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SURFACE AND GROUND WATER QUALITY REPORT 2021

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Surface and Ground Water Quality Report 2021

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Editors:

Dr Abdul Hamid
Director General
Department of Environment

Syeda Masuma Khanam
Director (Joint Secretary)
Natural Resource Management
Department of Environment

AKM Rafiqul Islam
Deputy Director (Water & Bio)
Natural Resources Management

Department of Environment

Technical Guidance and Supervision

Zawata Afnan
Assistant Director (Water & Bio)
Natural Resources Management
Department of Environment

Report Compilation:

Md. Abubakar Ahmed (Biplob)
Junior Consultant

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MESSAGE

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Rivers and wetlands are lifeline of Bangladesh. Three major river systems namely the Ganges, the Brahammaraputra and the Maghna which drain through the country of the Bay of Bengal created huge floodplains, active and moribund and a good number of unique water ecosystems. Industrialization, urbanization and other development initiatives pose a continuous risk of pollution of surface and ground waters. Water is a major need for a growing economy with a continuous growth rate of more than 7 percent a year. water is also impotant for irrigation, health, domestic use and for fisheries and other biodiversity.

Department of Environment (DoE) has been monitoring surface water quality since its establishment in 1973. DoE's surface water quality monitoring network includes pollution hotspots of rivers, lakes, marine water (on a limited scale) and ground water.

Surface and Ground Water Quality Report 2021 is the ninth of its kind that gives overall status of river and ground water quality in Bangladesh. Municipal and industrial solid wastes, untreated sewage and effluents, are highly polluting rivers surrounding major cities and other urban growth centers. Water quality of rivers around the major cities and towns were not within the quality standards as set in the Environment Conservation Rules, 2023, the quality of water of large rivers such as the padma, the Meghna, the Jamuna, the Brahmmaputa was within the limit. Water quality of some rivers in southern coastal region degraded due to high salinity and turbidity and thus, waters of those rivers are often unfit for domestic and agricultural use specially in the dry season.

This report also highlighted the necessary steps to be taken for improvement in monitoring water quality and sustainable management of aquatic ecosystems. Hopefully this doccument will be useful in decision making for conservation of degraded riverine ecosystems of Bangladesh.

I sincerely thank Natural Resources Management and Research wing of the Department for preparing this report.

Dr Abdul Hamid
Director General
Department of Environment

FOREWORD

The aquatic ecosystem of Bangladesh is increasingly being threatened by surface water pollution and excessive ground water abstraction. Bangladesh, as a downstream part of three major rivers is dominated by floodplain and deltaic ecosystem. The aquatic ecosystem of these rivers, haors, baors and perennial flood-plains largely depends on the quality of its water. Population increases, release of untreated industrial effluents and sewage, unplanned solid waste dumping along the river banks, encroachment and non-point source pollution for agricultural activities are continuously deteriorating the water quality and their aquatic ecosystem. The dry season availability of both surface and ground water is already under pressure due to upstream uptake by the neighboring countries. Hence, monitoring of the quality and continuous improvement initiatives are vital for better ecosystem services.

The quality of water of rivers in dry season surrounding Dhaka city, near Chattagram city, Khulna city and near other major urban areas were below the Environmental Quality Standard (EQS) depicted in the Environmental Conservation rules, 2023. The pollution level of different points along a single stress of a river also varied. River erosion and dumping of solid waste increased the turbidity of river water in some sampling points. The water quality of three lakes in Dhaka was mostly below the EQS although Gulshan Lake's data showed some improvements.

The report suggests future programme of actions for conservation of water resources. Implementation of recommended activities in this report is vital to pave the way of conservation and sustainable use of water resources at various levels of our development agenda.

Syeda Masuma Khanam
Director (Joint Secretary)
Natural Resource Management
Department of Environment

EDITORIAL NOTES

Water is an essential element for industrial as well as agricultural development. Water quality refers to the chemical, physical, biological, and radiological characteristics of water. It is a measure of the condition of water relative to the requirements of one or more biotic species and or to any human need or purpose. It is most frequently used by reference to a set of standards against which compliance can be assessed. The most common standards used to assess water quality relate to health of ecosystems, safety of human contact, and drinking water. Water quality and quantity greatly affects ecosystems productivity and services they provide. To provide with necessary information for sustainable services especially of aquatic ecosystem, continuous monitoring of water quality is essential.

Water quality parameters like p^H, Dissolve Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Turbidity, Total Dissolve Solids (TDS), Suspended Solid (SS), Total Alkalinity, Electrical Conductivity (EC), Chloride and Salinity presented in this report were measured more or less round the year of 2021. Basic analysis was done on all rivers included in this report. The report did not incorporate biological data and data which were not measured/received from the DoE Laboratories. Due to limited time and resource allocation, it also did not cover all the analytical methods. A number of data are missing in various months due to unavailability. The yearly trend analysis of water quality of major rivers was avaraged data and hence the data variation was unexpectedly high in some cases.

As water pollution affects the entire biosphere of plants and organisms living in these water bodies, as well as organisms and plants that might be exposed to the water, this report can act as a guide for intervention measures.

AKM Rafiqul Islam
Deputy Director (Water & Bio)

ACKNOWLEDGEMENT

The River Water Quality Report 2021 is an effort of series of analytical results of water quality data that were collected by the Laboratories of Department of Environment (DoE). At the outset, I would like to express our gratitude to Dr A.K.M Rarique Ahmed, Director General, Department of Environment, for the supervision and guidance during the preparation of this report. Our sincere gratitude to all laboratories' personnel (Directors, Deputy Directors, Senior Chemists, Junior Chemists, Assistant Biochemists and Sample Collectors) of all six laboratories of DoE for collecting water samples, conducting on-site and laboratory tests of water and provide us the data. Without their support it could not be done. I would like to extend our sincere thanks and appreciation to the editors Dr. Fahmida Khanom, Director (Natural Resources Management & Research) and A K M Rafiqul Islam, Deputy Director (Water & Bio) for their continuous efforts with excellent guidance to accomplish this report. Special thanks are also extended to Mr. Md. Abubakar Ahmed, Junior Consultant, for compiling data for this report.

Zawata Afnan
Assistant Director (Water & Bio.)

ABBREVIATIONS

BOD	-	Biochemical Oxygen Demand
COD	-	Chemical Oxygen Demand
TDS	-	Total Dissolved Solids
EC	-	Electrical Conductivity
ECA	-	Ecologically Critical Area
ECR	-	Environmental Conservation Rules
DO	-	Dissolved Oxygen
SS	-	Suspended Solids
DoE	-	Department of Environment
EQS	-	Environmental Quality Standard
GEMS	-	Global Environment Monitoring System
GPS	-	Global Positioning System
IWM	-	Integrated Watershed Management
NTU	-	Nephelometric Turbidity Unit
SoE	-	State of the Environment
WQI	-	Water Quality Index
WCZ	-	Water Control Zone

GLOSSARY

pH

In chemistry, **p**H is a logarithmic scale used to specify the acidity or basicity of an aqueous solution. It is approximately the negative of the base 10 logarithm of the molar concentration, measured in units of moles per liter, of hydrogen ions. More precisely it is the negative of the base 10 logarithm of the activity of the hydrogen ion. At 25 °C, solutions with a pH less than 7 are acidic and solutions with a pH greater than 7 are basic. The neutral value of the pH depends on the temperature, being lower than 7 if the temperature increases. Pure water is neutral, pH 7 at (25 °C), being neither an acid nor a base. Contrary to popular belief, the pH value can be less than 0 or greater than 14 for very strong acids and bases respectively. Measurements of pH are important in agronomy, medicine, chemistry, water treatment, and many other applications. The pH scale is traceable to a set of standard solutions whose pH is established by international agreement. Primary pH standard values are determined using a concentration cell with transference, by measuring the potential difference between a hydrogen electrode and a standard electrode such as the silver chloride electrode. The pH of aqueous solutions can be measured with a glass electrode and a pH meter, or an indicator.

Dissolved Oxygen (DO)

Dissolved Oxygen is the amount of gaseous oxygen (O_2) dissolved in the water. Oxygen enters the water by direct absorption from the atmosphere, by rapid movement, or as a waste product of plant photosynthesis. Water temperature and the volume of moving water can affect dissolved oxygen levels. Oxygen dissolves easier in cooler water than warmer water. Adequate dissolved oxygen is important for good water quality and necessary to all forms of life. Dissolved oxygen levels that drop below 5.0 mg/L cause stress to aquatic life. Lower concentrations cause greater stress. Oxygen levels that go below 1-2 mg/L for a few hours may result in large fish kills.

Biochemical Oxygen Demand (BOD_5)

Biochemical Oxygen Demand (BOD_5), also called Biological Oxygen Demand) is the amount of dissolved oxygen needed (i.e. demanded) by aerobic biological organisms to break down organic material present in a given water sample at certain temperature over a specific time period. The BOD value is most commonly expressed in milligrams of oxygen consumed per litre of sample during 5 days of incubation at 20 °C and is often used as a surrogate of the degree of organic pollution of water. BOD can be used as a gauge of the effectiveness of wastewater treatment plants. BOD is similar in function to chemical oxygen demand (COD), in that both measure the amount of organic compounds in water. However, COD is less specific, since it measures everything that can be chemically oxidized, rather than just levels of biodegradable organic matter.

Methods- There are two commonly recognized methods for the measurement of BOD.

Dilution method

This standard method is recognized by U.S. EPA, which is labeled Method 5210B in the Standard Methods for the Examination of Water and Wastewater. In order to obtain BOD_5, dissolved oxygen (DO) concentrations in a sample must be measured before and after the incubation period, and appropriately adjusted by the sample corresponding dilution factor. This analysis is performed using 300 ml incubation bottles in which buffered dilution water is dosed with seed microorganisms and stored for 5 days in the dark room at 20 °C to prevent DO production via photosynthesis. In addition to the various dilutions of BOD samples, this procedure requires dilution water blanks, glucose glutamic acid (GGA) controls, and seed controls. The dilution water blank is used to confirm the quality of the dilution water that is used to dilute the other samples. This is necessary because impurities in the dilution water may cause significant alterations in the results. The GGA control is a standardized solution to determine the quality of the seed, where its recommended BOD_5 concentration is 198 mg/l ± 30.5 mg/l. For measurement of carbonaceous BOD (cBOD), a nitrification

inhibitor is added after the dilution water has been added to the sample. The inhibitor hinders the oxidation of ammonia nitrogen, which supplies the nitrogenous BOD (nBOD). When performing the BOD_5 test, it is conventional practice to measure only cBOD because nitrogenous demand does not reflect the oxygen demand from organic matter. This is because nBOD is generated by the breakdown of proteins, whereas cBOD is produced by the breakdown of organic molecules.

BOD_5 is calculated by:

$$Seeded: BOD_5 = \frac{(D_0 - D_5) - (B_0 - B_5)f}{P} \qquad Unseeded: BOD_5 = \frac{(D_0 - D_5)}{P}$$

where:

D_0 is the dissolved oxygen (DO) of the diluted solution after preparation (mg/l)

D_0 D_5 is the DO of the diluted solution after 5 days incubation (mg/l)

P is the decimal dilution factor

B_0 is the DO of diluted seed sample after preparation (mg/l)

B_5 is the DO of diluted seed sample after 5 days incubation (mg/l)

f is the ratio of seed volume in dilution solution to seed volume in BOD test on seed

Manometric method

This method is limited to the measurement of the oxygen consumption due only to carbonaceous oxidation. Ammonia oxidation is inhibited. The sample is kept in a sealed container fitted with a pressure sensor. A substance that absorbs carbon dioxide (typically lithium hydroxide) is added in the container above the sample level. The sample is stored in conditions identical to the dilution method. Oxygen is consumed and, as ammonia oxidation is inhibited, carbon dioxide is released. The total amount of gas, and thus the pressure, decreases because carbon dioxide is absorbed. From the drop of pressure, the sensor electronics computes and displays the consumed quantity of oxygen.

The main advantages of this method compared to the dilution method are:

simplicity: no dilution of sample required, no seeding, no blank sample.

direct reading of BOD value.

continuous display of BOD value at the current incubation time.

Chemical Oxygen Demand (COD)

In environmental chemistry, the chemical oxygen demand (COD) is an indicative measure of the amount of oxygen that can be consumed by reactions in a measured solution. It is commonly expressed in mass of oxygen consumed over volume of solution which in SI units is milligrams per litre (mg/L). A COD test can be used to easily quantify the amount of organics in water. The most common application of COD is in quantifying the amount of oxidizable pollutants found in surface water (e.g. lakes and rivers) or wastewater. COD is useful in terms of water quality by providing a metric to determine the effect an effluent will have on the receiving body, much like biochemical oxygen demand (BOD).

Using potassium dichromate: Potassium dichromate is a strong oxidizing agent under acidic conditions. (Acidity is usually achieved by the addition of sulfuric acid.) Most commonly, a 0.25 N solution of potassium dichromate is used for

$$\mathrm{C_nH_aO_bN_c} + \mathrm{dCr_2O_7^{2-}} + (8\mathrm{d} + \mathrm{c})\mathrm{H^+} \rightarrow \mathrm{nCO_2} + \frac{\mathrm{a} + 8\mathrm{d} - 3\mathrm{c}}{2}\mathrm{H_2O} + \mathrm{cNH_4^+} + 2\mathrm{dCr^{3+}}$$

COD determination, although for samples with COD below 50 mg/L, a lower concentration of potassium dichromate is preferred. In the process of oxidizing the organic substances found in the water sample, potassium dichromate is reduced (since in all redox reactions, one reagent is oxidized and the other is reduced), forming Cr^{3+}. The amount of Cr^{3+} is determined after oxidization is complete, and is used as an indirect measure of the organic contents of the water sample.

Total Dissolved Solid (TDS)

Total dissolved solids (TDS) is a measure of the dissolved combined content of all inorganic and organic substances present in a liquid in molecular, ionized or micro-granular (colloidal sol) suspended form. Generally, the operational definition is that the solids must be small enough to survive filtration through a filter with two-micrometer (nominal size, or smaller) pores. Total dissolved solids are normally discussed only for freshwater systems, as salinity includes some of the ions constituting the definition of TDS. The principal application of TDS is in the study of water quality for streams, rivers and lakes, although TDS is not generally considered a primary pollutant (e.g. it is not deemed to be associated with health effects) it is used as an indication of aesthetic characteristics of drinking water and as an aggregate indicator of the presence of a broad array of chemical contaminants.

Measurement

The two principal methods of measuring total dissolved solids are gravimetry and conductivity. Gravimetric methods are the most accurate and involve evaporating the liquid solvent and measuring the mass of residues left. This method is generally the best, although it is time-consuming. If inorganic salts comprise the great majority of TDS, gravimetric methods are appropriate. Electrical conductivity of water is directly related to the concentration of dissolved ionized solids in the water. Ions from the dissolved solids in water create the ability for that water to conduct an electrical current, which can be measured using a conventional conductivity meter or TDS meter. When correlated with laboratory TDS measurements, conductivity provides an approximate value for the TDS concentration, usually to within ten-percent accuracy. The relationship of TDS and specific conductance of groundwater can be approximated by the following equation:

$TDS = k_e EC$, where TDS is expressed in mg/L and EC is the electrical conductivity in microsiemens per centimeter at 25 °C. The correlation factor k_e varies between 0.55 and 0.8.

Electrical Conductivity (EC):

Electrical conductivity is the measure of the amount of electrical current a material can carry or it's'ability to carry a current. Electrical conductivity is also known as specific conductance. Conductivity is an intrinsic property of a material.

Units of Electrical Conductivity

Electrical conductivity is denoted by the symbol σ and has SI units of siemens per meter (S/m). In electrical engineering, the Greek letter κ is used. Sometimes the Greek letter γ represents conductivity. In water, conductivity is often reported as specific conductance, which is a measure compared to that of pure water at 25°C. The electrical conductivity of the water depends on the water temperature: the higher the temperature, the higher the electrical conductivity would be. The electrical conductivity of water increases by 2-3% for an increase of 1 degree Celsius of water temperature. Many EC meters nowadays automatically standardize the readings to 25ºC. While the electrical conductivity is a good indicator of the total salinity, it still does not provide any information about the ion composition in the water. The same electrical conductivity values can be measured in low quality water (e.g. water rich with Sodium, Boron and Fluorides) as well as in high quality irrigation water (e.g. adequately fertilized water with appropriate nutrient concentrations and ratios). The commonly used units for measuring EC of water are: µS/cm (microSiemens/cm) or dS/m (deciSiemens/m), Where: 1000 µs/cm = 1 dS/m

Relationship between TDS and EC

Since the electrical conductivity is a measure to the capacity of water to conduct electrical current, it is directly related to the concentration of salts dissolved in water, and therefore to the Total Dissolved Solids (TDS). Salts dissolve into positively charged ions and negatively charged ions, which conduct electricity. Since, it is difficult to measure TDS in the field, the electrical conductivity of the water is

used as a measure. The electrical conductivity of the water can be determined in a quick and inexpensive way, using portable meters. Distilled water does not contain dissolved salts and, as a result, it does not conduct electricity and has an electrical conductivity of zero. Nevertheless, when the salt concentration reaches a certain level, electrical conductivity is no longer directly related to salts concentration. This is because ion pairs are formed. Ion pairs weaken each other's'charge, so that above this level, higher TDS will not result in equally higher electrical conductivity.
EC can be converted to TDS using the following calculation:
TDS (ppm) = 0.64 X EC (μS/cm) = 640 X EC (dS/m)
This relation provides an estimate only.

Suspended Solids (SS)

Suspended solids refers to small solid particles which remain in suspension in water as a colloid or due to the motion of the water. It is used as one indicator of water quality. It is sometimes abbreviated SS, but is not to be confused with settleable solids, also abbreviated SS, which contribute to the blocking of sewer pipes.

Total Suspended Solids (TSS)

Total suspended solids (TSS) is the dry-weight of suspended particles, that are not dissolved, in a sample of water that can be trapped by a filter that is analyzed using a filtration apparatus. It is a water quality parameter used to assess the quality of a specimen of any type of water or water body, ocean water for example, or wastewater after treatment in a wastewater treatment plant. It is listed as a conventional pollutant in the U.S. Clean Water Act. Total dissolved solids is another parameter acquired through a separate analysis which is also used to determine water quality based on the total substances that are fully dissolved within the water, rather than undissolved suspended particles. TSS was previously called non-filterable residue (NFR), but was changed to TSS because of ambiguity in other scientific disciplines.
TSS in mg/L can be calculated as:
(dry weight of residue and filter - –ry weight of filter alone, in grams)/ mL of sample * 1,000,000
TSS of a water or wastewater sample is determined by pouring a carefully measured volume of water (typically one litre; but less if the particulate density is high, or as much as two or three litres for very clean water) through a pre-weighed filter of a specified pore size, then weighing the filter again after drying to remove all water. Filters for TSS measurements are typically composed of glass fibres.[2] The gain in weight is a dry weight measure of the particulates present in the water sample expressed in units deriverd or calculated from the volume of water filtered (typically milligrams per litre or mg/L).

Chloride

The chloride ion is the anion (negatively charged ion) Cl^-. It is formed when the element chlorine (a halogen) gains an electron or when a compound such as hydrogen chloride is dissolved in water or other polar solvents. Chloride salts such as sodium chloride are often very soluble in water. It is an essential electrolyte located in all body fluids responsible for maintaining acid/base balance, transmitting nerve impulses and regulating fluid in and out of cells.

Alkalinity

Alkalinity is the capacity of water to resist changes in pH that would make the water more acidic. (It should not be confused with basicity which is an absolute measurement on the pH scale.) Alkalinity is the strength of a buffer solution composed of weak acids and their conjugate bases. It is measured by titrating the solution with a monoprotic acid such as HCl until its pH changes abruptly, or it reaches a known endpoint where that happens. Alkalinity is expressed in units of meq/L (milliequivalents per liter), which corresponds to the amount of monoprotic acid added as a titrant in millimoles per liter.

Turbidity

Turbidity is the cloudiness or haziness of a fluid caused by large numbers of individual particles that are generally invisible to the naked eye, similar to smoke in air. The measurement of turbidity is a key test of water quality. Fluids can contain suspended solid matter consisting of particles of many different sizes. While some suspended material will be large enough and heavy enough to settle rapidly to the bottom of the container if a liquid sample is left to stand (the settable solids), very small particles will settle only very slowly or not at all if the sample is regularly agitated or the particles are colloidal. These small solid particles cause the liquid to appear turbid. Turbidity (or haze) is also applied to transparent solids such as glass or plastic. In plastic production, haze is defined as the percentage of light that is deflected more than 2.5° from the incoming light direction.

Salinity

Salinity is the saltiness or amount of salt dissolved in a body of water, called saline water (see also soil salinity). Salinity is an important factor in determining many aspects of the chemistry of natural waters and of biological processes within it, and is a thermodynamic state variable that, along with temperature and pressure, governs physical characteristics like the density and heat capacity of the water.

Salinity is the saltiness or dissolved salt content of a water body. Salinity is an important factor in determining many aspects of the chemistry of natural waters and of biological processes within it, and is a thermodynamic state variable that, along with temperature and pressure, governs physical characteristics like the density and heat capacity of the water. Seawater typically has a salinity of around 35 g/kg, although lower values are typical near coasts where rivers enter the ocean. Rivers and lakes can have a wide range of salinities, from less than 0.01 g/kg to a few g/kg, although there are many places where higher salinities are found. The Dead Sea has a salinity of more than 200 g/kg.

Hardness

Hardness is a measure of the resistance to localized plastic deformation induced by either mechanical indentation or abrasion. Some materials (e.g. metals) are harder than others (e.g. plastics, wood). Macroscopic hardness is generally characterized by strong intermolecular bonds, but the behavior of solid materials under force is complex; therefore, there are different measurements of hardness: scratch hardness, indentation hardness, and rebound hardness. Hardness is dependent on ductility, elastic stiffness, plasticity, strain, strength, toughness, viscoelasticity, and viscosity.

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EXECUTIVE SUMMARY

Quality of surface and ground water mainly depends on the anthropogenic activities, its source characteristics, geological landform, volume of flow and the ecosystem of each habitat. As a riverine country Bangladesh's surface water sources cover the downstream of three major international rivers, (namely, the Ganges, the Brahmmaputra and the Meghna) and their tribuitaries and distribuitaires, perinnial floods of riverine and deltaic flood plains and the wetlands (Haors, Baors and lakes, as a part of the *geological sinks*). They are also replenishing the sources of groundwater. The volumes of water they carry vary widely depending on the season, heavy summer rainstorms, upstream diversion of water flow and dry winter months. These sources carry a vast amount of biodiversity withim each ecosystem. The dry season flow along with anthropogenic misuse of water resulted in poor quality of water which mainly prevails in major urban areas and industrial clusters and rural growth centres.

The monitoring involved field measurements (only pH at some stations) and collecting water samples for laboratory analyses. Six divisional offices measured a total of 12 parameters (physical and chemical) of collected samples. Depending on continuity of measurements and spatio-temporal context, ten parameters viz. pH, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Suspended Solids (SS), Total Dissolved Solids (TDS), Electrical Conductivity (EC), Chloride, Turbidity, Total Alkalinity and Salinity were taken for analysis.

In 2021, Water quality-monitoring programme of DoE covered sampling from 113 points of 29 rivers, 13 points of 3 Lakes (Gulshan, Dhanmondi and Hatir Jheel lakes) of Dhaka and 93 groundwater points of 4 districts (Barisal, Bogura, Sunamganj, Khulna) in Bangladesh. The monitoring involved field measurements (only pH at some stations) and collecting water samples for laboratory analyses. Six divisional offices measured a total of 12 parameters (physical and chemical) of collected samples. Depending on continuity of measurements and spatio-temporal context, ten parameters viz. pH, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Suspended Solids (SS), Total Dissolved Solids (TDS), Electrical Conductivity (EC), Chloride, Turbidity, Total Alkalinity and Salinity were taken for analysis.

Based on the parameters, water quality of large rivers viz. the Padma, the Meghna, the Jumuna, the Surma, the Korotoa etc. was found within the limit of Environmental Quality Standards (EQS) in 2021. In the Meghna River DO and BOD level were found within the EQS which varied from 0.7 mg/l to 9.8 mg/l and 2.0 mg/l to 23 mg/l, respectively. In the Jamuna River, DO and BOD levels were found from 4.0 mg/l to 8.12 mg/l and 2.0 to 26 mg/l, respectively. On the other hand, rivers around greater Dhaka were highly polluted specially in the dry season of 2021 in terms of DO, BOD and COD values. High levels of Turbidity (512 mg/l), Total Alkalinity (262 mg/l), BOD (40 mg/l) and COD (120 mg/l) were found in the Buriganga River from January to December in 2021. High BOD (54 mg/l) and Turbidity (336 NTU) was found in the Balu River. High BOD (36 mg/l) and Turbidity (517 NTU) was found in the Turag River.

Among the coastal rivers, high levels of Chloride, TDS and Turbidity were found in the Moyuri, the Rupsa, the Pashur and in the Kakshiali River. The level of Chloride (2675 mg/l), TDS (5860 mg/l) and Turbidity (78.8 NTU) were also very high in the Pashur River. Highest value of Chloride (1375 mg/l), Turbidity (153 NTU), Salinity (4.1 ppt) and EC (7430 µmohos/cm) was found in the Kakshiali River. High COD (560 mg/l), SS (533 mg/l) and TDS (13450 mg/l) was found in the Karnapuli River. High DO (6.5 mg/l) and EC (5982 µmohos/cm) was found in the Kirtankhola River. High DO (7.3 mg/l) and BOD (3.6 mg/l) was found in the Kushiara River.

Impact of seasonality on water quality was evident in data analysis. During dry seasons, water quality in rivers around Dhaka was more degraded. The quality improved greatly during the wet seasons indicating clear relationship between increased flow of river and river water quality.

CHAPTER 1: INTRODUCTION

1.1 Background

Water is essential not only for survival of human-beings, but also for animals, plants and all other living beings. Monitoring water quality is one of the vital responsibilities of the Department of Environment (DoE). According to the clause 18, A of the Constitution of Bangladesh "The state shall endeavor to protect and improve the environment and to preserve and safeguard the natural resources, biodiversity, wetlands, forests and wild life for the present and future citizens". A a part of that responsibility the Governmnet has to conserve water quality for human consumption and other uses. The Government has set Environmental Quality Standard (EQS) for inland surface water under the Environmental Conservation Rules (ECR) 2023. The monitoring of water quality includes and identifies part of diagnosis of functionality of the aquatic ecosystem of rivers and other surface water sources. Also, it would help evaluating effectiveness of the pollution control measures.

There are about 405 rivers in Bangladesh including 57 transboundary rivers (BWDB, 2011). The flows in the rivers varies greatly depending on seasons, rainfall intensity and upstream diversion of transboundary rivers. Following fluctuation in flow river water quality varies significantly. Dumping of industrial untreated wastes, household and municipal wastes, medical wastes, naval waste etc. into water courses further degrade surface water quality. Because of severe pollution, Government has already declared five rivers (Buriganga, Shitalakhya, Turag, Balu and Jaflong Dawki) as Ecologically Critical Area (ECA) to protect from further pollution.

DoE has established a monitoring network. Following this network for surface water quality, DoE collect surface water samples for laboratory analyses. Samples are collected on monthly basis from selected sampling points of rivers under the monitoring network.

1.2 Major objectives of the report

Mojor objectives of this report are -

- Provide updated information on quality of surface and ground water to help information-based decision-making process for environmental and ecosystem conservation, sustainable development and management of water resources;
- Deliver information for research/study in the relevant field;
- Water quality data to Global Environment Monitoring System (GEMS);
- Sensitize and create awareness among the stakeholders and public in general;
- Share information and prepare of State of the Environment (SoE) Report and
- Give a guidance to policy makers.

1.3 Limitation of the report

This report has been prepared based on primary data and information collected by six divisional offices of DoE for the period of January to December 2021. The limitations of the report are:

- In some cases, data on all the parameters as per ECR 2023, for the entire period of the year could not be furnished with this report because of non-availability of data for certain parameters in some months of the year.
- This report does not include information on microbiological parameters and biological indicators. Data on weather conditions of the sampling locations at the time of sampling were unavailable.
- This report does not cover all the sources of surface water and all rivers.

CHAPTER 2: AN OVERVIEW OF BANGLADESH'S SURFACE AND GROUND WATER

2.1 Surface Water Sources and Rivers of Bangladesh

Rivers, cannels, streams, lakes, Haors, Baors, Beels and ponds as surface water sources are the most important elements of physiographic features of Bangladesh and play a crutial role in the economy. The rivers of Bangladesh are considered as the lifeline of the people. These rivers generally flow towards south. The larger rivers serve as the main source of water for cultivation and as the principal arteries of commercial transportation. Rivers also provide fish, an important source of protein. Flooding of the rivers during the monsoon season and river bank erosion cause enormous hardship and hinders development, but fresh deposits of rich silt replenish the fertile but overworked soil. The rivers also drain excess monsoon rainfall into the Bay of Bengal. Thus, the great river system is at the same time the country's principal resource and source of its greatest hazard.

As also mentioned earlier, Bangladesh is situated at the confluence of three mighty rivers the Ganges, the Brahmaputra and the Meghna. Apart from these three rivers, there are many rivers which create a net-like network covering the whole country. The country has 405 rivers (BWDB, 2011) of which 57 are trans-boundary rivers. **A map of river network is also given in the Figure-A.** Three large rivers systems (Brahmaputra-Jamuna, Ganges-Padma and Surma-Meghna) of the world covering a combined total catchments area of about 1.7 million sq. km. extending over Bhutan, China, India and Nepal, flow through this country. Out of these huge catchments only 7% lies within Bangladesh. The fourth river system lies in the Chittagong region of the country.

The river systems of the country can be divided into four major systems, which are:

1. Brahmaputra-Jamuna River System
2. Ganges-Padma River System
3. Surma-Meghna River System
4. Chittagong Region River System

Brahmaputra-Jamuna River System: Brahmaputra-Jamuna and old Brahmaputra, with their main tributary Teesta, and a good number of small tributaries and distributaries constitute the largest floodplain of Bangladesh.

The Brahmaputra enters Bangladesh from east of Bhabanipur (India) and northeast of Kurigram district. It first flows south and then turns southeast and travels through the Madhupur Tract to meet the Meghna near Bhairab Bazar. Among the major rivers, Brahmaputra-Jamuna is the most energetic and has the highest stream power.

Ganges-Padma River System: Ganges River is one of the largest river systems of the world and an important river flowing through India and Bangladesh. The Ganges rises near the Tibet-Indian border. The Bhagirathi is accepted traditionally as the original Ganges. The source is Gangotri glacier located at an altitude of about 3,900m in the Himalayas. The Bhagirathi joins its western tributary the Jahnavi, a little away to the north of the main Himalayan range and about 11 km below the Gangotri temple. The combined river then cuts through the main Himalayan range through a magnificent gorge in

which the river bed is 3,960m below the peaks on either side. The river flows in a southeasterly direction across India and crosses the western border of Bangladesh in Nawabganj district.

Flowing almost in the same direction it meets the Jamuna (the Brahmaputra) at Goalondaghat and then further down meets the Meghna at Chandpur. From the confluence with the Jamuna to the confluence with the Meghna the river is named Padma. The Ganges has a total length of about 2,600 km up to its confluence with the Jamuna and a catchment area of about 10,87,400 sq. km of which about 46,300 sq. km lies within Bangladesh.

Surma-Meghna River System: Surma-Meghna River System is the longest river (669 km) system in the country. It also drains one of the world's heaviest rainfall areas (e.g. about 1,000 cm at Cherapunji, Meghalaya, India). East of Brahmaputra-Jamuna River system is Surma-Meghna River System. The Surma originates in the hills of Shillong and Meghalaya of India. The main source is Barak River, which has a considerable catchment in the ridge and valley terrain of Naga-Manipur hills bordering Myanmar. Barak-Meghna has a length of 950 km of which 340 km lies within Bangladesh. On reaching the border with Bangladesh at Amalshid in Sylhet district, Barak bifurcates to form the steep and highly flashy rivers Surma and Kushiyara.

Between the Surma and the Kushiyara, there lays a complex basin area comprised of depressions (Haors). Most of the Surma system falls in the Haor basin, where the line of drainage is not clear or well defined.

Meghna has two distinct parts. Upper Meghna from Bhairab Bazar to Shaitnol is comparatively a small river. Lower Meghna below Shaitnol is one of the largest rivers in the world, because it is the mouth of Ganges-Padma and Brahmaputra-Jamuna rivers. It is a tidal reach carrying almost the entire fluvial discharge of Ganges, Brahmaputra and Upper Meghna River.

Chittagong Region River System: Chittagong Region River System the Chittagong region consists of the 5 hilly districts of Chittagong division namely Chittagong, Cox's Bazar, Bandarban, Rangamati and Khagrachhari. It is bounded by the Bay of Bengal on the south and west, the Naf River with Myanmar on the southeast, and India on the east. The region is characterized by three distinct ecological zones: inter-tidal zone, coastal plains and extensive hill areas. The remainder of the region consists of plains. The total area is approximately 19,956 sq. km with a hilly area of 1,300 sq. km.

The major rivers of this region are: Karnafuli and its tributaries (e.g. Rainkhiang, Kasalong, Halda, Ichamati etc.); Bakkhali, Sangu, Matamuhuri, Naf, and Feni. The Kutubdia and Maheshkhali channels are the coastal channels of the region. The Karnafuli is the principal river of the region. It originates in the Lushai Hills of Mizoram (India), flows through Rangamati and the port city of Chittagong and discharges into the Bay of Bengal near Patenga. The river is flashy and its length is about 131 km. Rainkhiang, Sublong, Thega, Kasalong, Ichamati and Halda are its main tributaries. Its major distributaries are Saylok and Boalkhali.

2.2 Ground Water of Bangladesh

Groundwater is the main source of water for drinking and irrigation in Bangladesh. The sediments underlying most of Bangladesh provide good aquifers which are widely exploited to supply domestic and irrigation water, except in the hilly areas. In most of the areas except major city areas like Dhaka and Barind Tract, aquifers are mostly recharged every year by rainfall, seasonal flooding and percolation of water through river beds. Due to abstraction of groundwater, serious depletion of groundwater table around major cities, particularly in Dhaka has reached at an alarming situation. Similar situation is reported for the Barind areas (due to excessive withdrawal of groundwater for irrigation purposes. Currently, 35,322 deep tube wells, 1,523,322 shallow tube wells and 170,570 low lift pumps are working in Bangladesh to provide water for irrigation. About 79% of the total cultivated area in Bangladesh is irrigated by groundwater, whereas the remaining is irrigated by surface water. The Arsenic contamination in groundwater is increasing at an alarming rate. Today, in Bangladesh, an estimated 35–77 million people have been chronically exposed to Arsenic via drinking water. An estimated 25% of the wells exceed Arsenic levels according to the Bangladesh standard. (CSISA-MI, 2015)

In the last two decades, increased groundwater accessibility resulting from the expansion of deep and shallow tube wells helped Bangladesh attain near self-sufficiency in rice. This has resulted in serious problems, most notably excessive drawdown in intensively irrigated areas, and the deterioration of groundwater quality. As such, Government has decided not to expand further deep tube wells in irrigated areas. Increasing energy prices are also threatening the sustainability of Bangladesh's groundwater irrigated economy.

Artesian flow (where groundwater comes to surface naturally) occurs in a few places on piedmont plains near the foot of the Northern and Eastern Hills and in some areas of the Madhupur Tract (Brammer, 2012).

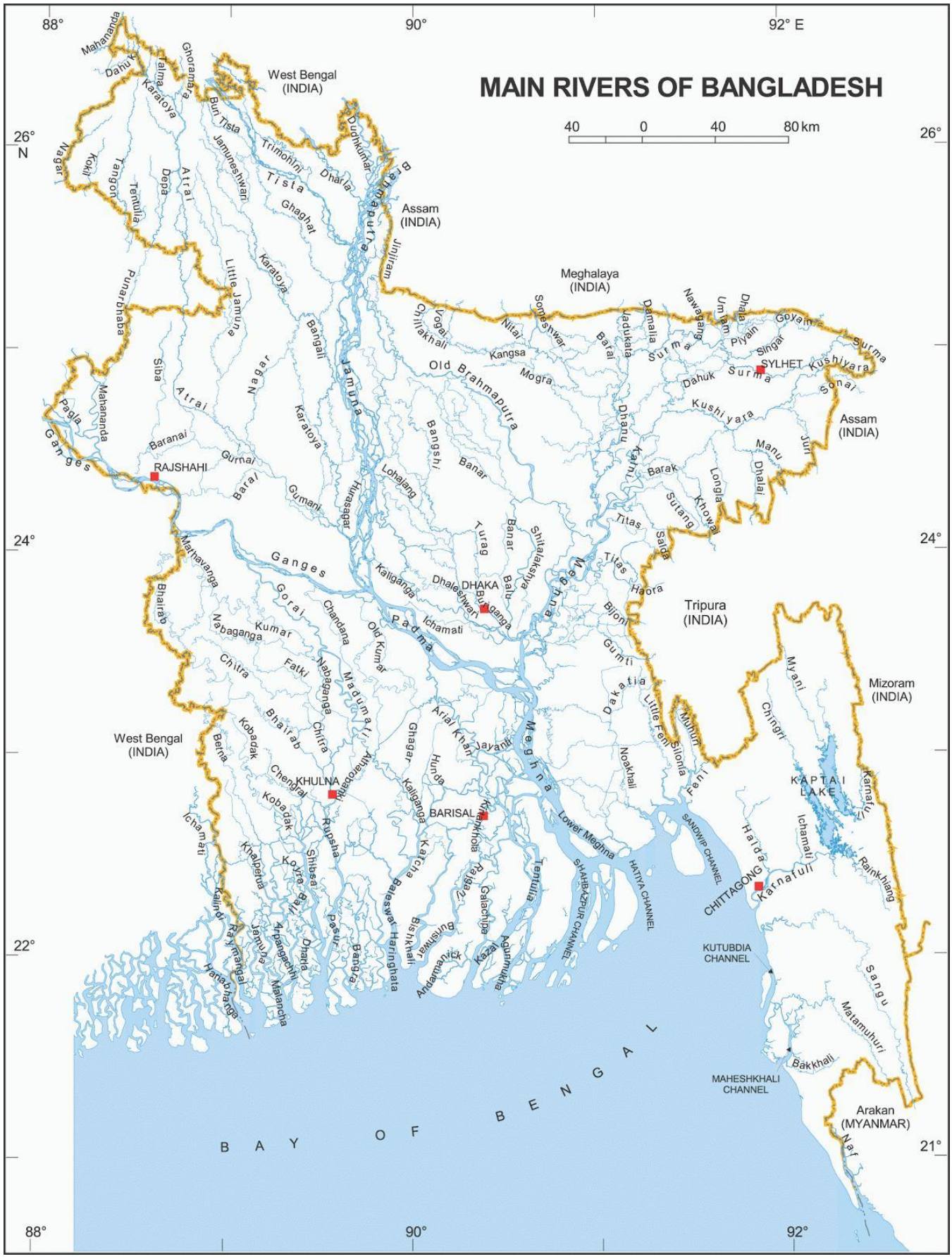

Figure-A: Riverr system of Bangladesh (Source: BWDB, 2011)

CHAPTER 3: METHODS FOR MEASUREMENT AND ANALYSIS OF WATER QUALITY

3.1 Water Quality Parameters

Water quality monitoring can help researchers to predict and learn from natural processes at the environment and determine human impacts on an ecosystem. The measurement efforts of the quality can assist in restoration projects or ensure environmental standards are being met.

Water has physical, chemical and biological properties. Physical properties of water quality include temperature and turbidity. Chemical characteristics involve parameters such as pH and dissolved oxygen. Biological indicators of water quality include algae and phytoplankton. These parameters are relevant not only to surface water studies of the ocean, lakes and rivers, also to studies of groundwater and monitoring the industrial processes as well.

A comprehensive range of physico-chemical parameters such as Temperature, Electrical Conductivity (EC), Dissolved Oxygen (DO), pH, Total Alkalinity, Turbidity, Total Dissolved Solids (TDS), Suspended Solids (SS), Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD), Chloride and Salinity were measured to assess the inland surface water quality in Bangladesh.

3.2 Sampling Locations

In 2021, the monitoring program covered sampling of 113 points of 29 rivers, 13 points of 3 Lakes (Gulshan, Dhanmondi and Hatir Jheel lakes) of Dhaka and 93 stations (Barisal Dist.-38 points Stations, Sylhet Division (Sunamgonj Dist.)-05 points, Rajshahi Division (Bogura Dist)-10 points), Khulna-40 points (Figure B).

3.3 Methods of Analysis

Usually testing procedures and parameters grouped into physical, chemical, bacteriological and microscopic categories.

-Physical tests indicate properties detectable by the senses.
-Chemical tests determine the amounts of mineral and organic substances that affect the water quality.
-Bacteriological tests show the presence of bacteria, characteristic of faecal pollution. This report only covered the physio-chemical analysis.

The following mathods are followed for analaysis:

Parameters	Mathods
Dissolved Oxygen (DO)	Modified Winkler's Method/Titrimetric Method
Biochemical Oxygen Demand (BOD_5)	Dilution Method
Chemical Oxygen Demand (COD)	Closed Reflux Colorimetric Method
Total Dissolved Solid (TDS)	Gravimetric Method
Suspended Solid (SS)	Gravimetric Method
Chloride	Argentometric Method
Temperature	Thermometer
Turbidity	Nephelometric Method
pH	Standard method/Using Electrode
EC	Standard method
Total Alkalinity	Standard method/ Titrimetric Method
Salinity	Using Electrode

3.4 Surface Water Monitoring Stations

In 2021, sample from 113 monitoring points of both rivers and inland waterbodies were collected. The following table lists all monitoring stations in selected 29 rivers (Table A, Figure-B).

Table- A: Water Quality Monitoring Stations of DoE for Selected 29 Rivers

Sl	River Name	Monitoring Stations	No. of Stations
1	Buriganga	Mirpur Bridge (M.B), Mohammadpur (Mdr.), Bosila Bridge (B.B), Hazaribagh (Hg.), Satmosjid Road (S.R), Chandni Ghat (C.G), Sadarghat (Sg.), Bangladesh China Friendship Bridge (B.C.F.B), Pagla (Pg.), Fatullah (Fh)	10
2	Shitalakhya	Port Road, Majira Demra Ghat, Murapara (Rupgonj), Gorashal	04
3	Turag	Turag (Tongi) Bridge, Ashulia, Kaliakoir, Vawal, Nama Bazar	05
4	Dhaleshwari	Mukterpur, Ruhitpur, Hazaratpur, Alipur, Sirajnagar, Utorro Mitra, Pathorghata	07
5	Brahmaputra	Rail Bridge, Shamvoganj, Jamalpur Rail Bridge	02
6	Kaliganga	Veuta Ghat, Manikgonj	01
7	Jamuna	Sarkarkhana, Kakua, Jamuna Eco Park, J.E.P (Up), Jamuna Eco Park, J.E.P (Dn), Shariakand Kheya Ghat, S.K.G (Up), Shariakand Kheya Ghat, S.K.G (Dn), Horipur Kheya Ghat, H.K.G (Up), Horipur Kheya Ghat, H.K.G (Dn), Mohon Ganj, M.G (Up), Mohon Ganj, M.G (Dn)	10
8	Meghna	Meghna Ghat, Bhairob Ferry Ghat, Narshingdi Launch Ghat, Shajalal Paper, Annondo Bazar and Bishondi Ghat	06
9	Padma	Josldia, Sitardor, Kandipara, Khoiria, Shimolia, Gordor Bazar, Mawa Ferry Ghat and Barha Ghat	08
10	Korotoa	Dottobari Bridge, Dt.Bd. (UP), Dt. Bd. (Dn), Aziz Ahmed Taki Road, A.A.T.R.(UP), Aziz Ahmed Taki Road, A.A.T.R.(Dn), Sultanganj Up, and Sultanganj Down	06
11	Teesta	Tista Bridge (up Stream and down stream), Nohali Sapmari (up Stream and down stream), Teesta Barrage (Teesta Barrage (Up)	06
12	Karnaphuli	CUFL, TSP, Shikalbaha, Kalurghat Bridge, Mariam Nagar, Karnafully Paper	06
13	Halda	Maduna Ghat, Garduara Sluice Gate, Halda Bridge	03
14	Moyuri	Shoshan Ghat, Buro Moulavir Darga, Doshgate Jalma	03
15	Bhairab	Basundia Bazar (Aladipur), Noapara Ferry Ghat Abhaynagar, Noapara Jafarpur, Fultala Ghat (Dhulgram)	04
16	Rupsa	Gilatola (Nadan Pratap), Kalibari Ghat, Charer Hat (Sulpur Aijgati), Rupsa Ghat	04
17	Mathavanga	Pipeghat	01
18	Passur	Rampal Power Plant, Banishanta, Batiaghata By Pass	03
19	Kkakshiali	Uzirpur, Kaliganj Bazar, Boshontopur	03
20	Gorai	Kamarkhali Bridge	01
21	Modhumoti	Dhalaitala	01
22	Ganges	Gorai off Take	01
23	Kirtankhola	Launch Ghat (S), Launch Ghat (M), Kaower Char (S), Kaower Char (M), Dopdopia Kheyaghat (S), Dopdopia Kheyaghat (M)	06
24	Tetulia	Vadura Launch Ghat (S), Vadura Launch Ghat (M)	02
25	Kalabodar	Kalabodar Ferry Ghat (S), Kalabodar Ferry Ghat (M)	02
26	Lohalia	Patuakhali Launch Ghat (PLG) (side and middle)	02
27	Surma	Mendibag Point, Kin Bridge Point, Sheaik Ghat, Chhatak	04
28	Kushiara	Fenchuganj Bridge Point	01
29	Balu	Trimohoni Bridge, Jolshiri Abason	02

Map of Existing Monitoring Station of DoE

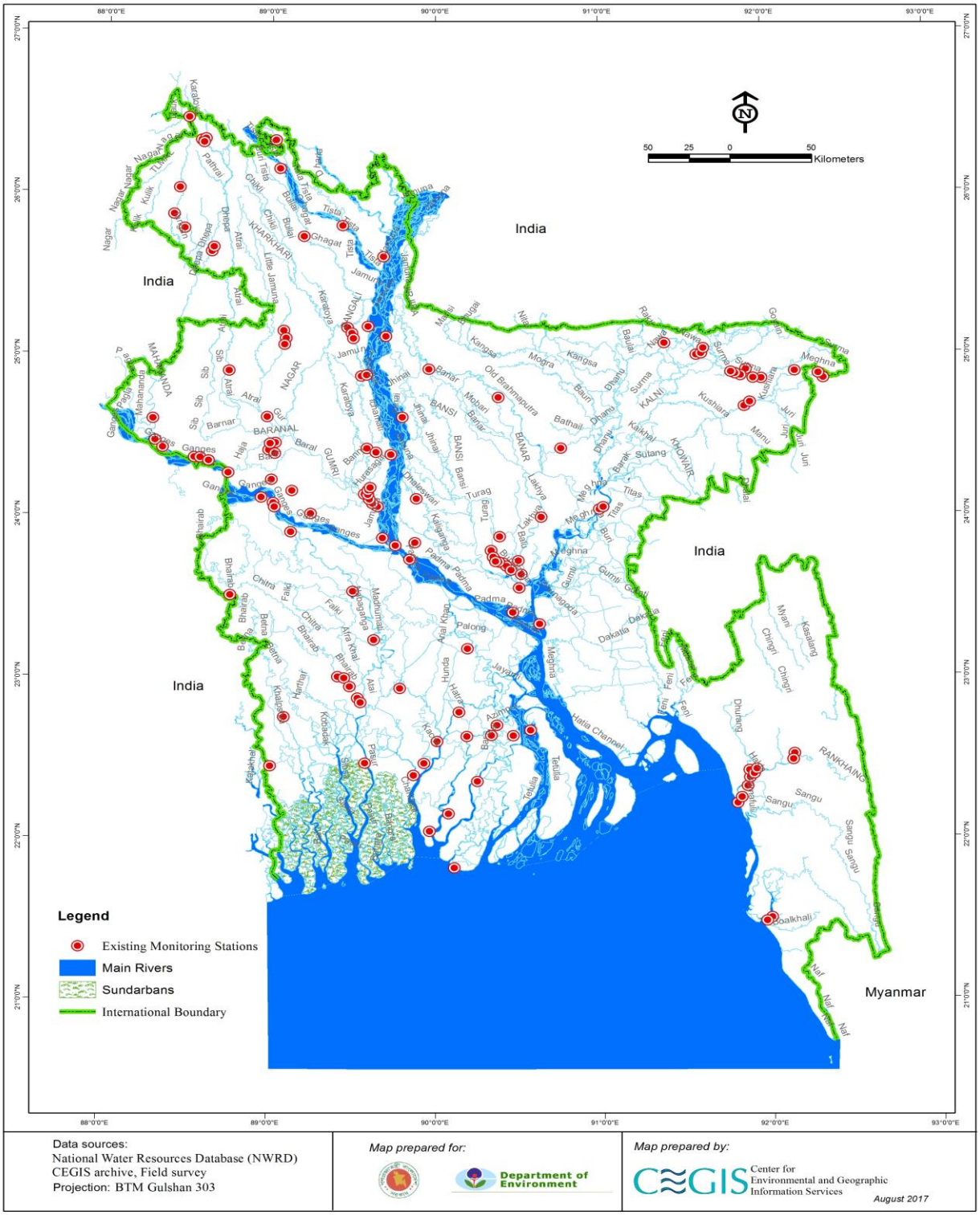

Figure-B: Location of Surface Water Monitoring Stations

CHAPTER 4: RIVER WATER QUALITY IN 2021

4.1 Buriganga River

Buroganga river starts fromTurag River at Amin Bazar of Savarand falls into Dhaleswari River at Keraniganj of Dhaka (Source: Bangladesh Water Development Board 2011, Department of Bangladesh Haor & Wetlands Development 2016).

