STATUS OF TRACE & TOXIC METALS IN INDIAN RIVERS

Ministry of Jal Shakti

Dept. of Water Resources, River Development and Ganga Rejuvenation

Central Water Commission

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River Data Compilation-2 Directorate
Central Water Commission
Department of Water Resources, River Development & Ganga Rejuvenation
MINISTRY OF JAL SHAKTI

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FOREWORD

Water is the most essential element for life existence on earth. The quantity and quality of the world's water has been deterioting with exponential growth in human population and its needs for industrial and agricultural activities. Metal contamination in river water is increasingly becoming common in India. Toxicity caused by metals posing problem for ecological, evolutionary, nutritional and environmental areas. Presence of metals in river water in excesses may cause a significant threat to human health and ecological systems.

Central Water Commission under Department of Water Resources, RD & GR, Ministry of Jal Shakti has been playing a vital role in water quality monitoring of river water over the past years and at present, is observing water quality at 531 key locations covering all major river basins of India. The present report attempts to provide the water quality scenario of Indian rivers in respect of trace & toxic metals. Based on the analysis results of various metal elements, first and second editions of the Status of Trace & Toxic Metals in Indian rivers were published by River Data Compilation Directorate, CWC in May 2014 and April 2018, respectively. The revised and comprehensive edition of this report comprising the data of eight elements viz; Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Nickel and Zinc for the period from May 2014 to April 2018 has been prepared.

I would like to place on record my appreciation of Shri R.K. Sinha, Member (River Management), CWC, Shri Ravi Shankar, Chief Engineer (P&D), CWC and his team for excellently bringing out third edition of this publication. I also appreciate the sampling, testing and compilation work done by scientific officers of CWC.

I hope this publication would prove to be useful to all the stakeholders and agencies that are responsible for taking necessary remedial measures for conservation of river water quality.

New Delhi
August, 2019

(A. K. Sinha)

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PREFACE

Pollution of river waters are gaining increasing attention worldwide because of its impacts on social, economic, health and others. Anthropogenic activities and natural processes have led to serious decline in river/surface waters quality. The extent of influence of the human activities in the river waters of the developing countries has increased dramatically during the past decades.

Metals play great role in the function of living organisms; they constitute a nutritional requirement and fulfill a physiological role. But, its concentration beyond certain quantities in the environmental is one of the persistent global environmental problems. This contamination is caused by continuous growth of different industries such as mining, fertilizer, tannery, paper, batteries, electroplating etc. Heavy metals such as Zinc, Copper, Nickel, Mercury, Cadmium, Lead, Chromium and Arsenic released from there industries tend to accumulate in organisms, which may lead to a reduction in species diversity.

I appreciate the commendable efforts put by Shri. Ravi Shankar (Chief Engineer, P & D) for bringing out 3rd edition of this book. Efforts put in by the officers of River Data Compilation-2 Directorate, Shri. Pankaj Kumar Sharma, Director, Shri. Rakesh Kumar Gupta, Dy. Director, Dr. Jakir Hussain, Research Officer, Dr. N. Prabhakar Rao and Dr. Sakshi Sharma, Senior Research Assistant in the preparation of the report are also appreciated. I also express sincere thanks to all field Chief Engineers of CWC for making arrangements for collection and submission of river water samples to the National River Water Quality Laboratory, CWC, New Delhi

I hope this publication will provide a vision of state of Trace & Toxic Metals in Indian rivers to all stake holders and then ponder to search for remedial measures to check the pollution.

New Delhi
August, 2019. **(R.K.Sinha)**

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ABBREVIATIONS

µg/dL	Microgram/ desci litre
AAS	Atomic Absorption Spectrophotometer
APHA	American Public Health Association
As	Arsenic
BCM	Billion Cubic meter
BIS	Bureau of Indian Standards
Cd	Cadmium
Cr	Chromium
Cu	Copper
Fe	Iron
Hg	Mercury
ICMR	Indian Council of Medical Research
IUPAC	International Union of Pure and Applied Chemistry
kms	kilo meters
M. ha	Million hectres
MCL	Maximum Contaminant Level
mm	milli meter
MSL	Mean Sea Level
Ni	Nickel
NRWQL	National River Water Quality Laboratory
Pb	Lead
ppb	Parts Per Billion
ppm	Parts Per Million
TEL	Tetra Ethyl Lead
USEPA	United States Environmental Protection Agency
WHO	World Health Organisation
WQ	Water Quality
Zn	Zinc

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EXECUTIVE SUMMARY

In the developing countries like India, facilities of drinking water treatment before supply are not always available or possible. In many parts of the country people take water directly from the source for their domestic use. Because of the rapid urbanization and industrialization, availability of good quality and quantity of water is a threat.

To observe the current status of toxic metal content of Indian Rivers, 2959 no. of river water samples from 424 water quality monitoring stations spread over major river basins in India were collected in three different seasons viz, monsoon (August, 2016 and August, 2017), summer (May, 2014; April, 2016, April, 2017 and April, 2018) and winter (November, 2014; February 2015, December, 2015, December, 2016 and December, 2017). These samples were analyzed for selected eight trace and toxic metals at National River Water Quality Laboratory, Central Water Commission, New Delhi. Toxic metal wise summary of the results are as under:

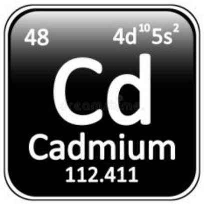
Arsenic (As)

As Permissible Limit as BIS 10500; 2012	10 µg/L
No of Samples Tested	2293
No. of Samples Exceed the Limit	0
No. of Stations	0
No.of Rivers	0
No. of Rivers where it exceeded more than one WQ Stations	0

BIS (Bureau of Indian Standard) 10500-2012) have recommended an acceptable limit of 10 µg/L of arsenic in drinking water. Total 2293 numbers of water samples from 424 water quality monitoring stations were collected and analyzed for arsenic content in Indian Rivers in the period May, 2014 to April, 2018. The arsenic concentration varies from 0.01 to 9.87 µg/L. Maximum arsenic concentration (9.87 µg/L) was observed at Ekmighat water quality monitoring station on Bagmati River during April, 2018. During the study period, all the River water quality stations are reported that arsenic concentration is well within the

acceptable limits according to the Bureau of Indian Standards (BIS: 10500-2012) and no toxicity of arsenic in the River waters is observed.

Cadmium (Cd)



Cd Permissible Limit as BIS 10500; 2012	3 µg/L
No of Samples Tested	2908
No. of Samples Exceed the Limit	40
No. of Stations	31
No.of Rivers	24
No. of Rivers where it exceeded more than one WQ Stations	5

BIS (Bureau of Indian Standard) 10500-2012) have recommended an acceptable limit of 3 µg/L of cadmium in drinking water. Out of 2908 water samples, 40 no. of samples of 31 water quality stations found Cd concentrations beyond the acceptable limit and on Rivers i.e. Ganga, Kopili, Rapti, Tungabhadra and Yamuna rivers were found to have cadmium content more than one Water Quality station above the acceptable limits. The highest cadmium concentration (70.518 µg/L) was observed at the Vautha water quality monitoring station on Sabarmati River during February, 2015. It is also observed that Cadmium concentration exceeds the acceptable limit during non-monsoon period.

Chromium (Cr)

Cr Permissible Limit as BIS 10500; 2012	50 µg/L
No of Samples Tested	2959
No. of Samples Exceed the Limit	42
No. of Stations	29
No. of Rivers	22
No. of Rivers where it exceeded more than one WQ Stations	3

BIS (Bureau of Indian Standard) 10500-2012) have recommended an acceptable limit of 50 µg/L of chromium in drinking water. Chromium concentration was 450.26 µg/L at Paliakalan water quality monitoring station on Sharda River in August 2016, which is reported as the maximum concentration during entire study period. Out of 2959 water samples, total 42 numbers of water samples from 29 water quality monitoring stations located on 22 major Indian Rivers were found above the tolerance limit of 50 µg/L with respect to chromium.

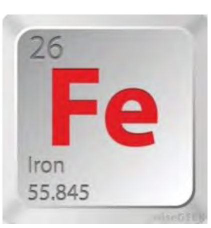
Two or more water quality stations located on the rivers like Ganga, Ghagra and Rapti have shown chromium concentration above permissible limit.

Copper (Cu)

Cu Permissible Limit as BIS 10500; 2012	50 µg/L
No of Samples Tested	2959
No. of Samples Exceed the Limit	12
No. of Stations	11
No. of Rivers	10
No. of Rivers where it exceeded more than one WQ Stations	1

BIS (Bureau of Indian Standard) 10500-2012) have recommended an acceptable limit of 50 µg/L of copper in drinking water. 2959 water samples from 424 water quality stations were collected and analyzed for copper content from May, 2014 to April, 2018. Out of 2959 water samples, 12 samples were found to contain copper concentrations above the acceptable limits of 50 µg/L during the study period, the maximum Copper concentration 314.93 µg/L was observed at Pingalwada water quality station on Dhadher River in April, 2017. Total 12 numbers of water samples exceeded the BIS prescribed acceptable limit at 11 numbers of WQ monitoring stations situated on 10 Indian Rivers during the study period. Brahmaputra, Buridehing, Damanganga, Dhadher, Dikhow, Ganga, Pranhitha, Sabarmati, Subarnarekha and Tel are the rivers where one or two water quality monitoring stations were found contaminated with copper. The stations i.e Ghatsila and Jamsolphat located on Subarnarekha river have been found copper concentration above the permissible limit.

Iron (Fe)



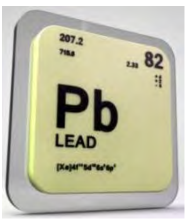
Fe Permissible Limit as BIS 10500; 2012	300 µg/L
No of Samples Tested	2959
No. of Samples Exceed the Limit	610
No. of Stations	245
No.of Rivers	142
No. of Rivers where it exceeded more than one WQ Stations	47

According to BIS the acceptable limit for Iron is 0.3 mg/L (300 µg/L). Higher concentration of iron >300

µg/L has been observed in 610 water samples collected from 245 WQ stations of 142 Indian Rivers during the study period. The highest concentration of 14.55 mg/L is observed at Chenimari on Buridehing River. Bagmathi, Beki, Bhagirath, Brahmani, Brahmaputra, Buridehing, Desang, Dhansiri, Ganga, Godavari, Gomti, Indravathi, Jaldhaka, Kopili, Narmada, Ramganga, Rapti, Sone, Subarnarekha, Teesta and Wainganga are the Rivers where three or more water quality stations have been found to have Iron concentration that exceed the limits throughout the study period.

Lead (Pb)

Pb Permissible Limit as BIS 10500; 2012	10 µg/L
No of Samples Tested	2959
No. of Samples Exceed the Limit	128
No. of Stations	92
No.of Rivers	69
No. of Rivers where it exceeded more than one WQ Stations	11



As per Bureau of Indian Standard (10500, 2012) has recommended that the acceptable limit for lead is 0.01 mg/L or 10 µg/L in drinking water. Lead concentration was maximum (374.58 µg/L) at Lowara water quality station on Sheturni River during April, 2016. 128 water samples from 92 water quality monitoring stations were observed having lead concentrations above the acceptable limit for drinking water in 69 rivers during the study period. Brahmaputra, Buridehing, Cauvery, Ganga, Ghagra, Gomti, Ramganga, Rapti, Sone, Tungabhadra, and Yamuna are the rivers where two or more numbers of WQ monitoring stations were found to be contaminated with lead.

Nickel (Ni)

Ni Permissible Limit as BIS 10500; 2012	20 µg/L
No of Samples Tested	2582
No. of Samples Exceed the Limit	45
No. of Stations	34
No.of Rivers	31
No. of Rivers where it exceeded more than one WQ Stations	3

BIS (Bureau of Indian Standard) 10500-2012) have recommended an acceptable limit of 20 µg/L of nickel in drinking water.

It is observed that Nickel concentration found more than the prescribed limit in 45 water

samples out of 2582 samples according to the BIS limits. Nickel concentration at Durvesh water quality station on Vaitarna river in December 2017 is reported to be the maximum (245.01 µg/L) during the entire study period. Seonath, Subarnarekha and Tungabhadra are the rivers where 2 or more WQ monitoring stations were found contaminated with Nickel. 45 water samples from 34 water quality monitoring stations over 31 Indian Rivers were observed to have nickel concentration that exceed the acceptable limit during the study period. The Rivers where Nickel concentration found above permissible limits at more than one WQ Stations are Seonath (WQ Stations: Ghatora & Simga), Subarnarekha (WQ Stations: Ghatsila & Jamshedpur) and Tungabhadra (WQ Stations: Bawapuram & Mantralayam).

Zinc (Zn)

BIS (Bureau of Indian Standard) 10500-2012) have recommended an acceptable limit of 5mg/L (5000 µg/L) of Zinc in drinking water. Total 2959 water samples from the 424 water quality monitoring stations were analyzed during the reporting period. Maximum Zinc concentration (2.65 mg/L) was observed at Manot water quality monitoring station on Narmada River during August, 2016. In the study area, all the River water quality stations are reported to have zin c concentration well within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of Zinc in the River waters is observed.

Zn Permissible Limit as BIS 10500; 2012	5000 µg/L
No of Samples Tested	2959
No. of Samples Exceed the Limit	0
No. of Stations	0
No.of Rivers	0
No. of Rivers where it exceeded more than one WQ Stations	0

CHAPTER 1

1.0 Introduction

Environmental health has been deterioting day by day due to exponetial increment in human population in the world. Which results acceleration in emission of organic and inorganic pollutants such as pesticides, salts, petroleum products, acids, heavy metals etc. Most of the pollutants cannot be easily degraded and hence they accumulate in the environment. Heavy metals are widespread pollutant of great environmental concern as they are non-degradable, toxic and persistent with serious ecological ramification on aquatic ecology (Jumbe and Nandini, 2009). Heavy metals discharged into a river system by natural or anthropogenic sources during their transport are distributed between the aqueous phase and sediments. Heavy metals are of high ecological significance since they are not removed from water as a result of self-purification, but accumulate in water systems and enter the food chain (Loska and Wiechula 2003). But, majority of the people having limited knowledge abouth the pollution caused by the heavy metals. Therefoe, Central Water Commission (CWC) made an attempt to study the heavy metals concentration in Indian River Systems.

These are important in aquatic systems because of their demonstrated effects as both essential at low levels and toxic agents at higher levels for biota. The term ‘‘heavy metal’’ refers to any metal and metalloid element that has a relatively high density ranging from 3.5 to 7 g/cm^3 and is toxic or poisonous at low concentrations, and includes mercury (Hg), cadmium (Cd), arsenic (As), chromium (Cr), thallium (Tl), zinc (Zn), nickel (Ni), copper (Cu) and lead (Pb). Although ‘‘heavy metals’’ is a general term defined in the literature, it is widely documented and frequently applied to the widespread pollutants of soils and water bodies (Duffus, 2002).

According to the World Health Organization (WHO), 2011 the common toxic ‘heavy metals’ that can be of public health concerns include beryllium (Be), aluminium (Al), chromium (Cr), manganese (Mn), iron (Fe), cobalt (Co), nickel (Ni), copper (Cu), zinc (Zn), arsenic (As), selenium (Se), molybdenum (Mo), silver (Ag), cadmium (Ca), tin (Sn), antimony (Sb), barium (Ba), mercury (Hg), thallium (Tl) and lead (Pb). This list includes beryllium, which is the second lightest metallic element (an alkaline earth metal) after lithium with an atomic number of four, as well as aluminium, one of the most widely used industrial light metals with a density of 2.7 g/cm^3, and arsenic and selenium, which are not even metals, but a metalloid and a non-metal, respectively.

These metals are found widely in the earth’s crust and are non-biodegradable in nature. They enter into the human body via air, water and food. Metals in environmental waters arise from both natural and anthropogenic sources. In many cases, anthropogenic inputs of metals exceed natural inputs. Living organisms require some metals as essential nutrients, including calcium, sodium, potassium, magnesium, iron, zinc, chromium, cobalt, copper, nickel, manganese, molybdenum, and selenium. Excessive levels or certain oxidation states of some essential metals, however, are detrimental to living organisms. In addition to non-nutrient metals generally recognized as toxic, such as antimony, arsenic, beryllium, cadmium, lead, and mercury, health-based water quality standards will also include the nutrient metals chromium, copper, nickel, selenium, and zinc, all of which can be toxic at too-high levels or in certain oxidation states (Weiner, E.R. 2013).

1.1 Sources of Metal Pollution

The main sources of heavy metal pollution are mining, milling, plating and surface finishing industries that discharge a variety of toxic metals such as Cr, Cu, Cd, Ni, Co, Zn and Pb into the environment. Over the last few decades, the concentration of these heavy metals in river water and sediments has increased rapidly. Consequently, concentrations of toxic metals in grains and vegetables grown in contaminated soils have increased at alarming rates. This poses a serious threat to humans and the environment because of its toxicity, non-biodegradability and bioaccumulation (Bahadir et al., 2007; Perez-Marin et al., 2008; Reddad et al., 2003).

1.1.1 Metal Pollution from Mining and Processing Ores

Digging a mine, removing ore from it, and extraction and processing of the minerals sometimes cause environmental damage. For example, mining operations can destroy habitat, farmland, and homes; produce soil erosion; and pollute waterways via toxic drainage. Emission of toxic materials from smelters such as arsenic (As), selenium (Se), lead (Pb), cadmium (Cd), and sulfur oxides, among others — causes serious air pollution. Surface mining produces about eight times as much waste as underground mining, but deep mining can produce even worse problems, such as earthquakes. When underground mines cave in, not only do they kill miners but they also cause subsidence of the surface, forming holes into which roads and houses may collapse. As near-surface minerals are depleted, miners have to dig deeper to find the mineral. A study by the National Academy of Science predicted that copper (Cu) mining operations in the year 2000 would produce three times as much waste per ton of copper output compared to the same activities in 1978.

Exposure of pyrite (FeS) and other sulfide minerals to atmospheric oxygen and moisture results in oxidation of this mineral and the formation of acid-mine drainage water. The release of acid-mine drainage from active and abandoned mines, particularly coal mines, has been widely associated with serious water quality problems. It dissolves toxic elements from tailings and soils and carries them into waterways and even groundwater. Water quality problems involve relatively high levels of metals such as iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), nickel (Ni) and cobalt (Co).

Ore processing, smelting, and refining operations can cause deposition of large quantities of trace metals such as lead (Pb), zinc (Zn), copper (Cu), arsenic (As) and silver (Ag), into drainage basins or direct discharge into aquatic environments.



1.1.2 Other Sources of Metal Pollution

Domestic Wastewater Effluents

Domestic wastewater effluents contain large amounts of trace metals from metabolic waste products, corrosion of water pipes - copper (Cu), lead (Pb), zinc (Zn), and cadmium (Cd), and household products, such as detergents - iron (Fe), manganese (Mn), chromium (Cr), nickel (Ni), cobalt (Co), zinc (Zn), boron (B), and arsenic (As). Wastewater treatment usually removes less than 50% of the metal content of the influent, leaving the effluent with significant metal loading. The sludge resulting from wastewater treatment is also rich in metals. Domestic wastewater and the dumping of domestic and industrial sludge are the major artificial sources of cadmium (Cd), chromium (Cr), copper (Cu), iron (Fe), lead (Pb), and mercury (Hg) pollution.

Stormwater Runoff

Stormwater runoff from urbanized areas is a significant source of metal pollution in the receiving water streams. Metal composition of urban runoff water is dependent on many factors, such as city planning, traffic, road construction, land use, and the physical characteristics and climatology of the watershed.

Industrial Wastes and Discharges

In general, the concentration of heavy metals in industrial effluents is much greater than their prescribed permissible limits in the aqueous solutions, so there is an urgent need to treat the metal containing effluents before they are discharged into the aquatic bodies. Metals and their concentrations in industrial waste discharges specifically depend on the profile of that particular industry.

Table 1: Sources of heavy metals in the environment

S. No.	Pollutant	Major sources
1.	**Arsenic**	Arsenic containing fungicides, pesticides and herbicides, metal smelters, byproducts of mining activities, chemical wastes
2	**Cadmium**	Cadmium producing industries, electroplating, welding. Byproducts from refining of Pb, Zn and Cu, fertilizer industry, pesticide manufacturers, cadmium–nickel batteries, nuclear fission plants.

S. No.	Pollutant	Major sources
3	**Chromium**	Metallurgical and chemical industries, processes using chromate compounds, cement and asbestos units
4	**Copper**	Iron and steel industry, fertilizer industry, burning of wood, discharge of mine tailings, disposal of fly ash, disposal of municipal and industrial wastes are the sources of copper in the atmosphere
5	**Iron**	Cast Iron, Wrought Iron, steel, alloys, construction, transportation, machine manufacturing
6	**Lead**	Automobile emissions, lead smelters, burning of coal and oil, lead arsenate pesticides, smoking, mining and plumbing
7	**Mercury**	Mining and refining of mercury, organic mercurial's used in pesticides, laboratories using mercury
8	**Nickel**	Metallurgical industries using nickel, combustion of fuels containing nickel additives, burning of coal and oil, electroplating units using nickel salts, incineration of nickel containing substances
9	**Zinc**	Zinc refineries, galvanizing processes, brass manufacture, metal plating, plumbing

Sanitary Landfills

The metal contents and average concentrations of sanitary-landfill leachates are Cu (5 ppm), Zn (50 ppm), Pb (0.3 ppm), and Hg (60 ppb).

Agricultural Runoff

The metal content of agricultural runoff originates in sediments and soils saturated by animal and plant residues, fertilizers, specific herbicides and fungicides, and use of sewage and sludge as plant nutrients.

Fossil Fuel Combustion

Fossil fuel combustion is a major source of airborne metal contamination of natural.

CHAPTER 2

2.0 Indian Water Resources Scenario

2.1 India-Physiography

India lies in the south-central peninsula of the Asian continent. Besides the main land, there are two groups of islands, namely Lakshadweep in the Arabian Sea and Andaman & Nicobar Islands in the Bay of Bengal. The mainland of India lies between $8^0$4'N and $37^0$6' N latitude and $68^0$7' E and $97^0$25'E longitude. India occupies 329 million hectare (Mha) geographical areas, which forms 2.4% of world's land area.

Physiographically, India may be divided into seven well defined regions. These are: the Northern Mountains comprising the mighty Himalayan ranges; the Great Plains traversed by the Indus, Ganga and Brahmaputra river systems; the Central Highlands, consisting of a wide belt of hills running east-west between the Great Plains and the Deccan plateau; the Peninsular Plateaus; the East Coast, a belt of land of about 100-130 km wide, bordering the Bay of Bengal; the West Coast, a narrow belt of land of about 10-25 km wide, bordering the Arabian Sea; and the islands, comprising the coral islands of Lakshadweep in Arabian Sea and Andaman and Nicobar group of islands in the Bay of Bengal.

2.1.1 Climate

The great mountain mass of Himalayas in the north and the ocean in the south are the two major influences operating on the climate of India. The Himalaya poses an impenetrable barrier to the influence of cold winds from central Asia and gives the sub-continent the elements of tropical type of climate. The oceans are the source of moisture-laden winds, giving India the elements of the oceanic type of climate. India has a very great diversity and variety of climate and an even greater variety of weather conditions. The climate ranges from extremes of heat to extremes of cold; from extreme aridity and negligible rainfall to excessive humidity and torrential rainfall. The climatic condition influences to a great extent the water resources utilization in the country.

2.1.2 Rainfall

Rainfall in India is dependent on the South-West and North-East monsoons, on shallow cyclonic depressions and disturbances and on violent local storms which form regions where cool humid winds from the sea meet hot dry winds from the land and occasionally reach cyclonic dimension. Most of the rainfall in India takes place under the influence of South-West monsoon between June to September except in Tamil Nadu where it is under the influence of North-East monsoon during October and November. However, there is considerable spatial variation in rainfall which ranges from less than 100 mm in the western Rajasthan to more than 2,500 mm in North-Eastern areas. The total mean annual rainfall as calculated from IMD data in study area comes out to be 1,105 mm.

2.2 River Basin of India

India is blessed with many rivers. Land slope determines the river to which the rain falling on an area will eventually flow. A river basin, also called catchment area of the river, is the area from which the rain will flow into that particular river. The shape and size of the river basin is determined by the topography. A river basin is the most appropriate unit for planning, development and management of water resources. The drainage area of a system of rivers normally flowing into a common terminus constitutes a drainage basin.

CWC's publication No. 30/88 "Water Resources of India", April 1988 has standardized the river basins of India. The country was divided into 20 river basins comprising of 12 major basins and 8 composite river basins.

The twelve major basins are: (1) Indus; (2) Ganga-Brahmaputra-Meghna; (3) Godavari; (4) Krishna; (5) Cauvery; (6) Mahanadi; (7) Pennar; (8) Brahmani-Baitarani; (9) Sabarmati; (10) Mahi; (11) Narmada and (12) Tapi, each of these basins having a drainage area exceeding 20000 sq.km. and eight composite river basins combining suitably together all the other remaining medium and small river systems for the purpose of planning and management..

The eight composite river basins are: (1) Subarnarekha – combining Subarnarekha and other small rivers between Subarnarekha and Baitarni; (2) East flowing rivers between Mahanadi and Pennar; (3) East flowing rivers between Pennar and Kanyakumari; (4) Area of Inland Drainage in Rajasthan Desert; (5) West flowing rivers of Kutch and Saurashtra including Luni; (6) West flowing rivers from Tapi to Tadri; (7) West flowing rivers from Tadri to Kanyakumari; and (8) Minor rivers draining into Myanmar (Burma) and Bangladesh.

CHAPTER 3

3.0 Indian River System

The Indian River Systems can be divided into four categories– the Himalayan, the Rivers traversing the Deccan Plateau, the Coastal and those in the inland drainage basin (Figure 1). The Himalayan Rivers are perennial as they are fed by melting glaciers every summer. During the monsoon, these Rivers assume alarming proportions. Swollen with rainwater, they often inundate villages and towns in their path. The Gangetic basin is the largest River system in India, draining almost a quarter of the country.

Figure 1: Indian River Basins

The Rivers of the Indian peninsular plateau are mainly fed by rain. During summer, their flow is greatly reduced, and some of the tributaries even dry up, only to be revived in the monsoon. The Godavari basin in the peninsula is the largest in the country, spanning an area of almost one-tenth of the country. The Rivers Narmada and Tapi flow almost parallel to each other but empty themselves in opposite directions. The two Rivers make the valley rich in alluvial soil and teak forests cover much of the land. While coastal Rivers gush down the peaks of the Western Ghats into the Arabian Sea in torrents during the rains, their flow slow down after the monsoon. Streams like the Sambhar in western Rajasthan are mainly seasonal in character, draining into the inland basins and salt lakes. In the Rann of Kutch, the only River that flows through the salt desert is the Luni. The major River systems of India are discussed below.

3.1 Indus Basin (Within India)

The Indus basin spreads over states of Jammu & Kashmir, Himachal Pradesh, Punjab, and part of Rajasthan, Haryana, besides Union Territory of Chandigarh having an area of 3,17,708 sq.km which is nearly 9.8 percent of the total geographical area. The geographical extent of the basin is between 72°28’ to 79°39’ East longitudes and 29°8’ to 36°59’ North latitudes of the country. The upper part of the basin, which lies in Jammu & Kashmir and Himachal Pradesh, is dominated by mountain ranges and narrow valleys. In Punjab, Haryana and Rajasthan, the basin consists of vast plains, which are fertile granary of the country. There are 6 major rivers which are flowing in the basin namely, Indus, Jhelum, Chenab, Ravi, Beas and Sutlej. Indus is a trans-boundary river that originates in Tibet, it flows in Jammu & Kashmir region and further goes in Pakistan. Sutlej is also a trans-boundary river originating in Tibet and flows in Himachal Pradesh and Punjab region. There is snowmelt runoff addition in the flow in the summer months of the year.

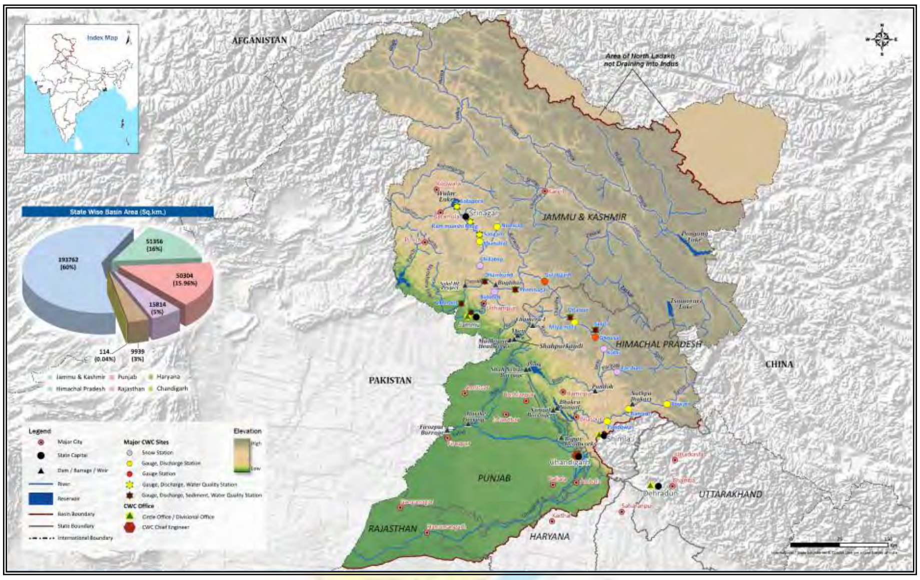


Figure 2: Indus River Basin

Rainfall

The rainfall varies temporally and spatially across the basin. The south-west monsoon brings rains in the summer months while the winter rains are caused by the storms in Jammu & Kashmir. Mean annual rainfall of the study time period is 896 mm for the basin. During the period (1985 to 2015) maximum rainfall was recorded as 1315.6 mm in 1995-96 and minimum as 512.6 mm in 2000-01.

Temperature

The Indus basin faces variability in temperature from upper portion of the basin to the lower portion of the basin. The difference may be due to variation in topography of the basin. The temperature goes below 0 ^{o}C in the upper part of the Indus basin, whereas the temperature rises above 40 ^{o}C in the lower part of the basin.

3.2 Ganga-Brahmaputra-Meghna Basin

3.2.1 Ganga Basin

The Ganga basin outspreads in India, Tibet (China), Nepal and Bangladesh over an area of 10,86,000 sq.km. In India, it covers states of Uttar Pradesh, Madhya Pradesh, Rajasthan, Bihar, West Bengal, Uttarakhand, Jharkhand, Haryana, Chhattisgarh, Himachal Pradesh and Union Territory of Delhi draining an area of 8,38,803 sq.km which is nearly 26% of the total geographical area of the country. The basin lies between East longitudes 73°2' to 89°5' and North latitudes 21°6' to 31°21' having maximum length and width of approximately 1,543 km and 1,024 km. The basin is bounded by the Himalayas on the north, the Aravalli on the west, the Vindhyas and Chhotanagpur plateau on the south and the Brahmaputra Ridge on the east. Mean annual rainfall of the study time period is 1,007 mm for the basin.

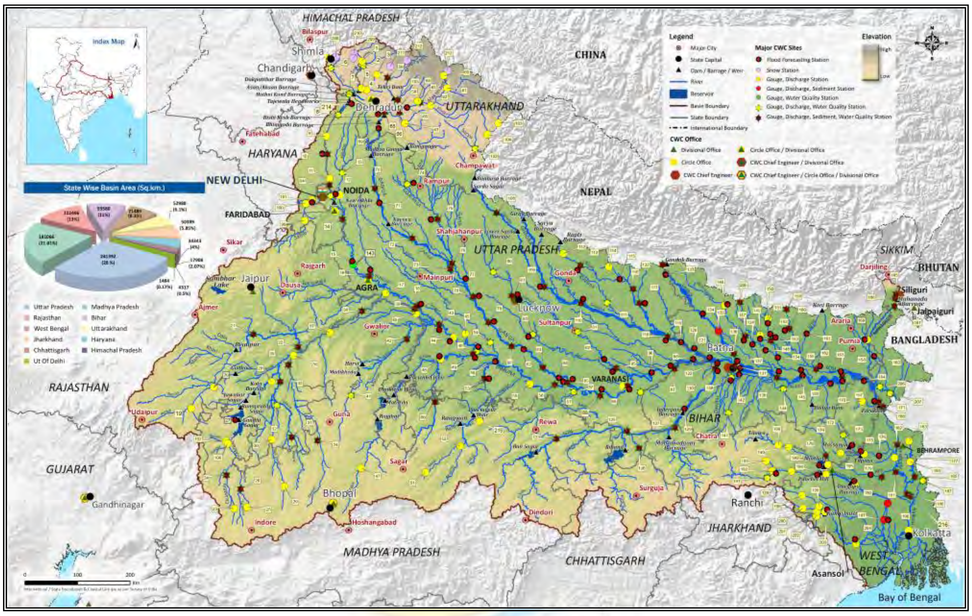


Figure 3: Ganga River Basin

River Ganga rises in the Gangotri glacier in the Himalayas at an elevation of about 7,010 m in the Uttarkashi district of Uttarakhand. At its source, the river is called as the Bhagirathi. It descends down the valley upto Devprayag where after joining another hill stream Alaknanda, it is called Ganga. The total length of river Ganga (measured along the Bhagirathi and the Hooghly) up to its outfall into Bay of Bengal is 2,525 km. The principal tributaries joining the river from right are the Yamuna and the Sone. The Ramganga, the Ghaghra, the Gandak, the Kosi and the Mahananda join the river from left. The Chambal and the Betwa are the two other important sub-tributaries. The major part of basin in Indian Territory is covered with agricultural land accounting to 65.57% of the total area and 3.47% of the basin is covered by water bodies.

3.2.2 Brahmaputra Basin

The Brahmaputra basin spreads over countries of Tibet (China), Bhutan, India and Bangladesh having a total area of 5,80,000 sq.km. In India, it spreads over states of Arunachal Pradesh, Assam, West Bengal, Meghalaya, Nagaland and Sikkim and lies between 88°11' to 96°57' East longitudes and 24°44' to 30°3' North latitudes and extends over an area of 1,93,252 sq.km which is nearly 5.9% of the total geographical area of the country. It is bounded by the Himalayas on the north, the Patkari range of hills on the east running along the India-Myanmar border, the Assam range of hills on the south and the Himalayas and the ridge separating it from Ganga basin on the west. The Brahmaputra River originates in the north from Kailash ranges of Himalayas at an elevation of 5,150 m just south of the lake called Konggyu Tsho and flows for about a total length of 2,900 km. In India, it flows for 916 km. The principal tributaries of the river joining from right are the Lohit, the Dibang, the Subansiri, the Jiabharali, the Dhansiri, the Manas, the Torsa, the Sankosh and the Teesta whereas the Burhidihing, the Disang, the Dikhow, the Dhansiri and the Kopili joins it from left. The major part of basin is covered with forest accounting to 55.48% of the total area and 5.79% of the basin is covered by water bodies. Mean annual rainfall of the study time period is 2,330 mm (IMD rainfall) for the basin.

The Teesta basin extends over an area of 9,855 sq.km, which is nearly 0.28% of the total geographical area of the country. The basin lies in the states of Sikkim and West Bengal. The Teesta River is a 309 km long river with drainage area of 12,540 sq.km, flowing through India and Bangladesh and finally draining into Bay of Bengal. The Teesta River originates from the Pahunri (or Teesta Kangse) glacier above 7,068 m, and flows southward through gorges and rapids in the Sikkim Himalaya. The river then flows past the town of Rangpo where the Rangpo River joins, and where it forms the border between Sikkim and West Bengal up to Teesta Bazaar. Just before the Teesta Bridge, where the roads from Kalimpong and Darjeeling join, the river is met by its main tributary, the Rangeet River. At this point, it changes course southwards flowing into West Bengal. The river then goes merging up with the Brahmaputra River after it bifurcates the city of Jalpaiguri and flows just touching Cooch Behar district at Mekhliganj and moves to Fulchori in Bangladesh. The Teesta River is one of the rivers that has changed over the years. Teesta river area is in the seismically active Zone-IV and has experienced micro-seismic activity. The hydroelectric projects are cascaded over the length of the river, do not store large amounts water, have small reservoirs, and therefore the projects are expected to have very low risk from the reservoir induced seismicity in the area. The Teesta basin receives major part of its rainfall during the South-West monsoon period. Rainfall is heavy and well distributed during the months from May to early October. July is the wettest month in most of the places. The intensity of rainfall during South-West monsoon season decreases from South to North, while the distribution of winter rainfall is in the opposite order. Some tributaries flowing from Bhutan also contribute to the basin, which have been considered in the present study.

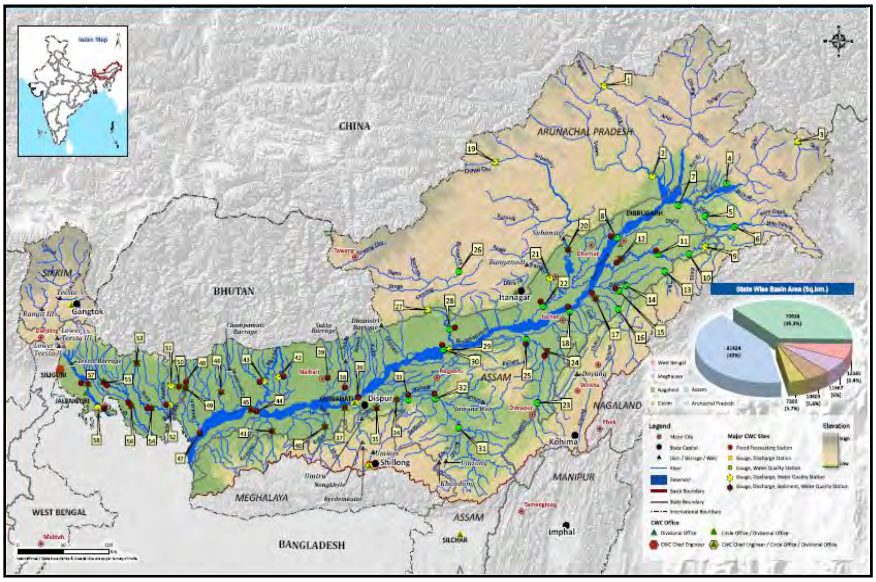


Figure 4: Brahmaputra River Basin

3.2.3 Barak & others Basin

The Barak & others basin extends over an area of 86,335 sq.km, which is nearly 1.44% of the total geographical area of the country. The basin covers the states of Meghalaya, Manipur, Mizoram, Tripura, Assam and Nagaland. The Barak river rises from the Manipur Hills, south of Mao in Senapati District at an elevation of 2,331 m. Then it flows along Nagaland-Manipur border through hilly terrains and enters Assam. It further enters Bangladesh where it is known by the Surma and the Kushiyara and later called the Meghna before receiving combined flow of the Ganga and the Brahmputra. The length of Barak River from its origin up to the border of Assam along the Kushiyara is 564 km. The principal tributaries from right are the Jiri, the Chiri, the Modhura, the Jatinga, the Harang whereas the Dhareshwari, the Singla, the Longai, the Sonai are principal tributary joining from the left.

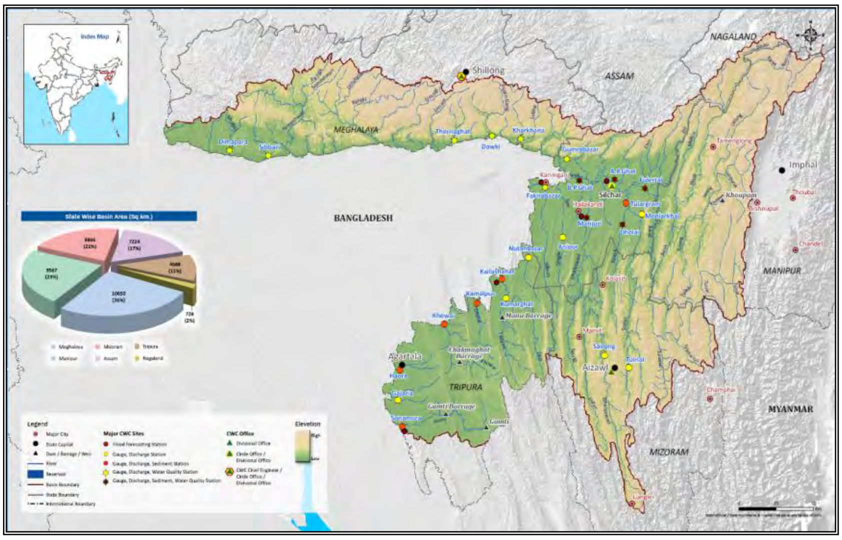


Figure 5: Barak River Basin

Rainfall: Rainfall varies both spatially and temporally in Barak & other basins. Annual rainfall of the basin varies from 1,975 mm to 3,518 mm. The average annual rainfall (1985-2015) in the Barak & others basin is 2,625 mm.

Climate: The Barak & other basins has a tropical climate. The average annual monthly maximum temperature is about 27.9 °C and average annual minimum temperature is about 26.5 °C in the basin. Temperatures in the bordering region with Bangladesh are higher, whereas in interior location temperature is moderate.

3.3 Godavari Basin

The Godavari basin extends over an area of 3,12,150 sq.km, which is nearly 9.5% of the total geographical area of the country. The basin lies in the states of Maharashtra, Andhra Pradesh & Telangana, Chhattisgarh, Madhya Pradesh, Odisha, and Karnataka.

Godavari is a perennial and the second largest river draining in India. Godavari River originates near Trayambakeswar near Nasik, northeast of Mumbai in the state of Maharashtra at an elevation of 1,067 m and flows for a length of about 1,465 km before joining the Bay of Bengal. It flows through the Eastern Ghats and emerges out at Polavaram into the plains. At Dhawaleswaram the river divides into two branches, the Gautami and Vasishta. Between the two lies the Godavari Central Delta. Pranahita, Manjeera, Sabari, Indravati, Maner and Manar are the main tributaries of the Godavari River. The Godavari basin receives major part of its rainfall during the South-West monsoon period. The other rainy seasons are not so well defined and well spread as the South-West monsoon season. Floods are the regular phenomenon in the basin. Bhadrachalam, Kunavaram, and Deltaic portion of the river are more flood-prone.

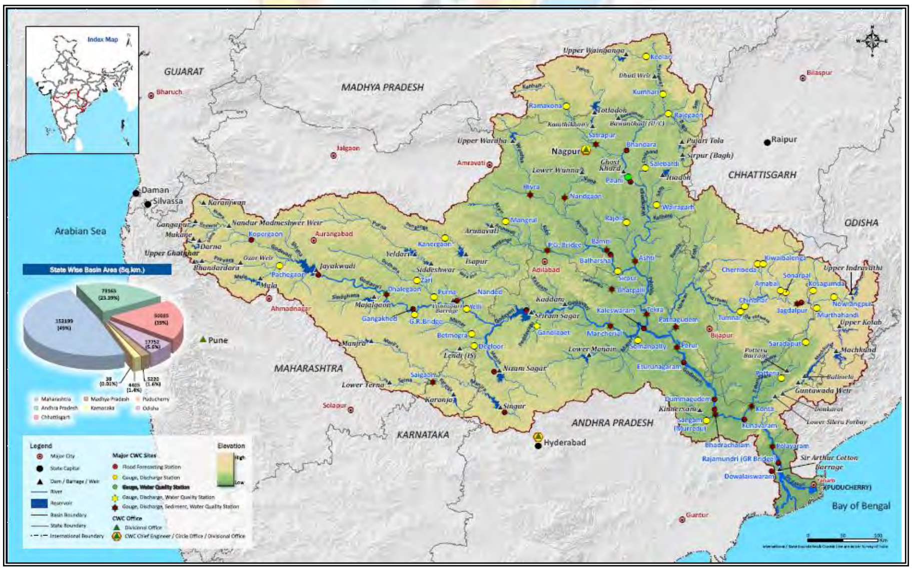


Figure 6: Godavari River Basin

Rainfall: Rainfall varies both spatially and temporally in Godavari Basin. Annual rainfall of the basin varies from 877 mm to 1,493 mm. The mean annual rainfall (1985-2015) in the Godavari basin is 1,117 mm.

***Climate**:* The Godavari basin has a tropical climate. The temperature varies from 20 ^{o}C to 35 ^{o}C in a year which causes lot of monthly variations in the potential evapotranspiration in the basin. Minimum potential evapotranspiration in the basin is 30 to 100 mm during January/February and maximum goes up to 400 mm to 450 mm during April/May months.

3.4 Krishna Basin

The Krishna basin extends over an area of 2,59,439 sq.km, which is nearly 7.9% of the total geographical area of the country. Krishna basin lies in the states of Maharashtra, Karnataka, Telangana and Andhra Pradesh. The river Krishna is a perennial river and second largest eastward draining interstate river in Peninsular India. The river rises from the Western Ghats near Jor village of Satara district of Maharashtra at an altitude of 1,337 m just north of Mahabaleshwar. The total length of river from origin to its outfall into the Bay of Bengal is 1400 km. Its principal tributaries joining from right are the Ghatprabha, the Malprabha, the Koyna, the Varna, the Panchganga, the Dudhganga and the Tungabhadra whereas the Bhima, the Khagna, the Musi and the Munneru are principal tributaries joining the river from left. The Krishna basin receives major part of its rainfall during the South-West monsoon period. Around 70% of the rainfall takes place during July to September months. The other rainy seasons are not so well defined and well spread as the South-West monsoon season.

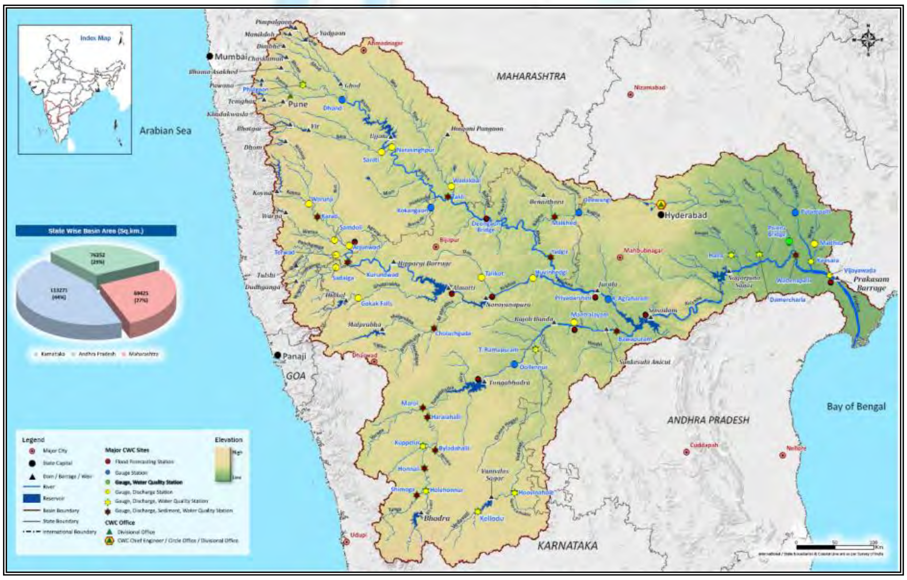


Figure 7: Krishna River Basin

***Rainfall**:* Rainfall varies both spatially and temporally in Krishna basin. Annual rainfall of the basin varies from 604 mm to 1,045 mm and the mean annual rainfall (1985-2015) in the Krishna basin is 841 mm. Many times basin receives high rainfall in less duration causing floods in those years.

Climate: The Krishna basin has a tropical climate. The mean monthly maximum and minimum temperature is about 32.1°C and 26.5°C in the basin respectively. Temperatures in the coastal region are moderate but humidity is higher.

3.5 Cauvery Basin

The river Cauvery is biggest river in south India. It rises at Talakaveri on the Brahmagiri range in the Western Ghats in Karnataka at an elevation of about 1,341 m above Mean Sea Level and flows for about 800 km, before its outfall into the Bay of Bengal. The Cauvery river system consists of 21 principal tributaries each with catchment area around 250 sq.km. The Cauvery basin extends over states of Tamil Nadu, Karnataka, Kerala and Union Territory of Puducherry, draining an area of 85,167sq.km *(GIS Calculated as per India-WRIS Database)* which is nearly 2.59% of the total geographical area of the country with a maximum length and width of about 560 km and 245 km, respectively. The total length of the river Cauvery from the head to its outfall into the sea comprises a length of 320 km in Karnataka, 416 km in Tamil Nadu and remaining length of 64 km forms the common boundary between states of Karnataka and Tamil Nadu. Its principal tributaries are Shimsa, Arkavathi, Hemavathi, Kabini, Amravati, Noyil and Bhavani.

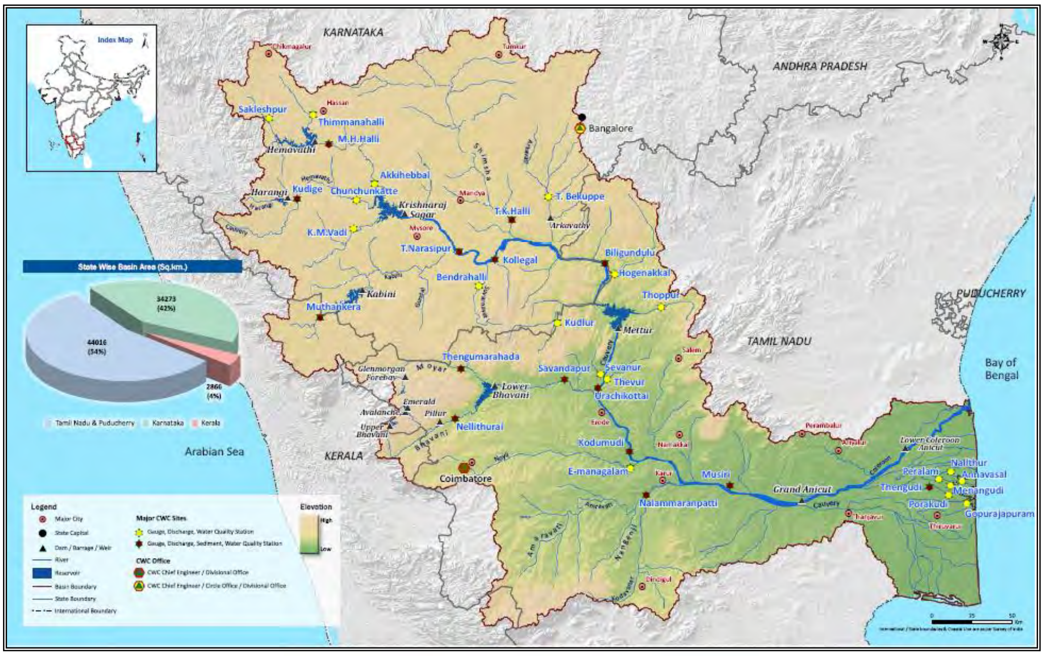


Figure 8: Cauvery River Basin

Rainfall: The rainfall in the basin varies from region to region. The normal annual rainfall in Kerala region is about 2,400 mm. In the Western Ghats it ranges from 1,700 mm to 3,800 mm. In Karnataka for the Cauvery basin, the average rainfall is between 600 mm to 800 mm resulting into semi-arid condition. In Tamil Nadu, under the Cauvery basin the average rainfall is low ranging from 500 mm to 1,000 mm and is semi-arid. In general, the highest rainfall in the Cauvery basin usually occur in July or early August and the mean annual rainfall (1985-2015) is around 949 mm.

Climate: The Cauvery basin has a tropical and sub-tropical climate. The average annual monthly maximum temperature is about 30.56 °C and average annual minimum temperature is about 20.21 °C in the basin. Temperatures in the coastal region are moderate but humidity is higher.

3.6 Subernarekha Basin

The Subernarekha (Including Burhabalang) basin extends over an area of 26,804 sq.km, which is nearly 0.82% of the total geographical area of the country. The basin covers the states of Jharkhand, Odisha and West Bengal. The river Subernarekha is one of the longest east flowing interstate rivers. It originates near Nagri village in Ranchi district of Jharkhand at an elevation of 600 m. The total length of river is about 395 km. The principal tributaries of the river are Kanchi, Kharkai and Karkai. Subernarekha river is situated in the North-East corner of peninsular India. It is bounded on the North-West by the Chhotnagpur Plateau, in the South-West by Brahmani basin, in the South by Burhabalang basin and in the South-East by the Bay of Bengal. The basin is generally influenced by the South-West monsoon, which onsets in the month of June and extends up to October.

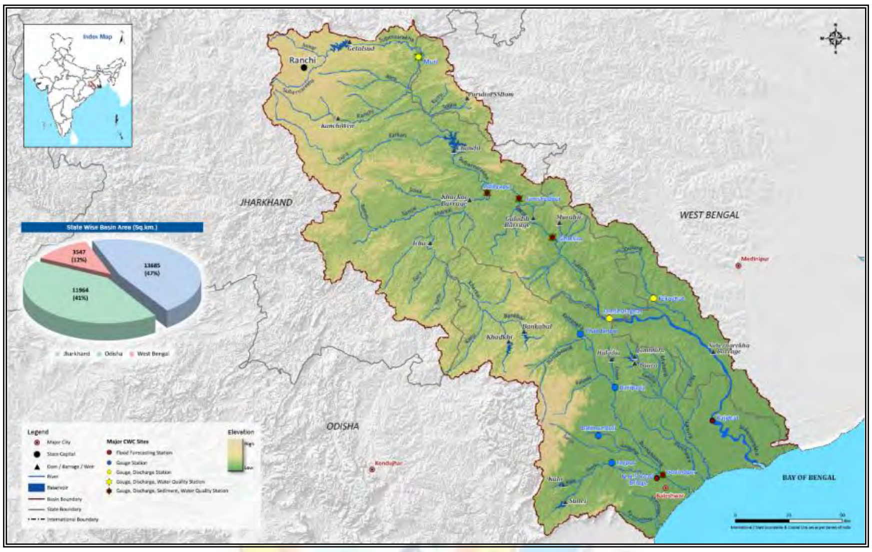


Figure 9: Cauvery River Basin

Rainfall*:* Rainfall varies both spatially and temporally in Subernarekha basin. Annual rainfall of the basin varies from 1,007 mm to 1,810 mm. The mean annual rainfall (1985-2015) in the Subernarekha basin is 1,427 mm. Many times basin receives high rainfall in less duration causing floods in those years.

Climate*:* The Subernarekha basin has a tropical climate with hot summers and mild winters. Mean monthly maximum and minimum temperature varies from 27°C to 25°C in the basin (2004-05).

3.7 Brahmani-Baitarani Basin

The combined Brahmani-Baitarani river basin extends over a geographical area of 53,902 sq.km and the basin is bounded on the north by the Chhotanagpur Plateau, on the west and south by the ridge separating it from Mahanadi basin and on the east by the Bay of Bengal. Through intersection of state administrative boundaries and basin boundary (derived for the present study) state-wise drainage areas are computed. The drainage area of the basin lies in the states of

Odisha (33,923 sq.km.), Jharkhand (15,479 sq.km.) and Chhattisgarh (1,367 sq.km.). The basin is bounded by 20°29'00" to 23°37' 47" North latitude and 83°53'49" to 87°1'27" East longitude.

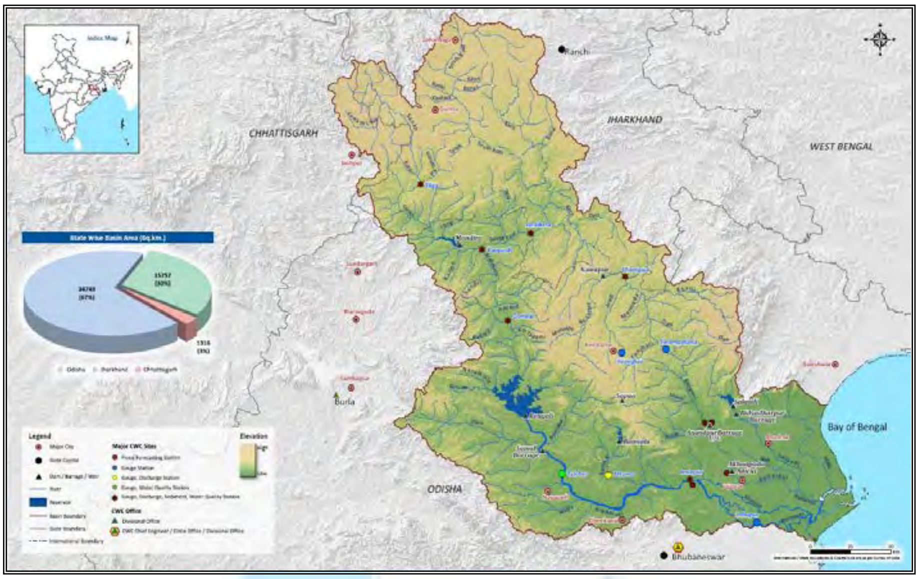


Figure 10: Brahmani-Baitarni River Basin

Rainfall: Rainfall varies both spatially and temporally in Brahmani-Baitarani basin. Annual rainfall of the basin varies from 1,108 mm to 1,452 mm. The mean annual rainfall (1985-2015) in the basin is 1,456 mm. Rainfall varies both spatially and temporally in the Brahmani-Baitarani basin.

Climate: In Brahmani-Baitarani basin, maximum temperature rises to 47 °C during summer while the minimum during winter may be as low as 4 °C. Temperatures in the coastal region are moderate but humidity is higher.

3.8 Mahanadi Basin

The Mahanadi basin extends over states of Chhattisgarh and Odisha and comparatively smaller portions of Jharkhand, Maharashtra and Madhya Pradesh, draining an area of 1,44,905 sq.km which is nearly 4.4% of the total geographical area of the country. The geographical extent of the basin lies between 80°28’ and 86°43’ East longitudes and 19°8’ and 23°32’ North latitudes. The basin has maximum length and width of 587 km and 400 km. It is bounded by the Central India hills on the north, by the Eastern Ghats on the south and east and by the Maikala range on the west. The Mahanadi is one of the major rivers of the country and among the peninsular rivers, in water potential and flood producing capacity, it ranks second to the Godavari. It originates from a pool, 6 km from Farsiya village of Dhamtari district of Chhattisgarh. The total length of the river from origin to its outfall into the Bay of Bengal is 851 km. The Seonath, the Hasdeo, the Mand and the Ib joins Mahanadi from left whereas the Ong, the Tel and the Jonk joins it from right. Six other small streams between the Mahanadi and the Rushikulya draining directly into the Chilka Lake also forms the part of the basin. The major part of basin is covered with agricultural land accounting to 54.27% of the total area and 4.45% of the basin is covered by water bodies. The Mahanadi basin receives major part of its rainfall during the South-West monsoon period. Around

70% of the rainfall takes place during July to September months. The other rainy seasons are not so well defined and well spread as the South-West monsoon season.

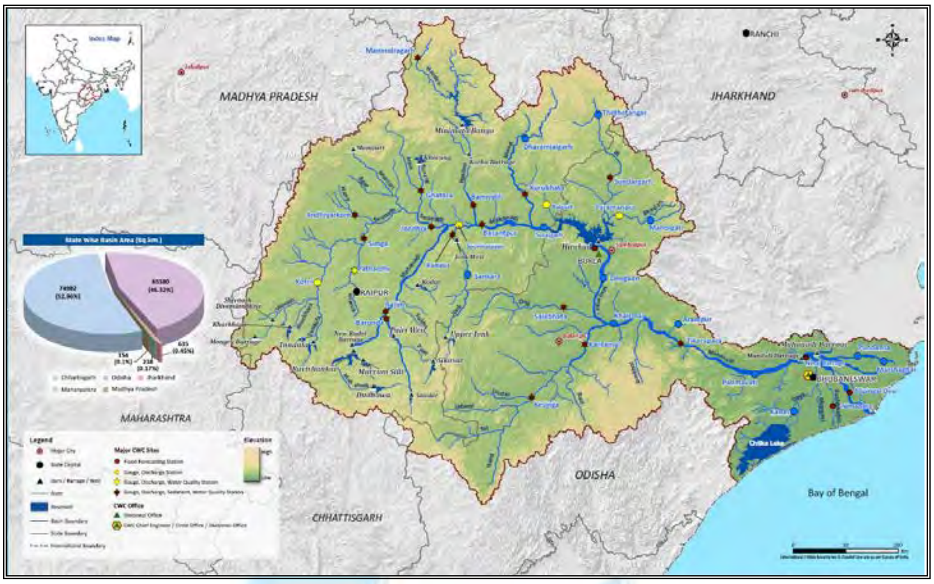


Figure 11: Mahanadi River Basin

Rainfall: Rainfall varies both spatially and temporally in Mahanadi Basin. Annual rainfall of the basin varies from 923 mm to 1,905 mm. The average annual rainfall (1985-2015) in the Mahanadi basin is 1,317 mm.

Climate: The Mahanadi basin has a sub-tropical climate. The mean monthly maximum and minimum temperature is about 29 °C and 21 °C in the basin respectively. Temperatures in the coastal region are moderate but humidity is higher.

3.9 Pennar Basin

The Pennar River (also known as Uttara Pinakini) is one of the major East Flowing Rivers in southern India. It rises in the Chenna Kasava hill of the Nandidurg range in Karnataka, flows in the North Westerly direction through Kolar and Tumkur districts of Karnataka and enters Andhra Pradesh in the Hindupur taluk of Anantapur district, runs eastwards before draining into the Bay of Bengal near Nellore. The Somasila is major project in the catchment area of the river basin. Located in peninsular India, the Pennar basin extends over states of Andhra Pradesh and Karnataka having an area of 54,905 sq.km, which is nearly 1.67 % of the total geographical area of the country with maximum length and width of 433 km and 266 km. The basin lies between 77°1’ to 80°10’ East longitudes and 13°18’ to 15°49’ North latitudes. The fan shaped basin is bounded by the Erramala range on the north, the Nallamala and Velikonda ranges of the Eastern Ghats on the east, the Nandidurg hills on the south and the narrow ridge separating it from the Vedavati valley of the Krishna basin on the west. The other hill ranges in the basin to the south of the river are the Seshachalam and Paliconda ranges. The total length of the river from origin to its outfall in the Bay of Bengal is 597 km. The principal tributaries of the river joining from left are the

Jayamangali, the Kunderu and the Sagileru whereas the Chitravathi, the Papagni and the Cheyyeru join it from right.

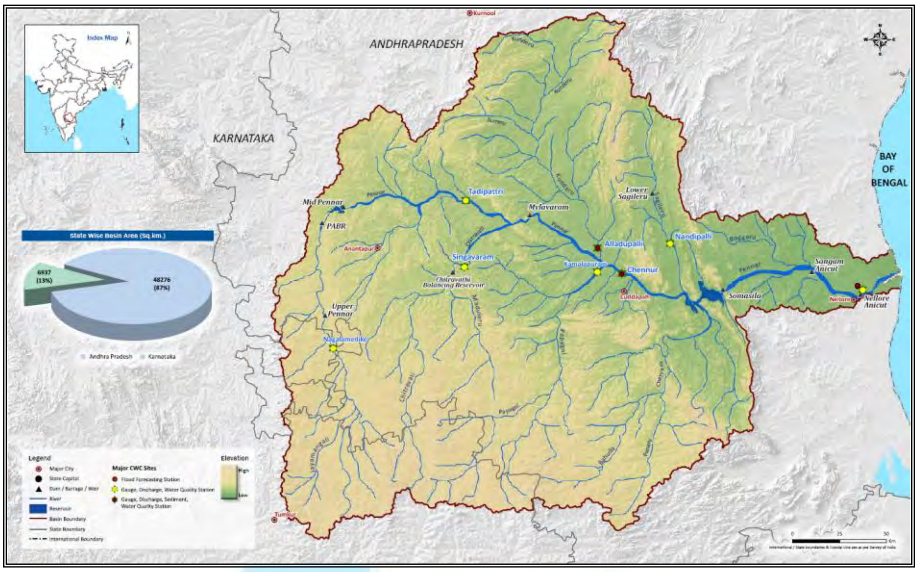


Figure 12: Pennar River Basin

Rainfall: The entire basin lies largely in a semi-arid region with low rainfall. The annual average rainfall is highest in Nellore region in the Eastern end of the basin. A large part of the basin lying in the region of Karnataka and Anantapur, Kurnool and Cuddapah districts of Andhra Pradesh receives rainfall ranging from 400-800 mm. Parts of Nellore district, adjacent to the sea-coast receive some rain from the retreating monsoon also. Mean annual rainfall of the study time period is 716 mm for the basin.

Climate: As far as the temperature is concerned, the annual average maximum, minimum and mean temperature for the basin for the years from 1969 to 2004 is found to be 32.71 °C, 21.63 °C and 27.17 °C respectively.

3.10 Mahi Basin

The Mahi basin extends over an area of 39,566 sq.km (which includes the independent Dhadhar basin having as area of 4,131 sq.km), and is nearly 1.2% of the total geographical area of the country. The basin lies in the states of Rajasthan, Gujarat, and Madhya Pradesh. River Mahi is the major inter-state west flowing river of India. The river is rising from the northern slopes of the Vindhyas near the village of Sardarpur in the Dhar district of Madhya Pradesh at an elevation of about 500 m and draining in to the gulf of Khambhat. Before falling in to Arabian Sea through the Gulf of Khambhat in Kheda district of Gujarat, the river flows about 538 km through Madhya Pradesh, Rajasthan and Gujarat states. The major tributaries of river are Som, Anas and Panam. The Mahi basin receives major part of its rainfall during South-West monsoon, that to in the months of July and August. The other rainy seasons are not so well defined and well spread as the South-West monsoon season. Mean annual rainfall of the study time period is 811 mm for the basin.

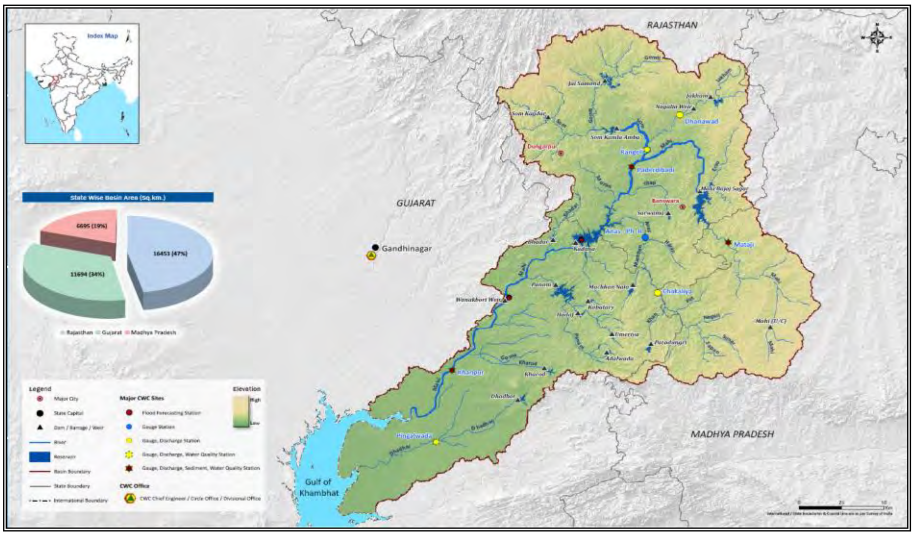


Figure 13: Mahi River Basin

Rainfall: Rainfall varies both spatially and temporally in Mahi basin. The mean rainfall of these 30 years is found to be 811 mm. When spatial variations are considered, some areas receive 405 mm and some other areas receive 1,366 mm annual rainfall for year 2004-05. Major part of the basin receives an annual rainfall of 500 mm to 1,000 mm.

Climate: The mean annual temperature in Mahi basin varies from 25.00 ^{o}C to 27.44 ^{o}C in 2004-05.

3.11 Sabarmati Basin

The Sabarmati River is one of the major west flowing inter-state rivers in India draining into the Gulf of Khambhat. The Sabarmati river originates in the Aravalli hills at latitude 24 ^{o} 40' North and longitude 73^{o} 20' East in the State of Rajasthan at an elevation of 762 m above Mean Sea Level. The basin is bounded by Aravalli hills in the North and north-east, ridge separating it from Minor streams which are flowing into the Rann of Kutch in the west and Gulf of Khambhat in the south. The total catchment area of the Sabarmati basin extends over an area of 31,901 sq.km and is nearly 0.97% of the total geographical area of the country. The basin lies in the states of Rajasthan and Gujarat and have a drainage area of 4,126.2 sq.km and 27,775 sq.km respectively. Before falling in to Arabian Sea through the Gulf of Khambhat in Kheda district of Gujarat, the river flows about 371 km through Rajasthan (48 km) and Gujarat states (323 km). The major tributaries of the Sabarmati are Sei, Wakal, Harnav, Hathmati and Watrak. The Sabarmati basin receives major part of its rainfall during South-West monsoon, in the months of July and August. The other rainy seasons are not so well defined and well spread as the South-West monsoon season. Mean annual rainfall of the study time period is 727 mm for the basin.

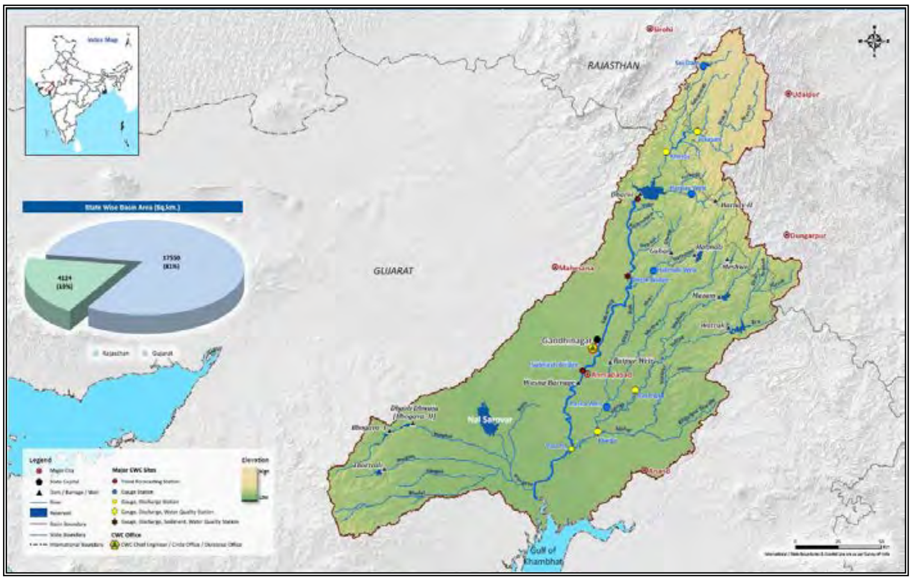


Figure 14: Sabarmati River Basin

3.12 Narmada Basin

The Narmada basin extends over an area of 96,659.79 sq.km, which is nearly 2.9 % of the total geographical area of the country. The basin lies in the states of Madhya Pradesh, Gujarat and Maharashtra. The Narmada originates from a Kund (spring) at an elevation of 1,057 m at Amarkantak in the Maikal hill in Shahdol district of Madhya Pradesh and flows through Madhya Pradesh, Maharashtra and Gujarat between Vindhya and Satpura hill ranges before falling into the Gulf of Cambay in the Arabian Sea, about 10 km north of Bharuch, Gujarat. The total length of this west flowing river from its origin to its outfall into the Arabian Sea is 1,312 km. For the first 1,079 km, it flows in Madhya Pradesh and thereafter forms the common boundary between Madhya Pradesh and Maharashtra for 35 km, and Maharashtra and Gujarat for 39 km. In Gujarat State it stretches for 159 km. There are 41 important tributaries to the Narmada. Significant among them are Burhner, Banjar, Hiran, Tawa, Chhota Tawa, Orsang and Kundi which are major tributaries having catchment area more than 3,500 sq.km. The remaining tributaries are having catchment area ranging from 500 to 2,500 sq.km. The Narmada basin receives major part of its rainfall during the South-West monsoon period. The other rainy seasons are not so well defined and well spread as the South-West monsoon season. Mean annual rainfall of the study time period is 1,114 mm for the basin.

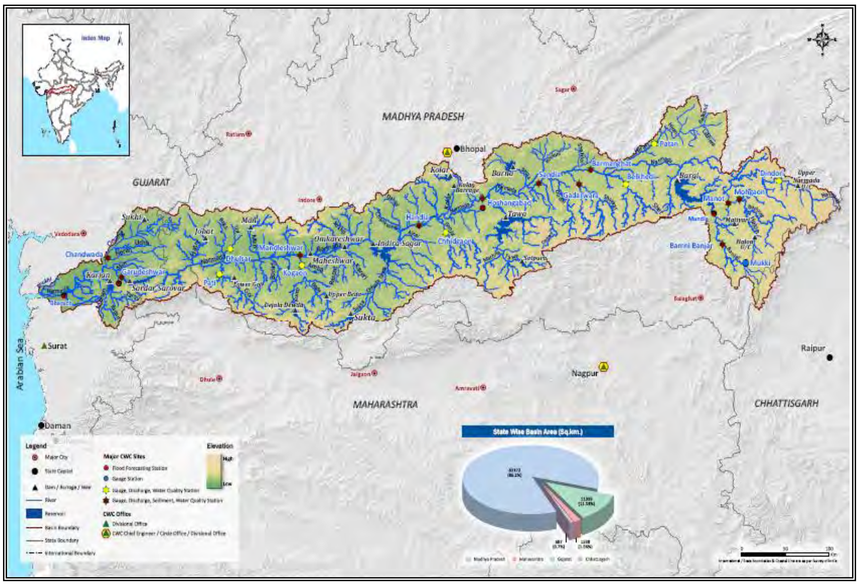


Figure 15: Narmada River Basin

3.13 Tapi Basin

The Tapi basin extends over states of Maharashtra, Madhya Pradesh and Gujarat and having an area of 65,805.80 sq. km which is nearly 2 % of the total geographical area of the country, with a maximum length and width of 534 and 196 km. It lies between 72°33’ to 78°17’ East longitudes and 20°9’ to 21°50’ North latitudes. Situated in the Deccan plateau, the basin is bounded by the Satpura range on the north, the Mahadev hills on the east, the Ajanta Range and the Satmala hills on the south and the Arabian Sea on the west. The hilly region of the basin is well forested while the plains are broad and fertile areas suitable for cultivation. The Tapi is the second largest westward draining river of the Peninsula. It originates near Multai reserve forest in Betul district of Madhya Pradesh at an elevation of 752 m. The total length of the river from origin to outfall into the Arabian Sea is 724 km and its important tributaries are the Suki, the Gomai, the Arunavati and the Aner which joins it from right, and those joining from left are the Vaghur, the Amravati, the Buray, the Panjhra, the Bori, the Girna, the Purna, the Mona and the Sipna. The major part of basin is covered with agriculture accounting to 66.19 % of the total area. 2.99 % of the basin is covered by water bodies. Mean annual rainfall of the study time period is 839 mm for the basin.

