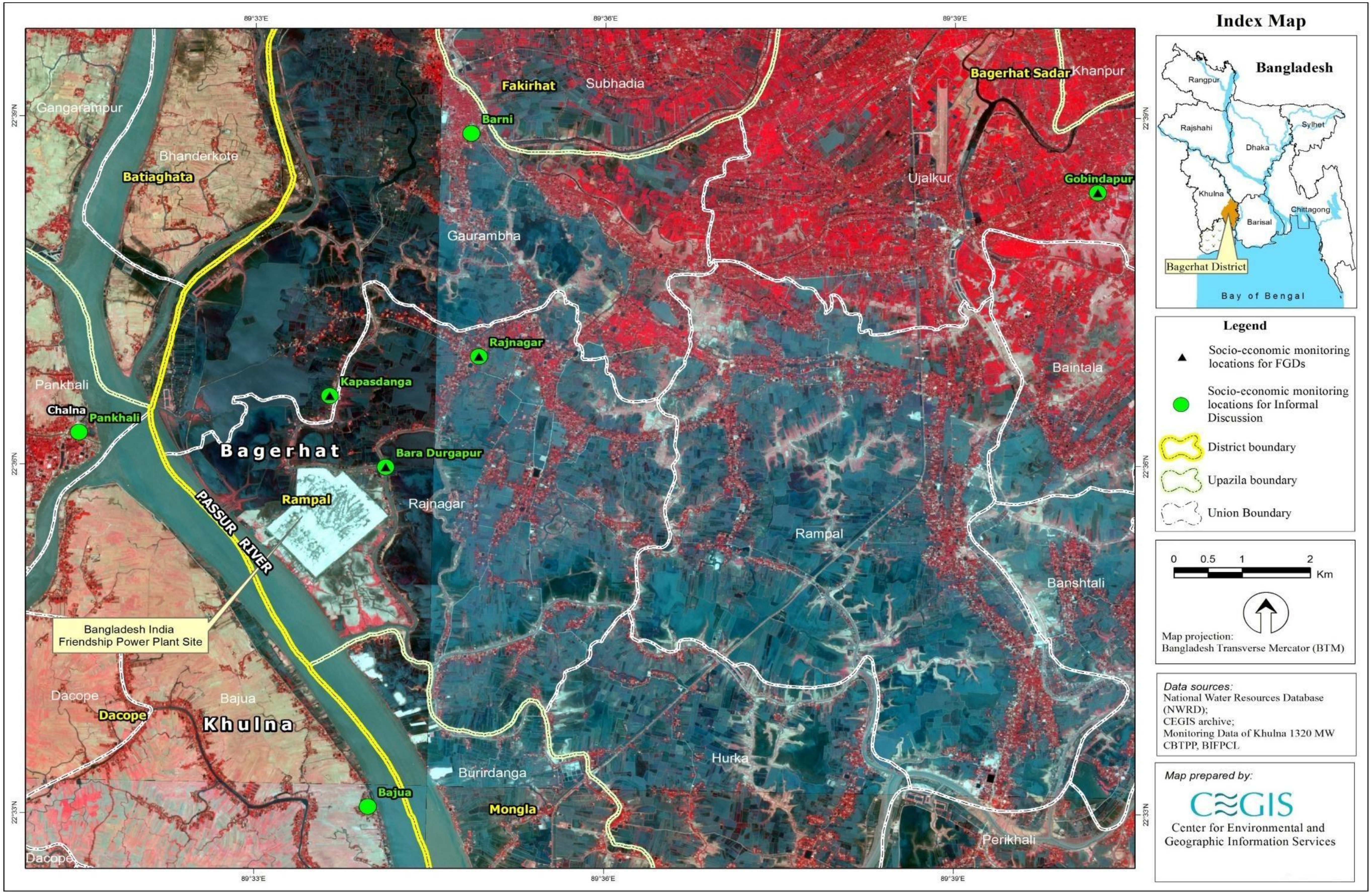


Figure 4.1: Location of Socio-economic monitoring

Working Environment

The PMU regularly monitors the working environment to avoid unwanted situation and to create an enabling working environment in the project premises. In this backdrop, they provide working-relationship trainings on a regular basis to ensure the congeniality among themselves and to create enabling working environment. In this monitoring phase, 11 such general trainings were conducted to 412 internal officers of MSTPP by the HR of MSTPP. Also, before recruiting new employees/workers/labors, all necessary medical tests, and checks-up are conducted to ensure safe and enabling working environment for all. The newly recruited workers should have minimum safety sense, and after passing such tests and examination, he/she is appointed in the tasks. The MSTPP authority bears all necessary costs of this examinations and tests.

The MSTPP authority also provides medical supports for their employees in an affordable price, and some services are provided in free of cost i.e., medicine, consultancy fees, ward/cabin charges, ambulance service, etc. However, the employees have to pay discounted costs of medical tests, and ICU bed charge. Emergency and ordinary medicines are available in the medical center but the rare and costly medicines need to be purchased from outside. To combat the fire related incidents, an well-equipped firefighting system has been set up in the MSTPP premises and this system includes two (02) fire fighter trucks, a rescue team consisting of 36 personnel, a couple of rescue-cum ambulance vehicles, and 11 designated assembling points. The MSTPP authority also developed a recreational site (Figure 4.1) near by the jetty in addition to the recreational facilities created in the Township Area.

For the wellbeing of the MSTPP employees, the authority has initiated an English Version School after the name of 'Maitree School' in their premises. In this regard, an agreement was signed between BIFPCL and Edison International Collegiate School, a Dhaka-based English Version School. For operating the school by maintaining the good practice. the authority is communicating with different popular school in Dhaka for opening their branch in BIFPCL premises. Also, they are initiating to set up a super shop in their market complex and so far, 'Daily Shopping' brand has shown their interest in this regard.

Grievance Redress Mechanism

A grievance redressal team has been formed to receive, record and address the whatsoever grievances dropped in the grievance box hung (**Figure 4.2**) at the entrance (Gate No. 1) of the plant premises by the aggrieved workers and the community resides around the plant.

Figure 4.2: A Community Grievance Box Hung out-side the Main Gate of MSTPP

Health and Safety

The PMU regularly monitors the health and safety issues to avoid unwanted situation in the project premises. In this connection, they provide safety related different trainings and necessary safety equipment (Personal Protective Equipment - PPEs) on a regular basis. In this monitoring phase, five (05) health and safety related trainings were conducted to the technicians and workers on how to use PPEs and how to keep safe himself and others as well. Necessary safety equipment like PPEs are provided to the workers and it was observed that most of the workers have worn the safety equipment, though, a few were found without wearing PPEs. This phenomenon is usually observed particularly in the summer as the PPEs may not be suited to those workers.

During this monitoring, it is observed that, coal handling and processing system has been improved conspicuously thus coal handling related health concern becomes low. At the jetty site, the coal receiving vessels are found to be fenced by fine meshed nets during coal transferring from other vessels. It is known from the community residing around the plant that they cannot trace any project induced health and safety issues now-a-day.

It is observed during this monitoring that the dredged materials coming from the maintenance dredging at the jetty harbor have been managed well by disposing them in the designated place following the chamber method. The accompanying water with dredged materials is also managed scientifically to avoid sliding back the materials to the Moidara River. Considering the volume of the dredged materials and available space for the disposal, the authority has been thinking proactively and searching the ways how to sell the dredged materials to the vendors.

A Solid Waste Management Plant (SWMP) has been in operation since February 2025 to scientifically manage the waste generated within the MSTPP premises (**Figure 4.3**). The compost manure produced as a by-product of the plant is being used in the gardens, thereby reducing costs associated with maintaining and rejuvenating the plants.

Figure 4.3: Solid Waste Management facilily in MSTPP Premises

To restore the environmental conditions that existed prior to the pre-construction phase, the authority committed to planting 2.0 lakh indigenous and mangrove species. During this quarter (May to July), 19,000 saplings have been planted which includes fruit trees, coconut trees and medicinal plants. In total,175,000 saplings have been planted so far under this plantation program.

The authority regularly sprays water on the roads of the project premises to suppress dust and sand. It is worth mentioning that the community did not raise any project induced health and safety issues during this phase

Corporate Social Responsibility (CSR)

The Corporate Social Responsibility (CSR) activities are usually operated based on the project's profit margin. From inception to construction stage of the project, the MSTPP authority performed diversified activities linked to social welfare of the local community in an ad hoc or extraordinary basis. At the onset of the operation of the plant, the authority has formed a CSR Committee consisting of five (05) members following the CSR Guidelines of BPDB. The committee involves one (01) member form Local Government Institutes (LGIs), one (01) from local administration and three (03) members from the MSTPP. The CSR activities will be designed, planned and executed in the operation phase under the guidance and supervision of this committee.

The authority under the guidance of the committee has already planned and executed a number of activities in the field. These are:

- A regular free mobile medical camp for the local community; and
- Installed 11 RO-based water supply system to ensure safe drinking water in the surrounding communities;

The monitoring findings reveal that out of 11 of such RO-based water supply systems only nine (09) are functional and the servicing of the remaining two (02) systems, one at Shidamkhali Village and another at Proshadnagar Village, are held up due to lack of financial arrangement and some faulty technical issues.

In the contract between MSTPP and Water Supply System Contractor, the authority kept a provision of free service for the maintenance of the supply system for four (04) years. The contractor did not perform the maintenance work as per the contract and thus the above-mentioned systems were collapsed. The stakeholders of Burir Danga, Barni, Rajnagar and Kapasdanga Villages showed their personal concern and requested to take proper initiative on these issues.

RO/Safe Water Supply Facilities

The residents of the project-surrounding unions had been facing severe scarcity of safe drinking water since long. To address and solve this acute safe water scarcity, the project authority proactively initiated an effort to supply safe water to the resident by installing 11 RO-based safe water supply system.

As agreed by both parties (MSTPP and villagers), the management of supply system involves following two major aspects-

- The MSTPP will look after the maintenance work of the systems for four (04) years from the installation through the contractor(s); and
- Operational costs for the systems will be borne by the respective users.

The monitoring findings indicate that one-fourth to one-third of the beneficiaries have been regularly paying the operational cost which is common for almost each water supply system. However, the local people and RO operators demanded more involvement of the MSTPP authority for better functioning of the water supply facilities and consistent safe water supply to the community. The following figures (**Figure 4.4 and Figure 4.5**) portray the existence of the RO-based water supply system.

Figure 4.4: Functional Water System through MSTPP, RO

Figure 4.5: Non-functional System in Shidomkhali, Hurka

Celebration of World Environment Day

The authority arranged rally, exhibition, consultation meeting, quiz competitions and tree plantation in the world environment day in the plant premises. BIFPCL officials and their family members attended the program and participate in different events.

Figure 4.6: Rally in the World Environment Day

Figure 4.7: Exhibition in the World Environment Day

Graduate students of Earth and Environmental Science, University of Dhaka and Graduates of Environmental Science and Management, North South University visited the Rampal Power Plant as a study tour. Students along with respective faculty member visit different sites of the plant and observe the process of Effluent Treatment Plant (ETP), Flue Gas Desulfurization (FGD), Sewage Treatment Plant (STP), Solid Waste Management, Colling mechanism etc. The MSTPP authority provided all kind of necessary support in this regard.

Figure 4.8: Graduate Students of University of Dhaka

Figure 4.9: Graduate Students of North South University

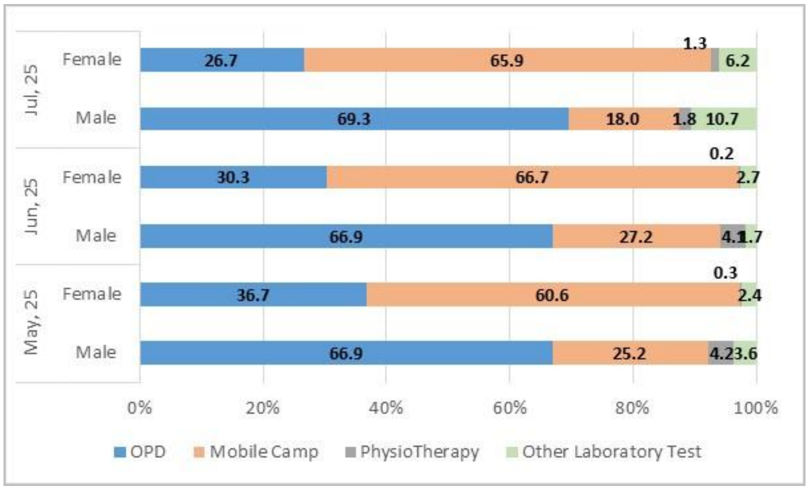
Medical Facilities

The MSTPP authority has been providing medical support and health services to the surrounding communities through their own medical facility, the Maitree Hospital. The health services include but not limited to-

- Out Patient Department (OPD),
- Medical camping,
- Physiotherapy,
- Laboratory test (i.e., dengue test, etc.) and
- Doctor consultation.

The MSTPP staff and the community people are eligible to receive all those above mentioned facilities including the consultancy service. The free medical camp services are usually arranged maintaining a certain interval with some exceptions and the medical camping held in April 2025 provided health/medical services to about 485 patients coming from the surrounding communities. The consultancy service of Maitree Hospital is open for all (workers and local community) for 24 hours a day. The Maitree Hospital also provides free ambulance service and general surgical activities for all.

The logbook record of the Maitree Hospital indicates that for the last three months since May 2025, in total, 5,336 patients have been received medical services, in which highest 2,911 patients received services from the OPD followed by 485 patients from medical camping. A detail of the gender specific health/medical service receivers' distribution is depicted in the following **Figure 4.7**.



Source: Maitree Hospital, July 2025

Figure 4.10: Medical Services from May to July 2025

MSTPP Induced Development

No induced development was recorded in the monitoring study area during this monitoring quarter.

Recommendations

- Laborers should be recruited through a proper process of open circular system.
- Local people have limited technical knowledge aligning with the opportunities being created in the MSTPP. As a part of community-inclusive approach of the MSTPP, it is suggested to train up the local potential workforces aligning with the scopes of the MSTPP i.e., training on, cooking and others.
- The Communication Liaison Officer of the MSTPP is suggested to maintain regular communication with the local people to know their perceptions regarding the plant, grievances if any and appraise them if there is any new development from the MSTPP end regarding CSR activities or taking their suggestions to devise future CSR activities.
- The MSTPP authority should share the scope of CSR services to the monthly coordination meeting of the respective upazilas to ensure unfettered dissemination to the community level.
- The PAP households resettled at Foyla Shelter Home should be given preference under CSR program (i.e., van distribution, providing floating businesses arrangements etc.) as they are seriously affected by the project, and no welfare services of MSTPP is yet to be provided to them.
- The authority is suggested to conduct community consultation to make them understand the significance of safe water supply system. and
- The authority should take care of the maintenance of the RO-based safe water supply systems to keep those operational and letting the users to enjoy safe water. It is suggested to ensure monthly visit of MSTPP concerned officer to monitor the operability of the ROs. The monthly field note for each of the ROs should be prepared and endorsed by the concerned union chairman, operator and concerned MSTPP officer.

5. Environmental Compliance

5.1 Introduction

The purpose of this environmental compliance report is to draw attention to any instances, real or imagined, in which Bangladesh-India Friendship Power Company (Pvt.) Ltd. (BIFPCL) is trying its best level to comply with the standards and guidelines and mitigations steps outlined in the EMP measures in the EIA Report. The report will demonstrate the status of compliance with DoE conditions and the Environmental Management Plan (EMP) requirements stated in the EIA Report. This will be done by providing an operational translation of local laws, international standards, and company codes.

An Environmental Health and Safety (EH&S) team from the Consultant comprised of diversified expertise paid a routine inspection to the plant site from 05th to 07th August, 2025 in order to gather necessary information and data, considering the bio-physical, Environmental Health and Safety and other relevant information. This was done through a thorough walk-in visit, meetings with Plant officials and general laborers, and physical observation of the ongoing activities at the Plant.

A set of theme-based comprehensive and detailed checklist was prepared to collect information on environmental and social compliance issues. The checklists have been prepared by reflecting the issues/indicators/parameters embedded in the following aspects e.g., Environmental and Social Management System (ESMS) and Action Plan; Laborer and Working Conditions; Community Health, Safety, and Security; Biodiversity and Sustainable Management of Living Natural Resources, waste management etc. The major findings during the 45th field visit are as follows:

- Maintenance dredging is being conducted using a dredger with a capacity of 500 cubic meters per hour to maintain the required draft for the navigability of coal ships and barges transporting coal to the Plant's jetty. The dredged materials are disposed of in a 200-acre designated pond located at the southeast corner of the Plant's premises. The accompanying water from the dredged slurry is carefully managed to ensure that only silt-free water is discharged into the river, thereby preventing sedimentation and minimizing environmental impacts.
- The Coal Supplier, under the strict directives of the Project Proponent, has implemented corrective measures such as netting to control coal dust dispersion during ship-to-ship coal transfer operations at the jetty. However, additional comprehensive actions are required to further minimize dust emissions and protect the local aquatic ecosystem. The recommended measures include: (a) installing fringing or extended netting around the ships, and (b) elongating the existing flexible coal chute to ensure more controlled and contained coal transfer.
- The Proponent is committed to use enclosed coal grabber. Primarily, the existing grabbers will be modified to a level to arrest coal from dropping and simultaneously, they will search the enclosed grabber in the market for procuring. The action will be helpful in minimizing coal and dust emissions during unloading.
- Sand and/or earth piles were found uncovered at a few places inside the plant premises and the authority has been trying to reduce the number of such piles as low as possible and at the

same time, they have been keeping the piles covered. Although minor, this issue should be properly addressed to ensure the health and well-being of staff, workers, and officials.

- The plantation program is ongoing and is expected to achieve a milestone of 200,000 saplings by 2025. Up to April, a total of 156,000 saplings have been planted out of 300,000 reflects steady progress. During this quarter (May to July), 19,000 saplings have been planted which includes fruit trees, coconut trees and medicinal plants. In total,175,000 saplings have been planted so far out of 300,000 saplings under this plantation program.
- The environmental control measures like Flue Gas Desulphurization (FGD), FGD Waste Water Treatment Plant, Electrostatic Precipitator (ESP), Effluent Treatment Plant (ETP), Sewage Treatment Plant (STP), Solid Waste Management Plant (SWMP), etc. are in operation.

- The Proponent has installed a community grievance box outside the main entrance of the plant premises so that the affected community (if any) can easily drop their grievances in the box to be accounted and resolved the issues by the authority.

In general, the aim of this compliance checklists is to check the implementation and effectiveness of mitigation measures as stated in the EMP of EIA. The checklists are developed as a Compliance Data Sheet that contains both quantitative and qualitative data. The findings of the environmental compliance monitoring are summarized and presented in the following **Tables (Table 5.1, 5.2, 5.3** and **5.4)**.

Table 5.1: Monitoring of Environmental and Social Management System Action Plan Implementation

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already implemented	Compliance Status	Recommended Action
1	Generation of Noise within the BIFPCL's Plant construction premises.	• Switch off / throttle down all site machinery, vehicles, water vessels, and generator when not in use • No construction activities at night • Use noise damper within the project boundary, Limit vehicle speed and monitor it at every suitable point.	• Noise data are being monitored quarterly by an Independent Monitoring Agency (IMA) at various sensitive areas such as the labor shed, township, nearby regions, etc., and are compared with the Noise Pollution Control Rule 2006. No anomalies have been recorded yet. • Aside from a faint sound during the walk-in visit inside the plant premises, no discernible noise was heard. • Idle machinery, equipment, and generators were kept turned off down. • Generators with acoustic enclosures are only being used as and when required.	Complied	Limited noise is generated from the repair works at this stage. It is recommended that technicians and workers maintain health and safety protocols and wear relevant PPE (e.g., earplugs/noise mufflers) before appearing at the repair site.
2	Dust generation from construction works	• Limiting activities for producing fugitive dust particle within project area • Vegetation clearance and base stripping should be minimized. • Vehicle speed restriction must be enforced to control dust generation. • Earthen roads and undeveloped roads should be avoided to minimize dust generation • Construction materials must be covered to protect from wind action • Spray water regularly for suppressing fugitive dust	• Although the construction works are completed, regular repairing activities are natural phenomena, and therefore, quarterly air quality monitoring is being conducted in and around the project site to adhere to the standards of the Air Pollution (Control) Rules 2022. The results showed that there is no exceedance of the criteria pollutants checked. • Crushed materials, stone chips were well covered but a few stockpiles of sand and other loose materials were noticed uncovered at the repairment areas.	Being Complied	• Suggested to cover all the Stockpiles of sand and other loose materials inside the plant premises. • Good housekeeping is strongly recommended

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already implemented	Compliance Status	Recommended Action
		• Dust particle generated from access road must be controlled by spraying water during dry season. • Stock piles of construction materials must be covered in order to protect from wind action. • An appropriate freeboard must be maintained in trucks hauling construction materials.	• Continuous water spraying on the dusty road was noticed to arrest the fugitive dust. • No black smoke was observed as the plant and equipment are being maintained properly. • During the visual monitoring, no noticeable dust was observed • Appropriate freeboard was observed in the loaded truck.		
3	Water Quality	• Surface water must be saved from any harmful effluent emission and waste dumping from project site. • Provide closed system facilities and wastewater treatment plant to minimize discharge of effluents from worker's colony. • Good housekeeping at workplace and construction site • Appropriate equipment with safety measures should be used for storage and handling of lubricant • Provide training and awareness programs for workers during construction. The training and awareness programs are: a) Arrange weekly consultation session among the workers through plant site managers. The duration of consultation is one hour according to ISO-14001 standard, b) Arrange monthly Environmental meeting among the mid-level officers	• Wastewater is being treated in the ETP plant and sewage is being managed in the STP, and no contaminated discharge is allowed outside disposal. So, there is no chance of deteriorating the surface water of the nearby waterbody. • BIFPCL has a designated chemical lab for testing where Temperature, pH, Conductivity, TDS, COD, Turbidity, FRC, E. Coli, TSS, T. Nitrogen, T. Phosphate, Oil & Grease parameters are being tested and monitored. • Training and awareness programs are being conducted at a regular interval through PEP talks, lectures, one to one meeting etc. • Scrap washed water bears the potentiality of water contamination. The ongoing action of removal of scraps once finished would ensure non contamination of water from this source.	Being Complied	Good housekeeping is strongly recommended

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already implemented	Compliance Status	Recommended Action
		through top management when those issues will be discussed under guidance of ECR 2023.			
4	Waste Generation	• Limiting site clearance and base stripping activities within the project boundary. • Gathering and stocking of construction materials and machinery must be within a limited area in the project boundary. • The project area has to be fenced prior to initiation of construction activities. • Stock piles of construction materials requiring cover up in order to protect them from wind and weathering action. • The existing right of way have to be used for material transportation without creating any block • Location of spoil stock pile ought to be located in safe area and protected from wind and rain action. • No spoil store on River bank/slope • Construction wastes must be reused or recycled as and where possible • Burning of waste material should be restricted • Quality housekeeping practice must be maintained by regular inspection and checking. • Keep onsite waste collection and disposal facilities	• Waste generated from the repairing works need further attention to its better management. • No chemical or gaseous waste noticed during the visit as Chemical wastes are properly stored and labelled. • Material transportation is being carried out by the designated way without creating any block. • There are adequate number (130 bins) of colored waste containers which are colored and labeled with Bengali language sticker for source segregation of the waste. • Burning of waste materials is strictly prohibited inside the plant premises. • No construction residuals and other waste observed by the side of the river bank. • Waste management training are being provided to the employees at a regular interval. • Development of environment friendly waste collection and disposal system like Solid Waste Management plant is now under operation.	Partially Complied	• Good housekeeping within the plant premises is strongly recommended. • It is appreciated to label the waste container in Bengali and English, so that one can understand the right container for the right waste disposal.

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already implemented	Compliance Status	Recommended Action
		• Keep provision of different colored waste bin for dumping biodegradable, reusable and recyclable wastes. • Keep provision of awareness building meeting and training for employees.			
5	Compensation and Resettlement	• Proper resettlement action plan (RAP) and compensation plan if the Project needs any land acquisition addressing compensation, livelihood restoration, living standards etc. in assessing the socio-economic status of the PAPs. • Resettlement of the PAPs. • Cash Compensation under Law (CCL) before resettlement formal agreement with the affected people prior to migration/resettlement • Sufficient standing crop compensation • Compensation for movable structures • Retention of salvageable materials • Compensation for loss of trading income one-time moving assistance grant to cover loss of regular wage income • Has a resettlement plan been developed which includes compensation, livelihood restoration, living standards etc. based on proper socio-economic studies? • Provision of monitoring the compensation and resettlement process Provision of monitoring the compensation and resettlement process	Compensation has been given to the rightful owners of the land as per the laws of Bangladesh e.g., 'Acquisition and Requisition of Immovable Property Ordinance, 1982 by the BPDB. The BIFPCL is only the lease holder to construct and operate the MSTPP.	Resettlement issue is settled by BPDB; BIFPCL is the lessee only.	

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already implemented	Compliance Status	Recommended Action
		Human provide/take extra care/caution for the disadvantaged/vulnerable groups (women, children, ethnic minorities, indigenous people etc.)	• The proponent has been conducting Corporate Social Responsibility (CSR) activities regularly, where the target beneficiaries are the affected people. • They have been planning to expand the CSR activities in larger extent to involve active and passive stakeholders living around the power plant. The plan also involves rigorous CSR activities so that manpower is generated in the area to be eligible to work at the greater horizon of the employment market home and abroad. In this regard, they have formed a committee involving local administration and LGIs. • BIFPCL prioritizes the directly affected local people for employment in the MSTPP and trains them to make them eligible and adaptable to the working environment. • The power plant induced marginal level employment generated in this area includes- ○ Movement of about 300 motorized vehicles using the approach road of the MSTPP daily. ○ Evolvement of dry market related small trading like tea stalls, mobile recharge services, mobile banking services, food and beverages, restaurants, etc. at and around the power plant. ○ Evolvement of wet market related small trading like vegetable selling shops, fish		• It is suggested to continue the current livelihood enhancement activities by the MSTPP as a part of the social responsibility; • The households/people around the power plant who are passively affected, should be included in CSR packages.

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already implemented	Compliance Status	Recommended Action
			markets, butcher/meat shops, etc. at and around the power plant. The BIFPCL has developed a market facility in the plant premises comprising of 34 shops. Among the shops, 28 shops have already been allotted of which 79% of shops (22 shops) are distributed among the local villagers.		
6	Livelihood and living condition	• The labor recruitment policy must be formulated in such a way that the local laborers can easily get the chance of employment in the project work force. • Govt./NGOs need to provide support the skill development program and income generation activities to local people; • For the increased movement of people and heavy vehicles, the road networks must be developed. • Keep provision of sanitary toilet, one toilet for 10 persons.	• BIFPCL is recruiting local people who were the PAPs with the cooperation of the local government (UP Chairman and Members). • At present, a sum of 247 employees is engaged in MSTPP, of which 217 are Bangladeshi and 30 are Indians. In addition to this, required day- laborers are involved from the locality. • The wage of the labor was found compatible with the national standard. • The Khulna-Mongla Road and the approach road seem well-developed. Roads inside the plant premises are paved with concrete. • Most of the labor shed has been demolished. Adequate toilet facilities are available for the maintenance workers are staying presently.	Mostly complied	• Campaigning within the local community should be continued to let them informed for any job opportunities created by the plant. • Capacity building program should be continued and expanded to involve more active and passive stakeholders living around the power plant to facilitate them to explore a wide horizon of the employment market.

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already implemented	Compliance Status	Recommended Action
7	Green House Gas Controlling Measures	• Restriction of any kind of solid waste disposal • Approved pollution control devices to be fitted in equipment and machinery. • Transport vehicles must not be overloaded. • Avoid queuing of vehicles in areas adjacent to the site, particularly near sensitive receptors, including housing. • Switch off / throttle down all site vehicles, water vessels, generator, and machinery when not in use. • Regular maintenance of water vessels, vehicles, generator, and machinery in accordance with the manufacturer's guidelines	• The authority has been using modern equipment and vehicles to reduce GHG contribution to the atmosphere as part of due diligence. • Equipment, generators, and vehicles were observed throttled down/switched off during the non-operation period. • Transportation vehicles observed with the appropriate load. • Solid Waste Management plant (SWMP) is now in operation, which is helping to manage the solid waste properly and will play a role in reducing the contribution of GHGs.	Being Complied	Maintenance of the site vehicles, dump vehicles, etc., should be conducted regularly.

Table 5.2: Monitoring of Labor and Working Conditions

Sl. No	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already implemented	Compliance Status	Recommended Action
1	Working Conditions and Management of Worker Relationship	• Preparation of Human Resources Policies and Procedures for Direct workers; • Defined Working condition and Terms of Employment for direct worker; • Sustainably equivalent terms and condition for migrant workers; • Compliance to national law of forming workers' organization; • No discrimination and equal opportunity for all.	• BIFPCL maintains the HR policies for the recruitment of new manpower as per their requirements. • No discrimination to the workers was recorded in terms of gender, equal opportunity, laborer level (local and migrated), etc. • The proponent has ensured minimum wage and working hours for the laborer as per GoB rules and regulations. • GRM procedure is being followed for the project workers and officials.	Complied	There should be a mechanism of record keeping if any GRM is applied.
2	Protecting Work Force	• The client will not employ children in any manner that is economically exploitative, or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child health or physical, mental, spiritual, moral, or social development. • No Forced Labor	• The BIFPCL has been maintaining the Bangladesh Labour Act 2006 and the amendments in engaging laborers for the construction and other works without involving any child laborer even in the operation stage. • No forced laborers are recorded during the monitoring. • Proper documentation of contract with the worker is being maintained which includes age limit, working hour, wage, work scope and benefit.	Complied	This should be continued throughout the project life cycle.
3	Safety at site	• Installation/Construction of Safety Fence around the Project area	• The authority has demarcated the specific construction site with an appropriate warning sign, though most of the construction work has already been finished.	Complied	This should be practiced throughout the entire project life cycle.

Sl. No	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already implemented	Compliance Status	Recommended Action
		• Use of Personnel Protective Equipment's (i.e., safety vest, safety goggles, ear plug, safety shoes, gloves, dust mask, etc.); • Safety trainings for workers (i.e., fire control, working at height, working in heat, first aid etc.); • Practice of Tool box meeting, safety talks • Safe Storage of Hazardous Chemicals (e.g., fuel, flammable chemical, toxic chemicals, etc.); • Maintaining Material Safety Data Sheet (MSDS); • Provision of Health care facilities such as doctor, hospital etc. available at/nearby the Plant construction site; • Availability of First Aid at work place; • Preparation and Follow of Emergency Response Plan (ERP); • Adequate fire precautions in place (e. g., fire extinguishers, escape routes etc.); • Documentation and reporting of occupational accidents, diseases, and incidents; • Policies and procedures for managing and monitoring the performance of third-party employers in relation to OHS	• The Laborers and Project personnel have been maintaining safety protocol by wearing safety shoes, safety vest, helmet and other appropriate PPEs, like face masks while they are in the plant site. • Fire-fighting system installed in the project premises to combat the fire related unwanted situation includes fire extinguisher of following types: – ○ Foam type - 17 nos., ○ DCP type - 502 nos., ○ CO2 type - 364 nos., and ○ water – 129 In addition to the above, there are two (02) firefighting vehicles, and an ambulance with doctors available at the sites. • Induction training and awareness programs have been providing batch by batch to the employees at regular intervals as recruitments are the recurrent phenomena. • Regarding occupational health and safety, no emergency situation occurred since April 2021However, during this quarter the following accident/incident happened: ○ **May:** 1 near miss occurred; no major, minor and first aid recorded. ○ **June:** 1 first aid, and 1 near miss occurred; no major or minor accident/incident recorded.		

Sl. No	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already implemented	Compliance Status	Recommended Action
			○ **July:** 3 near miss and 2 first ais incident occurred; • Regular safety talks and safety meetings are usually organized at the site and in the classrooms. The following safety trainings were recorded during this quarter: ○ **May:** 342 participants of which 30 were rewarded. Tool-box training were given to 797 workers. ○ **June:** Training was given to 390 participants and Tool-box training was given to 797 workers. ○ **July:** Training was provided to 1025 participants and 508 tool-box meeting was arranged. • Emergency contact details have been hung on the board at the site to take immediate action to handle any kind of sudden incident. Different types of awareness posters have been kept scattered at the site premises. • Accident Frequency Rate is 3.681 (April,2025). Rest of the months till now was 0.0. No Loss Time Injury (LTI) was recorded. • Warning signs, speed limit, and convex mirror are installed at site to avoid accidental events.		

Sl. No	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already implemented	Compliance Status	Recommended Action
4	Occupational Health and Safety procedure	• Provision of complete EHS division in the Human Resources Planning/ Organogram • Preparation of Safety Policy to be adopted during Plant operation	• Adequate number of safety officers are engaged who are working on OHS issues. • MSTPP Authority has adopted a Safety Policy for plant operation in compliance with national and international standards. Key measures include an HSE management system, mandatory PPE, SOP-based operations, and regular safety training. Fire protection systems, emergency response plans, and incident reporting mechanisms are in place to ensure safe operations.	Being Complied	OHS should be a Continuous process
5	Workers Well Being	• Provision of Welfare facilities for Worker/Labor such as, timely bonuses, wage, overtime, sick leaves, vacations etc.; • Routine medical check-up and emergency medical care for the sick and injured; • Appointment of a leader amongst the labor group, who will look into workers' well- being.	• Workers were found satisfied with the residence facilities, wages and timely payment provided by the Proponent. No dissatisfaction was observed among the workers. • The Proponent has ensured the benevolent grant developed by the Contractor for the victim's family, as per the Government's rule. • Basic Medical care with free medicine and counseling is being provided to workers on a regular basis. • Grievance Redress Mechanism (GRM) is available for workers by which safety issues are usually addressed.	Complied	

Table 5.3: Monitoring of Community Health, Safety and Security

Sl. no	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
1	Disturbance to nearby community due to dust from developed land and Noise from construction activities	• Construction of boundary wall around the Project area; • Installed water spraying system to control dusts; • Conducting dust monitoring and visual inspection around the site boundary; • Adopted noise management plan.	• Boundary wall construction around the entire plant is completed. • Some loose materials were found uncovered that barely a concern for the local communities. • No significant complaints were recorded from the communities in connection with dust and noise while visiting them during monitoring. Noise levels at and around the project site is monitored regularly and presented in the report. No exceedance was observed.	Mostly complied	Complaints are addressed immediately and recorded accordingly in the register.
2	Grievance of local people	• Availability and operation of Grievance Redress Mechanism; • Maintaining open communication channel with the local community.	• A community Liaison Officer (CLO) has been working for maintaining relation with the local communities. • The MSTPP authority/BIFPCL displays the regular development through their website (https://www.bifpcl.com/) and conduct disclosure meeting with the local government • BIFPCL has been receiving grievance from local community through local government institutes (LGIs) like Union Parishad Chairman or Local Administration. • The Proponent has installed a community grievance box at the main entrance of the plant premises so that the affected community members (if any) can easily drop their grievances.	Complied	The authority is advised to address the grievances of one and all.
3	Risk of breaching Community Safety	• Construction of boundary wall/safety fence around the Project area;	• Boundary wall construction around the entire plant is completed.	Complied	

Sl. no	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
		• Practicing Risk Assessment and Evaluation Process; • Practicing safe management for hazardous materials which may pose threat to the community; • Availability and operation of Emergency Response Plan; • Maintaining open communication channel with the local community; • Training and instruction to the security personnel about their behavior and communication with the local people; • Aware the security personnel about the right of the community people.	• Initiated a set of pollution mitigating measures to protect outgoing dust and other pollutants from the Project site. • The Project authority has been maintaining the exit and entry strictly even for the employees. If required, an entry pass is checked by the security guard to enter the project site area. • No conflict has been noticed between local communities and project authorities or workers. • Project Security personnel is well trained and instructed by the authority to demonstrate a decent behavior and attitude to the local communities. • Though BIFPCL receives grievances from the local community through local government institutes (LGIs), such as the Union Parishad Chairman or Local Administration, the Proponent has hung a community grievance box at the main entrance of the plant premises so that the affected community members (if any) can easily drop their grievances.		
4	Community Health and Risk	• Provision of providing health service facilities to community if the Project poses any health risk like sexually transmitted disease, contract disease, vector-borne diseases; • Implement all pollution mitigation measures to ensure safeguarding to community.	• Continued the medical facilities (consisting medical officer, medical assistant, office assistant) at Plant site for checkup the communicable diseases of the workers and staffs; • Out Patient Department (OPD), laboratory test, physiotherapy service and medical check-up services are found to be continued in this quarter.	Complied	BIFPCL is advised to conduct awareness program for STD and other transmitted diseases from workers to the community or vice-versa.

Sl. no	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
			• BIFPCL arrange regular weekly health service program (medical consultation and free medicine) for the local community including the Dengue issue. • Pollution control measures like FGD, ESP, ETP, STP, SWMP and other facilities are now functioning properly. Routine water sprinkler is being conducted to suppress the dust dispersion. • Adequate training is being provided to the laborers to prevent transmission of vector borne diseases, HIV positives and any kind of pandemic to the local community.		
5	Youth Employment (Local)	• Providing training / awareness program for the local youth to let them aware about the required qualification to get involved in the Project related activities Emphasis to recruit local labors according to their skills and capacities.	• Regular communication is being maintained with the local government and community representatives for labor recruitment. • The proponent took initiatives and provided computer training for generating ICT skill and sewing training for generating alternative income source among the local people. Besides, BIFPCL have also plan to initiate skill development trainings on electric and electronics, painting, welding, health and hazard safety, fittings, etc.	Being Complied	Before planning training program in future, local interest and demand should be assessed and addressed.

Sl. no	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
6	Public Communication, Consultation and Awareness	• Arranging public communication / consultation meeting; • Sharing of Project information with local people; • Organizing environmental and social awareness programs /meetings.	• One Social Liaison Officer (SLO) is assigned to work continuously to develop relations with local communities and inform them about the project activities and environmental protection measures. However, the local community has requested to improve communication and engagement of SLO. • A social expert from IMA also used to visit the nearby community quarterly to obtain their opinions. Regular consultation meetings are being carried out with the local government and administration. The proponent regularly displays the progress (through Video) of the development through their website (https://www.bifpcl.com/) and disclosure meetings at the local government. The local people are aware of the project activities through multiple sources, such as public communication, consultation with the monitoring team, display board, website, etc.	Mostly Complied	BIFPCL may use local print media, social media, and digital media to disclose and spread the updated project information.

Table 5.4: Monitoring of Biodiversity and Sustainable Management of Living Natural Resources

Sl No	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
1	Rainfall runoff from the construction site would cause deterioration of aquatic ecosystem.	• Installation of proper runoff drains; • Use of sediment fences, traps and basins for trapping the sediment, if required.	• Based on the suggestion in the meeting of 44th quarter, the Proponent has cleaned the drainage channel to facilitate uninterrupted drainage of storm water. • A proper runoff drainage system has already been installed. • There are two (02) silt traps at the Project site to settle sediments coming along with the stormwater and discharges sediment-free stormwater from the traps in the open environment.	Mostly complied	The drainage channel should be cleaned regularly to avoid unexpected drainage congestion in the plant premises.
2	Disturbance to nearby ecosystem due to different construction activities	• No cutting/ felling of trees along the river bank; • Implementation of onsite waste and air quality management plan; • Limiting soil extraction activities within the defined area; • Limiting the vegetation clearance and base stripping process within the Project boundary; • Safety fence around the construction site; • Limiting the use of night light; • Using shade (directed downwards) around the outdoor lights; • Provision of cut-off time to switch off unnecessary lights at night; • Initiate Green plantation; • No plantation of non-native species;	• As the construction work is now completed, the risk of tree felling and disturbance to the dependent ecosystem is out of questions, rather plantation started long back is at the maturing stage and creating new ecosystem and becoming an abode for wildlife. • An MoU was signed between BIFPCL and Forest Dept., Bangladesh on 24.02.2015 for implementation of the Afforestation Program. The initial target was to plant 3 lac saplings. The Proponent is committed to reach up to the plantation of two (02) lac saplings by the year 2025. The plantation program has already been started which includes various species such as fruit trees, coconut trees and medicinal plants. During this quarter (May to July), 19,000 saplings have been planted which includes fruit trees, coconut trees and medicinal plants. In total 175,000 saplings have been planted so far out of	Being Complied	• It is strongly recommended to accomplish the plantation program within a limited time frame. • It is also advised to monitor regularly to reduce the mortality rate at the sapling stages. • Topsoil management should be strictly followed.

Sl No	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
		• Retaining top soil for future habitat restoration; • No degradation of sensitive habitat.	300,000 saplings under this plantation program. The species of the plantation program along the rivers (the Passur and the Moidara) are dominated by the mangrove plant species, such as Keora (Sonneratia apetala), Gewa (Excoecaria agallocha), Golpata (Nypa fruticans) and Baen (Avicennia spp.). The highland of the plant premises is planted with various fruit-bearing plants like coconut (Cocos nucifera), mango (Mangifera indica), etc. and the medicinal plants like Bahera (Terminalia bellirica), Horitaki (Terminalia chebula), Tulsi (Ocimum tenuiflorum), Arjun (Terminalia arjuna), Neem (Azadirachta indica), • No alien species has been recorded. • Wild species like avifauna and mammals were observed and recorded in the project site greenery areas. • Employees are aware of rescuing of species if any got injured and harming to wildlife is strictly prohibited.		
3	Disturbance to river, inter-tidal areas and wet lands	• No encroachment of inter-tidal flood plain area; • No disturbance to Dolphin community; • Monitoring of Ecosystem Health and Monitoring of Sundarbans Forest Health; • If required, embankment should be constructed considering a setback distance from river/canal bank;	• Monitoring of ecosystem health of Sundarbans, and around the Project site is being continued. • Slope protection works from jetty area to North-Western side and township area has completed. • Ecological monitoring is being continued and no disturbance has been observed. • No impact or disturbance observed on dolphin community.	Complied	Monitoring needs to be continued throughout the entire operation stage.

Sl No	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
		• Slope protection work along the Moidara River should be completed on an urgent basis before rainy season come, and; • BIFPCL may take initiatives of excavating of silted reach of Moidara river near proposed township area to facilitate proper functioning of River for maintaining tidal flow dynamics			

Table 5.5: Status of Compliance to the Conditions of DoE

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
1	This EIA Report is approved only for 1320 MW Khulna Coal Based Power Plant. Any expansion or extension of this Power Plant will require obtaining further Environmental Clearance with additional EIA Study.	The proponent does not have any plan to expand or extend the 2x660 MW Maitree Super Thermal Power Plant.	Complied.
2	The Coal Specification and Power Plant technology should be maintained as per EIA report. In case any change in design the proponent must obtain consent from DoE.	• The Coal Specification is being maintained as per EIA report. • The Power Plant has been built by maintaining the technology mentioned in the EIA Report, and this is under operation.	Complied.
3	Project Proponent may undertake activities for land development and infrastructural development of the Project.	Land development and infrastructural development of the power plant has already completed. Both units are in operating condition. Commercialization started for Unit -1 on 23 December 2022 and Unit-2 on 12 March 2024.	Complied.
4	Project Proponent may open L/C (Letter of Credit) for importing machineries for the Project, which shall also include machineries relating to waste treatment plant and other pollution control devices.	The Proponent opened L/C and imported the required machineries including waste treatment plants and other pollution control devices. Civil structures for all of these facilities have already completed and under operation.	Complied.
5	The activity under Proposed Khulna 1320 MW Coal based Thermal Power Plant Construction and operation shall not release any pollutant that affect	The Proponent has been trying to avoid releasing pollutants from construction to operation phases affecting human health and natural environment with some minor exceptions. CEGIS, a third-party monitoring	Being Complied.

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
	human health or will have damaging impact on the environment or natural resources.	agency, has been conducting quarterly environmental and social impact monitoring along with compliance monitoring as per EMP since 2014. No significant impact during construction and operation so far was recorded on the surrounding environment or on the natural resources. Moreover, to control the emissions, pollutants and contaminants, ETP, STP, ESP, FGD, FGD, SWMP, Waste Water Treatment Plant etc. have been installed and operationalized. Furthermore, an online air quality monitoring machine has been installed by DoE and four (04) machines by the proponent to monitor air quality at the plant premises. The air quality monitoring parameters include $PM_{2.5}$, PM_{10}, SO_2, CO, NO_2, O_3, etc.	
6	Proper and adequate mitigation measures shall be ensured throughout preparation, construction and operation period of the proposed Khulna 1320 MW Coal based Thermal Power Plant Project activities.	• BIFPCL has taken appropriate mitigation measures conforming EMP and technical specification of main Plant at each of the stages of Project Development. • Proper safeguard measures for the safety of the workers were very satisfactory.	Complied.
7	Any heritage sight, ecologically critical area, and other environmentally, religious and archaeologically sensitive places shall be kept protected during Project construction phase.	In the monitoring corridor, there is no religious and archaeological sites. However, the Southeast Sundarbans World Heritage Site (WHS) and the Sundarbans Ecologically Critical Area (ECA) are fallen in this corridor. Considering the sensitivity of these environmentally and ecologically important areas, a regular quarterly monitoring is being done at the close proximity of the WHS and ECA	Complied
8	Environment friendly construction and development practices shall be followed that minimize loss of habitats and fish breeding, feeding & nursery sites.	Construction work is almost finished. Still if there are any construction activities need to be done, it is suggested to follow the best practices and according to the EMPs of EIA Report.	Being Complied.
9	Construction works shall be restricted to daytime hours so as to avoid/mitigate the disturbance of local lives as well as implementation schedules of the works shall be notified in advance to nearby residents.	As Construction work is already finished, there is no major construction related disturbance noticed to the community. Moreover, the authority has appointed one social liaison officer who is working closely for developing relation with local communities. Quarterly community visit is also being conducted by a IMA's social expert. Regular consultation meetings are carried out with the local government and administration in order to receive and realize the grievances and accordingly to redress those. There	Being Complied.

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
		are no grievances related to the noise effect registered yet from the nearby communities.	
10	Proper and adequate sanitation facilities shall be ensured in labor camps throughout the proposed Project period.	Most of the labor shed has been demolished. Adequate toilet facilities are there for for the maintenance workers are staying presently	Being Complied
11	In order to control noise pollution, vehicles & equipment shall undergo regular maintenance; working during sensitive hours and locating machinery close to sensitive receptor shall be avoided.	All vehicles & equipment used at site are under regular maintenance and registration process. Working during sensitive hours like night time (if necessary) and operating machinery close to sensitive receptor like near the labor shed and residential areas are being avoided.	Being Complied
12	No solid waste can be burnt in the Project area. An environment friendly solid waste management should be in place during the whole period of the Project in the field.	• Burning of waste materials is strictly prohibited inside the project boundary. • Solid Waste Management Plant (SWMP) is under operation where the solid waste is being managed properly and compost is being prepared in this plant. This compost is being used in the horticulture and gardens located in the plant premises. In the process of compost preparation from the solid waste, leachate is generated which is being managed by depositing in the scientifically made leachate pond to avoid unexpected water contamination	Being complied
13	Proper and adequate on-site precautionary measures and safety measures shall be ensured so that no habitat of any flora and fauna would be endangered or destructed.	Quarterly monitoring activities are being carried out to examine the potential impacts on habitat of flora and fauna. As construction works have been finished, no detectable impact on flora and fauna observed.	Being Complied
14	All the required mitigation measures suggested in the EIA report along with the emergency response plan are to be strictly implemented and kept operative / functioning on a continuous basis.	The proponent is giving top priorities and trying to follow mitigation measures against the impacts on environmental and social segments including occupational and community health and safety issues. To keep the workers and the plant safe, plenty of precautionary measures has identified during the physical visit of the plant. • Mitigation measures for the impacts on environmental quality (Air, Water and Noise) and biodiversity/ecosystem are being implemented and monitored by the IMA.	Being Complied

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
		• An ICU rich hospital with an experienced medical team and ambulance has kept ready to provide the instant services • In case of medical emergency, the Proponent has signed a contract with a private hospital (GAZI medical, Khulna) for emergency services for both BIFPCL officials and staff, and also the daily or contracted workers. • Emergency fire exit, assembling point, fire extinguisher, fire alarm has observed available and well-functioning. • As a part of emergency response plan, laminated posters of emergency contact numbers were noticed hung inside the plant premises. • Proper PPEs like face mask, earplugs etc. have been observed during the field visit.	
15	To control dust, spraying of water over the earthen materials should be carried out from time to time.	Quarterly air quality monitoring in and around the project sites is being conducted and recorded data checked with Air Pollution Control Rules 2022 standards. Though the construction activities have almost completed, the water sprinkling is still continuing at the designated places for suppressing dust.	Being Complied
16	Storage area for soils and other construction materials shall be carefully selected to avoid disturbance of the natural drainage.	• Construction materials and wastes (i.e., scraps) observed piled up at the designated areas like backyard of the ETP, laborer camp areas, etc. which seems a good practice but these areas need to be covered to avoid accidental events and enhance aesthetic value. The removal of the piled-up waste materials is underway emphatically. • Sand piles and other loose materials were found covered except some that could be a concern for the local communities.	Mostly complied.
17	Adequate considerations should be given to facilitate drainage system for runoff water from rain/tidal surge.	Adequate attempt has been adopted to facilitate drainage system for runoff water from rain/tidal surge as BIFPCL has already constructed the permanent drainage system for discharging water from the project area.	Being Complied.
18	Adequate facilities should be ensured for silt trap to avoid clogging of drain/canal/water bodies	There are two (02) silt traps at the Project site to settle sediments coming with the storm water and discharges sediment-free storm water in the open environment.	Being Complied.

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
19	The entire coal handling system should be designed as an enclosed (and not only covered) conveyor system. There should be integrated dust control system with dust extraction and bag filters at unloading areas and at each transfer points on the conveyor system.	Entire coal handling system is designed and constructed as an enclosed conveyor system as per DoE requirement. Integrated dust control system with dust extraction system/bag filter and dust suppression system at crusher house, unloading points, transfer points are being maintained as stated in the contract package. Due to the technical reason 25 m of the conveyor system at the jetty site was kept uncovered,	Mostly Complied
20	Coal Plant should have high-efficiency bag filter for arresting dust emissions.	Integrated dust control system with dust extraction system/bag filter and dust suppression system has installed as per the technical specification. In addition, high-efficient ESP (with 99.99% efficiency) for both units are now under operation that will control the coal dust and fly ash.	Being complied
21	Coal should be stored in a covered storage yard.	04 no of coal cover shed construction has already finished. Out of them two (02) are in operation and rest two (02) are ready to be operated as and when required.	Being complied
22	The entire coal stockyard should be covered with water sprinkler provided with automated moisture sensor to control self-combustion.	The entire coal stockyard is fully covered and automated moisture sensor has been provisioned to protect coal self-combustion.	Being complied
23	100% utilization of fly ash and bottom ash should be planned and implemented throughout the operation of the Plant. There should only be a provision of small ash dyke that will not exceed 25 (twenty-five) acres of land to store residual ash.	100% utilization of fly ash has been planned throughout the operation of this Plant. The ash dykes are in operation.	Being complied
24	Integrated dry ash handling, loading, unloading and transportation system should be established.	Integrated dry ash handling, loading, unloading and transportation system are being followed Erection of Ash silo structures has done beside the jetty in order to transport the dry ash through ships/cargo.	Being complied
25	There should be adequate and properly sized and designed dry ash silo with appropriate conveyor system.	Ash silos with the proper conveyor system are now under operation.	Being complied
26	Bottom ash should be extracted, crashed and stored in silos for utilization with proper collection and conveyor system.	• Bottom Ash Intermediate Silo structural erection completed and is under operation.	Being complied

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
		• The pneumatic technology of fly ash (FA) collection using pipeline and transferring to the hoody and confined vessels for a take away was observed functioning well.	
27	Resettlement and rehabilitation of the displaced population (including those who do not own land) should be done properly.	The land has been acquired by BPDB by following the Acquisition and Requisition of Immovable Property Ordinance, 1982 (ARIPO). Moreover, a Livelihood Restoration Plan (LRP) has been conducted by BPDB to resettle and rehabilitate properly the people who do not own land in the site. The BIFPCL has been given lease by BPDB to construct a 2X660 MW Coal-based Power Plant. As a lessee, BIFPCL is not liable to address any resettlement related issues except the livelihood improvement initiatives. In this regard, the Proponent has been conducting Corporate Social Responsibility (CSR) activities with a large section of people living around the site to skill up the capacities of the local people.	Being complied
28	Resettlement plan should be properly implemented and people should be adequately compensated.	BPDB has conducted an assessment (Livelihood Restoration Plan) regarding the rehabilitees, including those who do not own land in the power plant area, but whose livelihood depends on that land. Based on the recommendation of the LRP, the local NGO conducted the training and other tasks for the PAPs. Some poor of the livelihood-dependent households were resettled in the Foyla Cluster Village and compensated as well.	Complied
29	Construction material should be properly disposed-off after construction work is over.	The piled-up construction materials and wastes (i.e., scraps) observed at the designated areas are being removed emphatically. However, Solid Waste Management plant (SWMP) is under operation where the solid waste is being managed properly and compost is produced as a by-product. This compost is used in the horticulture and gardens located in the plant premises.	Being complied
30	As described in the report environmental monitoring should be strictly followed and monitoring report should be shared with DoE to ensure the environmental management properly.	The Proponent has engaged CEGIS as an IMA for conducting environmental monitoring on a quarterly basis in February 2014. Accordingly, each quarterly monitoring report has been prepared, submitted and shared with DoE, which are also available at BIFPCL web site.	Being Complied.

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
31	All activities (pre-construction, construction and post-construction stage) should be implemented according to EMP clearly listed in the EIA report.	The proponent has adopted the EMP suggestions applicable at construction stages. BIFPCL is taking appropriate actions based on EMP monitoring report. The proponent regularly updates the EMP and OHAS which assist to reduce the risk of accidental events further. From the preconstruction stage till now BIFPCL has been following the guideline of EMP stated in the EIA report and we have suggested to follow the EMP strictly for the rest of the work.	Being Complied
32	A third party/independent monitoring bodies excluding JVC/BPDB should be engaged immediately for monitoring of all activities during pre-construction, construction and operation phases as per monitoring plan of EIA report and monitoring report must be submitted to Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously.	The proponent engaged an Independent Monitoring Agency (IMA) for conducting environmental monitoring on a quarterly basis since February 2014. Since the contract, CEGIS has been conducting the monitoring programs quarterly and producing monitoring reports on quarterly basis which are submitted by CEGIS to BIFPCL for onward submission to the Bagerhat District Office, Khulna Divisional Office and headquarters of the Department of Environment as directed by DoE.	Being Complied
33	Regular monitoring of the susceptible places of Sundarbans for protecting ecosystem, biodiversity and forest coverage should be made using latest high-resolution image for keeping ambient environment.	The Monitoring activities of IMA includes monitoring of the susceptible places of Sundarbans. The monitoring report contains analysis of biodiversity and forest coverage. However, in addition to this, Forest Department has also suggested some survey & analysis which have also been monitored and reported by CEGIS through the quarterly monitoring report and submitted to the concerned authorities.	Being Complied.
34	Air, water, soil, biological and social data should be monitored regularly with a network monitoring system with a view to assess the natural quality of the Sundarbans and other fragile ecosystem and report of monitoring results should be submitted to Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously.	Air, water, soil and biological components are regularly monitored as per recommendation of EMP. Each of the monitored environmental data has been incorporated in the Monitoring report and displayed on the BIFPCL website at present.	Being Complied.
35	There should be regularly disclosure of the report through workshops and websites and responses should be taken care accordingly.	All the monitoring reports are being kept available on the website of BIFPCL (www.bifpcl.com)	Being Complied.

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
36	Online air and water quality monitoring system should be made functional throughout the life of the Plant.	Water quality analysis system has already been developed. As a part of air monitoring system, DoE has already installed one device to monitor the online air quality data at Project Area (Padma Abashan) which is now functional and four (04) other devices has installed by the Proponent around the plant premises where SPM, SO_2, CO, NO_2, O_3 etc. are being monitored.	Compliance action initiated
37	Management Information System (MIS) is to be developed for this coal-based Power Plant. The scope of MIS services will obviously include representing the real time monitored data especially environmental parameters displaying at Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment, BPDB and other concerned agencies/Ministries. The MIS should be web based for accessing every individual to show the real time monitored records.	• Findings of the real-time ambient air quality monitoring findings and data are displaying at BIFPCL's Website and Gate No. 02 of MSTPP for mass people's understanding on the environment quality issues. To fulfill the condition, it is suggested to onboard the web-based MIS of real-time monitoring data with accessibility to every individual. • DoE has set up an AAQMS placed in Project Area (Padma Abashan) and real time monitoring data of environmental parameters displaying at the Department of Environment. • Water quality monitoring data are portraying in the Quarterly Monitoring Report (QMR) on a regular basis.	Compliance action initiated
38	JVC should provide all sort of logistics support to DoE and other relevant agencies for monitoring environment related items/events.	The Proponent is providing all sorts of logistic support to DoE as and when required along with other relevant agencies for monitoring of Plant construction activities and environmental items/events maintain the health and safety protocol of the construction site.	Being complied
39	No ground water should be allowed to use for plant purposes.	The Power Plant has been designed considering withdrawn of surface water for all stages of project development and operation. In this regard, two (02) RO plants have been constructed and operated to fulfill the requirement of plant and potable water. There is no provision of withdrawing ground water for any purposes of the Plant, However, there is a deep tube-well installed for construction purposes, which being pertained purely for testing.	Being complied
40	Conduct stakeholder meetings on regular basis for better performance of the Project as a whole.	One Community Liaison Officer (CLO) is assigned to work continuously to develop relations with local communities and inform them about the project activities and environmental protection measures. Besides a third-party monitoring body is also carrying out consultation with the local	Being Complied

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
		people with interviews on regular basis for better performance of the Project as a whole.	
41	Additional Environmental baseline data to be collected as suggested in the EIA report and conveyed to DoE and other concern authorities.	All quarterly monitoring reports containing the contemporary data are being collected as suggested in the EIA study and are disseminating to DoE and other concerned authorities as instructed. The baseline data refer to the information collected during the pre-construction phase of the project.	Being Complied
42	The Environmental Management Plan under the EIA study shall strictly be implemented and kept functioning on a continuous basis.	BIFPCL has been implementing all the EMP measures realistically phase by phase as suggested in EIA report and DoE condition. The status of EMP implementation is also regularly monitored. Based on the monitoring, proponent updates the site specific EMP to manage the potential impacts.	Being Complied
43	The Project authority shall submit a detail work plan with time schedule of development activities at least 7 (seven) days ahead of the work commences in the field to the Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously.	Though most of the construction works is now finished, BIFPCL is still committed to follow the practice of submitting the detailed work plan to the prescribed offices of DoE, seven (7) days before starting any construction activities (if there is any). This practice will be continued till the end of the project.	Being complied
44	Environmental Monitoring Reports according to specific format specified in the EIA Report shall be made available simultaneously to DoE Bagerhat District Office, Khulna Divisional Office and Headquarters on a monthly basis during the construction period of the Project.	Environmental Monitoring Reports as per specific format provided in the EIA Report made available by BIFPCL and submitted to DoE Bagerhat District Office, Khulna Divisional Office and Headquarters accordingly.	Being Complied
45	The following records must be kept in respect if any samples required to be collected for the purpose of environmental monitoring activities: • The date(s) on which the sample was taken; • The time(s) at which the sample was collected; • The point at which the sample was taken; and • The name of the person who collected the sample.	The Monitoring report keeps all the records as suggested.	Being Complied

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
46	The results of any monitoring, required to be conducted under this EIA report must be recorded.	BIFPCL has been collecting all the monitoring data and submitting with proper documentation and accordingly sharing with DoE on regular basis.	Being Complied
47	In case of any emergency, the following information shall be immediately reported to Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment (DoE) simultaneously. Nature of incident (oil spill, fire, accident. Collision, land slide, etc.). Personnel affected (injured, missing, fatalities, etc.). Emergency support available and its location (standby transport, medical facilities, etc.). Weather conditions Current operations (abandoning the site, firefighting, etc.)	• To improve the safety system, the Proponent used to practice immediate sharing of the information to Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment (DoE) simultaneously in case of any emergency. • The recent dengue outbreak has been considered a top priority by the authorities. To prevent the dengue outbreak, the proponent has taken some precautionary measures, like fogging for mosquito control, admonishing all project personnel to close their windows after sunset, using mosquito nets, etc.	Mostly Complied Suggested to take initiatives to control Dengue outbreak
48	The Project authority or its employees must notify the department of Environment of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident.	BIFPCL has established a proper mechanism for recording such incident as suggested and notify the department of Environment regarding incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident.	Being complied
49	All pollution incidents shall be reported immediately and simultaneously to the Bagerhat District Office, Khulna Divisional Office and Headquarters of DoE.	BIFPCL has established a proper mechanism for recording such incident as suggested in the ERP	Being complied
50	Appropriate permission would require to be obtained from the Forest Department in favor of cutting/felling on any plant/tree/sapling forested by any individual or government before doing such type of activity.	There is no need of cutting/felling down of any trees outside the project boundary. However, in future, if any such case arises, BIFPCL is committed to obtain appropriate permission from the Bangladesh Forest Department (BFD).	Being complied
51	Re-vegetation and re-plantation under green belt activities shall be undertaken in consultation with the Forest Department according to those mentioned in the EIA report.	An MoU was signed between BIFPCL and Forest Dept., Bangladesh on 24.02.2015 for implementation of the Afforestation Program. The initial target was to plant 3 lac saplings. The Proponent is committed to reach up to the plantation of two (02) lac saplings by the year 2025. During this quarter (May to July), 19,000 saplings have been planted which includes fruit trees, coconut trees and medicinal plants. In total 175,000 saplings	Being Complied

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
		have been planted so far out of 300,000 saplings under this plantation program.	
52	Climate Change impacts and maximum storm surge height shall have to consider at the design and construction phase.	The design level (elevation) of the land and earthen embankment has designed and constructed considering the climate change impact and maximum storm surge height.	Being Complied
53	A separate EIA/morphological study shall have to be conducted for coal transportation and river dredging to develop sound environmental management plan towards conservation of ecosystem and biodiversity.	Coal transportation activities is done through the existing maritime route, which is controlled by Mongla Port Authority (MPA). M/s. Institute of Water Modelling (IWM) has already completed the EIA study for the dredging activity and submitted the report to MPA. A separate EIA study for Coal Transportation was conducted by M/s. Center for Environment and Geographic Information Services (CEGIS) which has approved by DoE.	Being Complied.
54	A full-fledged institutional setup for EHS and CSR must be put in place before operation of the Power Plant.	• Due to a full-fledged institutional setup for EHS activities, no major incident has been occurred since April, 2021. • The proponent has been conducting Corporate Social Responsibility (CSR) activities regularly, where the target beneficiaries are the affected people along with other destitute people. • They have been planning to expand the CSR activities in larger extent to involve active and passive stakeholders living around the power plant. The plan also involves rigorous CSR activities so that manpower is generated in the area to be eligible to work at the greater horizon of the employment market home and abroad.	Being complied
55	The Project authority shall extend active cooperation to DoE officials to facilitate their visit to the site as and when necessary.	BIFPCL is extending its all-out cooperation to DoE.	Being Complied
56	Violation of any of the above conditions shall render this approval void.	Noted by BIFPCL	Being Complied
57	Any injunction on this Project from the Honorable Supreme Court/High Court Division shall render this approval void.	Noted by BIFPCL	Being Complied

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
58	Without installation of 275 Meter Height Chimney, Effluent Treatment Plant (ETP), Waste Water Treatment Plant (WWTP), Settling Pond, Desalinization Plant, API Oil Water Separator, High Efficiency Electro Static Precipitator (ESP), 'closed-loop' Flue Gas Desulfurization (FGD), Low NOx Burner, online air and water quality monitoring system and other pollution control equipment and obtaining Environmental Clearance Certificate, the proponent shall not start operation of the Project.	**Current status:** • Chimney: Under operation. • DM water plant: Under operation. • Effluent Treatment Plant (ETP): ETP is under operation • API Oil Water Separator: This is a part of ETP which is under operation. • The Sewage Treatment Plant (STP): Under Operation • Electro Static Precipitator (ESP): Both units are Under operation • Flue Gas Desulfurization (FGD): Both units are under operation. • Solid Waste Management Plant (SWMP): Under operation • Desalinization plant: Under operation • Low NOx burner: Under operation • **Online air and water quality monitoring system:** and water quality analysis system has already been installed. For air quality monitoring DoE has already installed one device to monitor the online air quality data at Project Area (Padma Abashan), and four (04) other devices has installed by BIFPCL around the plant premises which is now fully functional. • Settling pond: Two (02) settling ponds has already been constructed to settle down the silt before discharge in to the river.	Being Complied
59	This EIA Approval has been issued with the approval of the appropriate authority.	BPDB and BIFPCL are thankful to DoE.	Complied

Compliance to the conditions of DoE (EIA study of Coal Transportation)

However, with reference to the approval of EIA study of coal transportation for 2x660 MWMSTPP having (Memo no: DoE/clearance/5532 /2016/50, dated 31/01/2018), Department of Environment has set some specific conditions to be followed as a fulfillment of the condition no.53 of the EIA approval letter of 2x660 MWMSTPP.

Table 5.6: Compliance conditions of DoE (EIA study of Coal transportation)

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
1	This EIA Report is approved only for Coal Transportation for the Proposed 2x660 MW Maitree Super Thermal Power Plant Project. Any modification of this project as well as Coal Transportation will require further EIA approval with additional EIA Study.	BIFPCL will notify to DoE prior to initiation of any modification, expansion or extension of the Power Plant and the alteration of coal transportation route.	Suggested to comply as and when required.
2	The route of coal Transportation should be maintained as per EIA Report. In case of any changes the proponent must obtain consent from DoE.	The route of coal Transportation is maintained as stated in the EIA report. In case of any changes in the transportation route, the proponent shall obtain consent from DoE.	Suggested to comply as and when required.
3	Project Proponent may open L/C (Letter of Credit) for importing machineries for the project which shall also include machineries relating to waste treatment plant and plant and other pollution control devices.	All the Power Plant related equipment and machineries including the waste management treatment plant and other pollution control devices have already been imported and installed in the MSTPP premises.	Complied.
4	The activity under Coal Transportation for the Proposed 2x660 MW Maitree Super Thermal Power Plant Project shall not release any pollutant that affect human health or will have damaging impact on the environment or natural resources.	• Conventionally, the coal carrying mother vessels are IMO certified vessel. So, as per the compliance of IMO regulation, no untreated waste/pollutant is released into the open environment that may affect human health or will have damaging impact on the environment or natural resources. • As per the EIA, the lighterages are also should be the IMO regulated vessels or vessels should be complied with national rules and regulations. However, the vessels observed anchoring and unloading at the MSTPP jetty, sometimes found uncovered. This may cause the deterioration of the water quality of the river by dispersing the coal dust.	Suggested to use IMO regulated vessels or maintain the specifications of lighterage stringently. It is advised to set tarpaulin at the joining area of vessel and jetty.