To monitor water quality of Buriganga river, samples were collected from 10 (Ten) different locations viz. Mirpur Bridge (M.B), Mohammadpur (Mdr.), Bosila Bridge (B.B), Hazaribagh (Hg.), Satmosjid Road (S.R), Chandni Ghat (C.G), Sadarghat (Sg.), Bangladesh China Friendship Bridge (B.C.F.B), Pagla (Pg.), Fatullah (Fh) along the river. Data was not collected for the month of October and November. Detail data is attached Annex-1 (Table:1-10).

In 2021, pH among different locations varied from 6.61 to 7.99 (Fig.1a) while standard pH range for inland surface water for fisheries is 6.0 to 9.0. In 2020, pH range varied from 6.5 to 7.79. In 2021. the maximum DO (5.94 mg/l) was found at Hazaribagh in September and the minimum (0.0 mg/l) was at Bosila Bridge (B.B) point in March (Fig.1b). Direct discharge of untreated effluent from industries, reduced flow of river water, municipal wastes and tannery wastes into the river are the proximate causes for depletion of DO in dry season. DO level was slightly increased in wet season (September to October) at all locations of the river. In 2020, DO level varied from 0.0 mg/l to 5.79 mg/l. In 2021, BOD of Buriganga river water was higher than EQS (≤6 mg/l). The maximum BOD (40 mg/l) was found at Mirpur Bridge Point in December and the minimum (5.8 mg/l) was at Satmosjid Road point in January (Fig.1c). In 2020, BOD range was 3.0 to 56 mg/l. In 2021, COD level was mostly higher the EQS (50 mg/l) set for fisheries for the month of January to March and July to August. The maximum and the minimum COD concentration of Buriganga river was 120 mg/l at Bosila Bridge in March and 12 mg/l at Hazaribagh (Hg.) Point in June (Fig.1d). In 2020, COD varied from 6 mg/l to 207 mg/l. In 2021, TDS of Buriganga river varied from 68.7 to 594 mg/l (Fig.1e) against the EQS of 1000 mg/l for fisheries. In 2020, TDS concentration varied from 61.6 to 597 mg/l.

In 2021, Chloride concentration of the Buriganga river was below the EQS for industrial wastewater after treatment. The maximum concentration was 76 mg/l at Hazaribagh point in April and the minimum 13.5 mg/l at Bosila Bridge pint in September (Fig.1f). In 2020, Chloride concentration varied from 5.5 mg/l to 40.5 mg/l. In 2021, SS of Buriganga river water at different locations was below the EQS (100 mg/l) for wastewater after treatment from industrial units. The maximum SS was 254 mg/l in March at Chandni Ghat point and the minimum 02 mg/l in April at Mirpur Bridge Point (Fig.1g). In 2020, SS varied from 3 mg/l to 76 mg/l. In 2021, the maximum and the minimum Total Alkalinity of Buriganga river water was 262 mg/l at Chandni Ghat point in March and 50 mg/l at Hazaribagh in July (Fig.1h). In 2020, T. Alkalinity varied from 37 mg/l to 324 mg/l. In 2021, the maximum EC of Buriganga river water was 1149 µmhos/cm in April at Mirpur Bridge point and the minimum 122.4 µmhos/cm in July at Mirpur Bridge (M.B) point (Fig.1i). In 2020, EC varied from 114.7 µmhos/cm to 1171 µmhos/cm. In 2021, the maximum and the minimum Turbidity of Buriganga river water was 512 NTU at Satmosjid Road in March and 19.9 NTU at Mirpur Bridge in September while EQS is 10 NTU (Fig.1j). In 2020, Turbidity range varied from 6.83 to 285 NTU.

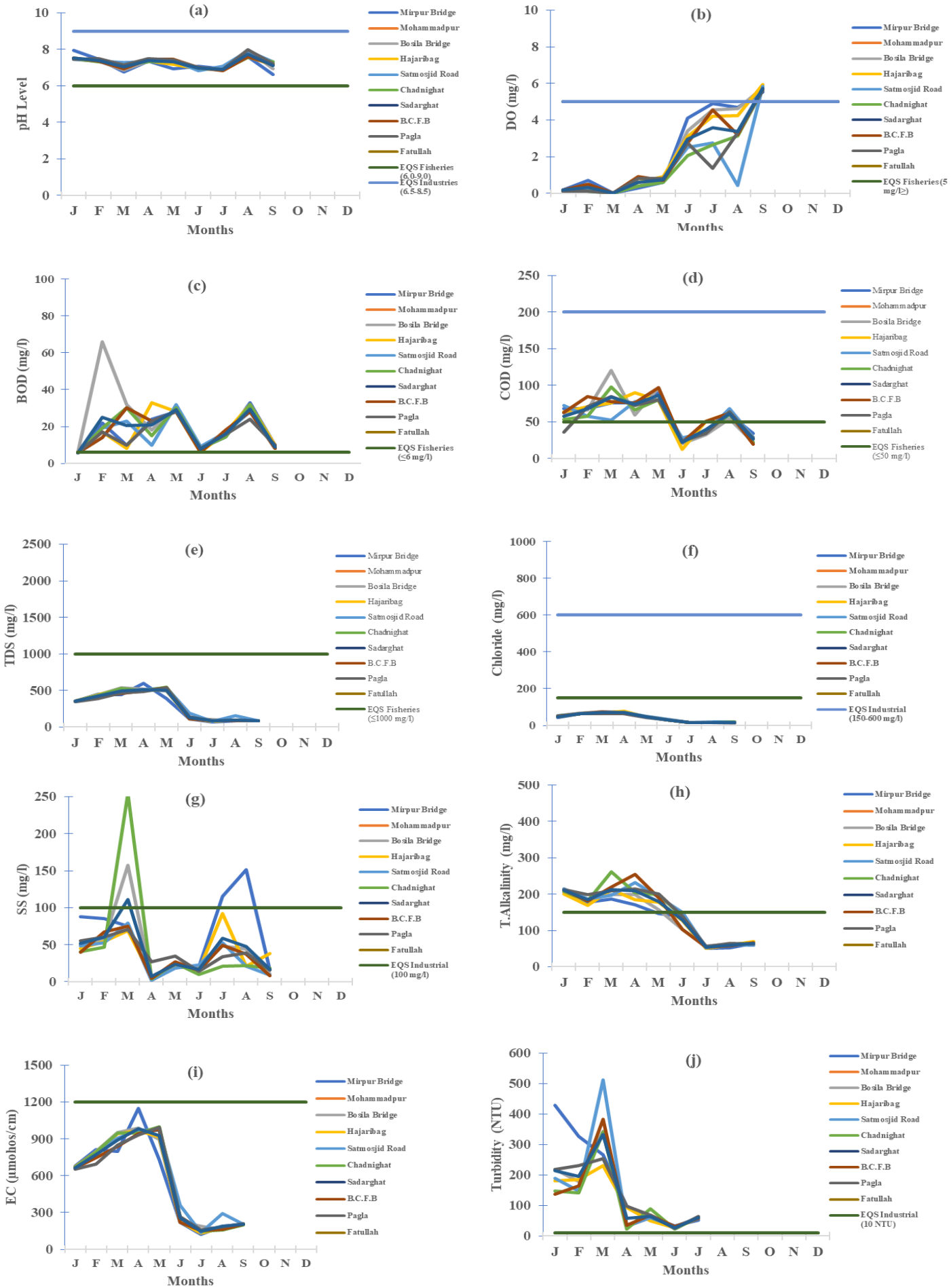

Fig.1: Status of pH, DO, BOD, COD, TDS, Chloride, SS, T.Alkalinity, EC and Turbidity of Buriganga River in 2021

4.2 Shitalakhya River

The Shitalakhya river is a distributary of the Brahmaputra river. It remains navigable round the year. For monitoring water quality, samples were colleted from 04 (Four) different locations viz. Port Road, Majira Demra Ghat, Murapara (Rupgonj), Gorashal. Data was not collected for the month of March, October and November. Detail data is attached Annex-1 (Table:11-19).

In 2021, pH of Shitalakhya river water was within the EQS (6.5-8.5) range for inland surface water. The maximum pH was 7.84 in August at Majira Demra Ghat point and the minimum P^H was 6.54 in August at Gorashal point (Fig.2a). In 2020, pH varied from 6.88 to 7.82. In 2021, the maximum DO (66.5 mg/l) was found at Murapara point in September and the minimum (0.0 mg/l) was found at Port Road, Majira Demra Ghat, Murapara (Rupgonj) point in January-February, April and May. December (Fig.2b). In 2020, DO varied from 0.0 to 4.8 mg/l. In 2021, BOD at Demra Ghat was very high during dry season and was above the EQS (≤6 mg/l) for fisheries. Highest value of BOD (49.2 mg/l) was found Port Road in February and lowest (4.0 mg/l) was in September at Gorashal point (Fig.2c). In 2020, BOD concentration varied from 6.0 mg/l to 49.0 mg/l. In 2021, COD level was slightly higher the EQS (50 mg/l) for wastewater for fisheries at maximum locations of Shitalakhya river. The maximum COD (166 mg/l) was at Port Road in February and the minimum COD (54 mg/l) was at Ghorasal in January (Fig.2d). In 2020, COD level varied from 10 mg/l to 146 mg/l. In 2021, TDS of Shitalakhya river water varied from 54.9 to 445 mg/l against the EQS (1000 mg/l) for fisheries. The maximum TDS (445 mg/l) was at Majira Demra Ghat point in April and the minimum (54.9 mg/l) in July at Murapara point (Fig.2e). In 2020, TDS range was from 88 to 452 mg/l. In 2021, Chloride concentration of the Shitalakhya river water was below the EQS (600 mg/l) for wastewater after treatment from industrial units. The maximum Chloride (70 mg/l) was found at Port Road in February and the minimum was 6.0 mg/l at Murapara in July (Fig.2f). In 2020, Chloride concentration varied from 12.5 mg/l to 77.5 mg/l. In 2021, SS of Shitalakhya river water at different sampling locations was within the EQS (100 mg/l). Maximum SS concentration of Shitalakhya river was 143 mg/l at Murapara point in July and the minimum was 05 mg/l in April at the same location (Fig.2g). In 2020, SS varied from 8 mg/l to 249 mg/l. In 2021, EC of Shitalakhya river at different locations was mostly within the EQS (1200 µmhoms/cm) for treated wastewater from industrial units (Fig.2h). The maximum EC (919 µmhoms/cm) was at Majira Demra Ghat point in April and the minimum EC (101.5 µmho/cm) was at Murapara point in July. In 2020, EC varied from 169 µmhos/cm to 865 µmhos/cm. In 2021, Maximum Total Alkalinity (262 mg/l) was at Port Road in February and that the minimum was (11 mg/l) at Ghorasal point in July (Fig.2i). In 2020, Total Alkalinity varied from 42 mg/l to 288 mg/l.

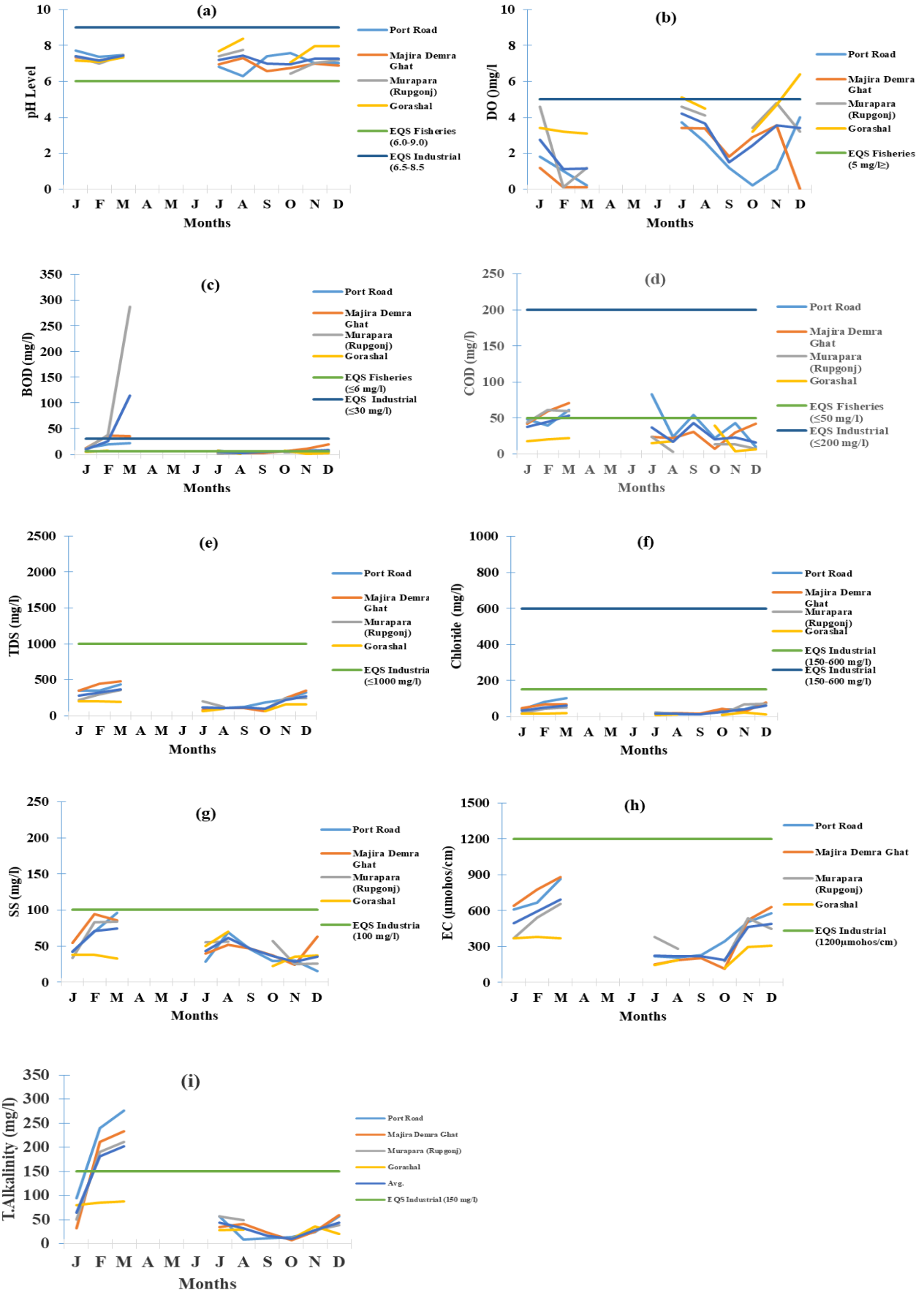

Fig.2: Status of pH, DO, BOD, COD, TDS, Chloride, SS, EC and T.Alkalinity of Shitalakhya River in 2021

4.3 Turag River

The Turag River is the upper tributary of the Buriganga. It sourced (offtake) from Bangshi River of Kaliakair Upazila of Gazipur District and ended (outfall) into Buriganga River of Savar Upazila of Dhaka District (Source: Bangladesh Water Development Board 2011, Department of Bangladesh Haor & Wetlands Development 2016). To monitor water quality in 2021, water samples were collected from 05 (Five) locations such as Turag Bridge, Ashulia, Kaliakoir, Vawal, Nama Bazar. Data was not collected for the month of January, October and November. Detail data is attached Annex-1 (Table: 20-28).

In 2021, the pH range (6.34 - 8.27) (Fig.3a) of Turag River was within EQS (6.5 -8.5). The maximum pH 7.98 was found in April at Turag Bridge point and the minimum pH 6.42 was found in August at Ashulia Point. In 2020, pH range was 6.88-7.79. In 2021, the maximum DO (7.6 mg/l) found at Kaliakoir in Juneand the minimum DO (0.1) mg/l was found in February, March and April at Turagh Bridge, Ashulia, Vawal, Nama Bazar point (Fig.3b). In 2020, DO was varied from 0.0 to 6.56. In 2021, BOD of Turag River water was higher the EQS (≤6 mg/l) for the months of January to March. The maximum BOD was 36 mg/l in February at Vawal and the minimum was 6.2 mg/l in February at Ashulia point (Fig.3c). In 2020, BOD varied from 4.4 mg/l to 62 mg/l. In 2021, COD at almost all locations of Turag River was higher the EQS (50 mg/l) for for fisheries in the month of January to March. The maximum and the minimum COD content of Turag River water was 129 mg/l at Ashulia in March and 10 mg/l at Kaliakoir in May (Fig.3d). In 2020, COD range was from 13 mg/l to 263 mg/l. In 2021, TDS was below the EQS (1000 mg/l) for fisheries (Fig.3e) at all the sampling points. The maximum TDS was 813 mg/l in April at Vawal while that of minimum was 53.6 in July at Kaliakoir point. In 2020, TDS varied from 58.5 mg/l to 708 mg/l. In 2021, Chloride content of Turag River water was below the EQS (150-600 mg/l). The maximum Chloride was (121 mg/l) found in March at Nama Bazar point and the minimum Chloride was (6.0 mg/l) in June at Vawal point (Fig.3f). In 2020, Chloride varied from 3.0 mg/l to 55 mg/l. In 2021, the maximum SS (396 mg/l) was at Ashulia point in March and the minimum (1.0 mg/l) in May at Ashulia and Nama Bazar point (Fig.3g). In 2020, SS varied from 1.0 mg/l to 78 mg/l. In 2021, the maximum EC (1372 µmhos/cm) was in March at Vawal point and the minimum (93.4 µmhos/cm) was in July (Fig.3h) at Kaliakoir point. In 2020, EC varied from 118.8 µmhos/cm to 1387 µmhos/cm. In 2021, the maximum Total Alkalinity (385 mg/l) was at Vawal in March and the minimum (46 mg/l) in July at Vawal point (Fig.3i). In 2020, Total Alkalinity varied from 35 mg/l to 326 mg/l. In 2021, the maximum Turbidity (517 mg/l) was at Turag Bridge in April and the minimum (10 mg/l) in February at Kaliakoir point (Fig.3i).

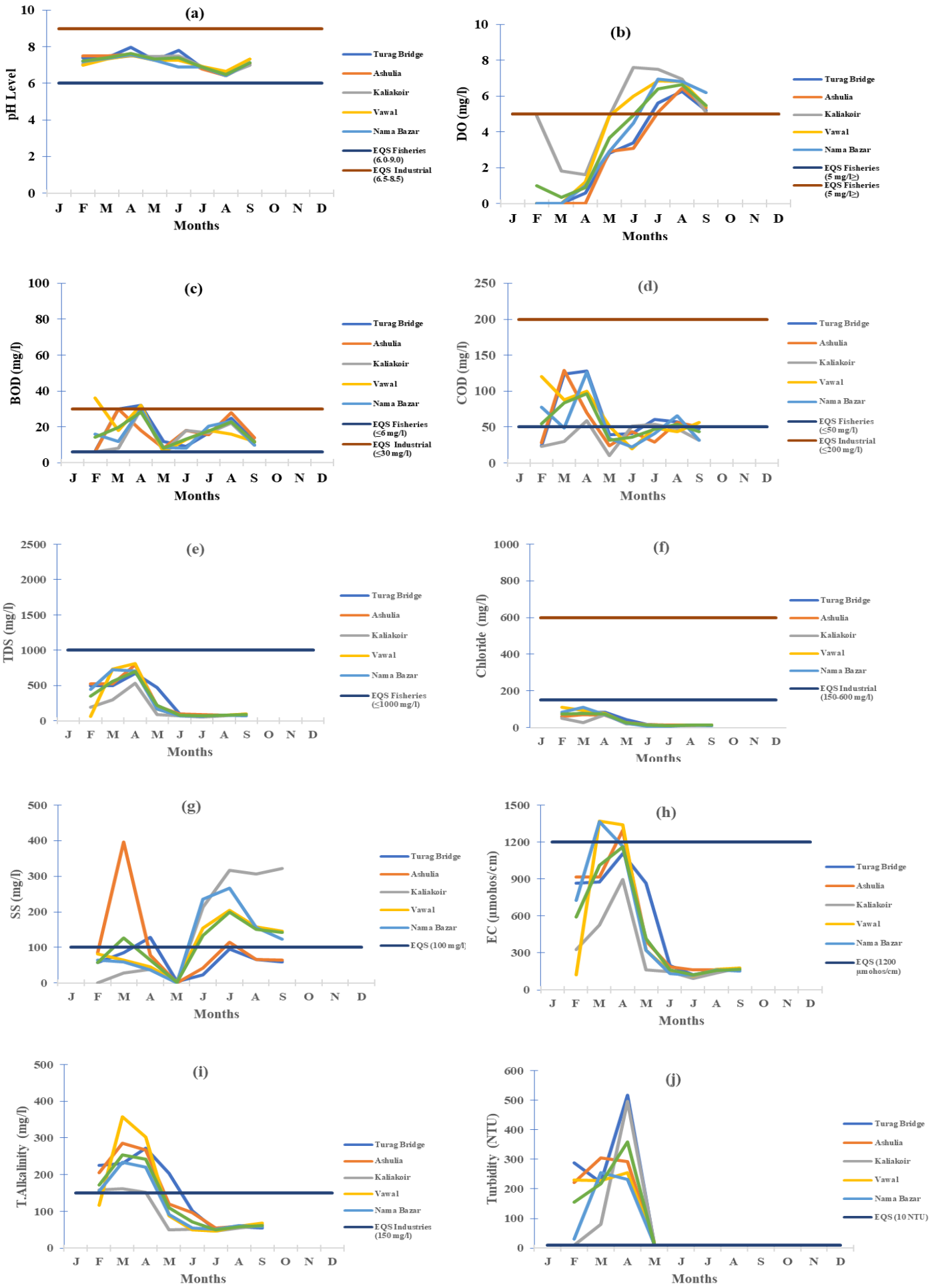

Fig.3. Status of pH, DO, BOD, COD, TDS, Chloride, SS, EC T. Alkalinity and Turbidity of Turag River in 2021

4.4 Dhaleshwari River

The Dhaleshwari river is a 160 km long distributary of the Jamuna river flowing through central part of Bangladesh. Dhaleswari River is an important branch river Brahmaputra-Jamuna River. It starts off Brahmaputra-Jamuna River at Kalihati Upazila of Tangail District and finally meets with Meghna (Upper) River at Gazaria Upazila of Munshiganj District. (Source: Bangladesh Water Development Board 2011, Department of Bangladesh Haor & Wetlands Development 2016).

In 2021, water samples were collected from 07 (Seven) locations namely Mukterpur, Ruhitpur, Hazaratpur, Alipur, Sirajnagar, Utorro Mitra, Pathorghata for analyses. Data was not available in the months of May, October and November. Detail data is attached Annex-1 (Table: 29-37).

In 2021, Dhaleshwari river water was almost neutral and pH varied from 6.12 to 8.07 (Fig.4a). In 2020, pH level varied from 7.32 to 7.86. In 2021, the maximum DO concentration (16.1 mg/l) was at Ruhitpur in march and the minimum (0.5 mg/l) at Sirajnagar in January (Fig.4b). In 2020, DO concentration varied from 2.1 to 5.7 mg/l. In 2020, BOD varied from 4.0 to 34.0 mg/l (Fig.4c) while EQS for fisheries is ≤6 mg/l. The maximum BOD was 34.0 mg/l in January at Mukterpur and the minimum BOD was 4.0 mg/l in August Pathorghata. In 2020, BOD varied from 4.6 to 9.0 mg/l. The maximum COD of Dhaleshwari river water was 90 mg/l in January at Hazartpur and the minimum was 10 mg/l in July at Pathorghata point (Fig.4d) against the EQS (50 mg/l) for fisheries. In 2020, COD varied from 15 to 39 mg/l. In 2021, TDS concentration varied from 65.1 to 401 mg/l (Fig.4e) while standard TDS level is 1000 mg/l for fisheries. The maximum TDS was 401 mg/l in January at Alipur and the minimum TDS was 65.1 mg/l in June at Hazratpur. In 2020, TDS varied from 227 to 315 mg/l. In 2021, Chloride concentration ranged from 6.0 to 70.0 mg/l (Fig.4f), which is far below the EQS (600 mg/l) for wastewater after treatment from industrial units. In 2020, Chloride concentration range of Dhaleshwari river water was from 8 to 25 mg/l mg/l. In 2021, SS concentration ranged from 04 to 121 mg/l (Fig.4g), which some location is not within the EQS (150 mg/l) for wastewater after treatment from industrial units. In 2020, SS concentration range of Dhaleshwari river water was from 14 to 25 mg/l mg/l. In 2021, Electrical Conductivity (EC) of Dhaleshwari river water at different locations was mostly within the EQS (1200 µmhos/cm). The maximum and the minimum EC of Dhaleshwari river water was 675 µmhos/cm in January at alipur and 124.1 µmhos/cm in June at Hazratpur (Fig.4h). In 2020, EC of Dhaleshwari river water was from 401 µmhos/cm to 623 µmhos/cm. In 2021, the maximum Total Alkalinity of Dhaleshwari river water was 281 mg/l in June at Ruhitpur and the minimum was 60 mg/l in August at Hazratpur (Fig.4i).

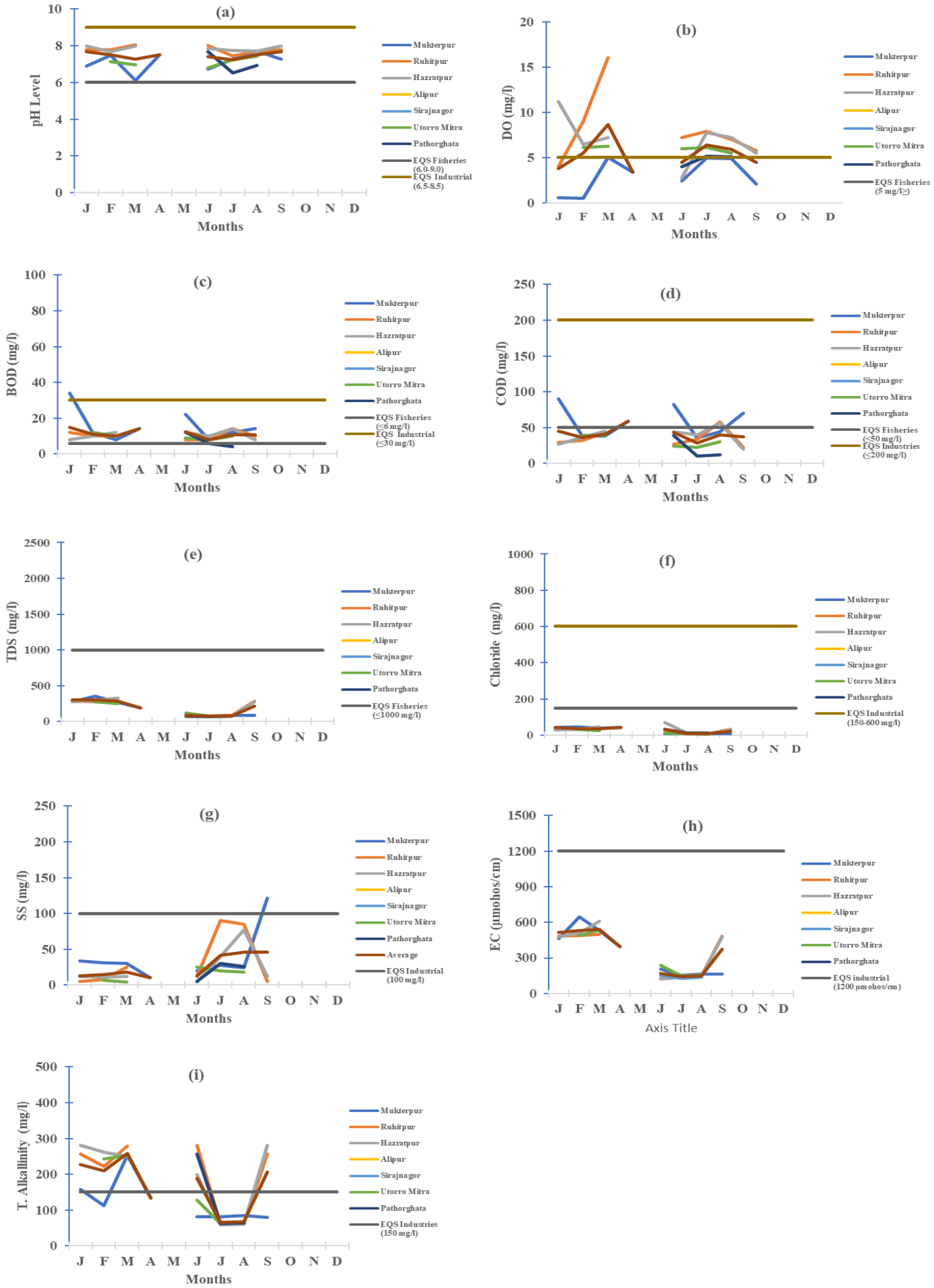

Fig.4. Status of pH, DO, BOD, COD, TDS, Chloride, SS, EC and T. Alkalinity of Dhaleshwari River in 2021

4.5 Brahmaputra River

Brahmaputra river originates from mount kailash of the Himalay. After flowing past Chilmari, Bangladesh, it is joined on its right bank by the Tista River and then follows south as the Jamuna River. South of Gaibanda, the Brahmaputra leaves the left bank of the mainstream and flows past Jamalpur and Mymensingh to join the Meghna River at Bhairab Bazar (Source: Bangladesh Water Development Board 2011, Department of Bangladesh Haor & Wetlands Development 2016). For monitoring of water quality, water samples were collected from two location (e.g. Rail Bridge, Shamvoganj, Jamalpur Rail Bridge) of the river. Date was not available for the months of April, May, June, July, September, October, November and December of the river. Detail data is attached Annex-1 (Table: 38-43).

In 2021, pH level of Brahmaputra River water varied from 7.12 to 8.03 (Fig.5a), while standard range for fisheries is 6.0 to 9.0. In 2020, pH level varied from 7.83 to 8.03. In 2021, DO concentration varied from 6.2 to 8.8 mg/l (Fig.5b). The highest and the lowest DO was found in January and August respectively, while EQS for DO for fisheries is ≥5 mg/l. In 2020, DO varied from 8.6 to 8.9 mg/l. In 2021, BOD concentration varied from 2.0 to 9.0 mg/l (Fig.5c) while EQS for fisheries is ≤6 mg/l. In 2020, BOD varied from 7.0 to 14.0 mg/l. In 2021, TDS level ranged from 124 to 480 mg/l (Fig.5d) and was within the EQS (1000 mg/l) for fisheries. In 2020, TDS level varied from 141 to 156.2 mg/l. In 2021, SS was varied from 05 to 480 mg/l (Fig.5e). In 2020, SS was 18 to 23 mg/l. In 2021, Chloride level was from 9.0 to 14.0 mg/l (Fig.5f) and which was less than EQS (150-600 mg/l) for treated wastewater from industrial units. In 2020, Chloride concentration varied from 14 to 19.5 mg/l.

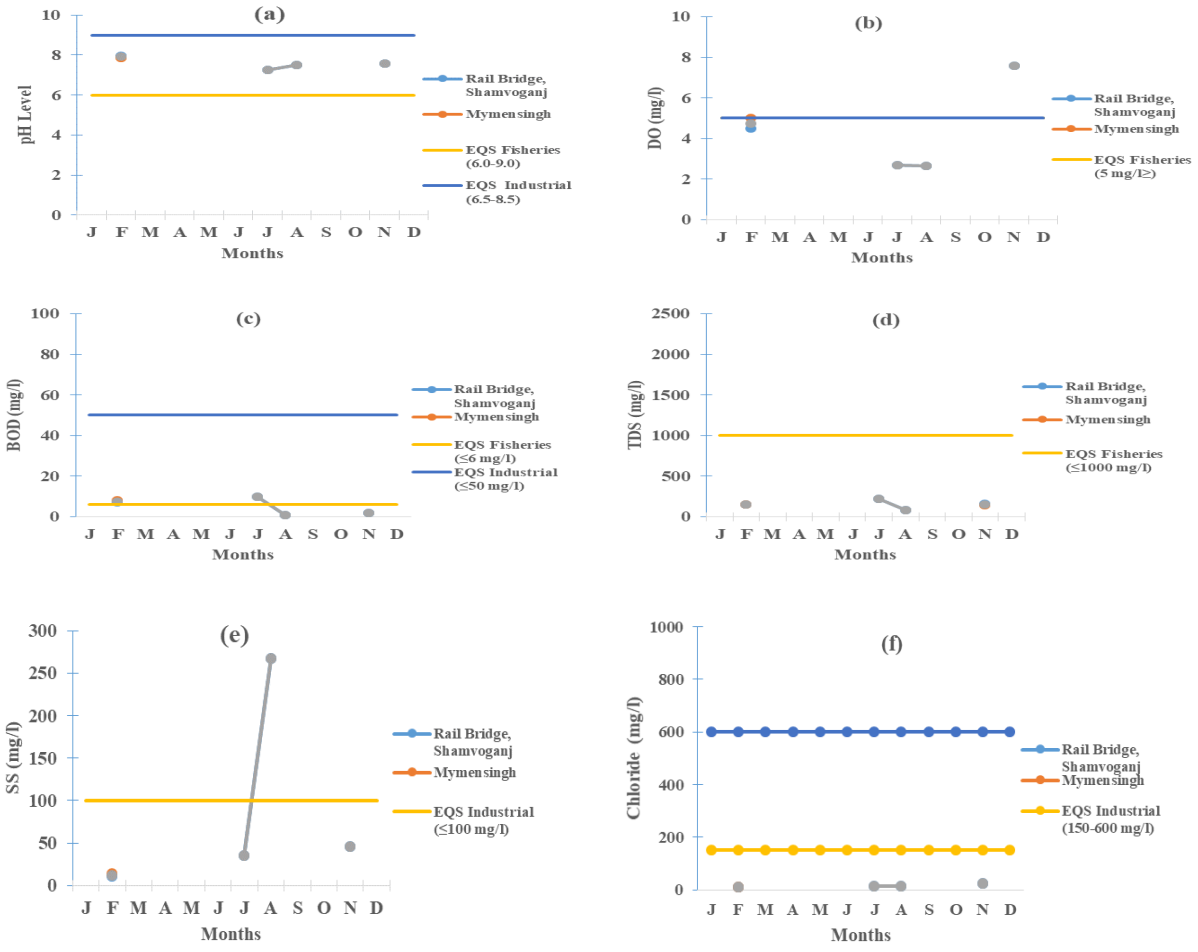

Fig.5. Graphical presentation of pH, DO, BOD, TDS, SS and Chloride of Brahmaputra River in 2021

4.6 Kaliganga River

The Kaliganga river flows by Manikganj district. For monitoring of water quality, water samples were collected from one location (e.g. Bheutha Ghat, Manikganj) of the river. Date was collected for the months of April, September, October and November of the river. Detail data is attached Annex-1(Table: 44-49).

In 2021, pH of Kaliganga river varied from 6.94 to 8.21 (Fig.6a). The maximum and the minimum pH was found in May and june, respectively. In 2020, pH level varied from 6.89 to 8.09. In 2021, DO range was from 5.0 to 9.8 mg/l (Fig.6b). In 2020, DO was from 6.2 to 9.4 mg/l. In 2021, BOD varied within a range of 1.0 to 8.0 mg/l (Fig.6c). In 2020, BOD varied from 4.4 to 7.0 mg/l. In 2021, COD varied within a range of 8.0 to 24.0 mg/l (Fig.6d). In 2021, TDS concentration was within the limit of EQS (1000 mg/l) for wastewater after treatment from industrial units. The maximum TDS was 259 mg/l in December and the minimum TDS was 62.1 mg/l in June (Fig.6e). In 2020, TDS concentration varied from 216.5 to 308 mg/l. In 2021, SS of Kaliganga river water was within the EQS (100 mg/l). The maximum and the minimum SS was 272 mg/l and 3.0 mg/l, respectively (Fig.6f). In 2020, SS was from 6.0 to 32 mg/l.

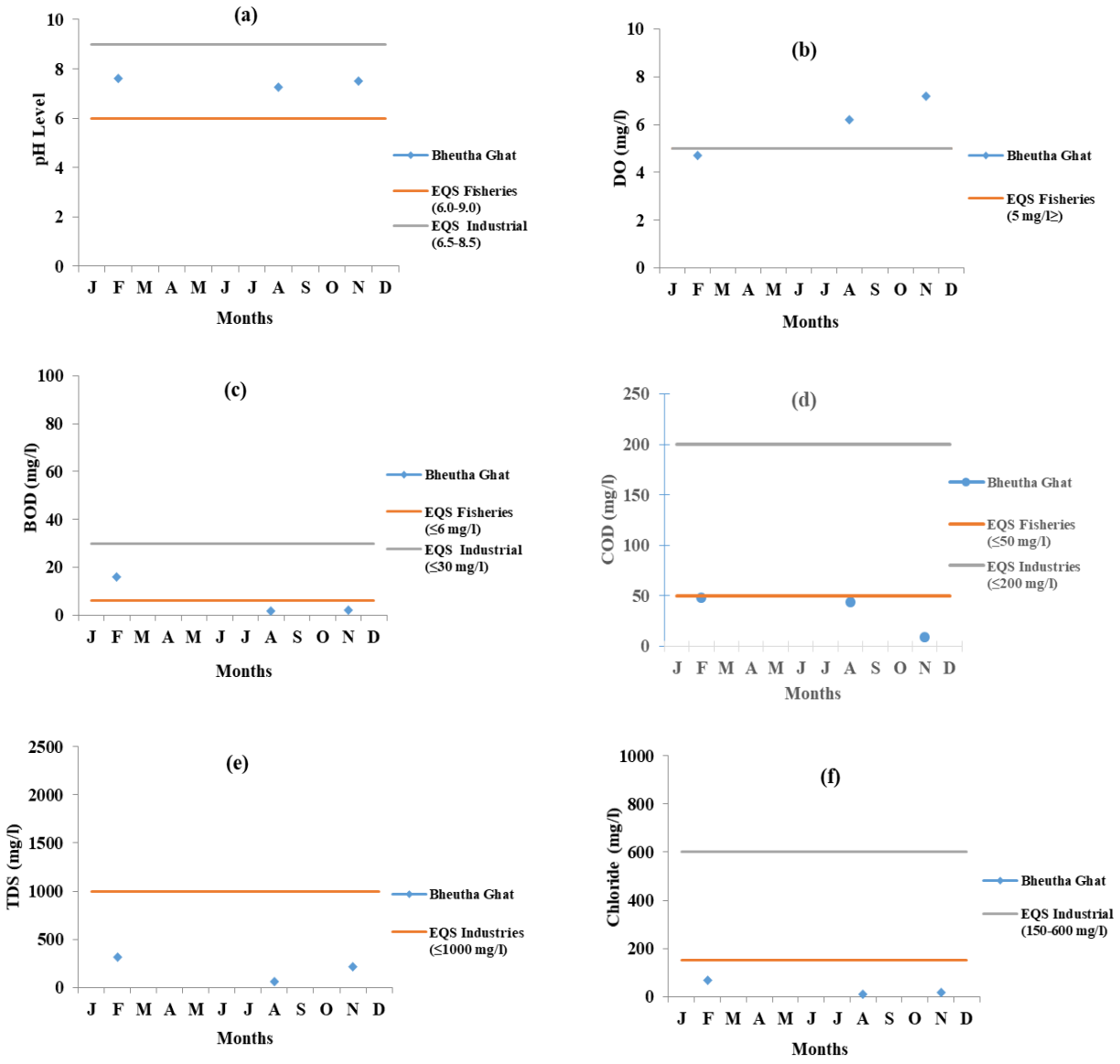

Fig.6. Status of pH, DO, BOD, COD, TDS and SS of Kaliganga Rriver in 2021

4.7 Jamuna River

To monitor water quality, samples were collected only from 10 (Ten) locations e.g. Sarkarkhana, Kakua, Jamuna Eco Park, J.E.P (Up), Jamuna Eco Park, J.E.P (Dn), Shariakand Kheya Ghat, S.K.G (Up), Shariakand Kheya Ghat, S.K.G (Dn), Horipur Kheya Ghat, H.K.G (Up), Horipur Kheya Ghat, H.K.G (Dn), Mohon Ganj, M.G (Up), Mohon Ganj, M.G (Dn). Data was not available for the months of July. Detail data is attached Annex-1 (Table: 50-55).

In 2021, pH varied from 7.13 to 8.13 and it was within the EQS limits (6.0 to 9.0) (Fig.7a). In 2020, pH was varied from 6.85 to 8.0. In 2021, DO concentrations ranged from 4.0 to 8.12 mg/l (Fig.7b) and maximum data was within the EQS (≥5 mg/l) for fisheries. In 2020, DO concentration varied from 6.7 to 12.9 mg/l. In 2021, the maximum BOD level was 26 mg/l in December at Sarkarkhana and the minimum BOD level was 2 mg/l in January at Sarkarkhana and Kakua point (Fig.7c). BOD was while the EQS (≤6 mg/l) for fisheries (Fig.7c). In 2020, BOD concentration varied from 2.0 to 12 mg/l. In 2021, level of TDS of Jamuna River water varied from 74.3 to 253 mg/l (Fig.7d), while EQS for TDS is 1000 mg/l. In 2020, TDS level varied from 90 to 162 mg/l. In 2021, EC content was varied from 137 µmohos/cm to 415 µmohos/cm (Fig.7e). In 2020, EC was from 150 µmohos/cm to 400 µmohos/cm. In 2021, SS concentration varied 07 mg/l to 440 mg/l and was below the EQS (100 mg/l) except the Kakua point ((Fig.7f). In 2020, SS was from 15 mg/l to 80 mg/l.

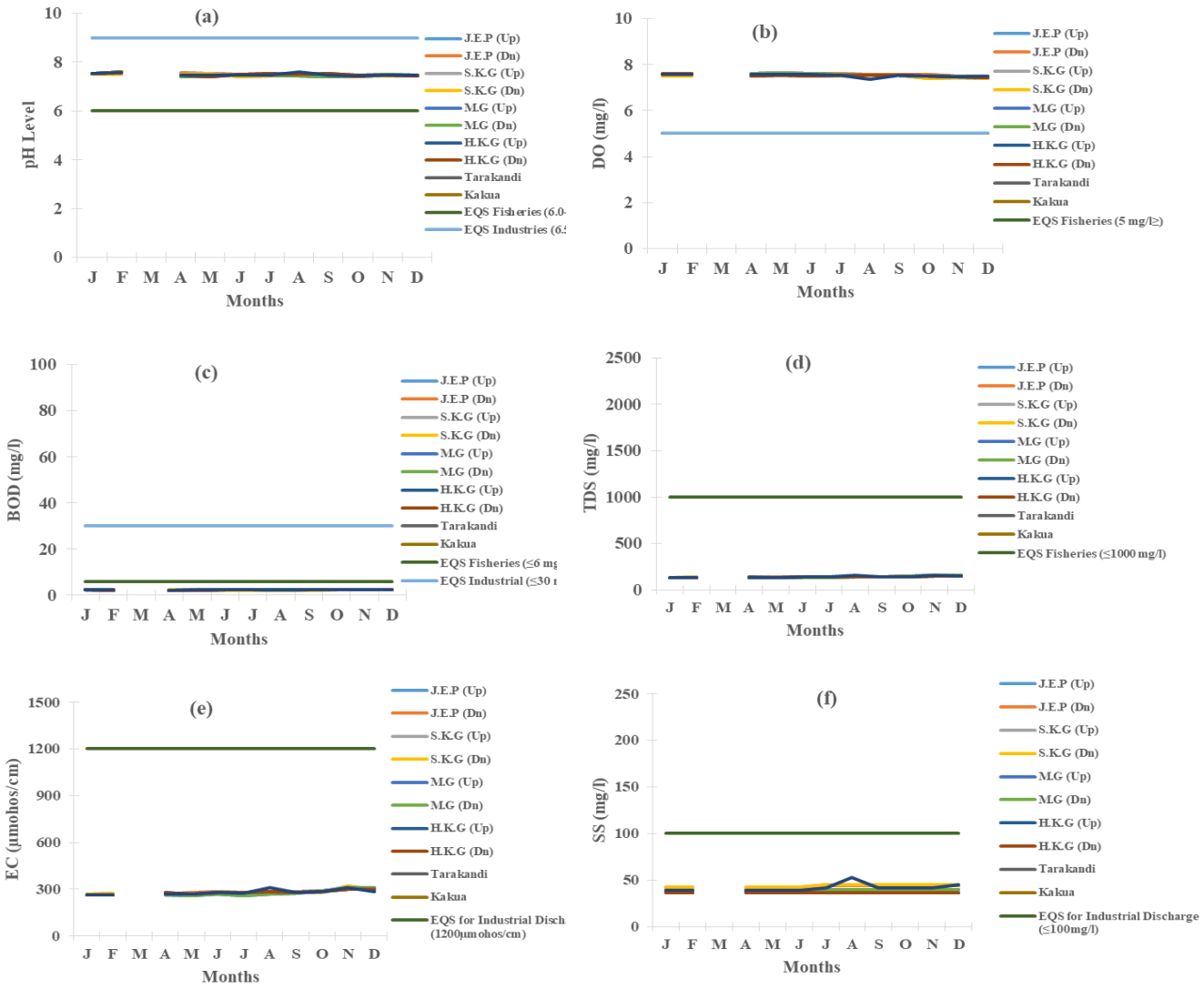

Fig.7. Status of pH, DO, BOD, TDS, EC and SS of Jamuna Rriver in 2021

4.8 Meghna River

To monitor water quality, water samples were collected from 06 (Six) locations of Meghna Ghat, Bhairob Ferry Ghat, Narshingdi Launch Ghat, Shajalal Paper, Annondo Bazar and Bishondi Ghat of the Meghna River. Data was not collected for the month of October and November. Detail data is attached Annex-1 (Table: 56-61).

In 2021, the highest pH was 8.65 in February at Narshingdi Launch Ghat point and the minimum pH was 6.41 at Meghna Ghat point in September (Fig.8a). In 2020, pH level varied from 7.01 to 9.6. In 2021, DO level of Meghna River was varied 0.7 mg/l to 9.8 mg/l while the EQS (≥5 mg/l) for fisheries (Fig.8b). In 2020, DO level varied from 2.8 mg/l to 7.8 mg/l. In 2021, at all the sampling locations of the river, BOD was below the EQS (≤6 mg/l) for fisheries round the year. The maximum and the minimum BOD load were 23 mg/l in January at Narshingdi Launch Ghat and 2.0 mg/l in May at Bhairab Ferry Ghat point (Fig.8c). In 2020, BOD concentration varied from 1.2 to 28 mg/l. In 2021, COD of Meghna River water range was from 6.0 to 65 mg/l (Fig.8d). In 2017, COD concentration varied from 7 to 95 mg/l. In 2021, TDS of Meghna River varied from 23 to 237 mg/l (Fig.7e). In 2020, TDS was varied from 29.8 to 98.1 mg/l. In 2021, Chloride concentration at all the sampling locations was within the EQS (150-600 mg/l) for waste water after treatment from industrial units. The maximum Chloride (46 mg/l) was found in May at Bhairab Ferry Ghat and the minimum (4.5 mg/l) was in September at Bishondi Ghat point (Fig.8f). In 2020, Chloride concentration varied from 6.0 to 40.0 mg/l.