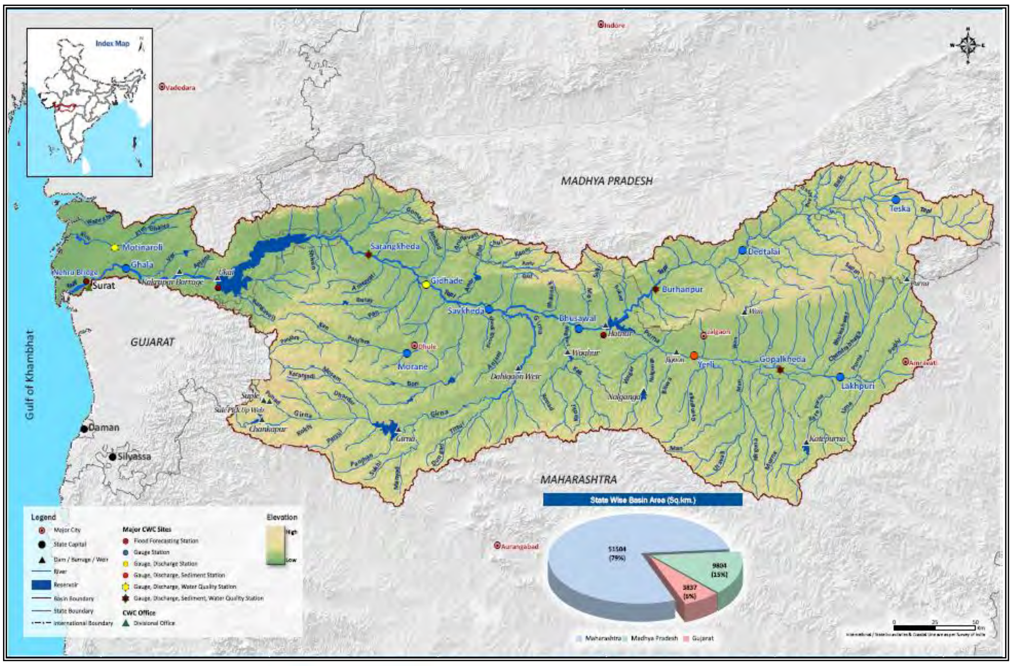


Figure 16: Tapi River Basin

3.14 West Flowing Rivers Basin from Tapi to Tadri Basin Basin

The West Flowing Rivers Basin between Tapi to Tadri is a composite basin lying in Gujarat and Maharashtra states. The basin consists of a number of small independent River systems of peninsular India. The basin is bounded on the north by Tapi basin, on the east by Western Ghat and on the west by the Arabian Sea.

All the Rivers in the basin originate from Western Ghat and exhibit similar character. The Rivers have steep high banks. Important Rivers in the basin are the Purna, the Ambica, the Damanganga, the Vaitarna, the Ulhas, the Kal, the Gad the Mandovi etc. Brief description of the Rivers is as follows:-

- The River Purna is one of the important western flowing Rivers in Gujarat state. It originates from the Satpura Hill Ranges and after flowing for a length of 142 kms falls in the Arabian Sea. The catchment area of the Purna basin is 2,431 km^2.

- The Damanganga is one of the main westward draining interstate River basins. The River originates at an elevation of 930.5 m in Sahyadri Hills in Nashik district. Majority of its catchment area lies in the state of Maharashtra besides some catchment area lying in the state of Gujarat and the Union Territory of Dadra & Nagar Haveli and Daman. The Damanganga drains an area of 2,318 km^2.

- The River Vaitarna originates from the hilly terrain of Maharashtra at Trimbak, in district Nashik. After running for 120 kms in Maharashtra towards west, it falls in the Arabian Sea. The catchment area of the basin is 3,637 km^2.

- The Ulhas River raises from the Sahyadri hill Ranges in the Raigad district of Maharashtra at an elevation of 600 m above MSL. The total length of this west flowing River from its origin to its out fall into the Arabian Sea is 122 kms The River drains an area of 4,637 km^2 which lies completely in Maharashtra state.

- The Kal River is one of the western flowing Rivers in Maharashtra state. This is a major tributary of the River Savitri. The River rises from the Sahyadri Hill Ranges in the Raigad district of Maharashtra at an elevation of 652 m above MSL. The total length of the River from its origin to its confluence with the Savitri River is 40 Kms. The River drains an area of 670 km^2 which lies completely in the Raigad district.

- The Gad River rises from the Sahyadri Hill Ranges in the Sindhudurg district of Maharashtra at an elevation of 600 m above MSL. The total length of the west flowing River from its origin to its out fall into the Arabian Sea is 66 kms The River drains an area of 890 km^2 which lies completely in Sindhudurg district of Maharashtra state.

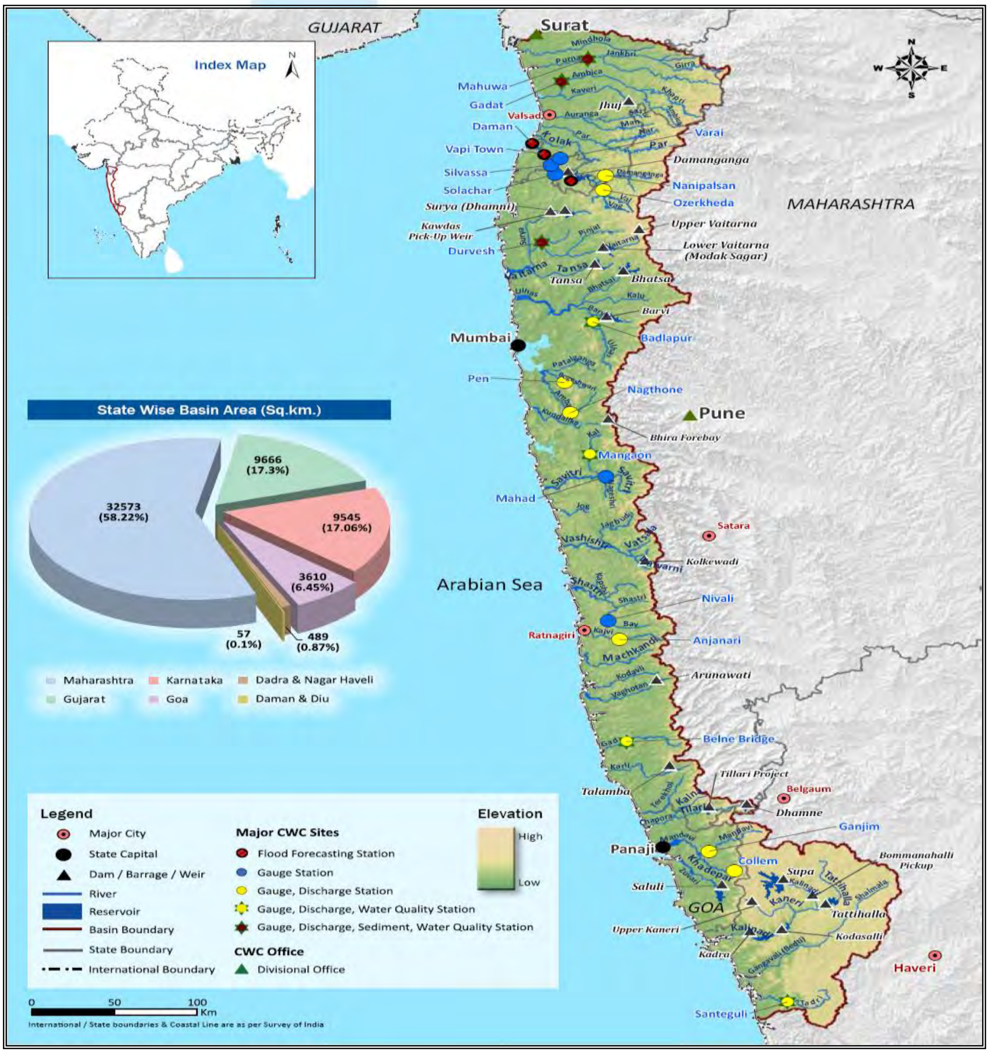


Figure 17: Tapi to Tadri River Basin

3.15 West Flowing Rivers Basin from Tadri to Kanyakumari Basin

The composite basin extends over the states of Kerala, Karnataka, Tamil Nadu, and Union Territory of Puducherry. It has an area of 54,231 sq.km, which is 1.66 % of total geographical area of the country with a maximum length and width of 777 km and 135 km respectively. The basin is divided into nine sub-basins namely Gurpur, Netravati, Valapatanam, Chaliyar, Bharathapuzha, Periyar, Pamba, Kallada, and Others (ungauged portion of composite basin). There are 54-river systems in the basin. The total river length is about 98,395 km. The major independent rivers (directly draining into Arabian Sea) in the basin having length more than 150 km are Bharathapuzha, Periyar, and Pamba. The basin falls into three Agro-Climatic Zones and three Agro-Ecological Zones. As per LULC statistics (2014-15), major part (52.80 %) of the basin is covered with agricultural land. Forest cover in the basin is about 37.90 % of the total basin area. The basin is bounded by Sahyadri hills on the north, the Western Ghats on the east, Indian Ocean on the south, and the Arabian Sea on the west. The mean annual rainfall in the composite basin during 1985-2015 is 2,854 mm. The sub-basins namely Chaliyar, Bharathapuzha, Periyar, and Kallada have lesser rainfall as compared to sub-basins like Gurpur,Netravati, Valapatanam, Pamba, and others. Mean annual rainfall of the study time period is 2,773 mm for the basin.

3.16 East Flowing Rivers between Mahanadi and Pennar

The composite basin extends over an area of 82,073 sq.km. and is nearly 2.50 % of the total geographical area of the country. The basin lies in the states of Andhra Pradesh, Odisha and Telangana and stretches between 78°40′ to 85°1′ East longitudes and 14°34′ to 20°22′ North latitudes. It is bounded by the Eastern Ghats on the north and west, Nallamala Range and Andhra plains on the south and the Bay of Bengal on the east. This composite basin comprises of three river systems. The river systems between Mahanadi and Godavari covers an area of 49,685 sq.km and the river systems between Krishna and Pennar extends over an area of 24,669 sq.km. In addition, there is also a small area between Godavari and Krishna drained mainly by the small stream of Palleru. This minor portion of the basin has an area of about 12,289 sq.km. The independent rivers (directly draining into Bay of Bengal) in the basin from north to south are the Rushikulya, the Bahuda, the Vamsadhara, the Nagavali, the Sarada, the Varaha, the Tandava, the Eluru, the Gundlakamma, the Musi, the Paleru and the Manneru. The major part of basin is covered with agricultural land accounting to 59.85 % of the total area and 3.66 % of the basin is covered by water bodies.

Rainfall: The mean annual rainfall (1985-2015) in the composite basin is 1,144 mm. The South-West monsoon sets in by the middle of June and withdraws by the first week of October. About 90% of total rainfall is received during the monsoon months of which 50% is received during July and August.

Climate: The composite basin has a sub-tropical climate. The average annual monthly maximum temperature is about 29° C and average annual minimum temperature is about 21 °C in the basin. Temperatures in the coastal region are moderate but humidity is higher.

3.17 East Flowing Rivers between Pennar and Kanyakumari Basin

The composite basin comprises the river systems between Pennar and Kanyakumari having an area of 1,01,657 sq.km. The basin lies in the states of Tamil Nadu, Andhra Pradesh, Karnataka, Puducherry and Kerala. The independent rivers (directly draining into Bay of Bengal) are the Kandleru, the Swarnamukhi, the Arani, the Korttalaiyar, the Cooum, the Adyar, the Palar, the Gingee, the Ponnaiyar, the Vellar, the Varshalei, the Vaigai, the Gundar, the Vaippar and the Tambraparni. The basin comprises four sub-basins viz. Vaippar and others sub-basin, the Palar and other sub-basin, Pamba and others sub-basin and Ponnaiyar and other sub-basin. Pennar to Cauvery part of this basin is bounded on the north, west and south by the various ranges of the Eastern Ghats. These are the Velikonda Range, the Nagari Hills, the Javadi Hills, the Shevaroy Hills, the Chitteri Hills, the Kalrayan Hills, the Kollaimalai Hills, the Pachai Malai Hills etc., and on the east by the Bay of Bengal. This basin area has a maximum length of about 290 km and a maximum width of about 360 km. Cauvery to Kanyakumari basin area is bounded by the Varushanad hills, the Andippatti hills, the Cardamom hills and Palani hills on the west, the Indian Ocean on the south, the Palk-Strait, Palk Bay and the Gulf of Mannar on the east and the ridge, which separates it from the Cauvery basin on the north. Shape of the area is irregular; it has a maximum length of 236 km in the northwest-southeast direction and a maximum width of 275 km in the northeast-South-West direction. Mean annual rainfall of the study time period is 960 mm for the basin.

3.18 West Flowing Rivers of Kutch & Saurashtra including Luni Basin

The composite basin extends over large areas in Rajasthan and Gujarat and covers whole of Diu having an area of 1,92,112 sq.km with maximum length and width of 865 km and 445 km. It lies between 67°52’ to 75°19’ East longitudes and 20°53’ to 26°57’ North latitudes. The basin is bounded by Aravalli range and Gujarat plains on the east, Rajasthan desert on north, and the Arabian Sea on the south and the west. Luni is the major river system of the basin and it originates from western slopes of the Aravalli ranges at an elevation of 772 m in Ajmer district of Rajasthan. The total length of the river is 511 km and it drains a total area of 32,879 sq.km. The river flows up to Rann of Kutch forming a delta where the water spreads out and does not contribute any runoff. The main tributaries of Luni joining from left are the Lilri, the Guhiya, the Bandi (Hemawas), the Sukri, the Jawai, the Khari Bandi, the Sukri Bandi and the Sagi whereas the Jojri joins it from right. Other independent rivers of the basin are the Shetrunji, the Bhadar, the Machhu, the Rupen, the Saraswati and the Banas. The Shetrunji drains into the Gulf of Khambhat, the Bhadar outfalls into Arabian Sea, and the Machhu, the Rupen, the Saraswati and the Banas drains into Little Rann of Kutch. The major part of basin is covered with agriculture accounting to 65.06% of the total area and only 5.25% of the basin is covered by water bodies. Mean annual rainfall of the study time period is 479 mm for the basin.

3.19 Area of inland drainage in Rajasthan Desert Basin

The composite basin extends over states of Haryana and Rajasthan and lies between 69°13’ to 77°15’ East longitudes and 25°31’ to 29°44’ north latitudes. The basin is having an area of 1,44,836 sq.km. It is bounded by the Punjab plains on the north and east, Aravalli range on the south and Thar Desert on the west. Small rivers draining into the basin are the Kantu, the Kakni, the Ghugri and the Sukri. The major part of basin is covered with agricultural land accounting to 64.15% of the total area and 0.4% of the basin is covered by water bodies. Mean annual rainfall is 302 mm (1985-2015) for the basin.

3.20 Minor rivers draining into Myanmar (Burma) and Bangladesh Basin

The composite basin extends over states of Manipur (40%), Mizoram (39%), Nagaland (15%) and Tripura (6%) having a total area of nearly 31,382 sq.km and its geographical extent is between 91°33’ to 94°52’ East longitudes and 21°45’ to 26°40’ North latitudes (Figure 3.35). The basin is bounded by Purvanchal range in the north and the west and Bay of Bengal in the east and the south. The Imphal is the main river of the basin and it rises near Kangpokpi in Senapati district of Manipur and receives the Iril from the south and the Thoubal from the east. It also receives the Khuga from the south-west and is known as Manipur River below its confluence. The Chakpi River joins Imphal from the opposite direction 3 km below Shuganu and the combined water flows southward through a narrow gorge to fall into the Chindwin river of Burma. The major part of basin is covered with forest accounting to 71.64% of the total area and only 1.66% of the basin is covered by water bodies. Mean annual rainfall of the study time period is 1,812 mm for the basin.

{Source: this chapter from CWC publication "Reassessment of Water Availability in India using Space inputs" June 2019 from Basin Planning & Management Organization, CWC, New Delhi. (http://old.cwc.gov.in/main/downloads/ReassessmentMainReport.pdf)}

CHAPTER 4

4.0 River Water Quality Monitoring by CWC

Presently, Central Water Commission (CWC) is monitoring river water quality at 531 key locations covering all the major River basins of India. Previously, it was 429 water quality monitoring stations, but in perspective of strengthening of water quality network in CWC it was increased from 429 to 531 stations. Further, CWC is planning to increase the water quality network on Indian rivers by considering future objectives and necessacities, to cover each and every corner in the country.

The details of basin wise water quality stations are given below. The basin wise WQ stations monitored by Central Water Commission are depicted in Table 2.

Table 2: Basin-wise Water Quality Stations of Central Water Commission

S.No.	Name of Basin	Type of Staion				Total
		GDQ	GDSQ	GQ	WQSS	
1	Brahamputra, Barak & Meghana Basin	23	28	31		82
2	Brahmani-Baitarni Basin		9	1	14	24
3	Cauvery Basin	16	24			40
4	EFR b/w Mahanadi and Pennar		5	5		10
5	EFR b/w Pennar and Kanyakumari	10	9			19
6	Ganga Basin	49	86	5	5	145
7	Godavari Basin	5	32	2		39
8	Indus Basin	3	6			9
9	Krishna Basin	7	28			35
10	Mahanadi Basin	1	20	7	8	36
11	Mahi Basin	1	3			4
12	Narmada Basin	5	11			16
13	Pennar Basin	4	4			8
14	Sabarmati Basin	1	1		1	3
15	Subarnarekha Basin	1	5	3	5	14
16	Tapi Basin	1	3			4
17	WFR from Tadri to Kanyakumari	11	18			29
18	WFR from Tapi to Tadri	3	5	1		9
19	WFR of Kutchh, Saurashtra including Luni	2	3			5
20	Minor Rivers draiing to Myanmar (Burma) and Bangaldesh	0	0	0	0	0
Grand Total		**143**	**300**	**55**	**33**	**531**

Note: GQ = Gauge & Water Quality; GDQ= Gauge, discharge & Water Quality; GDSQ= Gauge, Discharge, Sediment & Water Quality, WQSS = Water Quality Sampling Station

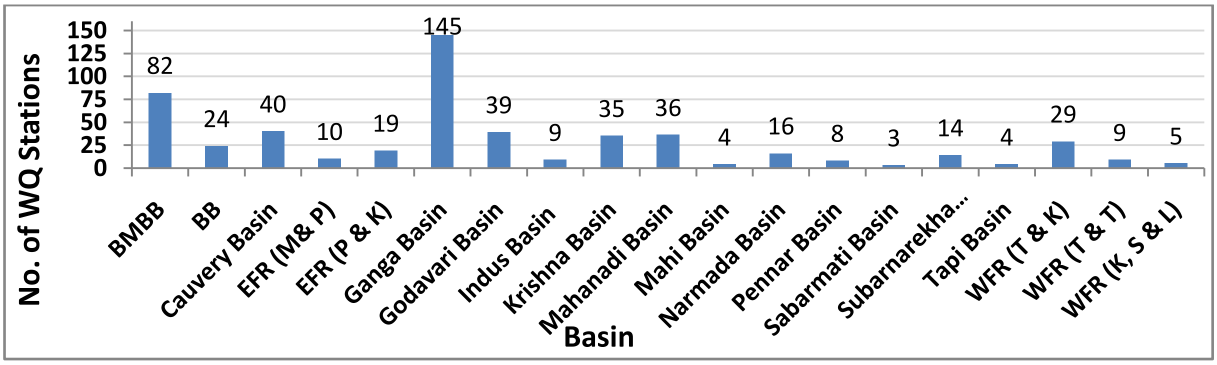


Figure 18: Basin-wise Water Quality Stations of Central Water Commission

The State wise WQ stations monitored by Central Water Commission are depicted in Table 3.

Table 3: State wise Water Quality Stations of Central Water Commission

S.No.	State	Type of Stations				Total
		GDQ	GDSQ	GQ	WQSS	
1	Andhra Pradesh	6	21	2		29
2	Arunachal Pradesh	4	1	8		13
3	Assam	8	18	23		49
4	Bihar	4	14			18
5	Chhattishgarh	1	18	4	8	31
6	Delhi	1	1			2
7	Gujarat	4	9	1	1	15
8	Haryana	1	1			2
9	Himachal Pradesh	3	2			5
10	Jammu & Kashmir	3	4			7
11	Jharkhand	3	6	1	4	14
12	Karnataka	14	24			38
13	Kerala	4	17			21
14	Madhya Pradesh	13	22	1		36
15	Maharashtra	6	32	1		39
16	Meghalaya	5	1			6
17	Odisha	1	18	10	15	44
18	Pondicherry	3				3
19	Rajasthan	5	7			12
20	Tamilnadu	20	22			42
21	Tripura		1			1
22	Utrakhand				1	1
23	Uttar Pradesh	20	39	3	4	66
24	Uttarakhand	5	6			11
25	West Bengal	9	16	1		26

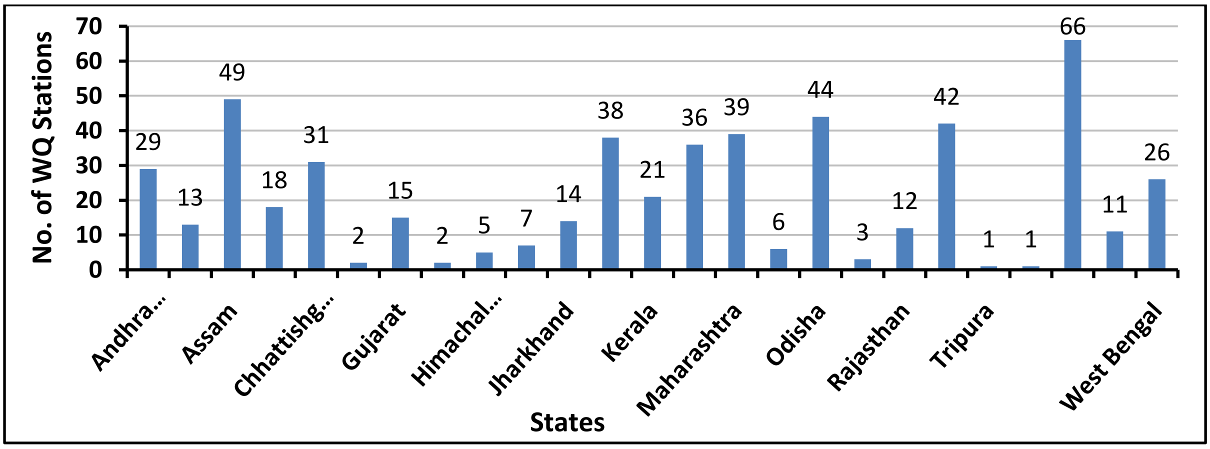


Figure 19: State wise Water Quality Stations of Central Water Commission

CHAPTER 5

5.0 Review of Trace & Toxic Metals

Heavy metals are one of the most widespread causes of pollution both in water and the soil; Further, increasing levels of these metals concentration in the environment is causing serious concern in public opinion owing to the toxicity shown by most of them. Heavy metals are usually defined as metals with high atomic number, atomic weight and a density greater than 5.0 g/cm^3, but in the literature it is possible to find so many different definitions. Recently, International Union of Pure and Applied Chemistry (IUPAC) defined the term "heavy metal" as a confusing and misleading one. Generally speaking, metals are natural components of the Earth's crust and some of them (e.g. copper, selenium, and zinc) are essential as trace elements to maintain the metabolism of the human body although at higher concentrations, they may show toxic effects. Many other metals (e.g. mercury, cadmium, lead, etc.) have direct toxic effects on human health. Owing to their chemical characteristics, metals remain in the environment, in many cases only changing from one chemical state to another one and eventually accumulating in the food chain. These pollutants enter the environment through a variety of human activities such as mining, refining and electroplating industries. The effluents produced by these industries contain a variety of heavy metals such as cadmium, copper, chromium, nickel, lead and zinc, subsequent release of these effluents into water bodies may significantly contribute to the increment in loads of toxic heavy metals in aquatic environments. Because of their high water solubility, heavy metals can be easily absorbed by living organisms and, due to their mobility in natural water ecosystems and their toxicity to living forms, have been ranked as major inorganic contaminants in surface and ground waters. Even if they may be present in dilute, almost undetectable quantities, their recalcitrance to degradation and consequent persistence in water bodies imply that, through natural processes such as bio-magnification, their concentration may become elevated to such an extent that they begin exhibiting toxic effects. Out of the 35 metals considered dangerous for human health, 23 have been defined as heavy metals: antimony, arsenic, bismuth, cadmium, cerium, chromium, cobalt, copper, gallium, gold, iron, lead, manganese, mercury, nickel, platinum, silver, tellurium, thallium, tin, uranium, vanadium, and zinc. However, the major lethal effects to human health caused by these heavy metals are associated with exposure to lead, cadmium, mercury and arsenic (this element is a metalloid but it is usually defined as a heavy metal). Large amounts of any of these metals may cause acute or chronic toxicity (poisoning), resulting in damaged or reduced mental and central nervous functions, modify blood composition, damage the lung, kidney, liver, and other vital organs.

Long-term exposure to the above-mentioned heavy metals may result in slowly progressing physical, muscular, and neurological degenerative processes that mimic Alzheimer's disease, Parkinson's disease, muscular dystrophy and multiple sclerosis.

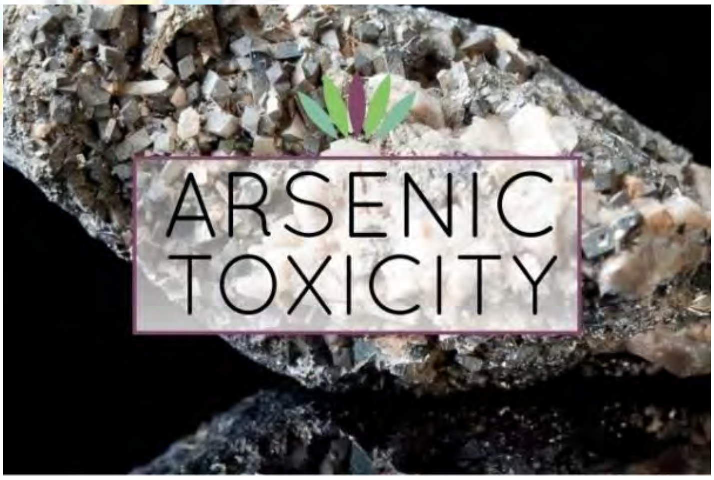
Allergies are not uncommon and repeated long term contact with some metals or their compounds may even cause cancer. Heavy metals may enter the human body through food, water and air, or it may be absorbed through the skin when they enter into contact with humans in agriculture and in manufacturing, pharmaceutical, industrial or residential settings. Although several adverse health effects of heavy metals have been known since a long time, exposure to these metals is continuing and even increasing in some parts of the world. Thus, the control of heavy metal dumplings and the removal of toxic heavy metals from waters has become a challenge for the twenty-first century.

5.1 Metal Toxicity:

Important issues related to selected toxic metals like occurrences in nature, sources of water pollution, toxic effects etc. are described here under:

5.1.1 Toxicity of Arsenic

Chemical Properties:



Arsenic is ubiquitous and ranks 20th in natural abundance, comprising about 0.00005% of the earth's crust, 14th in the seawater, and 12th in the human body (Mandal and Suzuki, 2002). Arsenic occurs in the environment in rocks, soil, water, air and in biota.

The element occurs in the environment in different oxidation states e.g. As as As(V), As(III), As(0) and As(-III). The chemical forms and oxidation states of ars enic are more important as regards to toxicity. Generally, inorganic forms are more toxic and mobile than organo-arsenic species, while arsenite is considered to be more toxic than arsenate. It has been reported that As(III) is 4 to 10 times more soluble in water than As(V) (Squibb and Fowler 1983; Xu et al. 1988; Lambe and Hill 1996; US EPA, 2002). Moreover, it has been found that As(III) is 10 times more toxic than As(V) and 70 times more toxic then Mono Methyl Arsonate {MMA(V)} and Di Methyl Arsinate {DMA(V)}. However, the trivalent methylated arsenic species, i.e., MMA(III) and DMA(III) have been found to be more toxic than inorganic arsenic because they are more efficient at causing DNA breakdown (Styblo et al. 2000; Dopp et al. 2004).

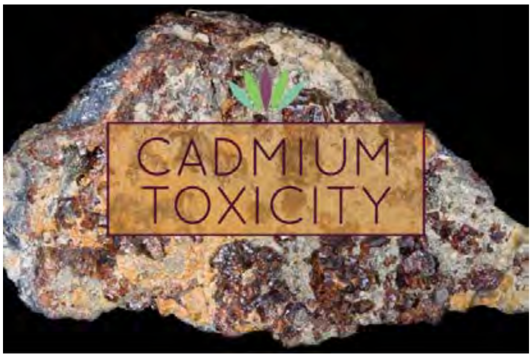
Health Effects:

Arsenic enters the human body through ingestion, inhalation or skin absorption. Most ingested and inhalated arsenic is well absorbed through the gastrointestinal tract and lung into the

bloodstream. People drinking arsenic contaminated water generally show arsenical skin lesions, which are a late manifestation of arsenic toxicity. Long term exposure to arsenic contaminated water may lead to various diseases such as conjunctivitis, hyperkeratosis, hyperpigmentation, cardiovascular diseases, disturbance in the peripheral vascular and nervous systems, skin cancer, gangrene, leucomelonisis, non pitting swelling, hepatomegaly and splenomegaly (Kiping, 1977; WHO, 2001; Pershagen, 1983). Chronic symptoms caused by a long exposure to As are unspecific (weight loss, chronic weakness) but a long exposure provokes arsenicosis, cardiovascular diseases, skin lesions among other organ function disorders (Bissen and Frimmel 2003). Arsenicosis is a chronic illness resulting from drinking water with high As level over a long period of time (Kapaj et al. 2006). The effects on the lungs, uterus, genitourinary tract and other parts of the body have been detected in the advance stages of arsenic toxicity. Besides, high concentrations of arsenic in drinking water also result in an increase in stillbirths and spontaneous abortions (Csanady and Straub, 1995).

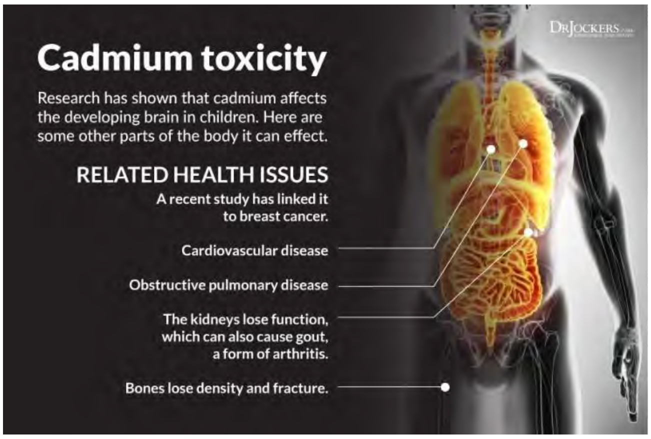
5.1.2 Toxicity of Cadmium

Chemical Properties:



Cadmium is an element that occurs naturally in the earth's crust. It is uniformly distributed in the Earth's crust, where it is generally estimated to be present at an average concentration of between 0.10 and 0.50 µg/L. Cadmium occurs in nature in the form of various inorganic compounds and as complexes with naturally occurring chelating agents; organo-cadmium compounds are extremely unstable and have not been detected in the natural environment. Cadmium is produced during extraction of zinc and is used in plating industry, pigments, in manufacture of plastic material, batteries and alloys. The water is contaminated with cadmium by industrial discharge, leaches from land filled area. Drinking water is generally contaminated with galvanized iron pipe, plated plumbing fitting of the water distribution pipes. Cadmium ranks next to mercury in its toxicity.

Health Effects:

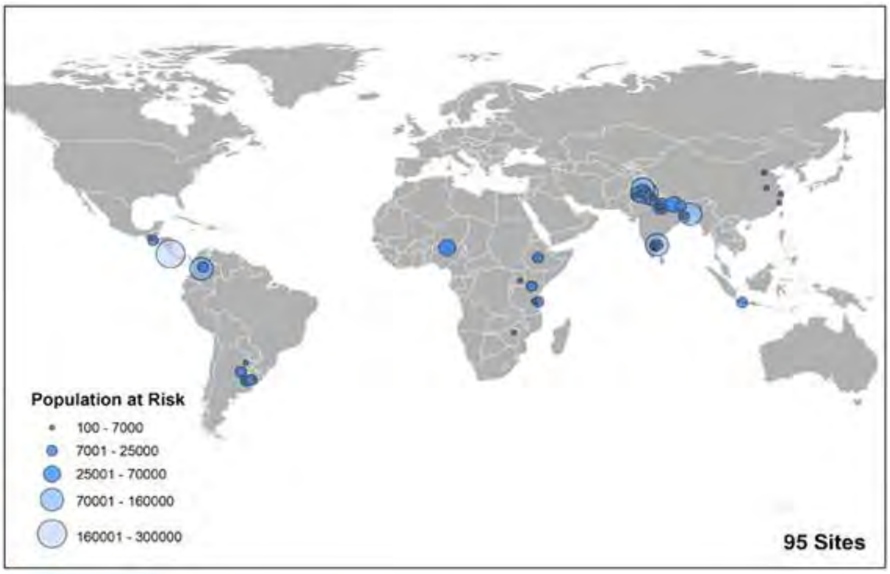


Exposure at low levels usually does not produ ce immediate health effects, but may cause severe health problems over long periods. The gastrointestinal tract is the major route of Cd uptake in both humans and animals. Cadmium is toxic to humans, animals, micro-organisms and plants, however only a small amount of cadmium intake is absorbed by the body and will be stored mainly in bones, liver and, in case of chronic exposure, in kidneys. In the last few years there have been some evidences that relatively low cadmium exposure may give rise skeletal damage due to low bone mineral density (osteoporosis) and fractures. The toxicity of the metal lies in that, after absorption, it accumulates in soft tissues. Animal tests have shown that cadmium may be a risk factor for cardiovascular disease (Jarup, 2003). For acute exposure, absorbed cadmium can cause symptoms such as salivation, difficulty in breathing, nausea, vomiting, a pain, anemia, kidney failure, and diarrohea. Inhalation of cadmium dust or smoke may cause dryness of the throat, headache, chest pain, coughing, increased uneasiness and bronchial complications (Lu et al., 2007). The adverse health effects caused by ingestion or inhalation of Cd include renal tubular dysfunction due to high urinary Cd excretion, high blood pressure, lung damage and lung cancer.

Furthermore, cadmium accumulation in animals and humans occurs throughout their life spans. The sites of greatest cadmium accumulation are the liver and kidney. After inhalation or absorption from the gastrointestinal, cadmium is concentrated in the kidney, where its half-life may exceed 10 to 20 years. One of the most widely known toxic effects manifested by Cd poisoning is nephro-toxicity. Adverse renal effects are more commonly seen with exposure to low levels of Cd. The effects are manifested by excretion of low-molecular-weight plasma proteins, such as β2-microglobulin and retinol-binding protein (RBP). -The widely reported Cd poisoning ***itai-itai byo*** episode occurred in Japan after World War II. In Japan cadmium from mining and refinery factories polluted Jinzo River water which was used for irrigation purpose. The rice grown on such cadmium accumulated fields, which the humans consumed through water and food chain affected by ostomolacia and skeletal deformation. There was sever pain in body and joints and the people cried *ITAI –ITAI* (it hurts-it hurts).

5.1.3 Toxicity of Chromium

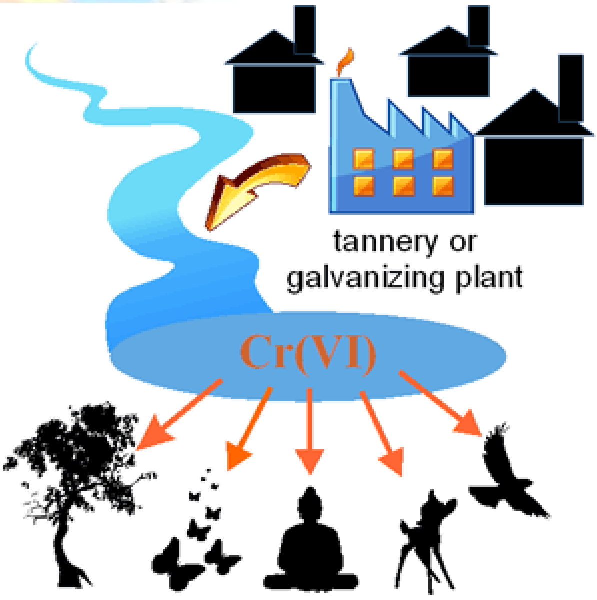
Chemical Properties:



Chromium Pollution from Tanneries

(Source: Blacksmith Institute's The World's Worst Toxic Pollution Problums Report, 2011)

Chromium can exist in valencies from -2 to 6 but it present in the environment mainly as trivalent or hexavalent state. Trivalent chromium (Cr [III]) is the most common naturally occurring state; most soils and rocks contain small amounts of chromic oxide (Cr_2O_3). Hexavalent chromium (Cr[VI]) occurs frequently in nature as chromates (CrO_4^{2-}) and dichromates ($Cr_2O_7^{2-}$) which are generally obtained from industrial and domestic emissions. Chromium is considered as an essential nutrient and a health hazard because Cr exists in more than one oxidation state. Specifically, Cr in oxidation state +6, written as Cr(VI), is considered harmful even in small intake quantity (dose) whereas Cr in oxidation state +3, written as Cr(III), is considered essential for good health in moderate intake. Chromium (III) is an essential nutrient for humans and shortages may cause heart conditions, disruptions of metabolisms and diabetes. Trivalent chromium is necessary for the synthesis of fat from glucose and also for the oxidation of fat to carbon dioxide. But the uptake of too much chromium (III) can cause health effects as well, for instance skin rashes.



Source: Matveyeva N.A., Dupliy V.P., Hydrobiological Journal. – 2013.

Health Effects:

People who smoke tobacco also have a higher chance of exposure to chromium. Chromium (VI) is known to cause various health effects. When it is a compound in leather products, it can cause allergic reactions, such as skin rash. After breathing in, chromium (VI) can cause nose irritations and nosebleeds. Other health problems that are caused by chromium (VI) are:

- Skin rashes
- Upset stomachs and ulcers
- Respiratory problems
- Weakened immune systems
- Kidney and liver damage
- Alteration of genetic material
- Lung cancer
- Death

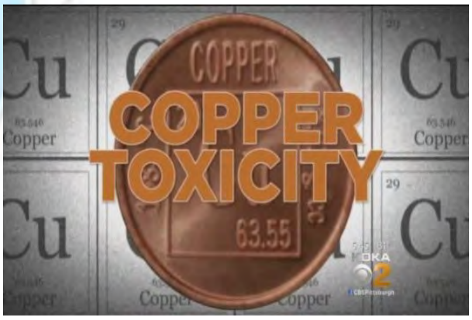
The health hazards associated with exposure to chromium are dependent on its oxidation state. The metal form (chromium as it exists in this product) is of low toxicity and the hexavalent form is toxic. Adverse effects of the hexavalent form on the skin may include ulcerations, dermatitis, and allergic skin reactions. Inhalation of hexavalent chromium compounds can result in ulceration and perforation of the mucous membranes of the nasal septum, irritation of the pharynx and larynx, asthmatic bronchitis, bronchospasms and edema. Respiratory symptoms may include coughing and wheezing, shortness of breath and nasal itch.

Hexavalent chromium is toxic to plants and animals. It causes yellowing of leaves of wheat and paddy. Maximum permissible limit of chromium in drinking water as recommended by WHO is 0.05 mg/L.

5.1.4 Toxicity of Copper

Chemical Properties:

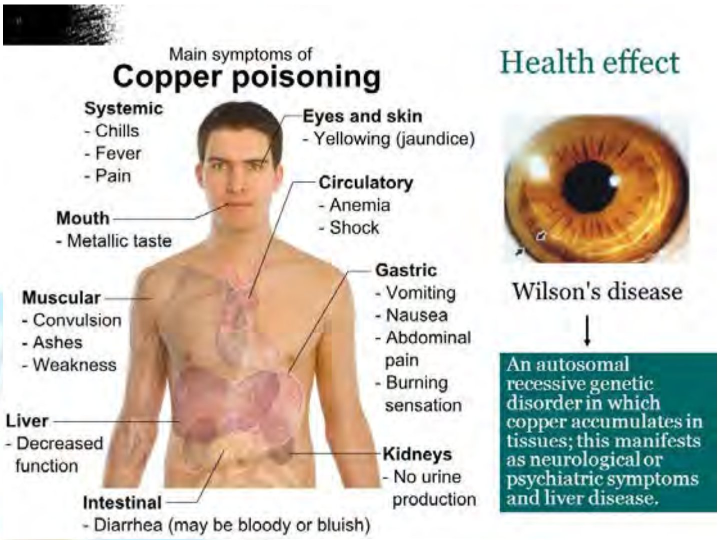
Copper is an essential micronutrient (Underwood 1977; Goyer 1991). The Food and Nutrition Board (FNB) recommends dietary copper intake for adults of 1.53 mg/day (NRC, 1989). Three major valence states: copper metal Cu(0), Cu(I) and Cu(II). Copper is commonly found in ores. Copper occurs in nature as the metal and in minerals, most commonly cuprite (Cu_2O) and malachite ($Cu_2CO_3(OH)_2$). The principal copper ores are sulphides, oxides, and carbonates.



Copper is both essential and toxic to living systems. As an essential metal, copper is required for adequate growth, cardiovascular integrity, lung elasticity, neovascularization, neuroendocrine functions, and iron metabolism. An average adult human ingests about 1 mg of copper per day in the diet; about half of which is absorbed (Harris 1997). Copper is obligatory for enzymes involved in aerobic metabolism, such as cytochrome oxidase in the mitochondria, lysyl oxidase in connective tissue, dopamine mono-oxygenase in brain, and ceruloplasmin. As a co-factor for apo-copper-zinc superoxide dismutase (apoCuZnSOD), copper protects against free-radical damage to proteins, membrane lipids, and nucleic acids in a wide range of cells and organs.

Health Effects:

Severe copper deficiencies, either gene defects due to mutations or low dietary copper intakes, although relatively rare in humans, have been linked to mental retardation, anemia, hypothermia, neutropenia, diarrhea, cardiac hypertrophy, bone fragility, impaired immune function, weak connective tissue, impaired central-nervous-system (CNS) functions, peripheral neuropathy, and loss of skin, fur (in animals), or hair color (Linder and Goode 1991; Uauy et al. 1998; Cordano 1998; Percival 1998).



Long-term exposure to copper can cause irritation of the nose, mouth and eyes and it causes headaches, stomachaches, dizziness, vomiting and diarrhea. Intentionally high uptakes of copper may cause liver and kidney damage and even death. Whether copper is carcinogenic has not been determined yet. There are scientific articles that indicate a link between long-term exposure to high concentrations of copper and a decline in intelligence with young adolescents. Whether this should be of concern is a topic for further investigation. Industrial exposure to copper fumes, dusts, or mists may result in metal fume fever with atrophic changes in nasal mucous membranes. Chronic copper poisoning results in *Wilson's Disease*, characterized by a hepatic cirrhosis, brain damage, demyelination, renal disease, and copper deposition in the cornea.

Excess amount of copper sulphate also shows detrimental effect on botanical environment. Copper in ionic form is very toxic to the photosynthesis of the green algae, Chlorella pyrenoidosa and the diatom, Nitzchiz palea in concentrations of copper normally found in natural waters. Copper accumulates progressively in soils where copper fungicides are used, particularly in vineyards and orchards, which are spread repeatedly. Thus, it is seen that though copper is essential of life and health, its deficiency or excesses both cause adverse effects.

5.1.5 Toxicity of Iron

Chemical Properties:

Iron is essential to almost all living things, from micro-organisms to humans. Iron is the fourth most abundant element in the earth's crust and the most abundant heavy metal; it is present in the environment mainly as Fe (II) or Fe (III). Iron is generally present in surface waters as salts containing Fe (III) when the pH is above

7. Most of those salts are insoluble and settle out or adsorbed onto surfaces; therefore, the concentration of iron in well-aerated waters is seldom high. Under reducing conditions, which may exist in groundwater, some lakes or reservoirs, and in the absence of sulphide and carbonate, high concentrations of soluble Fe(II) may be found. The presence of iron in natural waters can be attributed to the weathering of rocks and minerals, acidic mine water drainage, landfill leachates, sewage effluents and iron-related industries.

Health Effects:

Iron, an essential element in human nutrition, is an integral component of cytochromes, porphyrins and metalloenzymes. Dietary iron requirements vary according to sex and age; older infants, children and women of menstrual age are most vulnerable to iron deficiency. Iron is an essential constituent in plant metabolism. It is indispensable for the synthesis of chlorophyll in green plants, although it does not enter in the constituent of the chlorophyll molecules. Most of the iron in plants is present as a constituent of organic molecules, enzymes and carries catalase, peroxide and cyto-chromes which play important role in cellular metabolism. Iron is indispensable for the synthesis of chlorophyll molecules. Deficiency of iron in plants causes chlorosis. It is one of the most immobile elements in plants.

Iron is also widely distributed in human body where it exists in the ionic (loosely bound, inorganic iron) and nonionic (tightly bound organic form) state. It is also a constituent of hemoglobin molecule. It is more often suggested that iron deficiency predispose children to lead poisoning. Deficiency of iron with other trace elements is the cause of pica (a morbid appetite for unusual or unfit food, as clay, chalk, ashes, bricks etc., showing itself especially in hysteria, pregnancy and chlorosis). Iron deficiency also affects the transport of lead to the tissue. According to Dr. Ronald Hoffman, depending upon the age, sex and body weight, minimum daily requirement of iron varies from 6 mg/day to 30 mg/day. Following are the recommendations for intakes of iron, according to Dr. Hoffman:

- Infants upto 6 months require 6 mg/day.
- From 6 months to 1 year, 10 mg/day is required.
- Children age 1 to 10 years, require 10 mg/day.
- Males age 11 to 18 years, require 12 mg/day.
- Males age 19 to 51+ years, require 10 mg/day.
- Females age 11 to 50 years, require 15 mg/day.
- Females over 51 years, require 10 mg/day.
- Pregnant women require 30 mg/day.
- Lactating women require 15 mg/day.

Toxic iron builds up across the body and can cause serious damage to vital organs, including the heart and liver.

Thus while normal amount of iron is essential, the normally large amount adversely affects the human system, which may result in haemochromatosis. Iron absorption is enhanced by heme, ascorbic acid, amino acids and inhibited by tannins, calcium, phosphate, phytic acid and fibers. Although the human body contains only about 0.004% iron, this element plays a central role in the life processes. As a constituent of the respiratory pigment haemoglobin, iron is essential for the functioning of every organ and tissue of the human body. Over half of the iron is present in the form of haemoglobin; the remaining iron is stored mainly in the liver. Nutritional anaemia is one of the most prevalent deficiency diseases throughout the world. Although anaemia may result from many different causes, the form most frequently encountered is iron deficiency anaemia (Tsai, 1975). Anaemia is a major health problem in India, with over half of ever-married woman having the condition. The problem clearly requires immediate attention and intervention.

Iron usually exists in natural water both in ferric and ferrous form. The form of iron however may be altered as a result of oxidation or reduction due to the growth of bacteria in the water during storage, usually the ferric form is predominant in the most of the natural waters. Iron in water may be either in true solution or in a colloidal state or in the form of relatively coarse suspended particles. The iron determination is helpful in assessing the extent of corrosion and aiding in the solution of these problems. Research on corrosion and methods of corrosion control requires the use of many types of tests to evaluate the extent of metal loss. The most important one of them is the iron determination (Sawyer, 1978). In drinking water 0.3 mg/L is the highest desirable limit and 1 mg/L the maximum permissible limit of iron in absence of alternative sources.

5.1.6 Toxicity of lead

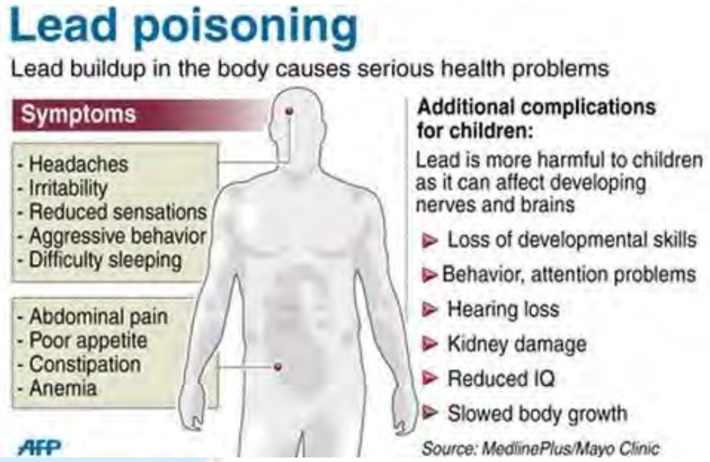
Chemical Properties:

Lead is the most common in the heavy elements. Several stable isotopes exist in nature, ^{208}Pb being the most abundant. Lead is used mainly in the production of lead-acid batteries, solder and alloys. The organo-lead compounds tetraethyl and tetramethyl lead have also been used extensively as antiknock and lubricating agents in petrol, although their use for these purposes in many countries is being phased out. Owing to the decreasing use of lead containing additives in petrol and of lead containing solder in the food processing industry, concentrations in air and food are declining, and intake from drinking water constitutes a greater proportion of total intake.

Lead toxicity has been known for over two thousand years. The early Greeks used Pb as a glazing for ceramic pottery and became aware of its harmful effects when it was used in the presence of acidic foods. Researchers suggest that some Roman emperors became ill and even died as a result of Pb poisoning from drinking wines contaminated with high levels of Pb.

Health Effects:

Lead is found in all human tissues and organs though it is not needed nutritionally. It is known as one of the systemic poisons because, once absorbed into the circulation it will distribute throughout the body, where it affects various organs and tissues. It inhibits hematopoiesis (formation of blood or blood cells) because it interferes with heme synthesis, and Pb poisoning may cause anaemia. Pb also affects the kidneys by inducing renal tubular dysfunction. This, in turn, may lead to secondary effects. Effects of Pb on the gastrointestinal tract include nausea, anorexia, and severe abdominal cramps (lead colic) associated with constipation. Pb poisoning is also manifested by muscle aches and joint pain, lung damage, difficulty in breathing, and diseases such as asthma, bronchitis, and pneumonia. Pb poisoning can also damage the immune system, interfering with cell maturation and skeletal growth. Pb can pass the placental barrier and may reach the fetus, causing miscarriage, abortions and stillbirths.



According to the CDC, lead poisoning is the most common and serious environmental disease affecting young children. Children are much more vulnerable to Pb exposure than adults because of their more rapid growth rate and metabolism. Pb absorption from the gastrointestinal tract in children is also higher than in adults (25% vs. 8%), and ingested Pb is distributed to a smaller tissue mass. Children also tend to play and breathe closer to the ground, where Pb dust concentrates. One particular problem has been the Pb poisoning of children who ingest flakes of lead-based paint. This type of exposure accounts for as much as 90% of childhood Pb poisoning. The main health concern in children is retardation and brain damage. High exposure may be fatal.

Plants grown in lead mining area are known to accumulate high levels of lead. Plants near highways accumulate atmospheric dust containing Pb as foliar deposits, from the combustion of petrol as well as absorb if from soil.

5.1.7 Toxicity of Nickel

Chemical Properties:

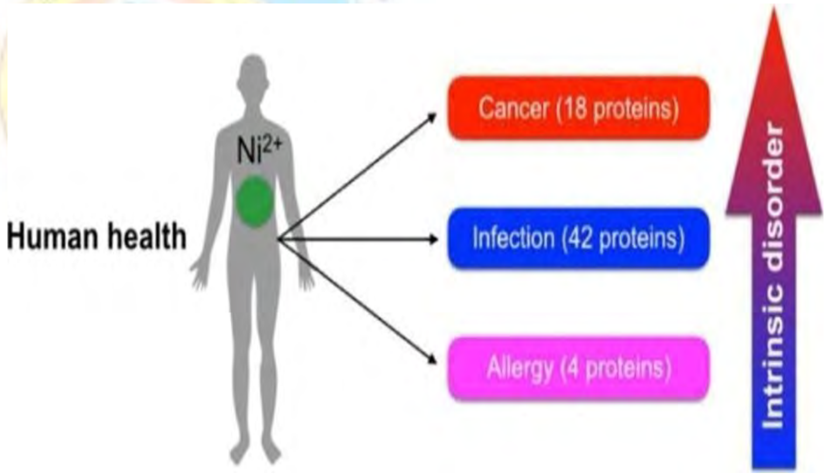
Nickel is the 24th most abundant element (twice as Cu) and comprises approximately 0.008% of the content of the earth's crust; hence, it is a natural component of soil (parent material) and water (Alloway 1995; Hostynek and Maibach 2002; Hedfi et al. 2007). It is the 5th most abundant element in the biosphere, Ni was only discovered through the

mining of other metals. Its principal ores are nickelite (NiAs), millerite (NiS), and pentlandite ([Ni, Fe]S).

Nickel is released into the environment from a variety of natural and anthropogenic sources. Among industrial sources, a considerable amount of environmental Ni derives from the combustion of coal, oil, and other fossil fuels. Other industrial sources that contribute to nickel emissions are mining and refining processes, nickel alloy manufacturing (steel), electroplating, and incineration of municipal wastes (Sharma 2005; Ensink et al. 2007). Wastewater from municipal sewage treatment plants also contributes to environmental metal accumulation (van der Hoek et al. 2002).

Health Effects:

In small quantities nickel is essential, but when the uptake is too high it can be a danger to human health. Humans may be exposed to nickel by breathing air, drinking water, eating food or smoking cigarettes. Skin contact with nickel-contaminated soil or water may also result in nickel exposure. The most common type of Ni exposure for the public is through direct skin contact with Ni plating. $Ni(CO)_4$ gas is the most toxic out of the Ni compounds and it is the first to cause deaths in refineries. The immediate symptoms included headaches, nausea, weakness, dizziness, vomiting, and epigastric pain. There was a latency period of 1 to 5 days, followed by secondary symptoms which included chest constriction, chills and sweating, shortness of breath, coughing, muscle pains, fatigue, gastrointestinal discomfort and in severe cases, convulsions and delirium.



Nickel fumes are respiratory irritants and may cause pneumonitis. Exposure to nickel and its compounds may result in the development of a dermatitis known as “nickel itch” in sensitized individuals. The first symptom is usually itching, which occurs up to 7 days before skin eruption occurs. The primary skin eruption is erythematous or follicular which may be followed by skin ulceration. Nickel sensitivity once acquired appears to persist indefinitely. High level occupational exposure has been associated with renal problems, vertigo and dyspnoea (Commission of European Communities, 1976). Nickel and certain nickel compounds have been listed by the National Toxicology Program (NTP) as being reasonably anticipated to be carcinogens. The International Agency for Research on Cancer (IARC) has listed nickel compounds within group 1 (there is sufficient evidence for carcinogenicity in humans) and nickel within group 2B (agents which are possibly carcinogenic to humans).

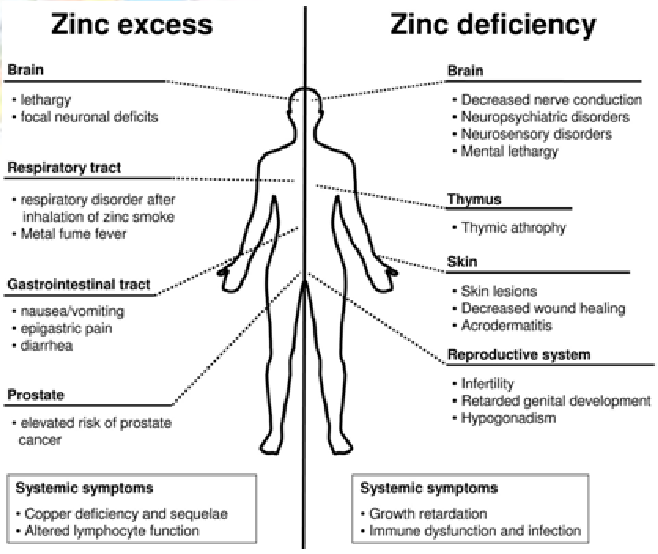
5.1.8 Toxicity of Zinc

Chemical Properties:

Zinc is the twenty-fifth most abundant element. It is widely found in nature and makes up 0.02% by weight of the earth's crust (Budavari, 1989). Zinc normally appears dull grey owing to coating with an oxide or basic carbonate. It is extremely rare to find zinc metal free in nature (Beliles, 1994). The major source of zinc is sphalerite, smithsonite, hemimorphite and franklinite. The largest natural emission of zinc to water results from erosion. Natural inputs to air are mainly due to igneous emissions and forest fires. Anthropogenic and natural sources are of a similar magnitude. The main anthropogenic sources of zinc are mining, zinc production facilities, iron and steel production, corrosion of galvanized structures, coal and fuel combustion, waste disposal and incineration, and the use of zinc-containing fertilizers and pesticide

Health Effects:

Zinc is an essential element for both animals and man which is necessary for the functioning of various enzyme systems. Nutritional zinc deficiency in humans has been reported in a number of countries. In Egypt endemic zinc deficiency syndrome among young men has been reported (Prasad, et al., 1961; Halsted et al., 1972). This syndrome having characters of retarded growth, signs of immaturity and anemia is probably caused by low intestinal absorption of zinc. Its complete cure was observed by administration of large doses of zinc sulfate.



Acute toxicity arises from the ingestion of excessive amounts of zinc salts, either accidentally or deliberately as an emetic or dietary supplement. Vomiting usually occurs after the consumption of more than 500 mg of zinc sulfate. Mass poisoning has been reported following the drinking of acidic beverages kept in galvanized containers; fever, nausea, vomiting, stomach cramps and diarrhea occurred 3–12 h after ingestion. Food poisoning attributable to the use of galvanized zinc containers in food preparation has also been reported; symptoms occurred within 24 h and included nausea, vomiting, and diarrhea, sometimes accompanied by bleeding and abdominal cramps.

Symptoms of zinc toxicity in humans include vomiting dehydration, electrolyte imbalance, abdominal pain, nausea lethargyness, dizziness and lack of muscular co-ordination (Prasad and

Oberleas, 1976). Acute renal failure caused by zinc chloride has also been reported (Csata, 1968). Zinc unlike Hg, Pb or Cd is an essential trace element for organism and plays a vital role in the physiological and metabolic processes of many organisms. However, zinc can be toxic to the organisms in high concentrations.

Zinc is an essential trace element for plants and animals including human begins and it plays vital role in metabolic processes. The most common effect of zinc poisoning in human are non fatal 'metal fume' fever caused by inhalation of zinc oxide fumes and illness arising from the ingestion of acidic foods prepared in zinc galvanized containers. Particularly, zinc chloride in Zn salts produce dermatitis upon contact with the skin.

CHAPTER 6

6.0 Water Quality Standards

As it is a well-known fact that the sources of usable water on the earth are limited, any kind of pollution in such sources will further reduce its availability. Polluted water cannot be utilized for drinking because of its inherent health risk. Water with high salt contents is not suitable for agriculture and most industries. The quality of water also interferes with the aesthetic and economic pursuits of water bodies by affecting marine and fresh water life. However, the water which is not suitable for irrigation may be quite suitable for industrial cooling. Every use of water requires a certain minimum quality standard with regards to the presence of dissolved and suspended materials of both chemical and biological nature. The desirable quality of water ensures no harm to the user. To maintain the minimum quality standard for diverse user has led to the formulation of water quality criteria and water quality standards. Water quality criteria can be considered as specific requirements on which a decision or judgment to support a particular use will be based. The criteria for the various uses are developed based on the experimental data and our current knowledge of the health, ecology and other issues and assessing its overall economical effect these are not a set of fixed values, but subject to modification as the scientific data get updated and more and more knowledge is gathered. The term standard applies to any definite principle or measure established by an authority by limiting concentration of different constituents in water to ensure the safe use of water and safeguard the environment.

6.1 Drinking Water Quality Standards

In view of the direct consumption of water by human beings, the domestic water supply is considered to be most important use of water and drinking use has been given first priority on priority on utilization of water resource in the National Water Policy. In India, agencies like the Bureau of Indian Standards (BIS) and Indian Council of Medical Research (ICMR) have formulated drinking water standards. The World Health Organization (WHO) has also laid down drinking water standards, which are considered as international standards. Drinking water standards for trace and toxic metals according to BIS code 10500-2012 are given below in Table 4.

Table 4: Drinking Water Standards for Trace & Toxic metals (BIS-10500-2012)

S. No	Toxic metal	Requirement (Acceptable Limit)		Permissible Limit in the Absence of Alternative Source	
		(mg/L)	(µg/L)	(mg/L)	(µg/L)
1	**Total arsenic as As**	0.01	10	0.05	50
2	**Cadmium as Cd**	0.003	3	No relaxation	
3	**Total Chromium as Cr**	0.05	50	No relaxation	
4	**Copper as Cu**	0.05	50	1.5	1500
5	**Iron as Fe**	0.30	300	No relaxation	
6	**Lead as Pb**	0.01	10	No relaxation	
7	**Mercury as Hg**	0.001	1	No relaxation	
8	**Nickel as Ni**	0.02	20	No relaxation	
9	**Zinc as Zn**	5	5000	15	15000

Regulatory Limits of Heavy Metals US Environmental Protection Agency (US EPA)

Several types of toxic heavy metals frequently pollute surface water bodies and their maximum permissible limits according to WHO and US EPA are presented in Table 5. These limits are mandatory for all water supply systems. Naturally occurring water (both surface and groundwater) frequently contains some of these heavy metals at concentrations 100 or 1000 times more than the prescribed MCL values. Since these heavy metals are valuable resources for different industrial applications, their removal, recovery and recycling assume greater significance.

Table 5: Maximum acceptable limits of several toxic heavy metal ions in the surface waters based on WHO and US EPA regulations.

Heavy Metal	Toxicity rank	WHO (µg/L)	USEPA (µg/L)
Arsenic	1	10	10
Lead	2	10	15
Mercury	3	1	2
Cadmium	8	3	5
Chromium	17	50	100
Nickel	57	70	100
Zinc	75	NGL	5000
Copper	125	2000	1300
Iron	-		300
Note : NGL = NO Guideline			

In accordance with toxicity data obtained from human clinical investigations, and various other studies such as animal experiments, drinking water standards have been proposed by various governmental bodies. A brief summary is given in Table 6 compiled by Hattingh, 1977.

Table 6: Drinking water quality criteria for trace metals which might affect public health

Parameter	USPHS (1962)	Japan (1968)	USSR (1970)	WHO European (1970)	WHO Intern. (1971)	SABS (1971)	NAS (1972)	Australia (1973)	US EPA (1975)	FRG (1975)
Arsenic	10	50	50	50	50	50	100	50	50	40
Barium	1,000	—	4,000	1,000	—	—	1,000	1,000	1,000	—
Cadmium	10	—	10	10	10	50	10	10	10	6
Chromium	50	50	100	50	—	50	50	50	50	50
Copper	1,000	10,000	100	50	50	1,000	1,000	10,000	—	—
Lead	50	100	100	100	100	50	50	50	50	40
Mercury	—	1	5	—	1	—	2	—	2	4
Selenium	10	—	1	10	10	—	10	10	10	8
Silver	50	—	—	—	—	—	—	50	50	—
Zinc	5,000	100	1,000	5,000	5,000	5,000	5,000	5,000	—	2,000

[a] As proposed by the World Health Organization (WHO), US Public Health Service (USPHS), South African Bureau of Standards (SABS), Russia (USSR), USA National Academy of Sciences (NAS), Australia, Japan and Environmental Protection Agency (EPA) of the USA. All concentrations in µg/l. Compiled by Hattingh (1977), except for F.R.G. data (Schöttler, 1977).

Finally, it is worth noting that maximum permissible concentrations (USSR) and threshold limit values (US) have been established within the field of occupational hygiene (Roschin and Timofeevskaya, 1975). These values pertain to the control of occupational exposure with regard to airborne particulates. In consequence, they are of no relevant importance in the present context.

6.2 Water Quality Criteria for Livestock

A safe water supply is essential for healthy livestock. Contaminated water can affect growth, reproduction and productivity of animals as well as safety of animal products for human consumption. Contaminated water supplies for livestock and poultry can also contaminate human drinking water. For these reasons, farm water supplies should be protected against contamination from bacteria, nitrates, sulfates, and pesticides. The Environmental Protection Agency has set drinking water standards for human consumption, but no set of standards exists for drinking water for livestock or poultry. However, The National Academy of Science has recommended maximum levels for some contaminants.

The permissible daily intake of substances is greatly dependent on the concentration of the substances and the quality of water ingested. The daily water requirement of animals vary with a number of factors such as temperature and humidity, the water content in the food, the degree of exertion of the animal and the salinity of the water supply. Therefore, the recommended concentrations of specific substance are based on typical usage.

Excessive salinity in livestock drinking water can upset the animals' water balance and cause even death. High levels of specific ions in water can cause animal health problems and death. The National Academy of Sciences offers upper limits for toxic substances in water (Table 7).

Table 7: Recommendations for levels of toxic substances in drinking water for livestock

Sr.	Toxic metal	Upper Limit in mg/L	Sr.	Toxic metal	Upper Limit in mg/L
1.	Arsenic	0.2	5.	Iron as Fe	-
2.	Cadmium as Cd	0.05	6.	Mercury as Hg	0.01
3.	Chromium as Cr	1.0	7.	Zinc as Zn	24
4.	Copper as Cu	0.5			

Sources: Environmental Studies Board, Nat. Acad. Of Sci., Nat Acad of Eng., Water Quality Criteria, 1972 Ayers, R.S. and D.W. Wescot, Water Quality for Agriculture, Food and Agriculture Organization of the United Nations, Rome, 1976

6.3 Water Quality for Irrigation

Nearly all waters contain dissolved salts and trace elements, many of which results from the natural weathering of the earth's surface. In addition, drainage waters from irrigated lands and effluent from city sewage and industrial waste water can impact water quality. In most irrigation situations, the primary water quality concern is salinity levels, since salts can affect both the soil structure and crop yield. However, a number of trace elements are found in water which can also limit its use for irrigation.

The required quality of Irrigation water varies substantially, depending upon the salinity, soil permeability, toxicity and some miscellaneous concerns such as excessive nitrogen loading or unusual pH of water. Some elements in irrigation water may be directly toxic to crops. Establishing toxicity limits in water is complicated by reactions which take place once the water is applied to the soil. When an element is added to the soil from irrigation, it may be inactivated by chemical reactions or it may build up in the soil until it reaches a toxic level. An element at a given concentration in water may be immediately toxic to a crop because of foliar effects if sprinkler irrigation is used. If furrow irrigation is used, it may require a number of years for the element to accumulate to toxic levels, or it may be immobilized in the soil and never reach toxic levels. The recommended water quality for irrigation is shown in Table 8.

Table 8: Recommended limits for constituents in reclaimed water for irrigation.

Constituent	Long-term use (mg/L)	Short-term use (mg/L)	Remarks
Aluminum (Al)	5.0	20	Can cause nonproductivity in acid soils, but soils at pH 5.5 to 8.0 will precipitate the ion and eliminate toxicity.
Arsenic (As)	0.10	2.0	Toxicity to plants varies widely, ranging from 12 mg/L for Sudan grass to less than 0.05 mg/L for rice.
Beryllium (Be)	0.10	0.5	Toxicity to plants varies widely, ranging from 5 mg/L for kale to 0.5 mg/L for bush beans.
Boron (B)	0.75	2.0	Essential to plant growth, with optimum yields for many obtained at a few-tenths mg/L in nutrient solutions. Toxic to many sensitive plants (e.g., citrus) at 1 mg/L. Most grasses relatively tolerant at 2.0 to 10 mg/L.
Cadmium (Cd)	0.01	0.05	Toxic to beans, beets, and turnips at concentrations as low as 0.1 mg/L in nutrient solution. Conservative limits recommended.
Chromium (Cr)	0.1	1.0	Not generally recognized as essential growth element. Conservative limits recommended due to lack of knowledge on toxicity to plants.
Cobalt (Co)	0.05	5.0	Toxic to tomato plants at 0.1 mg/L in nutrient solution. Tends to be inactivated by neutral and alkaline soils.
Copper (Cu)	0.2	5.0	Toxic to a number of plants at 0.1 to 1.0 mg/L in nutrient solution.
Fluoride (F^-)	1.0	15.0	Inactivated by neutral and alkaline soils.
Iron (Fe)	5.0	20.0	Not toxic to plants in aerated soils, but can contribute to soil acidification and loss of essential phosphorus and molybdenum.
Lead (Pb)	5.0	10.0	Can inhibit plant cell growth at very high concentrations.
Lithium (Li)	2.5	2.5	Tolerated by most crops at up to 5 mg/L; mobile in soil. Toxic to citrus at low doses recommended limit is 0.075 mg/L.
Manganese (Mg)	0.2	10.0	Toxic to a number of crops at a few-tenths to a few mg/L in acid soils.
Molybdenum (Mo)	0.01	0.05	Nontoxic to plants at normal concentrations in soil and water. Can be toxic to livestock if forage is grown in soils with high levels of available molybdenum.
Nickel (Ni)	0.2	2.0	Toxic to a number of plants at 0.5 to 1.0 mg/L; reduced toxicity at neutral or alkaline pH.
Selenium (Se)	0.02	0.02	Toxic to plants at low concentrations and to livestock if forage is grown in soils with low levels of added selenium.
Vanadium (V)	0.1	1.0	Toxic to many plants at relatively low concentrations.
Zinc (Zn)	2.0	10.0	Toxic to many plants at widely varying concentrations; reduced toxicity at increased pH (6 or above) and in fine-textured or organic soils.

(Source: Rowe and Abdel-Magid, 1995)

CHAPTER 7

7.0 Study Area

A total number of 424 water quality stations covering all the major River Basins in India right from East to West and North to South were studied for Trace and Toxic metals during May, 2014; November, 2014; February, 2015; December, 2015; April, 2016; August, 2016; December, 2016; April, 2017; August 2017; December, 2017 and April, 2018. The details of the 424 monitoring stations on the Indian Rivers with their latitude, longitude, district and states are enclosed as **Annexure-1.** WQ monitoring station is given in GIS map as **figure 22.** River water samples were collected by Punjab type sampler. The water samples were stored in acid leached polyethylene bottles and preserved by adding ultra pure nitric acid as recommended (APHA, 2012). During the study period, water samples from other than the registered water quality monitoring stations of CWC were also received at National River Water Quality Laboratory, CWC, New Delhi.

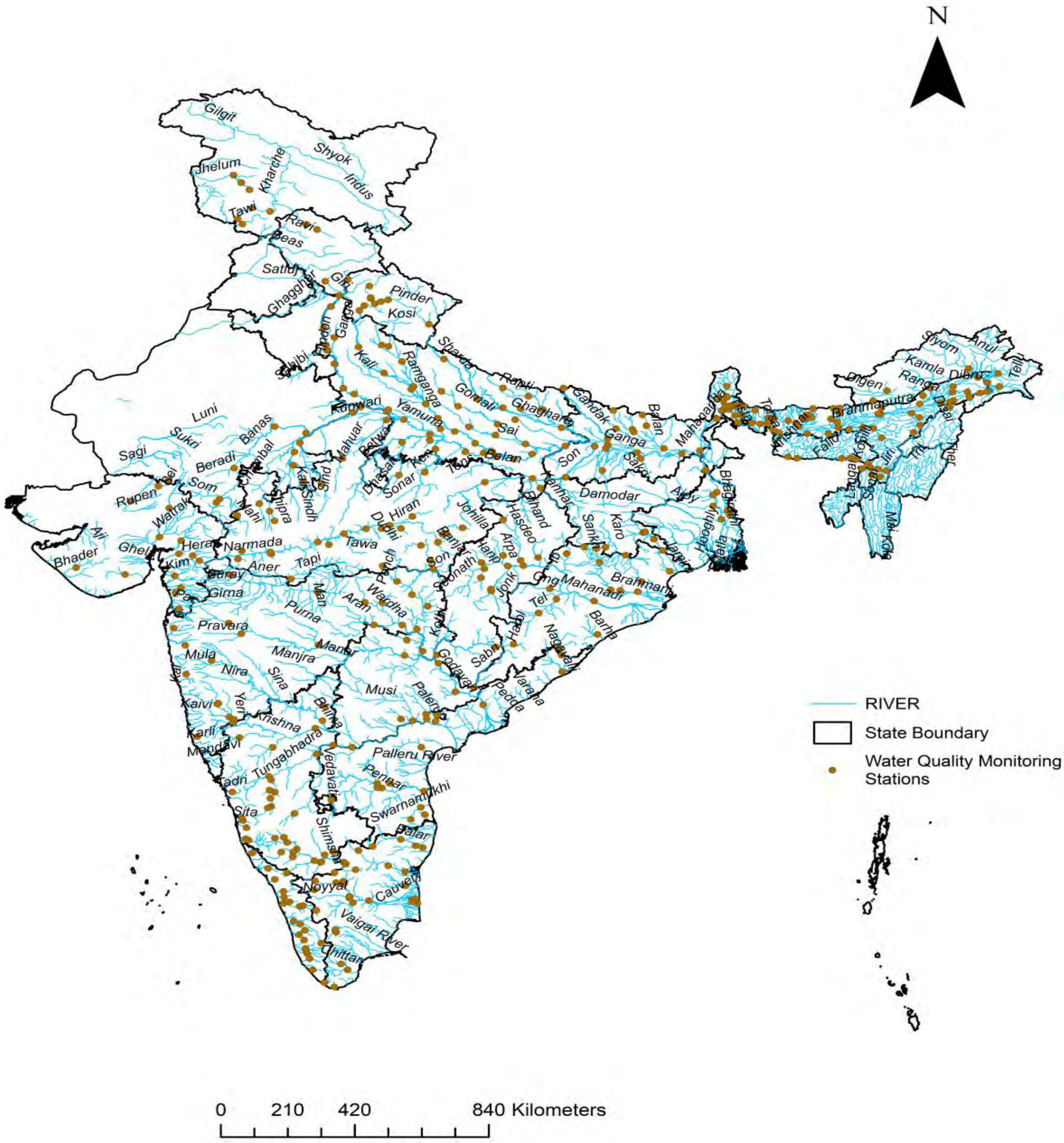


Figure 20: Water Quality Monitoring Stations in India

CHAPTER 8

8.0 Methodology

Living organisms require trace amounts of some metals including cobalt, copper, iron, manganese, molybdenum, vanadium, strontium and zinc. Excessive levels of these essential metals are detrimental to the organisms. Non- essential metals like cadmium, chromium, mercury, lead, arsenic and antimony are of more concern to surface water system because these metals produce undesirable effects on human and animal life. Once these metals enter into the system, they remain for relatively longer periods. Once absorbed, inorganic metals are capable of reacting with a variety of binding sites in the human body and have strong attraction to biological tissues. Natural water contains toxic metals in traces. Industrial wastes containing metals have aggravated the problem of metal pollution. Electroplating, metallurgical industry, galvanising plants, tanneries and thermal power stations are few of the major contributors of metal pollution in surface water. All metals exist in surface water in colloidal, particulate and dissolved forms, although dissolved concentrations are generally low. The soluble forms are generally ions or unionized, organo-metallic chelates or complexes. The solubility of trace metals in surface water is predominately controlled by pH, the type and concentration of legends on which the metal can absorb and the oxidation state of the mineral components.