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
5	Proper and adequate mitigation measures shall be ensured throughout the operation period of the Project	The project proponent has included all the mitigation measures in the BID document of Coal Transportation as suggested in the EIA study. In this regard, MSTPP authority has set up an Environment and Fire & Safety Wing to ensure the EMP implementation for the project life span.	Complied
6	Any heritage site, ecologically critical areas, and other environmentally, religious and archaeologically sensitive places shall be kept protected during project operation.	In the monitoring corridor, there is no religious and archaeological sites. However, the Southeast Sundarbans World Heritage Site (WHS) and the Sundarbans Ecologically Critical Area (ECA) are fallen in this corridor. Considering the sensitivity of these environmentally and ecologically important areas, a regular quarterly monitoring is being done at the close proximity of the WHS and ECA. The changes in environmental quality if any will be apparent in the quarterly monitoring data, which in turn will support in undertaking corrective measures in protecting the WHS and ECA in future during the operation of coal transportation.	Being complied.
7	Environment friendly construction and development practices shall be followed that minimize loss of habitats and fish breeding, feeding and nursery sites.	The installations related to the coal transportation system were the site slope protection and jetty at the project site. The site slope protection is considered for protecting sliding of land. During the installation of jetty, the authority followed the best practices, EMPs of EIA of Coal Transportation Report, national and international rules and guidelines. Since, the environmental monitoring indicators did not show any visualized anomalies, it can be concluded that the construction work was accomplished in an environment friendly manner.	Complied
8	Proper and adequate sanitation facilities shall be ensured in labor camps throughout the proposed project period.	The sanitation facilities in the laborer Shed have been meeting the sanitation requirements adequately.	Complied
9	Proper and adequate on-site precautionary Measures and safety measures shall be ensured so that no habitat of any flora and fauna would be endangered or destructed.	All the completed construction works including the Jetty has conducted in accordance with the EMP guidelines stated in the EIA report. As a part of the on-site precautionary measures, scraps were kept organized without hampering any floral and faunal biodiversity at the jetty site. However, it is under a clearing process.	Being Complied

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
10	All the required mitigation measures Suggested in the EIA report along with the emergency response plan are to be Strictly implemented and kept operative/functioning on a continuous basis.	The mitigation measures for environment health and safety are being followed according to the EMP recommendations stated in the EIA Report. An Emergency Response Plan (ERP) prepared under this project is being implemented.	Being complied
11	To control dust, spraying of water over the earthen materials should be carried out from time to time	An external company has been engaged to spray water to suppress fugitive dust from the earthen materials at the jetty site along with the whole plant premises. A quarterly air quality monitoring in and around the project sites including the jetty site is being conducted and compared with standards as per Air Pollution (Control) Rules, 2022.	Being Complied
12	The entire coal handling system should be designed as an enclosed (and not only covered) conveyor system. There should be integrated dust control system with dust extraction and bag filters at unloading areas and at each transfer points on the conveyor system.	The entire coal handling system is designed and constructed as an enclosed conveyor system as per the guidance of the EMP and DoE requirements. Integrated dust control system with dust extraction system/bag filter and dust suppression system at crusher house, unloading points, transfer points are being maintained as stated in the contract package. Due to technical reason, 25 m of the conveyor system at the jetty site was kept uncovered. The Proponent is committed to suggest the vessel owner to abstain from ship-to-ship transfer without taking proper measures for arresting fugitive dust. Among the potential measures, the important ones are: • Fringe: The coal delivery pipe of the conveyor belt when tranship coal from one barge to another should be equipped with fringe. • Netting: Fine-meshed netting around the conveyor belt at the dump barge should be installed covering the sides to the extent possible so that no or limited dust is dispersed outside. • Water spraying: Dust suppression mechanism should be installed at the beginning of the conveyor belt to limit the dispersion of the coal dust in the open environment.	• Among the measures suggested by the proponent, the netting around the conveyor belt at the dump barge has already installed. • Being complied
13	Coal should be stored in a covered storage yard.	There are four (04) coal stockyards for storing coal having Coal Stacker and Reclaimer facilities.	Complied

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
14	The entire coal stockyard should be Covered with water sprinkler provided with automated moisture sensor to control self-combustion.	The entire coal stockyard is fully covered and automated moisture sensor has been provisioned to protect coal self-combustion, which is under operation.	Complied
15	Construction material should be properly disposed of after the construction work is over.	Except scraps, construction materials are already removed from the site. Whatever materials are observed those are coming from the repairing sites.	Being Complied.
16	As described in the report environmental monitoring should be strictly followed and monitoring report should be shared with DOE to ensure the environmental management properly.	The Plant Authority engaged an Independent Monitoring Agency (IMA) as per the suggestion of EIA Report to conduct environmental and social monitoring from February 2014. For ensuring the environmental management properly, the Department of Environment (DoE) has been kept informed by sharing quarterly monitoring report, which is also available at BIFPCL's website.	Being Complied.
17	A third party / independent monitoring bodies excluding BIFPCL should be engaged immediately for monitoring of all the activities during pre-construction, construction and operation phases as per monitoring plan of EIA report and monitoring report must be submitted to Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously.	The Proponent has engaged an IMA from February 2014 for covering all phases of the project. From then on, Consultant has been conducting the monitoring programs quarterly and producing monitoring reports on regular basis which are submitted to BIFPCL for onward submission to the Bagerhat District Office, Khulna Divisional Office and Headquarters of DoE as directed.	Being Complied
18	Regular monitoring of the susceptible places of the Sundarbans for protecting ecosystem, biodiversity and forest coverage should be made using latest high-resolution image for keeping ambient environment.	The monitoring team has been conducting analysis of ecosystem, habitat, and biodiversity and forest coverage at the susceptible sites of the Sundarbans in connection with the project. The habitat and forest coverage analyses have been conducting using high resolution (10m) Sentinel satellite image. This analysis will help in understanding the forest coverage condition and taking necessary measures for keeping up the ambient environment of the forest. In addition to this, Forest Department has also suggested some survey & analysis of Sundarbans ecosystem along with the quarterly compliance monitoring report.	Being Complied.

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
19	Air, water, soil, biological and social data should be monitored regularly with a network monitoring system with a view to assess the natural quality of the Sundarbans and other fragile ecosystem and report of monitoring results should be submitted to Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously.	The IMA has been conducting quarterly monitoring involving environmental quality (i.e., air, water, noise and soil), biological and social resources with a view to assess the natural quality of the Sundarbans and other associated fragile ecosystem. DoE has installed an online air quality monitoring device at the Township area to monitor air quality continuously. The proponent has installed four (04) air quality monitoring devices around the plant premises, which measure SPM, SO_2, CO, NO_2, O_3 etc. are being monitored. The quarterly environmental and social monitoring reports are shared with Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously. The reports are also available on the BIFPCL website.	Being Complied.
20	There should be regular disclosure of the report through workshops and websites and responses should be taken care accordingly.	The quarterly environmental monitoring reports are disclosed to a wider group people by making available on the website of BIFPCL (www.bifpcl.com). The IMA and BIFPCL are regularly carrying out public consultations at local level severally to get the responses of the community.	Being Complied.
21	BIFPCL should provide all sorts of logistics support to DOE and other relevant agencies for monitoring environment related items / events.	The proponent through IMA has been facilitating DoE and other relevant agencies quarterly by providing logistics support to monitor the coal transportation route along with the susceptibility and fragility of the Sundarbans. The Proponent is committed to provide any kind of relevant support to DoE as and when required.	Being complied.
22	In order to control noise pollution, vessels and equipment shall undergo regular maintenance; working during sensitive hours and locating machinery close to sensitive receptor shall be avoided.	The rotatory machinery uses in the jetty are under regular maintenance. Being the IMO regulated vessels, they usually practice all kinds of environment friendly compliances including avoiding sensitive hours and locating them close to the sensitive receptors.	Being complied.
23	Vessels of this project should follow the MPA guidelines and protocol to ensure no hindrance to other vessels.	All the project related vessels and coal carrying ships are abiding by the MPA guidelines and no issues so far raised regarding hindrance to other regular vessels.	Being complied.
24	The vessels used for this project should maintain IMO criteria to enable identification	Being the IMO regulated vessels, they usually identify and sort out the substances harmful to the marine environment and	Being complied

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
	of substances harmful to the marine environment.	manage them maintaining the guidelines of IMO.	
25	All the vessels should follow applicable MARPOL Convention, Appendix V on the prevention of pollution by garbage from ships.	The vessels used in coal transportation are IMO regulated and strictly maintain MARPOL Convention to handle the garbage of the ships.	Being complied.
26	Additional Environmental baseline data to be collected as suggested in the EIA report and conveyed to DoE and other concern authorities.	The data collected during the quarterly monitoring held in the preconstruction period are considered as the additional environmental baseline data. The collected data were analyzed, standardized and conveyed to DoE quarterly.	Complied
27	The Environmental Management Plan under the EIA study shall· strictly be implemented and kept functioning on a continuous basis.	The Proponent has so far been implementing the EMP measures in phases as suggested in the EIA Report and conditions imposed by DoE. The status of EMP implementation is also regularly monitored by CEGIS as the IMA so that it can be maintained strictly.	Being Complied
28	The project authority shall submit a detail work plan with time schedule of development activities at least 7 (seven) days ahead of the work commences in the field to the Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously.	The Project Authority has been sharing the detailed work plan with time schedule of development activities as per the suggested timeline before starting of any construction activities to the Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously. This is to be noted that, most of the facilities are in operation now.	Being complied
29	Environmental Monitoring Reports According to specific format specified in the EIA Report shall be made available simultaneously to DOE Bagerhat District Office, Khulna Divisional Office and Headquarters on a quarterly basis during the project period.	Environmental Monitoring Reports are being generated as per the specific format suggested in the EIA from the beginning till now. The contents of the reports are disclosed by the Proponent at their website regularly and submitted to DoE Bagerhat District Office, Khulna Divisional Office and Headquarters as well.	Complied
30	The following records must be kept in respect of any samples required to be collected for the purposes of environmental monitoring activities: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected;	The IMA has been maintaining all the records as suggested.	Being Complied

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
	c) the point at which the sample was taken; and d) The name of the person who collected the sample.		
31	The results of any monitoring required to be conducted under this EIA report must be recorded.	The IMA has been maintaining a database for preserving all monitoring data and analysis results and submitting to the Proponent through proper documentations.	Being Complied
32	In case of any emergency, the following information shall immediately be reported to Bagerhat District Office, Khulna Divisional office and Headquarters of the Department of Environment (DOE) simultaneously: a. Nature of incident (oil spill, fire, accident, collision, land slide etc.) b. Personnel affected (injured, missing, fatalities, etc.) c. Emergency support available and its location (standby transport, medical facilities, etc.) d. Weather conditions e. Current operations (abandoning the site, firefighting, etc.)	The incidents, as mentioned in the conditions if happen, are addressed in the Quarterly Monitoring Report. The concerned authorities are usually informed about the incidents once reports are submitted to them.	Being complied
33	National Oil Spill Contingency Plan (NOSCOP) should be followed to establish an organizational structure to combat marine pollution	The Proponent is much aware about NOSCOP and committed to follow the plan strictly to protect the marine pollution.	Being complied
34	The project authority or its employees must notify the Department of Environment of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident.	The proponent has formed an E&S Wing to strengthen the mechanism to notify DoE regarding incidents causing or threatening material harm to the environment as soon as possible once the concerned person(s) becomes aware of the incident. As mentioned above, the IMA also flags the incident if happen in the quarterly monitoring report.	Being complied
35	All pollution incidents shall be reported immediately and simultaneously to the Bagerhat District Office, Khulna Divisional Office and	As above.	Being complied.

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
	Headquarters of the Department of Environment (DOE) in Dhaka.		
36	Climate Change impacts and maximum storm surge height shall have to consider at the design and construction phase of the jetty.	The maximum storm surge height has been considered in designing and constructing the jetty.	Complied
37	The transshipment point Faraway Buoy at the Bay should be used from November to March, and Mazhar point should be used from April to October every year for transporting coal which has been mentioned in the EIA Report.	The Proponent is abiding by the guidance of the EIA Report except for transshipping at Harbaria and sometimes at Kutubdia (in rough weather) instead of Mazhar Point. However, since the Passur River Route is under the jurisdiction of the Mongla Port Authority, so coal transshipment should be conducted with their guidance.	Mostly complied.
38	Violation of any of the above conditions shall render this approval void.	The Proponent is much aware about the conditions.	--
39	Any injunction on this project from the Honorable Supreme Court/High Court Division shall render this approval void.	Noted by the Proponent.	--
40	This EIA approval is valid for one year from the date of issuance and the project authority shall apply for renewal to the Bagerhat District Office of DoE at Bagerhat with a copy to Head Office of DOE in Dhaka.	The authority is maintaining the renewal process as suggested.	Being complied

5.2 Evidence based Environmental and Social responsibility

Along with meeting all regulatory compliance requirements, including implementing the Environmental Management Plan (EMP) and fulfilling the conditions set by the Department of Environment (DoE), the Maitree Super Thermal Power Plant (MSTPP) has also undertaken several voluntary initiatives that go beyond statutory obligations. These voluntary activities demonstrate MSTPP's commitment to the society through a proactive approach for promoting environmental awareness and education and boldness in exposing such a Key Point Installation (KPI) to the public as it bears the slogan of safeguarding environment.

Plant Visit and Industrial training

To dispel misconceptions and promote transparency, MSTPP encourages environmental organizations, journalists, and academic institutions to conduct on-site inspections at any time, subject to prior permission from the plant authority. In line with this open-door approach, several academic groups have already visited the facility for educational and research purposes, including the Department of Geography and Environment, University of Dhaka (2 May 2025); the Department of Mechanical Engineering, KUET (24 June 2025); the Department of Oceanography, University of Dhaka (24 June 2025); and two groups from the Department of Environmental Impact Assessment, North South University (10 and 12 July 2025). The Department of Environment unit at MSTPP warmly received the visitors and guided them through the entire plant, showcasing operational systems and key environmental control technologies such as the Flue Gas Desulphurization (FGD), Low NOx Burner, Electrostatic Precipitator (ESP), Effluent Treatment Plant (ETP), Sewage Treatment Plant (STP), and Solid Waste Management Plant (SWMP), FGD Water Treatment Plant (FWTP), etc. The visiting teams shared positive feedback with the plant authority, noting that MSTPP's operations appeared well-managed and environmentally compliant.

Creative Writing Contest

To celebrate World Environment Day (5 June), MSTPP organized a series of awareness-focused activities, including essay, slogan, poster, and painting competitions for BIFPCL employees and their children on 23 June 2025. This initiative was designed to engage participants in understanding the significance of environmental protection and to inspire a sense of responsibility toward conserving natural resources. Through these competitions, participants gained greater awareness of the importance of safeguarding the environment that supports and foster the proponent's commitment to operating the plant responsibly and in an environmentally conscious manner.

Certifications

MSTPP has recently achieved certification under ISO 9001:2015, ISO 14001:2015, and ISO 45001:2018, demonstrating its commitment to quality management, environmental stewardship, and occupational health and safety. The certification process confirms that the plant has established and running in a structured systems for operational control, documentation, monitoring, training, and continual improvement. As part of the compliance assessment, relevant manuals, standard operating procedures, risk assessments, and monitoring records were examined and verified to be in effective implementation. Internal audits, corrective actions, and management reviews have been conducted as required, indicating the existence of a functioning and matured management system. Overall, MSTPP's recent ISO certifications provide assurance that the plant is operating in accordance with internationally recognized best practices for quality, environmental management, and occupational health and safety performance.

Environmental Impact Assessment Department, NSU

Environmental Department, University of Dhaka

Bureau Veritas Certification

BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED
(A Joint Venture of BPDB & NTPC Limited)

2X660 MW MAITREE SUPER THERMAL POWER PROJECT: VILLAGE: SHAPMARI-KATHAKHALI, RAJNAGAR UNION AND KHOIGAR-DASHKATHI, GOURAMVA UNION, THANA & UPAZILA: RAMPAL, DISTRICT: BAGERHAT-9340, BANGLADESH.

(**Head Office:** Unique Heights (Borak), Level – 17, 117 Kazi Nazrul Islam Avenue, Eskaton Garden, Dhaka-1000, Bangladesh.)

(This is Multisite)

Bureau Veritas Certification Holding SAS – UK Branch certifies that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the Management System Standards detailed below.

Standards

ISO 9001:2015, ISO 14001:2015 & ISO 45001:2018

Scope of certification

GENERATION OF ELECTRICITY AND SUPPLY TO THE NATIONAL GRID

Original cycle start date: **25 October 2025**
Certification cycle start date: **25 October 2025**
Subject to the continued satisfactory operation of the organisation's Management System, this certificate is valid until: **24 October 2028**
Certificate No. **IND.25.2423/IM/U** Version: **1** Issue date: **25 October 2025**

Signed on behalf of BVCH SAS UK Branch
Dr. JN MANAN
Director – CERTIFICATION, South Asia
Commodities, Industry & Facilities Division

UKAS

ISO certification

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Appendices

Appendix I: Checklist of Monitoring Environmental Compliances

Table A: Checklist of Monitoring for ESMP Implementation (During Construction Phase)

Sl No	Potential Impacts	Proposed EMP	Actual Implementation	Recommended Action	Compliance Status
1	Generation of Noise within the BIFPCL's Plant premises	• Conduct noise survey around and inside the site boundary • Reducing Noise and Vibrations to country's ambient standards, and occupational health and safety standards • Introducing vehicle speed limit and speed limit monitoring system • Green Plantation around the Project boundary • Switching off/ throttling down of machines/equipment's/generators which are not in use			
2	Dust Generation from Land development activities and other construction works	• Conducting dust monitoring and visual inspection around the site boundary • No use of earthen and undeveloped roads by vehicles related to the Project use • Installation of water spraying system to control fugitive dusts • Introducing vehicle speed limit and speed limit monitoring system • If yes, do they monitor vehicle speed regularly?			
3	Water Quality	• Fencing the construction site by drum sheet or Tarjja of any other fencing • Arrangement of runoff drainage for reducing any water logging • Location of backfilling stockpile in safe area and protected from wind and rain action • No storing of backfilling materials/spoil stored on river bank/slope • No disposal of waste and wastewater to river or canal.			
4	Waste Management System	• Provision of onsite waste management system			
5	Compensation and Resettlement	• Prepare Proper resettlement action plant and compensation plan if the Project needs any land acquisition addressing compensation, restoration, livelihood, living standards etc. based on proper socio-economic studies			

Sl No	Potential Impacts	Proposed EMP	Actual Implementation	Recommended Action	Compliance Status
		• Resettlement of the PAPs • cash for compensation of land (CCL) before resettlement • formal agreement with the affected people prior to migration/resettlement • Sufficient standing crop compensation • Compensation for shift able structures? • Retention of salvageable materials? • Compensation for loss of trading income? • one-time moving assistance • grant to cover loss of regular wage income • Has a resettlement plan been developed which includes compensation, restoration, livelihood, living standards etc. based on proper socio-economic studies? • Provide/take extra care/caution for the disadvantaged/vulnerable group(s) (i.e., women, children, ethnic minorities, indigenous people etc.) • Provision of monitoring the compensation and resettlement process			
6	Livelihood and living	• Does the Project pose any threat to the livelihood/living standards of the local people? • If yes, are adequate steps taken to reduce the impacts? • Has the company developed any policy which prioritizes the local laborers in employment opportunities? • Is there any possibility that large vehicle related to the Project will cause traffic induced disturbance/s to the local dwellers? • If yes, are there any mitigative steps taken to decrease the disturbance/s? • Has the road network been developed after the Project being proposed and during the construction phase? • Are there separate water and sanitation facilities for the construction workers in the Project area?			

Sl No	Potential Impacts	Proposed EMP	Actual Implementation	Recommended Action	Compliance Status
7	Green House Gas Controlling Measures	• Use of efficient generator in the construction activities • Regular maintenance of vehicles, generator and machinery in accordance with manufacturer's specifications • Use of approved pollution control devices fitted in the equipment's and machineries • Switching off and throttling down the machines/equipment's/generators which are not in use			

Table B: Checklist of Monitoring ESMP Implementation (During Construction Phase)

(Labor and Working Condition)

Basic Data

Sl No	Description	Values
1	Direct Workers	
2	Contracted Workers	
3	Supply Chain Workers	
4	Child labor	
5	0 - 12	
6	13 - 14	
7	14 - 18	

Checklist for Labor and Working Condition

Sl No	Potential Impacts	Proposed EMP	Actual Implementation	Recommended Action	Compliance Status
1	Working Conditions and Management of Worker Relationship	• Preparation of Human Resources Policies and Procedures for Direct workers • Defined Working condition and Terms of Employment for direct worker • Sustainably equivalent terms and condition for migrant workers • Compliance to national law of forming workers' organization • No discrimination and equal opportunity for all • Measures for diminishing past discrimination • Grievance Mechanism			
	Protecting Workforce	• The client will not employ children in any manner that is economically exploitative, or is likely to be hazardous or to interfere with the child education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. • No Force Labor			
2	Safety at site	• Installation/Construction of Safety Fence around the Project area • Use of Personnel Protective Equipment (i.e. safety suit, safety goggles, ear plug, safety shoes, gloves, dust mask, etc.) • Safety trainings for workers (i.e. fire control, working at height, working in heat, first aid etc.) • Practice of Tool box meeting, safety talks, • Safe Storage of Hazardous Chemicals (e.g. fuel, flammable chemical, toxic chemicals, etc.) • Maintaining Material Safety Data Sheet (MSDS) • Provision of Health care facilities such as doctor, hospital etc. available at/nearby the plant construction site • Availability of First Aid at work place • Preparation and Follow of Emergency Response Plan			

Sl No	Potential Impacts	Proposed EMP	Actual Implementation	Recommended Action	Compliance Status
		• Adequate fire precautions in place (for example, fire extinguishers, escape routes etc.) • Documentation and reporting of occupational accidents, diseases, and incidents • Policies and procedures for managing and monitoring the performance of third-party employers in relation to OHS			
3	Occupational Health and Safety Procedure	• Provision of complete EHS division in the Human Resources Planning/Organogram • Preparation of Safety Policy to be adopted during plant operation			
4	Worker's Well Being	• Establishment Grievance Mechanisms • Ensuring fair treatment, non-discrimination and equal opportunity • Compliance of Project's labor policy with the national labor law • No Child Labor • No incident of forced labor • Provision of Welfare facilities for Worker/Labor			

Table C: Checklist of Monitoring ESMP Implementation (During Construction phase)

(Community Health, Safety and Security)

Sl No	Potential Impacts	Proposed EMP	Actual Implementation	Recommended Action	Compliance Status
1	Disturbance to nearby community due to dust from newly developed land and Noise from construction activities	• Construction of boundary wall around the Project are • Installation of water spraying system to control dusts • Conducting dust monitoring and visual inspection around the site boundary • Adoption of Noise management plan			
2	Grievance of local people	• Availability and operation of Grievance Redress Mechanism • Maintaining open communication channel with the local community			

Sl No	Potential Impacts	Proposed EMP	Actual Implementation	Recommended Action	Compliance Status
3	Risk of breaching Community Safety	• Construction of boundary wall/safety fence around the Project area • Practicing Risk Assessment and Evaluation Process • Practicing safe management for hazardous materials which may pose threat to the community • Availability and operation of Emergency Response Plan • Maintaining open communication channel with the local community • Training and instruction to the security personnel about their behaviour and communication with the local people • Aware the security personnel about the right of the community people			
4	Community Health Risk	• Provision of providing health service facilities to community if the Project possess any health risk like sexually transmitted disease, communicable disease, vector-borne diseases • Implement all pollution mitigation measures to ensure safeguarding to community			***(Continued)***
5	Youth Employment	• Providing training/awareness program for the local youth to let them aware about the required qualification to get involved in the Project related activities			
6	Public Communication, Consultation and Awareness	• Arranging public communication/consultation meeting • Sharing of Project information with local people • Organizing environmental and social awareness programs/meetings			

Table D: Checklist of Monitoring ESMP Implementation (During Construction phase)

(Biodiversity and Sustainable Management of Living Natural Resources)

Sl No	Potential Impacts	Proposed EMP	Actual Implementation	Recommended Action	Compliance Status
1	Runoff (contain mostly sediment load) from newly developed land falls into nearby river and channel.	• Installation of proper run on/runoff drains • Use of sediment fences, traps and basins for trapping the sediment, if required			
2	Disturbance to nearby ecosystem due to different construction activities	• No cutting/ felling of trees along the river bank • Implementation of on-site waste and air quality management plan • Limiting soil extraction activities limited within the defined area • Limiting the vegetation clearance and base stripping process within the Project boundary • Safety fence around the construction site • Limiting the use of night light • Using shade (directed downwards) around the outdoor lights • Provision of cut-off time to switch off unnecessary lights at night • Initiate Green plantation • No plantation of non-native species • Retaining top soil for future habitat restoration • No degradation of critical habitat?			
3	Occupation of river, inter-tidal areas and wetlands	• No encroachment of inter-tidal flood plain area • No disturbance to Dolphin community • Monitoring of Ecosystem Health and Monitoring of Sundarbans Forest Health • If required, embankment should be constructed considering a setback distance from river/canal bank • Slope protection work along the Moidara River should be completed on an urgent basis before rainy season come and • BIFPCL may take initiatives of excavating of silted reach of Moidara river near proposed township area to facilitate proper functioning of River for maintaining tidal dynamics			

Appendix II: Photo Album

Environmental and Socio-economic Monitoring of Khulna 2×660 MW Power Plant for 45th Monitoring Program (July 2025)

Monitoring Team

Monitoring of Noise Quality

Collection of Groundwater Sample

Collection of Foret Data

Fisheries Resources Monitoring

Measuring Surface Water Samples

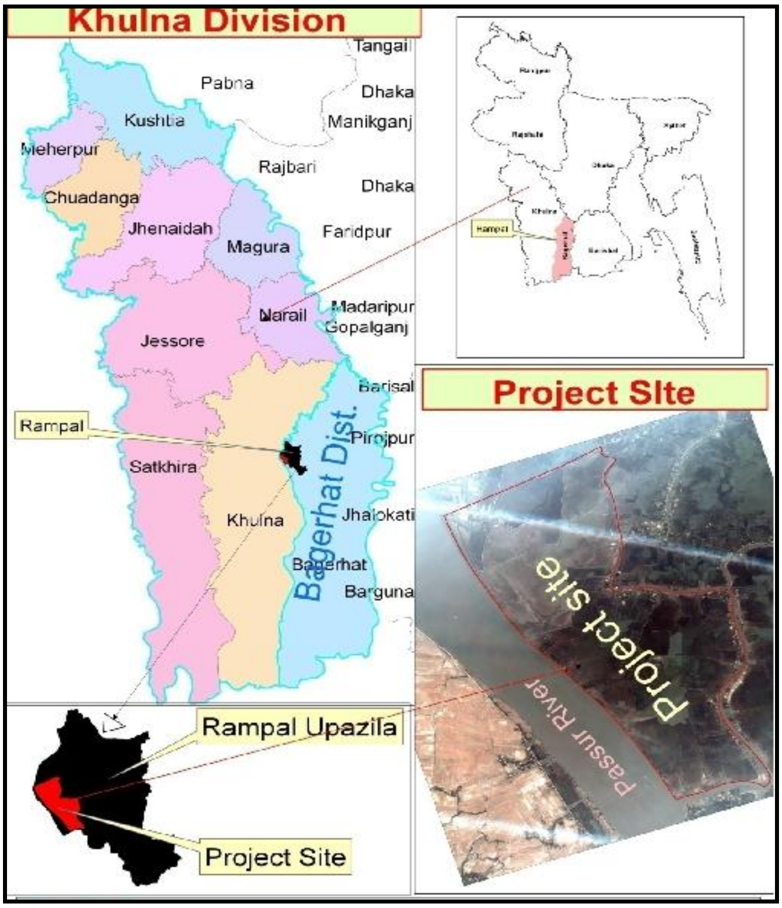
Counting Data of Saplings

Appendix III: Terms of References (ToR)

Background

Bangladesh-India Friendship Power Company (Pvt.) Ltd. (BIFPCL), a 50:50 Joint Venture Company of Bangladesh Power Development Board (BPDB) of Bangladesh & NTPC Limited of India, is implementing a coal-based thermal power plant named 2X660 MW Maitree Super Thermal Power Project at Rampal in Bagerghat District of Khulna Division of Bangladesh. The plant is envisaged to be based on super-critical technology and operated as Base Load Plant. The fuel envisaged is imported coal.

General Description of 2X660 MW Maitree Super Thermal Power Plant Project

Project Location:	Upazila: Rampal, District: Bagerhat Site is located at 23 kms Southward of Khulna City and 14 kms. North-Eastward from Mongla Port. 
Project Capacity:	1320 MW (2x660 MW), based on Ultra Super-critical Technology
Mode of Operation:	Base Load
Fuel:	Imported Coal
Fuel Transportation:	It is envisaged that imported coal from countries like Indonesia, Australia shall be transported through bigger ships, up to trans-shipment point,

	from where the coal shall be transported through barges to the coal unloading jetty at the plant end. From jetty to the power plant coal shall be transported through coal conveyor system.
Land& Land Development:	Based on the layout in the FR, it is estimated that approx. 575 acres of land will be required for the project. (375 Acres for Main Plant, 50 Acres for Township, 50 Acres for Jetty).
Evacuation of power:	Provision of line bays in generation switchyard for one no. 400 kV Double Circuit line and one no. 230 kV Double Circuit line have been kept. The Power evacuation (transmission line) system from the Project shall be at 400 kV level and will be outside the scope of the Project. 400 kV is being introduced for the first time in Bangladesh.
Expected Timeline for project implementation	The first unit of capacity 660 MW is scheduled to be synchronised in 41 months from the date of NTP to the EPC contractor for the Power project. Commissioning of the first unit of capacity 660 MW is envisaged at an interval of 5 months thereafter.

Broad Scope of Works

The study covers quarterly monitoring of different environmental and social parameters, and implementation of EMP (Environment Management Plan) during implementation phases as per DoE approval/requirement. The monitoring locations were selected based on physical activities, wind direction, sensitive receptors, etc. and were finalized through the consultation with DoE, Department of Fisheries (DoF), MPA and Forest Department (FD).

The Broad objectives of independent monitoring cover the following activities

- Monitoring implementation of EMP and environmental compliance;
- Monitoring of ambient air quality, noise level and water quality;
- Monitoring of cropping pattern and soil quality;
- Monitoring of fisheries resources covering fish habitats, biodiversity, migration and production;
- Monitoring of ecosystem and biodiversity;
- Monitoring of the Sundarbans Forest Health; and
- Monitoring of socio-economic condition and livelihoods.
- To evaluate the project environmental performance as due to construction activities.

The main objectives of this works are

- Monitoring of Social and Environmental parameters to update the baseline.
- Monitoring of Social and Environmental parameters during Implementation of the Project.
- Assistance to BIFPCL for implementation of Environmental Management Plan (EMP) during construction period.
- The scope of work of the Independent Monitoring will include the following specific tasks

- Develop specific monitoring indicators, checklists, and questionnaires to undertake independent monitoring (a preliminary list of monitoring indicators has been given in the EMP) in consultation with BIFPCL, DoE, Forest Department and the Financer;
- Review and verify the implementation progress of various EMP elements, particularly, mitigation plan, compliance monitoring, environmental trainings, documentation, and grievance redress mechanism;
- Physical aspects would cover air quality, noise level, water quality and land resources;
- Biological environment includes fisheries resources, ecological resources, Sundarbans Reserve Forest (SRF) health conditions including WHS;
- Environmental compliance monitoring includes Monitoring of Environmental and Social Management System Action Plan Implementation, monitoring of labour and working conditions, monitoring of community health, safety and security and monitoring of biodiversity and sustainable management of living natural resources.
- To establish baseline environmental conditions;
- Provide and monitor the environmental parameter during construction activities.
- To detect adverse environmental impacts for river dredging and other activities of site development;
- Provide technical assistance to the client for implementation of the EMP during the power plant construction at different sector of construction activities.
- To demonstrate whether the environmental control measures are operating as per designed;
- To provide data for emission inventories;
- To provide data at regular intervals for dissemination to the stakeholders
- To provide data for improvement and updating of the monitoring program;
- To assist in investigating the event of a trigger level or emission limit value being crossed.
- Update baseline data as per monitoring schedule and location.
- Provide technical assistance to the client for implementation of the EMP during power plant construction.
- Review the EIA document to evaluate the EMP measures incorporated in the contract to mitigate different social and environmental hazards and risks during construction of the Project
- Submit progress reports to the client.
- Physical observation to assess that all mitigation measures mentioned in EMP are carried out in all place.
- Sampling and carrying out necessary analysis of Environmental parameter such as surface & ground water quality, air quality, noise, Biological Environment, Socio-economic environment, Sundarbans Forest health etc. according to the monitoring framework in construction phase.
- Morphological changes of the adjacent river of the project will be influenced by the constructional activities. River bank erosion-accretion, drainage system, tidal inundation etc. will be investigate after regular intervals in the study area as per monitoring location of the EIA. The procedure of investigation and methodologies of analysis will be the same

as pre-construction phases. River bed pollution will be identified though this study during construction of the power plant.

- Monitoring of floral resources will be performed quarterly. The indicators and procedures of flora monitoring will be relatively same as earlier studies of this projects. Plant composition, canopy coverage, indigenous and exotic species, plant intensities will be the main monitoring indicators during construction phases.
- Monitoring of faunal resources will be performed quarterly at the construction period. Faunal resources survey will coincide with floral resources survey as it will provide more insight about the inter-dependency between flora and fauna in an ecosystem.
- Render any other related services as and when requested.
- Conduct community level consultation in a regular interval and disclose project level information.
- Keep liaison with different organization like Govt department, NGOs, and relevant stakeholders.

The Monitoring Parameter & Associated Indicator are Given Below

Monitoring Parameter	Indicators
Socio-economy	Livelihood and Occupation
	Income and expenditure
	Displacement and Migration
	Cultural and heritage
	Health and sanitation
	Risks and accidental assessment
	Transportation and communication
	Public and private Infrastructure development
Ecology and Biodiversity	Bio-indicator Assessment
	Movement of indigenous/ native species
	Envision of exotic species and regime dominance
	Species composition (Flora and Fauna)
	Assessment the services of dependent ecosystem
Agriculture	Land use and canopy coverage
	Soil quality (Salinity, pH, OM,)
	Cropping pattern and crop intensities
	Irrigation and crop production
	Farmers survey result
Fisheries	Fish diversity and specification
	Fish production and availability
	Fisher survey result
Noise level	Sound level at the sensitive zone
Water resources	DO, BOD, COD, Salinity, TDS, TS, pH, Hg, Pb

Monitoring Parameter	Indicators
	Total Hardness, Hg, NO_3 and PO_4
	River Morphology,
	Tidal inundation
	Drainage Network
	Erosion and Accretion
	Ground water quality
Air quality	SOx
	NOx
	SPM (PM_{10} and $PM_{2.5}$)
	CO

Air Quality Monitoring Progress

The most commonly used method for automatically monitoring air pollutant such as those above are:

- SOx: measured by Fluorescent signal generated by exiting SO_2 with UV light
- NOx: measured by Chemilumiscent reaction between NOx & O_3
- O_3: measured by ultra violet absorption analyzer, this determines the Ozone concentration by the attenuation of 254 nm UV light along this signal fixed path cell
- Particulate matter (SPM, PM_{10}, $PM_{2.5}$): measured by gravimetric methods including true micro weighing technology for automatic monitoring & instrument named 'Tapered element oscillating micro balance (TOEM)' has been most frequently used. Measurement on filter tape using the principles of beta attenuation for estimating 30 mnt or 1 hr average concentrations of PM_{10} or $PM_{2.5}$ has also been used.
- CO: In urban air pollution studies, a non-disruptive infrared photo meter utilizing a gas filter co relation technology & state of the art optical & electronic technology is used to measure low concentration of CO accurately & reliably.

Expected Output

- A breach of a trigger level or emission limit values may indicate a significant increase of a contaminate concentration in an environmental medium.
- Baseline Monitoring is monitoring in and around the location of a proposed site so as to establish background environmental conditions prior to any development of the proposed site. In case of existing facilities, baseline-monitoring serves as a reference point to which later monitoring results are compared. The information will be used to evaluate in future compliance monitoring.
- Compliance monitoring is periodic monitoring and is to determine whether there is any release of contaminants to the environment and to demonstrate compliance within the project area. It includes measurements of process conditions, process emissions and levels in receiving environments and the reporting of the results of such measurements to demonstrate compliance with limits specified in the legislation.
- The information provided by compliance monitoring is also valuable for other environmental and management activities (e.g. for optimizing process, protecting

sensitive ecosystems and informing the public of the effectiveness of environmental protection measures).

- Assessment monitoring is investigative monitoring which is initiated after detection of the impacts to the environment or on attaining a trigger level. The assessment monitoring will:
    - Identify the source of release materials;
    - Characterize the nature, extent and rate of releases;
    - Evaluate the risk to the environment and to human health;
    - Evaluate measures to prevent or minimize future releases;
    - Provide information for the design and implementation of corrective measures and
    - Express the residual environmental impacts for proper compensation.

Reporting Requirements

As it is proposed to carry out the monitoring program for two quarters and the proposed deliverables are scheduled below:

SL	Name	No. of copies
1	Monitoring Report after each monitoring mission (each in one quarter) with complete data, analysis, lab. Results, discussion etc. as intended in the scope of work.	12
2	CD-ROM in respect of documents/datasheets	2

Appendix IV: Monitoring Data

(A) Air Quality Data

Table A1: Ambient Air Quality Monitoring Results

Quarters	Weather	Parameters	Monitoring locations													Standard (Air pollution control Rules, 2022)
			ML-1	ML-2	ML-3	ML-4	ML-5	ML-6	ML-7	ML-8	ML-9	ML-10	ML-11	ML-12	ML-13	
1st QM Apr, 2014	Sunny	$PM_{2.5}$	33	39	37	39	35	47	47	19	17	15	54	NM	NM	65(24hr)
		PM_{10}	78	814.6	67	103	77	119	139	41	39	44	139			150(24hr)
		SPM	207	2156	234	233	117	297	288	111	114	101	301			200(8hr-ECR, 1997)
		SO_2	21	19	19	21	19	28	27	9	7	8	33			80(24hr)
		NO_2	26	29	23	25	23	41	44	19	17	18	49			80(24hr)
		CO	120	165	110	175	190	230	230	65	49	52	330			5000 (8hr)
		O_3	27	33	25	26	27	49	57	13	11	14	59			100(8hr)
2nd QM, Jul 2014	Rainy/Cloudy	$PM_{2.5}$	37	48	44	47	39	49	55	22	19	23	39	NM	NM	65(24hr)
		PM_{10}	77	90	78	122	86	127	174	39	44	38	117			150(24hr)
		SPM	239	263	217	244	113	266	303	117	133	119	287			200(8hr-ECR, 1997)
		SO_2	24	28	22	23	24	31	28	10	9	7	29			80(24hr)
		NO_2	29	39	28	28	26	39	39	22	19	18	41			80(24hr)
		CO	188	210	178	210	205	217	320	58	60	62	370			5000 (8hr)
		O_3	26	26	19	29	24	38	52	12	14	13	67			100(8hr)
3rd QM, Oct 2014	Sunny	$PM_{2.5}$	25	48	19	57	46	57	39	33	23	19	52	NM	NM	65(24hr)
		PM_{10}	53	74	56	67	69	139	77	59	32	34	91			150(24hr)
		SPM	190	217	157	183	162	254	197	129	97	107	239			200(8hr-ECR, 1997)
		SO_2	19	22	18	17	21	31	26	14	12	13	33			80(24hr)
		NO_2	27	27	22	22	27	36	33	27	22	19	39			80(24hr)
		CO	140	230	110	190	170	250	220	70	50	65	330			5000 (8hr)
		O_3	19	26	17	22	18	36	37	13	9	11	57			100(8hr)
4th QM, Jan 2015	Sunny	$PM_{2.5}$	33	39	42	39	37	41	41	27	18	17	42	NM	NM	65(24hr)
		PM_{10}	79	102	98	97	68	101	82	56	39	41	84			150(24hr)
		SPM	200	274	310	277	183	208	217	139	88	97	219			200(8hr-ECR, 1997)
		SO_2	23	21	27	22	18	24	24	12	13	14	28			80(24hr)
		NO_2	31	26	32	26	24	26	27	18	17	22	36			80(24hr)
		CO	190	164	210	150	170	188	211	64	46	60	296			5000 (8hr)
		O_3	22	23	36	19	22	27	26	11	10	9	39			100(8hr)
5th QM, Apr 2015	Sunny	$PM_{2.5}$	47	34	59	41	33	39	26	24	49	28	55	NM	NM	65(24hr)
		PM_{10}	83	97	91	82	61	105	35	49	77	60	75			150(24hr)

Quarters	Weather	Parameters	Monitoring locations													Standard (Air pollution control Rules, 2022)
			ML-1	ML-2	ML-3	ML-4	ML-5	ML-6	ML-7	ML-8	ML-9	ML-10	ML-11	ML-12	ML-13	
		SPM	177	266	244	236	188	299	214	109	102	110	222			200(8hr-ECR, 1997)
		SO_2	15	22	21	25	11	30	14	16	21	15	31			80(24hr)
		NO_2	29	24	39	27	18	27	17	22	27	20	33			80(24hr)
		CO	144	136	140	196	33	177	24	56	163	60	101			5000 (8hr)
		O_3	26	21	44	15	41	11	9	14	27	23	21			100(8hr)
6th QM, Jul2015	Rainy/Cloudy	$PM_{2.5}$	25	18	28	34	35	34	33	27	NO	NO	46	NM	NM	65(24hr)
		PM_{10}	35	31	96	65	109	144	52	42	NO	NO	89			150(24hr)
		SPM	42	47	321	79	175	339	118	70	NO	NO	181			200(8hr-ECR, 1997)
		SO_2	52	58	56	41	55	58	45	51	NO	NO	59			80(24hr)
		NO_2	35	46	43	44	49	47	40	34	NO	NO	38			80(24hr)
		CO	146	127	133	96	133	125	110	112	NO	NO	89			5000 (8hr)
		O_3	12	16	11	9	21	13	15	12	NO	NO	7			100(8hr)
7th QM, Oct 2015	Sunny/Rainy	$PM_{2.5}$	22	17	19	11	28	25	19	24	25	27	19	NM	NM	65(24hr)
		PM_{10}	52	48	29	26	49	62	33	50	32	45	49			150(24hr)
		SPM	91	79	66	112	94	183	65	73	51	88	101			200(8hr-ECR, 1997)
		SO_2	35	27	32	31	33	36	36	34	27	28	28			80(24hr)
		NO_2	29	25	21	32	23	23	20	22	19	23	26			80(24hr)
		CO	88	102	87	96	75	105	84	81	92	93	94			5000 (8hr)
		O_3	5	1	8	6	2	5	8	4	8	2	4			100(8hr)
8th QM, Jan 2016	Sunny	$PM_{2.5}$	34	35	24	29	31	47	34	26	18	NO	35	NM	NM	65(24hr)
		PM_{10}	135	116	125	97	98	128	132	82	77	NO	112			150(24hr)
		SPM	175	192	187	176	167	198	189	159	128	NO	181			200(8hr-ECR, 1997)
		SO_2	14	13	13	16	21	18	16	15	14	NO	16			80(24hr)
		NO_2	18	16	18	21	16	15	13	14	15	NO	16			80(24hr)
		CO	74	77	77	81	70	101	71	62	64	NO	98			5000 (8hr)
		O_3	4	1	2	4	1	2	3	2	1	NO	2			100(8hr)
9th QM, Apr 2016	Sunny	$PM_{2.5}$	19	25	11	23	25	15	21	13	9	17	11	NM	NM	65(24hr)
		PM_{10}	117	44	29	82	60	46	45	42	31	40	69			150(24hr)
		SPM	332	187	115	268	167	114	144	91	46	132	112			200(8hr-ECR, 1997)
		SO_2	18	11	17	20	13	9	10	11	9	15	11			80(24hr)
		NO_2	18	22	16	16	25	19	14	16	10	19	15			80(24hr)
		CO	57	22	38	73	33	55	29	47	21	40	68			5000 (8hr)
		O_3	1	1	0	0	1	2	1	2	0	0	1			100(8hr)
10th QM, Jul 2016	Rainy/Cloudy	$PM_{2.5}$	5	3	3	9	7	8	9	6	4	NO	16	NM	NM	65(24hr)
		PM_{10}	32	11	24	45	23	42	29	20	15	NO	68			150(24hr)
		SPM	51	27	31	69	31	78	50	43	23	NO	107			200(8hr-ECR, 1997)
		SO_2	9	4	4	10	7	8	8	6	4	NO	10			80(24hr)
		NO_2	12	6	5	12	10	9	10	8	5	NO	15			80(24hr)

Quarters	Weather	Parameters	Monitoring locations													Standard (Air pollution control Rules, 2022)
			ML-1	ML-2	ML-3	ML-4	ML-5	ML-6	ML-7	ML-8	ML-9	ML-10	ML-11	ML-12	ML-13	
		CO	35	31	47	41	38	29	31	32	37	NO	36			5000 (8hr)
		O_3	1	0	1	0	0	0	2	0	0	NO	0			100(8hr)
11th QM, Oct 2016	**Sunny**	$PM_{2.5}$	9	8	10	10	5	10	11	10	4	9	9	NM	NM	65(24hr)
		PM_{10}	22	11	14	13	20	18	15	14	14	14	24			150(24hr)
		SPM	53	23	35	30	48	34	6	44	27	26	64			200(8hr-ECR, 1997)
		SO_2	8	6	8	7	9	8	7	7	6	9	10			80(24hr)
		NO_2	10	8	11	9	8	9	8	10	6	9	14			80(24hr)
		CO	119	108	127	98	79	112	97	110	101	121	104			5000 (8hr)
		O_3	1	0	1	3	2	0	1	1	2	0	2			100(8hr)
12th QM, Jan 2017	**Sunny**	$PM_{2.5}$	24.8	25	29	21.7	25.2	38.7	25.7	19.2	14.3	21.7	34.6	NM	NM	65(24hr)
		PM_{10}	79	99.5	108.7	105.4	74.4	141.6	119.3	85.2	85.5	104.5	145.9			150(24hr)
		SPM	115.7	154.2	168	167.8	162	194.6	172.3	93.5	90.9	111.4	189.7			200(8hr-ECR, 1997)
		SO_2	9.5	12.9	12.2	12.2	18.9	16.1	16.8	11.9	8.4	13.5	17.1			80(24hr)
		NO_2	11.3	15.7	14.7	19.3	18	19	15.3	13	12.7	15.9	18.6			80(24hr)
		CO	59	66	31	63	36	48	44	67	58	43	66			5000 (8hr)
		O_3	5	1	3	5	2	3	4	4	3	4	3			100(8hr)
13th QM, April, 2017	**Rainy/Cloudy**	$PM_{2.5}$	8.12	14.6	10.3	7.9	8.7	15.8	22.6	10.5	13.2	No	23.1	NM	NM	65(24hr)
		PM_{10}	43.8	56.9	31.3	30.5	44.4	105	93.6	36.7	96	NO	99.5			150(24hr)
		SPM	122.4	136.7	91.7	95.6	110.6	179	196	103.7	137	NO	187.2			200(8hr-ECR, 1997)
		SO_2	9	10	5.8	5.5	8.2	12.9	10.5	5.7	6	NO	7.2			80(24hr)
		NO_2	10.7	11.8	7.1	9.8	11.2	18.7	15.1	7.7	10.1	NO	11.7			80(24hr)
		CO	91	78	74	85	94	83	72	73	79	NO	79			5000 (8hr)
		O_3	3	8	5	8	3	6	4	8	0	NO	7			100(8hr)
14th QM, Jul, 2017	**Sunny**	$PM_{2.5}$	28.2	8.5	15.2	13.8	17.3	17	33.2	28.3	7.5	17	19.5	NM	NM	65(24hr)
		PM_{10}	73.6	40.4	49.9	30.2	100.2	63.4	97	89.9	37.8	92.1	39.6			150(24hr)
		SPM	169.4	45.3	63.9	57.2	127.8	87.5	187.2	107	41.8	102	127.9			200(8hr-ECR, 1997)
		SO_2	7.2	4.3	7.5	4.1	7.9	8	8.2	7.6	5.8	6	7.1			80(24hr)
		NO_2	7.5	6	9.2	5	8.4	10.2	10.7	9.3	5.9	7.8	8.8			80(24hr)
		CO	73	79	80	77	69	87	79	84	69	72	81			5000 (8hr)
		O_3	10	25	10	6	5	0	9	0	0	0	7			100(8hr)
15th QM Jan, 2018	**Sunny**	$PM_{2.5}$	32.9	31.5	40.7	52.3	33.4	72.3	70.1	43.5	35.4	40.5	78.7	NM	NM	65(24hr)
		PM_{10}	133	147.8	136.3	140	157.1	208.9	209.1	152.4	150.6	149.8	213.9			150(24hr)
		SPM	145.6	181.4	161.7	171.9	200	223.9	242	189.9	175.1	173.7	243.4			200(8hr-ECR, 1997)
		SO_2	14.3	15	9.6	13.8	19	16.3	15.5	13.2	14	15.8	21			80(24hr)
		NO_2	17.7	18.6	11.7	16.7	20.7	17.7	18.4	15.2	15.1	18.1	25			80(24hr)
		CO	61	69	45	59	58	49	52	57	52	71	69			5000 (8hr)
		O_3	3	4	5	4	5	6	2	2	3	4	9			100(8hr)
	Rainy/Cloudy	$PM_{2.5}$	28.4	26.7	27.7	18	11.4	15.9	23.2	11.6	13.7	NO	12.4	29.1	33.1	65(24hr)

Quarters	Weather	Parameters	Monitoring locations													Standard (Air pollution control Rules, 2022)
			ML-1	ML-2	ML-3	ML-4	ML-5	ML-6	ML-7	ML-8	ML-9	ML-10	ML-11	ML-12	ML-13	
16th QM April, 2018		PM_{10}	70	52	100.1	30.5	40.6	74.3	89.9	29.1	36.4	NO	38.8	70.3	118.1	150(24hr)
		SPM	121.5	138.7	116.2	90.6	108	154.1	144.7	72.4	90.3	NO	78.9	120.6	142.5	200(8hr-ECR, 1997)
		SO_2	11.4	9.6	13.2	6.1	10.4	12.2	11.8	7.9	8.3	NO	7.5	13.1	12.2	80(24hr)
		NO_2	12.8	10.2	14.3	7.3	11.6	13.7	13.2	8.3	9.9	NO	8.4	14	14.8	80(24hr)
		CO	32	27	43	24	42	34	29	31	21	NO	36	46	38	5000 (8hr)
		O_3	9	4	7	6	2	6	3	2	3	NO	9	9	5	100(8hr)
17th QM, Jul 2018	Rainy/Cloudy	$PM_{2.5}$	15.2	15.8	12.9	11.9	10.2	11.1	13.2	11.4	14	NO	12.5	13.7	20.9	65(24hr)
		PM_{10}	15.8	64.4	44.3	20.5	30.6	58.4	47.5	24.3	41.6	NO	45.4	60.8	83.7	150(24hr)
		SPM	12.9	113.4	76.3	5.2	78.6	98.4	73.7	47.6	58	NO	69.9	98.1	106.2	200(8hr-ECR, 1997)
		SO_2	11.9	10.8	5.8	6.1	7.5	9.4	6.5	4.9	6.3	NO	7.5	8.4	10.9	80(24hr)
		NO_2	10.2	13.1	5.9	7.4	8.4	12.1	7.2	5.4	9.3	NO	11.1	9	13.4	80(24hr)
		CO	11.1	25	21	20	23	29	20	20	25	NO	28	32	34	5000 (8hr)
		O_3	13.2	8	6	6	4	8	1	6	4	NO	7	4	7	100(8hr)
18th QM, Nov, 2018	Sunny/Cloudy	$PM_{2.5}$	31.1	35.7	32.3	15.4	26.8	24.8	30.3	20.6	29.1	23.4	21.3	28.6	40.9	65(24hr)
		PM_{10}	106	109.9	117.4	50.1	105.9	92	103.7	80.5	100.2	86.7	57.9	111.7	128.3	150(24hr)
		SPM	137.4	143.9	156.2	113.5	128.5	139	161.9	90.3	121.4	107.9	102.9	144.6	177.8	200(8hr-ECR, 1997)
		SO_2	12.7	12.2	13.4	9.5	12.1	10.4	12	11.6	10.8	10.6	8.7	10.2	13.4	80(24hr)
		NO_2	14.8	13.6	15	10.7	14	13.4	16.8	13	11.7	12.5	9.7	11.6	15	80(24hr)
		CO	28	30	32	20	27	30	33	20	28	22	121	30	32	5000 (8hr)
		O_3	7	6	8	2	5	8	9	4	5	6	4	9	9	100(8hr)
19th QM, Feb, 2019	Sunny	$PM_{2.5}$	27.3	30.6	20.3	19.3	22.8	28.6	26.6	15.4	16.2	18.2	20.8	21.2	26.9	65(24hr)
		PM_{10}	105.4	126.3	93.6	102	126.7	125.8	109.3	92.6	93.2	96.1	91.3	88.7	112.9	150(24hr)
		SPM	151.6	168	125.5	127.5	146.6	178.2	157.1	118.3	117.8	127.8	158	129.4	168.2	200(8hr-ECR, 1997)
		SO_2	11.6	12.3	10.7	11.5	12.4	13.3	10.8	9.5	10.1	10.7	10.4	11.3	12.5	80(24hr)
		NO_2	12.4	13.8	11.3	13.8	13.8	14.9	12.6	10.1	11.3	10.9	11.1	12.1	13	80(24hr)
		CO	15	21	20	17	25	14	28	25	17	21	19	18	23	5000 (8hr)
		O_3	9	4	1	3	9	8	7	3	3	6	5	1	6	100(8hr)
20th QM, Apr, 2019	Sunny	$PM_{2.5}$	21.7	18.9	14.2	19.7	15	15.8	35	14.2	13	NO	33	17.2	36.1	65(24hr)
		PM_{10}	98.2	106.1	58.7	69.9	72.7	92.7	131	63.9	51.9	NO	125.9	61.6	137	150(24hr)
		SPM	128.6	150.8	119.2	92.2	117.6	141.1	183.1	90.9	71.1	NO	173.4	102.5	163.2	200(8hr-ECR, 1997)
		SO_2	13.9	12.1	11.6	12.6	11.2	10.4	16.8	11.6	8.9	NO	15.3	7.9	15.7	80(24hr)
		NO_2	16	13.9	13.5	13.8	13.7	11.7	17.8	13	9.4	NO	17.1	11.9	17.6	80(24hr)
		CO	18	20	16	18	20	14	17	16	14	NO	23	21	21	5000 (8hr)
		O_3	6	1	5	4	8	3	3	5	1	NO	6	5	7	100(8hr)
21st QM, Jul, 2019	Sunny/Cloudy	$PM_{2.5}$	37.76	50.24	37.27	57.51	19.46	24.03	56.67	28.03	19.68	NO	38.59	21.24	39.65	65(24hr)
		PM_{10}	67.15	63.94	42.99	33.25	46.37	56.56	119	21.85	43	NO	47.05	96.71	142.8	150(24hr)
		SPM	109.3	123.6	60.45	75.13	80.31	93.5	192.2	48.09	83.9	NO	101	127.8	171.2	200(8hr-ECR, 1997)
		SO_2	56.5	31.53	60.26	54.02	45.81	59.41	59.33	49.72	57.24	NO	35.42	9.32	17.37	80(24hr)

Quarters	Weather	Parameters	Monitoring locations													Standard (Air pollution control Rules, 2022)
			ML-1	ML-2	ML-3	ML-4	ML-5	ML-6	ML-7	ML-8	ML-9	ML-10	ML-11	ML-12	ML-13	
		NO_2	55.08	24.97	58.39	43.45	44.92	51.09	57.02	41.91	46.58	NO	40.09	15.63	21.32	80(24hr)
		CO	4	4	7	6	10	9	15	16	38	NO	11	9	8	5000 (8hr)
		O_3	25	34	18	7	2	22	5	8	9	NO	6	19	6	100(8hr)
22nd QM, Jul, 2019	**Sunny/Cloudy**	$PM_{2.5}$	51.32	19.34	33.2	31.28	33.74	24.03	39.69	39.69	36.67	27.76	18.65	29.64	14.65	65(24hr)
		PM_{10}	127.6	82.27	1119.3	69.32	78.27	119.3	64.12	64.12	87.15	67.89	59.19	98.15	79.92	150(24hr)
		SPM	183.6	120.5	175.13	102.2	101	101	83.9	83.9	122.6	90.31	78.09	127.8	109.3	200(8hr-ECR, 1997)
		SO_2	31.53	60.26	54.02	59.33	35.42	44.29	57.24	57.24	35.23	45.81	49.72	19.32	56.5	80(24hr)
		NO_2	24.97	58.39	43.45	57.02	40.09	17.72	46.58	46.58	31.26	44.92	41.91	15.63	55.08	80(24hr)
		CO	16	11	0	0	0	0	48	48	24	2	24	0	0	5000 (8hr)
		O_3	10	22	2	52	38	26	40	40	90	16	18	11	6	100(8hr)
23rd QM, Feb, 2020	**Sunny**	$PM_{2.5}$	27.12	19.14	21.61	26.66	39.44	33.26	38.92	17.81	23.04	17.39	40.22	44.26	26.26	65(24hr)
		PM_{10}	68.1	83.22	77.69	61.11	100.1	127.5	119.6	63.27	82.91	72.45	116.2	122.7	91.39	150(24hr)
		SPM	108.4	106.3	100.04	98.74	146.7	160	173.4	87.51	121.7	94.28	157.3	171.3	126.1	200(8hr-ECR, 1997)
		SO_2	18.35	27.41	19.68	18.88	36.14	30.89	31.33	16.47	24.21	13.33	28.31	34.12	16.16	80(24hr)
		NO_2	12.12	18.77	17.53	11.58	20.04	19.02	13.34	9.9	16.74	8.65	24.14	21.72	9.04	80(24hr)
		CO	28	44	30	32	18	11	29	30	20	36	32	18	22	5000 (8hr)
		O_3	8	9	9	12	22	2	4	12	2	7	10	4	6	100(8hr)
25th QM, July, 2020	**Rainy/Cloudy**	$PM_{2.5}$	18.71	20.35	21.93	18.04	18.22	16.63	41.33	20.11	13.16	NO	46.73	22.08	20.16	65(24hr)
		PM_{10}	80.28	71.06	76.76	59.02	59.91	55.78	126.1	62.24	58.82	NO	119.1	86.26	78.69	150(24hr)
		SPM	98.26	95.24	101.33	82.02	146.7	70.23	166.2	87.71	78.8	NO	167.2	111.7	102	200(8hr-ECR, 1997)
		SO_2	19.91	17.44	16.21	24.29	18.74	16.73	22.04	13.31	15.06	NO	30.73	20.61	18.82	80(24hr)
		NO_2	8.82	10.17	10.55	10.62	10.19	10.52	11.29	8.13	10.47	NO	24.24	11.17	9.22	80(24hr)
		CO	0	4	2	0	10	0	24	8	14	NO	18	2	0	5000 (8hr)
		O_3	8	6	8	8	8	2	2	22	4	NO	4	2	8	100(8hr)
26th QM, Oct 2020	**Sunny**	$PM_{2.5}$	44.18	29.17	46.73	38.69	43.91	33.32	40.75	34.42	22.74	28.15	48.32	41.29	38.72	65(24hr)
		PM_{10}	107.2	84.3	110.43	91.79	88.93	74.83	114.6	79.38	56.74	59.31	109.6	97.16	93.48	150(24hr)
		SPM	149.7	119.2	160.3	128.5	139	112	152.8	122.9	80.31	91.06	157.4	142.4	136.7	200(8hr-ECR, 1997)
		SO_2	26.63	14.15	25.82	20.17	29.94	21.39	20.06	19.74	12.74	11.36	29.58	21.73	18.11	80(24hr)
		NO_2	16.62	14.18	18.91	14.47	18.32	12.12	9.69	10.16	6.64	9.74	20.44	13.36	9.92	80(24hr)
		CO	2	0.013	0.012	0	0	0	0	0	0	0	0.7	0	0	5000 (8hr)
		O_3	8	2	8	0	0	4	1	3	6	1	0	0	2	100(8hr)
27th QM, Jan, 2021	**Sunny**	$PM_{2.5}$	55.35	52.74	68.26	61.29	59.18	66.31	74.19	53.28	48.2	55.71	88.71	166.7	94.23	65(24hr)
		PM_{10}	106.1	112	131.84	93.36	117.4	102.7	118.7	100.1	90.12	99.64	159.2	234.4	188.6	150(24hr)
		SPM	163.5	170.3	180.43	159.8	188.3	156.6	201.2	146.2	145	155.4	240.2	347.4	269.3	200(8hr-ECR, 1997)
		SO_2	14.74	18.32	16.19	16.47	16.45	16.16	12.26	14.66	15.05	16.2	18.8	18.61	20.23	80(24hr)
		NO_2	37.16	29.9	34.1	21.18	26.14	28.54	19.25	21.44	20.6	23.53	34.2	33.48	26.3	80(24hr)
		CO	0	0	0	0	0.1	1	2	0	0.2	0	2	3	0.8	5000 (8hr)
		O_3	9	6	12	6	23	20	66	6	8	11	80	212	68	100(8hr)

Quarters	Weather	Parameters	Monitoring locations													Standard (Air pollution control Rules, 2022)
			ML-1	ML-2	ML-3	ML-4	ML-5	ML-6	ML-7	ML-8	ML-9	ML-10	ML-11	ML-12	ML-13	
28th QM, April, 2021	**Sunny**	$PM_{2.5}$	49.13	48.64	58.81	62.29	53.36	42.62	65.37	46.13	41.33	NO	71.2	67.82	64.73	65(24hr)
		PM_{10}	103.9	83.1	97.61	103.4	86.44	73.29	129.7	82.83	84.16	NO	120.4	108.2	119.7	150(24hr)
		SPM	155.1	139.3	161.8	154.4	128.4	116.7	180.2	133.1	131.5	NO	193.6	170.4	173.9	200(8hr-ECR, 1997)
		SO_2	16.26	14.06	16.58	13.52	19.66	13.1	18.91	16.58	17.44	NO	20.64	23.72	19.16	80(24hr)
		NO_2	22.31	21.65	27.42	19.37	24.21	17.18	30.2	0	23.5	NO	28.35	34.49	23.74	80(24hr)
		CO	0	0	0.2	0	0.1	0	0.9	3	0	NO	3	1	0.2	5000 (8hr)
		O_3	16	9	14	2	28	2	91	46.13	8	NO	63	108	46	100(8hr)
29th QM, Aug, 2021	**Sunny**	$PM_{2.5}$	38.25	41.2	22.66	21.8	33.27	32.45	22.54	34.94	39.16	25.3	29.47	59.2	52.2	65(24hr)
		PM_{10}	59.17	64.28	48.19	50.26	61.9	74.89	64.44	61.53	76.18	59.7	64.44	94.6	96.1	150(24hr)
		SPM	99.44	116.5	77.149	83.2	104.3	118.4	85.2	108.7	123.6	94.7	101.9	158	151	200(8hr-ECR, 1997)
		SO_2	14.49	11.77	13.58	14.44	15.98	14.61	10.28	14.75	16.55	13.92	12.73	19.7	13.3	80(24hr)
		NO_2	19.87	21.39	20.49	19.48	18.66	20.27	19.73	23.28	21.28	20.06	20.45	27.3	20.1	80(24hr)
		CO	1	1	1	0	0.8	1	2	1	2	0	4	1	2	5000 (8hr)
		O_3	42	28	17	19	11	10	23	9	11	14	21	92	16	100(8hr)
30th QM, Nov, 2021	**Sunny**	$PM_{2.5}$	56.83	44.65	41.98	58.34	29.61	42.59	51.83	31.2	23.6	38.51	65.66	79.64	55.31	65(24hr)
		PM_{10}	83.46	71.35	61.48	73.17	44.28	64.71	72.4	49.07	51.88	49.27	124.6	102.3	69.4	150(24hr)
		SPM	144.5	118.5	104.73	134.6	77.88	107.3	128.3	83.16	79.47	89.36	195.2	193.4	129.5	200(8hr-ECR, 1997)
		SO_2	16.28	14.55	12.19	21.39	10.59	12.8	17.44	12.68	15.89	14.33	26.18	16.92	20.76	80(24hr)
		NO_2	21.64	20.85	18.39	38.46	17.21	19.33	29.16	22.27	21.39	16.27	38.58	48.41	31.69	80(24hr)
		CO	0	1.1	1.4	0	1	1.1	2.4	1	1	0	4.9	1	1	5000 (8hr)
		O_3	11	41	34	28	9	19	43	11	8	22	59	68	29	100(8hr)
31st QM, Jan, 2022	**Sunny**	$PM_{2.5}$	46.83	39.86	42.81	29.22	45.3	47.51	26.39	41.58	29.65	36.88	61.57	56.26	57.29	65(24hr)
		PM_{10}	91.25	58.29	73.42	43.88	66.54	81.84	61.63	58.92	53.69	58.45	100.3	104.7	69.89	150(24hr)
		SPM	159.5	128.3	123.76	92.38	134.7	148.9	100.5	118.8	98.47	106.9	198.2	178.6	137.5	200(8hr-ECR, 1997)
		SO_2	21.54	14.48	11.79	14.36	12.84	21.4	12.54	22	15.53	12.76	28.52	38.36	16.93	80(24hr)
		NO_2	39.5	20.44	20.25	21.92	16.73	38.27	18.43	27.2	19.38	19.66	41.59	44.77	21.62	80(24hr)
		CO	1	1	1	0.1	1	2.8	2	1	1.4	0.3	1.4	3.3	1	5000 (8hr)
		O_3	12	49	12	6	8	48	20	41	16	22	53	93	72	100(8hr)
32nd QM, May, 2022	**Rainy/Cloudy**	$PM_{2.5}$	41.78	36.71	54.16	31.43	48.94	42.57	28.19	43.27	58.43	39.62	67.33	69.23	31.28	65(24hr)
		PM_{10}	74.32	68.79	63.26	46.29	86.48	71.22	51.66	51.04	77.69	48.81	92.36	94.28	59.15	150(24hr)
		SPM	139.4	158.1	132.77	98.15	165.6	129	92	110.3	141.4	96.23	178.3	181.9	98.74	200(8hr-ECR, 1997)
		SO_2	15.22	13.96	10.47	18.42	14.82	19.71	20.33	13.76	21.81	15.38	19.29	27.45	19.3	80(24hr)
		NO_2	22.49	20.47	23.96	40.28	26.42	29.44	31.63	39.23	38.3	39.72	37.91	39.56	33.62	80(24hr)
		CO	1	1	0.6	1	1	2	0.2	1	0.3	0.7	0.2	4	1	5000 (8hr)
		O_3	18	8	8	10	13	39	13	24	41	38	36	59	31	100(8hr)
33rd QM, July, 2022	**Rainy/Cloudy**	$PM_{2.5}$	34.84	41.2	39.36	27.55	38.48	42.85	43.8	49.15	30.22	NO	69.28	51.29	28.43	65(24hr)
		PM_{10}	56.18	64.29	58.03	51.98	53.19	69.02	62.53	74.7	60.21	NO	100.3	69.28	53.42	150(24hr)
		SPM	106.3	118.6	108.2	93.44	103.7	127.4	120.3	141.5	103.5	NO	189.4	134.3	89.45	200(8hr-ECR, 1997)