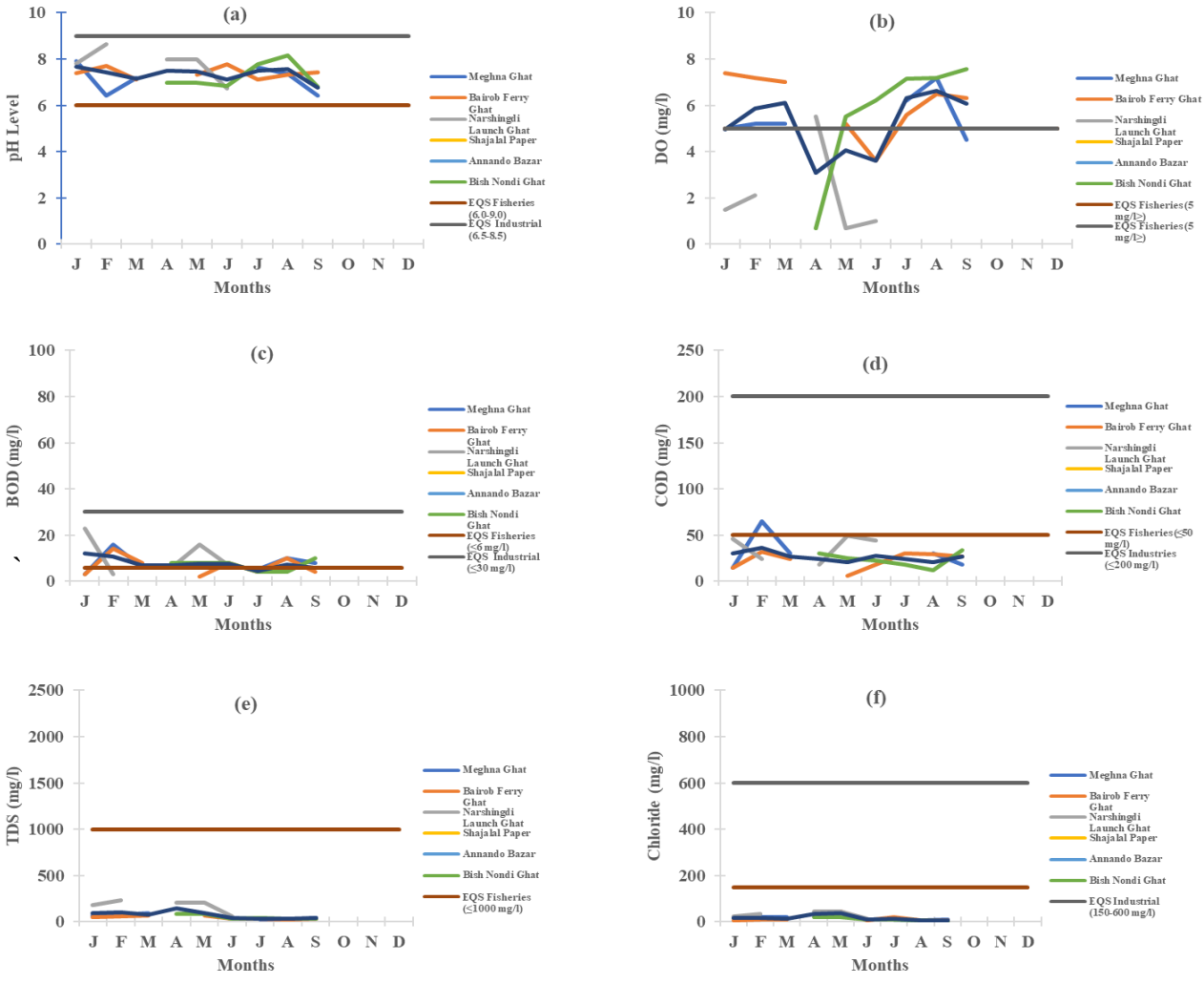

Fig.8. Status of pH, DO, BOD, TDS, SS and Chloride of Meghna River in 2021

4.9 Padma River

Padma River is the main distributary of the Ganges, originates from the Gangotri Glacier of Himalay. Padma River enters Bangladesh from India near Nawabganj of Rajshahi and meets the Jamuna near Aricha and retains its name, but finally meets with the Meghna near Chandpur and adopts the name Meghna before flowing into the Bay of Bengal (Source: Bangladesh Water Development Board 2011, Department of Bangladesh Haor & Wetlands Development 2016).

Water samples were collected from 08 (Eight) locations of the river namely Josldia, Sitardor, Kandipara, Khoiria, Shimolia, Gordor Bazar, Mawa Ferry Ghat and Barha Ghat points were used in the analysis. For analysis, average values of two points were considered. Date was available for the months of February, April, September, October and November of the river. Detail data is attached Annex-1 (Table: 62-67).

In 2021, pH of Padma River water was mostly neutral and varied from 7.78 to 8.17 (Fig.9a) while standard pH for fisheries is 6.0 to 9.0. The maximum pH was found at Mawa Ferry Ghat in January and the minimum pH level was at Barha Ghat point in August. In 2020, pH level varied from 7.51 to 7.99. In 2021, DO level of Padma River was above EQS (≥5 mg/l) for fisheries at almost all the locations and it varied from 5.0 to 9.2mg/l (Fig.9b). In 2020, DO concentration ranged from 6.7 to 9.4 mg/l. In 2021, BOD load was within the EQS (≤6 mg/l) for fisheries at all locations. The maximum BOD was found 30 mg/l in June at Mawa Ferry Ghat and the minimum was 1.0 mg/l in January at Shimolia point (Fig.9c). In 2020, BOD load varied from 2.1 to 13.0 mg/l. In 2021, TDS level of Padma River water was within EQS throughout the year and it varied from 40 to 148 mg/l (Fig.9d). In 2020, TDS concentration varied from 83.1 to 160 mg/l. In 2021, the maximum and the minimum EC of Padma River water was 271 µmhos/cm in July at Barha Ghat and 122.9 µmhos/cm in June at same point (Fig.9e), while EQS 1200 µmhos/cm wastewater after treatment from industrial units. In 2020, EC varied from 130 µmhos/cm to 320 µmhos/cm. In 2021, SS level of Padma River water was within EQS throughout the year and it varied from 4.0 to 393 mg/l (Fig.9f). In 2020, SS varied from 36 to 118 mg/l.

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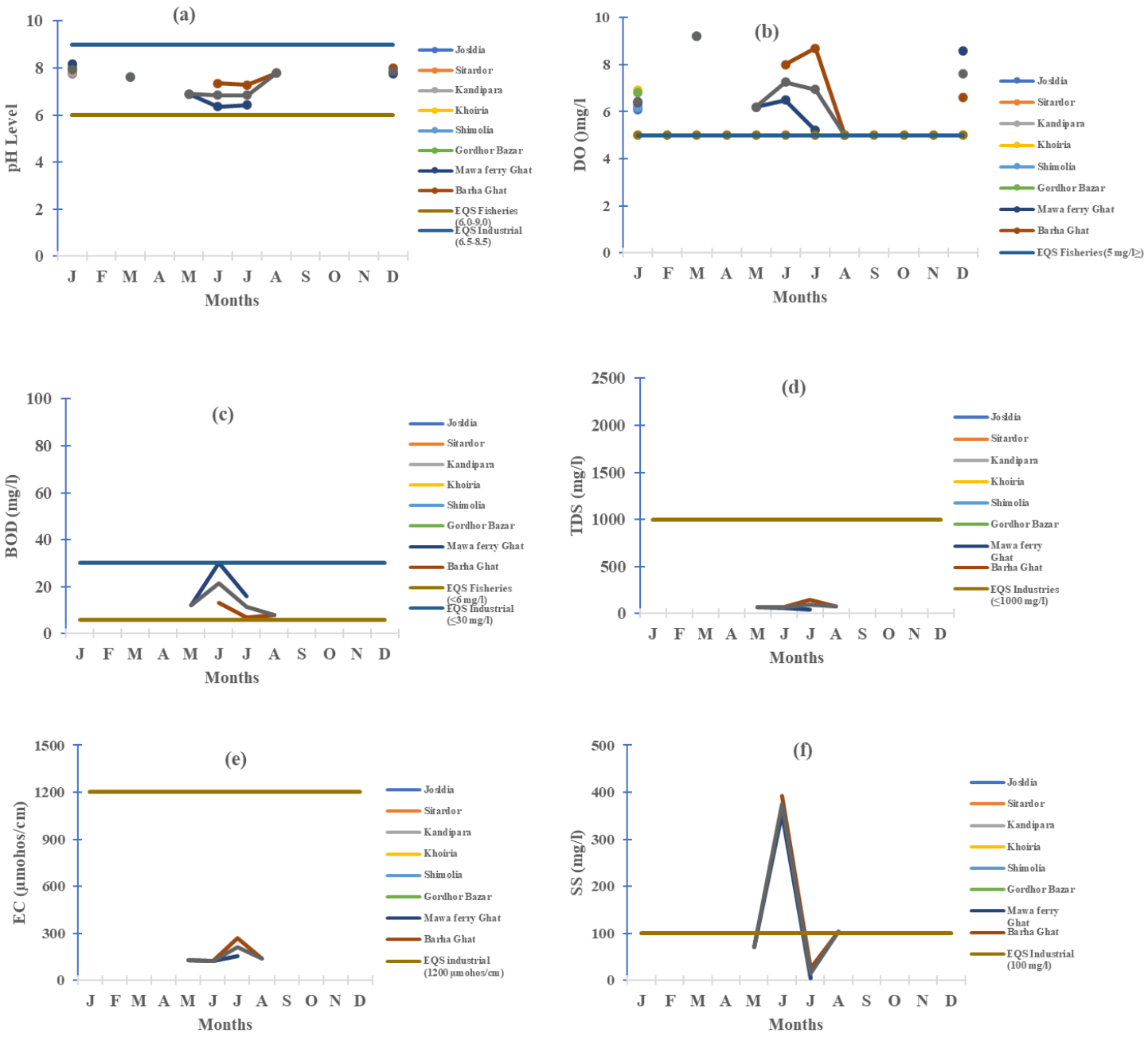

Fig.9. Status of pH, DO, BOD, TDS, SS and EC of Padma River in 2021

4.10 Korotoa River

To monitor water quality of Korotoa river in 2021, water samples were collected from 6 (Six) locations of the river e.g. Dottobari Bridge, Dt.Bd. (UP), Dt. Bd. (Dn), Aziz Ahmed Taki Road, A.A.T.R.(UP), Aziz Ahmed Taki Road, A.A.T.R.(Dn), Sultanganj Up, and Sultanganj Down. Data was not available in the months of July of the river. Detail data is attached Annex-1 (Table: 68-73).

In 2021, pH level of Korotoa river water varied from 6.92 to 7.26 (Fig.10a) and was within EQS limit. In 2020, pH level varied from 6.9 to 7.66. In 2021, DO level of Korotoa river water was lower than EQS (≥5 mg/l) for fisheries Shahjadpur Point. DO varied from 3.48 to 6.8 mg/l (Fig.10b). In 2020, DO concentration varied from 2.9 to 7.82 mg/l. In 2021, the minimum BOD was 3.0 in August at Dottobari Bridge and the maximum BOD was 6.46 mg/l in March at at same point (Fig.10c). In 2020, BOD concentration varied from 2.0 to 6.3 mg/l. In 2021, TDS varied from 134 mg/l to 270 mg/l (Fig.10d). In 2020, TDS range was from 110 mg/l to 360 mg/l. In 2021, level of SS of Korotoa river water at different locations was within the EQS. The maximum and the minimum SS was 72 mg/l in April at Dottobari Bridge and 46 mg/l in August at Aziz Ahmed Taki Road (Fig.10e). In 2020, SS concentration varied from 12 mg/l to 110 mg/l. In 2021, average EC varied from 268 µmhos/cm to 408 µmhos/cm (Fig.10f) and was within the EQS limit. In 2020, EC concentration varied from 220 µmhos/cm to 720 µmhos/cm.

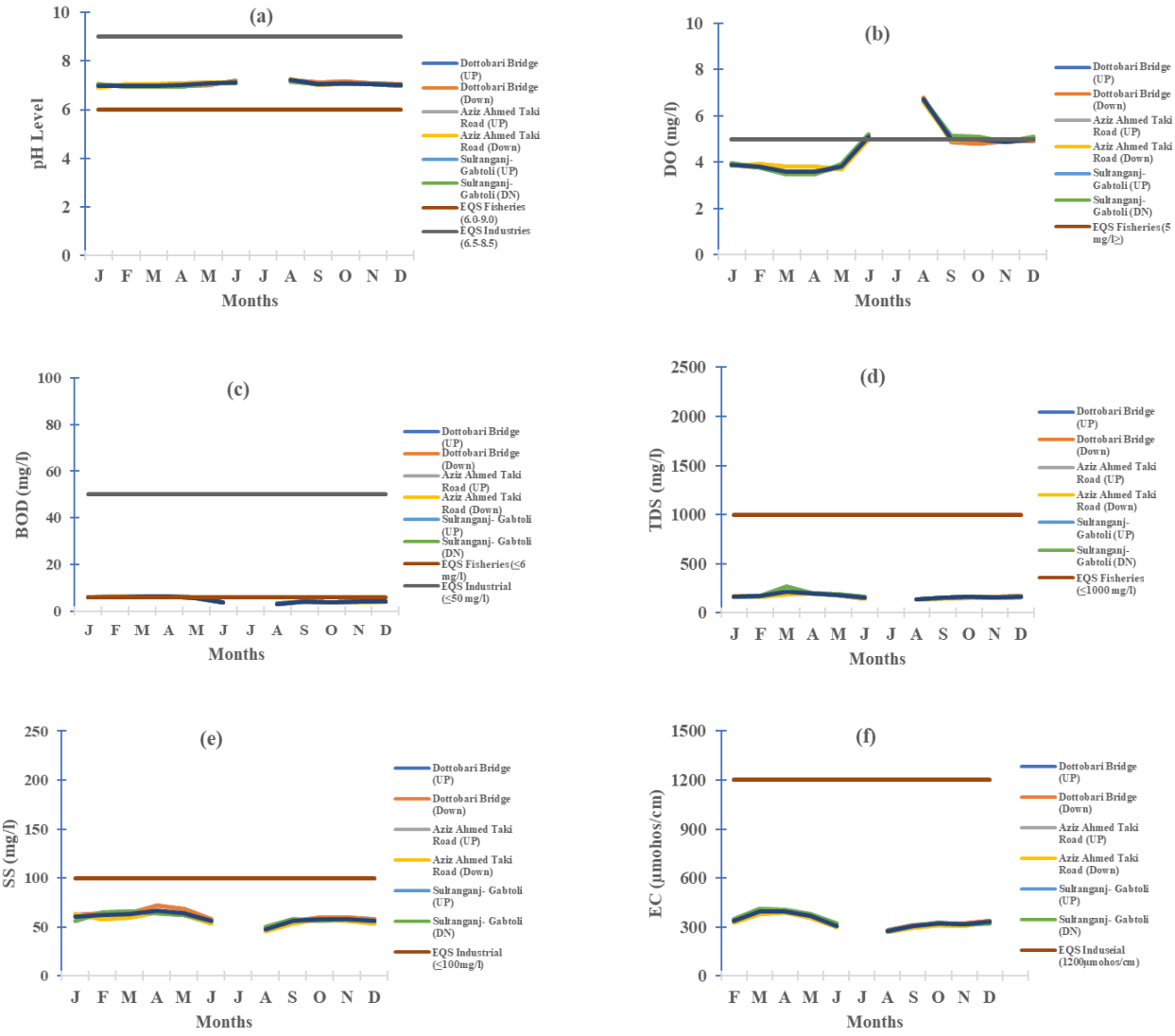

Fig.10. Status of pH, DO, BOD, TDS, SS and EC of Korotoa River in 2021

4.11 Teesta River

The Teesta River is about 315 km long and it rises in the eastern Himalayas, flows through the Indian states of West Bengal and Sikkim through Bangladesh and enters the Bay of Bengal. It joins the Jamuna River at Fulchhari in Bangladesh. It drains an area of 12,540 km^2. It forms the border between Sikkim and West Bengal. Water samples were collected from 6 (Six) locations near Tista Bridge (up Stream and down stream), Nohali Sapmari (up Stream and down stream), Teesta Barrage (Teesta Barrage (Up) of Teesta River for monitoring of water quality in 2021. Data was not available in the months of July of the river. Detail data is attached Annex-1 (Table: 74-79).

In 2021, pH level of Teesta River water varied from 7.56 to 9.96 (Fig.11a) and was within the EQS limit. In 2020, pH level varied from 7.54 to 7.88. In 2021, DO level of Teesta River water was above the EQS (≥5 mg/l) for fisheries. DO varied from 7.64 to 8.14 mg/l (Fig.11b). In 2020, DO level varied from 7.1 to 7.84 mg/l. In 2021, the maximum BOD was 2.3 mg/l and the minimum BOD was 2.2 mg/l (Fig.11c). In 2020, BOD level varied from 2.1 to 2.3 mg/l. In 2021, TDS varied from 114 mg/l to 138 mg/l (Fig.10d). In 2020, TDS level varied from 110 mg/l to 190 mg/l. In 2021, Level of SS of Teesta River at different locations was within the EQS. The maximum and the minimum SS was 45 mg/l in July and 37 mg/l in April (Fig.11e). In 2020, SS level varied from 60 to 90 mg/l. In 2021, the maximum and the minimum Chloride was 46 mg/l in April and 32 mg/l in March (Fig.11f). In 2020, Chloride level varied from 28.to 35 mg/l.

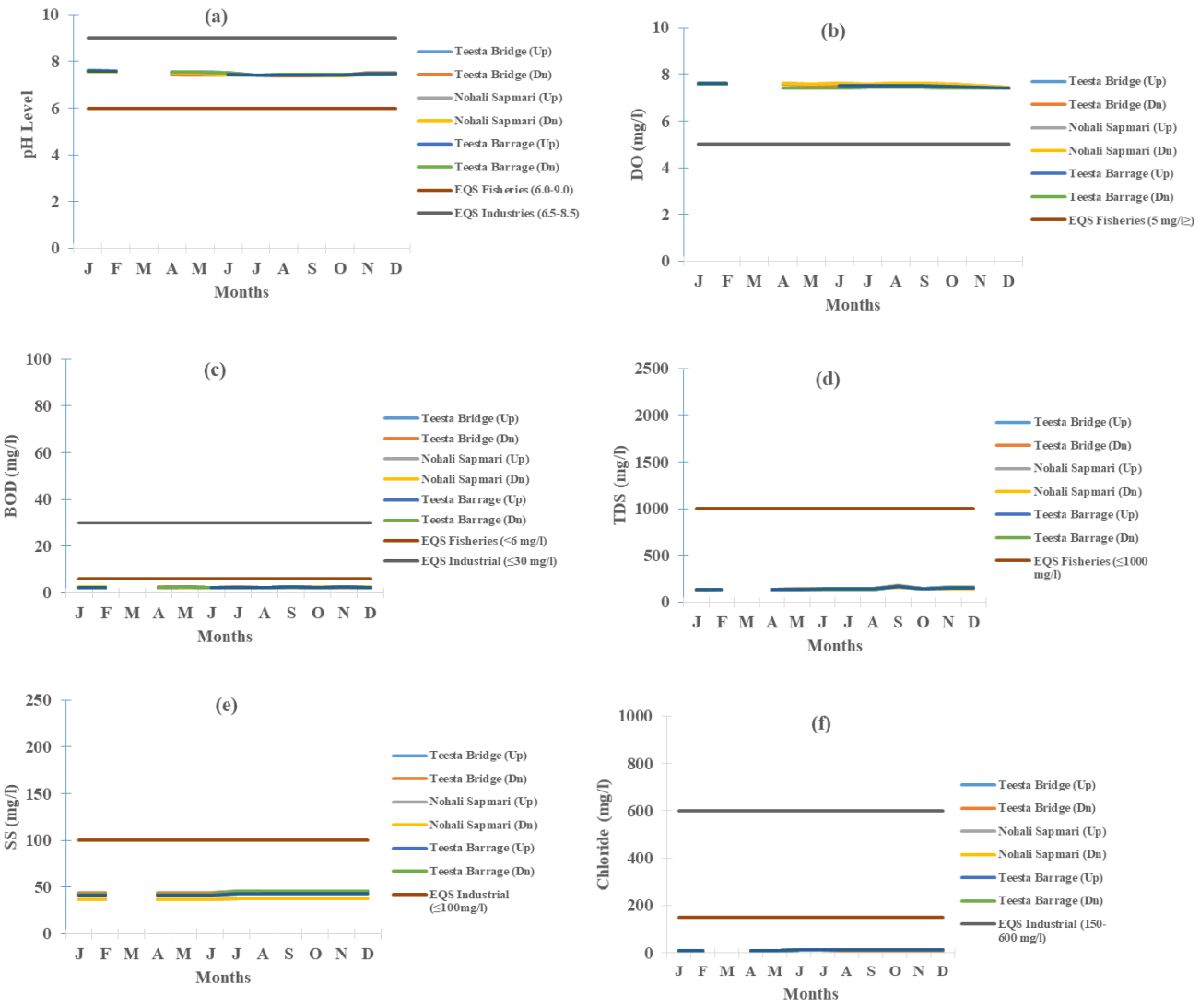

Fig.11. Status of pH, DO, BOD, TDS, SS and Chloride of Teesta River in 2021

4.12 Karnaphuli River

The Karnaphuli river is in the south-eastern part of Bangladesh that flows through Chattagram Hill Tracts and Chattagram into the Bay of Bengal. Water samples were collected from 6 (Six) locations (e.g. CUFL, TSP, Shikalbaha, Kalurghat Bridge, Mariam Nagar, Karnafully Paper of Karnaphuli river for monitoring of water quality in 2021. Data was not available in the months of October of the river. Detail data is attached Annex-1 (Table: 80-85).

In 2021, pH level at the sampling points of the Karnaphuli river varied from 6.14 to 8.19 (Fig.12a), while standard pH for inland surface water for fisheries is 6.0 to 9.0. In 2020, pH level varied from 6.54 to 8.37. DO level of Karnaphuli river was within the EQS althrough the year of 2021 and met the standard of DO for fisheries (≥5 mg/l). DO varied from 5.89 to 8.89 mg/l (Fig.12b). In 2020, DO concentration varied from 0.78 to 8.69 mg/l. In 2021, BOD value varied from 4 to 167 mg/l (fig.11c), while EQS for fisheries units (≤6 mg/l). In 2020, BOD value varied from 4.0 to 50 mg/l. In 2021, maximum COD was 560 mg/l in January at TSP Point and the minimum was 10 mg/l in January at Mariam Nagar point to (fig.11d), while EQS for fisheries units is 50 mg/l. In 2020, COD value varied from 79 to 1490 mg/l. In 2021, level of SS of Karnaphuli river water at different points was beyond the EQS (100 mg/l). The maximum and the minimum SS was 533 mg/l in July at TSP point and 5 mg/l in February at Karnafully Paper point (Fig.12e). In 2020, SS value varied from 64 to 1652 mg/l. In 2021, the maximum TDS was 13450 mg/l in March at TSP point and the minimum was 58.2 mg/l in February at Karnafully Paper point (Fig.12f). In 2020, TDS concentration varied from 275 to 20690 mg/l.

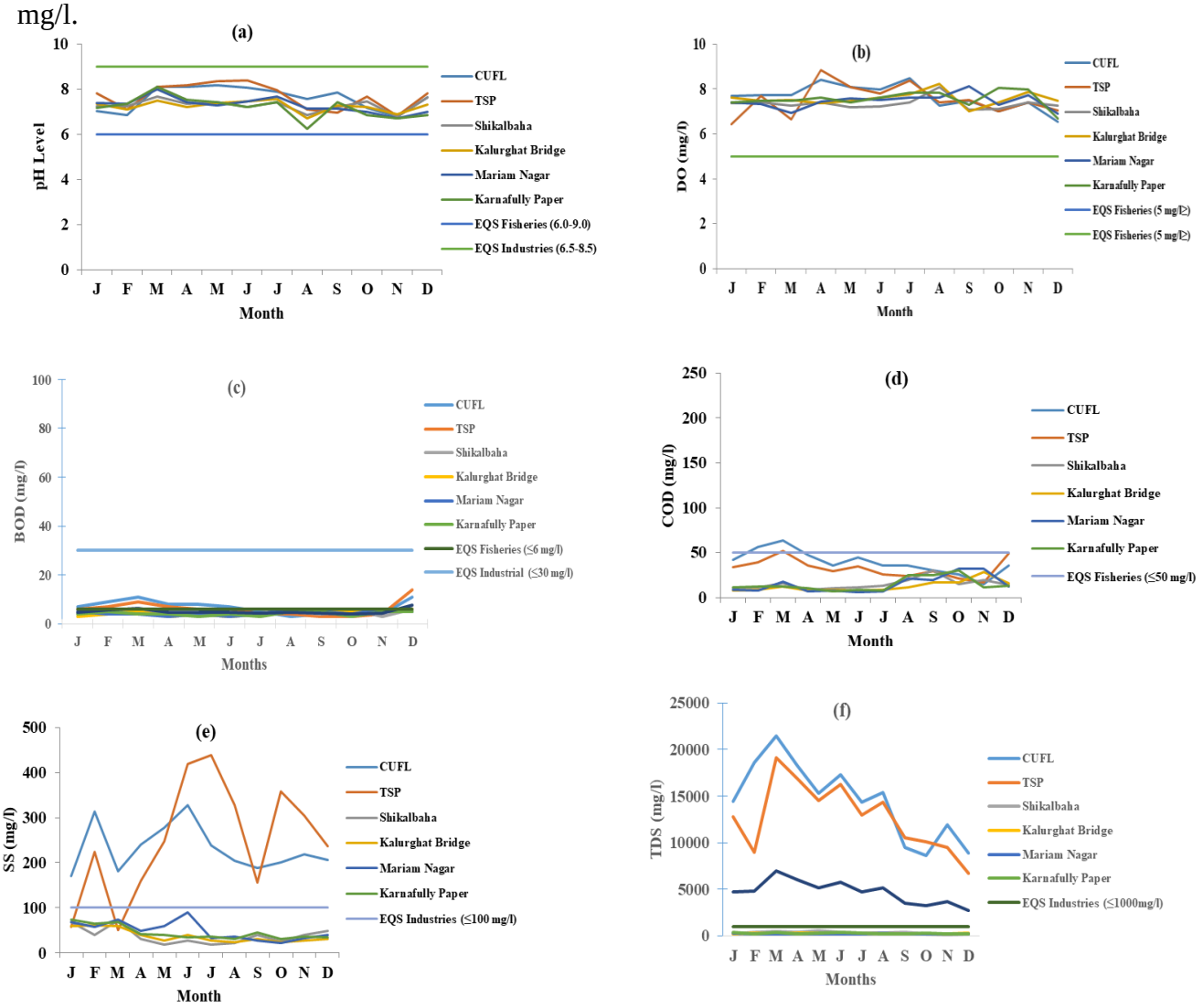

Fig.12. Status of pH, DO, BOD, COD, SS, TDS of Karnaphuli River in 2021

4.13 Halda River

The Halda river passes through the South-Eastern part of Bangladesh. Water sampling 3 (Three) locations (e.g. Maduna Ghat, Garduara Sluice Gate, Halda Bridge) of Halda River. Detail data is attached Annex-1 (Table: 86-91).

In 2021, the maximum pH of Halda river water was 9.03 in January at Garduara Sluice Gate and the minimum pH was 7.02 in September at the same point (Fig.13a) while standard pH for inland surface water for fisheries 6.0 to 9.0. In 2020, pH level varied from 6.36 to 8.55. In 2021, DO varied from 4.17 to 8.26 mg/l (Fig.13b). In 2020, DO range was from 0.31 to 9.79 mg/l. In 2021, BOD varied from 3 mg/l to 12 mg/l (Fig.13c). In 2020, BOD range was from 1.0 mg/l to 39 mg/l. In 2021, COD varied from 9 mg/l to 60 mg/l (Fig.13d). In 2020, COD range was from 6.0 mg/l to 180 mg/l. In 2021, SS level of Halda River was within the EQS (100 mg/l) for fisheries. SS varied from 14 to 548 mg/l (Fig.13e). In 2020, SS concentration varied from 23 to 518 mg/l. In 2021, the maximum and the minimum EC was 1407 µmohos/cm in May at Moduna Ghat point and 36.2 µmohos/cm in November at Garduara Sluice Gate point (fig.13f). In 2020, EC concentration varied 15.7 and 517.3 µmohos/cm.

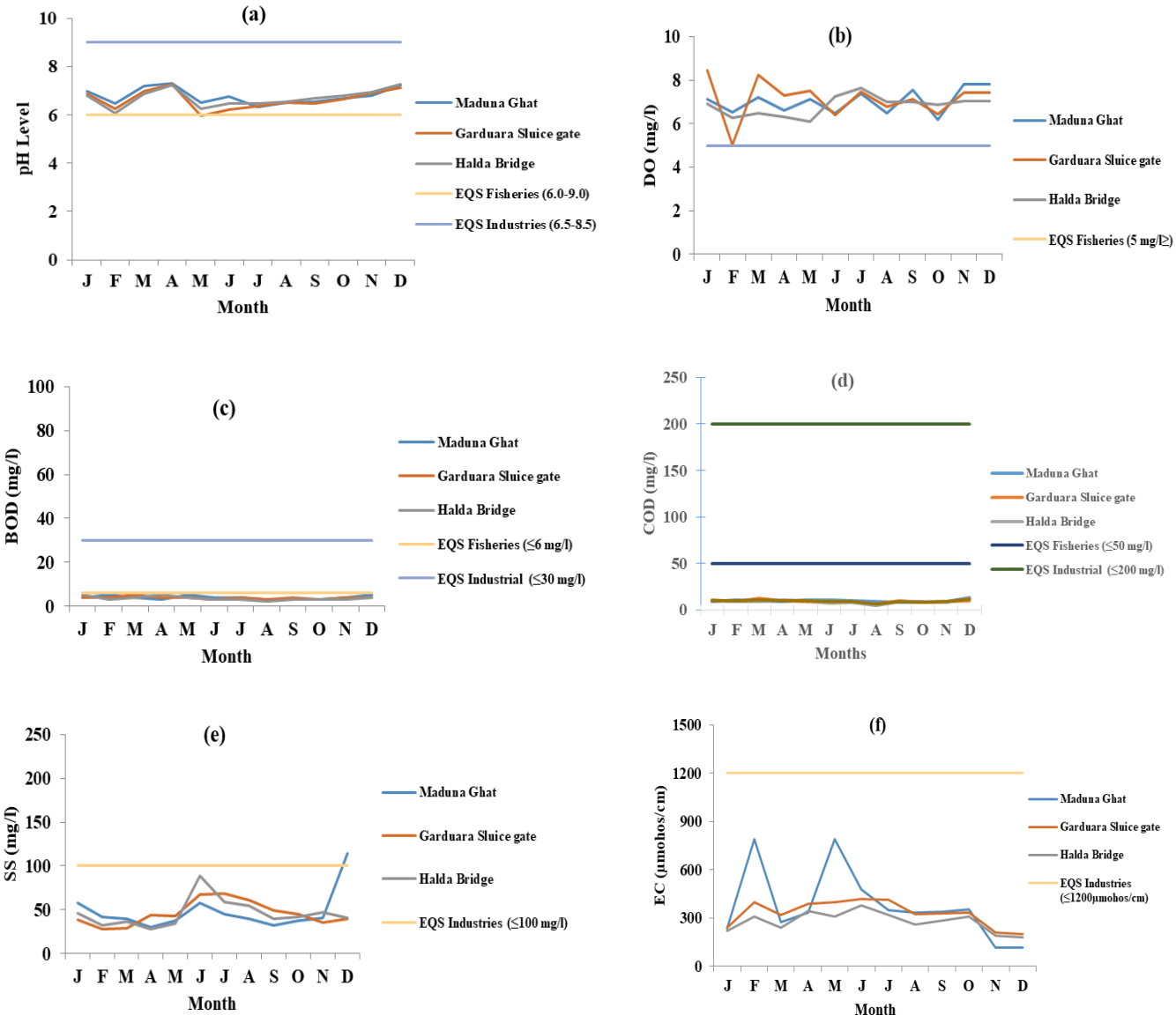

Fig.13. Status of pH, DO, COD, SS and EC of Halda River in 2021

4.14 Moyuri River

The Moyuri River is situated at the back swamp of the Bhairab-Rupsa River. For monitoring water samples were collected from three location named Shoshan Ghat, Buro Moulavir Darga, Doshgate Jalma of the river. Average value of those 3 (Three) points was used in the analysis. Data was not available in the months of March to July and December of the river. Detail data is attached Annex-1 (Table: 92-99).

In 2021, pH level of Moyuri River water varied from 7.20 to 8.36 (Fig.14a) and was within the EQS limit. The Maximum pH 8.35 at Doshgate Jalma in February and the minimum pH 7.20 at the same location in August. In 2020, pH level varied from 7.28 to 8.0.

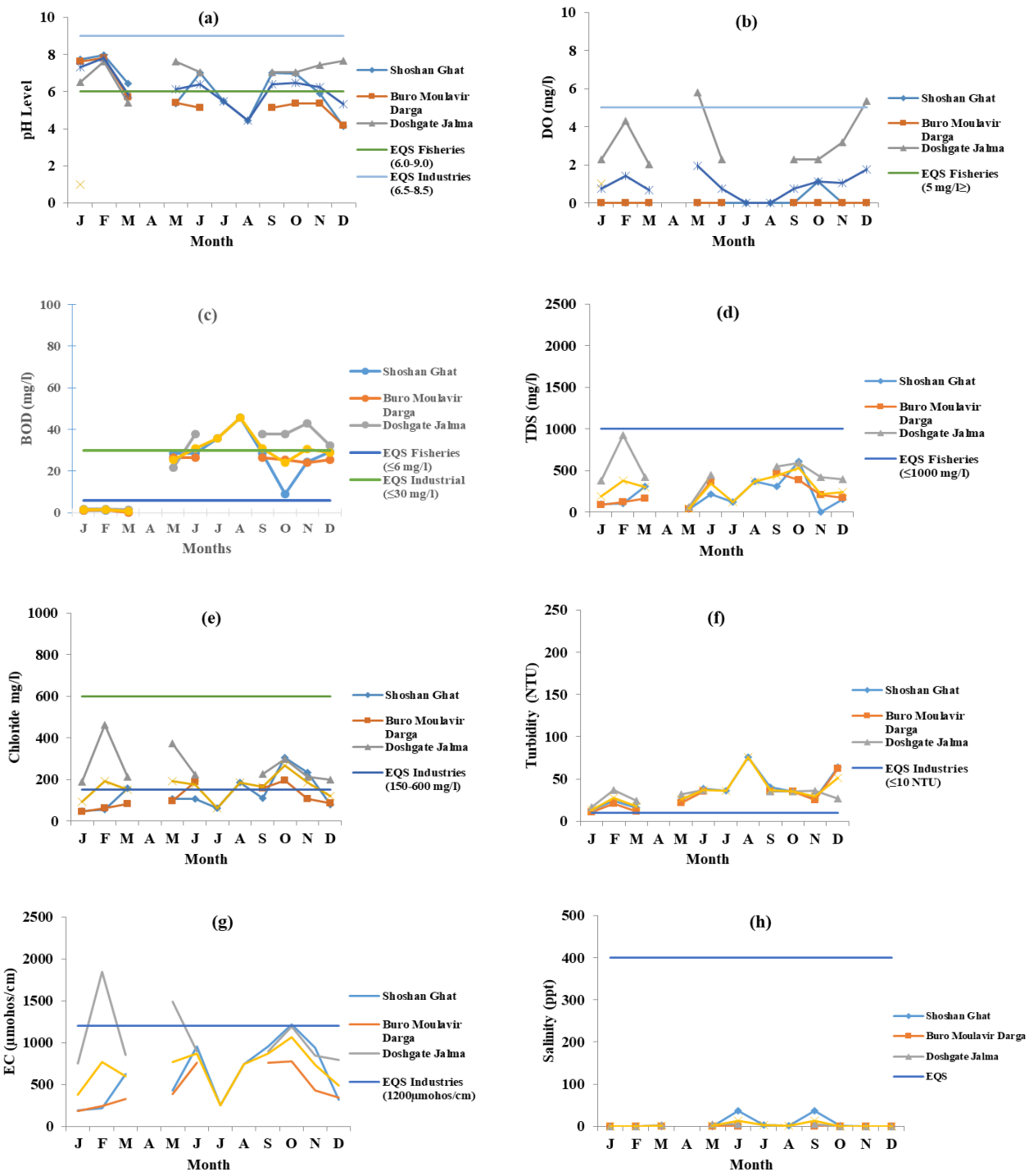

Fig.14. Status of pH, DO, BOD, TDS, Chloride, Turbidity, EC and Salinity of Moyuri River in 2021

In 2021, DO concentration of Moyuri River water varied from 0.0 to 6.67 (Fig.14b) and the maximum value was uper than the EQS (≥5 mg/l) for fisheries at the Doshgate Jalma points. In 2020, DO varied from 0.26 to 2.8 mg/l. In 2021, BOD level of the Moyuri River water varied from 1.6 to 88 mg/l (Fig.14c) while EQS for fisheries units is ≤6 mg/l mg/l. The maximum BOD was 88 mg/l in October at Doshgate Jalma and the minimum BOD Was 1.6 mg/l in October at Buro Moulavir Darga point. In 2021, TDS level of the Moyuri River water varied from 63 to 2815 mg/l (Fig.14d) while EQS is 1000 mg/l for fisheries. In 2020, TDS range was from 312 to 666 mg/l. In 2021, Chloride range was from 87 to 1410 mg/l (Fig.14e) while EQS 150-600 mg/l. Highest Chloride was found in August. In 2020, Chloride level varied from 82 to 328 mg/l. In 2021, the maximum Turbidity was 58.6 NTU in February at Shoshan Ghat point and the minimum Turbidity was 49 NTU in October at Buro Moulavir Darga point (Fig.14f) while EQS is 10 NTU. In 2020, Turbidity level varied from 30.3 to 78.3 NTU. In 2021, the maximum EC content of Moyuri River water was 5630 µmohos/cm in January at Doshgate Jalma and the monimum EC was 131 µmohos/cm in September at the same point (Fig.14g) where the EQS (1200 µmohos/cm). In 2020, EC was from 626 µmhos/cm to 1340 µmhos/cm. In 2021, Salinity varied from 0.15 to 2.84 ppt (Fig.14h). In 2020, Salinity varied from 0.3 to 1.91 ppt.

4.15 Bhairab River

The Bhairab river flows in the south of Bangladesh. Its water carries plenty of silt. Water samples were collected from 4 (Four) locations comprising four different points [e.g. Basundia Bazar-Aladipur, Noapara Ferry Ghat-Abhaynagar, Noapara Jafarpur, Fultala Ghat-Dhulgram] of Bhairab River for monitoring water quality in 2021. Data was not available in the months of February, May-July of the river. Detail data is attached Annex-1 (Table: 100-107).

In 2021, pH at different locations of the Bhairab river varied from 7.3 to 8.9 (Fig.15a) while EQS for inland surface water is 6.0 to 9.0. In 2020, pH varied from 7.74 to 8.36. In 2021, maximum DO was around the EQS ((≥5 mg/l) for fisheries. DO was from 0.0 to 6.8 mg/l (Fig.15b). In 2020, DO varied from 3.68 to 7.35 mg/l. In 2021, BOD varied from 0.65 to 5.3 mg/l the EQS (≤6 mg/l) for fisheries (Fig.15c). In 2020, BOD level varied from 0.2 to 2.5 mg/l. In 2021, the maximum and the minimum TDS were 4160 mg/l in March at Basundia Bazar-Aladipur and 63 mg/l in December at Fultala Ghat-Dhulgram (Fig.15d) while EQS 1000 mg/l for fisheries. In 2020, TDS was from 66 to 1162 mg/l. In 2021, Chloride was varied from 68 to 1631 mg/l (Fig.15e) while EQS for Chloride is 150-600 mg/l. Highest Chloride (1631mg/l) was found in April at Fultala Ghat-Dhulgram and lowest was 68 mg/l in March at Basundia Bazar-Aladipur points. In 2020, Chloride level varied from 48 to 732 mg/l. Turbidity of Bhairab river water at maximum locations was very high in 2021. It varied from 60.5 to 76.4 NTU while the EQS is 10 NTU (Fig.15f). The prime reason may be of carrying huge silt by the river throughout the year. In 2020, Turbidity level varied from 55.2 to 85.5 NTU. In 2021, the maximum EC was 8480 µmohos/cm in March at Basundia Bazar-Aladipur points and the minimum EC was 134 µmohos/cm in December at Fultala Ghat-Dhulgram point (Fig.15g). In 2020, EC varied from 133.7 µmohos/cm to 2330 µmohos/cm. In 2021, maximum Salinity was 1.95 ppt in April at Noapara Ferry Ghat, Abhaynagar and minimum Salinity was 0.06 mg/l in December at Fultala Ghat-Dhulgram point (Fig.15h). In 2022, Salinity varied from 0.06 ppt to 4.2 ppt.

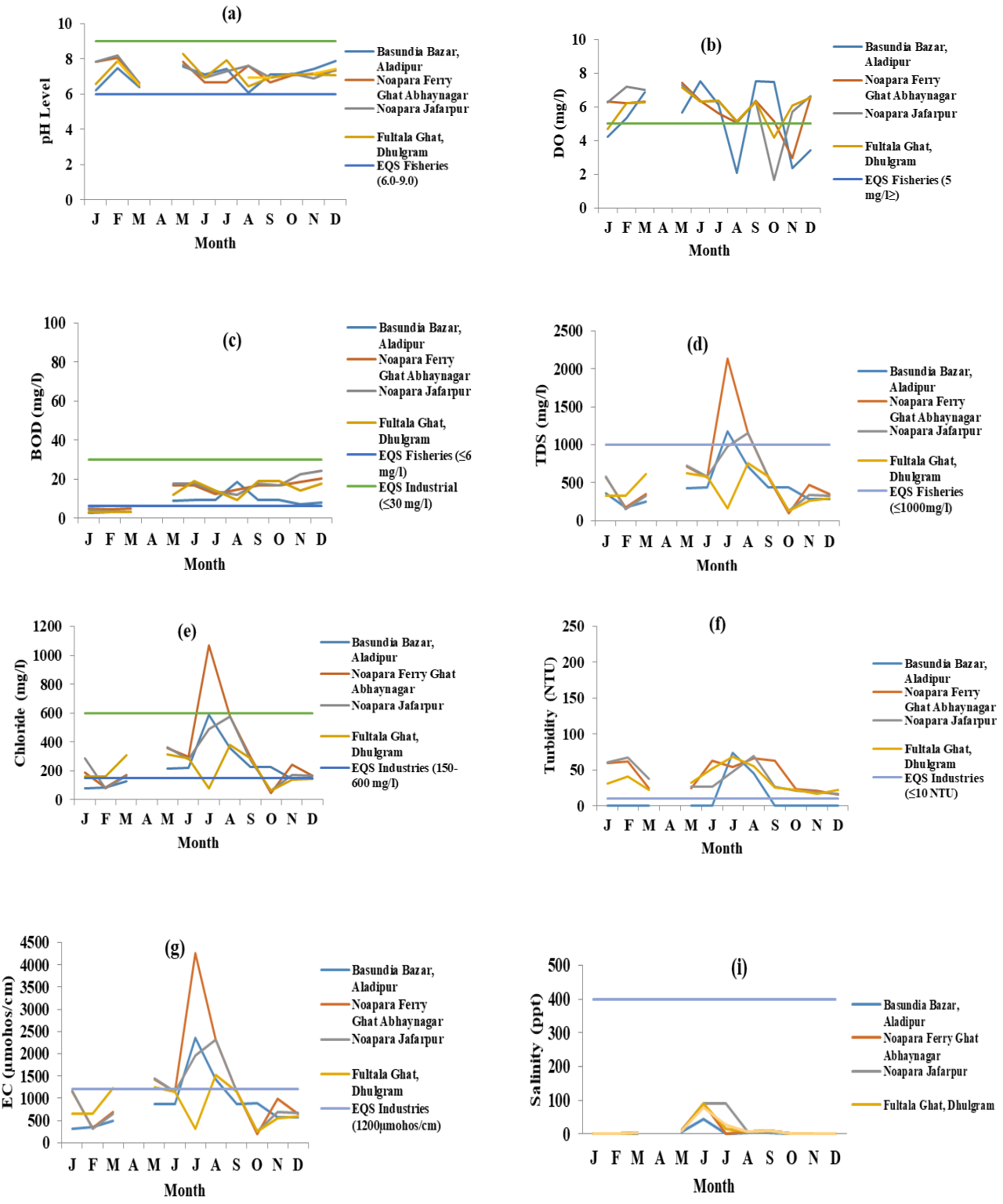

Fig.15. Status of pH, DO, BOD, TDS, Chloride, Turbidity, EC and Salinity of Bhairab River in 2021

4.16 Rupsa River

The Rupsa river forms from the confluence of the Bhairab and Atrai rivers, and flows into the Pasur River. Its etire length is affected by tides. Water samples were collected from 4 (Four) different locations [e.g. Gilatola-Nadan Pratap (M), Kalibari Ghat (M), Charer Hat-Sulpur Aijgati (M), Rupsa Ghat (M)] of Rupsa River for monitoring water quality in 2021. For analysis, average of three points of a location were considered. Data was not available in the months of May-July of the river. Detail data is attached Annex-1 (Table: 108-115).

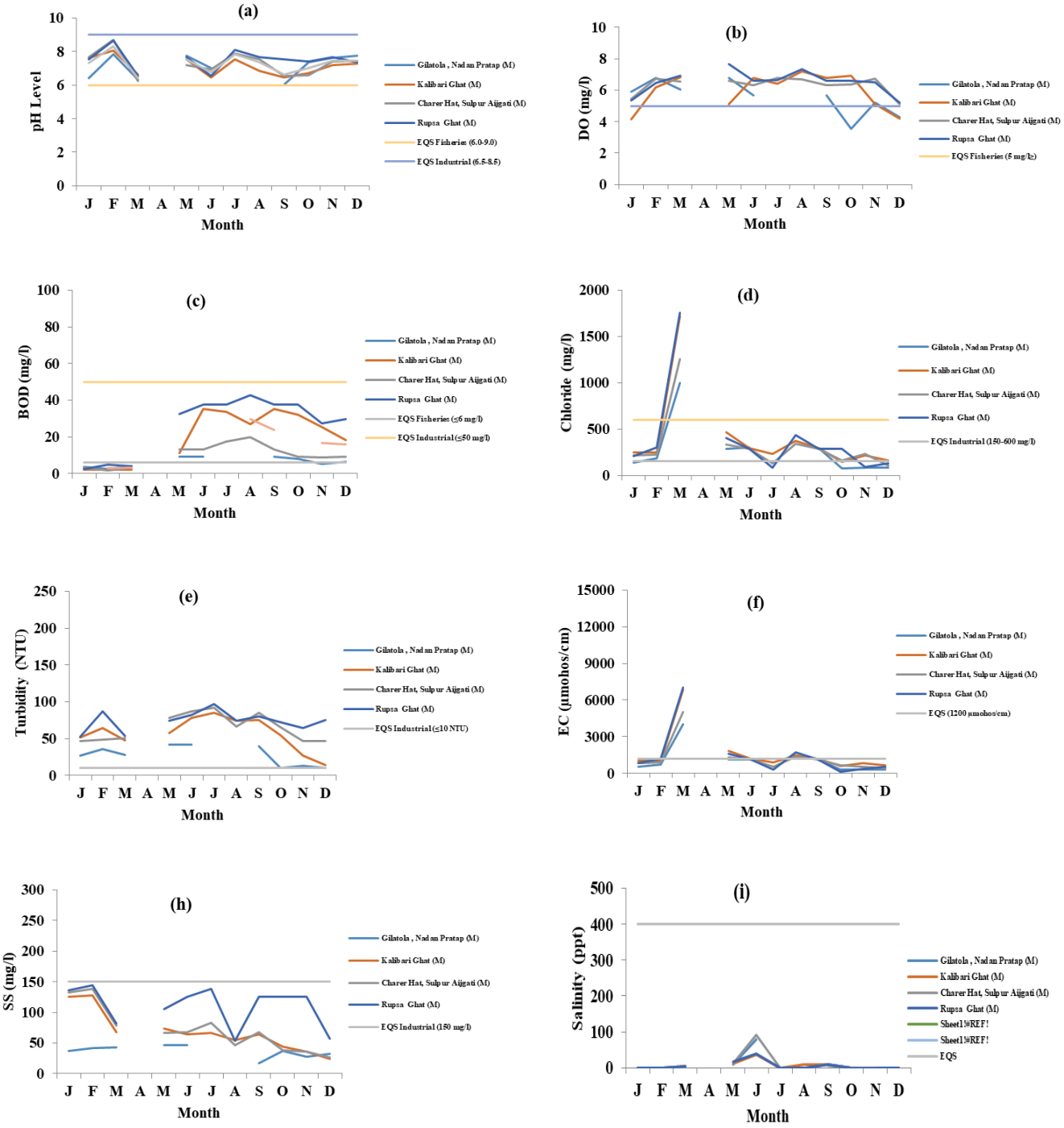

Fig.16. Status of pH, DO, BOD, Chloride, Turbidity, EC, SS and Salinity of Rupsa River in 2021

In 2021, pH varied from 7.15 to 8.8 (Fig.16a) while standard pH for inland surface water 6.0 to 9.0. In 2020, pH level varied from 7.29 to 8.42. In 2021, the maximum and the minimum DO content was 8.25 in January at Gilatola-Nadan Pratap (M) and 3.5 mg/l in October at Gilatola-Nadan Pratap (M) (Fig.16b). In 2020, DO level was varied from 5.28 to 8.47 mg/l. In 2021, the maximum and the minimum BOD was 3.3 mg/l in October at Charer Hat-Sulpur Aijgati (M) and 0.2 mg/l in November at Charer Hat, Sulpur Aijgati (M) (Fig.16c). In 2020, BOD level was from 1.0 to 1.6 mg/l. In 2021, Chloride level was much higher the months of March than the EQS (150-600 mg/l) for treated wastewater from industrial units. Chloride content varied from 66 to 1212 mg/l (Fig.16d). In 2020, Chloride varied from 40 to 960 mg/l. In 2021, Turbidity level of Rupsa River was very high all over the year. Turbidity varied from 66.2 to 75.4 NTU (Fig.15e) while EQS 10 NTU. In 2020, Turbidity range was from 57.35 to 94.8 NTU. In 2021, EC level varied from 111 to 4250 µmohos/cm (Fig.16f) while standard EC for treated wastewater from industrial units 1200 µmhos/cm. In 2020, EC level varied from 131 to 3098 µmohos/cm. In 2021, SS varied from 57 to 78 mg/l (Fig.16h) where the EQS is 100 mg/l. In 2020, SS varied from 57 to 74 mg/l. In 2021, Salinity varied from 0.06 to 5.34 mg/l (Fig.16i). In 2020, Salinity varied from 0.06 to 4.9 ppt.

4.17 Mathavanga River

For monitoring water quality of Mathavanga river, water samples were collected from a single location i.e Pipeghat. Data was not available in the month of April to July. Detail data is attached Annex-1 (Table: 116-123).