8.1 Heavy Metal Detection Techniques

The analytical methods commonly used in estimation of heavy metals in water and waste waters are:

- Inductively coupled plasma analyser (ICP)
- Atomic absorption spectrophotometry (AAS)
- Colorimetric methods
- Polarographic estimation
- Ion Selective Electrodes (ISE)

Inductively coupled plasma (ICP) techniques and atomic absorption spectrophotometry are applicable over a broad linear range and are especially sensitive for refractory elements. In general, detection limits for ICP methods are higher than AAS. Colorimetric methods are applicable when interferences are known to be within the limit of the particular method. Extreme care should be taken in sampling and analysis to prevent contamination.

In the present study, samples were collected in polyethylene containers. These water samples were prepared for the determination of heavy metals, viz., arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel and zinc by atomic absorption spectrophotometer. This instrumental technique was developed by Asian Walsh in 1955 by means of Atomic Absorption Spectrophotometer (AAS) and since then AAS techniques have been considered as most reliable and have become more common in recent times although the colorimetric/ spectrophotometric techniques have also been in use because of the exorbitant cost of the AAS. AAS techniques are usually favored due to its rapidity, accuracy and controllability while other methods do not respond if the metals are present in traces. It is generally employed when exact quantity of interfering radicals or ions is known. The study was carried out on Agilent 240FS atomic absorption spectrophotometer by graphite tube analyzer (GTA) using argon gas and Iron analyzed by flame operation using air and acetylene gas.

8.2 Chemicals and Reagents

All chemicals and reagents used in the chemical analysis during the study were of analytical reagent grade (Merck). Standard solutions of metals ions were procured from Merck, Germany. De-ionized water was used throughout the study. All glassware and containers used were thoroughly cleaned by soaking in detergent followed by soaking in 10% nitric acid for 48hrs and finally rinsed with de-ionized water several times prior to use.

8.3 Analytical Method Employed

Trace and toxic metals were analysed by using Agilent 240FS atomic absorption spectrophotometer. The wavelength, current, slit and method employed using atomic absorption spectrophotometer is given in Table 9.

Figure 21: Atomic Absorption Spectrophotometer instrument

Table 9: The wavelength, current, slit and method used for chemical analysis by AAS

Sr.	Parameter	Wave length (nm)	Current (mA)		Slit (nm)	Method used for analysis
			Recommended	Maximum		
1	**Arsenic**	193.7	10	12	0.5	By AAS with VGA
2	**Cadmium**	228.8	4	10	0.5	By AAS with Graphite Tube Analyzer (GTA)
3	**Chromium**	357.9	7	15	0.2	
4	**Copper**	324.8	4	10	0.5	
5	**Mercury**	253.7	4	8	0.5	By AAS with VGA
6	**Iron**	248.3	7	10	0.2	By AAS with Flame
7	**Lead**	217	10	12	1.0	By AAS with Graphite Tube Analyzer (GTA)
8	**Nickel**	232	4	10	0.2	
9	**Zinc**	213.9	5	10	1.0	

CHAPTER 9

9.0 Results and Discussion

Details of Indian rivers and their water quality monitoring stations where the water was found within acceptable limits in terms of toxic metal contamination as per (BIS 10500; 2012) during the study period is presented in **Annexure-2**. List of Indian rivers and their water quality monitoring stations and where the water was found above acceptable limits (BIS 10500; 2012) of metal concentration during the study period is presented in **Annexure-3**. Details of water quality monitoring stations where the water was found above the acceptable limit (BIS 10500:2012) due to presence of only one parameter (Iron or Copper or Cadmium or Nickel or Lead) during the study period is presented in **Annexure-4**. Details of water Qquality monitoring stations where the water was found above the acceptable limit (BIS 10500:2012) due to presence of more than one toxic metals during the study period is presented in **Annexure-5**.

The analytical results obtained from the trace and toxic metal analysis in the water samples of Indian Rivers are expressed in µg/L (Microgram per Litre) throughout the report. During the entire period of study, maximum concentration values of all eight metals in the Indian Rivers observed are as: Arsenic (9.87 µg/L), Cadmium (70.52 µg/L), Chromium (450.26 µg/L), Copper (314.93 µg/L), Lead (374.580 µg/L), Nickel (245.01 µg/L), Zinc (2.658 mg/L) and Iron (14.555 mg/L).

Table 10: Minimum and Maximum concentration of Metal during the May, 2014 to April, 2018

Metal	Min/Max	WQS	River	Month/Year	Season	Con.
Arsenic	Minimum	Ram Munshi Bagh	Jhelum	May, 2014	Summer	0.010 µg/L
	Maximum	Ekmighat	Bagmati	April, 2018	Summer	9.87 µg/L
Cadmium	Minimum	Jammu Tawi	Chenab/Tawi	December, 2017	Winter	0.001 µg/L
	Maximum	Vautha	Sabarmati	February, 2015	Winter	70.518 µg/L
Chromium	Minimum	Tuini	Tuini	April, 2016	Summer	0.002 µg/L
	Maximum	Paliakalan	Sharda	August, 2016	Monsoon	450.26 µg/L
Copper	Minimum	Nellithurai	Bhavani	November, 2014	Winter	0.003 µg/L
	Maximum	Pingalwada	Dhadher	April, 2017	Summer	314.93 µg/L
Nickel	Minimum	Chapra	Jalangi	April, 2017	Summer	0.005 µg/L
	Maximum	Durvesh	Vaitarna	December, 2017	Winter	245.01 µg/L
Lead	Minimum	Y.Nagar	Giri	April, 2016	Summer	0.003 µg/L
	Maximum	Lowara	Sheturni	April, 2016	Summer	374.58 µg/L
Zinc	Minimum	Y.Nagar	Giri	August, 2016	Monsoon	0.0003 mg/L
	Maximum	Manot	Narmada	August, 2016	Monsoon	2.6579 mg/L
Iron	Minimum	Safapora	Jhelum	April, 2016	Summer	0.001 mg/L
	Maximum	Chenimari	Buridehing	August, 2017	Monsoon	14.555 mg/L

Results were statistically analysed and minimum, maximum, average and standard deviation were calculated using MS Excel (Table 11).

Table 11: Summary and statistical analysis of analytical results of water samples (From May, 2014 to April, 2018)

Period	Particulars	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Ni (µg/L)	Pb (µg/L)	Fe (mg/L)	Zn (mg/L)
May, 2014	Minimum	0.01	0.01	0.04	0.02	0.01	0.02	0.00	0.00
	Maximum	8.95	10.39	40.65	58.34	83.83	19.76	5.34	0.77
	Average	3.97	0.30	2.85	5.11	6.93	2.07	0.21	0.03
	Standard Deviation	2.44	0.88	4.29	6.53	8.37	2.52	0.50	0.07
November, 2014	Minimum	0.39	0.00	0.01	0.00	0.07	0.01	0.00	0.00
	Maximum	6.30	11.77	230.90	269.63	37.32	28.41	9.06	1.50
	Average	2.09	0.24	10.70	8.22	2.57	1.73	0.30	0.03
	Standard Deviation	1.44	0.34	18.63	5.64	1.52	1.48	0.65	0.00
February, 2015	Minimum	0.30	0.00	0.01	0.19	0.01	0.01	0.00	0.00
	Maximum	4.28	70.52	61.26	72.87	184.64	116.29	1.92	1.94
	Average	1.91	1.06	3.31	6.55	5.85	6.88	0.03	0.02
	Standard Deviation	0.95	4.69	7.16	6.58	16.41	10.64	0.11	0.11
December, 2015	Minimum	0.03	0.00	0.07	0.01	0.01	0.06	0.00	0.00
	Maximum	8.88	9.17	81.70	34.30	17.14	19.83	3.81	0.22
	Average	1.55	0.25	2.73	2.34	1.08	1.97	0.21	0.01
	Standard Deviation	1.81	0.96	7.56	3.75	2.40	2.73	0.37	0.03
April, 2016	Minimum	0.02	0.00	0.00	0.02	0.03	0.00	0.00	0.00
	Maximum	9.53	28.05	224.33	44.20	68.48	374.58	1.03	0.17
	Average	2.89	0.43	3.13	3.08	1.32	3.78	0.07	0.01
	Standard Deviation	0.38	1.27	11.80	2.11	3.35	13.96	0.11	0.02
August, 2016	Minimum	0.02	0.00	0.01	0.02	0.01	0.01	0.01	0.00
	Maximum	8.16	0.65	450.26	27.22	32.72	51.52	6.12	2.66
	Average	1.54	0.11	15.70	5.30	1.30	3.36	0.66	0.04
	Standard Deviation	1.65	0.06	44.53	5.40	2.90	6.10	1.10	0.20
December, 2016	Minimum	0.02	0.00	0.02	0.02	0.01	0.02	0.00	0.00
	Maximum	8.91	3.25	68.56	26.89	85.94	156.07	4.32	0.30
	Average	2.09	0.14	4.45	3.19	2.30	4.06	0.26	0.02
	Standard Deviation	1.76	0.30	11.01	3.61	6.31	11.71	0.48	0.03
April, 2017	Minimum	0.02	0.00	0.03	0.04	0.01	0.04	0.01	0.00
	Maximum	9.52	3.94	202.71	314.93	12.58	227.93	6.13	1.08
	Average	2.29	0.22	5.57	6.82	0.72	4.08	0.30	0.02
	Standard Deviation	0.63	0.28	9.90	10.45	1.86	0.28	0.65	0.06
August, 2017	Minimum	0.02	0.00	0.01	0.01		0.01	0.04	0.00
	Maximum	9.39	2.51	133.49	75.58		16.81	14.56	0.80
	Average	2.23	0.25	7.03	4.82		2.24	0.92	0.02
	Standard Deviation	1.66	0.35	11.38	7.58		2.00	2.03	0.06
December, 2017	Minimum	0.07	0.00	0.01	0.26	0.01	0.01	0.00	0.00
	Maximum	9.38	12.26	49.58	28.59	245.01	20.96	6.15	0.93
	Average	3.17	0.15	6.96	4.60	6.84	1.66	0.20	0.02
	Standard Deviation	1.89	0.78	7.80	4.42	17.13	2.10	0.66	0.06

Period	Particulars	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Ni (µg/L)	Pb (µg/L)	Fe (mg/L)	Zn (mg/L)
April, 2018	**Minimum**	0.01	0.00	0.02	0.02	0.02	0.01	0.04	0.00
	Maximum	9.87	2.22	169.95	47.72	109.66	82.40	3.61	1.02
	Average	2.15	0.12	3.88	4.88	6.97	2.20	0.26	0.04
	Standard Deviation	2.20	0.19	12.31	8.03	8.18	5.45	0.41	0.11
TOTAL	**Minimum**	**0.01**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**
	Maximum	**9.87**	**70.52**	**450.26**	**314.93**	**245.01**	**374.58**	**14.56**	**2.66**
	Average	**2.35**	**0.30**	**6.03**	**4.99**	**3.59**	**3.09**	**0.31**	**0.02**
	Standard Deviation	**0.64**	**1.31**	**10.99**	**2.36**	**5.80**	**4.70**	**0.54**	**0.06**

Analytical results obtained were also compared with the Indian Standards, prescribed as acceptable toxic metal content in the drinking water by the Bureau of Indian Standards ("Drinking Water – Specification", 10500:2012). Number of water samples analysed for each of nine metals and total number of water samples exceeded the acceptable limits during the study period are summarized for all five sampling occasions here under in Table12.

Table 12: Number of samples analysed and found above acceptable limits of toxic metals.

Sampling Month/Year	No. of Samples analysed/exceeded the limits	As	Cd	Cr	Cu	Ni	Pb	Fe	Zn
May, 2014	A	296	313	313	313	313	313	313	313
	B	0	6	0	1	10	4	51	0
November, 2014	A	20	355	355	355	355	355	355	355
	B	0	1	14	2	4	24	81	0
February, 2015	A	12	326	326	326	326	326	326	326
	B	0	16	2	2	18	50	1	0
December, 2015	A	174	174	174	174	174	174	174	174
	B	0	4	1	0	0	3	28	0
April, 2016	A	247	196	247	247	213	247	247	247
	B	0	5	1	0	1	7	15	0
August, 2016	A	210	210	210	210	210	210	210	210
	B	0	0	12	0	1	16	94	0
December, 2016	A	220	220	220	220	220	220	220	220
	B	0	1	5	0	1	11	56	0
April, 2017	A	218	218	218	218	212	218	218	218
	B	0	5	3	5	0	5	48	0
August, 2017	A	337	337	337	337	0	337	337	337
	B	0	0	3	2	0	2	150	0
December, 2017	A	296	296	296	296	296	296	296	296
	B	0	2	0	0	8	3	26	0
April, 2018	A	263	263	263	263	263	263	263	262
	B	0	0	1	0	2	3	60	0
Total No. of Samples	A	2293	2908	2959	2959	2582	2959	2959	2958
	B	0	40	42	12	45	128	610	0
A - Total No. of samples analyzed; B - Total No. of samples exceeded the acceptable limits									

From the above table, it is evident that Iron ranks first among the metals that exceeded their respective acceptable limits on maximum occasions followed by Lead, Nickel, Chromium, Cadmium and Copper. Exceeding the acceptable limits in Indian River waters by Lead, Cadmium, Nickel, Chromium and Copper are more common in non-monsoon periods while Iron, Lead, Chromium and Copper are the metals whose concentrations have exceeded their tolerance limits in monsoon periods most of the time. This kind of tendency to exceed the tolerance limits is not seen in case of other metals like Arsenic and Zinc. Arsenic and Zinc are the two toxic metals whose concentration was always obtained within the limits throughout the study period.

During the study period, the samples were collected during monsoon (August, 2016 and August, 2017), non-monsson (May, 2014; November, 2014; February 2015, December, 2015; April, 2016; December, 2016, April, 2017, December, 2017 and April, 2018). For these monsoon and non-monsoon occasions of analysis, seasonal average values of the toxic metal concentration were evaluated and shown in Pie charts (Figures 18-19). From these figures, it is observed that out of eight metals analysed, the concentration of Iron is always found maximum in all the time during monsoon and nonmonsson period.

During all the monsoon and non-monsson period, the pattern of higher concentration occurrence of these toxic metals is almost same but the percentage of the other metals except iron is less during the monsoon season. The order of higher occurrence of these toxic metals in Indian Rivers during non-monsoon period is Fe > Zn > Cr > Cu > Ni > Pb> As > Cd (Figure-21).

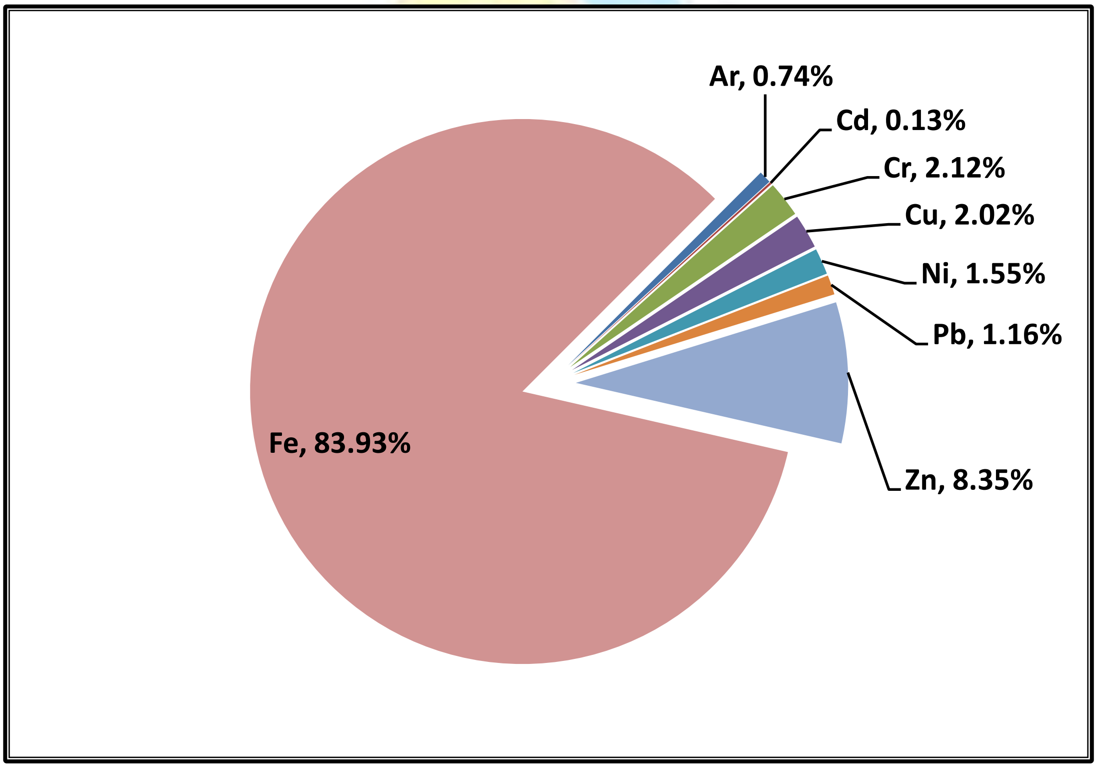


Figure 22: Order of higher occurrence in non-monsoon period

Order of higher occurrence of these eight metals is different in different seasons. In monsoon periods, the levels of many toxic metals like Zn, Ni and Cu fall down significantly. The order of higher occurrence in monsoon period is Fe > Zn > Cr > Cu > Pb > As > Ni > Cd (Figure-22).

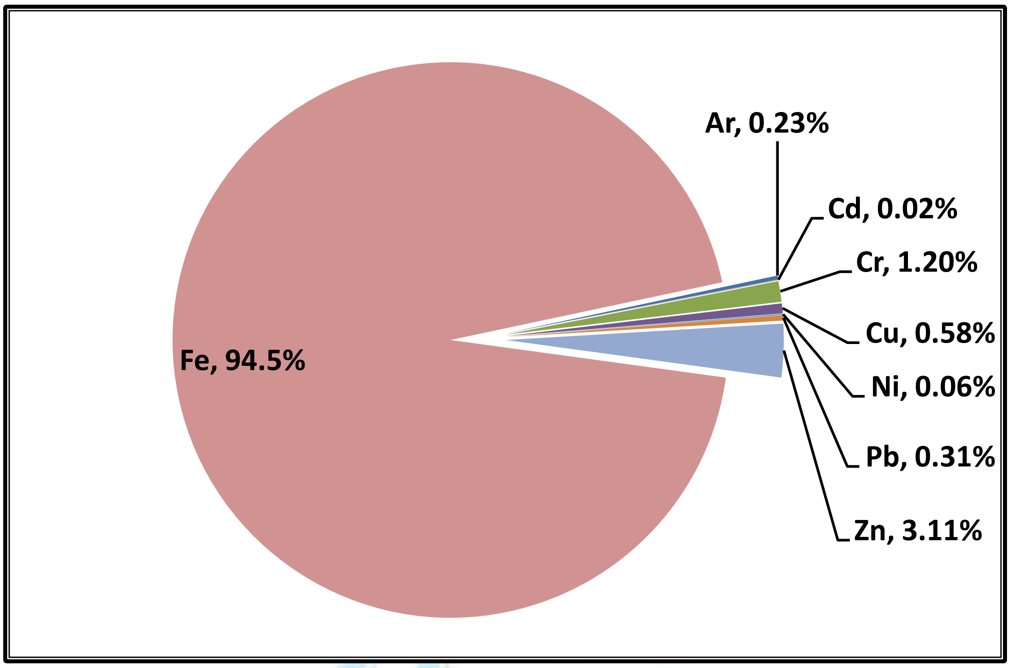


Figure 23: Order of higher occurrence in monsoon period

The parameter wise discussion on the results obtained from the trace and toxic metal analysis in the water samples collected from the 424 water quality monitoring stations functioning under Central Water Commission are given in subsequent paragraphs.

9.1 Summary of ARSENIC content in Indian Rivers

Arsenic (As) is a ubiquitous element that is comparatively rare, but widely distributed in the atmosphere, soils and rocks, natural waters and organisms. It is mobilised in the environment through a combination of natural processes such as weathering reactions, biological activity and volcanic emissions as well as through a range of anthropogenic activities. Most environmental arsenic problems are the result of mobilisation under natural conditions, but human have added to the adverse impact through mining activity, combustion of fossil fuels, the use of arsenical pesticides, herbicides and crop desiccants and the use of arsenic as an additive to livestock feed, particularly for poultry. Although the use of arsenical products such as pesticides and herbicides has decreased significantly in the last few decades, their use for wood preservation is still common. The impact on the environment of the use of arsenical compounds, at least locally, will remain for some years.

BIS has recommended 0.01 mg/L (10µg/L) as acceptable concentration of arsenic in drinking water. Total 2293 numbers of water samples were analysed and collected from 424 water quality monitoring stations for arsenic content in Indian Rivers in the period May, 2014 to April, 2018. The arsenic concentration varies from 0.01 to 9.87 µg/L. Maximum arsenic concentration (9.87 µg/L) was observed at Ekmighat water quality monitoring station on Bagmati River during April, 2018. From reported data of all River water quality stations, it was found that arsenic concentration well within the acceptable limits as per Bureau of Indian Standards (BIS) and no toxicity of arsenic in the River waters is observed during the study period.

9.2 Summary of CADMIUM content in Indian Rivers

Cadmium is a rare natural element which is widely distributed in the earth's crust in very small amount. It is uniformly distributed in the Earth’s crust, where it is generally estimated to be present at an average concentration of between 0.15 and 0.2 mg/kg. Cadmium may be present in the aquatic environment at relatively low levels as inorganic complexes such as carbonates, hydroxides, chlorides or sulphates, or as organic complexes with humic acids. Even in polluted rivers the cadmium levels in aqueous phase may be significantly low and even sometimes below detection limit.

A maximum acceptable concentration for cadmium in drinking water has been established on the basis of health considerations. BIS proposed the maximum desirable limit of cadmium is 0.003 mg/L or 3 µg/L and there is no relaxation in maximum permissible limit in absence of another source. The concentration of cadmium in unpolluted fresh waters is generally less than 0.001 mg/L. Surface waters containing in excess of a few micrograms of cadmium per litre have probably been contaminated by industrial wastes from metallurgical plants, plating works, plants manufacturing cadmium pigments, textile operations, cadmium-stabilized plastics, or nickel–cadmium batteries, or by effluents from sewage treatment plants.

2908 numbers of river water samples from 424 WQ monitoring stations were collected and analyzed for cadmium content during the study period from May, 2014 to April, 2018. Out of

2908 water samples, 40 water quality stations from Ganga, Kopili, Rapti, Tungabhadra and Yamuna rivers were found to have cadmium content in more than one station above the acceptable limits. The highest cadmium concentration (70.51 µg/L) was observed in the Vautha water quality monitoring station at Sabarmati River during February, 2015. It is also observed that, the acceptable limit exceed only during non-monsoon period. Table 13 shows the name of WQ monitoring stations with respect to their river where cadmium concentration exceeded the acceptable limits. These WQ monitoring stations are hot-spots from the point of view of cadmium pollution in the Indian rivers.

Table 13: Rivers and WQ monitoring stations where Cadmium exceeded the acceptable limits

S. No.	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
1	Arkavathi	T. Bekuppe (Feb, 2015)	1	1
2	Buridehing	Chenimari (May, 2014)	1	1
3	Dareng	Sibbari (Dec, 2016)	1	1
4	Dikhow	Sivasagar (May, 2014)	1	1
5	Ganga	Mirzapur (Apr, 2017), Shahzadpur (Apr, 2017)	2	2
6	Ghagra	Elginbridge (Feb, 2015)	1	1
7	Hagari	T. Ramapuram (Feb, 2015)	1	1
8	Hindon	Galeta (Dec, 2015; Apr, 2016)	1	2
9	Kamang	Seppa (May, 2014)	1	1
10	Kopili	Dharamtul (May, 2014), Kampur (May, 2014)	2	2
11	Noyyal	Elunuthimanagalam (Feb, 2015)	1	1
12	Orsang	Chanwada (Feb, 2015; Dec, 2017)	1	2
13	Ponnaiyar	Vazhavachanur (Feb, 2015)	1	1
14	Rapti	Balrampur (Feb, 2015), Bansi (Apr, 2017), Regauli (Feb, 2015)	3	3
15	Sabarmati	Vautha (Nov, 2014; Feb, 2015)	1	2
16	Saryu	Ayodhya (Feb, 2015)	1	1
17	Sharda	Paliakalan (Feb, 2015)	1	1
18	Sheturni	Lowara (May, 2014; Feb, 2015; Apr, 2016)	1	3
19	Sone	Chopan (Apr, 2017)	1	1
20	Tungabhadra	Bawapuram (Feb, 2015); Mantralayam (Feb, 2015)	2	2
21	Tirap	Udaipur (Tirap) (Apr, 2017)	1	1
22	Ulhas	Badlapur (Feb, 2015)	1	1
23	Vaitarna	Durvesh (Feb, 2015; Dec, 2017)	1	2
24	Yamuna	Delhi Rly Bridge (Dec, 2015; Apr, 2016), Mathura (Dec, 2015; Apr, 2016), Mohana (Dec, 2015; Apr, 2016)	3	6
		Total	**31**	**40**

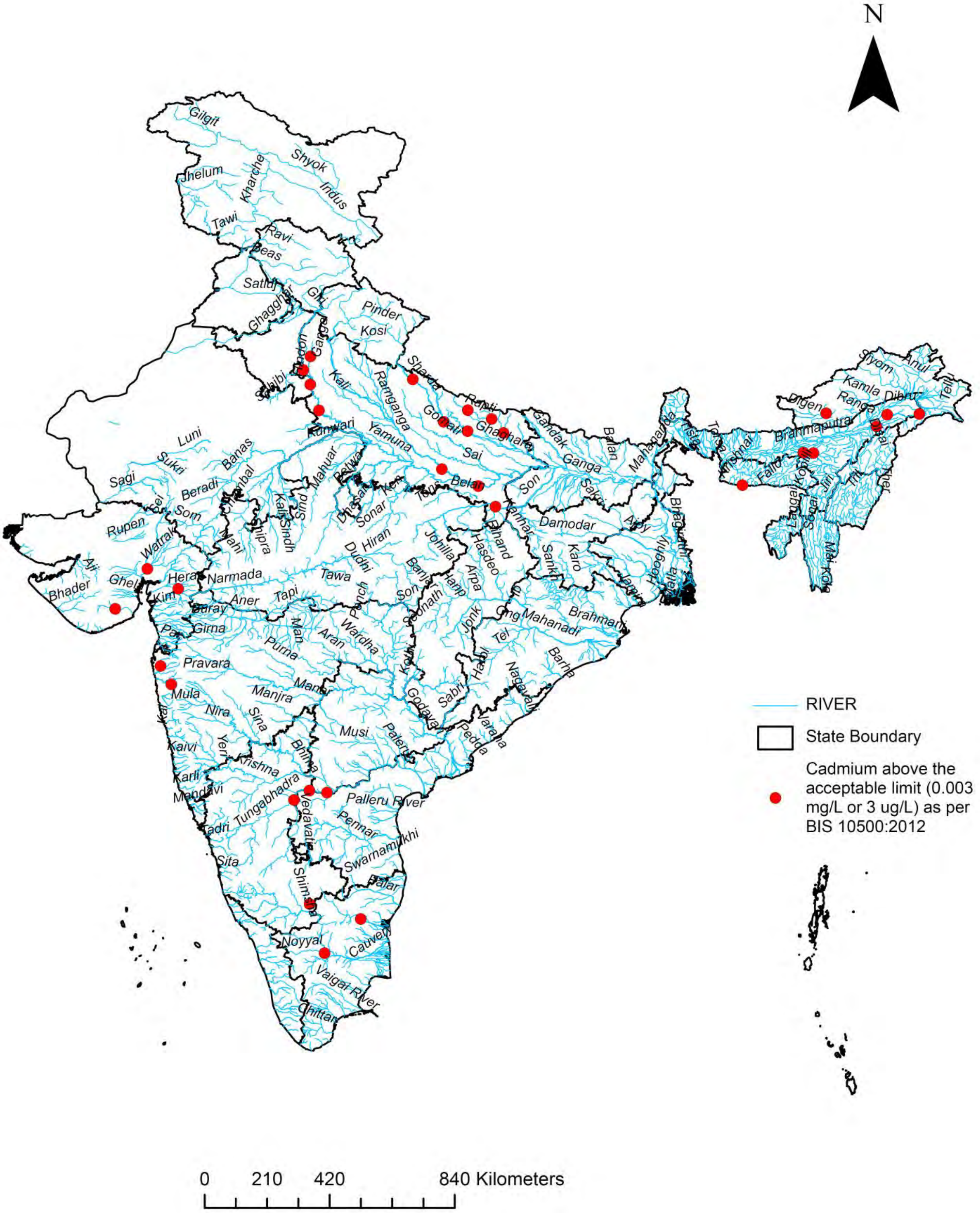


Figure 24: WQ monitoring stations where Cadmium exceeded the acceptable limits

9.3 Summary of CHROMIUM content in Indian rivers

Chromium is used to call as metal with two faces, that it can be either beneficial or toxic to animals and humans depending on its oxidation state and concentrations (Zayed et al., 1998). It can exist in valences from -2 to 6 but it is present in the environment mainly in the trivalent or hexavalent state. Cr(III) is considered to be a trace element essential for the proper functioning of living organisms (Wang et al., 2009). Nutritionally, at lower concentrations, Cr(III) is an essential component of a balanced human and animal diet for preventing adverse effects in the metabolism of glucose and lipids, e.g., impaired glucose tolerance, increased fasting insulin, increased cholesterol and triglycerides, and hypoglycemic symptoms (Zayed and Terry, 2003). Cr(III) at increased concentrations can interfere with several metabolic processes because of its high capability to coordinate various organic compounds resulting in inhibition of some metalloenzyme systems (Zayed et al., 1998).

On a worldwide basis, the major chromium source in aquatic ecosystems is domestic waste water effluents (32.2% of the total) (Barceloux 1999). The other major sources are metal manufacturing (25.6%), ocean dumping of sewage (13.2%), chemical manufacturing (9.3%), smelting and refining of nonferrous metals (8.1%), and atmospheric fallout (6.4%) (Nriagu and Pacyna 1988). Annual anthropogenic input of chromium into water has been estimated to exceed anthropogenic input into the atmosphere (Nriagu and Pacyna 1988). However, land erosion, a natural source of chromium in water, was not included in the Nriagu and Pacyna (1988) estimation of chromium contributions to the aquatic environment.

BIS (Bureau of Indian Standard) 10500-2012) have recommended an acceptable limit of 50 µg/L of chromium in drinking water. Total 2959 numbers of water samples from 424 water quality stations were collected and analyzed for chromium content during the study period. Data reveals that 42 water samples have the Chromium concentrations above the acceptable limit of 50 µg/L. Chromium concentrations at Paliakalan water quality monitoring station on Sharda River in August 2016, which is reported as the maximum concentration 450.26 µg/L during the entire study period. Annexure-5 shows the names of the WQ stations and the Rivers affected by high chromium concentration (>50 µg/L) and these WQ stations are hot spots from point of view of chromium pollution.

Total 42 numbers of water samples from 29 water quality monitoring stations located on 22 major Indian Rivers were found to have chromium concentration exceeding the tolerance limit of 50 µg/L (Table 14). Some Indian Rivers viz. Ganga, Ghagra and Rapti have two or more water quality monitoring stations which are polluted with chromium.

Table 14: Rivers and WQ monitoring stations where Chromium exceeded the acceptable limits.

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
1	Aghanashini	Santeguli (April, 2018)	1	1
2	Brahmaputra	Tezpur (Aug, 2016)	1	1
3	Churni	Hanskhali (Nov, 2014)	1	1
4	Desang	Desangpani (Aug, 2016)	1	1
5	Dikhow	Bihubar (Apr, 2017)	1	1
6	Gad	Belne Bridge (Aug, 2017)	1	1
7	Ganga	Bhitaura (Nov, 2014), Fatehgarh (Nov, 2014), Kachlabridge (Nov, 2014; Aug, 2016), Kanpur (Nov, 2014)	4	5
8	Ghagra	Elginbridge (Nov, 2014; Aug, 2016), Turtipar (Aug, 2016)	2	3
9	Hamp	Andhiyar Kore (Feb, 2015)	1	1
10	Jiabharali	Jiabharali NT Road Xing (Aug, 2016)	1	1
11	Kal	Mangaon (Seasonal) (Aug, 2017)	1	1
12	Krishna	Karad (Aug, 2017)	1	1
13	Mahananda	Labha (Nov, 2014)	1	1
14	Mahi	Khanpur (Dec, 2015)	1	1
15	Purna	Mahuwa (Aug, 2016)	1	1
16	Ramganga	Moradabad (Nov, 2014)	1	1
17	Rapti	Balrampur (Nov, 2014; Aug, 2016; Dec, 2016), Bansi (Nov, 2014; Apr, 2016; Apr, 2017), Birdghat (Nov, 2014; Aug, 2016; Dec, 2016), Regauli (Nov, 2014; Aug, 2016, Dec, 2016)	4	12
18	Sai	Raibareli (Dec, 2016)	1	1
19	Sarju	Ghat (Nov, 2014; Apr, 2017)	1	2
20	Sharda	Paliakalan (Nov, 2014; Aug, 2016; Dec, 2016)	1	3
21	Surma/Myntdu	Kharkhana (Aug, 2016)	1	1
22	Tel	Kantamal (Feb, 2015)	1	1
		Total	**29**	**42**

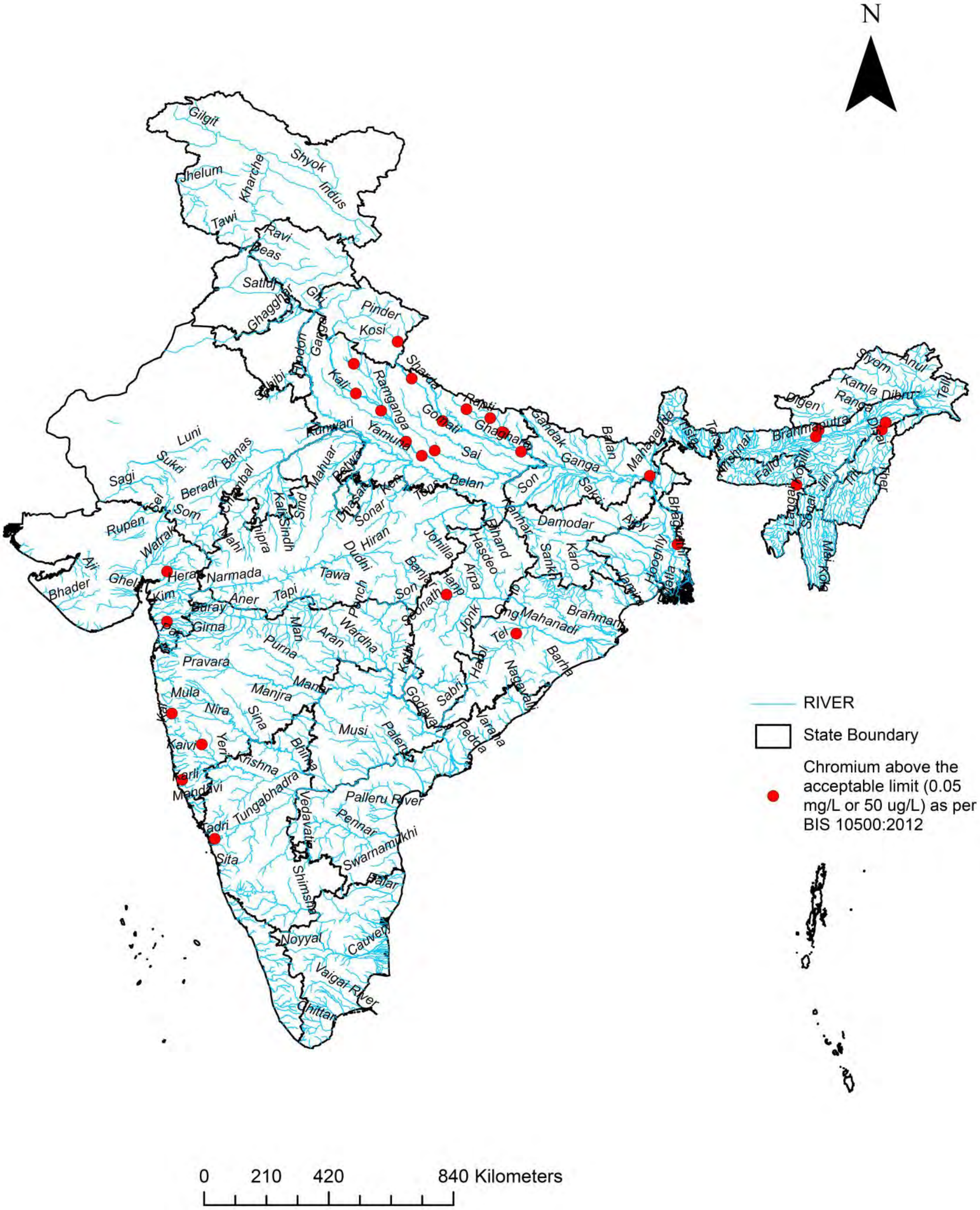


Figure 25: WQ monitoring stations where Chromium exceeded the acceptable limits

9.4 Summary of COPPER content in Indian rivers

Copper is a very common substance that occurs naturally in the environment and spreads to the environment through natural phenomena. Humans widely use copper. For instance it is applied in the industries and in agriculture. The production of copper has lifted over the last decades. Due to this, copper quantities in the environment have increased. It is an essential element in human metabolism, and it is well-known that deficiency results in a variety of clinical disorders, including nutritional anaemia in infants. BIS, 10500, 2012 has recommended an acceptable limit of 0.05 mg/L (50µg/L) of copper in drinking water; this concentration limit can be extended to 1.5 mg/L (1500 µg/L) of copper in case no alternative source of water with desirable concentration is available. The intake of large doses of copper has resulted in adverse health effects. Copper and its compounds are widely distributed in nature, and copper is found frequently in surface water and in some groundwater.

2959 water samples from 424 water quality stations were collected and analyzed for copper content from May, 2014 to April, 2018. Out of 2959 water samples, 12 samples were found to contain copper concentrations above the acceptable limits of 50 µg/L throughout the study period, the maximum Copper concentration 314.93 µg/L was observed at Pingalwada water quality station on Dhadher River in April, 2017. Table 16 shows the names of water quality stations and the Rivers affected by high copper concentration (>50 µg/L) and these WQ stations are water quality hot spots from the point of view of copper contamination in Indian Rivers.

Total 12 numbers of water samples from 11 numbers of WQ monitoring stations exceeded according to the BIS prescribed acceptable limit situated on 10 Indian Rivers during the study period. Brahmaputra, Buridehing, Damanganga, Dhadher, Dikhow, Ganga, Pranhitha, Sabarmati, Subarnarekha and Tel are the rivers where one or two water quality monitoring stations were contaminated with copper (Table 15).

Table 15: Rivers and WQ monitoring stations where Copper exceeded the acceptable limit.

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
1	Brahmaputra	Tezpur (Apr, 2017)	1	1
2	Buridehing	Margherita (Nov, 2014)	1	1
3	Damanganga	Vapi (Apr, 2017)	1	1
4	Dhadher	Pingalwada (Apr, 2017)	1	1
5	Dikhow	Bihubar (Apr, 2017)	1	1
6	Ganga	Kachlabridge (Nov, 2014)	1	1
7	Pranhitha	Tekra (Apr, 2017)	1	1
8	Sabarmati	Vautha (May, 2014)	1	1
9	Subarnarekha	Ghatsila (Feb, 2015; Aug, 2017), Jamsolghat (Aug, 2017)	2	3
10	Tel	Kantamal (Feb, 2015)	1	1
		Total	**11**	**12**

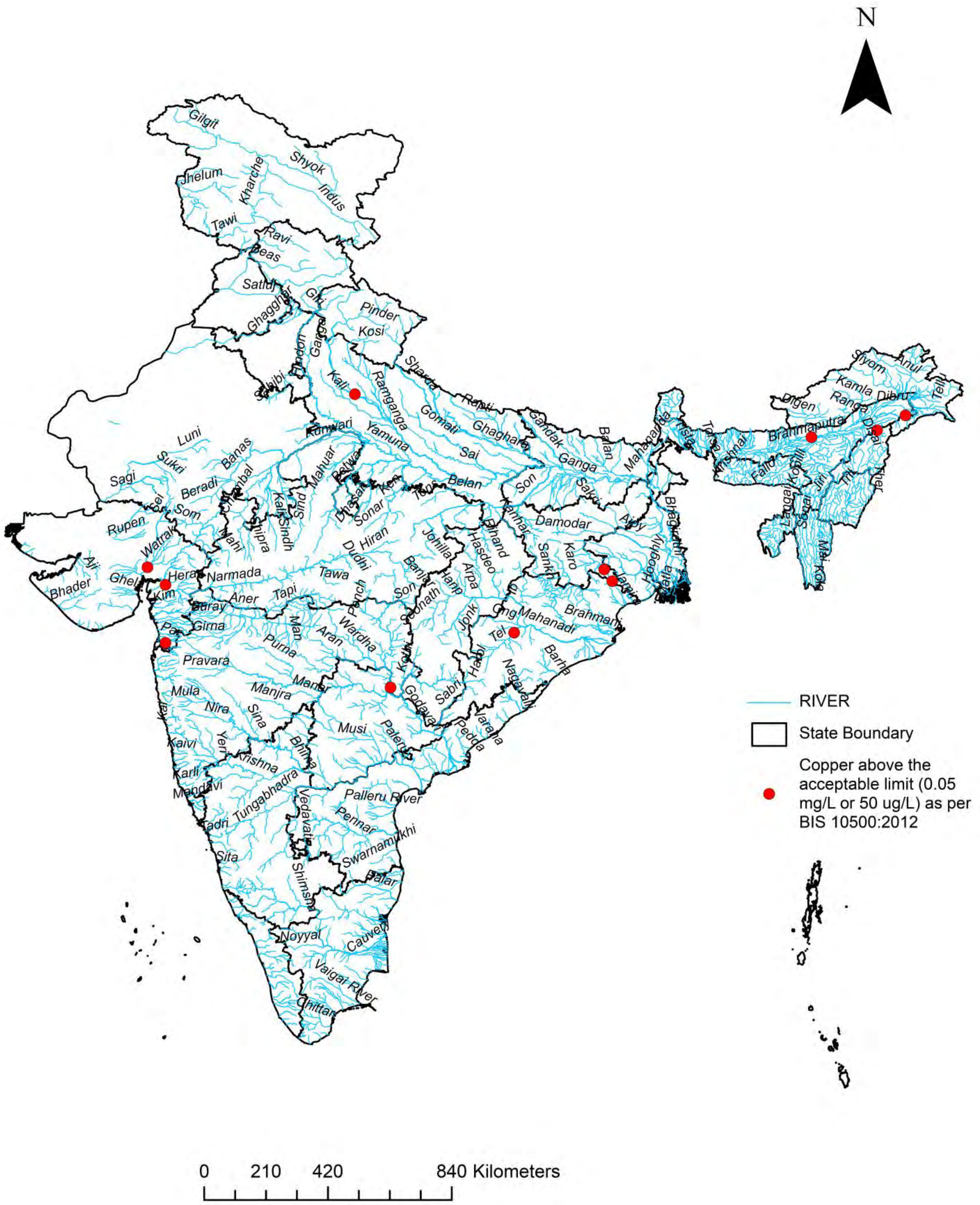


Figure 26: WQ monitoring stations where Copper exceeded the acceptable limits

9.5 Summary of LEAD content in Indian rivers

Lead is the one of the most common of the heavy elements. It has therefore been used extensively since Roman times and, as a result, has become widely distributed throughout the environment. The acceptable limit (AL) for lead in drinking water is 0.010 mg/L (10 µg/L). Above the acceptable limit lead is a cumulative general poison, with foetuses, infants, children up to six years of age and pregnant women (because of their foetuses) being most susceptible to adverse health effects. Lead can severely affect the central nervous system. Overt signs of acute intoxication include dullness, restlessness, irritability, poor attention span, headaches, muscle tremor, hallucinations and loss of memory. Signs of chronic lead toxicity, including tiredness, sleeplessness, irritability, headaches, joint pain and gastrointestinal symptoms, may appear in adults. After one or two years of exposure, muscle weakness, gastrointestinal symptoms, lower scores on psychometric tests, disturbances in mood and symptoms of peripheral neuropathy were observed in occupationally exposed populations.

Bureau of Indian Standard (10500, 2012) have recommended an acceptable limit of lead is 0.01 mg/L or 10 µg/L in drinking water. India some rivers have lead concentration above the acceptable limit prescribed by Bureau of Indian Standards, 10500; 2012. 2959 numbers of water samples from 424 water quality monitoring stations across India were collected and analyzed for lead content using AAS. It is observed that the lead concentrations in 128 water samples are greater than the acceptable limits of lead in drinking water i.e. 10 µg/L as set by BIS. Lead concentration was maximum (374.58 µg/L) at Lowara water quality station on Sheturni River during April, 2016. 128 water samples from 92 water quality monitoring stations are observed to have lead concentrations exceeding the acceptable limits in drinking water in 69 Indian Rivers during the study period (Table 16). Brahmaputra, Buridehing, Cauvery, Ganga, Ghagra, Gomti, Ramganga, Rapti, Sone, Tungabhadra, and Yamuna are the rivers where morethan one WQ monitoring stations are contaminated with lead.

Table 16: Rivers and WQ monitoring stations where Lead exceeded the acceptable limit.

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
1	Achankovil	Thumpamon (Apr, 2016)	1	1
2	Aliyar	Ambarampalayam (Feb, 2015)	1	1
3	Arkavathi	T. Bekuppe (Feb, 2015; Dec, 2016)	1	2
4	Barak	Fulertal (Dec, 2016)	1	1
5	Brahmani	Gomlai (Apr, 2017)	1	1
6	Brahmaputra	Dibrugarh (Aug, 2016), Pancharatna (Aug, 2016), Pandu (Aug, 2016)	3	3
7	Bugi	Dimapara (Aug, 2016; Apr, 2017)	1	2
8	Buridehing	Chenimari (Aug, 2016), Margherita (Dec, 2016)	2	2

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
9	Cauvery	Kodumudi (Feb, 2015), Urachikottai (Feb, 2015)	2	2
10	Chhoti Sarju	Akabarpur (Feb, 2015; Dec, 2015)	1	2
11	Damanganga	Vapi (Aug, 2016)	1	1
12	Dhadher	Pingalwada (Feb, 2015)	1	1
13	Digaru	Sonapur (Aug, 2016)	1	1
14	Dikhow	Sivasagar (Aug, 2016)	1	1
15	Dudhnai	Dudhnai (Aug, 2016)	1	1
16	Ganga	Ankinghat (Nov, 2014), Azmabad (Feb, 2015), Bhitaura (Nov, 2014; Feb, 2015), Buxar (Feb, 2015), Fatehgarh (Nov, 2014), Hathidah (Feb, 2015), Kachlabridge (Nov, 2014; Feb, 2015), Kanpur (Nov, 2014; Feb, 2015), Shahzadpur (Feb, 2015)	9	12
17	Ghagra	Elginbridge (Nov, 2014), Turtipar (Nov, 2014; Feb, 2015)	2	3
18	Godavari	Polavaram (Feb, 2015)	1	1
19	Gomti	Lucknow (Nov, 2015; Dec, 2016), Neemsar (Nov, 2014; Feb, 2015; Dec, 2016)	2	5
20	Hagari	T. Ramapuram (Feb, 2015)	1	1
21	Haladi	Haladi (Feb, 2015)	1	1
22	Hemavathi	Sakleshpur (Feb, 2015)	1	1
23	Hindon	Galeta (Nov, 2014)	1	1
24	Indravathi	Nowrangpur (Apr, 2016)	1	1
25	Jaldhaka	Jaldhaka NH-31 (Nov, 2014)	1	1
26	Jiabharali	Jiabharali NT Road Xing (Feb, 2015)	1	1
27	Kallada	Pattazhy (Feb, 2015; Apr, 2016)	1	2
28	Kamang	Seppa (Dec, 2016; Aug, 2017)	1	2
29	Kanhan	Ramakona (Feb, 2015)	1	1
30	Kharkai	Adityapur (Apr, 2016)	1	1
31	Kopili	Kheronighat (Feb, 2015)	1	1
32	Krishna	Huvin Hedgi (Feb, 2015)	1	1
33	Kunderu	Alladupalli (Feb, 2015; Apr, 2017)	1	2
34	Kwano	Basti (Nov, 2014)	1	1
35	Lohit	Dholabazar (Aug, 2016)	1	1
36	Longai	Fakirabazar (May, 2014)	1	1
37	Mahananda	Champasari (Feb, 2015)	1	1
38	Mahi	Khanpur (Dec, 2015)	1	1
39	Munneru	Keesara (Feb, 2015)	1	1
40	Narmada	Garudeshwar (Feb, 2015)	1	1
41	Neo dihing	Miao (Fen, 2015; Dec, 2016)	1	2

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
42	Noyyal	Elunuthimanagalam (Feb, 2015; Dec, 2017)	1	2
43	Orsang	Chanwada (Feb, 2015; Aug, 2016)	1	2
44	Pagladiya	Pagladiya N.T.Road Crossing (Aug, 2016)	1	1
45	Palar	Arcot (Aug, 2016)	1	1
46	Pennar	Chennur (Feb, 2015)	1	1
47	Ponnaiyar	Gummanur (Feb, 2015)	1	1
48	Purna	Gopalkheda (Feb, 2015; Aug, 2016)	1	2
49	Puthimari	Puthimari D.R.F (Feb, 2015)	1	1
50	Raidak-I	Tufanganj (Feb, 2015)	1	1
51	Ramganga	Bareilly (Nov, 2014), Dabri (Nov, 2014; Feb, 2015), Moradabad (May, 2014; Nov, 2014; Feb, 2015; Apr, 2018)	3	7
52	Rapti	Balrampur (Nov, 2014), Bansi (Nov, 2014), Birdghat (May, 2014; Nov, 2014; Feb, 2015), Regauli (May, 2014; Nov, 2014; Feb, 2015)	4	8
53	Sabarmati	Vautha (Nov, 2014; Dec, 2015; Dec, 2016)	1	3
54	Sai	Raibareli (Nov, 2014; Dec, 2016)	1	2
55	Sankosh	Sankosh LRP (Feb, 2015)	1	1
56	Saryu	Ayodhya (Nov, 2014)	1	1
57	Seonath	Simga (Feb, 2015)	1	1
58	Sheturni	Lowara (Apr, 2016; Dec, 2016; Dec, 2017; Apr, 2018)	1	4
59	Sone	Koelwar (Apr, 2016), Kuldah Bridge (Aug, 2016)	2	2
60	Subansiri	Badatighat (Feb, 2015)	1	1
61	Subarnarekha	Ghatsila (Apr, 2016)	1	1
62	Swarnamukhi	Naidupet (Feb, 2015)	1	1
63	Tapi	Sarangkheda (Apr, 2017)	1	1
64	Tungabhadra	Bawapuram (Feb, 2015), Mantralayam (Feb, 2015)	2	2
65	Ulhas	Badlapur (Feb, 2015)	1	1
66	Umsohrynkiew	Therriaghat (Aug, 2017)	1	1
67	Vaitarna	Durvesh (Feb, 2015; Aug, 2016; Dec, 2016; Apr, 2017; Dec, 2017)	1	5
68	Yagachi	Thimmanahalli (Feb, 2015)	1	1
69	Yamuna	Agra (Apr, 2018), Delhi Rly Bridge (Nov, 2014), Mohana (Nov, 2014; Feb, 2015)	3	4
		Total	**92**	**128**

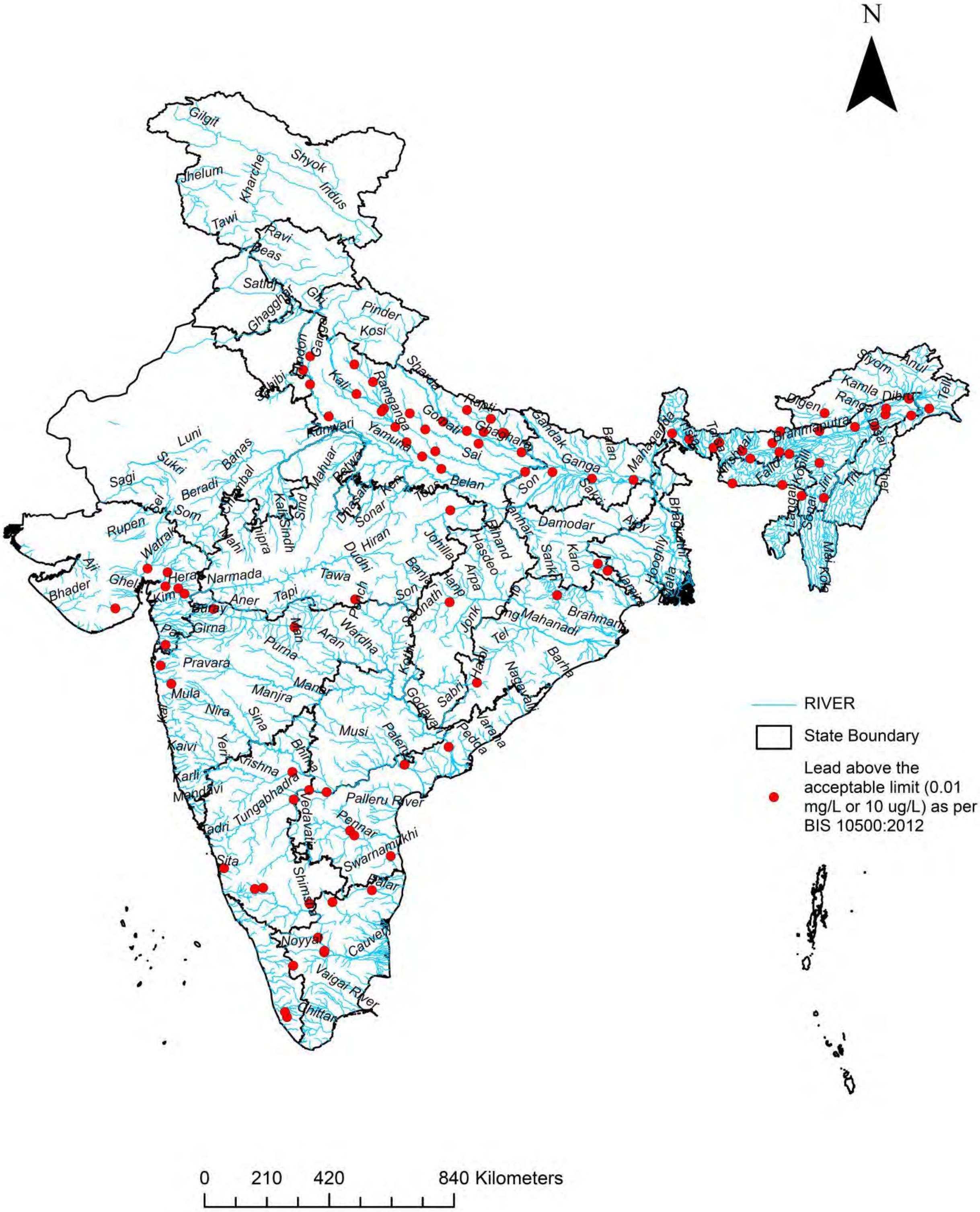


Figure 27: WQ monitoring stations where Lead exceeded the acceptable limits

9.6 Summary of NICKEL content in Indian rivers

Nickel is a nutritionally essential trace metal for at least several animal species, micro-organisms and plants, and therefore either deficiency or toxicity symptoms can occur when, respectively, too little or too much Ni is taken up. According to BIS-10500 (2012) the acceptable limit of nickel in drinking water is 20 µg/L. Nickel and nickel compounds have many industrial and commercial uses, and the progress of industrialization has led to increased emission of pollutants into ecosystems. Nickel is easily accumulated in the biota, particularly in the phytoplankton or other aquatic plants, which are sensitive bio-indicators of water pollution. It can be deposited in the sediment by such processes as precipitation, complexation and adsorption on clay particles and via uptake by biota.

Total 2582 numbers of water samples from 424 WQ monitoring stations of Central Water Commission were collected and analyzed for Nickel content in Indian Rivers. From the results, it is observed that Nickel concentration in 45 sampes of 34 water quality monitoring stations is found beyond the prescribed limits of BIS. Nickel concentration at Durvesh water quality station on Vaitarna river in December, 2017 is reported to be the maximum (245.01 µg/L) during the entire study period. Seonath, Subarnarekha and Tungabhadra are the rivers where morethan one WQ monitoring stations are observed being contaminated with Nickel (Table 18).

45 water samples from 34 water quality monitoring stations over 31 Indian Rivers were observed to have nickel concentration that exceed the acceptable limit during the study period (Table 17). Water quality monitoring stations and Rivers affected by high nickel concentration (>20 µg/L) are presented in Table-18 and these WQ stations are hot-spots from point of view of nickel pollution.

Table 17: Rivers and WQ monitoring stations where Nickel exceeded the acceptable limit

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
1	Arkavathi	T. Bekuppe (Feb, 2015)	1	1
2	Brahmani	Panposh (Feb, 2015)	1	1
3	Ganga	Kachlabridge (Nov, 2014)	1	1
4	Hagari	T. Ramapuram (Feb, 2015; Dec, 2017)	1	2
5	Hasdeo	Bamnidih (May, 2014)	1	1
6	Hindon	Galeta (Dec, 2017)	1	1
7	Ib	Sundergarh (Nov, 2014)	1	1
8	Jiabharali	Bhalukpong (May, 2014)	1	1
9	Jonk	Rampur (May, 2014)	1	1
10	Ken	Banda (Feb, 2015)	1	1
11	Krishna	Huvin Hedgi (Feb, 2015)	1	1
12	Kunderu	Alladupalli (Feb, 2015)	1	1
13	Mahanadi	Basantpur (May, 2014)	1	1
14	Mand	Kurubhata (May, 2014)	1	1

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
15	Narmada	Barmanghat (Feb, 2015; Dec, 2016)	1	2
16	Noyyal	Elunuthimanagalam (Feb, 2015; Feb, 2017)	1	2
17	Ong	Salebhata (May, 2014; Apr, 2018)	1	2
18	Orsang	Chanwada (Feb, 2015; Dec, 2017)	1	2
19	Pennar	Chennur (Feb, 2015)	1	1
20	Periyar	Vandiperiyar (Feb, 2015; Dec, 2017)	1	2
21	Purna	Gopalkheda (Feb, 2015)	1	1
22	Sabarmati	Vautha (Nov, 2014; Feb, 2015)	1	2
23	Saryu	Ayodhya (Feb, 2015; Dec, 2017)	1	2
24	Seonath	Ghatora (May, 2014), Simga (May, 2014)	2	2
25	Sharda	Paliakalan (Aug, 2016)	1	1
26	Sheturni	Lowara (Feb, 2015; Apr, 2016; Apr, 2018)	1	3
27	Siang	Passighat (Nov, 2014)	1	1
28	Subarnarekha	Ghatsila (May, 2014), Jamshedpur (May, 2014)	2	2
29	Tungabhadra	Bawapuram (Feb, 2015), Mantralayam (Feb, 2015)	2	2
30	Vaitarna	Durvesh (Feb, 2015; Dec, 2015)	1	2
31	Yamuna	Delhi Rly Bridge (Dec, 2017)	1	1
		Total	**34**	**45**

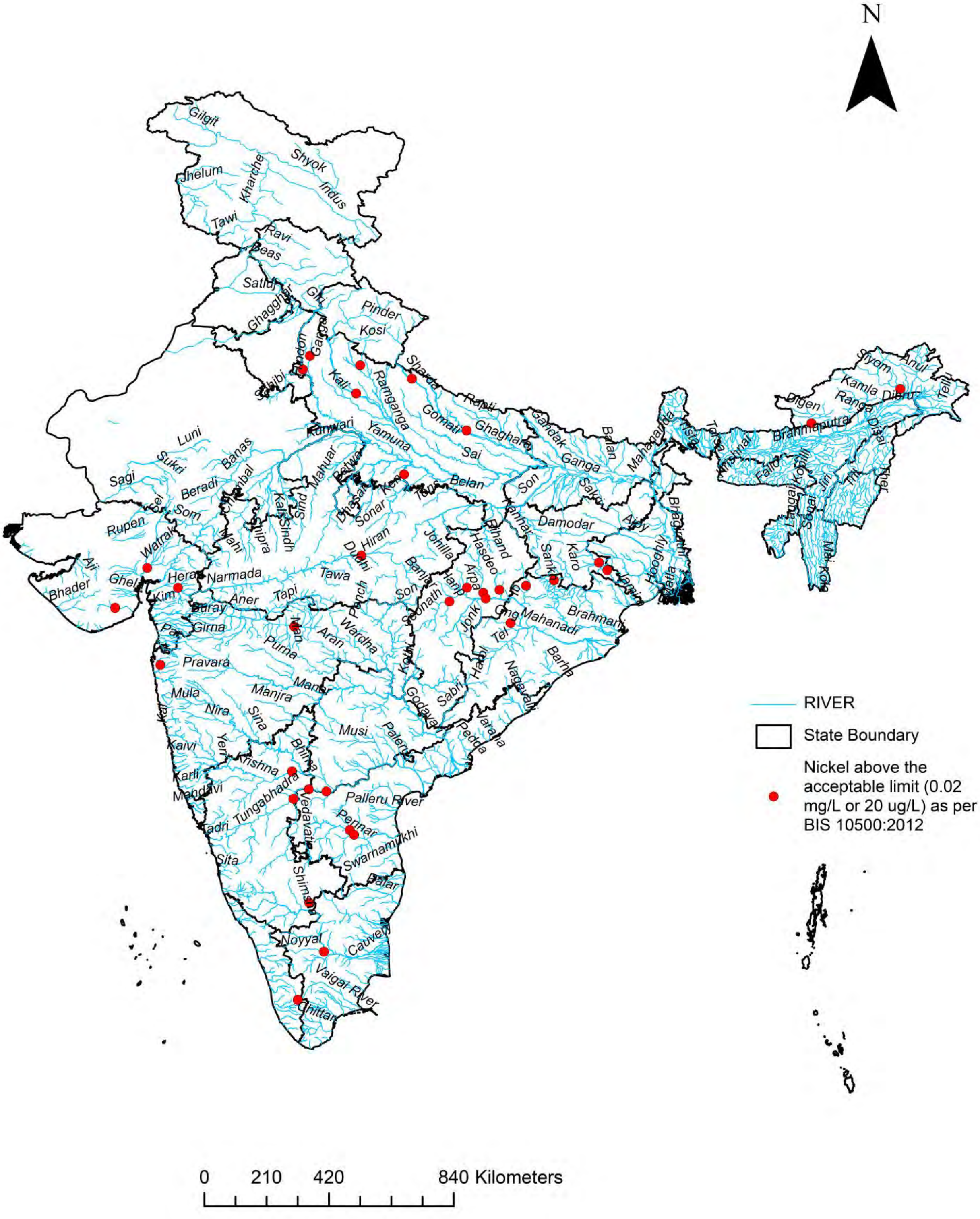


Figure 28: WQ monitoring stations where Nickel exceeded the acceptable limits

9.7 Summary of IRON content in Indian rivers

According to BIS the acceptable limit of Iron is 0.3 mg/L (300 µg/L). The occurrences of iron in River water above maximum acceptable limit (>300 µg/L) have been shown in the table 18. Total 2959 numbers of water samples from 424 WQ monitoring stations were collected and analyzed. Higher concentration of iron >300 µg/L has been observed in 610 water samples collected from 245 WQ stations of 142 Indian Rivers during the study period. The highest concentration of 14.55 mg/L is observed at Chenimari on Buridehing River. Table 19 shows the names of the water quality stations and the Rivers affected by high iron concentration 300 µg/L and these WQ stations are hot-spots in terms of Iron concentration.

Bagmathi, Beki, Bhagirath, Brahmani, Brahmaputra, Buridehing, Desang, Dhansiri, Ganga, Godavari, Gomti, Indravathi, Jaldhaka, Kopili, Narmada, Ramganga, Rapti, Sone, Subarnarekha, Teesta and Wainganga are the Rivers where three or more water quality stations have been found to have Iron concentration that exceed the limits throughout the study period.