Quarters	Weather	Parameters	Monitoring locations													Standard (Air pollution control Rules, 2022)
			ML-1	ML-2	ML-3	ML-4	ML-5	ML-6	ML-7	ML-8	ML-9	ML-10	ML-11	ML-12	ML-13	
		SO_2	11.04	12.58	13.29	10.57	11.08	12.71	14.55	14.9	12.59	NO	23.66	14.56	11.39	80(24hr)
		NO_2	23.18	18.4	20.63	16.4	21.94	23.16	22.3	20.82	19.69	NO	39.12	20.23	20.47	80(24hr)
		CO	0.3	1	0.4	0.8	0.2	0.4	0.1	0.4	0.9	NO	2.1	1.3	2	5000 (8hr)
		O_3	12	16	11	14	29	37	29	31	24	NO	66	38	23	100(8hr)
34th QM, Oct, 2022	Sunny	$PM_{2.5}$	39.63	49.63	46.32	41.59	30.22	48.3	58.46	53.98	35.35	57.2	63.57	61.47	42.84	65(24hr)
		PM_{10}	57.26	58.48	64.18	64.71	39.66	74.05	93.43	76.18	50.14	89.22	92.2	84.89	71.49	150(24hr)
		SPM	109.3	123.6	139.24	111.4	77.36	138.5	170.3	142.1	99.42	164.2	169.5	158.3	127.8	200(8hr-ECR, 1997)
		SO_2	10.18	16.71	14.66	13.88	10.52	15.42	21.41	12.37	11.06	16.82	21.71	23.49	13.27	80(24hr)
		NO_2	17.64	25.45	21.43	20.31	18.03	22.14	34	20.41	18.2	27.87	36.56	39.35	20.63	80(24hr)
		CO	0.6	0.4	0.2	0.1	0.1	0.6	1.9	0.3	1	0.5	1.6	1	1.1	5000 (8hr)
		O_3	19	14	13	33	14	24	59	41	19	28	64	49	14	100(8hr)
35th QM, Jan, 2022	Sunny	$PM_{2.5}$	56.81	43.95	55.86	37.86	57.36	50.11	53.71	35.19	54.94	47.31	51.17	59.24	40.29	65(24hr)
		PM_{10}	81.45	58.71	81.08	57.94	96.94	74.37	69.26	42.07	97.62	70.5	64.49	91.3	74.81	150(24hr)
		SPM	144.2	111.6	146.79	102.3	161.5	133.7	130.5	85.63	159.4	124.5	124.9	155.9	121.2	200(8hr-ECR, 1997)
		SO_2	19.56	17.48	19.51	12.69	26.24	16.42	12.51	13.27	25.7	14.26	17.32	16.26	11.09	80(24hr)
		NO_2	18.61	15.72	29.29	15.78	31.89	23.94	18.59	20.18	27.24	21.67	23.09	31.49	23.25	80(24hr)
		CO	0.8	0.8	0.7	0.7	0.9	0.5	0.2	0.3	0.8	0.1	0.3	0.8	0.8	5000 (8hr)
		O_3	20	21	25	16	56	37	14	11	63	35	12	38	17	100(8hr)
36th QM, May, 2023	Rainy/Cloudy	$PM_{2.5}$	44.72	53.16	52.33	39.81	58.71	58.35	51.81	39.51	47.74	NO	53.57	57.73	42.34	65(24hr)
		PM_{10}	66.62	80.42	70.84	59.5	79.6	92.53	72.55	58.55	71.27	NO	70.49	95.63	78.77	150(24hr)
		SPM	112.8	142.8	140.73	107.1	147.8	169.5	138	109.9	137.6	NO	134.7	160.3	126.6	200(8hr-ECR, 1997)
		SO_2	18.62	16.51	18.19	13.91	18.22	24.74	14.74	15.36	17.2	NO	14.05	18.34	15.88	80(24hr)
		NO_2	13.32	27.41	24.64	14.18	19.01	28.77	19.99	24.22	23.83	NO	21.89	32.53	22.67	80(24hr)
		CO	0.7	0.9	0.8	0.6	0.6	0.7	0.3	0.4	0.2	NO	0.4	0.7	0.5	5000 (8hr)
		O_3	22	28	34	19	25	61	12	13	32	NO	15	36	18	100(8hr)
37th QM, Aug, 2023	Rainy/Cloudy	$PM_{2.5}$	53.38	44.65	46.66	52.33	59.21	45.44	49.15	13.93	2.63	2.28	86.08	25.7	28.36	65(24hr)
		PM_{10}	67.47	54.76	58.91	65.17	73.88	54.87	74.7	15.28	3.07	2.61	99.54	28.3	33.23	150(24hr)
		SPM	52.28	43.17	45.76	50.75	57.88	43.77	47.16	13.43	2.59	2.26	81.37	24.23	27.24	200(8hr-ECR, 1997)
		SO_2	3.04	7.21	6.6	8.82	19.42	12.22	14.9	7.7	1.08	1.27	22.14	7.57	4.64	80(24hr)
		NO_2	30.46	33	41.6	34.68	38.37	28.75	20.8	35.17	17.88	17.53	34.49	30.51	26.49	80(24hr)
		CO	0.438	0.282	0.234	0.22	0.442	0.37	0.4	0.614	0.204	0.138	0.57	0.162	0.213	5000 (8hr)
		O_3	21.77	21.83	20.39	22.45	22.38	18.41	21.85	17.73	8.32	9.17	22.91	18.58	18.65	100(8hr)
38th QM, Oct, 2023	Sunny	$PM_{2.5}$	44.24	44.52	49.92	52.21	42.24	42.01	59.68	70.29	87.94	73.6	50.49	26.24	28.84	65(24hr)
		PM_{10}	55.03	55.74	59.62	61.03	51.93	51.57	66.93	76.43	96.99	79.96	58.75	30.67	33.53	150(24hr)
		SPM	58.69	58.85	64.79	67.19	55.81	55.55	76.21	87.85	108.3	91.21	64.35	77.4	84.84	200(8hr-ECR, 1997)
		SO_2	16.17	10.16	9.9	4.41	19.56	23.14	12.79	9.17	4.67	2.87	8.1	24.35	18.54	80(24hr)
		NO_2	28.11	30.16	27.13	26.83	27.38	29.58	28.35	26.33	21.64	15.8	30.13	25.52	25.56	80(24hr)
		CO	0.21	0.5	0.17	0.37	0.36	0.519	0.35	0.39	0.47	0.16	0.17	0.175	0.522	5000 (8hr)

Quarters	Weather	Parameters	Monitoring locations													Standard (Air pollution control Rules, 2022)
			ML-1	ML-2	ML-3	ML-4	ML-5	ML-6	ML-7	ML-8	ML-9	ML-10	ML-11	ML-12	ML-13	
		O_3	22.53	25.87	24.96	25.83	25.23	24.85	24.88	20.56	26.81	12.23	23.4	16.95	18.85	100(8hr)
39th QM, Feb 2024	Sunny	$PM_{2.5}$	203.6	87.2	90.71	62.03	97.4	102.5	63.62	91.28	70.5	65.11	69.09	184.5	121	65(24hr)
		PM_{10}	233.7	109.3	106.2	73.22	112.2	115.9	77.71	104.7	85.8	75.76	82.9	246.2	135	150(24hr)
		SPM	362.3	196	174	113.2	185	178.3	123.5	156.2	134.2	122.6	129.7	358	209.2	200(8hr-ECR, 1997)
		SO_2	36.39	9.97	10.78	5.2	19.81	10.17	9.57	6.61	0.85	2.9	8.67	52.47	32.43	80(24hr)
		NO_2	17.38	21.77	34.75	22.49	27.23	28.04	18.96	17.63	18.9	18.49	19.27	19.59	16.61	80(24hr)
		CO	1.1	0.38	0.44	0.32	0.81	0.48	0.3	0.25	0.28	0.11	0.34	1.15	0.22	5000 (8hr)
		O_3	19.91	25.75	27.05	22.8	22.62	28.12	22.14	19.27	19.4	10.23	24.06	18.28	20.74	100(8hr)
40th QM, May, 2024	Sunny	$PM_{2.5}$	29.95	16.27	24.2	21.84	27.12	32.59	38.82	40.28	45.66	45.66	35.53	23.74	51.28	65(24hr)
		PM_{10}	31.73	17.25	25.71	23.75	29.1	36.28	44.75	52.71	55.85	38.3	39.56	21.63	42.88	150(24hr)
		SPM	49.18	27.6	37.28	39.18	43.65	58.04	71.6	76.43	83.77	50.65	62.1	33.23	73.84)	200(8hr-ECR, 1997)
		SO_2	1.97	1.11	6.94	5.02	5.24	5.93	11.06	9.61	10.2	73.2	2.45	0.501	0.036	80(24hr)
		NO_2	16.28	17.03	18.57	19.67	17.16	17.13	16.38	18.73	16.52	8.5	16.78	7	6.79	80(24hr)
		CO	0.11	0.188	0.18	0.215	0.253	0.219	0.254	0.54	0.4	17.2	0.432	18.19	17.53	5000 (8hr)
		O_3	22.95	24.63	26.9	23.05	24.55	20.58	19.81	20.27	21	0.435	20.76	20.18	24.66	100(8hr)
41st QM, July, 2024	Rainy/Cloudy	$PM_{2.5}$	4.87	5.4	14.82	6.4	12.06	8.13	6	12.11	16.85	NO	14.48	5.79	2.86	65(24hr)
		PM_{10}	8.13	9.82	21.18	8.53	15.07	13.69	10	26.92	28.09	NO	29.53	7.18	4.4	150(24hr)
		SPM	13	15.22	36.01	14.92	27.13	21.22	16	39.03	44.94	NO	44.29	11.22	7.26	200(8hr-ECR, 1997)
		SO_2	6.08	13.76	3.5	9.01	16.15	13.79	7.39	8.43	3.16	NO	5.23	15.81	8.18	80(24hr)
		NO_2	13.12	13.12	6.78	13.06	11.47	12.71	12.98	13.73	6.87	NO	10.92	9.81	14.24	80(24hr)
		CO	0.44	0.21	0.22	0.23	0.22	0.22	0.16	0.9	0.16	NO	0.21	0.49	0.22	5000 (8hr)
		O_3	18.53	19.05	8.75	19.3	15.24	18.06	16.56	16.5	8.97	NO	13.01	22.4	20.27	100(8hr)
42nd QM, Oct, 2024	Sunny	$PM_{2.5}$	12.77	15.45	69.76	30.33	22.62	27.32	43.93	35.97	56.73	63.16	89.65	41.88	22.74	65(24hr)
		PM_{10}	15.5	19.32	86.82	41.88	30.42	37.88	54.94	48.14	70.43	77.79	112.8	55.95	30.77	150(24hr)
		SPM	28.27	34.78	156.58	72.21	53.04	65.2	98.87	84.11	127.2	141	202.5	97.82	53.07	200(8hr-ECR, 1997)
		SO_2	9.88	9.95	52.84	14.65	156	27.57	11.73	8.82	11.65	10.82	40.75	17.04	5.52	80(24hr)
		NO_2	1.29	0.9	2.78	2.41	4.37	2.69	2.01	1.96	2.12	1.73	3.82	3.44	0.86	80(24hr)
		CO	1.09	1.14	1.26	1.25	1.2	1.56	1.18	1.07	1.16	1.13	1.63	1.1	1.04	5000 (8hr)
		O_3	18.05	22.81	30.73	24.35	25.62	18.03	21.35	11.22	13.18	19.81	30.85	19.25	20.21	100(8hr)
43rd QM, Jan, 2025	Sunny	$PM_{2.5}$	46.73	46.7	41.3	47.95	44.94	89.19	68.39	37.91	63.69	47.3	68.56	119	35.94	65(24hr)
		PM_{10}	52.96	52.61	50.8	55.38	50.88	97.12	74.45	47.74	7.56	55.41	75.25	132.4	45.11	150(24hr)
		SPM	99.69	99.31	92.1	103.3	95.81	186.3	142.8	85.66	134.2	102.7	143.8	251.4	81.06	200(8hr-ECR, 1997)
		SO_2	8.34	8.31	9.59	14.8	10.26	9.91	27.13	12.42	9.87	15.42	14.58	21.3	10.73	80(24hr)
		NO_2	1.44	1.43	1.33	1.8	1.07	0.85	2.66	2.42	1.99	1.98	1.99	3.81	1.5	80(24hr)
		CO	1.08	1.1	1.14	1.27	1.02	1.16	1.47	1	1.23	1.11	1.19	1.47	1.15	5000 (8hr)
		O_3	28.34	26.88	33.95	18.86	20.02	19.48	17.17	14.33	14.42	6.5	18.35	19.2	28.31	100(8hr)
44th QM, May 2025		$PM_{2.5}$	18.42	15.45	10.51	14.01	15.64	13.21	16.79	6.04	5.44	5.71	17.74	24.24	25.05	65(24hr)
		PM_{10}	25.89	20.72	12.81	17.78	20.92	16.77	22.45	7.97	7.47	7.72	25.33	34.35	17.89	150(24hr)

Quarters	Weather	Parameters	Monitoring locations													Standard (Air pollution control Rules, 2022)
			ML-1	ML-2	ML-3	ML-4	ML-5	ML-6	ML-7	ML-8	ML-9	ML-10	ML-11	ML-12	ML-13	
		SPM	44.32	36.16	23.32	31.79	36.56	29.98	39.24	14.01	12.91	13.42	43.07	58.59	42.94	200(8hr-ECR, 1997)
		SO_2	6.02	6.4	5.05	5.18	6.29	5.53	8.58	6.52	5.72	6.09	7.79	11.2	4.35	80(24hr)
		NO_2	1.99	1.39	1.71	1.7	1.01	1.72	2.96	2.68	1.6	1.98	0.87	2.01	1.6	80(24hr)
		CO	0.18	0.2	0.13	0.16	0..205	0.15	0.25	0.22	0.2	0.22	0.2	0.226	0.12	5000 (8hr)
		O_3	8.39	8.64	8.29	6.99	6.91	5.98	3.65	5.15	5.95	6.49	3.42	4.98	3.8	100(8hr)
45th QM, July 2025		$PM_{2.5}$	15.48	12.32	13.73	18.2	11.34	21.52	20.61	1.44	1.72	0.93	21.69	5.2	10.12	65(24hr)
		PM_{10}	21.2	16.32	17.92	24.49	14.76	35.08	29.06	2.04	3.39	1.22	31.55	6.77	13.12	150(24hr)
		SPM	36.67	28.64	31.65	42.69	26.1	56.6	49.67	3.48	5.11	2.15	53.24	11.97	23.23	200(8hr-ECR, 1997)
		SO_2	2.36	0.68	2.02	3.77	1.91	2.63	3.26	1.91	6.72	7.01	2.19	3.65	2.54	80(24hr)
		NO_2	5.21	4.31	4.79	4.83	4.01	4.63	5.46	4.37	2.47	3.7	5.98	7.24	5.21	80(24hr)
		CO	0.15	0.21	0.13	0.24	0.15	0.21	0.22	0.11	0.58	0.65	0.27	0.11	0.12	5000 (8hr)
		O_3	8.03	8.35	5.47	7.43	5.75	7.8	6.11	2.5	2.42	2.93	6.9	4.16	5.02	100(8hr)

Note(s): Concentrations are in μg/m³; CEGIS field survey from April 2014 to July 2025.

- DoE- Department of Environment, NF- Not found; NO-Not observed; x-not measured at pre-construction stage.
- Fine Particulate Matter ($PM_{2.5}$), Respirable Dust Content (PM_{10}), Suspended Particulate Matter (SPM), Oxides of Nitrogen (NO_X). Sulfur dioxide (SO_2), Carbone Monoxide (CO) & Ozone (O_3);
- Standards for 1hr, 24hr or Annual are indicated using superscript;
- This monitoring was carried out by - Respirable Dust Sampler (Model-Envirotech India APM-460BL) and Fine Particulate Sampler (Model-Envirotech India APM-550). All data presented here are 8 hrs. Monitoring data.

Table A.2: Baseline conditions of emission of different infrastructures and sources

Sampling Locations	Criteria Pollutant	Cement Industry	Condensate Fractionating Plant	LPG Bottling Plant	Brick Field	Road Traffic	Small vessels, engine boat	Inland Water Cargo vessel	Sea going Mother Vessel (MV)	Fly ash Carrier	Clinkers Carrier	Clinker, Fly Ash Handling	Coal Carrier (MV)	Coal Ash Carrier (MV)	Coal Carrier (Lighter Vessel)	Coal Ash Carrier (Lighter Vessel)	Coal Loading and Unloading	Coal Handling (Stock Yard, Conveyor belt, etc)	BIF Power Plant (PP)	Other Coal Based PP	Other Fuel Based PP	Dredging and Land Filling	Earth excavation	Other Construction Activities	Residential sources
SW Corner of the PP area	PM	√	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	√	X	√	√
	SOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	NOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	GHGs	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
Township area of the PP	PM	√	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	√	X	X	√
	SOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	NOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	GHGs	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
NW Corner of the PP area	PM	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	√	X	X	√
	SOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	NOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	GHGs	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
Barni, Gaurambha	PM	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√	√
	SOx	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	NOx	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	GHGs	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	PM	√	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√

Sampling Locations	Criteria Pollutant	Cement Industry	Condensate Fractionating Plant	LPG Bottling Plant	Brick Field	Road Traffic	Small vessels, engine boat	Inland Water Cargo vessel	Sea going Mother Vessel (MV)	Fly ash Carrier	Clinkers Carrier	Clinker, Fly Ash Handling	Coal Carrier (MV)	Coal Ash Carrier (MV)	Coal Carrier (Lighter Vessel)	Coal Ash Carrier (Lighter Vessel)	Coal Loading and Unloading	Coal Handling (Stock Yard, Conveyor belt, etc)	BIF Power Plant (PP)	Other Coal Based PP	Other Fuel Based PP	Dredging and Land Filling	Earth excavation	Other Construction Activities	Residential sources
Chunkuri-2, Dacope	SOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	NOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	GHGs	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
Pankhali, Dacope	PM	√	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√	√
	SOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	NOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	GHGs	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
Mongla Port area	PM	√	√	√	X	√	√	√	√	√	√	√	X	X	X	X	X	X	X	X	√	X	X	X	√
	SOx	X	√	X	X	√	√	√	√	√	√	X	X	X	X	X	X	X	X	X	√	X	X	√	√
	NOx	X	√	X	X	√	√	√	√	√	√	X	X	X	X	X	X	X	X	X	√	X	X	X	√
	GHGs	X	√	X	X	√	√	√	√	√	√	X	X	X	X	X	X	X	X	X	√	X	X	X	√
Harbaria, Sundarbans	PM	X	X	X	X	X	√	√	√	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X
	SOx	X	X	X	X	X	√	√	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	NOx	X	X	X	X	X	√	√	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	GHGs	X	X	X	X	X	√	√	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	√
Akram Point Sundarbans	PM	X	X	X	X	X	√	√	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X
	SOx	X	X	X	X	X	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	NOx	X	X	X	X	X	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	GHGs	X	X	X	X	X	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	PM	X	X	X	X	X	√	√	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	√

Sampling Locations	Criteria Pollutant	Cement Industry	Condensate Fractionating Plant	LPG Bottling Plant	Brick Field	Road Traffic	Small vessels, engine boat	Inland Water Cargo vessel	Sea going Mother Vessel (MV)	Fly ash Carrier	Clinkers Carrier	Clinker, Fly Ash Handling	Coal Carrier (MV)	Coal Ash Carrier (MV)	Coal Carrier (Lighter Vessel)	Coal Ash Carrier (Lighter Vessel)	Coal Loading and Unloading	Coal Handling (Stock Yard, Conveyor belt, etc)	BIF Power Plant (PP)	Other Coal Based PP	Other Fuel Based PP	Dredging and Land Filling	Earth excavation	Other Construction Activities	Residential sources
Hiron Point Sundarbans	SOx	X	X	X	X	X	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	NOx	X	X	X	X	X	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	GHGs	X	X	X	X	X	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Khulna City, near Khan Jahan Ali Bridge	PM	√	X	X	√	√	√	√	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	√	√
	SOx	X	X	X	√	√	√	√	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	√
	NOx	X	X	X	√	√	√	√	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	√
	GHGs	X	X	X	√	√	√	√	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	√
Township area	PM	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√	√	√	√
	SOx	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	NOx	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	GHGs	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√	√	√	√
Access road bridge area	PM	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√	√	√	√
	SOx	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	√	X	X	X	X	X	√
	NOx	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	√	X	X	X	X	X	√
	GHGs	√	√	X	√	√	X	X	X	X	X	√	X	X	X	X	X	X	√	X	X	√	√	√	√

Legend X-Absence of source or no emission

√*-Presence of source, emission of pollutant*

(B) Water Quality Data

Surface Water Quality Monitoring Data

Table B.1: pH Values of Passur River Water

Monitoring period	Sampling Locations ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	7.2	7.2	7.2	7.9	7.1	7.1	7.4	7.4	7.3	7.4	7.4	7.3	7.9	7.2	7.2
2nd QM	7	7	6.9	7.1	6.9	6.9	7	6.9	6.8	6.9	6.8	6.8	6.9	6.9	7
3rd QM	8.1	8.2	8	8.1	8.1	8.2	8.1	8	8	8.1	8.1	7.4	8	7.9	7
4th QM	7.9	8	8.1	7.9	7.9	7.9	7.6	7.5	7.8	7.7	7.3	8.2	8.1	8.1	8.1
5th QM	7.6	7.7	7.8	7.5	7.6	7.7	7.5	7.2	7.3	7.5	7.6	7.5	7.7	7.7	7.7
6th QM	7.8	7.9	7.8	7.9	8	8	8.1	8	8.1	8.1	6.9	7.9	7.9	NS	NS
7th QM	7.6	7.58	7.64	7.6	7.58	7.62	7.78	7.6	7.64	7.3	7.56	7.1	7.8	7.63	7.39
8th QM	7.1	7.3	7.3	7.1	7.5	7.6	8.1	8	7.9	7.3	7.1	7.4	8.2	8	NS
9th QM	7.5	7.8	7.2	7.4	7.8	7.4	7.6	7.1	7.2	7.1	7.4	7.3	7.3	7.9	7.8
10th QM	7.27	7.3	7.93	7.56	7.6	7.9	7.94	8.04	8.2	8.1	7.8	7.3	7.63	7.67	NS
11th QM	6.9	7	7.2	7.3	7	6.9	7.2	7.5	7.3	6.8	7.1	6.9	7.4	7.1	7.6
12th QM	7.6	7.5	7.8	8.2	8.5	8.7	8.1	8.6	8.9	8.1	7.6	7.2	7.8	8.2	8.5
13th QM	7.2	7.3	7.3	7.2	7.8	7.4	6.9	6.8	7.1	7.2	7.4	6.9	6.9	7.2	NS
14th QM	7.1	6.9	6.9	6.9	7.2	7.2	7.2	7.1	7	7.1	7	6.8	7.1	7.1	6.8
15th QM	8.28	8.25	8.17	8.2	8.21	8.2	8.39	8.15	8.16	8.4	7.92	7.48	8.19	8.22	8.2
16th QM	8.1	8.1	8.1	8.1	8.1	8.1	8	8.1	8.1	8.1	7.6	7.3	8.1	8.2	NS
17th QM	8.4	8.4	8.4	8.3	8.3	8.2	8.4	8.5	8.5	8.6	7.3	8.3	8.4	8.2	NS
18th QM	7.9	6.04	8.09	7.65	8.2	7.87	8.11	7.44	7.07	7.94	7.63	7.02	7.19	8	7.18
19th QM	8.18	8.03	8.06	7.78	7.97	8.04	7.89	7.85	8.06	8.05	7.8	8.65	7.71	7.77	7.79
20th QM	9	9.9	8.7	8.9	8.4	8.5	9.3	8.7	8.4	9.3	8.2	8.1	8.2	7.9	NS
21st QM	6.8	6.8	7.1	7.5	7.2	6.7	7.4	6.5	7.3	7.2	7	7	7.2	7.1	NS
22nd QM	7.9	7.8	7.8	7.5	7.4	7.4	7.3	7.2	7.2	7.4	7.3	8	8	7.8	7.8
23rd QM	8.4	8.3	8.8	8.3	8.3	8	8.6	8.2	8.3	8	7.9	8.3	8.4	8.2	8.2
25th QM	6.9	7	7.1	7	7.2	7.2	7.4	7.6	7.8	7.1	6.9	7.1	7.4	7.7	NS
26th QM	6.9	6.66	6.59	6.6	6.77	6.88	7.13	6.82	6.8	6.85	6.83	7.06	6.1	6.6	6.7
27th QM	8.5	7.8	8	7.7	7.7	7.8	7.8	8	7.8	7.4	7.5	7.8	8.2	7.7	7.6
28th QM	8.3	8.1	8	8.6	8	8.9	8.2	8.4	8.3	8	8.3	8.6	7.8	8.2	NS
29th QM	5.5	6.5	8.5	7.4	8.4	5.8	6.7	8.6	8.5	5.9	6.9	7.3	6.6	6	8

Monitoring period	Sampling Locations ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
30th QM	7.8	7.5	6.5	6.8	7.6	7.6	8.2	8.2	7.9	7.8	8.5	8.1	7.3	6.9	6.7
31st QM	8	7.6	7.7	8.1	7.7	7.8	7.9	7.8	7.7	8	7.7	7.9	7.7	7.6	7.5
32nd QM	7.77	7.8	7.7	7.63	7.72	7.81	7.63	7.64	7.8	7.61	7.5	7.9	7.7	7.69	NS
33rd QM	8.02	8	7.94	7.58	7.95	7.98	7.99	7.99	8.03	8.5	7.74	8.1	8.07	7.83	NS
34th QM	7.67	7.59	7.6	7.55	7.44	7.42	7.58	7.5	7.4	7.79	7.66	8.4	8.2	7.71	7.28
35th QM	8.3	8.25	8.2	8.24	8.23	8.18	8.2	8.27	8.2	8.3	8.35	8.01	8.13	7.2	8.1
36th QM	7.86	8.02	8.07	8.1	8.05	7.95	8.08	8.04	8.1	7.84	8.2	7.51	7.8	7.79	NS
37th QM	7.21	7.84	7.68	7.98	7.81	7.3	7.84	8.1	8.3	7.9	7.8	7.4	7.4	7.8	7.9
38th QM	7.78	7.83	7.81	7.62	7.63	7.61	7.67	7.69	7.62	7.5	8.02	8.27	7.9	7.6	7.86
39th QM	7.9	7.8	7.6	7.9	7.6	7.7	7.8	7.8.	7.9	7.6	7.4	7.6	8.2	8.1	7.9
40th QM	7.8	7.81	7.7	7.6	7.79	7.7	7.8	7.81	7.8	7.75	7.8	7.5	7.7	7.4	7.5
41st QM	7.89	8.08	8.1	8	7.9	8	8.19	7.9	7.8	8.1	8.1	7.79	8.66	8.1	NS
42nd QM	8.7	8.07	8.23	8.03	8.06	8.03	8.07	8.01	8.04	8.01	8.1	9.29	8.6	8.43	8.4
43rd QM	8.2	8.5	8.4	8.1	8.2	8.1	8.1	8.1	8.5	8.6	8.3	8.68	8.76	8.9	8.6
44th QM	7	7.4	7.5	7.7	7.7	7.7	7.8	7.7	7.7	7.7	7.4	7.6	7.8	7.7	8.1
45th QM	7.8	7.9	7.9	7.8	8.2	8.15	8.02	8.02	8	8	7.5	7.93	7.99	8.07	7.34
Standard (ECR'2023)	6.5 - 9.0 (Coastal Industrial and others)												6.5– 8.5 (Coastal Reserved Natural area)		

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location.

Table B.2: Surface Water Temperature (^{0}C) in Passur River

Monitoring period	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	31	31	31	31	30	30	31	31	31	30	30	29	30	29	29
2nd QM	33	33	33	33	32	32	32	31	31	31	32	30	30	29	30
3rd QM	31	31	30	31	31	31	30	29	29	28	27	32	27	30	29
4th QM	19	20	20	19	19	19	20	19	19	19	20	19	22	21	21
5th QM	30	30	30	31	30	30	31	30	31	30	30	30	30	30	30
6th QM	31.8	30.5	30.5	30.8	30.6	30.4	30.5	30.8	30.6	30.8	31.6	29.8	29	NS	NS
7th QM	31.2	31.8	30.9	31.3	31.6	31.1	30.3	30.5	30.8	31.8	31.2	30.7	30.8	30.2	30.4
8th QM	22	21	21	22	22	21	23	22	21	22	23	21	22	21	NS

Monitoring period	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
9th QM	31.2	31.1	30.8	31.4	30.9	31	30.7	30.4	30.1	31.2	30.6	31.3	31.5	30.8	31.4
10th QM	29.6	29.1	29.4	30.1	30.5	30.5	30.7	29.8	29.8	30.4	30.7	30.7	30.9	30.4	NS
11th QM	30.1	30.8	30.4	30.1	31	31.1	30.4	30.2	31.1	31.1	31.2	30.38	29.9	30.4	31.3
12th QM	22.8	22.5	22.1	22.8	21.8	21.9	22.1	22	22.1	21.9	21.8	22.1	23.1	22.5	21.4
13th QM	30	30	29.8	31.3	30	30	29.9	29.8	30.1	30.3	30.1	30.2	30.2	30.8	NS
14th QM	29.8	30.1	30.2	30.1	29.8	29.9	30	30.1	30.1	29.9	30	30	29.8	29.9	29.4
15th QM	19.7	19.8	20.2	20.3	20.3	20.3	20.6	20.2	20.3	19.1	21.1	20.8	21	21.2	21.2
16th QM	30	30	31	28	29	28	28	28	28	28	31	30	30	32	NS
17th QM	30	30	30	30	30	31	31	31	31	31	31	29	29	30	NS
18th QM	28	26.9	27.5	28.4	28	28.1	27.9	28	28	27.62	30.2	26.82	27.62	27.21	28.66
19th QM	22	22	21.8	22.6	22.6	22.4	22.2	22.3	22.5	22.06	21	21.89	21.81	22.42	23.78
20th QM	31	31	31	31	31	31	33	31	32	33	32	31	31	31	NS
21st QM	30	30	30	30	31	30	30	30	30	30	30	30	31	31	NS
22nd QM	27	27	27	28	28	28	27	27	27	27	27	28	30	29	31
23rd QM	25	25	24	24	24	24	25	25	25	25	23	22	24	24	23
25th QM	30	30	31	30	30	30	30	30	30	30	30	30	31	31	NS
26th QM	27.7	27.7	27.7	27.8	27.8	27.7	28.4	27.9	27.8	28.67	28	28.07	28.35	29.48	29.02
27th QM	20	20	20	20	20	20	21	20	21	22	21	21	21	22	22
28th QM	31	30	30	30	30	30	30	30	30	31	31	29	30	30	NS
29th QM	30.3	30.5	30.5	30.6	30.4	30.5	30.4	30.5	30.5	30.39	30.5	30.15	29.6	29.75	30.66
30th QM	26	26	26	28	27	30	27	27	27	27	29	27	27	28	28
31st QM	22	22	22	21	22	22	23	22	22	23	22	22	24	21	22
32nd QM	30	30.2	30.2	30.1	30.3	30.2	30.1	30.2	30.2	30.45	29.2	31.63	30.13	31.36	NS
33rd QM	31.2	30.9	30.8	30.9	31	31.1	31.2	31	31.1	31.77	32.5	31.05	31.76	32.34	NS
34th QM	27.8	28	27.9	28.2	28.1	28.1	28.4	28.1	28.3	29.27	29.2	26.3	27.59	28.25	28.59
35th QM	25.29	24.3	23.6	24.2	23.86	24.4	24.8	23.95	24.57	26.54	28.1	21.91	25.38	22.28	23.6
36th QM	31.86	31.9	31.28	31.59	31.95	33.02	32.8	32.18	31.94	34.53	32.98	29.86	31.25	31.35	NS
37th QM	31.7	31.1	30.8	30.9	30.4	30.9	30.7	31	30.8	30.8	31.4	31.4	30.5	31.1	30.3

Monitoring period	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
38th QM	28.0	28.3	28.5	28.0	28.5	28.0	28.4	28.5	28.6	28.2	29.3	30.6	31.1	29.5	29.4
39th QM	22	23	23	21	22	21	23	21	22	22	23	20	21	20	21
40th QM	34.2	33.41	33.2	33.5	33.65	33.7	33.9	34.1	33.06	34.89	30.58	31.39	30.37	32.07	31.72
41st QM	30	30	30	29.7	30	30.1	30.3	29.8	30	30.1	28.4	28.9	29.7	30	NS
42nd QM	30.6	29.97	29.55	30	30.06	29.72	29.2	29.87	29.5	29.31	28.41	30.55	31.1	29.25	30.34
43rd QM	23.9	23.4	23.8	24.1	23.6	23.2	23.9	23.6	23.8	24.5	25.1	23.25	23.6	22.52	24.5
44th QM	29.4	29.6	29.3	29.7	30.1	29.7	28.8	29.7	29.4	29.3	32.6	30.8	30.8	30.3	30.2
45th QM	30.4	30.6	30.9	30.4	30.3	30.4	30.4	30.4	30.5	30.4	30	28.9	28.9	30.3	31.3
Standard (ECR*2023)	**N/A**														

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location.

Table B.3: Salinity (ppt.) in Passur River

Monitoring Periods	Sampling location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	11.5	11.5	11.5	12	12	12	9.5	9	10	10	9	10	12	19	23
2nd QM	2.5	0.3	0.2	2.2	0.3	0.5	4	0	2.5	0.5	4.5	9.5	10	15	19.5
3rd QM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
4th QM	4.5	4.1	4.5	4.7	5.1	5	5.2	5.2	5.1	5.2	4.5	5	6	16	23
5th QM	13	15	16	9	13	14	14	13	12	10	9	14	15	20	25
6th QM	0	0	0	0	0	0	0	0	0	0	0	0	0	NS	NS
7th QM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	6.2
8th QM	4.1	4.3	4.3	4.4	5.1	5	5.2	4.9	5.5	3.8	2.5	4.8	5.3	11.3	NS
9th QM	8	7.4	7	6	6.2	9	8	7	6.8	7.1	6.3	6	8.9	9.4	14
10th QM	0	0	0	0	0	0	0	0	0	0	0	0	0	4	NS
11th QM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5.8
12th QM	3.7	3.8	3.6	4	3.9	4.2	4.2	4.1	4.1	3.9	3.8	6.7	8.9	16.3	21.4
13th QM	6.3	5.9	6.2	6.8	6.9	6.1	6.5	7.1	7	7	6.9	10.4	10.4	16	NS
14th QM	0	0	0	0	0	0	0	0	0	0	0	1.2	2.3	3.6	5.1
15th QM	2	2	2	2.6	2.6	2.7	2.8	2.8	2.8	2.6	2.52	10.8	2.8	13.1	16.45
16th QM	11.5	11.5	11.5	12	12	12	9.5	9	10	10	9	10	12	19	23
17th QM	0.2	0.2	0.4	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.6	2.2	2.8	NS

Monitoring Periods	Sampling location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
18th QM	0.9	0.1	0.8	0.9	0.8	0.8	1	0.2	0.3	0.9	0.02	1	1.8	9.1	13.9
19th QM	11.1	11.1	10.6	10.8	10.8	11	9.9	11.5	11.1	11.3	9.9	7.9	11.9	16.7	22.7
20th QM	16.6	16.2	16.5	16.6	16.9	16.9	12	16.7	16.9	16.5	8	14.9	15.6	22.9	NS
21st QM	0.5	0.2	0.3	0.2	0.2	1.2	0.3	0.2	0.3	0.3	1	0.4	0.3	0.9	NS
22nd QM	0.4	0.3	0.3	0.5	0.3	0.3	2.1	0.1	0.4	0.3	0.3	0.5	0.7	6.6	9.2
23rd QM	3.8	3.9	4	3.8	3.9	3.9	3.7	0.1	3.5	4	4	3.6	3.7	8.9	11
25th QM	0.2	0.3	0.2	0.1	0.2	0.1	0.2	0.2	0.3	0.3	0.5	0.4	1.5	4	NS
26th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	2	0.2	0.2	1.6	2.6
27th QM	2.4	2.7	2.7	2.5	2.7	2.4	2.6	2.5	2.7	2.5	2.5	1.8	2.6	7.1	8.2
28th QM	7.1	7.5	7.2	7.2	7.3	7.3	7	7.3	7.4	7	6.5	6.9	7	10.9	NS
29th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8	0.1	0.1	1	0.9
30th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.1	0.2	2.2	2.6
31st QM	0.8	0.7	0.7	0.7	0.8	0.8	1	0.9	0.9	0.9	0.2	0.9	2.1	6.4	8
32nd QM	2.6	2.5	2.3	2.6	2.3	2.1	2.6	2.7	2.4	2.7	2.5	4	6.3	8.3	NS
33rd QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.6	0.3	0.6	3.2	NS
34th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	1.7	2.9
35th QM	3.2	3.7	3.7	3.5	3.9	4	3.8	4.2	4	3.5	3.3	2.9	3	8.4	9.5
36th QM	8.8	9.1	9.2	8.9	9	9	8.9	9	9.1	8.8	9.2	8.8	8.6	10.8	NS
37th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.19	0.11	1.14	0.3	0.9	1.5	2.8
38th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.2	2.5	3.5
39th QM	3.8	4.1	3.9	4	3.9	4	4.1	4	3.9	4.1	4.1	6.8	8.9	9.1	10.8
40th QM	8.5	8.1	8.6	8.5	8.5	8.5	8.7	8.8	8.7	8.5	8.8	8.7	7.5	10.6	11.7
41st QM	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.9	0.3	0.9	NS
42nd QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	2	3.4
43rd QM	6.1	8.2	5.5	6.1	8	6.9	5.9	8	8.1	8.2	8.1	6.62	6.36	5.48	6.93
44th QM	7.7	7.8	8	8.5	8.6	8.3	8.3	8.6	8.4	8.5	6.7	7.8	8.3	11.1	12.2
45th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.2	0.1	0.2	1.4	2.5
Standard (ECR*2023)	**N/A**														

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.4: Dissolve Oxygen (DO) in Passur River

Monitoring Period	Sampling Locations ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	5.9	4.9	5.2	5.7	5.9	5.8	6.6	6.5	6.5	6	6.7	5.3	5.4	7.9	7.5
2nd QM	6.1	6.8	6.7	6.8	6.9	6.6	7.3	7.1	7.2	6.5	6.8	6.2	5.9	6.4	6.5
3rd QM	5.6	7.7	7.7	7.6	7.2	8	5.6	5.6	5.8	8	8	7	7	7.7	7.8
4th QM	5.5	6.6	6.7	5.8	5.9	6.8	6.1	6.9	6.6	6	6.2	6.5	6.6	6.7	6.5
5th QM	6.2	6.4	6.2	6.2	6.6	6.4	6.3	6.5	6.4	6.2	6.5	6.3	5.8	6	5.8
6th QM	5.3	5	5	6.7	6.6	6	7.5	7.4	7.3	6	6.4	7	7.5	NS	NS
7th QM	6.8	6.4	7.1	6.8	7.2	7.6	6.4	6.1	6.3	7.1	7.1	6.6	7.1	7.3	7
8th QM	5.1	5.1	6.2	5.9	5.3	5.4	6	6.1	5.8	4.1	5.2	5.4	5.2	6.2	NS
9th QM	7.1	6.4	6.9	5.8	6.1	6.6	6.9	7.1	6.8	6.4	5.9	5.8	6.4	6.1	7.1
10th QM	6.2	5.7	5.6	6.1	6.3	5.8	6.3	6.4	5.6	5.2	5.4	5.4	5.4	6.2	6.8
11th QM	6	6.1	6	6.3	5.9	6.1	5.9	6	6	6.1	6.4	5.6	5.8	6.7	6.9
12th QM	6.1	5.9	6.1	6.2	5.9	5.9	6.3	6.4	6.4	6.7	6.7	5.9	6.1	6.5	6.8
13th QM	7.1	7.2	6.8	6.9	7.4	7.5	6.4	7.2	6.8	6.8	7.1	6.4	6.4	7.2	NS
14th QM	6.3	6.4	6.5	6.3	6.3	6.5	6.5	7.1	6.5	6.3	6.2	6.4	6.2	6.8	7.3
15th QM	5.19	5.03	5.06	5.1	5.03	4.9	5	4.98	5.11	5.17	5.11	5.23	5.03	5.4	5.4
16th QM	6.575	6.225	6.275	6.15	6.5	6.575	6.55	6.825	6.625	6.35	6.7	5.95	5.8	6	NS
17th QM	6	6.2	6.1	5.5	6	6.5	6.8	6.2	6	6.7	6.3	5.8	6.9	6.8	NS
18th QM	6.4	6.2	6.3	6	6.2	6	6.1	6.3	6.2	5.8	6	6	8.21	6.9	7.2
19th QM	8.7	7.9	7.3	8.7	7.3	7.4	7.8	7.1	6.9	7.5	6	6.9	7.5	7.7	8
20th QM	5.9	6.5	6.3	6.1	6.5	6	6.1	6.5	6.1	6.3	6.2	6.5	6.9	7	NS
21st QM	6	6	6.1	6.5	6.3	6.4	6.2	6.2	6.3	6.4	6	6.2	6	6.6	NS
22nd QM	7.7	7.8	7.8	8.6	8	8.2	9.9	10	10.5	7.1	7.7	7.9	8.4	7.7	8.6
23rd QM	8.4	8.6	7.6	8.1	8.2	7	6.9	7.2	7.8	9.7	7.5	8.6	6.9	9.7	6.7
25th QM	6.1	6.1	6	6	6.4	6.2	6.6	6.5	6.3	6.4	6.1	6	6.1	6.5	NS
26th QM	6.4	7.64	6.3	8.2	8.89	7.8	9.7	9.76	9.76	9.7		8.14	7.65	6.61	8.2
27th QM	9.2	9.6	7.8	9	8.9	9.3	9.6	7	6.4	8.1	8	9.2	7.6	7.2	9
28th QM	6.5	6	6.8	8.4	8	8.5	5.4	6.3	5.9	7.5	7	5.9	5.5	6.8	NS
29th QM	5.8	6	6.3	6.6	6.2	6.8	7.2	6.2	6.7	6.8	5.5	6.2	6.6	6.1	6.2
30th QM	7.8	7.5	6.5	6.7	5.6	6.5	6.7	6.5	6.1	6.7	6.2	5.8	6.8	6.5	6.9
31st QM	6.5	6.7	6.5	7.1	5.5	6.7	6.4	6.6	6.5	6.5	6.5	6.9	5.9	6.2	6.2
32nd QM	7.3	7.8	7.5	7.5	6	5	6.2	7.2	6.7	6.1	7	6.8	7.8	7.1	NS
33rd QM	8.1	8.5	7.8	7.5	8.8	8.1	7.5	8	8.1	8.5	7.6	7.1	7.6	7.6	NS

Monitoring Period	Sampling Locations ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
34th QM	6.2	8.4	8.5	7.7	5.7	5.8	7.5	8.2	5.9	5.7	7.5	8.1	8.4	8.2	7.5
35th QM	6.1	6.2	5.9	5.8	5.8	6.2	6	6.1	6.7	5.9	5.8	7.2	6.5	7.6	6.6
36th QM	5.3	6	5.2	4.9	5.4	5.6	5	5.3	5.2	5.75	6.1	6.7	5.8	6.8	NS
37th QM	6.7	6.8	6.7	6.4	6.6	6.7	6.6	6.8	6.7	6.3	7.2	7.4	7.8	7.6	7.9
38th QM	6.3	5.9	5.6	6.3	6.5	7	7	7.2	5.9	7.8	6.79	7.36	7.9	7.6	7.8
39th QM	6.9	7.1	7.2	7.2	7.1	6.9	7.3	7.3	7.4	7.1	7.2	7.4	7.5	7.7	8.0
40th QM	5.42	5.64	5.64	5.39	5.54	5.75	5.2	5.63	5.63	5.85	8.7	6.34	6.06	5.69	7.2
41st QM	5.96	5.43	5.16	5.62	5.49	6.5	5.66	5.82	5.51	6.2	8.1	8.78	7.1	5.9	NS
42nd QM	6.6	5.98	6.3	5.88	5.95	5.83	5.77	6.36	5.82	8.38	9.1	8.29	8.2	8.43	7.2
43rd QM	6.1	8.2	5.5	6.1	8	6.9	5.9	8	8.1	8.2	8.1	6.6	6.4	5.5	6.9
44th QM	5.3	5.9	5.8	6.8	7	6.1	5.7	5.4	5	4.6	8.1	8.2	7.5	6.3	7.4
45th QM	5.53	5.44	8.6	5.53	5.83	6.7	6.7	5.80	5.70	7.10	6.30	6.3	6.96	6.91	6.57
Standard (ECR*2023)	**≥4 (Coastal Industrial and others)**												**≥ 5 mg/l (Coastal Reserved Natural area)**		

Source: Field Survey from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.5: COD (mg/l) of Passur River System

Monitoring Periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	288	284	328	376	400	364	364	400	408	276	284	408	372	536	540
2nd QM	24	20	56	28	60	496	108	40	120	32	96	172	216	520	416
3rd QM	6	30	14	18	14	18	10	22	10	10	26	14	14	54	122
4th QM	128	68	92	84	116	108	104	16	100	116	84	96	96	316	472
5th QM	87	58	132	102	110	88	96	18	106	88	94	92	102	302	470
6th QM	42	43	18	26	21	24	32	25	25	51	36	30	26	NS	NS
7th QM	32	36	28	36	36	40	42	28	48	40	42	46	36	84	96
8th QM	124	100	96	100	108	80	100	100	124	100	108	88	100	96	NS
9th QM	220	240	280	280	240	260	240	180	200	160	210	220	140	156	160
10th QM	8	8	8	8	12	8	12	8	12	8	30	12	16	4	NS
11th QM	12	8	8	12	16	12	8	8	12	8	8	16	12	68	56
12th QM	56	40	44	48	52	42	56	52	44	36	48	40	40	56	196
13th QM	52	48	56	40	36	48	42	36	52	44	40	64	216	240	NS

Monitoring Periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
14th QM	24	8	40	32	40	16	48	8	4	16	32	40	32	16	4
15th QM	48	28	40	36	32	28	40	44	36	40	32	48	40	72	88
16th QM	276	240	230	232	254	252	212	218	230	180	252	260	280	296	NS
17th QM	20	24	12	30	16	12	10	24	16	40	20	10	16	110	NS
18th QM	56	44	48	60	36	42	48	32	28	36	42	20	58	44	76
19th QM	72	60	48	44	56	64	88	36	68	72	68	32	56	180	140
20th QM	188	180	176	192	180	172	200	160	180	160	172	178	184	160	NS
21st QM	36	24	32	20	28	24	28	20	32	24	20	24	32	220	NS
22nd QM	56	40	26	40	28	24	20	32	20	24	36	40	32	92	72
23rd QM	24	28	32	24	40	24	26	20	28	44	36	36	40	56	64
25th QM	32	36	28	24	36	40	48	36	42	32	48	72	80	108	NS
26th QM	16	12	8	28	16	20	8	12	20	12	28	56	76	60	40
27th QM	56	32	20	48	20	56	48	56	8	12	24	32	12	28	NS
28th QM	508	404	400	304	412	390	408	424	448	400	380	472	424	392	NS
29th QM	4	4	4	4	4	12	8	8	12	16	48	32	16	80	32
30th QM	44	52	40	20	40	4	4	24	4	48	4	12	4	192	180
31st QM	24	12	8	40	32	12	16	36	12	12	32	16	60	36	40
32nd QM	24	28	48	36	24	20	24	48	52	56	96	96	240	36	NS
33rd QM	4	12	4	8	36	20	4	36	48	4	12	0.03	4	84	NS
34th QM	4	8	4	12	4	4	8	8	4	8	12	8	16	8	8
35th QM	144	256	148	212	188	264	220	144	192	112	144	148	188	112	120
36th QM	436	236	248	288	412	296	416	412	496	348	480	248	236	436	NS
37th QM	36	48	20	52	56	4	12	4	20	16	16	12	8	20	124
38th QM	36	24	48	36	20	28	48	36	48	92	56	48	52	56	36
39th QM	164	148	156	96	200	24	200	164	248	164	216	248	324	112	148
40th QM	464	412	484	436	436	416	480	424	400	480	400	416	420	400	448
41st QM	12	4	8	8	4	8	4	12	24	8	12	16	40	12	NS
42nd QM	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
43rd QM	56	80	40	48	96	72	96	48	36	80	40	96	112	480	96
44th QM	428	412	464	448	400	400	428	460	428	400	392	400	316	212	368
Standard (ECR*2023)	**5 mg/l (Coastal Industrial and others)**												**8 mg/l (Coastal Reserved Natural area)**		

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.6: Oil and Grease (mg/l) Concentration of Passur River System

Monitoring periods	Sampling Location ID				
	SL-7	SL-12	SL-13	SL-14	SL-15
1st QM	<5	<5	<5	<5	<5
2nd QM	<5	<5	6.3	<5	<5
3rd QM	<5	<5	<5	<5	<5
4th QM	>15	>15	>20	>20	>20
5th QM	16.9	13	39.1	<5	<5
6th QM	9	7.63	10.1	NS	NS
7th QM	<5	9.87	<5	10.8	9.73
8th QM	39	21	14	ND	36
9th QM	61	30.3	26	31	82
10th QM	5	13.5	5.73	NS	5.87
11th QM	<5	<5	<5	10.1	<5
12th QM	9.2	15.6	<5	13.8	14.2
13th QM	*5.73*	<5	<5	7.71	ND
14th QM	<5	<5	<5	<5	<5
15th QM	16.6	<5	<5	<5	<5
16th QM	<5	<5	<5	<5	<5
17th QM	<1	<5	<1	NS	<1
18th QM	<2.0	<2.0	<2.0	<2.0	<2.0
19th QM	<2.0	<2.0	<2.0	<2.0	<2.0
20th QM	<2.0	<2.0	<2.0	<2.0	<2.0
21st QM	<2.0	<2.0	<2.0	<2.0	<2.0
22nd QM	<2.0	<2.0	<2.0	<2.0	<2.0
23rd QM	2.3	<2.0	<2.0	4.4	2.3
25th QM	<2.0	<2.0	<2.0	<2.0	<2.0
26th QM	<2.0	<2.0	<2.0	<2.0	<2.0
27th QM	2.93	<2.0	<2.0	<2.0	NS
28th QM	<2.0	<2.0	<2.0	<2.0	3.2
29th QM	<2.0	<2.0	<2.0	<2.0	<2.0
30th QM	<2.0	<2.0	<2.0	<2.0	<2.0
31st QM	<2.0	<2.0	<2.0	<2.0	<2.0
32nd QM	<2.0	<2.0	<2.0	<2.0	<2.0
33rd QM	<2.0	<2.0	<2.0	<2.0	NS

Monitoring periods	Sampling Location ID				
	SL-7	SL-12	SL-13	SL-14	SL-15
34th QM	<2.0	<2.0	<2.0	<2.0	<2.0
35th QM	<2.0	<2.0	<2.0	<2.0	<2.0
36th QM	<2.0	<2.0	<2.0	<2.0	<2.0
37th QM	<2.0	<2.0	<2.0	<2.0	<2.0
38th QM	<2.0	<2.0	<2.0	<2.0	<2.0
39th QM	<2.0	<2.0	<2.0	<2.0	<2.0
40th QM	<2.0	<2.0	<2.0	<2.0	<2.0
41st QM	<2.0	<2.0	<2.0	<2.0	<2.0
42nd QM	<2.0	<2.0	<2.0	<2.0	<2.0
43rd QM	<2.0	<2.0	<2.0	<2.0	<2.0
44th QM	<2.0	<2.0	<2.0	<2.0	<2.0
Standard (ECR*2023)	**5 mg/l (Coastal Industrial and others)**		**0.01 mg/l (Coastal Reserved area)**		

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.7: TDS (mg/l) of Passur River System

Monitoring Periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	13060	12630	12900	13190	13330	13380	13180	13390	13240	12400	10970	12800	12280	21500	21500
2nd QM	251	246	383	445	353	402	655	587	916	455	2510	6410	9360	15960	14050
3rd QM	176	162	153	169	156	152	162	153	154	214	257	209	285	3400	5720
4th QM	4360	3950	4330	4750	4920	4870	5040	5050	5130	5050	4390	5130	4780	12350	17900
5th QM	14400	14700	14900	14600	14500	14200	14500	14600	14250	14000	13900	14050	13900	13600	25300
6th QM	937	941	127	175	132	156	336	158	160	2320	355	298	683	NS	NS
7th QM	158	169	152	172	162	160	192	164	164	183	176	227	205	4220	5830
8th QM	5570	5910	5490	5720	5850	5480	5650	5740	5650	5450	4420	4540	4940	13330	NS
9th QM	13400	13280	13560	12830	13100	13460	12820	12960	13590	13340	11700	11330	13580	20720	25500
10th QM	179	112	125	162	185	143	205	195	140	165	5170	893	1321	7330	NS
11th QM	138	106	108	147	110	112	113	108	146	196	238	162	301	2550	4120
12th QM	3100	3140	3330	3630	3600	3520	3470	3790	3770	2920	3960	3370	3370	3580	12210
13th QM	13400	13480	13400	13560	13490	13330	13640	13680	13360	13490	13110	12340	13600	19370	NS
14th QM	496	122	123	172	125	125	160	126	127	1616	1200	204	245	3270	4450

Monitoring Periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
15th QM	1913	1919	1915	2500	2520	2500	2840	2710	2720	2500	2970	2570	2690	11390	14190
16th QM	14500	14420	14650	14300	14450	14540	14400	14500	14610	14160	14450	14500	15350	20600	NS
17th QM	315	224	232	328	235	208	205	286	296	265	340	580	2190	7680	NS
18th QM	855	733	722	824	716	732	945	784	786	992	827	940	1715	8100	12500
19th QM	9940	9950	9730	9860	9980	9800	10190	10280	10080	10040	8860	8350	10950	17200	21110
20th QM	15800	15600	15500	15700	16000	16100	15640	16000	15800	15700	15100	15722	15400	14800	NS
21st QM	290	150	152	205	142	150	208	145	154	940	365	172	560	12500	NS
22nd QM	480	175	170	190	175	174	325	180	172	1405	875	350	474	3950	5750
23rd QM	6800	6950	7300	6760	6760	6900	6740	6450	6700	7250	5800	6240	6430	16300	20400
25th QM	134	114	116	221	125	132	195	128	114	229	2893	740	489	4188	NS
26th QM	122	96	94	102	179	105	181	98	92	206	164	148	2260	1472	490
27th QM	3770	4410	4390	4150	4170	4060	4100	4210	4450	4170	2320	3010	4060	11400	14600
28th QM	12500	12700	12300	12800	13100	13200	13100	13300	13200	12500	11800	12100	12400	18500	NS
29th QM	58	105	106	74	97	110	158	110	100	216	1270	180	240	1700	1610
30th QM	160	150	147	158	150	153	155	153	156	160	780	203	275	3850	6300
31st QM	1380	1300	1210	1230	1510	1380	1850	1680	1650	1540	1350	1580	3850	11600	15500
32nd QM	4870	4800	4350	5250	4920	4060	5150	5070	4750	5100	8900	7820	12200	16400	NS
33rd QM	190	125	122	140	115	135	150	127	125	134	2850	460	1020	6200	
34th QM	155	150	136	158	135	133	235	136	132	210	140	210	315	2890	5300
35th QM	5700	6900	6850	6300	7400	7500	6800	7700	7600	5500	5600	5300	6100	15300	18100
36th QM	16900	17500	18000	17400	17800	17900	17600	17500	17800	17600	15200	16700	16800	21000	NS
37th QM	146	132	146	109	136	135	160	132	142	218	297	320	675	4200	5800
38th QM	280	195	190	210	192	190	525	215	192	950	350	226	430	4700	6800
39th QM	4100	4170	4200	5800	5300	5350	5500	5680	560	4150	5200	4900	6500	16100	14000
40th QM	16700	15800	16800	17100	16900	17000	16900	17300	17200	16800	17000	16800	14300	21100	22800
41st QM	507	230	165	168	164	157	215	153	148	870	446	1415	520	1610	507
42nd QM	100	163	160	167	164.00	173	203	170	166	200	870	205	344	3700	6400
43rd QM	3900	4100	4800	5000	5100	5050	4700	4900	4950	5100	4200	3800	7100	14100	17000
44th QM	14600	14400	15500	16100	16500	16000	15600	16400	16100	16150	12900	15000	15700	21400	23700
Standard (ECR*2023)	**N/A**														

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.8: TH (mg/l) Passur River System

Monitoring ID	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	2900	2500	2650	2550	2600	2625	2550	2800	2500	2500	2400	3150	2625	4500	4850
2nd QM	250	180	170	175	275	350	325	350	475	450	725	1400	2150	3625	3050
3rd QM	216	218	335	390	340	355	330	345	325	350	330	377	345	980	1440
4th QM	930	870	870	940	990	970	1045	1125	975	980	970	1000	970	2380	2690
5th QM	3000	3050	3250	3450	3250	3200	3600	3670	3540	3260	3190	3210	3080	3420	3640
6th QM	245	110	105	118	103	105	153	105	165	470	130	135	200	NS	NS
7th QM	250	330	360	365	355	350	345	390	445	183	340	410	430	1090	1460
8th QM	1270	1380	1240	1220	1300	1260	1370	1340	1270	950	1075	1090	1100	2850	NS
9th QM	3130	3090	3140	3010	3070	3100	3060	3130	3110	3180	3080	3060	3050	4520	5050
10th QM	240	205	205	220	232	218	235	242	224	220	875	405	415	1750	NS
11th QM	255	250	190	265	237	242	205	217	238	250	240	245	282	670	810
12th QM	1090	980	1030	1020	915	1070	935	1100	1110	1040	1170	1070	1070	1130	2870
13th QM	3640	3420	3300	3400	3440	3380	3540	3480	3600	1960	2300	2450	3560	4300	NS
14th QM	200	150	155	160	145	140	150	155	175	165	320	220	200	640	905
15th QM	430	510	498	570	590	480	505	530	512	505	478	1070	610	1475	1740
16th QM	3100	1040	1030	1060	1040	1085	1080	1110	1100	1300	1120	1410	1330	1440	NS
17th QM	210	205	185	200	210	215	205	212	205	210	220	245	530	2030	NS
18th QM	335	310	313	285	255	275	295	265	325	295	315	325	2550	2750	4200
19th QM	2050	3900	4100	4600	4200	4400	4400	4300	4600	4000	4100	4000	4500	5900	6900
20th QM	3000	5000	5000	5200	5000	4800	4400	5100	4900	5200	5000	4782	4500	4500	NS
21st QM	2100	1950	1900	1850	2500	2550	1700	1850	2000	2000	2200	1800	1400	4300	NS
22nd QM	215	125	190	175	178	155	175	150	115	350	285	200	185	830	1225
23rd QM	1540	1485	1530	1580	1560	1490	1530	1560	1485	1460	1440	1510	1390	3470	3850
25th QM	205	200	187	217	215	202	195	210	207	310	742	250	280	1000	NS
26th QM	272	195	225	210	235	200	240	235	243	198	217	265	225	210	230
27th QM	2800	2700	2750	3000	3100	2500	2550	3200	2800	1400	1200	2850	2870	5050	5600
28th QM	4500	4200	4300	4100	4500	4000	4400	4100	4400	4200	4100	4200	4400	4300	NS
29th QM	140	200	180	200	175	175	140	130	100	145	400	150	160	480	470
30th QM	145	125	130	175	140	145	160	170	155	165	265	190	170	1000	1450
31st QM	370	385	310	375	325	340	375	420	430	380	435	500	680	6500	5300
32nd QM	2500	2400	2250	2500	2350	2100	2550	2400	2460	2450	3100	2300	4000	5000	NS
33rd QM	140	110	115	120	110	120	125	120	130	140	1000	215	930	2500	NS

Monitoring ID	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
34th QM	190	140	150	130	125	115	152	140	130	155	140	115	110	2000	2500
35th QM	2600	2800	2800	2900	3100	3200	3100	3300	3500	2500	2500	2600	2800	4500	5000
36th QM	4700	4800	4700	4500	4650	4750	4600	4850	4800	4550	4400	4600	4650	5250	NS
37th QM	110	120	125	90	120	110	125	110	125	170	185	190	800	1500	1900
38th QM	185	145	160	190	170	160	190	140	120	315	225	165	210	1400	1600
39th QM	2550	2600	3250	3300	2850	2950	3350	3200	2900	3000	3100	2200	3300	5450	4950
40th QM	4500	4400	4500	4600	4600	4600	4700	4700	4500	4600	4500	4500	3800	5500	5950
41st QM	415	190	110	130	135	125	160	135	125	430	220	1300	300	1400	NS
42nd QM	140	125	135	125	130	140	150	150	140	145	215	160	185	1000	1200
43rd QM	2500	2450	2900	3000	2800	2800	2400	2900	3100	3300	2400	2300	3300	4900	5400
44th QM	4300	4200	4400	4500	4500	4500	4100	4300	4400	4400	3600	4100	4100	5500	5600
Standard (ECR*2023)	N/A														

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.9: TSS (mg/l) Passur River System

Monitoring Periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	598	45	53	54	60	55	24	27	67	7	9	50	65	115	91
2nd QM	126	92	112	99	100	105	116	112	37	65	24	310	90	99	72
3rd QM	234	193	174	227	232	186	185	536	459	798	389	203	869	28	267
4th QM	180	210	230	450	250	200	300	530	450	280	206	280	400	103	200
5th QM	160	167	170	160	165	155	150	147	155	148	160	165	160	150	180
6th QM	26	25	127	30	27	40	32	40	44	36	28	24	42	NS	NS
7th QM	76	80	65	92	85	97	104	90	82	96	92	60	74	110	144
8th QM	14	12	14	17	18	22	20	7	18	11	10	15	22	16	NS
9th QM	8	7	10	10	8	7	12	10	11	7	6	13	18	23	15
10th QM	61	48	56	62	45	49	51	43	39	42	11	47	31	16	NS
11th QM	20	18	16	20	24	19	20	18	16	24	30	27	18	41	33
12th QM	46	52	48	42	54	46	61	58	63	55	66	61	**61**	34	49
13th QM	51	42	48	52	43	38	32	44	40	37	49	38	33	28	NS
14th QM	18	15	22	16	20	17	15	16	14	26	30	**25**	27	22	16
15th QM	14	15	14	13	13	14	15	17	12	14	15	13	17	14	13
16th QM	18	17	22	20	19	21	17	19	18	23	32	14	15	18	NS

Monitoring Periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
17th QM	17	16	15	18	16	15	16	14	20	13	12	17	13	14	NS
18th QM	14	11	15	11	13	12	14	13	15	11	42	27	22	15	6
19th QM	15	12	14	12	13	15	16	13	14	14	8	15	12	11	9
20th QM	12	14	13	11	12	15	12	11	13	14	12	13	11	10	NS
21st QM	14	11	13	12	13	14	13	12	13	15	12	13	12	7	NS
22nd QM	8	7	6	8	7	6	7	6	5	9	7	15	11	7	5
23rd QM	11	8	7	8	9	6	7	8	6	13	12	14	11	10	10
25th QM	14	6	11	12	9	12	14	13	8	11	5	9	17	18	NS
26th QM	7	11	8	7	6	9	15	8	6	8	7	8	5	8	6
27th QM	11	6	7	7	6	8	7	6	6	7	8	6	8	11	6
28th QM	15	23	20	13	12	16	14	15	13	17	12	3	14	11	NS
29th QM	12	14	9	12	11	8	12	9	15	13	3	7	9	16	13
30th QM	13	12	10	14	9	13	17	4	15	11	8	13	15	12	13
31st QM	15	14	17	12	13	11	14	12	15	13	13	14	15	16	13
32nd QM	7	10	11	12	9	11	18	13	12	19	16	15	13	17	NS
33rd QM	27	23	24	31	27	26	29	26	24	30	15	64	21	32	NS
34th QM	16	15	19	18	14	16	21	18	14	15	18	25	20	23	21
35th QM	11	14	12	11	8	13	12	7	11	8	7	8	6	7	9
36th QM	25	20	16	18	12	13	10	7	6	8	6	7	6	11	NS
37th QM	15	12	17	14	12	13	11	12	9	13	16	14	10	13	9
38th QM	5	4	5	4	5	3	6	4	3	7	13	11	7	4	3
39th QM	3	3	6	4	3	3	4	4	4	5	4	13	3	3	3
40th QM	3	4	3	3	4	7	5	3	4	9	8	12	5	3	3
41st QM	8	3	4	7	8	6	8	9	7	8	12	22	7	15	NS
42nd QM	11	8	9	7	6	8	12	5	6	8	6	9	12	27	8
43rd QM	4	5	4	3	7	5	6	4	3	4	4	13	6	18	5
44th QM	133	26	135	146	27	95	31	35	212	225	16	43	38	70	82
Standard (ECR'2023)	100 mg/l (Coastal Industrial and others)												25 mg/l (Coastal Reserved area)		

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location.

Table B.10: Nitrate (NO_3^{2-}) (mg/l) concentration of Passur River System

Monitoring Periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	0.9	0.7	0.1	1.3	1.4	1.1	0.75	1.1	1.2	0.3	0.5	0.6	1.4	2.7	0.8
2nd QM	2.89	2.4	3.2	0.76	2.69	2.98	2.13	2.43	2.05	2.18	0.88	1.52	1.75	3.32	2.84
3rd QM	0.32	1.57	1.84	1.64	1.42	1.33	1.85	2.09	2.21	2.26	1.98	1.64	1.67	0.59	0.4
4th QM	3	1.5	4.3	3.1	2.2	8.5	2.7	1.8	1.9	6	4	4.5	2.7	1.5	2
5th QM	33	13	39	48	69	8	87	48	128	62	48	29	18	25	28
6th QM	9.1	7.5	6.2	6.6	6.1	6.6	14.9	4	4.9	7	3.1	7.8	4.4	NS	NS
7th QM	4	7.1	5	5.7	3.3	4.7	4.4	6.2	4.4	4.9	2.9	3.1	4.4	3.2	11.5
8th QM	6.3	4.3	3.9	3.1	5.2	4.1	4.9	3.7	4.4	5.6	3.9	3.7	5.1	4.9	NS
9th QM	3	2.9	2.5	2	3.1	3.6	2.6	2.9	2.6	2.7	3.1	3	3.4	2.9	3.5
10th QM	3.9	6.2	4.3	5.1	2.7	3.9	3.6	5.1	4.9	5.2	5.3	5.2	5.1	5.4	NS
11th QM	0.25	0.39	0.42	0.76	0.52	0.31	0.2	0.41	0.63	0.4	0.32	0.27	0.39	0.25	0.38
12th QM	3.62	2.89	1.87	2.25	2.46	3.01	3.64	1.93	2.17	2.46	3.1	2.78	2.78	3.08	2.28
13th QM	4.35	5.05	4.55	6.11	3.4	3.16	3.14	3.34	2	3.61	1.6	2.49	2.46	3.69	NS
14th QM	5.8	6.8	4.5	7.1	3.1	5	4.1	3.4	3.1	2.3	3.2	3.5	4.2	2.2	2.6
15th QM	3	4.2	3.6	3	4.7	7.6	8.8	8.5	2.8	1.6	3.4	4.5	4.6	1.8	6.1
16th QM	6.8	4.9	5.1	2.8	5.2	5.5	2.6	4.5	5.3	5.9	3.9	4.7	5.2	5.5	NS
17th QM	0.8	1.7	2.1	2.8	1.8	3.2	4	3.7	3.8	4.4	3.1	2.4	2.7	4.2	NS
18th QM	2.8	0.1	0.11	1.7	0.9	0.1	0.1	3.4	0.7	2.3	0.12	1.6	0.1	0.1	0.9
19th QM	3.5	2.6	1.9	2.1	2.2	3.5	4.2	3	3.1	2.1	1.3	3.7	4.7	1.8	2.6
20th QM	0.3	0.3	3.7	3	1.2	4.8	0.5	3.4	4.1	5	2.9	2.7	4.4	2.7	NS
21st QM	0.1	1.1	1.2	1.5	1.5	2.1	1.5	1.7	0.5	3.1	2.5	1.8	1.7	1.3	NS
22nd QM	3.5	2.7	3.4	3	1.7	2.1	2	1.3	2.2	2.9	1.6	2	2.1	1.6	2.5
23rd QM	1.3	1.7	3.2	4.5	2.7	5.1	7.4	3.9	4.1	4.7	4.9	3.3	3.2	2.6	4.1
25th QM	3	3.3	9.5	2.9	1.9	1.8	1	1.5	1.3	3.9	2.1	1.5	5.7	4	NS
26th QM	3.2	1.3	4.7	2.5	2.6	1	0.5	2.1	3	1.5	1.3	2.6	2.6	2.6	2.6
27th QM	4.3	2.2	1.2	0.7	3.1	2.7	1.8	3	1.9	3	4.9	0.5	0.5	2.9	3.9
28th QM	3.3	2.1	1.3	2.1	3	1.5	1.7	2	2.3	4.2	1	1.7	2.6	2.8	NS
29th QM	2.1	2.2	1.3	1.4	1.6	1.4	1.9	2.1	2.5	3.1	2.1	3.8	3.9	4.1	3.2
30th QM	3.5	3.8	6.7	12.6	0.3	7.4	0.7	9.2	1.7	0.5	0.1	0.4	1	0	0.5
31st QM	2.06	1.43	2	15.9	1.5	6.8	1.1	ND	1.5	16.2	5.7	9.4	4.06	24.7	1.8
32nd QM	8.41	13.52	12.75	10.8	8.71	9.39	11.15	8.5	11	14.42	6.41	8.05	15.35	10.85	NS
33rd QM	3.85	6.47	10.43	8.83	13.06	12.26	8.2	8.18	11.82	11.52	13.14	15.7	15.96	11.29	NS

Monitoring Periods	Sampling Location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
34th QM	0.03	0.09	0.23	3.79	2.06	3.6	5.18	5.01	4.71	5.74	1.62	5.97	5.72	3.49	5.76
35th QM	1.13	1.45	2.06	1.3	1.7	1.7	1.8	1.3	2.4	2.2	2.2	1.3	2.2	2.7	2.1
36th QM	2.27	1.94	0.68	2.44	1.1	4.19	2	4.44	5.32	3.57	1.2	13.96	1.53	0.52	NS
37th QM	ND	0.276	0.128	ND	0.654	0.843	0.591	1.243	0.675	1.117	7.1	1.916	3.640	1.117	4.187
38th QM	1.54	1.39	0.93	1.41	0.42	0.61	0.99	0.13	0.1	3.98	0.11	0.42	0.1	0.51	0.72
39th QM	2.9	3.38	2.75	1.51	1.32	3.34	2.35	1.57	0.45	2.17	2.11	0.97	2.01	2.87	1.61
40th QM	5.2	4.9	4.9	3.7	4.8	5.1	3.4	2.5	3.5	4.7	2.6	4.7	5.3	5.4	5.9
41st QM	3.9	4.1	3.8	2.9	2.7	4.50	5.9	6.5	9.6	2.8	6.2	15.2	7.3	9	NS
42nd QM	2	0.68	1.3	1.58	1.45	3.35	8.71	3.26	4.08	1.033	1.769	2.3758	0.7387	6.7534	3.0937
43rd QM	1.8	1.51	2.08	2.6	2	1.49	1.32	2.34	7.69	9.88	2.42	6.12	1.32	0.46	0.67
44th QM	3.2	2.6	3.5	4.1	3.5	2.8	2.9	3.1	3.4	4.3	2.42	7.3	3.5	2.8	4.8
Standard (ECR'2023)	**1.0 mg/l (Coastal Industrial and others)**												**0.3 mg/l (Coastal Reserved area)**		

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location.