In 2021, pH varied from 7.44 to 8.79 (Fig.17a) while standard pH for inland surface water 6.0 to 9.0. In 2020, pH range was from 7.92 to 8.26. In 2021, DO level varied from 3.2 to 7.62 mg/l (Fig.17b) while standard DO for fisheries is ≥5 mg/l. In 2020, DO level varied from 0.16 to 9.95 mg/l. In 2021, BOD was varied 2.1 to 2.7 mg/l (Fig.17c). The maximum BOD was 2.7 mg/l in December and the monimum was 2.1 mg/l in November. In 2020, BOD was varied 0.0 to 0.9 mg/l. In 2021, TDS varied from 50 to 269 mg/l (Fig.17d). In 2020, TDS range was from 58 to 153 mg/l. In 2021, Chloride of Mathavanga river water varied from 26 to 175 mg/l (Fig.17e) while EQS for Chloride is 150-600 mg/l. In 2020, Chloride content varied from 20 to 76 mg/l. In 2021, Turbidity level was higher than EQS (10 NTU) and varied from 38 to 45 NTU (Fig.17f). In 2020, Turbidity range was from 26.5 to 48.3 NTU. In 2021, the maximum EC was 1200 µmohos/cm in August and the minimum EC was 163 µmohos/cm in October at pipe ghat point (Fig.17g). In 2020, EC varied from 122 µmohos/cm to 305 µmohos/cm. In 2021, Salinity varied from 0.01 to 0.19 ppt (Fig.17h). In 2020, Salinity was varied 0.05 to 0.43 ppt.

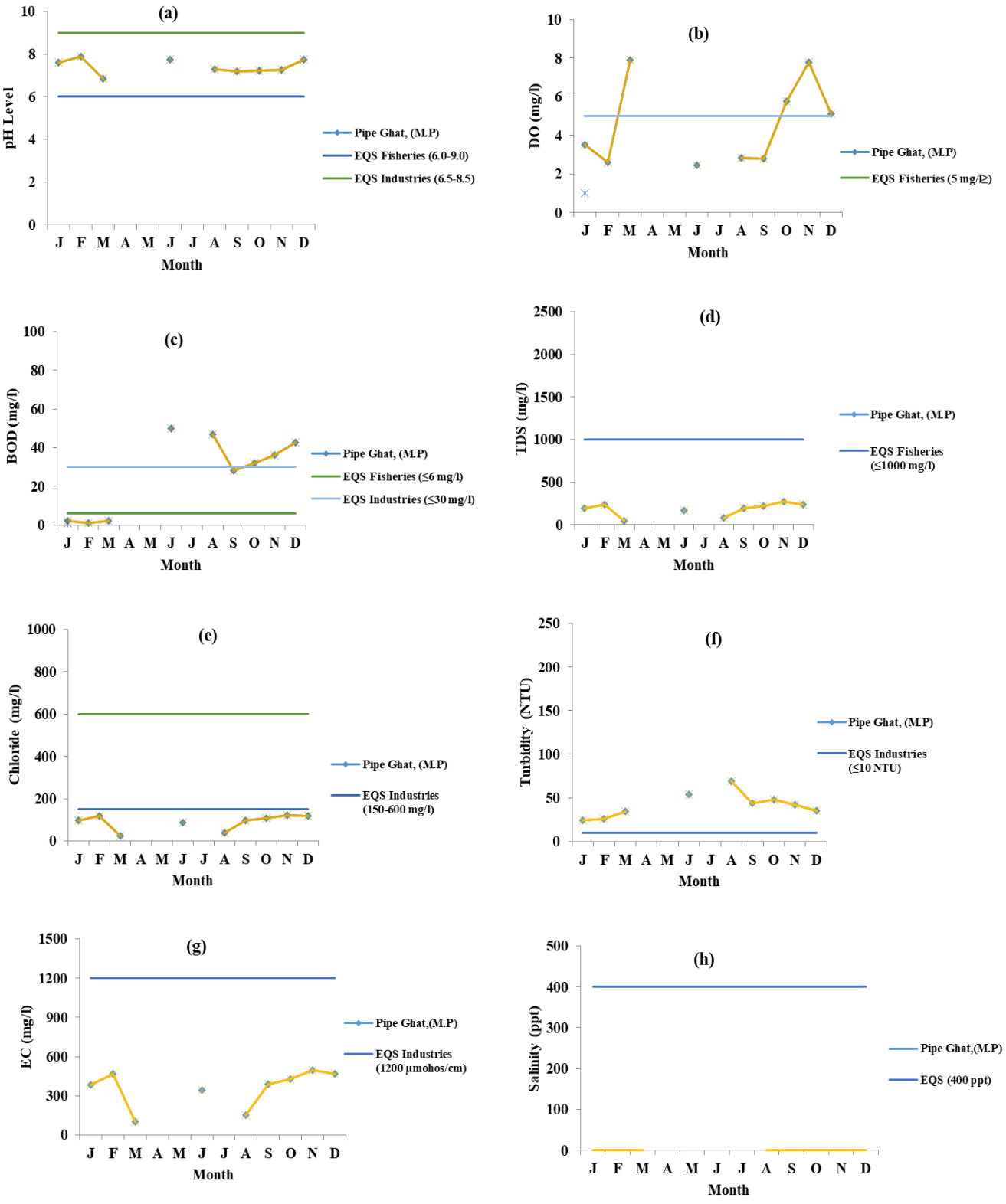

Fig.17. Status of pH, DO, BOD, TDS, Chloride, Turbidity, EC and Salinity of Mathavanga River in 2021

4.18 Pashur River

The Pashur river located in South-western Bangladesh, and a distributary of the Ganges, continues the Rupsa river. All its distributaries are tidal. It meets the Shibsa River within the Sundarbans, and near to the sea the river becomes the Kunga River. For monitoring of water quality, water samples were collected from 3 (Three) locations i.e. Rampal Power Plant, Banishanta and Batiaghata By Pass of Pashur river. For analysis, average values of three points were taken. Data was not available in the month of May to July. Detail data is attached Annex-1 (Table: 124-131).

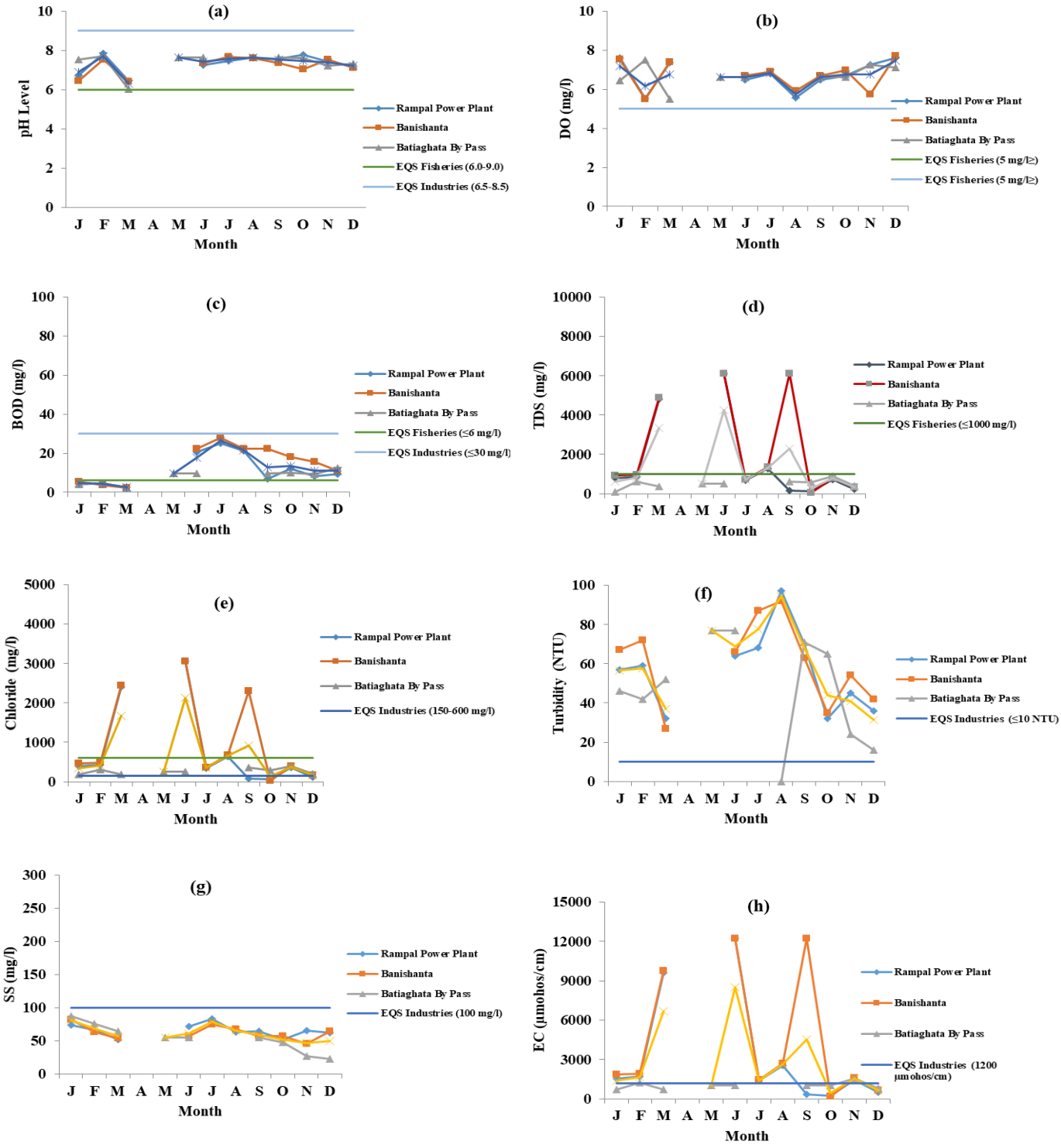

Fig.18. Status of pH, DO, BOD, TDS, Chloride, Turbidity, EC and SS of Pashur River in 2021

In 2021, pH level varied from 7.78 to 8.57 (Fig.18a) and was within the EQS (6.0 to 9.0) though slightly alkaline. In 2020, pH level varied from 8.08 to 8.43. In 2021, DO level was above the EQS (≥5 mg/l) for fisheries all over the year. The maximum and the minimum concentration of DO was 8.35 mg/l in January at Banishanta point and 4.2 mg/l in April at Batiaghata By Pass (Fig/18b). In 2020, DO varied from 4.7 mg/l and 7.9 mg/l. In 2021, BOD level was within the EQS (≤6 mg/l) for fisheries. The maximum and the minimum value of BOD was 3.2 mg/l in December at Banishanta and 1.1 mg/l in November at Rampal Power Plat (Fig.18c). In 2020, BOD level varied from 0.4 mg/l to 1.8 mg/l. In 2021, the maximum TDS 5860 mg/l in April at Banishanta point and the minimum TDS was 64 mg/l in September at Batiaghata By Pass (Fig.17d). In 2020, TDS level varied from 84 to 3162 mg/l. In 2021, Chloride level of Passur river water varied from 88 to 2675 mg/l. Chloride concentration was higher at Banishanta point in April (Fig.18e). In 2020, Chloride level varied from 60 mg/l to 1128 mg/l. In 2021, Turbidity level varied from 58.2 to 78.8 NTU (Fig.18f) against the EQS (10 NTU) for industrial discharge. Turbidity concentration was very high all over the year. In 2020, Turbidity level varied from 69.8 to 81.4 NTU. In 2021, the maximum SS was 2131 mg/l in Fabruary at Banishanta point and the minimum SS was 60 mg/l in September at the same point (Fig.18g). In 2020, SS varied 59 mg/l to 68 mg/l. In 2021, the maximum EC was 10700 µmohos/cm in April Banishanta point and the minimum EC was 134 µmohos/cm in September at Banishanta point (Fig.18g). In 2020, EC varied from 170 µmohos/cm to 6324 µmohos/cm (Fig.18h).

4.19 Khakshiali River

The Khakshiali river is located in Satkhira district in Khulna division. To monitor water quality of Khakshiali river, water samples were collected from 3 (Three) different points e.g. Uzirpur, Kaliganj Bazar, Boshontopur in 2021. Data was not available in the month of May to July. Detail data is attached Annex-1 (Table: 132-139).

In 2021, pH level was within the EQS (6.0-9.0) for fisheries and was varied from 7.69 to 8.46 (Fig.19a). In 2020, pH was from 8.05 to 8.27. In 2021, DO level varied from 1.4 to 8.7 mg/l (Fig.19b) throughout the year while EQS for fisheries is ≥5 mg/l. In 2020, DO level varied from 6.16 to 7.65 mg/l. In 2021, BOD was far below the EQS (≤6 mg/l). It varied from 1.0 to 10 mg/l (Fig.19c). In 2020, BOD level varied from 1.0 to 1.6 mg/l. In 2021, the minimum TDS was 216 mg/l in January at Uzirpur point and the maximum TDS was 3990 mg/l in March at Kaliganj Bazar (Fig.19d). In 2020, TDS level varied from 262 to 978 mg/l. In 2021, Chloride concentration was veried from 138 to 1375 mg/l (Fig.19e) while standard for treated wastewater from industrial units is 150-600 mg/l. The highest Chloride was found in December at Boshontopur point and the lowest value was at Kaliganj Bazar. In 2020, Chloride level varied from 64 to 489 mg/l. In 2021, Turbidity level was above the EQS (10 NTU) limit all the year that varied from 53.2 to 153 NTU (Fig.19f). In 2020, Turbidity level varied from 72.4 to 87.8 NTU. In 2021, the maximum EC was 7430 µmhos/cm in March at Kaliganj Bazar and the minimum 434 µmhos/cm in January at Kaliganj Bazar while EQS for EC 1200 µmhos/cm (Fig.19g). In 2020, EC varied from 526 to 1950 µmhos/cm. In 2021, SS varied from 51 mg/l to 88 mg/l (Fig.19h). In 2020, SS varied from 50 mg/l to 69 mg/l.

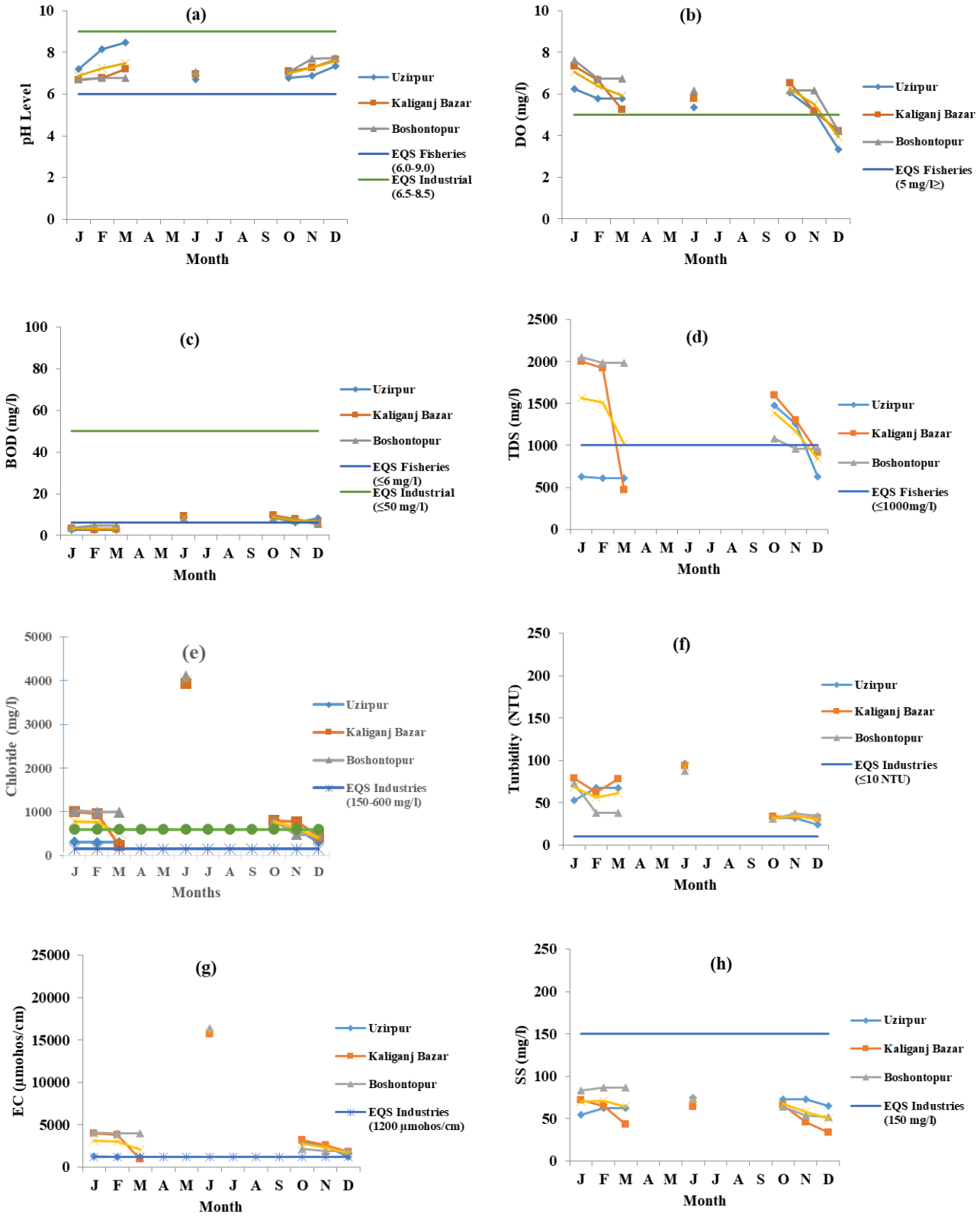

Fig.19. Status of pH, DO, BOD, TDS, Chloride, Turbidity, EC and SS of Khakshiali River in 2021

4.20 Gorai River

The Gorai River is located in Kushtia district in Khulna division. Water samples were collected from one location viz. Kamarkhali Bridge. Data was not available in the month of April to September. Detail data is attached Annex-1 (Table:140-1147).

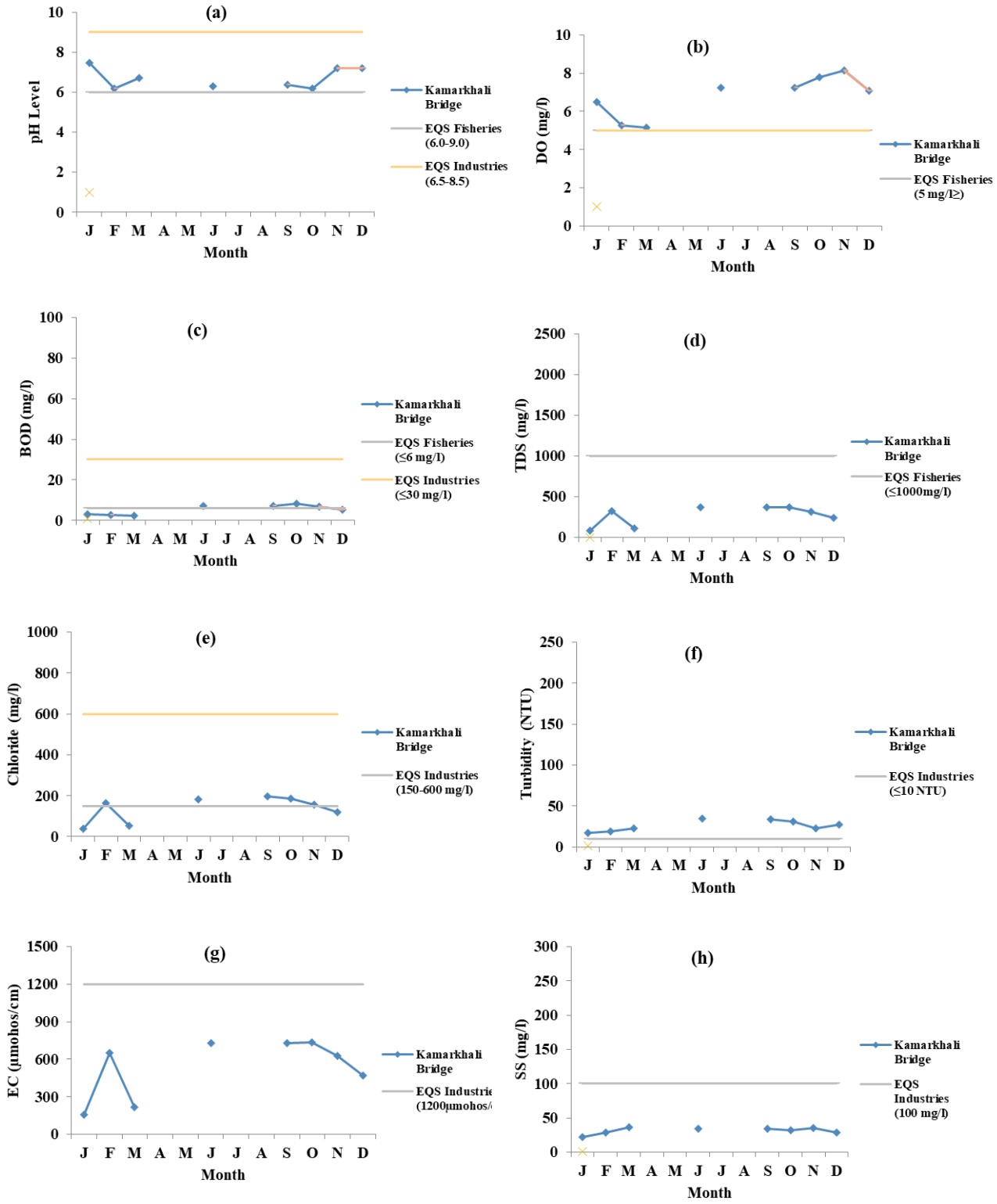

Fig.20. Status of pH, DO BOD, TDS, Chloride, Turbidity, EC and SS of Gorai River in 2021

In 2021, pH of Gorai River water was varied from 7.95 to 8.88 (Fig.20a) and was within the EQS (6.0-9.0) for fisheries. In 2020, pH level varied from 7.38 to 8.26. In 2021, DO was above the EQS (≥5 mg/l) limit for fisheries. Level of DO varied from 6.37 to 9.13 mg/l (Fig.20b). In 2020, DO level varied from 3.77 to 9.25 mg/l. In 2021, BOD level was within the EQS (≤6 mg/l) and varied from 1.0 to 3.8 mg/l (Fig.20c). In 2020, BOD range was from 0.4 to 2.1 mg/l. In 2021, TDS level of Gorai River water was within the limit while comparing to the EQS (1000 mg/l) for fisheries. It varied from 54 to 780 mg/l (Fig.20d). In 2020, TDS level varied from 46 to 506 mg/l. In 2021, the maximum and the minimum Chloride values were 411 and 40 mg/l (Fig.20e). In 2020, Chloride level was from 18 to 253 mg/l. In 2021, Turbidity level was relatively higher throughout the year than the EQS (10 NTU). It varied from 47.3 to 75 NTU (Fig.20f). In 2020, Turbidity level varied from 24.6 to 33.4 NTU. In 2021, the maximum EC was 1644 µmhos/cm in February and March and the minimum 112 µmhos/cm in November while EQS for EC 1200 µmhos/cm (Fig.20g). In 2020, EC varied from 93.9 to 1012 µmhos/cm. In 2021, SS varied from 52 mg/l to 59 mg/l (Fig.20 h). In 2020, SS varied from 35 mg/l to 54 mg/l.

4. 21 Modhumoti River

The Madhumati river, distributary of the upper Padma River, flowing through South-western Bangladesh. It leaves the Padma just north of Kushtia and flows 306 km southeast before turning south across the swampy Sundarbans region to empty into the Bay of Bengal. In its upper course it is called the Garai; in its lower course it is known as the Baleswar; and its estuary mouth, which is some 14 km wide, is called the Haringhata. The Madhumati is one of the largest of the Padma distributaries in the southern part of the Gangetic Plain, and it offers the best navigation conditions of any river at the head of the Bay of Bengal. To monitor water quality of Modhumoti river in 2021, samples were collected from 1 (One) location i.e Dhalaitala of Bagerhat. Data was not available in the month of April to September and December. Detail data is attached Annex-1 (Table: 148-155).

In 2021, pH level of Modhumoti river was within the EQS and varied from 7.45 to 8.57 (Fig.21a). In 2020, pH level varied from 7.41 to 8.09. In 2021, DO was varied from 0.0 to 6.1 mg/l while EQS(≥5 mg/l) for fisheries (Fig.21b). In 2020, DO level was varied from 5.5 to 9.58 mg/l. In 2021, BOD varied from 3.1 mg/l to 3.9 mg/l (Fig.21c). In 2020, BOD was varied from 0.3 mg/l to 1.9. In 2021, TDS of Modhumoti river water was within EQS (1000 mg/l). The maximum and the minimum value was 2330 mg/l in March and 84 mg/l in January and February (Fig.21d). In 2020, TDS level varied from 42 to 100 mg/l. In 2021, Chloride level varied from 43 to 236 mg/l while EQS for treated wastewater from industrial units 150-600 mg/l (Fig.20e). In 2020, Chloride level varied from 24 to 50 mg/l. In 2021, Turbidity varied from 30.6 to 55 NTU (Fig.21f). In 2020, Turbidity varied from 24.6 to 34.8 NTU. In 2021, the maximum EC was 4810 µmhos/cm in March and the minimum 174 µmhos/cm in November while EQS for EC 1200 µmhos/cm (Fig.21g). In 2020, EC varied from 86.8 to 200 µmhos/cm. In 2021, SS varied from 42 mg/l to 58 mg/l (Fig.21 h). In 2020, SS varied from 40 mg/l to 54 mg/l.

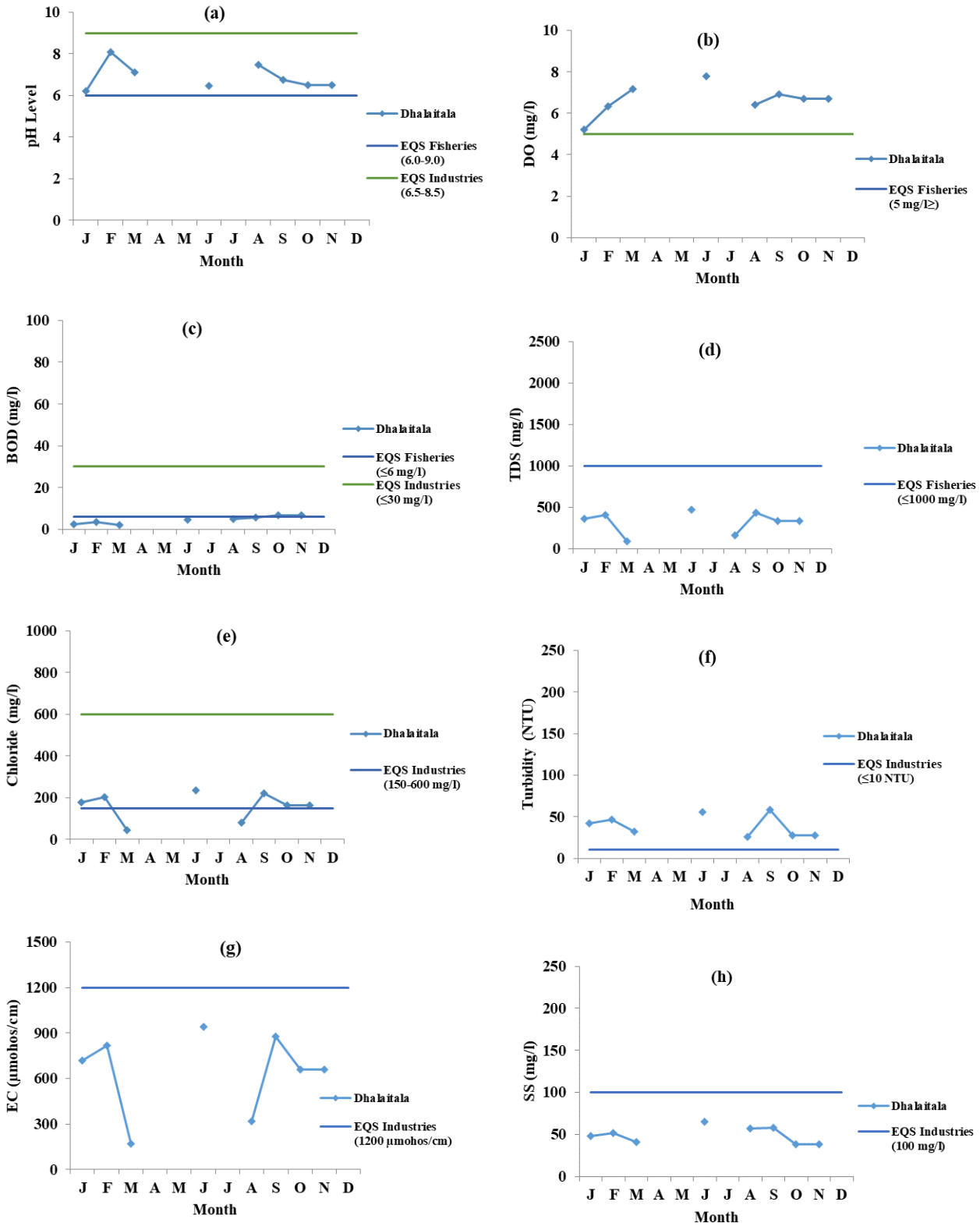

Fig.21. Status of pH, DO, BOD, TDS, Chloride, Turbidity, EC and SS of Modhumoti River in 2021

4.22 Ganges River

Ganges River one of the largest river systems of the world and an important river flowing through India and Bangladesh. The entire course of the Ganges inside Bangladesh is popularly called the Padma, though actually it is not. The Ganges has a total length of about 2,600 km up to its confluence with the Jamuna and a catchment area of about 10,87,400 sq km of which about 46,300 sq km lies within Bangladesh (Source: Banglapedia). To monitor water quality of Ganges River in 2021, samples were collected from one location i.e. Gorai off Take. Data was not available in the month of March, May to September. Detail data is attached Annex-1 (Table: 156-163).

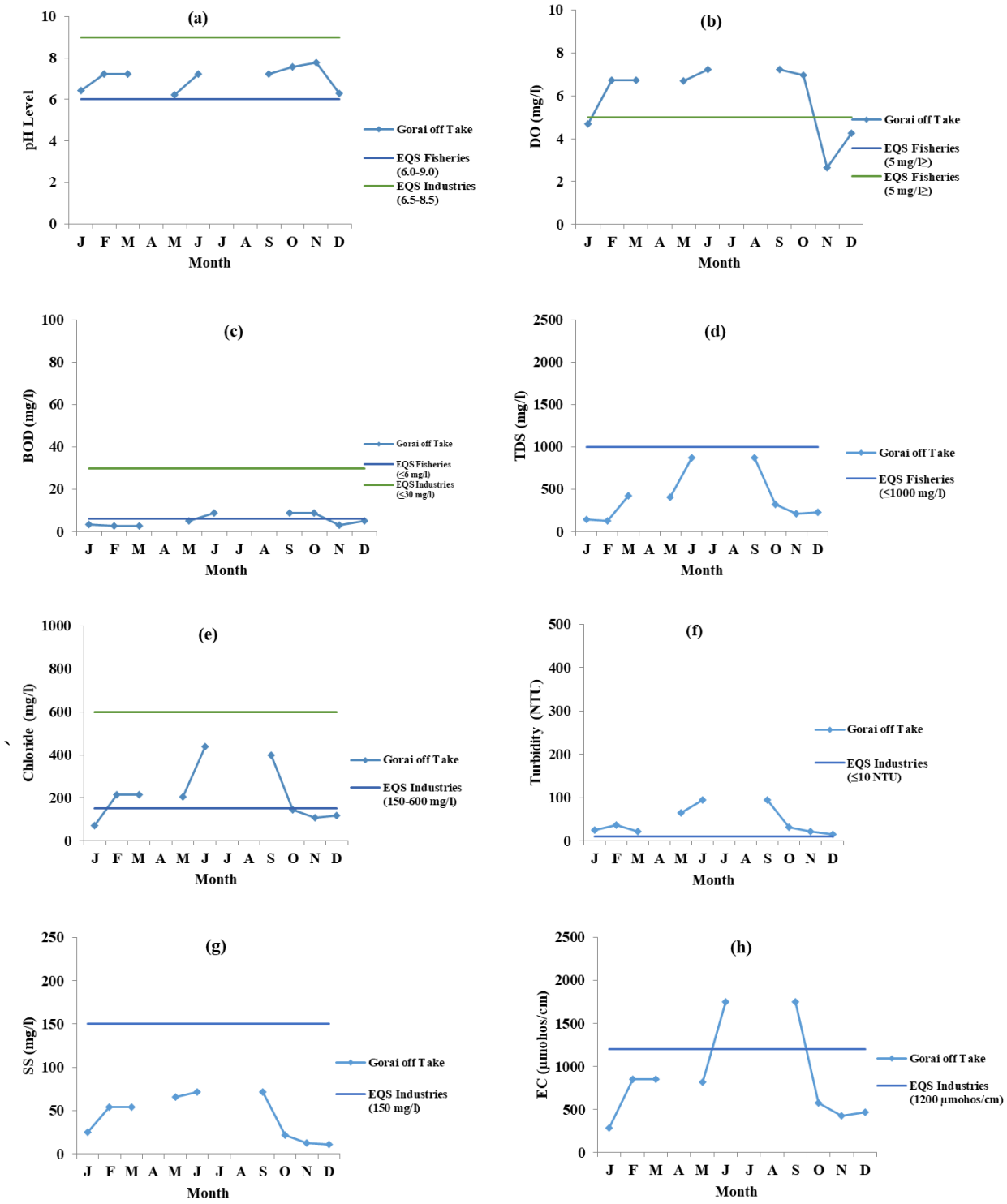

Fig.22. Status of pH, DO, BOD, TDS, Chloride, Turbidity, SS and EC of Ganges River in 2021

In 2021, pH level was within the EQS and varied from 7.84 to 8.32 (Fig.22a). DO varied from 6.36 to 8.76 mg/l (Fig.22b) and was closer to the EQS for fisheries (≥5 mg/l). BOD Concentration varied from 0.43 to 4.8 mg/l (Fig.22c). The maximum and the minimum TDS was 609 mg/l in April and 82 mg/l in October (Fig.22d). Chloride level varied from 38 mg/l to 305 mg/l while EQS for treated wastewater from industrial units is 150-600 mg/l. The maximum value was found in April and the minimum was in November (Fig.22e). Turbidity varied from 34 to 132 NTU (Fig.22f) and was higher than EQS (10 NTU). SS varied from 50 mg/l to 58 mg/l (Fig.22 g). In 2021, the maximum EC was 1218 µmhos/cm in April and the minimum 168 µmhos/cm in October while EQS for EC 1200 µmhos/cm (Fig.22h).

4.23 Kirtankhola River

The Kirtankhola river starting from Sayeshtabad in Barisal district, the river Kirtankhola ends into the Gajalia near Gabkhan khal. This old river is now known as the Barisal River. The total length of the river is about 160 km. For monitoring purpose water samples were collated from 6 (Six) locations i.e. Launch Ghat (S), Launch Ghat (M), Kaower Char (S), Kaower Char (M), Dopdopia Kheyaghat (S), Dopdopia Kheyaghat (M) of the river. Data was not available in the month of April, May, July and September. Detail data is attached Annex-1 (Table:164-167).

In 2021, pH level of Kirtankhola river water varied from 7.20 to 8.40 (Fig.23a) and was within the EQS. In 2020, pH range was from 6.3 to 8.0. In 2021, DO level of Kirtankhola river was above the EQS (≥5 mg/l) for fisheries. DO varied from 3.2 mg/l to 6.3 mg/l (Fig.23b). In 2020, DO level varied from 5.0 mg/l to 8.5 mg/l. In 2021, TDS of Kirtankhola river water was also within the EQS (1000 mg/l) throughout the year and the range was from 146 to 2573 mg/l (Fig.23c). In 2020, TDS level varied from 84 to 157 mg/l. In 2021, EC level of the Kirtankhola river varied from 146 to 2573 µmhos/cm against the EQS for treated wastewater from industrial units 1200 µmhos/cm (Fig.23d). In 2020, EC varied from 5.1 to 334 µmhos/cm.

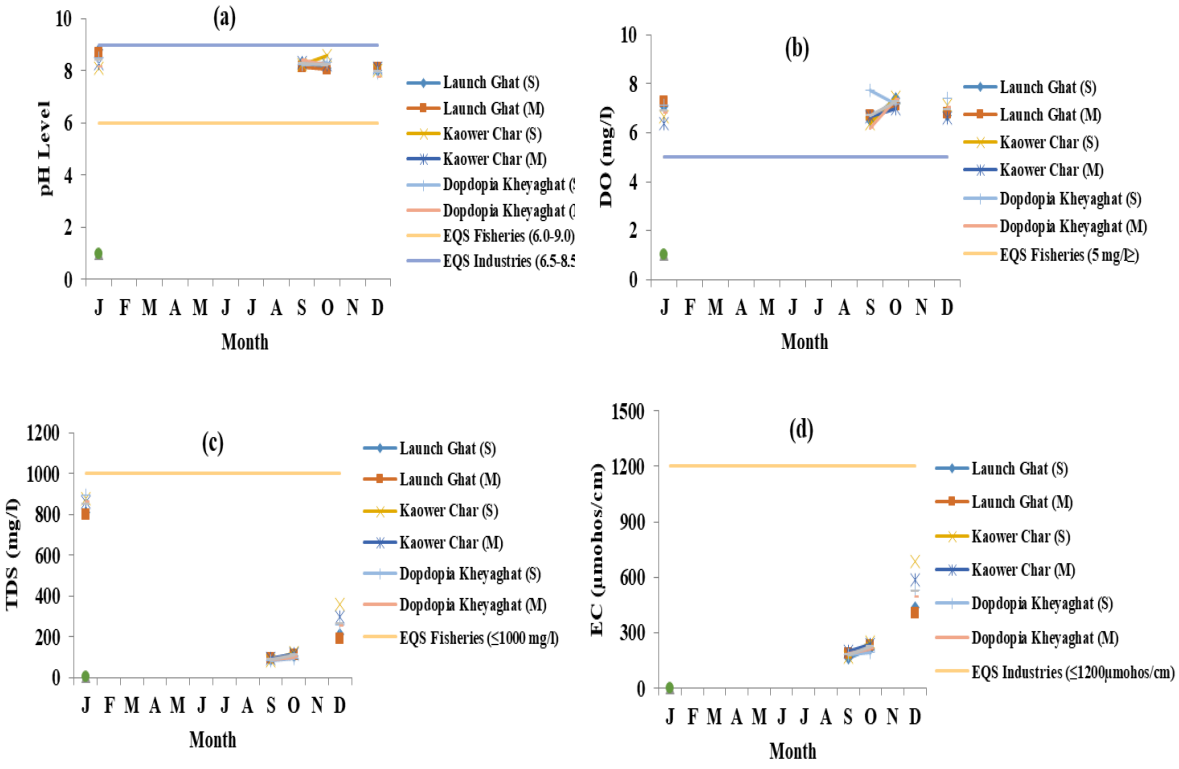

Fig.23. Status of pH, DO, TDS and EC of Kirtankhola River in 2021

4.24 Tatulia River

For monitoring of water quality of Tatulia river water samples was collated from Vedhoria Feri Ghat (VFG) location (side and middle point). For analysis, average of 2 (Two) points were used. Data was not available in the month of February to November. Detail data is attached Annex-1 (Table:168-171).

In 2021, pH level of the Tatulia river water ranged from 7.7 to 8.24 mg/l (Fig.24a) while in 2020, the pH range was from 7.4 to 7.9. In 2021, DO varied from 5.0 to 6.4 mg/l (Fig.24b) while standard limit for fisheries (≥5 mg/l). In 2020, DO level varied from 5.0 to 8.1 mg/l. In 2021, TDS range varied from 155 to 702 mg/l (Fig.24c). In 2020, TDS range was 84 mg/l to 111 mg/l. In 2021, EC varied from 308 µmhos/cm to 1402 µmhos/cm (Fig.24d). In 2020, EC varied from 182 µmhos/cm to 312 µmhos/cm.

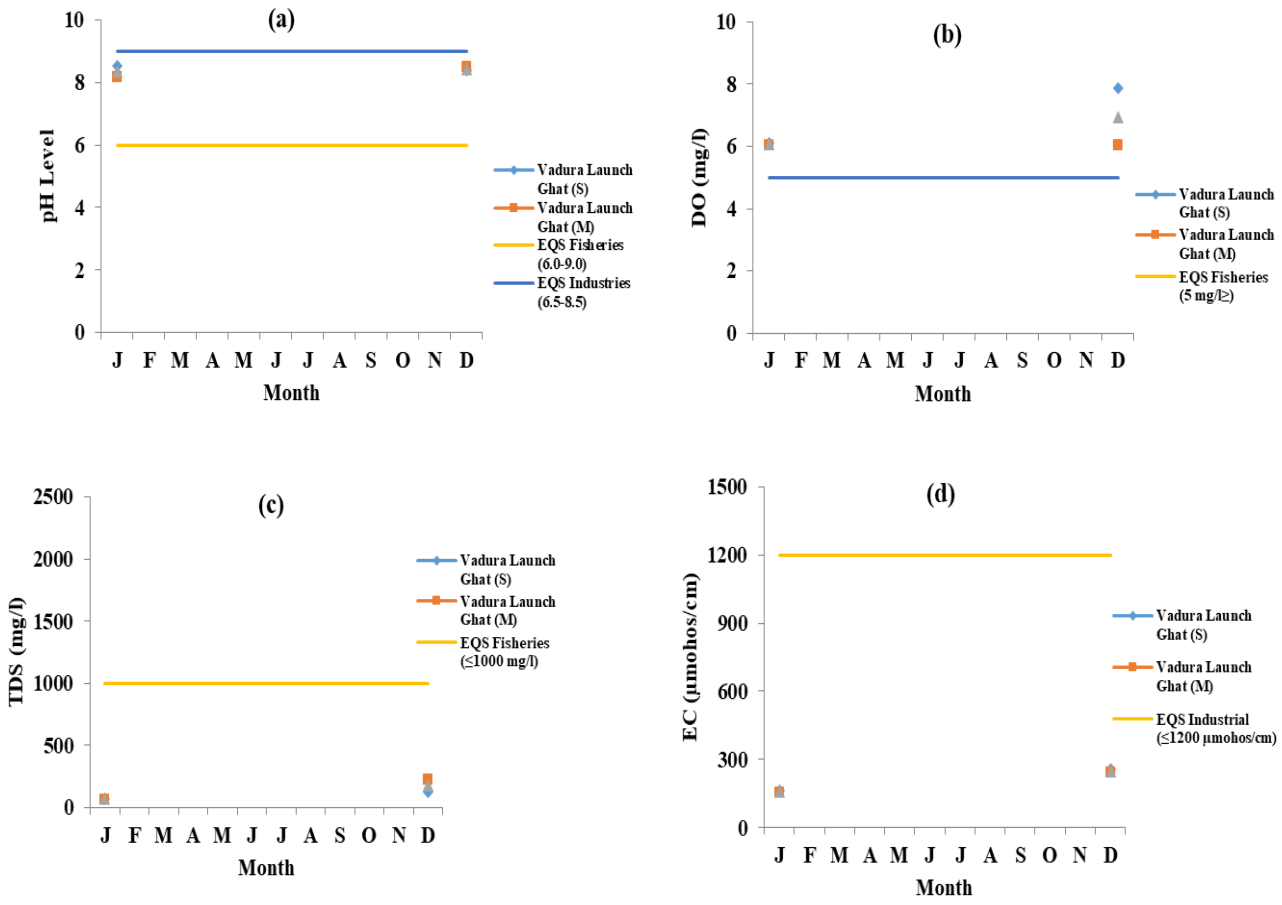

Fig.24.Status of pH, DO, TDS and EC of Tatulia River in 2021

4.25 Kalabodar River

The Kalabodar river is the South and South-eastern region of of Bangladesh. To monitor water quality of Kalabodar river water samples was colleted for analysis from 2 (Two) location i.e Kalabodar Ferry Ghat (S) of the river. Data was not collected for the month of February, April to October and December. Detail data is attached Annex-1 (Table: 172-175).

In 2021, pH level of the Kalabodar river water varied from 7.6 to 8.2. (Fig.25a) while EQS for fisheries 6.0 to 9.0. In 2020, pH level of the Kalabodar river water varied from 7.3 to 7.8. DO level varied from 5.3 mg/l to 6.6 mg/l (Fig.25b) and was above the EQS (≥5 mg/l) for fisheries. In 2020, DO level of the Kalabodar river water varied from 5.0 to 8.1 mg/l. TDS level of the Kalabodar river water was from 151 mg/l to 486 mg/l (Fig.25c) while corresponding EQS (1000 mg/l) for fosheries. In 2020, TDS level of the Kalabodar river water varied from 86 to 114 mg/l. EC of the Kalabodar river water was from 305 µmohos/cm to 972 µmohos/cm (Fig.25d) while corresponding EQS (1200 µmohos/cm) for treated wastewater from industrial units. In 2020, EC level of the Kalabodar river water varied from 197 to 310 µmohos/cm.

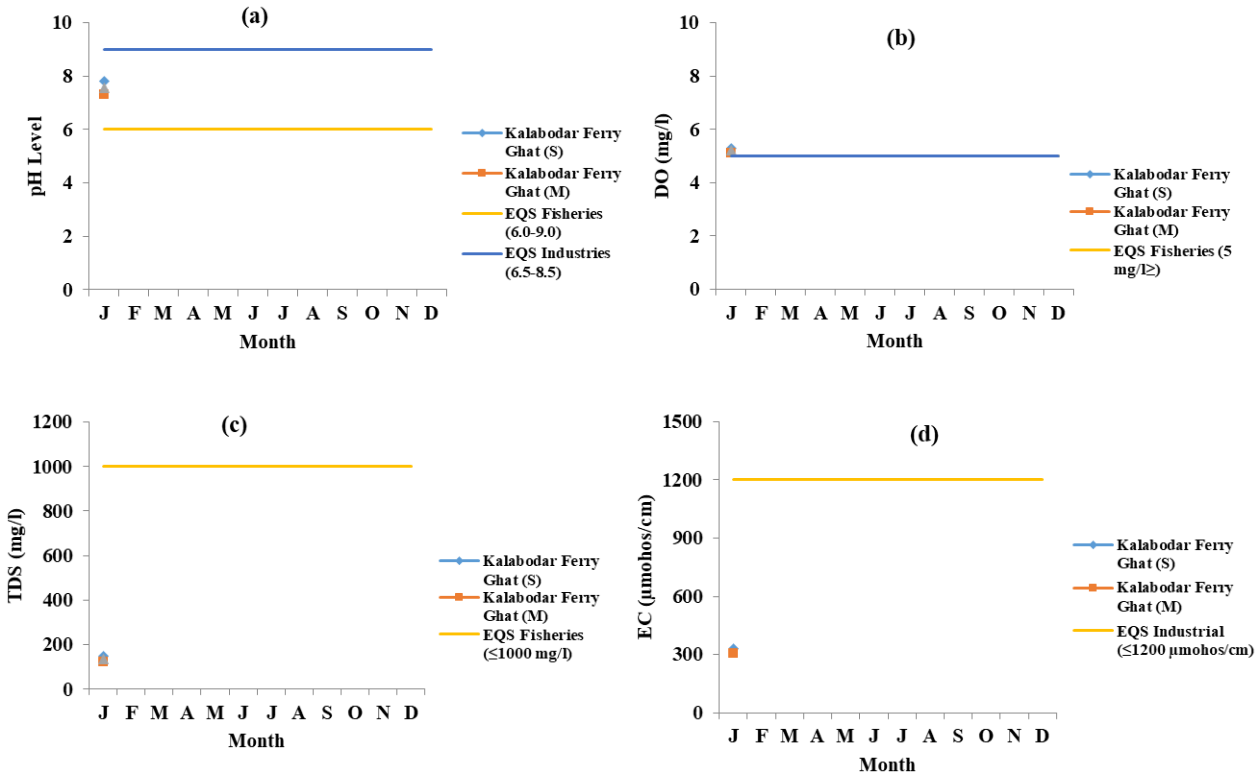

Fig.25. Status of pH, DO, TDS and EC of Kalabodar River in 2021

4.26 Lohalia River/Laukathi River

Patuakhali city is surrounded on three sides by two rivers. The two major rivers are Laukathi and Lohalia, which are directly connected with the Bay of Bengal. For monitoring purpose water samples were collected from Patuakhali Launch Ghat (PLG) (side and middle). For analysis, average of 2 (Two) points were used. Data was not available in the month of February, April to July, September and December. Detail data is attached Annex-1 (Table: 176-179).

In 2021, pH level of the Lohalia river water varied from 7.6 to 8.26. (Fig.26a) while EQS for fisheries 6.0 to 9.0. In 2020, pH was varied from 7.3 to 7.9. In 2021, DO level varied from 5.4 to 6.2 mg/l (Fig.25b) and was above the EQS (≥5 mg/l) for fisheries. In 2020, DO was varied from 5.6 to 7.9 mg/l. In 2021, TDS level of the Lohalia river water was from 150 mg/l to 1106 mg/l (Fig.25c) EQS (1000 mg/l). In 2020, TDS varied from 90 mg/l to 214 mg/l. In 2021, EC level of the Lohalia river water was from 299 to 2210 µmohos/cm (Fig.25d) EQS (1200 µmohos/cm). In 2020, EC level varied from 331 to 428 µmohos/cm.