Table 18: Rivers and WQ monitoring stations where Iron exceeded the acceptable limit

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
1	Aghanashini	Santeguli (Nov, 2014; Aug, 2017; Apr, 2018)	1	3
2	Aie	Aie NH Crossing (Nov, 2014)	1	1
3	Alakananda	Srinagar (Nov, 2014), Rudraprayag (May, 2014; Nov, 2014; Apr, 2016)	2	4
4	Ambika	Gadat (Aug, 2016; Aug, 2017)	1	2
5	Arkavathi	T. Bekuppe (Dec, 2016)	1	1
6	Bagh	Rajegaon (Aug, 2016; Aug, 2017)	1	2
7	Bagmathi	Dheng Bridge (Aug, 2017), Ekmighat (Dec, 2015; Aug, 2016; Dec, 2016; Aug, 2017; Apr, 2018), Hayaghat (Dec, 2016; Aug, 2017; Apr, 2018)	3	9
8	Baitarni	Anandpur (Aug, 2017), Champua (Aug, 2017)	2	2
9	Balason	Matigara (May, 2014; Nov, 2014)	1	2
10	Banas	Kamalpur (Aug, 2017)	1	1
11	Banjar	Bamni (Aug, 2016; Aug, 2017; Apr, 2018)	1	3
12	Barak	B.P. Ghat (Aug, 2017), Fulertal (Apr, 2018)	2	2
13	Beki	Beki Mathanguri (Nov, 2014), Beki Road Bridge (Nov, 2014), Mathanguri (May, 2014)	3	3
14	Bhadar	Ganod (Dec, 2015; Aug, 2017; Apr, 2018)	1	3

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
15	Bhadra	Holehonnur (Aug, 2017)	1	1
16	Bhagirath	Deoprayag (May, 2014; Nov, 2014), Koteshwar (Nov, 2014), Tehri (May, 2014), Uttarkashi (May, 2014; Nov, 2014)	4	6
17	Bhagirathi	Katwa (Nov, 2014)	1	1
18	Bhavani	Nellithurai (Nov, 2014)	1	1
19	Brahmani	Gomlai (Aug, 2017), Jenapur (Nov, 2014; Aug, 2017), Panposh (Nov, 2014; Apr, 2016; Aug, 2017), Talcher (Aug, 2017)	4	7
20	Brahmaputra	Bhomoraguri (Dec, 2015; Apr, 2016; Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Dec, 2017), Dhubri (Nov, 2014), Dibrugarh (Apr, 2016; Aug, 2016; Apr, 2017; Aug, 2017; Dec, 2017), Neamatighat (Apr, 2016; Aug, 2016; Apr, 2017; Aug, 2017; Dec, 2017, Apr, 2018), Pancharatna (May, 2014; Nov, 2014; Aug, 2017), Pandu (May, 2014; Apr, 2017; Aug, 2017; Dec, 2017), Tezpur (Dec, 2015; Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Dec, 2017; Apr, 2018)	7	33
21	Bugi	Dimapara (Dec, 2016)	1	1
22	Burhabalang	Govindapur (Aug, 2017)	1	1
23	Burhi Gandak	Sikandarpur (Aug, 2017; Apr, 2018)	1	2
24	Burhner	Mohgaoan (Aug, 2016; Aug, 2017)	1	2
25	Buridehing	Chenimari (Apr, 2016; Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Apr, 2018), Margherita (Apr, 2016; Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Apr, 2018), Naharkatia (Dec, 2015; Apr, 2016; Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Dec, 2017; Apr, 2018)	3	20
26	Burisuti	Panbari (Nov, 2014)	1	1
27	Cauvery	Chuchankatte (Aug, 2017), Kudige (Dec, 2015; Aug, 2017)	2	3
28	Champamati	Behalpur (Nov, 2014)	1	1
29	Chel	Chel (May, 2014; Nov, 2014)	1	2
30	Chhoti Sarju	Akabarpur (Aug, 2016)	1	1
31	Churni	Hanskhali (Nov, 2014)	1	1
32	Damanganga	Vapi (Nov, 2014; Aug, 2016; Apr,	1	4

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
		2017; Aug, 2017)		
33	Desang	Desangpani (Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Dec, 2017; Apr, 2018), Dillighat (Aug, 2016; Apr, 2017; Aug, 2017; Apr, 2018), Nanglamoraghat (Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Dec, 2017; Apr, 2018)	3	16
34	Dhadher	Pingalwada (Aug, 2016; Apr, 2017; Aug, 2017; Dec, 2017)	1	4
35	Dhansiri	Bokajan (Dec, 2015; Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Apr, 2018), Golaghat (Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Dec, 2017), Numaligarh (Apr, 2016; Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Apr, 2018)	3	17
36	Digaru	Sonapur (May, 2014; Dec, 2015; Apr, 2017; Apr, 2018)	1	4
37	Dikhow	Bihubar (Dec, 2015; Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Dec, 2017; Apr, 2018), Sivasagar (Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Dec, 2017; Apr, 2018)	2	13
38	Doyang	Gelabil (Dec, 2015; Aug, 2016; Apr, 2017; Aug, 2017; Dec, 2017)	1	5
39	Dudhnai	Dudhnai (May, 2014; Nov, 2014; Dec, 2015; Apr, 2017; Aug, 2017; Apr, 2018)	1	6
40	Gandak	Lalganj (Aug, 2016; Apr, 2017; Aug, 2017; Apr, 2018), Tribeni (Apr, 2017; Aug, 2017; Apr, 2018)	2	7
41	Ganga	Allahabad (Aug, 2017), Ankinghat (May, 2014; Nov, 2014; Dec, 2016), Azmabad (Aug, 2016; Dec, 2016; Aug, 2017; Dec, 2017), Bhitaura (May, 2014; Nov, 2014; Aug, 2016; Aug, 2017), Buxar (Aug, 2016; Apr, 2017; Aug, 2017; Apr, 2018), Fatehgarh (May, 2014; Nov, 2014; Aug, 2016; Dec, 2016; Aug, 2017), Garhamukteshwar (May, 2014; Nov, 2014; Aug, 2016; Dec, 2016; Apr, 2017), Haridwar (Nov, 2014), Hathidah (Apr, 2017; Aug, 2017; Apr,	16	50

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
		2018), Kachlabridge (May, 2014; Nov, 2014; Aug, 2016; Dec, 2016; Aug, 2017), Kanpur (May, 2014; Nov, 2014; Aug, 2016; Dec, 2016; Aug, 2017), Mirzapur (Aug, 2017), Patna (Aug, 2016; Apr, 2017; Aug, 2017; Dec, 2017; Apr, 2018), Rishikesh (May, 2014; Nov, 2014), Shahzadpur (Aug, 2017), Varanasi (Aug, 2017)		
42	Ganjal	Chhidgaon (Aug, 2017)	1	1
43	Gaurang	Kokrajhar (May, 2014; Nov, 2014)	1	2
44	Ghagra	Elginbridge (May, 2014; Nov, 2014; Aug, 2016; Dec, 2016; Aug, 2017), Turtipar (May, 2014; Nov, 2014; Aug, 2016; Dec, 2016)	2	9
45	Ghish	Ghish (May, 2014; Nov, 2014)	1	2
46	Godavari	Bhadrachalam (Aug, 2017), Koperagaon (Aug, 2017), Perur (Aug, 2017), Polavaram (Aug, 2017)	4	4
47	Gomti	Lucknow (May, 2014; Aug, 2016), Maighat (Aug, 2017), Neemsar (May, 2014; Nov, 2014; Aug, 2016; Dec, 2016), Sultanpur (Aug, 2016; Aug, 2017)	4	9
48	Gurupur	Addoor (Aug, 2017)	1	1
49	Haladi	Haladi (Aug, 2017)	1	1
50	Harohar/Phalgu	Gaya (Aug, 2017)	1	1
51	Hemavathi	M.H. Halli (Dec, 2015), Sakleshpur (Aug, 2017)	2	2
52	Hiran	Patan (Aug, 2017)	1	1
53	Indravathi	Jagdalpur (Aug, 2017), Nowrangpur (Feb, 2015; Aug, 2017), Pathagudem (Aug, 2017)	3	4
54	Jaldhaka	Jaldhaka NH-31 (May, 2014; Nov, 2014), Mathabhanga (Nov, 2014), Nagrakata (Nov, 2014)	3	4
55	Jiabharali	Bhalukpong (Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017), Jiabharali NT Road Xing (Dec, 2015; Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Apr, 2018)	2	10
56	Kabini	Muthankera (Dec, 2017)	1	1
57	Kamala-Balan	Jai Nagar (Apr, 2016; Aug, 2017), Jhanjharpur (Dec, 2016; Aug, 2017;	2	5

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
		Apr, 2018)		
58	Kamang	Seppa (Dec, 2015; Aug, 2016; Dec, 2016; Apr, 2017, Aug, 2017, Dec, 2017, Apr, 2018)	1	7
59	Kanhan	Ramakona (Aug, 2016; Aug, 2017), Satrapur (Aug, 2016)	2	3
60	Kanhar	Duddhi (Aug, 2016; Aug, 2017)	1	2
61	Kharkai	Adityapur (Aug, 2017)	1	1
62	Khobragarhi	Wairagarh (Aug, 2016)	1	1
63	Kim	Motinaroli (Aug, 2016; Aug, 2017)	1	2
64	Kiul	Lakhisarai (Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Apr, 2018)	1	5
65	Koel	Jaraikela (Aug, 2017)	1	1
66	Kopili	Dharamtul (Dec, 2015; Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Dec, 2017; Apr, 2018), Jagibhakatgaon (Dec, 2015; Apr, 2016; Aug, 2016; Dec, 2016, Apr, 2017; Aug, 2017; Dec, 2017; Apr, 2018), Kampur (Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017), Kheronighat (Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Apr, 2018)	4	24
67	Kosi	Baltara (May, 2014; Dec, 2015; Aug, 2016; Dec, 2016; Aug, 2017; Apr, 2018)	1	6
68	Krishna	Arjunwad (Aug, 2017); Huvinhedgi (Aug, 2017)	2	2
69	Kulsi	Kulsi (May, 2014; Dec, 2015; Apr, 2017; Aug, 2017; Apr, 2018)	1	5
70	Kuttyadi	Kuttyadi (Dec, 2017; Apr, 2018)	1	2
71	Kwano	Basti (May, 2014; Nov, 2014; Aug, 2016; Dec, 2016; Aug, 2017)	1	5
72	Lakshmantirtha	K.M. Vadi (Aug, 2017)	1	1
73	Lohit	Dholabazar (Dec, 2015; Aug, 2016; Apr, 2017; Aug, 2017; Apr, 2018), Tezu (Aug, 2016; Apr, 2017; Aug 2017)	2	8
74	Mahanadi	Tikarpara (Aug, 2017)	1	1
75	Mahananda	Champasari (May, 2014; Nov, 2014), Sonapurhat (May, 2014; Nov, 2014)	2	4
76	Mahi	Khanpur (Dec, 2015; Aug, 2017; Apr, 2018), Mataji (Aug, 2016; Aug, 2017; Apr, 2018)	2	6
77	Manas	Manas NH Crossing (Nov, 2014)	1	1

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
78	Meenachi	Kidangoor (Apr, 2016)	1	1
79	Murti	Murti (Nov, 2014)	1	1
80	Muvvattupuzha	Ramamangalam (Dec, 2017)	1	1
81	Nagavali	Srikakulam (Nov, 2014)	1	1
82	Naora	Neora (Nov, 2014)	1	1
83	Narmada	Barmanghat (Nov, 2014; Aug, 2017; Apr, 2018), Dindori (Apr, 2018), Garudeshwar (Aug, 2016), Handia (Apr, 2018), Hoshangabad (Nov, 2014; Aug, 2017), Manot (Aug, 2016; Aug, 2017; Apr, 2018), Sandia (Nov, 2014; Aug, 2017)	7	13
84	Neo dihing	Miao (Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017), Namsai (Apr, 2016; Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Apr, 2018)	2	10
85	Nethravathi	Bantwal (Aug, 2017)	1	1
86	Orsang	Chanwada (Aug, 2016; Aug, 2017)	1	2
87	Pagladiya	Pagladiya N.T.Road Crossing (May, 2014)	1	1
88	Papagni	Kamalapuram (Aug, 2017)	1	1
89	Pazhayar	Ashramam (Nov, 2014)	1	1
90	Penganga	P.G.Bridge (Aug, 2016)	1	1
91	Periyar	Vandiperiyar (Dec, 2017)	1	1
92	Pranhitha	Tekra (Aug, 2016)	1	1
93	Pravara	Pachegaon (Aug, 2017)	1	1
94	Pulanthodu	Pulamanthole (Apr, 2018)	1	1
95	Punpun	Sripalpur (Dec, 2015; Aug, 2016; Apr, 2017; Aug, 2017; Dec, 2017; Apr, 2018)	1	6
96	Purna	Gopalkheda (Nov, 2014; Aug, 2016; Aug, 2017), Mahuwa (Dec, 2015; Aug, 2016; Aug, 2017)	2	6
97	Puthimari	Puthimari D.R.F. (May, 2014), Puthimari NH Road Crossing (May, 2014)	2	2
98	Raidak-I	Chepan (Nov, 2014), Tufanganj (Nov, 2014)	2	2
99	Raidak-II	Barobisha (Nov, 2014)	1	1
100	Ramganga	Bareilly (Aug, 2016; Dec, 2016; Aug, 2017), Dabri (May, 2014; Nov, 2014; Aug, 2016; Dec, 2016; Aug, 2017), Moradabad (May, 2014; Nov, 2014; Aug, 2016; Dec, 2016)	3	12

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
101	Ramyala	Alutuma (Aug, 2017)	1	1
102	Ranganadi	Ranganadi NT-Road Xing (Dec, 2015; Aug, 2016; Dec, 2016; Aug, 2017; Apr, 2018)	1	5
103	Rangit	Majhitar (May, 2014), Singla-Bazar (May, 2014; Nov, 2014)	2	3
104	Rangpochu	Rangpo (May, 2014; Nov, 2014)	1	2
105	Rapti	Balrampur (Nov, 2014; Dec, 2016), Bansi (Nov, 2014; Aug, 2016; Dec, 2016; Apr, 2017), Birdghat (May, 2014; Nov, 2014; Dec, 2016), Regauli (May, 2014; Nov, 2014; Aug, 2016; Dec, 2016; Aug, 2017)	4	14
106	Sabari	Konta (Aug. 2017)	1	1
107	Sabarmati	Derol Bridge (Aug, 2017), Vautha (Nov, 2014; Dec, 2015; Aug, 2016; Apr, 2017; Aug, 2017; Apr, 2018)	2	7
108	Sagaileru	Nandipalli (Aug, 2017)	1	1
109	Sai	Pratapgarh (Aug, 2016; Aug, 2017), Raibareli (Nov, 2014; Aug, 2016; Dec, 2016)	2	5
110	Sankh	Tilga (Aug, 2017; Apr, 2018)	1	2
111	Sankosh	Sankosh LRP (Nov, 2014)	1	1
112	Sarju	Ghat (May, 2014; Nov, 2014; Dec, 2016; Apr, 2017; Apr, 2018)	1	5
113	Saryu	Ayodhya (May, 2014; Nov, 2014; Aug, 2016; Dec, 2016)	1	4
114	Sharda	Paliakalan (May, 2014; Nov, 2014; Aug, 2016; Dec, 2016)	1	4
115	Sher	Belkhedi (Aug, 2016)	1	1
116	Sheturni	Lowara (Aug, 2016; Aug, 2017; Apr, 2018)	1	3
117	Sita	Avershe (Aug, 2017)	1	1
118	Som	Rangeli (Aug, 2016; Apr, 2017)	1	2
119	Sone	Chopan (Aug, 2016; Dec, 2016), Japla (Aug, 2017; Dec, 2017; Apr, 2018), Koelwar (Aug, 2016; Aug, 2017; Dec, 2017; Apr, 2018), Kuldah Bridge (Aug, 2016; Aug, 2017)	4	11
120	Sonkosh	Golakganj (Nov, 2014)	1	1
121	Subansiri	Badatighat (Dec, 2015; Aug, 2016; Dec, 2016; Apr, 2018), Chouldhowaghat (Dec, 2015; Aug, 2016; Dec, 2016; Aug, 2017; Apr,	2	9

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
		2018)		
122	Subarnarekha	Ghatsila (Aug, 2017), Jamshedpur (Aug, 2017), Jamsolghat (Aug, 2017), Muri (Aug, 2017)	4	4
123	Suklai	Suklai (May, 2014; Nov, 2014; Dec, 2015; Dec, 2016; Apr, 2017; Apr, 2018)	1	6
124	Suruliar	Theni (Dec, 2016)	1	1
125	Tapi	Burhanpur (Aug, 2016; Apr, 2017; Aug, 2017), Sarangkheda (Nov, 2014; Aug, 2016; Aug, 2017)	2	6
126	Teesta	Coronation (May, 2014; Nov, 2014), Domohani (May, 2014; Nov, 2014; Apr, 2018), Gajaldoba (May, 2014; Nov, 2014), Khanitar (Nov, 2014), Mekhliganj (Nov, 2014), Sankalan (May, 2014; Nov, 2014), Sevoke (May, 2014; Nov, 2014), Teesta-Bazar (May, 2014; Nov, 2014)	8	15
127	Tunga	Shimoga (Aug, 2017)	1	1
128	Tungabhadra	Harlahalli (Aug, 2017); Honnali (Aug, 2017)	2	2
129	Tirap	Udaipur (Dec, 2015; Apr, 2016; Aug, 2016; Dec, 2016; Apr, 2017; Aug, 2017; Apr, 2018)	1	7
130	Tons	Meja Road (Aug, 2017)	1	1
131	Torsa	Ghugumari (Nov, 2014), Hasimara (Nov, 2014)	2	2
132	Umngot	Dawki (Aug, 2017)	1	1
133	Vaitarna	Durvesh (Aug, 2016; Aug, 2017)	1	2
134	Valapatnam	Perumannu (Apr, 2016; Apr, 2018)	1	2
135	Vamanapuram	Ayilam (Dec, 2017)	1	1
136	Vamsadhara	Gunupur (May, 2014; Nov, 2014; Aug, 2017)	1	3
137	Varada	Marol (Aug, 2017)	1	1
138	Wainganga	Ashti (Aug, 2016; Aug, 2017), Keolari (Aug, 2016), Kumhari (Aug, 2016; Aug, 2017), Pauni (Aug, 2016; Aug, 2017)	4	7
139	Wardha	Hivra (Aug, 2017)	1	1
140	Wyra	Madhira (Apr, 2018)	1	1
141	Yamuna	Agra (Aug, 2016; Aug, 2017)	1	2
142	Yennehole	Yennehole (Aug, 2017)	1	1
		Total	**245**	**610**

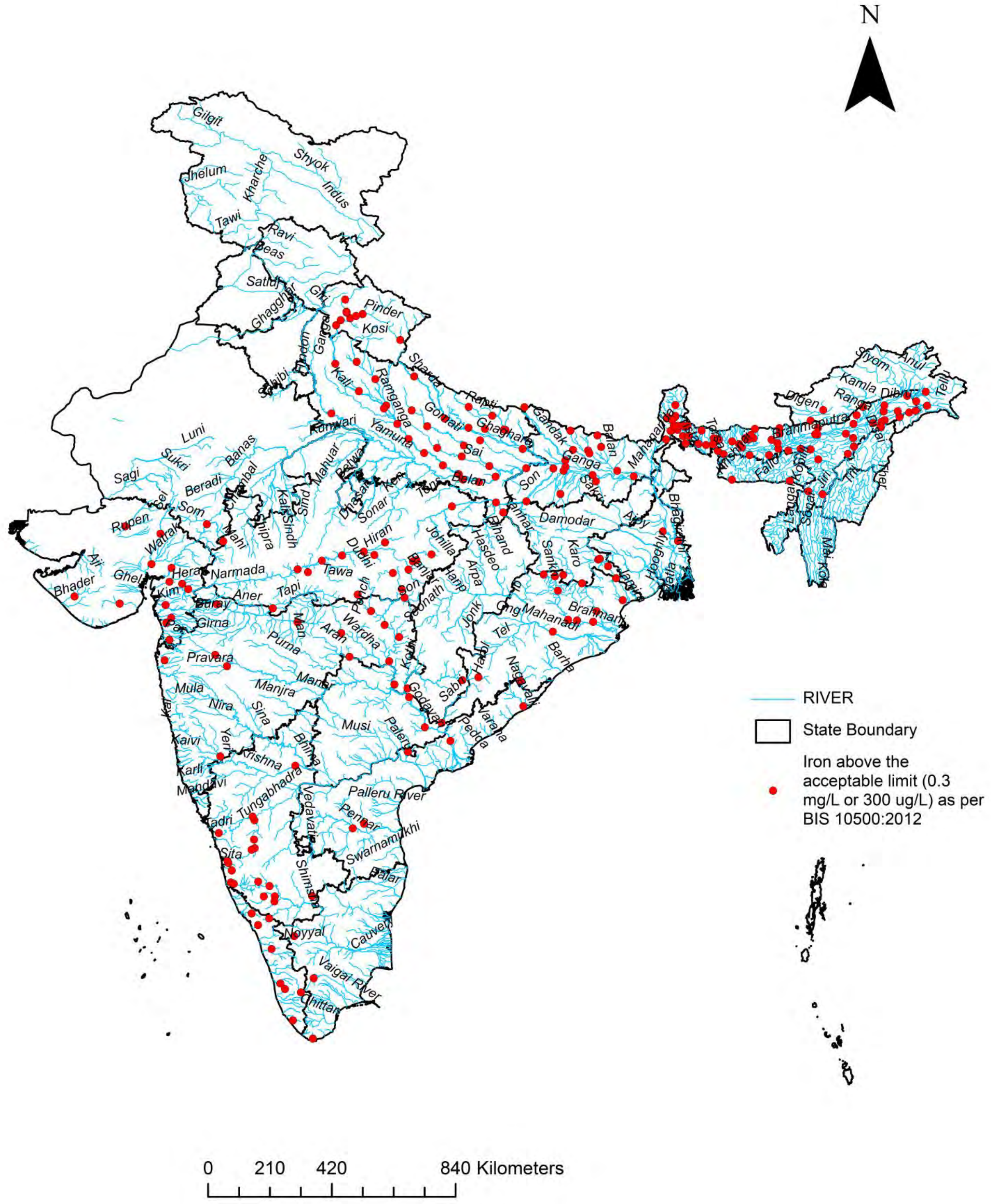


Figure 29: WQ monitoring stations where Iron exceeded the acceptable limits

9.8 Summary of ZINC content in Indian rivers

Zinc is an essential element for all living things, including man. Zinc-containing proteins and enzymes are involved in every aspect of metabolism, including the replication and translation of genetic material. BIS has recommended 5 mg/L (5000 µg/L) acceptable concentration of zinc in drinking water, which can be extended to 15 mg/L in case no alternative source of water is available, but the water with more than 5000 µg/L zinc content is not suitable for drinking purpose.

Total 2958 water samples from the 424 water quality monitoring stations were collected and analyzed for zinc content in Indian Rivers in the period between May, 2014 and April, 2018. Maximum Zinc concentration (2.65 mg/L) was observed at Manot water quality monitoring station on Narmada River during August, 2016. In the study area, all the River water quality stations are reported to have zinc concentration well within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of Zinc in the River waters is observed during the study period.

9.9 Concept of Normalization

In statistics and applications of statistics like data interpretation, normalization can have a range of meanings. In the simplest cases, normalization of ratings means adjusting values measured on different scales to a notionally common scale, often prior to averaging. In more complicated cases, normalization may refer to more sophisticated adjustments where the intention is to bring the entire probability distributions of adjusted values into alignment. In another usage in statistics, normalization refers to the creation of shifted and scaled versions of statistics, where the intention is that these normalized values allow the comparison of corresponding normalized values for different datasets in a way that eliminates the effects of certain gross influences, as in an anomaly time series

In this present case normalization concept is adopted to normalize the water quality Trace & Toxic parameters for data interpretation to attain alignment in representation and to make its respective permissible limit value into one unique value as 1 (one).

Normalized Value: *Each parameter is divided with its own permissible limit. Following that, permissible limit for all parameters also turns as 1 (one) and taking it as Threshold Value.*

Threshold Value for all parameters is - 1

Seasonal wise normalized value graphs plotted here by considering the parameters such as Cadmium (Cd), Chromium (Cr) and Lead (Pb) with respect to their lethal capacity and Iron (Fe) taken into account because of its more availability as pollutant during the study period.

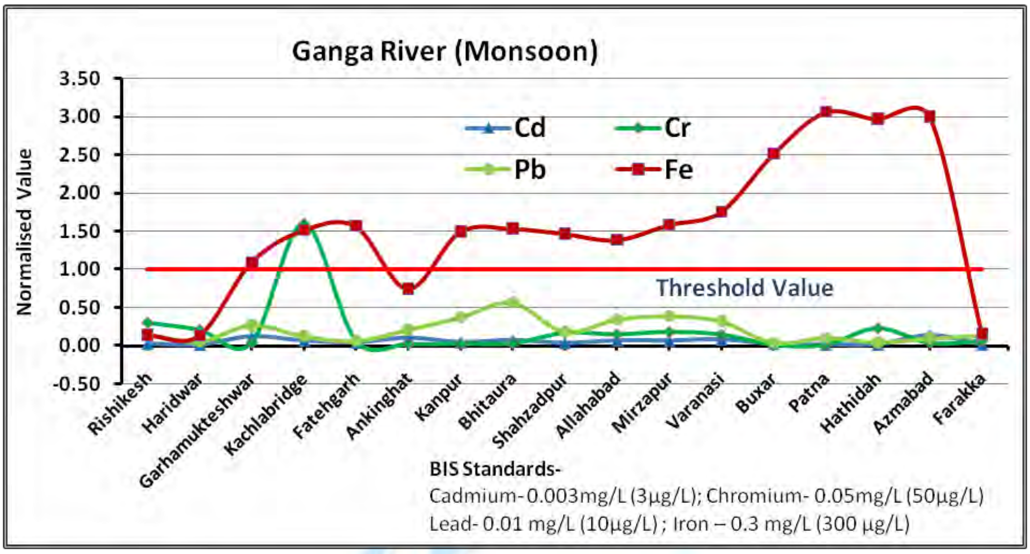
9.10 Variation in Heavy Metal concentrations along the rivers in India

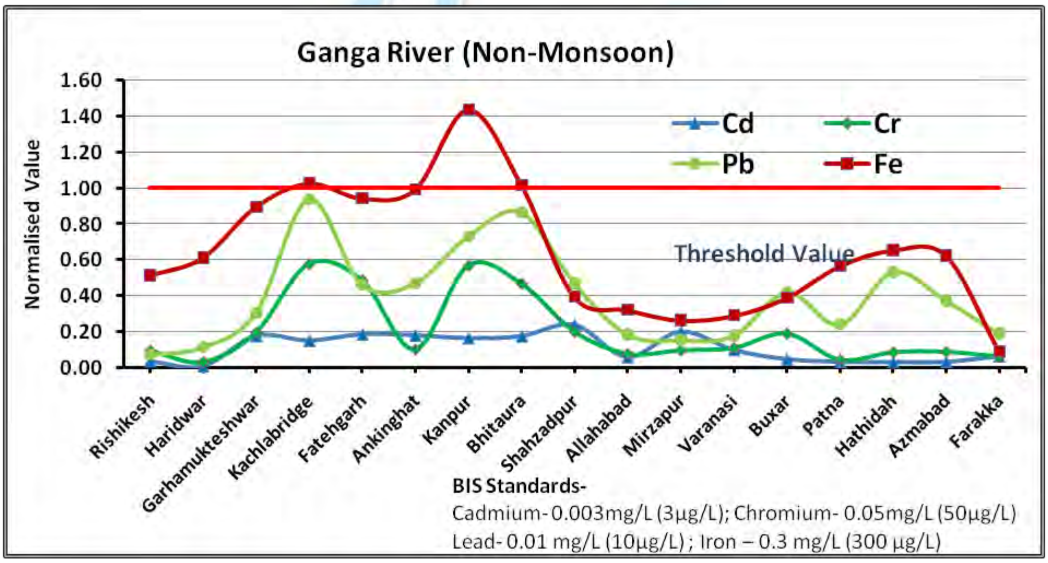
9.10.1 Ganga River:

The Ganga is the 20th longest river in the Asia and the 41st longest in the world (Source: Philips World Atlas). The headwaters region of Ganga is the Himalayas dotted by number of mighty tributaries. The Bhagirathi river that rises from the Gangotri glacier near Gomukh at an elevation of about 7,010 m above mean sea level in the Uttarkashi district of Uttarakhand is considered as the source of Ganga river. It descends down the valley up to Devprayag where after joining another hill stream Alaknanda, it is called Ganga. Flowing downhill, the river is joined by a number of streams, such as the Mandakini, the Dhuli Ganga and the Pindar. The principal tributaries joining the river from right are the Yamuna and the Son. The Ramganga, the Ghaghra, the Gandak, the Kosi and the Mahananda join the river from left. The total length of river Ganga (measured along the Bhagirathi and the Hooghly) up to its outfall into Bay of Bengal is 2,525 km with 631 km navigable length.

Ganga has been a cradle of human civilization since time immemorial. Millions depend on this great River for physical and spiritual sustenance. It is a life-line, a symbol of purity and virtue for countless people of India. But due to rapid industrialization, increase in urban population, change in lifestyle, use of artificial fertilizer has led to deterioration in water quality of holy river

Ganga. At certain stretches the river water is grossly polluted mostly due to industrial and municipal sewage discharge in the river Ganga. There are 18 water quality stations at Deoprayag, Rishikesh, Haridwar, Garhmukteshwar, Kachlabridge, Fatehgarh, Ankinghat, Kanpur, Bhitaura, Shahzadpur, Chhatnag Allahabad, Mirzapur, Varanasi, Buxar, Gandhighat (Patna), Hathidah, Azamabad and Farakka on the main stream of the river Ganga.





Graph 1: Normalization of Ganga River (Monsoon and Non-monsoon)

Oservations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters concentration observed below the threshold value except iron from Kanpur to Azmabad stretch during monsoon. During the study period, all the Ganga River water quality stations data reported that arsenic and zinc concentration lies within the acceptable limits of Bureau of Indian Standards (BIS) and no toxicity of arsenic and zinc in the River waters is observed. The concentration of the cadmium, chromium, lead and iron varies in the Ganga River are 0.001-3.936 μg/L; 0.080-205.82 μg/L; 0.020-36.91 μg/L and 0.002-1.53 mg/L respectively during the May, 2014 and April, 2018. Generally elementary iron dissolves in water under normal conditions.The iron concentration in the River Ganga was vaired between 0.002-1.53 mg/L.

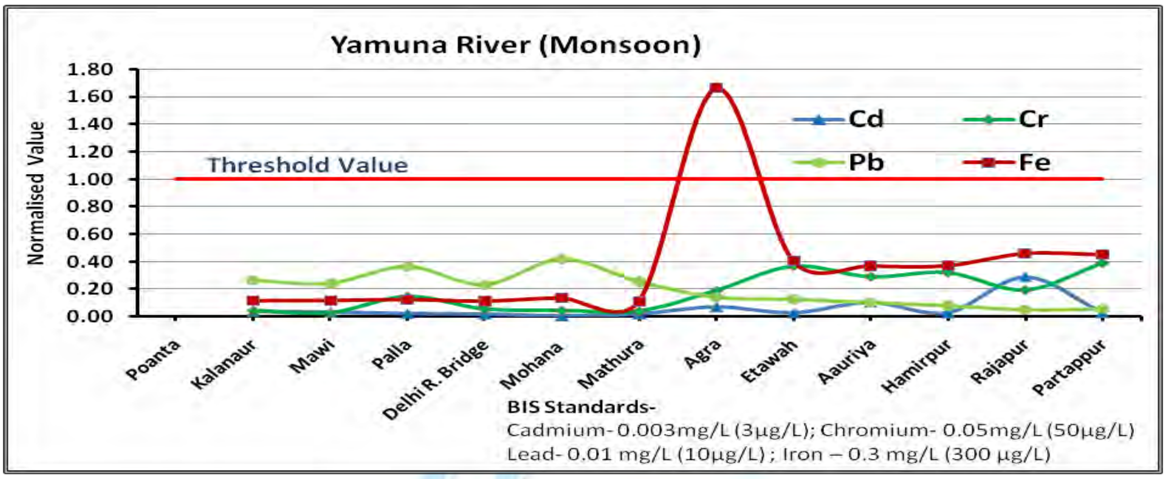
9.10.2 Yamuna River

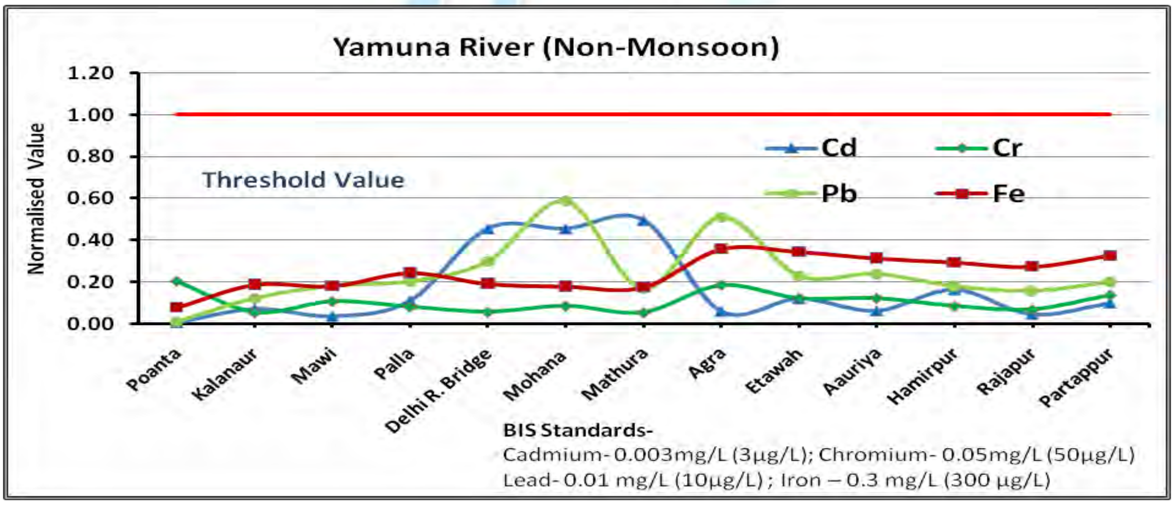
Yamunotri, which is north of Haridwar in the Himalayan Mountains, is the source of the Yamuna. The river Yamuna, a major tributary of river Ganges, originates from the Yamunotri glacier near Banderpoonch peaks (38^o 59' N 78^o 27' E) in the Mussourie range of the lower Himalayas at an elevation of about 6387 meters above mean sea level in district Uttarkashi (Uttrakhand). The track along the river bank is quite magnificently dominated by wide panorama of mountains. In its first 170 km stretch, the tributaries Rishi Ganga Kunta, Hanuman Ganga, Tons and Giri join the main river.

Arising from the source, river Yamuna flows through a series of valleys for about 200 Kms, in lower Himalayas and emerges into Indo-Gangetic plains. In the upper reaches, the main valley is overlooked by numerous hanging valleys, carved by glaciers during the last ice ages. The gradient of the river is steep here and the entire geomorphology of the valley has been influenced by the passage of the river. In the upper stretch of 200 Km, it draws water from several major streams. The combined stream flows through the Shivalik range of hills of Himachal Pradesh and Uttarakhand states of India and enters into plains at Dak Pathar in Uttrakhand where the river water is regulated through weir and diverted into canal for power generation. From Dak Pathar it flows through the famous Sikh religious place of Poanta Sahib. On the right side of the Yamuna basin is the Mussourie spur-along which, lies sprawled, the hill station of Mussourie. Flowing through Poanta Sahib it reaches Hathnikund/Tajewala in Yamuna Nagar district of Haryana state, where the river water is again diverted into Western Yamuna canal and Eastern Yamuna canal for irrigation. During dry season, no water is allowed to flow in the river downstream to Tajewala barrage and the river remains dry in some stretches between Tajewala & Delhi. The rivers regain water because of ground water accrual and contributions of feeding canal through Som nadi (seasonal stream) upstream of Kalanaur. It enters Delhi near Palla village after traversing a route of about 224 Km.

The river is again tapped at Wazirabad through a barrage for drinking water supply to Delhi. Generally, no water is allowed to flow beyond Wazirabad barrage in dry season, as the available water is not adequate to fulfill the demand of water supply of Delhi.

Whatever water flows in the downstream of Wazirabad barrage is the untreated or partially treated domestic and industrial wastewater contributed through several drains along with the water transported by Haryana Irrigation Department from Western Yamuna Canal (WYC) to Agra Canal via Nazafgarh Drain and the Yamuna. After 22 Km downstream of Wazirabad barrage there is another barrage, Okhla barrage, through which Yamuna water is diverted into Agra Canal for irrigation. No water is allowed to flow through barrage during dry season. Whatever water flows in the river beyond Okhla barrage is contributed through domestic and industrial wastewater generated from East Delhi, Noida and Sahibabad and joins the river through Shahdara drain. The Yamuna, after receiving water through other important tributaries, joins the river *Ganga* and the underground *Saraswati* at Prayag (Allahabad) after traversing about 950 Km. Thus, Yamuna river cannot be designated as continuous river particularly in dry seasons (almost 9 months), but can be segmented in five distinguished independent segments due to characteristic hydrological and ecological conditions. The catchments of Yamuna river system cover parts of Uttar Pradesh, Uttrakhand, Himachal Pradesh, Haryana, Rajasthan, Madhya Pradesh & Delhi states.There are thirteen (13) water quality stations at Poanta, Kalanour, Mawi, Palla, Delhi, Mathura, Mohana, Agra, Auraiya, Etawah, Hamirpur, Rajapur and Pratappur on river Yamuna.





Graph 2: Normalization of Yamuna river (Monsoon and Non-Monsoon)

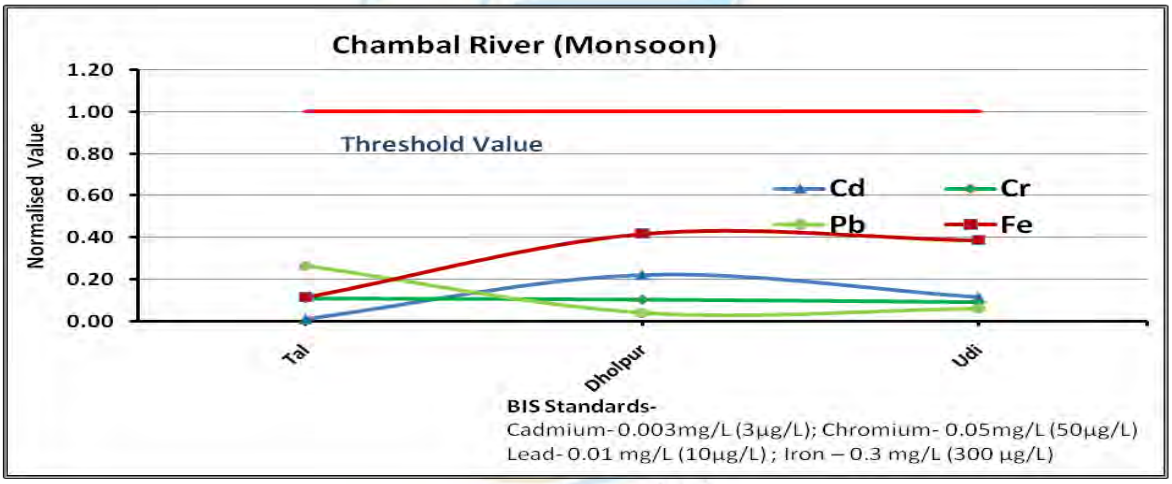
Observations/Findings:

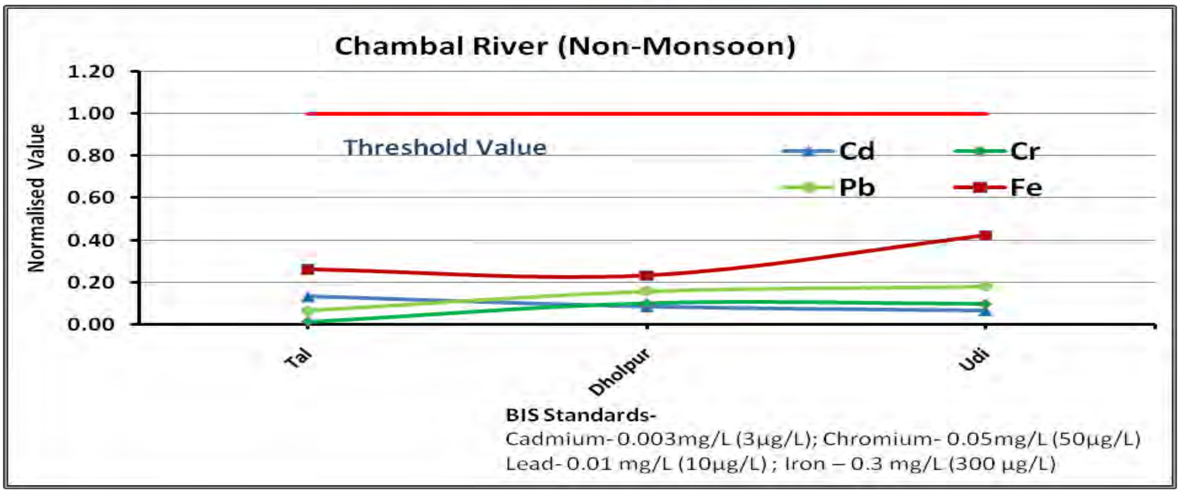
From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except iron at Agra during monsoon. In this study area, all the Yamuna River water quality stations data reported that arsenic, chromium, copper, nickel and zinc concentration lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of arsenic, chromium, copper, nickel and zinc in the River waters is observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Yamuna River are 0.002-9.166 µg/L; 0.010-

36.370 µg/L; 0.010-22.67 µg/L and 0.001-0.613 mg/L respectively during the May, 2014 and April 2018.

9.10.3 River Chambal

The Chambal River, called Charmanvati in ancient times, is the largest of the rivers flowing through Rajasthan state. This tributary of Yamuna is 960km long. The total area drained by the Chambal up to its confluence with the Yamuna is 143,219 sq km out of which 76,854 sq km lies in M.P. state, 65,264 sq km in Rajasthan state and 1,101 sq km in Uttar Pradesh. River Chambal, the biggest tributary of Yamuna rises in Vindhyan range near Mhow in Indore District of Madhya Pradesh at an elevation of 354 m at north latitude 22° 28' and east longitude 75° 40'. Chambal basin is bound on north by the ridge separating it from Luni and Yamuna basins, on the south by Vindhyan range and on the west by Aravali range, on east lies the ridge separating it from Kunwari and Sind rivers of Yamuna basin. Chambal basin lies between north latitudes 22° 27' and 27° 20' and east longitudes 73° 20' and 79° 15'. Its total catchment area is 1,39,468 sq.km. There are three (03) water quality stations at Tal, Dholpur, and Udi on River Chambal.





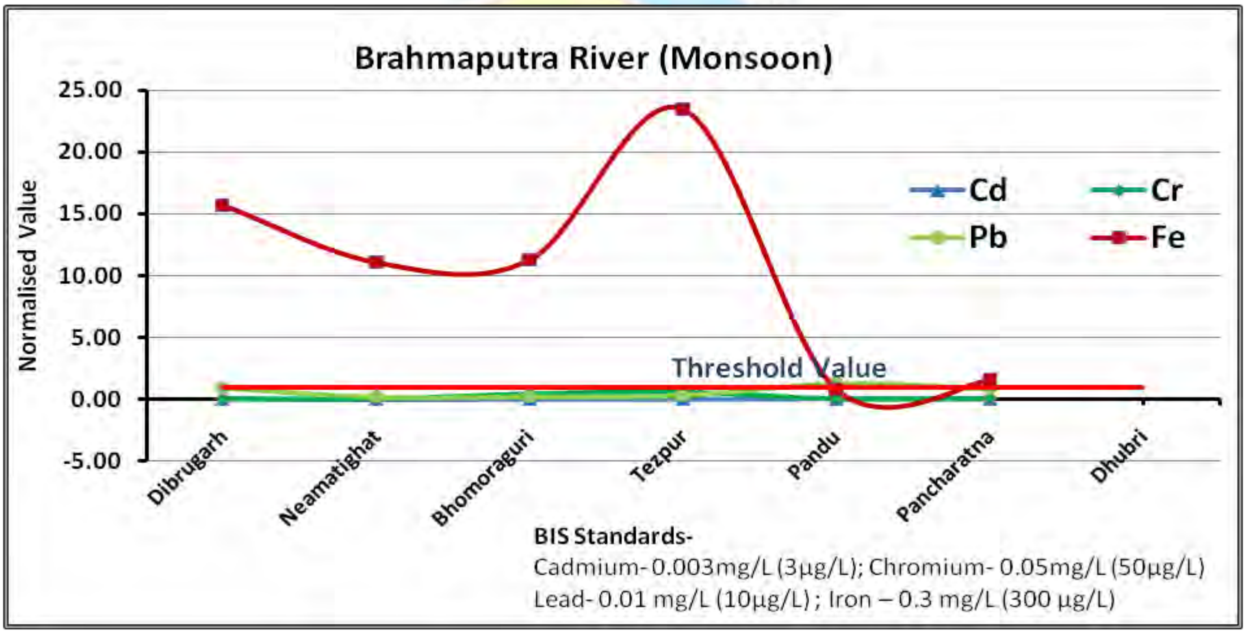
Graph 3: Normalization of Chambal River (Monsoon and Non-monsoon)

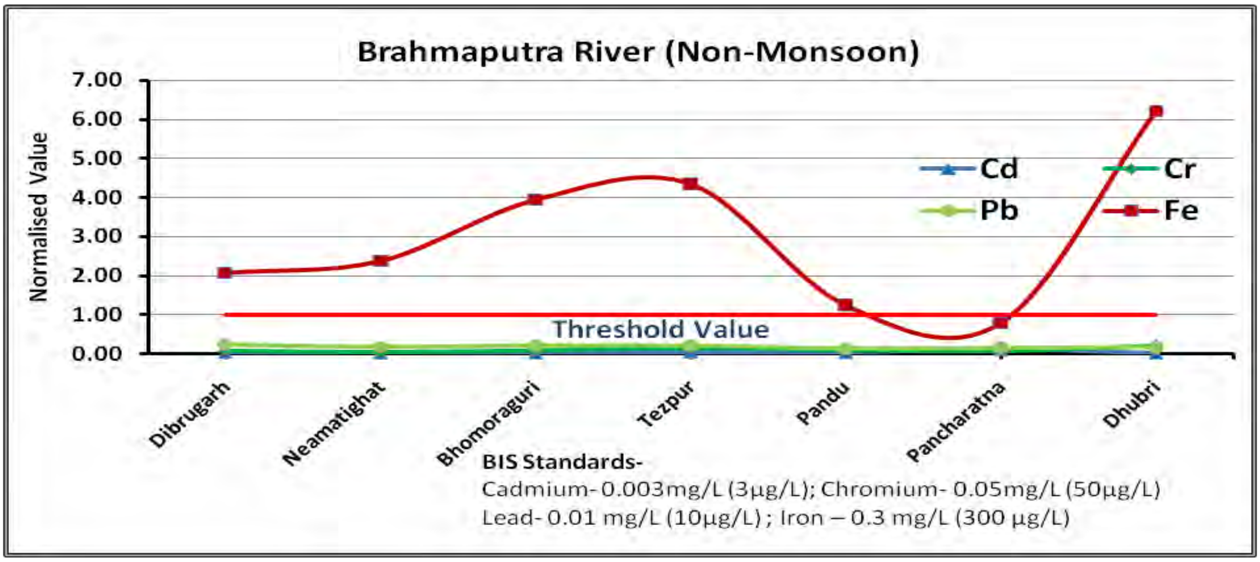
Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons all the parameters observed below the threshold value. In this study area, all the Chambal River water quality stations data reported that all trace and toxic metal (arsenic, cadmium, chromium, copper, nickel, lead, zinc and iron) concentration lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of aforesaid metals in the River waters is observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Chambal River are 0.002-1.251 µg/L; 0.680-12.290 µg/L; 0.010-5.070 µg/L and 0.001-0.276 mg/L respectively during the May, 2014 and April 2018.

9.10.4 Brahmaputra River

The Brahmaputra River originates in the north from Kailash ranges of Himalayas at an elevation of 5,150 m just south of the lake called Konggyu Tsho and flows for about a total length of 2,900 km. In India, it flows for 916 km. The principal tributaries of the river joining from right are the Lohit, the Dibang, the Subansiri, the Jiabharali, the Dhansiri, the Manas, the Torsa, the Sankosh and the Teesta whereas the Buridehing, the Desang, the Dikhow, the Dhansiri and the Kopili joins it from left. There are 48 water quality stations in Brahmaputra basin out of which six (06) stations Bhomoraguri, Dibrugarh, Pancharatna, Pandu, Tezpur and Neamatighat are located on the main stream of Brahmaputra.





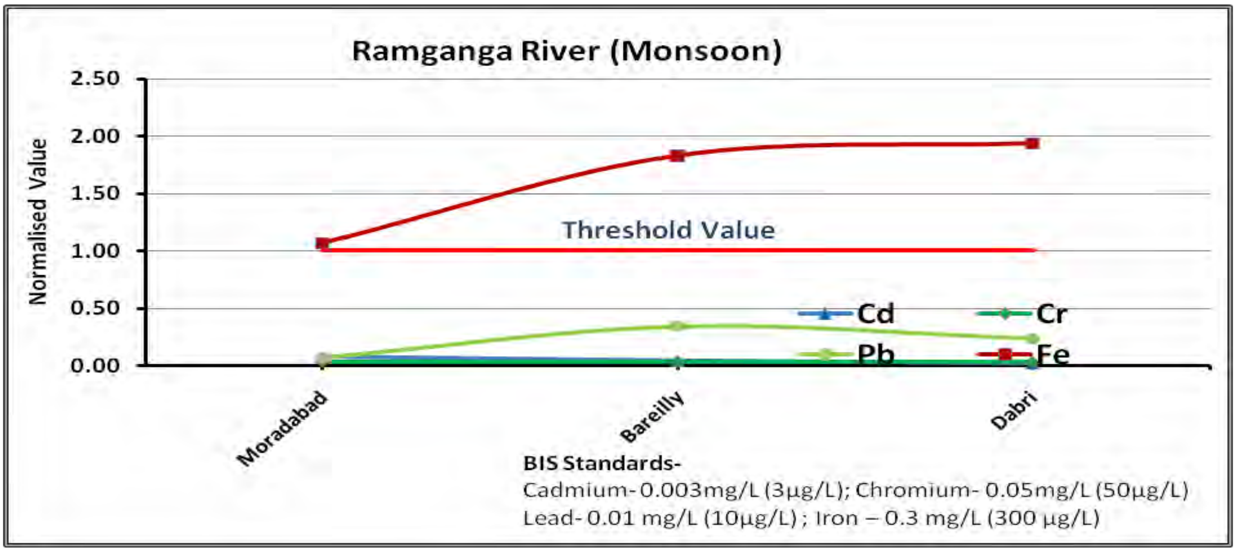
Graph 4: Normalization of Brahmaputra River (Monsoon and Non-Monsoon)

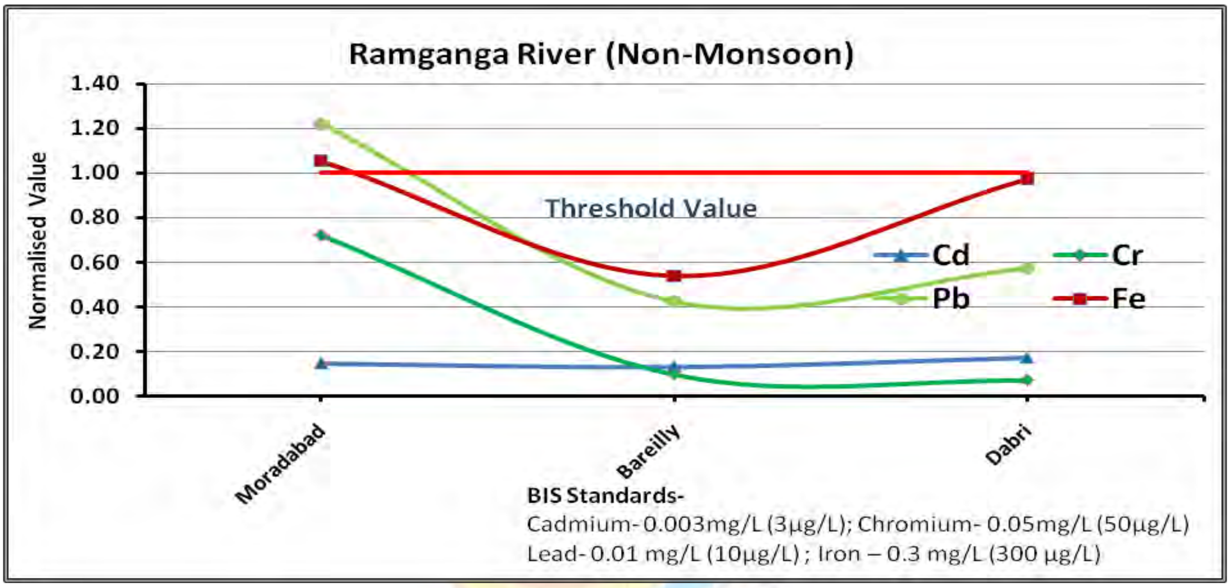
Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except for iron from dibrugarh to pandu stretch in both the seasons. In this study area, all the Brahmaputra River water quality stations data reported that arsenic, cadmium, nickel and zinc concentration lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of arsenic, cadmium, nickel and zinc in the River waters is observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Brahmaputra River are 0.002-1.314 µg/L; 0.040-53.100 µg/L; 0.020-21.480 µg/L and 0.008-9.872 mg/L respectively during the May, 2014 and April 2018.

9.10.5 Ramganga River

Ramganga is the first major tributary joining Ganga. It rises at an altitude of about 3,110 m in the lower Himalayas near the Lohba village in the Garhwal district of Uttarakhand. The length of the Ramganga River from the source to the confluence with the Ganga is 596 km. During its course, the river flows through a mountainous terrain and has a number of falls and rapids. The river enters the plains at Kalagarh near the border of the Garhwal district, where the famous Ramganga dam has been constructed. Beyond Kalagarh, the river flows in a southeasterly direction and finally joins the Ganga on its left bank near Kanauj in the Fategarh district. The river flows entirely in the states of Uttarakhand and Uttar Pradesh. The catchment area of the basin is about 32,493 sq. km. The important tributaries that join the Ramganga River are the Kho, the Gangan, the Aril, the Kosi, and the Deoha (Gorra). There are three (03) water quality stations at Moradabad, Bareilly and Dabri on river Ramganga.





Graph 5: Normalization of Ramganga River (Monsoon and Non-monsoon)

Observations/Findings:

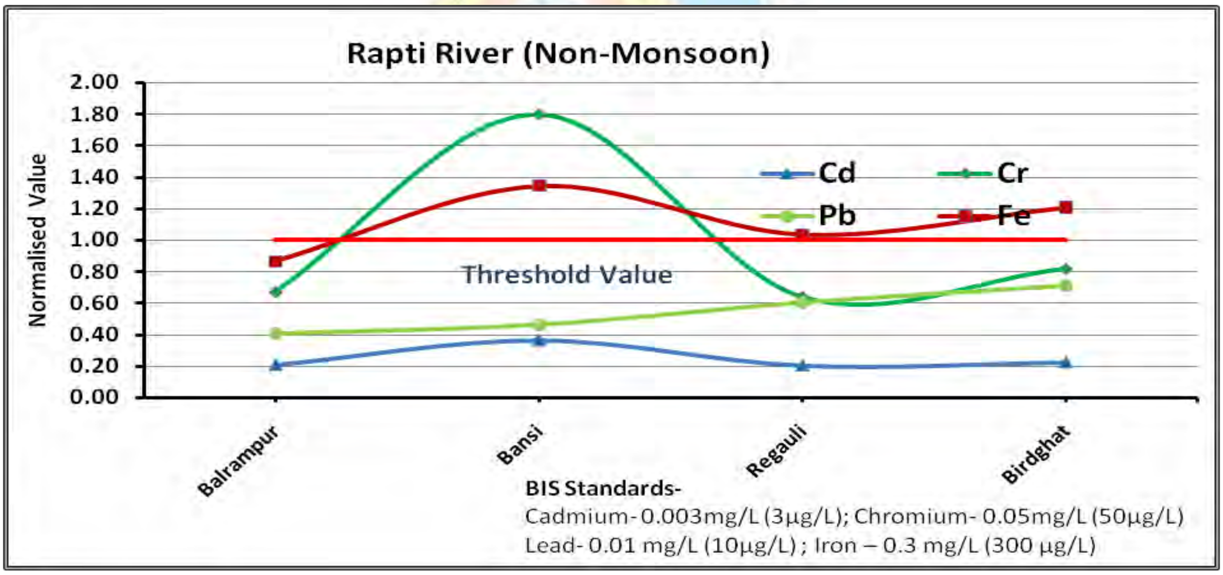
From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except for iron throughout the ramganga river stretch in both the seasons. In this study area, all the Ramganga River water quality stations data reported that arsenic, cadmium, copper, nickel and zinc concentration lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of arsenic, cadmium, copper, nickel and zinc in the River waters is observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Ramganga River are 0.032-1.749 µg/L; 0.040-230.9 µg/L; 0.010-32.850 µg/L and 0.008-1.16 mg/L respectively during the May, 2014 and April 2018.

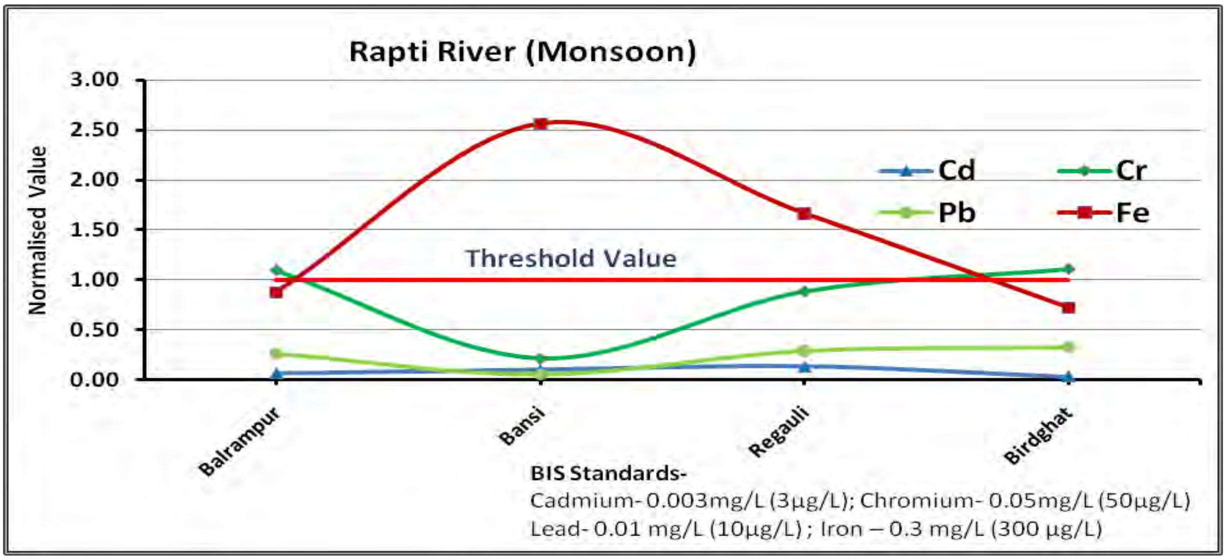
9.10.6 Rapti River

The Rapti is a tributary of Ghaghra river. The Rapti rises south of a prominent E-W ridgeline midway between the western Dhaulagiri Himalaya and the Mahabharat Range. A 3,500 metres summit on this ridgeline marks a triple divide. North of the triple divide the Karnali and Gandaki basins are adjacent; south of it the Rapti and similar but smaller *Babai River* separate the two larger basins. After crossing into India, the Babai and Rapti separately join the Karnali's continuation called *Ghaghara*. The Ghaghara ultimately joins the Ganges, as does the Gandaki.Four (04) water quality monitoring stations at Balrampur, Birdghat, Reguli and Bansi are being operated by CWC on the Rapti River.

Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except for iron throughout the rapti river stretch in both the seasons. In this study area, all the Rapti River water quality stations data reported that arsenic, copper, nickel and zinc concentration lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of arsenic, copper, nickel and zinc in the River waters is observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Rapti River are 0.009-3.493 µg/L; 0.032-229.73 µg/L; 0.030-18.650 µg/L and 0.006-1.362 mg/L respectively during the May, 2014 and April, 2018.

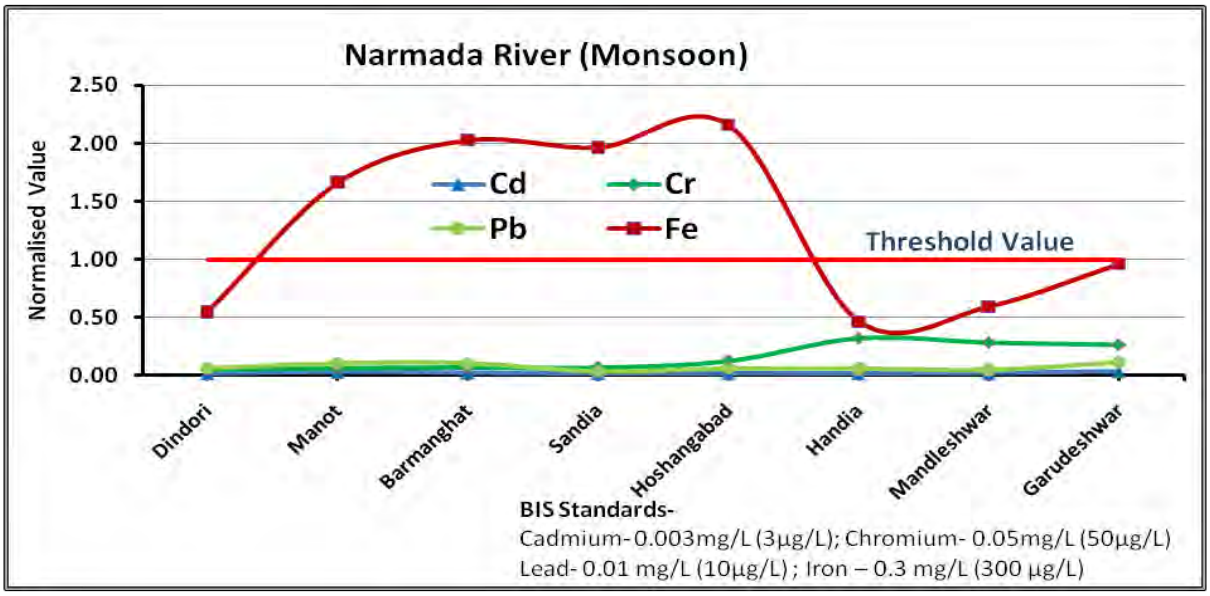


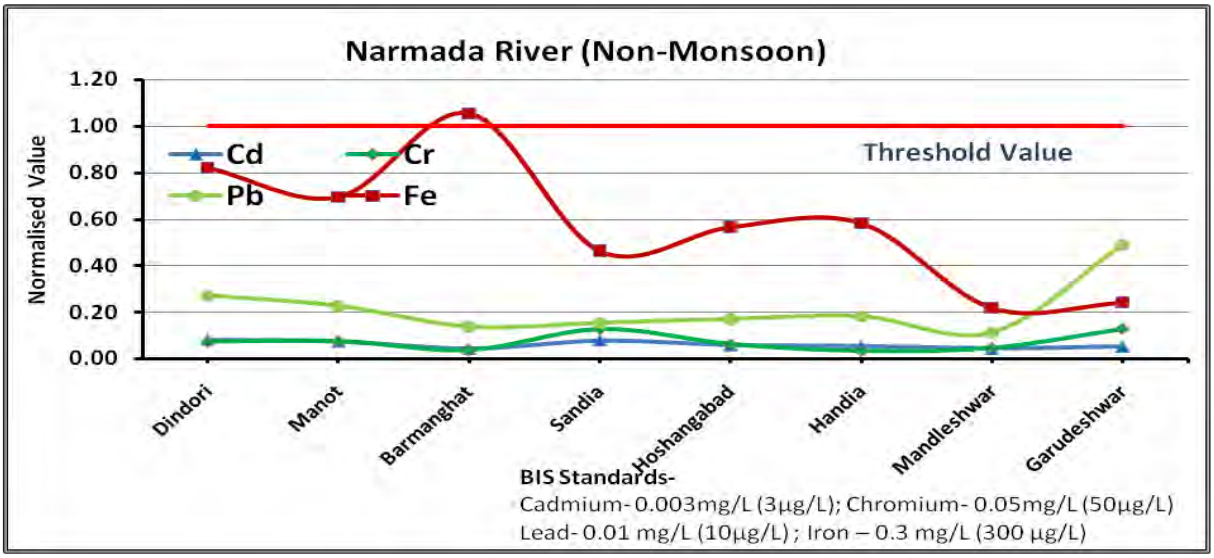


Graph 6: Normalization of Rapti River (Monsoon and Non-monsoon)

9.10.7 Narmada River

Narmada is the largest west flowing river of the peninsular India. It rises from Maikala range near Amarkantak in Anuppur district of Madhya Pradesh, at an elevation of about 900 m. The total length of the river is 1,312 km and its important tributaries are the Burhner, the Banjar, the Sher, the Shakkar, the Dudhi, the Tawa , the Ganjal, the Kundi, the Goi and the Karjan which join from left whereas the Hiran, the Tendoni, the Barna, the Kolar, the Man, the Uri, the Hatni and the Orsang join from right. Narmada drains into the Arabian Sea through the Gulf of Khambhat. There are eight (08) water quality stations at Barmanghat, Dindori, Handia, Hoshangabad, Madleshwar, Manot, Garudeshwar and Sandia on the main stream of river Narmada while ten (10) water quality stations are located at its tributaries viz., Orsang, Banjar, Sakkar, Burhner, Sher, Ganjal, Uri, Kundi, Hiran and Goi. Narmada River has 41 tributaries. Of these, 22 are on the left bank and 19 are on the right.





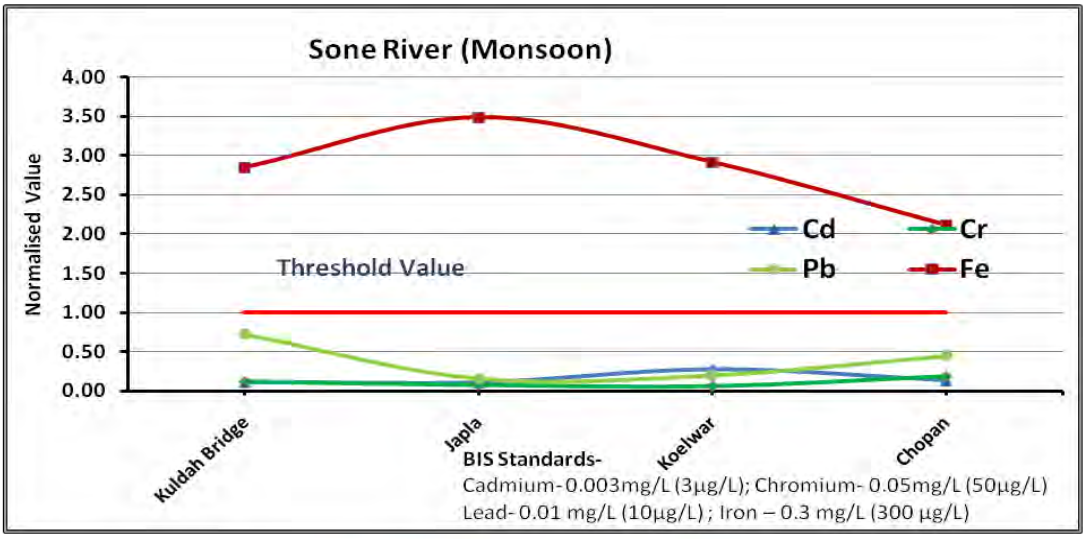
Graph 7: Normalisation of Narmada River (Monsoon and Non-Monsoon)

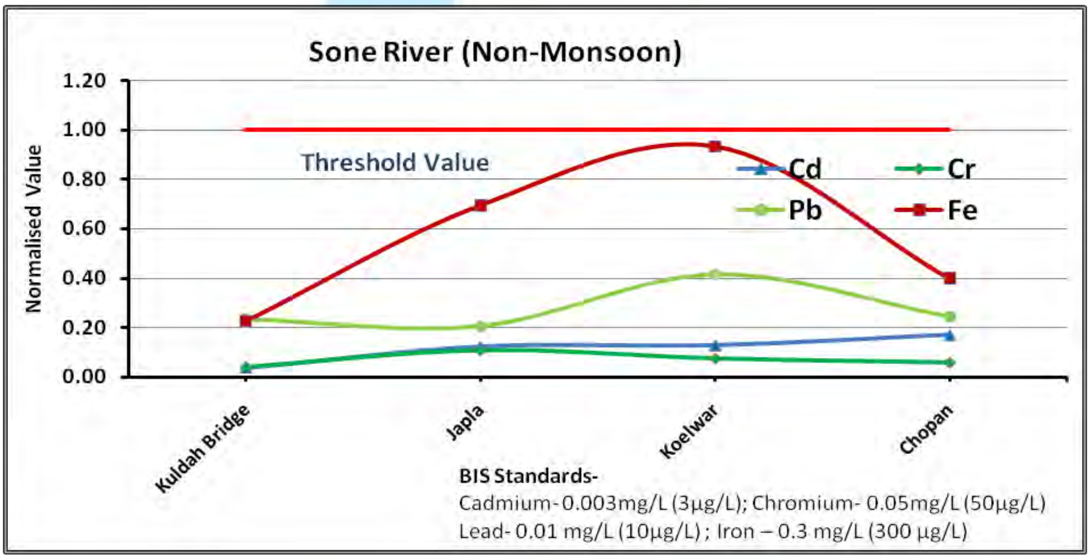
Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except for iron from manot to hoshangabad stretch during monsoon season. In this study area, all the Narmada River water quality stations data reported that arsenic, cadmium, chromium, copper and zinc concentration lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of arsenic, cadmium, chromium, copper and zinc in the river waters is observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Narmada River are 0.002-1.201 µg/L; 0.080-26.66 µg/L; 0.080-21.930 µg/L and 0.002-1.312 mg/L respectively during the May, 2014 and April, 2018.

9.10.8 Sone River

The river Sone is an important right bank tributary of the river Ganga. It originates from Amarkantak high lands in hills of Maikala range in Bilaspur district of Chhattisgarh at an elevation of 640 m and latitude 20°44’ N and longitude 82°4’E. The river outfalls into the Ganga at about 16 km. upstream of Patna at latitude 25°14’ N and longitude 84°42’ E. The total catchment area of river system is 70,055 sq.km. The catchment of the whole river system is surrounded by the Vindhachal range in the North, the Punpun river system and the Chotanagpur plateau on the East, the Baghelkhand plateau and the Mahadeva hills on the South and the forest clad Maikal and Bhamver ranges on the West. After flowing a distance of 655 km. through the states of Chhattisgarh, Madhya Pradesh and Uttar Pradesh, the river Sone enters in Jharkhand. Its important tributaries lying in the states of Chhattisgarh, Madhya Pradesh, Uttar Pradesh and Jharkhand are Johilla, Mahanadi, Banas, Gopad, Rihand, Ghaghar, Kanhar and North Koel. The river Kanhar, a tributary of Sone, flows South to North and in the downstream reach and forms boundaries between Jharkhand and Madhya Pradesh. The total length of the river is 784 km, out of which about 500 km lies in Madhya Pradesh, 82 km in Uttar Pradesh and the remaining 202 km in Bihar. There are five (05) water quality stations at Kuldah Dridge, Chopan, Goverdhey Ghat, Japla and Koelwar on river Sone.





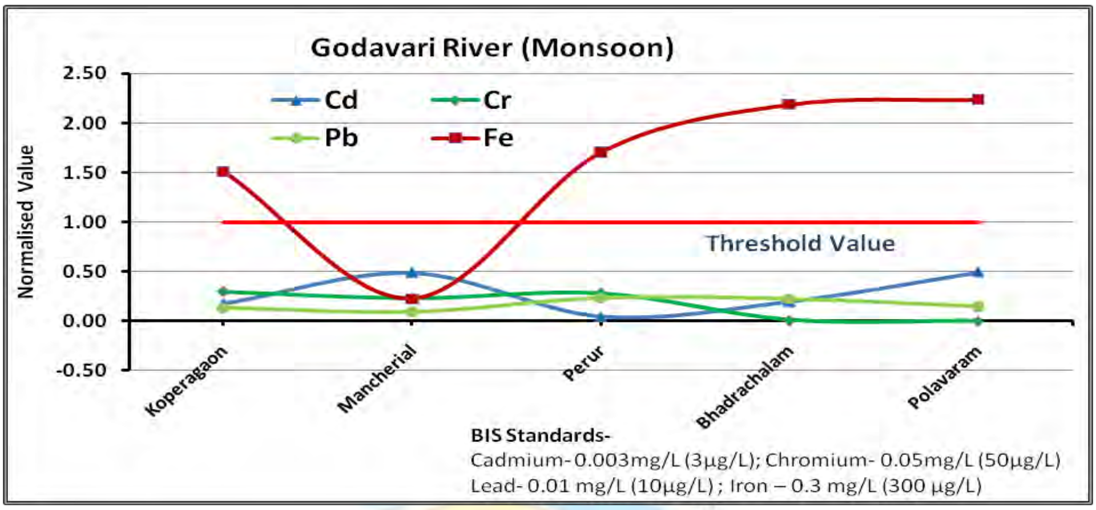
Graph 8: Normalization of Sone River (Monsoon and Non-monsoon)

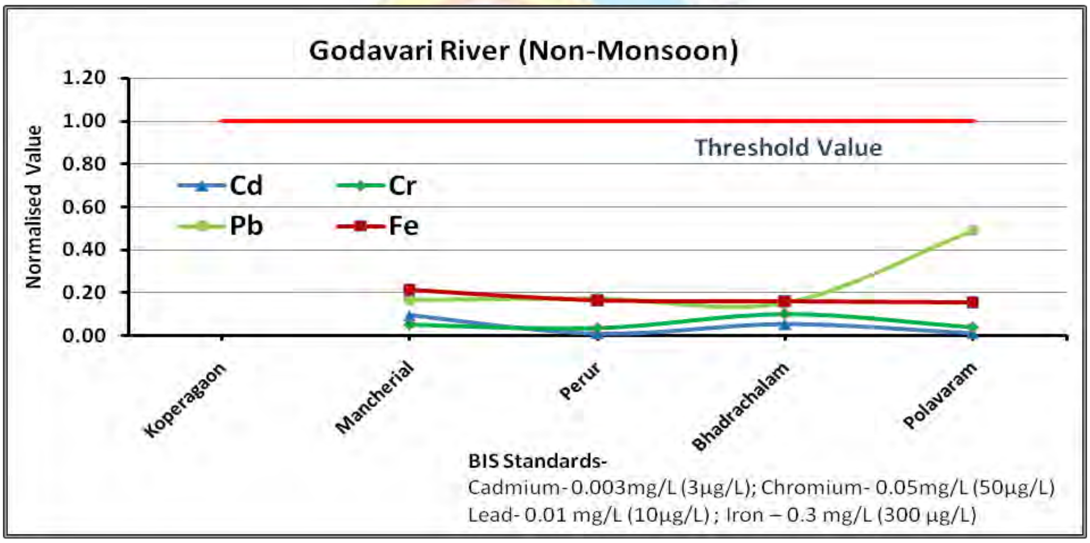
Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except for iron throughout sone river stretch during monsoon season. In this study area, all the Sone River water quality stations data reported that arsenic, chromium, copper, nickel and zinc concentration lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of arsenic, chromium, copper, nickel and zinc in the river waters is observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Sone River are 0.006-3.034 µg/L; 0.240-29.490 µg/L; 0.010-16.750 µg/L and 0.002-2.050 mg/L respectively during the May, 2014 and April, 2018.

9.10.9 Godavari River

The Godavari River rises from Trimbakeshwar in the Nashik district of Maharashtra about 80 km from the Arabian Sea at an elevation of 1,067 m. The total length of Godavari from its origin to outfall into the Bay of Bengal is 1,465 km. Its principal tributaries joining from right are the Pravara and the Manjra whereas the Purna, the Penganga, the Wardha, the Wainganga, the Indravati and the Kolab joins from left. There are nine (09) water quality stations at Bhadrachalam, Perur, Polavaram, Mancherial, Dhaligaon, G.R. Bridge, Koperagaon, Nanded and Yelli on Godavari River.





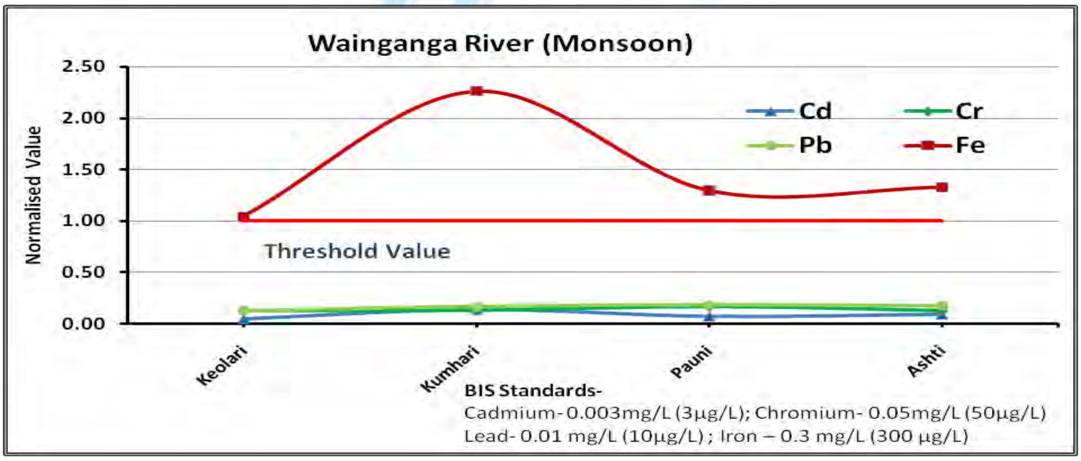
Graph 9: Normalization of Godavari River (Monsoon and Non-monsoon)

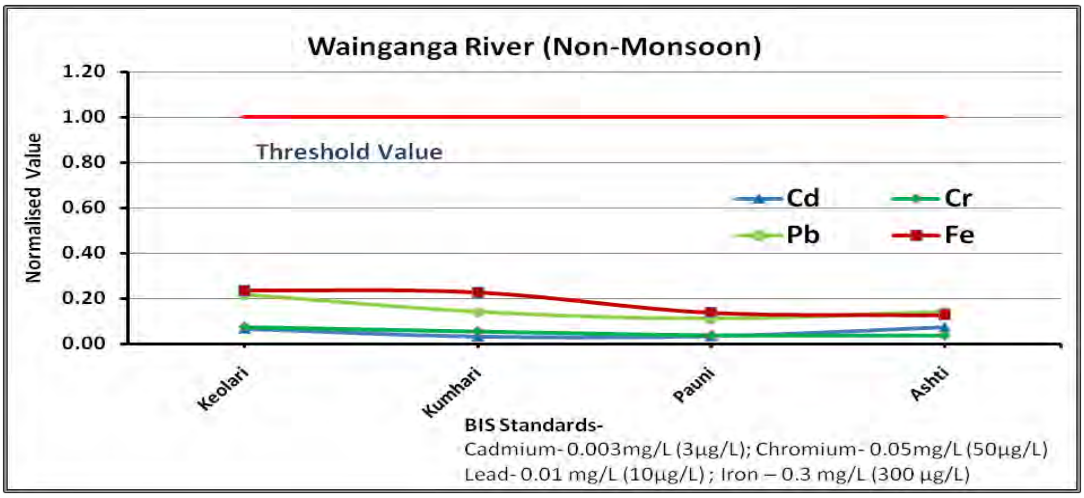
Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except for iron at mancherial in monsoon season. In this study area, all the Godavari River water quality stations data reported that arsenic, cadmium, chromium, copper, nickel and zinc concentration lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of arsenic, cadmium, chromium, copper, nickel and zinc in the river waters is observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Godavari River are 0.009-1.489 µg/L; 0.010-21.510 µg/L; 0.020-22.870 µg/L and 0.008-0.670 mg/L respectively during the May, 2014 and April, 2018.

9.10.10 Wainganga River

The Wainganga River originates near village Partabpur or Mundara (21°57'N & 79°34'E) about 20 km from the town of Satapura plateau and flows in a wide half circle, bending and winding among the spurs of the hills from the west to the east of the Seoni District. Here it is directed to the South being joined by the Thanwar river from Mandla and forms boundary of Seoni for some Kilometers until it enters Balaghat. Subsequently emerging from the hills the river flows south & south-west through rich rice lands of Balaghat, Bhandara & Pauni. The principal tributaries of the river are Bagh in Balaghat, Bawanthari, Kanhan Chulband in Bhandara & Garvhi in Chandrapur. It then flows through Chandrapur & Gadchiroli Districts and after a course of about 570 km. joins the Wardha at Seoni in Chandrapur district. The total catchment area of the river upto Its confluence with river Wardha is 51000 Sq. Km. There are four (04) water quality stations at Ashti, Keolari, Kumhari and Pauni on river Wainganga.





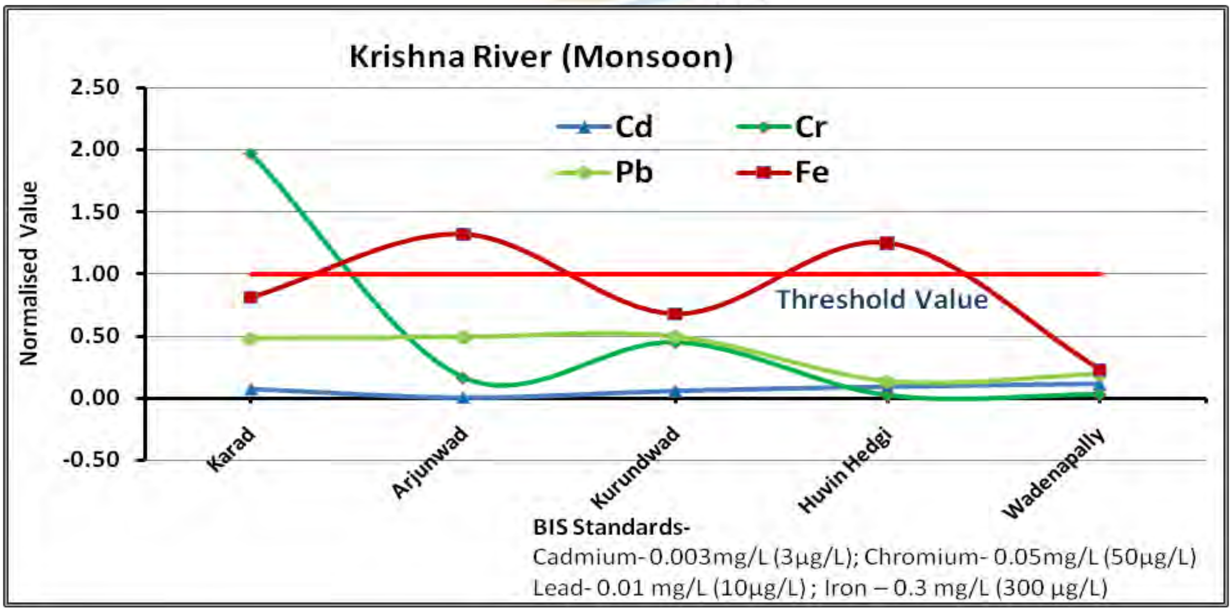
Graphs 10: Normalization of Wainganga River (Monsoon and Non-monsoon)

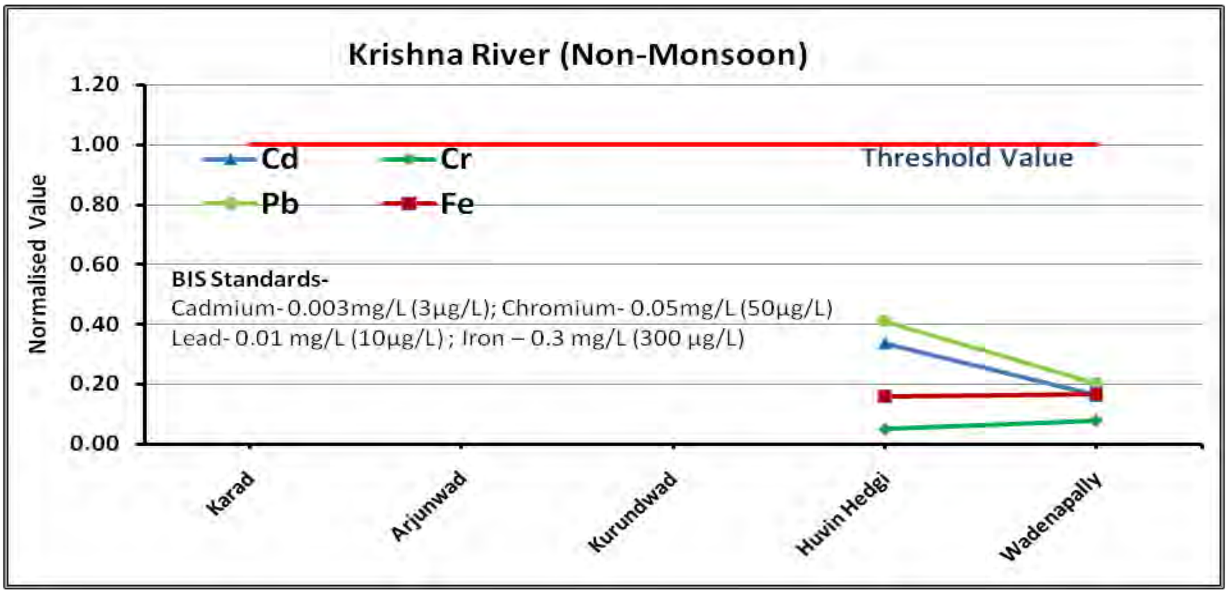
Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except for iron throughout the complete wainganga river stretch during monsoon season. In this study area, all the Wainganga River water quality stations data reported that all trace & toxic metal (Arsenic, Cadmium, Chromium, Copper, Nickel, Lead and Zinc) concentrations excluding iron lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of above said trace & toxic metals in the river waters are observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Wainganga River are 0.003-0.741 µg/L; 0.110-15.990 µg/L; 0.060-8.960 µg/L and 0.005-0.740 mg/L respectively during the May, 2014 and April, 2018.