Table B.11: Sulphate (SO_4^{2-}) (mg/l) Concentration of Passur River System

Monitoring periods	Sampling Location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
1st QM	1840	1320	1280	1360	1040	1320	1640	1520	1280	1120	1320	1360	1560	2600	2080
2nd QM	20	23	36	45	32	20	60	40	80	20	210	620	860	1400	1160
3rd QM	26	28	34	33	30	27	40	35	64	63	63	44	69	1390	2360
4th QM	580	450	480	550	520	540	630	560	620	570	460	630	590	850	1500
5th QM	1360	1260	1240	1240	1120	820	880	1180	900	1220	840	980	900	1540	1920
6th QM	67	11	9	26	6	8	9	19	12	72	27	39	51	NS	NS
7th QM	7	8	11	10	8	9	12	8	6	11	9	13	7	84	97
8th QM	570	590	560	550	580	565	640	560	550	96	480	482	500	760	NS
9th QM	1080	1040	1020	1060	980	1100	1060	1020	1080	1040	1020	1100	1080	1650	2100
10th QM	18	10	13	15	17	14	15	18	12	11	480	42	60	620	NS
11th QM	5	3	4	4	6	5	6	5	8	14	14	14	19	190	320
12th QM	230	210	200	230	280	230	230	231	250	160	200	220	220	230	1090
13th QM	422	460	1340	1380	1280	1400	880	1440	1340	1220	1340	1220	1300	1420	NS
14th QM	29	3	5	2	1	2	2	1	3	120	76	**5**	13	30	2
15th QM	630	370	410	310	310	490	700	340	340	270	350	280	220	760	510

Monitoring periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
16th QM	1400	1320	1440	1260	1200	1400	1300	1380	1240	1200	1250	1260	1300	1460	NS
17th QM	24	18	20	22	21	16	10	24	22	21	18	28	35	620	NS
18th QM	51	49	46	52	38	42	56	52	39	65	46	30	20	250	780
19th QM	760	756	764	748	760	762	768	760	770	758	760	765	756	764	769
20th QM	1460	1380	1420	1410	1440	1400	1500	1450	1460	1500	1490	1446	1500	1500	NS
21st QM	23	19	21	16	17	19	15	16	14	18	12	14	16	980	NS
22nd QM	37	6	6	5	4	8	25	9	6	71	55	33	38	370	540
23rd QM	490	510	560	530	640	490	520	470	510	490	565	580	470	410	445
25th QM	4	3	5	8	10	13	16	8	16	16	21	12	34	60	NS
26th QM	3	6	11	5	3	8	6	4	12	31	26	21	540	430	30
27th QM	270	420	460	410	420	430	450	440	450	420	190	260	410	580	1240
28th QM	1	5	2	1	3	2	3	1	2	3	15	13	5	5	NS
29th QM	21	20	24	18	15	18	19	13	14	17	39	39	41	410	598
30th QM	99.4	90.3	92.6	89.3	108.4	98	118.7	118	118.7	115	91.1	106.8	243.8	183.3	230.8
31st QM	185.5	188.6	197.8	198.1	186.2	180.8	191.3	189.4	185	199.7	218	212.37	227.53	245.62	985
32nd QM	36.32	33.65	46.92	41.55	22.28	29.53	37.16	45.68	52.04	36.65	158.9	111.28	200.6	517.86	NS
33rd QM	28.35	19.51	21.31	23.56	21.32	22.27	30.07	14.26	21.18	35.24	33.71	92.53	79.75	172.39	NS
34th QM	200.77	206.51	200.31	202.27	208.03	211.48	198.41	202.02	211.53	199.39	193.21	198.8	185.87	232.06	236.27
35th QM	240	244	243	244	241	246.5	245	246.1	238.7	247.5	243	247	246	248	246
36th QM	20.7	13.22	33.64	20.52	24.94	17.49	24.13	36.43	12	39.89	38.22	54.14	59.7	194.84	NS
37th QM	15.47	7.93	7.26	6.70	7.65	8.73	28.83	9.22	7.99	43.73	41.95	24.84	35.06	103.85	211.27
38th QM	136.6	174.08	148.8	189.5	191.5	197.3	195.8	199.1	159.1	154.1	172.4	177.4	197.2	224	219.1
39th QM	242.8	237.3	242.6	243.7	238	247.6	234.7	241.1	243.4	242.6	242.9	245.1	227.6	240.4	246
40th QM	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32
41st QM	50.9	39	36.7	33.1	37.1	40.4	33	22.2	33.3	69.6	59.6	191.7	60.8	130.3	NS
42nd QM	108.95	170.59	187.53	177.8	188.3	184.16	108.95	170.59	187.53	177.8	188.3	184.16	108.95	170.59	187.53
43rd QM	234.55	223.22	228.15	229.55	235.48	216.29	231	232.22	232.72	277.3	228.9	227.04	227.33	224.92	234.6
44th QM	280.12	247.31	258.38	265.36	248.37	270.84	264	244.39	249.96	289.61	287.6	227.14	229.35	221.3	258.34
Standard (ECR'2023)	N/A														

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.12: Phosphate (PO_4^{3-}) (mg/l) concentration of Passur River System

Monitoring periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	0.52	0.5	1.1	2.1	2.2	2	0.57	1.2	1.5	0.55	1.1	1.3	1.1	1.3	7.51
2nd QM	2.23	1.99	2.55	0.45	2.13	2.42	1.25	1.51	1.1	2.1	0.53	0.35	0.56	0.29	0.29
3rd QM	0.67	1.12	0.95	0.92	1.11	0.99	1.18	1.25	1	1.27	1.04	0.86	1.22	0.8	1.09
4th QM	0.32	0.61	0.7	0.43	0.41	0.55	0.76	0.85	0.53	0.59	0.64	0.42	0.61	0.42	0.44
5th QM	0.86	0.53	0.72	0.49	0.68	0.61	0.65	0.53	0.6	0.7	0.55	0.71	0.59	0.61	0.47
6th QM	10	0.23	0.67	0.27	0.59	0.13	0.1	0.18	0.1	0.5	0.29	0.59	0.89	NS	NS
7th QM	1.27	1.97	1.94	2.53	1.3	1.32	0.99	1.02	1.39	1.27	1.28	0.95	0.35	0.43	0.45
8th QM	0.269	0.269	0.179	0.357	0.536	0.269	0.536	0.625	0.536	0.351	0.269	0.179	0.269	0.357	NS
9th QM	0.22	0.36	0.27	0.31	0.3	0.43	0.63	0.21	0.33	0.19	0.13	0.31	0.42	0.26	0.36
10th QM	1.14	1.76	1.77	2.31	0.98	1.01	0.87	0.96	1.123	1.06	1	0.78	0.53	0.47	NS
11th QM	3.39	4.11	4.58	2.76	3.2	2.48	4.16	2.76	2.71	2.836	5.23	4.01	1.16	9.08	5.9
12th QM	0.67	0.31	0.09	0.07	0.12	0.16	0.09	0.04	0.07	0.07	0.2	0.09	0.09	0.1	0.23
13th QM	1.31	1.72	2.73	2.77	0.66	0.62	0.65	0.37	0.45	0.61	0.47	0.18	0.21	0.19	NS
14th QM	0.49	2.5	2.8	3.3	3.9	3.9	4.6	0.41	0.63	0.51	15.3	1.3	3.15	0.36	0.55
15th QM	0.21	0.16	0.3	0.19	0.17	0.47	1.31	0.39	0.62	0.38	0.71	0.63	0.81	0.97	1.45
16th QM	0.38	0.25	0.29	0.38	0.34	0.27	0.29	0.29	0.42	0.24	0.28	0.37	0.26	0.2	NS
17th QM	1.03	0.83	0.76	0.88	1.07	0.67	1.16	0.86	1.03	0.83	1.2	0.86	0.5	0.67	NS
18th QM	0.25	0.3	0.22	0.24	0.4	0.53	0.32	0.43	0.57	0.27	0.22	0.33	0.25	0.5	0.61
19th QM	0.25	0.3	0.17	0.2	0.35	0.27	0.2	0.2	0.37	0.4	0.28	0.29	0.3	0.19	0.18
20th QM	0.25	0.32	0.4	0.3	0.27	0.25	0.41	0.35	0.27	0.28	0.3	0.31	0.52	0.63	NS
21st QM	10.1	0.6	0.5	0.6	0.6	0.9	11.1	0.8	0.8	0.5	0.8	0.6	0.6	0.5	NS
22nd QM	0.3	0.3	0.4	0.2	0.3	0.4	0.5	0.7	0.5	0.6	0.4	0.6	0.7	0.3	0.3
23rd QM	0.2	0.2	0.3	0.3	0.2	0.3	0.4	0.4	0.4	0.5	0.3	0.4	0.2	0.1	0.2
25th QM	0.25	0.27	0.3	0.35	0.29	0.36	0.4	0.43	0.52	0.25	0.56	0.53	0.4	0.37	NS
26th QM	0.5	0.5	0.5	0.7	0.5	0.8	0.7	0.4	1.3	1.2	0.7	0.8	0.3	0.4	0.4
27th QM	5.3	3.5	3.2	2.9	3	5.4	3	2.5	3.2	13.1	4.1	9.6	2.6	7.1	1.1
28th QM	4.9	2	1.9	2.3	5.7	4	1.2	2.4	6.3	8	0.76	0.79	0.6	3	NS
29th QM	4.2	0.6	0.54	4.5	2.1	3.4	5.4	3.7	2.7	3.4	0.2	0.27	1.9	0.87	0.5
30th QM	1.5	0.9	1.3	0	0	0	0.3	0.4	0.1	0.2	0.4	0.2	0.7	0.4	0.2
31st QM	0.19	0.33	0.13	0.46	0.1	0.4	0.04	0.03	0.14	0.59	0.35	0.3	0.48	0.45	1.03
32nd QM	0.048	0.025	0.069	0.051	0.02	0.021	0.02	0.061	0.008	0.006	0.003	0.0572	0.228	0.125	NS
33rd QM	1.02	0.67	1.2	1.74	0.49	0.4	0.44	0.3	0.5	0.71	0.68	2.53	1.7	1.04	NS

Monitoring periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
34th QM	2.14	1.2	0	0.08	0.04	0.07	0.07	0.13	0.11	0.08	0.08	0.61	0.6	0.02	0.03
35th QM	1.01	0.56	0.62	0.45	0.08	0.08	0.06	0.06	0.03	0.1	0.09	0.14	0.5	0.07	0.52
36th QM	0.97	1.42	1.25	2.53	0.01	0.09	0.002	0.0235	0.001	0.044	0.037	0.543	0.004	0.07	NS
37th QM	0.08	0.1046	0.1147	0.0285	0.1829	0.0964	0.0468	0.0838	0.0415	0.0733	0.9322	0.4559	0.4183	0.1134	0.2034
38th QM	0.12	0.06	0.04	0.08	0.09	0.07	0.09	0.08	0.78	0.05	0.02	0.08	0.05	0.08	0.1
39th QM	0.222	0.211	0.31	0.189	0.241	0.458	0.085	0.175	0.142	0.277	0.163	1.05	0.249	0.12	0.08
40th QM	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
41st QM	0.50	2.10	1.10	0.60	0.20	0.30	0.20	0.05	0.10	0.05	0.50	1.50	0.20	0.95	NS
42nd QM	0.0847	0.0869	0.1115	0.12	0.01	0.18	0.01	0.05	UD	0.06	0.0746	0.221	0.1497	0.4423	0.1857
43rd QM	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
44th QM	0.2	0.2	0.2	0.1	0.1	0.2	0.14	0.1	0.1	0.14	0.19	0.2	0.087	0.09	0.074
Standard (ECR'2023)	**0.1 mg/l (Coastal Industrial and others)**												**0.05 mg/l (Coastal Reserved area)**		

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location; UD-Undetectable.

Table B.13: Arsenic (As) (mg/l) concentration of Passur River System

Monitoring Periods	Sampling Location ID														
	Sl-1	Sl-2	Sl-3	Sl-4	Sl-5	Sl-6	Sl-7	Sl-8	Sl-9	Sl-10	Sl-11	Sl-12	Sl-13	Sl-14	Sl-15
1st QM	0.002	0.002	0.001	0.002	0.002	0.002	<0.001	<0.002	0.002	<0.001	0.002	0.002	0.004	0.004	0.003
2nd QM	0.003	0.003	0.003	0.004	0.004	0.003	0.003	0.004	0.003	0.003	0.002	0.004	0.003	0.002	0.002
3rd QM	0.004	0.004	0.004	0.004	0.004	0.003	0.006	0.004	0.006	0.006	0.003	0.003	0.004	0.002	0.003
4th QM	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.004	0.003	0.002
5th QM	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.002	0.002
6th QM	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	NS	NS
7th QM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
8th QM	0.001	0.001	0.001	0.002	0.002	0.001	0.002	0.001	0.001	0.002	0.001	0.002	0.002	0.002	NS
9th QM	0.001	0.003	0.003	0.002	0.002	0.002	0.001	0.002	0.002	0.002	0.002	0.003	0.005	0.006	0.004
10th QM	0.002	0.003	0.005	0.004	0.002	0.002	0.003	0.003	0.004	0.005	0.002	0.004	0.002	0.001	NS
11th QM	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.003	0.003	0.003	0.002
12th QM	0.002	0.001	0.001	0.002	0.002	0.001	0.002	0.001	0.002	0.001	0.001	0.002	0.002	0.001	0.002
13th QM	0.002	0.002	0.001	0.001	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.002	0.001	0.002	NS
14th QM	0.002	0.001	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.003	0.001	0.002	0.003	0.002	0.002

Monitoring Periods	Sampling Location ID														
	Sl-1	**Sl-2**	**Sl-3**	**Sl-4**	**Sl-5**	**Sl-6**	**Sl-7**	**Sl-8**	**Sl-9**	**Sl-10**	**Sl-11**	**Sl-12**	**Sl-13**	**Sl-14**	**Sl-15**
15th QM	0.002	0.002	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.001
16th QM	0.001	0.001	0.001	0.002	0.001	0.002	0.002	0.001	0.001	0.002	0.001	0.002	0.001	0.002	NS
17th QM	0.004	0.005	0.004	0.005	0.003	0.002	0.005	0.003	0.004	0.004	0.003	0.003	0.003	0.002	NS
18th QM	0.003	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.002	0.001	0.001	0.001	0.002	0.001	0.001
19th QM	0.002	0.001	0.003	0.001	0.001	0.002	0.003	0.001	0.001	0.002	0.005	0.007	0.001	0.002	0.001
20th QM	0.003	0.002	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.003	0.002	0.002	NS
21st QM	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.003	0.004	0.002	0.001	0.001	NS
22nd QM	0.002	0.003	0.002	0.003	0.003	0.002	0.003	0.002	0.002	0.003	0.004	0.004	0.002	0.002	0.002
23rd QM	0.002	0.003	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.002	0.002
25th QM	0.003	0.003	0.003	0.002	0.002	0.002	0.005	0.003	0.003	0.004	0.002	0.002	0.002	0.003	NS
26th QM	0.003	0.003	0.003	0.003	0.004	0.003	0.004	0.003	0.003	0.004	0.004	0.002	0.002	0.002	0.009
27th QM	0.002	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.003	0.002	0.002	0.002
28th QM	0.003	0.004	0.003	0.002	0.002	0.004	0.003	0.003	0.003	0.003	0.004	0.002	0.002	0.002	NS
29th QM	0.003	0.002	0.003	0.003	0.002	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003
30th QM	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.003	0.003	0.002
31st QM	0.003	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.002	0.003	0.003	0.003	0.002	0.002	0.002
32nd QM	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.004	0.003	0.003	0.003	0.003	NS
33rd QM	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.003	0.002	0.003	0.002	0.002	0.003	NS
34th QM	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
35th QM	0.003	0.003	0.004	0.003	0.003	0.003	0.004	0.003	0.003	0.004	0.001	0.002	0.002	0.002	0.002
36th QM	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.001	0.001	0.002	0.002	NS
37th QM	0.003	0.003	0.003	0.002	0.001	0.003	0.003	0.002	0.002	0.004	0.003	0.003	0.003	0.004	0.003
38th QM	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.003	0.002	0.002
39TH QM	0.002	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.002	0.003	0.003	0.001	0.003	0.002	0.002
40th QM	0.003	0.002	0.002	0.003	0.003	0.003	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.002	0.002
41st QM	0.002	0.002	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.001	0.002	NS
42nd QM	0.002	0.003	0.002	0.003	0.002	0.003	0.004	0.002	0.002	0.002	0.004	0.003	0.002	0.003	0.002
43rd QM	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.004	0.002	0.005	0.002
44th QM	0.005	0.003	0.004	0.005	0.003	0.003	0.003	0.004	0.006	0.004	0.003	0.003	0.003	0.003	0.004
Standard (ECR'2023)	**0.003 mg/l (Coastal Industrial and others)**												**0.001 mg/l (Coastal Reserved area)**		

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.14: Pb (mg/l) concentration of Passur River System

Monitoring Periods	Sampling Locations ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	0.053	0.055	0.055	0.057	0.06	0.058	0.053	0.054	0.056	0.053	0.048	0.05	0.043	0.194	0.224
2nd QM	0.004	0.002	0.005	0.002	0.002	0.002	0.002	0.003	0.005	0.004	0.004	0.032	0.044	0.071	0.05
3rd QM	0.002	0.003	0.002	0.003	0.002	0.002	0.003	0.004	0.004	0.004	<0.002	<0.002	0.004	0.032	0.07
4th QM	0.104	0.104	0.111	0.154	0.139	0.138	0.16	0.153	0.139	0.143	0.133	0.141	0.137	0.309	0.309
5th QM	0.098	0.102	0.138	0.142	0.135	0.156	0.142	0.148	0.163	0.135	0.14	0.14	0.13	0.297	0.291
6th QM	0.0059	0.0038	0.0058	0.011	0.002	0.0021	0.0076	0.002	0.002	0.002	0.002	0.002	0.002	NS	NS
7th QM	0.007	0.006	0.008	0.01	0.009	0.007	0.01	0.011	0.009	0.07	0.008	0.009	0.012	0.084	0.073
8th QM	0.168	0.092	0.176	0.115	0.148	0.112	0.134	0.099	0.093	0.023	0.067	0.078	0.135	0.302	NS
9th QM	0.203	0.302	0.347	0.336	0.317	0.298	0.396	0.323	0.331	0.35	0.275	0.258	0.228	0.359	0.607
10th QM	0.01	0.009	0.017	0.014	0.006	0.01	0.007	0.006	0.012	0.008	0.015	0.098	0.02	0.142	NS
11th QM	0.009	0.007	0.01	0.007	0.006	0.005	0.006	0.007	0.007	0.008	0.007	0.011	0.01	0.126	0.151
12th QM	0.024	0.034	0.03	0.036	0.046	0.041	0.048	0.044	0.056	0.038	0.056	0.05	0.05	0.033	0.129
13th QM	0.002	0.001	0.003	0.001	0.003	0.002	0.003	0.009	0.003	<LOQ	0.001	0.0001	0.001	0.009	NS
14th QM	0.003	0.003	0.003	0.002	0.002	0.001	0.001	0.002	0.002	0.003	0.011	0.011	0.005	0.004	0.019
15th QM	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.003	0.169	0.175
16th QM	0.002	0.001	0.004	0.001	0.003	0.001	0.007	0.003	0.005	0.002	0.003	0.002	0.003	0.001	NS
17th QM	0.002	0.001	0.02	0.018	0.008	0.041	0.012	0.015	0.03	0.01	0.016	0.015	0.017	0..062	NS
18th QM	0.003	0.007	0.017	0.013	0.01	0.012	0.011	0.014	0.019	0.008	0.017	0.009	0.009	0.018	0.014
19th QM	0.004	0.005	0.007	0.005	0.003	0.007	0.003	0.004	0.006	0.004	0.005	0.007	0.015	0.013	0.017
20th QM	0.003	0.002	0.004	0.003	0.003	0.002	0.002	0.003	0.002	0.002	0.003	0.003	0.002	0.002	NS
21st QM	0.001	0.003	0.002	0.009	0.003	0.009	0.12	0.006	0.004	0.003	0.004	0.002	0.006	0.001	NS
22nd QM	0.001	0.002	0.001	0.001	0.001	0.003	0.001	0.002	0.001	0.002	0.003	0.002	0.014	0.019	0.008
23rd QM	0.008	0.007	0.009	0.008	0.006	0.004	0.006	0.008	0.007	0.008	0.006	0.005	0.007	0.043	0.056
25th QM	0.006	0.004	0.007	0.005	0.007	0.008	0.019	0.009	0.01	0.013	0.005	0.003	0.009	0.011	NS
26th QM	0.002	0.005	0.006	0.008	0.006	0.005	0.018	0.008	0.004	0.003	0.006	0.007	0.004	0.02	0.013
27th QM	0.016	0.017	0.018	0.015	0.017	0.019	0.019	0.017	0.022	0.019	0.007	0.015	0.002	0.001	0.001
28th QM	0.029	0.029	0.036	0.016	0.014	0.012	0.0140.	0.003	0.014	0.013	0.015	0.014	0.014	0.018	NS
29th QM	0.017	0.019	0.019	0.012	0.012	0.016	0.022	0.015	0.016	0.022	0.002	0.023	0.011	0.005	0.5
30th QM	0.009	0.019	0.002	0.003	0.002	0.002	0.003	0.004	0.005	0.004	0.005	0.008	0.019	0.004	0.005
31st QM	0.013	0.01	0.011	0.009	0.007	0.011	0.014	0.006	0.007	0.008	0.01	0.013	0.01	0.011	0.009
32nd QM	0.009	0.009	0.01	0.008	0.003	0.008	0.004	0.007	0.009	0.01	0.012	0.017	0.01	0.009	NS
33rd QM	0.006	0.005	0.006	0.007	0.009	0.007	0.007	0.006	0.008	0.003	0.002	0.006	0.001	0.001	NS

Monitoring Periods	Sampling Locations ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
34th QM	0.004	0.003	0.004	0.006	0.002	0.003	0.005	0.005	0.004	0.007	0.006	0.024	0.01	0.012	0.003
35th QM	0.006	0.007	0.007	0.006	0.007	0.005	0.007	0.008	0.006	0.004	0.006	0.005	0.006	0.008	0.007
36th QM	0.008	0.009	0.007	0.01	0.012	0.007	0.006	0.01	0.009	0.003	0.004	0.007	0.004	0.005	NS
37th QM	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
38th QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
39th QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
40th QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
41st QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NS
42nd QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
43rd QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
44th QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Standard (ECR'2023)	N/A												0.05 mg/l (Coastal Reserved area)		

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.15: Hg (mg/l) Concentration of Passur River System

Monitoring Periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
2nd QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
3rd QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
4th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
5th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
6th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
7th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
8th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
9th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
10th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
11th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
12th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
13th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
14th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
15th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015

Monitoring Periods	Sampling Location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
16th QM	0.004	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	NS
17th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
18th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
19th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
20th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
21st QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
22nd QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
23rd QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
25th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
26th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
27th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
28th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
29th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
30th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
31st QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
32nd QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
33rd QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
34th QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
35th QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
36th QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS
37th QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
38th QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
39th QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
40th QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
41st QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS
42nd QM	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
43rd QM	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
44th QM	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Standards (ECR'2023)	**0.0001 mg/l (Coastal Industrial and others)**												**0.0001 mg/l (Coastal Reserved area)**		

Source: Field Survey; from 2014 up to July 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Parameters for Ground Water Quality Monitoring

Table B.16: pH and Temperature (^{0}C) of Ground Water

pH					Temperature (^{0}C)				
Monitoring periods	Sampling location ID				Monitoring periods	Sampling location ID			
	SL-1	SL-2	SL-3	SL-4		SL-1	SL-2	SL-3	SL-4
1st QM	7.6	7.6	7.6	6.3	1st QM	27.3	29.6	29.2	27.5
2nd QM	7.7	7.8	7.7	6.5	2nd QM	28.5	29.9	28.9	28.7
3rd QM	7.9	8	8	NF	3rd QM	26	28	28	NF
4th QM	8	8.2	8.1	NF	4th QM	24.5	22.5	25.1	NF
5th QM	TC	7.8	7.9	NF	5th QM	TC	28.6	28.8	NF
6th QM	8.1	8.3	8.3	NF	6th QM	31	28	30	NF
7th QM	7.49	7.93	7.7	NF	7th QM	30	27.8	28.7	NF
8th QM	7.6	8.1	7.9	NF	8th QM	24	23	25	NF
9th QM	7.8	8.3	8.2	NF	9th QM	29.8	29.6	30.1	NF
10th QM	7.8	8.1	7.9	NF	10th QM	28.6	29.1	29.4	NF
11th QM	8.4	7.9	7.9	NF	11th QM	29.1	30.4	29.8	NF
12th QM	8.1	7.5	7.6	NF	12th QM	25.1	24.3	24	NF
13th QM	7.4	7.8	7.4	NF	13th QM	28.7	27.7	28.4	NF
14th QM	8.2	8.1	7.8	NF	14th QM	27.2	26.5	26.4	NF
15th QM	6.9	7.4	7.2	NF	15th QM	22.9	23.8	23.6	NF
16th QM	NF	6.9	7.2	NF	16th QM	NF	30.3	30.1	NF
17th QM	NF	7.9	7.6	NF	17th QM	NF	29.3	29.7	NF
18th QM	NF	7.3	7.6	NF	18th QM	NF	30	29	NF
19th QM	7.1	6.9	6.5	NF	19th QM	23.8	23.7	23.2	NF
20th QM	8.3	8.4	8.9	NF	20th QM	29	30	30	NF
21st QM	8.2	7.9	8.1	NF	21st QM	31.4	30	31.2	NF
22nd QM	7.2	7.6	7.4	NF	22nd QM	27	27	26	NF
23rd QM	7.8	7.3	7.5	NF	23rd QM	24	23	23	NF
25th QM	**8.1**	**8**	**8**	NF	25th QM	31	30	30	NF
26th QM	7.4	8	8	NF	26th QM	27	28	27	NF
27th QM	**7.2**	**7.5**	**7.5**	NF	27th QM	22	25	25	NF
28th QM	8	8.3	8.2	NF	28th QM	23	23	24	NF

pH					Temperature (^0C)				
Monitoring periods	Sampling location ID				Monitoring periods	Sampling location ID			
	SL-1	SL-2	SL-3	SL-4		SL-1	SL-2	SL-3	SL-4
29th QM	5.6	6.2	7.4	NF	**29th QM**	31.3	30.45	30.72	NF
30th QM	8	8.6	9.1	NF	**30th QM**	28.89	27.7	28.04	NF
31st QM	7.7	8.1	8.1	NF	**31st QM**	23	24	25	NF
32nd QM	7.7	7.4	8.2	NF	**32nd QM**	29	31.48	29.37	NF
33rd QM	7.26	7.8	7.7	NF	**33rd QM**	32	30	29	NF
34th QM	7.1	8.1	8	NF	**34th QM**	26	26.69	26	NF
35th QM	8.4	9.0	8.1	NF	**35th QM**	31	27.3	26.9	NF
36th QM	8.1	8.7	8.3	NF	**36th QM**	29	30	30.13	NF
37th QM	7.4	7.6	7.1	NF	**37th QM**	29	30	30.1	NF
38th QM	7.9	8.1	8.2	NF	**38th QM**	31.5	30.86	28.1	NF
39th QM	8.1	8.2	8.1	NF	**39th QM**	28	29	28	NF
40th QM	8.1	7.6	7.9	NF	**40th QM**	30	28.28	26.9	NF
41st QM	7.7	7.56	7.06	NF	**41st QM**	28	29	29	NF
42nd QM	7.7	7.56	7.06	NF	**42nd QM**	28	28.95	28.5	NF
43rd QM	8.6	8.33	9.2	NF	**43rd QM**	29.2	26.28	26.6	NF
44th QM	7.4	7.6	7.2	NF	**44th QM**	7.4	7.6	7.2	NF
45th QM	7.8	7.8	7.8	NF	**45th QM**	29.43	32.08	29.06	NF
Standard (ECR'2023)	**6.5-8.5**				**Standard (ECR'2023)**	**(20^0C-30^0C) mg/l**			

Source: Field Survey; from April 2014 up to July 2025; Note: QM=Quarterly Monitoring, NF=Not Functional.

Table B.17: Salinity (ppt.) and DO (mg/l) in Groundwater

Salinity (ppt.)					DO (mg/l)				
Monitoring periods	Sampling location ID				Monitoring periods	Sampling location ID			
	SL-1	SL-2	SL-3	SL-4		SL-1	SL-2	SL-3	SL-4
1st QM	0	0	0	0	**1st QM**	4.4	6	6.4	4.4
2nd QM	0	0	0	0	**2nd QM**	5.2	6.2	6.5	6
3rd QM	0	0	0	NF	**3rd QM**	6.5	7.7	6.1	NF
4th QM	1	0	0	NF	**4th QM**	6.7	6.3	6.5	NF
5th QM	TC	0	0	NF	**5th QM**	TC	6	6.6	NF
6th QM	0	0	0	NF	**6th QM**	6	5.9	6	NF

Salinity (ppt.)					DO (mg/l)				
Monitoring periods	Sampling location ID				Monitoring periods	Sampling location ID			
	SL-1	SL-2	SL-3	SL-4		SL-1	SL-2	SL-3	SL-4
7th QM	0	0	0	NF	**7th QM**	5.4	6.1	5.6	NF
8th QM	0	0	0	NF	**8th QM**	4.9	5.2	4.8	NF
9th QM	0	0	0	NF	**9th QM**	6.1	5.8	5.6	NF
10th QM	0	0	0	NF	**10th QM**	5.8	6.1	5.7	NF
11th QM	0	0	0	NF	**11th QM**	6.3	5.8	6.1	NF
12th QM	0	0	0	NF	**12th QM**	4.5	4.8	4.6	NF
13th QM	0	0	0	NF	**13th QM**	5.1	5.3	5.7	NF
14th QM	0	0	0	NF	**14th QM**	6.2	5.8	6.2	NF
15th QM	0	0.3	0.4	NF	**15th QM**	5.2	4.47	4.26	NF
16th QM	NF	0.3	0.2	NF	**16th QM**	NF	6	5.4	NF
17th QM	NF	0.1	0.1	NF	**17th QM**	NF	6	5.9	NF
18th QM	NF	0.1	0.1	NF	**18th QM**	NF	5.9	6.1	NF
19th QM	0.1	0.1	0.1	NF	**19th QM**	6	6.1	6.2	NF
20th QM	0.1	0.5	0.7	NF	**20th QM**	6	6.5	6.2	NF
21st QM	0.1	0.1	0.1	NF	**21st QM**	6.1	6	6	NF
22nd QM	0	0	0	NF	**22nd QM**	6	6.2	6	NF
23rd QM	0.1	0.1	0.1	NF	**23rd QM**	6	6.1	6	NF
25th QM	0.1	0.1	0.1	NF	**25th QM**	6	6.1	6.1	NF
26th QM	0.18	0.1	0.1	NF	**26th QM**	6	6.2	6	NF
27th QM	0.1	0.2	0.4	NF	**27th QM**	6.4	6.7	4.9	NF
28th QM	0.1	0.3	0.3	NF	**28th QM**	6.4	6.3	6.3	NF
29th QM	0.1	0.2	0.4	NF	**29th QM**	6	6	5	NF
30th QM	0	0	0	NF	**30th QM**	6.5	7.7	6.1	NF
31st QM	0.1	0.2	0.4	NF	**31st QM**	6.2	4.7	3.5	NF
32nd QM	0.3	0.2	0.4	NF	**32nd QM**	4	2.99	3.8	NF
33rd QM	0.4	0.2	0.1	NF	**33rd QM**	2.6	5.9	6	NF
34th QM	0.2	0.2	0.4	NF	**34th QM**	3.2	5	3.8	NF
35th QM	0.6	0.2	0.4	NF	**35th QM**	5.99	5.8	3.8	NF
36th QM	0.6	0.2	0.4	NF	**36th QM**	3.1	2	2.2	NF
37th QM	0.2	0.1	0.4	NF	**37th QM**	4.1	4	3.8	NF

Salinity (ppt.)					DO (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
38th QM	0.1	0.2	0.4	NF	**38th QM**	5.15	4.8	3.6	NF
39th QM	0.1	0.1	0.5	NF	**39th QM**	4.5	4.6	4.8	NF
40th QM	0.6	0.2	0.4	NF	**40th QM**	3.91	7	2.5	NF
41st QM	0.1	0.2	0.4	NF	**41st QM**	6.2	3.19	3.5	NF
42nd QM	0.1	0.2	0.4	NF	**42nd QM**	6.2	3.19	3.5	NF
43rd QM	0.2	0.2	0.4	NF	**43rd QM**	2.65	3	4.6	NF
44th QM	0.2	0.2	0.4	NF	**44th QM**	5.1	2.8	2.8	NF
45th QM	0.2	0.4	0.2	NF	**45th QM**	4.66	4.66	4.66	NF
Standard (ECR'2023)	**N/A**				**Standard (ECR'2023)**	**N/A**			

Source: Field Survey; from April 2014 up to July 2025; Note: QM=Quarterly Monitoring, NF=Not Functional.

Table B.18: TDS (mg/l) and TSS (mg/l) in Groundwater

TDS (mg/l)					TSS (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
1st QM	1113	4090	643	1055	**1st QM**	-	-	-	-
2nd QM	999	371	635	970	**2nd QM**	6	6	8	48
3rd QM	-	-	-	-	**3rd QM**	19	2	6	NF
4th QM	1021	378	600	NF	**4th QM**	40	28	32	NF
5th QM	NO	390	600	NF	**5th QM**	NF**	4	6	NF
6th QM	881	574	328	NF	**6th QM**	23	16	14	NF
7th QM	377	1007	611	NF	**7th QM**	4	5	4	NF
8th QM	447	491	284	NF	**8th QM**	31	46	41	NF
9th QM	1025	384	645	NF	**9th QM**	3	4	3	NF
10th QM	1000	408	607	NF	**10th QM**	5	4	4	NF
11th QM	617	382	636	NF	**11th QM**	7	4	5	NF
12th QM	623	401	998	NF	**12th QM**	32	28	25	NF
13th QM	395	617	558	NF	**13th QM**	4	10	9	NF
14th QM	602	996	390	NF	**14th QM**	8	10	9	NF
15th QM	405	602	994	NF	**15th QM**	12	6	7	NF
16th QM	NF	615	370	NF	**16th QM**	NF	12	5	NF
17th QM	NF	390	608	NF	**17th QM**	NF	2	3	NF

TDS (mg/l)					TSS (mg/l)				
Monitoring periods	Sampling location ID				Monitoring periods	Sampling location ID			
	SL-1	SL-2	SL-3	SL-4		SL-1	SL-2	SL-3	SL-4
18th QM	NF	365	610	NF	**18th QM**	NF	6	8	NF
19th QM	1315	376	927	NF	**19th QM**	3	3	4	NF
20th QM	915	380	610	NF	**20th QM**	3	2	4	NF
21st QM	25	602	360	NF	**21st QM**	2	1	4	NF
22nd QM	900	385	603	NF	**22nd QM**	4	3	4	Nf
23rd QM	3080	660	370	NF	**23rd QM**	2	3	2	NF
25th QM	1196	701	316	NF	**25th QM**	1	3	1	NF
26th QM	139	335	202	NF	**26th QM**	3	5	2	NF
27th QM	200	350	610	NF	**27th QM**	1	2	5	NF
28th QM	810	450	570	NF	**28th QM**	1	1	1	NF
29th QM	890	360	610	NF	**29th QM**	1	1	2	NF
30th QM	350	615	860	NF	**30th QM**	1	4	3	NF
31st QM	0.86	350	620	NF	**31st QM**	1	1	1	NF
32nd QM	1150	360	620	NF	**32nd QM**	2	1	2	NS
33rd QM	350	620	900	NF	**33rd QM**	1	2	1	NF
34th QM	885	620	510	NF	**34th QM**	1	1	3	NF
35th QM	370	900	630	NF	**35th QM**	1	1	1	NF
36th QM	890	350	1300	NF	**36th QM**	1	1	3	NF
37th QM	272	392	650	NF	**37th QM**	1	1	2	NF
38th QM	240	500	670	NF	**38th QM**	1	1	2	NF
39th QM	960	615	370	NF	**39th QM**	1	2	1	NF
40th QM	940	410	620	NF	**40th QM**	1	1	2	NF
41st QM	190	365	650	NF	**41st QM**	1	1	2	NF
42nd QM	365	680	950	NF	**42nd QM**	2	1	1	NF
43rd QM	350	620	330	NF	**43rd QM**	1	1	1	NF
44th QM	400	400	400	NF	**44th QM**	1.7	1.3	1	NF
Standard (ECR'2023)	**1000**				**Standard (ECR'2023)**	**10 mg/l**			

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NF-Not Functional.

Table B.19: TH (mg/l) and COD (mg/l) concentrations in Groundwater

TH (mg/l)					COD (mg/l)				
Monitoring periods	Sampling location ID				Monitoring periods	Sampling location ID			
	SL-1	SL-2	SL-3	SL-4		SL-1	SL-2	SL-3	SL-4
1st QM	425	220	190	780	**1st QM**	32	28	48	32
2nd QM	250	175	140	450	**2nd QM**	32	28	32	36
3rd QM	300	180	180	NF	**3rd QM**	34	18	34	NF
4th QM	235	110	125	NF	**4th QM**	20	16	20	NF
5th QM	NO	138	216	NF	**5th QM**	NO	14	18	NF
6th QM	225	125	115	NF	**6th QM**	12	10	14	NF
7th QM	325	450	480	NF	**7th QM**	4	8	4	NF
8th QM	295	195	225	NF	**8th QM**	4	4	4	NF
9th QM	305	263	163	NF	**9th QM**	4	4	4	NF
10th QM	320	248	28	NF	**10th QM**	4	4	2	NF
11th QM	175	295	183	NF	**11th QM**	4	4	4	NF
12th QM	550	510	620	NF	**12th QM**	4	4	4	NF
13th QM	720	420	654	NF	**13th QM**	4	4	4	NF
14th QM	145	240	215	NF	**14th QM**	8	8	16	NF
15th QM	NF	265	305	NF	**15th QM**	NF	4	4	NF
16th QM	NF	195	215	NF	**16th QM**	NF	4	4	NF
17th QM	NF	235	170	NF	**17th QM**	NF	4	4	NF
18th QM	NF	178	138	NF	**18th QM**	NF	4	4	NF
19th QM	355	215	270	NF	**19th QM**	4	3	4	NF
20th QM	235	182	167	NF	**20th QM**	352	4	4	NF
21st QM	97	167	212	NF	**21st QM**	4	4	4	NF
22nd QM	145	245	137	NF	**22nd QM**	4	4	4	NF
23rd QM	137	118	145	NF	**23rd QM**	4	4	4	NF
25th QM	625	210	237	NF	**25th QM**	4	4	4	NF
26th QM	232	185	207	NF	**26th QM**	4	4	4	NF
27th QM	160	145	130	NF	**27th QM**	4	4	4	NF
28th QM	1400	1600	1200	NF	**28th QM**	16	32	8	NF
29th QM	160	195	140	NF	**29th QM**	32	28	36	NF
30th QM	70	243	155	NF	**30th QM**	4	20	28	NF

TH (mg/l)					COD (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
31st QM	180	200	210	NF	**31st QM**	12	8	28	NF
32nd QM	320	165	275	NF	**32nd QM**	32	28	32	NF
33rd QM	225	415	515	NF	**33rd QM**	4	4	4	NF
34th QM	265	130	110	NF	**34th QM**	4	4	4	NF
35th QM	215	445	348	NF	**35th QM**	16	12	8	NF
36th QM	237	190	1200	NF	**36th QM**	32	28	36	NF
37th QM	160	185	190	NF	**37th QM**	4	20	12	NF
38th QM	170	170	185	NF	**38th QM**	28	24	12	NF
39th QM	1200	715	240	NF	**39th QM**	72	48	64	NF
40th QM	320	210	200	NF	**40th QM**	28	39	48	NF
41st QM	160	160	160	NF	**41st QM**	4	4	4	NF
42nd QM	225	315	415	NF	**42nd QM**	4	4	4	NF
43rd QM	250	550	270	NF	**43rd QM**	16	64	12	NF
44th QM	225	300	190	NF	**44th QM**	12	48	12	NF
Standard (ECR'2023)	**500**				**Standard (ECR'2023)**	**N/A**			

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NF-Not Functional.

Table B.20: NO_3^- (mg/l) and SO_4^{2-} (mg/l) Concentrations in Groundwater

NO_3^- (mg/l)					SO_4^{2-} (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
1st QM	0.2	0.6	0.8	0.4	**1st QM**	-	-	-	NF
2nd QM	0.48	0.68	0.4	0.56	**2nd QM**	3	2	10	3
3rd QM	<0.10	0.31	0.8	NF	**3rd QM**	-	-	-	NF
4th QM	28	26	13	NF	**4th QM**	-	-	-	-
5th QM	-	-	-	NF	**5th QM**	-	-	-	-
6th QM	7.6	2.2	4.7	NF	**6th QM**	-	-	-	-
7th QM	4.3	4.2	3.8	NF	**7th QM**	1	2	2	-
8th QM	2.1	1.9	2.8	NF	**8th QM**	5	6	2	NF
9th QM	1.7	2.3	1.9	NF	**9th QM**	1	2	8	NF

NO_3^- (mg/l)					SO_4^{2-} (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
10th QM	3.8	3.3	3.7	NF	**10th QM**	1	1	1	NF
11th QM	6.1	7.51	10.16	NF	**11th QM**	1	1	1	NF
12th QM	4.65	7.02	4.65	NF	**12th QM**	1	1		NF
13th QM	9.32	14.7	10.2	NF	**13th QM**	5	1	3	NF
14th QM	3.3	2.5	4.6	NF	**14th QM**	1	1	2	NF
15th QM	5.9	7.2	1.7	NF	**15th QM**	8	2	6	NF
16th QM	NF	5.3	5.7	NF	**16th QM**	NF	2	4	NF
17th QM	NF	8.6	7.8	NF	**17th QM**	NF	4	6	NF
18th QM	NF	0.9	1.4	NF	**18th QM**	NF	1	1	NF
19th QM	1.7	4.4	2.1	NF	**19th QM**	1	2	1	NF
20th QM	4.4	2.7	8.3	NF	**20th QM**	4	1	4	NF
21st QM	1.4	2.7	1.7	NF	**21st QM**	1	2	1	NF
22nd QM	1.8	3.1	1.6	NF	**22nd QM**	2	2	1	NF
23rd QM	1.9	1.4	2.7	NF	**23rd QM**	2	3	2	NF
25th QM	1.7	7.5	1.7	NF	**25th QM**	4	3	4	NF
26th QM	0.5	3.8	3.1	NF	**26th QM**	9	3	3	NF
27th QM	2.4	2.2	4.9	NF	**27th QM**	1	1	7	NF
28th QM	1	1	2	NF	**28th QM**	1	1	1	NF
29th QM	1.5	2.1	2.1	NF	**29th QM**	1	4	3	NF
30th QM	3.7	4.1	2.6	NF	**30th QM**	2.2	6.3	2.6	NF
31st QM	12.09	4.02	8.83	NF	**31st QM**	14.94	4.22	9.51	NF
32nd QM	4.331	12.304	1.9372	NF	**32nd QM**	2.1054	6.83	1.76	NF
33rd QM	4.88	0.801	4.33	NF	**33rd QM**	1.41	1.36	3.31	NF
34th QM	15.51	1.22	4.82	NF	**34th QM**	0.2	1.9	1.0	NF
35th QM	1.34	1.34	1.34	NF	**35th QM**	5.25	5.57	11	NF
36th QM	2.003	0.7807	6.31	NF	**36th QM**	14.7	0.89	3.94	NF
37th QM	ND	1.9	10.5	NF	**37th QM**	5.4	1.8	5.0	NF
38th QM	8.56	0.1	4	NF	**38th QM**	1.34	3.11	3.03	NF
39th QM	3.001	3.001	3.001	NF	**39th QM**	2.39	143	5.68	NF
40th QM	1	1	2	NF	**40th QM**	3.5	5.8	0.65	NF

NO_3^- (mg/l)					SO_4^{2-} (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
41st QM	6	6	6	NF	**41st QM**	3.50	5.80	0.65	NF
42nd QM	0.4863	0.4863	0.4863	NF	**42nd QM**	16.92	1.29	3.64	NF
43rd QM	1.98	2.34	6.23	NF	**43rd QM**	0.49	2.59	3.58	NF
44th QM	1.1	1.4	1.1	NF	**44th QM**	3.1	2.9	3.0	NF
Standard (ECR'2023)	**45 mg/l**				**Standard (ECR'2023)**	**250 mg/l**			

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NF-Not Functional.

Table B.21: PO_4^{3-} (mg/l) and as (mg/l) Concentrations in Groundwater

PO_4^{3-} (mg/l)					As (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
1st QM	NF	-	-	NF	**1st QM**	0.013	0.006	0.036	0.376
2nd QM	2.2	2.5	6.2	1.2	**2nd QM**	0.02	0.009	0.033	0.407
3rd QM	-	-	-	NF	**3rd QM**	0.012	0.006	0.02	NF
4th QM	0.74	0.44	0.48	NF	**4th QM**	0.014	0.008	0.017	NF
5th QM	NO	1.98	4.54	NF	**5th QM**	NO	0.01	0.034	NF
6th QM	1.4	1.6	4.1	NF	**6th QM**	0.015	0.014	0.024	NF
7th QM	0.31	0.27	0.48	NF	**7th QM**	0.002	0.012	0.011	NF
8th QM	0.267	0.179	0.179	NF	**8th QM**	0.008	0.002	0.002	NF
9th QM	1.08	1.53	3.26	NF	**9th QM**	0.018	0.007	0.047	NF
10th QM	0.17	0.29	0.31	NF	**10th QM**	0.012	0.018	0.005	NF
11th QM	0.167	0.67	0.6	NF	**11th QM**	0.033	0.011	0.016	NF
12th QM	1.18	1.21	1.18	NF	**12th QM**	0.028	0.005	0.028	NF
13th QM	2.18	1.8	2.1	NF	**13th QM**	0.012	0.022	0.01	NF
14th QM	1.68	3.5	4.7	NF	**14th QM**	0.014	0.004	0.027	NF
15th QM	0.13	0.17	0.18	NF	**15th QM**	0.002	0.012	0.002	NF
16th QM	NF	4..5	0.27	NF	**16th QM**	0.001	0.022	0.001	NF
17th QM	NF	2.9	4.8	NF	**17th QM**	NF	0.012	0.004	NF
18th QM	NF	0.15	0.26	NF	**18th QM**	NF	0.007	0.05	NF
19th QM	2.1	1.3	3.6	NF	**19th QM**	0.014	0.003	0.004	NF

PO_4^{3-} (mg/l)					As (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
20th QM	2.3	2.5	3.2	NF	**20th QM**	0.012	0.012	0.012	NF
21st QM	0.3	4	2	NF	**21st QM**	0.014	0.006	0.022	NF
22nd QM	1	0.5	1.5	NF	**22nd QM**	0.001	0.027	0.001	NF
23rd QM	1.1	0.4	0.9	NF	**23rd QM**	0.018	0.006	0.033	NF
25th QM	0.3	1.5	1.7	NF	**25th QM**	0.02	0.068	0.003	NF
26th QM	0.7	6.3	2.3	NF	**26th QM**	0.022	0.045	0.004	NF
27th QM	2	1.8	2.3	NF	**27th QM**	0.003	0.053	0.006	NF
28th QM	1.4	0.98	4	NF	**28th QM**	0.002	0.004	0.049	NF
29th QM	1.7	1.2	5	NF	**29th QM**	0.002	0.003	0.008	NF
30th QM	0.9	1.4	0.6	NF	**30th QM**	0.012	0.003	0.061	NF
31st QM	1	0.6	1.4	NF	**31st QM**	0.003	0.063	0.014	NF
32nd QM	0.8	1.4	0.3	NF	**32nd QM**	0.016	0.003	0.048	NF
33rd QM	1.2	0.5	1.36	NF	**33rd QM**	0.008	0.003	0.064	NF
34th QM	0.7548	0.5	1.5	NF	**34th QM**	0.02	0.00	0.05	NF
35th QM	0.757	0.5	1.3	NF	**35th QM**	0.019	0.003	0.056	NF
36th QM	0.0	0.4	1.3	NF	**36th QM**	0.005	0.002	0.042	NF
37th QM	0.00	0.7	1.4	NF	**37th QM**	0.00	0.00	0.1	NF
38th QM	0	0.6	4.39	NF	**38th QM**	0.001	0.002	0.056	NF
39th QM	0.1	0.1	0.1	NF	**39th QM**	0.004	0.004	0.004	NF
40th QM	1.2	1.9	1.9	NF	**40th QM**	0.001	0.003	0.048	NF
41st QM	1.4	<0.0003	0.6	NF	**41st QM**	0.003	0.002	0.050	NF
42nd QM	0.0225	0.546	1.3771	NF	**42nd QM**	0.001	0.047	0.002	NF
43rd QM	0.02	0.02	0.02	NF	**43rd QM**	0.003	0.043	0.002	NF
44th QM	1.4	1.8	2.7	NF	**44th QM**	0.005	0.055	0.001	NF
Standard (ECR'2023)	**N/A**				**Standard (ECR'2023)**	**0.05 mg/l**			

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NF-Not Functional.

Table B.22: Pb (mg/l) and Hg (mg/l) Concentrations in Groundwater

PB (mg/l)					Hg (mg/l)				
Monitoring Periods	**Sampling location ID**				**Monitoring Periods**		**Sampling Location ID**		
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
1st QM	0.002	<0.002	<0.002	0.002	**1st QM**	<0.00015	<0.00015	<0.00015	<0.00015
2nd QM	<0.002	<0.002	0.004	0.008	**2nd QM**	<0.00015	<0.00015	<0.00015	<0.00015
3rd QM	0.004	<0.002	<0.002	NF	**3rd QM**	<0.0005	<0.0005	<0.0005	NF
4th QM	0.023	0.016	0.013	NF	**4th QM**	<0.0005	<0.0005	<0.0005	NF
5th QM	NO	0.013	0.017	D	**5th QM**	<0.0005	<0.00015	<0.00015	NF
6th QM	0.002	0.0027	0.002	D	**6th QM**	0.00015	0.00015	0.00015	NF
7th QM	0.006	0.021	0.005	NF	**7th QM**	<0.00015	<0.00015	<0.00015	NF
8th QM	0.026	0.011	0.012	NF	**8th QM**	<0.00015	<0.00015	<0.00015	NF
9th QM	0.019	0.007	0.008	NF	**9th QM**	<0.00015	<0.00015	<0.00015	NF
10th QM	0.002	0.002	0.002	NF	**10th QM**	<0.00015	<0.00015	<0.00015	NF
11th QM	0.001	0.001	0.001	NF	**11th QM**	<0.00015	<0.00015	<0.00015	NF
12th QM	0.01	0.009	0.016	NF	**12th QM**	<0.00015	<0.00015	<0.00015	NF
13th QM	0.001	0.001	0.001	NF	**13th QM**	0.001	0.001	0.001	NF
14th QM	0.003	0.007	0.002	NF	**14th QM**	<0.0001	<0.0001	<0.0001	NF
15th QM	0.001	0.002	0.001	NF	**15th QM**	<0.001	<0.001	<0.001	NF
16th QM	0.001	0.001	0.001	NF	**16th QM**	<0.001	<0.001		NF
17th QM	0.001	0.001	0.001	NF	**17th QM**	<0.001	<0.001	<0.001	NF
18th QM	NF	0.001	0.001	NF	**18th QM**	<0.001	<0.001	<0.001	NF
19th QM	NF	0.004	0.056	NF	**19th QM**	<0.001	<0.001	<0.001	NF
20th QM	0.008	0.003	0.004	NF	**20th QM**	<0.001	<0.001	<0.001	NF
21st QM	0.004	0.004	0.006	NF	**21st QM**	0.001	0.003	0.001	NF
22nd QM	0.018	0.002	0.001	NF	**22nd QM**	<0.001	<0.001	<0.001	NF
23rd QM	0.002	0.008	0.001	NF	**23rd QM**	<0.001	<0.001	<0.001	NF
25th QM	0.001	0.001	0.002	NF	**25th QM**	<0.001	<0.001	<0.001	NF
26th QM	0.001	0.001	0.001	NF	**26th QM**	<0.001	<0.001	NF	NF
27th QM	0.004	0.006	0.002	NF	**27th QM**	<0.001	<0.001	<0.001	NF
28th QM	0.048	0.016	0.056	NF	**28th QM**	<0.001	<0.001	<0.001	NF
29th QM	0.003	0.008	0.002	NF	**29th QM**	<0.001	<0.001	<0.001	NF
30th QM	0.009	0.002	0.001	NF	**30th QM**	<0.001	<0.001	<0.001	NF

PB (mg/l)					Hg (mg/l)				
Monitoring Periods	**Sampling location ID**				**Monitoring Periods**		**Sampling Location ID**		
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
31st QM	0.001	0.001	0.001	NF	**31st QM**	<0.001	<0.001	<0.001	NF
32nd QM	0.003	0.004	0.003	NF	**32nd QM**	<0.001	<0.001	<0.001	NF
33rd QM	0.8	1.4	0.3	NF	**33rd QM**	0.008	0.003	0.064	NF
34th QM	0.002	0.003	0.001	NF	**34th QM**	<0.001	<0.001	<0.001	NF
35th QM	0.002	0.002	0.003	NF	**35th QM**	<0.001	<0.001	<0.001	NF
36th QM	0.001	0.002	0.001	NF	**36th QM**	<0.001	<0.001	<0.001	NF
37th QM	<0.01	<0.02	<0.03	NF	**37th QM**	<0.001	<0.001	<0.001	NF
38th QM	<0.01	<0.01	<0.01	NF	**38th QM**	<0.001	<0.001	<0.001	NF
39th QM	<0.01	<0.01	<0.01	NF	**39th QM**	<0.001	<0.001	<0.001	NF
40th QM	<0.01	<0.01	<0.01	NF	**40th QM**	<0.001	<0.001	<0.001	NF
41st QM	<0.01	<0.01	<0.01	NF	**41st QM**	<0.001	<0.001	<0.001	NF
42nd QM	<0.01	<0.01	<0.01	NF	**42nd QM**	<0.0001	<0.0001	<0.0001	NF
43rd QM	<0.01	<0.01	<0.01	NF	**43rd QM**	<0.0001	<0.0001	<0.0001	NF
44th QM	<0.01	<0.01	<0.01	NF	**44th QM**	<0.0001	<0.0001	<0.0001	NF
Standard (ECR'2023)	**0.01 mg/l**				**Standard (ECR'2023)**	**0.001 mg/l**			

Source: Field Survey; from April 2014 up to July 2025; Note: QM= Quarterly Monitoring, NF-Not Functional.

Table B.23: PAH (mg/l) Concentrations of Monitored Locations

PAH		Acenapthylene	Anthracene	Benzlol (A) Anthracene	Benzlol (A) Pyrene	Benzlol (B) Fluoranthene	Benzol (G, H, I) Perilene	Benzol (K) Fluoranthene	Chrysene	Dibenzol (A, H) Anthracene	Fluorene	Phenanthrene	Pyrene
July, 2018	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
January, 2019	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
July, 2019	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	Project Jetty	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

PAH		Acenapthylene	Anthracene	Benzlol (A) Anthracene	Benzlol (A) Pyrene	Benzlol (B) Fluoranthene	Benzol (G, H, I) Perilene	Benzol (K) Fluoranthene	Chrysene	Dibenzol (A, H) Anthracene	Fluorene	Phenanthrene	Pyrene
February, 2020	**Majhar point**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
July, 2020	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January, 2021	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
August, 2021	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January, 2022	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
July, 2022	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January, 2023	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
August, 2023	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January, 2024	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
August, 2024	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January, 2025	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Source: Field Survey; from April 2014 up to July 2025; Note: ND-not determined

Table B.24: TOC (mg/l) and TC (mg/l) Concentrations of Monitored Locations

Monitoring sites	July, 2018		January, 2019		July, 2019		February, 2020		July, 2020		January, 2021		August, 2021		January, 2022		July, 2022		January, 2023	
	Total Carbon	Total Organic Carbon	Total Carbon	Total Organic Carbon	Total Carbon	Total Organic Carbon	Total Carbon	Total Organic Carbon	Total Carbon	Total Organic Carbon	Total Carbon	Total Organic Carbon	Total Carbon	Total Organic Carbon	Total Carbon	Total Organic Carbon	Total Carbon	Total Organic Carbon	Total Carbon	Total Organic Carbon
Project jetty site	26.4	19.5	20.7	14.3	17.2	13.6	37.5	26.4	152	9.17	1302	<5	250	<5	218	21.2	65	10.5	1403	5
Majhar point or Harbaria area	21.9	25.1	24.8	18.8	21.7	18.1	21.7	18.1	200	9.48	1568	<5	200	20.2	686	19.7	239	12.7	1058	5
Hiron point	NM	NM	6.8	5.7	NM	NM	8.1	6.7	NM	NM	9241	<5	NM	NM	2901	15.2	NM	NM	3759	5

Monitoring Sites	August 2023		January, 2024		August, 2024	
	Total Carbon	Total Organic Carbon	Total Carbon	Total Carbon	Total Carbon	Total Carbon
Project jetty site	61	<5	Not Detectable	9.38	3.43	2.17
Majhar point or Harbaria area	47	<5	Not Detectable	5.1	2.33	2.53
Hiron point	134	<5	Not Detectable	5.38	NS	NS

Source: Field Survey; from April 2014 up to July 2025

(C) Noise Level monitoring data

Table C.1: Ambient Noise Monitoring Status at the Monitored Locations

Sl No	Location	QM1 (Noise Level in dB (A)) Mar-14				QM2 (Noise Level in dB (A)) Jul-14				QM3 (Noise Level in dB (A)) Oct-14				QM4 (Noise Level in dB (A)) Jan-15				Standard (Noise Control Rules 2006)
		Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	80.32	60.86	63.22	68.13	52.71	55.62	50.27	52.87	53.37	53.52	57	54.63	51.92	53.7	54.21	53.28	70
2	NW Corner of the Project area	55.23	53	47.43	51.89	NM	NM	NM	NM	42.67	41.73	41.37	41.92	33.87	36.42	35.46	35.25	50
3	Chunkuri-2, Bajua	62.69	57.19	53.39	57.76	54.61	51.14	51.9	52.55	52.26	51.14	50.76	51.39	55.08	46.29	46.49	49.29	50
4	SW corner of the Project area	49.2	NM	NM	49.2	44.55	48.94	49.33	47.6	45.56	45.1	47.18	45.95	36.57	34.24	37.27	36.03	50
5	Township area, Project site	47.8	49.7	NM	48.75	46.15	47.21	NM	46.68	42.67	41.73	41.37	41.92	41.49	39.55	43.37	41.47	50
6	Barni, Gaurambha	64.95	50.93	60.65	58.84	48.73	50.37	50.75	49.95	50.18	50.89	48.27	49.78	43.36	38.56	48.86	43.6	50
7	Khan Jahan Ali Bridge, Khulna	76.12	66.72	72.25	71.7	55.97	64.68	61.75	60.8	72.24	58.3	68.3	66.28	61.34	63.4	60.41	61.72	70
8	Mongla Port area	69.38	54.55	59.79	61.24	54.75	54.2	52.58	53.84	66.8	55.2	59.5	60.5	40.26	35.04	40.76	38.69	75
9	Harbaria, Sundarbans	39.24	NM	42.51	40.88	59.25	60.52	48.62	56.13	54.08	56.51	NM	55.3	36.36	32.4	NM	34.38	45
10	Akram Point, Sundarbans	40.95	41.98	39.9	40.94	48.95	46.86	NM	47.9	45.27	42.69	NM	43.98	37.9	30.75	NM	34.32	45
11	Hiron Point, Sundarbans	35.99	40.75	39.16	38.63	51.29	NM	NM	51.29	47.98	39.42	NM	47.98	42.82	31.93	NM	37.37	45

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.2: Ambient Noise Monitoring Status at the Monitored Locations

Sl No	Location	QM 5(Noise Level in dB (A)) Apr-15				QM 6 (Noise Level in dB (A)) Jul-15				QM 7 (Noise Level in dB (A)) Oct-15				QM 8 (Noise Level in dB (A)) Jan-16				Standard (Noise Control Rules 2006)
		Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	57.27	54.31	59.65	57.08	43.52	54.23	51.56	49.77	68.32	66.09	60.96	65.12	67.84	61.25	66.31	66.07	70
2	NW Corner of the Project area	45.05	42.15	46.8	44.67	37.58	40.91	46.18	41.56	41.51	39.58	44.74	41.94	53.91	49.02	49.95	50.96	50
3	Chunkuri-2, Bajua	45.9	48.19	NM	47.05	40.57	42.23	39.17	40.66	47.53	45.48	49.28	47.43	56.84	48.12	55.90	53.62	50
4	SW corner of the Project area	40.6	43.25	46.89	43.58	44.57	44.30	42.36	43.75	36.15	48.26	43.68	42.70	60.32	55.30	63.70	60.44	50
5	Township area, Project site	41.49	39.55	43.37	41.47	43.41	50.86	45.99	46.75	46.89	49.47	55.20	50.52	54.79	52.22	54.29	53.77	50
6	Barni, Gaurambha	58.23	50.11	NM	54.17	46.76	44.83	46.95	46.18	56.40	54.19	54.88	55.16	60.62	60.00	56.86	59.16	50
7	Khan Jahan Ali Bridge, Khulna	75.2	72.75	72.42	73.45	52.95	52.18	53.34	52.82	64.43	61.65	66.65	64.25	69.96	64.81	70.56	68.45	70
8	Mongla Port area	46.02	49.29	49.15	48.15	36.72	38.56	43.54	39.61	45.39	NM	48.63	47.01	54.15	51.82	52.14	52.70	75
9	Harbaria, Sundarbans	67.06	64.05	64.99	65.37	39.33	30.74	NM	35.03	54.97	46.54	NM	50.75	45.72	44.69	*NM*	45.20	45
10	Akram Point, Sundarbans	53.35	56.37	NM	54.86	NM	NM	NM	NM	45.28	53.92	NM	49.60	45.60	40.29	*NM*	42.95	45
11	Hiron Point, Sundarbans	47.48	48.2	NM	47.84	NM	NM	NM	NM	54.44	37.69	NM	46.06	NM	NM	NM	NM	45

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.3: Ambient Noise Monitoring Status at the Monitored Locations

Sl No	Location	QM9 (Noise Level in dB (A)) Apr-16				QM 10 (Noise Level in dB (A)) Jul-16				QM 11 (Noise Level in dB (A)) Oct-16				QM 12 (Noise Level in dB (A)) Jan-17				Standard (Noise Control Rules 2006)
		Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	67.71	61.23	66.31	65.08	50.92	50.04	52.3	51.42	60.1	68.6	67.8	65.5	54.4	61	61.46	58.95	70
2	NW Corner of the Project area	53.81	48.66	49.90	50.79	54.40	53.19	50.36	52.65	54.7	54.8	57.0	55.5	44.52	44.52	NM	44.52	50
3	Chunkuri-2, Bajua	43.30	43.35	46.84	44.49	56.29	49.4	54.51	53.4	50.4	47.7	56.6	51.6	55.73	56.2	NM	55.31	50
4	SW corner of the Project area	56.81	54.73	51.97	54.50	67.38	74.12	54.61	65.37	47.8	49.0	50.8	49.2	44.41	45.96	NM	45.19	50
5	Proposed Township area, Project site	55.02	52.41	52.69	53.37	62.71	52.98	51.67	55.79	45.8	41.6	48.7	45.4	NM	43.4	41.85	42.63	50
6	Barni, Gaurambha	50.63	54.19	57.09	53.97	51.2	59.54	59.53	56.75	52.4	57.3	55.0	54.9	49.75	48.35	NM	49.05	50
7	Khan Jahan Ali Bridge, Khulna	66.40	64.82	66.34	65.85	63.52	62.15	65.73	63.80	61.9	59.6	61.3	60.9	51.69	60.05	54.97	55.57	70
8	Mongla Port area	49.89	48.67	51.07	49.88	53.87	52.04	52.7	52.87	49.5	50.0	50.2	49.9	47.82	48.67	50.33	48.94	75
9	Harbaria, Sundarbans	44.40	44.69	NM	44.55	53.87	53.04	52.79	52.9	57.2	53.5	49.3	53.3	41.13	38.4	37.98	39.17	45
10	Akram Point, Sundarbans	45.60	40.29	NM	42.95	47.16	46.48	50.24	47.96	40.5	43.0	42.5	42.0	38.74	38.45	37.06	38.08	45
11	Hiron Point, Sundarbans	48.53	37.69	NM	43.11	NM	NM	NM	NM	46.1	42,08	41.9	44.0	43.62	40.96	42.29	42.29	45

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.4: Ambient Noise Monitoring Status at the Monitored Locations

Sl No	Location	QM13 (Noise Level in dB (A)) Apr-17				QM 14 (Noise Level in dB (A)) Oct-17				QM 15 (Noise Level in dB (A)) Jan-18				QM 16 (Noise Level in dB (A)) April-18				Standard (Noise Control Rules 2006)
		Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	58.21	59.00	66.57	61.62	47.65	51.06	50.27	49.66	60.2	60.2	60.5	60.3	64.09	59.30	65.43	62.94	70
2	NW Corner of the Project area	44.97	49.30	47.31	47.19	47.65	45.12	46.65	46.47	47.8	48.1	49.2	48.37	47.92	54.32	61.14	54.46	55
3	Chunkuri-2, Bajua	45.60	52.29	53.42	50.44	39.82	45.60	41.73	42.38	51.1	51.2	52.1	51.47	44.77	46	63.14	51.30	55
4	SW corner of the Project area	39.62	42.64	47.48	43.25	60.80	64.08	62.52	62.47	43.5	43.5	45.7	44.23	64.45	63.49	66.63	64.85	55
5	Project site near Shapmari area	41.40	43.09	43.45	42.65	43.05	48.52	45.01	45.53	53.2	54	52.82	53.34	51.95	59.66	56.8	56.13	55
6	Barni, Gaurambha	43.05	46.45	45.01	44.83	45.60	52.29	53.42	50.44	56.5	54.2	56.1	55.6	55.6	51.80	51.39	52.93	60
7	Khan Jahan Ali Bridge, Khulna	54.01	57.50	58.66	56.72	40.60	42.64	46.55	43.26	60.2	62.1	62.2	61.5	49.4	45.25	47.98	47.54	70
8	Mongla Port area	47.78	47.45	45.25	47.61	41.40	44.68	45.71	43.93	60.2	60.2	58.4	59.6	50.84	48.33	53.25	50.80	75
9	Harbaria, Sundarbans	50.79	53.67	57.84	54.10	44.25	46.67	47.31	46.08	45.8	44.7	43.8	44.7	50.23	45.55	65.43	53.73	50
10	Akram Point, Sundarbans	43.41	45.60	43.89	44.30	58.21	58.59	58.70	58.50	39.4	40.5	41.1	40.3	58.31	60.93	64.87	61.37	50
11	Hiron Point, Sundarbans	NM	NM	NM	NM	39.92	39.79	33.5	37.74	37.2	39	38.4	38.2	NM	NM	NM	NM	50

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.5: Ambient noise monitoring status at the monitored locations