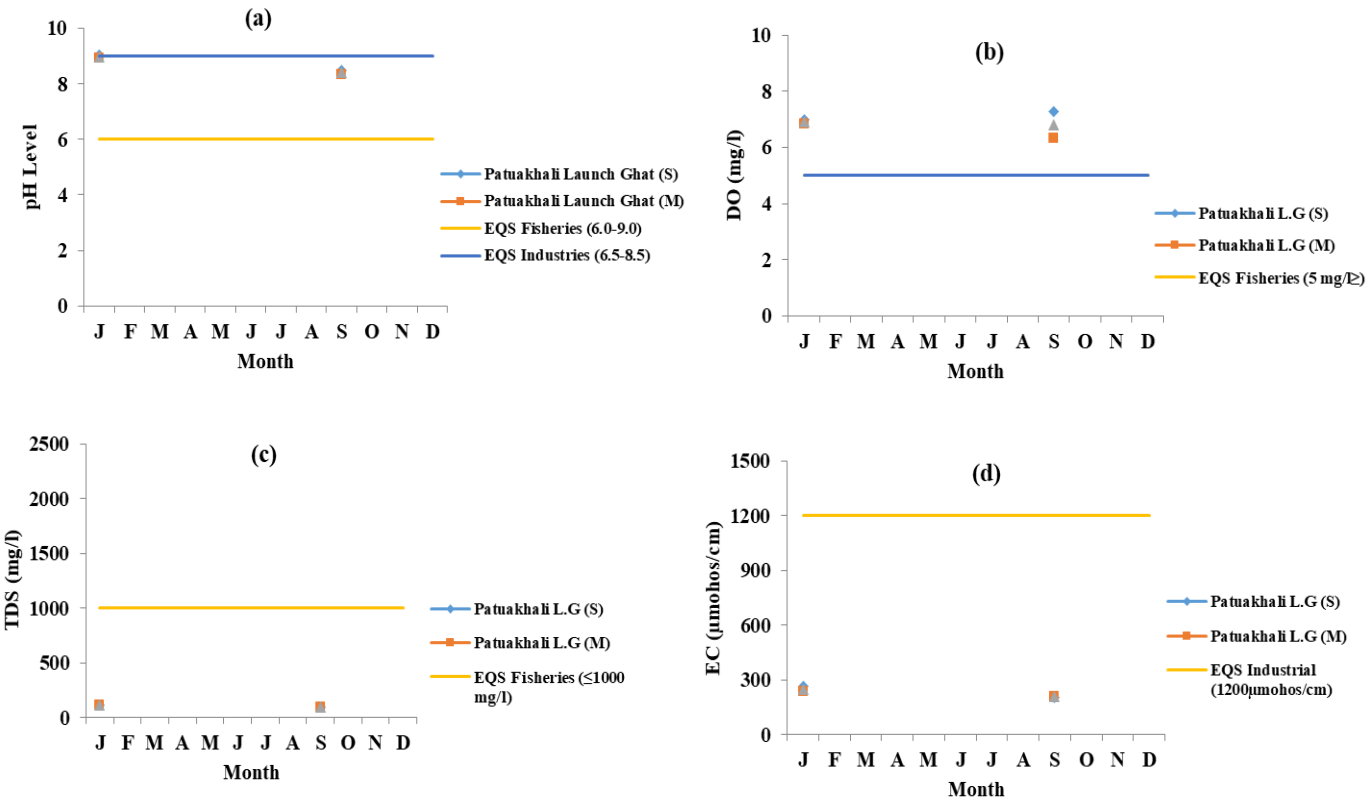

Fig.26. Status of pH, DO, TDS and EC of Lohalia River in 2021

4.27 Surma River

The Surma River is a major river in Bangladesh, part of the Surma-Meghna River System. It starts when the Barak River from North-east India divides at the Bangladesh border into the Surma and the Kushiyara rivers. It ends in Kishoreganj District, above Bhairab Bazar, where the two rivers rejoin to form the Meghna River. The waters from the river ultimately flow into the Bay of Bengal. The average depth of this river is 86m and maximum depth is 170m. For monitoring purpose water samples were collected from 4 (Four) different locations of the river namely Mendibag Point, Kin Bridge, Shak Ghat and Chattak. Detail data is attached Annex-1 (Table: 180-185).

In 2021, pH level of the Surma river water varied from 6.51 to 7.76 (Fig. 27a) while in 2020, pH was from 5.8 to 9.5. In 2021, DO content was mostly above the EQS (≥5 mg/l). It varied from 4.97 to 8.55 mg/l (Fig. 27b). In 2020, DO level varied from 6.6 to 8.94 mg/l. In 2021, BOD value was also within the EQS at all locations. The maximum and the minimum BOD was 3.8 mg/l in January at Chattak point and 1.7 mg/l in January at Kin Bridge point (Fig. 27c). In 2020, BOD level varied from 1.4 to 4.0 mg/l. In 2021, TDS range was from 44 to 59.2 mg/l (Fig. 27d) where EQS for TDS (1000 mg/l) for fisheries. In 2020, TDS level was varied from 33.2 to 267 mg/l. In 2021, SS varied from 24 mg/l to 68 mg/l (Fig. 27e). In 2020, SS varied from 09 mg/l to 146 mg/l. In 2021, EC level of Surma river water was within the EQS limit for treated wastewater from industrial unit. It varied from 117.2 to 134.3 µmohos/cm (Fig. 27f). In 2020, EC varied from 70.9 to 584 µmohos/cm.

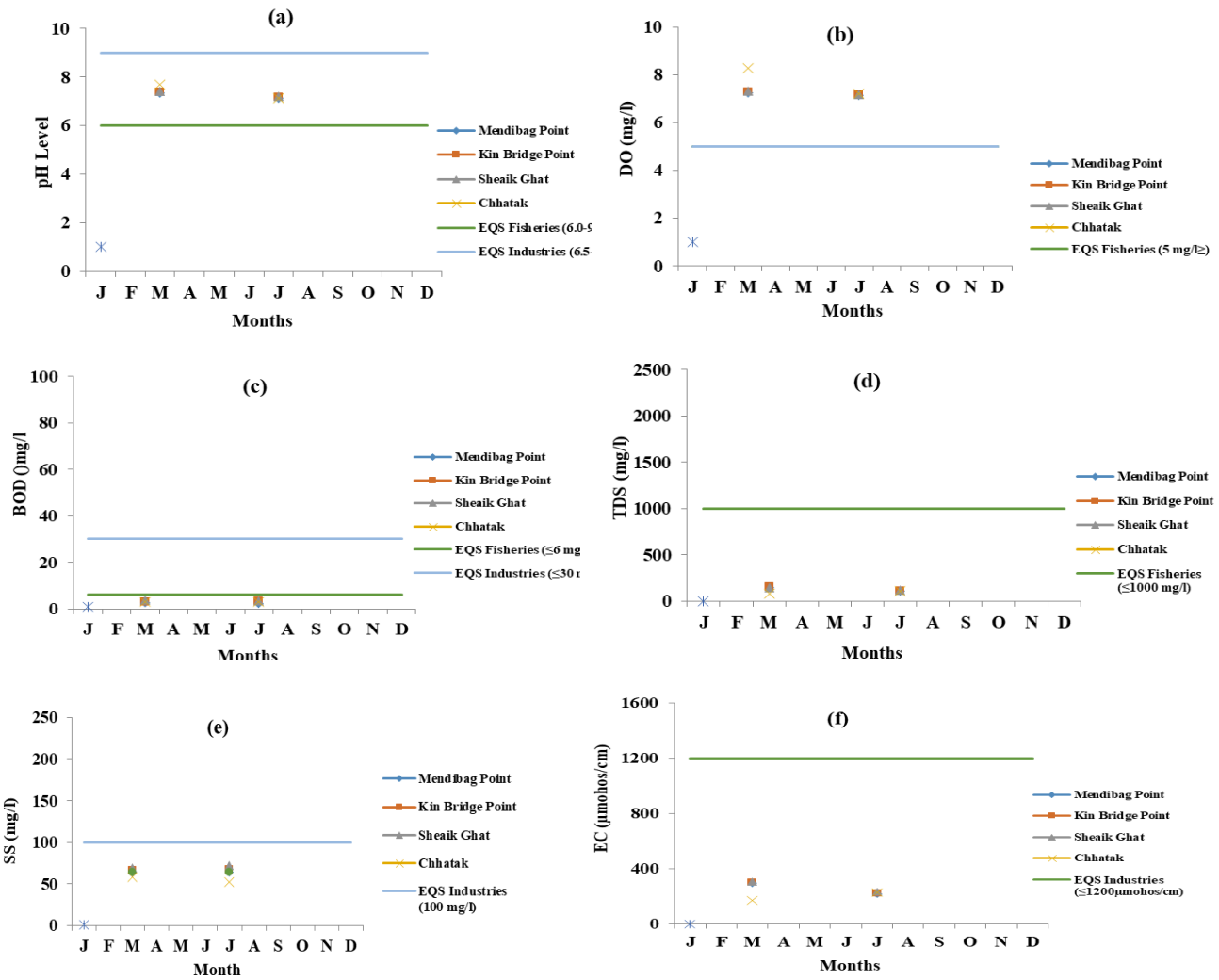

Fig.27. Status of pH, DO, BOD, COD, TDS and EC of Surma River in 2021

4.28 Kushiara River

The Kushiara river is one of the Trans-boundary rivers of Bangladesh. The total length of the Kushiara is about 161 km and width of the river is 250m. During rainy season the mean depth of the Kushiyara reaches upto 10m. Water samples were collected Fenchugonj point among the One location (e.g. Fenchuganj Bridge Point (F.B.P.) of the river in 2021 for analysis of water quality. Detail data is attached Annex-1 (Table: 186-191).

In 2021, pH level of Kushiara river water was within EQS (6.0-9.0) for inland surface water. It varied from 6.99 to 7.3 (Fig. 28a). In 2020, pH level varied from 6.4 to 7.3. In 2021, DO was above the EQS (≥5 mg/l) for fisheries and varied from 6.7 to 7.3 mg/l (Fig. 28b). In 2020, DO level varied from 6.40 to 7.51 mg/l. In 2021, BOD level was from 2.5 mg/l to 3.6 mg/l while EQS for fisheries (≤6 mg/l) (Fig. 28c). In 2020, BOD level varied from 1.2 mg/l to 6.1 mg/l. In 2021, COD content was within the EQS (50 mg/l) for fisheries and varied from 15 mg/l to 22 mg/l (Fig. 28d). In 2020, COD level varied from 5 mg/l to 16 mg/l. In 2021, TDS level of Kushiara river water was below the EQS for fisheries and varied from 47 to 59 mg/l (Fig. 28e). In 2020, TDS level varied from 26 to 62.6 mg/l. In 2021, EC was within the EQS limit and it varied from 92.6 to 119.4 µmohos/cm (Fig. 28f). In 2020, EC varied from 42.4 to 108 µmohos/cm.

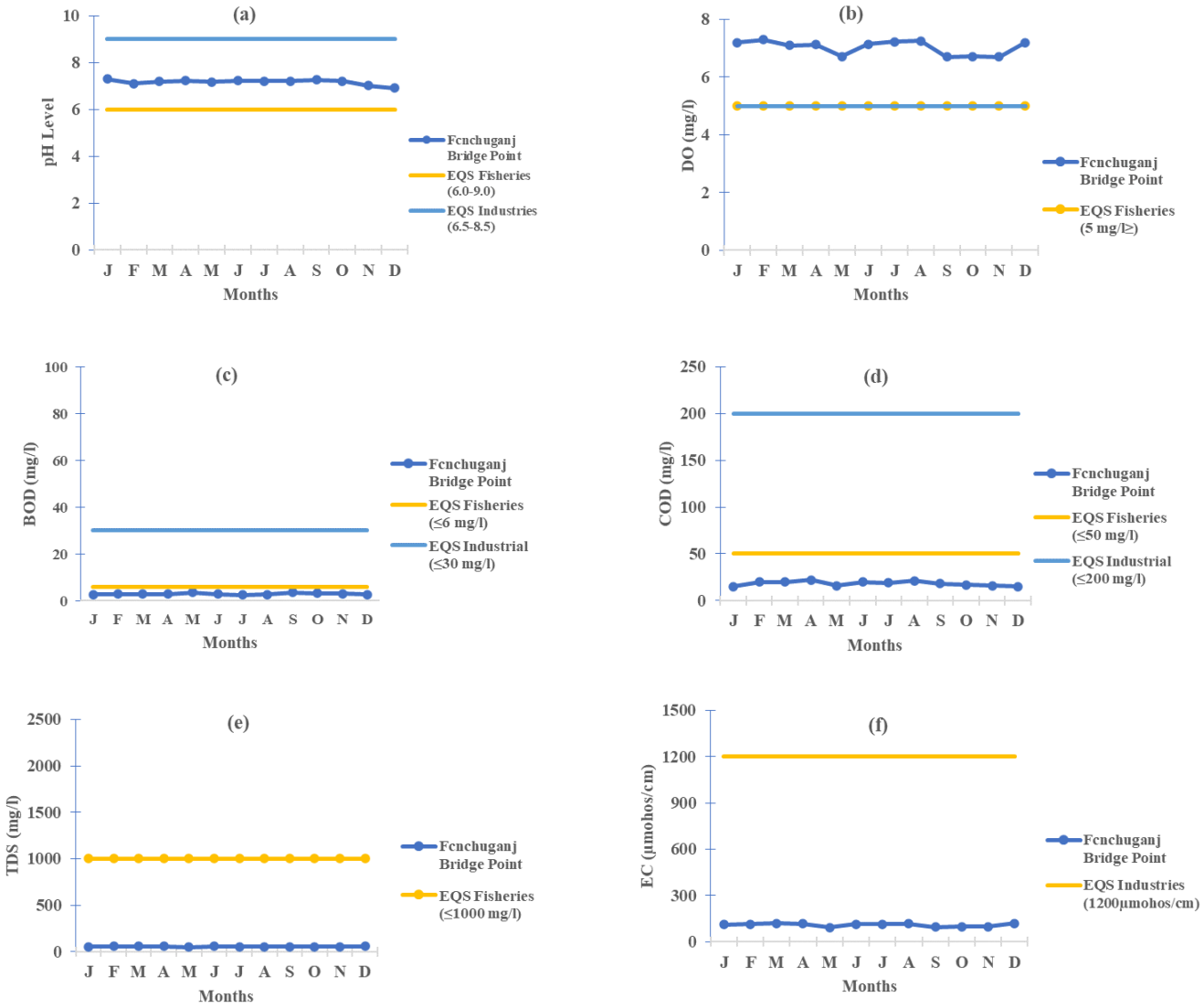

Fig 28. Status of pH, DO, BOD, COD, TDS and EC of Kushiara River in 2021

4.29 Balu River

The Balu river runs mainly through the extensive swamps of Beel Belai and those east of Dhaka, joining the shitalakshya near demra. It has a narrow connection through the Suti Nadi near kapasia with the Shitalakshya, and also by way of the Tongi Khal with the turag; there is also a link with the Shitalakshya near kaliganj. Although it carries floodwater from the Shitalakshya and the Turag during the flood season, the Balu is of importance mainly for local drainage and access by small boats. [Sifatul Quader Chowdhury]. To monitor water quality in 2021, water samples were collected from 2 (Two) locations such as Trimohoni Bridge, Jolshiri Abason of the river. Data was not available in the months of April to June and September. Detail data is attached Annex-1 (Table:192-201).

In 2021, the pH range (6.55 to 7.77) (Fig.29a) of Balu River was within EQS (6.0 -9.0). The maximum pH 7.77 was found in August at Trimohoni Bridge point and the minimum pH 6.55 was found in September at Jolshiri Abason point. In 2020, pH level varied from 6.96 to 8.61. In 2021, DO concentration of Balu River water was very low during dry season. The maximum DO (5.9 mg/l) found at Jolshiri Abason point in September and the minimum DO (0.0) mg/l was found in April at Trimohoni Bridge point (Fig.29b). In 2020, DO level varied from 0.0 to 6.32 mg/l. In 2021, the maximum BOD was 54 mg/l in March at Trimohoni Bridge point and the minimum was 4.0 mg/l in July at Jolshiri Abason point (Fig.29c). In 2020, BOD level varied from 2.0 to 76 mg/l. In 2021, COD of Balu River was over the EQS (50 mg/l) in dry season for fisheries. The maximum and the minimum COD content of Balu River water was 135 mg/l at Trimohoni Bridge point in March and 10 mg/l at Jolshiri Abason point in July (Fig.29d). In 2020, COD level varied from 14 to 356 mg/l. In 2021, TDS was below the EQS (1000 mg/l) for fisheries (Fig.29e) at all the sampling points. The maximum TDS was 618 mg/l in March at Trimohoni Bridge point while that of minimum was 78 in August at the same location. In 2020, TDS level varied from 55.9 to 767 mg/l. In 2021, the maximum Chloride was (90 mg/l) found in March at Trimohoni Bridge point and the minimum Chloride was (13.5 mg/l) in July at Jolshiri Abason point (Fig.29f). In 2020, Chloride level varied from 5.0 to 83.8 mg/l. In 2021, the maximum SS was 103 mg/l at Jolshiri Abason point in February and the minimum was 2 mg/l in January at Trimohoni Bridge point (Fig.29g). In 2020, SS level varied from 1.0 to 136 mg/l. In 2021, the maximum EC (1115 µmhos/cm) was in March at Trimohoni Bridge point and the minimum (147 µmhos/cm) was in August at Trimohoni Bridge point (Fig.29h). In 2020, EC level varied from 120.4 to 1399 µmhos/cm. In 2021, the maximum Total Alkalinity (287 mg/l) was at Jolshiri Abason point in April and the minimum (73 mg/l) in July at Jolshiri Abason point (Fig.29i). In 2020, Total Alkalinity level varied from 32 to 364 mg/l. In 2021, the maximum Turbidity of Balu River was (336 mg/l) at Jolshiri Abason point in February and the minimum (7.82 mg/l) in September at Trimohoni Bridge point (Fig.29j). In 2020, Turbidity level varied from 1.8 to 223 NTU.

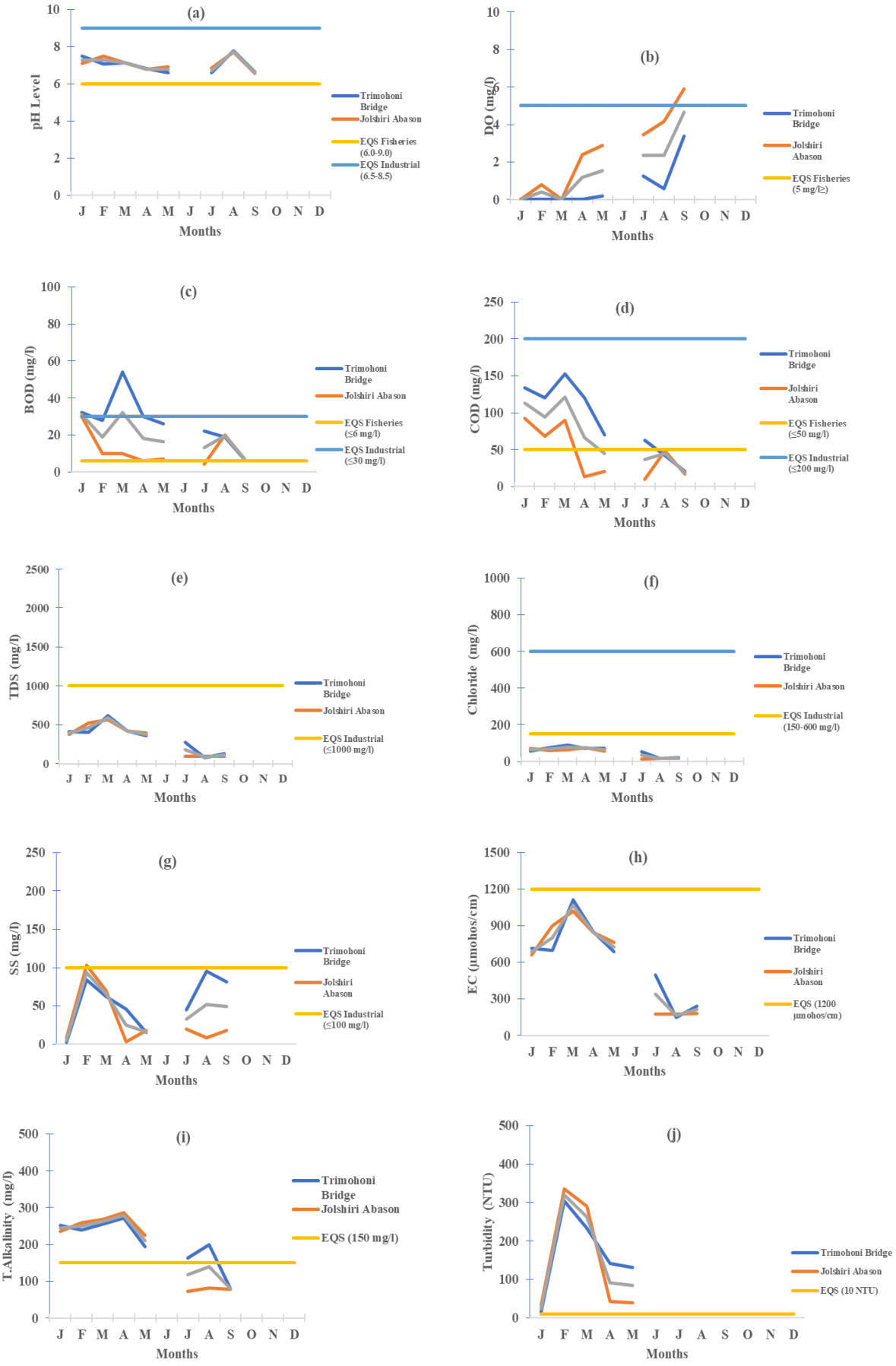

Fig 29. Status of pH, DO, BOD, COD, TDS, Chloride, SS, EC, T. alkalinity and Turbidity of Balu River in 2021

CHAPTER 5: WATER QUALITY PARAMETERS OF LAKE WATER

5.1 Water Quality Parateters of Gulshan Lake Water

It is an important urban water body in Dhaka city providing environmental services. However, the lack itself is a victim of environmental pollution. Direct discharge of sewage and dumping of municipal waste into the lake turned it highly polluted. The lake has been declared by the government as "Ecologically Critical Area" in 2001. Water samples were collected from 06 (Six) locations e.g. United Hospital, South Bridge, Lake View Clinic, Taltola Shooting Complex, South Side of Gulsan Baridhara Lake, North Side of Gulsan Baridhara Lake of the lake in 2021 for analysis of water. Detail data is attached Annex-2 (Table:202-211).

In 2021, pH of Gulshan Lake water varied from 6.85 to 7.67. The maximum pH was in June at United Hospital point and the minimum pH was in September at Taltola Shooting Complex point (Fig. 30a). In 2020, pH of Gulshan Lake water varied from 6.99 to 7.97. In 2021, DO content of Gulshan Lake widely varied among the sampling locations as well as among sampling months. DO of Gulshan Lake water varied from 0.8 to 17.4 mg/l. The maximum DO (17.4 mg/l) was in December at North Side of Gulsan Baridhara Lake and the minimum DO (0.8 mg/l) was in February at United Hospital point (Fig. 30b). In 2020, DO concentration of Gulshan Lake water varied from 0.0 to 18.81 mg/l. In 2021, BOD of Gulshan Lake water varied from 14 to 50 mg/l. The maximum BOD (50 mg/l) was in December at Lake View Clinic point and the minimum BOD (14) was in August at North Side of Gulsan Baridhara Lake point (Fig. 30c). BOD was higher than EQS for fisheries throughout the year of 2021. In 2020, BOD of Gulshan Lake water varied from 4.9 to 58 mg/l. In 2021, COD of Gulshan Lake water varied from 34 to 180 mg/l. The maximum COD (180 mg/l) was in February at South Bridge point and the minimum COD (34) mg/l was in August at North Side of Gulsan Baridhara Lake point (Fig. 30d). In 2020, COD of Gulshan Lake water varied from 15 to 227 mg/l. In 2021, TDS of Gulshan Lake water varied from 173.8 to 352 mg/l. The maximum TDS (352 mg/l) was in December at Lake View Clinic point and the minimum TDS (173.8 mg/l) was in June at United Hospital point (Fig. 30e). In 2020, TDS of Gulshan Lake water varied from 148 to 297 mg/l. In 2021, Turbidity of Gulshan Lake water varied from 19.4 to 522 NTU. The maximum Turbidity (522 NTU) was in January at South Bridge point and the minimum Turbidity (19.4 NTU) was in September at Taltola Shooting Complex point (Fig. 30f). In 2020, Turbidity of Gulshan Lake water varied from 3.59 to 172 NTU and it was higher than EQS throughout the year. In 2021, Chloride of Gulshan Lake water varied from 23 to 54 mg/l. The maximum Chloride (54 mg/l) was in December at Lake View Clinic point and the minimum Chloride (23 mg/l) was in July at United Hospital point (Fig. 30g). In 2020, Chloride of Gulshan Lake water varied from 15 to 88.5 mg/l. In 2021, SS of Gulshan Lake water varied from 19 mg/l to 200 mg/l. The maximum SS (200 mg/l) was in April at South bridge and the minimum SS (19 mg/l) was in March at Lake View Clinic (Fig. 30h). In 2020, SS of Gulshan Lake water varied from 6.0 mg/l to 186 mg/l. In 2021, Total Alkalinity of Gulshan Lake water varied from 80 mg/l to 256 mg/l. The maximum Total Alkalinity (256 mg/l) was in February at United Hospital point and the minimum Total Alkalinity (80 mg/l) was in September at North Side of Gulshan Baridhara Lake point (Fig. 30i). In 2020, Total Alkalinity of Gulshan Lake water varied from 62 mg/l to 265 mg/l. In 2021, the maximum EC 654 µmohos/cm was in December at Lake View Clinic point and the minimum EC 338 µmohos/cm was in June at North Side of Gulsan Baridhara Lake point (Fig. 30j). In 2020, EC of Gulshan Lake water varied from 248 µmohos/cm to 588 µmohos/cm.

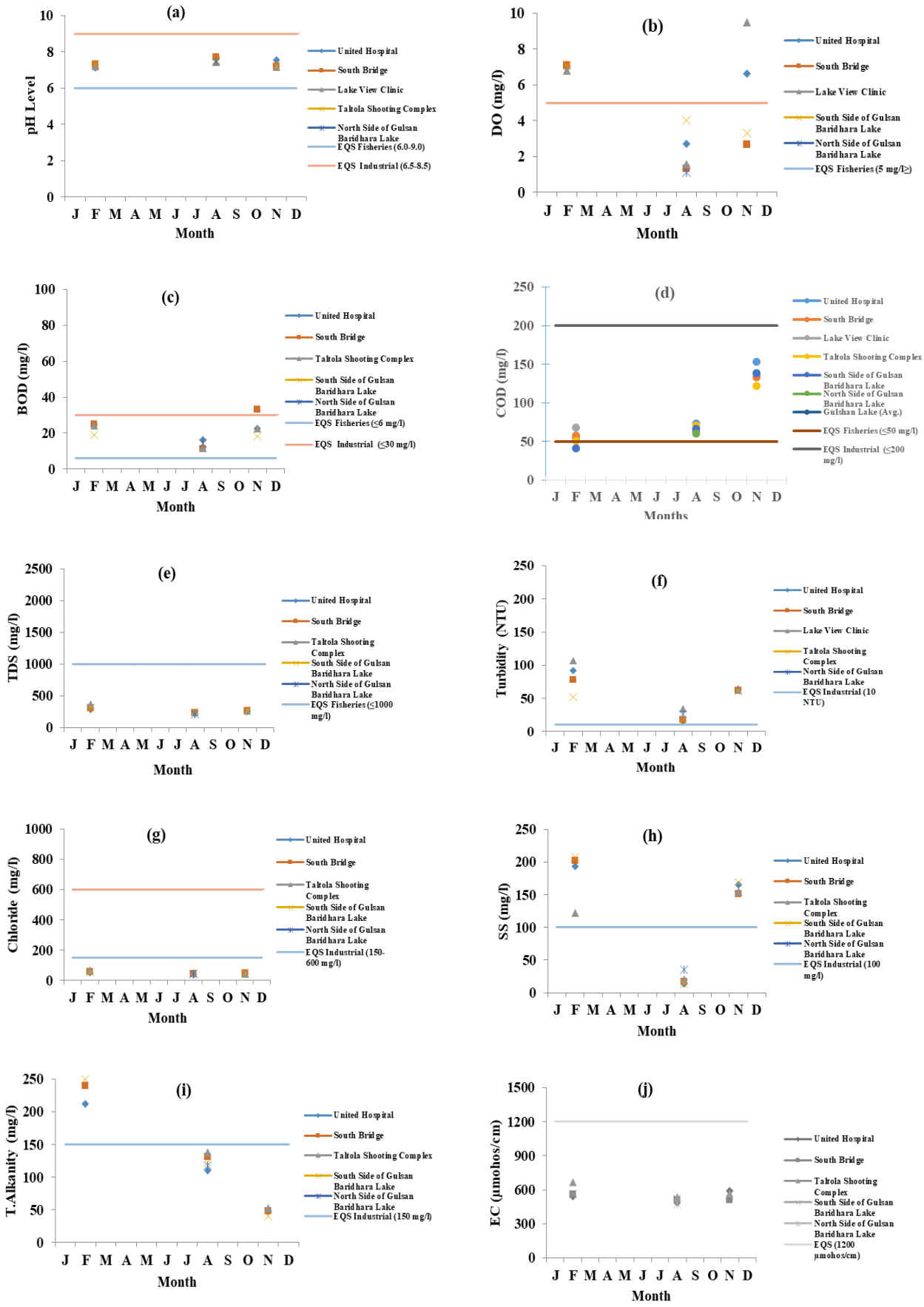

Fig 30. Status of pH, DO, BOD, COD, TDS, Turbidity, Chloride, SS, T. Alkalinity and EC of Gulshan Lake in 2021

5.2 Water Quality Parameters of Dhanmondi Lake

Dhanmondi Lake is in the Dhanmondi residential area in Dhaka, Bangladesh. The lake was originally a dead channel and was connected to the Turag River. The lake is partially connected with the Begunbari Canal. In 1956, Dhanmondi was developed as a residential area. In the development plan, about 16% of the total area of Dhanmondi was designated for the lake. The lake has become a well visited tourist spot, with cultural hubs such as the Rabindra-Sarobar located along its side. Detail data is attached Annex-2 (Table: 212-221).

Water samples were collected from 04 (Four) locations e.g. 8 No. Road Bridge, Near Gigatola Pilkhana More, Near Dhanmondi-32 Bridge, Near Dhanmondi- Road No 28 of the lake in 2021 for analysis of water quality.

In 2021, pH level of Dhanmondi Lake water was within the EQS (6.0-9.0) for fisheries. It varied from 6.54 to 7.76 (Fig. 31a). In 2020, pH level varied from 6.87 to 8.82. In 2021, DO was varied from 2.80 to 9.6 mg/l (Fig. 31b). In 2020, DO was varied from 2.4 to 12.1 mg/l. In 2021, BOD was varied from 4.0 to 28 mg/l (Fig. 31c). In 2020, BOD was varied from 4.0 to 21 mg/l. In 2021, COD was varied from 10 to 90 mg/l COD was within the EQS (Fig. 31d). In 2020, COD was varied from 14 to 90 mg/l. In 2021, TDS was varied from 120.9 mg/l to 172 mg/l and was within the EQS (Fig. 31e). In 2020, TDS was varied from 113.2 to 306 mg/. In 2021, Turbidity was varied from 2.25 to 75 (Fig. 31f). In 2020, Turbidity was varied from 2.62 to 39.2 NTU. In 2021, Chloride was varied from 20.5 to 56 mg/l and was within the EQS (Fig. 31g). In 2020, Chloride was varied from 14 to 84 mg/l. In 2021, SS was varied from 1.0 mg/l to 29 mg/l and was within the EQS (Fig. 31h). In 2020, SS was varied from 3.0 to 40 mg/l. In 2021, Total Alkalinity varied from 72 to 182 mg/l (Fig. 31i). In 2020, Total Alkalinity varied from 42 to 168 mg/l. In 2021, EC was within the EQS (1200 µmohos/cm) limit and it was varied 207 to 321 µmohos/cm (Fig. 31j). In 2020, EC varied µmohos/cm 214.2 to 511 µmohos/cm. Overall condition of the lake was good.

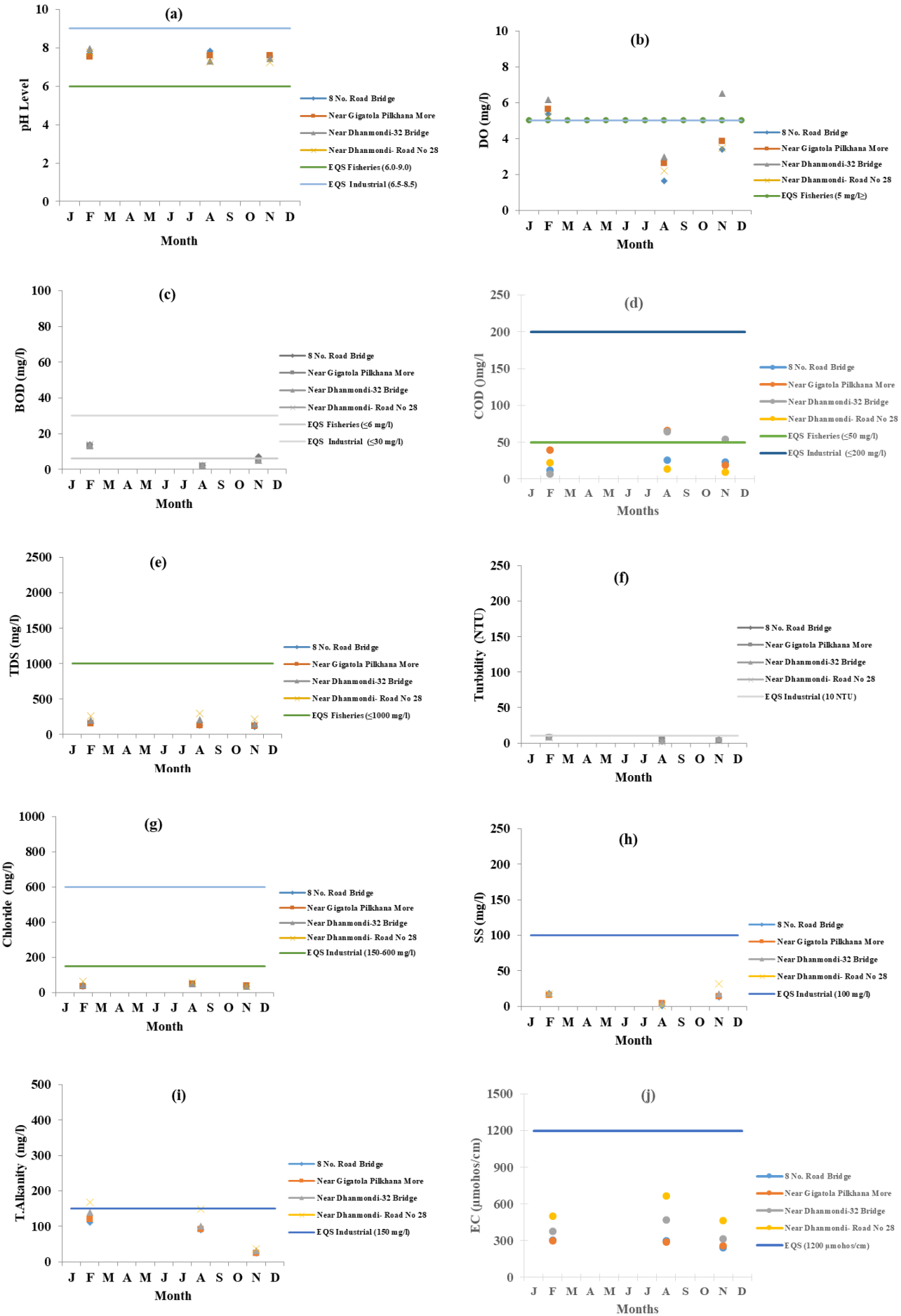

Fig 31. Status of pH, DO, BOD, COD, TDS, Turbidity, Chloride, SS, T. Alkalinity and EC of Dhamnondi Lake in 2021

5.3 Water Quality Parameters of Hatir-Jheel Lake

Hatir-Jheel is a lake front in Dhaka, Bangladesh that has been transformed into a transportation medium for minimizing traffic congestion. It is now a popular recreational spot for residents of Dhaka. Hatir Jheel, the new projects of beautification Dhaka city. It has already become an attractive location to visit in Dhaka City.

Hatirjheel is located at the centre of the capital city, Dhaka. It has a latitude of 23.7495747 and a longitude of 90.3967635. In other words, the Hatirjheel has a coordinate of 23°44′58.47″N 90°23′48.35″E. The area stretches from Sonargaon Hotel in the south to all the way to Banasree in the north. The place is surrounded by Tejgaon, Gulshan, Badda, Rampura, Banasree, Niketon, and Maghbazar, and it made the transportation of the people living near these areas much easier.

Direct discharge of sewage, municipal waste and industrial effluent cause water pollution in the lake. Water samples were collected from 03 (Three) locations e.g. Badda-Gulshan Link Road Bridge, FDC More Bridge and Raampura Bridge of the lake in 2021 for analysis of water quality. Detail data is attached Annex-2 (Table: 222-231).

In 2021, pH level of Hatir Jheel Lake water was within the EQS (6.0-9.0) for fisheries. It varied from 6.64 to 8.42 (Fig.32a). In 2020, pH level varied from 6.78 to 8.3. In 2021, DO was varied from 0.0 to 18.68 mg/l (Fig.32b). In 2020, DO was varied from 0.0 to 9.2 mg/l. In 2021, BOD was varied from 6 to 32 mg/l (Fig.32c). In 2020, BOD was varied from 10.2 to 43.2 mg/l. In 2021, COD of Hatir Jheel water varied from 22 to 149 mg/l (Fig.32d). In 2020, COD of Hatir Jheel water varied from 37 to 161 mg/l. In 2021, TDS was varied from 198 to 326 mg/l (Fig.32e). In 2020, TDS was varied from 210 to 340 mg/l. In 2021, Chloride of Hatir Jheel Lake water varied from 39 to 65.5 mg/l (Fig.32f). In 2020, Chloride of Hatir Jheel Lake water varied from 13 to 78 mg/l. In 2021, SS was varied from 3 to 125 mg/l (Fig.32g). In 2020, SS was varied from 5.0 to 131 mg/l. In 2021, Total Alkalinity was above the EQS (150 mg/l) and varied from 104 mg/l to 260 mg/l (Fig. 32h). In 2020, Total Alkalinity varied from 74 to 330 mg/l. In 2021, Turbidity was varied from 22 to 687 NTU and was above the EQS (Fig.32i). In 2020, Turbidity was varied from 6.38 to 84.4 NTU. In 2021, EC was within the EQS (1200 µmohos/cm) limit and it varied from 378 µmohos/cm to 557 µmohos/cm (Fig. 32j). In 2020, EC varied from 375 to 680 µmohos/cm.

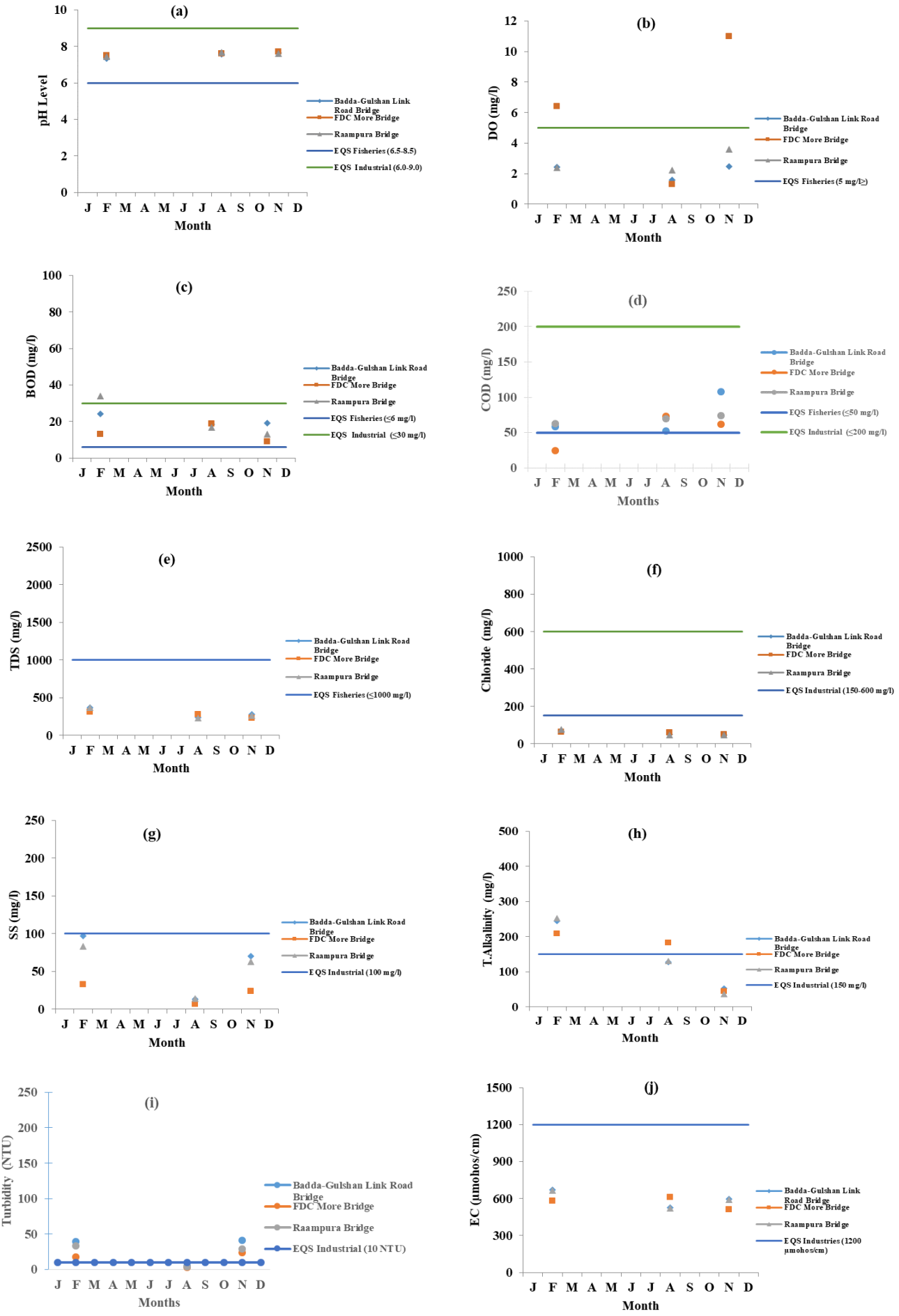

Fig 32. Status of pH, DO, BOD, COD, TDS, Chloride, SS, T. Alkalinity, Turbidity and EC of Hatir Jheel Lake in 2021

CHAPTER 6: WATER QUALITY PARAMETERS OF GROUND WATER

6.1 Water Quality Parameters of Ground Water in Barisal District

Barisal is a major city that lies on the bank of kirtankhola river in south-central Bangladesh. It is one of the oldest municipalities and river ports of the country. For monitoring ground water quality, samples were collected from 38 (Thirty-Eight) different locations viz. Notullabad Bus Stand, B.M College, Upozilla Office, Sadar Hospital, Sher-e Bangla Medical College, Amrita Lal Dey College, B.M School, Barishal Zila School, Barishal City College, Rupatoli Bus Stand, Choumatha Bazar, Bat Tala Bazar, Kalizira Bazar, Notun Hat Alia Madrasha, Govt. Board Primary School, Rupatoli Alia Madrasha, Rupatoli Jagua Secondary School, Rupatoli Karitas Office, Roads & High Way office, Khan Bari Road, Water Development Board, Bapist Mission Boys School, Bapist Mission Girls School, T& T Office, Police Hospital Police Line, Terminal Launch Ghat, Police outpost Launch Ghat, Head Post Office, Dopdopia Kheya Ghat, Gasterbsine Chowmath, Office of the Civil Sergeon, West Muslim Gorsthan Road, Baitul Falah Mosjid, Sharshat Girls School and College, Udayan School, A.K School, Multipurpas Co-Operative market, Govt Halima Khatun Secondary School. Average points were used. Detail data is attached Annex-3 (Table: 232-235).

In 2021, pH level of Barisal district ground water was within EQS (6.5-8.5). It varied from 7.0 to 7.7 (Fig.33a). In 2020, pH varied from 7.0 to 7.6. In 2021, EC varied from 336 to 632 µmohos/cm (Fig.33b) while EQS (1200 µmohos/cm). In 2020, EC varied from 326 to 630 µmohos/cm. In 2021, TDS level of Barisal district ground water was within EQS (1000 mg/l). It varied from 168 mg/l to 328 mg/l (Fig.33c). In 2020, TDS varied from 168 mg/l to 320 mg/l. In 2021, Iron level of Barisal district ground water was within EQS (0.3-1.0 mg/l). It varied from 0.14 mg/l to 0.5 mg/l (Fig.33d). In 2020, Iron varied from 0.16 mg/l to 0.5 mg/l.

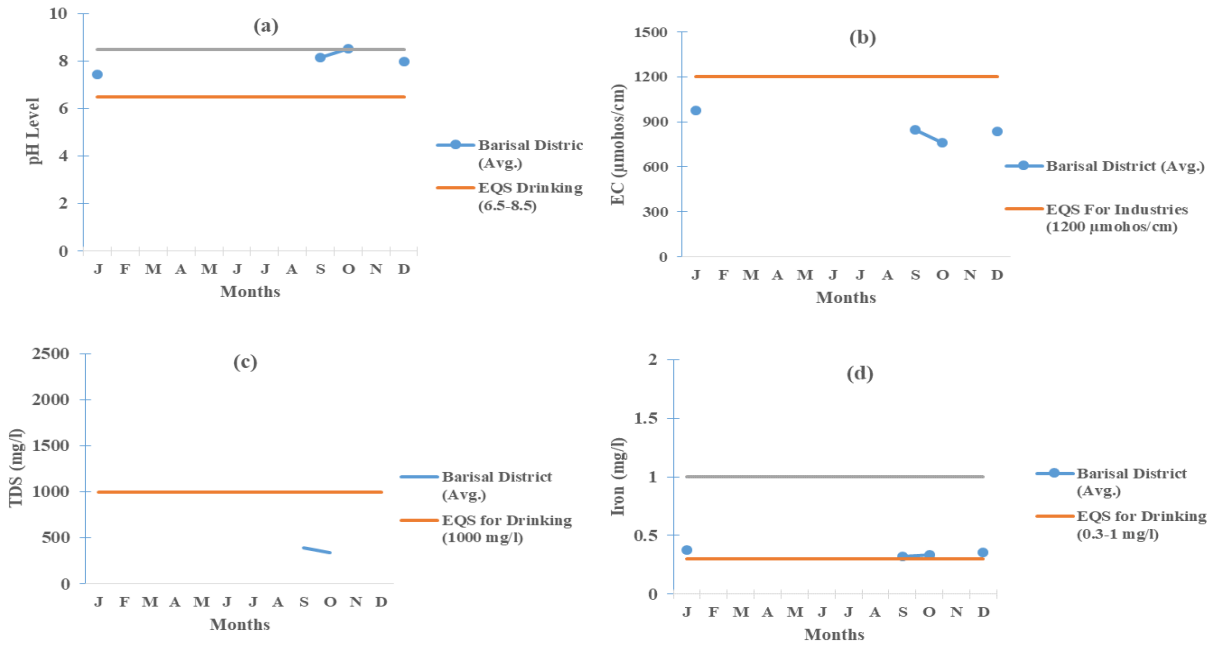

Fig 33. Status of pH, EC, TDS and Iron of Barisal District Area Ground Water in 2021

6.3 Water Quality Parameters of Ground Water in Bogura District

Bogura district is a northern district of Bangladesh in the Rajshahi division. It is called the gateway to North-bangal. Bogura is an industrial city where many small and mid-sized industries are sited. For monitoring ground water quality, samples were collected from 10 (Ten) different locations viz. Bogra Zilla School, Head Post Office, Commercial College, Zilla Parishad, Office of the Duputy Commissioner, Porosovha, VM School, Sadar, T & T Office, Biddut Office, Bogra sadar thana. For analysis, average points were used. Detail data is attached Annex-3 (Table: 236-240).

In 2021, pH level of Bogura district ground water was within EQS (6.5-8.5) for drinking water. It varied from 7.21 to 7.78 (Fig. 34a). In 2020, pH level varied from 7.21 to 7.78. In 2021, EC was within the EQS (1200 µmohos/cm) limit and it varied from 320 to 422 µmohos/cm (Fig. 34b). In 2020, EC varied from 320 to 422 µmohos/cm. In 2021, Iron was within the EQS (0.3-1.0 mg/l) and it varied from 0.26 to 0.42 mg/l (Fig. 34c). In 2020, Iron varied from 0.26 to 0.42 mg/l. In 2021, Total Hardness varied from 210 to 240 mg/l while EQS for Total Hardness (200-500 mg/l) ((Fig. 34d)). In 2020, Total Hardness varied from 200 to 240 mg/l.