9.10.11 Krishna River

The Krishna is the second largest eastward draining interstate river in Peninsular India. The Krishna River rises from the Western Ghats near Jor village of Satara district of Maharashtra at an altitude of 1,337 m just north of Mahabaleshwar in Maharashtra. Thirteen major tributaries join the Krishna River along its course, out of which six are right bank tributaries and seven are left bank tributaries. All the major tributaries draining the base of the triangle fall into the Krishna River in the upper two thirds of its length. Among the major tributaries, the Ghatprabha, the Malprabha and the Tungabhadra are the principal right bank tributaries which together account for 35.45% of the total catchment area, whereas the Bhima and the Musi are the principal left bank tributaries which together account 35.62% of the total catchment area. The total length of the river from origin to its outfall into the Bay of Bengal is about 1300 km. There are six (06) water quality stations at Wadenapally, Vijaywada, Kurundwad, Arjunwad, Huvenhedigi and Karad on Krishna River.





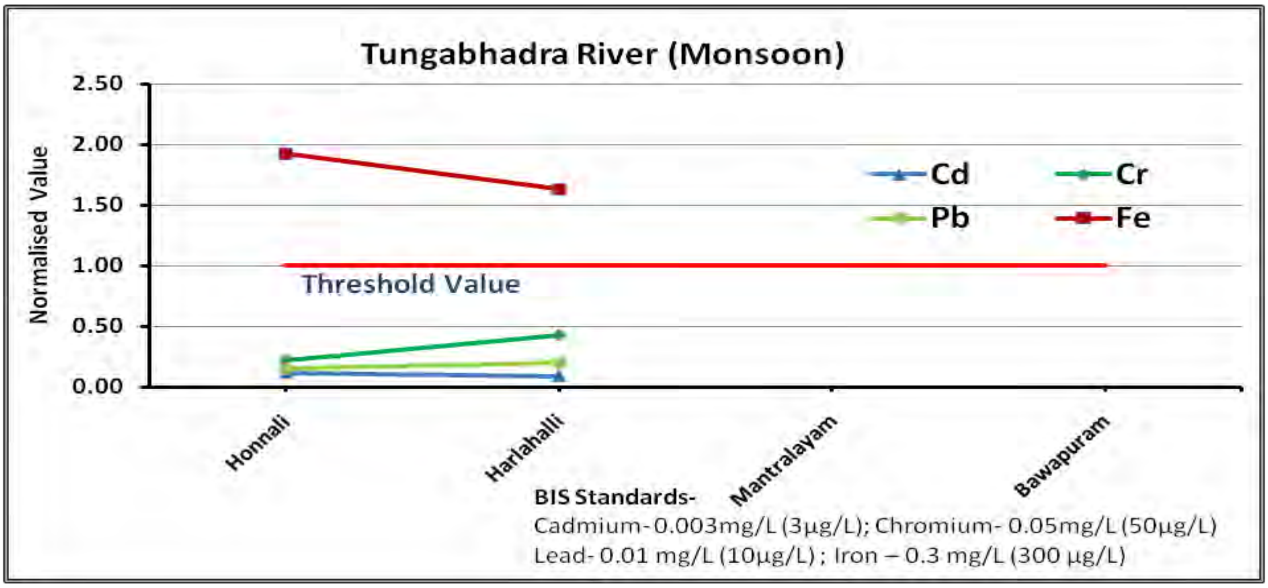
Graphs 11: Normalization of Krishna River (Monsoon and Non-monsoon)

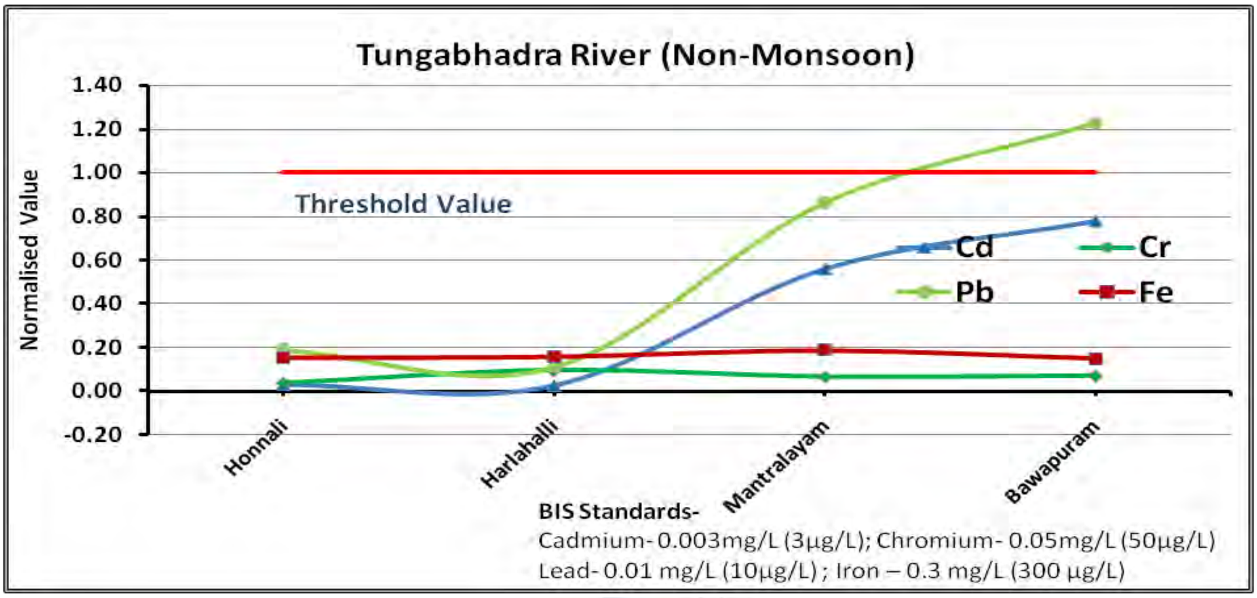
Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except for Iron at arjunwad and huvinhedgi during monsoon season. In this study area, all the Krishna River water quality stations data reported that Arsenic, Cadmium, Copper and Zinc concentrations lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of Arsenic, Cadmium, Copper and Zinc in the river waters are observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Krishna River are 0.006-2.708 µg/L; 0.050-98.350 µg/L; 0.260-14.340 µg/L and 0.008-0.396 mg/L respectively during the May, 2014 and April, 2018.

9.10.12 Tungabhadra River

Tungabhadra River is formed from the union of the two rivers, namely Tunga and Bhadra, which together rise in Varahagiri in the Western Ghats of Karnataka State at an altitude of about 1,196m. The two rivers confluence at a village called Kudali near Shimoga. The united Tungabhadra River flows for about 531 km in a generally northeasterly direction, through Mysore and Andhra Pradesh and joins the Krishna at an elevation of about 264 m beyond Karnool. The length of the river is 786 km. The important tributaries of the Tungabhadra River are the Varada, the Hagari, the Vedavati, and the Kumudvati. The total drainage area of the Tungabhadra is 71,417 km^2. There are four (04) water quality stations at Bawapuram, Harlahalli, Honnali and Holehonnur on Tungabhadra River.





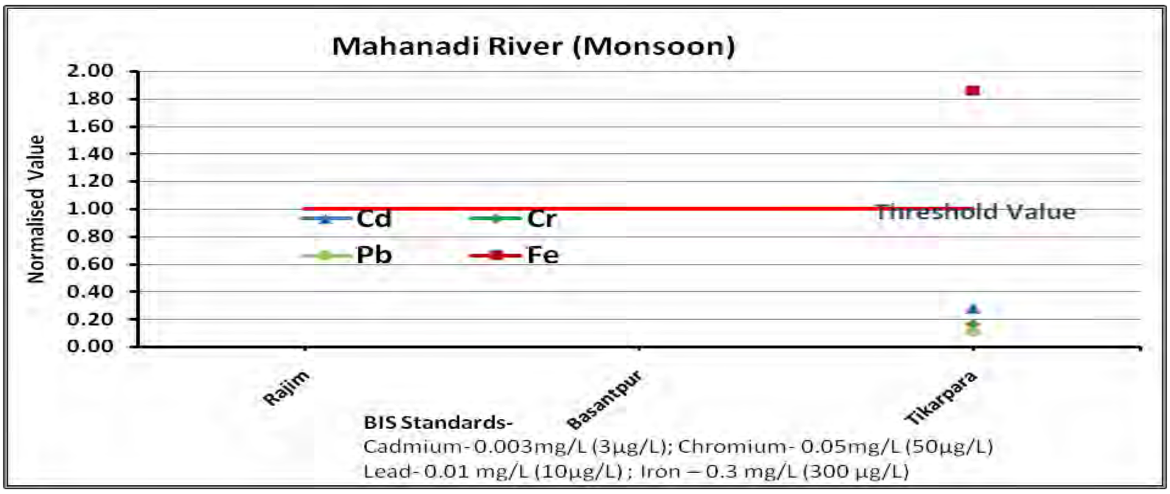
Graphs 12: Normalization of Tungabhadra River (Monsoon and Non-monsoon)

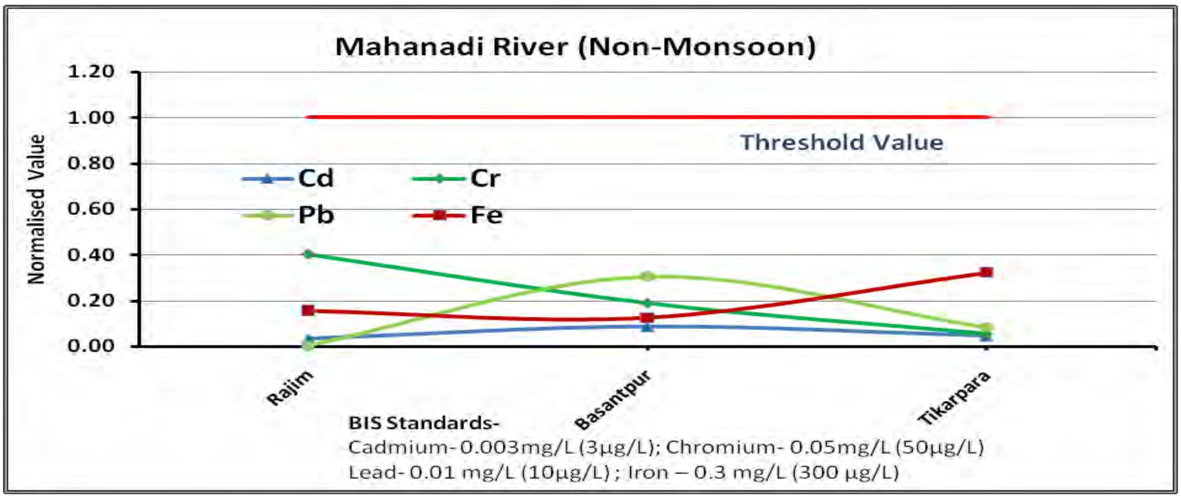
Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except for iron from honnali to harlahalli stretch during monsoon season. In this study area, all the Tungabhadra River water quality stations data reported that Arsenic, Chromium, Copper and Zinc concentrations lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of Arsenic, Chromium, Copper and Zinc in the river waters are observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Tungabhadra River are 0.003-5.475 μg/L; 0.150-21.410 μg/L; 0.060-33.410 μg/L and 0.011-0.577 mg/L respectively during the May, 2014 and April, 2018.

9.10.13 Mahanadi River

The Mahanadi River is one of the major rivers which flow from west to east and finally drains into the Bay of Bengal. The Mahanadi River rises in a pool, 6km from Pharsiya village near Nagri town in Raipur district of Chhattisgarh at a height of 442m. The Mahanadi flows for a total length of about 851 km of which, 357km is in Chhattisgarh and the balance of 494 km isin Odisha. The river enters Odisha state below Baloda Bazaar and crosses the Eastern Ghats to enter the Plains of Odisha near Cuttack. It is finally debouches into the Bay of Bengal through a series of branches. The Seonath, the Jonk, the Hasdeo, the Mand, the Ib, the Ong and the Tel are the principal tributaries of Mahanadi. There are four (04) water quality stations at Tikarapara, Basantpur, Seorinarayan and Rajim on main stream of river Mahanadi.





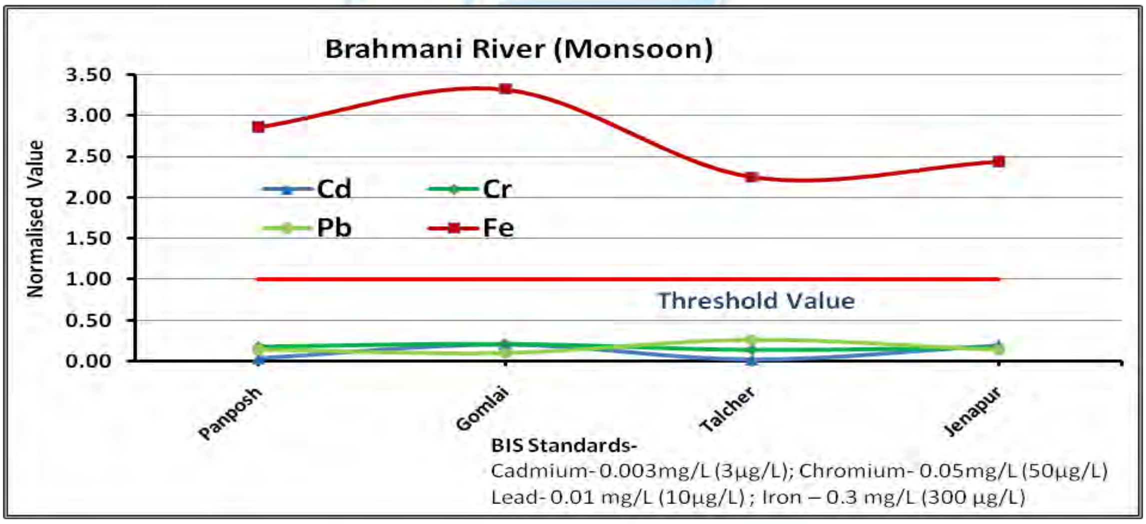
Graphs 13: Normalization of Mahanadi River (Monsoon and Non-monsoon)

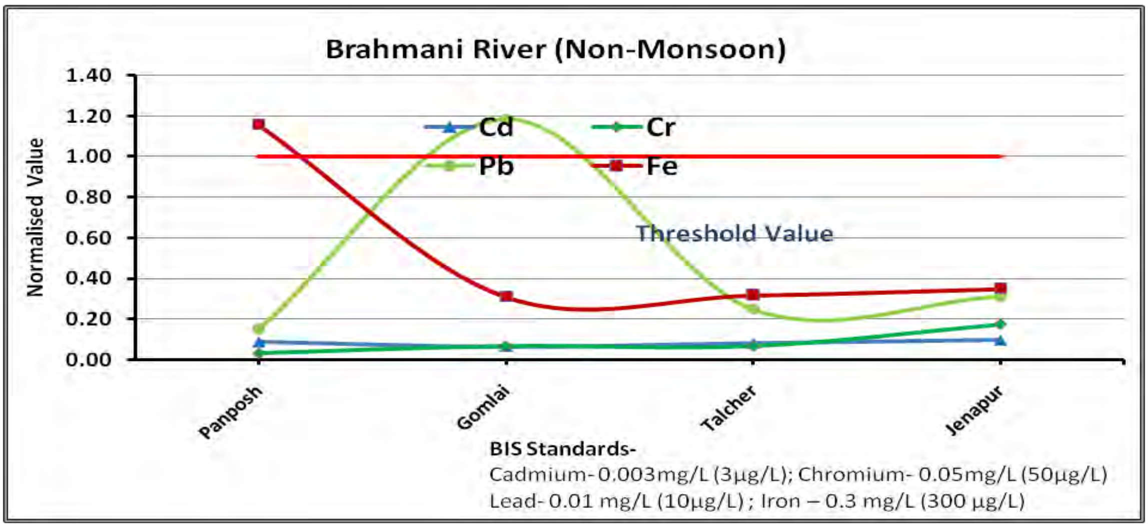
Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except for iron at Tikarpara in monsoon season. In this study area, all the Mahanadi River water quality stations data reported that Arsenic, Cadmium, Chromium, Copper, Lead and Zinc concentrations lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of Arsenic, Cadmium, Chromium, Copper, Lead and Zinc in the river waters are observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Mahanadi River are 0.015-0.836 µg/L; 0.260-31.620 µg/L; 0.040-7.180 µg/L and 0.009-0.557 mg/L respectively during the May, 2014 and April, 2018.

9.10.14 Brahmani River

The Brahmani River is the second largest river in the state of Odisha. In fact, two headwater streams, namely Sankh River and South Koel River originate in Chhattisgarh and Jharkhand states, respectively. After the confluence of Sankh River and South Koel River at Vedvyas, the combined river is known by the name Brahmani. The Brahmani River flows through the heart of Odisha till it joins the Bay of Bengal at Dhamara mouth. After the confluence at Vedvyas, the Brahmani River heads towards the southeast direction and traverses a total length 461 km before it joins the Bey of Bengal. It drains a total catchment area 39,269km^2. There are four (04) water quality stations at Gomlai, Jenapur, Panposh and Talcher on river Brahmani.





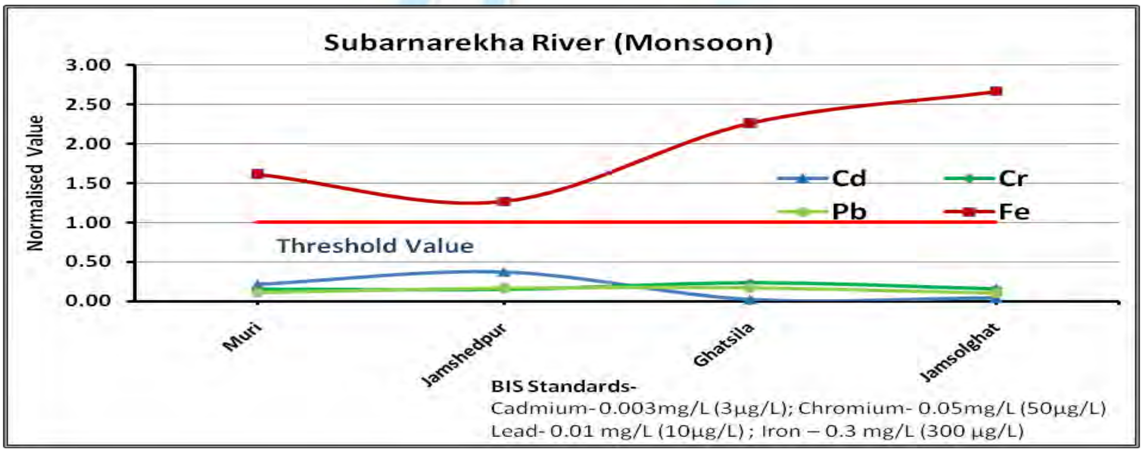
Graphs 14: Normalization of Brahmani River (Monsoon and Non-monsoon)

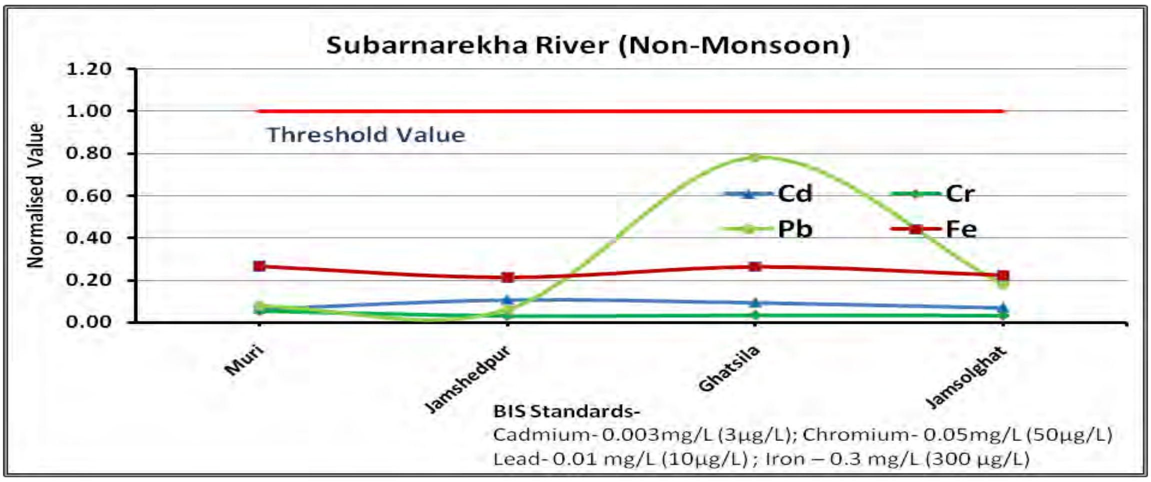
Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except for iron throughout Brahmani river stretch in monsoon season and at Panposh during non-monsoon. In this study area, all the Brahmani River water quality stations data reported that Arsenic, Cadmium, Chromium, Copper, Lead and Zinc concentrations lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of Arsenic, Cadmium, Chromium, Copper and Zinc in the river waters are observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Brahmani River are 0.006-0.688 µg/L; 0.090-36.960 µg/L; 0.030-77.420 µg/L and 0.008-1.793 mg/L respectively during the May, 2014 and April, 2018.

9.10.15 Subernarekha River

The Subernarekha River rises near Nagri village in the Ranchi District of Jharkhand at an elevation of 600 m. It flows for a length of 395 km before outfalling into the Bay of Bengal. Out of this, 269 km lies in Bihar, 64 km in West Bengal and 62 km in Odisha. There are three (03) water quality stations at Ghatsila, Jamshedpur, Jamsolghat and Muri on river Shernarekha. Its principal tributaries joining from right are the Kanchi, the Karkari and the Kharkai.





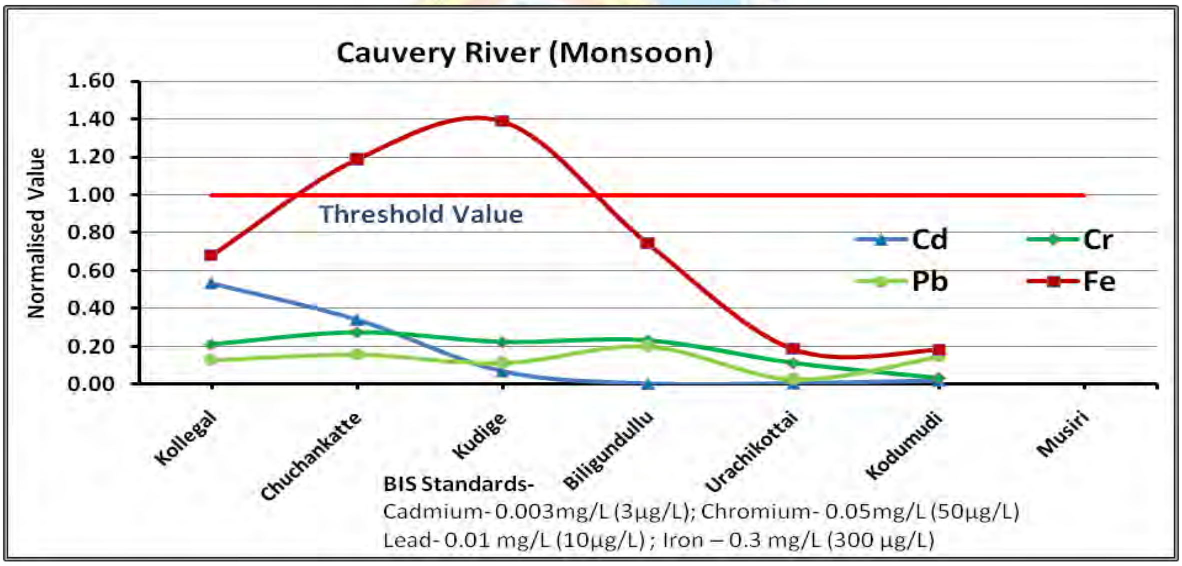
Graphs 15: Normalization of Subarnarekha River (Monsoon and Non-monsoon)

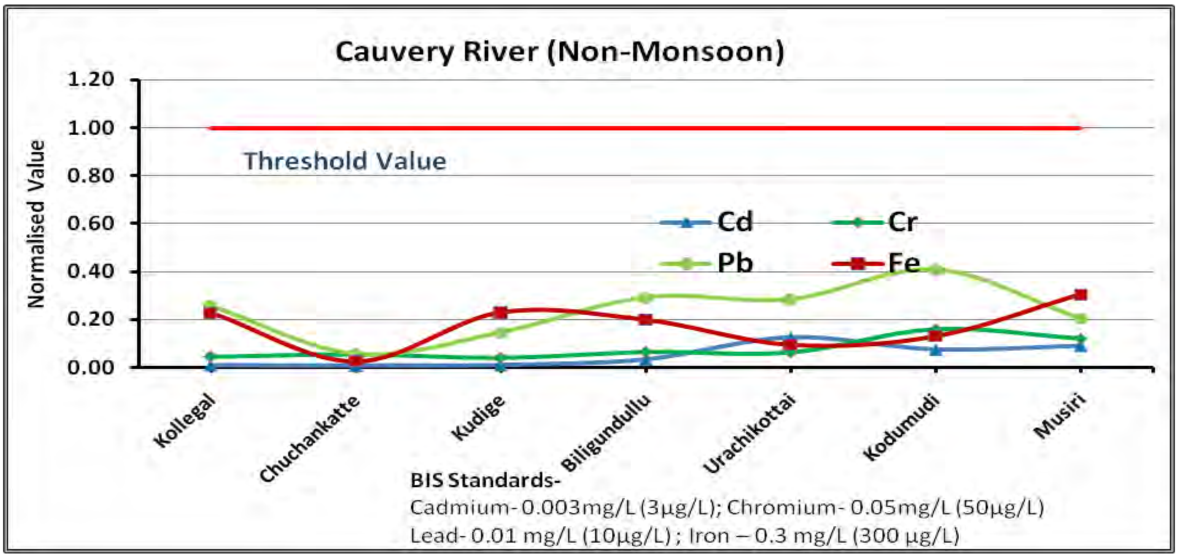
Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except for iron throughout Subernarekha river stretch in monsoon season. In this study area, all the Subernarekha River water quality stations data reported that Arsenic, Cadmium, Chromium, and Zinc concentrations lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of Arsenic, Cadmium, Chromium, and Zinc in the river waters are observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Subernarekha River are 0.004-1.533 µg/L; 0.040-11.6 µg/L; 0.050-37.420 µg/L and 0.002-0.800 mg/L respectively during the May, 2014 and April, 2018.

9.10. 16 Cauvery River

The Cauvery River is one of the major rivers of the peninsula. It rises at an elevation of 1,341 m at TalaCauveryon the Brahmagiri range near Cherangala village of Kodagu district of Karnataka. The total length of the river from origin to outfall is 800 km. Its important tributaries joining from left are the Harangi, the Hemavati, the Shimsha and the Arkavati whereas the Lakshmantirtha, the Kabbani, the Suvarnavati, the Bhavani, the Noyyal and the Amaravati join from right. The river drains into the Bay of Bengal. There are seven (07) water quality stations at Biligundullu, Chuchankatte, Kollegal, Kudige, Kodumudi, Musiri and Urachikottai on the main stream of Cauvery river.





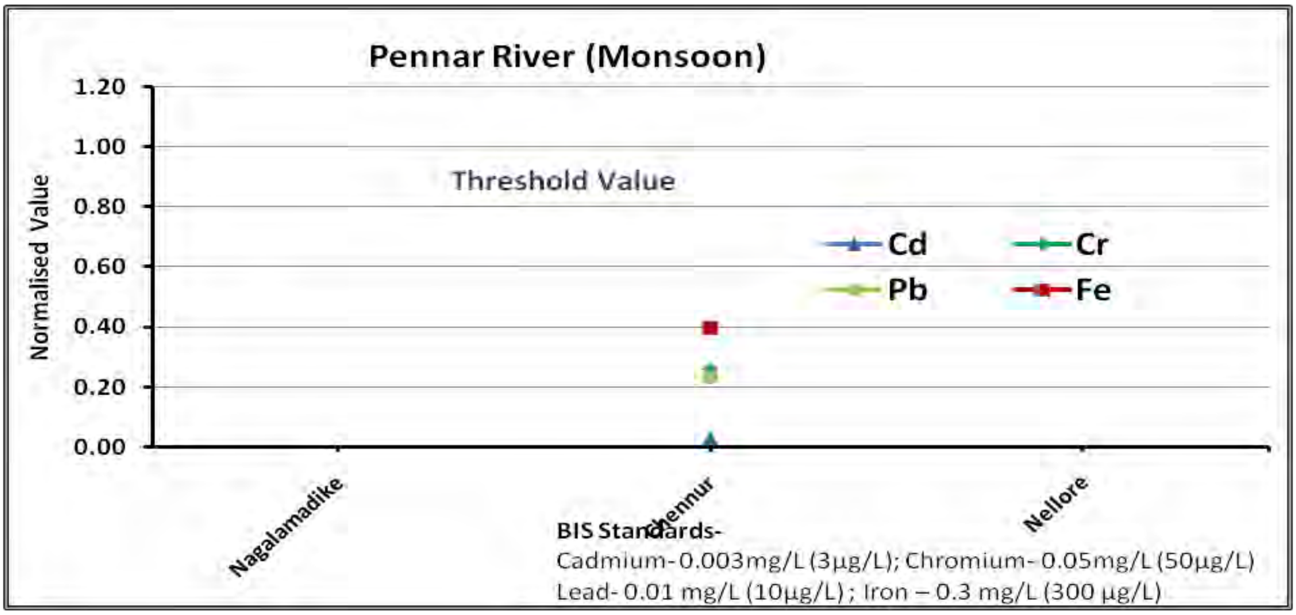
Graphs 16: Normalization of Cauvery a River (Monsoon and Non-monsoon)

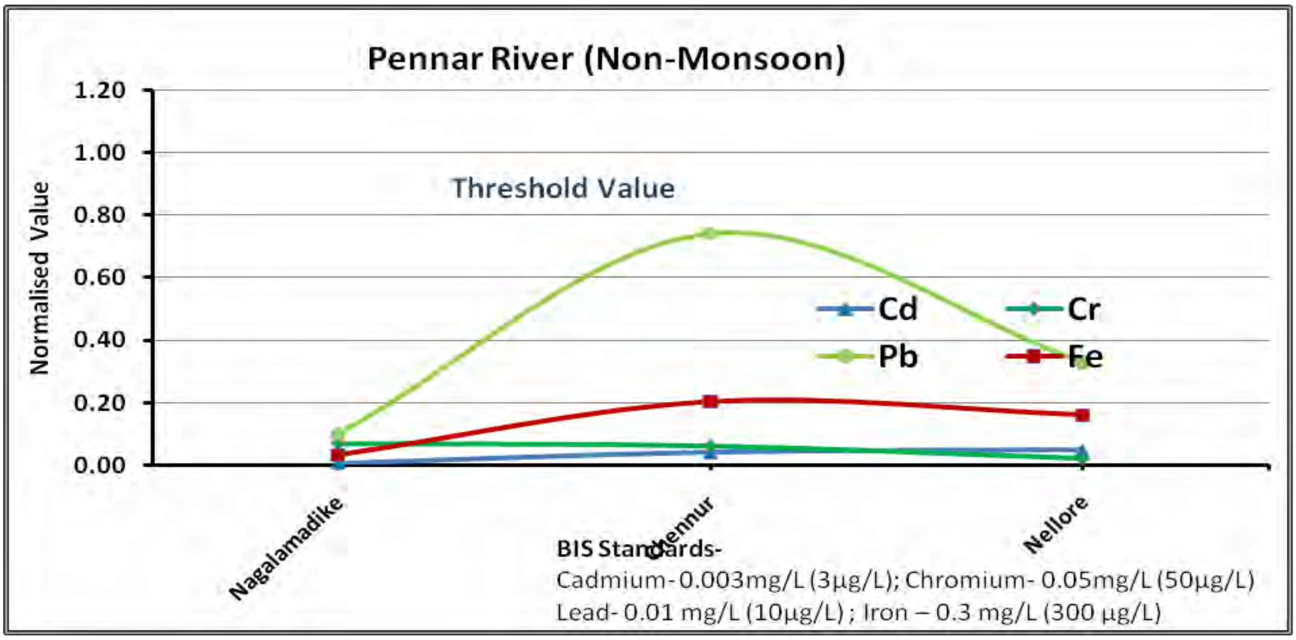
Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except for iron at chuchankatte and kudige stations in monsoon season. In this study area, all the Cauvery River water quality stations data reported that Arsenic, Cadmium, Chromium, Copper Nickel and Zinc concentrations lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of Arsenic, Cadmium, Chromium, Copper Nickel and Zinc in the river waters are observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Cauvery River are 0.008-1.609 µg/L; 0.050-35.36 µg/L; 0.010-16.670 µg/L and 0.004-0.416 mg/L respectively during the May, 2014 and April, 2018.

9.10.17 Pennar River

The Pennar (also known as Uttara Pinakini) is one of the major rivers of the peninsula. The Pennar rises in the Chenna Kasava hill of the Nandidurg range, in Chikkaballapura district of Karnataka and flows towards east eventually draining into the Bay of Bengal. The total length of the river from origin to its outfall in the Bay of Bengal is 597 km. The principal tributaries of the river joining from left are the Jayamangali, the Kunderu and the Sagileru whereas the Chiravati, the Papagni and the Cheyyeru joins it from right. There are four (04) water quality stations at Chennur, Nagalamadike, Nellore and Tadipatri on river Pennar.





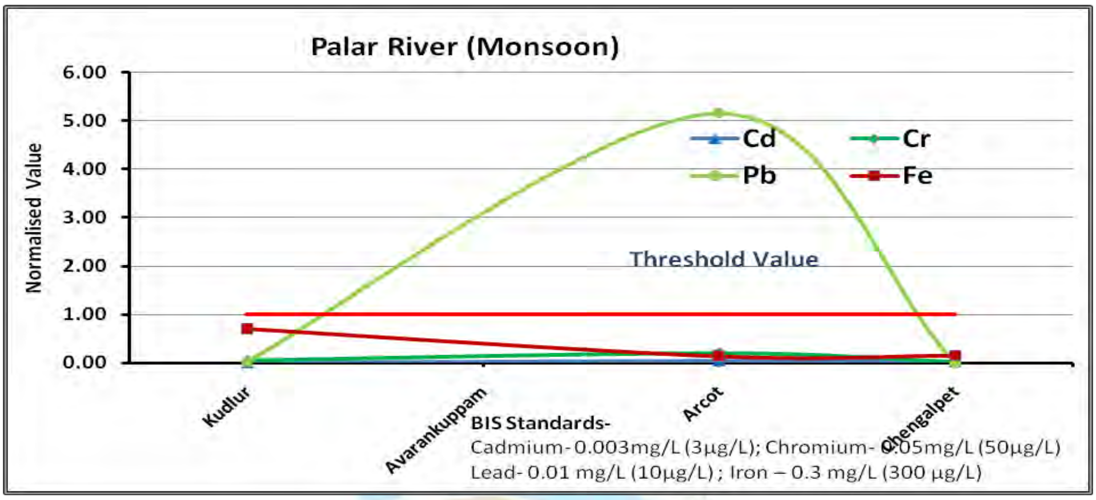
Graphs 17: Normalization of Pennar River (Monsoon and Non-monsoon)

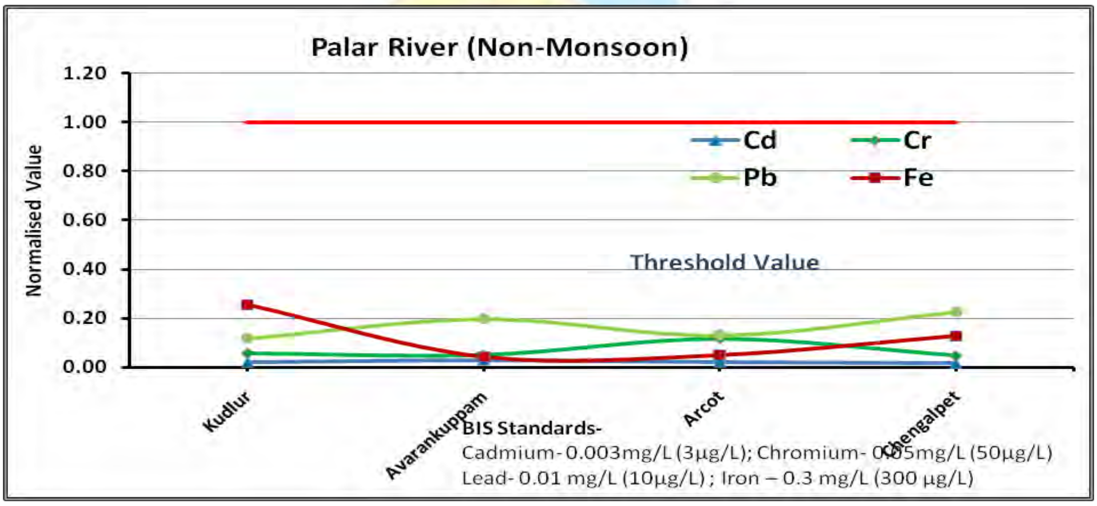
Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value. In this study area, all the Pennar River water quality stations data reported that Arsenic, Cadmium, Chromium, Copper Nickel, Zinc and Iron concentrations lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity of Arsenic, Cadmium, Chromium, Copper Nickel, Zinc and Iron in the river waters are observed during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Pennar River are 0.005-0.683 µg/L; 0.180-20.24 µg/L; 0.580-38.5 µg/L and 0.014-0.199 mg/L respectively during the May, 2014 and April, 2018.

9.10.18 Palar River

The Palar Basin is an important basin among the 12 basins lying between the Pennar and the Cauvery basins. This basin is divided into three major topographical divisions namely, i) the hill ranges of Eastern Ghats ii) the plateau region and iii) the coastal plains. Though most of the drainage area lies in Tamil Nadu, its drainage area extends to cover the South-East and South-Western parts of Karnataka and Andhra Pradesh respectively. The shape of the basin is rhombus and finds its outlet in to Bay of Bengal. Central Water Commission is operating three (03) water quality monitoring stations at Avarankuppam, Arcot and Chengalpet on this river.





Graphs 18: Normalization of Palar River (Monsoon and Non-monsoon)

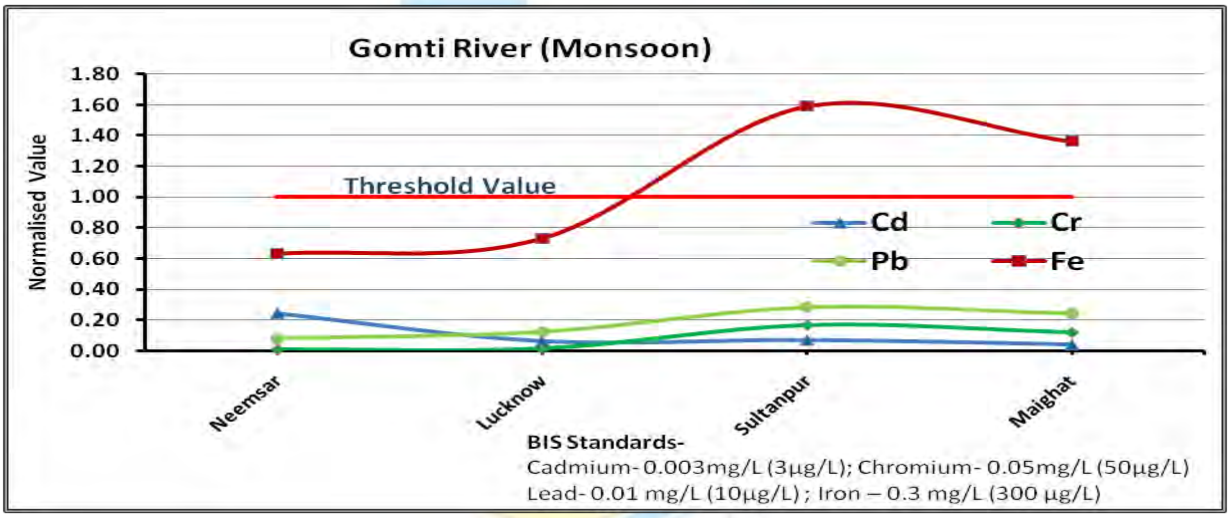
Observations/Findings:

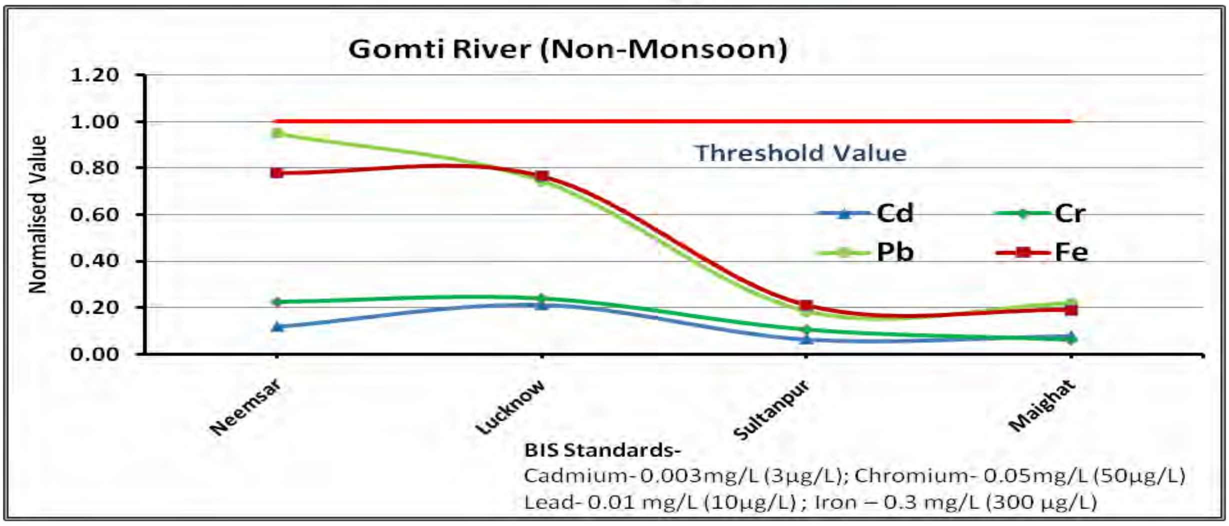
From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except Lead at Arcot in both the seasons. In this study area, all the Palar River water quality stations data reported that all the trace and toxic metal (Arsenic, Cadmium, Chromium, Copper, Nickel, Zinc and Iron) concentrations excluding Lead lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity in the river waters are observed for aforementioned trace &

toxic metals excluding lead during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Palar River are 0.010-0.136 µg/L; 0.970-10.14 µg/L; 0.020-51.52 µg/L and 0.003-0.212 mg/L respectively during the May, 2014 and April, 2018.

9.10.19 Gomti River

The Gomti River originates near Mainkot, about 3 km east of the Pilibhit town in Uttar Pradesh, at an elevation of 200 m. The river drains the area between Ramganga and Ghaghra systems. The total length of the river is about 940 km and it flows entirely in the State of Uttar Pradesh. The total drainage area of the river is 30, 437 sq. km. The river flows through Sahajahanpur, Kheri, Lucknow, Barabanki, Sultanpur, Faizabad, Jaunpur, Varanasi and Ghazipur districts before merging into the Ganga in Audihar in Jaunpur. Lucknow, the capital city of Uttar Pradesh, is situated on the banks of the Gomti River. The main tributaries of the Gomti River are the Gachai, the Sai, the Jomkai, the Barna, the Chuha and the Sarayu. There are five (05) water quality stations at Neemsar, Lucknow, Sultanpur, Maighat and Jaunpur on river Gomti.





Graphs 19: Normalization of Gomti River (Monsoon and Non-monsoon)

Observations/Findings:

From the above graphs it is observed that, during the study period in monsoon and non-monsoon seasons almost all the parameters observed below the threshold value except Iron from sultanpur to maighat river stretch in monsoon season. In this study area, all the Gomti River water quality stations data reported that Arsenic, Cadmium, Chromium, Copper, Nickel and Zinc concentrations lies within the acceptable and permissible limits of Bureau of Indian Standards (BIS) and no toxicity in the river waters are observed for Arsenic, Cadmium, Chromium, Copper, Nickel and Zinc metals during the study period. The concentration of the cadmium, chromium, lead and iron varies in the Gomti River are 0.037-1.414 µg/L; 0.190-45.340 µg/L; 0.140-23.440 µg/L and 0.009-0.782 mg/L respectively during the May, 2014 and April, 2018.

9.11 Index Value Calculation

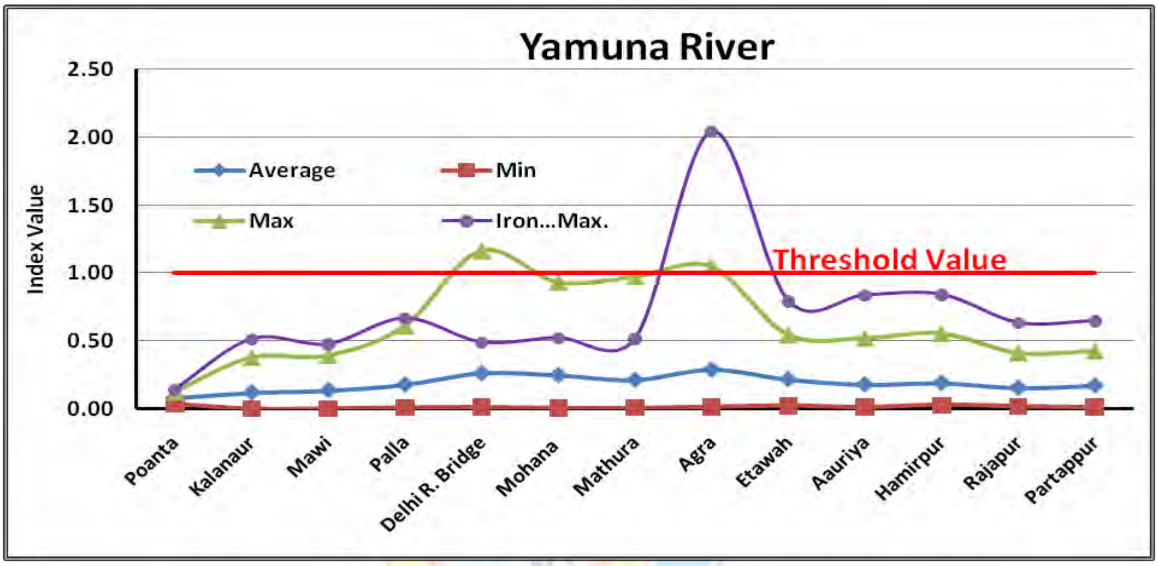
Index Value = Average of Normalised Values of all parameters.

Parameters considered for Index Value calculations:

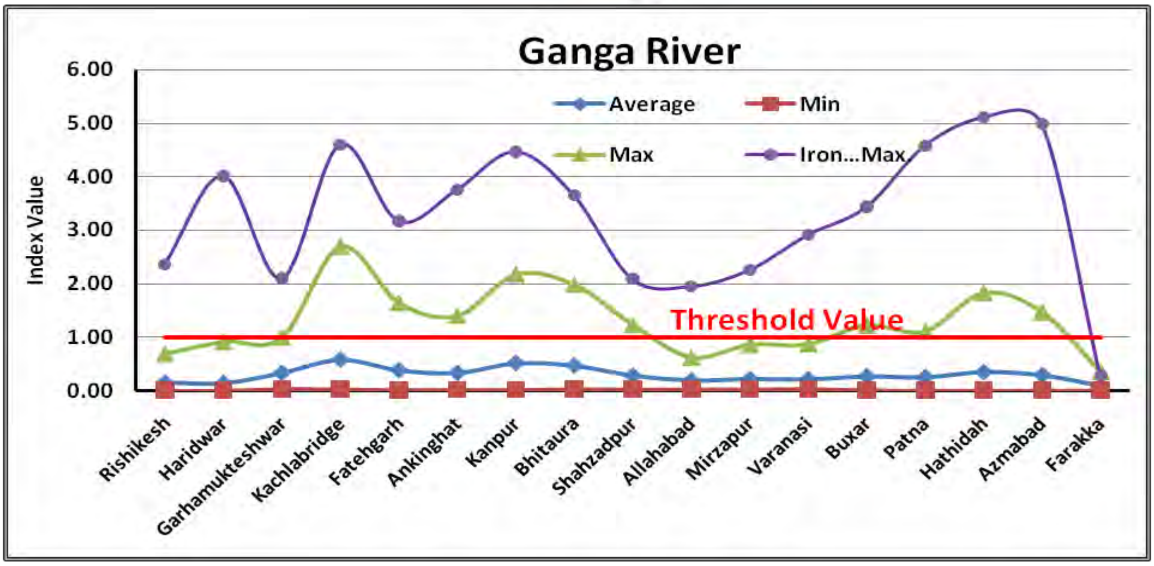
(a) Cadmium (Cd)	(b) Chromium (Cr)	(c) Copper (Cu)
(d) Nickel (Ni)	(e) Lead (Pb)	(f) Iron (Fe)

Threshold value = 1 (One)

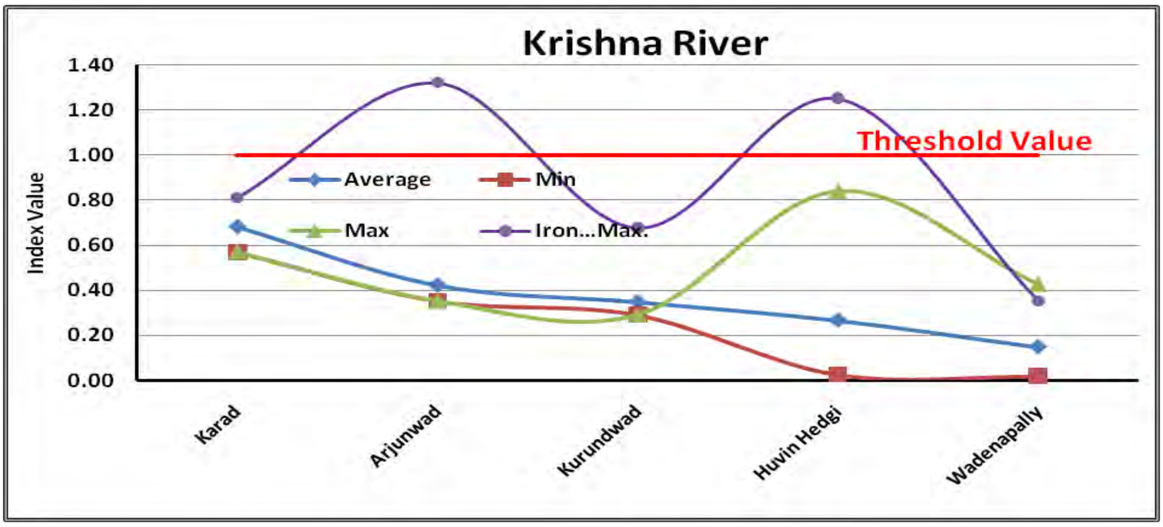
9.11.1 Index Value variation along the Rivers during the study period



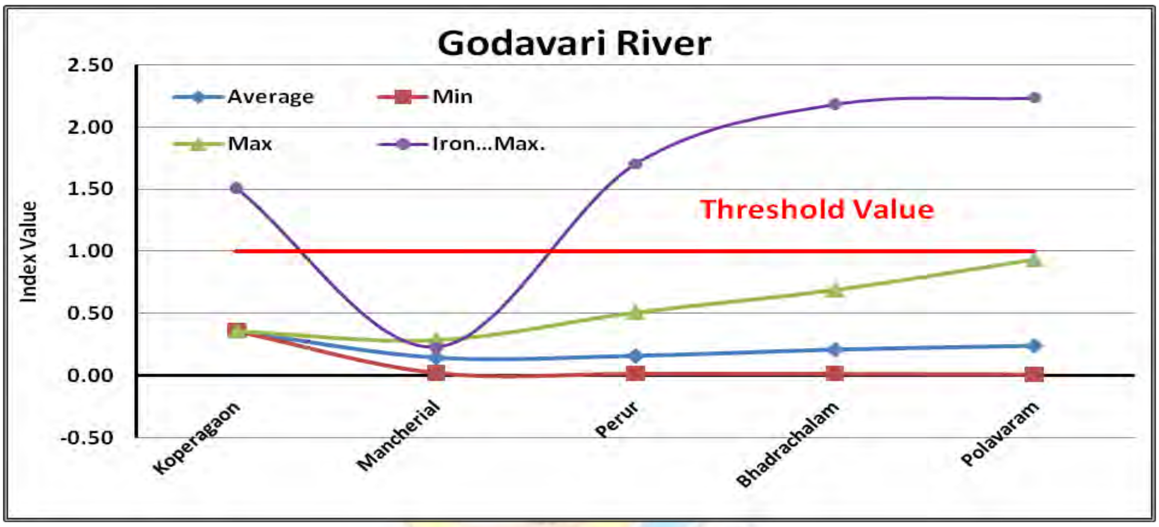
Graph 20: Variation in Index Value of Yamuna River



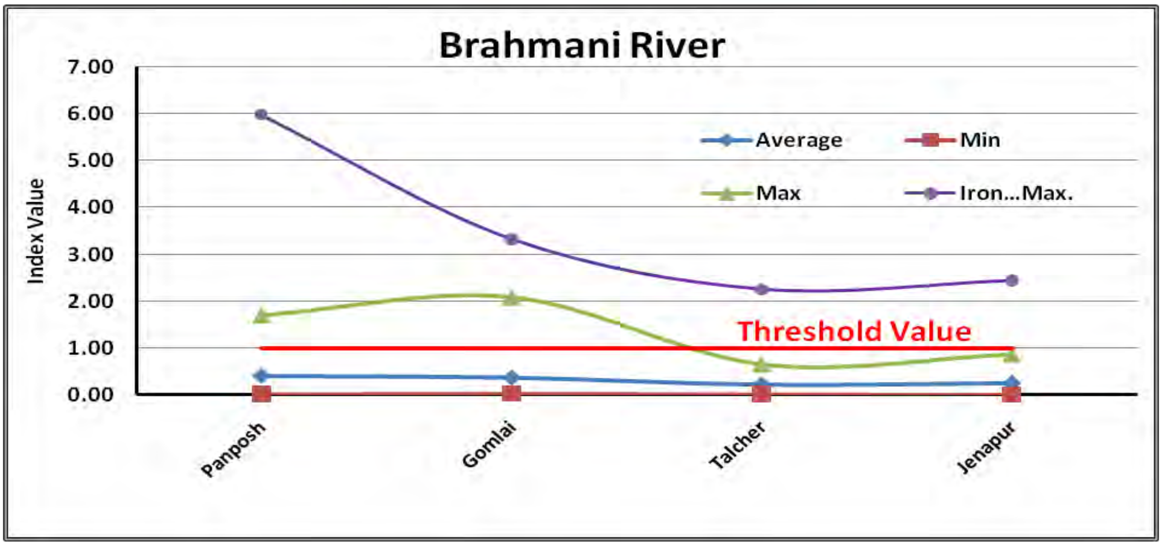
Graph 21: Variation in Index Value of Ganga River



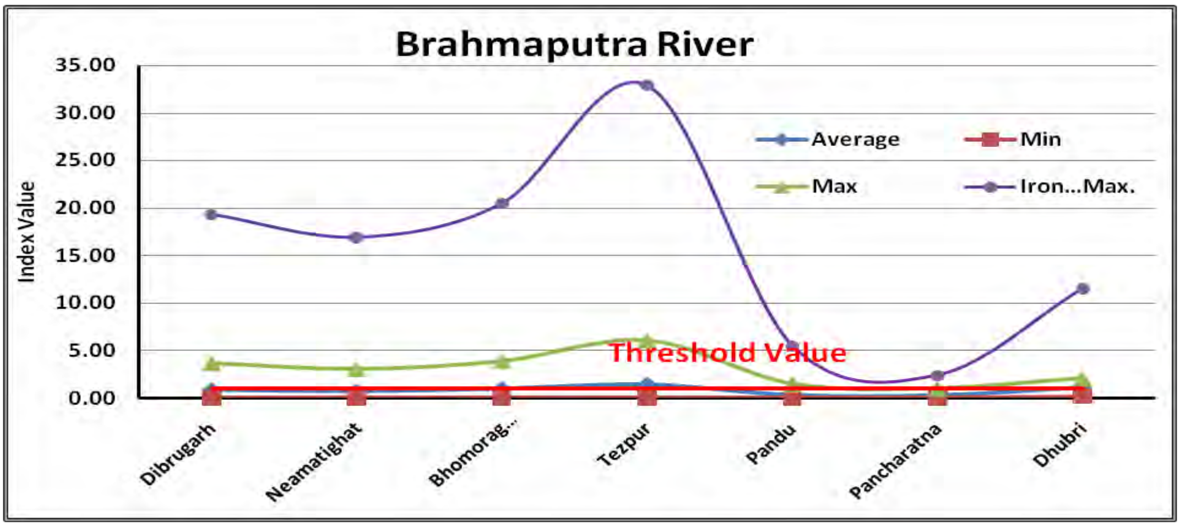
Graph 22: Variation in Index Value of Krishna River



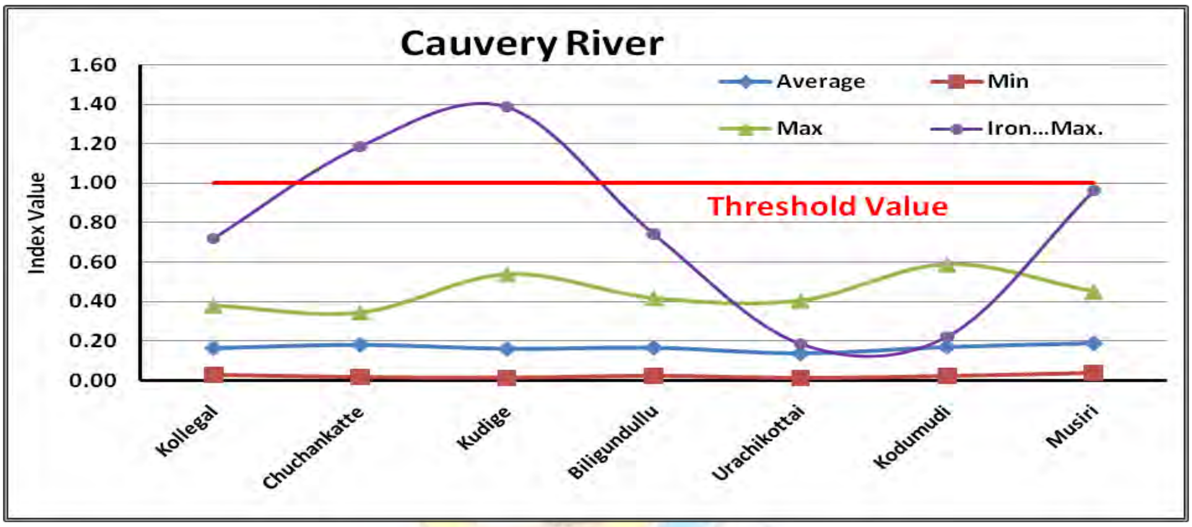
Graph 23: Variation in Index Value of Godavari River



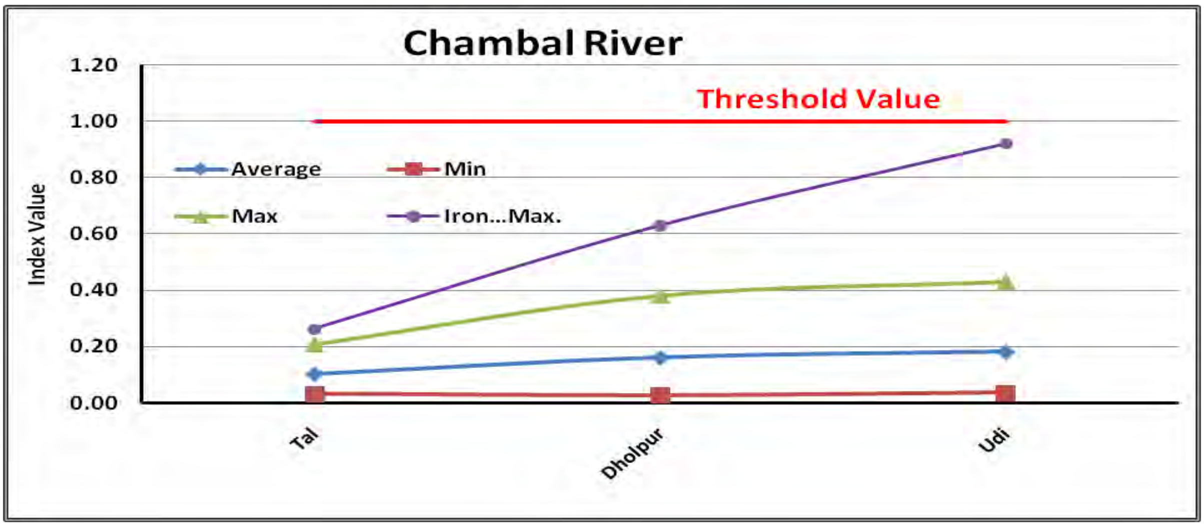
Graph 24: Variation in Index Value of Brahmani River



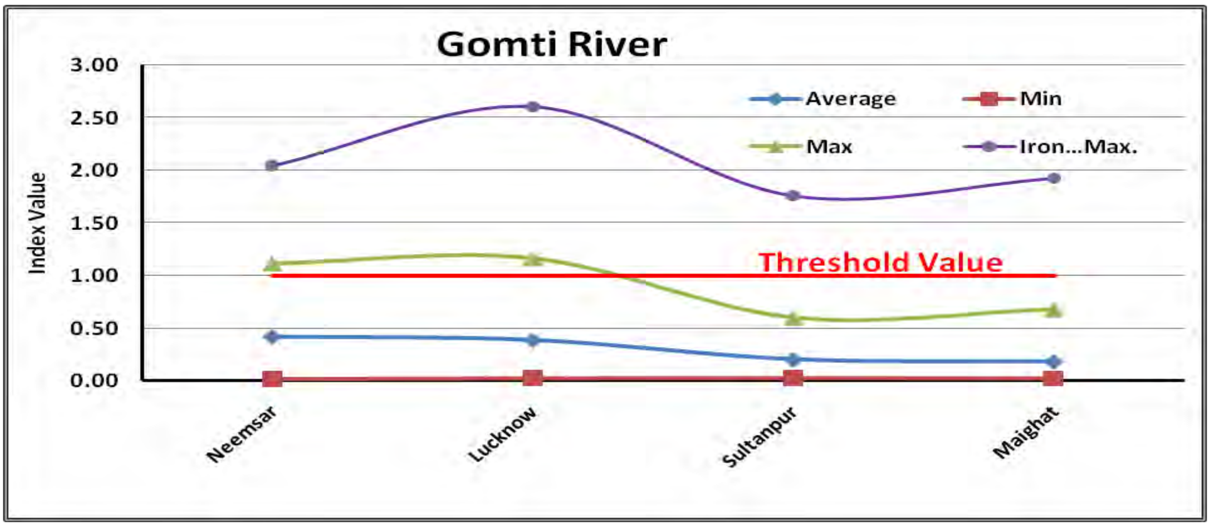
Graph 25: Variation in Index Value of Brahmaputra River



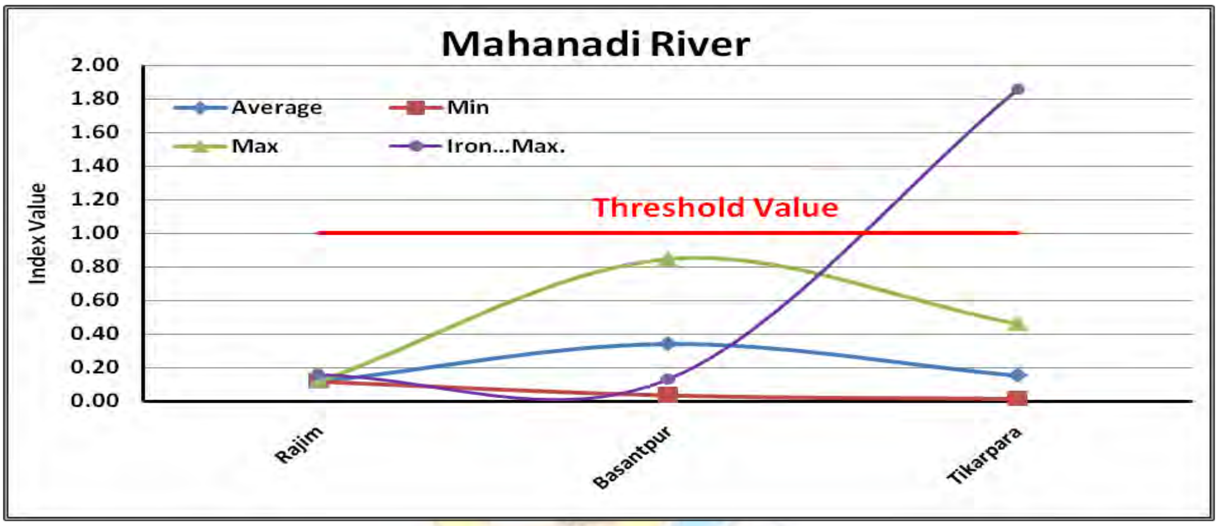
Graph 26: Variation in Index Value of Cauvery River



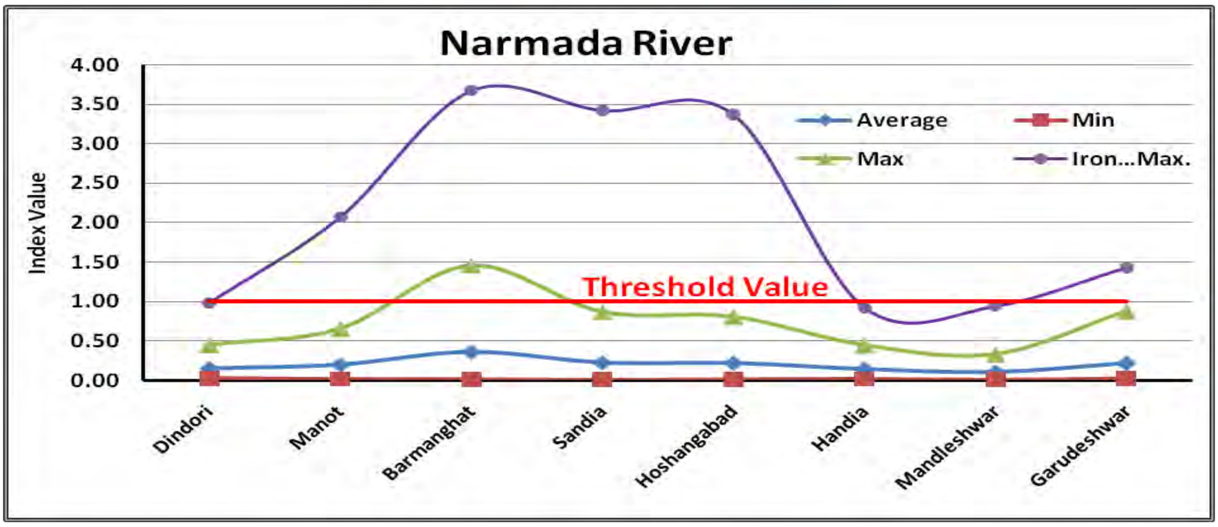
Graph 27: Variation in Index Value of Chambal River



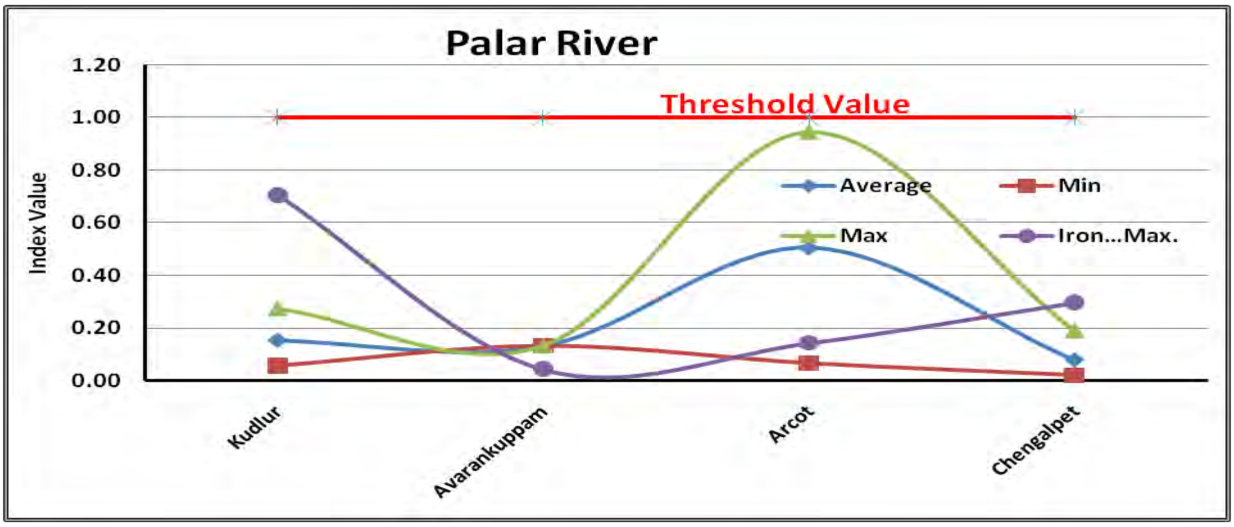
Graph 28: Variation in Index Value of Gomti River



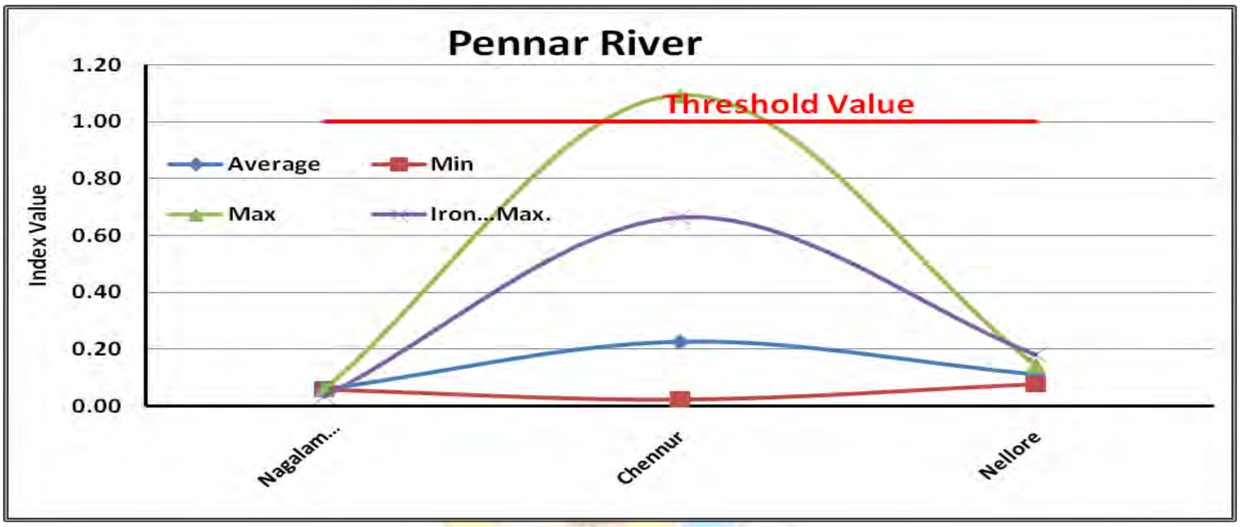
Graph 29: Variation in Index Value of Mahanadi River



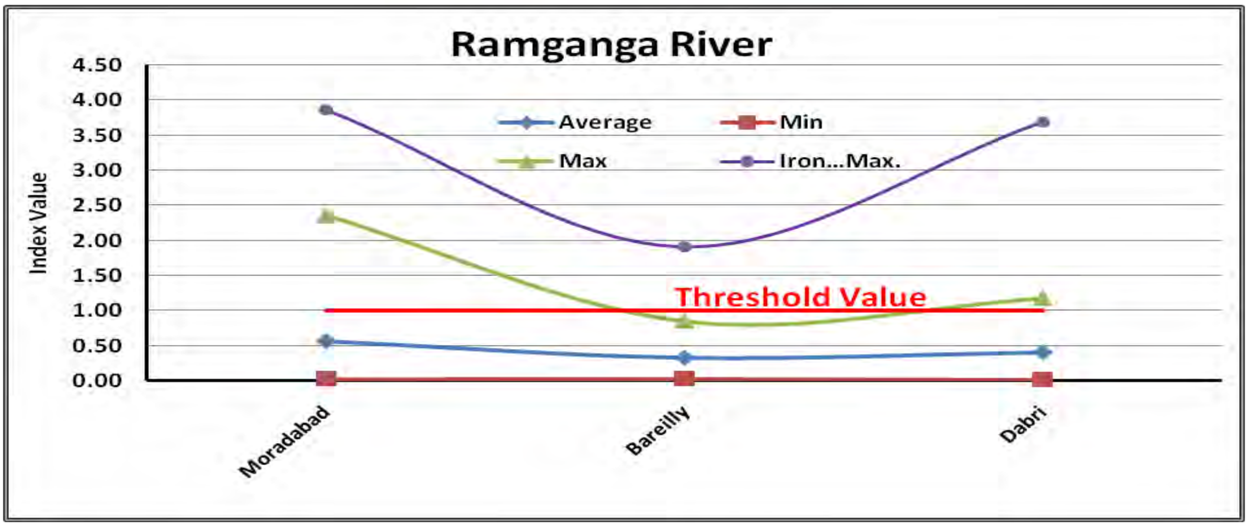
Graph 30: Variation in Index Value of Narmada River



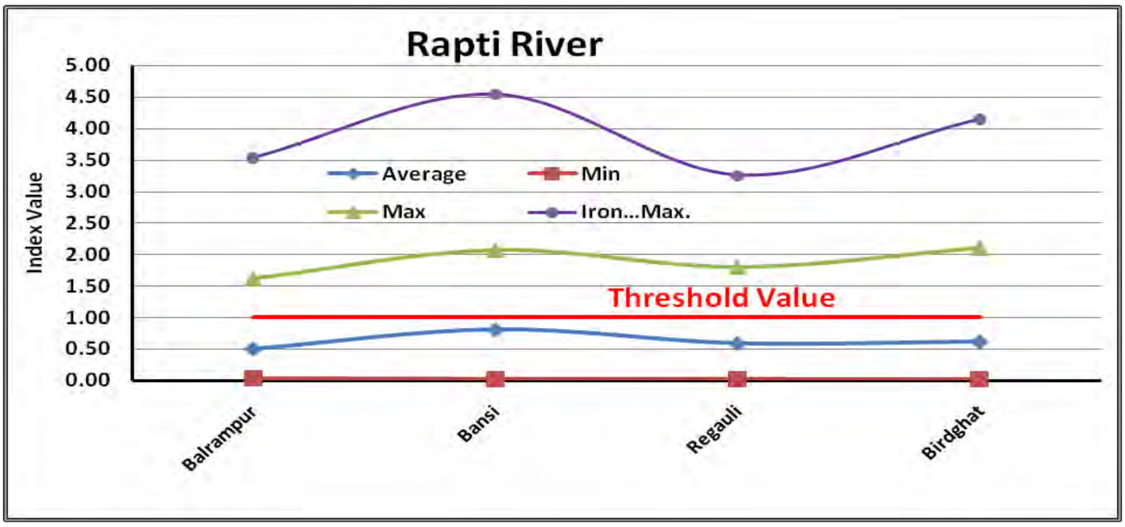
Graph 31: Variation in Index Value of Palar River



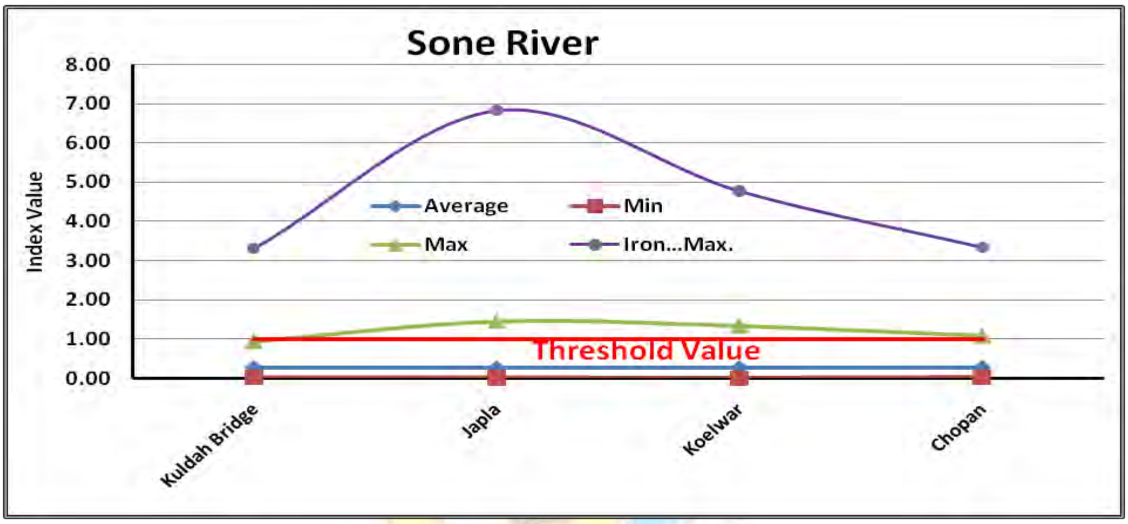
Graph 32: Variation in Index Value of Pennar River



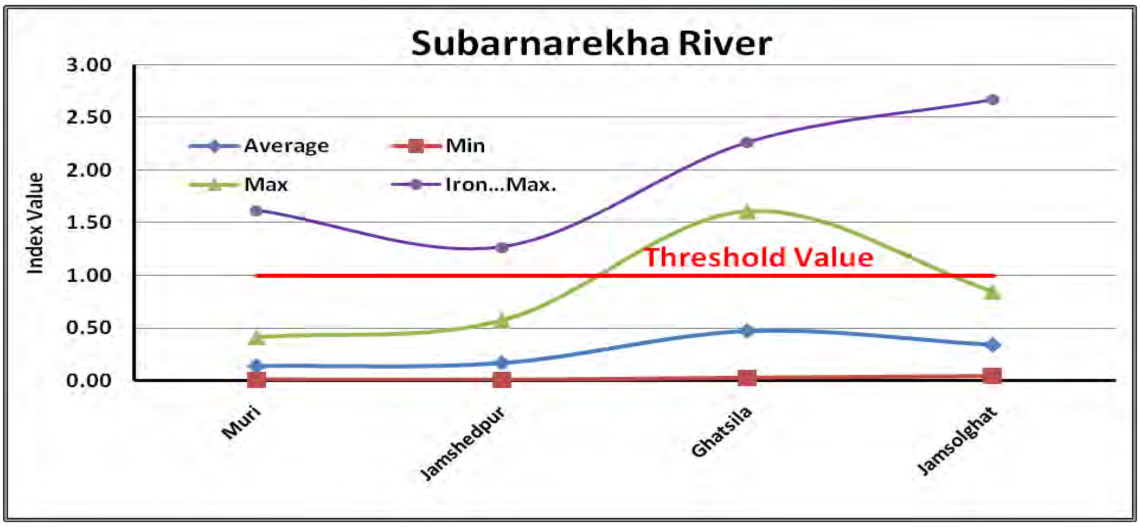
Graph 33: Variation in Index Value of Ramganga River



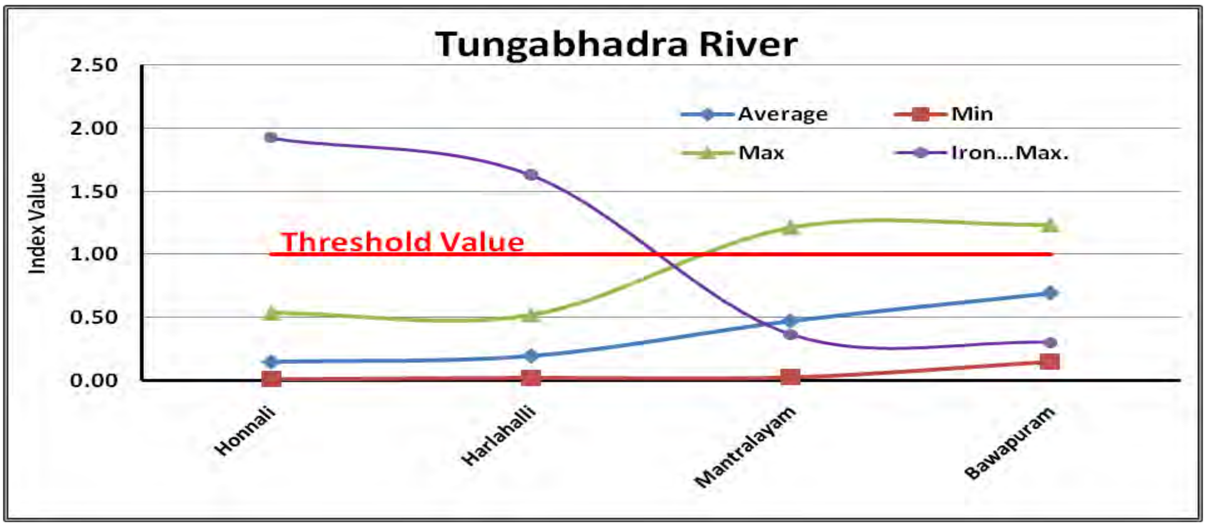
Graph 34: Variation in Index Value of Rapti River



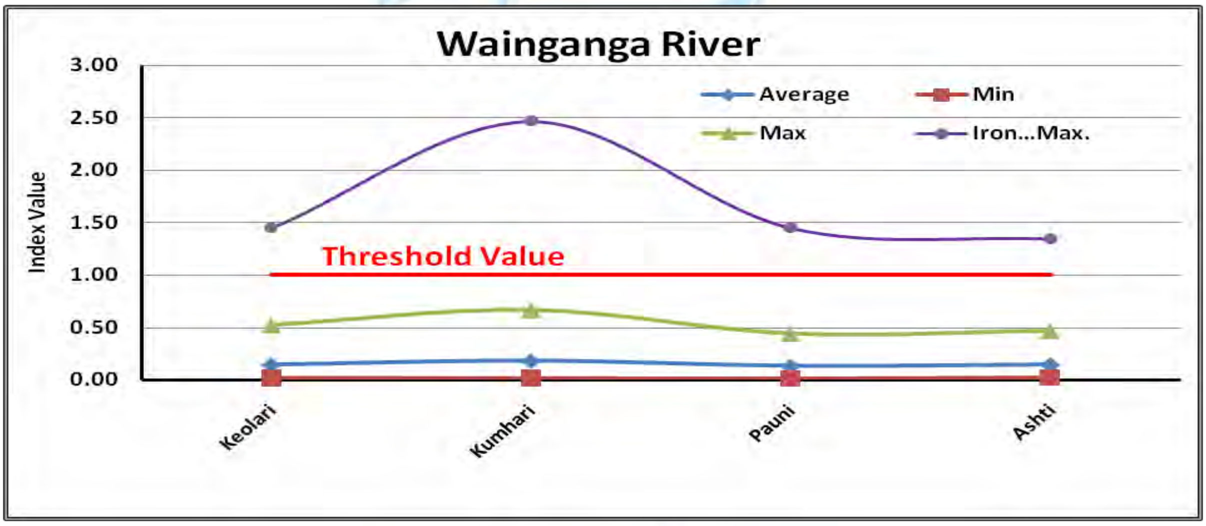
Graph 35: Variation in Index Value of Sone River



Graph 36: Variation in Index Value of Subarnarekha River



Graph 37: Variation in Index Value of Tungabhadra River



Graph 38: Variation in Index Value of Wainganga River

CHAPTER 10

10.0 Conclusions

A comprehensive study of the results reveals that out of 424 River water quality stations monitored, water samples collected at 137 water quality stations are found within the acceptable limit as per BIS: 10500-2012. While results of samples from 101 stations were beyond the acceptable limit due to presence of two or more toxic metals. At 156 numbers of stations, only Iron concentration was beyond acceptable limit (0.3 mg/L). Similarly, results of samples were above the acceptable limit at three stations due to presence of cadmium, at six stations due to presence of Chromium, at nine stations due to presence of nickel and twelve stations due to presence of lead contamination. Nevertheless, it was concluded that Arsenic and Zinc concentrations are found within the acceptable limits as per Bureau of Indian Standards (BIS) and no toxicity of Arsenic and Zinc in the River waters is observed during the study period.