Sl No	Location	QM 17 (Noise Level in dB (A)) July-18				QM 18 (Noise Level in dB (A)) Nov-18				QM 19 (Noise Level in dB (A)) Feb-19				QM 20 (Noise Level in dB (A)) Apr-19				Standard (Noise Control Rules 2006)
		Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	57.64	56.94	58.03	57.54	61.3	56.3	57.1	70	56.14	59.28	53.95	56.45	62.02	61.91	61.08	61.67	70
2	NW Corner of the Project area	42.80	47.51	46.57	45.63	56.5	60.1	59.85	55	45.15	54.11	53	50.75	53.70	58.92	57.92	56.85	55
3	Chunkuri-2, Bajua	46.23	49.02	47.34	47.53	45.8	48.9	51.3	55	50.19	49.35	51	50.18	49.66	54.02	51.35	51.68	55
4	SW corner of the Project area	58.84	48.00	51.03	52.63	64.5	60.6	60.2	55	53.50	58.01	55.88	55.79	58.08	54.79	55.27	56.05	55
5	Project site near Shapmari area	42.66	45.82	48.78	45.75	45.1	51.2	55.8	55	58.48	61.21	54.70	58.13	61.35	58.97	56.16	58.83	55
6	Barni, Gaurambha	42.67	47.95	45.90	45.51	58.3	50.6	50.2	60	54.32	57.65	45.75	52.57	58.58	51.05	49.92	53.18	60
7	Khan Jahan Ali Bridge, Khulna	64.1	64.06	61.90	63.35	64.6	60.9	60.9	70	65.72	69.04	66.03	66.93	67.95	63.09	69.82	66.95	70
8	Mongla Port area	63.12	59.00	60.77	60.96	55.8	53.1	59.0	75	64.33	63.37	70.85	66.18	64.12	62.41	65.45	63.99	75
9	Harbaria, Sundarbans	51.98	48.58	50.28	50.28	49.9	47.6	NM	50	51.43	47.90	NM	49.67	49.42	47.45	NM	48.43	50
10	Akram Point, Sundarbans	46.52	43.88	45.2	45.20	41.9	40.1	NM	50	47.35	45.55	NM	46.45	46.16	38.49	NM	42.33	50
11	Hiron Point, Sundarbans	NM	NM	NM	57.54	39.7	39.1	NM	50	33.8	44.62	NM	39.21	NM	NM	NM	-	50

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.6: Ambient noise monitoring status at the monitored locations

Sl No	Location	QM 21 (Noise Level in dB (A)) July-19				QM 22 (Noise Level in dB (A)) November-19				QM 23 (Noise Level in dB (A)) February 20				QM 25 (Noise Level in dB (A)) July, 20				Standard (Noise Control Rules 2006)
		Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Day time	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	55.92	60.88	61.23	59.34	70	61.03	55.78	58.60	56.24	54.09	53.45	54.59	52.00	51.11	50.56	51.28	70
2	NW Corner of the Project area	56.44	53.21	55.88	55.18	55	53.45	50.97	51.11	40.96	43.33	51.98	45.42	43.9	42.95	43.26	43.37	55
3	Chunkuri-2, Bajua	56.15	63.34	58.60	59.36	55	52.92	54.51	55.27	59.78	51.59	54.96	55.44	49.42	48.52	48.32	48.75	55
4	SW corner of the Project area	66.94	58.41	65.65	63.66	55	49.98	42.05	46.57	56.35	54.05	56.40	55.60	49.91	49.78	50.85	50.18	55
5	Project site near Shapmari area	53.14	55.40	55.05	54.53	55	55.80	54.77	54.86	51.02	47.91	47.93	48.95	54.55	53.21	52.88	53.72	55
6	Barni, Gaurambha	51.36	57.98	NM	54.67	60	49.37	48.53	50.53	57.37	60.48	68.05	61.97	56.53	40.65	49.21	48.80	60
7	Khan Jahan Ali Bridge, Khulna	63.38	60.55	66.44	63.46	70	67.65	65.32	66.05	60.75	62.81	63.05	62.20	65.55	66.86	66.52	66.31	70
8	Mongla Port area	60.49	62.10	63.43	62.01	75	55.66	55.85	57.25	59.74	62.38	61.07	61.06	64.92	67.90	63.71	66.41	75
9	Harbaria, Sundarbans	47.62	42.18	NM	44.90	50	44.71	NM	44.10	45.59	42.29	41.35	43.94	47.80	52.15	41.2	49.97	50
10	Akram Point, Sundarbans	44.05	45.62	NM	44.84	50	42.60	NM	44.86	NM	36.59	40.46	36.59	51.04	45.11	43.1	51.04	50
11	Hiron Point, Sundarbans	NM	NM	NM	NM	50	41.34	NM	40.28	41.3	39.41	NM	40.34	NM	NM	NM	NM	50

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.7: Ambient noise monitoring status at the monitored locations

Sl No	Location	QM 26 (Noise Level in dB (A)) Oct, 2020				QM 27 (Noise Level in dB (A)) Jan, 2021				QM 28 (Noise Level in dB (A)) Apr, 2021				QM 29 (Noise Level in dB (A) Jul, 2021				Standard (Noise Control Rules 2006)
		Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	65.91	51.62	56.93	58.15	58.33	NM	62.68	60.50	61.35	61.74	61.22	61.44	50.96	51.08	51.57	51.21	70
2	NW Corner of the Project area	47.82	50.15	47.45	48.48	45.00	52.75	56.51	51.42	50.65	48.34	NM	49.50	49.60	51.64	49.09	50.11	55
3	Chunkuri-2, Bajua	43.58	47.68	46.45	45.91	48.75	45.45	46.96	47.05	50.22	52.90	50.81	51.31	49.93	51.65	49.52	50.36	55
4	SW corner of the Project area	49.50	48.83	49.22	49.18	NM	50.88	53.84	52.36	55.41	54.85	55.45	55.24	49.82	54.82	51.07	51.90	55
5	Project site near Shapmari area	50.23	41.71	41.43	44.45	49.19	47.07	51.00	49.09	52.23	51.24	52.67	52.05	53.45	54.35	53.71	53.84	55
6	Barni, Gaurambha	67.71	51.76	55.51	58.33	51.69	51.99	55.60	53.09	54.16	51.69	51.15	52.34	52.73	NM	49.28	51.00	60
7	Khan Jahan Ali Bridge, Khulna	81.72	81.45	82.25	81.81	61.95	NM	61.93	61.94	56.08	54.09	53.79	54.65	52.78	51.29	53.05	52.38	70
8	Mongla Port area	74.72	75.67	80.37	76.92	55.16	56.85	57.53	56.52	54.01	52.41	54.48	53.63	55.26	55.54	55.68	54.49	75
9	Harbaria, Sundarbans	59.01	NM	50.06	54.54	46.98	41.82	NM	44.40	48.54	47.54	NM	48.04	NM	NM	NM	NM	50
10	Akram Point, Sundarbans	NM	42.23	NM	42.23	40.34	35.35	NM	37.85	45.95	40.89	NM	43.42	46.31	42.94	NM	44.62	50
11	Hiron Point, Sundarbans	52.40	49.01	NM	50.70	42.50	35.23	NM	38.85	NM	NM	NM	NM	49.70	51.2	NM	50.94	50

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.8: Ambient noise monitoring status at the monitored locations

Sl No	Location	QM 30 (Noise Level in Db (A)) Oct, 2021				QM 31 (Noise Level in dB (A)) Jan, 2022				QM 32(Noise Level in dB (A)) May, 2022				QM 33(Noise Level in dB (A)) Jul, 2022				Standard (Noise Control Rules 2006)
		Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	68.9	52.08	58.3	64.57	56	59.05	64.08	59.71	56	61.25	59.97	59.08	52.71	52.62	53.30	52.88	70
2	NW Corner of the Project area	47.99	51.61	48.17	49.59	49	48.90	48.56	48.82	48.63	48.64	48.64	48.60	46.55	44.82	45.44	45.60	55
3	Chunkuri-2, Bajua	45.31	48.07	46.8	46.87	49.85	47.48	49.70	49.01	48.32	48.72	49.70	48.91	48.00	45.61	47.75	47.12	55
4	SW corner of the Project area	49.66	49.49	48.95	49.37	63.74	49.95	50.25	54.65	50.31	50.05	51.24	50.53	54.00	48.07	46.06	49.38	55
5	Project site near Shapmari area	50.94	42.29	41.88	47.17	50.05	50.57	49.45	50.03	49.70	49.34	50.24	49.76	44.50	45.75	43.49	44.58	55
6	Barni, Gaurambha	68.37	51.5	56.61	63.96	47.60	49.57	49.51	48.89	47.60	45.05	49.04	47.23	50.06	45.93	46.40	47.46	60
7	Khan Jahan Ali Bridge, Khulna	77.75	80.58	81.43	80.18	61.04	63.52	62.44	62.33	56.46	56.93	62.42	58.60	55.75	NM	NM	55.75	70
8	Mongla Port area	73.94	75.15	79.45	76.86	NM	53.89	58.02	55.95	55.95	56.99	59.19	57.38	55.41	55.09	54.75	55.08	75
9	Harbaria, Sundarbans	59.51	50.62	NM	57.02	49.85	44.77	NM	47.31	52.31	46.44	NM	49.37	42.95	38.59	NM	40.77	50
10	Akram Point, Sundarbans	44.22	42.12	NM	43.29	38.66	36.15	NM	37.41	46.22	39.94	NM	43.08	41.97	NM	41.01	41.49	50
11	Hiron Point, Sundarbans	53.99	49.41	NM	52.27	39.5	33.08	NM	36.29	NM	NM	NM	NM	NM	NM	NM	NM	50

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.9: Ambient noise monitoring status at the monitored locations

Sl. No	Location	QM 34(Noise Level in dB (A)) Oct, 2022				QM 35 (Noise Level in dB (A)) Jan, 2023				QM 36 (Noise Level in dB (A)) Apr, 2023				QM 37 (Noise Level in dB (A)) Apr, 2023				Standard (Noise Control Rules 2006)
		Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	78.1	72.2	76.2	75.5	69.5	67	62.7	66.4	62	55.2	57	58	57.69	55.83	57.87	57.13	**70**
2	NW Corner of the Project area	57	57.7	52.3	55.67	53.4	48.3	43.2	48.3	45.1	44.5	46	45.2	50.47	48.07	48.62	49.06	**55**
3	Chunkuri-2, Bajua	63.5	55.4	54.6	57.83	51.8	55.4	53.3	53.5	51.5	52.4	50.8	51.6	54.93	47.43	46.28	49.54	**55**
4	SW corner of the Project area	56.2	53.7	52.7	54.2	49.8	53.8	NM	51.8	58.7	49.7	50.9	54.2	50.55	55.53	53.87	53.32	**55**
5	Project site near Shapmari area	57.4	50.9	NM	54.15	56.3	53.8	46.4	52.2	46.7	46.4	51.2	48.1	47.07	45.4	47.54	46.67	**55**
6	Barni, Gaurambha	62.5	60.5	62.6	61.87	59.9	57	58.5	58.5	59.1	46.8	52.9	52.9	57.97	49.15	52.66	53.26	**60**
7	Khan Jahan Ali Bridge, Khulna	65.1	63.2	NM	64.15	70.2	68.9	75.9	71.7	65.9	62.1	NM	64	60.35	55.4	54.9	56.88	**70**
8	Mongla Port area	61.5	67.9	65.6	65	65.2	68.1	56.4	63.2	63.3	58.3	61.9	61.2	55.97	56.58	53.36	55.31	**75**
9	Harbaria, Sundarbans	49.6	50.4	NM	50	48.1	41.8	NM	44.9	48.7	51.4	NM	50	49.15	48.64	NM	48.89	**50**
10	Akram Point, Sundarbans	42.5	41.7	NM	42.1	42.9	37.6	NM	40.2	46.5	43.7	NM	45.1	40.49	55.69	NM	48.09	**50**
11	Hiron Point, Sundarbans	47.8	NM	NM	47.8	41.3	41.3	NM	41.3	NM	NM	NM	NM	55.8	52.51	NM	54.15	**50**

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.10: Ambient noise monitoring status at the monitored locations

Sl. No	Location	QM 38(Noise Level in dB (A)) Oct, 2022				QM 39(Noise Level in dB (A)) Jan, 2023				QM 40 (Noise Level in dB (A)) May, 2024				QM 41(Noise Level in dB (A)) July, 2024				Standard (Noise Control Rules 2006)
		Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	55.56	52.75	54.53	54.28	51.74	55.18	57.78	54.90	53.88	52.39	53.90	53.39	51.80	50.90	51.90	51.53	**70**
2	NW Corner of the Project area	48.92	45.19	50.22	48.11	49.15	42.96	46.73	46.28	43.41	60.26	52.09	51.92	52.40	53.80	49.70	51.97	**55**
3	Chunkuri-2, Bajua	57.15	57.35	53.24	55.91	50.09	52.87	54.18	52.36	52.86	44.24	47.59	48.23	47.90	48.10	47.10	47.70	**55**
4	SW corner of the Project area	53.93	58.77	61.45	58.05	49.69	54.55	50.58	51.61	49.55	55.10	48.25	50.97	51.80	51.20	49.20	50.73	**55**
5	Project site near Shapmari area	45.91	44.70	44.98	45.20	57.42	58.04	58.79	58.08	48.68	47.25	47.09	47.68	48.90	47.10	48.30	48.10	**55**
6	Barni, Gaurambha	56.59	54.05	60.79	57.14	54.77	58.06	66.85	59.90	60.16	53.38	58.09	57.21	59.70	58.40	59.60	59.23	**60**
7	Khan Jahan Ali Bridge, Khulna	67.89	62.10	65.13	65.04	61.93	61.14	64.05	62.37	64.96	58.36	65.02	62.78	59.20	57.50	60.70	59.13	**70**
8	Mongla Port area	53.95	50.79	56.02	53.59	61.33	57.55	59.56	59.48	58.60	54.00	59.13	57.24	61.40	57.10	57.80	58.77	**75**
9	Harbaria, Sundarbans	49.46	49.74	NM	49.60	41.17	32.40	NM	36.79	51.44	46.31	NM	48.87	42.30	41.50	45.20	43.00	**50**
10	Akram Point, Sundarbans	40.68	37.45	NM	39.07	33.10	38.36	NM	35.73	37.96	37.99	NM	37.98	41.60	42.50	40.90	41.67	**50**
11	Hiron Point, Sundarbans	40.90	39.75	NM	40.34	35.40	35.59	NM	35.49	41.20	43.78	NM	42.47	NM	NM	NM	NM	**50**

Source: CEGIS Field Survey; Note: NM-Not measured

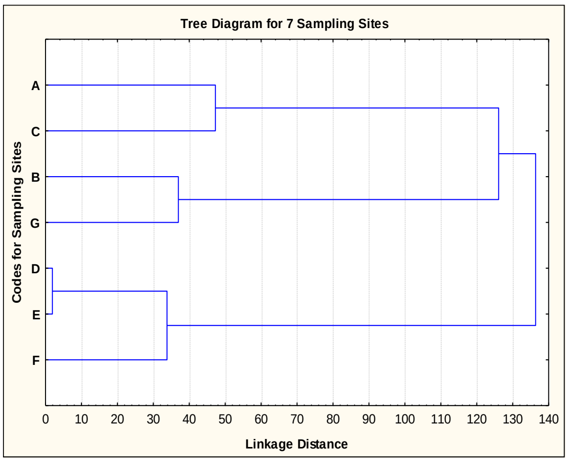
Table C.11: Ambient noise monitoring status at the monitored locations

Sl. No	Location	QM 42 (Noise Level in dB (A)) October, 2024				QM 43 (Noise Level in dB (A)) January, 2025				QM 44 (Noise Level in dB (A)) July, 2025				QM 45 (Noise Level in dB (A)) Oct, 2025				Standard (Noise Control Rules 2006)
		Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	52.45	48.82	53.06	51.44	50.60	50.67	52.08	51.12	49.46	59.58	54.71	54.58	52.95	50.39	54.01	52.45	**70**
2	NW Corner of the Project area	51.04	48.72	50.61	50.12	48.11	44.37	55.67	49.38	46.33	44.54	49.86	46.91	55.43	51.95	55.84	54.41	**55**
3	Chunkuri-2, Bajua	61.95	59.77	62.75	61.49	58.12	47.10	51.48	52.23	62.45	55.68	66.94	61.69	48.44	47.70	59.34	51.83	**55**
4	SW corner of the Project area	44.87	44.50	46.42	45.26	48.65	44.50	47.51	46.89	45.80	44.50	54.16	48.15	45.80	44.50	47.50	45.93	**55**
5	Project site near Shapmari area	47.45	48.32	46.88	47.25	50.33	45.09	47.64	47.68	49.85	44.98	47.04	47.29	49.85	47.45	47.68	48.33	**55**
6	Barni, Gaurambha	59.23	57.13	63.56	59.97	57.35	55.65	50.28	54.42	62.10	49.70	59.72	57.14	54.03	49.09	61.57	54.90	**60**
7	Khan Jahan Ali Bridge, Khulna	62.58	57.89	61.50	60.66	62.18	60.35	61.27	61.27	66.73	63.50	64.23	64.82	65.03	65.29	65.56	65.29	**70**
8	Mongla Port area	61.00	56.28	59.68	58.99	55.05	58.10	61.70	58.28	60.04	56.33	56.61	57.66	60.18	57.96	59.65	59.26	**75**
9	Harbaria, Sundarbans	52.45	48.82	53.06	51.44	50.60	50.67	52.08	51.12	49.46	59.58	54.71	54.58	48.94	46.99	NM	47.96	**50**
10	Akram Point, Sundarbans	51.04	48.72	50.61	50.12	48.11	44.37	55.67	49.38	46.33	44.54	49.86	46.91	46.64	44.35	NM	45.50	**50**
11	Hiron Point, Sundarbans	61.95	59.77	62.75	61.49	58.12	47.10	51.48	52.23	62.45	55.68	66.94	61.69	47.77	50.37	NM	49.07	**50**

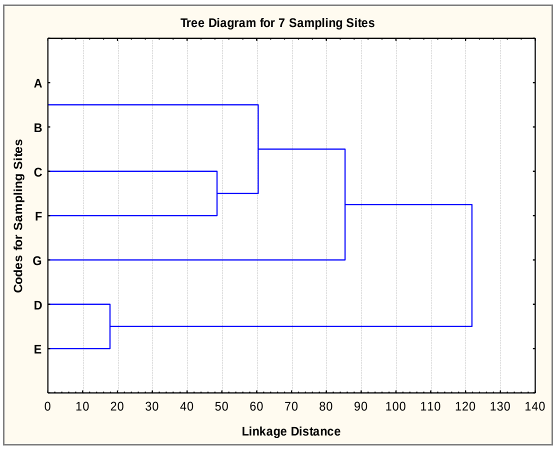
Source: CEGIS Field Survey; Note: NM-Not measured

(D) Fisheries Resources Monitoring Data

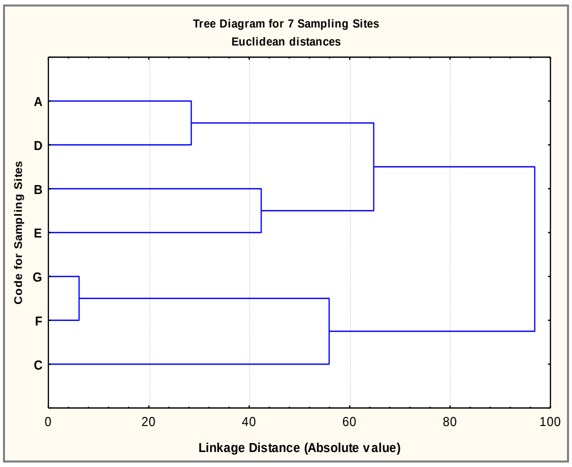
Figure D1: Classification of Functional Habitats



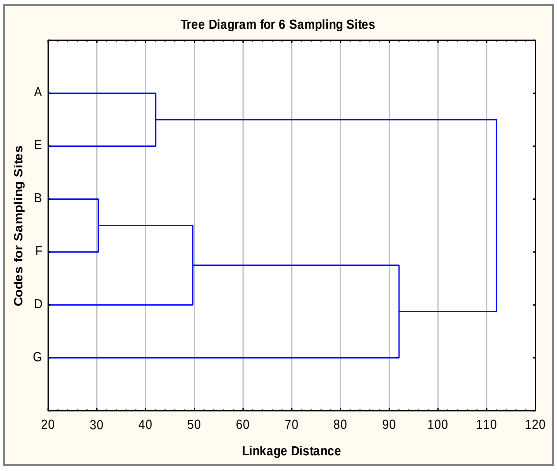
1st Monitoring, April, 2014



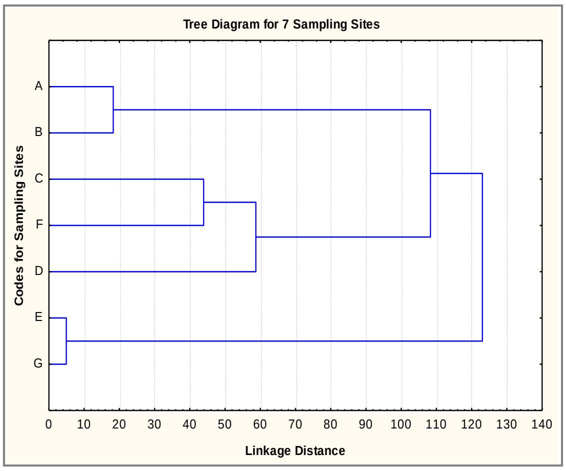
2nd Monitoring, July 2014



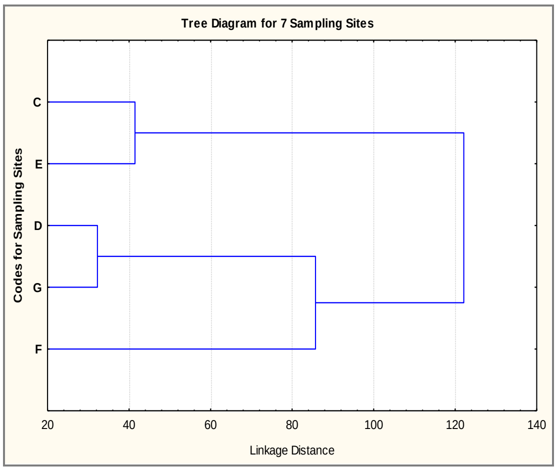
3rd Monitoring, October, 2014



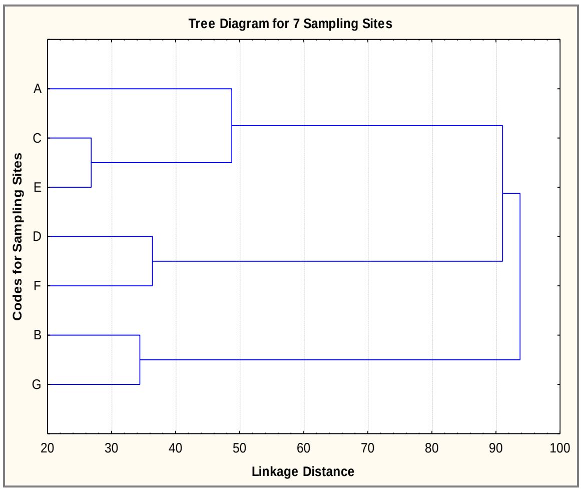
4th Monitoring, January 2015



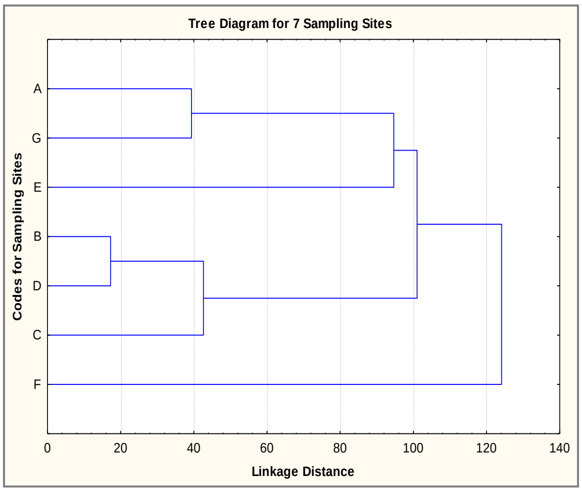
5th Monitoring, April, 2015



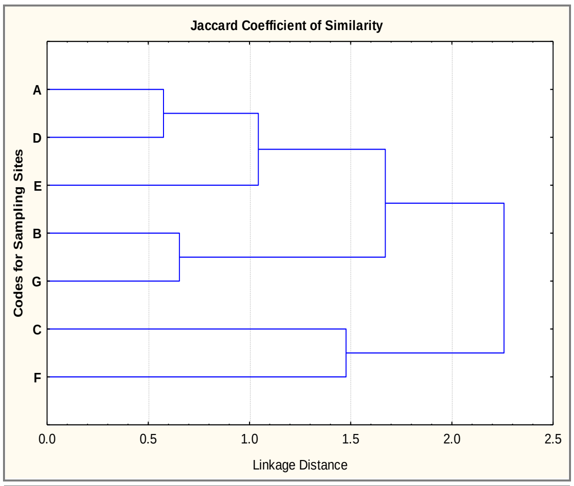
6th Monitoring, July, 2015

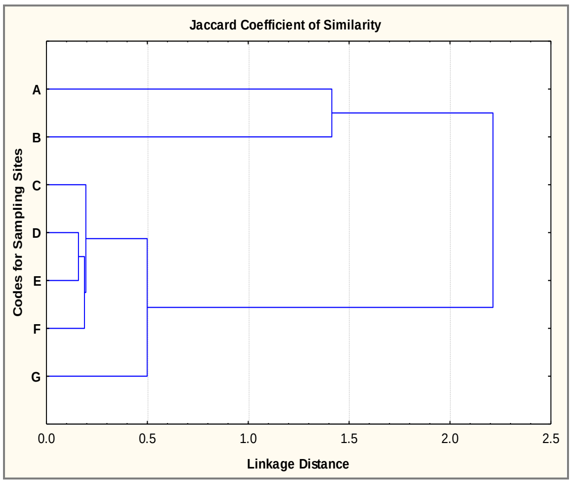


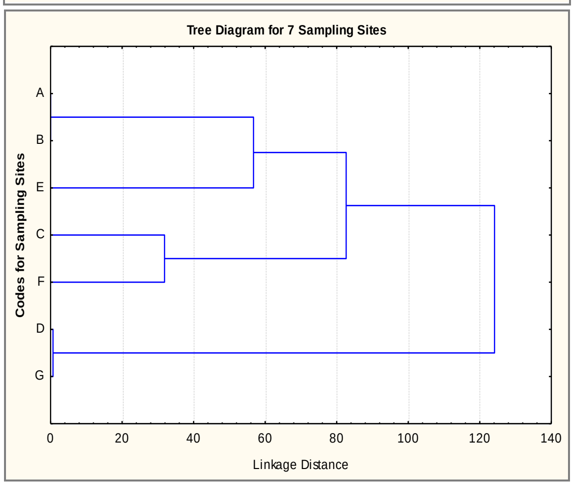
7th Monitoring, October, 2015



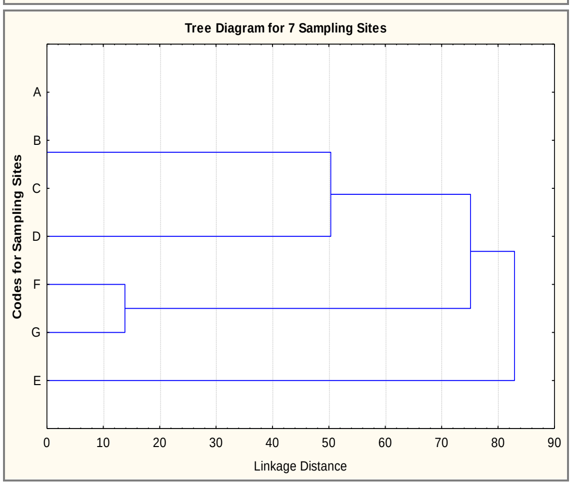
8th Monitoring, January, 2016



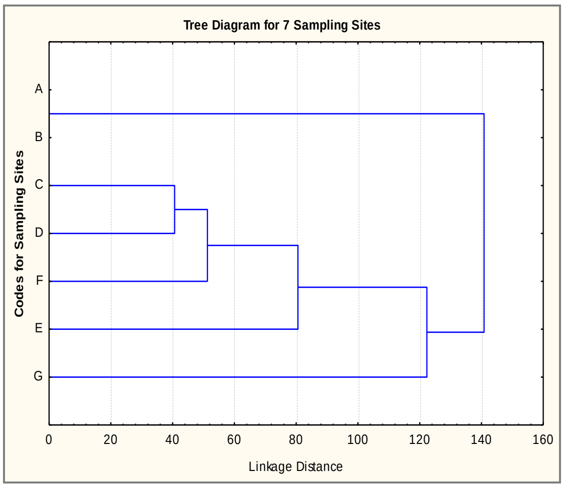




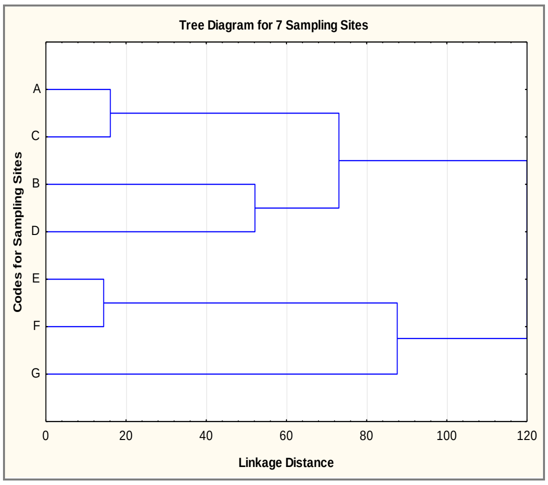
9th Monitoring, April, 2016



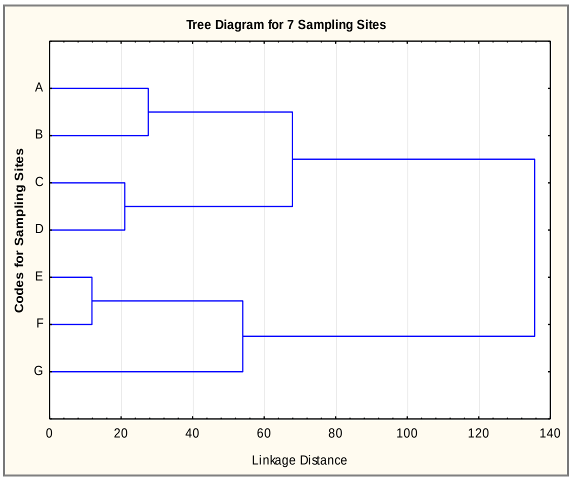
10th Monitoring, July, 2016



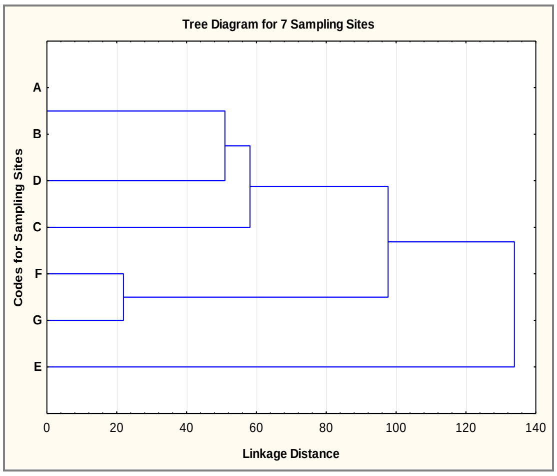
11th Monitoring, October, 2016



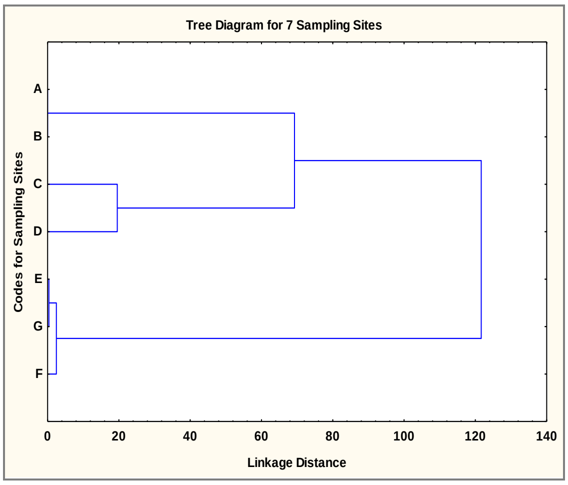
12th Monitoring, January, 2017



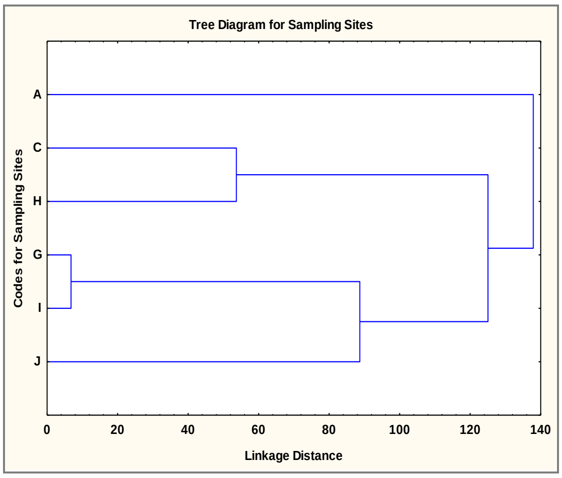
13th Monitoring, April, 2017



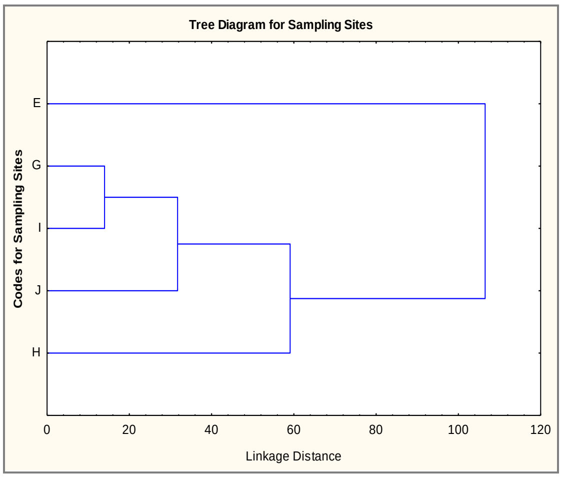
14th Monitoring, October, 2017



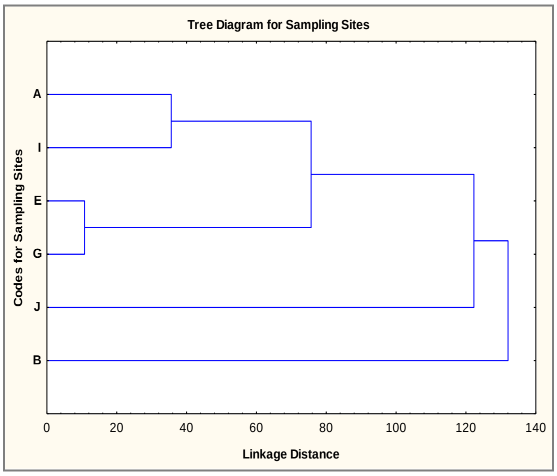
15th Monitoring, January, 2018



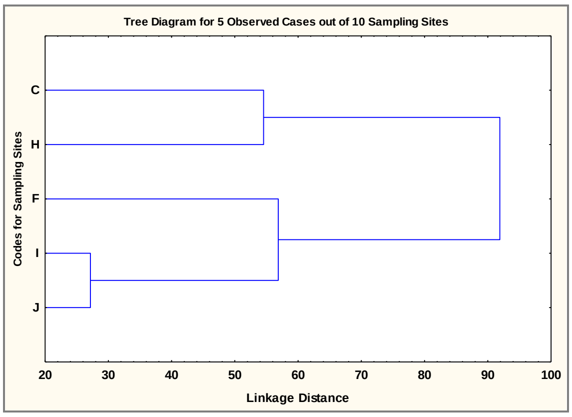
16th Monitoring, April, 2018



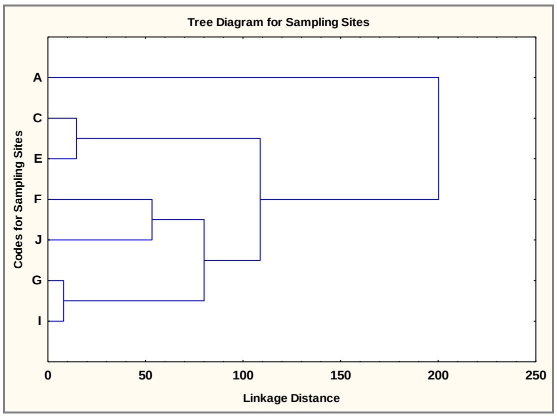
17th Monitoring, July, 2018



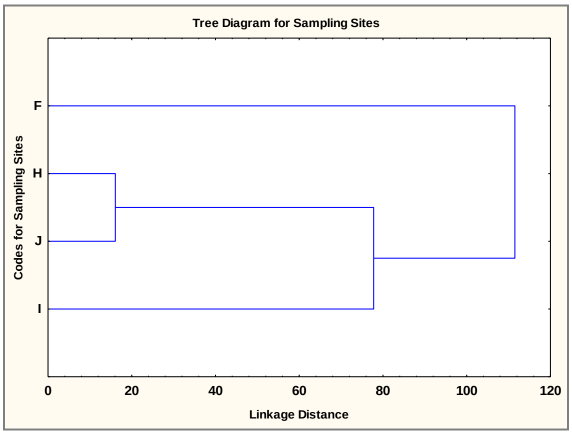
18th Monitoring, November, 2018



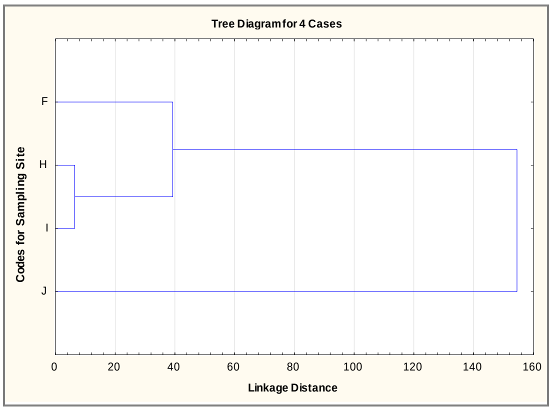
19th Monitoring, February, 2019



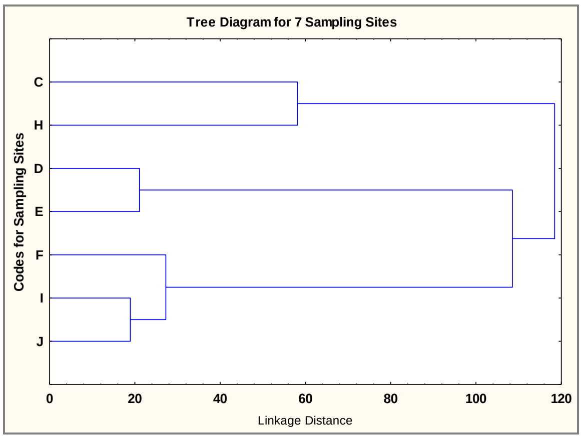
20th Monitoring, April, 2019



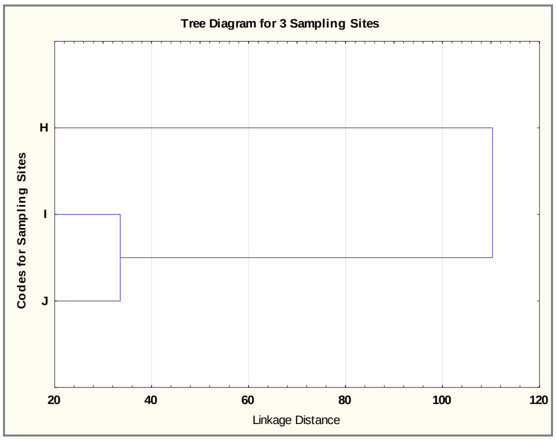
21st Monitoring, July 2019



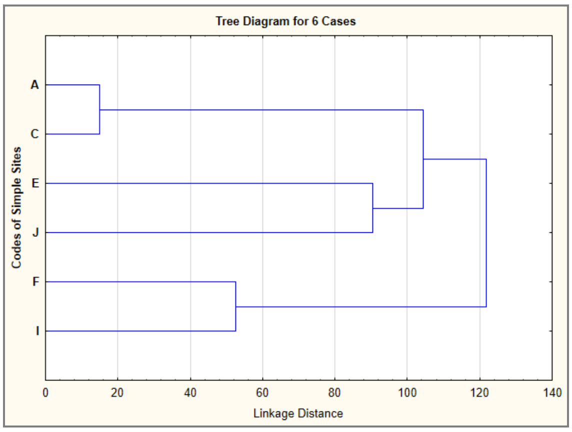
22nd Monitoring, November, 2019



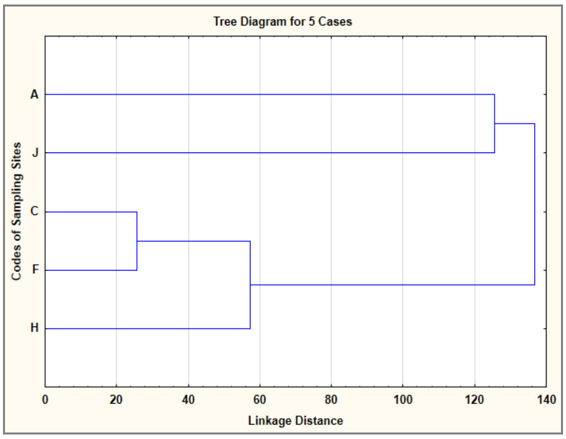
23rd Monitoring, February 2020



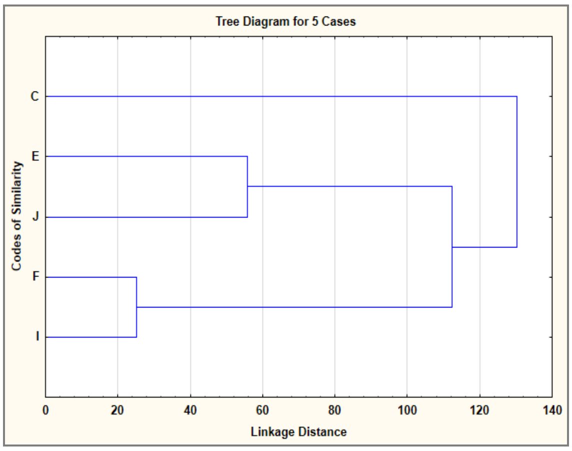
25th Monitoring, July 2020



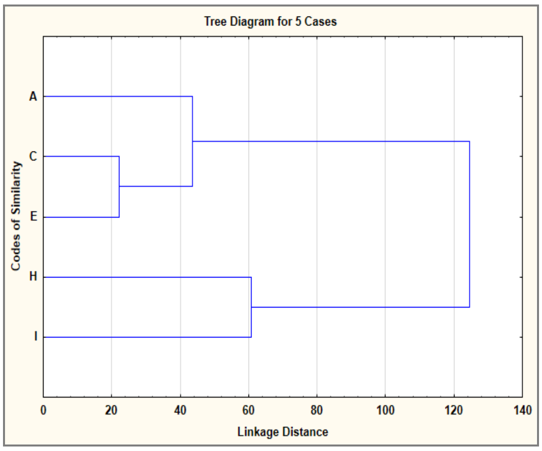
26th Monitoring, November 2020



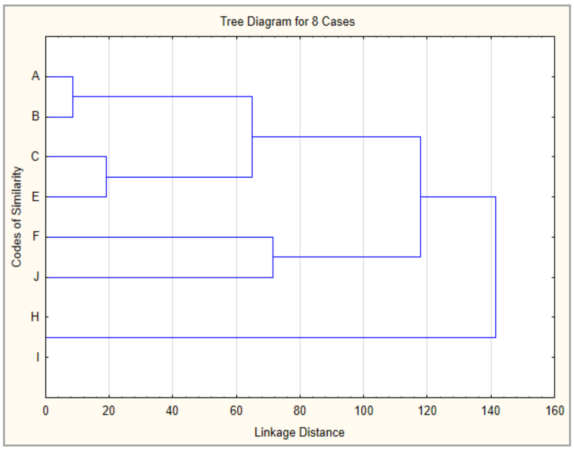
27th Monitoring, January 2021



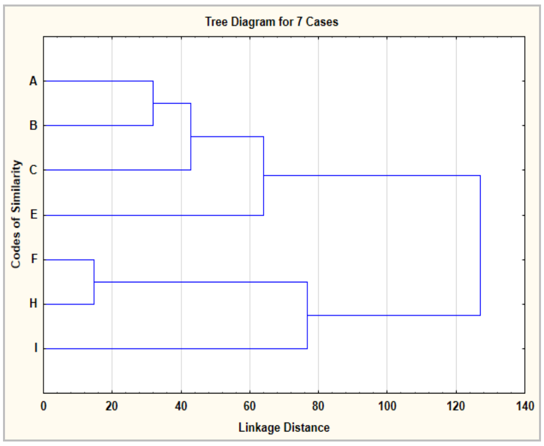
28th monitoring, April 2021



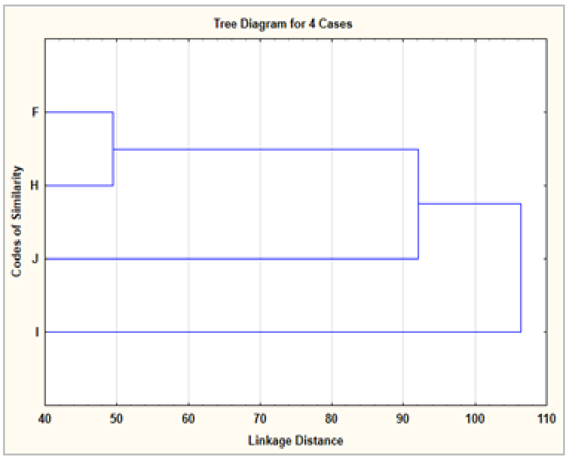
29th Monitoring, August 2021



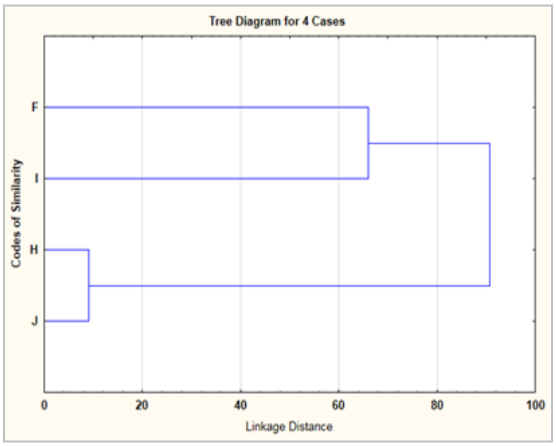
30th Monitoring, November 2021



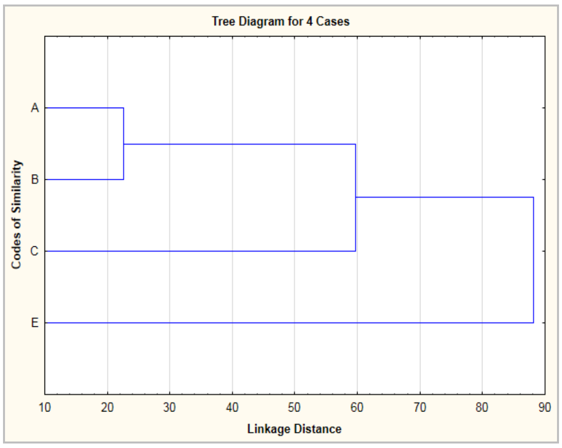
31st Monitoring, February, 2022



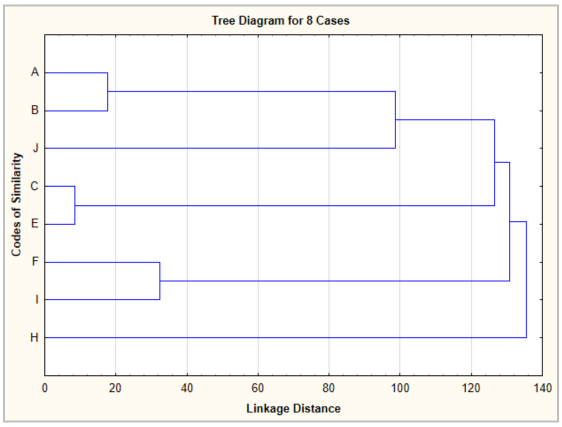
32nd Monitoring, May 2022



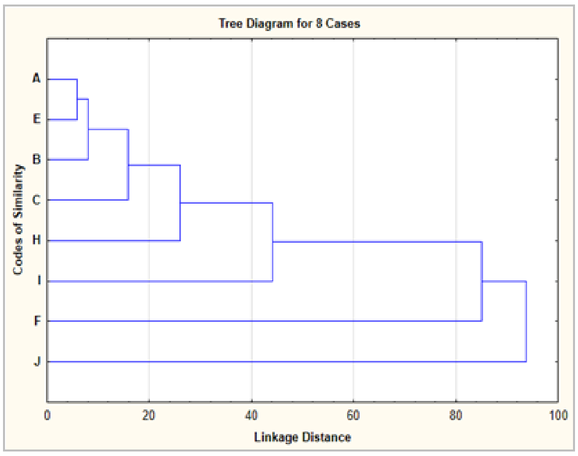
33rd Monitoring, July 2022



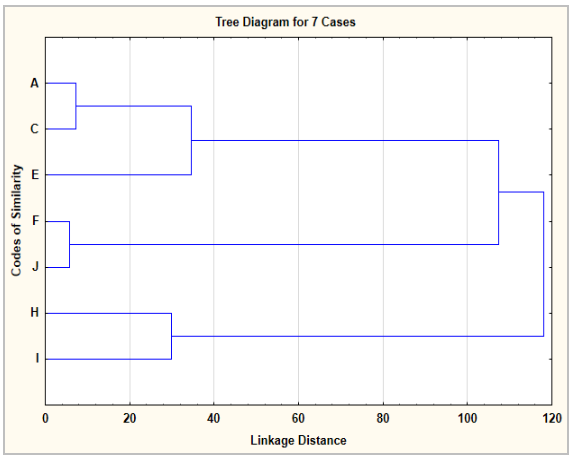
34th Monitoring, Oct 2022



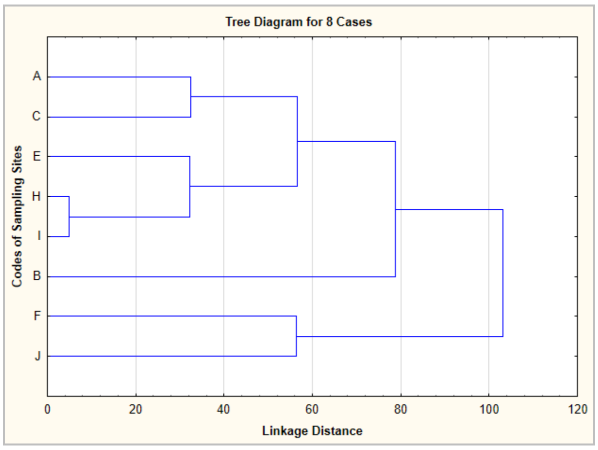
35th Monitoring Jan 2023



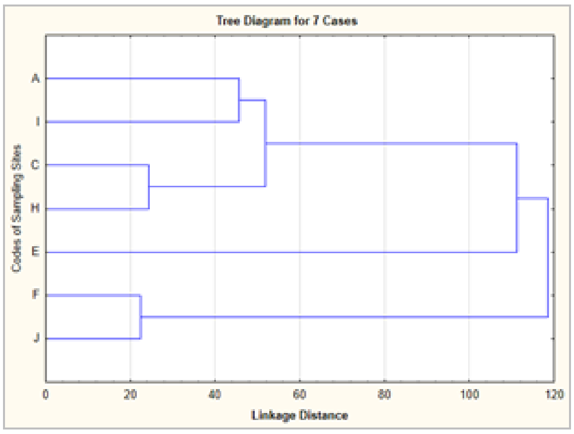
36th Monitoring, May 2023



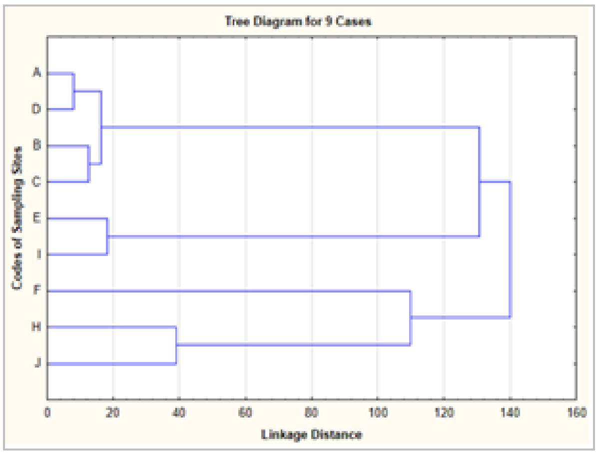
37th Monitoring, September 2023



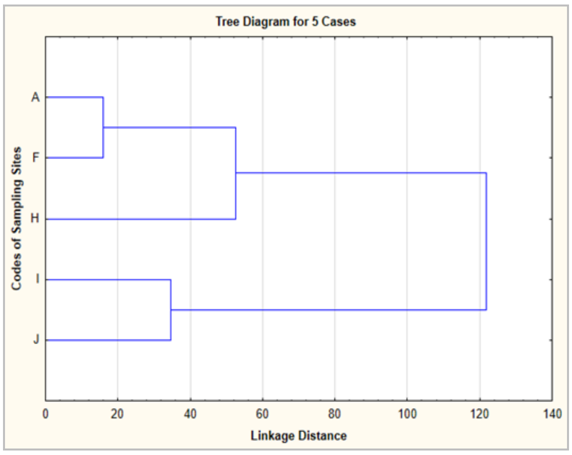
38th Monitoring, November 2023



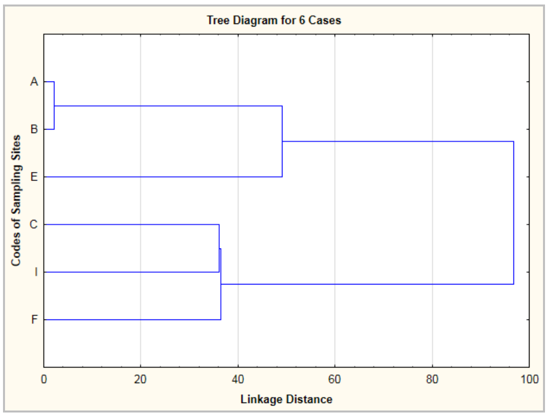
39th Monitoring, Feb 2024



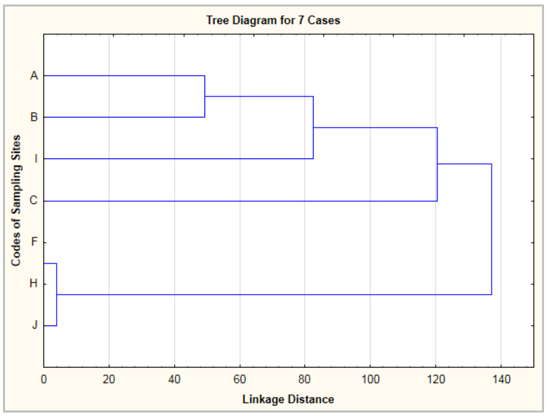
40th QM May 2024



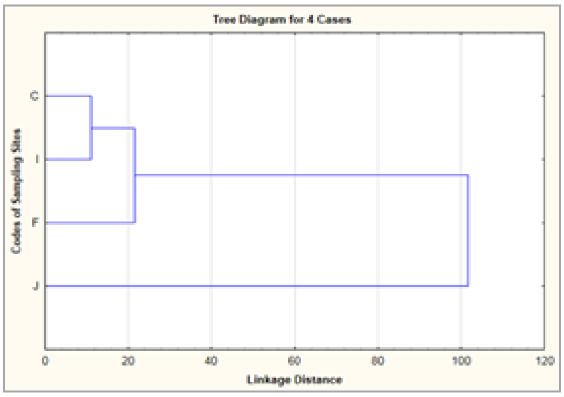
41st QM August 2024



42nd QM Oct 2024

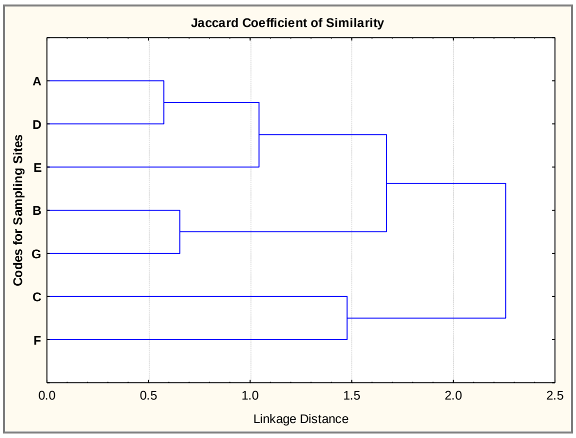


43rd QM Feb 2025

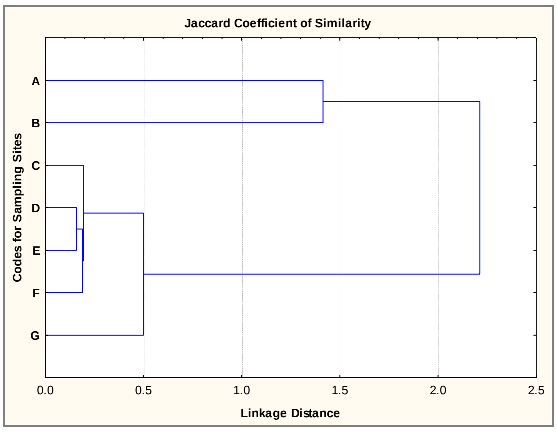


44th QM July 2025

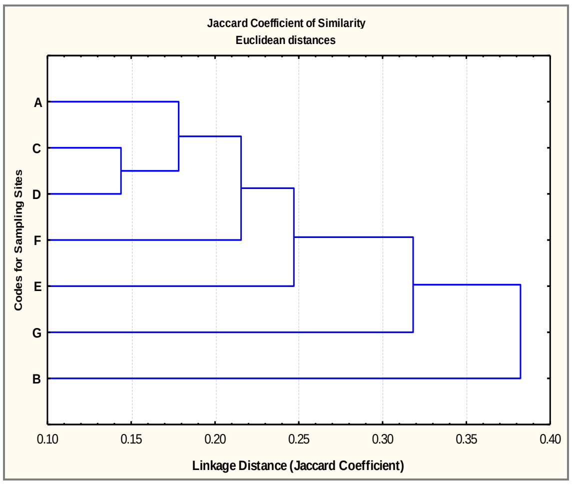
Figure D2: Jaccard Co-efficient of Similarity of Habitats respecting fish species occurrence