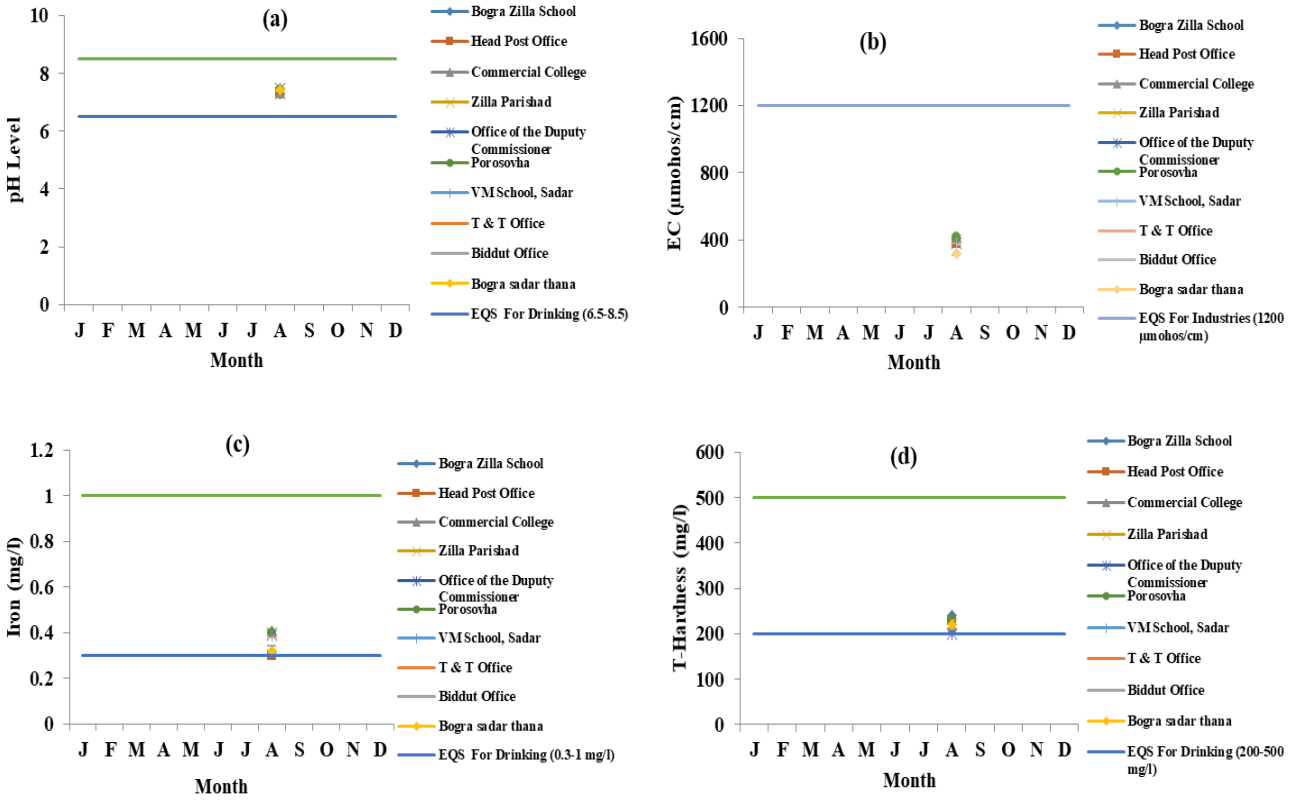

Fig 34. Status of pH, EC, Iron and T. Hardness of Bogura District Area Ground Water in 2021

6.4 Different Water Quality Parameters of Ground Water in Sunamgonj District

Sunamgonj is the northeastern division of Bangladesh. For monitoring ground water quality, samples were collected from 5 (Five) different locations viz. Hossain bokht and forida bokht Primary school, Old Bus Stand, Govt Jubli high school, Pouro Biponi Market, Sohor Girls Primary school. data is attached Annex-3. Detail data is attached Annex-3 (Table: 241-246).

In 2021, pH level of Sunamgonj district ground water was within EQS (6.5-8.5). It varied from 7.0 to 7.40 (Fig.35a). In 2020, pH level varied from 7.05 to 7.2. In 2021, EC was within the EQS (1200 µmohos/cm) limit and it varied from 378 to 432 µmohos/cm (Fig.35b). In 2020, EC varied from 281 to 312 µmohos/cm. In 2021, Chloride was within the EQS (150-600 mg/l) limit and it varied from 10 to 15 mg/l (Fig.35c). In 2020, Chloride varied from 9.0 to 14 mg/l. In 2021, Iron was within the EQS (0.3-1.0 mg/l) limit and it varied from 0.68 to-0.89 mg/l (Fig.35d). In 2020, Iron varied from 0.29 to 0.56 mg/l.

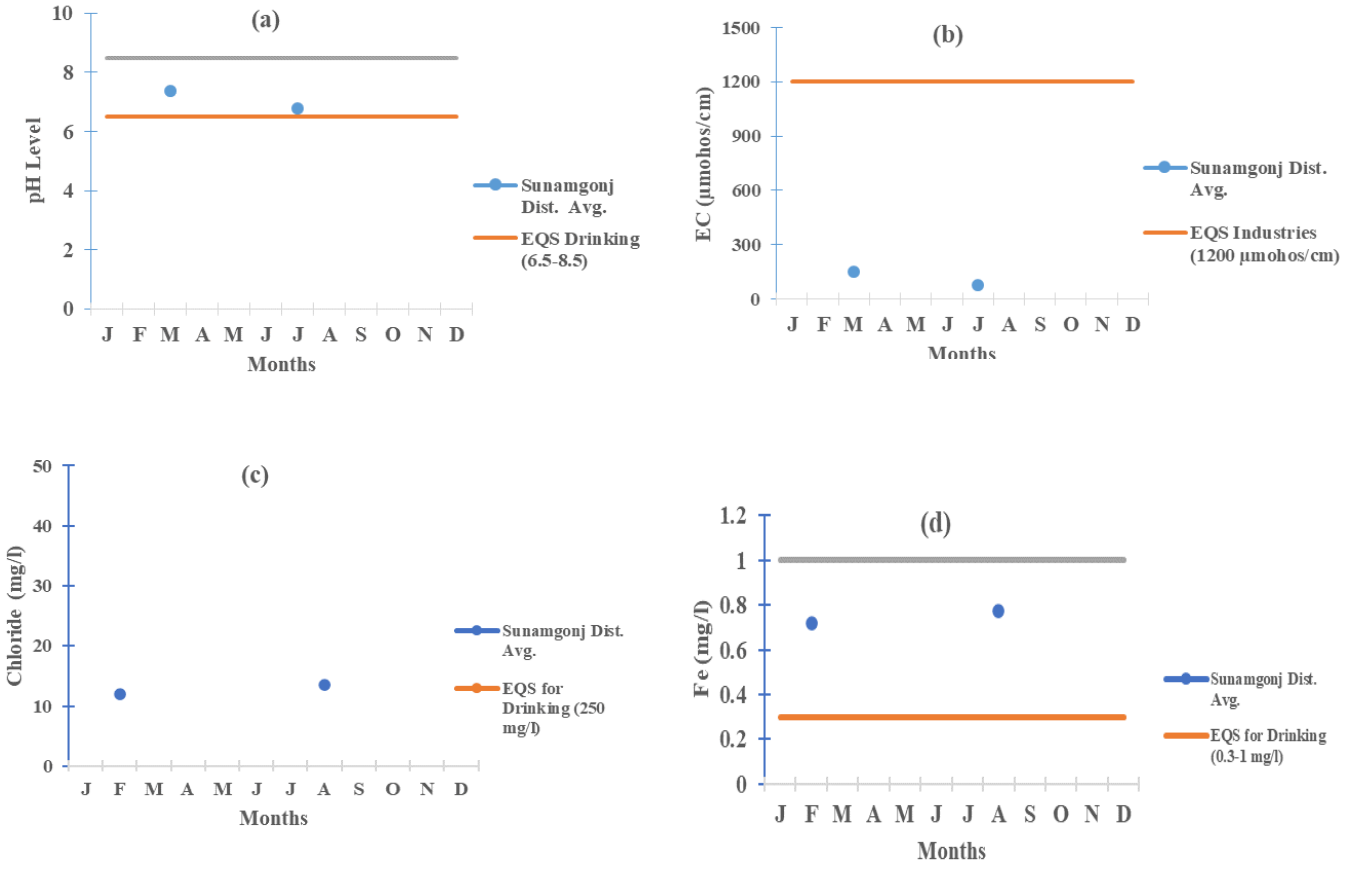

Fig 35. Status of pH, EC, Chloride and Iron of Sunamgonj District Area Ground Water in 2021

6.1 Water Quality Parameters of Ground Water in Khulna District

Khulna is the third-largest city of Bangladesh. It is situated north of the port of Mongla and has various heavy and light industries. For monitoring ground water quality, samples were collected from 40 (Forty) different locations viz. Divisional Commissioner office, Boyra, KUET University Main Gate, Fulbari Gate, Govt. B.L College, Daulatpur, Govt. Mohasin College, Khalishpur, Govt. Girls College, Boyra, Khulna Public College, Boyra, Boyra Bazar More, Boyra, Aizer More, Boyra, Govt. Comercial College, Sonadanga, Sonadanga Bus Stand, Sonadanga, Hazi Mohasin College, Khulna Medical College, Ad-din Medical College and Hospital, Khulna, Natun Bazar, Rupsha, Sarkit House, Govt. Khulna Gila School, D.C Office, Dak Banglo More, Govt.Azom Khan Commerce College, Govt. Majid Memorial City Colleg, Sarjical Clinic, Sonadanga, Jia Hall, Sib Bary, Islami Bank Hospital, Santidham Mor, Moylapota More, Seba Clinic, Sher-E-Bangal Road, Nirala More, Gollamari Bus Stand, Gollamari, Khulna University, Vaskarja Chattar, Rupsha Bus Stand, Rupsha, Sundarban Adorso College, Khulna, Magura Porosova, Low cost colony, Art college, C and B colony, Govt nur nagar Primary school, PWD High school, Daulatpur Bus stand, Notun Rasta More, Bora Bus Stand, Govt Khulna college. Detail data is attached Annex-3 (Table: 245-248).

In 2021, pH level of ground water of Chittagong District area was within EQS (6.5-8.5) for drinking water. It varied from 7.04 to 8.5 (Fig. 36a). The maximum pH was 8.5 in December at Boyra Bus Stand and the minimum pH was 7.04 in January at Seba Clinic. In 2020, pH level varied from 7.04 to 7.53. In 2021, EC varied from 424 µmohos/cm to 2131 µmohos/cm (Fig.36b) while EQS (1200 µmohos/cm). In 2020, EC concentration varied from 1702 to 2240 µmohos/cm. In 2021, Chloride level of Khulna District area ground water was below the EQS (150-600 mg/l) for treated wastewater from drinking unit and varied from 209 to 579 mg/l (Fig. 36c). In 2020, Chloride varied from 212 to 540 mg/l. In 2021, Total Hardness varied from 220 to 342 mg/l (Fig. 36d). In 2020, Total Hardness varied from 204 to 272 mg/l. In 2021, Salinity varied from 0.2 to 11 ppt (Fig. 36e). In 2020, Salinity varied from 0.1 to 0.5 ppt.

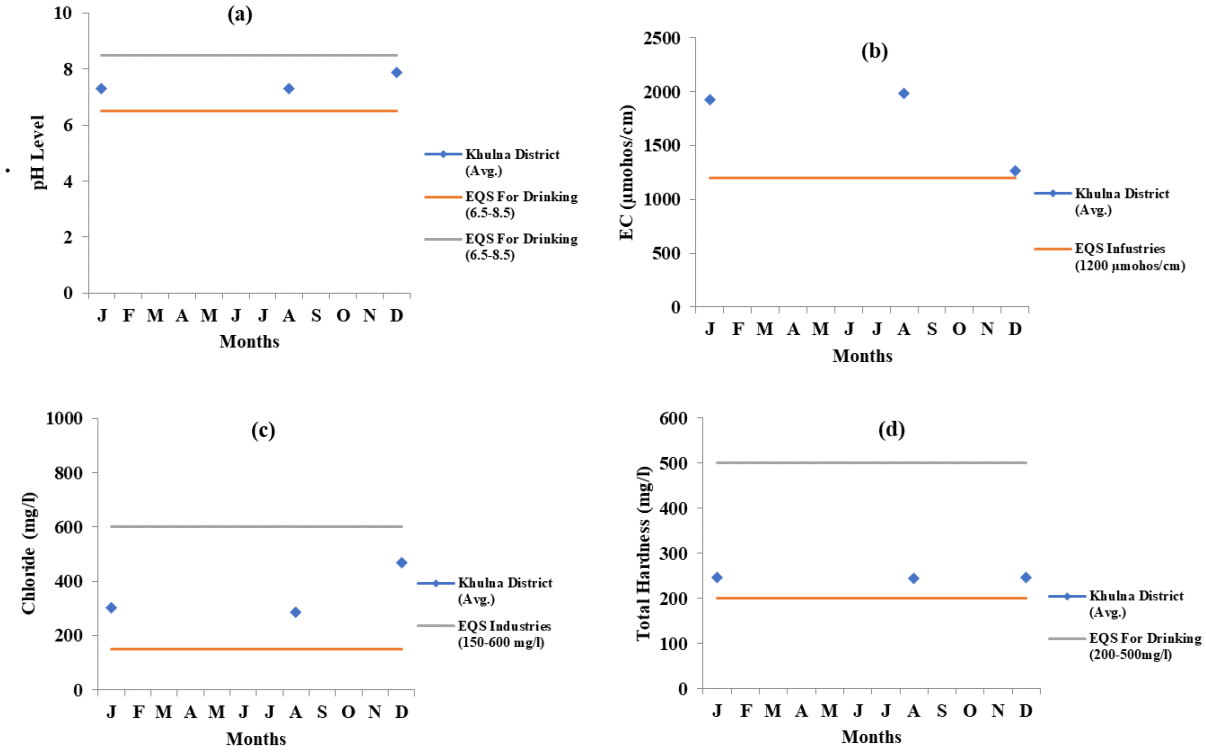

Fig 36. Status of pH, EC, TDS, and T. Hardness of Khulna District area ground water in 2021

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

The present investigation demonstrates that most of the water bodies in Bangladesh are contaminated with several contaminants and not suitable for human consumption without proper treatment. Besides heavy metal contamination, pesticide contamination of surface water sources is the most prospective menace for the people of Bangladesh. In Bangladesh, sewage and solid waste & industrial waste & effluents are the main cause of surface water pollution. Industrial pollutants are the major cause of surface water pollution in the urban region in Bangladesh. Impacts of seasonal variation of flow, industrialization and urbanization has been assumed to be responsible for poor water quality for the rivers around Dhaka city, Chattagram and Khulna city. Spatial and temporal variation in water quality has been evident from the data analysis. Ninety percent of surface water flows through the 57 transboundary rivers. Low rainfall and upstream intake of water by the neighboring countries reduces the flow of water in dry season. During monsoon water quality of most monitoring stations was improved, when compared to the Environmental Quality Standard (EQS) set in the ECR, 1997. High density of industries, poor solid waste management by the City Corporations and untreated liquid wastes including sewage are assumed to be responsible for poor quality water quality of rivers around Dhaka city, Chattagram and Khulna city. The difference in pollution level among the sampling points along a single river was also evident because of urbanization.

High salinity together with high turbidity are making river ecosystem in the southern region fragile. Salinity level of rivers in southern Bangladesh greatly increases during dry season. Long dry period and reduced upstream flow are the proximate causes of high salinity of surface water in southern region. Soil erosion from catchment area, dumping of solid wastes into rivers are the main causes of high turbidity. Salinity level reduces near to EQS during wet season. Summer rainfall and increased flow from upstream are proximate causes of salinity decrease.

Despite discontinuous sampling and measurement of a few parameters, this report provides important indication of pollution level of surface and ground water of the country. Due to limited time and restricted budget the trend analysis has been limited to certain parameters and a few rivers. Still, the report can be used as a basis for identifying the reasons of pollution and developing sustainable water resource management plans.

This report also tries to give an overview on the up-to-date information of surface water, ground water lake water and sea water, what should be monitored to assess the status of river pollution in Bangladesh. Thus, the report also discusses the role and activities of concerned ministry, departments, research organizations and on their ongoing activities, program, and projects related to environment and biodiversity conservation, linkage to other regional and international organizations.

7.2 Recommendations

To provide with useful information for policy feedback a continuous monitoring of a comprehensive set of parameters is essential. The following actions are recommended to avail comprehensive data sets:

a. Introduction of online water quality monitoring system is essential to avoid the discontinuity of data.
b. Review and updating of surface water monitoring network is essential. Pollution hot-spots could be identified and monitoring stations should include those hotspots.
c. For each river, sampling must be done from more than one location. Collection of water samples and analyses must be in a consistent way and on regular basis for assessment of water quality.
d. More rivers can be included in the monitoring programme;
e. Other wetlands such as hopes and baor could be included;
f. Biological indicators should be included in the monitoring programme.
g. Weather information could be collected while sampling.
h. Use of Global Positioning System (GPS) to represent monitoring results in global context is essential.
i. Monitoring of ETP outlets of major industrial zones should be intensified and data should be collected more frequently.
j. Enforcement programme should be increased to stop all illegal discharges to surface water.
k. Existing parameters should be revisited and new parameters should be included for a comprehensive groundwater monitoring.
l. For the sustainable management of trans-boundary rivers and to increase river flow during dry season strengthening regional cooperation is essential and Integrated Watershed Management (IWM) approach can be implemented in this regard.
m. Programmes could be initiated to develop River Health Card and establish Water Quality Index (WQI) for each river to guide the policy makers.
n. Take a comprehensive assessment of water management issues, participate in learning processes and exchange knowledge and information on better water management practices.
o. River conservation program have direct linkage with coastal habitat conservation. However, very little efforts have been made at linking river conservation program with coastal conservation activities. A comprehensive approach to river conservation in terms of land use planning, scientific urban management, industrial sitting, transportation of chemicals, and discharge of effluents needs to be adopted.
p. Increase skilled manpower at all level of water quality analysis including sample collection.
q. To initiate program for spreading awareness about scarcity of water and introduce better management practices in agriculture, urban and industrial use.
r. To take immediate measures to develop legislation for regulating with-drawl of ground water on a sustainable basis.

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Annex-1: List of Tables for Different Parameters of River Water

1.0 Buriganga River (Table: 1-10)

Table-1. Level of pH of Buriganga River Water in 2021

Location of Buriganga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mirpur Bridge	7.94	7.47	6.75	7.35	6.95	7.06	6.93	7.6	6.61			7.28
Mohammadpur	7.48											
Bosila Bridge	7.45	7.37	6.88	7.36	7.39	6.98	6.9	7.98	6.92			7.35
Hajaribag	7.48	7.35	7.21	7.35	7.18	6.92	6.9	7.61	7.13			7.23
Satmosjid Road	7.47	7.37	7.28	7.32	7.4	6.82	7.08	7.9	7.32			7.27
Chadnighat	7.48	7.32	7.16	7.32	7.34	6.98	6.87	7.55	7.33			7.32
Sadarghat	7.44											
B.C.F.B	7.54	7.34	6.94	7.45	7.47	7.02	6.84	7.58	7.19			7.28
Pagla	7.46	7.49	7.14	7.49	7.43	7	6.9	7.99	7.23			7.42
Fatullah	7.47											
EQS Fisheries (6.0-9.0)												
EQS Industrial (6.5-8.5)												

Table-2. Level of DO (mg/l) of Buriganga River Water in 2021

Location of Buriganga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mirpur Bridge	0.2	0.7	0	0.3	0.6	4.1	4.9	4.68	5.54			1.72
Mohammadpur	0.7											
Bosila Bridge	0.1	0.4	0	0.4	0.7	3.4	4.57	4.64	5.78			1.51
Hajaribag	0.1	0.3	0	0.6	0.9	3.1	4.21	4.23	5.94			1.54
Satmosjid Road	0.1	0.2	0	0.8	0.8	2.5	2.74	0.44	5.85			1.56
Chadnighat	0.1	0.1	0	0.4	0.6	2.05	2.66	3.13	5.67			1.86
Sadarghat	0.1											
B.C.F.B	0.2	0.5	0	0.9	0.7	2.75	4.57	3.21	5.69			2.13
Pagla	0.1	0.1	0	0.8	0.8	2.75	1.36	3.29	5.63			
Fatullah	0.1											1.3
EQS Fisheries (5 mg/l≥)												

Table-3. Level of BOD (mg/l) of Buriganga River Water in 2021

Location of Buriganga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mirpur Bridge	6	22	10	24	28	8.2	14.4	33	10			40
Mohammadpur	5.8											
Bosila Bridge	6	66	32	18	30	8.4	16.8	30	8			14
Hajaribag	6	17	8	33	28	6.2	16.8	32	10			16
Satmosjid Road	5.8	19	23	10	32	9.2	16.8	28	8			26
Chadnighat	5.8	19	30	15	30	8.2	14.4	32	8			32
Sadarghat	6											
B.C.F.B	5.8	14	30	23	28	6.2	18	28	8			28
Pagla	5.8	17	10	23	28	8.2	15.6	24	10			30
Fatullah	6											
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-4. Level of COD (mg/l) of Buriganga River Water in 2021

Location of Buriganga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mirpur Bridge	68	68	76	76	90	24	34	60	34			119
Mohammadpur	43											
Bosila Bridge	62	66	120	59	97	20	32	54	**22**			37
Hajaribag	64	71	76	90	79	12	51	62	29			39
Satmosjid Road	72	58	52	78	80	28	36	68	29			73
Chadnighat	53	58	98	66	80	22	37	60	22			93
Sadarghat	63											
B.C.F.B	63	85	78	76	97	22	51	62	19			80
Pagla	36	71	85	72	80	24	34	64	27			85
Fatullah	50											
EQS Fisheries (≤50 mg/l)												
EQS Industrial (≤200 mg/l)												

Table-5. Level of TDS (mg/l) of Buriganga River Water in 2021

Location of Buriganga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Location of Burigonga river	J	F	M	A	M	J	J	A	S	O	N	D
Mirpur Bridge	358	448	438	594	386	112.5	68.7	89	83.5			287
Mohammadpur	356											
Bosila Bridge	356	443	534	518	496	117.9	103.5	82	84.9			281
Hajaribag	356	440	517	506	500	118.5	73.4	93	84.7			286
Satmosjid Road	356	436	501	511	536	188.9	75.3	157	84.2			276
Chadnighat	354	433	528	495	546	132.1	83.1	85	82.2			290
Sadarghat	354											
B.C.F.B	353	414	462	493	541	113.4	84.8	85	86			285
Pagla	346	386	471	485	540	138	87.6	98	88			316
EQS for Fisheries (≤1000 mg/l)												

Table-6. Level of Turbidiy (NTU) of Buriganga River Water in 2021

Location of Buriganga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mirpur Bridge	428	327	267	97	62	33.2	52		19.9			33.4
Mohammadpur	280											
Bosila Bridge	219	178	344	31	60	24.4	63		28.9			28.8
Hajaribag	181	186	232	94	50	27.3	59		25.4			49.7
Satmosjid Road	189	147	512	33	61	30.9	61		25.6			22.4
Chadnighat	148	142	342	22	89	23.5	63		24.4			36.9
Sadarghat	138											
B.C.F.B	137	164	383	36	68	30.4	58		20.8			38.6
Pagla	219	231	253	98	68	25.2	64		27.9			38.1
EQS Industrial (10 NTU)												

Table-7. Level of Chloride (mg/l) of Buriganga River Water in 2021

Location of Buriganga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mirpur Bridge	42	65	70	73	46	30	14	15	16.5			24.5
Mohammadpur	42.5											
Bosila Bridge	52.5	67	74	74	45	31	17	14	13.5			24
Hajaribag	47	63.5	67	76	48	31	14.5	15	14.5			20
Satmosjid Road	52	62.5	68	72	49	32	15.5	20	17.5			23.5
Chadnighat	50.2	64.5	70	68	46	31	15.5	14	19			44.5
Sadarghat	51											
B.C.F.B	49	64.5	74	66	45	30	15.5	15	14.5			24
Pagla	47.5	63.5	63	63	44	31	16	15	15			31
Fatullah	46											
EQS Industrial (150-600 mg/l)												

Table-8. Level of SS (mg/l) of Buriganga River Water in 2021

Location of Buriganga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mirpur Bridge	88	85	75	2	19	20	115	151	16			44
Mohammadpur	58											
Bosila Bridge	50	56	157	2	20	18	48	44	11			37
Hajaribag	45	54	69	7	22	16	92	21	38			59
Satmosjid Road	48	53	79	2	18	23	53	21	9			38
Chadnighat	41	47	254	4	25	10	21	22	18			53
Sadarghat	37											
B.C.F.B	40	67	75	5	27	15	49	37	8			53
Pagla	55	60	71	27	35	14	34	39	16			47
Fatullah	53											
EQS Industrial (100 mg/l)												

Table-9. Level of Total Alkalinity (mg/l) of Buriganga River Water in 2021

Location of Buriganga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mirpur Bridge	215	178	186	170	147	139	50	52	64			168
Mohammadpur	214											
Bosila Bridge	205	199	199	199	157	102	57	63	61			160
Hajaribag	201	169	213	185	177	127	50	59	70			172
Satmosjid Road	214	186	196	232	192	150	52	61	59			159
Chadnighat	208	181	262	204	199	137	54	63	64			202
Sadarghat	210											
B.C.F.B	211	181	220	255	189	102	54	58	67			164
Pagla	212	198	209	215	200	139	55	64	62			173
Fatullah	210											
EQS Industrial (150 mg/l)												

Table-10. Level of EC (µmohs/cm) of Buriganga River Water in 2021

Location of Buriganga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mirpur Bridge	678	814	799	1149	730	218.1	122.4	188	201.7			524
Mohammadpur	671											
Bosila Bridge	666	795	955	990	896	226	187.5	155	204.2			514
Hajaribag	673	793	941	966	917	227	131.1	175	203.3			524
Satmosjid Road	669	785	907	974	970	358	134.9	294	201.7			498
Chadnighat	666	791	949	948	1000	261	149.4	159	199.2			533
Sadarghat	665											
B.C.F.B	663	746	837	943	978	219	152.7	161	205.9			521
Pagla	651	695	851	930	993	264	155.2	185	209.7			561
Fatullah	647											
EQS Industrial (1200µmohs/cm)												

2.0 Shitalakhya River (Table: 11-19)

Table-11. Level of pH of Shitalakhya River Water in 2021

Location of Shitalakhya river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Port Road		6.97			7.35	7.29	7.19	7.31	6.98			7.31
Majira Demra Ghat	7.06	7.34		7.07	6.93	7.09	6.83	7.84	6.57			7.28
Murapara (Rupgonj)	7.26	7.44		7.38	7.13	7.07	6.91	7.54	6.58			7.56
Gorashal	7.48	7.21				7.02		6.54	7.21			7.68
EQS Fisheries (6.0-9.0)												
EQS Industrial (6.5-8.5)												

Table-12. Level of DO (mg/l) of Shitalakhya River Water in 2021

Location of Shitalakhya river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Port Road		0			1.2	3	4.51	2.8	4.5			3.4
Majira Demra Ghat	0.4	0		0	0	2.6	4.69	5.9	6.1			3
Murapara (Rupgonj)	0	4.1		4.2	1.3	1.4	4.99	5.5	6.5			4
Gorashal	5.8	5.2				2.4		3.6	6.4			4.5
EQS Fisheries (5 mg/l≥)												

Table-13. Level of BOD (mg/l) of Shitalakhya River Water in 2021

Location of Shitalakhya river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Port Road		49.2			12	14	14	12	10			10
Majira Demra Ghat	4.5	32.4		14	10	14	12	18	8			12
Murapara (Rupgonj)	4.6	6		6.4	8	12	12	17	12			8
Gorashal	12	6				7		16	4			8
EQS for Fisheries (≤6 mg/l)												
EQS for Industrial (≤30 mg/l)												

Table-14. Level of COD (mg/l) of Shitalakhya River Water in 2017

Location of Shitalakhya river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Port Road		166			70	42	38	32	30			32
Majira Demra Ghat	20	80		36	58	46	37	38	24			34
Murapara (Rupgonj)	32	27		18	21	44	60	36	46			30
Gorashal	54	28				19		34	12			29
EQS for Fisheries (≤50 mg/l)												
EQS for Industrial (≤200 mg/l)												

Table-15. Level of TDS (mg/l) of Shitalakhya River Water in 2021

Location of Shitalakhya river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Port Road		354			285	186	134	83	158			296
Majira Demra Ghat	247	338		445	320	134	58.1	70	82.5			242
Murapara (Rupgonj)	235	274		299	259	167.4	54.9	246	75.9			222
Gorashal	158	164				79.4		64	79			185
EQS for Fisheries (≤1000 mg/l)												

Table-16. Level of Chloride (mg/l) of Shitalakhya River Water in 2021

Location of Shitalakhya river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Port Road		70			42	30.5	35	19	19			24
Majira Demra Ghat	39	51		65	45	34.5	15.5	14	9			15
Murapara (Rupgonj)	37	41		52	37	19	6	29	8.5			20
Gorashal	10.5	14				11		12	16			14
EQS for Industrial (150-600 mg/l)												

Table-17. Level of SS (mg/l) of Shitalakhya River Water in 2021

Location of Shitalakhya river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Port Road		65			10	28	26	37	16			38
Majira Demra Ghat	26	26		57	6	6	120	29	38			33
Murapara (Rupgonj)	59	94		5	9	12	143	28	138			36
Gorashal	7	11				78		35	12			29
EQS for Industrial (100 mg/l)												

Table-18. Level of EC (µmohs/cm) of Shitalakhya River Water in 2021

Location of Shitalakhya river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Port Road		634			598	364	264	154	422			550
Majira Demra Ghat	429	584		919	611	263	109.1	131	156.6			431
Murapara (Rupgonj)	407	489		610	501	318	101.5	452	142.6			510
Gorashal	251	277				156.7		126	389			331
EQS for Industrial (1200 µmohos/cm)												

Table-19. Level of Total Alkalinity (mg/l) of Shitalakhya River Water in 2021

Location of Shitalakhya river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Port Road		262			251	149	88	74	84			102
Majira Demra Ghat	112	196		227	186	138	47	20	29			39
Murapara (Rupgonj)	164	166		192	252	19	49	54	50			82
Gorashal	61	63				11		56	73			76
EQS for Industrial (150 mg/l)												

3.0 Turagh River (Table: 20-28)

Table-20. Level of pH of Turagh River Water in 2021

Location of Turagh river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Turag Bridge		7.41	7.41	**7.98**	7.27	7.8	6.86	6.5	7.08			7.14
Ashulia		7.5	7.5	7.6	7.32	7.48	6.8	**6.42**	7.11			7.28
Kaliakoir		7.05	7.38	7.51	7.46	7.5	6.91	6.5	6.98			7.6
Vawal		7	7.34	7.55	7.26	7.25	6.94	6.66	7.32			7.12
Nama Bazar		7.19	7.36	7.58	7.27	6.9	6.88	6.43	7.12			7.53
EQS Fisheries (6.0-9.0)												
EQS Industrial (6.5-8.5)												

Table-21. Level of DO (mg/l) of Turagh River Water in 2021

Location of Turagh river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Turag Bridge		0	0	0.6	2.8	3.4	5.6	6.25	5.21			2.3
Ashulia		0	0	**0**	2.9	3.1	5.1	6.45	5.35			0.5
Kaliakoir		4.9	1.8	1.6	4.9	**7.6**	7.49	6.95	5.1			2.1
Vawal		0	0	1.2	4.9	6	6.86	6.83	5.44			3.2
Nama Bazar		0	0	1	2.9	4.5	6.96	6.8	6.21			1.2
EQS Fisheries (5 mg/l≥)												

Table-22. Level of BOD (mg/l) of Turagh River Water in 2021

Location of Turagh river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Turag Bridge		6.4	30	32	12	9	16.8	25	12			18
Ashulia		**6.2**	30	18	8.2	18	15.6	28	14			8
Kaliakoir		6.2	8	30	6.2	18	16.8	22	10			12
Vawal		**36**	18	32	6.2	13	18	16	12			8
Nama Bazar		16	12	30	8.4	8	20.4	23	10			8
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-23. Level of COD (mg/l) of Turagh River Water in 2021

Location of Turagh river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Turag Bridge		24	124	128	39	41	61	57	48			51
Ashulia		28	**129**	70	24	44	29	56	50			22
Kaliakoir		23	30	59	**10**	51	54	48	32			36
Vawal		120	88	100	51	20	49	44	56			28
Nama Bazar		78	49	126	34	22	41	66	32			28
EQS Fisheries (≤50 mg/l)												
EQS Industrial (≤200 mg/l)												

Table-24. Level of TDS (mg/l) of Turagh River Water in 2021

Location of Turagh river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Turag Bridge		498	498	670	472	99.4	68	79	84			240
Ashulia		525	525	791	211	96.3	92.3	82	82			257
Kaliakoir		195	301	534	86	75.1	**53.6**	68	94			160
Vawal		67	732	**813**	168	76.9	63.2	83	97			162
Nama Bazar		449	721	705	170	69.6	64.6	83	76			319
EQS Fisheries (≤1000 mg/l)												

Table-25. Level of Chloride (mg/l) of Turagh River Water in 2021

Location of Turagh river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Turag Bridge		62	82	85	44.5	18	12	13	14			36
Ashulia		62	71	66	26	18	13	14	13			34.5
Kaliakoir		50	26	72	20.5	16	9	12	14			12
Vawal		110	95	76	24.5	14.5	10	14	14			14
Nama Bazar		83	**112**	71	25	**6**	7	14	12			31
EQS Industrial (150-600 mg/l)												

Table-26. Level of SS (mg/l) of Turagh River Water in 2021

Location of Turagh river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Turag Bridge		57	86	128	4	23	96	67	60			20
Ashulia		86	**396**	78	**1**	42	115	67	64			27
Kaliakoir		1	29	38	2	213	316	307	322			13
Vawal		81	64	46	4	155	205	158	146			13
Nama Bazar		65	59	37	1	235	266	156	123			22
EQS for Industrial Discharge (100 mg/l)												

Table-27. Level of EC (µmohs/cm) of Turagh River Water in 2021

Location of Turagh river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Turag Bridge		867	876	1106	868	195.9	120.9	155	165			422
Ashulia		916	916	1296	399	188.8	164	161	166			455
Kaliakoir		327	527	895	163	148.2	**93.4**	135	176			296
Vawal		124.1	**1372**	1338	322	147.8	110	165	176			300
Nama Bazar		726	1363	1165	322	131.2	115.2	164	154			560
EQS for Industrial Discharge (1200 µmohos/cm)												

Table-28. Level of Total Alkalinity (mg/l) of Turagh River Water in 2021

Location of Turagh river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Turag Bridge		226	230	272	203	102	49	58	55			104
Ashulia		206	286	267	120	97	55	60	63			100
Kaliakoir		159	162	152	49	51	47	55	62			86
Vawal		116	**358**	302	89	50	**46**	59	68			86
Nama Bazar		156	233	220	92	54	51	61	58			109
EQS for Industrial Discharge (150 mg/l)												

4.0 Dhalaeswari River (Table: 29-37)

Table-29. Level of pH of Dhaleshwari River Water in 2021

Location of Dhaleshwari river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mukterpur	6.91	7.49	**6.12**	7.5		6.73	7.27	7.72	7.28			7.2
Ruhitpur	7.79	7.77	**8.07**			8.01	7.43	7.72	7.79			
Hazratpur	8	7.69	7.99			7.86	7.76	7.7	8			
Alipur	7.86											
Sirajnagor	7.86											
Utorro Mitra		7.14	6.96			6.79	7.23	7.45				7.26
Pathorghata						7.69	6.54	6.94				7.64
EQS Fisheries (6.0-9.0)												
EQS Industrial (6.5-8.5)												

Table-30. Level of DO (mg/l) of Dhaleshwari River Water in 2021

Location of Dhaleshwari river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mukterpur	0.6	0.5	5	3.4		2.4	4.99	4.9	2.1			1.1
Ruhitpur	4	9	**16.1**			7.2	7.9	7	5.8			
Hazratpur	11.2	6.5	7.2			2.8	7.8	7.2	5.5			
Alipur	2.8											
Sirajnagor	**0.5**											
Utorro Mitra		6.1	6.3			6	6.1	5.5				5.1
Pathorghata						4	5.2	5.1				6.2
EQS Fisheries (5 mg/l≥)												

Table-31. Level of BOD (mg/l) of Dhaleshwari River Water in 2021

Location of Dhaleshwari river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mukterpur	**34**	12	8	14		22	8	12	14			**10**
Ruhitpur	12	10	10			8	8	14	10			
Hazratpur	8	10	12			12	10	14	8			
Alipur	12											
Sirajnagor	8.4											
Utorro Mitra		12	10			9	8	10				6
Pathorghata						12	6	**4**				12
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-32. Level of COD (mg/l) of Dhaleshwari River Water in 2021

Location of Dhaleshwari river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mukterpur	**90**	39	38	59		82	35	44	70			34
Ruhitpur	29	32	42			27	34	58	22			
Hazratpur	27	36	45			44	40	56	20			
Alipur	44											
Sirajnagor	34											
Utorro Mitra		39	39			24	22	30				19
Pathorghata						39	**10**	12				32
EQS Fisheries (≤50 mg/l)												
EQS Industries (≤200 mg/l)												

Table-33. Level of TDS (mg/l) of Dhaleshwari River Water in 2021

Location of Dhaleshwari river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mukterpur	276	350	270	185		107	78	89	86			165
Ruhitpur	284	280	270			68.2	77	82	284			
Hazratpur	279	291	332			**65.1**	72	80	279			
Alipur	**401**											
Sirajnagor	279											
Utorro Mitra		279	253			118.1	70	74.2				295
Pathorghata						72.3	70	72.3				272
EQS Fisheries (≤1000 mg/l)												

Table-34. Level of Chloride (mg/l) of Dhaleshwari River Water in 2021

Location of Dhaleshwari river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mukterpur	43	47	38	43		9	8	**9**	8			14
Ruhitpur	32	33.5	41.5			30	8	9	32			
Hazratpur	29.5	33	44.5			**70**	10	8	30			
Alipur	69.5											
Sirajnagor	30.5											
Utorro Mitra		31	23.6			11	8	**6**				34.5
EQS Industrial (150-600 mg/l)												

Table-35. Level of SS (mg/l) of Dhaleshwari River Water in 2021

Location of Dhaleshwari river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mukterpur	34	31	30	10		20	28	24	**121**			37
Ruhitpur	5	8	25			12	90	85	5			
Hazratpur	12	11	12			**4**	40	77	12			
Alipur	4											
Sirajnagor	8											
Utorro Mitra		7	4			25	20	18				14
Pathorghata						5	30	26				25
EQS Industrial (100 mg/l)												

Table-36. Level of EC (1200µmohs/cm) of Dhaleshwari River Water in 2021

Location of Dhaleshwari river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mukterpur	464	644	531	396		206	155	165	162			312
Ruhitpur	482	490	499			130	140	147	482			
Hazratpur	477	509	607			**124.1**	140	143	477			
Alipur	**675**											
Sirajnagor	477					152	127	137				520
Utorro Mitra		489	534			236	146	152				489
Pathorghata												
EQS industrial (1200 µmohos/cm)												

Table-37. Level of Total Alkalinity (mg/l) of Dhaleshwari River Water in 2021

Location of Dhaleshwari river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Mukterpur	158	113	254	134		82	82	84	80			88
Ruhitpur	256	222	280			**281**	62	62	256			
Hazratpur	281	262	249			199	58	**60**	281			
Alipur	199											
Sirajnagor	239											
Utorro Mitra		243	253			129	62	66				190
Pathorghata						256	62	64				108
EQS Industries (150 mg/l)												

5.0 Brahmaputra River (Table: 38-43)

Table-38. Level of pH of Brahmaputra River Water in 2021

Location of Brahmaputra River	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Rail Bridge, Shamvoganj	7.66							**8.03**				
JamalpurRail Bridge	**7.12**	7.28	7.41					7.82				
EQS Fisheries (6.0-9.0)												
EQS Industrial (6.5-8.5)												

Table-39. Level of DO (mg/l) of Brahmaputra River Water in 2021

Location of Brahmaputra River	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Rail Bridge, Shamvoganj	8							**6.2**				
JamalpurRail Bridge	**8.8**	8.7	8.7					6.7				
EQS Fisheries (5 mg/l≥)												

Table-40. Level of BOD (mg/l) of Brahmaputra River Water in 2021

Location of Brahmaputra River	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Rail Bridge, Shamvoganj	7							**2**				
JamalpurRail Bridge	**9**	6	5					3				
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-41. Level of TDS (mg/l) of Brahmaputra River Water in 2021

Location of Brahmaputra River	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Rail Bridge, Shamvoganj	155.8							**307**				
JamalpurRail Bridge	141	147.8	**124**					**480**				
EQS Fisheries (≤1000 mg/l)												

Table-42. Level of SS (mg/l) of Brahmaputra River Water in 2021

Location of Brahmaputra River	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Rail Bridge, Shamvoganj	19							307				
JamalpurRail Bridge	**5**	25	5					**480**				
EQS Industrial (150 mg/l)												

Table-43. Level of Chloride (mg/l) of Brahmaputra River Water in 2021

Location of Brahmaputra River	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Rail Bridge, Shamvoganj	11							**9**				
JamalpurRail Bridge	10	10	**14**					10				
EQS Industrial (150-600 mg/l)												

6.0 Kaligonga River (Table: 44-49)

Table-44. Level of pH of Kaligonga River Water in 2021

Location of Kaligonga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Bheutha Ghat	7.47	7.24	7.28		**8.21**	**6.94**	7.24	7.39				7.55
EQS Fisheries (6.0-9.0)												
EQS Industrial (6.5-8.5)												

Table-45. Level of DO (mg/l) of Kaligonga River Water in 2021

Location of Kaligonga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Bheutha Ghat	9.2	**9.8**	6.9		**5**	6.9	9.8	7.2				7.6
EQS Fisheries (5 mg/l≥)												

Table-46. Level of BOD (mg/l) of Kaligonga River Water in 2021

Location of Kaligonga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Bheutha Ghat	5	**8**	6		**1**	7	8	3				4
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-47. Level of TDS (mg/l) of Kaligonga River Water in 2021

Location of Kaligonga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Bheutha Ghat	246	244	244		216	**62.1**	244	75				**259**
EQS Fisheries (≤1000 mg/l)												

Table-48. Level of SS (mg/l) of Kaligonga River Water in 2021

Location of Kaligonga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Bheutha Ghat	**3**	5	12		6	**272**	5	8				9
EQS Industrial (100 mg/l)												

Table-49. Level of Chloride (mg/l) of Kaligonga River Water in 2021

Location of Kaligonga river	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Bheutha Ghat	16	14	15		**26**	**8**	14	14				15
EQS Industrial (150-600 mg/l)												

7.0 Jamuna River (Table: 50-55)

Table-50. Level of pH of Jamuna River Water in 2021

Location of Jamuna River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Sarkarkhana	7.36				7.32			7.56				7.59
Kakua	7.27				**7.13**			7.65				
Jamuna Eco Park (UP)	7.68	7.66	7.46	7.8	7.52	7.52		7.58	7.52	7.48	7.52	7.54
Jamuna Eco Park (DN)	7.68	7.66	7.46	7.8	7.52	7.52		7.58	7.52	7.48	7.52	7.54
Shariakandi Kheya Ghat Growin Bandh (UP)	7.45	7.48	7.67	7.68	7.72	7.48		7.5	7.42	7.52	7.52	7.5
Shariakandi Kheya Ghat Growin Bandh (DN)	7.45	7.48	7.67	7.68	7.72	7.48		7.5	7.48	7.52	7.52	7.5
Horipur Kheya Ghat (UP)	7.68	7.63	**8.13**	8.11	7.82	7.74		7.68	7.7	7.7	7.76	7.76
Horipur Kheya Ghat (DN)	7.68	7.63	8.13	8.11	7.82	7.74		7.68	7.7	7.7	7.76	7.76
Mohonganj (DN)	7.71	7.69	7.64	7.62	7.64	7.56		7.62	7.54	7.54	7.58	7.58
Mohonganj (UP)	7.71	7.69	7.64	7.62	7.64	7.56		7.62	7.54	7.54	7.58	7.58
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-51. Level of DO (mg/l) of Jamuna River Water in 2021

Location of Jamuna River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Sarkarkhana	8				**4**			6.8				6.5
Kakua	4.7				7.8			7.5				
Jamuna Eco Park (UP)	7.78	7.76	7.6	7.62	7.66	7.6		7.58	7.62	7.6	7.52	7.6
Jamuna Eco Park (DN)	7.78	7.76	7.6	7.62	7.66	7.6		7.58	7.62	77.6	7.52	7.6
Shariakandi Kheya Ghat Growin Bandh (UP)	7.58	7.62	7.6	7.5	7.54	7.56		7.62	7.58	7.56	7.56	7.56
Shariakandi Kheya Ghat Growin Bandh (DN)	7.58	7.62	7.6	7.5	7.54	7.56		7.62	7.58	7.56	7.56	7.56
Horipur Kheya Ghat (UP)	7.68	7.66	**8.12**	8.1	7.66	7.68		7.64	7.72	7.66	7.66	7.68
Horipur Kheya Ghat (DN)	7.68	7.66	8.12	8.1	7.66	7.68		7.64	7.72	7.66	7.66	7.68
Mohonganj (DN)	7.82	7.8	7.72	7.7	7.58	7.66		7.64	7.64	7.66	7.66	7.66
Mohonganj (UP)	7.82	7.8	7.72	7.7	7.58	7.66		7.64	7.64	7.66	7.66	7.66
EQS Fisheries (5 mg/l≥)												

Table-52. Level of BOD (mg/l) of Jamuna River Water in 2021

Location of Jamuna River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Sarkarkhana	2				6			12				**26**
Kakua	**2**				8			15				
Jamuna Eco Park (UP)	2.3	2.3	2.2	2.2	2.3	2.3		2.3	2.3	2.3	2.3	2.3
Jamuna Eco Park (DN)	2.3	2.3	2.2	2.2	2.3	2.3		2.3	2.3	2.3	2.3	2.3
Shariakandi Kheya Ghat Growin Bandh (UP)	2.4	2.3	2.3	2.3	2.3	2.3		2.3	2.3	2.3	2.3	2.3
Shariakandi Kheya Ghat Growin Bandh (DN)	2.4	2.3	2.3	2.3	2.3	2.3		2.3	2.3	2.3	2.3	2.3
Horipur Kheya Ghat (UP)	2.3	2.3	2.2	2.2	2.2	2.2		2.3	2.2	2.2	2.2	2.2
Horipur Kheya Ghat (DN)	2.3	2.3	2.2	2.2	2.2	2.2		2.3	2.2	2.2	2.2	2.2
Mohonganj (DN)	2.2	2.3	2.2	2.2	2.2	2.2		2.3	2.2	2.2	2.2	2.2
Mohonganj (UP)	2.2	2.3	2.2	2.2	2.2	2.2		2.3	2.2	2.2	2.2	2.2
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-53. Level of SS of Jamuna River Water in 2021

Location of Jamuna River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Sarkarkhana	8				**7**			**440**				12
Kakua	13				42			428				
Jamuna Eco Park (UP)	38	36	40	38	40	40		38	36	42	40	40
Jamuna Eco Park (DN)	38	36	40	38	40	40		38	36	42	40	40
Shariakandi Kheya Ghat Growin Bandh (UP)	36	38	44	46	44	42		4o	40	40	42	42
Shariakandi Kheya Ghat Growin Bandh (DN)	36	38	44	46	44	42		40	40	40	42	42
Horipur Kheya Ghat (UP)	38	36	39	38	34	36		34	38	38	36	36
Horipur Kheya Ghat (DN)	38	36	39	38	34	36		34	38	38	36	36
Mohonganj (DN)	40	42	34	34	36	38		36	38	38	38	38
Mohonganj (UP)	40	42	34	34	36	38		36	38	38	38	38
EQS Industrial (100 mg/l)												

Table-54. Level of TDS (mg/l) of Jamuna River Water in 2021

Location of Jamuna River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Sarkarkhana	209				**253**			**74.3**				224
Kakua	149				149			75				
Jamuna Eco Park (UP)	113	115	128	128	126	128		127	128	131	128	128
Jamuna Eco Park (DN)	113	115	128	128	126	128		127	128	131	128	128
Shariakandi Kheya Ghat Growin Bandh (UP)	116	118	126	128	129	132		132	130	128	133	132
Shariakandi Kheya Ghat Growin Bandh (DN)	116	118	126	128	129	132		132	130	128	133	132
Horipur Kheya Ghat (UP)	122	121	131	132	118	121		124	124	123	124	121
Horipur Kheya Ghat (DN)	122	121	131	132	118	121		124	124	123	124	121
Mohonganj (DN)	118	119	118	118	120	124		126	126	127	167	124
Mohonganj (UP)	118	119	118	118	120	124		126	126	127	167	124
EQS Fisheries (≤1000 mg/l)												

Table-55. Level of Chloride (mg/l) of Jamuna River Water in 2021

Location of Jamuna River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Sarkarkhana	12				13			5				**18**
Kakua	11				12			5				
Jamuna Eco Park (UP)	13	12	11	11	11	11		11	11	11	11	11
Jamuna Eco Park (DN)	13	12	11	11	11	11		11	11	11	11	11
Shariakandi Kheya Ghat Growin Bandh (UP)	12	11	11	11	11	11		11	11	11	11	11
Shariakandi Kheya Ghat Growin Bandh (DN)	12	11	11	11	11	11		11	11	11	11	11
Horipur Kheya Ghat (UP)	10	10	10	10	10	**10**		10	10	10	10	10
Horipur Kheya Ghat (DN)	10	10	10	10	10	10		10	10	10	10	10
Mohonganj (DN)	11	11	11	11	11	11		11	11	11	11	11
Mohonganj (UP)	11	11	11	11	11	11		11	11	11	11	11
EQS Industrial (150-600 mg/l)												