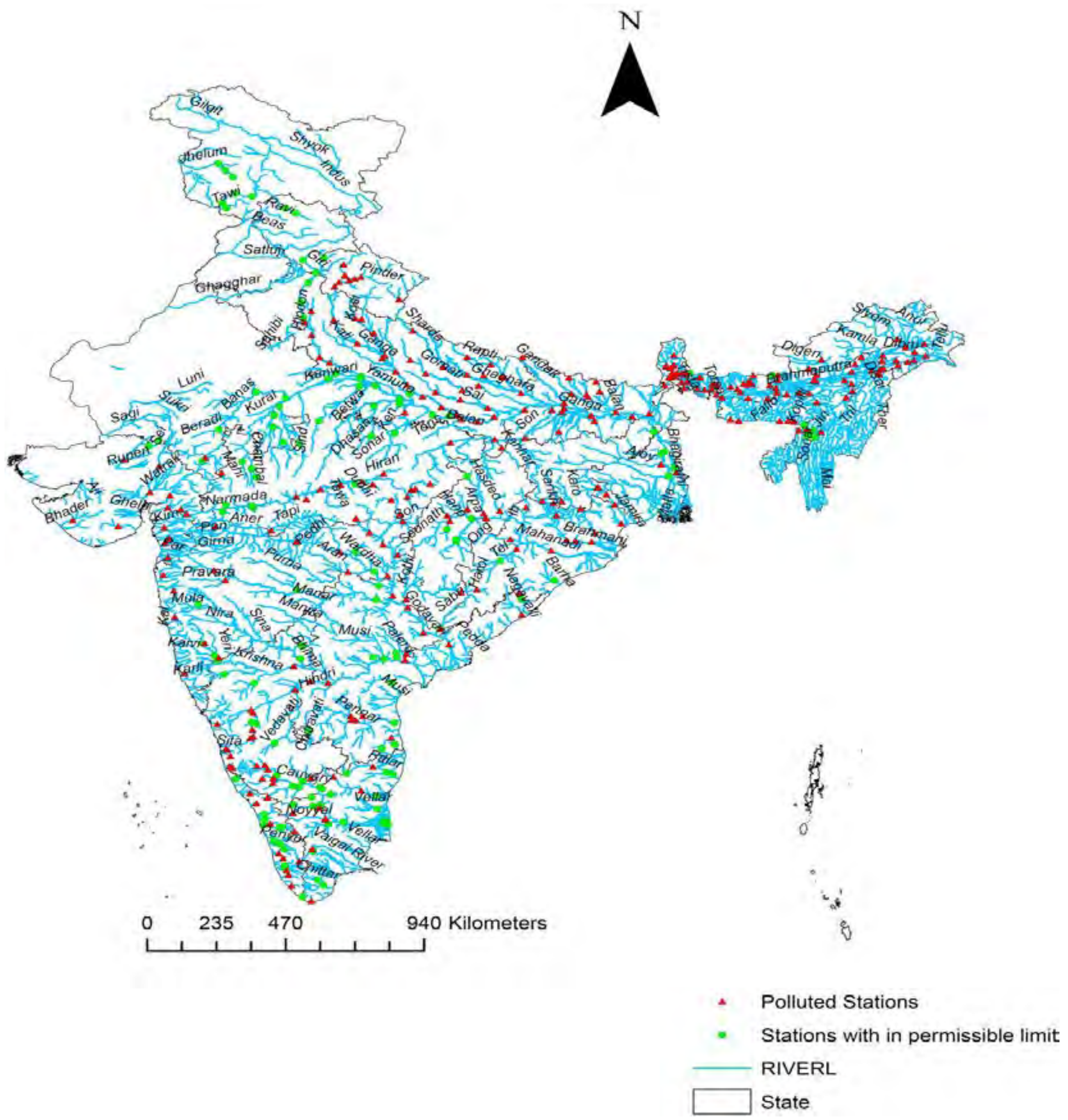


Figure 30: Water Quality Polluted and Unpolluted Station in respect to Toxic metals

Furthemore, it is evident from the Annexure-5 that 101 water quality stations across the country were found contaminated with more than one toxic metal. At these locations, it is necessasary to take measurers to remediate the river waters as far as drinking purpose is concerned. The details thereof are as under,

- **Brahmaputra River:**
  Dibrugarh, Pancharatna and Pandu WQ station were contaminated with respect to Pb & Fe (Table 16: p62 & Table 18: p70) Tezpur WQ station was contaminated with respect to Cu, Cr & Fe (Table 15: p60, Table 14: p58 & Table 18: p70).
- **Brahmani River:**
  Gomlai and Paposh WQ stations were contaminated with respect to Pb, Fe (Table 16: p62, Table 18: p58) and Ni, Fe (Table 17: p66, table 18: p70) respectively.
- **Buridehing River:**
  Chenimari WQ station was contaminated with respect to Cd, Pb & Fe (Table 13: p55, Table 16: p62 & Table 18: p70). Margherita WQ Station was contaminated with respect to Cu, Pb & Fe (Table 15: p60, Table 16: p62 & Table 18: p70).
- **Dikhow River:**
  Bihubar WQ station was contaminated with respect to Cr, Cu & Fe (Table 14: p58, Table 15: p60 & Table 18: p71). Sivasagar WQ station was contaminated with respect to Cd, Pb & Fe (Table 13: p55, Table 16: p63 & Table 18: p71).
- **Ganga River:**
  Ankinghat and Azmabad WQ stations were contaminated with respect to Pb (only at one time found above acceptable limit during Nov, 2011 at Ankinghat and Feb, 2015 at Azmabad) and Fe (Table 18: p71). Bhitaura, Fatehgarh and Kanpur WQ stations were contaminated with respect to Cr, Pb & Fe (Table 14: p58, Table 16: p63 & Table 18: p71). Kachlabridge WQ Station was contaminated with Cr, Cu, Ni, Pb & Fe (Table 14: p58, Table 15: p60, Table 17: p67, Table 16: p63 & Table 18: p72).
- **Ghagra River:**
  Elginbridge WQ station was contaminated with respect to Cd, Cr, Pb & Fe (Table 13: p55, Table 14: p58, Table 16: p63 & Table 18: p72). Turtipar WQ station was contaminated with respect to Cr, Pb & Fe (Table 14: p58, Table 16: p63 & Table 18: p72).
- **Gomti River:**
  Lucknow and Neemsar WQ stations were contaminated with respect to Pb & Fe (Table 16: p72 & Table 18: p72).
- **Kopili River:**
  Dharamtul and Kampur WQ stations were contaminated with respect to Cd & Fe (Table 13: p5 & Table 18: p73). Kheronighat WQ station was contaminated with respect to Pb & Fe (Table 16: p63 & Table 18: p73).
- **Krishna River:**
  Huvenhedgi WQ Station was contaminated with respect to Ni, Pb & Fe (Table 17: p66, Table 16: p63 & Table 18: p73)

.

- **Purna River:**
  Gopalkheda WQ Station was contaminated with respect to Ni, Pb & Fe (Table 17: p67, Table 16: p64 & Table18: p74). Mahuwa WQ Station was contamined wih respect to Cr & Fe (Table 14: p58 & Table 18: p74).
- **Ramganga River:**
  Bareily and Dabri WQ Stations were contaminated with respect to Pb & Fe (Table 16: p64 & Table 18: p74). Moradabad WQ station was contaminated with respect to Cr (November, 2014), Pb & Fe (Table 14: p58, Table 16: p64 & Table 18: p75).
- **Rapti River:**
  Balrampur, Bansi and Regauli WQ Stations were contaminated with respect to Cd, Cr, Pb & Fe (Table 13: p55, Table 14: p58, Table 16: p64 & Table 18: p75). Birdghat WQ Station was contamined with respect to Cr, Pb & Fe (Table 14: p58, Table 16: p64 & Table 18: p75).
- **Sabarmathi River:**
  Vautha WQ Station was contaminated with respect to Cd, Cu, Ni, Pb & Fe (Table 13: p55, Table 15: p60, Table 17: p67, Table 16: p64 & Table 18: p75).
- **Sone River:**
  Koelwar and Kuldah Bridge WQ stations were contaminated with respect to Pb & Fe (Table 16: p64 & Table 18: p75). Chopan WQ station was contaminated with respect to Cd & Fe (Table 13: p55 & Table 18: p75).
- **Subarnarekha River:**
  Ghatsila WQ Station was contaminated with respect to Cu, Ni, Pb & Fe (Table 15: p60, Table 17: p67, Table 16: p64 & Table 18: p76). Jamshedpur and Jamsolghat WQ Stations were contaminated with respect to Ni, Fe (Table 17: p67, Table 18: p73) and Cu, Fe (Table 15: p60, Table 18: p75) respectively.
- **Tungabhadra River:**
  Bawapuram and Mantralayam WQ Stations were contaminated with respect to Cd, Ni & Pb (Table 13: p55, Table 17: p67 & Table 16: p64).
- **Vaitarna River:**
  Durvesh WQ Station was contaminated with respect to Cd, Ni, Pb & Fe (Table 13: p55, Table 17: p67, Table 16: p64 & Table 18: p76).
- **Yamuna River:**
  Delhi Rly Bridge was contaminated with respect to Cd, Ni & Pb (Table 13: p55, Table 17: p67 & Table 16: p64). Mohana and Agra WQ stations were contaminated with respect to Cd, Pb (Table 13: p55, Table 16: p64) and Pb, Fe (Table 16: p64, Table 18: p76) respectively.

Apart from the above, at few numbers of stations, the contamination due to different parameters was found beyond the acceptable limits repeatedly. For example,

- With respect to Cd concentration, Lowara WQ stations located on Sheturni River was found 3 out of 11 times, Mathura and Mohana WQ stations situated on Yamuna River were found 2 out of 11 times above limits.

- With respect to Cr concentration, the stations situated on Rapti River such as Balrampur (3 out of 10 times), Bansi (3 out of 9 times), Regauli (3 out of 10 times) and Birdghat (3 out of 10 times) were found above limits.
- With respect to Pb contamination, at Birdghat and Regauli WQ stations located on Rapti River 3 out of 10 times, at Durvesh on Vaitarna River 5 out of 8 times, at Neemsar on Gomti River 3 out of 9 times, and at Vautha on Sabarmati River 3 out of 11 times were found above limits.

Metal contamination owing to anthropogenic sources is a persistent global issue, having environmental, political and medical implications. Heavy metals are toxic, carcinogenic and bio-accumulative in organisms which render serious health effects on humans and the flora & fauna. As a consequence, various treatment methods have been developed for the treatment of metal contaminated waste streams and some processes can also recover the metals.

Among the commonly used physico-chemical and biological technologies for heavy metal removal and recovery, cost effectiveness, technical feasibility, plant simplicity and longevity of the process are the factors that govern the selection of an appropriate technology. The wastewater treatment technologies available for treating heavy metals contaminated water prior are chemical precipitation, evaporative recovery, oxidation/ reduction, filtration, ion exchange, membrane technologies and electrochemical treatment technologies are commonly used for practical applications.

Adsorption is an effective physico-chemical process for removing heavy metals from wastewater, especially for treating wastewaters with a low metal concentration. It is well known method in metal removal because of its effectiveness and relatively cheap. It is widely used in many countries, especially in developing and transition countries, where expensive, advanced technologies cannot be afforded. There are many adsorbents available, varying from natural materials (clay balls) to agricultural waste and waste materials (sludges). The advantage of using agricultural waste as heavy metal adsorbent is the reduction of the solid waste problems and an increase in economic value and incentive of several by-products from agricultural materials. Rice husk, coconut shell, banana peel, sawdust, orange peel and groundnut shell are some examples of adsorbents from agricultural materials which have been studied over the past years (Demirbas 2008; Janyasuthiwong et al. 2015a; Mohan and Singh 2002; Sud et al. 2008).

Phytoremediation is one of the biological technologies used for the treatment of pollutants present in wastewater, including heavy metals. This technology not only offers advantages during wastewater treatment, but also provides other advantages in terms of ecology, green area, reduced carbon footprint and aesthetics. Phytoremediation is the method in which selected plant species that are used to mitigate the environmental problems or pollutants (metals, pesticides, solvents, crude oils and their derivatives) from soil, air, or water. There are many plant species that are commonly used in this field: Vetiveria sp., Typha sp. and Cyperus sp. are examples of those plants. Maine et al. (2006) reported that the constructed wetlands which were planted with several plant species for example Pistia stratiotes, Cyperus alternifolius and Typha domingensis, showed a high percentage of Cr and Ni removals and the Zn concentration was below 50 µg/L.

Iron is an essential element in human nutrition. In this regard, it may be mentioned that the presence of higher concentration of iron in drinking water makes its taste unpleasant; however, living organism can tolerate higher concentration of iron without any serious damage to their system. Estimates of the minimum daily requirement for iron depend on age, sex, physiological status, and iron bioavailability and range from about 10 to 50 mg/day (FAO/WHO, 1988). Although iron is essential element to humans and are relatively non-toxic, ions of these elements in water often cause mild to severe aesthetic problems, such as discoloured water, precipitation, scaling, staining and metallic water taste. Metallic taste and staining in laundry and toilet staining occur at iron concentration above 0.3 mg/L. The BIS has set the drinking water maximum contaminant levels (MCL) of 0.3mg/L for iron. Iron is not considered mutagenic or carcinogenic in the forms typically found in the aquatic environment and drinking water. Because of their ubiquitous presence in conventional drinking water sources, removal of iron is one of the most common water treatment practices. A two-step process with chemical oxidation followed by filtration is often employed for the removal of dissolved iron from water. The oxidants commonly used include oxygen in air, chlorine, permanganate and ozone. Sand, anthracite, greensand and other synthetic manganese dioxide media are commonly used as granular filter media to remove oxidized iron. Ion-exchange softening may also be used, but only on smaller scales. Other treatmentmethods that may be used for iron and manganese removal include water reverse osmosis and nanofiltration.

10.1 Recommendations

Based on the evaluation of the results obtained from the analysis of River water samples of 424 water quality station spanning all over India, it is recommended that the trace and toxic metals in the river water samples may be analysed at least twice a year during pre-monsoon and post-mosoon as per "Guidelines on Water Quality Monitoring, 2017". It was concluded that water quality of the Indian rivers particularly in some identified polluted stretches have been affected adversely by manmade activities by overcrowding accompanied by inadequate treatment or non-existent sanitation and also by unregulated enormous discharge of untreated industrial waste waters into riverine system. This might be caused by the population growth and also due to the compulsory growth in agricultural & industrial activities. The effluent discharge from the industry in localized areas due to this water pollution is creating situations which are dangerous to health of human and aquatic life.

1. All the toxic metallic elements like chromium and its other associated heavy metals coming in river from the tanneries, mining & other industries. Effluent released from such industries should be treated chemically and biologically before it finds its way into River.
2. Effective and efficient implementation of water pollution control laws and regulations should be promoted.
3. There is an urgent need for stringent Government policy and monitoring for effluents discharged from agriculture and industry into rivers.

4. Speciation of the Chromium (+3 & +6) and Arsenic (+3 & +5) in Indian rivers need to be further researched.
5. The metal fractionation study should be carried out in the river sediments to identify the inorganic load.

Special studies for particular stretches of the rivers may also be undertaken suitably by the concerned basin organization. The number of parameters and frequencies of sampling can be increased for better observations, interpretation & modeling purposes, for other important parameters also such as biological parameters.

REFERENCES

Agency for Toxic Substance and Disease Registry (ATSDR) (2003), Toxicological Profile for Arsenic U.S. Department of Health and Humans Services, Public Health Humans Services, Centers for Diseases Control. Atlanta.

Alloway, B.J. (1995). Heavy Metals in Soils. Springer, The Netherlands.

Bahadir, T., Bakan, G., Altas, L. and Buyukgungor, H. (2007) Enzyme Microb. Technol., 41, 98–102.

Beliles, R.P. (1994) Zinc, Zn. In: Clayton GD & Clayton FE ed. Patty's industrial hygiene and toxicology, 4th ed. Part C Toxicology. New York, John Wiley & Sons Inc, pp 2332–2342.

Blackman SAB, Baumol WJ (2008), "Natural Resources". The Concise Encyclopedia of Economics. Library of Economics and Liberty.

Budavari, S. ed. (1989) The Merck Index. Rahway, NJ, Merck & Co Inc, pp 1597–1598.

CCREM, (1987), (Canadian Council of Resource and Environment Ministers) Canadian water quality guidelines. Inland Waters Directorate, Environment Canada, Ottawa. .

Chromium (1986), https://www.canada.ca/...chromium-chrome.../water-chromium-chrome-eau-eng.pdf

Chromium, https://www.**lenntech.com**/periodic/elements/cr.htm

Cordano, A. (1998). Clinical manifestations of nutritional copper deficiency in infants and children. Am. J. Clin. Nutr. 67 (5 Suppl.): 1012S1016S

Csanady, M. and Straub I. (1995) Health damage due to pollution in Hungary. In Proceedings of the Rome Symposium, September, 1994, IAHS Publ. No. 233, pp. 1±11.

Csata, S. et al., (1968) In guidelines for drinking water quality, WHO, 1984, 333pp

Demirbas A (2008) Heavy metal adsorption onto agro-based waste materials: a review. J Hazard Mater 157(2):220–229.

DNHW, (1983), Department of National Health and Welfare. Recommended nutrient intakes for Canadians. Committee for Revision of the Canadian Dietary Standard, Ottawa.

Dopp, E., Hartmann, L.M., Florea, A.M., van Recklinghausen, U., Pieper, R. and Shokouhi, B. (2004) Uptake of inorganic and organic derivates of arsenic associated with induced cytotoxic and genotoxic effects in Chinese hamster ovary (CHO) cell. Toxicol Appl Pharmacol 201:156–165

Duffus, J.H., (2002). "Heavy metals" a meaningless term? (IUPAC Technical Report). Pure and Applied Chemistry 74 (5), 793-807.

Ensink J.H.J., Simmons, R.W., van der Hoek W (2007) Wastewater Use in Pakistan: The Cases of Haroonabad and Faisalabad. The International Development Research Centre, Canada. http:// www.idrc.ca/fr/ev-68336-201-1-DO_TOPIC.html.

ER Rene, E Sahinkaya, A Lewis, PNL Lens (2017), Sustainable Heavy Metal Remediation: Volume 1: Principles and Processes, Springer International Publishing AG 2017

FAO/WHO. (1988) Requirements of vitamin A, iron, folate and vitamin B12. Report of a Joint FAO/WHO Expert Consultation. Rome: FAO. (FAO Food and Nutrition Series No. 23).

Fu F, Wang Q (2011), Removal of heavy metal ions from wastewaters: a review. J Environ Manag 92(3):407–418.

Goyer, R.A. (1990) Lead toxicity from over to sub-clinical to subtle health effects, Enviro. Health Perspective, 86,178-180.

Greenwood, N.N. and Earnshaw, A. (1984), Chemistry of the elements. 1st edition. Pergamon Press, Oxford.

Halsted, J. A., Ronaghy, H. A. and Abadi, P. (1972), Zinc deficiency in man. American Journal of Medicine 53, 277-284.

Harris, E.D. (1997), Copper. Pp. 231273 in Handbook of Nutritionally Essential Mineral Elements, B.L. O'Dell and R.A. Sunde, eds. New York: Marcel Dekker.

Hedfi, A., Mahmoudi, E., Boufahja, F., Beyrem, H. and Aissa, P. (2007), Effects of increasing levels of nickel contamination on structure of offshore nematode communities in experimental microcosms. Bull Environ Contam Toxicol 79:345–349.

Hem, J.D. (1972), Chemical factors that influence the availability of iron and manganese in aqueous systems. Geol. Soc. Am. Spec. Pap., 140:17.

Hoogenraad, T.U., C.J. van den Hamer, R. Koevoet, and E.G. Korver. (1978), Oral zinc in Wilson's disease [letter]. Lancet 2(8102):12621263.

Hostynek J.J. and Maibach H.I. (2002) Nickel and the Skin: Absorption, Immunology, Epidemiology, and Metallurgy. Informa Health Care Publishers.

Janyasuthiwong S, Phiri SM, Kijjanapanich P, Rene ER, Esposito G, Lens PNL (2015), Copper, lead and zinc removal from metal-contaminated wastewater by adsorption onto agricultural wastes. Environ Technol 36(24):3071–3083

Jarup, L. (2003), Hazards of Heavy Metals Contamination, Brit Med Bull. 68:167–182. DOI: 10.1093/bmb/ldg032.

K. Ikehata, A. T. Komor and N. T. Komor and Y. Jin (2014), Removal of Iron and Manganese from Water—Chemistry and Engineering Considerations, 122-140, Book - Heavy Metals In Water Presence, Removal and Safety, The Royal Society of Chemistry (RSC publications).

Kapaj, S. Peterson, H. Liber, K. and Bhattacharya, P. (2006), Human health effects from chronic arsenic poisoning- a review. J Environ Sci Health 41A:2399–2428.

Kapaj, S., Peterson, H., Liber, K. & Bhattacharya, P. (2006), Human health effects from chronic arsenic poisoning — a review. Journal of Environmental Science Health Part A, Environmental Science Engineering Toxic Hazard Substance Control, 41, 2399–2428.

Kiping M. D. (1977), Arsenic, the Chemical Environment, Environment and Man, Vol. 6, eds J. Lenihan and W. W. Fletcher. pp. 93±110, Glasgow.

Lambe, K.J., and Hill, S.J. (1996), Arsenic speciation in biological samples by online high performance liquid chromatography-microwave digestion-hydride generation atomic absorption spectrometry. Anal Chim Acta 334:261–270

Liang S, Guo X-Y, Feng N-C, Tian Q-H (2010), Effective removal of heavy metals from aqueous solutions by orange peel xanthate. Trans Nonferrous Metals Soc China 20:187–191.

Linder M. and C.A. Goode. (1991), Biochemistry of Copper. New York: Plenum Press.

Liptak, B.G. (1974), Environmental Engineering Handbook, Vol. III, Land pollution, Chilton book Co., Ontario pp. 1130

Lu, L.T., Chang, I.C., Hsiao, T.Y., Yu1, Y.H., and Ma, H.W. (2007), Identification of Pollution Source of Cadmium in Soil, Application of Material Flow Analysis, A Case Study in Taiwan, Env Sci Pollut Res. 14(1):49–59.

Maine MA, Suñe N, Hadad H, Sánchez G, Bonetto C (2006), Nutrient and metal removal in a constructed wetland for wastewater treatment from a metallurgic industry. Ecol Eng 26(4):341– 347.

Mandal, B.K. and Suzuki, K.T. (2002), Arsenic round the world: A review. Talanta 58, 201–235

Maria Csuros, Csaba Csuros, (2002), Environmental Sampling and Analysis for Metals. CRC Press, Lewis Publishers.

Ming-Ho, Y. (2005), Environmental Toxicology: Biological and Health Effects of Pollutants, Chap.12, CRC Press LLC, ISBN 1-56670-670-2, 2nd Edition, BocaRaton, USA.

Mohan D, Singh KP (2002) Single-and multi-component adsorption of cadmium and zinc using activated carbon derived from bagasse – an agricultural waste. Water Res 36(9):2304–2318.

NAS, (1974), National Academy of Sciences. Chromium. Committee on Biological Effects of Atmospheric Pollutants, Washington, DC.

National Academies Press (NAP), (2000) Copper in drinking water, page 16-31, National Academies Press, Washington, D.C.

National Research Council (1989), Recommended Dietary Allowances, 10th Ed. Washington, D.C.: National Academy Press

Needleman H (2004), Lead poisoning. Annu Rev Med 55:209–222

Norseth, T. (1981), The carcinogenicity of chromium. Environ. Health Perspect., 40: 121.

NRCC, (1976), National Research Council of Canada. Effects of chromium in the Canadian environment. NRCC No. 15017, Associate Committee on Scientific Criteria for Environmental Quality, Ottawa (1976).

Percival, S.S. (1998), Copper and immunity. Am. J. Clin. Nutr. 67(5 Suppl.): 1064S1068S.

Perez-Marin, B., Ballester, A., F. Gonza´lez, M. L. Bla´zquez, J. A. Mun˜oz, J. Sa´ez and Zapata, V. M. (2008), Bioresour. Technol., 2008, 99, 8101–8106.

Pershagen, G. (1983), The Epidemiology of Human Arsenic Exposure, ed. B. A. Fowler, pp. 199±211. Elsevier, Amsterdam.

Prasad, A. S., Halsted, J. A. and Nadimi, M. (1961), Syndrome of iron deficiency anaemia, hepatosplenomegaly, hypogonadism, dwarfism and geophagia. American Journal of Medicine 31, 532-546.

Prasad, A.S. and Oberlease, D. (1976), Trace elements in human health and diease. Vol. I zinc and copper, Academic Press, New York, 470pp

Reddad, Z., rente, C., Ge ´ Andre `s, Y., Thibault, J.-F. and Cloirec, P. Le (2003), Water Res., 37, 3983–3991.

Rees W, Wackernagel M (2008), Urban ecological footprints: why cities cannot be sustainable – and why they are a key to sustainability, Urban ecology. Springer, New York, pp 537–555.

RSC, (1986), Commission on Lead in the Environment. Lead in the Canadian environment: science and regulation. Final report. Royal Society of Canada, Toronto, September.

Ryan, K.A. et al., (2004), Reducing children's risk from lead in soil, Environ. Sci. Technol., 38, 19A.

Sawyer, C.N. and McCarty, P.L. (1978), Chemistry for Environmental Engineering, McGraw Hill Inc., Singapore.

Schroeder, H.A., Nason, A.P., Tipton, I.H. and Balassa, J.J. (1966), Essential trace elements in man. Copper. J. Chronic Dis., 19: 1007.

Sharma P.D. (2005), Environmental Biology and Toxicology. Rastogi Publications.

Sharma, S.K., (2014), Heavy Metals in Water: Presence, Removal and Safety. Royal Society of Chemistry, Cambridge, U.K.

Squibb, K.S. and Fowler, B.A. (1983), The toxicity of arsenic and its compounds. In: Fowler BA (Ed) Biological and environmental effects of arsenic. Elsevier, Amsterdam, pp 233–269

Styblo, M., Razzo, L.M.D., Vega, L., Germolec, D.R., LeCluyse, E.L. and Hamilton, G.A. (2000), Comparative toxicity of trivalent and pentavalent inorganic and methylated arsenicals in rat and human cells. Arch Toxicol 74:289–299

Sud D, Mahajan G, Kaur M (2008), Agricultural waste material as potential adsorbent for sequestering heavy metal ions from aqueous solutions: a review. Bioresour Technol 99(14):6017– 6027.

Suthee Janyasuthiwong, Eldon R. Rene, Giovanni Esposito, and Piet N.L. Lens (2017), Techniques for Metal Removal and Recovery from Waste Stream, 1-24, Sustainable Heavy Metal Remediation Volume 1: Principles and Processes, Springer International Publishing AG 2017.

Tsai, C.M.E. and Evans, J.L. (1975), Influence of Dietary ascorbic cid and copper on tissue trace elements, cholesterol and Hemoglobin, Proc. Of 9th annual conference on "Trace substances in Environmental Health" University of Missouri, Columbia, USA, 441-449pp.

Uauy, R., Olivares, M. and Gonzalez, M. (1998), Essentiality of copper in humans. Am. J. Clin. Nutr. 67(5 Suppl.): 952S959S.

Underwood, E.J. (1977), Trace elements in human and animals nutrition. D.D. Hemphill. 4th Edition Academic press, New York

USEPA (2002), Proven alternatives for aboveground treatment of arsenic in groundwater solid waste and emergency EPA-542-S- 02–002

USNRC (1980), U.S. National Research Council, Lead in the Human Environment, National Academy Press/NAS, Washington, D.C.

Van der Hoek, W., Hassan, M.U.l., Ensink, J.H.J., Feenstra, S., Raschid-Sally, L., Munir, S., Aslam, R., Ali, N., Hussain, R. and Matsuno, Y. (2002), Urban Wastewater: A Valuable Resource for Agriculture A Case Study from Haroonabad, Pakistan. IWMI Research Report no. 63, International Water Management Institute, Colombo, Sri Lanka, pp 14.

Weiner, E.R. (2013), Applications of Environmental Aquatic Chemistry, CRC Press

WHO (2001), Environmental Health Criteria 224: Arsenic compounds 2nd edition. World Health Organisation, Geneva.

WHO (2011), Adverse Health Effect of Heavy Metals in Children, World Health Organization, Geneva, Switzerland, 2011, http://www.who.int/ceh/ capacity/heavy_metals.pdf.

WHO (2011), Manganese in Drinking-water – Background Document for Development f WHO Guidelines for Drinking-water Quality WHO/SDE/WSH/03.04/ 104/Rev/1, World Health Organization, Geneva, Switzerland, 2011.

WHO, (2003), Iron in Drinking-water – Background Document for Development of WHO Guidelines for Drinking-water Quality WHO/SDE/WSH/03.04/08, World Health Organization, Geneva, Switzerland, 2003.

Xu, H., Allard, B. and Grimvall, A. (1988), Influence of pH and organic substance on adsorption of As(V) on geologic materials. Water Air Soil Pollution, 40:293–305.

NATIONAL RIVER WATER QUALITY LABORATORY

National River Water Quality Laboratory (NRWQL) is referral laboratory (Level III) in Central Water Commission under Yamuna Basin Organization located at Kalindi Bhawan, Qutub Institutional Area, New Delhi-110016. It is NABL accreditated laboratory in Chemical and biological disciplines according to the IS/ISO/IEC: 17025-2005. It has been designated as the referral laboratory to ensure uniformity in physico-chemical and biological analysis of surface waters in India. Besides conducting the Special Studies assigned by the Ministry of Water Resources, NRWQL also caters to the referral needs of various organizations in the field of water quality analysis. The laboratory has facilities and capabilities to determine about 41 water quality constituents including major and minor ions, trace elements and bacteriological parameters.

NRWQL has sophisticated equipment supported by automation to identify and quantify physical, chemical and bacteriological parameters in rivers, lakes, reservoirs, wells etc. NRWQL aims to provide professional and need based training with a wide outreach in environment, water quality related topic. Hands-on training is provided in the laboratory, where participants can improve their skills in analyzing water and wastewater samples. NRWQL provides hands-on training for PG students/ research scholars of Universities.

The analysis of the trace and toxic metals was initiated in NRWQL, New Delhi from 2011 by Central Water Commission. The current study regarding Trace & Toxic metals status in Indian Rivers has been carried out by collecting river water samples in three different seasons (Monsoon, Winter, Summer) from the all water quality monitoring stations of Central Water Commission covering major river basins across India. The Trace & Toxic Metal analysis processes were performed according to Standard Analysis methods (APHA, 23rd Edition, 2017) by using Atomic Absorption Spectrophotometer (Agilent 240 FS) at National River Water Quality Laboratory only.






ANNEXURES

Annexure-1: List of Water Quality Monitoring Stations under Central Water Commission

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
1	A.B.Road Crossing	Ganga/Yamuna/Chambal/Parwati	24°22'00"	77°05'56"	Guna	Madhya Pradesh
2	A.P. Puram	Tambraparani/Chittar	08°54’05”	77°38’55”	Tirunelveli	Tamilnadu
3	A.P.Ghat	Barak	24°49’58”	92°47’30”	Cachar	Assam
4	Abu Road	Banas	24°29’38”	72°47’30’’	Sirohi	Rajasthan
5	Addoor	Gurupur	12°55’49”	74°49’47”	South Kanara	Karnataka
6	Adityapur	Subarnarekha/Kharkai	22°47’29”	86°10’25”	Purba Singhbhum	Jharkhand
7	Agra (P.G.)	Ganga/Yamuna	27°15'15''	78°01'23''	Agra	Uttar Pradesh
8	Aie NH Crossing	Brahmaputra / Aie	26°29’52”	90°39’18”	Barpeta	Assam
9	Akabarpur	Ganga/Chhoti Sarju	26°25'49"	82°33'43"	Ambedkar Nagar	Uttar Pradesh
10	Akhnoor	Chenab	32°53’00”	74°49’00”	Jammu	Jammu and Kashmir
11	Akkihebbal	Cauvery/ Hemavathi	12°36’10”	76°24’03”	Mandya	Karnataka
12	Aklera	Ganga/Yamuna/Chambal/Kalisindh/Parwan	24°25'47"	76°36'14"	Jhalawar	Rajasthan
13	Alladupalli	Pennar/Kunderu	14°43’12”	78°40’08”	Kadapa	Andhra Pradesh
14	Allahabad	Ganga	25°23'35"	81°54'40"	Allahabad	Uttar Pradesh
15	Altuma	Brahmani/Ramyala	20°55’47”	85°31’08”	Dhenkanal	Odisha
16	Ambarampalayam	Bharathapuzha/Kannadipuzha/Aliyar	10°37’49”	76°56’46”	Coimbatore	Tamilnadu
17	Ambasamudram	Vaigai	09°55’32”	77°30’42”	Theni	Tamilnadu
18	Anandpur	Baitarni	21°12’40”	86°07’14”	Keonjhar	Odisha
19	Andhiyar Kore	Mahanadi/Seonath/Hamp	21°49’53”	81°36’21”	Durg	Chhatisgarh

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
20	Ankinghat	Ganga	26°56'05"	80°02'10"	Kanpur Dehat	Uttar Pradesh
21	Annavasal	Cauvery/Nattar	10°58’21”	79°45’20”	Karaikal	Pondicherry
22	Arangaly	Periyar	10°16’53”	76°18’55”	Trichur	Kerala
23	Arcot	Palar	16.44'21"	79.40'11"	Nalgonda	Andhra Pradesh
24	Arjunwad	Krishna	16.56'56"	80.02'52"	Krishna	Andhra Pradesh
25	Ashramam	Pazhayar	08°09’30”	77°27’40”	Knayakumari	Tamilnadu
26	Ashti	Godavari/Pranhita/Wainganga	19°41’05”	79°47’08”	Gadchiroli	Maharastra
27	Auraiya	Ganga/Yamuna	26°25'34''	79°25'00''	Auraiya	Uttar Pradesh
28	Avarankuppam	Palar	12°41’03”	78°32’22”	Vellore	Tamilnadu
29	Avershe	Sita	13°31’17”	74°52’48”	Udupi	Karnataka
30	Ayilam	Vamanapuram	08°42’55”	76°51’01”	Thiruvananth	Kerala
31	Ayodhya	Ganga/Ghaghra/Saryu	26°48'49"	82°12'28''	Faizabad	Uttar Pradesh
32	Azmabad	Ganga	25°22’00’’	87°17’00’’	Bhagalpur	Bihar
33	B.P.Ghat	Barak	24°52’32”	92°35’00”	Karimganj	Assam
34	Badatighat	Brahmaputra/Subansiri	26°56’05”	93°57’44”	Lakhimpur	Assam
35	Badlapur	Ulhas	19°09’50”	73°15’17”	Thane	Maharastra
36	Balrampur	Ganga/Ghaghra/Rapti	27°27'00"	82°12'29''	Balrampur	Uttar Pradesh
37	Baltara	Ganga/Kosi	25°30’’02’’	86°45’00’’	Khagaria	Bihar
38	Bamni	Narmada/Banjar	22°29’03”	80°22’41’’	Mandla	Madhya Pradesh
39	Bamni	Godavari/Pranhita/Wardha	19°48”48”	79°22”58’	Chandrapur	Maharastra

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
40	Bamnidhi	Mahanadi/Hasdeo	21°53’55”	82°42’53”	Janjgir-champa	Chhatisgarh
41	Banda	Ganga/Yamuna/Ken	25°29'00"	80°18'48"	Banda	Uttar Pradesh
42	Bansi	Ganga/Ghaghra/Rapti	27°11'00"	82°55'57"	Siddarthnagar	
43	Bantwal	Nethravathi	12°52’49”	75°02’28”	South Kanara	Karnataka
44	Baranwada	Ganga/Yamuna/ Chambal/Banas	26°00'00"	76°40'00"	Sawai-madhopur	Rajasthan
45	Bareilly	Ganga/Ramganga	28°17'57"	79°22'00"	Bareilly	Uttar Pradesh
46	Barmanghat	Narmada	23°01’49”	79°00’35’’	Narsinghpur	Madhya Pradesh
47	Barobisha	Brahmaputra / Sankosh / Raidak-II	26°28’28”	89°47’07	Jalpaiguri	West Bengal
48	Barod	Ganga/Yamuna/Chambal/Kalisindh	25°23'00"	76°20'02"	Kota	Rajasthan
49	Baronda	Mahanadi/Pairi	20°54’22”	81°53’10”	Raipur	Chhatisgarh
50	Basantpur	Mahanadi	21°43’33”	82°47’17”	Janjgir-champa	Chhatisgarh
51	Basti	Ganga/Ghaghra/Kwano	26°47'02"	82°42'47"	Basti	Uttar Pradesh
52	Bawapuram	Krishna/Tungabhadra	15°53’00”	77°57’26”	Kurnool	Andhra Pradesh
53	Behalpur	Brahmaputra / Champamati	26°19’10”	90°28’08”	Barpeta	Assam
54	Beki Mathanguri	Brahmaputra/Beki	26°46’55”	90°57’22”	Barpeta	Assam
55	Beki Road bridge	Brahmaputra/Beki	26°29’40”	90°54’59”E	Barpeta	Assam
56	Belkhedi	Narmada/Sher	22°55’01”	79°20’32’’	Narsinghpur	Madhya Pradesh
57	Belne Bridge	Gad	16°13’16”	73°35’42”	Sindudurg	Maharastra
58	Bendrahalli	Cauvery/Suvarnavathi	12°09’13”	77°04’48”	Chamarajanagar	Karnataka
59	Berhampore	Bhagirathi	24°05’21’’	88°14’33’’	Murshidabad	West Bengal
60	Bhadrachalam	Godavari	17°40’34’’	80°52’58’’	Khammam	Andhra Pradesh

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
61	Bhalukpong	Brahmaputra/Jiabharali	27°01’03”	92°38’59”	West Kameng	Mizoram
62	Bhatpalli	Godavari/Pranhita/Peddavagu	19°19’49”	79°30’15”	Adilabad	Andhra Pradesh
63	Bhitaura	Ganga	26°02'35"	80°51'15"	Fatehpur	Uttar Pradesh
64	Bhomoraguri	Brahmaputra	26°36’37”	92°51’52”	Sonitpur	Assam
65	Bihubar	Brahmaputra/Dikhow	26°49’17”	94°48’18”	Sivasagar	Assam
66	Biligundulu	Cauvery	12°10’48”	77°43’48”	Dharmapuri	Tamilnadu
67	Birdghat	Ganga/Ghaghra/Rapti	26°44'40"	83°20'24"	Gorakhpur	Uttar Pradesh
68	Bokajan	Brahmaputra/Dhansari(South)	26°01’03”	93°47’32”	Karbi Anglong	Assam
69	Burhanpur	Tapi	21°17’58”	76°14’06’’	Khandwa	Madhya Pradesh
70	Buxar	Ganga	25°34’00”	83°57’15’’	Bhojpur	Bihar
71	Byaladahalli	Krishna/Tungabhadra/Haridra	14°26’02”	75°46’45”	Davangere	Karnataka
72	Champasari (Silliguri)	Ganga/Mahananda	26°44’21”	88°25’21”	Darjeeling	West Bengal
73	Champua	Baitarni	22°04’00”	85°40’20”	Keonjhar	Odisha
74	Chanwada	Narmada/Orsang	22°03’00”	73°27’58’’	Vadodara	Gujarat
75	Chapra	Bhagirathi/Jalangi	23°30’15’’	88°33’05’’	Nadia	West Bengal
76	Chel	Brahmaputra / Teesta / Chel	26°51’49”	88°38’06”	Jalpaiguri	Sikkim
77	Chengalpet	Palar	12°39’00”	79°56’50”	Kancheepuram	Tamilnadu
78	Chenimari	Brahmaputra/Buridehing	27°18’56”	94°53’08”	Dibrugarh	Assam
79	Chennur	Pennar	14°34’20”	78°48’00”	Kadapa	Andhra Pradesh
80	Chepan	Brahmaputra/ Torsa/Raidak-I	26°29’32”	89°42’02”	Jalpaiguri	West Bengal
81	Chhidgaon	Narmada/Ganjal	22°24’16”	77°18’35’’	Harda	Madhya Pradesh

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
82	Chitrasani	Banas/Balaram	24°17’20”	72°29’54’’	Banaskantha	Gujarat
83	Chittorgarh	Ganga/Yamuna/Chambal/Banas/Gambhiri	26.02'00"	85.54'00"	Darbhanga	Bihar
84	Cholachguda	Krishna/Malaprabha	15°52’33”	75°43’19”	Bijapur	Karnataka
85	Chopan	Ganga/Sone	24°32'00"	83°01'26"	Sonbhadra	Madhya Pradesh
86	Chouldhowaghat	Brahmaputra/Subansiri	27°26’51”	94°15’10”	Lakhimpur	Assam
87	Chunchankatte	Cauvery	12°30’30”	76°18’03”	Mysore	Karnataka
88	Coronation	Brahmaputra / Teesta	26°29’32”	89°42’02”	Darjeeling	West Bengal
89	Dabri	Ganga/Ramganga	27°29'40"	79°41'50''	Sahajahanpur	Uttar Pradesh
90	Damarcherla	Krishna/Musi	16°44’14”	79°40’08”	Nalgonda	Andhra Pradesh
91	Dawki	Meghna/Umngot	25°11’23”	92°01’07”	Jaintia Hills	Meghalaya
92	Delhi Rly Bridge	Ganga/Yamuna	28°39'45''	77°14'48''	North Delhi	Delhi
93	Deoprayag	Ganga	30°08'00"	78°35'44"	Pauri	Uttarakhand
94	Derol Bridge	Sabarmati	23°34’24”	72°48’25’’	Sabarkantha	Gujarat
95	Desangpani	Brahmaputra/Desang	27°02’47”	94 °54’56”	Sivasagar	Assam
96	Dhamkund	Chenab	30°14’00”	75°09’00”	Ramban	Jammu and Kashmir
97	Dharamtul	Brahmaputra/Kopili	26°09’51”	92 °21’00”	Morigaon	Assam
98	Dheng Bridge	Ganga/Kosi/Bagmati	26°43’22’’	85°19’23’’	Sitamarhi	Bihar
99	Dholabazar	Brahmaputra/Lohit	27°45’39”	95 °35’51”	Tinsukia	Assam
100	Dholai	Barak/Rukni	24°35’10”	92°50’32”	Cachar	Assam
101	Dholpur	Ganga/Yamuna/Chambal	26°39'24''	77°54'00''	Dholpur	Rajasthan

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
102	Dhubri	Brahmaputra	26°00'36"	89°59'43"	Barpeta	Assam
103	Dhulsar	Narmada/Uri	22°12'30"	74°52'09"	Dhar	Madhya Pradesh
104	Diana	Brahmaputra / Teesta / Diana	26°51'41"	89°00'04"	Jalpaiguri	West Bengal
105	Dibrugarh	Brahmaputra	27°29'56"	94 °54'21"	Dibrugarh	Assam
106	Dillighat	Brahmaputra/Desang	27°08'24"	95 °22'00"	Dibrugarh	Assam
107	Dimapara	Meghna/Bugi	25°13'51"	90°15'00"	South Garo Hills	Meghalaya
108	Dindori	Narmada	22°56'51"	81°04'40"	Dindori	Madhya Pradesh
109	Domohani	Brahmaputra/ Teesta	26°33'46"	88°45'28"	Jalpaiguri	West Bengal
110	Duddhi	Ganga/Sone/Kanhar	24°13'38"	83°16'14"	Sonbhadra	Uttar Pradesh
111	Dudhnai	Brahmaputra/Dudhnai	25°58'45"	90°47'27"	Goalpara	Assam
112	Durvesh	Vaitarna	19°42'47"	72°55'48"	Maharashtra	Thane
113	Ekmighat	Ganga/Kosi/Bagmati/Adhwara	26°07'03"	85°52'35"	Darbhanga	Bihar
114	Elginbridge	Ganga/Ghaghra	27°05'44"	81°29'02"	Barabanki	Uttar Pradesh
115	Elunuthimangalam	Cauvery/Noyyal	11°01'54"	77°53'15"	Erode	Tamilnadu
116	Englishbazar	Padma/Mahananda	24°59'51"	88°09'08"	Malda	West Bengal
117	Erinjipuzha	Payaswani	12°29'00"	75°09'14"	Kasargod	Kerala
118	Etawah	Ganga/Yamuna	26°45'00"	78°59'00"	Etawah	Uttar Pradesh
119	Fakirabazar	Kushiyara/Longai	24°51'06"	92°20'43"	Karimganj	Assam
120	Farakka	Ganga	24°48'14"	87'55'52"	West bengal	Murshidabad
121	Farakka/(HR)	Bhagirathi/Feeder Canal	24°48'08"	87°55'18"	Murshidabad	West Bengal
122	Fatehgarh	Ganga	27°24'15"	79°37'30"	Farukhabad	Uttar Pradesh

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
123	Fulertal	Barak	24°47’19”	93°01’08”	Cachar	Assam
124	Gadarwara	Narmada/Sakkar	22°55’25”	78°47’27’’	Narsinghpur	Madhya Pradesh
125	Gadat	Ambika	20°51’29”	72°59’06’’	Navsari	Gujarat
126	Gajaldoba	Brahmaputra / Teesta	26°45’09”	88°35’14”	Jalpaiguri	West Bengal
127	Galeta	Ganga/Yamuna/Hindon	29°04'32''	77°27'45''	Meerut	Uttar Pradesh
128	Ganod	Bhadar	21°39’52”	70°10’52’’	Rajkot	Gujarat
129	Garhamukteshwar	Ganga	28°48'00''	78°08'30''	Gaziabad	Uttar Pradesh
130	Garrauli	Ganga/Yamuna/Betwa/Dhasan	25°04'00''	79°20'00''	Chhatarpur	Madhya Pradesh
131	Garudeshwar	Narmada	21°53’06”	73°39’16’’	Narmada	Gujarat
132	Gaya	Ganga/Kiul/Harohar/Phalgu	24°42’18’’	85°00’48’’	Gaya	Bihar
133	Gelabil	Brahmaputra/Dhansiri(South)/Doyang	26°14’26”	93°58’39”	Golaghat	Assam
134	Ghat	Ganga/Ghaghra/Sharda/Sarju	29°30'00''	80°07'40''	Pithoragarh	Uttarakhand
135	Ghatora	Mahanadi/Seonath	22°03’25”	82°13’11”	Bilaspur	Chhatisgarh
136	Ghatsila	Subarnarekha	22°34’50”	86°28’06”	Purba Singhbhum	Jharkhand
137	Ghish	Brahmaputra / Teesta / Ghish	26°52’29”	88°36’34”	Jalpaiguri	West Bengal
138	Ghugumari	Brahmaputra/ Torsa	26°17’14”	89°27’39”	Cooch Behar	West Bengal
139	Gokak	Krishna/Ghataprabha	34.03'47"	74.50'04"	Sirnagar	Jammu & Kashmir
140	Golaghat	Brahmaputra/Dhansari(South)	26°30’10”	93°57’07”	Golaghat	Assam
141	Golokganj	Brahmaputra/Sonkosh	26°06’26”	89°49’10”	Dhubri	Assam
142	Gomlai	Brahmani	21°50’16”	84°56’33”	Sundergarh	Odisha
143	Gopalkheda	Tapi/Purna	20°52’27”	76°59’23’’	Akola	Maharashtra

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
144	Gopurajapuram	Nagapattinam	10°51’04”	79°48’00”	Nagapattinam	Tamilnadu
145	Govindapur	Burhabalang	21°32’44”	86°55’05”	Balasore	Odisha
146	Gummanur	Ponnaiyar	12°33’18”	78°08’18”	Krishnagiri	Tamilnadu
147	Gumrabazar	Meghna/Surma/Gumra	25°00’41”	92°30’35”	Cachar	Assam
148	Gunupur	Vamsadhara	22.20'00"	84.30'15"	Simdega	Jharkhand
149	Haladi	Haladi	13°34’52”	74°51’26”	Udupi	Karnataka
150	Halia	Krishna/Halla	16°47’24”	79°20’19”	Nalgonda	Andhra Pradesh
151	Hamirpur	Ganga/Yamuna	25°57'39''	80°09'16''	Hamirpur	Uttar Pradesh
152	Handia	Narmada	22°29’26”	76°58’33”	Harda	Madhya Pradesh
153	Hanskhali	Bhagirathi/Churni	23°21’28’’	88’36’31’’	Nadia	West Bengal
154	Haridwar	Ganga	13.58'34'	75.41'07"	Shimoga	Karnataka
155	Harlahalli	Krishna/Tungabhadra	14°49’50”	75°40’28”	Haveri	Karnataka
156	Hassimara	Brahmaputra/ Torsa	26°43’52”	89°21’28”	Jalpaiguri	West Bengal
157	Hathidah	Ganga	25°23’06’’	85°59’35’’	Patna	Bihar
158	Hayaghat	Ganga/Kosi/Bagmati	26°01’30’’	85°51’57’’	Darbhanga	Bihar
159	Hivra	Godavari/Pranhita/Wardha	20°32’50”	78°19’29”	Wardha	Maharastra
160	Holehonnur	Krishna/Tungabhadra/Bhadra	13°58’34”	75°41’07”	Shimoga	Karnataka
161	Hogenakkal	Cauvery/Chinnar	12°07’16”	77°47’07”	Dharmapuri	Tamilnadu
162	Honnali	Krishna/Tungabhadra	14°14’18”	75°39’27”	Davangere	Karnataka
163	Hoshangabad	Narmada	22°45’22”	77°43’58’’	Hoshangabad	Madhya Pradesh

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
164	Huvenhedigi	Krishna	12.20'46"	76.17'16"	Mysore	Karnataka
165	Jagdalpur	Godavari/Indravati	19°05'53''	82°02'26''	Bastar	Chhattisgarh
166	Jagibhakatgaon	Brahmaputra/ Kopili	26°09'54"	92°21'07"	Morigaon	Assam
167	Jai Nagar	Ganga/Kosi/Kamla-Balan	26°35'00''	86°08'53''	Madhubani	Bihar
168	Jaldhaka NH-31	Brahmaputra/Jaldhaka	26°34'11"	88°56'18"	Jalpaiguri	West Bengal
169	Jammu Tawi	Chenab/Tawi	32°44'00"	74°52'53"	Jammu	Jammu and Kashmir
170	Jamshedpur	Subarnarekha	22°48'56"	86°12'58"	Purba Singhbhum	Jharkhand
171	Jamsolghat	Subarnarekha	14.56'20"	75.37'05"	Haveri	Karnataka
172	Japla	Ganga/Sone	24°34'05''	83°58'30''	Palamu	Jharkhand
173	Jaraikela	Brahmani/Koel	22°19'18"	85°06'17"	Sundergarh	Odisha
174	Jenapur	Brahmani	20°53'10"	86°00'50"	Jajpur	Odisha
175	Jhanjharpur	Ganga/Kosi/Kamla-Balan	26°14'00''	86°15'34''	Madhubani	Bihar
176	Jiabharali NT Road X-ing	Brahmaputra/ Jiabharali	26°48'35"	92 °52'44"	Sonitpur	Assam
177	Jondhra	Mahanadi/Seonath	21°42'57"	82°20'50"	Bilaspur	Chhatisgarh
178	K.M. Vadi	Cauvery/Lakshmantirtha	12°20'46"	76°17'16"	Mysore	Karnataka
179	Kachlabridge	Ganga	27°55'52"	78°51'20''	Badaun	Uttar Pradesh
180	Kalampur	Muvattupuzha	09°59'25"	76°37'56"	Emakulam	Kerala
181	Kalanaur	Ganga/Yamuna	30°04'10''	77°21'52''	Saharanpur	Uttar Pradesh
182	Kallooppara	Pamba	09°24'10"	76°39'00"	pathanamthitt	Kerala
183	Kalna (EBB)*	Bhagirathi	23°13'31''	88°22'21''	Burdwan	West Bengal

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
184	Kalna (Flow)	Bhagirathi	11.50'00"	76.07'21"	Wynad	Kerala
185	Kamalapuram	Pennar/Papagani	14°34’50”	78°40’40”	Kadapa	Andhra Pradesh
186	Kamalpur	Banas	23°48’50”	71°45’00’’	Banaskantha	Gujarat
187	Kampur	Brahmaputra/ Kopili	26°09’13”	92 °39’23”	Nagaon	Assam
188	Kanpur	Ganga	26°28'10"	80°22'35''	Kanpur Nagar	Uttar Pradesh
189	Kantamal	Mahanadi/Tel	20°39’00”	83°43’20”	Boudh	Odisha
190	Karad	Krishna	17°17’40”	74°11’25”	Satara	Maharashtra
191	Karathodu	Kadalundi	11°03’25”	76°02’22”	Malappuram	Kerala
192	Kashinagar	Vamsadhara	18°50’54”	83°52’23”	Gajapati	Odisha
193	Katwa (Purbasthali)	Bhagirathi	23°38’37’’	88°08’52’’	Burdwan	West Bengal
194	Keesara	Krishna/Munneru	16°43’05”	80°19’05”	Krishna	Andhra Pradesh
195	Kellodu	Krishna/Tungabhadra/Vedavathi	13°45’00”	76°20’44”	Chitradurga	Karnataka
196	Keolari	Godavari/Pranhita/Wainganga	09.34'24"	77.05'27"	Idukki	Kerala
197	Kesinga	Mahanadi/Tel	20°12’14”	83°13’23”	Kalahandi	Odisha
198	Khanitar	Brahmaputra / Teesta	27°08’02”	88°30’10’’	East Sikkim	Sikkim
199	Khanpur	Mahi	22°31’55”	73°08’27’’	Anand	Gujarat
200	Kharkhana	Meghna/Myntdu	25°09’30”	92°13’30”	Jaintia Hills	Meghalaya
201	Khatoli	Ganga/Yamuna/Chambal/Parwati	25°40'57"	76°28'58"	Kota	Rajasthan
202	Kheronighat	Brahmaputra/ Kopili	25°50’54”	92 °53’12”	Karbi Anglong	Assam
203	Kidangoor	Meenachil	09°40’30”	76°36’10”	kottayam	Kerala
204	Kodumudi	Cauvery	11°04’52”	77°53’25”	Erode	Tamilnadu

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
205	Koelwar	Ganga/Sone	25°34'15''	84°47'59''	Arrah	Bihar
206	Kogaon	Narmada/Kundi	22°06'18"	75°40'42''	Khargone	Madhya Pradesh
207	Kokrajhar	Brahmaputra/Gaurang	26°23'49"	90°15'18"	Kokrajhar	Assam
208	Kollegal	Cauvery	12°11'21"	77°06'00"	Chamarajanagar	Karnataka
209	Konta	Godavari/Sabari	17°48'00"	81°23'34"	Dantewara	Chhattisgarh
210	Koperagaon	Godavari	23.18'40"	79.39'43"	Jabalpur	Madhya Pradesh
211	Kora	Ganga/Yamuna/Rind	26°07'58''	80°27'15''	Fatehpur	Uttar Pradesh
212	Koteshwar	Ganga/Bhagirath	23.01'51"	79.00'56"	Narsinghpur	Madhya Pradesh
213	Kudalaiyathur	Vellar	22.29'30"	76.59'37"	Harda	Madhya Pradesh
214	Kudige	Cauvery	12°30'09"	75°57'40"	Coorg	Karnataka
215	Kudlur	Cauvery/Palar	11°50'26"	77°27'46"	Chamarajan-agara	Karnataka
216	Kuldah Bridge	Ganga/Sone	24°24'45"	81°42'01"	Sidhi	Madhya Pradesh
217	Kulsi	Brahmaputra/Kulsi	25°58'45"	91°23'09"	Kamrup	Assam
218	Kumbidi	Bharathapuzha	10°51'00"	76°01'18"	Palakkad	Kerala
219	Kumhari	Godavari / Pranhita / Wainganga	21°53'03"	80°10'30"	Balaghat	Madhya Pradesh
220	Kuniyil	Chaliyar	11°14'26"	76°01'26"	Malappuram	Kerala
221	Kuppelur	Krishna/Tungabhadra/Kumudavathi	14°30'00"	75°38'02"	Haveri	Karnataka
222	Kurubhata	Mahanadi/Mand	21°59'11"	83°12'15"	Raigarh	Chhatisgarh
223	Kurundwad	Krishna	16°41'01"	74°36'11"	Kolhapur	Maharastra
224	Kuttyadi	Kuttyadi	11°37'30"	75°47'04"	Kozhikode	Kerala
225	Kuzhithurai	Thambraparni	08°18'08"	77°10'51"	Knayakumari	Tamilnadu

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
226	Labha	Ganga/Mahananda	25°26’10’’	87°45’57’’	Katihar	Bihar
227	Lakhisarai	Ganga/Kiul	25°10’33’’	86°05’58’’	Lakhisarai	Bihar
228	Lalganj	Ganga/Gandak	25°50’05’’	85’09’47’’	Vaishali	Bihar
229	Lowara	shetruni	21°26’36”	71°33’42’’	Bhavnagar	Gujarat
230	Lucknow	Ganga/Gomti	26°51'40"	80°56'47''	Lucknow	Uttar Pradesh
231	M.H. Halli	Cauvery/Hemavathi	12°49’08”	76°08’00”	Hassan	Karnataka
232	Madhira	Krishna/Munneru/Wyra	25.10'44"	77.41'13"	Shivpuri	Madhya Pradesh
233	Madla	Ganga/Yamuna/Ken	26.25'03"	78.55'48"	Datia	Madhya Pradesh
234	Mahidpur	Ganga/Yamuna/ Chambal/Shipra	23°28'50"	75°38'11"	Ujjain	Madhya Pradesh
235	Mahuwa	Purna	21°00’57”	73°08’08’’	Surat	Gujarat
236	Magaral	Palar/Cheyyar	12°42’30”	79°45’00”	Kancheepuram	Tamilnadu
237	Maighat	Ganga/Gomti	25°38'37"	82°50'48"	Jaunpur	Uttar Pradesh
238	Majhitar	Brahmaputra / Teesta / Rangit	27°06’28”	88°19’18”	South Sikkim	Sikkim
239	Malakkara	Pamba	09°19’57”	76°39’47”	pathanamthitt	Kerala
240	Malkhed	Krishna/Bhima/Kagna	17°12’12”	77°09’25”	Gulbarga	Karnataka
241	Manas NH Crossing	Brahmaputra/Manas	26°27’51”	90°44’59”	Barpeta	Assam
242	Mancherial	Godavari	18°50’09’’	79°26’42’’	Adilabad	Andhra Pradesh
243	Mandleshwar	Narmada	22°10’06”	75°39’36”	Khargone	Madhya Pradesh
244	Manendragarh	Mahanadi/Hasdeo	23°12’13”	82°13’02”	Koria	Chhatisgarh
245	Mangaon (Seasonal)	Savitri/kal	18°13’58”	73°17’05”	Raigarh	Maharastra

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
246	Mankara	Bharathapuzha	10°45’40”	76°29’10”	Palakkad	Kerala
247	Manot	Narmada	22°44’08”	80°30’47’’	Mandla	Madhya Pradesh
248	Mantralayam	Krishna/Tungabhadra	16.46'51"	74.38'00"	Kolhapur	Maharashtra
249	Marella	Gundlakamma	15°52’58”	79°54’37”	Praksam	Andhra Pradesh
250	Margherita	Brahmaputra/ Buridehing	27°17’01”	95 °39’46”	Tinsukia	Assam
251	Marol	Krishna/Tungabhadra/Varada	14°56’20”	75°37’05”	Haveri	Karnataka
252	Mataji	Mahi	23°20’38”	74°43’29’’	Ratlam	Madhya Pradesh
253	Mathabhanga	Brahmaputra/Jaldhaka	26°19’31”	89°14’08”	Cooch Behar	West Bengal
254	Mathanguri	Brahmaputra / Beki	26°46’55”	90°57’22”	Barpeta	Assam
255	Mathura	Ganga/Yamuna	27°26'30''	77°42'54''	Mathura	Uttar Pradesh
256	Matigara	Ganga/Mahananda/Balson	26°43’13”	88°22’37”	Darjeeling	West Bengal
257	Matijuri	Barak/Katakhal	24°38’53”	92°36’29”	Hailakandi	Assam
258	Matunga	Brahmaputra / Pagladiya / Kalanadi	26°47’30”	91°32’07”	Baksa (BTAD)	Assam
259	Mawi	Ganga/Yamuna	29°23'07''	77°09'16''	Muzaffar Nagar	Uttar Pradesh
260	Meja Road	Ganga/Tons	25°14'00"	82°02'16"	Allahabad	Uttar Pradesh
261	Mekhliganj	Brahmaputra / Teesta	-	-	-	-
262	Menangudi	Cauvery/Noolar	10°56’54”	79°42’20”	Thiruvarur	Tamilnadu
263	Miao	Brahmaputra/Noa-dehing	27°29’57”	96°12’35”	Changlang	Mizoram
264	Mirzapur	Ganga	25°09'22"	82°31'49"	Mirzapur	Uttar Pradesh
265	Mohana	Ganga/Yamuna	28°14'58''	77°28'12''	Faridabad	Haryana

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
266	Mohana	Ganga/Yamuna/Betwa	13.33'41"	79.36'56"	Chandrapur	Maharashtra
267	Mohgaoan	Narmada/Burhner	22°45'42"	80°37'26''	Mandla	Madhya Pradesh
268	Moradabad	Ganga/Ramganga	28°49'32"	78°47'54''	Moradabad	Uttar Pradesh
269	Motinaroli	Kim (Indepent River)	21°24'16"	72°57'45''	Surat	Gujarat
270	Murappanadu	Tambraparni	08°42'52"	77°50'06"	Tuticorin	Tamilnadu
271	Muri	Subarnarekha	23°22'50"	85°52'40"	Ranchi	Jharkhand
272	Murti	Brahmaputra / Jaldhaka / Murti	26°50'26"	88°49'42"	Jalpaiguri	Assam
273	Musiri	Cauvery	10°56'36"	78°26'06"	Thiruchira Palli	Tamilnadu
274	Muthankera	Cauvery/ Kabini	11°50'00"	76°05'20"	Wynad	Kerala
275	Nagrakata	Brahmaputra / Jaldhaka	26°52'22"	88°53'43"	Jalpaiguri	Assam
276	Nagalamadike	Pennar	14°11'20"	77°22'20"	Tumkur	Andhra Pradesh
277	Naharkatia	Brahmaputra/ Buridehing	27°19'15"	95 °18'38"	Dibrugarah	Assam
278	Naidupet	Swarnamukhi	13°56'54"	79°53'50"	Nellore	Andhra Pradesh
279	Nallamaranpatty	Cauvery/Amaravathi	10°52'51"	77°59'05"	Karur	Tamilnadu
280	Nallathur	Cauvery/Nandalar	22.03'57"	85.40'24"	Keonjhar	Odisha
281	Namsai	Brahmaputra/Noa-dehing	27°37'28"	95°53'44"	Lohit	Mizoram
282	Nandgaon	Godavari/Pranhita/Wunna	20°32'04"	78°48'04"	Wardha	Maharastra
283	Nandipalli	Pennar/Sagaileru	14°42'51"	79°01'21"	Kadapa	Andhra Pradesh
284	Nanglamoraghat	Brahmaputra/Desang	27°00'00"	94 °49'05"	Sivasagar	Assam
285	Neamatighat	Brahmaputra	26°52'12"	94 °15'08"	Jorhat	Assam

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
286	Neeleswaram	Periyar	10°11’00”	76°29’46”	Emakulam	Kerala
287	Neemsar	Ganga/Gomti	27°20'46"	80°28'40"	Sitapur	Uttar Pradesh
288	Nellithurai	Cauvery/Bhavani	11°17’16”	76°53’28”	Coimbatore	Tamilnadu
289	Nellore	Pennar	14°28’13”	79°59’20”	Nellore	Andhra Pradesh
290	Neora	Brahmaputra / Teesta / Neora	26°52’43”	88°46’18”	Jalpaiguri	West Bengal
291	Nowrangpur	Godavari/Indravati	19°11’51’’	82°30’43’’	Nowrangpur	Odisha
292	Numaligarh	Brahmaputra/Dhansiri(South)	26°38’02”	93°43’48”	Golaghat	Assam
293	P.G.Bridge	Godavari/Pranhita/Penganga	19°49’02”	78°34’39”	Yeotmal	Maharastra
294	Pachauli	Ganga/Yamuna/Sind	25°10'44''	77°41'13''	Shivpuri	Madhya Pradesh
295	Pachegaon	Godavari/Pravara	19°32’04’’	74°50’02’’	Ahmednagar	Maharashtra
296	Paderdibadi	Mahi	23°46’02”	74°08’12’’	Dungarpur	Rajasthan
297	Pagladiya N.T. Road X-ING	Brahmaputra / PagladiYa	26°26’58”	91°27’36”	Nalbari	Assam
298	Paleru Bridge	Krishna/Paleru	16°57’08”	80°02’56”	Krishna	Andhra Pradesh
299	Paliakalan	Ganga/Ghaghra/Sharda	28°23'00"	80°33'09''	Lakhimpur Khiri	Uttar Pradesh
300	Palla	Ganga/Yamuna	28°49'46''	77°13'27''	North West Delhi	Delhi
301	Panbari	Brahmaputra / Burisuti	26°35’30”	90°49’44”	Barpeta	Assam
302	Pancharatna	Brahmaputra	26°12’00”	90°34’38”	Goalpara	Assam
303	Pandu	Brahmaputra	26°10’15”	91°40’18”	Kamrup	Assam
304	Panposh	Brahmani	22°13’33”	84°48’01”	Sundergarh	Odisha
305	Passighat	Brahmaputra/Siang	28°04’23”	95°20’25”	East Siang	Mizoram