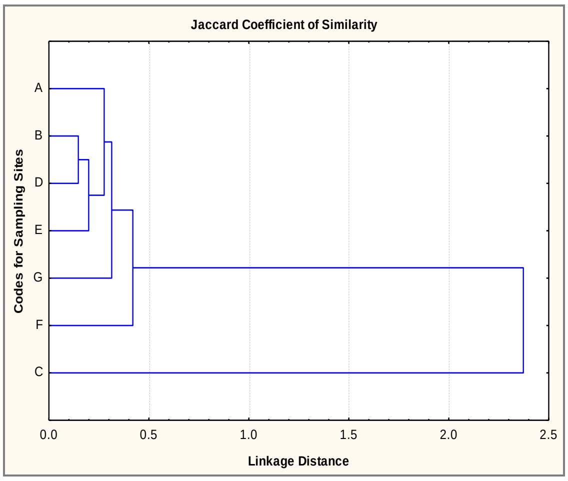
1st Monitoring, April, 2014



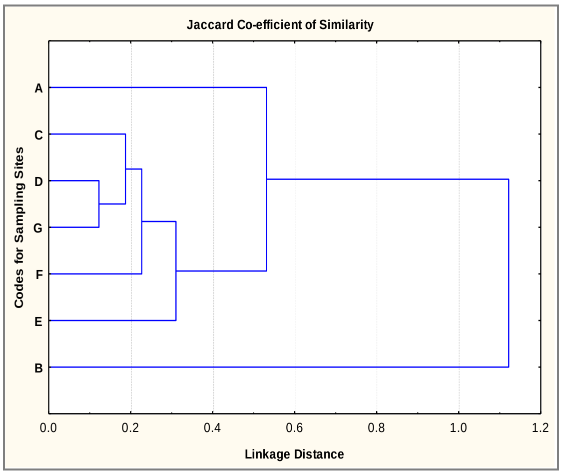
2nd Monitoring, July 2014



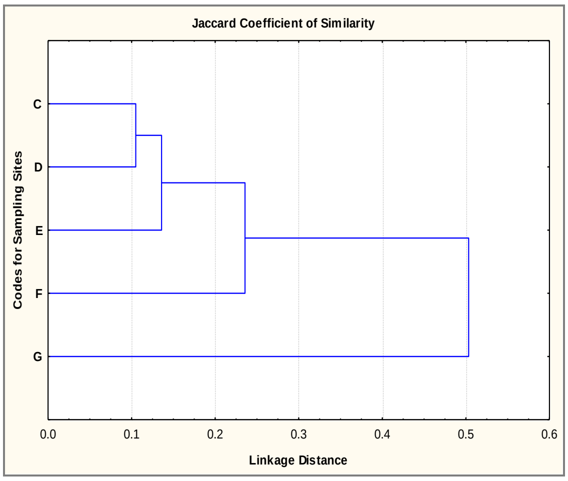
3rd Monitoring, October, 2014



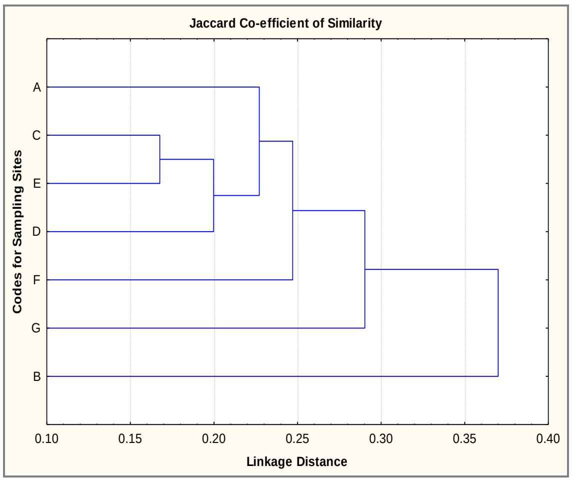
4th Monitoring, January 2015



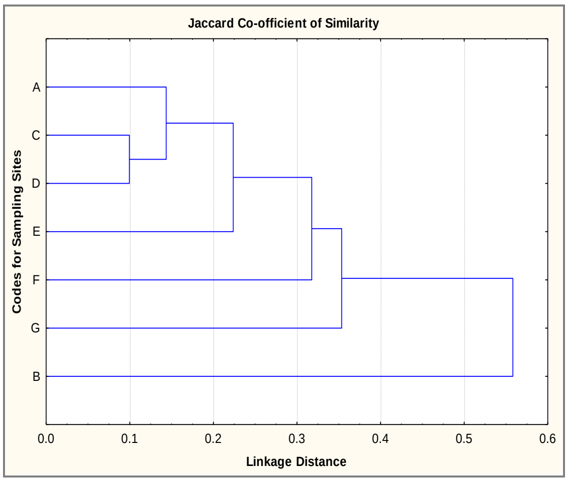
5th Monitoring, April, 2015



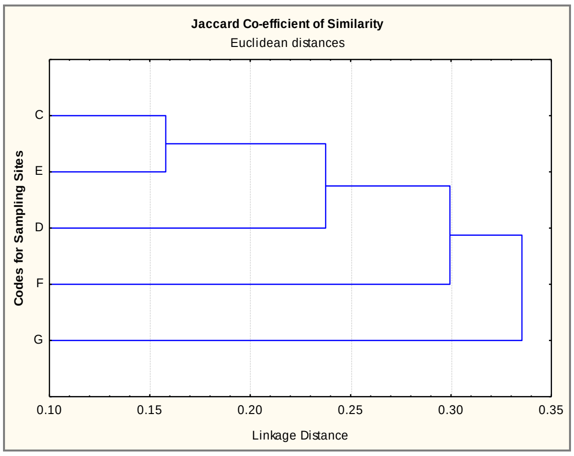
6th Monitoring, August, 2015



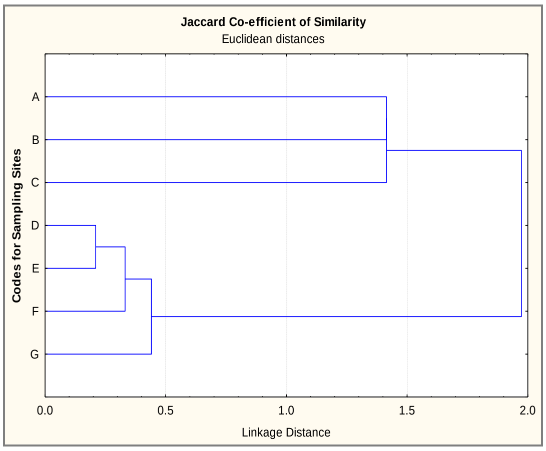
7th Monitoring, October, 2015



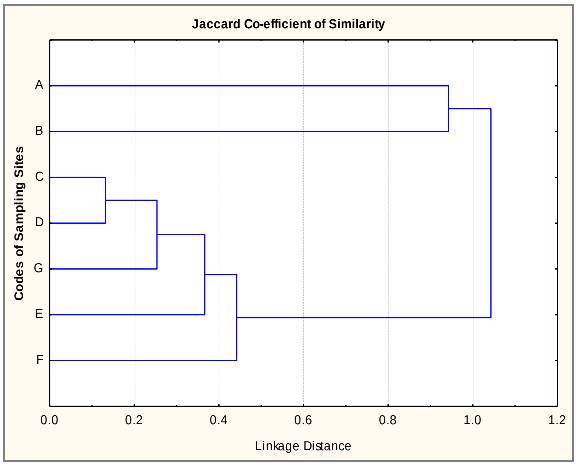
8th Monitoring, January, 2016



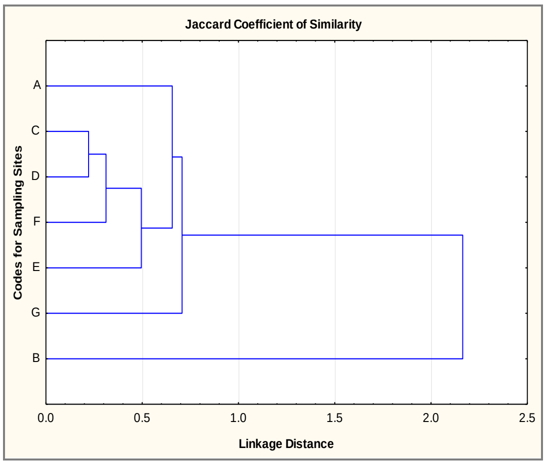
9th Monitoring, April, 2016



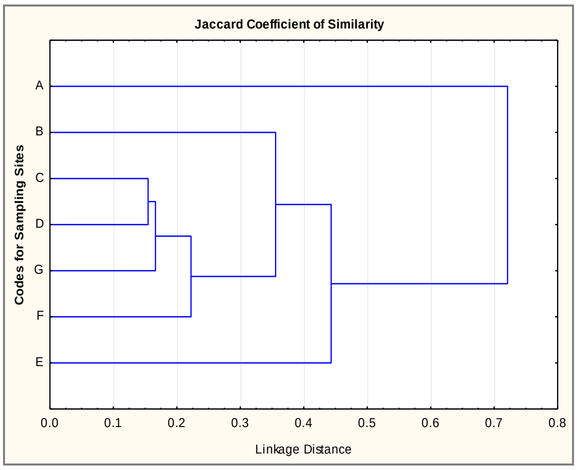
10th Monitoring, July, 2016



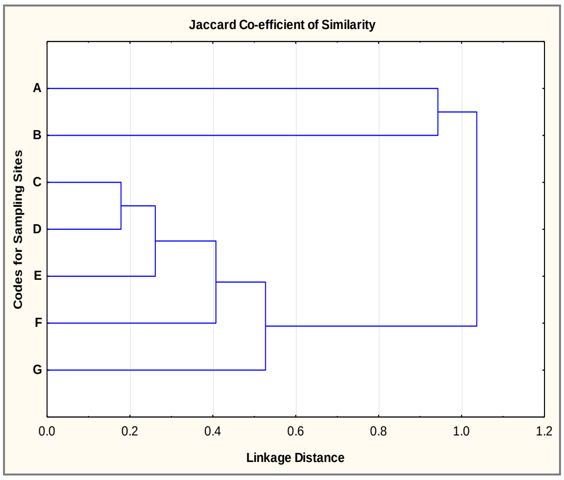
11th Monitoring, October, 2016



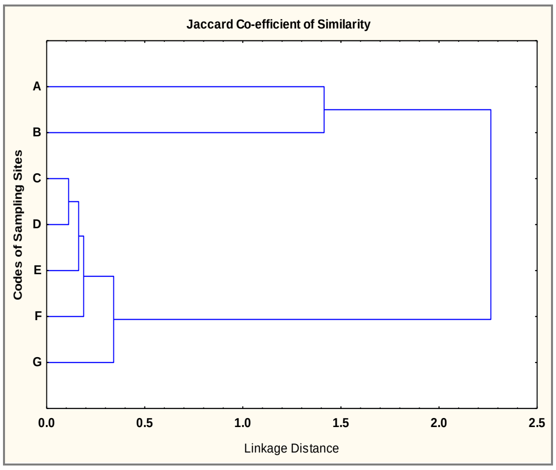
12th Monitoring, January, 2017



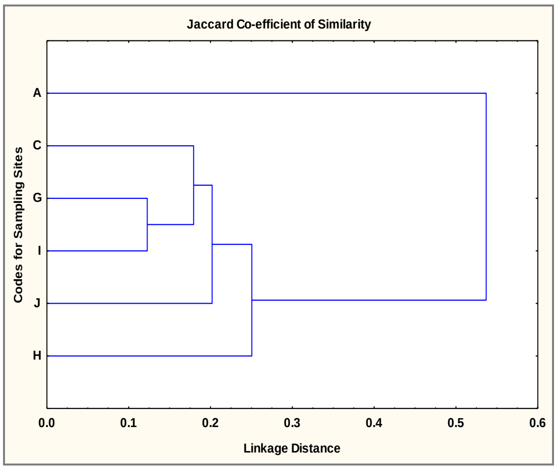
13th Monitoring, April, 2017



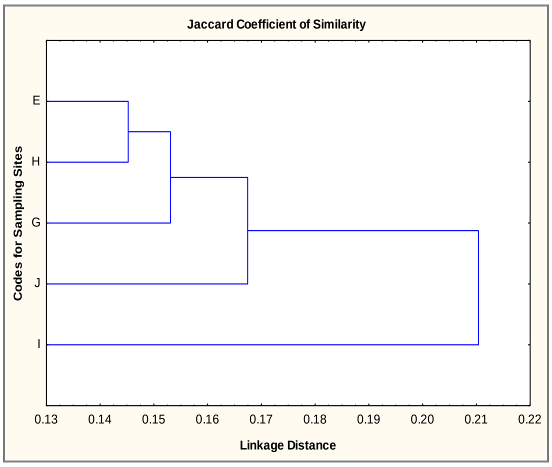
14th Monitoring, October, 2017



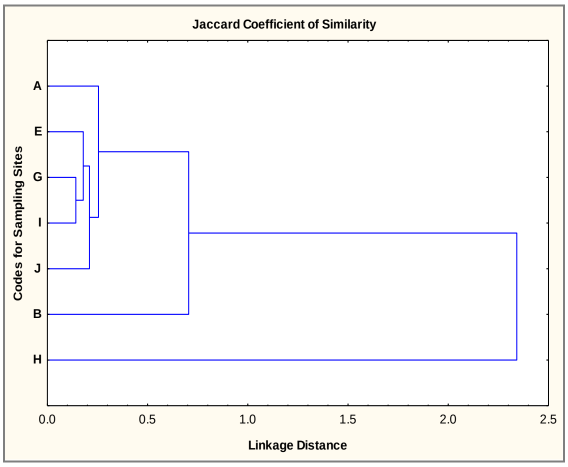
15th Monitoring, January, 2018



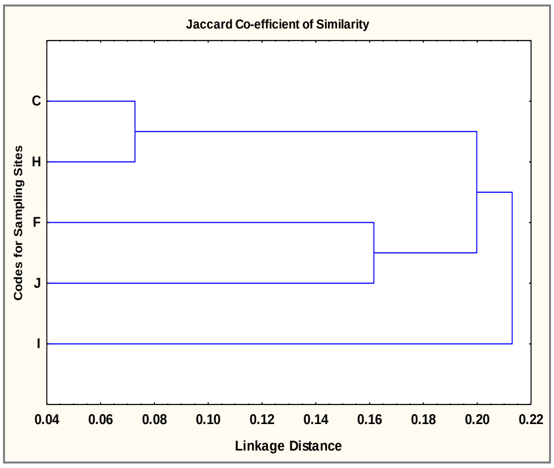
16th Monitoring, April, 2018



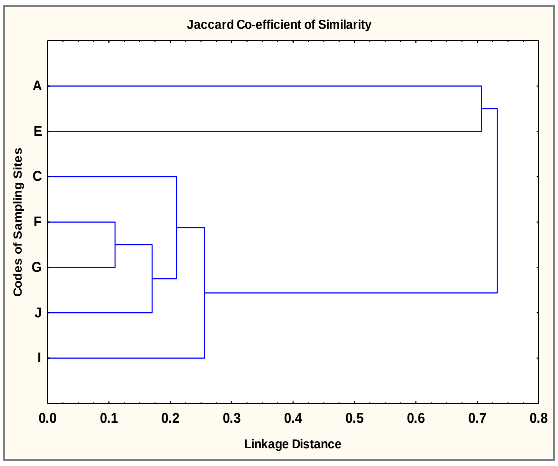
17th Monitoring, July, 2018



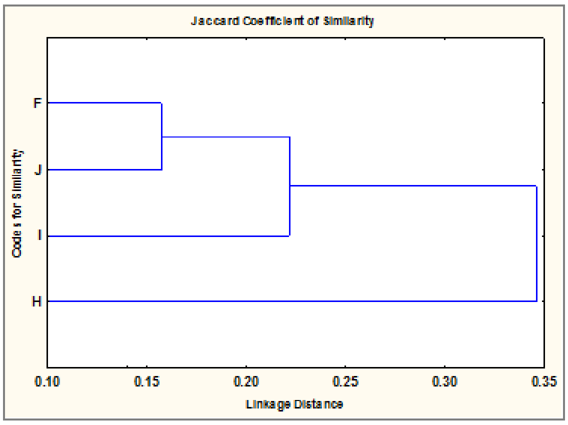
18th Monitoring, November, 2018



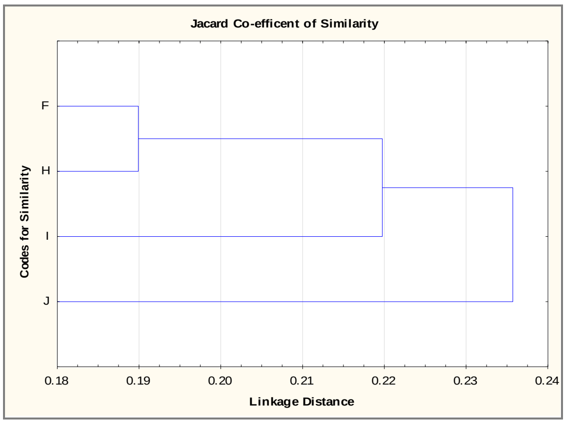
19th Monitoring, February, 2019



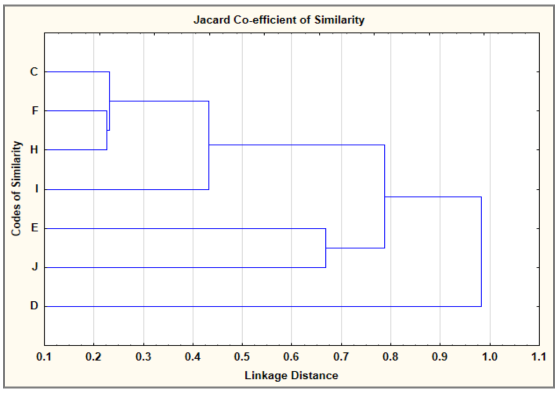
20th Monitoring, April, 2019



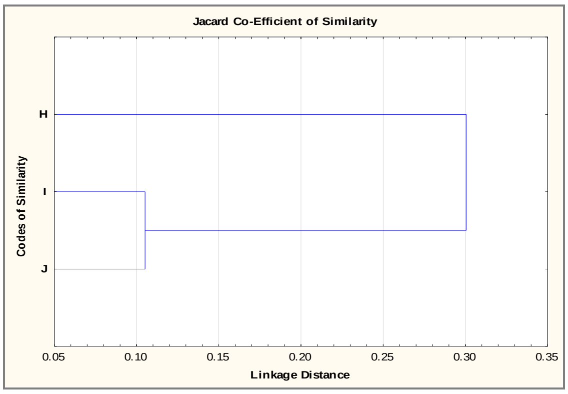
21st Monitoring, July 2019



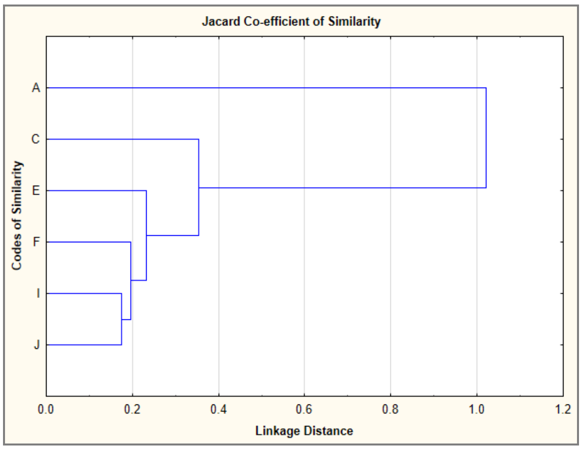
22nd Monitoring, November 2019



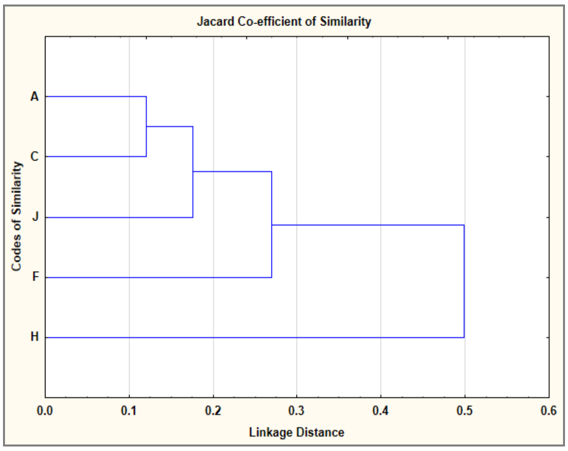
23rd Monitoring, February 2020



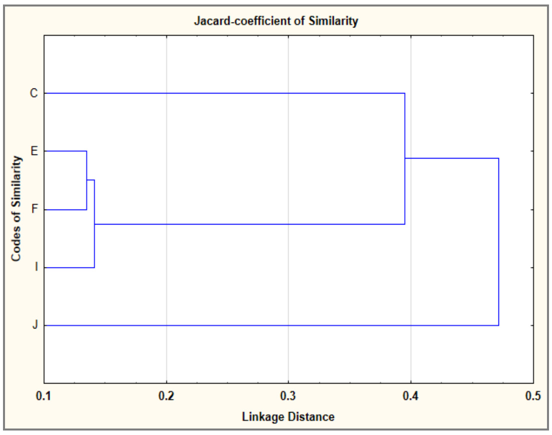
25th Monitoring, July 2020



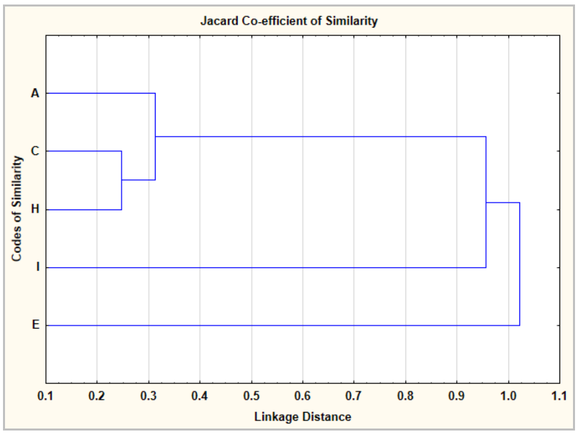
26th Monitoring, November, 2020



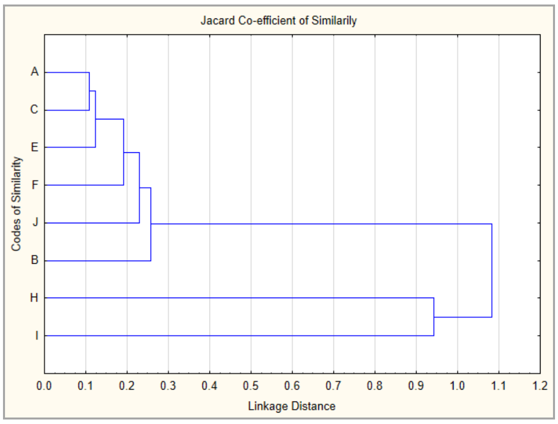
27th Monitoring, January, 2021



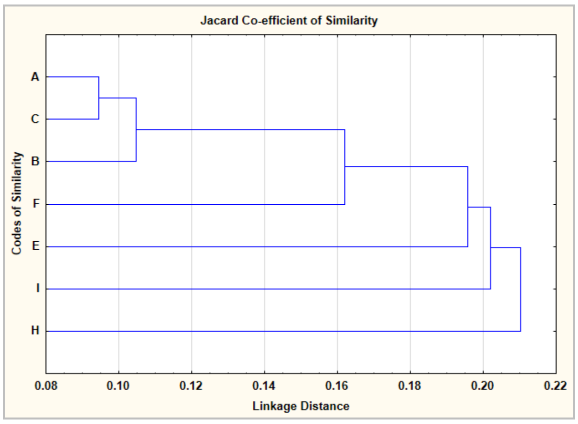
28th monitoring, April, 2021



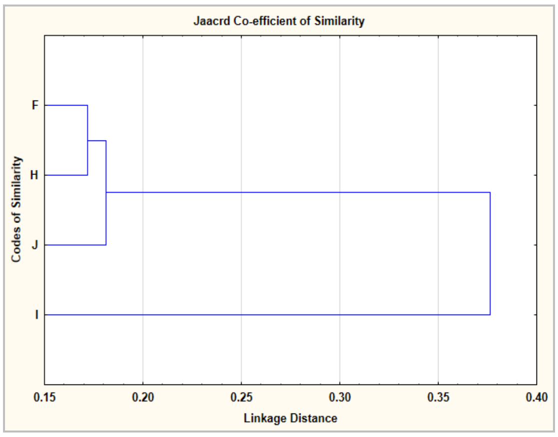
29th monitoring, August, 2021



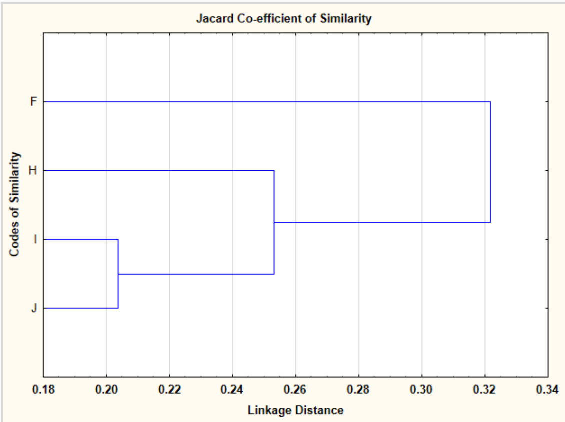
30th Monitoring, November 2021



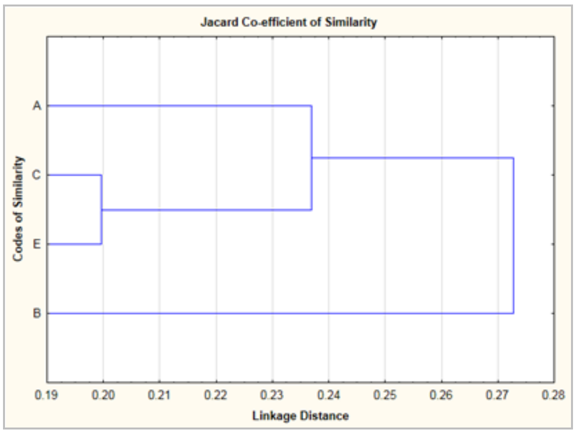
31st Monitoring, February, 2022



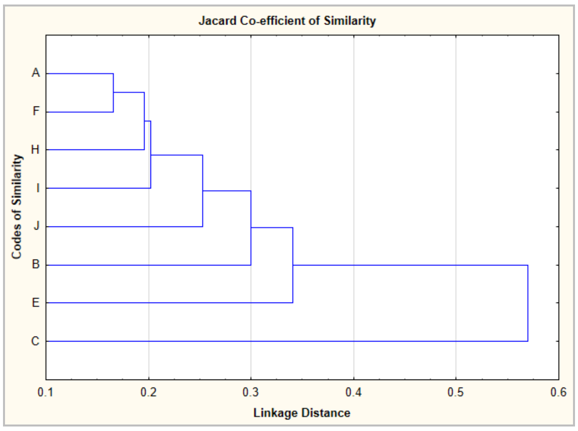
32nd Monitoring, May 2022



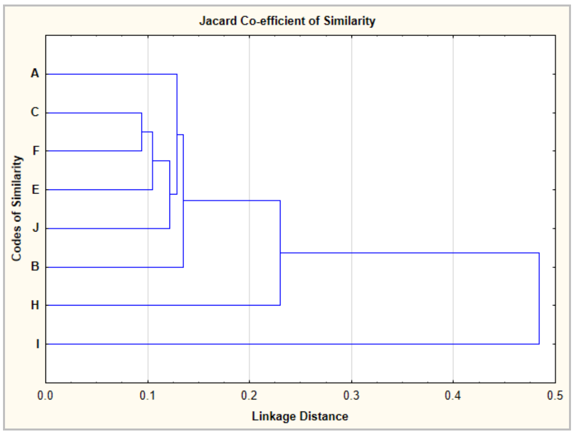
33rd Monitoring, July 2022



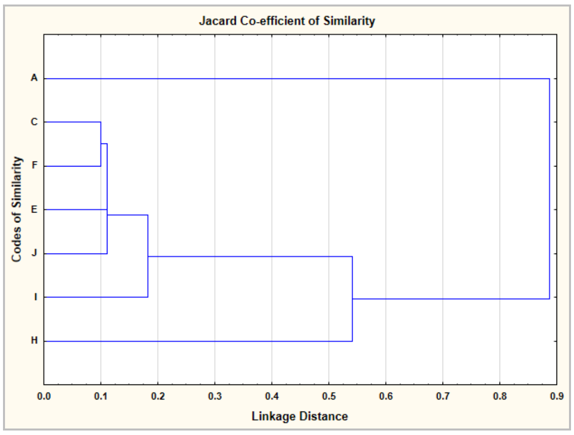
34th Monitoring, Oct 2022



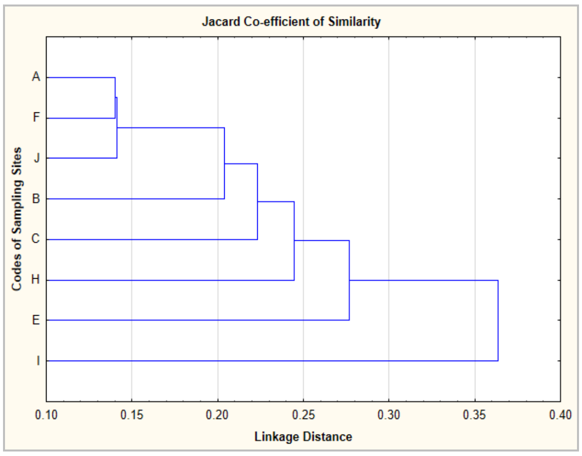
35th Monitoring, Feb 2023



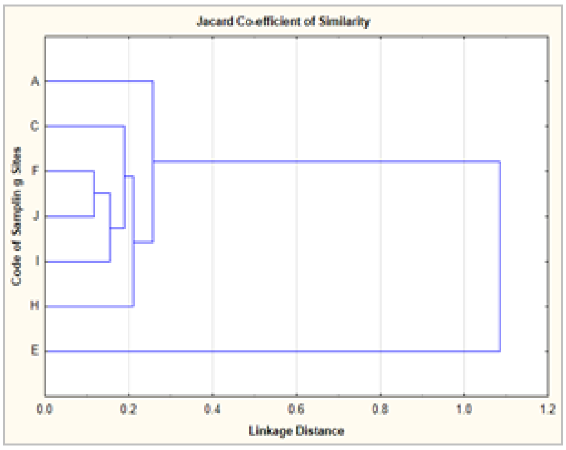
36th Monitoring, May 2023



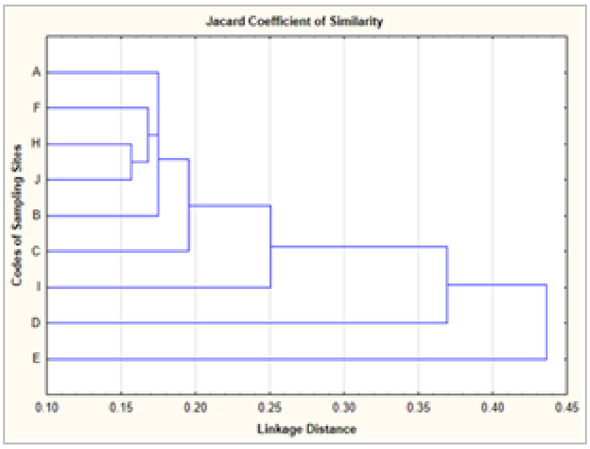
37th Monitoring, September 2023



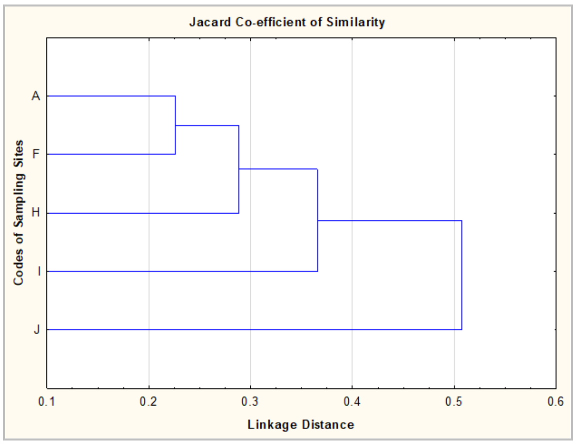
38th Monitoring, November 2023



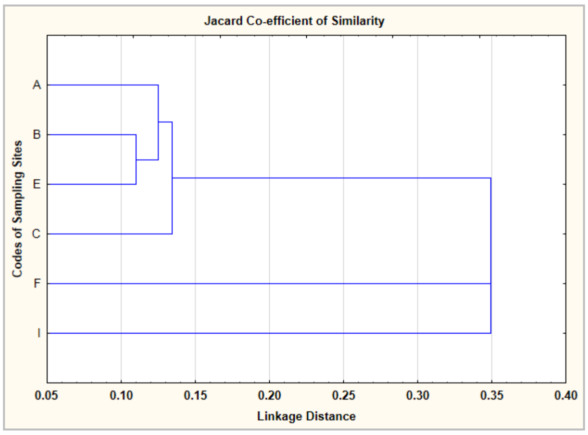
39th Monitoring, February 2024



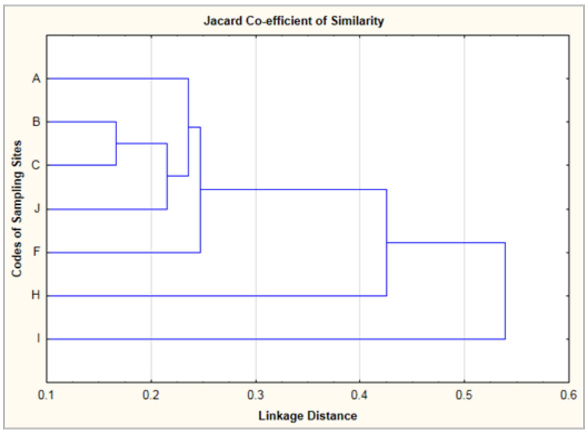
40th QM May 2024



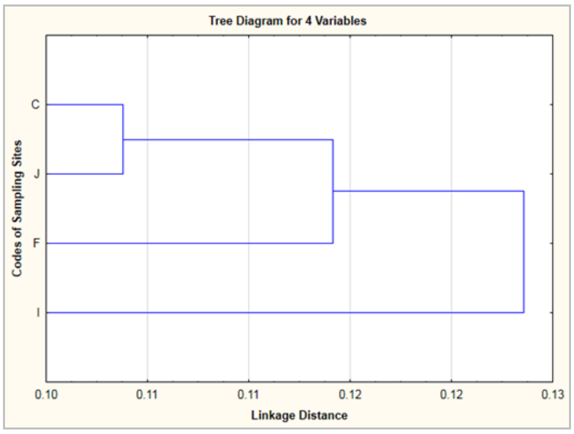
41st QM August 2024



42nd QM Nov 2024

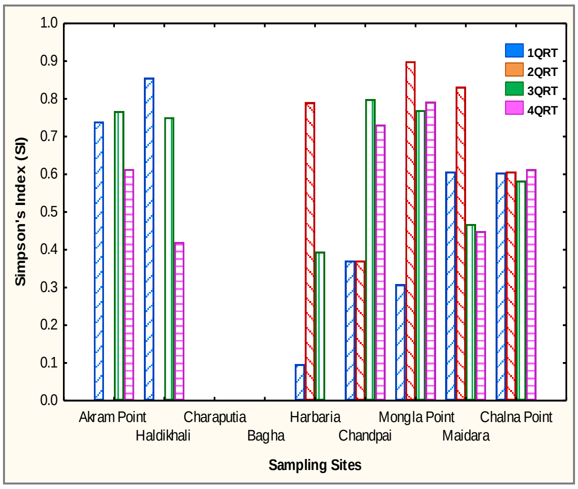


43rd QM Feb 2025

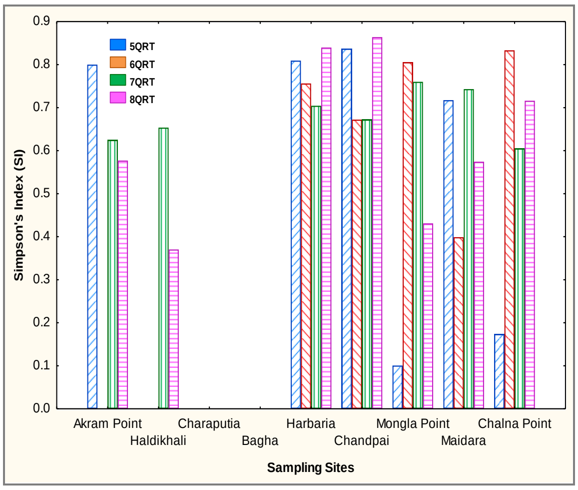


44th QM April 2025

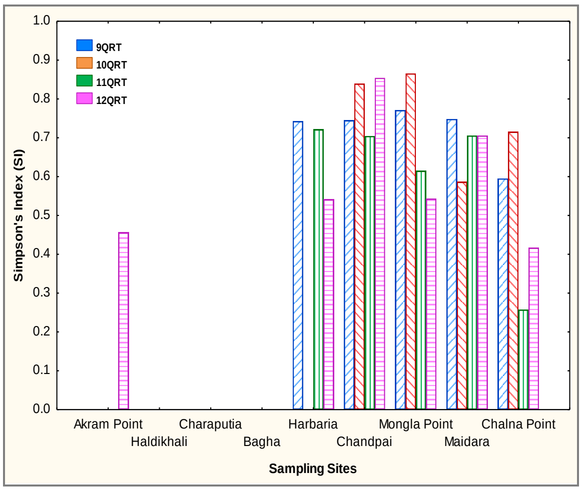
Figure D3: Site-wise fish species richness (FSR) in the Passur River System



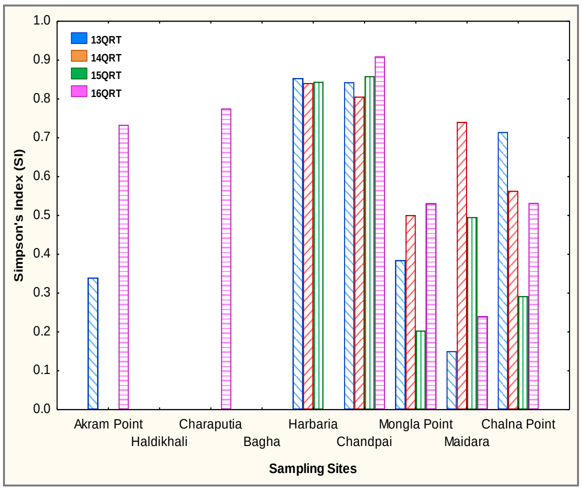
2014-2015



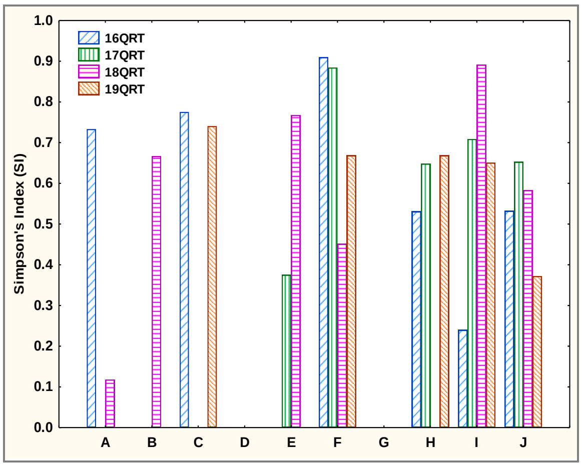
2015-2016



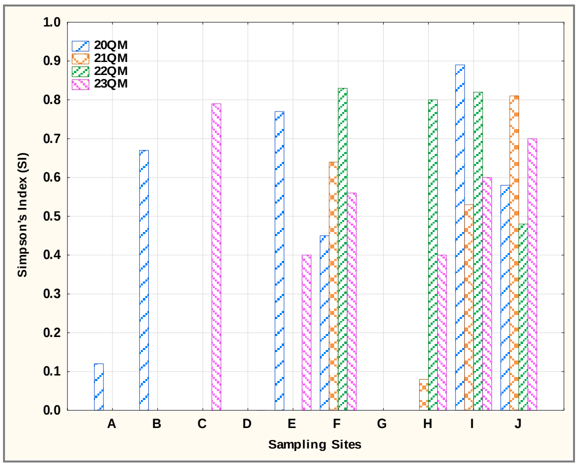
2016-2017



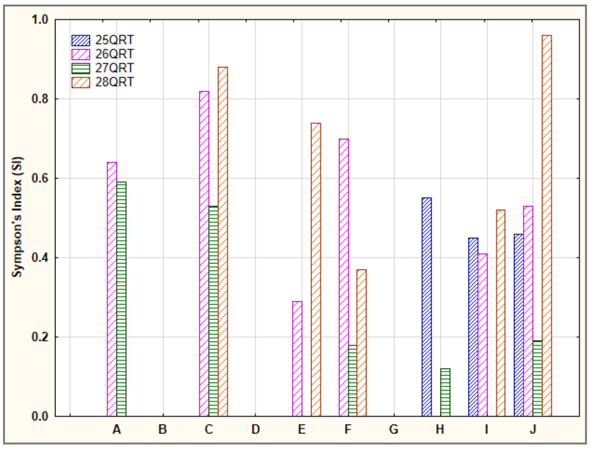
2017-18



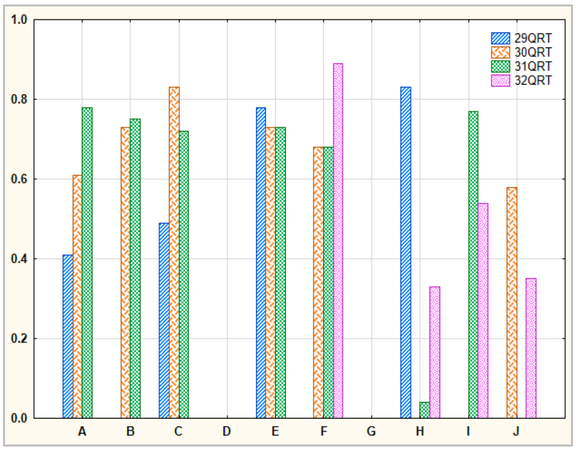
2018-19



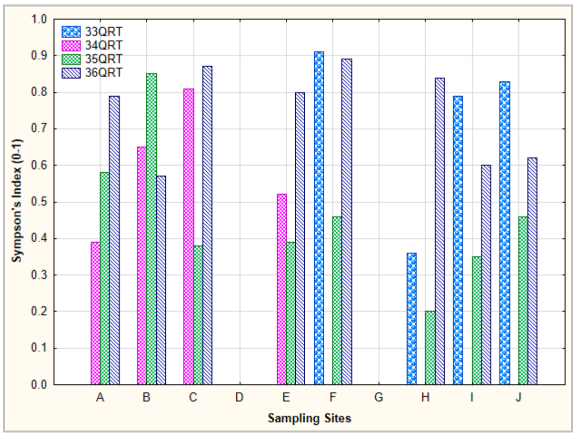
2019-20



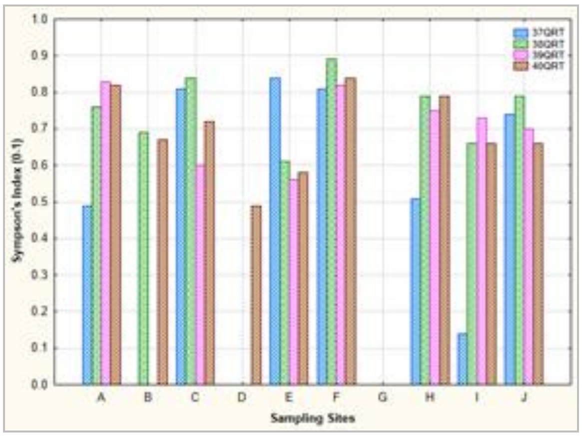
2020-21



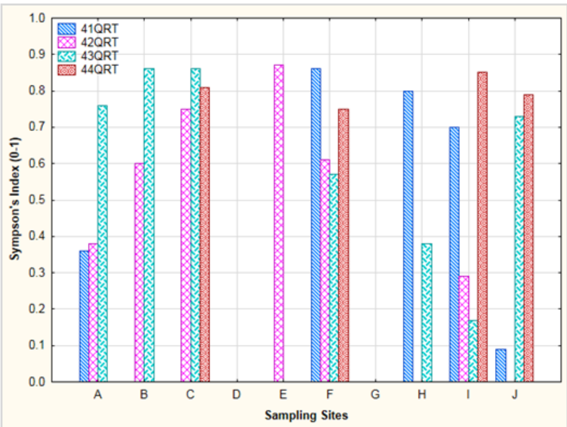
2021-2022



2022-23

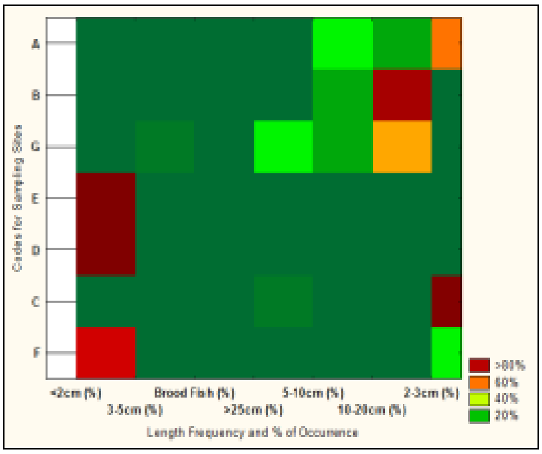


2023-2024

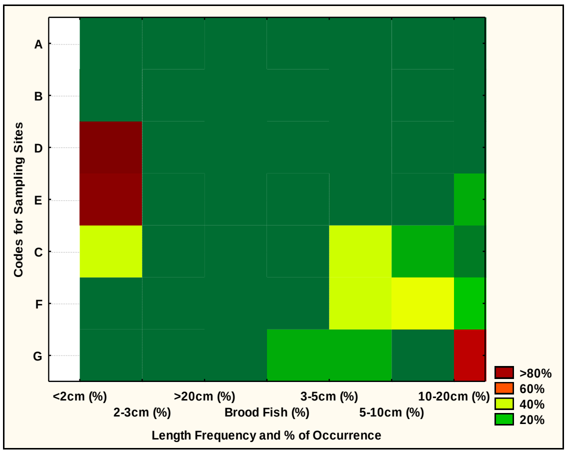


2024-2025

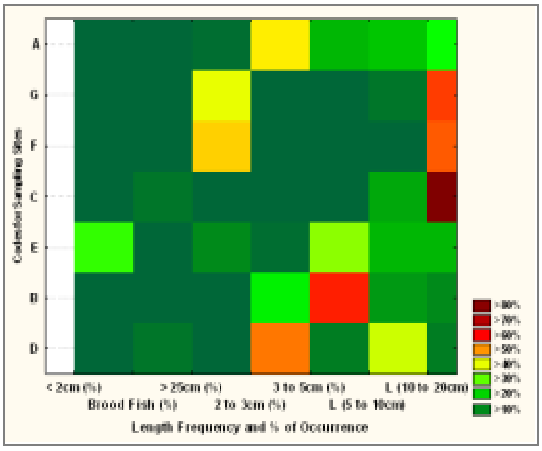
Figure D4: Fish Community Structure



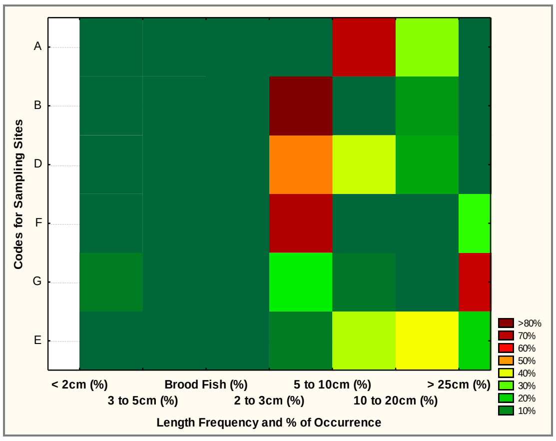
1st Monitoring, April, 2014



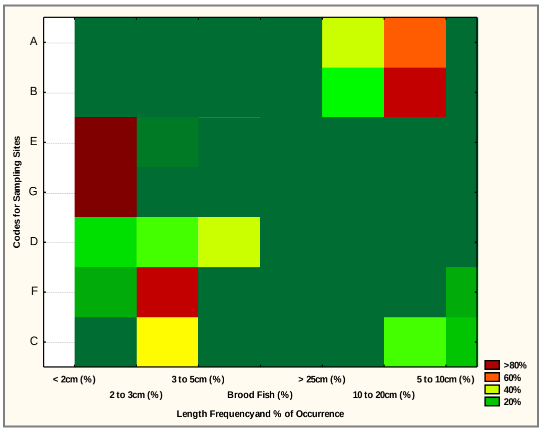
2nd Monitoring, July 2014



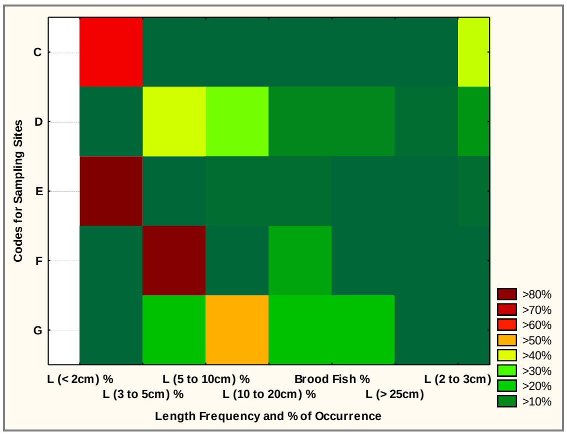
3rd Monitoring, October, 2014



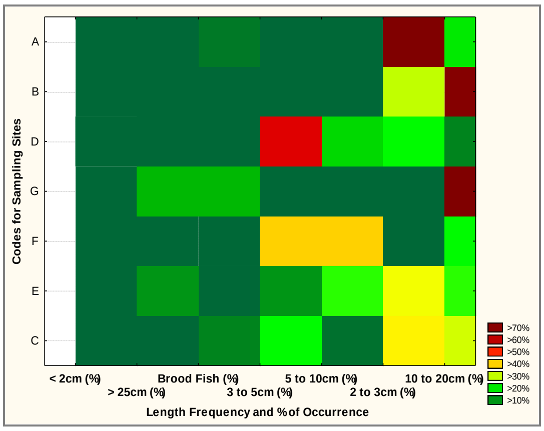
4th Monitoring, January 2015



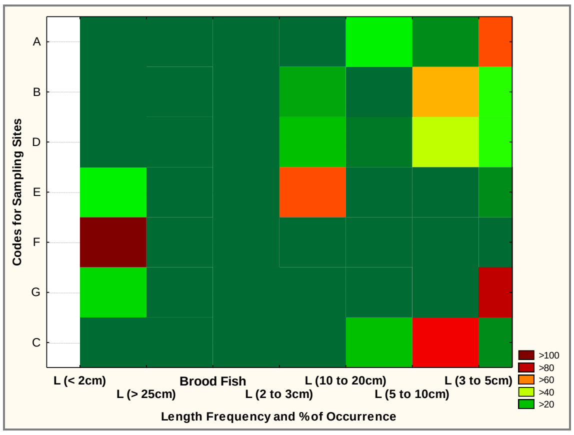
5th Monitoring, April, 2015



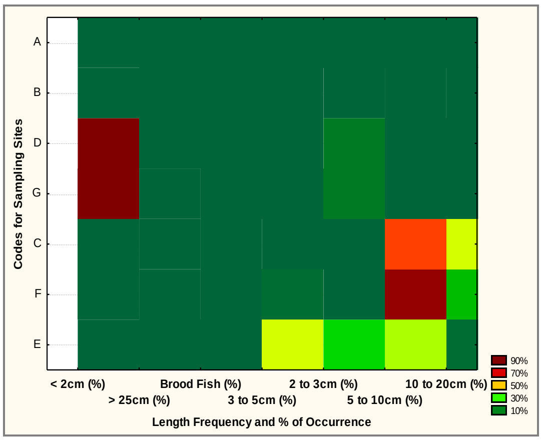
6th Monitoring, August, 2015



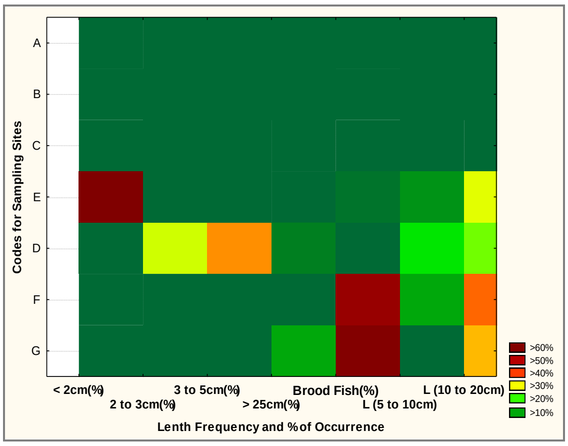
7th Monitoring, October, 2015



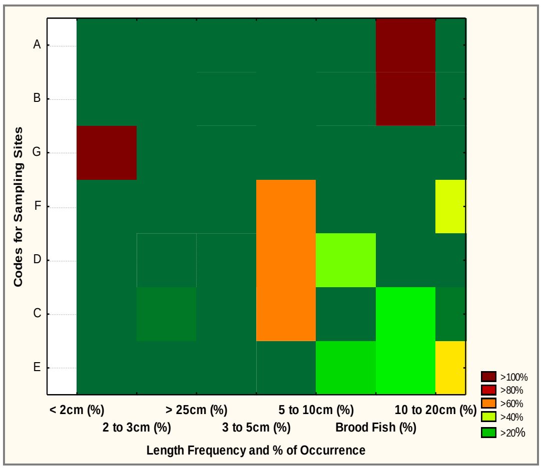
8th Monitoring, January, 2016



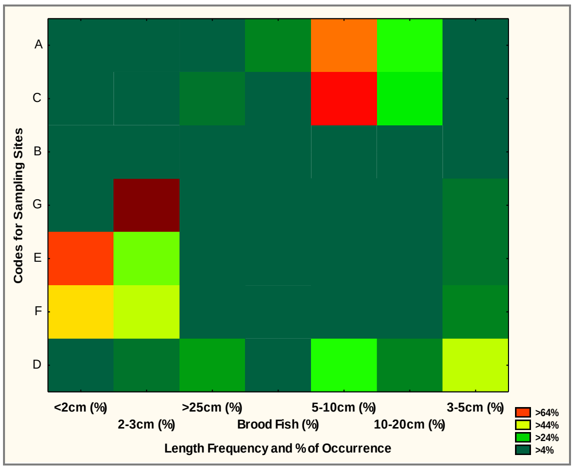
9th Monitoring, April, 2016



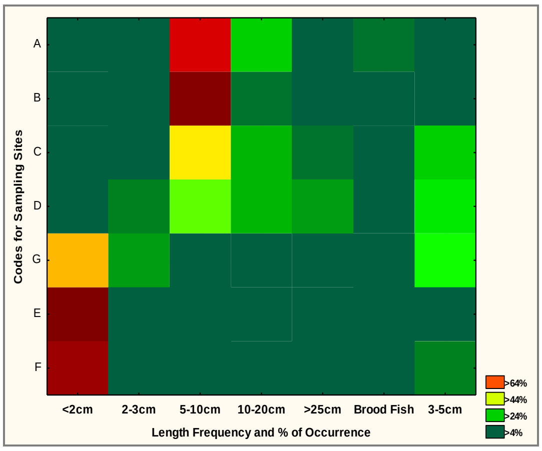
10th Monitoring, July, 2016



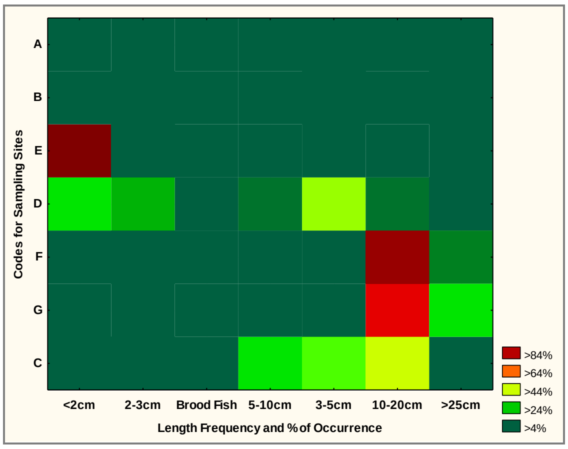
11th Monitoring, October, 2016



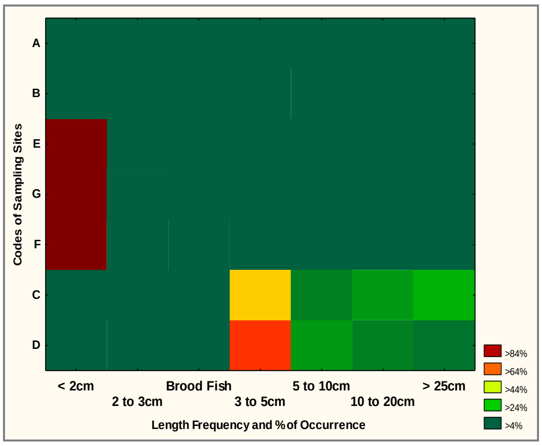
12th Monitoring, January, 2017



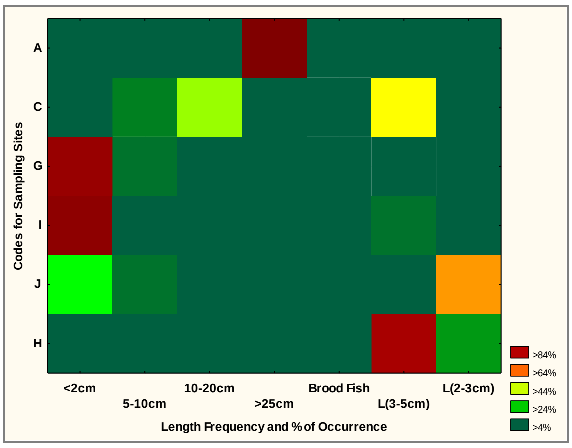
13th Monitoring, April, 2017



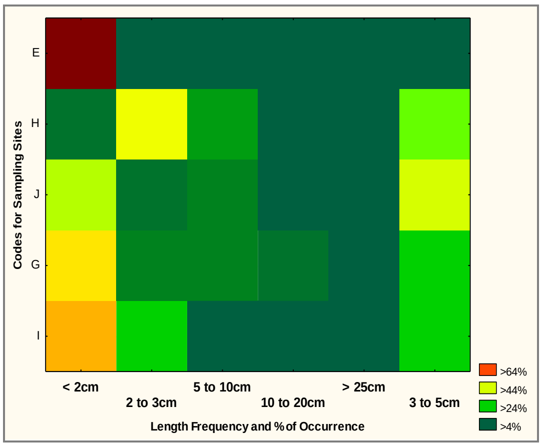
14th Monitoring, October, 2017



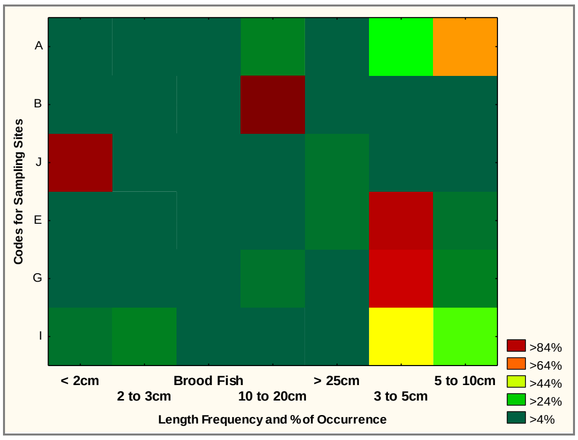
15th Monitoring, January, 2018



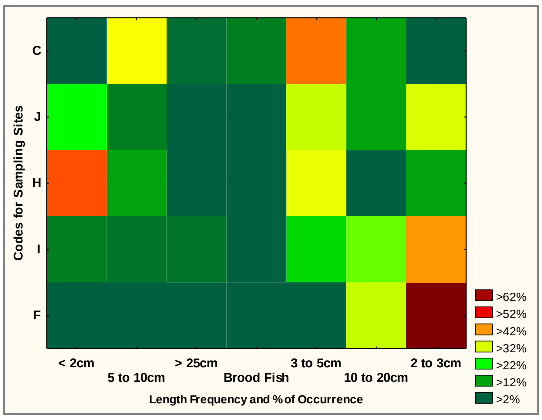
16th Monitoring, April, 2018



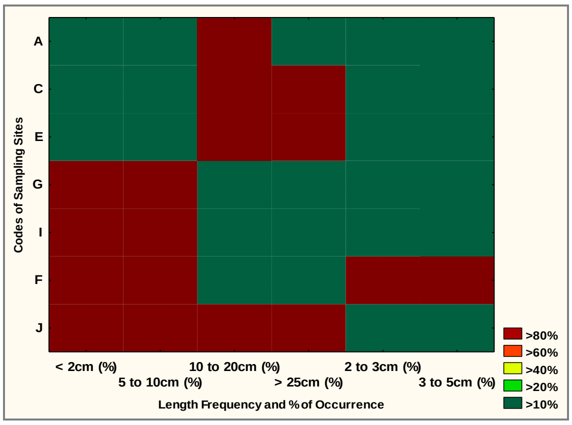
17th Monitoring, July, 2018



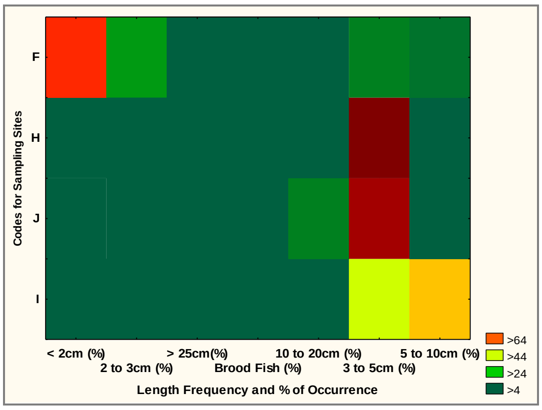
18th Monitoring, November, 2018



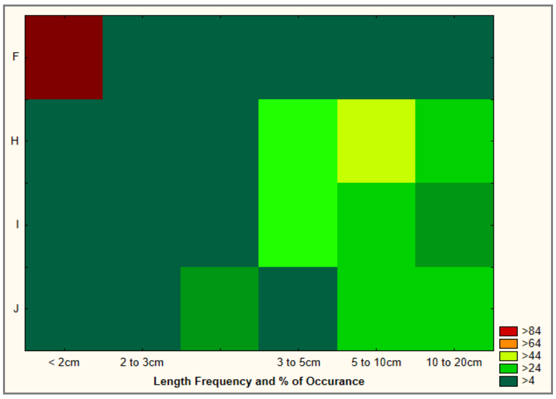
19th Monitoring, February, 2019



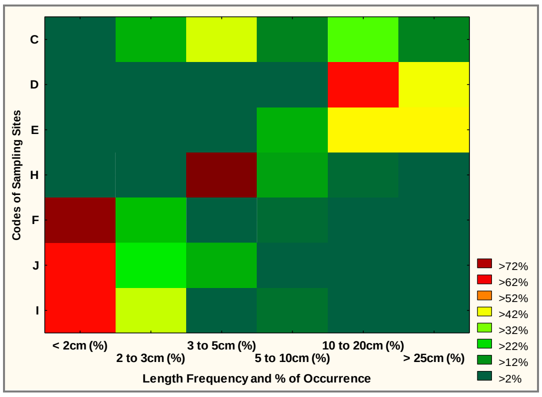
20th Monitoring, April, 2019



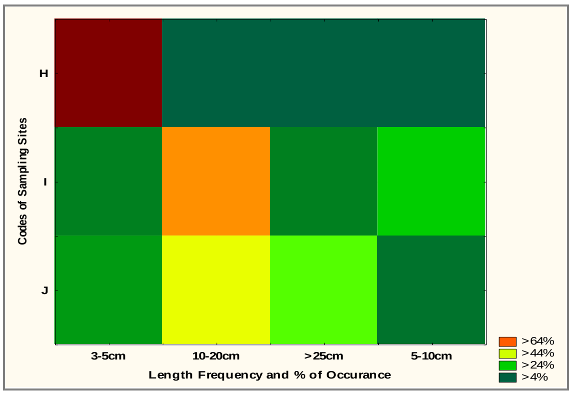
21st Monitoring, July 2019



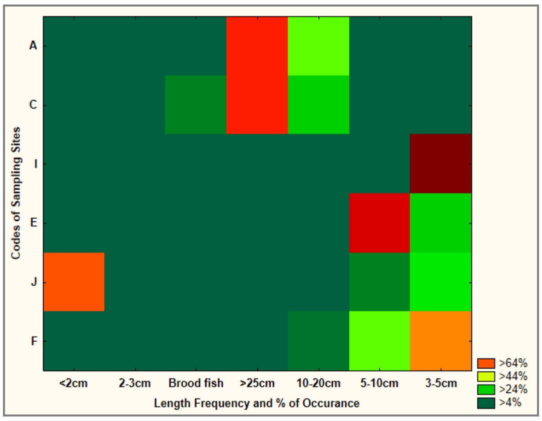
22nd Monitoring, November 2019



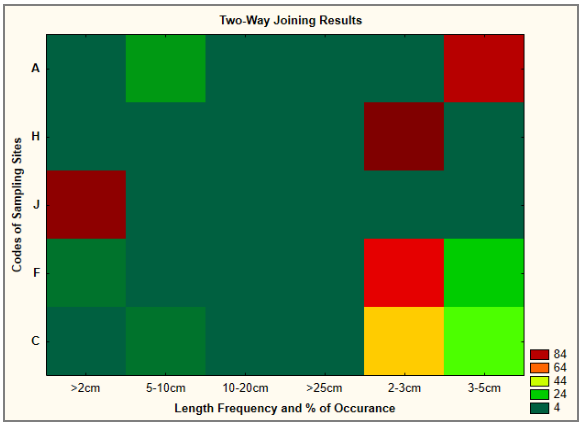
23rd Monitoring, February 2020



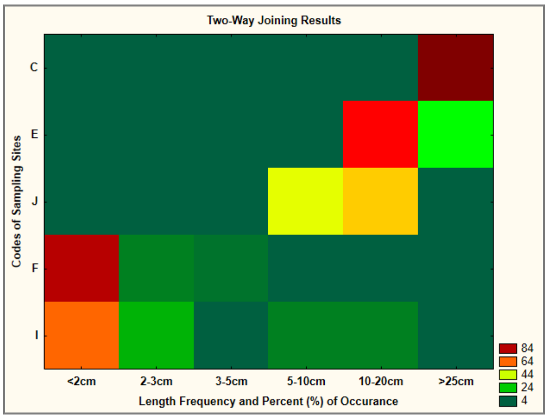
25th Monitoring, July 2020



26th Monitoring, November 2021

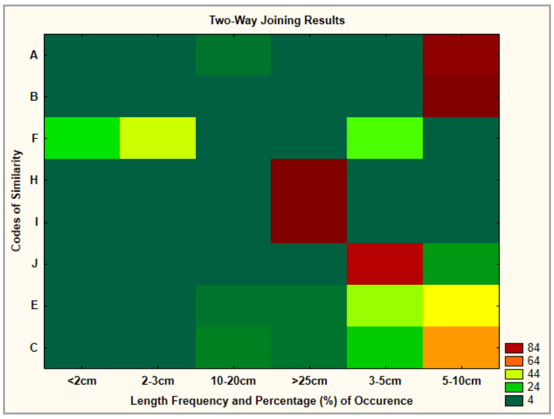


27th Monitoring, January, 2021

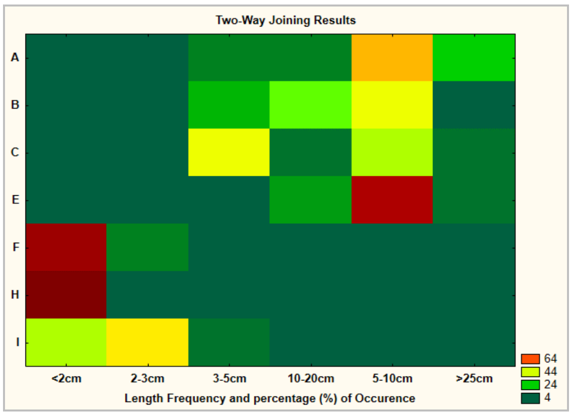


28th monitoring, April, 2021

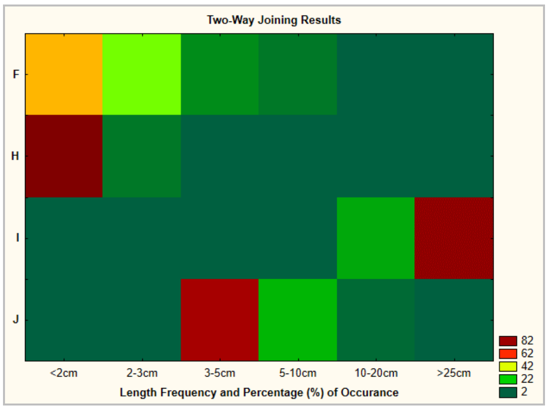
29th monitoring, August, 2021



30th Monitoring, November, 2021

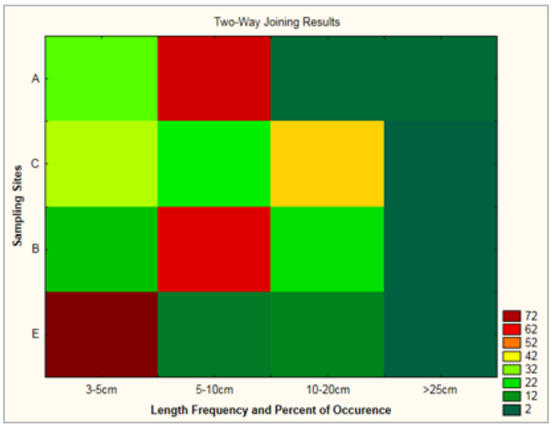


31st Monitoring, February, 2022



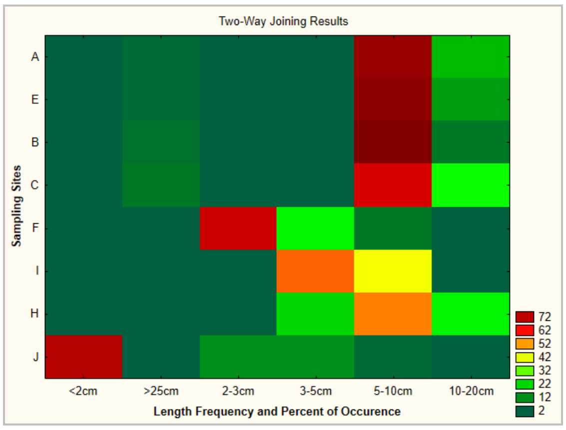
32nd Monitoring, May 2022

33rd Monitoring, July 2022

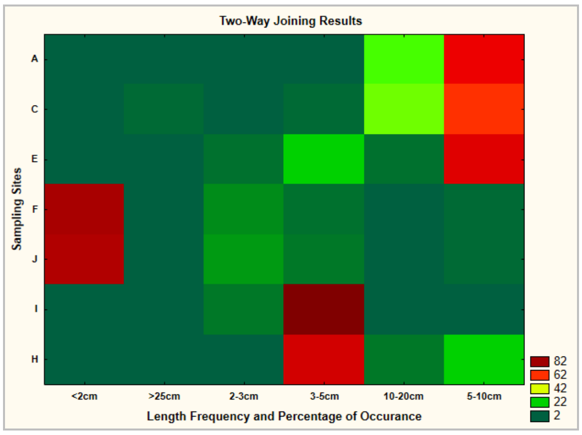


34th Monitoring, Oct 2022

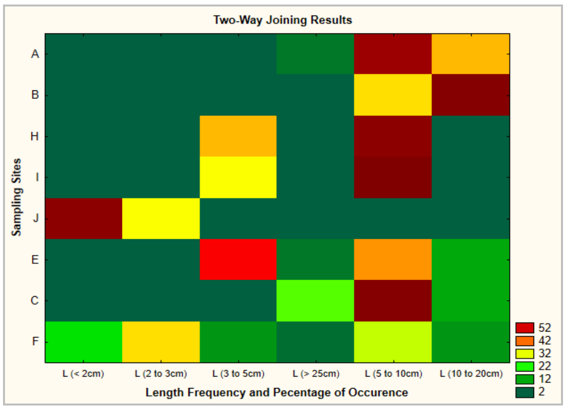
35th Monitoring, Feb 2023



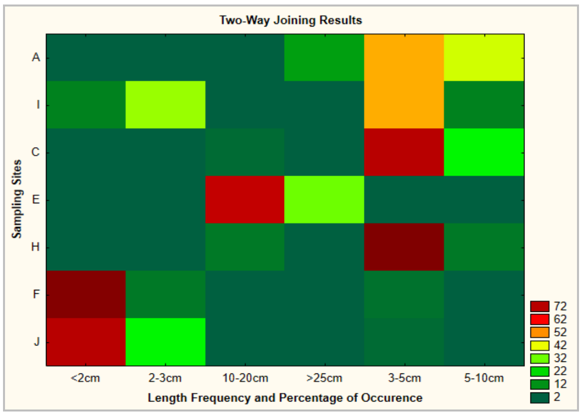
36th Monitoring, May 2023



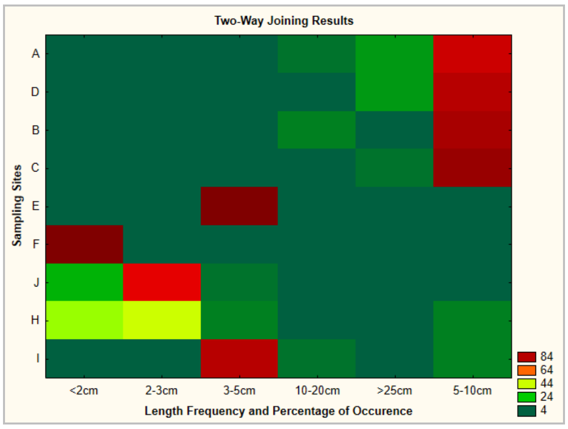
37th Monitoring, September 2023



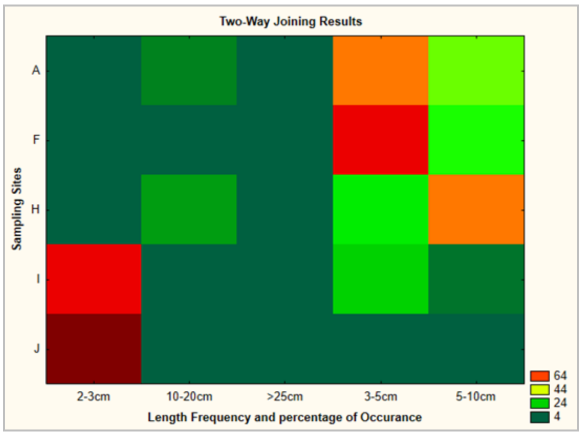
38th Monitoring, November 2023



39th Monitoring, February 2024



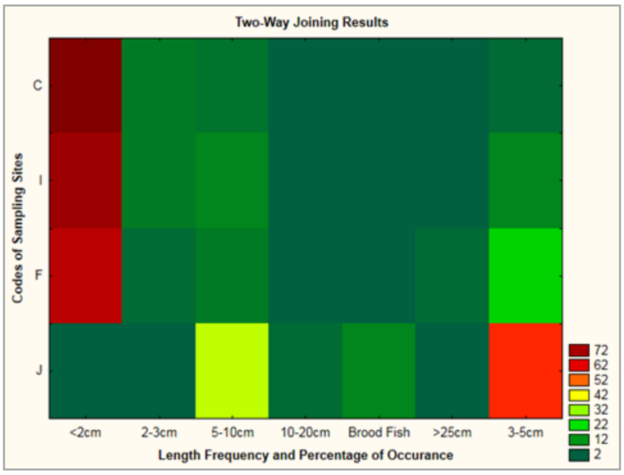
40th Monitoring, May 2024



41st Monitoring, July 2024

42nd Monitoring, Nov 2024

43rd Monitoring, Feb 2025



44th Monitoring, April 2025

Source: CEGIS Field Survey, 2019-20, 2020-21, 2021-22, 2022-23, 2023-2024, and 2024-2025

Table D.1: Site Wise Species Diversity using Shannon–Weiner Index (1st to 42nd QM)

Quarters	Species Number										Shannon-Weiner Index									
Sites	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
1st QM	33	12	2	12	7	3	6	-	-	-	0.5	0.9	0.3	0.3	0.4	0.8	0.7	-	-	-
2nd QM	-	-	12	22	13	13	3	-	-	-	-	-	0.77	0.78	0.6	0.77	0.82	-	-	-
3rd QM	13	24	9	15	10	6	5	-	-	-	0.7	0.6	0.4	0.7	0.8	0.5	0.7	-	-	-
4th QM	7	14	-	26	11	4	7	-	-	-	0.6	0.4	-	0.5	0.8	0.6	0.7	-	-	-
5th QM	3	-	11	27	6	10	18	-	-	-	1	-	0.8	0.7	0.2	0.7	0.2	-	-	-
6th QM	-	-	26	24	16	8	3	-	-	-	-	-	0.6	0.7	0.7	0.4	1	-	-	-
7th QM	10	11	18	20	9	14	8	-	-	-	0.6	0.6	0.5	0.5	0.9	0.8	0.7	-	-	-
8th QM	15	3	24	25	9	6	6	-	-	-	0.4	0.6	0.7	0.7	0.4	0.7	0.8	-	-	-
9th QM	-	-	17	8	15	7	6	-	-	-	-	-	0.6	0.6	0.7	0.8	0.6	-	-	-
10th QM	-	-	-	19	12	5	4	-	-	-	-	-	-	0.6	0.5	0.7	0.9	-	-	-
11th QM	1	1	23	32	5	7	12	-	-	-	-	-	0.6	0.6	0.7	0.9	0.2	-	-	-
12th QM	2	-	10	27	4	12	3	-	-	-	0.9	-	0.6	0.8	0.7	0.9	0.7	-	-	-
13th QM	2	5	18	15	4	9	15	-	-	-	0.74	0.37	0.79	0.76	0.51	0.53	0.67	-	-	-
14th QM	-	-	-	-	-	6	81	112	3	4	-	-	-	-	-	0.85	0.62	0.54	0.88	0.78
15th QM	-	-	-	-	-	17	29	13	13	5	-	-	-	-	-	0.81	0.74	0.21	0.33	0.32
16th QM	3	-	12	-	-	-	21	3	12	10	0.92	-	0.69	-	-	-	0.78	0.55	0.21	0.54
17th QM	-	-	-	-	-	-	16	18	10	14	-	-	-	-	0.31	-	0.85	0.49	0.65	0.52
18th QM	8	2	-	-	12	-	19	2	17	11	0.16	0.92	-	-	0.73	-	0.34	-	0.85	0.52
19th QM	-	-	24	-	-	13	-	13	11	11	-	-	0.53	-	-	0.56	-	0.4	0.61	0.29
20th QM	2	-	11	-	2	22	26	-	8	12	0.65	-	0.86	-	0.99	0.74	0.58	-	0.14	0.5
21st QM	-	-	-	-	-	19	-	5	9	14	-	-	-	-	-	0.5	-	0.14	0.52	0.71
22nd QM	-	-	-	-	-	11	-	11	11	9	-	-	-	-	-	0.81	-	0.76	0.8	0.5
23rd QM	-	-	10	1	2	11	-	10	12	8	-	-	0.78	-	0.72	0.56	-	0.4	0.54	0.64
25th QM	-	-	-	-	-	-	-	11	6	15	-	-	-	-	-	-	-	0.55	0.45	0.46
26th QM	7	-	4	-	9	12	-	-	16	11	0.64	-	0.82	-	0.29	0.7	-	-	0.41	0.53
27th QM	18	-	28	-	-	7	-	3	-	12	0.59	-	0.53	-	-	0.18	-	0.12	-	0.19
28th QM	-	-	4	-	3	20	-	-	18	4	-	-	0.88	-	0.74	0.37	-	-	0.52	0.96
29th QM	6	-	10	-	13	-	-	9	1	-	0.49	-	0.82	-	0.79	-	-	0.85	-	-
30th QM	20	7	34	-	25	10	-	1	1	8	0.61	0.73	0.83	-	0.73	0.68	-	-	-	0.58