8.0 Meghna River (Table: 56-61)

Table-56. Level of pH of Meghna River Water in 2021

Location of Meghna River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Meghna Ghat	7.9	6.42	7.18		7.12		7.65	7.36	**6.41**			7.23
Bairob Ferry Ghat	7.4	7.71	7.1		7.32	7.76	7.12	7.31	7.42			6.89
Narshingdi Launch Ghat	7.82	**8.65**		7.98	7.98	6.74		7.51				
Shajalal Paper	7.53											
Annando Bazar		6.98			7.88				6.48			7.14
Bish Nondi Ghat		7.36		6.99	6.99	6.85	7.76	8.15	6.79			7.39
EQS Fisheries (6.0-9.0)												
EQS Industrial (6.5-8.5)												

Table-57. Level of DO (mg/l) of Meghna River Water in 2021

Location of Meghna River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Meghna Ghat	5	5.2	5.2		4.5		6.2	7.2	4.5			6
Bairob Ferry Ghat	7.4	7.2	7		5.2	3.6	5.6	6.5	6.3			6.5
Narshingdi Launch Ghat	1.5	2.1		5.5	0.7	1		5.7				
Shajalal Paper	5.9											
Annando Bazar		**9.8**			4.3				5.9			7.2
Bish Nondi Ghat		5.1		**0.7**	5.5	6.2	7.16	7.18	7.56			5.8
EQS Fisheries (5 mg/l≥)												

Table-58. Level of BOD (mg/l) of Meghna River Water in 2021

Location of Meghna River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Meghna Ghat	3	16	6		8		5	10	8			3
Bairob Ferry Ghat	3	14	8		**2**	8	4	10	4			3
Narshingdi Launch Ghat	**23**	3		6	16	7		4.2				
Shajalal Paper	20											
Annando Bazar		8			4				2			3
Bish Nondi Ghat		12		8	8	8	4	4.2	10			6
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-59. Level of TDS (mg/l) of Meghna River Water in 2021

Location of Meghna River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Meghna Ghat	70.4	80.7	92		60		28.3	**23**	43.8			66
Bairob Ferry Ghat	50	56.2	64		64	37.1	36	27	37.2			44
Narshingdi Launch Ghat	177	**237**		209	209	55.9		44				
Shajalal Paper	64.5											
Annando Bazar		60.2			72				35.2			48
Bish Nondi Ghat		68.3		83	83	35.7	45	30	36.9			60
EQS Industries (≤2100 mg/l)												

Table-60. Level of SS (mg/l) of Meghna River Water in 2021

Location of Meghna River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Meghna Ghat	38	4	29		35		17	12	19			18
Bairob Ferry Ghat	13	13	3		40	15	32	11	14			16
Narshingdi Launch Ghat	16	20		8	34	**100**		20				
Shajalal Paper	25											
Annando Bazar		9			32				22			9
Bish Nondi Ghat		**1**		5	5	11	18	20	2			15
EQS Industrial (100 mg/l)												

Table-61. Level of Chloride (mg/l) of Meghna River Water in 2021

Location of Meghna River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Meghna Ghat	16	21.5	20		42		9	5	9			10
Bairob Ferry Ghat	7	8.5	9		**46**	5	20	6	7			8.5
Narshingdi Launch Ghat	25	34.5		44.5	45	11.5		11				
Shajalal Paper	14.5											
Annando Bazar		9			35				5			7
Bish Nondi Ghat		8		21	21	10	8	6	**4.5**			7
EQS Industrial (150-600 mg/l)												

9.0 Padma River (Table: 62-67)

Table-62. Level of pH of Padma River Water in 2021

Location of Padma River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Josldia	7.75											
Sitardor	7.8											
Kandipara	7.84											
Khoiria	7.94											
Shimolia	7.99											
Gordhor Bazar	8.02											
Mawa ferry Ghat	**8.17**		7.62		6.89	6.35	6.42					7.74
Barha Ghat						7.35	7.28	**7.78**				8.01
EQS Fisheries (6.0-9.0)												
EQS Industrial (6.5-8.5)												

Table-63. Level of DO (mg/l) of Padma River Water in 2021

Location of Padma River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Josldia	6.1											
Sitardor	6.2											
Kandipara	6.3											
Khoiria	6.9											
Shimolia	6.2											
Gordhor Bazar	6.8											
Mawa ferry Ghat	6.4		**9.2**		6.2	6.5	5.2					8.6
Barha Ghat						8	8.7	**5**				6.6
EQS for Fisheries (5 mg/l≥)												

Table-64. Level of BOD (mg/l) of Padma River Water in 2021

Location of Padma River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Josldia	5											
Sitardor	4											
Kandipara	4											
Khoiria	4											
Shimolia	**1**											
Gordhor Bazar	2											
Mawa ferry Ghat	4		4		12	**30**	16					3
Barha Ghat						13	7	8				4
EQS for Fisheries (≤6 mg/l)												
EQS Industrial Discharge (≤30 mg/l)												

Table-65. Level of TDS (mg/l) of Padma River Water in 2021

Location of Padma River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Josldia	96											
Sitardor	101											
Kandipara	101											
Khoiria	103											
Shimolia	102											
Gordhor Bazar	103											
Mawa ferry Ghat	**148**		109		66	62.4	**40**					128
Barha Ghat						64.6	147	77				111
Josldia	96											
EQS for Industrial Discharge (≤1000mg/l)												

Table-66. Level of SS (mg/l) of Padma River Water in 2021

Location of Padma River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Josldia												
Sitardor	14											
Kandipara	12											
Khoiria	12											
Shimolia	17											
Gordhor Bazar	14											
Mawa ferry Ghat	20		31		70	355	**4**					67
Barha Ghat						**393**	25	103				93
EQS for Industrial Discharge (≤100 mg/l)												

Table-67. Level of EC (µmohs/cm) of Padma River Water in 2021

Location of Padma River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Josldia	166											
Sitardor	175											
Kandipara	175											
Khoiria	179											
Shimolia	178											
Gordhor Bazar	179											
Mawa ferry Ghat	257		193		128	123.2	157					240
Barha Ghat						**122.9**	**271**	138				207
EQS for Industrial Discharge (1200 µmohos/cm)												

10.0 Korotoa River (Table: 68-73)

Table-68. Level of pH of Korotoa River Water in 2021

Location of Korotoa river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dottobari Bridge (UP)	7.02	7	6.98	6.97	7.02	7.2		7.24	7.12	7.16	7.1	7.04
Dottobari Bridge (Down)	7.02	7	6.98	6.97	7.02	7.2		7.24	7.12	7.16	7.1	7.04
Aziz Ahmed Taki Road (UP)	**6.92**	7.06	7.06	7.08	7.12	7.12		7.26	7.02	7.08	7.06	7.02
Aziz Ahmed Taki Road (Down)	6.92	7.06	7.06	7.08	7.12	7.12		**7.26**	7.02	7.08	7.06	7.02
Sultanganj- Gabtoli (UP)	7.04	6.94	6.94	6.96	7.08	7.08		7.16	7.04	7.04	7.04	6.98
Sultanganj- Gabtoli (DN)	7.04	6.94	6.94	6.96	7.08	7.08		7.16	7.04	7.04	7.04	6.98
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-69. Level of DO (mg/l) of Korotoa River Water in 2021

Location of Korotoa river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dottobari Bridge (UP)	3.88	3.78	3.52	3.51	3.8	5.1		**6.8**	4.88	4.8	4.92	4.9
Dottobari Bridge (Down)	3.88	3.78	3.52	3.51	3.8	5.1		6.8	4.88	4.8	4.92	4.9
Aziz Ahmed Taki Road (UP)	3.84	3.94	3.8	3.81	3.72	5		6.6	4.94	5.04	4.86	5
Aziz Ahmed Taki Road (Down)	3.84	3.94	3.8	3.81	3.72	5		6.6	4.94	5.04	4.86	5
Sultanganj- Gabtoli (UP)	3.96	3.76	**3.48**	3.49	3.94	5.2		6.7	5.12	5.1	4.88	5.1
Sultanganj- Gabtoli (DN)	3.96	3.76	3.48	3.49	3.94	5.2		6.7	5.12	5.1	4.88	5.1
EQS Fisheries (5 mg/l≥)												

Table-70. Level of BOD (mg/l) of Korotoa River Water in 2021

Location of Korotoa river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dottobari Bridge (UP)	6.1	6.2	6.46	6.44	5.94	3.8		**3**	4.1	3.6	4.1	4.1
Dottobari Bridge (Down)	6.1	6.2	**6.46**	6.44	5.94	3.8		3	4.1	3.6	4.1	4.1
Aziz Ahmed Taki Road (UP)	6	5.9	6.2	6.22	5.42	3.8		3.1	4	3.7	3.9	4.2
Aziz Ahmed Taki Road (Down)	6	5.9	6.2	6.22	5.42	3.8		3.1	4	3.7	3.9	4.2
Sultanganj- Gabtoli (UP)	5.8	6.1	6.3	6.32	5.84	3.9		3.2	4.1	3.8	4	4
Sultanganj- Gabtoli (DN)	5.8	6.1	6.3	6.32	5.84	3.9		3.2	4.1	3.8	4	4
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-71. Level of TDS (mg/l) of Korotoa River Water in 2021

Location of Korotoa river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dottobari Bridge (UP)	167	172	196	198	180	150		140	155	160	160	**170**
Dottobari Bridge (Down)	167	172	196	198	180	150		140	155	160	160	170
Aziz Ahmed Taki Road (UP)	170	164	190	195	180	150		**134**	148	156	154	166
Aziz Ahmed Taki Road (Down)	170	164	190	195	180	150		134	148	156	154	166
Sultanganj- Gabtoli (UP)	162	174	**270**	202	190	160		138	154	164	158	160
Sultanganj- Gabtoli (DN)	162	174	270	202	190	160		138	154	164	158	160
EQS Fisheries (≤1000 mg/l)												

Table-72. Level of SS (mg/l) of Korotoa River Water in 2021

Location of Korotoa river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dottobari Bridge (UP)	62	64	64	**72**	68	58		48	56	60	60	58
Dottobari Bridge (Down)	62	64	64	72	68	58		48	56	60	60	58
Aziz Ahmed Taki Road (UP)	63	58	60	65	62	54		**46**	54	58	56	54
Aziz Ahmed Taki Road (Down)	63	58	60	65	62	54		46	54	58	56	54
Sultanganj- Gabtoli (UP)	56	65	66	64	62	56		50	58	56	58	56
Sultanganj- Gabtoli (DN)	56	65	66	64	62	56		50	58	56	58	56
EQS Industrial (≤150 mg/l)												

Table-73. Level of EC (µmohos/cm) of Korotoa River Water in 2021

Location of Korotoa river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dottobari Bridge (UP)	334	344	392	396	360	300		280	310	320	320	**340**
Dottobari Bridge (Down)	334	344	392	396	360	300		280	310	320	320	340
Aziz Ahmed Taki Road (UP)	340	328	380	390	360	300		**268**	296	312	308	332
Aziz Ahmed Taki Road (Down)	340	328	380	390	360	300		268	296	312	308	332
Sultanganj- Gabtoli (UP)	324	348	**408**	404	380	320		276	308	328	316	320
Sultanganj- Gabtoli (DN)	324	348	408	404	380	320		276	308	328	316	320
EQS Induseial (1200 µmohos/cm)												

11.0 Teesta River (Table: 74-79)

Table-74. Level of pH of Teesta River Water in 2021

Location of Teesta River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Teesta Bridge (Up)	7.94	7.93	8.08	8.06	8.02	7.94		7.8	7.9	7.9	7.86	7.9
Teesta Bridge (Dn)	7.94	7.93	8.08	8.06	8.02	7.94		7.8	7.9	7.9	7.86	79
Nohali Sapmari (Up)	8.12	8.1	7.66	7.64	7.64	7.6		7.72	**7.56**	7.68	7.62	7.62
Nohali Sapmari (Dn)	8.12	8.1	7.66	7.64	7.64	7.6		7.72	7.56	7.68	7.62	7.62
Teesta Barrage (Up)	8.16	8.15	7.67	7.65	8.06	**9.96**		7.78	7.96	8.02	7.82	7.8
Teesta Barrage (Dn)	8.16	8.15	7.67	7.65	8.06	**9.96**		7.78	7.96	8.02	7.82	7.8
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-75. Level of DO (mg/l) of Teesta River Water in 2021

Location of Teesta River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Teesta Bridge (Up)	7.84	7.86	8.02	8.04	7.94	7.88		7.72	7.84	7.86	7.9	7.88
Teesta Bridge (Dn)	7.84	7.86	8.02	8.04	7.94	7.88		7.72	7.84	7.86	7.9	7.88
Nohali Sapmari (Up)	8.07	8.03	7.7	7.72	7.76	7.68		**7.64**	7.68	7.66	7.66	7.68
Nohali Sapmari (Dn)	8.07	8.03	7.7	7.72	7.76	7.68		7.64	7.68	7.66	7.66	7.68
Teesta Barrage (Up)	8.14	8.14	7.68	7.66	7.98	7.9		7.7	7.88	7.84	7.92	7.9
Teesta Barrage (Dn)	8.14	**8.14**	7.68	7.66	7.98	7.9		7.7	7.88	7.84	7.92	7.9
EQS Fisheries (5 mg/l≥)												

Table-76. Level of BOD (mg/l) of Teesta River Water in 2021

Location of Teesta River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Teesta Bridge (Up)	2.2	2.2	2.2	2.2	2.2	2.3		2.3	2.3	2.3	2.3	2.3
Teesta Bridge (Dn)	2.2	2.2	2.2	2.2	2.2	2.3		2.3	2.3	2.3	2.3	2.3
Nohali Sapmari (Up)	**2.3**	2.3	2.2	2.2	2.2	2.2		2.2	2.2	2.2	2.2	2.2
Nohali Sapmari (Dn)	2.3	2.3	2.2	2.2	2.2	2.2		2.2	**2.2**	2.2	2.2	2.2
Teesta Barrage (Up)	2.3	2.3	2.2	2.2	2.2	2.3		2.3	2.3	2.3	2.3	2.3
Teesta Barrage (Dn)	2.3	2.3	2.2	2.2	2.2	2.3		2.3	2.3	2.3	2.3	2.3
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-77. Level of TDS (mg/l) of Teesta River Water in 2021

Location of Teesta River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Teesta Bridge (Up)	126	127	136	134	132	130		129	132	132	130	132
Teesta Bridge (Dn)	126	127	136	134	132	130		129	132	132	130	132
Nohali Sapmari (Up)	128	131	118	118	121	123		124	123	125	129	123
Nohali Sapmari (Dn)	128	131	118	118	121	123		124	123	125	129	123
Teesta Barrage (Up)	124	126	**114**	116	128	128		128	128	127	**138**	128
Teesta Barrage (Dn)	124	126	114	116	128	128		128	128	127	138	128
EQS Fisheries (≤1000mg/l)												

Table-78. Level of SS (mg/l) of Teesta River Water in 2021

Location of Teesta River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Teesta Bridge (Up)	40	40	44	**46**	42	44		40	42	40	44	44
Teesta Bridge (Dn)	40	40	44	46	42	44		40	42	40	44	44
Nohali Sapmari (Up)	40	44	**32**	34	36	38		38	38	44	38	37
Nohali Sapmari (Dn)	40	44	32	34	36	38		38	38	44	38	37
Teesta Barrage (Up)	36	37	36	36	40	42		40	40	42	42	42
Teesta Barrage (Dn)	36	37	36	36	40	42		40	40	42	42	42
EQS Industrial (≤2100mg/l)												

Table-79. Level of Chloride (mg/l) of Teesta River Water in 2021

Location of Teesta River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Teesta Bridge (Up)	10	10	10	10	10	10		10	10	10	10	10
Teesta Bridge (Dn)	10	10	10	10	10	10		10	10	10	10	10
Nohali Sapmari (Up)	10	10	10	10	10	10		10	10	10	10	10
Nohali Sapmari (Dn)	10	10	10	10	10	10		10	10	10	10	10
Teesta Barrage (Up)	10	10	10	10	10	10		10	10	10	10	10
Teesta Barrage (Dn)	10	10	10	10	10	10		10	10	10	10	10
EQS (150-600 mg/l)												

12.0 Karnaphuli River (Table: 80-85)

Table-80. Level of pH of Karnaphuli River Water in 2021

Location of Karnaphuli river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
CUFL	7	7.32	7.42	7.42	7.42	7.33	6.7	7.3	7.32		6.44	**6.14**
TSP	6.59	7.1	7.21	7.21	7.34	7.32	6.34	7.31	7.68		6.69	6.74
Shikalbaha	7.89	7.57	7.67	7.73	7.67	7.46	7.42	7.63	7.63		7.24	7.41
Kalurghat Bridge	**8.19**	7.22	7.32	7.69	7.52	7.68	7.48	7.53	7.53		7.35	7.19
Mariam Nagar	8.2	7.35	7.43	7.54	7.47	7.58	7.58	7.69	7.69		7.11	7.24
Karnafully Paper	7.23	7.16	7.26	7.43	7.32	7.43	7.46	7.58	7.58		7.17	7.37
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-81. Level of DO (mg/l) of Karnaphuli River Water in 2021

Location of Karnaphuli river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
CUFL	6.56	6.36	6.43	**5.89**	6.23	7.81	8.44	7.66	9.7		7.87	7.56
TSP	**8.1**	8.42	8.23	**7.98**	8.49	7.82	**8.89**	7.74	6.58		6.69	6.29
Shikalbaha	6.43	6.69	6.59	6.59	6.78	6.89	7.59	7.64	7.45		7.56	7.21
Kalurghat Bridge	7.04	**7.44**	7.53	7.8	7.47	7.63	7.69	7.34	7.47		7.87	7.59
Mariam Nagar	6.47	6.56	6.63	6.72	6.72	6.96	6.87	7.12	7.42		7.49	7.36
Karnafully Paper	7.48	7.44	7.45	7.52	7.49	7.67	7.59	7.63	7.48		7.68	7.61
EQS Fisheries (5 mg/l≥)												

Table-82. Level of BOD (mg/l) of Karnaphuli River Water in 2021

Location of Karnaphuli river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
CUFL	150	120	112	112	110	95	52	25	16		21	19
TSP	**167**	140	123	123	123	109	67	23	13		17	**11**
Shikalbaha	15	**21**	24	22	24	21	16	13	9		**6**	5
Kalurghat Bridge	**4**	4	6	**5**	6	**7**	6	7	8		5	4
Mariam Nagar	4	5	**4**	5	7	6	5	6	7		5	5
Karnafully Paper	10	11	14	12	13	12	14	15	13		5	5
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-83. Level of COD (mg/l) of Karnaphuli River Water in 2021

Location of Karnaphuli river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
CUFL	520	480	420	420	390	358	240	96	60		92	76
TSP	**560**	540	460	460	460	426	284	74	41		**54**	38
Shikalbaha	72	86	89	78	69	57	43	35	26		19	16
Kalurghat Bridge	12	16	18	19	22	32	18	20	24		14	15
Mariam Nagar	**10**	18	21	18	19	24	16	18	20		16	15
Karnafully Paper	51	49	54	42	58	45	42	38	32		14	16
CUFL	520	480	420	420	390	358	240	96	60		92	76
EQS Fisheries (≤50 mg/l)												
EQS Industrial (≤200 mg/l)												

Table-84. Level of TDS (mg/l) of Karnaphuli River Water in 2021

Location of Karnaphuli river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
CUFL	8040	8340	9670	9480	7430	10060	2610	1385	392		6740	5432
TSP	11370	1240	**13450**	5980	1140	10230	4750	1256	70.6		3710	3198
Shikalbaha	2080	2130	2360	2453	1890	2140	1580	1260	390		312	432
Kalurghat Bridge	72.4	145	167	179	127	149	140	167	210		142	164
Mariam Nagar	79.2	121	148	156	136	168	139	149	214		198	213
Karnafully Paper	68.5	**58.2**	69	59	67.5	79.6	79	123	142		212	189
EQS Industries (≤1000 mg/l)												

Table-85. Level of SS (mg/l) of Karnaphuli River Water in 2021

Location of Karnaphuli river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
CUFL	73	79	120	66	84	98	310	205	55		210	197
TSP	130	145	154	300	156	118	**533**	137	62		178	139
Shikalbaha	21	35	42	63	**45**	64	63	97	120		87	84
Kalurghat Bridge	55	38	34	32	48	58	58	63	49		32	48
Mariam Nagar	49	29	42	46	39	48	49	64	67		89	112
Karnafully Paper	12	**5**	10	23	12	21	41	52	63		59	63
EQS Industries (≤100 mg/l)												

13.0 Halda River (Table: 86-91)

Table-86. Level of pH of Halda River Water in 2021

Location of Halda river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Maduna Ghat	8.95	7.54	7.62	7.72	8.57	8.31	8.34	7.62	7.12	7.43	7.47	7.49
Garduara Sluice gate	**9.03**	8.02	7.89	7.71	8.09	8.64	8.14	7.55	**7.02**	7.35	7.26	7.34
Halda Bridge	8.98	7.55	7.67	7.76	8.48	8.38	8.09	7.72	7.61	7.56	7.43	7.45
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-87. Level of DO (mg/l) of Halda River Water in 2021

Location of Halda river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Maduna Ghat	8	7.8	7.78	7.69	7.43	5.91	5.05	5.74	5.76	5.49	8.07	7.89
Garduara Sluice gate	7.82	7.4	7.56	7.61	7.29	6.37	4.25	5.34	5.85	5.4	8.12	7.44
Halda Bridge	7.75	7.68	7.74	7.74	7.72	6.01	**4.17**	5.52	5.38	6.12	**8.26**	7.22
EQS Fisheries (5 mg/l≥)												

Table-88. Level of BOD (mg/l) of Halda River Water in 2021

Location of Halda river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Maduna Ghat	**12**	6	7	6	7	6	6	4	**3**	5	4	**4**
Garduara Sluice gate	10	7	5	5	6	4	4	4	3	4	5	4
Halda Bridge	9	4	4	4	4	5	5	6	4	5	4	5
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-89. Level of COD (mg/l) of Halda River Water in 2021

Location of Halda river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Maduna Ghat	**60**	20	25	21	28	24	20	16	10	15	13	17
Garduara Sluice gate	45	20	23	20	25	18	18	15	**9**	13	14	11
Halda Bridge	36	15	19	19	20	22	17	18	12	12	10	14
EQS Fisheries (≤50 mg/l)												
EQS Industrial (≤200 mg/l)												

Table-90. Level of TDS (mg/l) of Halda River Water in 2021

Location of Halda river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Maduna Ghat	77.3	70.7	84	78	**592**	104.1	52.4	62.4	57.2	68.5	17.42	54.6
Garduara Sluice gate	74.7	67.4	89.4	79.5	540	79.8	51.8	51.3	53.3	46	15.64	38
Halda Bridge	75.1	69.9	73.9	73.9	190.2	72.3	49.7	66.3	69.1	49.3	**17.2**	64.2
EQS Fisheries (≤1000 mg/l)												

Table-91. Level of SS (mg/l) of Halda River Water in 2021

Location of Halda river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Maduna Ghat	169	29	36	28	219	151	121	105	76	67	**14**	46
Garduara Sluice gate	136	32	42	48	89	481	135	142	63	45	24	37
Halda Bridge	139	37	49	49	176	**548**	139	113	37	98	15	59
EQS Industries (≤100 mg/l)												

14.0 Moyuri River (Table: 92-99)

Table-92. Level of pH of Moyuri River Water in 2021

Location of Moyuri River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Shoshan Ghat	7.81	7.98						7.82	7.9	7.94	8.05	
Buro Moulavir Darga	7.77	7.97						7.6	7.66	8.01	8.03	
Doshgate Jalma	7.85	**8.36**						**7.2**	8.2	7.66	7.7	
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-93. Level of DO (mg/l) of Moyuri River Water in 2021

Location of Moyuri River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Shoshan Ghat	0.64	0.64						3.2	5.3	4.1	2.65	
Buro Moulavir Darga	0.81	1						**0**	6.2	0.3	3.91	
Doshgate Jalma	**6.67**	6.47						6.6	0.2	2.6	2.56	
EQS Fisheries (5 mg/l≥)												

Table-94. Level of TDS (mg/l) of Moyuri River Water in 2021

Location of Moyuri River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Shoshan Ghat	762	502						244	240	164	257	
Buro Moulavir Darga	1866	409						255	221	235	257	
Doshgate Jalma	**2815**	1658						2820	**63**	151	180	
EQS Fisheries (≤1000mg/l)												

Table-95. Level of Chloride (mg/l) of Moyuri River Water in 2021

Location of Moyuri River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Shoshan Ghat	88	**87**						260	262	269	325	
Buro Moulavir Darga	88	89						150	152	155	325	
Doshgate Jalma	93	95						**1410**	141	269	225	
EQS Industries (150-600 mg/l)												

Table-96. Level of Turbidity (NTU) of Moyuri River Water in 2021

Location of Moyuri River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Shoshan Ghat	57.1	**58.6**						52	52.5	51.4	50.2	
Buro Moulavir Darga	57	57.7						50.1	50.2	**49**	49.2	
Doshgate Jalma	56	56.2						52.2	52	51.4	51.1	
EQS Industries (≤10 NTU)												

Table-97. Level of BOD (mg/l) of Moyuri River Water in 2021

Location of Moyuri River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Shoshan Ghat										**1.6**	14	
Buro Moulavir Darga										**88**	26	
Doshgate Jalma										38	34	
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-98. Level of EC (µmohos/cm) of Moyuri River Water in 2021

Location of Moyuri River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Shoshan Ghat	1635	979						304	497	368	540	
Buro Moulavir Darga	3620	792						327	442	522	540	
Doshgate Jalma	**5630**	3220						5540	**131**	339	350	
EQS Industries (1200 µmohos/cm)												

Table-99. Level of Salinity (mg/l) of Moyuri River Water in 2021

Location of Moyuri River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Shoshan Ghat	0.76	0.5						0.24	0.24	0.16	0.26	
Buro Moulavir Darga	1.77	1.4						0.25	0.22	0.23	0.26	
Doshgate Jalma	2.84	1.68						1.25	0.6	**0.15**	0.18	
EQS (400 ppt)												

15.0 Bhairab River (Table: 100-107)

Table-100. Level of pH of Bhairab River Water in 2021

Location of Bhairab river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Basundia Bazar, Aladipur	8.32		8.46					**7.3**	8.65	8.49	8.54	7.86
Noapara Ferry Ghat Abhaynagar	8.59		8.34	7.39				7.38	8.47	8.36	8.55	8.05
Noapara Jafarpur	8.87		8.44	7.35				7.33	8.25	8.31	8.09	8.15
Fultala Ghat, Dhulgram	**8.9**		8.36	8.52				8.5	8.14	8.3	8.07	8.12
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-101. Level of DO (mg/l) of Bhairab River Water in 2021

Location of Bhairab river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Basundia Bazar, Aladipur	5.65		**0**					5.94	5.75	4.8	3.4	**6.8**
Noapara Ferry Ghat Abhaynagar	6.74		5.88	5.88				5.87	5.31	3.8	5.93	6.1
Noapara Jafarpur	4.39		5.49	6.51				6.5	5.34	2.6	4.2	6.2
Fultala Ghat, Dhulgram	5.78		6.14	6.14				6.13	5.51	2.7	3.77	5.1
EQS Fisheries (5 mg/l≥)												

Table-102. Level of BOD (mg/l) of Bhairab River Water in 2021

Location of Bhairab river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Basundia Bazar, Aladipur											2.1	3.1
Noapara Ferry Ghat Abhaynagar				**0.65**							0.9	**5.3**
Noapara Jafarpur				0.74							2.6	**5**
Fultala Ghat, Dhulgram				0.44							9	2.6
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-103. Level of TDS (mg/l) of Bhairab River Water in 2021

Location of Bhairab river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Basundia Bazar, Aladipur	263		**4160**					3246	86	97.6	101.2	108
Noapara Ferry Ghat Abhaynagar	339		335	1965				1960	70	91.7	87.1	70
Noapara Jafarpur	344		611	812				810	88	99.1	104	71
Fultala Ghat, Dhulgram	274		1466	1631				1512	83	101	99	**63**
EQS Fisheries (≤1000mg/l)												

Table-104. Level of Chloride (mg/l) of Bhairab River Water in 2021

Location of Bhairab river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Basundia Bazar, Aladipur	70		**68**					1311	131	132	123	262
Noapara Ferry Ghat Abhaynagar	70		73	983				982	982	980	113	88
Noapara Jafarpur	72		71	406				403	405	406	125	88
Fultala Ghat, Dhulgram	72		71	**1631**				1630	163	162	125	75
EQS Industries (150-600 mg/l)												

Table-105. Level of Turbidity (NTU) of Bhairab River Water in 2021

Location of Bhairab river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Basundia Bazar, Aladipur	64.8		65.8					66.4	66.4	67.4	67.4	65.4
Noapara Ferry Ghat Abhaynagar	63.5		63.1	67.4				67.3	67.3	68.3	64.5	69
Noapara Jafarpur	66.5		66.2	**76.4**				76.5	75.5	75	69	70
Fultala Ghat, Dhulgram	65.5		65.3	65.8				65.7	64.7	64.5	67	**60.5**
EQS Industries (≤10 NTU)												

Table-106. Level of EC (µmohos/cm) of Bhairab River Water in 2021

Location of Bhairab river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Basundia Bazar, Aladipur	542		**8480**					5245	180	206	210	224
Noapara Ferry Ghat Abhaynagar	694		930	3930				3931	147	193	182.8	147
Noapara Jafarpur	695		1229	1624				1620	185	207.9	217.7	149
Fultala Ghat, Dhulgram	551		2860	3262				3260	173	228	208	**134**
EQS Industries (µmohos/cm)												

Table-107. Level of Salinity (ppt) of Bhairab River Water in 2021

Location of Bhairab river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Basundia Bazar, Aladipur	0.16		0.41					1.65	0.8	0.1	0.1	0.21
Noapara Ferry Ghat Abhaynagar	0.14		0.28	**1.95**				1.94	0.07	0.09	0.09	0.07
Noapara Jafarpur	0.11		0.62	1.62				1.61	0.09	0.1	0.1	0.07
Fultala Ghat, Dhulgram	0.13		0.56	1.85				1.84	0.8	0.1	0.1	**0.06**
EQS (400 ppt)												

16.0 Rupsa River (Table: 108-115)

Table-108. Level of pH of Rupsa River Water in 2021

Location of Rupsa River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gilatola, Nadan Pratap (M)	8.75	8.13	8.03	7.25						8.56	**8.8**	7.21
Kalibari Ghat (M)	8.76	8.11	**7.15**					8.08	8.52	8.73	8.23	7.17
Charer Hat, Sulpur Aijgati (M)	8.78	8.16	8.16						8.41	8.59	8.15	
Rupsa Ghat (M)	8.65	8.08	7.68					8.53	8.22	8.79	8.26	8.1
EQS Fisheries (6.0-9.0)												
EQS Industrial (6.5-8.5)												

Table-109. Level of DO (mg/l) of Rupsa River Water in 2021

Location of Rupsa River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gilatola, Nadan Pratap (M)	**8.25**	4.91	6.46	6.4						**3.5**	6.02	5.2
Kalibari Ghat (M)	7.16	4.93	6.42					5.3	5.8	5.3	5	5.4
Charer Hat, Sulpur Aijgati (M)	7.24	4.88	6.72						5.9	5	7.01	
Rupsa Ghat (M)	8.15	7.2	6.17					4.2	4.8	5.2	4.5	5.5
EQS Fisheries (5 mg/l≥)												

Table-110. Level of BOD (mg/l) of Rupsa River Water in 2021

Location of Rupsa River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gilatola, Nadan Pratap (M)				0.68						1.8	1	2.8
Kalibari Ghat (M)										3	3	3.1
Charer Hat, Sulpur Aijgati (M)										**3.3**	**0.2**	
Rupsa Ghat (M)										3.1	2.1	2.5
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-111. Level of Chloride (mg/l) of Rupsa River Water in 2021

Location of Rupsa River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gilatola, Nadan Pratap (M)	66	69	69	928						**66**	123	125
Kalibari Ghat (M)	66	67	68					980	380	368	124	87.5
Charer Hat, Sulpur Aijgati (M)	70	72	72						370	372	123	
Rupsa Ghat (M)	68	68	69					**1212**	385	386	138	75
EQS Industrial (150-600 mg/l)												

Table-112. Level of SS (mg/l) of Rupsa River Water in 2021

Location of Rupsa River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gilatola, Nadan Pratap (M)	70	72	70	**78**						75	72	68
Kalibari Ghat (M)	66	77	76					72	60	59	61	65
Charer Hat, Sulpur Aijgati (M)	62	64	66						64	65	65	
Rupsa Ghat (M)	76	76	74					75	63	62	61	**57**
EQS Industrial (100 mg/l)												

Table-113. Level of Turbidity (NTU) of Rupsa River Water in 2021

Location of Rupsa River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gilatola, Nadan Pratap (M)	68.9	67.8	67.8	72.6						70.4	70.1	**75.4**
Kalibari Ghat (M)	**66.2**	69.6	68.2					74.4	73.4	75.4	75.4	74.4
Charer Hat, Sulpur Aijgati (M)	67.3	69.3	69.3						71.04	71.04	71.04	
Rupsa Ghat (M)	68.4	68.4	68.2					72.3	72	75	75	70.8
EQS Industrial (≤10 NTU)												

Table-114. Level of EC (µmohos/cm) of Rupsa River Water in 2021

Location of Rupsa River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gilatola, Nadan Pratap (M)	330	1102	3870	3712						182	204	212.5
Kalibari Ghat (M)	324	1112	3740					198	129	126	136	141
Charer Hat, Sulpur Aijgati (M)	330	912	3520						130	164	205.6	
Rupsa Ghat (M)	349	1925	**4250**					**111**	215	137	131.4	136
EQS (1200 µmohos/cm)												

Table-115. Level of Salinity (ppt) of Rupsa River Water in 2021

Location of Rups River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gilatola, Nadan Pratap (M)	0.16	0.52	2.04	**5.34**						0.08	0.1	0.1
Kalibari Ghat (M)	0.14	0.57	1.85					0.09	0.06	**0.06**	0.1	0.07
Charer Hat, Sulpur Aijgati (M)	0.15	0.56	1.85						0.06	0.07	0.1	
Rupsa Ghat (M)	0.17	1.02	2.13					1.91	0.1	0.06	0.11	0.06
EQS (400 ppt)												

17.0 Mathavanga River (Table: 116-123)

Table-116. Level of pH of Mathavanga River Water in 2021

Location of Mathavanga river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dorshona Railway Junction	8.63	8.36	8.36					**7.44**	8.51	8.55	**8.79**	7.95
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-117. Level of DO (mg/l) of Mathavanga River Water in 2021

Location of Mathavanga river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dorshona Railway Junction	6.28	**7.62**	5.94					6.8	5.4	**3.2**	5.02	5.4
EQS Fisheries (5 mg/l≥)												

Table-118. Level of BOD (mg/l) of Mathavanga River Water in 2021

Location of Mathavanga river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dorshona Railway Junction										2.2	2.1	2.7
EQS Fisheries (≤6 mg/l)												
EQS Industries (≤30 mg/l)												

Table-119. Level of TDS (mg/l) of Mathavanga River Water in 2021

Location of Mathavanga river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dorshona Railway Junction	148	194	**1439**					1410	96	**77**	110	146
EQS Fisheries (≤1000 mg/l)												

Table-120. Level of Chloride (mg/l) of Mathavanga River Water in 2021

Location of Mathavanga river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dorshona Railway Junction	**26**	26	29					29	30	65	135	**175**
EQS Industries (150-600 mg/l)												

Table-121. Level of Turbidity (NTU) of Mathavanga River Water in 2021

Location of Mathavanga river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dorshona Railway Junction	44.3	44.3	44.3					41	41	**45**	40	**38**
EQS Industries (≤10 NTU)												

Table-122. Level of EC (µmohos/cm) of Mathavanga River Water in 2021

Location of Mathavanga river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dorshona Railway Junction	310	405	301					**1200**	203	**163**	226	304
EQS Industries (1200 µmohos/cm)												

Table-123. Level of Salinity (ppt) of Mathavanga River Water in 2021

Location of Mathavanga river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dorshona Railway Junction	**0.01**	**0.19**	0.14					0.05	0.09	0.08	0.11	0.14
EQS (400 ppt)												

18.0 Pashur River (Table: 124-131)

Table-124. Level of pH of Pashur River Water in 2021

Location of Pashur river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Rampal Power Plant	8.18	8.45	7.9	**7.78**				8.15	8.18	8.18	8.22	8.64
Banishanta	8.15	8.36	8.09	7.87				7.97	8.19	8.25	**8.57**	7.85
Batiaghata By Pass	8.23	8.47	7.98					8.1	8.25	8.4	8.1	
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-125 Level of DO (mg/l) of Pashur River Water in 2021

Location of Pahsur river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Rampal Power Plant	7.76	7.48	6.7	6.97				5.79	5.94	5.94	5.82	4.8
Banishanta	7.74	6.01	6.57	**4.2**				6.2	5.95	5.95	6.97	**6**
Batiaghata By Pass	**8.35**	8.05	5.86					5.24	6.1	5.6	5.09	
EQS Fisheries (5 mg/l≥)												

Table-126. Level of BOD (mg/l) of Pashur River Water in 2021

Location of Pashur river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Rampal Power Plant				**1.78**						1.9	**1.1**	1.9
Banishanta				1.72						2	1.5	**3.2**
Batiaghata By Pass										2.7	2.5	
EQS Fisheries (≤6 mg/l)												
EQS Industries (≤30 mg/l)												

Table-127. Level of TDS (mg/l) of Pashur River Water in 2021

Location of Pashur river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Rampal Power Plant	818	2400	3770	1938				241	84	84	90	118.4
Banishanta	802	1292	3810	**5860**				3701	85	85	67.5	116
Batiaghata By Pass	276	2049	4120					4012	**64**	105	196	
EQS Industries (≤1000mg/l)												

Table-128. Level of Chloride (mg/l) of Pashur River Water in 2021

Location of Pashur river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Rampal Power Plant	96	98	99	920				922	725	725	**88**	150
Banishanta	96	627	234	**2675**				2573	256	256	113	138
Batiaghata By Pass	88	235	610					2524	252	249	250	
EQS Industries (150-600 mg/l)												

Table-129. Level of Turbidity (NTU) of Pashur River Water in 2021

Location of Pashur river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Rampal Power Plant	68.5	68.9	68.1	**75.4**				75.3	74.3	74.3	74	74
Banishanta	60.4	59.5	68.4	78.3				76.3	75.3	75.3	75.8	**78.8**
Batiaghata By Pass	**58.2**	68.4	59.4					65.1	64.1	63.1	61.2	
EQS Industries (≤10 NTU)												

Table-130. Level of EC (µmohos/cm) of Pashur River Water in 2021

Location of Pashur river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Rampal Power Plant	1640	927	7550	3680				501	180	180	142.1	238
Banishanta	1616	2540	7610	**10700**				298	**134**	178	178	244
Batiaghata By Pass	576	930	7670					225	178	237	415	
EQS Industries (1200 µmohos/cm)												

Table-131. Level of Salinity (ppt) of Pashur River Water in 2021

Location of Pashur river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Rampal Power Plant	1.6	2.46	3.87	1.97				0.24	0.07	0.07	0.07	0.12
Banishanta, Mongla	1.5	1.32	3.91	**6.04**				3.13	0.08	0.08	0.09	0.11
Batiaghata By Pass	1.2	2.56	4.21					4.1	**0.06**	0.1	0.2	
EQS (400 ppt)												

19.0 Khakshiali River (Table: 132-139)

Table-132. Level of pH of Khakshiali River Water in 2021

Location of Khakshiali river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Uzirpur	8.32	8.37	8.28						8.03	8.18	8.17	7.86
Kaliganj Bazar	8.24	**8.46**	8.39						7.87	8.2	8.18	**7.69**
Boshontopur	8.34	8.45	8.43						8.45	8.23	8.2	8.09
EQS Fisheries (6.0-9.0)												
EQS Industrial (6.5-8.5)												

Table-133 Level of DO (mg/l) of Khakshiali River Water in 2021

Location of Khakshiali river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Uzirpur	7.28	5.51	3.7						4.7	3.5	3.7	6.7
Kaliganj Bazar	7.21	6.03	6.23						4.4	3.5	3.4	**8.7**
Boshontopur	7.28	7.29	6.5						3.7	3.7	3.7	**1.4**
EQS Fisheries (5 mg/l≥)												

Table-134. Level of BOD (mg/l) of Khakshiali River Water in 2021

Location of Khakshiali river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Uzirpur										9	8	4.2
Kaliganj Bazar										**10**	7	6.1
Boshontopur										9	8	**1**
EQS Fisheries (≤6 mg/l)												
EQS Industries (≤30 mg/l)												

Table-135. Level of TDS (mg/l) of Khakshiali River Water in 2021

Location of Khakshiali river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Uzirpur	**216**	2156	3320						1000	906	734	1093
Kaliganj Bazar	228	2010	**3990**						644	285	262	1084
Boshontopur	220	2210	3840						645	289	268	1089
EQS Fisheries (≤1000mg/l)												

Table-136. Level of Chloride (mg/l) of Khakshiali River Water in 2021

Location of Khakshiali river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Uzirpur	154	1015	1000						209	210	762	1375
Kaliganj Bazar	148	945	950						205	203	363	**1375**
Boshontopur	152	1005	972						203	205	375	**138**
EQS Industries (150-600 mg/l)												

Table-137. Level of Turbidity (NTU) of Khakshiali River Water in 2021

Location of Khakshiali river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Uzirpur	**53.2**	153	**153**						87	88	84	98
Kaliganj Bazar	56.3	124	124						89	90	90	90
Boshontopur	58.2	132	132						90	89	88	88
EQS Industries (≤10 NTU)												

Table-138. Level of EC (µmohos/cm) of Khakshiali River Water in 2021

Location of Khakshiali river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Uzirpur	440	4170	6240						1984	1810	1428	1945
Kaliganj Bazar	**434**	3880	**7430**						1299	588	512	1926
Boshontopur	444	4250	7140						1306	599	523	1942
EQS Industries (1200 µmohos/cm)												

Table-139. Level of SS (mg/l) of Khakshiali River Water in 2021

Location of Khakshiali river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Uzirpur	56	59	60						68	69	64	87
Kaliganj Bazar	52	52	**51**						67	68	68	**88**
Boshontopur	56	55	56						70	70	69	82
EQS Industries (150 mg/l)												

20.0 Gorai River (Table: 140-147)

Table-140. Level of pH of Gorai River Water in 2021

Location of Gorai River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Kamarkhali Bridge	8.22	8.88	8.88							8.82	7.95	8.49
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-141. Level of DO (mg/l) of Gorai River Water in 2021

Location of Gorai River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Kamarkhali Bridge	8.56	9.13	9.13							6.37	6.64	7.6
EQS Fisheries (5 mg/l≥)												

Table-142. Level of BOD (mg/l) of Gorai River Water in 2021

Location of Gorai River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Kamarkhali Bridge										1.3	1	3.8
EQS Fisheries (≤6 mg/l)												
EQS Industries (≤50 mg/l)												

Table-143. Level of TDS (mg/l) of Gorai River Water in 2021

Location of Gorai River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Kamarkhali Bridge	76	780	780							54	56	81.4
EQS Fisheries (≤1000mg/l)												

Table-144. Level of Chloride (mg/l) of Gorai River Water in 2021

Location of Gorai River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Kamarkhali Bridge	40	410	411							72	75	262
EQS Industries (150-600 mg/l)												

Table-145. Level of Turbidity (NTU) of Gorai River Water in 2021

Location of Gorai River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Kamarkhali Bridge	47.3	47.7	47.7							75	48	49
EQS Industries (≤10 NTU)												

Table-146. Level of EC (µmohos/cm) of Gorai River Water in 2021

Location of Gorai River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Kamarkhali Bridge	156	1644	1644							**114.3**	112	150
EQS Industries (1200 µmohos/cm)												

Table-147. Level of SS (mg/l) of Gorai River Water in 2021

Location of Gorai River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Kamarkhali Bridge	54	54	53							55	52	59
EQS Industries (100 mg/l)												

21.0 Modhumoti River (Table: 148-155)

Table-148. Level of pH of Modhumoti River Water in 2021

Location of Modhumoti river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dhalaitala	7.59	8.21	8.57							7.49	**7.45**	
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-149. Level of DO (mg/l) of Modhumoti River Water in 2021

Location of Modhumoti river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dhalaitala	6.1	6.1	0							4.5	4.8	
EQS Fisheries (5 mg/l≥)												

Table-150. Level of BOD (mg/l) of Modhumoti River Water in 2021

Location of Modhumoti river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dhalaitala										3.9	3.1	
EQS Fisheries (≤6 mg/l)												
EQS Industries (≤30 mg/l)												

Table-151. Level of TDS (mg/l) of Modhumoti River Water in 2021

Location of Modhumoti river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dhalaitala	84	84	2330							155	86	
EQS Fisheries (≤1000mg/l)												

Table-152. Level of Chloride (mg/l) of Modhumoti River Water in 2021

Location of Modhumoti river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dhalaitala	28	28	202							28	50	
EQS Industries (150-600 mg/l)												

Table-153. Level of Turbidity (NTU) of Modhumoti River Water in 2021

Location of Modhumoti river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dhalaitala	30.6	30.6	30.6							55	52.1	
EQS Industries (≤10 NTU)												

Table-154. Level of EC (µmohos/cm) of Modhumoti River Water in 2021

Location of Modhumoti river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dhalaitala	176	912	4810							176	174	
EQS Industries (1200 µmohos/cm)												

Table-155. Level of SS (mg/l) of Modhumoti River Water in 2021

Location of Modhumoti river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Dhalaitala	58	58	56							42	48	
EQS Industries (100 mg/l)												

22.0 Ganges River (Table: 156-163)

Table-156. Level of pH of Ganges River Water in 2021

Location of Ganges River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gorai off Take	8.24	8.24		**7.84**						8.24	**8.32**	8.24
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-157. Level of DO (mg/l) of Ganges River Water in 2021

Location of Ganges River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gorai off Take	8.76	8.76		**6.36**						**8.76**	6.8	7.8
EQS Fisheries (5 mg/l≥)												
EQS Industries (4.5-8 mg/l)												

Table-158. Level of BOD (mg/l) of Ganges River Water in 2021

Location of Ganges River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gorai off Take				**0.43**						1	1.1	**4.8**
EQS Fisheries (≤6 mg/l)												
EQS Industries (≤50 mg/l)												

Table-159. Level of TDS (mg/l) of Ganges River Water in 2021

Location of Ganges River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gorai off Take	82	82		**609**						82	86	**73**
EQS Fisheries (≤1000 mg/l)												

Table-160. Level of Chloride (mg/l) of Ganges River Water in 2021

Location of Ganges River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gorai off Take	46	46		**305**						46	**38**	87.5
EQS Industries (150-600 mg/l)												

Table-161. Level of Turbidity (NTU) of Ganges River Water in 2021

Location of Ganges River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gorai off Take	132	**132**		**52.6**						48.4	34.2	**34**
EQS Industries (≤10 NTU)												

Table-162. Level of EC (µmohos/cm) of Ganges River Water in 2021

Location of Ganges River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gorai off Take	168	168		**1218**						168	174	**150**
EQS Industries (1200 µmohos/cm)												

Table-163. Level of SS (mg/l) of Ganges River Water in 2021

Location of Ganges River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Gorai off Take	50	50		**58**						**50**	53	51
EQS Industries (100 mg/l)												

23.0 Kirtankhola River (Table: 164-167)

Table-164. Level of pH of Kirtankhola River Water in 2021

Location of Kirtankhola river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Launch Ghat (S)	7.9	7.7	7.5					7.8		7.4	7.8	8
Launch Ghat (M)	8	7.6	7.4					8		**7.2**	7.74	7.89
Kaower Char (S)	8	8	7.6					7.6		8.1	8	8.25
Kaower Char (M)	7.9	7.6	7.8					7.8		8.4	8.1	8.32
Dopdopia Kheyaghat (S)	7.8	7.8	8			7.5		8.3		7.9	8.16	**8.4**
Dopdopia Kheyaghat (M)	7.7	7.6	8.2			7.4		8.1		8.2	8.14	8.3
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-165. Level of DO (mg/l) of Kirtankhola River Water in 2021

Location of Kirtankhola river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Launch Ghat (S)	5.8	6.2	5.1					**3.2**		5.8	6.1	6.2
Launch Ghat (M)	6	6	5.2					3.4		6	6.3	6.1
Kaower Char (S)	6.1	6	5.3					4.2		6.2	**6.5**	6.1
Kaower Char (M)	5.9	6.3	5.4					4		6	6.2	6.2
Dopdopia Kheyaghat (S)	5.7	6.1	5.4			5.3		5.4		5.8	6.1	6.2
Dopdopia Kheyaghat (M)	5.6	6.3	5.6			5.1		5.2		6.1	6.2	6
EQS Fisheries (5 mg/l≥)												

Table-166. Level of TDS (mg/l) of Kirtankhola River Water in 2021

Location of Kirtankhola river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Launch Ghat (S)	150	158	681					1695		1297	1366	1360
Launch Ghat (M)	148	154	682					1644		1270	1349	1345
Kaower Char (S)	148	164	667					1711		2413	1216	2544
Kaower Char (M)	**146**	160	672					1684		2438	1228	**2573**
Dopdopia Kheyaghat (S)	149	171	622			1196		2310		1840	933	1345
Dopdopia Kheyaghat (M)	152	164	620			1162		2188		1847	936	1920
EQS Fisheries (≤1000mg/l)												