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
306	Patan	Narmada/Hiran	23°18’42”	79°39’46”	Jabalpur	Madhya Pradesh
307	Pathagudem	Godavari/Indravati	18°49’39”	80°20’21”	Bijapur	Chhattisgarh
308	Pathardihi	Mahanadi/Seonath/Kharun	21°20’28”	81°35’38”	Raipur	Chhatisgarh
309	Pati	Narmada/Goi	21°56’36”	74°44’41”	Barwani	Madhya Pradesh
310	Patna	Ganga	25°37’25”	85°10’21”	Patna	Bihar
311	Pattazhy	Kallada	09°04’22”	76°45’40”	Quilon	Kerala
312	Pauni	Godavari/Pranhita/Wainganga	20°47’41”	79°38’46”	Bhandara	Maharastra
313	Peralam	Cauvery/Vanjiyar	10°58’00”	79°39’50”	Thiruvarur	Tamilnadu
314	Perumannu	Valapatnam	11°58’53”	75°35’15”	Cannanore	Kerala
315	Perur	Godavari	18°33’00”	80°23’05”	Khammam	Andhra Pradesh
316	Phulgaon (Seasonal)	Krishna/Bhima	18°40’00”	74°00’07”	Pune	Maharastra
317	Pingalwada	Dhadher	22°06’39”	73°04’43”	Vadodara	Gujarat
318	Poanta	Yamuna	30°25'31''	77°35'31''	Simaur	Himachal Pradesh
319	Polavaram	Godavari	17°14’45”	81°39’35”	West Godavari	Andhra Pradesh
320	Pratapgarh	Ganga/Gomti/Sai	25°56'05"	82°00'07"	Pratapgarh	
321	Pratappur	Ganga/Yamuna	25°21'17''	81°40'02''	Allahabad	Uttar Pradesh
322	Prem Nagar	Chenab	33°08’00”	75°39’04”	Doda	Jammu and Kashmir
323	Pudur	Bharathapuzha	10°46’48”	76°34’30”	Palakkad	Kerala
324	Pulamanthole	Bharathapuzha	10°53’56”	76°11’50”	Palakkad	Kerala
325	Purna	Godavari/Purna	10.37'49"	76.56'46"	Coimbatore	Tamilnadu

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
326	Purushottampur	Rushikulya	19°30’53”	84°53’00”	Ganjam	Odisha
327	Puthimari D.R.F.	Brahmaputra / Puthimari	26°48’01”	91°42’01”	Baksa (BTAD)	Assam
328	Puthimari NH X-ING	Brahmaputra / Puthimari	26°20’48”	91°38’45”	Kamrup	Assam
329	Raibareli	Ganga/Gomti/Sai	26°11'55''	81°15'04''	Raibareli	Uttar Pradesh
330	Rajapur	Ganga/Yamuna	25°23'23''	81°09'15''	Chitrakoot	Uttar Pradesh
331	Rajegaon	Godavari / Pranhita / Bagh	21°37’32”	80°15’14”	Balaghat	Andhra Pradesh
332	Rajghat	Ganga/Yamuna/Betwa	26°49'23''	78°12'00''	Lalitpur	Uttar Pradesh
333	Rajim	Mahanadi	20°58’25”	81°52’42”	Raipur	Chhatisgarh
334	Ramakona	Godavari/Pranhita/Kanhan	11.33'18"	77.42'52"	Erode	Tamilnadu
335	Ramamangala	Muvattupuzha	09°50’41”	76°28’00”	Emakulam	Kerala
336	Rammunshi Bagh	Jhelum	34°03’47”	74°50’04”	Sirnagar	Jammu and Kashmir
337	Rampur	Mahanadi/Jonk	21°39’06”	82°31’02”	Raipur	Chhatisgarh
338	Ranganadi NT-Road Crossing	Brahmaputra/	27°12’00”	94°03’46”	Lakhimpur	Assam
339	Rangeli	Mahi/som	23°52’22”	74°13’25’’	Dungarpur	Rajasthan
340	Rangpo	Brahmaputra / Teesta / Rangpochu	27°10’20”	88°31’47”	Gangtok	Sikkim
341	Reguali	Ganga/Ghaghra/Rapti	26°45'33''	83°17'26''	Gorakhpur	Uttar Pradesh
342	Rishikesh	Ganga	30°04'57''	78°17'30''	Dehradun	Uttarakhand
343	Rudraprayag	Ganga/ Alaknanda	30°17'03''	78°58'29''	Rudraprayag	Uttarakhand
344	Safapora	Jhelum	34°17’44”	74°37’29”	Baramulla	Jammu and Kashmir

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
345	Sakleshpur	Cauvery/Hemavathi	12°57’10”	75°47’04”	Hassan	Karnataka
346	Sakmur(Sirpur)	Godavari/Pranhita/Wardha	27.05'44"	81.29'02"	Barabanki	Uttar Pradesh
347	Salebhata	Mahanadi/Ong	20°59’00”	83°32’09”	Balangir	Odisha
348	Samdoli (Seasonal)	Krishna/Varna	16°51’18”	74°29’48”	Sangli	Maharastra
349	Sandia	Narmada	22°54’57”	78°20’51’’	Hoshangabad	Madhya Pradesh
350	Sangam K	Kinnerasani	17°47’56”	81°23’32”	Khammam	Andhra Pradesh
351	Sangam J	Jhelum	33°49’59”	75°03’58”	Anantnag	Jammu and Kashmir
352	Sangod	Ganga/Yamuna/ Chambal/Parwan	24°58'09"	76°17'32"	Kota	Rajasthan
353	Sankalan	Brahmaputra / Teesta	27°30’30”	88°31’30”	North Sikkim	Sikkim
354	Sankosh LRP	Brahmaputra/Sankosh	26°27’28”	89°51’29”	Cooch Behar	West Bengal
355	Santeguli	Aghanashini	14°26’04”	74°35’10”	North Kanara	Karnataka
356	Sarangkheda	Tapi	21°25’42”	74°31’38”	Nandurbar	Maharashtra
357	Satrapur	Godavari/Pranhita/Kanhan	21°13’05”	79°13’56”	Nagpur	Maharastra
358	Savandapur	Cauvery/Bhavani	11°31’17”	77°30’36”	Erode	Tamilnadu
359	Seondha	Ganga/Yamuna/Sind	26°09'49''	78°47'00''	Datia	Madhya Pradesh
360	Seppa	Brahmaputra/Kameng	27°21’21”	93°02’24”	East Kameng	Mizoram
361	Sevanur	Cauvery/Chittar	11°33’07”	77°43’55”	Erode	Tamilnadu
362	Sevoke	Brahmaputra / Teesta	26°52’54”	88°28’37”	Darjeeling	West Bengal
363	Shahjina	Ganga/Yamuna	25°57'00''	80°08'52''	Hamirpur	Uttar Pradesh
364	Shahzadpur	Ganga	25°40'00"	81°25'48"	Kaushambi	Uttar Pradesh

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
365	Shimoga	Krishna/Tungabhadra/Tunga	13°56’06”	75°34’37”	Shimoga	Karnataka
366	Sibbari	Meghna/Dareng	25°10’50”	90°30’22”	South Garo Hills	Meghalaya
367	Sikandarpur	Ganga/Burhi Gandak	26°08’22’’	85°24’05’’	Muzaffarpur	Bihar
368	Simga	Mahanadi/Seonath	21°37’51”	81°41’16”	Raipur	Chhatisgarh
369	SinglaBazar	Brahmaputra / Teesta / Rangit	27°07’51”	88°16’45”	Darjeeling	West Bengal
370	Sivasagar	Brahmaputra/ Dikhow	26°58’21”	94°36’35”	Sivasagar	Assam
371	Sonapur	Brahmaputra/Digaru	26°06’55”	91°58’27”	Kamrup	Assam
372	Sonapurhat	Mahananda	26°27’25”	88°14’36”	North Dinajpur	West Bengal
373	Srikakulam	Nagavali	18°18’52	85°53’06”	Srikakulam	Andhra Pradesh
374	Srinagar	Ganga/Alakananda	26.16'33"	82.04'04"	Sultanpur	Uttar Pradesh
375	Sripalpur	Ganga/Punpun	25°30’16’’	85’07’23’’	Patna	Bihar
376	Suklai	Brahmaputra / Puthimari / Suklai	26°38’16”	91°42’39”	Baksa (BTAD)	Assam
377	Sultanpur	Ganga/Gomti	26°17'00"	82°07'21"	Sultanpur	Uttar Pradesh
378	Sulurpet	Kalingi	13°42’41”	80°00’30”	Nellore	Andhra Pradesh
379	Sundergarh	Mahanadi/Ib	22°06’55”	84°00’40”	Sundergarh	Odisha
380	T. Narasipur	Cauvery/Kabini	12°13’02”	76°53’13”	Mysore	Karnataka
381	T. Ramapuram (Seasonal)	Krishna/Tungabhadra/Hagari	15°39’45”	76°57’50”	Bellary	Karnataka
382	T.Bekuppe	Cauvery/Arkavathi	12°31’00”	77°26’00”	Bangalore Rural	Karnataka
383	T.K. Halli	Cauvery/Shimsha	12°25’00”	77°11’33”	Mandya	Karnataka
384	Tal	Ganga/Yamuna/ Chambal	23°43'03"	75°21'14"	Ratlam	Madhya Pradesh

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
385	Talcher	Brahmani	20°57’07”	85°14’32”	Angual	Odisha
386	Tandi	Chenab/Bhaga	32°33’00”	76°58’33”	Lahaul Spiti	Himachal Pradesh
387	TeestaBazar	Brahmaputra / Teesta	27°03’20”	88°25’35”	Darjeeling	West Bengal
388	Tehri	Ganga/Bhagirath	30°21'24"	78°28'58"	Tehri	Uttarakhand
389	Tekra	Godavari/Pranhita/Pranhita	18°58’42”	79°56’49”	Gadchiroli	Maharastra
390	Tezpur	Brahmaputra	26°36’56”	92 °47’48”	Sonitpur	Assam
391	Tezu	Brahmaputra/Lohit	27°54’38”	96°10’15”	Lohit	Mizoram
392	Thengudi	Cauvery/Thirumalairajanar	10°55’00”	79°38’19”	Thiruvarur	Tamilnadu
393	Thengumarahada	Cauvery/Bhavani/Moyar	11°34’22”	76°55’09”	Nilgiris	Tamilnadu
394	Theni	Vaigai/Suruliar	10°00’04”	77°29’06”	Theni	Tamilnadu
395	Therriaghat	Meghna/Umsohrynkiew	25°10’48”	91°45’41”	East Khasi Hills	Meghalaya
396	Thevur	Cauvery/Sarabenga	11°31’38”	77°45’03”	Salem	Tamilnadu
397	Thimmanahalli	Cauvery/Yagachi	12°59’00”	76°02’18”	Hassan	Karnataka
398	Thoppur	Cauvery/Thoppaiyar	11°56’18”	78°03’26”	Salem	Tamilnadu
399	Thumpamon	Pamba	09’13’37	76°42’00”	pathanamthitt	Kerala
400	Tikarpara	Mahanadi	20°35’22”	84°47’00”	Angul	Odisha
401	Tilga	Brahmani/Sankh	22°37’07”	84°24’23”	Simdega	Jharkhand
402	Tonk	Ganga/Yamuna/ Chambal/Banas	26°12'32"	75°47'00"	Tonk	Rajasthan
403	Tribeni	Ganga/Gandak	27°26’30’’	83°55’00’’	West Champaran	Bihar
404	Tufanganj	Brahmaputra/Torsa/Raidak-I	26°18’31”	89°40’28”	Cooch Behar	West Bengal
405	Tuini (Tons)	Ganga/Yamuna/Tons	30°56'23''	77°50'48'	Dehradun	UttaraKhand

S. No.	Site Name	River Name/Tributory/ SubTributory	Latitude	Longitude	District	State
406	Turtipar	Ganga/Ghaghra	26°08'37"	83°52'49"	Ballia	Uttar Pradesh
407	Udaipur	Chenab/Chandra	32°43’00”	76°40’03”	Lahaul Spiti	Himachal Pradesh
408	Udaipur	Brahmaputra/Buridehing/Tirap	27°20’00”	95°51’18”	Tinsukia	Assam
409	Udi	Ganga/Yamuna/Chambal	26°42'16"	80°10'23"	Etawah	Uttar Pradesh
410	Ujjain	Ganga/Yamuna/Chambal/Shipra	26.28'28'	89.47'07"	Jalpaiguri	West Bengal
411	Urachikottai	Cauvery	11°28’40”	77°42’00”	Erode	Tamilnadu
412	Uttarkashi	Ganga/Bhagirath	30°44'20"	78°21'23"	Uttarkashi	Uttarakhand
413	Vandiperiyar	Periyar	09°34’30”	77°05’16”	Idukki	Kerala
414	Vapi	Damanganga	20°20’20”	72°54’42’’	Valsad	Gujarat
415	Varanasi	Ganga	25°19'25"	83°02'15"	Varanasi	Uttar Pradesh
416	Vautha	Sabarmati	22°38’50”	72°32’08’’	Kheda	Gujarat
417	Vazhavachanur	Ponnaiyar	12°03’55”	78°58’15”	Thiruvannam-alai	Tamilnadu
418	Villupuram	Ponnaiyar	11°52’16”	79°27’34”	Villupuram	Tamilnadu
419	Wadenapally	Krishna	16°47’39”	80°04’10”	Nalgonda	Andhra Pradesh
420	Wairagarh	Godavari/Pranhita/Khobragarhi	24.09'17"	88.27'44"	Murshidabad	West Bengal
421	Warunji	Krishna/Koyna	23.21'19"	88.36'22"	Nadia	West Bengal
422	Yadgir	Krishna/Bhima	16°44’15”	77°07’20”	Gulbarga	Karnataka
423	Yashwant nagar	Ganga/Yamuna/	30°53'12"	77°12'22"	Simaur	Himachal Pradesh
424	Yennehole	Swarna	13°17’39”	74°58’51”	Udupi	Karnataka

Annexure-2: Details of Indian rivers and their water quality monitoring stations where the water was found within acceptable limits in terms of toxic metal contamination as per (BIS 10500; 2012) metal concentration during the study period.

S.No.	River	Name of the Water Quality Sites	No. of Stations
1	Amaravathi	Nallammaranpatty	1
2	Balaram	Chitrasani	1
3	Banas	Abu Road, Baranwada, Tonk	3
4	Barak	A.P.Ghat	1
5	Betwa	Rajghat, Shahijina, Mohana (Betwa)	3
6	Bhagirathi	Berhampore, Kalna (EBB), Kalna (Flow)*	3
7	Bharathapuzha	Kumbidi, Mankara	2
8	Bhavani	Savandapur	1
9	Bhima	Yadgir	1
10	Cauvery	Biligundullu, Kollegal, Musiri	3
11	Cauvery/Noolar	Menangudi	1
12	Cauvery/Puravidaiyanar	Gopurajapuram	1
13	Chalakudy	Arangaly	1
14	Chaliyar	Kuniyil	1
15	Chambal	Dholpur, Tal, Udi	3
16	Chenab	Akhnoor, Dhamkund, Prem Nagar	3
17	Chenab/Bhaga	Tandi	1
18	Chenab/Chandra	Udaipur (Chandra)	1
19	Chenab/Tawi	Jammu Tawi	1
20	Cheyyar	Magaral	1
21	Chinnar	Hogenakkal	1
22	Chittar	A.P. Puram, Sevanur	2
23	Dhaleshwari	Matijuri	1
24	Dhasan	Garrauli	1
25	Diana	Diana	1
26	Feeder Canal	Farakka/(HR)	1
27	Gambhiri	Chittorgarh	1
28	Ganga	Farakka	1
29	Ghataprabha	Gokak	1
30	Giri	Yashwant nagar	1
31	Godavari	Mancherial	1
32	Goi	Pati	1
33	Gumra	Gumrabazar	1
34	Gundlakamma	Marella	1
35	Halia	Halia	1

S.No.	River	Name of the Water Quality Sites	No. of Stations
36	Haridra	Byaladahalli	1
37	Hasdeo	Manendragarh	1
38	Hemavathi	Akkihebbal	1
39	Jalangi	Chapra	1
40	Jhelum	Ram Munshi Bagh, Sangam J, Safapora	3
41	Kabini	T. Narasipur	1
42	Kadalundi	Karathodu	1
43	Kagna	Malkhed	1
44	Kalanadi	Matunga	1
45	Kali Sindh	Barod	1
46	Kalingi	Sulurpet	1
47	Kaliyar	Kalampur	1
48	Kannadipuzha	Pudur	1
49	Ken	Madla	1
50	Kharun	Pathardhi	1
51	Kinnerasani	Sangam K	1
52	Koyna	Warunji	1
53	Krishna	Kurundwad, Wadenapally	2
54	Kumudavathi	Kuppelur	1
55	Kundi	Kogaon	1
56	Mahanadi	Rajim	1
57	Mahi	Paderdibadi	1
58	Malaprabha	Cholachguda	1
59	Manimala	Kallooppara	1
60	Moyar	Thengumarahada	1
61	Musi	Damarcherla	1
62	Nandalar	Nallathur	1
63	Narmada	Mandleshwar	1
64	Nattar	Annavasal	1
65	Padma/Mahananda	English Bazar	1
66	Pairi	Baronda	1
67	Palar	Avarankuppam, Chengalpet, Kudlur	3
68	Paleru	Paleru Bridge	1
69	Pampa	Malakkara	1
70	Parwan	Aklera, Sangod,	2
71	Parwati	A B Road Xing, Khatoli	2
72	Payaswani	Erinjipuzha	1
73	Peddavagu	Bhatpalli	1
74	Pennar	Nagalamadike, Nellore	2
75	Periyar	Neeleswaram	1
76	Ponnaiyar	Villupuram	1
77	Purna	Purna	1

S.No.	River	Name of the Water Quality Sites	No. of Stations
78	Rind	Kora	1
79	Rukni	Dholai	1
80	Rushikulya	Purushottampur	1
81	Sakkar	Gadarwara	1
82	Sarabenga	Thevur	1
83	Seonath	Jondhra	1
84	Shimsha	T.K.Halli	1
85	Sind	Pachauli, Seondha	2
86	Sipra	Mahidpur, Ujjain	2
87	Suvarnavathi	Bendrahalli	1
88	Tambrapani	Kuzhithurai, Murappanadu	2
89	Tel	Kesinga	1
90	Thirumalairajanar	Thengudi	1
91	Thoppaiyar	Thoppur	1
92	Tuini	Tuini	1
93	Uri	Dhulsar	1
94	Vaigai	Ambasamudram	1
95	Vamsadhara	Kashinagar	1
96	Vanjiyar	Peralam	1
97	Varna	Phulgaon (Seasonal), Samdoli	2
98	Vedavathi	Kellodu	1
99	Vellar	Kudalaiyathur	1
100	Wardha	Bamni (Wardha), Sakmur	2
101	Wunna	Nandgaon	1
102	Yamuna	Aauriya, Etawah, Hamirpur, Kalanaur, Palla, Pratapur, Poanta, Mawi, Rajapur	9
		Total Water Quality Stations	137

Annexure-3: List of Indian rivers and their water quality monitoring stations and where the water was found above acceptable limits (BIS 10500; 2012) metal concentration during the study period.

S.No.	River	Name of the Water Quality Sites	No. of Stations
1	Achankovil	Thumpamon	1
2	Aghanashini	Santeguli	1
3	Aie	Aie NH Crossing	1
4	Alakananda	Srinagar, Rudraprayag	2
5	Aliyar	Ambarampalayam	1
6	Ambika	Gadat	1
7	Arkavathi	T. Bekuppe	1
8	Bagh	Rajegaon	1
9	Bagmathi	Dheng Bridge, Ekmighat, Hayaghat	3
10	Balason	Matigara	1
11	Banas	Kamalpur	1
12	Banjar	Bamni (Banjar)	1
13	Barak	B.P. Ghat, Fulertal	2
14	Beki	Beki Mathanguri, Beki Road Bridge, Mathanguri	3
15	Bhadar	Ganod	1
16	Bhadra	Holehonnur	1
17	Bhagirath	Deoprayag, Koteshwar, Tehri, Uttarkashi, Katwa	5
18	Bhavani	Nellithurai	1
19	Brahmani	Gomlai, Jenapur, Panposh, Talcher	4
20	Brahmaputra	Bhomoraguri, Dhubri, Dibrugarh, Neamatighat, Pancharatna, Pandu, Tezpur	7
21	Bugi	Dimapara	1
22	Burhabalang	Govindapur	1
23	Burhi Gandak	Sikandarpur	1
24	Burhner	Mohgaoan	1
25	Buridehing	Chenimari, Margherita, Naharkatia	3
26	Burisuti	Panbari	1
27	Cauvery	Urachikottai, Kodumudi, Chuchankatte, Kudige,	4
28	Champamati	Behalpur	1
29	Chel	Chel	1
30	Chhoti Sarju	Akabarpur	1
31	Churni	Hanskhali	1
32	Damanganga	Vapi	1
33	Dareng	Sibbari	1
34	Desang	Desangpani, Dillighat, Nanglamoraghat	3
35	Dhadher	Pingalwada	1
36	Dhansiri	Bokajan, Golaghat, Numaligarh	3

S.No.	River	Name of the Water Quality Sites	No. of Stations
37	Digaru	Sonapur	1
38	Dikhow	Bihubar, Sivasagar	2
39	Doyang	Gelabil	1
40	Dudhnai	Dudhnai	1
41	Gad	Belne Bridge	1
42	Gandak	Lalganj, Tribeni	2
43	Ganga	Allahabad, Anandpur, Ankinghat, Azmabad, Bhitaura, Buxar, Champua, Fatehgarh, Garhamukteshwar, Haridwar, Hathidah, Kachlabridge, Kanpur, Mirzapur, Patna, Rishikesh, Shahzadpur, Varanasi	18
44	Ganjal	Chhidgaon	1
45	Gaurang	Kokrajhar	1
46	Ghagra	Elginbridge	1
47	Ghagra	Turtipar	1
48	Ghish	Ghish	1
49	Godavari	Bhadrachalam, Koperagaon, Perur, Polavaram	4
50	Gomti	Lucknow, Maighat, Neemsar, Sultanpur	4
51	Gurupur	Addoor	1
52	Hagari	T. Ramapuram	1
53	Haladi	Haladi	1
54	Hamp	Andhiyar Kore	1
55	Harohar/Phalgu	Gaya	1
56	Hasdeo	Bamnidih	1
57	Hemavathi	M.H. Halli, Sakleshpur	2
58	Hindon	Galeta	1
59	Hiran	Patan	1
60	Ib	Sundergarh	1
61	Indravathi	Jagdalpur, Nowrangpur, Pathagudem	3
62	Jaldhaka	Jaldhaka NH-31, Mathabhanga, Nagrakata	3
63	Jiabharali	Bhalukpong, Jiabharali NT Road Xing	2
64	Jonk	Rampur	1
65	Kabini	Muthankera	1
66	Kal	Mangaon (Seasonal)	1
67	Kallada	Pattazhy	1
68	Kamala-Balan	Jai Nagar, Jhanjharpur	2
69	Kamang	Seppa	1
70	Kanhan	Ramakona, Satrapur	2
71	Kanhar	Duddhi	1
72	Ken	Banda	1
73	Kharkai	Adityapur	1
74	Khobragarhi	Wairagarh	1
75	Kim	Motinaroli	1

S.No.	River	Name of the Water Quality Sites	No. of Stations
76	Kiul	Lakhisarai	1
77	Koel	Jaraikela	1
78	Kopili	Dharamtul, Jagibhakatgaon, Kampur, Kheronighat	4
79	Kosi	Baltara	1
80	Krishna	Arjunwad, Huvin Hedgi, Karad	3
81	Kulsi	Kulsi	1
82	Kunderu	Alladupalli	1
83	Kuttyadi	Kuttyadi	1
84	Kwano	Basti	1
85	Lakshmantirtha	K.M. Vadi	1
86	Lohit	Dholabazar, Tezu	2
87	Longai	Fakirabazar	1
88	Mahanadi	Basantpur, Tikarpara	2
89	Mahananda	Labha, Champasari, Sonapurhat	3
90	Mahi	Khanpur, Mataji	2
91	Manas	Manas NH Crossing	1
92	Mand	Kurubhata	1
93	Meenachi	Kidangoor	1
94	Munneru	Keesara	1
95	Murti	Murti	1
96	Muvvattupuzha	Ramamangalam	1
97	Nagavali	Srikakulam	1
98	Naora	Neora	1
99	Narmada	Barmanghat, Garudeshwar, Dindori, Handia, Hoshangabad, Manot, Sandia	7
100	Neo dihing	Miao, Namsai	2
101	Nethravathi	Bantwal	1
102	Noyyal	Elunuthimanagalam	1
103	Ong	Salebhata	1
104	Orsang	Chanwada	1
105	Pagladiya	Pagladiya N.T.Road Crossing	1
106	Palar	Arcot	1
107	Papagni	Kamalapuram	1
108	Pazhayar	Ashramam	1
109	Penganga	P.G.Bridge	1
110	Pennar	Chennur	1
111	Periyar	Vandiperiyar	1
112	Ponnaiyar	Gummanur, Vazhavachanur	2
113	Pranhitha	Tekra	1
114	Pravara	Pachegaon	1
115	Pulanthodu	Pulamanthole	1
116	Punpun	Sripalpur	1

S.No.	River	Name of the Water Quality Sites	No. of Stations
117	Purna	Gopalkheda, Mahuwa	2
118	Puthimari	Puthimari D.R.F., Puthimari NH Road crossing	2
119	Raidak-I	Chepan, Tufanganj	2
120	Raidak-II	Barobisha	1
121	Ramganga	Bareilly, Dabri, Moradabad	3
122	Ramyala	Alutuma	1
123	Ranganadi	Ranganadi NT-Road Xing	1
124	Rangit	Majhitar, Singla-Bazar	2
125	Rangpochu	Rangpo	1
126	Rapti	Balrampur, Bansi, Birdghat, Regauli	4
127	Sabari	Konta	1
128	Sabarmati	Derol Bridge, Vautha	2
129	Sagaileru	Nandipalli	1
130	Sai	Pratapgarh, Raibareli	2
131	Sankh	Tilga	1
132	Sankosh	Sankosh LRP	1
133	Sarju	Ghat	1
134	Saryu	Ayodhya	1
135	Seonath	Ghatora, Simga	2
136	Sharda	Paliakalan	1
137	Sher	Belkhedi	1
138	Sheturni	Lowara	1
139	Siang	Passighat	1
140	Sita	Avershe	1
141	Som	Rangeli	1
142	Sone	Chopan, Japla, Koelwar, Kuldah Bridge	4
143	Sonkosh	Golagang	1
144	Subansiri	Badatighat, Chouldhowaghat	2
145	Subarnarekha	Ghatsila, Jamshedpur, Jamsolghat, Muri	4
146	Suklai	Suklai	1
147	Surma/Myntdu	Kharkhana	1
148	Suruliar	Theni	1
149	Swarnamukhi	Naidupet	1
150	Tapi	Burhanpur, Sarangkheda	2
151	Teesta	Coronation, Domohani, Gajaldoba, Khanitar , Mekhliganj, Sankalan, Sevoke, Teesta-Bazar	8
152	Tel	Kantamal	1
153	Tunga	Shimoga	1
154	Tungabhadra	Bawapuram, Harlahalli, Honnali, Mantralayam	4
155	Tirap	Udaipur (Tirap)	1
156	Tons	Meja Road	1
157	Torsa	Ghugumari, Hasimara	2

S.No.	River	Name of the Water Quality Sites	No. of Stations
158	Ulhas	Badlapur	1
159	Umngot	Dawki	1
160	Umsohrynkiew	Therriaghat	1
161	Vaitarna	Durvesh	1
162	Valapatnam	Perumannu	1
163	Vamanapuram	Ayilam	1
164	Vamsadhara	Gunupur	1
165	Varada	Marol	1
166	Wainganga	Ashti, Keolari, Kumhari, Pauni	4
167	Wardha	Hivra	1
168	Wyra	Madhira	1
169	Yagachi	Thimmanahalli	1
170	Yamuna	Agra, Delhi Rly Bridge, Mathura, Mohana (Yamuna)	4
171	Yennehole	Yennehole	1
		Total Water Quality Stations	287

Annexure-04: Details of water quality monitoring stations where the water was found above the acceptable limit (BIS 10500:2012) in presence of only one parameter (Iron or Copper or Cadmium or Nickel or Lead) during the study period.

IRON

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
1	Aie	Aie NH Crossing (Nov, 2014)	1	1
2	Alakananda	Srinagar (Nov, 2014), Rudraprayag (May, 2014)	2	2
3	Ambika	Gadat (Aug, 2016)	1	1
4	Bagh	Rajegaon(Aug, 2016)	1	1
5	Bagmathi	Dheng Bridge (Aug, 2017); Ekmighat (Dec, 2015), Hayaghat (Dec, 2016)	3	3
6	Baitarni	Anandpur (Aug, 2017), Champua (Aug, 2017)	2	2
7	Balason	Matigara (May, 2014)	1	1
8	Banas	Kamalpur (Aug, 2017)	1	1
9	Banjar	Bamni (Aug, 2016)	1	1
10	Barak	B.P. Ghat (Aug, 2017)	1	1
11	Beki	Beki Mathanguri (Nov, 2014), Beki Road Bridge (Nov, 2014), Mathanguri (May, 2014)	3	3
12	Bhadar	Ganod (Dec, 2015)	1	1
13	Bhadra	Holehonnur (Aug, 2017)	1	1
14	Bhagirath	Deoprayag (May, 2014), Koteshwar (Nov, 2014); Tehri (May, 2014), Uttarkashi (May, 2014)	4	4
15	Bhagirathi	Katwa (Nov, 2014)	1	1
16	Bhavani	Nellithurai (Nov, 2014)	1	1
17	Brahmani	Jenapur (Nov, 2014), Talcher (Aug, 2017)	2	2
18	Brahmaputra	Bhomoraguri (Dec, 2015), Dhubri (Nov, 2014), Neamatighat (Apr, 2016)	3	3
19	Burhabalang	Govindapur (Aug, 2017)	1	1
20	Burhi Gandak	Sikandarpur (Aug, 2017)	1	1
21	Burhner	Mohgaoan (Aug, 2016)	1	1
22	Buridehing	Naharkatia (Dec, 2015)	1	1
23	Burisuti	Panbari (Nov, 2014)	1	1
24	Cauvery	Chuchankatte (Aug, 2017), Kudige (Dec, 2015)	2	2
25	Champamati	Behalpur (Nov, 2014)	1	1
26	Chel	Chel (May, 2014)	1	1

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
27	Desang	Dillighat (Aug, 2016), Nanglamoraghat (Aug, 2016)	2	2
28	Dhansiri	Bokajan (Dec, 2015), Golaghat (Aug, 2016), Numaligath (Apr, 2016)	3	3
29	Doyang	Gelabil (Dec, 2015)	1	1
30	Gandak	Lalganj (Aug, 2016), Tribgeni (Apr, 2017)	2	2
31	Ganga	Allahabad (Aug, 2017), Garhamukteshwar (May, 2014), Haridwar (Nov, 2014), Patna (Aug, 2016), Rishikesh (May, 2014), Varanasi (Aug, 2017)	6	6
32	Ganjal	Chhidgaon (Aug, 2017)	1	1
33	Gaurang	Kokrajhar (May, 2014)	1	1
34	Ghish	Ghish (May, 2014)	1	1
35	Godavari	Bhadrachalam (Aug, 2017), Koperagaon (Aug, 2017), Perur (Aug, 2017)	3	3
36	Gomti	Maighat (Aug, 2017), Sultapur (Aug, 2016)	2	2
37	Gurupur	Addoor (Aug, 2017)	1	1
38	Harohar/Phalgu	Gaya (Aug, 2017)	1	1
39	Hemavathi	M.H. Halli (Dec, 2015)	1	1
40	Hiran	Patan (Aug, 2017)	1	1
41	Indravathi	Jagdalpur (Aug, 2017), Pathagudem (Aug, 2017)	2	2
42	Jaldhaka	Mathabhanga (Nov, 2014), Nagrakata (Nov, 2014)	2	2
43	Kabini	Muthankera (Dec, 2017)	1	1
44	Kamala-Balan	Jai Nagar (Apr, 2016), Jhanjharpur (Dec, 2016)	2	2
45	Kanhan	Satrapur (Aug, 2016)	1	1
46	Kanhar	Duddhi (Aug, 2016)	1	1
47	Khobragarhi	Wairagarh (Aug, 2016)	1	1
48	Kim	Motinaroli (Aug, 2016)	1	1
49	Kiul	Lakhisarai (Aug, 2016)	1	1
50	Koel	Jaraikela (Aug, 2017)	1	1
51	Kopili	Jagibhakatgaon (Dec, 2015)	1	1
52	Kosi	Baltara (May, 2014)	1	1
53	Krishna	Arjunwad (Aug, 2017)	1	1

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
54	Kulsi	Kulsi (May, 2014)	1	1
55	Kuttyadi	Kuttyadi (Dec, 2017)	1	1
56	Lakshmantirtha	K.M. Vadi (Aug, 2017)	1	1
57	Lohit	Tezu (Aug, 2016)	1	1
58	Mahanadi	Tikarpara (Aug, 2017)	1	1
59	Mahananda	Sonapurhat (May, 2014)	1	1
60	Mahi	Mataji (Aug, 2016)	1	1
61	Manas	Manas NH Crossing (Nov, 2014)	1	1
62	Meenachi	Kidangoor (Apr, 2016)	1	1
63	Murti	Murti (Nov, 2014)	1	1
64	Muvvattupuzha	Ramamangalam (Dec, 2017)	1	1
65	Nagavali	Srikakulam (Nov, 2014)	1	1
66	Naora	Neora (Nov, 2014)	1	1
67	Narmada	Dindori (Apr, 2018), Handia (Apr, 2018), Hoshangabad (Nov, 2014), Manot (Aug, 2016), Sandia (Nov, 2014)	5	5
68	Neo dihing	Namsai (Apr, 2016)	1	1
69	Nethravathi	Bantwal (Aug, 2017)	1	1
70	Papagni	Kamalapuram (Aug, 2017)	1	1
71	Pazhayar	Ashramam (Nov, 2014)	1	1
72	Penganga	P.G.Bridge (Aug, 2016)	1	1
73	Pravara	Pachegaon (Aug, 2017)	1	1
74	Pulanthodu	Pulamanthole (Apr, 2018)	1	1
75	Punpun	Sripalpur (Dec, 2015)	1	1
76	Puthimari	Puthimari NH Road crossing (May, 2014)	1	1
77	Raidak-I	Chepan (Nov, 2014)	1	1
78	Raidak-II	Barobisha (Nov, 2014)	1	1
79	Ramyala	Alutuma (Aug, 2017)	1	1
80	Ranganadi	Ranganadi NT-Road Xing (Dec, 2015)	1	1
81	Rangit	Majhitar (May, 2014), Singla-Bazar (May, 2014)	2	2
82	Rangpochu	Rangpo (May, 2014)	1	1
83	Sabari	Konta (Aug, 2017)	1	1
84	Sabarmati	Derol Bridge (Aug, 2017)	1	1
85	Sagaileru	Nandipalli (Aug, 2017)	1	1
86	Sai	Pratapgarh (Aug, 2016)	1	1

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
87	Sankh	Tilga (Aug, 2017)	1	1
88	Sher	Belkhedi (Aug, 2016)	1	1
89	Sita	Avershe (Aug, 2017)	1	1
90	Som	Rangeli (Aug, 2016)	1	1
91	Sone	Japla (Aug, 2017)	1	1
92	Sonkosh	Golakganj (Nov, 2014)	1	1
93	Subansiri	Chouldhowaghat (Dec, 2015)	1	1
94	Subarnarekha	Muri (Aug, 2017)	1	1
95	Suklai	Suklai (May, 2014)	1	1
96	Suruliar	Theni (Dec, 2016)	1	1
97	Tapi	Burhanpur (Aug, 2016)	1	1
98	Teesta	Coronation (May, 2014), Domohani (May, 2014), Gajaldoba (May, 2014), Khanitar (Nov, 2014), Mekhliganj (Nov, 2014), Sankalan (May, 2014), Sevoke (May, 2014), Teesta-Bazar (May, 2014)	8	8
99	Tunga	Shimoga (Aug, 2017)	1	1
100	Tungabhadra	Harlahalli (Aug, 2017), Honnali (Aug, 2017)	2	2
101	Tons	Meja Road (Aug, 2017)	1	1
102	Torsa	Ghugumari (Nov, 2014), Hasimara (Nov, 2014)	2	2
103	Umngot	Dawki (Aug, 2017)	1	1
104	Valapatnam	Perumannu (Apr, 2016)	1	1
105	Vamanapuram	Ayilam (Dec, 2017)	1	1
106	Vamsadhara	Gunupur (May, 2014)	1	1
107	Varada	Marol (Aug, 2017)	1	1
108	Wainganga	Ashti (Aug, 2016), Keolari (Aug, 2016), Kumhari (Aug, 2016), Pauni (Aug, 2016)	4	4
109	Wardha	Hivra (Aug, 2017)	1	1
110	Wyra	Madhira (Apr, 2018)	1	1
111	Yennehole	Yennehole (Aug, 2017)	1	1

Total no. of Water Quality Stations: 156 **Total no. of Rivers: 111**

CHROMIUM

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
1	Gad	Belne Bridge (Aug, 2017)	1	1
2	Hamp	Andhiyar Kore (Feb, 2015)	1	1
3	Kal	Mangaon (Seasonal) (Aug, 2017)	1	1
4	Krishna	Karad (Aug, 2017)	1	1
5	Mahananda	Labha (Nov, 2014)	1	1
6	Surma/Myntdu	Kharkhana (Aug, 2016)	1	1

Total no. of Water Quality Stations: 06

Total no. of Rivers: 06

CADMIUM

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
1	Yamuna	Mathura (Dec, 2015)	1	1
2	Dareng	Sibbari (Dec, 2016)	1	1
3	Ponnaiyar	Vazhavachanur (Feb, 2015)	1	1

Total no. of Water Quality Stations: 03
Total no. of Rivers: 03

NICKEL

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
1	Hasdeo	Bamnidih (May, 2014)	1	1
2	Ib	Sundergarh (Nov, 2014)	1	1
3	Jonk	Rampur (May, 2014)	1	1
4	Ken	Banda (Feb, 2015)	1	1
5	Mahanadi	Basantpur (May, 2014)	1	1
6	Mand	Kurubhata (May, 2014)	1	1
7	Ong	Salebhata (May, 2014)	1	1
8	Seonath	Ghatora (May, 2014)	1	1
9	Siang	Passighat (Nov, 2014)	1	1

Total no. of Water Quality Stations: 9
Total no. of Rivers: 9

LEAD

S. No	River	WQ Stations (period)	Total No. of WQ Stations	Total No. Of water Samples
1	Achankovil	Thumpamon (Apr, 2016)	1	1
2	Aliyar	Ambarampalayam (Feb, 2015)	1	1
3	Cauvery	Kodumudi (Feb, 2015), Urachikottai (Feb, 2015)	2	2
4	Kallada	Pattazhy (Feb, 2015)	1	1
5	Longai	Fakirabazar (May, 2014)	1	1
6	Munneru	Keesara (Feb, 2015)	1	1
7	Palar	Arcot (Aug, 2016)	1	1
8	Ponnaiyar	Gummanur (Feb, 2015)	1	1
9	Swarnamukhi	Naidupet (Feb, 2015)	1	1
10	Umsohrynkiew	Therriaghat (Aug, 2017)	1	1
11	Yagachi	Thimmanahalli (Feb, 2015)	1	1

Total no. of Water Quality Stations: 12
Total no. of Rivers: 11

Annexure-5: Details of water Qquality monitoring stations where the water was found above the acceptable limit (BIS 10500:2012) in presence of more than one toxic metal during the study period.

S.No	River	Name of the Water Quality Sites	Which Metals exceeds permissible Limits
1	Aghanashini	Santeguli	Cr, Fe
2	Kharkai	Adityapur	Pb, Fe
3	Arkavathi	T. Bekuppe	Cd, Ni, Pb, Fe
4	Barak	Fulertal	Pb, Fe
5	Brahmani	Gomlai	Pb, Fe
6	Brahmani	Panposh	Ni, Fe
7	Brahmaputra	Dibrugarh	Pb, Fe
8	Brahmaputra	Pancharatna	Pb, Fe
9	Brahmaputra	Pandu	Pb, Fe
10	Brahmaputra	Tezpur	Cr, Cu, Fe
11	Bugi	Dimapara	Pb, Fe
12	Buridehing	Chenimari	Cd, Pb, Fe
13	Buridehing	Margherita	Cu, Pb, Fe
14	Chhoti Sarju	Akabarpur	Pb, Fe
15	Churni	Hanskhali	Cr, Fe
16	Damanganga	Vapi	Cu, Pb, Fe
17	Desang	Desangpani	Cr, Fe
18	Dhadher	Pingalwada	Cu, Pb, Fe
19	Digaru	Sonapur	Pb, Fe
20	Dikhow	Bihubar	Cr, Cu, Fe
21	Dikhow	Sivasagar	Cd, Pb, Fe
22	Dudhnai	Dudhnai	Pb, Fe
23	Ganga	Ankinghat	Pb, Fe
24	Ganga	Azmabad	Pb, Fe
25	Ganga	Bhitaura	Cr, Pb, Fe
26	Ganga	Buxar	Pb, Fe
27	Ganga	Fatehgarh	Cr, Pb, Fe
28	Ganga	Hathidah	Pb, Fe
29	Ganga	Kachlabridge	Cr, Cu, Ni, Pb, Fe
30	Ganga	Kanpur	Cr, Pb, Fe
31	Ganga	Mirzapur	Cd, Fe
32	Ganga	Shahzadpur	Cd, Pb, Fe
33	Ghagra	Elginbridge	Cd, Cr, Pb, Fe
34	Ghagra	Turtipar	Cr, Pb, Fe
35	Godavari	Polavaram	Pb, Fe
36	Gomti	Lucknow	Pb, Fe

S.No	River	Name of the Water Quality Sites	Which Metals exceeds permissible Limits
37	Gomti	Neemsar	Pb, Fe
38	Hagari	T. Ramapuram	Cd, Ni
39	Haladi	Haladi	Pb, Fe
40	Hemavathi	Sakleshpur	Pb, Fe
41	Hindon	Galeta	Cd, Ni, Pb
42	Indravathi	Nowrangpur	Pb, Fe
43	Jaldhaka	Jaldhaka NH-31	Pb, Fe
44	Jiabharali	Bhalukpong	Ni, Fe
45	Jiabharali	Jiabharali NT Road Xing	Cr, Pb, Fe
46	Kamang	Seppa	Cd, Pb, Fe
47	Kanhan	Ramakona	Pb, Fe
48	Kopili	Dharamtul	Cd, Fe
49	Kopili	Kampur	Cd, Fe
50	Kopili	Kheronighat	Pb, Fe
51	Krishna	Huvin Hedgi	Ni, Pb, Fe
52	Kunderu	Alladupalli	Ni, Pb
53	Kwano	Basti	Pb, Fe
54	Lohit	Dholabazar	Pb, Fe
55	Mahananda	Champasari	Pb, Fe
56	Mahi	Khanpur	Cr, Pb, Fe
57	Narmada	Barmanghat	Ni, Fe
58	Narmada	Garudeshwar	Pb, Fe
59	Neo dihing	Miao	Pb, Fe
60	Noyyal	Elunuthimanagalam	Cd, Ni, Pb
61	Orsang	Chanwada	Cd, Ni, Pb, Fe
62	Pagladiya	Pagladiya N.T.Road Crossing	Pb, Fe
63	Pennar	Chennur	Ni, Pb
64	Periyar	Vandiperiyar	Ni, Fe
65	Pranhitha	Tekra	Cu, Fe
66	Purna	Gopalkheda	Ni, Pb, Fe
67	Purna	Mahuwa	Cr, Fe
68	Puthimari	Puthimari D.R.F.	Pb, Fe
69	Raidak-I	Tufanganj	Pb, Fe
70	Ramganga	Bareilly	Pb, Fe
71	Ramganga	Dabri	Pb, Fe
72	Ramganga	Moradabad	Cr, Pb, Fe
73	Rapti	Balrampur	Cd, Cr, Pb, Fe
74	Rapti	Bansi	Cd, Cr, Pb, Fe
75	Rapti	Birdghat	Cr, Pb, Fe
76	Rapti	Regauli	Cd, Cr, Pb, Fe
77	Sabarmati	Vautha	Cd, Cu, Ni, Pb, Fe

S.No	River	Name of the Water Quality Sites	Which Metals exceeds permissible Limits
78	Sai	Raibareli	Cr, Pb, Fe
79	Sankosh	Sankosh LRP	Pb, Fe
80	Sarju	Ghat	Cr, Fe
81	Saryu	Ayodhya	Cd, Ni, Pb, Fe
82	Seonath	Simga	Ni, Pb
83	Sharda	Paliakalan	Cd, Cr, Ni, Fe
84	Sheturni	Lowara	Cd, Ni, Pb, Fe
85	Sone	Chopan	Cd, Fe
86	Sone	Koelwar	Pb, Fe
87	Sone	Kuldah Bridge	Pb, Fe
88	Subansiri	Badatighat	Pb, Fe
89	Subarnarekha	Ghatsila	Cu, Ni, Pb, Fe
90	Subarnarekha	Jamshedpur	Ni, Fe
91	Subarnarekha	Jamsolghat	Cu, Fe
92	Tapi	Sarangkheda	Pb, Fe
93	Tel	Kantamal	Cr, Cu
94	Tungabhadra	Bawapuram	Cd, Ni, Pb
95	Tungabhadra	Mantralayam	Cd, Ni, Pb
96	Tirap	Udaipur (Tirap)	Cd, Fe
97	Ulhas	Badlapur	Cd, Pb
98	Vaitarna	Durvesh	Cd, Ni, Pb, Fe
99	Yamuna	Delhi Rly Bridge	Cd, Ni, Pb
100	Yamuna	Mohana (Yamuna)	Cd, Pb
101	Yamuna	Agra	Pb, Fe

Total no. of Water Quality Stations: 101

Total no. of Rivers: 67

Annexure-6: Details of water quality sites, Rivers and the level of toxic metal concentration found above the acceptable limist as prescribed by BIS during the study period.

1. CADMIUM (Cd in µg/L)

S.No	River	Name of the Water Quality Sites	Month/Year	Cd (µg/L)	S.No	River	Name of the Water Quality Sites	Month/Year	Cd (µg/L)
1	Arkavathi	T. Bekuppe	Febuary, 2015	3.977	21	Sabarmati	Vautha	November, 2014	11.770
2	Buridehing	Chenimari	May, 2014	5.149	22	Sabarmati	Vautha	Febuary, 2015	70.518
3	Dareng	Sibbari	December, 2016	3.253	23	Saryu	Ayodhya	Febuary, 2015	4.138
4	Dikhow	Sivasagar	May, 2014	3.490	24	Sharda	Paliakalan	Febuary, 2015	3.708
5	Ganga	Mirzapur	April, 2017	3.650	25	Sheturni	Lowara	May, 2014	10.386
6	Ganga	Shahzadpur	April, 2017	3.936	26	Sheturni	Lowara	Febuary, 2015	24.065
7	Ghagra	Elginbridge	Febuary, 2015	4.558	27	Sheturni	Lowara	April, 2016	28.047
8	Hagari	T. Ramapuram	Febuary, 2015	7.888	28	Sone	Chopan	April, 2017	3.034
9	Hindon	Galeta	December, 2015	4.398	29	Tungabhadra	Bawapuram	Febuary, 2015	5.475
10	Hindon	Galeta	April, 2016	4.959	30	Tungabhadra	Mantralayam	Febuary, 2015	5.170
11	Kamang	Seppa	May, 2014	5.158	31	Tirap	Udaipur (Tirap)	April, 2017	3.428
12	Kopili	Dharamtul	May, 2014	5.074	32	Ulhas	Badlapur	Febuary, 2015	5.017
13	Kopili	Kampur	May, 2014	5.086	33	Vaitarna	Durvesh	Febuary, 2015	33.809
14	Noyyal	Elunuthimanagalam	Febuary, 2015	15.946	34	Vaitarna	Durvesh	December, 2017	12.262
15	Orsang	Chanwada	Febuary, 2015	11.938	35	Yamuna	Delhi Rly Bridge	December, 2015	4.400
16	Orsang	Chanwada	December, 2017	3.158	36	Yamuna	Delhi Rly Bridge	April, 2016	7.248
17	Ponnaiyar	Vazhavachanur	Febuary, 2015	3.826	37	Yamuna	Mathura	December, 2015	9.166
18	Rapti	Balrampur	Febuary, 2015	3.493	38	Yamuna	Mathura	April, 2016	3.768
19	Rapti	Bansi	April, 2017	3.311	39	Yamuna	Mohana (Yamuna)	December, 2015	6.159
20	Rapti	Regauli	Febuary, 2015	3.13	40	Yamuna	Mohana (Yamuna)	April, 2016	5.419

2. CHROMIUM (Cr in µg/L)

S No	River	Name of the Water Quality Sites	Month/Year	Cr (µg/L)	S.No	River	Name of the Water Quality Sites	Month/Year	Cr (µg/L)
1	Aghanashini	Santeguli	April, 2018	169.95	22	Ramganga	Moradabad	November, 2014	230.900
2	Brahmaputra	Tezpur	August, 2016	53.100	23	Rapti	Balrampur	November, 2014	141.110
3	Churni	Hanskhali	November, 2014	147.770	24	Rapti	Balrampur	August, 2016	107.180
4	Desang	Desangpani	August, 2016	65.590	25	Rapti	Balrampur	December, 2016	53.740
5	Dikhow	Bihubar	April, 2017	90.830	26	Rapti	Bansi	November, 2014	199.270
6	Gad	Belne Bridge	August, 2017	66.190	27	Rapti	Bansi	April, 2016	224.330
7	Ganga	Bhitaura	November, 2014	164.250	28	Rapti	Bansi	April, 2017	202.710
8	Ganga	Fatehgarh	November, 2014	175.240	29	Rapti	Birdghat	November, 2014	229.730
9	Ganga	Kachlabridge	November, 2014	198.300	30	Rapti	Birdghat	August, 2016	109.150
10	Ganga	Kachlabridge	August, 2016	155.040	31	Rapti	Birdghat	December, 2016	68.560
11	Ganga	Kanpur	November, 2014	205.820	32	Rapti	Regauli	November, 2014	172.710
12	Ghagra	Elginbridge	November, 2014	144.480	33	Rapti	Regauli	August, 2016	88.330
13	Ghagra	Elginbridge	August, 2016	183.010	34	Rapti	Regauli	December, 2016	50.390
14	Ghagra	Turtipar	August, 2016	316.840	35	Sai	Raibareli	December, 2016	54.770
15	Hamp	Andhiyar Kore	Febuary, 2015	61.260	36	Sarju	Ghat	November, 2014	193.260
16	Jiabharali	Jiabharali NT Road Xing	August, 2016	111.430	37	Sarju	Ghat	April, 2017	83.740
17	Kal	Mangaon (Seasonal)	August, 2017	133.490	38	Sharda	Paliakalan	November, 2014	140.220
18	Krishna	Karad	August, 2017	98.350	39	Sharda	Paliakalan	August, 2016	450.260
19	Mahananda	Labha	November, 2014	50.770	40	Sharda	Paliakalan	December, 2016	54.290
20	Mahi	Khanpur	December, 2015	81.700	41	Surma/Myntdu	Kharkhana	August, 2016	62.240
21	Purna	Mahuwa	August, 2016	135.570	42	Tel	Kantamal	Febuary, 2015	55.000

3. COPPER (Cu in µg/L)

S.No	River	Name of the Water Quality Sites	Month/Year	Cu (µg/L)	S.No	Name of the Water Quality Sites	Month/Year	River	Cu (µg/L)
1	Brahmaputra	Tezpur	April, 2017	54.000	7	Pranhitha	Tekra	April, 2017	76.230
2	Buridehing	Margherita	November, 2014	269.630	8	Sabarmati	Vautha	May, 2014	58.340
3	Damanganga	Vapi	April, 2017	61.550	9	Subarnarekha	Ghatsila	Febuary, 2015	53.660
4	Dhadher	Pingalwada	April, 2017	314.930	10	Subarnarekha	Ghatsila	August, 2017	61.920
5	Dikhow	Bihubar	April, 2017	54.720	11	Subarnarekha	Jamsolghat	August, 2017	75.580
6	Ganga	Kachlabridge	November, 2014	107.990	12	Tel	Kantamal	Febuary, 2015	72.870

4. IRON (Fe in µg/L)

S.No	River	Name of the Water Quality Sites	Month/Year	Fe (mg/L)	S.No	River	Name of the Water Quality Sites	Month/Year	Fe (mg/L)
1	Aghanashini	Santeguli	November, 2014	0.358	27	Banjar	Bamni (Banjar)	August, 2017	1.322
2	Aghanashini	Santeguli	August, 2017	0.353	28	Banjar	Bamni (Banjar)	April, 2018	1.09
3	Aghanashini	Santeguli	April, 2018	0.831	29	Barak	B.P. Ghat	August, 2017	0.626
4	Aie	Aie NH Crossing	November, 2014	0.794	30	Barak	Fulertal	April, 2018	0.758
5	Alakananda	Srinagar	November, 2014	0.744	31	Beki	Beki Mathanguri	November, 2014	0.499
6	Alaknanda	Rudraprayag	May, 2014	0.892	32	Beki	Beki Road Bridge	November, 2014	1.370
7	Alaknanda	Rudraprayag	November, 2014	0.598	33	Beki	Mathanguri	May, 2014	0.697
8	Alaknanda	Rudraprayag	April, 2016	0.395	34	Bhadar	Ganod	December, 2015	0.592
9	Ambika	Gadat	August, 2016	0.964	35	Bhadar	Ganod	August, 2017	0.488
10	Ambika	Gadat	August, 2017	1.023	36	Bhadar	Ganod	April, 2018	1.185
11	Arkavathi	T. Bekuppe	December, 2016	0.379	37	Bhadra	Holehonnur	August, 2017	0.515
12	Bagh	Rajegaon	August, 2016	0.646	38	Bhagirath	Deoprayag	May, 2014	1.219
13	Bagh	Rajegaon	August, 2017	0.570	39	Bhagirath	Deoprayag	November, 2014	2.568
14	Bagmathi	Dheng Bridge	August, 2017	0.564	40	Bhagirath	Koteshwar	November, 2014	1.087
15	Bagmathi	Ekmighat	December, 2015	0.474	41	Bhagirath	Tehri	May, 2014	1.412
16	Bagmathi	Ekmighat	August, 2016	0.690	42	Bhagirath	Uttarkashi	May, 2014	1.107
17	Bagmathi	Ekmighat	December, 2016	0.909	43	Bhagirath	Uttarkashi	November, 2014	0.424
18	Bagmathi	Ekmighat	August, 2017	4.414	44	Bhagirathi	Katwa	November, 2014	2.221
19	Bagmathi	Ekmighat	April, 2018	1.745	45	Bhavani	Nellithurai	November, 2014	0.434
20	Bagmathi	Hayaghat	December, 2016	0.332	46	Brahmani	Gomlai	August, 2017	0.997
21	Bagmathi	Hayaghat	August, 2017	2.150	47	Brahmani	Jenapur	November, 2014	0.452
22	Bagmathi	Hayaghat	April, 2018	2.335	48	Brahmani	Jenapur	August, 2017	0.732
23	Balason	Matigara	May, 2014	5.340	49	Brahmani	Panposh	November, 2014	0.306
24	Balason	Matigara	November, 2014	0.726	50	Brahmani	Panposh	April, 2016	1.793
25	Banas	Kamalpur	August, 2017	1.322	51	Brahmani	Panposh	August, 2017	0.858
26	Banjar	Bamni (Banjar)	August, 2016	0.339	52	Brahmani	Talcher	August, 2017	0.676

S.No	River	Name of the Water Quality Sites	Month/Year	Fe (mg/L)	S.No	River	Name of the Water Quality Sites	Month/Year	Fe (mg/L)
53	Brahmaputra	Pancharatna	May, 2014	0.490	81	Brahmaputra	Tezpur	December, 2016	2.382
54	Brahmaputra	Pancharatna	November, 2014	0.498	82	Brahmaputra	Tezpur	April, 2017	2.199
55	Brahmaputra	Pancharatna	August, 2017	0.720	83	Brahmaputra	Tezpur	August, 2017	9.872
56	Brahmaputra	Pandu	May, 2014	1.649	84	Brahmaputra	Tezpur	December, 2017	5.703
57	Brahmaputra	Pandu	April, 2017	0.390	85	Brahmaputra	Tezpur	April, 2018	0.449
58	Brahmaputra	Pandu	August, 2017	0.421	86	Bugi	Dimapara	December, 2016	0.303
59	Brahmaputra	Pandu	December, 2017	0.412	87	Burhabalang	Govindapur	August, 2017	0.630
60	Brahmaputra	Dhubri	November, 2014	3.467	88	Burhi Gandak	Sikandarpur	August, 2017	0.568
61	Brahmaputra	Bhomoraguri	December, 2015	1.007	89	Burhi Gandak	Sikandarpur	April, 2018	0.536
62	Brahmaputra	Bhomoraguri	April, 2016	0.362	90	Burhner	Mohgaoan	August, 2016	0.545
63	Brahmaputra	Bhomoraguri	August, 2016	3.412	91	Burhner	Mohgaoan	August, 2017	0.655
64	Brahmaputra	Bhomoraguri	December, 2016	1.443	92	Buridehing	Chenimari	April, 2016	0.336
65	Brahmaputra	Bhomoraguri	April, 2017	1.362	93	Buridehing	Chenimari	August, 2016	3.118
66	Brahmaputra	Bhomoraguri	August, 2017	3.340	94	Buridehing	Chenimari	December, 2016	1.093
67	Brahmaputra	Bhomoraguri	December, 2017	6.147	95	Buridehing	Chenimari	April, 2017	0.602
68	Brahmaputra	Dibrugarh	April, 2016	0.336	96	Buridehing	Chenimari	August, 2017	14.555
69	Brahmaputra	Dibrugarh	August, 2016	3.602	97	Buridehing	Chenimari	April, 2018	0.513
70	Brahmaputra	Dibrugarh	April, 2017	0.715	98	Buridehing	Margherita	April, 2016	0.620
71	Brahmaputra	Dibrugarh	August, 2017	5.801	99	Buridehing	Margherita	August, 2016	1.722
72	Brahmaputra	Dibrugarh	December, 2017	3.9	100	Buridehing	Margherita	December, 2016	2.641
73	Brahmaputra	Neamatighat	April, 2016	0.570	101	Buridehing	Margherita	April, 2017	0.405
74	Brahmaputra	Neamatighat	August, 2016	1.555	102	Buridehing	Margherita	August, 2017	7.684
75	Brahmaputra	Neamatighat	April, 2017	0.867	103	Buridehing	Margherita	April, 2018	3.213
76	Brahmaputra	Neamatighat	August, 2017	5.075	104	Buridehing	Naharkatia	December, 2015	0.817
77	Brahmaputra	Neamatighat	December, 2017	4.22	105	Buridehing	Naharkatia	April, 2016	0.371
78	Brahmaputra	Neamatighat	April, 2018	0.327	106	Buridehing	Naharkatia	August, 2016	3.146
79	Brahmaputra	Tezpur	December, 2015	0.848	107	Buridehing	Naharkatia	December, 2016	1.443
80	Brahmaputra	Tezpur	August, 2016	4.189	108	Buridehing	Naharkatia	April, 2017	1.289

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109	Buridehing	Naharkatia	August, 2017	11.270	137	Desang	Nanglamoraghat	April, 2017	0.844
110	Buridehing	Naharkatia	December, 2017	0.839	138	Desang	Nanglamoraghat	August, 2017	3.168
111	Buridehing	Naharkatia	April, 2018	3.605	139	Desang	Nanglamoraghat	December, 2017	0.623
112	Burisuti	Panbari	November, 2014	1.408	140	Desang	Nanglamoraghat	April, 2018	1.235
113	Cauvery	Chuchankatte	August, 2017	0.356	141	Dhadher	Pingalwada	August, 2016	0.718
114	Cauvery	Kudige	December, 2015	0.321	142	Dhadher	Pingalwada	April, 2017	3.500
115	Cauvery	Kudige	August, 2017	0.416	143	Dhadher	Pingalwada	August, 2017	1.348
116	Champamati	Behalpur	November, 2014	0.626	144	Dhadher	Pingalwada	December, 2017	2.409
117	Chel	Chel	May, 2014	1.119	145	Dhansiri	Bokajan	December, 2015	0.677
118	Chel	Chel	November, 2014	0.726	146	Dhansiri	Bokajan	August, 2016	4.291
119	Chhoti Sarju	Akabarpur	August, 2016	0.492	147	Dhansiri	Bokajan	December, 2016	1.075
120	Churni	Hanskhali	November, 2014	9.058	148	Dhansiri	Bokajan	April, 2017	2.271
121	Damanganga	Vapi	November, 2014	0.362	149	Dhansiri	Bokajan	August, 2017	13.608
122	Damanganga	Vapi	August, 2016	0.378	150	Dhansiri	Bokajan	April, 2018	0.513
123	Damanganga	Vapi	April, 2017	0.869	151	Dhansiri	Golaghat	August, 2016	4.103
124	Damanganga	Vapi	August, 2017	1.311	152	Dhansiri	Golaghat	December, 2016	0.524
125	Desang	Desangpani	August, 2016	3.740	153	Dhansiri	Golaghat	April, 2017	5.089
126	Desang	Desangpani	December, 2016	0.512	154	Dhansiri	Golaghat	August, 2017	3.139
127	Desang	Desangpani	April, 2017	2.825	155	Dhansiri	Golaghat	December, 2017	1.31
128	Desang	Desangpani	August, 2017	10.279	156	Dhansiri	Numaligarh	April, 2016	0.401
129	Desang	Desangpani	December, 2017	0.966	157	Dhansiri	Numaligarh	August, 2016	3.296
130	Desang	Desangpani	April, 2018	0.584	158	Dhansiri	Numaligarh	December, 2016	0.809
131	Desang	Dillighat	August, 2016	3.510	159	Dhansiri	Numaligarh	April, 2017	2.808
132	Desang	Dillighat	April, 2017	1.227	160	Dhansiri	Numaligarh	August, 2017	7.894
133	Desang	Dillighat	August, 2017	8.684	161	Dhansiri	Numaligarh	April, 2018	0.623
134	Desang	Dillighat	April, 2018	0.632	162	Digaru	Sonapur	May, 2014	0.962
135	Desang	Nanglamoraghat	August, 2016	4.086	163	Digaru	Sonapur	December, 2015	0.431
136	Desang	Nanglamoraghat	December, 2016	0.431	164	Digaru	Sonapur	April, 2017	1.171

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165	Digaru	Sonapur	April, 2018	0.395	193	Gandak	Lalganj	April, 2018	0.667
166	Dikhow	Bihubar	December, 2015	1.264	194	Gandak	Tribeni	April, 2017	1.114
167	Dikhow	Bihubar	August, 2016	2.162	195	Gandak	Tribeni	August, 2017	2.688
168	Dikhow	Bihubar	December, 2016	0.475	196	Gandak	Tribeni	April, 2018	0.737
169	Dikhow	Bihubar	April, 2017	5.874	197	Ganga	Haridwar	November, 2014	1.203
170	Dikhow	Bihubar	August, 2017	8.980	198	Ganga	Rishikesh	May, 2014	0.709
171	Dikhow	Bihubar	December, 2017	0.693	199	Ganga	Rishikesh	November, 2014	0.370
172	Dikhow	Bihubar	April, 2018	0.301	200	Ganga	Allahabad	August, 2017	0.585
173	Dikhow	Sivasagar	August, 2016	3.434	201	Ganga	Mirzapur	August, 2017	0.676
174	Dikhow	Sivasagar	December, 2016	0.687	202	Ganga	Shahzadpur	August, 2017	0.626
175	Dikhow	Sivasagar	April, 2017	2.969	203	Ganga	Varanasi	August, 2017	0.873
176	Dikhow	Sivasagar	August, 2017	2.158	204	Ganga	Ankinghat	May, 2014	0.495
177	Dikhow	Sivasagar	December, 2017	1.168	205	Ganga	Ankinghat	November, 2014	1.126
178	Dikhow	Sivasagar	April, 2018	0.366	206	Ganga	Ankinghat	December, 2016	0.335
179	Doyang	Gelabil	December, 2015	0.903	207	Ganga	Bhitaura	May, 2014	0.334
180	Doyang	Gelabil	August, 2016	3.707	208	Ganga	Bhitaura	November, 2014	1.094
181	Doyang	Gelabil	April, 2017	6.125	209	Ganga	Bhitaura	August, 2016	0.499
182	Doyang	Gelabil	August, 2017	7.894	210	Ganga	Bhitaura	August, 2017	0.421
183	Doyang	Gelabil	December, 2017	2.245	211	Ganga	Fatehgarh	May, 2014	0.435
184	Dudhnai	Dudhnai	May, 2014	0.987	212	Ganga	Fatehgarh	November, 2014	0.950
185	Dudhnai	Dudhnai	November, 2014	0.591	213	Ganga	Fatehgarh	August, 2016	0.365
186	Dudhnai	Dudhnai	December, 2015	0.405	214	Ganga	Fatehgarh	December, 2016	0.441
187	Dudhnai	Dudhnai	April, 2017	1.155	215	Ganga	Fatehgarh	August, 2017	0.575
188	Dudhnai	Dudhnai	August, 2017	0.645	216	Ganga	Garhamukteshwar	May, 2014	0.387
189	Dudhnai	Dudhnai	April, 2018	0.467	217	Ganga	Garhamukteshwar	November, 2014	0.630
190	Gandak	Lalganj	August, 2016	0.949	218	Ganga	Garhamukteshwar	August, 2016	0.406
191	Gandak	Lalganj	April, 2017	0.360	219	Ganga	Garhamukteshwar	December, 2016	0.420
192	Gandak	Lalganj	August, 2017	0.467	220	Ganga	Garhamukteshwar	April, 2017	0.538

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221	Ganga	Kachlabridge	May, 2014	0.308	249	Ganjal	Chhidgaon	August, 2017	0.791
222	Ganga	Kachlabridge	November, 2014	1.379	250	Gaurang	Kokrajhar	May, 2014	1.745
223	Ganga	Kachlabridge	August, 2016	0.332	251	Gaurang	Kokrajhar	November, 2014	2.442
224	Ganga	Kachlabridge	December, 2016	0.341	252	Ghagra	Elginbridge	May, 2014	0.350
225	Ganga	Kachlabridge	August, 2017	0.576	253	Ghagra	Elginbridge	November, 2014	0.943
226	Ganga	Kanpur	May, 2014	1.226	254	Ghagra	Elginbridge	August, 2016	0.412
227	Ganga	Kanpur	November, 2014	1.339	255	Ghagra	Elginbridge	December, 2016	0.401
228	Ganga	Kanpur	August, 2016	0.500	256	Ghagra	Elginbridge	August, 2017	0.462
229	Ganga	Kanpur	December, 2016	0.329	257	Ghagra	Turtipar	May, 2014	2.231
230	Ganga	Kanpur	August, 2017	0.396	258	Ghagra	Turtipar	November, 2014	1.909
231	Ganga	Anandpur	August, 2017	0.689	259	Ghagra	Turtipar	August, 2016	0.481
232	Ganga	Champua	August, 2017	0.611	260	Ghagra	Turtipar	December, 2016	0.512
233	Ganga	Azmabad	August, 2016	0.301	261	Ghish	Ghish	May, 2014	0.466
234	Ganga	Azmabad	December, 2016	0.505	262	Ghish	Ghish	November, 2014	0.991
235	Ganga	Azmabad	August, 2017	1.496	263	Godavari	Bhadrachalam	August, 2017	0.655
236	Ganga	Azmabad	December, 2017	0.584	264	Godavari	Koperagaon	August, 2017	0.453
237	Ganga	Buxar	August, 2016	0.476	265	Godavari	Perur	August, 2017	0.511
238	Ganga	Buxar	April, 2017	0.349	266	Godavari	Polavaram	August, 2017	0.670
239	Ganga	Buxar	August, 2017	1.029	267	Gomti	Maighat	August, 2017	0.578
240	Ganga	Buxar	April, 2018	0.301	268	Gomti	Sultanpur	August, 2016	0.427
241	Ganga	Hathidah	April, 2017	0.543	269	Gomti	Sultanpur	August, 2017	0.528
242	Ganga	Hathidah	August, 2017	1.530	270	Gomti	Lucknow	May, 2014	0.782
243	Ganga	Hathidah	April, 2018	0.634	271	Gomti	Lucknow	August, 2016	0.311
244	Ganga	Patna	August, 2016	0.464	272	Gomti	Neemsar	May, 2014	0.375
245	Ganga	Patna	April, 2017	0.346	273	Gomti	Neemsar	November, 2014	0.614
246	Ganga	Patna	August, 2017	1.371	274	Gomti	Neemsar	August, 2016	0.306
247	Ganga	Patna	December, 2017	0.447	275	Gomti	Neemsar	December, 2016	0.310
248	Ganga	Patna	April, 2018	0.407	276	Gurupur	Addoor	August, 2017	0.681

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277	Haladi	Haladi	August, 2017	0.436	305	Kamala-Balan	Jhanjharpur	April, 2018	0.485
278	Harohar/Phalgu	Gaya	August, 2017	1.145	306	Kamang	Seppa	December, 2015	3.814
279	Hemavathi	M.H. Halli	December, 2015	0.318	307	Kamang	Seppa	August, 2016	1.779
280	Hemavathi	Sakleshpur	August, 2017	0.635	308	Kamang	Seppa	December, 2016	4.321
281	Hiran	Patan	August, 2017	0.988	309	Kamang	Seppa	April, 2017	2.105
282	Indravathi	Jagdalpur	August, 2017	1.181	310	Kamang	Seppa	August, 2017	9.174
283	Indravathi	Nowrangpur	Febuary, 2015	1.923	311	Kamang	Seppa	December, 2017	2.011
284	Indravathi	Nowrangpur	August, 2017	1.767	312	Kamang	Seppa	April, 2018	0.77
285	Indravathi	Pathagudem	August, 2017	0.969	313	Kanhan	Ramakona	August, 2016	0.385
286	Jaldhaka	Jaldhaka NH-31	May, 2014	0.360	314	Kanhan	Ramakona	August, 2017	0.407
287	Jaldhaka	Jaldhaka NH-31	November, 2014	0.557	315	Kanhan	Satrapur	August, 2016	0.574
288	Jaldhaka	Mathabhanga	November, 2014	1.183	316	Kanhar	Duddhi	August, 2016	0.832
289	Jaldhaka	Nagrakata	November, 2014	1.607	317	Kanhar	Duddhi	August, 2017	1.395
290	Jiabharali	Bhalukpong	August, 2016	4.076	318	Kharkai	Adityapur	August, 2017	0.595
291	Jiabharali	Bhalukpong	December, 2016	0.336	319	Khobragarhi	Wairagarh	August, 2016	0.559
292	Jiabharali	Bhalukpong	April, 2017	0.410	320	Kim	Motinaroli	August, 2016	0.348
293	Jiabharali	Bhalukpong	August, 2017	8.518	321	Kim	Motinaroli	August, 2017	0.759
294	Jiabharali	Jiabharali NT Road	December, 2015	1.552	322	Kiul	Lakhisarai	August, 2016	0.418
295	Jiabharali	Jiabharali NT Road	August, 2016	6.118	323	Kiul	Lakhisarai	December, 2016	0.396
296	Jiabharali	Jiabharali NT Road	December, 2016	0.591	324	Kiul	Lakhisarai	April, 2017	0.593
297	Jiabharali	Jiabharali NT Road	April, 2017	0.509	325	Kiul	Lakhisarai	August, 2017	1.241
298	Jiabharali	Jiabharali NT Road	August, 2017	4.318	326	Kiul	Lakhisarai	April, 2018	0.337
299	Jiabharali	Jiabharali NT Road	April, 2018	0.427	327	Koel	Jaraikela	August, 2017	0.980
300	Kabini	Muthankera	December, 2017	0.997	328	Kopili	Dharamtul	December, 2015	0.863
301	Kamala-Balan	Jai Nagar	April, 2016	0.359	329	Kopili	Dharamtul	August, 2016	1.205
302	Kamala-Balan	Jai Nagar	August, 2017	1.580	330	Kopili	Dharamtul	December, 2016	1.779
303	Kamala-Balan	Jhanjharpur	December, 2016	0.406	331	Kopili	Dharamtul	April, 2017	2.868
304	Kamala-Balan	Jhanjharpur	August, 2017	1.877	332	Kopili	Dharamtul	August, 2017	1.016