Quarters	Species Number										Shannon-Weiner Index									
Sites	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
31st QM	25	25	33	-	12	13	-	11	12	-	0.5	0.52	0.54	-	0.71	0.59	-	0.06	0.67	-
32nd QM	-	-	-	-	-	19	-	13	4	10	-	-	-	-	-	0.84	-	0.31	0.69	0.37
33rd QM	-	-	-	-	-	6	-	8	11	13	-	-	-	-	-	0.91	-	0.36	0.79	0.83
34th QM	11	7	13	-	12	-	-	-	-	-	0.39	0.65	0.81	-	0.52	-	-	-	-	-
35th QM	13	7	3	-	7	20	-	12	12	7	0.58	0.3	0.38	-	0.39	0.46	-	0.2	0.35	0.46
36th QM	20	18	5	-	23	22	-	9	4	20	0.69	0.47	0.73	-	0.66	0.75	-	0.9	0.75	0.48
37th QM	9	-	32	-	20	23	-	3	11	20	0.48	-	0.6	-	0.85	0.75	-	0.81	0.73	0.69
38th QM	16	10	9	-	7	31	-	8	5	13	0.91	0.6	0.85	-	0.66	0.75	-	0.81	0.73	0.69
39th QM	8	-	12	-	3	22	-	11	14	24	0.88	-	0.46	-	0.81	0.64	-	0.71	0.66	0.53
40th QM	13	12	9	4	10	14	-	16	8	16	0.76	0.53	0.73	0.65	0.51	0.78	-	0.65	0.69	0.55
41st QM	9	-	-	-	-	13	-	7	5	3	0.36	-	-	-	-	0.84	-	0.88	0.83	0.18
42nd QM	16	20	9	-	26	5	-	-	5	-	0.35	0.45	0.62		0.72	0.67		-	0.4	-
43rd QM	10	13	26	-	-	9	-	4	3	15	0.75	0.84	0.64	-	-	0.51	-	0.53	0.31	0.55
44th QM	-	-	9	-	-	20	-	-	18	15	-	-	0.61	-	-	0.54	-	-	0.65	0.67

**According to Shannon-Weiner Index, 0-0.30: Low diversity/equally distribution (VH); 0.31-0.50: Moderate Diversity (M); 0.51-0.80: High Diversity (HD) and 0.80-1.0: Very High Diversity (VHD)*

Table D.2: Site wise Rich Species Number (1st to 42nd QM)

Fiscal Year	Monitoring Quarters	Sampling Sites									
		A	B	C	D	E	F	G	H	I	J
2014-15	1st QM	4	7	1	2	1	3	3	-	-	-
	2nd QM	0	0	5	2	10	6	3	-	-	-
	3rd QM	4	4	2	5	4	2	2	-	-	-
	4th QM	3	2	0	4	5	2	3	-	-	-
2015-16	5th QM	3	0	4	5	3	4	1	-	-	-
	6th QM	-	-	4	8	6	2	3	-	-	-
	7th QM	3	3	3	3	4	4	3	-	-	-
	8th QM	2	2	6	7	2	2	4	-	-	-
2016-17	9th QM	0	0	4	4	4	3	2	-	-	-
	10th QM	0	0	0	6	7	2	4	-	-	-
	11th QM	1	1	4	3	3	3	1	-	-	-
	12th QM	2	0	2	7	2	3	2	-	-	-
2017-18	13th QM	2	1	-	-	7	6	-	2	1	4
	14th QM	-	-	-	-	6	5	-	2	3	2
	15th QM	-	-	-	-	6	7	-	1	2	1
2018-19	16th QM	4	-	4	-	-	11	-	2	1	2
	17th QM	-	-	-	-	2	9	-	3	3	3
	18th QM	1	3	-	-	4	2	-	-	9	2
	19th QM	-	-	4	-	-	3	-	3	3	2
2019-20	20th QM	2	-	7	-	2	7	3	-	1	2
	21st QM	-	-	-	-	-	4	-	1	1	3
	22thQM	-	-	-	-	-	6	-	5	6	2
	23rd QM	-	-	5	1	2	2	-	2	3	3
2020-21	25th QM	-	-	-	-	-	-	-	3	2	2
	26th QM	2	-	3	-	1	4	-	-	3	3
	27th QM	4	-	3	-	-	1	-	1	-	1
	28th QM	-	-	2	-	2	2	-	-	3	2
2021-22	29th QM	1	-	2	-	4	-	-	3	1	-
	30th QM	3	4	6	-	4	3	-	-	1	2
	31st QM	5	4	4	-	4	5	-	3	4	-
	32th QM	-	-	-	-	-	9	-	1	2	2
2022-23	33rd QM	-	-	-	-	-	5	-	2	4	5
	34th QM	2	3	6	-	2	-	-	-	-	-
	35th QM	3	1	1	-	2	3	-	1	2	2
	36th QM	5	2	8	-	5	9	-	6	2	3
2023-24	37th QM	2	-	5	-	6	5	-	2	1	4
	38th QM	4	-	5	-	3	9	-	5	3	5
	39th QM	6	-	3	-	2	6	-	4	4	3
	40th QM	5	3	4	2	2	6	-	5	5	3
2024-25	41st QM	2	-	-	-	-	7	-	5	3	1
	42nd QM	2	2	4	-	7	3	-	-	1	-
	43rd QM	4	7	6	-	-	2	-	2	1	4
	44th QM	-	-	5	-	-	4	-	-	7	5

Source: CEGIS Field Survey, April 2014 - July 2025

Table D.3: Total Catch in the Sampling Sites

Monitoring Quarters	Total Catch (kg)									
	Sampling Site									
	A	B	C	D	E	F	G	H	I	J
1st QM	28	65	1,559	0	0	0	0	-	-	-
2nd QM	0	0	0.5	12	0.6	1.2	1.6	-	-	-
3rd QM	3	1	8	3	5	13	4	-	-	-
4th QM	28.7	3.3	8.7	30	0	3.7	0.7	-	-	-
5th QM	6	0	1.05	10.5	0.5	1.5	2.9	-	-	-
6th QM	0	0	0.33	5.08	0.4	0.7	0.83	-	-	-
7th QM	20	10	19.5	10.75	0.6	0.8	0.825	-	-	-
8th QM	276.2	12.8	173.6	189	7.8	0	70	-	-	-
9th QM	0	0	2.8	0	5	1.5	1	-	-	-
10th QM	0	0	0	12	7.5	0.8	0.8	-	-	-
11th QM	10	4	2.6	18	2.6	0.5	0.1	-	-	-
12th QM	2	0	10	56	0	0	0	-	-	-
13th QM	2	0.25	8.13	77.5	0	0.3	0.12	-	-	-
14th QM	-	-	-	-	1.5	0	10.5	-	0.4	0.3
15th QM	-	-	-	-	2.56	-	37.67	-	0.67	-
16th QM	17	-	1.5	-	-	-	3	0.33	0.13	1
17th QM	-	-	-	-	0.1	-	4	22	3	0.25
18th QM	16	1	-	-	2	-	27	-	5	1.2
19th QM	-	-	93	-	-	-	-	5	1.2	0.6
20th QM	0.4	-	17.5	-	0.5	-	-	-	-	0.17
21st QM	-	-	-	-	-	-	-	11.5	0.5	1.6
22nd QM	-	-	-	-	-	-	-	0.2	1.7	0.8
23rd QM	-	-	4.6	1.35	1.17	-	-	20	0.4	-
25th QM	-	-	-	-	-	-	-	10.5	3	6.3
26th QM	30.5	-	18.9	-	2.07	0.6	-	-	5	7.5
27th QM	3.5	-	33	-	-	-	-	4	-	-
28th QM	-	-	12.7	-	47.5	2.3	-	-	3.5	0.3
29th QM	1.1	-	5.85	0	11.34	-	-	6.1	7.75	-
30th QM	27	13	23	-	52	-	-	0.25	2.5	3.25
31st QM	30	14.5	20	-	4	-	-	1	0.1	-
32nd QM	-	-	-	-	-		-	-	1.2	1.3
33rd QM	-	-	-	-	-	0.6	-	0.8	1.25	3.1
34th QM	81	0.4	1.1	-	5.7	-	-	-	-	-
35th QM	51.7	20.5	8	-	27.5	0.8	-	0.2	-	0.5
36th QM	14	39	20.3	-	18.5	0.8	-	1.3	0.2	0.3
37th QM	1.25	-	10.9	-	10.6	1.1	-	0.2	0.25	0.5
38th QM	104.5	34.75	2.1	-	5	9.85	-	0.3	0.25	0.4
39th QM	0.4	-	6.4	-	13	-	-	0.72	1.3	3.16
40th QM	53.4	138.6	31.93	11	4	-	-	11.25	0.75	0.22
41st QM	47.6	-	-	-	-	31.3	-	0.5	-	3
42nd QM	8	7	5.25	-	11.25	0.32	-	-	3	-
43rd QM	3.5	3.3	16	-	-	2.0	-	-	2.0	0.5
44th QM	-	-	63.17	-	-	27.6	-	-	3.75	1.45

Average Weight 0.15kg/mud crab and average weight 0.6 kg/mud eel Weight of Fry is not considered for catch assessment.*

Table D.4: Occurrence of Species (1st to 22nd QM)

Local Name	Scientific Name	Local Status*	1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21st QM	22nd QM
			'-'= No; '+' = Occurrence																					
Hilsa	*Tenualosa ilisha*	NO	-	-	+	-	-	+	+	-	-	-	+	-	-	-	-	-	-	+	-	-	-	+
Sagor Baim	*Anguilla bengalensis*	NT	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacha	*Eutropiichthys vacha*	CR	+	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	+
Bagda Chingri	*Penaeus monodon*	DD	+	+	+	+	+	+	+	+	+	+	-	+	+	-	+	+	+	+	+	+	+	+
Banspata	*Brachypleura novae*	NO	+	+	+	+	-	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	-
Kukurjib	*Cynoglossus lingua*	NO	+	-	-	-	-	-	-	+	+	+	-	+	-	-	+	-	-	-	+	-	+	+
Bele	*Glossogobius giuris*	NO	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+
Aswine Bele	*Butis butis*	NO	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	-	+	+	-	-
Bairagi	*Coilia dussumieri*	NO	+	+	+	+	+	+	-	+	-	-	-	+	+	+	+	+	+	+	+	+	+	-
Boishakhi Chingri	*Macrobrachium* sp.	NO	-	+	-	-	+	+	+	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-
Chammu Chingri	*Metapenaeus brevicornis*	DD	+	+	+	-	+	+	+	+	+	+	+	-	-	+	+	+	+	+	+	+	+	+
Chaka Chingri	*Penaeus indicus*	DD	+	+	-	+	+	+	+	+	+	-	+	-	+	-	+	+	+	+	+	+	+	+
Ghora Chela	*Securicula gora*	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chanda Chela	*Securicula sp.*		-	+	+	-	-	-	-	-	+	+	-	-	-	-	+	+	+	+	-	-	-	+
Sada Chewa	*Trepauchen vagina*	NO	+	-	+	-	-	+	-	-	-	+	-	-	-	-	-	+	-	-	-	+	-	+
Lal Chewa	*Taenioides cirratus*	NO	+	+	+	+	+	+	+	+	+	-	-	-	+	+	-	+	+	-	+	+	-	-
Chhuri	*Trichiurus muticus*	NO	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Sagor Chela	*Megalops cyprinoids*	NO	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Purabi Chela	*Thryssa purava*	NO	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabashi Tengra	*Mystus cavasius*	DD	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Gagra Tengra	*Nemapteryx nenga*	DD	-	+	+	-	+	-	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Gulsha Tengra	*Mystus bleekery*	DD	+	+	-	+	-	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	-
Harina Chingri	*Metapenaeus ensis*	DD	+	+	+	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	+	+
Ekthuto	*Hyporhampus limbatus*	NO	+	-	+	+	-	-	-	+	+	-	+	-	+	+	-	-	+	+	+	+	+	+
Kakila	*Xenentodon cancila*	NO	+	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-	+	-	-	-	-	+
Chapila	*Gudusia chapra*	NO	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+	+	+	-	+	+

Local Name	Scientific Name	Local Status*	1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21st QM	22nd QM
			‘-‘= No; ‘+’ = Occurrence																					
Kuchia	*Monopterus cuchia*	DD	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	-
Loitta	*Harpodon nehereus*	NO	+	+	+	-	+	-	-	-	+	+	-	-	+	-	+	-	-	-	-	+	-	-
Motka Chingri	*Macrobrachium villosimanusless*	DD	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+
Mud Crab	*Scylla serrata*	NO	+	-	+	+	+	+	+	+	+	-	+	+	+	+	+	+	-	+	+	+	-	+
Tular Dandi	*Sillaginopsis panijus*	NO	+	-	+	-	+	-	+	-	-	-	+	-	-	+	-	-	-	+	+	+	+	-
Paira Chanda	*Scatophagus argus*	DD	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-
Paissa	*Liza parsia*	NO	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+
Pangas	*Pangasius pangasius*	CR	+	-	+	-	-	-	-	+	-	-	-	+	-	-	-	-	-	+	+	+	+	+
Tak Chanda	*Leiognathus equulus*	NO	+	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Phessa	*Setipinna phasa*	NO	+	+	+	+	+	+	+	+	+	-	+	-	+	+	-	+	-	-	+	+	+	+
Teli Phessa	*Setipinna phasa*	DD	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Poma	*Poma poma*	NO	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Potka	*Chelonodon patoca*	NO	+	+	-	+	+	+	-	+	+	-	+	+	+	+	+	+	+	+	+	+	-	-
Shilong	*Silonia silondia*	EN	+	-	+	-	-	-	-	-	-	-	+	-	+	+	-	-	-	-	-	-	-	+
Tailla	*Eleutheronema tetradactylum*	DD	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	+	+	-
Tapse	*Polynemus paradiseus*	DD	+	+	+	-	-	+	+	+	-	-	+	+	-	+	+	+	+	+	+	+	+	-
Daitna	*Acanthopagrus latus*	DD	-	-	-	+	-	-	-	+	+	-	+	+	-	+	+	+	-	+	+	+	-	-
Shole	*Channa striatus*	DD	-	-	-	+	-	-	-	+	-	-	-	-	-	+	+	-	-	-	-	-	-	-
Magur	*Clarias batrachus*	DD	-	-	-	+	-	-	-	+	-	-	-	+	-	+	+	-	-	-	-	-	-	-
Koi	*Anabas testudineus*	DD	-	-	-	+	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Vetki	*Lates calcarifer*	DD	-	-	-	+	+	+	+	+	+	-	+	+	+	+	+	+	-	+	+	-	+	-

Table D.5: Occurrence of Species (23rd to 45th QM)

Local Name	Scientific Name	Local Status*	23rd QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31th QM	32nd QM	33rd QM	34th QM	35rd QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM	45th QM
			'-'= No; '+' = Occurrence																					
Hilsa	*Tenualosa ilisha*	NO	-	-	-	-	-	+	+	+	-	+	-	-	-	-	-	-	-	+	-	+	-	+
Sagor Baim	*Anguilla bengalensis*	NT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacha	*Eutropiichthys vacha*	CR	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bagda Chingri	*Penaeus monodon*	DD	+	-	-	+	+	+	+	+	+	-	-	-	-	+	+	+	+	-	-	+	+	+
Banspata	*Brachypleura novae-zeelandiae*	NO	-	+	-	+	-	+	+	+	+	-	-	-	+	+	+	+	+	-	+	+	-	-
Kukurjib	*Cynoglossus lingua*	NO	-	+	+	+	-	+	+	+	-	+	-	+	+	-	-	+	+	+	-	-	-	-
Bele	*Glossogobius giuris*	NO	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Aswine Bele	*Butis butis*	NO	-	-	+	-	-	-	-	-	+	-	-	-	-	-	+	+	+	-	-	+	-	-
Bairagi	*Coilia dussumieri*	NO	+	+	-	+	+	+	+	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
Boishakhi Chingri	*Macrobrachium* sp.	NO	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chammu Chingri	*Metapenaeus brevicornis*	DD	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	+	+	+	+	+
Chaka Chingri	*Penaeus indicus*	DD	+	-	-	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	-
Ghora Chela	*Securicula gora*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-
Chanda Chela	*Securicula sp.*		+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sada Chewa	*Trepauchen vagina*	NO	-	-	+	-	-	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Lal Chewa	*Taenioides cirratus*	NO	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Chhuri	*Trichiurus muticus*	NO	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
Sagor Chela	*Megalops cyprinoids*	NO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Purabi Chela	*Thryssa purava*	NO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabashi Tengra	*Mystus cavasius*	DD	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gagra Tengra	*Nemapteryx nenga*	DD	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+
Gulsha Tengra	*Mystus bleekery*	DD	+	-	+	+	-	-	+	+	-	+	+	+	+	+	+	+	+	-	+	+	+	-
Harina Chingri	*Metapenaeus ensis*	DD	+	+	-	+	+	-	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+
Ekthuto	*Hyporhampus limbatus*	NO	-	-	+	+	-	-	-	-	-	-	-	-	+	-	+	-	-	-	+	-	-	-
Kakila	*Xenentodon cancila*	NO	-	-	-	-	-	-	+	+	-	-	+	+	-	-	+	-	-	-	+	-	+	+
Chapila	*Gudusia chapra*	NO	-	+	+	+	+	-	+	+	+	+	-	-	+	-	+	-	-	+	-	+	-	-

Local Name	Scientific Name	Local Status*	23rd QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31th QM	32nd QM	33rd QM	34th QM	35rd QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM	45th QM
			‘-‘= No; ‘+’ = Occurrence																					
Kuchia	*Monopterus cuchia*	DD	+	+	-	+	+	+	+	+	-	+	-	+	+	-	+	-	-	-	-	-	+	+
Loitta	*Harpodon nehereus*	NO	-	-	+	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-
Motka Chingri	*Macrobrachium villosimanusless*	DD	+	-	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	-
Mud Crab	*Scylla serrata*	NO	+	-	+	-	-	-	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+
Tular Dandi	*Sillaginopsis panijus*	NO	-	-	-	-	+	-	-	-	+	-	-	-	+	+	+	+	+	+	+	+	+	-
Paira Chanda	*Scatophagus argus*	DD	-	-	+	+	-	-	+	+	-	-	+	-	+	+	-	-	-	-	+	+	-	+
Paissa	*Liza parsia*	NO	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Pangas	*Pangasius pangasius*	CR	-	-	+	-	-	+	+	+	-	-	+	-	-	-	+	+	+	-	+	+	+	-
Tak Chanda	*Leiognathus equulus*	NO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Pheksa	*Setipinna phasa*	NO	+	-	-	-	+	+	+	+	-	-	-	+	+	-	+	+	-	+	+	+	-	-
Teli Pheksa	*Setipinna phasa*	DD	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	-	-
Poma	*Poma poma*	NO	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+
Potka	*Chelonodon patoca*	NO	-	-	+	+	+	+	+	+	+	-	-	+	+	+	+	+	+	-	-	+	+	+
Shilong	*Silonia silondia*	EN	-	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-
Tailla	*Eleutheronema tetradactylum*	DD	-	-	-	+	-	+	+	-	-	-	+	-	+	-	-	-	-	-	-	+	-	-
Tapse	*Polynemus paradiseus*	DD	+	+	+	-	-	+	+	-	+	-	-	-	+	+	+	-	-	-	-	+	-	+
Datina	*Acanthopagrus latus*	DD	+	-	-	+	-	-	+	+	-	-	+	+	+	+	+	+	+	+	-	+	+	-
Shole	*Channa striatus*	DD	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magur	*Clarias batrachus*	DD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Koi	*Anabas testudineus*	DD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vetki	*Lates calcarifer*	DD	-	-	-	-	-	+	+	-	-	-	+	-	-	+	+	-		+	-	+	-	

**Local Status Source: IUCN Bangladesh, 2015*

Table D.6: Length-wise species distribution (%) in sampling sites

Fish Species	Sampling	L (< 2cm)	L (2 to 3cm)	L (3 to 5cm)	L (5 to 10cm)	L (10 to 20cm)	L (> 25cm)	Brood Fish
Amadi	F	0.00	25.00	25.00	25.00	25.00	0.00	0.00
	I	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Bagda	F	27.27	0.00	27.27	18.18	18.18	9.09	0.00
	I	20.00	0.00	20.00	20.00	20.00	20.00	0.00
Bele	F	0.00	0.00	50.00	50.00	0.00	0.00	0.00
	I	0.00	0.00	50.00	50.00	0.00	0.00	0.00
Chaka Chingri	F	0.00	25.00	50.00	25.00	0.00	0.00	0.00
	I	0.00	0.00	25.00	75.00	0.00	0.00	0.00
Chami Chingri	F	0.00	0.00	100.00	0.00	0.00	0.00	0.00
	I	0.00	50.00	0.00	50.00	0.00	0.00	0.00
Chata Bele	F	0.00	0.00	0.00	0.00	100.00	0.00	0.00
	I	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Chewa	F	0.00	0.00	33.33	33.33	33.33	0.00	0.00
	I	0.00	0.00	33.33	33.33	33.33	0.00	0.00
Chitra	I	0.00	0.00	0.00	0.00	100.00	0.00	0.00
Gagra Tengra	I	0.00	0.00	0.00	50.00	50.00	0.00	0.00
Golda	F	60.00	0.00	40.00	0.00	0.00	0.00	0.00
	I	50.00	0.00	50.00	0.00	0.00	0.00	0.00
Harina Chingri	F	0.00	0.00	0.00	66.67	33.33	0.00	0.00
	I	20.00	20.00	20.00	20.00	20.00	0.00	0.00
Ilish	J	0.00	0.00	0.00	16.67	33.33	50.00	0.00
Kakila	F	0.00	0.00	0.00	0.00	100.00	0.00	0.00
	I	0.00	0.00	0.00	0.00	100.00	0.00	0.00
Kalo Bele	F	0.00	0.00	0.00	0.00	100.00	0.00	0.00
Kuchia	F	0.00	0.00	0.00	33.33	33.33	33.33	0.00
	I	0.00	0.00	0.00	0.00	100.00	0.00	0.00
Kumirer Khil	F	0.00	0.00	0.00	37.50	37.50	25.00	0.00
Motka Chingri	I	0.00	16.67	50.00	33.33	0.00	0.00	0.00
Mud Crab	F	0.00	0.00	50.00	50.00	0.00	0.00	0.00
	I	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Nandi Bele	F	0.00	0.00	0.00	100.00	0.00	0.00	0.00
	I	0.00	0.00	0.00	50.00	50.00	0.00	0.00
Nuna Chingri	F	0.00	66.67	33.33	0.00	0.00	0.00	0.00
Paissa	F	0.00	0.00	33.33	33.33	33.33	0.00	0.00
	I	0.00	0.00	33.33	33.33	33.33	0.00	0.00
Poikka	F	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Poma	F	0.00	0.00	0.00	33.33	33.33	33.33	0.00
	I	0.00	20.00	20.00	20.00	20.00	20.00	0.00
	J	0.00	0.00	0.00	40.00	40.00	20.00	0.00
Potka	F	0.00	50.00	0.00	50.00	0.00	0.00	0.00
Topse	F	0.00	0.00	33.33	33.33	33.33	0.00	0.00
	I	0.00	0.00	33.33	33.33	33.33	0.00	0.00

Source: CEGIS field survey, July 2025

Table D.7: Purpose, timing and extent of migration for different year-class of migratory fish species

Migratory Species	Sites	Year Class*	Migration Purpose																				
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21th QM
Tapsi	B	Juvenile and Age-1 adult	F&G	-	F&G	-	-	-		-	-	-	-	-	-	-	G	-	-	-	-	-	-
	C	Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile and Age-1 adult	F&G	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Adult	F&G	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-
	J	Age-1 adult and Brood fish	F&G	S	-	-	-	F	F&S	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	F&G	-	-	F	F	-	-	-		-	-	F	-	-	F	-	-	F	F
	E	Juvenile and Age-1 adult	F&G	F&G		-	-	-	-	-	-	-	-	F	F	-	-	-	-	-	-	-	-
		Adult and Brood Fish	-	-	B&S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Juvenile	-	-	F&G	-	-	-	F	-	-	-	F	-	-	F&G	-	F&G	-	-	-	-	-
	H	Adult	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
		Fry										-					N		-	-	-	-	-
	SWP	Age-1 adult	F&G	F&G	F&G	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Brood Fish	-	-	-	-	-	B&S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bairagi	B	Juvenile and Age-1 adult	F&G	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile and Age-1 adult	F&G	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile and Adult	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Fry	B&S	B&S	F&G	F	-	F	-	-	-	-	-	-	-	N	-	N	-	-		N	
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	F&G	F&G	-	M	F&G	-	N

Migratory Species	Sites	Year Class*	Migration Purpose																				
			1st QM	**2nd QM**	**3rd QM**	**4th QM**	**5th QM**	**6th QM**	**7th QM**	**8th QM**	**9th QM**	**10th QM**	**11th QM**	**12th QM**	**13th QM**	**14th QM**	**15th QM**	**16th QM**	**17th QM**	**18th QM**	**19th QM**	**20th QM**	**21th QM**
	J	Juvenile and Age-1 adult	F&G	-	-	-	F&G	F	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-
		Fry	-	-	-	-	-	-	-	-	-	-	-	N	N	-	-	-	-	N	-	N	-
	H	Fry	-	N	-	F	-	-	-	-	-	-	-	N	N	-	N	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	F&G	-	-	-	-
	E	Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	-	F&G	-	-	-	-
	SWP	Juvenile	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fry	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-
Chapila	B	Juvenile	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Fry	-	N	-	-	-	-	-	-	-	-	-	-	-	-	N	-	N	-	-	-	-
	J	Adult																					M
	SWP	Age-1 adult	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loitta	B	Juvenile and Age-1 adult	F&G	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile	F&G	-	-	-	F&	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Age-1 adult	-	-	F&G	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	Juvenile	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Fry, Juvenile	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	Age-1 adult	-	F&G	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fry	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	-
Poma	B	Juvenile	F&G	-	-	F	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile	F&G	-	-	-	-	-	-	G&F	-	-	-	-	-	-	-	-	-	-	-	-	-
		Age-1 adult	-	-	F&G	-	-	-	F	F	-	-	-	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Fry and Juvenile	B&S	N	-	-	-	F	-	-	-	-	-	-	-	-	N	-	F	-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																				
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21th QM
		Juvenile	-	-	F&G	F	F&G	-	F&G	-		F&G			F&G	-	F&G	-	-	-	-	-	-
		Adult	-	-	-	-	-	-	F	-					-	F	F	-	-	-	-	-	-
		Brood Fish	-	-	-	-	-	-	-	-		S	-		-	-	-	-	-	-	-	-	-
	B	Fry and Juvenile	-	-	N	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-
	C	Brood Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-	-	-	-	-
		Juvenile and Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	G&M	-
	E	Adult and Brood Fish	-	-	B&S	-	-	-	-	-	-	-	F&S	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	-	-	-	F	-		-	F		-	-	-	-	-	F	-	-	-
		Fry and Juvenile	-	-	-	-	-	S&N	-	-	F&G		-	-	-	-	-	-	-	-	-	-	-
	H	Fry	-	-	S,F&G	-	-	-	-	N	-		-	N	N	-	-	-	N	-	F&G	-	-
		Juvenile	-	-	-	-	-	-	F&G	-		-	-		-	N	-	-	-	-	-	-	-
		Age-1 Adult	-	-	-	-	-	-	F	F	-		-	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	F	-	F	-	-	-		F	-	-	-	-	-	-	-	-	F	-
		Brood Fish	-	-	-	-	-	-	-	-	-		S	-	-	-	-	-	-	-	-	-	-
	SWP	Adult	-	-	F	F	-	F	-	-	-		-	-	-	-	-	-	-	-	F	F	-
	C	Adult and Brood Fish	B&S	-	-	-	-	-	-	-	-	-	F,G&S	-	-	-	-	-	B&S	-	-	-	-
		Juvenile and Adult	-	-	F&G	F	F&G	-	F&G	-	-	-	-	-	-	-	-	-	-	M&F	M&F	-	-
		Fry	-	-	-	-	-	-	-	-	N	-	-	N	-	-	-	-	-	-	-	-	-
Chhuri	B	Adult	F	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A		F	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chela	B	Adult	F	-	F	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	
	A	Juvenile and Adult	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																				
			1st QM	**2nd QM**	**3rd QM**	**4th QM**	**5th QM**	**6th QM**	**7th QM**	**8th QM**	**9th QM**	**10th QM**	**11th QM**	**12th QM**	**13th QM**	**14th QM**	**15th QM**	**16th QM**	**17th QM**	**18th QM**	**19th QM**	**20th QM**	**21th QM**
	E	Fry and Juvenile	-	F&G	-	-	-	N	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	F		-	-	-	-	-	-	-	G&F	N		-	-	-	-	F&G	-	-	-	-	-	N
	J	Fry and Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N&F	-	-	-	-	-
Gang Tengra	F	Juvenile and Age-1 adult	-	F&G	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Brood Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	B	-	-	-	-	-	-
	J	Age-1 adult	-	-	-	-	F&G	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	H	Age-1 adult	-	F&G	-	-	-	-	-	-	-		-	-	-	-	-	-	F&G	-	-	-	-
	A	Juvenile and Adult	-	-	F&G	-	-	-	F	-	-		-	F	-	-	-	-	-	-	-	-	-
	B	Juvenile	-	-	-	-	-	-	F&G	-	-		-	-	-	-	-	-	-	-	-	-	-
	E	Adult	-	-	F	-	F&G	-	-	-	F		F		-	-	-	-	-	-	-	-	-
Gagra Tengra	F	Juvenile and Age-1 adult	-	F&G	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	M	-	-	-
		Fry	-	-	-	-	-	-	-	-	-	-	-						N	-	-	-	-
	J	Age-1 adult	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Age-1 adult	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	M&F
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile and Adult	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	-
		Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	B	Juvenile	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Adult	-	-	F	-	F&G	-	-	-	-	-	F	-	F	F	-	-	-	-	F	-	-
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M	-	M	-	-
	C	Juvenile and Age-1 adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M	-	-	-
Gulsha Tengra	B	Adult	F&B	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile		-	-	-	-	-	-	-	-		-	-	F	-	-	-	-	-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																				
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21th QM
	F	Age-1 adult	-	-	-	F	-	F	F&G	-	-		-	F	-	-	F&G	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	F&G	-		F&G	-		-	F&G	-	F&G	-	-	-	-	-
	H	Age-1 adult	-	F&G	-	F&G	-	F&G	-	F&G		-	-		-	-	-	-	F&G	-	-	-	-
		Juvenile	-	-	-	-	-	-	F&G	-		F&G	-		-	-	-	-	F&G	-	-	-	-
	E	Juvenile	-	-	-	-	-	-	F&G	-		-	-		-	-	-	-	F&G	-	-	-	-
		Age-1 adult	-	-	-	-	-	-	-	-	F&G	-	-	-	F	-	-	-	F&G	-	-	-	-
	I	Juvenile and Age-1 Adult	-	-	-	-	-	-	F&G	-		-	-	-	-	-	-	-	-	-	-	-	-
	J	Juvenile	-	-	-	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-
Potka	B	Adult	F&S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Fry	S	S&N	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	F&G	-	-	-	F	F	-	-	-	-	-	F&G	-	-
		Adult	-	-	-	F	-	-	-	-	-	-	F	-	-	F&G	-	-	-	-	-	-	-
	H	Fry	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-
	E	Fry	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-
	I	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	-	-
Paira Chanda	A	Adult	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Fry	B&S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chewa	A	Juvenile and Adult	F	-	F&G	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
	F	Fry and Juvenile	S	-	F&G	-	N&G	N	F&G	-	N	-	-	-	F&G	F&G	F&G	-	-	-	-	N	F&G
		Adult	-	-	-	F	-	F	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-
	B	Juvenile and Adult	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Juvenile and Adult	-	-	F&G	-	-	F&N	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																				
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21th QM
	M	Juvenile	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	-
	I	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-
	SWP	Juvenile	-	F&G	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	J	Adult	-	-	-	-	F	-	-	-	-		-	-	-	-	-	-	F	-	-	-	-
		Age-1 Juvenile	-	-	-	-	-	-	-	-	F&G		-	-	-	-	-	-	-	-	-	-	-
Bele	A	Adult	F	-	F	F	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	F&G	-		-	-	-	-	-	-	-	-	-	-	-
	B	Juvenile and Adult	-	-	N&G	F	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	E	Juvenile and Adult	-	-	F&G	-	F&G	N&F	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Fry	B&S	N	-	-	N	N	-	-	N	-	-	-	-	-	-	N	N	-	-	N	-
		Juvenile and Adult	-	-	F&G	F	-	F	-	F	-	-	F&G	-	-	-	F&G	-	-	-	-	F&G	-
	E	Juvenile and Age-1 Adult	-	-	-	-	-	-	F&G		-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Fry	B&S	-	-	-	-	N	-	-	-		-	-	-	N	N	-	N	-	-	-	-
		Juvenile and Adult	-	-	N&G	F	F&G	F	F&G	-	-		-	-	-	-	-	-	-	-	-	-	M&F
	J	Fry	B&S	N	-	-	N	-	-	N	-		-	-	-	-	N	N	N	-	-	-	-
		Adult	-	-	-	F	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	I	Juvenile and Age-1 adult	-	F&G	F&G	F	F&G	-	-	-	F&G		-	-	-	-	F	-	F&G	F&G	-	-	-
		Fry	-	-	-	-	-	-	-	N	-		-	N	N	-	-	-	-	-	-	-	-
Tular Dandi (Nona Bele)	A	Adult	F	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	F&M	-
	I	Adult														F	-	-	-	-	M	-	-
	F	Age-1 Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	G	-	-	-
	SWP	Adult	-	-	F	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																				
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21th QM
	J	Adult	F	-	F	-	F	-	F	-	-	-	-	-	-	-	-	-	-	-	M	M	M&F
Tairel	A	Adult	F	-	-	-	-	-	-	F	-	-	-	-	-	-	-	F	-	-	-	-	-
	E	Age-1 Adult	-	-	-	-	-	-	-	-	F&G	-	-	-	-	F&G	F&G	-	-	-	-	-	-
	H	Juvenile	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G
Pheksa	A	Adult	F	-	-	-	-	-	-	F	-		-	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	F&G	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	B	Juvenile	-	-	F&G	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	F	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	E	Juvenile	-	-	-	-	-	-	-	-	F&G		-	-	-	-	-	-	-	-	-	-	-
	J	Juvenile and Adult	F	F&G	-	-	-	-	F&G	-			-	-	-	-	-	F&G	-	-	-	M	-
		Adult	-	-	F	F	F	-	F	-	-		-	-	-	F	F	-	-	-	M	-	M
	H	Adult	-	-	F	F	-	-	F&G	-	-		F	-	-	-	-	-	-	-	M	-	-
		Juvenile															-	G	-	-	-	-	-
	F	Juvenile and Adult	F	F&G	-	-	F&G	-		-	-		-	-	-	-	-	F&G	-	-	M	-	-
	I	Juvenile and Adult	F	F&G	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	F&G	-	-		-	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	F	F	-	F	-	-	-		-	-	-	-	-	-	-	-	-	-	-
Paissa	A	Juvenile and Adult	F	-	F&G	F	-	-	-	F&G	-	-	-	F	F	-	-	-	-	G&M	-	-	-
		Brood	-	-	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	F&G		-	-	-		-	-	-	-	-	-	-	-	-
	B	Juvenile and Adult	F	-	F&G	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Juvenile	-	-	F	-	F&G	-	F&G	-	-	-	-	-	-	F&G	F&G	-	-	-	-	-	-
		Adult	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-					-

Migratory Species	Sites	Year Class*	Migration Purpose																				
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21th QM
	F	Fry	B&S	-	-	-	N	-	-	-	N	-	-	-	-	-	-	N	-	-	F&G	N	-
		Juvenile and Adult	-	-	F&G	-	-	N&F	-	-	-	-	F&G	F	F	-	-	F&G	-	M	-	-	-
	E	Juvenile	-	-	-	-	-	-	F&G	-	-	-		-	-	-	-	-	-	M	-	-	-
	H	Fry	B&S	-	-	-	-	N	-	-	N	-	-	-	-	-	N	-	-	-	-	-	-
		Age-1 Juvenile	-	-	-	-	-	-	F&G	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-
		Age-1 Adult	-	-	-	-	F&G	F	-	-		-	-	-	-	-	-	-	-	-	-	-	-
	I	Fry	B&S	F&G	-	-	F&G	-	-	-		-	-	-	-	-	-	-	-	-	F&G	-	-
		Juvenile	-	-	-	-	-	-	F&G	-	-	-	F&G	-	-	-	-	-	-	G	-	-	-
		Adult	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	J	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G
Banshpata	F	Juvenile	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	G	F&G	-	-	-	-
		Adult	-	-	-	F	-	F	-	-	-	-	-	-	-	F	F	-	-	-	-	-	-
	A	Juvenile	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-
	B	Juvenile and adult	-	-	F&G	F	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	Juvenile and Age-1 Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	G&M	-	-
	E	Adult	-	-	-	-	-	-	-	F	F	-	F	-	-	-	-	-	-	-	-	-	-
	H	Fry and Adult	F	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	-	-	-	-
		Adult	-	-	-	F	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-
	I	Adult	-	-	F	F	-	B&S	-	-	-	-	-	-	-	F	-	-	-	G&M	G&M	-	-
	J	Adult	-	-	F	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	G&M	F	-
Hilsa	A	Brood Fish	-	-	-	-	-	-	-	-	-	-	B&S	-	-	-	-	-	-	-	-	-	-
	B	Brood Fish	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																				
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21th QM
	E	Brood Fish	-	-	-	-	-	-	-	-	-	-	B&S	-	-	-	-	-	-	-	-	-	-
	F	Adult and Brood Fish	-	-	-	-	-	-	F&B	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Adult	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Brood Fish	-	-	-	-	-	-	-	-	-	-	B&S	-	-	-	-	-	-	-	-	-	-
	I	Age-1 Adult	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-
	J	Adult	-	-	-	-	-	B&S	-	-	-	-	-	-	-	-	-	-	-	M	-	-	-
Pangas	B	Juvenile	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Adult	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Juvenile and Adult	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	-	F&G

Table D.8: Purpose, timing and extent of migration for different year-class of migratory fish species

Migratory Species	Sites	Year Class*	Migration Purpose																					
			22th QM	23th QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31st QM	32nd QM	33rd QM	34th QM	35th QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM	45th QM
Tapsi	B	Juvenile and Age-1 adult	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	M&F	-	-	-	-	-
	C	Adult	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-
	J	Adult	-	-	-	-	-	-	-	-	-	M&F	-	-	-	-	M&F	-	-	-	-	-	-	-	-
		Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Juvenile and Age-1 adult	-	-	-	-	-	-	F	F	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-
	H	Adult	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-	M&F	M&F
		Fry	-	-	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bairagi	B	Juvenile and Age-1 adult	-	-	-	-	-	-	-	-	M	-	-	-	-	F	-	-	-	M&F	-	-	M&F	-	-
	A	Juvenile and Age-1 adult	-	-	-	-	-	-	F	F	-	-	-	-	F&G	F	-	-	-	-	-	-	-	M&F	M&F
	F	Fry	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	M&F	-	-	M&F	-	-	-	-
	J	Juvenile and Age-1 adult	-	-	-	-	-	-	-	-	-	M&F	-	-	-	-	-	F	-	-	-	-	-	-	-
	E	Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	M&F	-
	H	Fry	-	N	N	-	-	-	-	-	-	F&G	-	-	-	-	F&G	-	-	-	-	-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																						
			22th QM	23th QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31st QM	32nd QM	33rd QM	34th QM	35th QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM	45th QM
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	-	-	-	-	-
	I	Juvenile	F&G	-	-	-	-	F&G	-	-	-	M	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-
Chapila	B	Juvenile	-	-	-	-	-	-	-	-	G	-	-	-	-	-	-	-	-	-	-	-	-	F&G	-
	A	Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-	-	-	-	-	F	-
	H	Fry	-	-	-	-	-	-	-	-	N	-	-	-	-	-	N	-	-	-	-	-	-	-	-
		Juvenile	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G		-	-	-	-
	J	Adult	F	-	-	-	-	-	-	-	-	F&G	F&G	-	-	-	-	-	-	M&F	-	-	-	-	-
		Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-
Poma	B	Age-1 adult	-	-	-	-	-	-	-	-	M	-	-	-	-	-	-	-		-		-	M&F	-	-
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	-	-	-
	A	Juvenile	-	-	-	-	-	-	-	-	G	-	-	-	F&G	-	-	-	F	-		-	-	-	-
		Age-1 adult	-	-	-	-	-	-	M	-	-	-	-	-	-	M&F	M&F	-	M&F	-		-	-	-	-
	C	Juvenile and Adult	-	G&M	-	-	G&M	M	-	M	G&M	-	-	-	-	M&F	M&F	-	-	-		M&F	M&F	-	-
	J	Fry	-	-	-	-	-	-	-	N	-	G	-	-	-	-	-	N	-	-	N	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	G	-	-	-	-	-	F&G	-	M&F	-
		Adult	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-
	B	Fry and Juvenile	-	-	-	-	-	-	-	-	G	-	-	-	-	-	-	-	-	-	-	F&G	-	M	M&F
	E	Juvenile and Adult	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	F	M&F
		Adult	-	-	-	-	-	-	M	-	M	-	-	-	-	-	-	F	-	-	-	-	-	-	-
		Fry and Juvenile	-	N	-	-	-	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-
	H	Fry	-	N&M	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-
		Age-1 Adult	-	-	-	-	-	-	M	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-
	I	Adult	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-
		Juvenile	-	-	M&F	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-		M&F	F&G	-	-
		Fry	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	F	-
	J	Juvenile and Adult		-	M&F	-	-	-	-	-	-	M&F	M&F	-	-	-	M&F	-	-	-		-	F&G	F&G	M&F
Chhuri	A	Adult	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-
	B	Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-		-	-	-	-
Chela	A	Juvenile and Adult	-	-	-	-	M&F	-	-	-	F	-	-	-	-	-	-	-	-	-		-	-	-	-
	C	Juvenile and Adult	-	-	-	-	-	-	-	-	G	-	-	-	-	-	-	-	-	M&F		-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																						
			22th QM	23th QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31st QM	32nd QM	33rd QM	34th QM	35th QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM	45th QM
	E	Fry and Juvenile	-	-	-	N&M	-	-	-	-	-	-	-	-	-	M&F	N&F	-	-	F&G		-	-	-	-
	J	Fry and Juvenile	N&M	-	N&M	-	-	-	-	-	-	-	M&F	-	-	-	-	-	-	F&G		-	F&G	-	-
	F	Fry and Juvenile		-	-	N&M	-	F&G	-	F&G	-	-	-	-	-	-	M&F	-	-	-	-	-	-	-	-
	H	Fry and Juvenile	N&M	-	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-
Gang Tengra	F	Adult		-	-	-	-	-	-	-	-	-	-	-	M	-	-	-	-	-	-	-	-	-	-
Ghagra Tengra	F	Juvenile and Age-1 adult		-	-	M	-	M	-	-	-	-	-	-	-	-	M&F	-	-	M&F	-	M&F	-	-	-
	H	Age-1 adult		-		-	-	-	-	-	-	-	-	-	-	M&F	-	-	-	-	M&F	-	-	-	-
		Juvenile	-	-	F&G	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile and Adult		-	-	M	-	-	-	-	-	-	-	M&F		M&F	-	M&F	-	-	-	M&F	-	-	-
		Adult		-	-	-	-	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-
	B	Juvenile		-	-	-	-	-	-	F&G	-	-	-	-	M	-	-	-	-	-	-	F&G	-	-	-
		Adult	-	-	-	-	-	-	-	-	M	-	-	-	-	M&F	-	-	-	M&F	-	-	M&F	-	-
	E	Adult	-	-	-	M	-	M	F	M	-	-	-	-	-	M&F	-	F	M&F	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	-	-	-
	C	Juvenile and Age-1 adult	M	-	-	M	-	M	-	M	-	-	-	M&F	-	M&F	-	-	M&F	M&F	-	M&F	-	-	-
Gulsha Tengra	B	Adult		-	-	-	-	-	-	-	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Adult		-	-	-	-	-	-	-	M	-	-	-	-	-	-	-	M&F	-	-	-	-	M&F	-
	F	Juvenile		-	-	-	-	-	-	F&G	-	F&G	F&G	-	-	-	-	-	-	-	-	-	-	M	M&F
	C	Juvenile		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	-	M	-
		Age-1 adult	-	-	-	-	M	-	-	M	-	-	-	-	-	M&F	-	-	-	-	-	-	M&F	-	-
	E	Age-1 adult		-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-	-	-	-	-	-	-
	J	Juvenile	-	-	F&G		-	-	-	-	-	-	M	-	-	-	-	-	-	M&F	-	-	-	F&G	-
Potka	A	Adult	-	-		-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-
	B	Adult	-	-	-	-	-	-	-	-	F	-	-	-	-	M&F	-	-	-	-	-	M&F	-	M&F	-
	J	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-
	J	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	-	-	F&G	-
		Juvenile		-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Adult		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-
	C	Juvenile and adult	-	-	-	-	F&G	-	-	F&G	-	-	-	-	-	M&F	M&F	-	-	-	-	-	M&F	-	M&F
Paira Chanda	A	Adult	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-	-	-	-	-	-	-	-	-
		Juvenile and Adult	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	B	Juvenile and Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																					
			22th QM	23th QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31st QM	32nd QM	33rd QM	34th QM	35th QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM	45th QM
	C	Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-	-	-	-	-	-	-
Chewa	J	Fry and Juvenile		-	-	-	-	F&G	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	G	Fry and Juvenile	-	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Juvenile	M	M	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fry		-	-	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	M&F	-
	I	Juvenile	M	-	-	-	-	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F
	J	Adult	F	-	F	-	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-	-	F&G	F&G
		Age-1 Juvenile		M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bele	A	Adult		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-		-	-
		Juvenile and Adult		-	-	-	F	-	-	F&G	F&G	-	-	M&F	-	-	M&F	M&F	-	-	-	M&F	-	-	-
	J	Fry and Juvenile	N	-	-	-	-	M	-	-	-	-	-	-	N	-	-	N	N	N	M	-	M	-	F&G
		Juvenile and Adult	-	-	-	M&F	-	-	-	-	-	-	-	-	-	M&F	M&F	M&F	-	-	-	M&F	-	-	-
	G	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
	E	Juvenile and Age-1 Adult	-	-	-	-	-	-	-	F&M	M	-	-	F	-	-	M&F	M&F	-	-	-	M&F	-	-	-
	H	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile and Adult	-	-	-	-	-	-	-	-	-	M&F	M&F	-	-	M&F	-	M&F	M&F	-	M&F	-	-	-	-
	J	Fry		-		-	-	-	-	-	-	-	-	-	N	-	-	N	-	-	-	-	N	-	-
		Fingerling		N	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile and Age-1 adult	-	-	M&F	-	-	-	-	F&M	-	-	-	-	-	-	M&F	-	M&F	M&F	-	-	-	-	-
	I	Juvenile and Age-1 adult	M&F	M&F	-	-	-	F&G	-	-	-	-	-	-	-	-	M&F	-	M&F	M&F	-	-	-	M&F	M&F
		Fry	-	-		-	-	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	Juvenile and Age-1 adult	-	-		-	-	-	M	-	M	-	-	-	-	M&F	-	-	-	-	-	-	-	-	--
Tular Dandi	F	Age-1 Adult		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-	-
	J	Adult	-	-	-	M&F	-	M&F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	I	Age-1 Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-
Tairel	A	Adult	-	-	-	-	M	-	-	M	-	-	-	-	-	M&F	-	-	-	M&F	-	-	M&F	-	M&F
	B	Juvenile	-	-	-	-	-	-	-	-	-	-	-	G&M	-	-	-	-	-	-	-	-	-	-	-
	C	Juvenile		-	-	-	-	-	-	M	-	-	-	-	-	M	-	-	-	-	-	-	-	M&F	-
	E	Age-1 Adult		-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-	-	-	-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																						
			22nd QM	23rd QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31st QM	32nd QM	33rd QM	34th QM	35th QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM	45th QM
	F	Juvenile		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	-	-	-	-
	J	Juvenile		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	I	Fry		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N&G	-	-	-	-
Pheksa	A	Adult		-	-	-	-	-	M	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	B	Juvenile																			-	G&M	-	M	-
	C	Juvenile and Adult	-	-	-	-	-	-	-	-	M	-	-	-	-	M&F	-	-	-	-	-	-	-	-	-
	E	Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-	-	-	M&F	M&F	-	-
	J	Juvenile and Adult			-	M	-	M	-	-	-	-	-	-	-	-	-	M&F	-	-	-	-	-	-	-
		Adult	F		-	-	-	-	-	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Adult		M	-	-	-	-	-	-	M	-	-	-	G&M	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	M&F	-	-	G&M	-	-
	F	Juvenile and Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M	-	-	M	-	-	-	-
	I	Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-
Paissa	A	Juvenile and Adult	-	-	-	-	G&M	-	-	G&M	G&M	-	-	G&M	-	-	M&F	M&F	M&F	M&F	G&M	M&F	-	-	-
	B	Juvenile and Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-
	C	Juvenile and Adult	-	-	-	-	F	-	-	G&M	G&M	-	-	G&M	-	-	M&F	M&F	M&F	M&F	-	M&F	-	-	-
		Fry	-	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Juvenile and Adult		-	-	F&G	-	-	F	G&M	G&M	-	-	G&M	-	-	M&F	-	M&F	-	-	M&F	-	-	-
		Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	J	Fry		N	N	-	F	-	-	-	-	-	G&M	-	-	-	M&F	F&G	-	-	-	-	-	-	-
	H	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	G&M	-	-
	F	Fry and Juvenile	N	N	-	F&G	F	F&G	-	-	N	G&M	-	-	-	-	-	F	N	N	G&M	M&F	G&M	M&F	-
		Age-1 Adult	M	-	-	-	-	-	-	-	-	-	G&M	-	-	-	-	F&G	-	-	-	-	-	-	-
	I	Fry and Juvenile	-	-	-	F&G	-	-	-	-	-	M	G&M	-	-	-	G&M	-	-	-	-	-	-	-	-
		Age-1 adult		M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Banshpata	F	Juvenile		-	-	-	-	-	-	-	-	-	-	-	G&M	G&M	-	-	-	-	-		-	-	-
		Adult		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-
	C	Juvenile and Age-1 Adult		-	-	-	G&M	-	-	G&M	M	-	-	-	-	M&F	M&F	-	-	-	-	-	M&F	-	G&M
	A	Juvenile		-	-	-	-	-	-	-	G&M	-	-	-	-	M&F	-	-	-	-	-	-	-	-	-
	B	Juvenile and adult		-	-	-	-	-	-	-	M	-	-	-	-	M&F	-	-	-	-	-	M&F	-	M&F	G&M
	E	Adult		-	-	-	-	-	-	F&G	-	-	-	-	-	M&F	-	-	-	-	-	M&F	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																						
			22th QM	23th QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31st QM	32nd QM	33rd QM	34th QM	35th QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM	45th QM
	I	Juvenile and Age-1 Adult		-	-	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	J	Juvenile and Age-1 Adult		-	G&M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-
Hilsa	A	Brood Fish		-	-	-	-	-	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	I	Age-1 Adult	M	-	-	-	-	-	M	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	J	Adult	F	-	-	-	-	-	-	M	-	M	-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Age-1 Adult	-	-	-	-	-	-	-	M	M	M	-	-	-	-	-	-	-	-	-	-	-	-	-
Pangas	A	Adult	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-
	B	Juvenile	-	-	-	-	-	-	-	-	G	-	-	-	-	-	-	-	-	-	-	G&F	-	-	-
	C	Adult	-	-	-	-	-	-	-	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	G&F	-	-	M&F
	H	Juvenile	-	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	I	Juvenile and Age-1 Adult	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Source: Field findings at different times

**Only Age-1 to Brood fish was allowed to interpret the migration purpose; SWP= South-west of the Project; F = Feeding; B=Breeding, S= Spawning, N=Nursing, G=Growing, M=Maturation*

Table D.9: The Present Catch in Three (03) Sampling Ghers

Sampling Site	Species	Total Catch (Ton)																			
		1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM
1	Bagda	5.0	6.42	4.8	-	-	1.6	2.0		-	-	3.0	-	-	3.0	-	2.0	0.76	-	-	3.2
	Golda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-
	Harina	0.78	-	-	-	1	1	0.32	0.8	-	-	0.8	-	1.0	-	-	0.1	1.6	-	-	4.8
	Bele	0.98	-	-	-	-	0.25	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-
	Chali	0.11	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	1.2	-	-	-
	Chaka	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
	Paissa	-	-	-	-		0.25	0.24	0.6	-	-	0.1	-	-	-	-	-	-	-	-	-
	Vetki/Patari	1.57	-	-	-	-	-	0.02	0.8	-	-	2.0	-	-	-	-	-	-	-	-	-
	Gulsha	-	-	-	-	-	-	0.08	-	-	-	0.1	-	-	-	-	-	-	-	-	-

Sampling Site	Species	Total Catch (Ton)																			
		1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM
	Kailla	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tilapia	-	-	-	-	-	-	-	1.6	-	-	-	-	-	-	-	0.45	12.8	-	-	-
	Rui	-	-	-	-	-	-		3	-	-		-	-	1.3	-	0.12	0.12	4.2	-	-
	Catla	-	-	-	-	-	-	-	2	-	-	-	-	-	1.0	-	0.3	-	1.2	-	-
	Minar Carp	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	0.3	-	-
	Grass Carp	-	-	-	-	-	-	-	0.1	-	-		-	-	-	-	0.2	-	0.3	-	-
Sub-total =		**8.52**	**6.42**	**4.8**	**-**	**1.0**	**3.6**	**2.7**	**9.0**	**-**	**-**	**6.0**	**-**	**1.0**	**5.3**	**-**	**3.27**	**16.68**	**6.0**	**-**	**8.0**
2	Bagda	4	1	7	-	-	1.67	-	-	1.0	-	0.2	0.29	-	5	-	3.93	1.48	5.0	-	1.41
	Golda	-	0.01	0.9	-	-	-	-	-	-	-	-	-	-	-	-	0.13		0.08	-	0.1
	Harina	2	0.33	-	-	-	0.5	-	-	0.14	-	0.08	-	-	-	-	1.91	0.5	1.8	-	2.92
	Chali	0.18	0.08	-	-	-	0.3	-	-	-	-	0.04	-	-	-	-	1.16	0.04	0.4	-	1.52
	Motka																	0.05		-	-
	Bele	-	0.08	-	-	-	0.3	-	-	-	-	0.16	0.15	-	-	-	0.43	0.06		-	1.35
	Tengra	-	-	0.2	-	-	-	-	-	-	-	0.08	0.31	-	-	-	4.20	0.13	0.8	-	0.27
	Paissa	-	0.04	10	-	-	0.25	-	-	-	-	0.2	0.22	-	7	-	0.14	0.05	0.08	-	0.6
	Vetki	-	-	1	-	-	-	-	-	-	-	0.24	0.06	-	0.5	-	0.96	0.01	2.0	-	-
	Phessa	-	-	2.4	-	-	-	-	-	-	-	-	-	-	1.0	-				-	-
	Bhangan	-	-	1.7	-	-	-	-	-	-	-	-	-	-	0.7	-		0.01	0.05	-	-
	Tilapia	-	-		-	-	-	-	-	-	-	8.0	0.53	-	-	-	5.9	0.41	8.0	-	0.3
	Chela	-	-	-	-	-	-	-	-	-	-	-	0.45	-	-	-		0.01		-	-
	Rui																8.41		3.0	-	0.35
	Catla																		3.0	-	0.2
	Grass Carp																0.11			-	-
	Common Carp																5.55			-	-
	Sarpunti																0.53			-	-
	Tairel																0.003			-	-
	Pheksa																0.001			-	-
Sub-total =		**6.18**	**1.52**	**23.2**	**-**	**-**	**3.02**	**-**	**-**	**1.14**	**-**	**9.0**	**2.01**	**-**	**14.2**	**-**	**33.36**	**2.75**	**24.21**	**-**	**9.02**
3	Bagda	1.38	2.4	1.5	-	-	3.5	0.4	-	2	-	0.4	-	-	0.2	-	0.5	0.1	-	-	0.4

Sampling Site	Species	Total Catch (Ton)																			
		1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM
	Harina	0.34	0.34	-	-	-	-	0.35	-	-	-	0.3	-	-	-	-	0.6		-	-	0.1
	Chali	0.17	0.17	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-		-	-	0.03
	Chaka							0.1	-	-	-	-	-	-	-	-	-		-	-	0.01
	Motka	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
	Paissa	-	-	0.01	-	-	-	3.2	-	-	-	0.06	-	-	0.8	-	-		-	-	-
	Tengra	-	-	0.01	-	-	-	-	-	-	-	0.04	-	-	0.2	-	0.12		-	-	-
	Bele	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	0.01
	Tilapia	-	-	0.22	-	-	-	0.06	-	-	-	3.2	-	-	0.5	-	1.5	0.2	-	-	-
	Rui	-	-	0.21	-	-	-	-	-	-	-	-	-	-	0.3	-	-		-	-	-
	Catla							-							1.0	-	-		-	-	-
	Vetki	-	-	-	-	-	-	0.4	-	-	-	-	-	-	0.2	-	-		-	-	-
	Chami	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
	Tairel	-	-	-	-	-	-	0.06	-	-	-	-	-	-	-	-	-		-	-	-
Sub-total =		**1.89**	**2.91**	**1.97**	**-**	**-**	**3.5**	**5.17**	**-**	**2.0**	**-**	**4.0**	**-**	**-**	**3.2**	**-**	**2.72**	**0.3**	**-**	**-**	**0.57**
Grand-total =		**16.59**	**10.87**	**29.97**	**-**	**1.0**	**10.12**	**7.87**	**9.0**	**3.14**	**-**	**19.0**	**2.01**	**1.0**	**22.7**	**-**	**39.35**	**19.73**	**30.21**	**-**	**17.59**

Table D.10: The Present Catch in Three (03) Sampling Ghers

Sampling Site	Species	Total Catch (Ton)																						
		21tst QM	22nd QM	23rd QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31st QM	32nd QM	33rd QM	34th QM	35th QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM
1	Bagda	2.72	0.8	-	-	0.3	-	0.7	0.5	-	-	1.2	1.2	0.7	0.7	1.35	2.0	0.01	-	0.20	-	0.1	-	0.09
	Golda	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-
	Harina	3.44	1.0	0.02	2.0	0.2	-	0.15	0.6	0.1	-	0.5	0.2	0.2	0.2	0.59	1.6	0.05	-	-	0.3	0.25	-	0.12
	Bele	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	-
	Chali	-	0.2	-	-	-	-	-	0.3	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chaka	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Paissa	0.17	-	-	-	0.05	-	-	0.05	-	-	-	-	0.05	0.05	-	0.2	0.08	-	-	-	0.04	-	-
	Patari	-	0.3	-	-	0.2	-	-	-	0.3	-	-	-	0.05	0.05	-	-	0.04	-	-	-	0.04	-	-
	Gulsha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kailla	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tilapia	0.7	0.5	-	-	0.5	-		2.0	1.2	-	-	-	2.0	0.2	0.53	4.0	2.4	-	-	1.2	0.09	-	-
	Rui	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Catla	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Minar Carp	-	-	-	-	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Grass Carp	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tairel	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Datina	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kakra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-
	Sub-total =	**7.03**	**2.83**	**0.02**	**2.0**	**2.37**	**-**	**0.85**	**3.45**	**1.7**	**-**	**1.7**	**1.4**	**3.0**	**1.2**	**2.47**	**8.1**	**2.59**	**-**	**0.02**	**1.5**	**0.52**		**-**
2	Bagda	6.74	3.42	-	4.48	1.45	-	0.04	2.73	0.07	-	3.2	1.5	0.07	-	2.4	1.6	-	-	-	-	-	-	0.32
	Golda	0.01	0.4	-	0.03	0.3	-	-	-	-	-	-	-	-	-	0.22	0.4	-	-	-	-	-	-	-
	Harina	-	3.96	0.01	0.92	1.08	-	0.14	0.96	0.81	-	0.28	0.16	0.8	-	0.4	0.6	0.08	-	-	-	-	-	-
	Chali	0.04	0.38	-	0.20	0.3	-	0.03	0.11	0.01	-	0.12	0.1	0.12	-	-	-	-	-	-	-	-	-	-
	Bele	0.09	2.11	-	0.27	0.19	-	-	0.44	0.58	-	0.15	0.15	0.52	-	-	0.15	-	-	-	-	-	-	-
	Tengra	0.57	-	-	0.01	0.17	-	-	0.01	0.02	-	-	0.1	0.02	-	-	-	-	-	-	-	-	-	-
	Paissa	0.01	2.62	-	0.04	1.8	-	-	0.23	0.34	-	0.1	0.2	0.32	-	0.25	0.4	0.16	-	-	-	-	-	0.08
	Vetki/Patari	-	2.25	-	0.25	0.25	-	-	-	1.75	-	0.04	0.6	1.6	-	-	0.2	0.08	-	-	-	-	-	-
	Bhangan	0.08	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sampling Site	Species	Total Catch (Ton)																						
		21tst QM	22nd QM	23rd QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31st QM	32nd QM	33rd QM	34th QM	35th QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM
	Tilapia	0.22	9.85	-	3.87	6.93	-	-	12.9	7.82	-	4.5	-	7.0	-	0.35	-	0.88	-	-	-	-	-	2.98
	Rui	-	1.27	-	1.95	-	-	-	-	0.27	-	-	0.6	0.24	-	-	2.0	0.20	-	-	-	-	-	-
	Catla	-	-	-	0.04	0.05	-	-	-	-	-	-	-	-	-	-	0.2	0.08	-	-	-	-	-	-
	Kailla	-	0.96	-	-	-	-	-	-	0.03	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-
	Grass Carp	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kakra	0.65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Datina	-	1.01	-	-	-	-	-	-	0.06	-	-	0.14	0.06	-	-	-	-	-	-	-	-	-	-
	Chemo	-	0.02	-	0.32	0.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chaka	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nundi Bele	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kakra	-	0.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sub-total =	**8.41**	**28.83**	**0.01**	**12.38**	**12.57**	**-**	**0.21**	**17.38**	**11.76**	**-**	**8.39**	**3.65**	**10.75**	**-**	**3.62**	**5.55**	**1.48**	**-**	**-**	**-**	**-**		**-**
	Bagda	0.02	0.02	-	0.1	0.02	-	0.01	0.04	0.04	-	0.04	0.05	0.06	-	0.02	0.14	0.01	-	0.08	-	0.05	-	0.02
	Golda	0.03	0.01	-	0.03	0.01	-	-	0.01	0.01	-	-	-	-	-	0.01	0.04	0.01	-	0.01	-	0.01	-	0.01
	Harina	0.02	0.01	-	0.15	0.02	-	0.06	0.06	0.04	-	0.07	0.4	0.40	-	0.12	0.18	0.01	-	0.02	0.05	0.04	-	0.03
	Chali	-	0.01	-	-	0.02	-	-	-	-	-	-	-	-	-	-	0.02	0.02	-	-	-	0.04	-	-
	Chaka	0.01	-	-	0.01	0.02	-	-	0.04	0.04	-	-	-	-	-	-		-	-	-	-		-	0.10
	Paissa	0.01	0.06	-	0.05	0.03	-	-	0.12	0.08	-	-	-	0.8	-	0.02	0.1	0.02	-	0.01	0.02	0.05	-	0.10
	Kharsul	-	0.01	-	0.01	-	-	-	-	-		-	-	0.05	-	-	0.04	-	-		-	0.01	-	
	Tengra	-	0.01	-	0.02	0.01	-	-	-	-	-	-	-	-	-	-	0.12	-	-		-	0.01	-	--
3	Bele	-	-	-	0.03	-	-	-	0.01	-	-	-	-	-	-	-	0.02	0.01	-		-	0.01	-	-
	Tilapia	-	0.24	-	-	0.06	-	-	0.08	0.16	-	-	-	0.12	-	-	0.11	0.01	-		0.16	0.06	-	0.01
	Patari	0.01	0.02	-	-	0.02	-	-	0.02	0.04	-	-	0.4	0.04	-	-	0.04	0.01	-		-	0.03	-	-
	Chaina Punti	-	0.05	-	-	-	-	-	-	-		-	-	-	-	-		-	-		-		-	-
	Chami	-	-	-	-	-	-	-	0.04	0.04	-	-	-	-	-	-		-	-		-		-	-
	Ilish	-	-	-	-	0.005	-	-	-	-		-	-	-	-	-		-	-		-		-	-
	Motka	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.01	-		0.02		-	-
	Chaka	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-		-		-	-
	Kakra	-	-	-	-	-	-	0.01	0.12	-	-	-	-	-	-	-		-	-	-	-			0.02

Sampling Site	Species	Total Catch (Ton)																						
		21^{tst} QM	22nd QM	23rd QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31st QM	32nd QM	33rd QM	34th QM	35th QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM
	Tairu	0.01	-	-	0.02	0.01	-	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-		-	-
	Bhangan	0.01	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-		-	-
	Datina	0.03	0.02	-	0.02	0.02	-	-	-	-	-	-	-	-	-	-		-	-	-	-	0.02	-	-
	Pheksa																					0.02	-	-
Sub-total =		**0.15**	**0.46**	**-**	**0.44**	**0.25**	**-**	**0.08**	**0.54**	**0.45**	**-**	**0.11**	**0.85**	**1.47**	**-**	**0.17**	**0.87**	**0.11**	**-**	**0.12**	**0.25**	**0.32**		**-**
Grand-total =		**15.59**	**32.14**	**0.03**	**14.82**	**15.46**	**-**	**1.14**	**21.37**	**13.91**	**-**	**10.20**	**5.90**	**15.22**	**1.2**	**6.26**	**14.52**	**4.18**	**-**	**0.32**	**1.75**	**0.84**		**-**

(E) Traffic Survey Data

Table E.1: Traffic Volume Survey at Khulna Mongla Road (Khudir Bottola)

Date: August 03, 2025 (Sunday)

Vehicles		7:00 AM to 10:00AM			12:00 PM to 2:00PM			17:00 PM to 19:00PM		
Direction	**Factor**	**Khulna to Mongla**	**Mongla to Khulna**	**PCU**	**Khulna to Mongla**	**Mongla to Khulna**	**PCU**	**Khulna to Mongla**	**Mongla to Khulna**	**PCU**
Pedestrian	0	39	18	0	22	11	0	30	17	0
Auto Rickshaw	0.8	3	1	2	0	3	2	0	0	0
Van	0.6	111	84	116	116	118	140	16	152	101
Cycle	0.2	31	13	9	27	5	6	1	29	6
Human Howler	0.6	19	13	19	18	3	12	0	8	5
CNG	0.5	26	23	24	22	21	21	4	15	9
Private Car	1	43	27	70	39	30	68	1	46	47
Motor Cycle	0.3	137	105	73	144	153	89	9	220	69
Jeep	1	5	8	13	9	3	12	2	9	11
Pick-up	2	13	19	63	24	14	76	0	13	26
Micro	1	41	17	58	39	34	73	2	36	38
Bus	2.5	64	40	260	65	50	288	0	44	109
Light Truck	2	16	14	60	13	18	61	0	6	12
Medium Truck	2	51	32	164	66	43	218	0	43	85
Heavy Truck	2	11	12	44	10	7	34	2	6	16
Total				**974**			**1100**			**532**

Table E.2: Traffic Volume Survey at Khulna Mongla Road (Gonaibelai Bridge)

Date: August 2, 2025 (Saturday)

Vehicles		7:00 AM to 10:00AM			12:00 PM to 2:00PM			17:00 PM to 19:00PM		
Direction	**Factor**	**Babubari to Plant site**	**Plant site to Babubari**	**PCU**	**Babubari to Plant site**	**Plant site to Babubari**	**PCU**	**Babubari to Plant site**	**Plant site to Babubari**	**PCU**
Pedestrian	0	12	12	0	7	4	0	5	5	0
Auto Rickshaw	0.8	0	0	0	0	0	0	0	0	0
Van	0.6	37	34	42	20	9	17	16	17	20
Cycle	0.2	22	8	6	10	5	3	1	11	2
Human Howler	0.6	8	10	11	3	3	4	0	2	1
CNG	0.5	7	7	7	7	3	5	4	4	4
Private Car	1	4	5	9	2	2	4	1	2	3
Motor Cycle	0.3	38	36	22	39	27	20	9	27	11
Jeep	1	0	1	1	1	1	2	2	0	2
Pick-up	2	0	1	2	0	1	1	0	2	4
Micro	1	2	2	4	3	3	6	2	4	6
Bus	2.5	0	0	1	1	1	4	0	3	6
Light Truck	2	0	0	1	2	1	5	0	0	0
Medium Truck	2	1	0	2	0	0	0	0	0	0
Heavy Truck	2	0	0	0	1	1	2	2	0	4
			Total	**108**			**71**			**63**

Table E.3: Traffic Volume Survey at Power Plant access road (Gonai Bridge)

Date: August 1, 2025 (Friday)

Vehicles		7:00 AM to 10:00AM			12:00 PM to 2:00PM			17:00 PM to 19:00PM		
Direction	**Factor**	**Khulna to Mongla**	**Mongla to Khulna**	**PCU**	**Khulna to Mongla**	**Mongla to Khulna**	**PCU**	**Khulna to Mongla**	**Mongla to Khulna**	**PCU**
Pedestrian	0	12	13	0	13	21	0	18	23	0
Auto Rickshaw	0.8	0	0	0	0	0	0	0	0	0
Van	0.6	18	23	24	30	72	61	48	48	57
Cycle	0.2	3	12	3	3	4	1	5	7	2
Human Howler	0.6	10	8	11	3	12	9	9	17	15
CNG	0.5	9	14	11	10	11	10	22	10	16
Private Car	1	7	11	17	3	6	8	4	13	17
Motor Cycle	0.3	28	27	16	30	70	30	65	61	38
Jeep	1	2	1	2	1	2	3	1	2	3
Pick-up	2	3	2	10	3	7	19	1	6	14
Micro	1	7	3	10	2	5	7	3	6	9
Bus	2.5	7	6	34	6	5	28	13	10	55
Light Truck	2	5	1	13	5	0	10	2	2	7
Medium Truck	2	8	2	20	8	5	24	8	14	43
Heavy Truck	2	2	1	5	3	2	9	4	3	14
			Total	**178**					**218**	

(F) Ecological survey data

Table F.1: Plant species composition of the sampled homesteads

Sl. No.	Species Name	Local Name	Family	Rajnagar				Borni				Kalekarber				Chalkghona				Total Number of individuals	pi	Ln pi	pi*ln pi	Biodiversity Index
				Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16					
1	*Acrostichum aureum*	Tiger Fern	Pteridaceae					23	32		25				15	3	12			110	0.18	-1.71	-0.31	
2	*Albizia richardiana*	Chambol	Fabaceae					1	1		1	1	1	3	1					9	0.01	-4.21	-0.06	
3	*Albizia saman*	Rendi Koroi	Fabaceae					4		2										6	0.01	-4.62	-0.05	
4	*Aphanamixis polystachya*	Rhyna	Meliaceae										1	1						2	0.00	-5.72	-0.02	
5	*Areca catechu*	Supari	Arecaceae				3	1	5	2	5		1							17	0.03	-3.58	-0.10	
6	*Azadirachta indica*	Neem	Meliaceae					3				1		2	3					9	0.01	-4.21	-0.06	
7	*Borassus flabellifer*	Taal	Arecaceae								1	3			4			2		10	0.02	-4.11	-0.07	
8	*Cocos nucifera*	Narikel	Arecaceae		5	1	4	2		1						2				15	0.02	-3.70	-0.09	
9	*Diospyros pregrina*	Gaab	Ebenaceae										4	5	5					14	0.02	-3.77	-0.09	
10	*Excoecaria agallocha*	Gewa	Euphorbiaceae	15	4	7	3		9							21	10	4		73	0.12	-2.12	-0.25	
11	*Ficus hispida*	Dumur	Moraceae				1					1	3					1	1	7	0.01	-4.47	-0.05	
12	*Hibiscus tiliaceus*	Bola	Malvaceae	5				2		3					5					15	0.02	-3.70	-0.09	
13	*Lannea coromandelica*	Jigar	Anacardiaceae			6		5	2						1		5	2		21	0.03	-3.37	-0.12	
14	*Manilkara zapota*	Safeda	Sapotaceae									2								2	0.00	-5.72	-0.02	
15	*Mimusops elengi*	Bokul	Sapotaceae										1							1	0.00	-6.41	-0.01	
16	*Moringa oleifera*	Sazna	Moringaceae					1		1			2		1				1	6	0.01	-4.62	-0.05	
17	*Musa sp*	Kola	Musaceae		2	6						8	13					2	1	32	0.05	-2.95	-0.15	
18	*Phoenix sylvestris*	Khejur	Arecaceae	6	3						3				2		5	2		21	0.03	-3.37	-0.12	
19	*Phyllanthus acidus*	Orboroi	Phyllanthaceae						1			1		1						3	0.00	-5.31	-0.03	
20	*Pithecellobium dulce*	Jilapi	Fabaceae													1	1			2	0.00	-5.72	-0.02	
21	*Pongamia pinnata*	Koromja	Fabaceae							2						1		1		4	0.01	-5.03	-0.03	
22	*Psidium guajava*	Peyara	Myrtaceae		1													2		3	0.00	-5.31	-0.03	
23	*Sonneratia apetala*	Kewra	Lythraceae		1	1														2	0.00	-5.72	-0.02	3.01
24	*Magnifera Indica*	Aam	Anacardiaceae									1						3	2	6	0.01	-4.62	-0.05	
25	*Swietenia mahagoni*	Mahagoni	Meliaceae					4				17	11	7	6				1	46	0.08	-2.58	-0.20	
26	*Tamarindus indica*	Tentul	Fabaceae	3	1															4	0.01	-5.03	-0.03	
27	*Terminalia catapa*	Kathbadam	Combretaceae			1														1	0.00	-6.41	-0.01	
28	*Ziziphus mauritiana*	Kul boroi	Rhamnaceae															1		1	0.00	-6.41	-0.01	
29	*Acacia auriculiformis*	Akashmoni	Fabaceae							2										2	0.00	-5.72	-0.02	
30	*Morinda citrifolia*	Noni	Rubiaceae					3	5	6	8									22	0.04	-3.32	-0.12	
31	*Khaya Anthotheca*	Lombu	Meliaceae								1									1	0.00	-6.41	-0.01	
32	*Avicenia officinalis*	Baen	Acanthaceae		1													1		2	0.00	-5.72	-0.02	
33	*Eucalyptus sp*	Eucalyptus	Myrtaceae					1												1	0.00	-6.41	-0.01	
34	*Ficus benjamina*	Lokkho Pakur	Moraceae	1				1			1									3	0.00	-5.31	-0.03	
35	*Euphorbia tirucalli*	Pencil Tree	Euphorbiaceae		1			20		10	3									34	0.06	-2.89	-0.16	
36	*Acanthus ilicifolius*	Hargoja	Acanthaceae	30	35															65	0.11	-2.24	-0.24	
37	*Ceiba pentandra*	Shet shimul	Bombacaceae															1	1	2	0.00	-5.72	-0.02	
38	*Nypa fruticans*	Golpata	Arecaceae																2	2	0.00	-5.72	-0.02	
39	*Averrhoa carambola*	Kamranga	Oxalidacea									1								1	0.00	-6.41	-0.01	
40	*Citrus grandis*	Jambura	Rutaceae	1																1	0.00	-6.41	-0.01	
41	*Colocasia esculenta*	Taro	Araceae			3			5										4	12	0.02	-3.93	-0.08	
42	*Cordia dichotoma*	Bohal/Gum Tree	Boraginaceae					1		2										3	0.00	-5.31	-0.03	
43	*Cassia fistula*	Sonalu	Fabaceae							2	1									3	0.00	-5.31	-0.03	
44	*Lawsonia inermis*	Mehedi	Lythraceae			4	7													11	0.02	-4.01	-0.07	
45	*Syzygium samarangense*	Jamrul	Myrtaceae															1		1	0.00	-6.41	-0.01	
46	*Erythrina ovalifolia*	Mandar	Fabaceae				1													1	0.00	-6.41	-0.01	
Total				**61**	**54**	**29**	**19**	**72**	**60**	**33**	**49**	**36**	**37**	**19**	**43**	**28**	**33**	**23**	**13**	**609**	**1**	**(218)**	**(3)**	**3.01**

Source: Field Survey, July, 2025.