Table-167. Level of EC (µmohos/cm) of Kirtankhola River Water in 2021

Location of Kirtankhola river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Launch Ghat (S)	303	320	1360					3390		2591	2732	2720
Launch Ghat (M)	299	314	1362					3288		2538	2698	2688
Kaower Char (S)	300	332	1331					3422		4826	5938	5088
Kaower Char (M)	**292**	321	1342					3368		4872	**5982**	5144
Dopdopia Kheyaghat (S)	300	340	1242			2392		4620		3680	3820	3822
Dopdopia Kheyaghat (M)	304	324	1240			2322		4376		3692	3884	3862
EQS Industries (≤1200µmohos/cm)												

24.0 Tatulia River (Table: 168-171)

Table-168. Level of pH of Tatulia River Water in 2021

Location of Tatulia river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Vadura Launch Ghat (S)	**7.7**		7.9							7.9	8.16	
Vadura Launch Ghat (M)	8		7.8							7.8	**8.24**	
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-169. Level of DO (mg/l) of Tatulia River Water in 2021

Location of Tatulia river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Vadura Launch Ghat (S)	5.8		**5**							6.4	**6.4**	
Vadura Launch Ghat (M)	6.1		5.1							6.1	6.2	
EQS Fisheries (5 mg/l≥)												

Table-170. Level of TDS (mg/l) of Tatulia River Water in 2021

Location of Tatulia river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Vadura Launch Ghat (S)	156		313							607	695	
Vadura Launch Ghat (M)	**155**		322							622	**702**	
EQS Fisheries (≤1000mg/l)												

Table-171. Level of EC (µmohos/cm) of Tatulia River Water in 2021

Location of Tatulia river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Vadura Launch Ghat (S)	311		622							1210	1388	
Vadura Launch Ghat (M)	**308**		638							1240	**1402**	
EQS Industries (1200 µmohos/cm)												

25.0 Kalabodar River (Table: 172-175)

Table-172. Level of pH of Kalabodar River Water in 2021

Location of Kalabodar river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Kalabodar Ferry Ghat (S)	7.8		7.8								**8.2**	
Kalabodar Ferry Ghat (M)	7.9		**7.6**								8.14	
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-173. Level of DO (mg/l) of Kalabodar River Water in 2021

Location of Kalabodar river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Kalabodar Ferry Ghat (S)	5.5		5.5								6.4	
Kalabodar Ferry Ghat (M)	**6.6**		**5.3**								6.2	
EQS Fisheries (5 mg/l≥)												

Table-174. Level of TDS (mg/l) of Kalabodar River River Water in 2021

Location of Kalabodar river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Kalabodar Ferry Ghat (S)	154		394								484	
Kalabodar Ferry Ghat (M)	**151**		374								**486**	
EQS Fisheries (≤1000 mg/l)												

Table-175. Level of EC (µmohos/cm) of Kalabodar River Water in 2021

Location of Kalabodar river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Kalabodar Ferry Ghat (S)	306		788								966	
Kalabodar Ferry Ghat (M)	**305**		748								**972**	
EQS Industries (1200 µmohos/cm)												

26.0 Lohalia River (Table: 176-179)

Table-176. Level of pH of Lohalia River Water in 2021

Location of Lohalia river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Patuakhali Launch Ghat (S)	8		7.8					8.2		8	8.22	
Patuakhali Launch Ghat (M)	7.9		**7.6**					8		7.9	**8.26**	
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-177. Level of DO (mg/l) of Lohalia River Water in 2021

Location of Lohalia river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Patuakhali L.G (S)	5.8		**5.4**				5.7		6	6		5.8
Patuakhali L.G (M)	5.7		5.6				5.5		5.8	**6.2**		5.7
EQS Fisheries (5 mg/l≥)												
EQS Industries (4.5-8 mg/l)												

Table-178. Level of TDS (mg/l) of Lohalia River River Water in 2021

Location of Lohalia river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Patuakhali L.G (S)	**150**		512					**1106**		870	570	
Patuakhali L.G (M)	153		499					1094		910	614	
EQS Fisheries (≤1000mg/l)												

Table-179. Level of EC (µmohos/cm) of Lohalia River Water in 2021

Location of Lohalia river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Patuakhali L.G (S)	**299**		1022					**2210**		1736	1138	
Patuakhali L.G (M)	302		998					2188		1818	1228	
EQS Industries (1200 µmohos/cm)												

27.0 Surma River (Table: 180-185)

Table-180. Level of pH of Surma River Water in 2021

Location of Surma river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Mendibag Point	6.56	6.57	6.62	6.61	6.62	6.69	6.68	6.69	6.68	6.79	6.76	6.88
Kin Bridge Point	6.61											
Sheaik Ghat	6.7	6.62	6.68	6.67	6.69	6.75	6.77	6.75	6.72	6.71	6.72	6.92
Chhatak	7.2	**6.51**	6.72	6.69	6.71	6.78	6.72	6.76	6.79	**7.76**	6.79	6.76
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-181. Level of DO (mg/l) of Surma River Water in 2021

Location of Surma river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Mendibag Point	6.9	6.8	6.9	6.8	6.81	6.88	6.81	6.83	6.81	6.89	6.88	**8.55**
Kin Bridge Point	7											
Sheaik Ghat	7.1	6.9	7.1	7.2	7.09	7.19	7.18	7.17	7.13	7.21	7.2	8.23
Chhatak	6.81	**4.97**	7.12	7.09	7.19	7.27	7.26	7.25	7.28	7.26	7.23	7.19
EQS Fisheries (5 mg/l≥)												

Table-182. Level of BOD (mg/l) of Surma River Water in 2021

Location of Surma river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Mendibag Point	1.9	2.3	2.8	2.6	2.7	3.3	3.2	3.3	2.2	2.4	2.3	2.9
Kin Bridge Point	**1.7**											
Sheaik Ghat	2.1	2.5	2.9	2.7	2.9	3.2	3.1	3.2	2.7	2.8	2.7	2.8
Chhatak	**3.8**	2.4	2.7	2.8	2.6	2.8	2.7	2.9	2.4	2.6	2.5	2.3
EQS Fisheries (≤6 mg/l)												
EQS Industries (≤30 mg/l)												

Table-183. Level of COD (mg/l) of Surma River Water in 2021

Location of Surma river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Mendibag Point	14	18	15	17	16	17	19	23	13	14	13	16
Kin Bridge Point	**12**											
Sheaik Ghat	13	21	19	19	20	19	23	22	18	16	15	18
Chhatak	16	16	16	22	21	22	21	**24**	15	15	14	14
EQS Fisheries (≤50 mg/l)												
EQS Industrial (≤200 mg/l)												

Table-184. Level of TDS (mg/l) of Surma River Water in 2021

Location of Surma river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Mendibag Point	**44**	48	48.6	49.7	49.8	49	47	49	51	52	50	68.4
Kin Bridge Point	47											
Sheaik Ghat	49	53	51.9	51.8	51.9	52	51	54	54	56	54	**69.2**
Chhatak	65	51.6	53.6	52.9	53	54	53	58	56	54	53	52
EQS Fisheries (≤1000 mg/l)												

Table-185. Level of EC (µmohos/cm) of Surma River Water in 2021

Location of Surma river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Mendibag Point	120.1	122.3	126.9	128.9	126.9	127.8	127.8	127.2	126.4	128.1	128	127.7
Kin Bridge Point	122.6											
Sheaik Ghat	127.3	126.2	128.2	129.2	128.2	131.6	131.6	129.6	129.3	131.9	131.7	132.9
Chhatak	132	**117.2**	128.4	128.6	127.6	133.4	133.4	132.8	132.2	133.2	133.2	**134.3**
EQS Industries (≤1200µmohos/cm)												

28.0 Kushiara River (Table: 186-191)

Table-186. Level of pH of Kushiara River Water in 2021

Location of Kushiara river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Fcnchuganj Bridge Point	**7.3**	7.1	7.2	7.23	7.18	7.24	7.21	7.22	7.26	7.22	7.02	**6.91**
EQS Fisheries (6.0-9.0)												
EQS Industries (6.5-8.5)												

Table-187. Level of DO (mg/l) of Kushiara River Water in 2021

Location of Kushiara river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Fenchuganj Bridge Point	7.2	**7.3**	7.1	7.13	6.71	7.14	7.23	7.25	**6.7**	6.71	6.7	7.2
EQS Fisheries (5 mg/l≥)												

Table-188. Level of BOD (mg/l) of Kushiara River Water in 2021

Location of Kushiara river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Fenchuganj Bridge Point	2.7	2.9	2.9	2.8	**3.6**	2.8	**2.5**	2.6	3.6	3.2	3.1	2.6
EQS Fisheries (≤6 mg/l)												
EQS Industries (≤30 mg/l)												

Table-189. Level of COD (mg/l) of Kushiara River Water in 2021

Location of Kushiara river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Fenchuganj Bridge Point	**15**	20	20	**22**	16	20	19	21	18	17	16	15
EQS Fisheries (≤50 mg/l)												
EQS Industrial (≤200 mg/l)												

Table-190. Level of TDS (mg/l) of Kushiara River Water in 2021

Location of Kushiara river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Fenchuganj Bridge Point	55.4	56.4	57.4	58.3	**47**	56	54	54	54	53	52	**59**
EQS Fisheries (≤1000 mg/l)												

Table-191. Level of EC (µmohos/cm) of Kushiara River Water in 2021

Location of Kushiara river	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Fenchuganj Bridge Point	112.6	114.6	118.6	118.3	**92.6**	115.1	115.1	116.2	96.8	97.8	98.2	**119.4**
EQS Industries (1200 µmohos/cm)												

29.0 Balu River (Table: 192-201)

Table-192. Level of pH of Balu River Water in 2021

Location of Balu River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Trimohoni Bridge	7.48	7.06	7.15	6.82	6.6		6.59	**7.77**	6.65			7.07
Jolshiri Abason	7.09	7.51	7.15	6.77	6.93		6.85	7.7	**6.55**			6.91
EQS Fisheries (6.0-9.0)												
EQS Industrial (6.5-8.5)												

Table-193. Level of DO (mg/l) of Balu River Water in 2021

Location of Balu River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Trimohoni Bridge	0	0	0	**0**	0.2		1.26	0.59	3.4			1.5
Jolshiri Abason	0	0.8	0	2.4	2.9		3.46	4.15	**5.9**			2.2
EQS Fisheries (5 mg/l≥)												

Table-194. Level of BOD (mg/l) of Balu River Water in 2021

Location of Balu River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Trimohoni Bridge	32	28	**54**	30	26		22	19	6.2			40
Jolshiri Abason	30	10	10	6	7		**4**	20	6.8			8
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-195. Level of COD (mg/l) of Balu River Water in 2021

Location of Balu River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Trimohoni Bridge	134	120	**153**	120	70		63	42	20			119
Jolshiri Abason	92	68	90	13	20		**10**	48	17			22
EQS Fisheries (≤50 mg/l)												
EQS Industrial (≤200 mg/l)												

Table-196. Level of TDS (mg/l) of Balu River Water in 2021

Location of Balu River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Trimohoni Bridge	411	401	**618**	420	360		272	**78**	127			393
Jolshiri Abason	382	523	562	422	399		95.5	95	94			218
EQS Industrial (≤200 mg/l)												

Table-197. Level of Chloride (mg/l) of Balu River Water in 2021

Location of Balu River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Trimohoni Bridge	58	73	**90**	72	72		53.5	15	19			39
Jolshiri Abason	71	60	63	74	55		**13.5**	17	15			20
EQS Industrial (150-600 mg/l)												

Table-198. Level of SS (mg/l) of Balu River Water in 2021

Location of Balu River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Trimohoni Bridge	**2**	84	62	46	15		45	95	81			79
Jolshiri Abason	8	**103**	70	3	18		20	**8**	18			10
EQS Industrial (≤100 mg/l)												

Table-199. Level of EC (µmohos/cm) of Balu River Water in 2021

Location of Balu River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Trimohoni Bridge	714	699	**1115**	849	689		496	**147**	243			723
Jolshiri Abason	659	901	1022	845	763		175.8	177	178			407
EQS (1200 µmohos/cm)												

Table-200. Level of T.alkalinity (mg/l) of Balu River Water in 2021

Location of Balu River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Trimohoni Bridge	252	239	256	272	194		164	200	80			148
Jolshiri Abason	236	260	269	**287**	225		**73**	81	78			102
EQS (150 mg/l)												

Table-201. Level of Turbidity (NTU) of Balu River Water in 2021

Location of Balu River	Jan	Feb	Mar	Apl	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Trimohoni Bridge	14.7	304	234	142	131				**7.82**			46.5
Jolshiri Abason	32.4	**336**	290	42	39				7.91			8.43
EQS (10 NTU)												

Annex-2: List of Tables for different parameters of Lake Water

I. Gulshan Lake (Table: 202-211)

Table-202. Level of pH of Gulshan Lake Water in 2021

Location of Gulshan Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
United Hospital	7.54	7.33	7.33	7.12		**7.67**	7.21	6.97	6.92			7.28
South Bridge	7.65	7.23	7.23	7.32		7.55	7.14	6.97	6.96			7.41
Lake View Clinic	7.43	7.26	7.26	7.19		7.47	7.13	6.96	6.94			7.33
South Side of Gulsan Baridhara Lake	7.63	7.25	7.25	7.12		7.39	7.25		7.06			
North Side of Gulsan Baridhara Lake	7.5	7.35	7.35	7.32		7.44	7.11	6.98	7.1			7.31
Taltola Shooting Complex							7.24	6.94	**6.85**			7.39
EQS Fisheries (6.0-9.0)												
EQS Industrial (6.5-8.5)												

Table-203. Level of DO (mg/l) of Gulshan Lake Water in 2021

Location of Gulshan Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
United Hospital	3.8	**0.8**	2.3	0.94		2.19	3.3	3.5	3.8			4.13
South Bridge	3.8	1.6	6.2	12		7.77	3.8	4.4	4.8			12.04
Lake View Clinic	3.9	1.4	6.3	8.64		3.4	3.8	4.1	3			7.68
South Side of Gulsan Baridhara Lake	8	0.8	12	8.12		4.65	4.3		3.5			
North Side of Gulsan Baridhara Lake	3.7	1	6.5	12		7.71	3.3	2.6	4			**17.4**
Taltola Shooting Complex							3.5	**3.4**	3.7			7.76
EQS for fisheries ≥5 mg/l												

Table-204. Level of BOD (mg/l) of Gulshan Lake Water in 2021

Location of Gulshan Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
United Hospital	48	35	32	30		35	30	22	32			38
South Bridge	39.6	38	34	32		40	28	20	30			36
Lake View Clinic	40.8	42	32	34		32	26	18	32			**50**
South Side of Gulsan Baridhara Lake	43.2	40	38	34		46	22		32			
North Side of Gulsan Baridhara Lake	37.2	38	30	32		34	30	**14**	30			32
Taltola Shooting Complex							30	18	25			30
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-205. Level of COD (mg/l) of Gulshan Lake Water in 2021

Location of Gulshan Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
United Hospital	141	146	135	103		124	100	49	120			115
South Bridge	127	**180**	138	139		137	94	46	97			107
Lake View Clinic	122	120	136	146		95	86	78	110			149
South Side of Gulsan Baridhara Lake	122	120	140	138		159	80		110			
North Side of Gulsan Baridhara Lake	83	80	138	120		93	120	**34**	132			95
Taltola Shooting Complex							140	63	78			88
EQS Fisheries (≤50 mg/l)												
EQS Industrial (≤200 mg/l)												

Table-206. Level of TDS (mg/l) of Gulshan Lake Water in 2021

Location of Gulshan Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
United Hospital	252	252	252	230		**173.8**	176	198.4	206.7			247
South Bridge	272	246	246	224		186	169	198	204.4			241
Lake View Clinic	249	249	249	222		166.3	165	198.3	206.8			**352**
South Side of Gulsan Baridhara Lake	250	292	292	287		185.6	175		224			
North Side of Gulsan Baridhara Lake	237	290	290	234		166.8	166	206.3	206.8			241
Taltola Shooting Complex							174	229	236			302
EQS Fisheries (≤1000 mg/l)												

Table-207. Level of Turbidity (NTU) of Gulshan Lake Water in 2021

Location of Gulshan Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
United Hospital	462	112	112	209		144			43			56.9
South Bridge	**522**	131	131	184		129			41			58.9
Lake View Clinic	461	86.3	87	223		220			40.2			52.4
South Side of Gulsan Baridhara Lake	350	148	148	174		167			24			
North Side of Gulsan Baridhara Lake	213	220	220	128		129			28.6			51.4
Taltola Shooting Complex									**19.4**			50.2
EQS for wastewater after treatment from industrial units 10 NTU												

Table-208. Level of Chloride (mg/l) of Gulshan Lake Water in 2021

Location of Gulshan Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
United Hospital	32.1	40	40	40		24	**23**	25	33.5			40
South Bridge	34.3	39.5	39.5	31		30	27	29	32.5			41
Lake View Clinic	30.5	39	39	42		29.5	28	31	33.5			**54**
South Side of Gulsan Baridhara Lake	29.5	41	41	38		29	27		36.5			
North Side of Gulsan Baridhara Lake	31.5	41	41	38		30	28	34	34			42
Taltola Shooting Complex							27	30	36			48
EQS for wastewater after treatment from industrial units 150-600 mg/l												

Table-209. Level of SS (mg/l) of Gulshan Lake Water in 2021

Location of Gulshan Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
United Hospital	181	32	32	39		107	98	95	119			140
South Bridge	171	54	54	**200**		67	114	105	110			152
Lake View Clinic	165	19	**19**	190		96	105	102	104			146
South Side of Gulsan Baridhara Lake	143	32	32	123		75	59		56			
North Side of Gulsan Baridhara Lake	165	68	68	120		102	63	55	58			148
Taltola Shooting Complex							93	52	40			114
EQS for wastewater after treatment from industrial units 100 mg/l												

Table-210. Level of Total Alkalinity (mg/l) of Gulshan Lake Water in 2021

Location of Gulshan Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
United Hospital	252	**256**	256	199		142	138	144	81			143
South Bridge	238	239	239	200		148	136	111	89			148
Lake View Clinic	249	232	232	245		149	138	149	120			148
South Side of Gulsan Baridhara Lake	250	238	238	204		150	102		91			
North Side of Gulsan Baridhara Lake	237	252	252	202		150	140	148	**80**			146
Taltola Shooting Complex							143	150	83			130
EQS for wastewater after treatment from industrial units 150 mg/l												

Table-211. Level of EC (µmohos/cm) of Gulshan Lake Water in 2021

Location of Gulshan Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
United Hospital	406	439	439	390		355	342	378	394			454
South Bridge	430	430	430	390		378	348	375	389			440
Lake View Clinic	403	425	425	402		337	333	378	393			**654**
South Side of Gulsan Baridhara Lake	412	513	513	386		378	376		425			
North Side of Gulsan Baridhara Lake	442	491	491	399		**338**	343	394	398			443
Taltola Shooting Complex							365	437	439			551
EQS for wastewater after treatment from industrial units 1200 µmohos/cm												

II. Dhanmondi Lake (Table: 212-221)

Table-212. Level of pH of Dhanmondi Lake Water in 2021

Location of Dhanmondi Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
8 No. Road Bridge	7.3	7.12	7.46	7.43		7.46	7.23	6.96	**6.54**			6.85
Near Gigatola Pilkhana More	7.41	7.55	7.41	7.57		7.41	7.45	7.09	6.7			7.22
Near Dhanmondi- Road No 28	7.37	7.31	7.55	7.45		7.36	**7.76**	6.87	6.73			7.16
Near Dhanmondi-32 Bridge	7.28	7.14	7.31	7.5		7.4	7.43	6.9	6.64			7.23
EQS Fisheries (6.0-9.0)												
EQS Industrial (6.5-8.5)												

Table-213. Level of DO (mg/l) of Dhanmondi Lake Water in 2021

Location of Dhanmondi Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
8 No. Road Bridge	**2.8**	6.2	5.2	5.21		8.37	8.54	5	2.9			3
Near Gigatola Pilkhana More	6.1	**9.6**	5	7.94		7.54	8.14	8.2	4.5			4.2
Near Dhanmondi- Road No 28	5.1	9.2	5.2	5.14		5.53	6.23	5.5	3.8			4.3
Near Dhanmondi-32 Bridge	4	8.9	5.1	7.87		7.52	8.22	6	4..3			3.6
EQS for fisheries ≥5 mg/l												

Table-214. Level of BOD (mg/l) of Dhanmondi Lake Water in 2021

Location of Dhanmondi Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
8 No. Road Bridge	7	10	8	8		**4**	6	**6**	8			**28**
Near Gigatola Pilkhana More	6	8	10	10		7	8	8	12			14
Near Dhanmondi- Road No 28	10	8	8	14		6	8	6	6			10
Near Dhanmondi-32 Bridge	8	6	6	12		6	6	6	8			16
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-215. Level of COD (mg/l) of Dhanmondi Lake Water in 2021

Location of Dhanmondi Lake	Jan	Feb	Mar	Apl	May	Jun e	July	Aug	Sep	Oct	Nov	Dec
8 No. Road Bridge	21	30	27	41		16	18	**10**	54			58
Near Gigatola Pilkhana More	24	24	26	42		17	20	**22**	**90**			56
Near Dhanmondi- Road No 28	26	24	24	66		20	22	12	27			63
Near Dhanmondi-32 Bridge	24	18	24	46		22	20	14	48			86
EQS Fisheries (≤50 mg/l)												
EQS Industrial (≤200 mg/l)												

Table-216. Level of TDS (mg/l) of Dhanmondi Lake Water in 2021

Location of Dhanmondi Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
8 No. Road Bridge	150	128.2	135	145		131.7	132	122	145.9			162.2
Near Gigatola Pilkhana More	122	124.6	142	137		132.1	136	159	121			128
Near Dhanmondi- Road No 28	122	160.1	125	**172**		164.8	164	149	**120.9**			130.2
Near Dhanmondi-32 Bridge	134	141.5	160	156		144.5	144	133	129.8			148
EQS Fisheries (≤1000 mg/l)												

Table-217. Level of Turbidity (NTU) of Dhanmondi Lake Water in 2021

Location of Dhanmondi Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
8 No. Road Bridge	65.2	65.2	62	47		50.8			**2.25**			4.5
Near Gigatola Pilkhana More	39	39	56	50		53.2			6.05			6.6
Near Dhanmondi- Road No 28	47.6	47.6	44	48		41.8			7.35			8.7
Near Dhanmondi-32 Bridge	46.2	46.2	**75**	52		43.3			5.37			9
EQS for wastewater after treatment from industrial units 10 NTU												

Table-218. Level of Chloride (mg/l) of Dhanmondi Lake Water in 2021

Location of Dhanmondi Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
8 No. Road Bridge	39.5	39.5	**56**	52		34.5	33	34	26			28
Near Gigatola Pilkhana More	49	49	52	56		34	34	30	20			24
Near Dhanmondi- Road No 28	44.5	44.5	50.5	47		39	40	29	**20.5**			38
Near Dhanmondi-32 Bridge	47	47	56	55		35	36	32	23.5			26
EQS for wastewater after treatment from industrial units 150-600 mg/l												

Table-219. Level of SS (mg/l) of Dhanmondi Lake Water in 2021

Location of Dhanmondi Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
8 No. Road Bridge	18	18	23	4		9	10	**8**	4			28
Near Gigatola Pilkhana More	8	8	27	7		23	25	9	3			14
Near Dhanmondi- Road No 28	11	8	15	3		8	11	6	**1**			10
Near Dhanmondi-32 Bridge	17	6	**29**	5		17	18	11	1			16
EQS for wastewater after treatment from industrial units 100 mg/l												

Table-220. Level of Total Alkalinity (mg/l) of Dhanmondi Lake Water in 2021

Location of Dhanmondi Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
8 No. Road Bridge	126	128	133	112		95	96	93	89			88
Near Gigatola Pilkhana More	120	133	180	132		91	93	92	87			85
Near Dhanmondi- Road No 28	179	182	133	144		101	106	99	**72**			84
Near Dhanmondi-32 Bridge	102	146	**182**	135		89	92	90	86			86
EQS for wastewater after treatment from industrial units 150 mg/l												

Table-221. Level of EC (µmohos/cm) of Dhanmondi Lake Water in 2021

Location of Dhanmondi Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
8 No. Road Bridge	255	243	266	250		266	278	235	274			324
Near Gigatola Pilkhana More	**207**	230	276	235		268	275	309	229			255
Near Dhanmondi- Road No 28	207	295	230	297		332	349	285	235			260
Near Dhanmondi-32 Bridge	237	263	295	264		292	**321**	253	249			294
EQS for wastewater after treatment from industrial units 1200 µmohos/cm												

III. Hatir Jheel Lake (Table: 222-231)

Table-222. Level of pH of Hatir Jheel Lake Water in 2021

Location of Hatir Jheel Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Badda-Gulshan Link Road Bridge	7.48	7.45	7.45	7.85		7.36	7.18	6.82	6.7			7.61
FDC More Bridge	7.46	7.7	7.7	**8.42**		7.3	7.12	6.74	**6.64**			7.71
Raampura Bridge	7.45	7.38	7.38	8.02		7.38	7.28	**6.82**	6.86			7.57
EQS Fisheries (6.5-8.5)												
EQS Industrial (6.0-9.0)												

Table-223. Level of DO (mg/l) of Hatir Jheel Lake Water in 2021

Location of Hatir Jheel Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Badda-Gulshan Link Road Bridge	2.9	1.8	1.8	15.02		5.56	5.56	1.8	0			2.59
FDC More Bridge	2.7	6	4.5	**18.68**		2.02	5.02	**0**	0			1.68
Raampura Bridge	5	1.9	1.9	16.3		8.54	8.54	1.1	0			3.22
EQS for fisheries ≥5 mg/l												

Table-224. Level of BOD (mg/l) of Hatir Jheel Lake Water in 2021

Location of Hatir Jheel Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Badda-Gulshan Link Road Bridge	18	22	30	28		22	18	12	30			**32**
FDC More Bridge	12	20	28	22		**6**	8	15	12			24
Raampura Bridge	22	22	30	22		22	16	10	30			28
EQS Fisheries (≤6 mg/l)												
EQS Industrial (≤30 mg/l)												

Table-225. Level of COD (mg/l) of Hatir Jheel Lake Water in 2021

Location of Hatir Jheel Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Badda-Gulshan Link Road Bridge	64	78	107	132		76	74	51	107			97
FDC More Bridge	60	51	110	93		**22**	28	46	46			68
Raampura Bridge	117	120	120	98		78	108	44	**149**			83
EQS Fisheries (≤50 mg/l)												
EQS Industrial (≤200 mg/l)												

Table-226. Level of TDS (mg/l) of Hatir Jheel Lake Water in 2021

Location of Hatir Jheel Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Badda-Gulshan Link Road Bridge	309	**326**	326	287		203.7	**198**	252	277			276
FDC More Bridge	314	313	313	260		298	243	274	267			259
Raampura Bridge	301	313	313	254		286.7	205	259	267			294
EQS Fisheries (≤1000 mg/l)												

Table-227. Level of Turbidity (NTU) of Hatir Jheel Lake Water in 2021

Location of Hatir Jheel Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Badda-Gulshan Link Road Bridge	62.2	62	92	678		120	134		**22**			48.6
FDC More Bridge	68.8	64	25	339		95	106		32			50.7
Raampura Bridge	214	214	88	**687**		112	211		33			29.9
EQS for wastewater after treatment from industrial units 10 NTU												

Table-228. Level of Chloride (mg/l) of Hatir Jheel Lake Water in 2021

Location of Hatir Jheel Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Badda-Gulshan Link Road Bridge	50	54.5	42	48		44.5	42	44	45			42
FDC More Bridge	62	63	40	62		46	44	40	41.5			44
Raampura Bridge	45.5	**65.5**	42	57		42	40	**39**	40.5			46
EQS for wastewater after treatment from industrial units 150-600 mg/l												

Table-229. Level of SS (mg/l) of Hatir Jheel Lake Water in 2021

Location of Hatir Jheel Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Badda-Gulshan Link Road Bridge	11	11	18	86		86	90	68	46			**125**
FDC More Bridge	13	13	**3**	30		41	44	72	58			48
Raampura Bridge	82	82	20	30		74	80	64	56			86
EQS for wastewater after treatment from industrial units 15 mg/l												

Table-230. Level of Total Alkalinity (mg/l) of Hatir Jheel Lake Water in 2021

Location of Hatir Jheel Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Badda-Gulshan Link Road Bridge	206	213	213	212		157	147	187	143			144
FDC More Bridge	252	260	**260**	240		149	143	193	174			108
Raampura Bridge	189	220	220	230		137	127	184	**104**			128
EQS for wastewater after treatment from industrial units 150 mg/l												

Table-231. Level of EC (µmohos/cm) of Hatir Jheel Lake Water in 2021

Location of Hatir Jheel Lake	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Badda-Gulshan Link Road Bridge	518	557	**557**	491		407	**378**	476	525			503
FDC More Bridge	527	530	530	441		514	469	514	498			471
Raampura Bridge	505	545	545	430		427	417	494	497			531
EQS for wastewater after treatment from industrial units 1200 µmohos/cm												

Annex-3: List of Tables for Different Parameters of Ground Water

IV. Ground Water (Deep Tubewell) in Barisal district (Table: 232-235)

Table-232: Level of pH of Ground Water at Barisal District in 2021

Locations of Barisal District	Jan	Feb	Mar	Apl	May	July	June	Aug	Sep	Oct	Nov	Dec
Notullabad Bus Stand			7.4									7.5
B.M College			7.5									7.5
Upozilla office	7.3		7.3								7.29	
Sadar Hospital		7.34										7.5
Sher-e Bangla Medical College			7.5								7.22	
Sayad Hatem Ali College												
Amrita Lal Dey College		7										
B.M School		7.29										7.4
Barishal Zila School			7.7									
Barishal Central Jail												
Barishal City College		7.26										7.4
Rupatoli Bus Stand	7.3		7.4								7.26	
Choumatha Bazar	7.36		7.4									7.3
Bat Tala Bazar		7										7.3
Kalizira Bazar	7.25		7.6								7.24	
Notun Hat Alia Madrash a	7.3										7	
Govt. Board Primary school	7.37										7.22	
Rupatoli Alia Madrasha	7.28										7.26	
Rupatoli Jagua Secondary School	7.26										7.32	
Rupatoli Karitas Office	7.25										7.34	
Roads & High Way office											7.26	
Khan Bari Road			7.4								7.26	
Water Development Board		7.26									7.26	
Bapist Mission Boys School		7.26									7.24	
Bapist Mission Girls School		7.32									7.2	
T& T Office											7.2	
Police Hospital Police Line	7.3											7.4
Terminal Launch Ghat	7.36		7.5									
Police outpost Launch Ghat	7.3		7.4									7.4
Head post office	7.33											
Dopdopia Kheya Ghat	7.28		7.5									
Gasterbsine chowmath	7.27		7.4									
Office of the civil Sergeon		7.2										7.4
Baitul Falah Mosjid			7.3									7.4
Sharshat girls' school and college		7.26										7.7
Udayan school		7.22										7.3
A.K school		7.26										7.5
Multi purpas Co operative market		7.24										7.6
Govt halima Khatun Secondary School		7.22										7.2
EQS (6.5-8.5) for drinking												

Table-233: Level of EC of Ground Water at Barisal District in 2021

Locations of Barisal District	Jan	Feb	Mar	Apl	May	July	June	Aug	Sep	Oct	Nov	Dec
Notullabad Bus Stand			352									352
B.M College			352									344
Upozilla office	628		342								626	
Sadar Hospital		625										340
Sher-e Bangla Medical College			340								628	
Sayad Hatem Ali College												
Amrita Lal Dey College		628										
B.M School		627										348
Barishal Zila School		626	352									
Barishal Central Jail		630										
Barishal City College		626										346
Rupatoli Bus Stand	634		336								626	
Choumatha Bazar	628		340									
Bat Tala Bazar		628										348
Kalizira Bazar	632		338								624	
Notun Hat Alia Madrasha	628										628	
Govt. Board Primary school	626										628	
Rupatoli Alia Madrasha	632										626	
Rupatoli Jagua Secondary School	626		352								630	
Rupatoli Karitas Office	632										625	
Roads & High Way office											626	
Khan Bari Road			346								626	
Water Development Board		626									626	
Bapist Mission Boys School		626									621	
Bapist Mission Girls School		630									628	
T& T Office											641	
Police Hospital Police Line	634											
Terminal Launch Ghat	630		344									
Police outpost Launch Ghat	636		348									344
Head post office	632											
Dopdopia Kheya Ghat	636		340									
Gasterbsine chowmath	630		344									
Office of the civil Sergeon		628										336
West Muslim gorsthan road		632										
Baitul Falah Mosjid			348									340
Sharshat Girls school and college		626										352
Udayan school		628										342
A.K school		626										340
Multi purpas Co operative market		621										338
Govt halima Khatun Secondary School		**628**										**352**
EQS for Industrial Units 1200 µmohos/cm												

Table-234: Level of TDS of Ground Water at Barisal District in 2021

Locations of Barisal District	Jan	Feb	Mar	Apl	May	July	June	Aug	Sep	Oct	Nov	Dec
Notullabad Bus Stand			176									176
B.M College			176									172
Upozilla office	324		171								313	
Sadar Hospital		312										170
Sher-e Bangla Medical College			170								314	
Sayad Hatem Ali College												
Amrita Lal Dey College		314										
B.M School		313										174
Barishal Zila School			176									
Barishal Central Jail												
Barishal City College		313										173
Rupatoli Bus Stand	320		168								313	
Choumatha Bazar	314		170									174
Bat Tala Bazar		314										174
Kalizira Bazar	312		169								312	
Notun Hat Alia Madrash a	324										314	
Govt. Board Primary school	328										314	
Rupatoli Alia Madrasha	318										313	
Rupatoli Jagua Secondary School	310		176								314	
Rupatoli Karitas Office	312										312	
Roads & High Way office											313	
Khan Bari Road			173								313	
WaterDevelopment Board		313									313	
Bapist Mission Boys School		313									311	
Bapist Mission Girls School		315									314	
T& T Office											320	
Police Hospital Police Line	320											
Terminal Launch Ghat	310		172									
Police outpost Launch Ghat	316		174									172
Head post office	314											
Dopdopia Kheya Ghat	318		170									
Gasterbsine chowmath	322		172									
Office of the civil Sergeon		314										168
West Muslim gorsthan road		316										
Baitul Falah Mosjid			174									170
Sharshat Girls school and college		313										176
Udayan school		314										171
A.K school		313										170
Multi purpas Co operative market		311										169
Govt halima Khatun Secondary School		314										**176**
EQS for Industrial Units 1000 mg/l												

Table-235: Level of Iron of Ground Water at Barisal District in 2021

Locations of Barisal District	Jan	Feb	Mar	Apl	May	July	June	Aug	Sep	Oct	Nov	Dec
Notullabad Bus Stand			0.2									0.4
B.M College			0.4									0.4
Upozilla office	0.16		0.4								0.21	
Sadar Hospital		0.18										0.4
Sher-e Bangla Medical College			0.4								0.23	
Sayad Hatem Ali College												
Amrita Lal Dey College		0.23										
B.M School		0.21										0.3
Barishal Zila School			0.3									
Barishal Central Jail												
Barishal City College		0.16										0.3
Rupatoli Bus Stand	0.14		0.4									
Choumatha Bazar	0.2		0.3									0.4
Bat Tala Bazar		0.23										0.4
Kalizira Bazar	0.22		0.5								0.18	
Notun Hat Alia Madrash a	0.16										0.23	
Govt. Board Primary school	0.18										0.23	
Rupatoli Alia Madrasha	0.2										0.16	
Rupatoli Jagua Secondary School	0.16		0.2								0.16	
Rupatoli Karitas Office	0.22										0.18	
Roads & High Way office											0.16	
Khan Bari Road			0.3								0.16	
WaterDevelopment Board		0.16									0.16	
Bapist Mission Boys School		0.16									0.22	
Bapist Mission Girls School		0.16									0.19	
T& T Office												
Police Hospital Police Line	0.14											
Terminal Launch Ghat	0.2		0.4									
Police outpost Launch Ghat	0.18		0.3									0.4
Head post office	0.2											
Dopdopia Kheya Ghat	0.14		0.3									
Gasterbsine chowmath	0.2		0.4									
Office of the civil Sergeon		0.19										0.4
West Muslim gorsthan road		0.19										
Baitul Falah Mosjid			0.4									0.3
Sharshat Girls school and college		0.16										0.3
Udayan school		0.23										0.4
A.K school		0.16										0.3
Multi purpas Co operative market		0.22										0.5
Govt halima Khatun Secondary school		0.23										0.2
EQS for Drinking Water (0.3-1.0) mg/l												

V. Ground water (Deep Tubewell) in Bogura District (Table: 236-240)

Table-236. Level of pH of Ground Water at Bogura District in 2021

Locations of Bogura District	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Bogra Zilla School			7.42	7.42	7.42			7.42		7.42		
Head Post Office			7.38	7.38	7.38			7.38		7.38		
Commercial College			7.31	7.31	7.31			7.31		7.31		
Zilla Parishad			7.35	7.35	7.35			7.35		7.35		
Office of the Duputy Commissioner			7.62	7.62	7.62			7.62		7.62		
Porosovha			7.78	7.78	7.78			7.78		7.78		
VM School, Sadar			7.46	7.46	7.46			7.46		7.46		
T & T Office			7.38	7.38	7.38			7.38		7.38		
Biddut Office			7.21	7.21	7.21			7.21		7.21		
Bogra sadar thana			7.42	7.42	7.42			7.42		7.42		
EQS (6.5-8.5) for drinking												

Table-237. Level of EC of Ground Water at Bogura District in 2021

Locations of Bogura District	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Bogra Zilla School			374	374	374			374		374		
Head Post Office			354	354	354			354		354		
Commercial College			422	422	422			422		422		
Zilla Parishad			420	420	420			420		420		
Office of the Duputy Commissioner			392	392	392			392		392		
Porosovha			390	390	390			390		390		
VM School, Sadar			359	359	359			359		359		
T & T Office			368	368	368			368		368		
Biddut Office			320	320	320			320		320		
Bogra sadar thana			330	330	330			330		330		
EQS For Industries (1200 µmohos/cm)												

Table-238. Level of Iron of Ground Water at Bogura District in 2021

Locations of Bogura District	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Bogra Zilla School			0.28	0.28	0.28			0.28		0.28		
Head Post Office			0.28	0.28	0.28			0.28		0.28		
Commercial College			0.4	0.4	0.4			0.4		0.4		
Zilla Parishad			0.42	0.42	0.42			0.42		0.42		
Office of the Duputy Commissioner			0.33	0.33	0.33			0.33		0.33		
Porosovha			0.42	0.42	0.42			0.42		0.42		
VM School, Sadar			0.34	0.34	0.34			0.34		0.34		
T & T Office			0.32	0.32	0.32			0.32		0.32		
Biddut Office			0.38	0.38	0.38			0.38		0.38		
Bogra sadar thana			0.26	0.26	0.26			0.26		0.26		
EQS For Drinking (0.3-1 mg/l)												

Table-239. Level of T. Alkalinity of Ground Water at Bogura District in 2021

Locations of Bogura District	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Bogra Zilla School			32	32	32			32		32		
Head Post Office			30	30	30			30		30		
Commercial College			32	32	32			32		32		
Zilla Parishad			28	28	28			28		28		
Office of the Duputy Commissioner			34	34	34			34		34		
Porosovha			28	28	28			28		28		
VM School, Sadar			26	26	26			26		26		
T & T Office			28	28	28			28		28		
Biddut Office			32	32	32			32		32		
Bogra sadar thana			28	28	28			28		28		
EQS For Industries (150 mg/l)												

Table-240. Level of T. Hardness of Ground Water at Bogura District in 2021

Locations of Bogura District	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Bogra Zilla School			230	230	230			230		230		
Head Post Office			240	240	240			240		240		
Commercial College			220	220	220			220		220		
Zilla Parishad			210	210	210			210		210		
Office of the Duputy Commissioner			200	200	200			200		200		
Porosovha			240	240	240			240		240		
VM School, Sadar			220	220	220			220		220		
T & T Office			200	200	200			200		200		
Biddut Office			220	220	220			220		220		
Bogra sadar thana			240	240	240			240		240		
EQS For Drinking (200-500 mg/l)												

VI. Ground water (Deep Tubewell) in Sunamgonj District (Table: 241-246)

Table-241. Level of pH of Ground Water at Sunamgonj District in 2021

Locations of Sunamgonj District	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Hossain Bokht and Forida Bokht Primary School		7.1						7.2				
Old Bus Stand		7.3						7.3				
Govt Jubli High school		7						7.2				
Pouro Biponi Market		7.6						7.1				
Sohor Girls Primary School		7.4						7.5				
EQS (6.5-8.5) for drinking												

Table-242. Level of EC of Ground Water at Sunamgonj District in 2021

Locations of Sunamgonj District	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Hossain Bokht and Forida Bokht Primary School		422						428				
Old Bus Stand		426						432				
Govt Jubli High school		418						398				
Pouro Biponi Market		389						396				
Sohor Girls Primary School		378						386				
EQS for wastewater after treatment from industrial units 1200 µmohos/cm												

Table-243. Level of Chloride of Ground Water at Sunamgonj District in 2021

Locations of Sunamgonj District	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Hossain Bokht and Forida Bokht Primary School		11						14				
Old Bus Stand		13						12				
Govt Jubli High school		10						15				
Pouro Biponi Market		12						**11**				
Sohor Girls Primary School		14						16				
EQS for Industrial Units (150-600 mg/l)												

Table-244. Level of Iron of Ground Water at Sunamgonj District in 2021

Locations of Sunamgonj District	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Hossain Bokht and Forida Bokht Primary School		20						20				
Old Bus Stand		18						24				
Govt Jubli High school		21						20				
Pouro Biponi Market		23						22				
Sohor Girls Primary School		19						21				
EQS for Drinling (0.3-1.0 mg/l)												

VI. Ground water (Deep Tubewell) in Khulna District (Table: 245-248)

Table-245. Level of pH of Ground Water at Khulna District in 2021

Locations of Khulna District	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Divisional Comissioner Office	7.25											
KUET University Main Gate, Fulbari Gate	7.77											
Govt. B.L College, Daulatpur	7.43											
Govt. Mohasin College, Khalishpur	7.63											
Govt. Girls College, Boyra	7.69											
Khulna Public College, Boyra	7.58											
Boyra Bazar More, Boyra	7.44											
Aizer More, Boyra	7.42											
Govt. Comercial College, Sonadanga	7.53											
Sonadanga Bus Stand, Sonadanga	7.44											
Hazi Mohasin College, Khulna	7.21											
Khulna Medical College	7.25											8.3
Ad-din Medical College and Hospital	7.33											
Natun Bazar, Rupsha	7.23											
Sarkit House	7.46											
Govt. Khulna Gila School	7.23											
D.C Office	7.28											
Dak Banglo More	7.27											
Govt.Azom Khan Commerce College	7.24											
Govt. Majid Memorial City College	7.24											
Sarjical Clinic, Sonadanga	7.2							7.2				7.35
Jia Hall, Sib Bary	7.06							7.24				7.65
Islami Bank Hospital, Santidham Mor	7.14							7.24				7.45
Moylapota More	7.13							7.26				7.75
Seba Clinic, Sher-E-Bangal Road	7.04							7.33				7.82
Nirala More	7.21							7.32				7.54
Gollamari Bus Stand, Gollamari	7.22							7.3				7.35
Khulna University, Vaskarja Chattar	7.14							7.32				7.32
Rupsha Bus Stand, Rupsha	7.14							7.35				7.34
Govt. Sundarban Adorso College	7.12							7.41				7.45
Magura Porosova												7.5
Low-Cost Colony												8.12
Art College												8.03
C and B Colony												8.35
Govt Nur Nagar Primary School												8.21
PWD High School												8.4
Daulatpur Bus Stand												8.41
Notun Rasta More												8.45
Bora Bus Stand												8.5
Govt Khulna College												8.48
EQS (6.5-8.5) for drinking												

Table-246. Level of EC of Ground Water at Khulna District in 2021

Locations of Khulna District	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Divisional Comissioner Office	1844											
KUET University Main Gate, Fulbari Gate	2008											
Govt. B.L College, Daulatpur	1948											
Govt. Mohasin College, Khalishpur	1734											
Govt. Girls College, Boyra	1707											
Khulna Public College, Boyra	1843											
Boyra Bazar More, Boyra	1834											
Aizer More, Boyra	1907											
Govt. Comercial College, Sonadanga	1813											
Sonadanga Bus Stand, Sonadanga	1817											
Hazi Mohasin College, Khulna	1977											
Khulna Medical College	1955											524
Ad-din Medical College and Hospital	1947											
Natun Bazar, Rupsha	1906											
Sarkit House	1907											
Govt. Khulna Gila School	2003											
D.C Office	1974											
Dak Banglo More	1936											
Govt.Azom Khan Commerce College	1935											
Govt. Majid Memorial City College	1936											
Sarjical Clinic, Sonadanga	1806							1800				1745
Jia Hall, Sib Bary	1804							1802				1756
Islami Bank Hospital, Santidham Mor	1887							1840				1654
Moylapota More	2086							2080				2054
Seba Clinic, Sher-E-Bangal Road	2066							2051				2040
Nirala More	2018							2030				2014
Gollamari Bus Stand, Gollamari	2050							2041				2040
Khulna University, Vaskarja Chattar	2102							2131				2014
Rupsha Bus Stand, Rupsha	2089							2040				1920
Govt. Sundarban Adorso College	**2049**							2039				1985
Magura Porosova												1728
Low-Cost Colony												570
Art College												984
C and B Colony												482
Govt Nur Nagar Primary School												693
PWD High School												438
Daulatpur Bus Stand												424
Notun Rasta More												540
Bora Bus Stand												428
Govt Khulna College												454
EQS (6.5-8.5) for drinking												

Table-247. Level of Chloride of Ground Water at Khulna District in 2021

Locations of Khulna District	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Divisional Comissioner Office	424											
KUET University Main Gate, Fulbari Gate	476											
Govt. B.L College, Daulatpur	409											
Govt. Mohasin College, Khalishpur	402											
Govt. Girls College, Boyra	403											
Khulna Public College, Boyra	404											
Boyra Bazar More, Boyra	413											
Aizer More, Boyra	413											
Govt. Comercial College, Sonadanga	475											
Sonadanga Bus Stand, Sonadanga	464											
Hazi Mohasin College, Khulna	260											
Khulna Medical College	255											452
Ad-din Medical College and Hospital	254											
Natun Bazar, Rupsha	243											
Sarkit House	242											
Govt. Khulna Gila School	237											
D.C Office	240											
Dak Banglo More	248											
Govt.Azom Khan Commerce College	266											
Govt. Majid Memorial City College	247											
Sarjical Clinic, Sonadanga	222							446				568
Jia Hall, Sib Bary	**206**							463				**579**
Islami Bank Hospital, Santidham Mor	214							245				427
Moylapota More	228							246				517
Seba Clinic, Sher-E-Bangal Road	236							244				520
Nirala More	248							242				506
Gollamari Bus Stand, Gollamari	248							242				509
Khulna University, Vaskarja Chattar	250							245				504
Rupsha Bus Stand, Rupsha	247							246				485
Govt. Sundarban Adorso College	246							241				482
Magura Porosova												455
Low-Cost Colony												212
Art College												410
C and B Colony												432
Govt Nur Nagar Primary School												435
PWD High School												552
Daulatpur Bus Stand												547
Notun Rasta More												454
Bora Bus Stand												344
Govt Khulna College												431
EQS for Industrial Units (150-600 mg/l)												

Table-248. Level of Total Hardness of Ground Water at Khulna District in 2021

Locations of Khulna District	Jan	Feb	Mar	Apl	May	June	July	Aug	Sep	Oct	Nov	Dec
Divisional Comissioner Office	226											
KUET University Main Gate, Fulbari Gate	231											
Govt. B.L College, Daulatpur	234											
Govt. Mohasin College, Khalishpur	252											
Govt. Girls College, Boyra	234											
Khulna Public College, Boyra	220											
Boyra Bazar More, Boyra	246											
Aizer More, Boyra	264											
Govt. Comercial College, Sonadanga	264											
Sonadanga Bus Stand, Sonadanga	260											
Hazi Mohasin College, Khulna	240											
Khulna Medical College	231											235
Ad-din Medical College and Hospital	242											
Natun Bazar, Rupsha	241											
Sarkit House	246											
Govt. Khulna Gila School	265											
D.C Office	237											
Dak Banglo More	273											
Govt.Azom Khan Commerce College	244											
Govt. Majid Memorial City College	266											
Sarjical Clinic, Sonadanga	244							240				244
Jia Hall, Sib Bary	246							244				248
Islami Bank Hospital, Santidham Mor	256							252				273
Moylapota More	246							243				244
Seba Clinic, Sher-E-Bangal Road	232							242				245
Nirala More	254							251				257
Gollamari Bus Stand, Gollamari	243							243				244
Khulna University, Vaskarja Chattar	254							247				245
Rupsha Bus Stand, Rupsha	246							247				242
Govt. Sundarban Adorso College	254							242				243
Magura Porosova												242
Low-Cost Colony												234
Art College												231
C and B Colony												237
Govt Nur Nagar Primary School												222
PWD High School												242
Daulatpur Bus Stand												232
Notun Rasta More												235
Bora Bus Stand												342
Govt Khulna College												231
EQS for drinking (200-500 mg/l)												

******** End ********