Table F.2: Proportion of healthy and unhealthy plants in studied homesteads

Location		Rajnagar								Borni										Kalekarber Dighi									Chalkghona							
Plant Name		*Cocos nucifera*	*Phoenix sylvestris*	*Manilkara zapota*	*Albizia saman*	*Excoecaria agallocha*	*Mangifera indica*	*Psidium guajava*	*Heritiera fomes*	*Cocos nucifera*	*Phoenix sylvestris*	*Borassus flabellifer*	*Mangifera indica*	*Excoecaria agallocha*	*Swietenia mehogani*	*Areca catechu*	*Manilkara zapota*	*Psidium guajava*	*Syzygium cumini*	*Cocos nucifera*	*Phoenix sylvestris*	*Mangifera indica*	*Manilkara zapota*	*Borassus flabellifer*	*Zizyphus sp*	*Psidium guajava*	*Tamarindus indica*	*Swietenia mehogani*	*Cocos nucifera*	*Phoenix sylvestris*	*Albizia saman*	*Excoecaria agallocha*	*Manilkara zapota*	*Psidium guajava*	*Mangifera indica*	*Borassus flabellifer*
Total No. of Plant		**17**	**25**	**1**	**2**	**100**	**3**	**2**	**1**	**10**	**12**	**6**	**6**	**18**	**11**	**10**	**1**	**2**	**1**	**56**	**10**	**5**	**1**	**8**	**1**	**8**	**2**	**1**	**39**	**24**	**3**	**36**	**1**	**17**	**7**	**2**
	Apr-14	NS	NS	NS	NS	NS	NS	NS	-	-	-	3	3	-	-	-	-	2	-	35	-	1	-	-	-	1	-	-	25	-	-	-	-	7	2	-
	Jun-14	10	15		-	-	1	2	-	3	5	1	3	-	-	6	-	1	-	5	3	1	-	-	-	-	-	-	19	10	-	-	-	7	1	-
	Apr-15	5	4		-	1	-	-	-	-	4	-	1	-	-	2	-	-	-	1	-	-	-	-	-	-	-	-	5	1	-	1	-	-	-	-
	Aug-15	4	9		-	-	-	-	-	1	1	-	-	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-	20	5	-	-	-	-	-	-
	Oct-15	5	13		-	-	-	-	-	2	4	-	-	-	-	2	-	-	-	3	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
	Oct-16	3	10		-	-	-	-	-	1	4	-	-	-	-	-	-	-	-	1	3	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-
	Jan-17	4	2		-	-	-	-	-	2	3	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	2	-	-	-	-	-	1	-
	Jan-18	6	5		-	-	1	-	-	3	4	-	-	-	-	-	-	-	-	-	3	-	-	-	-	1	-	-	4	5	-	-	-	-	-	-
	Nov-18	4	6		-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
	Feb-19	4	8		-	-	-	-	-	1	-	1	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	3	-	1	-	-	3	-	-
No. of Unhealthy Plant	**Apr-19**	3	9		-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	4	1	-	-	-	-	-	-
	Jul-19	2	5		-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-
	Nov-19	3	3		-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	4	2	-	-	-	1	-	-
	Feb-20	10	4		-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	3	1	-	-	-	-	-	-
	Jul-20	3	4		-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-	-	5	3	-	-	-	-	-	-
	Nov-20	7	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
	Jan 21	11	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
	Apr-21	10	12	-	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	2	-	-	-	-
	Jul-21	10	2	-	2	10	2	-	-	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
	Nov-21	10	3	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
	Jan-22	3	2	-	-	-	-	-	1	1	-	-	3	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-
	May-22	1	2	-	2	-	-	-	-	-	-	-	3	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-

Location	Rajnagar								Borni										Kalekarber Dighi									Chalkghona							
Plant Name	*Cocos nucifera*	*Phoenix sylvestris*	*Manilkara zapota*	*Albizia saman*	*Excoecaria agallocha*	*Mangifera indica*	*Psidium guajava*	*Heritiera fomes*	*Cocos nucifera*	*Phoenix sylvestris*	*Borassus flabellifer*	*Mangifera indica*	*Excoecaria agallocha*	*Swietenia mehogani*	*Areca catechu*	*Manilkara zapota*	*Psidium guajava*	*Syzygium cumini*	*Cocos nucifera*	*Phoenix sylvestris*	*Mangifera indica*	*Manilkara zapota*	*Borassus flabellifer*	*Zizyphus sp*	*Psidium guajava*	*Tamarindus indica*	*Swietenia mehogani*	*Cocos nucifera*	*Phoenix sylvestris*	*Albizia saman*	*Excoecaria agallocha*	*Manilkara zapota*	*Psidium guajava*	*Mangifera indica*	*Borassus flabellifer*
Jul-22	2	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dec-22	4	7	1	2	12	3	2	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	2	2	-	-	-	-	1	-
Feb-23	5	3	D	L	3	D	D	-	-	-	-	-	1	-	-	-	-	-	1	1	-	-	-	-	-	-	-	1	2	-	-	-	-	0	-
May-23	7	2	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	3	3	-	-	-	-	3	-
Sep-23	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
Nov-23	2	4	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-
Feb-24	15	2	-	-	3	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
May-24	2	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jul-24	1	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aug-24	1	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oct-24	1	1	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Feb-25	1	-	-	-	-	-	-	-	1	-	-	1	-	-	-	1	-	3	1	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
Jul-25	2	1	-	-	-	-	-	-	3	-	-	1	-	-	-	-	-	3	3	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table F.3: Dolphin observation Datasheet

Monitoring Tier	Tidal Condition	Passur River at Project Site	Karamjal	Harbaria	Akram Point	Moidara River	Shella River at Chandpai
Apr-14	FT	Y	NS	NS	NS	Y	NS
	NT	Y	NS	NS	NS	N	NS
Jun-14	FT	Y	NS	NS	NS	N	NS
	NT	Y	N	N	N	N	NS
Oct-14	FT	Y	NS	NS	NS	Y	NS
	NT	Y	Y	Y	N	Y	NS
Jan-15	FT	Y	Y	Y	NS	Y	NS
	NT	Y	Y	N	Y	N	NS
Apr-15	FT	Y	N	N	Y	Y	NS

Monitoring Tier	Tidal Condition	Passur River at Project Site	Karamjal	Harbaria	Akram Point	Moidara River	Shella River at Chandpai
	NT	Y	N	N	Y	N	NS
Aug-15	FT	Y	NS	N	NS	Y	NS
	NT	Y	Y	N	NS	N	NS
Oct-15	FT	NS	NS	Y	N	NS	NS
	NT	Y	Y	NS	Y	Y	NS
Oct-15	FT	Y	Y	Y	Y	N	NS
	NT	Y	N	N	NS	Y	NS
Jul-16	FT	Y	Y	Y	NS	Y	NS
	NT	Y	NS	Y	NS	NS	NS
Oct-16	FT	N	Y	Y	N	NS	NS
	NT	Y	Y	NS	N	Y	NS
Jan-17	FT	Y	Y	N	NS	N	NS
	NT	Y	Y	N	NS	Y	NS
Jan-18	FT	Y	NS	Y	N	NS	NS
	NT	Y	Y	N	N	Y	N
Jun-18	FT	Y	N	N	N	Y	Y
	NT	Y	NS	N	Y	Y	NS
Nov-18	FT	NS	N	N	N	NS	NS
	NT	Y	N	N	N	Y	Y
Feb-19	FT	NS	Y	Y	N	NS	Y
	NT	Y	N	N	Y	N	NS
Apr-19	FT	NS	Y	N	N	NS	NS
	NT	N	N	Y	N	N	Y
Jul-19	FT	Y	Y	N	N	Y	Y
	NT	Y	NS	N	N	N	NS
Nov-19	FT	NS	Y	Y	N	NS	Y
	NT	Y	Y	N	Y	Y	Y
Feb-20	FT	Y	Y	Y	Y	Y	Y
	NT	Y	N	NS	NS	Y	Y
Jul-20	FT	Y	N	N	N	Y	Y
	NT	Ns	Y	N	N	NS	Y
Nov-20	FT	NS	NS	NS	NS	NS	Y
	NT	Y	NS	NS	NS	Y	NS
Jan-21	FT	NS	NS	NS	NS	NS	Y
	NT	Y	NS	NS	NS	Y	NS
	FT	NS	N	N	N	Y	Y

Monitoring Tier	Tidal Condition	Passur River at Project Site	Karamjal	Harbaria	Akram Point	Moidara River	Shella River at Chandpai
Dec-22	NT	Y	NS	NS	N	NS	NS
Feb-23	FT	NS	NS	Y	NS	Y	Y
	NT	Y	NS	NS	Y	NS	NS
May-23	FT	NS	NS	N	NS	Y	Y
	NT	Y	Y	NS	N	NS	NS
Sep-23	FT	NS	Y	N	NS	Y	Y
	NT	NS	N	Y	N	NS	NS
Nov-23	FT	NS	N	Y	N	NS	NS
	NT	Y	N	Y	N	Y	Y
Nov-23	FT	y	N	N	N	Y	NS
	NT	N	Y	N	N	NS	Y
Feb-24	FT	y	N	N	N	Y	NS
	NT	N	Y	N	N	NS	Y
May-24	FT	NS	N	N	N	Y	NS
	NT	N	Y	NS	N	NS	Y
Aug-24	FT	NS	Y	NS	N	NS	Y
	NT	Y	Y	N	N	Y	NS
Oct-24	FT	NS	Y	NS	N	NS	NS
	NT	Y	Y	Y	N	Y	Y
Jan-25	FT	Y	Y	NS	N	Y	NS
	NT	NS	Y	Y	N	NS	Y
July-25	FT	Y	N	Y	N	Y	N
	NT	NS	Y	Y	N	Y	Y
Note: FT=Flood Tide, NT=Neap Tide, NS=Not Surveyed; Occurrence Status: Y = Occurred, N = Not occurred							

Table F4: Bird Nest Monitoring Datasheet

Monitoring Tier	Location	Name of nesting Bird								
		Little Cormorant	Little Egret	Asian Pied Starling	Tailor Bird	Great Egret	Black-rumped Flameback	Common Myna	RV Bulbul	Jungle myna
1st QM (Apr 2014)	R	NS	NS	NS	NS	NS	-	-	-	-
	B	-	-	1	-		-	-	-	-
	K	NS	NS	NS	NS	NS	-	-	-	-
	C	-	1	-	1	-	-	-	-	-
2nd QM (Jun 2014)	R	12	4	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C			11		-	-	-	-	-
3rd QM	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
4th QM	R					-	-	-	-	-
	B					-	-	-	-	-
	K					-	-	-	-	-
	C					-	-	-	-	-
5th QM	R					-	-	-	-	-
	B					-	-	-	-	-
	K					-	-	-	-	-
	C					-	-	-	-	-
6th QM (Aug 2015)	R	1	5	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
7th QM (Jan 2016)	R			-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
7th QM (Jun 2016)	R	10	5	-	-	3	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	1	1	-	-	-	-	-	-	-
11th QM (Oct 2016)	R	-	-			-	-	-	-	-

Monitoring Tier	Location	Name of nesting Bird								
		Little Cormorant	Little Egret	Asian Pied Starling	Tailor Bird	Great Egret	Black-rumped Flameback	Common Myna	RV Bulbul	Jungle myna
	B	-	-			-	-	-	-	-
	K	-	-			-	-	-	-	-
	C	-	-			-	-	-	-	-
12th QM (Jan 2017)	R	-	-			-	-	-	-	-
	B	-	-			-	-	-	-	-
	K	-	-			-	-	-	-	-
	C	-	-			-	-	-	-	-
13th QM (Jan 2018)	R	-	-			-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	1	-	-	-	-	-	-	-
18th QM (Nov 2018)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
19th QM (Feb 2019)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	1	-	-	-	-	-
20th QM (Apr 2019)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
21th QM (Jul 2019)	R	-	-	-	1	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
22th QM (Nov 2019)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
22th QM (Feb 2020)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-

Monitoring Tier	Location	Name of nesting Bird								
		Little Cormorant	**Little Egret**	**Asian Pied Starling**	**Tailor Bird**	**Great Egret**	**Black-rumped Flameback**	**Common Myna**	**RV Bulbul**	**Jungle myna**
23th QM (Jul 2020)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
24th QM (Nov 2020)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
25th QM (Jan 2021)	R	-	-	1	1	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
30th QM (Feb 2022)	R	-	-	-			-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
31th QM (Jan 2022)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
32th QM (May 2022)	R	-	-	-	-	-	1	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	1	-	-	-
	C	-	-	-	-	-	-	-	-	-
32th QM (Jul 2022)	R	-	-	-	-	-	1	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	1	-	-	-
	C	-	-	-	-	-	-	-	-	-
33th QM (Dec 2022)	R	-	-	-	-	-	1	-	-	-
	B	-	-	-	-	-	-	10	-	-
	K	-	-	-	-	-	1	-	-	-
	C	-	-	-	-	-	-	-	-	-
34th QM (Feb 2023)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-

Monitoring Tier	Location	Name of nesting Bird								
		Little Cormorant	Little Egret	Asian Pied Starling	Tailor Bird	Great Egret	Black-rumped Flameback	Common Myna	RV Bulbul	Jungle myna
	C	-	-	-	-	-	-	-	-	-
35th QM (May 2023)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	2	-	-	-	-	-	-
36th QM (Sep 2023)	R	-	-	-	-	-	-	-	1	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-		-	-	-	-	-	-
37th QM (Sep 2023)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	2	-	-
38th QM (Feb 2024)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
39th QM (May 2024)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
40th QM (July 2024)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
41th QM (July 2024)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-
42nd QM (July 2024)	R	-	-	-	-	-	-	-	-	
	B	-	-	-	-	-	-	-	-	
	K	-	-	-	-	-	-	-	-	
	C	-	-	-	-	-	-	-	-	2
43rd QM (Feb 2025)	R	-	-	-	-	-	-	-	-	
	B	-	-	-	-	-	-	-	-	

Monitoring Tier	Location	Name of nesting Bird								
		Little Cormorant	Little Egret	Asian Pied Starling	Tailor Bird	Great Egret	Black-rumped Flameback	Common Myna	RV Bulbul	Jungle myna
	K	-	-	-	-	-	-	-	-	
	C	-	-	-	-	-	-	-	-	
44rd QM (April 2025)	R	-	-	2	-	-	-	-	-	
	B	-	-	-	-	-	1	-	-	
	K	-	-	-	1	-	-	-	-	
	C	-	-	2	-	-	-	-	-	
45th QM (July 2025)	R	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-	-	-

Appendix V: Analysis Results from the Laboratory

CEGIS Center for Environmental and Geographic Information Services
(A Public Trust under the Ministry of Water Resources)
House 6, Road 23/C, Gulshan-1, Dhaka-1212, Bangladesh.

Environmental Laboratory

Ref No. ELAB202508000092-1 **Date: 18/09/2025**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Monitoring of Environmental Parameter & Implementation of EMP along with engineering activities during construction period of 2x660 MW MSTPP at Rampal, Bagerhat. Project Code: FPC008

Location (Geographic): 89°33' 13.7"E; 22° 35' 43"N Sampling ID: AQ-01 Sampling Date: (30-31)/07/2025

Monitoring Location (Administrative): Maitree Township Area, Bagerhat, Khulna
Weather Condition: Raining

Analysis Results:

SL. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter (PM_{10})	μg/m³	6.77	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	Sensor based instrumentation method
02	Particulate Matter ($PM_{2.5}$)	μg/m³	5.2	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
03	Suspended Particulate Matter (SPM)	μg/m³	11.97	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.112	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	μg/m³	3.65	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	μg/m³	7.24	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	μg/m³	4.16	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

Checked by
Name: Md. Rafiqul Islam
Designation: Research Associate & Scientific Instrument In-Charge (addl.)
Signature:

Approved by
Name: Md. Rafiqul Alam
Designation: Laboratory Expert
Signature:

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Environmental Laboratory

Ref No. ELAB202508000092-2 **Date: 18/09/2025**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Monitoring of Environmental Parameter & Implementation of EMP along with engineering activities during construction period of 2x660 MW MSTPP at Rampal, Bagerhat. Project Code: FPC008

Location (Geographic): 89°35'16.49"; 22°34'37.11"N Sampling ID: AQ-02 Sampling Date: 31/07/2025

Monitoring Location (Administrative): Access Road bridge area or Taltola Bazar/BIFPCL (Project), Bagerhat.
Weather Condition: Raining & Cloudy

Analysis Results:

SL. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter (PM_{10})	μg/m³	13.12	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	Sensor based instrumentation method
02	Particulate Matter ($PM_{2.5}$)	μg/m³	10.12	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
03	Suspended Particulate Matter (SPM)	μg/m³	23.23	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.12	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	μg/m³	2.54	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	μg/m³	5.21	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	μg/m³	5.02	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

Checked by
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Signature:

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Name: Md. Rafiqul Alam
Designation: Laboratory Expert
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Environmental Laboratory

Ref No. ELAB202508000092-3 **Date: 18/09/2025**

Test Report

Analysis of Ambient Air Quality Monitoring Report

Project Name: Monitoring of Environmental Parameter & Implementation of EMP along with engineering activities during construction period of 2x660 MW MSTPP at Rampal, Bagerhat. Project Code: FPC008

Location (Geographic): 89°31'24.2"E; 22°36'6.7"N Sampling ID: AQ-03 Sampling Date: 01/08/2025

Monitoring Location (Administrative): Chalna Bazar Area, Dacope, Bagerhat, Khulna
Weather Condition: Sunny

Analysis Results:

SL NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter (PM_{10})	μg/m³	35.08	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	Sensor based instrumentation method
02	Particulate Matter ($PM_{2.5}$)	μg/m³	21.52	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
03	Suspended Particulate Matter (SPM)	μg/m³	56.60	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.21	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	μg/m³	2.63	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	μg/m³	4.63	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	μg/m³	7.80	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

Checked by	**Approved by**
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Environmental Laboratory

Ref No. ELAB202508000092-4 **Date: 18/09/2025**

Test Report

Analysis of Ambient Air Quality Monitoring Report

Project Name: Monitoring of Environmental Parameter & Implementation of EMP along with engineering activities during construction period of 2x660 MW MSTPP at Rampal, Bagerhat. Project Code: FPC008

Location (Geographic): 89°33'34.5"E; 22°34'33.8"N Sampling ID: AQ-04 Sampling Date: 02/08/2025

Monitoring Location (Administrative): South-West corner of the project Boundary, Moidara, Bagerhat, Khulna
Weather Condition: Cloudy

Analysis Results:

SL NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter (PM_{10})	μg/m³	21.20	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	Sensor based instrumentation method
02	Particulate Matter ($PM_{2.5}$)	μg/m³	15.48	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
03	Suspended Particulate Matter (SPM)	μg/m³	36.67	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.15	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	μg/m³	2.36	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	μg/m³	5.21	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	μg/m³	8.03	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

Checked by	**Approved by**
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Environmental Laboratory

Ref No. ELAB202508000092-5 **Date: 18/09/2025**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Monitoring of Environmental Parameter & Implementation of EMP along with engineering activities during construction period of 2x660 MW MSTPP at Rampal, Bagerhat.

Project Code: FPC008

Location (Geographic): 89°32'3.8"E; 22°36'32.5"N Sampling ID: AQ-05 Sampling Date: 06/08/2025

Monitoring Location (Administrative): Propose Township area near Chimney location, Sapmari, Bagerhat, Khulna
Weather Condition: Sunny

Analysis Results:

SL. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter (PM_{10})	µg/m³	16.32	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	Sensor based instrumentation method
02	Particulate Matter ($PM_{2.5}$)	µg/m³	12.32	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
03	Suspended Particulate Matter (SPM)	µg/m³	28.64	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.21	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	0.68	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	4.31	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	8.35	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

Checked by	**Approved by**
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Environmental Laboratory

Ref No. ELAB202508000092-6 **Date: 18/09/2025**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Monitoring of Environmental Parameter & Implementation of EMP along with engineering activities during construction period of 2x660 MW MSTPP at Rampal, Bagerhat.

Project Code: FPC008

Location (Geographic): 89°33'51.8"E; 22°36'1.06"N Sampling ID: AQ-06 Sampling Date: 04/08/2025

Monitoring Location (Administrative): North west corner of the project boundary (Koigardas Kathir Char)
Weather Condition: Sunny

Analysis Results:

SL. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter (PM_{10})	µg/m³	17.92	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	Sensor based instrumentation method
02	Particulate Matter ($PM_{2.5}$)	µg/m³	13.73	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
03	Suspended Particulate Matter (SPM)	µg/m³	31.65	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.13	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	2.02	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	4.79	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	5.47	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

Checked by	**Approved by**
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Environmental Laboratory

Ref No. ELAB202508000092-7 **Date: 18/09/2025**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Monitoring of Environmental Parameter & Implementation of EMP along with engineering activities during construction period of 2x660 MW MSTPP at Rampal, Bagerhat. Project Code: FPC008

Location (Geographic): 89°34'01.1"E; 22°32'3.3"N Sampling ID: AQ-07 Sampling Date: 03/08/2025

Monitoring Location (Administrative): Bauja Union 4km south west from the chimney location, Bagerhat, Khulna
Weather Condition: Sunny

Analysis Results:

Sl. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter (PM_{10})	µg/m³	14.76	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	Sensor based instrumentation method
02	Particulate Matter ($PM_{2.5}$)	µg/m³	11.34	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
03	Suspended Particulate Matter (SPM)	µg/m³	26.10	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.15	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	1.91	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	4.01	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	5.75	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

Checked by	**Approved by**
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Environmental Laboratory

Ref No. ELAB202508000092-8 **Date: 18/09/2025**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Monitoring of Environmental Parameter & Implementation of EMP along with engineering activities during construction period of 2x660 MW MSTPP at Rampal, Bagerhat. Project Code: FPC008

Location (Geographic): 89°34'37.7"E; 22°38'51.8"N Sampling ID: AQ-08 Sampling Date: 05/08/2025

Monitoring Location (Administrative): Barni, Gaurambha 4 KM North-West from the Chimney location, Bagerhat
Weather Condition: Sunny

Analysis Results:

Sl. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter (PM_{10})	µg/m³	24.49	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	Sensor based instrumentation method
02	Particulate Matter ($PM_{2.5}$)	µg/m³	18.20	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
03	Suspended Particulate Matter (SPM)	µg/m³	42.69	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.24	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	3.77	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	4.83	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	7.43	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

Checked by	**Approved by**
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Environmental Laboratory

Ref No. ELAB202508000092-9 **Date: 18/09/2025**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Monitoring of Environmental Parameter & Implementation of EMP along with engineering activities during construction period of 2x660 MW MSTPP at Rampal, Bagerhat.
Project Code: FPC008

Location (Geographic): 89°35'35.5"E; 22°46'36.8"N Sampling ID: AQ-09 Sampling Date: 07/08/2025

Monitoring Location (Administrative): Khulna Khan Jahan Ali Bridge near toll plaza area, Bagerhat, Khulna
Weather Condition: Rainy

Analysis Results:

SL. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter (PM_{10})	µg/m³	31.55	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	Sensor based instrumentation method
02	Particulate Matter ($PM_{2.5}$)	µg/m³	21.69	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
03	Suspended Particulate Matter (SPM)	µg/m³	53.24	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.27	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	2.19	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	5.98	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	6.9	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment- AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

Checked by
Name: Md. Rafiqul Islam
Designation: Research Associate & Scientific Instrument In-Charge (addl.)
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Approved by
Name: Md. Rafiqul Alam
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Environmental Laboratory

Ref No. ELAB202508000092-10 **Date: 18/09/2025**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Monitoring of Environmental Parameter & Implementation of EMP along with engineering activities during construction period of 2x660 MW MSTPP at Rampal, Bagerhat.
Project Code: FPC008

Location (Geographic): 89°35'50.4"E; 22°28'24.8"N Sampling ID: AQ-10 Sampling Date: 08/08/2025

Monitoring Location (Administrative): Mongla Port Area, Rampal
Weather Condition: Sunny & Rainy

Analysis Results:

SL. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter (PM_{10})	µg/m³	29.06	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	Sensor based instrumentation method
02	Particulate Matter ($PM_{2.5}$)	µg/m³	20.61	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
03	Suspended Particulate Matter (SPM)	µg/m³	49.67	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.22	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	3.26	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	5.46	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	6.11	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment- AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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Environmental Laboratory

Ref No. ELAB202508000092-11 **Date: 18/09/2025**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Monitoring of Environmental Parameter & Implementation of EMP along with engineering activities during construction period of 2x660 MW MSTPP at Rampal, Bagerhat. Project Code: FPC008

Location (Geographic): 89°35'34.2"E 22°17'43.1"N Sampling ID: AQ-11 Sampling Date: 09/08/2025

Monitoring Location (Administrative): Harbaria, Bagerhat, Khulna
Weather Condition: Cloudy

Analysis Results:

SL NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter (PM_{10})	µg/m³	2.04	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	Sensor based instrumentation method
02	Particulate Matter ($PM_{2.5}$)	µg/m³	1.44	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
03	Suspended Particulate Matter (SPM)	µg/m³	3.48	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.11	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	1.91	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	4.37	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	2.5	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

Checked by	**Approved by**
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Environmental Laboratory

Ref No. ELAB202508000092-12 **Date: 18/09/2025**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Monitoring of Environmental Parameter & Implementation of EMP along with engineering activities during construction period of 2x660 MW MSTPP at Rampal, Bagerhat. Project Code: FPC008

Location (Geographic): 89°27'53.2"E; 21°46'27.60"N; Sampling ID: AQ-12 Sampling Date: 11/08/205

Monitoring Location (Administrative): Hiron Point, Sundarban, Bagerhat, Khulna
Weather Condition: Rainy & Cloudy

Analysis Results:

SL NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter (PM_{10})	µg/m³	1.22	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	Sensor based instrumentation method
02	Particulate Matter ($PM_{2.5}$)	µg/m³	0.93	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
03	Suspended Particulate Matter (SPM)	µg/m³	2.15	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.65	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	7.01	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	3.70	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	2.93	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

Checked by	**Approved by**
Name: Md. Rafiqul Islam	Name: Md. Rafiqul Alam
Designation: Research Associate & Scientific Instrument In-Charge (addl.)	Designation: Laboratory Expert
Signature:	Signature:

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Environmental Laboratory

Ref No. ELAB202508000092-13 **Date: 18/09/2025**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Monitoring of Environmental Parameter & Implementation of EMP along with engineering activities during construction period of 2x660 MW MSTPP at Rampal, Bagerhat. Project Code: FPC008

Location (Geographic): 89°30'54.1"E, 22° '23.50"N Sampling ID: AQ-13 Sampling Date: 12/08/2025

Monitoring Location (Administrative): Akram Point (Sibsa River), Bagerhat, Khulna
Weather Condition: Rainy & Cloudy

Analysis Results:

SL NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter (PM_{10})	µg/m³	3.39	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	Sensor based instrumentation method
02	Particulate Matter ($PM_{2.5}$)	µg/m³	1.72	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
03	Suspended Particulate Matter (SPM)	µg/m³	5.11	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.58	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	6.72	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	2.47	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	2.422	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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Signature:

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Designation: Laboratory Expert
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Environmental Laboratory

Memo No. ELAB202505004009 Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_001 Collection Date: April/May-2025

Location: N/A

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^m Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_1	Nitrate (NO_3^-)	-	-	7	-	1.7900	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	234.55	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.2223	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & Checked by
Name: Rafiqul Islam & Md. Rafiqul Alam
Designation: Research Associate & Scientific Instrument In-Charge (addl) and Laboratory Expert
Signature: 29.06.25

Compiled & Approved by
Name: Md. Rafiqul Alam
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Environmental Laboratory

Memo No. ELAB202505004010

Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_002 Collection Date: April/May-2025

Location: N/A

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^m Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_2	Nitrate (NO_3^-)	-	-	7	-	1.5167	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	223.22	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.1491	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

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Environmental Laboratory

Memo No. ELAB202505004011

Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_003 Collection Date: April/May-2025

Location: N/A

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^m Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_3	Nitrate (NO_3^-)	-	-	7	-	2.0844	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	228.15	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.1339	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

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Environmental Laboratory

Memo No. ELAB202505004012

Date: 29/06/2025

Test Report

Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_004 Collection Date: April/May-2025

Location: N/A

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^m Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_4	Nitrate (NO_3^-)	-	-	7	-	2.5470	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	229.55	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.2233	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & Checked by

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Environmental Laboratory

Memo No. ELAB202505004013

Date: 29/06/2025

Test Report

Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_005 Collection Date: April/May-2025

Location: N/A

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^m Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_5	Nitrate (NO_3^-)	-	-	7	-	2.0003	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	235.48	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.1128	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

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Environmental Laboratory

Memo No. ELAB202505004014 Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_006 Collection Date: April/May-2025

Location: N/A

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^m Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_6	Nitrate (NO_3^-)	-	-	7	-	1.4956	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	216.29	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.1260	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & Checked by

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Environmental Laboratory

Memo No. ELAB202505004015 Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_007 Collection Date: April/May-2025

Location: N/A

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^m Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_7	Nitrate (NO_3^-)	-	-	7	-	1.3274	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	230.56	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.1204	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & Checked by

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Environmental Laboratory

Memo No. ELAB202505004016 Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_008 Collection Date: April/May-2025

Location: N/A

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997 Drinking	Bangladesh Standard ECR/1997 Others	Bangladesh Standard ECR/2023 Drinking	Bangladesh Standard ECR/2023 Others	Concentration Present	Unit	Analysis Method	Min^m Detection Limit (MDL)
01	SW_8	Nitrate (NO_3^-)	-	-	7	-	2.3367	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	232.22	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.0951	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

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Environmental Laboratory

Memo No. ELAB202505004017 Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_009 Collection Date: April/May-2025

Location: N/A

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997 Drinking	Bangladesh Standard ECR/1997 Others	Bangladesh Standard ECR/2023 Drinking	Bangladesh Standard ECR/2023 Others	Concentration Present	Unit	Analysis Method	Min^m Detection Limit (MDL)
01	SW_9	Nitrate (NO_3^-)	-	-	7	-	7.6986	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	232.72	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.1134	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & Checked by

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Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert

Signature: 29.06.25

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Name: Md. Rafiqul Alam

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Environmental Laboratory

Memo No. ELAB202505004018 Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_010 Collection Date: April/May-2025

Location: N/A

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_{10}	Nitrate (NO_3^-)	-	-	7	-	9.8854	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	277.25	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.4953	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & Checked by
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Environmental Laboratory

Memo No. ELAB202505004019 Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_011 Collection Date: April/May-2025

Location: Shapmari.

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_{11}	Nitrate (NO_3^-)	-	-	7	-	2.4208	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	228.93	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.1608	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

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Environmental Laboratory

Memo No. ELAB202505004020 Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_012 Collection Date: April/May-2025

Location: Mongla.

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^m Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_{12}	Nitrate (NO_3^-)	-	-	7	-	6.1426	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	227.04	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.1529	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & Checked by
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Environmental Laboratory

Memo No. ELAB202505004021 Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_013 Collection Date: April/May-2025

Location: Harbaria.

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^m Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_{13}	Nitrate (NO_3^-)	-	-	7	-	1.3274	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	227.33	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.0929	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & Checked by
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Name: Md. Rafiqul Alam
Designation: Laboratory Expert
Signature: 29.06.25

CEGIS Center for Environmental and Geographic Information Services
(A Public Trust under the Ministry of Water Resources)
House 6, Road 23/C, Gulshan-1, Dhaka-1212, Bangladesh.
Tel: 88 02 58817649-52, 9842581, 9842551 Fax: 88 02 9843128 e-mail: cegis@cegisbd.com http://www.cegisbd.com

Environmental Laboratory

Memo No. ELAB202505004022 Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_014 Collection Date: April/May-2025

Location: Akram Point.

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_{14}	Nitrate (NO_3^-)	-	-	7	-	0.4653	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	224.92	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.2182	ppt	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & Checked by
Name: Rafiqul Islam & Md. Rafiqul Alam
Designation: Research Associate & Scientific Instrument In-Charge (addl. and Laboratory Expert
Signature: 29.06.25

Compiled & Approved by
Name: Md. Rafiqul Alam
Designation: Laboratory Expert
Signature: 29.06.25

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Environmental Laboratory

Memo No. ELAB202505004023 Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_015 Collection Date: April/May-2025

Location: Hiron Point.

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_{15}	Nitrate (NO_3^-)	-	-	7	-	0.6756	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	234.60	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.0519	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & Checked by
Name: Rafiqul Islam & Md. Rafiqul Alam
Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert
Signature: 29.06.25

Compiled & Approved by
Name: Md. Rafiqul Alam
Designation: Laboratory Expert
Signature: 29.06.25

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Environmental Laboratory

Memo No. ELAB202505004024 Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Drinking Water ID: FPC008_016 Collection Date: April/May-2025

Location: PPj RO Drinking.

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	GW_1	Nitrate (NO_3^-)	10	-	45	-	1.9793	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	400	-	250	-	0.4496	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	6	-	-	-	0.0219	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & Checked by

Name: Rafiqul Islam & Md. Rafiqul Alam

Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert

Signature: 29.06.25

Compiled & Approved by

Name: Md. Rafiqul Alam

Designation: Laboratory Expert

Signature: 29.06.25

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Environmental Laboratory

Memo No. ELAB202505004025 Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_017 Collection Date: April/May-2025

Location: Rajanagar.

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	GW_2	Nitrate (NO_3^-)	10	-	45	-	2.3367	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	400	-	250	-	2.5926	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	6	-	-	-	0.5900	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & Checked by

Name: Rafiqul Islam & Md. Rafiqul Alam

Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert

Signature: 29.06.25

Compiled & Approved by

Name: Md. Rafiqul Alam

Designation: Laboratory Expert

Signature: 29.06.25

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Environmental Laboratory

Memo No. ELAB202505004026 Date: 29/06/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_018 Collection Date: April/May-2025

Location: Kapashdanga.

Received From: Md. Mutasim Bilah Received Date: 28/05/2025 Testing Date: 01-26/06/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^m Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	GW₃	Nitrate (NO_3^-)	10	-	45	-	6.2267	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	400	-	250	-	3.5799	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	6	-	-	-	1.5796	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & Checked by

Name: Rafiqul Islam & Md. Rafiqul Alam

Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert

Signature: 29.06.25

Compiled & Approved by

Name: Md. Rafiqul Alam

Designation: Laboratory Expert

Signature: 29.06.25

Form No. QSF-22 Revision No. 14 Revision Date: 04 November, 2024

জীবনের জন্য বিজ্ঞান

বাংলাদেশ বিজ্ঞান ও শিল্প গবেষণা পরিষদ

BANGLADESH COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Institute of National Analytical Research and Service (INARS)

ANALYSIS REPORT

ASC Ref No. : IN-258 of Analytical Service Cell
BCSIR-02/06/2025

Lab/Sample ID : A-911-933

Client's Details : মোঃ মু'তাসিম বিল্লাহ
রিসার্চ এসোসিয়েট, সি.ই.জি.আই.এস.
Center For Environmental And Geographic Information Service (CEGIS)
CEGIS Bhaban, Plot: F-14/E, Agargaon Administrative Area,
Sher-E-Bangla Nagar, Dhaka-1207.

Number of Sample : 23 (Twenty Three)

Sample Description : রামপাল ২×৬৬০ মেঃ ওঃ বিদ্যুৎ প্রকল্পের অধীনে পানির নমুনা পরীক্ষণ প্রসংগে,
তারিখঃ ০২/০৬/২০২৫ ইং।

Test Commencement Date : 02/06/2025

Test Completion Date : 09/09/2025

Lab ID	Particulars of supplied sample	Parameters	Results	Test Method (APHA)
A-911	Water (Hiron Point)	Oil and Grease	Less than 2.0 mg/L	5520.B
A-912	Water (Harbaria)	Oil and Grease	Less than 2.0 mg/L	5520.B
A-913	Water (Mongla Con.)	Oil and Grease	Less than 2.0 mg/L	5520.B
A-914	Water (Akram Point)	Oil and Grease	Less than 2.0 mg/L	5520.B
A-915	Water (Jetty Site)	Oil and Grease	Less than 2.0 mg/L	5520.B

Page 1 of 3

Note:
a. The results reported here are based only on the supplied samples in this laboratory.
b. Any complain about test report will not be acceptable after one month from the date of issuing of the said report.
c. This report/result shall not be reproduced/published without prior approval of the authority.

Analytical Service Cell
Dr. Qudrat-I-Khuda Road, Dhanmondi, Dhaka-1205, Bangladesh
Telephone: 9671108, Fax: 88-02-9671108 E-mail:asc@bcsir.gov.bd Wedsite: www.bcsir.gov.bd

Form No. QSF-22 Revision No. 14 Revision Date: 04 November, 2024

জীবনের জন্য বিজ্ঞান

বাংলাদেশ বিজ্ঞান ও শিল্প গবেষণা পরিষদ

BANGLADESH COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Lab ID	Particulars of supplied sample	Parameter	Results	Test Method (APHA)
A-916	Surface Water (Sample-01)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-917	Surface Water (Sample-02)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-918	Surface Water (Sample-03)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-919	Surface Water (Sample-04, Jetty)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-920	Surface Water (Sample-05)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-621	Surface Water (Sample-06)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-922	Surface Water (Sample-07)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-923	Surface Water (Sample-08)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-924	Surface Water (Sample-09)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-925	Surface Water (Sample-10)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-926	Surface Water (Sample-11, Shapmari)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B

Page 2 of 3

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Telephone: 9671108, Fax: 88-02-9671108 E-mail:asc@bcsir.gov.bd Website: www.bcsir.gov.bd

Form No. QSF-22 Revision No. 14 Revision Date: 04 November, 2024

জীবনের জন্য বিজ্ঞান

বাংলাদেশ বিজ্ঞান ও শিল্প গবেষণা পরিষদ

BANGLADESH COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Lab ID	Particulars of supplied sample	Parameter	Results	Test Method (APHA)
A-927	Water (GW, Rajnagar)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-928	Surface Water (Harbaria)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-929	Surface Water (Hiron Point)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-930	Water (GW, Power Plant)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-931	Water (GW, Kapashdanga)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-932	Surface Water (Akram Point)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B
A-933	Water (Mongla Con.)	Mercury (Hg)	Less than 0.0001 mg/L	3112.B
		Lead (Pb)	Less than 0.01 mg/L	3111.B

09/09/2025

Analyst

Md. Tanzil Ahamed Shawon
Scientific Officer
Institute of National Analytical Research & Service (INARS)
BCSIR, Dhanmondi, Dhaka-1205

9/09/25

Supervisor

Dr. Md. Ahedul Akbor
Principal Scientific Officer
Institute of National Analytical Research & Service (INARS)
BCSIR, Dhaka-1205

09/09/25

Director

Dr. Md. Salim Khan
Director (Additional In-Charge)
Institute of National Analytical Research and Service (INARS)
BCSIR, Dhaka-1205.

Page 3 of 3

Note:

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পরিবেশ বিজ্ঞান ডিসিপ্লিন খুলনা বিশ্ববিদ্যালয়

Environmental Science Discipline
Khulna University

Sample analysis Jan 2025 (**Sample 1**)

Experiment point	Total species diversity/L	Indivudual number of species/L					
		Phytoplankton	Abundance (n/L)	Zooplankton	Abundance (n/L)	Benthos	Abundance (n/L)
Confluence	2	Oscillatoria princeps	372	-		Polychaeta	434
Harbaria	11	*Leptocylindrus*	67	*Calanus sp.*	43		
		Carteria sp.	104	*Brachionus rubens*	38	Nil	
		Coscinodiscus granii Gough	124				
		Pleurosigma	73				
		cymatopleura	56				
		Radiofilum	45				
		Coscinodiscus excentricus	110				
		Closteriopsis sp.	72				
		Raphidiopsis mediterranea skuja	56				
Hiron point	8	*Lyngbya confervoides*	982	*Calanus sp*	79	*Polychaeta*	987
		Rhizosolenia setigara	789			*unidentified*	234
		Oscillatoria princeps	678				
		Asterionellopsis glacialis	789				
		Coscinodiscus excentricus	456				
Akram point	7	*Coscinodiscus granii Gough*	120			Mollusc	890
		Thalassionema sp.	80				
		Pleurosigma angulatum	72	*Calanus sp*	32		
		Coscinodiscus excentricus	88				
		Alexandrium catenella	96				
Jetty	11	*Coscinodiscus excentricus*		*Brachionus rubens*	22		
		Raphidiopsis mediterranea skuja	897				
		Oscillatoria princeps	450				
		Coscinodiscus granii Gough	456				
		Nitzschia lorenziana	76				
		Homoeothrix sp.	345				
		Raphidiopsis mediterranea skuja	123				

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1

পরিবেশ বিজ্ঞান ডিসিপ্লিন খুলনা বিশ্ববিদ্যালয়

Environmental Science Discipline
Khulna University

Sample analysis Jan 2025 (**Sample 1**)

Experiment point	Total species diversity/L	Indivudual number of species/L					
		Phytoplankton	Abundance (n/L)	Zooplankton	Abundance (n/L)	Benthos	Abundance (n/L)
Jetty		*Coscinodiscus granii Gough*	234				
		Leptocylindrus	54				
		Aphanizomenon flos-aquae	43				
		Ulnaria sp.	*124*				
Moidara	12	*Proboscia alata*	456				
		Raphidiopsis mediterranea skuja	789	*Brachionus calyciflorus*	67		
		Eucampia	456				
		Thalassiosira weissflogii					
Moidara		*Coscinodiscus sp.*	567			Snail	35
		Fragilariopsis oceanica	345				
		Leptocylindrus	234				
		Aphanizomenon flos-aquae	567				
		Guinardia sp.	345				
		Coscinodiscus granii Gough	675				
Khalkerber	9	*Aphanocapsa sp.*	76				
		Pleurosigma angulatum	56				
		Tropidoneis	38				
		Scytonema	64				
		Aphanizomenon flos-aquae	90			shrimp larvae	32
		Raphidiopsis mediterranea skuja	84				
		Planktothrix	54				
		Pandorina	38				
Koigor daskathi	11	*Proboscia sp.*	70	*Brachionus calyciflorus*	78	shrimp larvae	20
		Pleurosigma angulatum	2647			Snail	36
		Planktothrix	88				
		Eucampia	67				
		Coscinodiscus centralis	345				
		Aphanizomenon flos-aquae	123				
		Microcystis	125				
		Oscillatoria princeps	300				

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2

পরিবেশ বিজ্ঞান ডিসিপ্লিন খুলনা বিশ্ববিদ্যালয়

Environmental Science Discipline
Khulna University

Sample 2: June 2025

Experiment point	Total species diversity/L	Indivudual number of species/L					
		Phytoplankton	Abundance (n/L)	Zooplankton	Abundance (n/L)	Benthos	Abundance (n/L)
Khalkerber-	9	*Aphanocapsa sp.*	56				
		Pleurosigma angulatum	47				
		Tropidoneis	49				
		Scytonema	60				
		Aphanizomenon flos-aquae	38			shrimp larvae	7
		Raphidiopsis mediterranea skuja	48				
		Pandorina	70				
		Planktothrix					
Koigor daskathi	8	*Microcystis*		*Brachionus calyciflorus*	78	Snail	20
		Pleurosigma angulatum	2647				
		Planktothrix	88				
		Eucampia	67				
		Coscinodiscus centralis	345				
		Aphanizomenon flos-aquae	123				

08.10.2025
(Dr. Salma Begum)
Professor
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Government of the People's Republic of Bangladesh
Office of the Chief Chemist
Department of Public Health Engineering
Central Lab, 38-39, Mohakhali C/A, Dhaka-1212
Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 63/ CC, DPHE, CL, Dhaka

Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070067	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-01)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.005	mg/L	AAS	0.001
2	Calcium (Ca)	75	370	mg/L	AAS	0.17
3	Chemical Oxygen Demand (COD)	4.0	428	mg/L	CRM	4.0
4	Chloride	150-600	10000	mg/L	Titrimetic	-
5	Silica (Sio2)	0.0	9.6	mg/L	UVS	-
6	Bi-Carbonate (HCO3-)	0.0	120	mg/L	Titrimetic	-
7	Hardness	200-500	4300	mg/L	Titrimetic	-
8	Iron (Fe)	0.3-1	40.49	mg/L	AAS	0.05
9	Magnesium (Mg)	30-35	686	mg/L	AAS	0.05
10	Potassium (K)	12.0	345	mg/L	AAS	-
11	Sodium (Na)	200	4050	mg/L	AAS	0.34
12	Total Dissolved Solid (TDS)	1000	14600	mg/L	Multimeter	-
13	Total Suspended Solid (TSS)	10	133	mg/L	Gravimetric Method	-
14	Turbidity	10	645	NTU	Turbidity Meter	-
15	Carbonate (CO3)	-	0.69	mg/L	Titrimetic	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

24/07/2025
Md. Biplab Hossain
Chief Chemist
Department of Public Health Engineering
Central Laboratory Mohakhali, Dhaka

Page 1 of 2

Government of the People's Republic of Bangladesh
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Lab Nemo: 63/ CC, DPHE, CL, Dhaka

Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070068	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-02)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.003	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	412	mg/L	CRM	4.0
3	Hardness	200-500	4200	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	14400	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	26	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist	24/07/2025
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 63/ CC, DPHE, CL, Dhaka

Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070069	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-03)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.004	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	464	mg/L	CRM	4.0
3	Hardness	200-500	4400	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	15500	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	135	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist	24/07/2025
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 63/ CC, DPHE, CL, Dhaka　　Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070070	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukterruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-04)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.005	mg/L	AAS	0.001
2	Calcium (Ca)	75	415	mg/L	AAS	0.17
3	Chemical Oxygen Demand (COD)	4.0	448	mg/L	CRM	4.0
4	Chloride	150-600	11300	mg/L	Titrimetic	-
5	Silica (Sio2)	0.0	4.8	mg/L	UVS	-
6	Bi-Carbonate (HCO3-)	0.0	100	mg/L	Titrimetic	-
7	Hardness	200-500	4500	mg/L	Titrimetic	-
8	Iron (Fe)	0.3-1	30.58	mg/L	AAS	0.05
9	Magnesium (Mg)	30-35	780	mg/L	AAS	0.05
10	Potassium (K)	12.0	408	mg/L	AAS	-
11	Sodium (Na)	200	4010	mg/L	AAS	0.34
12	Total Dissolved Solid (TDS)	1000	16100	mg/L	Multimeter	-
13	Total Suspended Solid (TSS)	10	146	mg/L	Gravimetric Method	-
14	Turbidity	10	530	NTU	Turbidity Meter	-
15	Carbonate (CO3)	-	0.82	mg/L	Titrimetic	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Alam　　Parvs 24/07/2025　　24/07/2025

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Lab Memo: 63/ CC, DPHE, CL, Dhaka　　Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070071	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukterruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-05)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.003	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	400	mg/L	CRM	4.0
3	Hardness	200-500	4500	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	16500	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	27	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	Parvs 24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist	24/07/2025
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 63/ CC, DPHE, CL, Dhaka

Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070072	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-06)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.003	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	400	mg/L	CRM	4.0
3	Hardness	200-500	4500	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	16000	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	95	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	Parves 24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist	
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	BHossain 24/07/2025

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Lab Memo: 63/ CC, DPHE, CL, Dhaka

Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070073	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-07)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.003	mg/L	AAS	0.001
2	Calcium (Ca)	75	504	mg/L	AAS	0.17
3	Chemical Oxygen Demand (COD)	4.0	428	mg/L	CRM	4.0
4	Chloride	150-600	11000	mg/L	Titrimetic	-
5	Silica (Sio2)	0.0	10.2	mg/L	UVS	-
6	Bi-Carbonate (HCO3-)	0.0	110	mg/L	Titrimetic	-
7	Hardness	200-500	4100	mg/L	Titrimetic	-
8	Iron (Fe)	0.3-1	7.43	mg/L	AAS	0.05
9	Magnesium (Mg)	30-35	820	mg/L	AAS	0.05
10	Potassium (K)	12.0	360	mg/L	AAS	-
11	Sodium (Na)	200	5030	mg/L	AAS	0.34
12	Total Dissolved Solid (TDS)	1000	15600	mg/L	Multimeter	-
13	Total Suspended Solid (TSS)	10	31	mg/L	Gravimetric Method	-
14	Turbidity	10	219	NTU	Turbidity Meter	-
15	Carbonate (CO3)	-	0.70	mg/L	Titrimetic	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Alam   Parves 24/07/2025   BHossain 24/07/2025

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Lab Memo: 63/ CC, DPHE, CL, Dhaka

Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070074	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-08)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.004	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	460	mg/L	CRM	4.0
3	Hardness	200-500	4300	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	16400	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	35	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by: Signature	Countersigned/Approved by: Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer Parves 24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist Betoros 24/07/2025
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist

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Lab Memo: 63/ CC, DPHE, CL, Dhaka

Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070075	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-09)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.006	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	428	mg/L	CRM	4.0
3	Hardness	200-500	4400	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	16100	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	212	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by: Signature	Countersigned/Approved by: Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer Parves 24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist Betoros 24/07/2025
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist

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Lab Memo: 63/ CC, DPHE, CL, Dhaka

Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070076	Sample Receiving date: 01-06-2025
Ref.Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-10)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.004	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	400	mg/L	CRM	4.0
3	Hardness	200-500	4400	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	16150	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	225	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by: Signature	Countersigned/Approved by: Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer Parves 24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist B.Hossain 24/07/2025

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Lab Memo: 63/ CC, DPHE, CL, Dhaka

Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070077	Sample Receiving date: 01-06-2025
Ref.Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-11)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.003	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	392	mg/L	CRM	4.0
3	Hardness	200-500	3600	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	12900	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	16	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by: Signature	Countersigned/Approved by: Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer Parves 24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist B.Hossain 24/07/2025

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Lab Memo: 63/ CC, DPHE, CL, Dhaka | Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070078	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-12)	Union:, Vill.:Mongla Confluence
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.003	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	400	mg/L	CRM	4.0
3	Hardness	200-500	4100	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	15000	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	43	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	Parvs 24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist	24/07/2025
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 63/ CC, DPHE, CL, Dhaka | Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070079	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-13)	Union:, Vill.:Harbaria
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.003	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	316	mg/L	CRM	4.0
3	Hardness	200-500	4100	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	15700	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	38	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	Parvs 24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist	24/07/2025
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Office of the Chief Chemist
Department of Public Health Engineering
Central Lab, 38-39, Mohakhali C/A, Dhaka-1212
Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 63/ CC, DPHE, CL, Dhaka

Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070080	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukterуzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-14)	Union:, Vill.:Akram Point
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.003	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	212	mg/L	CRM	4.0
3	Hardness	200-500	5500	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	21400	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	70	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	Parvs 24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist	
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	B.Hossain 24/07/2025

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Lab Memo: 63/ CC, DPHE, CL, Dhaka

Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070081	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Surface Water
Sent by:Mohammed Mukterуzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : SW-15)	Union:, Vill.:Hiron Point
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.004	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	368	mg/L	CRM	4.0
3	Hardness	200-500	5600	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	23700	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	82	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	Parvs 24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist	
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	B.Hossain 24/07/2025

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Lab Memo: 63/ CC, DPHE, CL, Dhaka

Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070082	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Ground Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : GW-01)	Union:, Vill.:Rajnagar
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.005	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	12	mg/L	CRM	4.0
3	Hardness	200-500	225	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	400	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	1.7	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist	24/07/2025
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 63/ CC, DPHE, CL, Dhaka

Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070083	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Ground Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : GW-02)	Union:, Vill.:Karpasdanga
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.055	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	48	mg/L	CRM	4.0
3	Hardness	200-500	300	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	670	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	1.3	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist	24/07/2025
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 63/ CC, DPHE, CL, Dhaka

Date: 24-07-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025070084	Sample Receiving date: 01-06-2025
Ref. Memo No: 42.06.0000.119.09.001.25.01952 & Dated: 01-06-2025	Sample Source: Ground Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample ID : GW-03)	Union:, Vill.:Project Site
Sample Collection date:	Date of Testing: 01/06/2025-20/07/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.001	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	12	mg/L	CRM	4.0
3	Hardness	200-500	190	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	260	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	1	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	Parves 24/07/2025	1.) Name: Mita Sarker Designation: Senior Chemist	24/07/2025
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 24.07.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
কৃষি মন্ত্রণালয়
মৃত্তিকা সম্পদ উন্নয়ন ইনস্টিটিউট
বিভাগীয় গবেষণাগার, ঢাকা
মৃত্তিকা ভবন, কৃষি খামার সড়ক, ঢাকা-১২১৫

প্রাপকঃ

জনাব মোহাম্মদ মোকতারুজ্জামান
পরিচালক (ভারপ্রাপ্ত)
পাওয়ার, এনার্জি এন্ড মিনারেল রিসোর্সেস ডিভিশন
সিইজিআইএস, ঢাকা-১২১২।

প্রেরিত মৃত্তিকা নমুনার বিশ্লেষিত ফলাফল

ক্রমিক নম্বর	ল্যাব নম্বর	উপাদানের নাম														
		পিএইচ	লবণাক্ততা	জৈব পদার্থ	মোট নাইট্রোজেন	ফসফরাস	পটাসিয়াম	ক্যালসিয়াম	ম্যাগনেসিয়াম	সালফার	বোরন	লৌহ	ম্যাঙ্গানিজ	দস্তা	লেড	ক্যাডমিয়াম
			ডিএস/মিটার	(%)		সহজলভ্য	বিনিময়যোগ্য			সহজলভ্য					মোট	
						(ppm)	(meq/100g soil)			(ppm)						
১.	৯৯৪০	৬.৩	১.১০	৩.৩৯	০.১৯	৪.৪৪	০.৭১	১৫.৪৫	৮.২৬	৩০৮.২৫	০.৬৮	৩৮.৭৫	১১.৭৭	২.০৯	২৮.৮০	০.১৪
২.	৯৯৪১	৬.৭	১.৬০	২.৩৪	০.১৩	৫.৪৪	০.৭৯	১২.৮৬	৮.৬২	২২৫.৩০	০.৫৭	২৫.৬০	৪.৪০	০.৯৬	২৮.০২	০.২৮
৩.	৯৯৪২	৭.০	১.০৬	২.২২	০.১২	৪.৯৪	০.৭১	১১.৫৫	৯.১০	১০৫.৫৩	০.৫৯	৬.১৬	৩.৭৩	০.৫১	২৮.৮০	০.১৭
৪.	৯৯৪৩	৪.৭	০.৭১	৩.৬২	০.২১	২.২৬	০.৬৯	৬.৪৬	৯.২৯	১৬৫.২০	০.৭০	১৫৭.৮৯	২১.১০	১.৯৫	২৫.৬৯	০.১৭
৫.	৯৯৪৪	৪.৮	২.৪৬	৩.৩৯	০.১৯	৩.২৫	০.৭৭	৪.৮৩	৯.৪৫	২০৮.৪০	০.৮১	১২৪.১৬	১৮.২৪	১.২২	২৭.২৪	০.৩১
৬.	৯৯৪৫	৫.৬	১.৬০	২.৩৪	০.১৩	৩.৮৫	০.৮৪	৫.৪২	১০.৬২	৩২০.২২	০.৪৮	৩৫.২৫	১৭.৩১	১.১৬	২৭.২৪	০.৪৩
৭.	৯৯৪৬	৫.৮	০.৭৬	৩.৫১	০.২০	২.২৭	০.৮৬	৯.৭৩	১০.৪৯	২৮০.১২	০.৮৬	২৯.০৮	১৪.৭৬	০.৬০	২৫.৬৯	০.২৮
৮.	৯৯৪৭	৭.০	০.৮৩	২.৩৪	০.১৩	৩.৮৫	১.১১	১৬.৫৯	৮.৩৬	৩৩৬.১০	০.৯৭	৩০.২১	১৭.১৪	১.০৪	২৪.৯১	০.১৭
৯.	৯৯৪৮	৭.৫	২.৬৪	২.২২	০.১২	৪.১৬	০.৯৫	১৬.৫০	১১.১৫	২১৬.১৮	০.৮৬	৩০.২২	২০.৬৮	০.৭৭	২৩.৩৫	০.২৮
১০.	৯৯৪৯	৭.৭	২.৩৪	২.৫৬	০.১৪	৪.৫১	০.৮৪	১৭.৭২	৬.৮০	১৮৫.৬০	০.৭৩	২৫.৫৪	১০.০১	১.১৮	২২.৫৭	০.২০
১১.	৯৯৫০	৭.৭	২.৬৮	৩.২৭	০.১৯	৬.৭৫	০.৭৮	২২.০০	৪.৭৭	২২৬.৮৫	০.৭৮	২৩.০৪	১৮.৫৭	১.০২	২৪.১৩	০.২৮
১২.	৯৯৫১	৭.৭	২.১৩	২.৬৮	০.১৫	৭.১৩	০.৭৯	২১.৭৯	৫.৫৩	১৭০.৫০	০.৭২	২৫.৬০	১২.৭৩	১.১৭	২৪.১৩	০.২৬

প্রেরিত মৃত্তিকা নমুনার বিশ্লেষিত ফলাফল

ক্রমিক নম্বর	ল্যাব নম্বর	উপাদানের নাম														
		পিএইচ	লবণাক্ততা	জৈব পদার্থ	মোট নাইট্রোজেন	ফসফরাস	পটাসিয়াম	ক্যালসিয়াম	ম্যাগনেসিয়াম	সালফার	বোরন	লৌহ	ম্যাঙ্গানিজ	দস্তা	লেড	ক্যাডমিয়াম
			ডিএস/মিটার	(%)		সহজলভ্য	বিনিময়যোগ্য			সহজলভ্য					মোট	
						(ppm)	(meq/100g soil)			(ppm)						
১৩.	৯৯৫২	৭.৯	১.১৮	২.৮১	০.১৬	৫.০১	০.৯৫	১৮.৯৪	৬.৬৭	১৮৮.২৫	০.৯৫	২৫.১৪	১২.৪৫	১.০৯	২৪.৯১	০.১১
১৪.	৯৯৫৩	৮.০	২.৬৮	২.৩৪	০.১৩	৪.৬৮	০.৮৮	১৭.৪৯	৫.৮১	২৫৫.৪৫	০.৮০	২৩.৬০	১৪.৬৭	১.০৯	২৪.৯১	০.৫৫
১৫.	৯৯৫৪	৭.৯	২.২৬	২.৪৫	০.১৪	৫.৮৭	০.৭৯	১৮.৪০	৫.৫৬	১২৫.৯০	০.৮৯	২৩.৮৯	১৬.০৭	০.৯৬	২৪.৯১	০.৩১
১৬.	৯৯৫৫	৭.৮	২.৭১	৩.১৫	০.১৮	৫.৩২	০.৯৮	১৮.৯৬	৬.৮৯	২০৭.৪৫	০.৮৩	২৫.৬৫	১৬.৪৭	১.১৬	২৭.২৪	০.০২
১৭.	৯৯৫৬	৭.৮	২.১৮	২.২২	০.১২	৪.৪১	০.৯৯	২০.৮৫	৮.৩৪	৩১২.২০	০.৯৭	২৩.১৫	১২.৩৬	১.২০	২৮.০২	০.১৪
১৮.	৯৯৫৭	৭.৯	২.৩৩	২.০০	০.১১	৪.৩৬	০.৯২	১৭.১৩	৬.৫৫	৩১০.২৫	০.৭২	১৩.১৬	১৫.১৫	০.৮৫	২৫.৬৯	০.৪০

M. Begum
০৪/০২/২২
(ড. মাসুদা বেগম)
উর্ধ্বতন বৈজ্ঞানিক কর্মকর্তা
ফোন ঃ ০২-৪১০২৫০৬৬।

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