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333	Kopili	Dharamtul	December, 2017	0.666	361	Kulsi	Kulsi	December, 2015	0.412
334	Kopili	Dharamtul	April, 2018	0.975	362	Kulsi	Kulsi	April, 2017	0.662
335	Kopili	Jagibhakatgaon	December, 2015	0.754	363	Kulsi	Kulsi	August, 2017	0.763
336	Kopili	Jagibhakatgaon	April, 2016	0.427	364	Kulsi	Kulsi	April, 2018	0.421
337	Kopili	Jagibhakatgaon	August, 2016	1.528	365	Kuttyadi	Kuttyadi	December, 2017	1.256
338	Kopili	Jagibhakatgaon	December, 2016	1.360	366	Kuttyadi	Kuttyadi	April, 2018	0.617
339	Kopili	Jagibhakatgaon	April, 2017	0.903	367	Kwano	Basti	May, 2014	0.362
340	Kopili	Jagibhakatgaon	August, 2017	2.554	368	Kwano	Basti	November, 2014	1.674
341	Kopili	Jagibhakatgaon	December, 2017	0.608	369	Kwano	Basti	August, 2016	0.610
342	Kopili	Jagibhakatgaon	April, 2018	0.81	370	Kwano	Basti	December, 2016	1.371
343	Kopili	Kampur	August, 2016	2.446	371	Kwano	Basti	August, 2017	0.400
344	Kopili	Kampur	December, 2016	0.521	372	Lakshmantirtha	K.M. Vadi	August, 2017	0.320
345	Kopili	Kampur	April, 2017	1.687	373	Lohit	Dholabazar	December, 2015	0.329
346	Kopili	Kampur	August, 2017	3.163	374	Lohit	Dholabazar	August, 2016	0.430
347	Kopili	Kheronighat	August, 2016	3.588	375	Lohit	Dholabazar	April, 2017	0.374
348	Kopili	Kheronighat	December, 2016	0.301	376	Lohit	Dholabazar	August, 2017	0.779
349	Kopili	Kheronighat	April, 2017	0.636	377	Lohit	Dholabazar	April, 2018	0.593
350	Kopili	Kheronighat	August, 2017	1.835	378	Lohit	Tezu	August, 2016	0.992
351	Kopili	Kheronighat	April, 2018	0.44	379	Lohit	Tezu	April, 2017	0.483
352	Kosi	Baltara	May, 2014	0.357	380	Lohit	Tezu	August, 2017	3.052
353	Kosi	Baltara	December, 2015	0.753	381	Mahanadi	Tikarpara	August, 2017	0.557
354	Kosi	Baltara	August, 2016	0.857	382	Mahananda	Champasari	May, 2014	0.921
355	Kosi	Baltara	December, 2016	0.550	383	Mahananda	Champasari	November, 2014	0.523
356	Kosi	Baltara	August, 2017	4.352	384	Mahananda	Sonapurhat	May, 2014	0.359
357	Kosi	Baltara	April, 2018	0.52	385	Mahananda	Sonapurhat	November, 2014	0.763
358	Krishna	Huvin Hedgi	August, 2017	0.375	386	Mahi	Khanpur	December, 2015	0.978
359	Krishna	Arjunwad	August, 2017	0.396	387	Mahi	Khanpur	August, 2017	0.544
360	Kulsi	Kulsi	May, 2014	0.613	388	Mahi	Khanpur	April, 2018	0.472

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389	Mahi	Mataji	August, 2016	0.809	417	Neo dihing	Namsai	December, 2016	0.480
390	Mahi	Mataji	August, 2017	0.410	418	Neo dihing	Namsai	April, 2017	1.678
391	Mahi	Mataji	April, 2018	0.31	419	Neo dihing	Namsai	August, 2017	4.289
392	Manas	Manas NH Crossing	November, 2014	5.757	420	Neo dihing	Namsai	April, 2018	0.383
393	Meenachi	Kidangoor	April, 2016	0.301	421	Nethravathi	Bantwal	August, 2017	0.673
394	Murti	Murti	November, 2014	5.197	422	Orsang	Chanwada	August, 2016	0.463
395	Muvvattupuzha	Ramamangalam	December, 2017	0.506	423	Orsang	Chanwada	August, 2017	1.736
396	Nagavali	Srikakulam	November, 2014	0.371	424	Pagladiya	Pagladiya N.T.Ro.Crossing	May, 2014	0.948
397	Naora	Neora	November, 2014	1.457	425	Papagni	Kamalapuram	August, 2017	1.565
398	Narmada	Garudeshwar	August, 2016	0.429	426	Pazhayar	Ashramam	November, 2014	0.436
399	Narmada	Barmanghat	November, 2014	1.100	427	Penganga	P.G.Bridge	August, 2016	0.329
400	Narmada	Barmanghat	August, 2017	0.994	428	Periyar	Vandiperiyar	December, 2017	3.115
401	Narmada	Barmanghat	April, 2018	1.09	429	Pranhitha	Tekra	August, 2016	0.427
402	Narmada	Dindori	April, 2018	1.312	430	Pravara	Pachegaon	August, 2017	0.339
403	Narmada	Handia	April, 2018	0.506	431	Pulanthodu	Pulamanthole	April, 2018	0.605
404	Narmada	Hoshangabad	November, 2014	0.903	432	Punpun	Sripalpur	December, 2015	0.394
405	Narmada	Hoshangabad	August, 2017	1.009	433	Punpun	Sripalpur	August, 2016	0.366
406	Narmada	Manot	August, 2016	0.378	434	Punpun	Sripalpur	April, 2017	0.907
407	Narmada	Manot	August, 2017	0.620	435	Punpun	Sripalpur	August, 2017	2.258
408	Narmada	Manot	April, 2018	1.045	436	Punpun	Sripalpur	December, 2017	0.416
409	Narmada	Sandia	November, 2014	0.677	437	Punpun	Sripalpur	April, 2018	0.835
410	Narmada	Sandia	August, 2017	1.025	438	Purna	Gopalkheda	November, 2014	0.375
411	Neo dihing	Miao	August, 2016	3.524	439	Purna	Gopalkheda	August, 2016	2.319
412	Neo dihing	Miao	December, 2016	2.553	440	Purna	Gopalkheda	August, 2017	1.256
413	Neo dihing	Miao	April, 2017	3.655	441	Purna	Mahuwa	December, 2015	0.849
414	Neo dihing	Miao	August, 2017	1.504	442	Purna	Mahuwa	August, 2016	1.966
415	Neo dihing	Namsai	April, 2016	0.336	443	Purna	Mahuwa	August, 2017	0.958
416	Neo dihing	Namsai	August, 2016	0.938	444	Puthimari	Puthimari D.R.F.	May, 2014	0.687

S.No	River	Name of the Water Quality Sites	Month/Year	Fe (mg/L)	S.No	River	Name of the Water Quality Sites	Month/Year	Fe (mg/L)
445	Puthimari	Puthimari NH Ro.crossing	May, 2014	0.677	473	Rapti	Balrampur	December, 2016	0.316
446	Raidak-I	Chepan	November, 2014	3.672	474	Rapti	Bansi	November, 2014	1.362
447	Raidak-I	Tufanganj	November, 2014	2.271	475	Rapti	Bansi	August, 2016	1.328
448	Raidak-II	Barobisha	November, 2014	1.361	476	Rapti	Bansi	December, 2016	0.475
449	Ramganga	Bareilly	August, 2016	0.573	477	Rapti	Bansi	April, 2017	0.684
450	Ramganga	Bareilly	December, 2016	0.406	478	Rapti	Birdghat	May, 2014	0.853
451	Ramganga	Bareilly	August, 2017	0.524	479	Rapti	Birdghat	November, 2014	1.244
452	Ramganga	Dabri	May, 2014	0.338	480	Rapti	Birdghat	December, 2016	0.346
453	Ramganga	Dabri	November, 2014	1.109	481	Rapti	Regauli	May, 2014	0.762
454	Ramganga	Dabri	August, 2016	0.730	482	Rapti	Regauli	November, 2014	0.977
455	Ramganga	Dabri	December, 2016	0.343	483	Rapti	Regauli	August, 2016	0.626
456	Ramganga	Dabri	August, 2017	0.431	484	Rapti	Regauli	December, 2016	0.326
457	Ramganga	Moradabad	May, 2014	0.329	485	Rapti	Regauli	August, 2017	0.374
458	Ramganga	Moradabad	November, 2014	1.160	486	Sabari	Konta	August, 2017	0.881
459	Ramganga	Moradabad	August, 2016	0.494	487	Sabarmati	Derol Bridge	August, 2017	1.677
460	Ramganga	Moradabad	December, 2016	0.397	488	Sabarmati	Vautha	November, 2014	0.307
461	Ramyala	Alutuma	August, 2017	0.808	489	Sabarmati	Vautha	December, 2015	0.631
462	Ranganadi	Ranganadi NT-Road	December, 2015	0.477	490	Sabarmati	Vautha	August, 2016	0.344
463	Ranganadi	Ranganadi NT-Road	August, 2016	0.552	491	Sabarmati	Vautha	April, 2017	0.309
464	Ranganadi	Ranganadi NT-Road	December, 2016	0.978	492	Sabarmati	Vautha	August, 2017	0.780
465	Ranganadi	Ranganadi NT-Road	August, 2017	0.573	493	Sabarmati	Vautha	April, 2018	0.747
466	Ranganadi	Ranganadi NT-Road	April, 2018	0.605	494	Sagaileru	Nandipalli	August, 2017	0.391
467	Rangit	Majhitar	May, 2014	3.298	495	Sai	Pratapgarh	August, 2016	0.461
468	Rangit	Singla-Bazar	May, 2014	3.282	496	Sai	Pratapgarh	August, 2017	1.007
469	Rangit	Singla-Bazar	November, 2014	0.474	497	Sai	Raibareli	November, 2014	2.724
470	Rangpochu	Rangpo	May, 2014	0.819	498	Sai	Raibareli	August, 2016	0.784
471	Rangpochu	Rangpo	November, 2014	0.596	499	Sai	Raibareli	December, 2016	0.377
472	Rapti	Balrampur	November, 2014	1.061	500	Sankh	Tilga	August, 2017	0.765

S.No	River	Name of the Water Quality Sites	Month/Year	Fe (mg/L)	S.No	River	Name of the Water Quality Sites	Month/Year	Fe (mg/L)
501	Sankh	Tilga	April, 2018	0.312	529	Sone	Japla	April, 2018	0.459
502	Sankosh	Sankosh LRP	November, 2014	1.242	530	Sone	Koelwar	August, 2016	0.319
503	Sarju	Ghat	May, 2014	0.327	531	Sone	Koelwar	August, 2017	1.431
504	Sarju	Ghat	November, 2014	1.294	532	Sone	Koelwar	December, 2017	0.953
505	Sarju	Ghat	December, 2016	0.778	533	Sone	Koelwar	April, 2018	1.015
506	Sarju	Ghat	April, 2017	0.368	534	Sonkosh	Golagang	November, 2014	0.518
507	Sarju	Ghat	April, 2018	0.766	535	Subansiri	Badatighat	December, 2015	0.586
508	Saryu	Ayodhya	May, 2014	0.325	536	Subansiri	Badatighat	August, 2016	0.529
509	Saryu	Ayodhya	November, 2014	1.457	537	Subansiri	Badatighat	December, 2016	0.520
510	Saryu	Ayodhya	August, 2016	0.343	538	Subansiri	Badatighat	April, 2018	0.457
511	Saryu	Ayodhya	December, 2016	0.399	539	Subansiri	Chouldhowaghat	December, 2015	0.488
512	Sharda	Paliakalan	May, 2014	0.348	540	Subansiri	Chouldhowaghat	August, 2016	3.858
513	Sharda	Paliakalan	November, 2014	0.908	541	Subansiri	Chouldhowaghat	December, 2016	1.067
514	Sharda	Paliakalan	August, 2016	0.370	542	Subansiri	Chouldhowaghat	August, 2017	8.937
515	Sharda	Paliakalan	December, 2016	0.344	543	Subansiri	Chouldhowaghat	April, 2018	0.301
516	Sher	Belkhedi	August, 2016	0.489	544	Subarnarekha	Ghatsila	August, 2017	0.679
517	Sheturni	Lowara	August, 2016	0.388	545	Subarnarekha	Jamshedpur	August, 2017	0.381
518	Sheturni	Lowara	August, 2017	0.789	546	Subarnarekha	Jamsolghat	August, 2017	0.800
519	Sheturni	Lowara	April, 2018	0.594	547	Subarnarekha	Muri	August, 2017	0.485
520	Sita	Avershe	August, 2017	0.373	548	Suklai	Suklai	May, 2014	0.638
521	Som	Rangeli	August, 2016	0.307	549	Suklai	Suklai	November, 2014	0.398
522	Som	Rangeli	April, 2017	0.507	550	Suklai	Suklai	December, 2015	0.321
523	Sone	Chopan	August, 2016	1.000	551	Suklai	Suklai	December, 2016	0.315
524	Sone	Chopan	December, 2016	0.564	552	Suklai	Suklai	April, 2017	0.333
525	Sone	Kuldah Bridge	August, 2016	0.993	553	Suklai	Suklai	April, 2018	0.468
526	Sone	Kuldah Bridge	August, 2017	0.714	554	Suruliar	Theni	December, 2016	0.340
527	Sone	Japla	August, 2017	2.050	555	Tapi	Burhanpur	August, 2016	0.503
528	Sone	Japla	December, 2017	0.776	556	Tapi	Burhanpur	April, 2017	0.780

S.No	River	Name of the Water Quality Sites	Month/Year	Fe (mg/L)	S.No	River	Name of the Water Quality Sites	Month/Year	Fe (mg/L)
557	Tapi	Burhanpur	August, 2017	0.704	584	Tirap	Udaipur (Tirap)	August, 2017	3.018
558	Tapi	Sarangkheda	November, 2014	0.385	585	Tirap	Udaipur (Tirap)	April, 2018	1.59
559	Tapi	Sarangkheda	August, 2016	1.468	586	Tons	Meja Road	August, 2017	0.667
560	Tapi	Sarangkheda	August, 2017	6.257	587	Torsa	Ghugumari	November, 2014	6.462
561	Teesta	Coronation	May, 2014	1.614	588	Torsa	Hasimara	November, 2014	6.097
562	Teesta	Coronation	November, 2014	8.246	589	Umngot	Dawki	August, 2017	0.640
563	Teesta	Domohani	May, 2014	1.261	590	Vaitarna	Durvesh	August, 2016	0.749
564	Teesta	Domohani	November, 2014	0.569	591	Vaitarna	Durvesh	August, 2017	0.970
565	Teesta	Domohani	April, 2018	0.5	592	Valapatnam	Perumannu	April, 2016	1.025
566	Teesta	Gajaldoba	May, 2014	1.273	593	Valapatnam	Perumannu	April, 2018	1.142
567	Teesta	Gajaldoba	November, 2014	1.268	594	Vamanapuram	Ayilam	December, 2017	0.412
568	Teesta	Khanitar	November, 2014	1.174	595	Vamsadhara	Gunupur	May, 2014	0.796
569	Teesta	Mekhliganj	November, 2014	1.379	596	Vamsadhara	Gunupur	November, 2014	0.338
570	Teesta	Sankalan	May, 2014	0.686	597	Vamsadhara	Gunupur	August, 2017	0.347
571	Teesta	Sankalan	November, 2014	1.052	598	Varada	Marol	August, 2017	0.473
572	Teesta	Sevoke	May, 2014	0.312	599	Wainganga	Ashti	August, 2016	0.393
573	Teesta	Sevoke	November, 2014	2.299	600	Wainganga	Ashti	August, 2017	0.404
574	Teesta	Teesta-Bazar	May, 2014	1.204	601	Wainganga	Keolari	August, 2016	0.436
575	Teesta	Teesta-Bazar	November, 2014	0.690	602	Wainganga	Kumhari	August, 2016	0.740
576	Tunga	Shimoga	August, 2017	0.660	603	Wainganga	Kumhari	August, 2017	0.617
577	Tungabhadra	Harlahalli	August, 2017	0.489	604	Wainganga	Pauni	August, 2016	0.343
578	Tungabhadra	Honnali	August, 2017	0.577	605	Wainganga	Pauni	August, 2017	0.435
579	Tirap	Udaipur (Tirap)	December, 2015	0.329	606	Wardha	Hivra	August, 2017	0.312
580	Tirap	Udaipur (Tirap)	April, 2016	0.556	607	Wyra	Madhira	April, 2018	0.315
581	Tirap	Udaipur (Tirap)	August, 2016	4.132	608	Yamuna	Agra	August, 2016	0.384
582	Tirap	Udaipur (Tirap)	December, 2016	0.627	609	Yamuna	Agra	August, 2017	0.613
583	Tirap	Udaipur (Tirap)	April, 2017	3.944	610	Yennehole	Yennehole	August, 2017	0.905

5. LEAD (Pb in µg/L)

S.No	River	Name of the Water Quality Sites	Month/Year	Pb (µg/L)	S.No	River	Name of the Water Quality Sites	Month/Year	Pb (µg/L)
1	Achankovil	Thumpamon	April, 2016	38.580	27	Ganga	Fatehgarh	November, 2014	14.610
2	Aliyar	Ambarampalayam	Febuary, 2015	13.310	28	Ganga	Kachlabridge	November, 2014	25.370
3	Arkavathi	T. Bekuppe	Febuary, 2015	26.290	29	Ganga	Kachlabridge	Febuary, 2015	33.780
4	Arkavathi	T. Bekuppe	December, 2016	16.170	30	Ganga	Kanpur	November, 2014	15.750
5	Barak	Fulertal	December, 2016	32.680	31	Ganga	Kanpur	Febuary, 2015	25.160
6	Brahmani	Gomlai	April, 2017	77.420	32	Ganga	Azmabad	Febuary, 2015	22.860
7	Brahmaputra	Pancharatna	August, 2016	15.810	33	Ganga	Buxar	Febuary, 2015	16.380
8	Brahmaputra	Pandu	August, 2016	21.480	34	Ganga	Hathidah	Febuary, 2015	36.910
9	Brahmaputra	Dibrugarh	August, 2016	14.250	35	Ghagra	Elginbridge	November, 2014	10.850
10	Bugi	Dimapara	August, 2016	13.090	36	Ghagra	Turtipar	November, 2014	18.200
11	Bugi	Dimapara	April, 2017	12.520	37	Ghagra	Turtipar	Febuary, 2015	29.260
12	Buridehing	Chenimari	August, 2016	20.550	38	Godavari	Polavaram	Febuary, 2015	22.870
13	Buridehing	Margherita	December, 2016	156.070	39	Gomti	Lucknow	November, 2014	15.140
14	Cauvery	Kodumudi	Febuary, 2015	16.670	40	Gomti	Lucknow	December, 2016	21.670
15	Cauvery	Urachikottai	Febuary, 2015	10.610	41	Gomti	Neemsar	November, 2014	23.440
16	Chhoti Sarju	Akabarpur	Febuary, 2015	40.840	42	Gomti	Neemsar	Febuary, 2015	11.910
17	Chhoti Sarju	Akabarpur	December, 2015	16.900	43	Gomti	Neemsar	December, 2016	19.950
18	Damanganga	Vapi	August, 2016	16.990	44	Hagari	T. Ramapuram	Febuary, 2015	41.820
19	Dhadher	Pingalwada	Febuary, 2015	17.650	45	Haladi	Haladi	Febuary, 2015	12.180
20	Digaru	Sonapur	August, 2016	32.740	46	Hemavathi	Sakleshpur	Febuary, 2015	23.000
21	Dikhow	Sivasagar	August, 2016	20.630	47	Hindon	Galeta	November, 2014	18.520
22	Dudhnai	Dudhnai	August, 2016	10.920	48	Indravathi	Nowrangpur	April, 2016	16.480
23	Ganga	Shahzadpur	Febuary, 2015	24.590	49	Jaldhaka	Jaldhaka NH-31	November, 2014	21.960
24	Ganga	Ankinghat	November, 2014	19.940	50	Jiabharali	Jiabharali NT Road	Febuary, 2015	29.260
25	Ganga	Bhitaura	November, 2014	14.850	51	Kallada	Pattazhy	Febuary, 2015	13.660

S.No	River	Name of the Water Quality Sites	Month/Year	Pb (µg/L)	S.No	River	Name of the Water Quality Sites	Month/Year	Pb (µg/L)
26	Ganga	Bhitaura	Febuary, 2015	34.040	52	Kallada	Pattazhy	April, 2016	13.580
53	Kamang	Seppa	December, 2016	46.820	80	Puthimari	Puthimari D.R.F.	Febuary, 2015	10.120
54	Kamang	Seppa	August, 2017	15.130	81	Raidak-I	Tufanganj	Febuary, 2015	16.590
55	Kanhan	Ramakona	Febuary, 2015	17.510	82	Ramganga	Bareilly	November, 2014	12.880
56	Kharkai	Adityapur	April, 2016	13.800	83	Ramganga	Dabri	November, 2014	16.540
57	Kopili	Kheronighat	Febuary, 2015	13.880	84	Ramganga	Dabri	Febuary, 2015	11.380
58	Krishna	Huvin Hedgi	Febuary, 2015	14.340	85	Ramganga	Moradabad	May, 2014	11.627
59	Kunderu	Alladupalli	Febuary, 2015	22.630	86	Ramganga	Moradabad	November, 2014	18.940
60	Kunderu	Alladupalli	April, 2017	11.770	87	Ramganga	Moradabad	Febuary, 2015	32.850
61	Kwano	Basti	November, 2014	28.410	88	Ramganga	Moradabad	April, 2018	19.37
62	Lohit	Dholabazar	August, 2016	13.130	89	Rapti	Balrampur	November, 2014	13.000
63	Longai	Fakirabazar	May, 2014	19.759	90	Rapti	Bansi	November, 2014	17.430
64	Mahananda	Champasari	Febuary, 2015	13.600	91	Rapti	Birdghat	May, 2014	13.129
65	Mahi	Khanpur	December, 2015	19.830	92	Rapti	Birdghat	November, 2014	18.650
66	Munneru	Keesara	Febuary, 2015	12.080	93	Rapti	Birdghat	Febuary, 2015	13.640
67	Narmada	Garudeshwar	Febuary, 2015	21.930	94	Rapti	Regauli	May, 2014	10.388
68	Neo dihing	Miao	Febuary, 2015	17.480	95	Rapti	Regauli	November, 2014	14.210
69	Neo dihing	Miao	December, 2016	19.300	96	Rapti	Regauli	Febuary, 2015	14.110
70	Noyyal	Elunuthimanagalam	Febuary, 2015	76.490	97	Sabarmati	Vautha	November, 2014	17.570
71	Noyyal	Elunuthimanagalam	December, 2017	10.64	98	Sabarmati	Vautha	December, 2015	12.760
72	Orsang	Chanwada	Febuary, 2015	39.800	95	Rapti	Regauli	November, 2014	14.210
73	Orsang	Chanwada	August, 2016	19.650	96	Rapti	Regauli	Febuary, 2015	14.110
74	Pagladiya	Pagladiya N.T.Road Cross.	August, 2016	18.700	97	Sabarmati	Vautha	November, 2014	17.570
75	Palar	Arcot	August, 2016	51.520	98	Sabarmati	Vautha	December, 2015	12.760
76	Pennar	Chennur	Febuary, 2015	38.500	99	Sabarmati	Vautha	December, 2016	12.880
77	Ponnaiyar	Gummanur	Febuary, 2015	13.980	100	Sai	Raibareli	November, 2014	26.240
78	Purna	Gopalkheda	Febuary, 2015	34.770	101	Sai	Raibareli	December, 2016	23.340

S.No	River	Name of the Water Quality Sites	Month/Year	Pb (µg/L)	S.No	River	Name of the Water Quality Sites	Month/Year	Pb (µg/L)
79	Purna	Gopalkheda	August, 2016	37.620	102	Sankosh	Sankosh LRP	Febuary, 2015	14.730
103	Saryu	Ayodhya	November, 2014	15.810	116	Tungabhadra	Mantralayam	Febuary, 2015	32.290
104	Seonath	Simga	Febuary, 2015	11.910	117	Ulhas	Badlapur	Febuary, 2015	13.600
105	Sheturni	Lowara	April, 2016	374.580	118	Umsohrynkiew	Therriaghat	August, 2017	16.810
106	Sheturni	Lowara	December, 2016	39.110	119	Vaitarna	Durvesh	Febuary, 2015	116.290
107	Sheturni	Lowara	December, 2017	15.2	120	Vaitarna	Durvesh	August, 2016	13.160
108	Sheturni	Lowara	April, 2018	82.4	121	Vaitarna	Durvesh	December, 2016	19.840
109	Sone	Kuldah Bridge	August, 2016	11.740	122	Vaitarna	Durvesh	April, 2017	227.930
110	Sone	Koelwar	April, 2016	16.750	123	Vaitarna	Durvesh	December, 2017	20.96
111	Subansiri	Badatighat	Febuary, 2015	13.780	124	Yagachi	Thimmanahalli	Febuary, 2015	13.840
112	Subarnarekha	Ghatsila	April, 2016	37.660	125	Yamuna	Agra	April, 2018	22.67
113	Swarnamukhi	Naidupet	Febuary, 2015	38.860	126	Yamuna	Delhi Rly Bridge	November, 2014	12.652
114	Tapi	Sarangkheda	April, 2017	62.120	127	Yamuna	Mohana (Yamuna)	November, 2014	18.338
115	Tungabhadra	Bawapuram	Febuary, 2015	33.410	128	Yamuna	Mohana (Yamuna)	Febuary, 2015	20.044

6. NICKEL (Ni in µg/L)

S.No	River	Name of the Water Quality Sites	Month/Year	Ni (µg/L)	S.No	River	Name of the Water Quality Sites	Month/Year	Ni (µg/L)
1	Arkavathi	T. Bekuppe	Febuary, 2015	44.460	24	Pennar	Chennur	Febuary, 2015	24.600
2	Brahmani	Panposh	Febuary, 2015	56.740	25	Periyar	Vandiperiyar	Febuary, 2015	21.880
3	Ganga	Kachlabridge	November, 2014	26.840	26	Periyar	Vandiperiyar	December, 2017	35.930
4	Hagari	T. Ramapuram	Febuary, 2015	43.570	27	Purna	Gopalkheda	Febuary, 2015	39.850
5	Hagari	T. Ramapuram	December, 2017	58.020	28	Sabarmati	Vautha	November, 2014	25.880
6	Hasdeo	Bamnidih	May, 2014	24.120	29	Sabarmati	Vautha	Febuary, 2015	49.180
7	Hindon	Galeta	December, 2017	21.380	30	Saryu	Ayodhya	Febuary, 2015	21.690
8	Ib	Sundergarh	November, 2014	37.320	31	Saryu	Ayodhya	December, 2017	42.360
9	Jiabharali	Bhalukpong	May, 2014	83.830	32	Seonath	Ghatora	May, 2014	28.990
10	Jonk	Rampur	May, 2014	57.790	33	Seonath	Simga	May, 2014	25.630
11	Ken	Banda	Febuary, 2015	27.870	34	Sharda	Paliakalan	August, 2016	32.720
12	Krishna	Huvin Hedgi	Febuary, 2015	23.720	35	Sheturni	Lowara	Febuary, 2015	184.640
13	Kunderu	Alladupalli	Febuary, 2015	28.030	36	Sheturni	Lowara	April, 2016	68.480
14	Mahanadi	Basantpur	May, 2014	59.210	37	Sheturni	Lowara	April, 2018	109.660
15	Mand	Kurubhata	May, 2014	27.570	38	Siang	Passighat	November, 2014	21.180
16	Narmada	Barmanghat	Febuary, 2015	56.840	39	Subarnarekha	Ghatsila	May, 2014	36.960
17	Narmada	Barmanghat	December, 2016	85.940	40	Subarnarekha	Jamshedpur	May, 2014	20.270
18	Noyyal	Elunuthimanagalam	Febuary, 2015	21.400	41	Tungabhadra	Bawapuram	Febuary, 2015	30.300
19	Noyyal	Elunuthimanagalam	December, 2017	26.420	42	Tungabhadra	Mantralayam	Febuary, 2015	31.390
20	Ong	Salebhata	May, 2014	50.070	43	Vaitarna	Durvesh	Febuary, 2015	179.340
21	Ong	Salebhata	April, 2018	22.500	44	Vaitarna	Durvesh	December, 2017	245.010
22	Orsang	Chanwada	Febuary, 2015	67.730	45	Yamuna	Delhi Rly Bridge	December, 2017	48.810
23	Orsang	Chanwada	December, 2017	132.550					

Annexure-7: Seasonal average values of Trace and Toxic metals with total no of water quality samples found above / below the acceptable limit as prescribed by BIS 10500: 2012

ARSENIC

S. No.	Water Quality Site	River	Arsenic (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 10 µg/L	Below 10 µg/L
1	A B Road Xing	Parwati	0.896	0.728	0.980	0.090	1.870	0	3
2	A.P. Puram	Chittar	1.470	1.470	-	0.020	3.770	0	3
3	A.P.Ghat	Barak	2.899	2.878	2.950	1.280	7.420	0	7
4	Aauriya	Yamuna	5.130	5.828	3.385	1.960	9.130	0	7
5	Abu Road	Banas	2.270	2.518	1.280	1.280	3.790	0	5
6	Addoor	Gurupur	2.860	-	2.860	2.860	2.860	0	1
7	Adityapur	Kharkai	3.835	4.384	1.090	1.090	7.780	0	6
8	Agra	Yamuna	4.056	3.024	6.635	1.380	8.160	0	7
9	Aie NH Crossing	Aie	1.730	1.730	-	1.730	1.730	0	1
10	Akabarpur	Chhoti Sarju	3.038	3.483	2.370	0.220	7.500	0	5
11	Akhnoor	Chenab	2.142	2.092	2.390	0.550	3.470	0	6
12	Akkihebbal	Hemavathi	2.103	2.223	1.380	0.110	4.990	0	7
13	Aklera	Parwan	1.828	1.506	2.310	0.548	3.960	0	5
14	Alladupalli	Kunderu	2.779	3.175	1.590	0.350	8.960	0	8
15	Allahabad	Ganga	3.163	3.314	2.635	1.160	5.540	0	9
16	Alutuma	Ramyala	1.270	1.297	1.190	0.270	2.120	0	4
17	Ambarampalayam	Aliyar	2.963	2.152	5.395	0.100	7.960	0	8
18	Ambasamudram	Vaigai	3.850	3.850	-	3.850	3.850	0	1
19	Anandpur	Ganga	1.142	1.076	1.470	0.110	2.070	0	6
20	Andhiyar Kore	Hamp	5.210	5.210	-	5.210	5.210	0	1
21	Ankinghat	Ganga	4.923	5.885	2.035	0.120	8.400	0	8
22	Annavasal	Nattar	-	-	-	0.000	0.000	0	0
23	Arangaly	Chalakudy	4.830	4.127	6.940	2.040	7.750	0	4
24	Arcot	Palar	0.670	0.680	0.660	0.660	0.680	0	2
25	Arjunwad	Krishna	2.540	-	2.540	2.540	2.540	0	1
26	Ashramam	Pazhayar	3.743	4.080	2.730	2.730	4.490	0	4
27	Ashti	Wainganga	2.098	2.401	1.035	0.580	6.070	0	9
28	Avarankuppam	Palar	4.700	4.700	-	4.700	4.700	0	1
29	Avershe	Sita	1.290	1.755	0.360	0.360	2.440	0	3
30	Ayilam	Vamanapuram	5.363	4.193	8.870	0.080	8.870	0	4
31	Ayodhya	Saryu	2.286	2.560	1.465	0.030	6.210	0	8
32	Azmabad	Ganga	3.872	4.826	0.535	0.170	6.470	0	9
33	B.P. Ghat	Barak	2.864	2.958	2.580	0.710	7.410	0	8
34	Badatighat	Subansiri	2.978	3.477	1.230	0.260	8.550	0	9
35	Badlapur	Ulhas	3.143	3.173	3.050	3.040	3.440	0	4
36	Balrampur	Rapti	2.486	2.952	1.090	0.290	6.560	0	8
37	Baltara	Kosi	3.283	3.909	1.095	0.260	8.880	0	9
38	Bamni (Banjar)	Banjar	1.067	1.036	1.145	0.100	2.190	0	7
39	Bamni (Wardha)	Wardha	2.766	3.257	1.045	0.770	8.980	0	9

S. No.	Water Quality Site	River	Arsenic (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 10 µg/L	Below 10 µg/L
40	Bamnidih	Hasdeo	8.670	8.670	-	8.670	8.670	0	1
41	Banda	Ken	3.469	3.306	3.875	0.190	5.970	0	7
42	Bansi	Rapti	2.069	2.256	1.600	0.020	4.240	0	7
43	Bantwal	Nethravathi	2.445	1.550	3.340	1.550	3.340	0	2
44	Baranwada	Banas	1.502	1.755	0.740	0.740	2.668	0	4
45	Bareilly	Ramganga	2.823	3.600	0.490	0.300	7.920	0	8
46	Barmanghat	Narmada	2.156	2.163	2.135	0.310	8.350	0	8
47	Barobisha	Raidak-II	3.610	4.430	1.970	1.640	7.220	0	3
48	Barod	Kali Sindh	1.466	1.746	0.625	0.230	4.680	0	8
49	Baronda	Pairi	-	-	-	0.000	0.000	0	0
50	Basantpur	Mahanadi	4.070	4.070	-	2.920	5.220	0	2
51	Basti	Kwano	3.660	4.283	1.790	0.200	8.260	0	8
52	Bawapuram	Tungabhadra	2.250	2.250	-	2.250	2.250	0	1
53	Behalpur	Champamati	6.240	6.240	-	6.240	6.240	0	1
54	Beki Mathanguri	Beki	-	-	-	0.000	0.000	0	0
55	Beki Road Bridge	Beki	4.513	5.240	3.060	2.500	7.980	0	3
56	Belkhedi	Sher	2.884	2.422	4.270	0.080	8.230	0	8
57	Belne Bridge	Gad	2.185	1.840	2.530	1.840	2.530	0	2
58	Bendrahalli	Suvarnavathi	-	-	-	0.000	0.000	0	0
59	Berhampore	Bhagirathi	2.532	2.443	2.845	0.920	4.880	0	9
60	Bhadrachalam	Godavari	3.392	4.085	0.620	0.620	7.390	0	5
61	Bhalukpong	Jiabharali	2.214	2.213	2.220	0.060	6.620	0	9
62	Bhatpalli	Peddavagu	2.686	2.611	2.945	1.330	6.090	0	9
63	Bhitaura	Ganga	5.801	7.455	0.840	0.440	9.020	0	8
64	Bhomoraguri	Brahmaputra	2.002	2.051	1.830	0.160	4.430	0	9
65	Bihubar	Dikhow	2.091	2.329	1.260	0.040	6.850	0	9
66	Biligundullu	Cauvery	2.154	2.242	1.630	0.470	5.820	0	7
67	Birdghat	Rapti	2.746	3.218	1.330	0.620	6.270	0	8
68	Bokajan	Dhansiri	1.954	2.050	1.620	0.140	4.410	0	9
69	Burhanpur	Tapi	1.230	1.130	1.430	0.270	2.590	0	6
70	Buxar	Ganga	4.633	5.764	0.675	0.530	9.530	0	9
71	Byaladahalli	Haridra	2.145	2.145	-	0.930	3.360	0	2
72	Champasari	Mahananda	3.080	3.080	-	2.750	3.410	0	2
73	Champua	Ganga	1.038	0.965	1.330	0.030	1.710	0	5
74	Chanwada	Orsang	2.411	2.832	1.360	0.270	4.900	0	7
75	Chapra	Jalangi	4.016	4.681	1.685	0.260	7.880	0	9
76	Chel	Chel	4.700	4.700	-	4.700	4.700	0	1
77	Chengalpet	Palar	1.603	2.110	0.590	0.590	2.330	0	3
78	Chenimari	Buridehing	1.673	1.851	1.050	0.140	5.490	0	9
79	Chennur	Pennar	3.413	4.130	1.260	0.170	7.930	0	8
80	Chepan	Raidak-I	2.973	3.190	2.540	2.540	3.680	0	3
81	Chhidgaon	Ganjal	2.141	2.715	0.420	0.030	8.560	0	8
82	Chitrasani	Balaram	2.237	2.630	1.255	0.180	6.300	0	7
83	Chittorgarh	Gambhiri	0.648	0.648	-	0.648	0.648	0	1
84	Cholachguda	Malaprabha	-	-	-	0.000	0.000	0	0
85	Chopan	Sone	3.318	3.266	3.500	0.430	7.000	0	9

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86	Chouldhowaghat	Subansiri	2.204	2.280	1.940	0.030	8.180	0	9
87	Chuchankatte	Cauvery	3.015	4.240	1.790	1.790	4.240	0	2
88	Coronation	Teesta	1.530	1.530	-	1.530	1.530	0	1
89	Dabri	Ramganga	4.599	5.307	2.475	0.120	8.530	0	8
90	Damarcherla	Musi	2.527	2.527	-	2.050	2.880	0	3
91	Dawki	Umngot	1.867	1.174	3.600	0.100	3.730	0	7
92	Delhi Rly Bridge	Yamuna	2.584	2.946	0.955	0.110	9.450	0	11
93	Deoprayag	Bhagirath	1.786	1.700	2.085	0.170	3.950	0	9
94	Derol Bridge	Sabarmati	2.093	2.520	0.600	0.140	5.800	0	9
95	Desangpani	Desang	2.279	2.276	2.290	0.120	6.360	0	9
96	Dhamkund	Chenab	2.477	2.480	2.460	0.850	4.870	0	6
97	Dharamtul	Kopili	2.022	2.077	1.830	0.140	6.200	0	9
98	Dheng Bridge	Bagmathi	2.787	2.857	2.540	0.560	4.300	0	9
99	Dholabazar	Lohit	2.186	2.443	1.285	0.400	6.390	0	9
100	Dholai	Rukni	2.143	2.233	1.870	0.100	7.220	0	8
101	Dholpur	Chambal	2.211	2.352	1.860	0.100	5.110	0	7
102	Dhubri	Brahmaputra	7.660	7.660	-	7.660	7.660	0	1
103	Dhulsar	Uri	0.260	-	0.260	0.260	0.260	0	1
104	Diana	Diana	4.680	4.680	-	4.680	4.680	0	1
105	Dibrugarh	Brahmaputra	2.150	2.191	2.005	0.370	5.660	0	9
106	Dillighat	Desang	1.996	1.933	2.215	0.360	6.150	0	9
107	Dimapara	Bugi	1.990	2.084	1.755	0.450	5.470	0	7
108	Dindori	Narmada	2.370	2.570	1.770	0.870	7.730	0	8
109	Domohani	Teesta	4.053	4.850	2.460	2.460	6.710	0	3
110	Duddhi	Kanhar	1.628	1.791	1.055	0.690	4.960	0	9
111	Dudhnai	Dudhnai	2.566	2.819	1.680	0.370	7.540	0	9
112	Durvesh	Vaitarna	2.590	2.863	2.045	0.070	7.420	0	6
113	Ekmighat	Bagmathi	4.109	4.947	1.175	0.090	9.870	0	9
114	Elginbridge	Ghagra	1.660	2.097	0.350	0.130	4.420	0	8
115	Elunuthimanagalam	Noyyal	2.440	2.440	-	0.940	3.940	0	2
116	English Bazar	Padma/Mahananda	2.493	2.659	1.915	0.130	6.670	0	9
117	Erinjipuzha	Payaswani	4.583	3.010	9.300	1.620	9.300	0	4
118	Etawah	Yamuna	4.467	4.630	4.060	1.090	7.030	0	7
119	Fakirabazar	Longai	2.900	3.048	2.530	1.200	7.540	0	7
120	Farakka	Ganga	2.222	2.206	2.280	0.690	5.280	0	9
121	Farakka/(HR)	Feeder Canal	1.592	1.694	1.235	0.390	2.770	0	9
122	Fatehgarh	Ganga	3.109	3.750	1.185	0.640	7.550	0	8
123	Fulertal	Barak	1.483	1.173	2.105	0.100	2.170	0	6
124	Gadarwara	Sakkar	2.543	3.015	1.600	0.250	8.750	0	6
125	Gadat	Ambika	2.247	2.543	1.655	1.060	4.320	0	6
126	Gajaldoba	Teesta	1.100	1.100	-	1.100	1.100	0	1
127	Galeta	Hindon	1.920	2.228	0.530	0.510	5.380	0	11
128	Ganod	Bhadar	3.077	3.405	1.110	1.110	5.390	0	7
129	Garhamukteshwar	Ganga	3.236	3.015	3.900	1.510	6.400	0	8
130	Garrauli	Dhasan	3.310	4.900	2.515	1.760	4.900	0	3
131	Garudeshwar	Narmada	2.119	2.174	1.980	0.030	7.290	0	7

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132	Gaya	Harohar/Phalgu	1.327	1.960	1.010	0.600	1.960	0	3
133	Gelabil	Doyang	1.715	1.420	2.305	0.300	3.350	0	6
134	Ghat	Sarju	2.410	2.680	1.600	0.820	3.860	0	8
135	Ghatora	Seonath	5.800	5.800	-	5.800	5.800	0	1
136	Ghatsila	Subarnarekha	3.153	3.582	1.010	1.010	6.830	0	6
137	Ghish	Ghish	3.620	3.620	-	3.620	3.620	0	1
138	Ghugumari	Torsa	3.407	3.740	2.740	2.160	5.320	0	3
139	Gokak	Ghataprabha	2.150	-	2.150	2.150	2.150	0	1
140	Golaghat	Sonkosh	2.216	2.227	2.175	0.020	6.760	0	9
141	Golakganj	Dhansiri	-	-	-	0.000	0.000	0	0
142	Gomlai	Brahmani	2.890	3.222	1.230	0.520	6.750	0	6
143	Gopalkheda	Purna	2.235	-	2.235	0.740	3.730	0	2
144	Gopurajapuram	Cauvery/Puravidaiyanar	3.150	3.150	-	3.150	3.150	0	1
145	Govindapur	Burhabalang	1.490	1.488	1.500	0.380	2.420	0	6
146	Gummanur	Ponnaiyar	3.858	3.390	5.260	0.250	8.190	0	8
147	Gumrabazar	Gumra	2.650	2.797	2.210	0.640	8.340	0	8
148	Gunupur	Vamsadhara	2.295	2.446	1.540	0.070	8.160	0	6
149	Haladi	Haladi	1.967	2.125	1.020	0.320	5.400	0	7
150	Halia	Halia	3.345	3.345	-	1.790	6.070	0	4
151	Hamirpur	Yamuna	5.829	6.606	3.885	2.250	8.410	0	7
152	Handia	Narmada	1.538	1.857	0.580	0.180	2.780	0	8
153	Hanskhali	Churni	3.693	4.243	1.770	0.820	8.910	0	9
154	Haridwar	Ganga	3.059	3.710	1.105	0.510	7.370	0	8
155	Harlahalli	Tungabhadra	1.742	1.850	1.310	0.610	3.630	0	5
156	Hasimara	Torsa	4.170	6.430	1.910	1.910	6.430	0	2
157	Hathidah	Ganga	3.444	4.044	1.345	1.070	8.310	0	9
158	Hayaghat	Bagmathi	3.271	3.859	1.215	0.030	7.970	0	9
159	Hivra	Wardha	2.296	2.846	0.370	0.170	8.010	0	9
160	Hogenakkal	Chinnar	2.520	2.520	-	2.520	2.520	0	1
161	Holehonnur	Bhadra	1.364	1.308	1.700	0.150	3.670	0	7
162	Honnali	Tungabhadra	2.230	2.180	2.530	0.550	5.670	0	7
163	Hoshangabad	Narmada	2.093	2.482	0.925	0.490	7.430	0	8
164	Huvin Hedgi	Krishna	1.720	2.490	0.180	0.180	2.760	0	3
165	Jagdalpur	Indravathi	0.350	-	0.350	0.350	0.350	0	1
166	Jagibhakatgaon	Kopili	1.893	2.071	1.270	0.330	5.850	0	9
167	Jai Nagar	Kamala-Balan	2.621	2.553	2.860	0.430	8.860	0	9
168	Jaldhaka NH-31	Jaldhaka	2.720	2.820	2.520	2.030	3.610	0	3
169	Jammu Tawi	Chenab/Tawi	1.992	1.886	2.520	0.530	3.640	0	6
170	Jamshedpur	Subarnarekha	1.582	1.676	1.110	0.740	3.140	0	6
171	Jamsolghat	Subarnarekha	2.530	2.898	1.060	0.950	7.080	0	5
172	Japla	Sone	1.952	2.246	0.925	0.240	6.260	0	9
173	Jaraikela	Koel	2.872	2.744	3.510	0.630	5.360	0	6
174	Jenapur	Brahmani	1.563	1.394	2.410	0.540	2.410	0	6
175	Jhanjharpur	Kamala-Balan	2.364	2.569	1.650	0.060	7.110	0	9
176	Jiabharali NT Road	Jiabharali	2.699	2.531	3.285	0.080	6.600	0	9

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	Xing								
177	Jondhra	Seonath	-	-	-	0.000	0.000	0	0
178	K.M. Vadi	Lakshmantirtha	3.030	-	3.030	3.030	3.030	0	1
179	Kachlabridge	Ganga	4.141	4.922	1.800	0.440	9.150	0	8
180	Kalampur	Kaliyar	2.125	1.497	4.010	0.870	4.010	0	4
181	Kalanaur	Yamuna	2.295	2.650	0.695	0.520	7.370	0	11
182	Kallooppara	Manimala	4.358	5.010	2.400	2.400	5.320	0	4
183	Kalna (EBB)	Bhagirathi	2.890	2.330	3.450	0.910	5.990	0	4
184	Kalna (Flow)*	Bhagirathi	4.318	4.318	-	0.160	7.390	0	4
185	Kamalapuram	Papagni	1.645	-	1.645	0.630	2.660	0	2
186	Kamalpur	Banas	0.935	0.820	1.050	0.820	1.050	0	2
187	Kampur	Kopili	2.408	2.566	1.855	0.430	7.380	0	9
188	Kanpur	Ganga	4.369	5.308	1.550	0.390	8.670	0	8
189	Kantamal	Tel	2.205	2.205	-	2.100	2.310	0	2
190	Karad	Krishna	2.720	-	2.720	2.720	2.720	0	1
191	Karathodu	Kadalundi	3.013	2.953	3.190	1.160	4.810	0	4
192	Kashinagar	Vamsadhara	1.345	1.302	1.560	0.290	3.180	0	6
193	Katwa	Bhagirathi	2.362	1.641	4.885	0.110	9.140	0	9
194	Keesara	Munneru	1.803	2.065	1.280	1.280	2.680	0	3
195	Kellodu	Vedavathi	-	-	-	0.000	0.000	0	0
196	Keolari	Wainganga	2.188	2.313	1.750	0.470	7.750	0	9
197	Kesinga	Tel	2.170	2.170	-	2.150	2.190	0	2
198	Khanitar	Teesta	7.390	7.390	-	7.390	7.390	0	1
199	Khanpur	Mahi	2.282	2.810	0.435	0.340	4.760	0	9
200	Kharkhana	Surma/Myntdu	1.387	1.194	1.870	0.250	2.310	0	7
201	Khatoli	Parwati	2.761	3.599	0.665	0.420	6.270	0	7
202	Kheronighat	Kopili	1.344	1.241	1.705	0.300	2.590	0	9
203	Kidangoor	Meenachi	3.555	3.813	2.780	1.480	5.640	0	4
204	Kodumudi	Cauvery	2.530	2.530	2.530	1.190	4.670	0	5
205	Koelwar	Sone	1.856	2.143	0.850	0.360	4.920	0	9
206	Kogaon	Kundi	1.137	2.040	0.685	0.020	2.040	0	3
207	Kokrajhar	Gaurang	2.697	2.820	2.450	1.780	3.860	0	3
208	Kollegal	Cauvery	1.620	1.860	1.140	0.650	3.070	0	3
209	Konta	Sabari	2.746	3.205	0.910	0.910	6.830	0	5
210	Koperagaon	Godavari	1.430	-	1.430	1.430	1.430	0	1
211	Kora	Rind	5.154	3.320	7.905	0.190	9.390	0	5
212	Koteshwar	Bhagirath	3.421	3.632	2.895	0.500	9.270	0	7
213	Kudalaiyathur	Vellar	2.555	2.555	-	1.500	3.610	0	2
214	Kudige	Cauvery	1.656	1.513	2.510	0.050	4.080	0	7
215	Kudlur	Palar	3.937	4.275	3.260	3.260	5.290	0	3
216	Kuldah Bridge	Sone	2.459	2.195	3.250	0.280	6.220	0	8
217	Kulsi	Kulsi	1.186	1.290	0.820	0.060	2.680	0	9
218	Kumbidi	Bharathapuzha	3.455	3.533	3.220	2.140	5.160	0	4
219	Kumhari	Wainganga	1.942	2.226	0.950	0.440	7.920	0	9
220	Kuniyil	Chaliyar	4.383	4.583	3.780	2.240	7.970	0	4
221	Kuppelur	Kumudavathi	-	-	-	0.000	0.000	0	0

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222	Kurubhata	Mand	2.195	2.195	-	2.120	2.270	0	2
223	Kurundwad	Krishna	1.430	-	1.430	1.430	1.430	0	1
224	Kuttyadi	Kuttyadi	3.274	3.353	2.960	0.480	6.070	0	5
225	Kuzhithurai	Tambrapani	3.530	3.847	2.580	2.580	5.840	0	4
226	Labha	Mahananda	1.428	1.229	2.125	0.390	3.540	0	9
227	Lakhisarai	Kiul	2.160	2.742	0.415	0.020	6.260	0	8
228	Lalganj	Gandak	2.797	3.216	1.330	0.350	6.470	0	9
229	Lowara	Sheturni	2.256	2.689	0.740	0.120	6.250	0	9
230	Lucknow	Gomti	4.169	4.573	2.955	1.900	7.930	0	8
231	M.H. Halli	Hemavathi	2.150	2.150	-	1.140	3.160	0	2
232	Madhira	Wyra	2.790	2.790	-	0.990	4.590	0	2
233	Madla	Ken	2.249	2.414	1.835	0.070	5.630	0	7
234	Magaral	Cheyyar	7.550	7.550	-	7.550	7.550	0	1
235	Mahidpur	Sipra	1.016	1.078	0.985	0.340	1.630	0	3
236	Mahuwa	Purna	1.267	1.055	1.690	0.240	3.020	0	6
237	Maighat	Gomti	4.073	4.414	2.880	1.080	8.950	0	9
238	Majhitar	Rangit	3.780	3.780	-	3.780	3.780	0	1
239	Malakkara	Pampa	2.680	2.873	2.100	1.410	4.240	0	4
240	Malkhed	Kagna	1.563	2.023	0.180	0.180	3.340	0	4
241	Manas NH Crossing	Manas	2.140	1.300	2.980	1.300	2.980	0	2
242	Mancherial	Godavari	2.734	3.160	1.030	0.930	5.570	0	5
243	Mandleshwar	Narmada	1.319	1.605	0.460	0.070	3.170	0	8
244	Manendragarh	Hasdeo	-	-	-	0.000	0.000	0	0
245	Mangaon (Seasonal)	Kal	1.770	-	1.770	1.770	1.770	0	1
246	Mankara	Bharathapuzha	2.626	2.870	1.650	0.590	4.720	0	5
247	Manot	Narmada	2.459	2.847	1.295	0.220	8.680	0	8
248	Mantralayam	Tungabhadra	3.860	3.860	-	3.810	3.910	0	2
249	Marella	Gundlakamma	3.270	3.270	-	3.270	3.270	0	1
250	Margherita	Buridehing	1.667	1.714	1.500	0.060	4.590	0	9
251	Marol	Varada	2.500	-	2.500	2.500	2.500	0	1
252	Mataji	Mahi	2.286	2.839	0.350	0.250	6.680	0	9
253	Mathabhanga	Jaldhaka	2.060	1.905	2.370	1.160	2.650	0	3
254	Mathanguri	Beki	1.500	1.500	-	1.040	1.960	0	2
255	Mathura	Yamuna	3.539	3.768	2.505	1.090	8.340	0	11
256	Matigara	Balason	3.265	3.265	-	2.110	4.420	0	2
257	Matijuri	Dhaleshwari	2.945	3.068	2.700	0.290	6.990	0	6
258	Matunga	Kalanadi	1.492	1.597	1.125	0.140	3.050	0	9
259	Mawi	Yamuna	3.131	3.596	1.040	0.730	8.160	0	11
260	Meja Road	Tons	1.758	2.265	0.235	0.190	5.880	0	8
261	Mekhliganj	Teesta	3.310	3.490	3.130	3.130	3.490	0	2
262	Menangudi	Cauvery/Noolar	1.740	1.740	-	1.740	1.740	0	1
263	Miao	Neo dihing	1.450	1.314	1.925	0.240	3.690	0	9
264	Mirzapur	Ganga	3.382	3.893	1.595	0.770	8.410	0	9
265	Mohana (Betwa)	Betwa	2.043	2.338	1.305	0.400	4.250	0	7
266	Mohana (Yamuna)	Yamuna	2.369	2.743	0.685	0.120	7.040	0	11
267	Mohgaoan	Burhner	1.495	1.552	1.325	0.370	4.720	0	8

S. No.	Water Quality Site	River	Arsenic (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 10 µg/L	Below 10 µg/L
268	Moradabad	Ramganga	2.745	2.887	2.320	1.180	4.370	0	8
269	Motinaroli	Kim	1.937	2.008	1.760	0.040	5.620	0	7
270	Murappanadu	Tambrapani	2.702	1.718	7.620	0.010	7.620	0	6
271	Muri	Subarnarekha	3.438	3.794	1.660	1.330	6.740	0	6
272	Murti	Murti	3.810	3.810	-	3.810	3.810	0	1
273	Musiri	Cauvery	2.196	2.196	-	0.470	4.100	0	5
274	Muthankera	Kabini	3.462	2.240	8.350	1.240	8.350	0	5
275	Nagalamadike	Pennar	4.780	4.780	-	4.780	4.780	0	1
276	Nagrakata	Jaldhaka	3.400	3.400	-	3.400	3.400	0	1
277	Naharkatia	Buridehing	1.530	1.654	1.095	0.340	3.730	0	9
278	Naidupet	Swarnamukhi	-	-	-	0.000	0.000	0	0
279	Nallammaranpatty	Amaravathi	3.010	3.920	2.100	2.100	3.920	0	2
280	Nallathur	Nandalar	2.627	2.627	-	2.060	3.040	0	3
281	Namsai	Neo dihing	1.257	1.043	2.005	0.280	3.300	0	9
282	Nandgaon	Wunna	2.625	1.993	3.890	0.100	7.680	0	6
283	Nandipalli	Sagaileru	3.667	6.500	2.250	1.580	6.500	0	3
284	Nanglamoraghat	Desang	2.630	2.929	1.585	0.170	7.100	0	9
285	Neamatighat	Brahmaputra	2.437	2.421	2.490	0.240	5.550	0	9
286	Neeleswaram	Periyar	3.024	2.945	3.340	0.720	7.430	0	5
287	Neemsar	Gomti	3.993	5.072	1.295	0.170	8.100	0	7
288	Nellithurai	Bhavani	3.615	3.615	-	0.660	6.570	0	2
289	Nellore	Pennar	2.075	2.075	-	1.700	2.450	0	2
290	Neora	Naora	5.710	5.710	-	5.710	5.710	0	1
291	Nowrangpur	Indravathi	1.404	1.688	0.270	0.270	3.150	0	5
292	Numaligarh	Dhansiri	2.604	2.945	1.580	0.300	8.430	0	8
293	P.G.Bridge	Penganga	2.981	2.654	3.800	0.640	6.940	0	7
294	Pachauli	Sind	0.710	-	0.710	0.710	0.710	0	1
295	Pachegaon	Pravara	0.950	-	0.950	0.950	0.950	0	1
296	Paderdibadi	Mahi	2.573	3.154	0.540	0.270	5.780	0	9
297	Pagladiya N.T.Road Crossing	Pagladiya	1.408	1.469	1.195	0.070	4.090	0	9
298	Paleru Bridge	Paleru	1.290	1.693	0.080	0.080	2.350	0	4
299	Paliakalan	Sharda	2.748	2.680	2.950	0.510	7.400	0	8
300	Palla	Yamuna	1.951	2.273	0.505	0.400	6.810	0	11
301	Panbari	Burisuti	4.380	4.380	-	4.380	4.380	0	1
302	Pancharatna	Brahmaputra	1.093	1.167	0.835	0.090	3.190	0	9
303	Pandu	Brahmaputra	1.713	1.864	1.185	0.400	5.170	0	9
304	Panposh	Brahmani	2.482	2.602	1.880	1.170	4.020	0	6
305	Passighat	Siang	3.203	3.203	-	0.670	5.950	0	3
306	Patan	Hiran	3.253	3.092	3.655	0.290	8.710	0	7
307	Pathagudem	Indravathi	1.714	2.070	0.290	0.290	3.740	0	5
308	Pathardhi	Kharun	-	-	-	0.000	0.000	0	0
309	Pati	Goi	1.255	1.420	0.760	0.340	2.250	0	4
310	Patna	Ganga	4.111	5.050	0.825	0.690	8.690	0	9
311	Pattazhy	Kallada	2.596	2.755	1.960	0.470	4.540	0	5
312	Pauni	Wainganga	2.227	2.341	1.825	0.700	5.110	0	9

S. No.	Water Quality Site	River	Arsenic (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 10 µg/L	Below 10 µg/L
313	Peralam	Vanjiyar	5.560	5.560	-	5.560	5.560	0	1
314	Perumannu	Valapatnam	2.762	2.423	4.120	0.400	5.730	0	5
315	Perur	Godavari	3.004	3.633	0.490	0.490	5.170	0	5
316	Phulgaon (Seasonal)	Varna	2.390	-	2.390	2.390	2.390	0	1
317	Pingalwada	Dhadher	1.941	1.972	1.865	0.450	4.510	0	7
318	Poanta	Yamuna	1.070	1.070	-	0.610	1.530	0	2
319	Polavaram	Godavari	1.920	2.003	1.590	0.060	3.630	0	5
320	Pratapgarh	Sai	2.890	2.763	3.270	0.100	7.020	0	8
321	Pratapur	Yamuna	2.990	3.428	1.895	0.200	9.010	0	7
322	Prem Nagar	Chenab	2.483	2.350	3.150	0.770	3.980	0	6
323	Pudur	Kannadipuzha	2.768	3.017	2.020	1.570	4.250	0	4
324	Pulamanthole	Pulanthodu	3.284	3.475	2.520	1.000	8.090	0	5
325	Purna	Purna	1.610	1.610	-	1.610	1.610	0	1
326	Purushottampur	Rushikulya	1.765	1.722	1.980	0.920	3.660	0	6
327	Puthimari D.R.F.	Puthimari	1.347	1.534	0.690	0.010	3.900	0	9
328	Puthimari NH Road crossing	Puthimari	1.855	2.093	1.140	0.140	4.190	0	8
329	Raibareli	Sai	3.740	4.002	3.085	0.550	8.030	0	7
330	Rajapur	Yamuna	4.713	5.028	3.925	1.090	8.610	0	7
331	Rajegaon	Bagh	2.181	2.630	1.060	0.640	6.940	0	7
332	Rajghat	Betwa	2.634	3.697	1.040	0.930	4.160	0	5
333	Rajim	Mahanadi	-	-	-	0.000	0.000	0	0
334	Ram Munshi Bagh	Jhelum	1.913	1.678	3.090	0.010	3.450	0	6
335	Ramakona	Kanhan	2.599	2.942	1.740	1.260	7.650	0	7
336	Ramamangalam	Muvvattupuzha	2.924	3.053	2.410	0.440	7.160	0	5
337	Rampur	Jonk	3.130	3.130	-	3.130	3.130	0	1
338	Ranganadi NT-Road Xing	Ranganadi	2.982	2.909	3.240	0.160	7.030	0	9
339	Rangeli	Som	2.363	2.949	0.310	0.180	5.800	0	9
340	Rangpo	Rangpochu	8.950	8.950	-	8.950	8.950	0	1
341	Regauli	Rapti	2.300	2.780	0.860	0.320	5.850	0	8
342	Rishikesh	Ganga	4.578	4.770	3.905	1.850	9.380	0	9
343	Rudraprayag	Alaknanda	4.216	5.085	1.610	0.830	9.380	0	8
344	Safapora	Jhelum	2.290	2.154	2.970	0.230	3.790	0	6
345	Sakleshpur	Hemavathi	2.017	2.192	0.970	0.030	5.980	0	7
346	Sakmur	Wardha	2.041	2.107	1.810	0.880	3.620	0	9
347	Salebhata	Ong	2.485	2.485	-	1.870	3.100	0	2
348	Samdoli	Varna	2.230	-	2.230	2.230	2.230	0	1
349	Sandia	Narmada	1.733	1.630	2.040	0.070	4.870	0	8
350	Sangam J	Jhelum	2.143	1.936	3.180	0.250	3.870	0	6
351	Sangam K	Kinnerasani	4.083	5.353	0.270	0.270	6.540	0	4
352	Sangod	Parwan	0.446	0.388	0.475	0.050	0.900	0	3
353	Sankalan	Teesta	8.290	8.290	-	8.290	8.290	0	1
354	Sankosh LRP	Sankosh	5.640	8.270	3.010	3.010	8.270	0	2
355	Santeguli	Aghanashini	1.959	2.142	0.860	0.650	6.640	0	7
356	Sarangkheda	Tapi	1.343	1.538	0.955	0.040	2.100	0	6

S. No.	Water Quality Site	River	Arsenic (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 10 µg/L	Below 10 µg/L
357	Satrapur	Kanhan	1.979	2.270	0.960	0.150	5.840	0	9
358	Savandapur	Bhavani	2.804	2.790	2.845	0.190	6.940	0	8
359	Seondha	Sind	2.563	2.553	2.590	0.440	4.530	0	4
360	Seppa	Kamang	1.464	1.577	1.070	0.020	6.160	0	9
361	Sevanur	Chittar	-	-	-	0.000	0.000	0	0
362	Sevoke	Teesta	7.950	7.950	-	7.950	7.950	0	1
363	Shahijina	Betwa	2.440	2.306	2.775	0.150	4.230	0	7
364	Shahzadpur	Ganga	5.059	5.148	4.790	1.270	9.710	0	8
365	Shimoga	Tunga	1.837	1.924	1.400	0.490	3.450	0	6
366	Sibbari	Dareng	1.787	1.368	2.835	0.210	3.930	0	7
367	Sikandarpur	Burhi Gandak	4.083	4.529	2.525	0.580	7.930	0	9
368	Simga	Seonath	3.250	3.250	-	3.250	3.250	0	1
369	Singla-Bazar	Rangit	4.590	4.590	-	4.590	4.590	0	1
370	Sivasagar	Dikhow	2.106	2.077	2.205	0.030	7.740	0	9
371	Sonapur	Digaru	1.556	1.660	0.930	0.030	3.340	0	7
372	Sonapurhat	Mahananda	2.715	2.715	-	1.580	3.850	0	2
373	Srikakulam	Nagavali	1.552	1.444	2.090	1.010	2.410	0	6
374	Srinagar	Alakananda	5.500	6.443	1.730	1.560	9.520	0	5
375	Sripalpur	Punpun	2.153	2.621	0.515	0.120	4.750	0	9
376	Suklai	Suklai	1.382	1.530	0.865	0.080	4.590	0	9
377	Sultanpur	Gomti	5.363	6.532	1.855	1.580	8.760	0	8
378	Sulurpet	Kalingi	2.530	2.530	-	2.530	2.530	0	1
379	Sundergarh	Ib	1.630	1.630	-	0.920	2.340	0	2
380	T. Bekuppe	Arkavathi	2.139	2.365	0.780	0.380	7.020	0	7
381	T. Narasipur	Kabini	1.533	1.713	0.990	0.750	3.390	0	4
382	T. Ramapuram	Hagari	1.790	1.790	-	1.790	1.790	0	1
383	T.K.Halli	Shimsha	2.260	2.260	-	0.510	4.010	0	2
384	Tal	Chambal	1.496	1.708	1.390	0.980	1.800	0	3
385	Talcher	Brahmani	1.638	1.262	3.520	0.130	3.900	0	6
386	Tandi	Chenab/Bhaga	2.680	-	2.680	2.680	2.680	0	1
387	Teesta-Bazar	Teesta	2.433	2.390	2.520	1.510	3.270	0	3
388	Tehri	Bhagirath	3.495	3.495	-	1.140	5.850	0	2
389	Tekra	Pranhitha	2.407	2.761	1.165	0.200	7.960	0	9
390	Tezpur	Brahmaputra	1.929	1.791	2.410	0.100	3.580	0	9
391	Tezu	Lohit	1.426	1.003	2.695	0.170	2.720	0	8
392	Thengudi	Thirumalairajanar	5.580	5.580	-	5.580	5.580	0	1
393	Thengumarahada	Moyar	3.365	2.737	5.250	0.210	8.170	0	8
394	Theni	Suruliar	2.841	2.218	4.710	0.410	6.970	0	8
395	Therriaghat	Umsohrynkiew	1.300	1.532	0.720	0.530	2.040	0	7
396	Thevur	Sarabenga	-	-	-	0.000	0.000	0	0
397	Thimmanahalli	Yagachi	1.130	1.130	-	0.380	2.480	0	4
398	Thoppur	Thoppaiyar	2.900	-	2.900	2.900	2.900	0	1
399	Thumpamon	Achankovil	3.160	3.377	2.510	1.770	5.480	0	4
400	Tikarpara	Mahanadi	2.445	2.550	1.920	1.080	3.780	0	6
401	Tilga	Sankh	2.175	2.270	1.700	0.300	5.680	0	6

S. No.	Water Quality Site	River	Arsenic (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 10 µg/L	Below 10 µg/L
402	Tonk	Banas	2.189	4.168	0.210	0.210	4.168	0	2
403	Tribeni	Gandak	3.046	3.066	2.975	0.460	5.490	0	9
404	Tufanganj	Raidak-I	3.840	4.180	3.160	1.520	6.840	0	3
405	Tuini	Tuini	2.274	2.647	0.595	0.450	7.080	0	11
406	Turtipar	Ghagra	4.098	4.617	2.540	0.330	8.800	0	8
407	Udaipur (Chandra)	Chenab/Chandra	2.690	-	2.690	2.690	2.690	0	1
408	Udaipur (Tirap)	Tirap	1.692	1.964	0.740	0.050	5.730	0	9
409	Udi	Chambal	2.280	2.066	2.815	0.410	4.520	0	7
410	Ujjain	Sipra	1.179	2.338	0.020	0.020	2.338	0	2
411	Urachikottai	Cauvery	2.815	2.170	4.750	0.130	4.750	0	4
412	Uttarkashi	Bhagirath	5.098	5.820	2.570	0.020	8.880	0	9
413	Vandiperiyar	Periyar	2.275	1.917	3.350	1.430	3.350	0	4
414	Vapi	Damanganga	2.127	2.346	1.580	0.020	8.810	0	7
415	Varanasi	Ganga	4.038	4.631	1.960	1.040	7.090	0	9
416	Vautha	Sabarmati	1.870	2.017	1.355	0.020	3.170	0	9
417	Vazhavachanur	Ponnaiyar	1.305	1.305	-	0.000	2.520	0	2
418	Villupuram	Ponnaiyar	0.070	0.070	-	0.070	0.070	0	1
419	Wadenapally	Krishna	2.182	2.690	0.150	0.150	4.070	0	5
420	Wairagarh	Khobragarhi	2.096	2.677	1.225	0.320	4.190	0	5
421	Warunji	Koyna	2.160	-	2.160	2.160	2.160	0	1
422	Yadgir	Bhima	0.600	-	0.600	0.600	0.600	0	1
423	Yashwant nagar	Giri	1.580	1.758	0.780	0.170	3.600	0	11
424	Yennehole	Yennehole	1.633	1.075	2.750	0.020	2.750	0	3

CADMIUM

S. No.	Water Quality Site	River	Cadmium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 3 µg/L	Below 3 µg/L
1	A B Road Xing	Parwati	0.083	0.161	0.044	0.002	0.161	0	3
2	A.P. Puram	Chittar	0.483	0.483	-	0.035	1.507	0	5
3	A.P.Ghat	Barak	0.087	0.060	0.157	0.002	0.230	0	7
4	Aauriya	Yamuna	0.217	0.190	0.313	0.043	0.525	0	9
5	Abu Road	Banas	0.197	0.126	0.548	0.004	0.548	0	6
6	Addoor	Gurupur	0.184	0.150	0.218	0.150	0.218	0	2
7	Adityapur	Kharkai	0.415	0.440	0.239	0.003	2.675	0	8
8	Agra	Yamuna	0.189	0.182	0.214	0.002	0.495	0	9
9	Aie NH Crossing	Aie	0.119	0.119	-	0.068	0.145	0	3
10	Akabarpur	Chhoti Sarju	0.173	0.188	0.137	0.064	0.290	0	7
11	Akhnoor	Chenab	0.068	0.060	0.120	0.007	0.129	0	7
12	Akkihebbal	Hemavathi	0.044	0.040	0.070	0.006	0.074	0	8
13	Aklera	Parwan	0.183	0.258	0.071	0.025	0.389	0	5
14	Alladupalli	Kunderu	0.184	0.214	0.066	0.001	0.901	0	10
15	Allahabad	Ganga	0.188	0.182	0.218	0.039	0.593	0	11
16	Alutuma	Ramyala	0.463	0.446	0.549	0.002	2.007	0	6
17	Ambarampalayam	Aliyar	0.279	0.342	0.027	0.002	1.118	0	10
18	Ambasamudram	Vaigai	0.281	0.281	-	0.032	0.529	0	2
19	Anandpur	Ganga	0.322	0.247	0.846	0.032	0.860	0	8
20	Andhiyar Kore	Hamp	0.118	0.118	-	0.038	0.257	0	3
21	Ankinghat	Ganga	0.503	0.547	0.325	0.016	2.047	0	10
22	Annavasal	Nattar	0.248	0.248	-	0.248	0.248	0	1
23	Arangaly	Chalakudy	0.066	0.078	0.019	0.019	0.123	0	5
24	Arcot	Palar	0.100	0.064	0.136	0.064	0.136	0	2
25	Arjunwad	Krishna	0.020	-	0.020	0.020	0.020	0	1
26	Ashramam	Pazhayar	0.035	0.040	0.016	0.001	0.070	0	5
27	Ashti	Wainganga	0.233	0.223	0.275	0.017	0.741	0	11
28	Avarankuppam	Palar	0.091	0.091	-	0.091	0.091	0	1
29	Avershe	Sita	0.100	0.052	0.294	0.018	0.294	0	5
30	Ayilam	Vamanapuram	0.037	0.044	0.009	0.009	0.071	0	5
31	Ayodhya	Saryu	0.624	0.738	0.170	0.010	4.138	1	9
32	Azmabad	Ganga	0.161	0.103	0.422	0.001	0.687	0	11
33	B.P. Ghat	Barak	0.102	0.028	0.322	0.009	0.569	0	8
34	Badatighat	Subansiri	0.147	0.164	0.073	0.008	0.879	0	11
35	Badlapur	Ulhas	0.981	1.123	0.268	0.038	5.017	1	5
36	Balrampur	Rapti	0.546	0.629	0.212	0.027	3.493	1	9
37	Baltara	Kosi	0.408	0.357	0.641	0.019	2.219	0	11
38	Bamni (Banjar)	Banjar	0.151	0.181	0.045	0.026	0.835	0	9
39	Bamni (Wardha)	Wardha	0.457	0.486	0.326	0.057	1.487	0	11
40	Bamnidih	Hasdeo	0.100	0.100	-	0.097	0.103	0	3
41	Banda	Ken	0.634	0.443	1.303	0.095	2.510	0	9

S. No.	Water Quality Site	River	Cadmium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 3 µg/L	Below 3 µg/L
42	Bansi	Rapti	0.922	1.096	0.314	0.053	3.311	1	8
43	Bantwal	Nethravathi	0.076	0.041	0.148	0.011	0.148	0	3
44	Baranwada	Banas	0.160	0.130	0.251	0.041	0.251	0	4
45	Bareilly	Ramganga	0.343	0.397	0.128	0.070	1.749	0	10
46	Barmanghat	Narmada	0.114	0.125	0.068	0.002	0.705	0	10
47	Barobisha	Raidak-II	0.076	0.065	0.122	0.046	0.122	0	5
48	Barod	Kali Sindh	0.126	0.144	0.073	0.008	0.484	0	8
49	Baronda	Pairi	0.582	0.582	-	0.582	0.582	0	1
50	Basantpur	Mahanadi	0.259	0.259	-	0.072	0.752	0	4
51	Basti	Kwano	0.435	0.524	0.077	0.033	2.609	0	10
52	Bawapuram	Tungabhadra	2.334	2.334	-	0.119	5.475	1	2
53	Behalpur	Champamati	0.189	0.189	-	0.015	0.363	0	2
54	Beki Mathanguri	Beki	0.090	0.090	-	0.053	0.127	0	2
55	Beki Road Bridge	Beki	0.117	0.102	0.177	0.050	0.177	0	5
56	Belkhedi	Sher	0.188	0.217	0.072	0.002	0.825	0	10
57	Belne Bridge	Gad	0.160	0.087	0.233	0.087	0.233	0	2
58	Bendrahalli	Suvarnavathi	0.058	0.058	-	0.058	0.058	0	1
59	Berhampore	Bhagirathi	0.126	0.142	0.053	0.002	0.427	0	11
60	Bhadrachalam	Godavari	0.234	0.163	0.590	0.035	0.590	0	6
61	Bhalukpong	Jiabharali	0.064	0.070	0.038	0.002	0.208	0	11
62	Bhatpalli	Peddavagu	0.194	0.171	0.295	0.023	0.439	0	11
63	Bhitaura	Ganga	0.471	0.531	0.230	0.077	1.713	0	10
64	Bhomoraguri	Brahmaputra	0.072	0.074	0.063	0.002	0.252	0	11
65	Bihubar	Dikhow	0.111	0.106	0.130	0.015	0.423	0	11
66	Biligundullu	Cauvery	0.089	0.099	0.015	0.009	0.321	0	8
67	Birdghat	Rapti	0.563	0.676	0.109	0.040	2.834	0	10
68	Bokajan	Dhansiri	0.095	0.097	0.086	0.012	0.366	0	11
69	Burhanpur	Tapi	0.399	0.493	0.119	0.010	2.333	0	8
70	Buxar	Ganga	0.137	0.148	0.085	0.002	0.644	0	11
71	Byaladahalli	Haridra	0.103	0.103	-	0.028	0.215	0	3
72	Champasari	Mahananda	0.098	0.098	-	0.059	0.166	0	4
73	Champua	Ganga	0.201	0.207	0.165	0.068	0.426	0	7
74	Chanwada	Orsang	1.756	2.207	0.177	0.007	11.938	2	7
75	Chapra	Jalangi	0.067	0.071	0.051	0.002	0.189	0	11
76	Chel	Chel	0.088	0.088	-	0.012	0.185	0	3
77	Chengalpet	Palar	0.058	0.049	0.083	0.022	0.091	0	4
78	Chenimari	Buridehing	0.599	0.693	0.175	0.011	5.149	1	10
79	Chennur	Pennar	0.116	0.123	0.091	0.005	0.683	0	10
80	Chepan	Raidak-I	0.154	0.169	0.094	0.073	0.297	0	5
81	Chhidgaon	Ganjal	0.153	0.170	0.083	0.023	0.702	0	10
82	Chitrasani	Balaram	0.180	0.174	0.203	0.008	0.875	0	9
83	Chittorgarh	Gambhiri	0.800	0.800	-	0.800	0.800	0	1
84	Cholachguda	Malaprabha	0.259	0.259	-	0.259	0.259	0	1

S. No.	Water Quality Site	River	Cadmium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 3 µg/L	Below 3 µg/L
85	Chopan	Sone	0.495	0.512	0.418	0.030	3.034	1	10
86	Chouldhowaghat	Subansiri	0.112	0.118	0.083	0.006	0.410	0	11
87	Chuchankatte	Cauvery	0.358	0.021	1.032	0.015	1.032	0	3
88	Coronation	Teesta	0.086	0.086	-	0.051	0.118	0	3
89	Dabri	Ramganga	0.428	0.519	0.065	0.032	1.455	0	10
90	Damarcherla	Musi	0.843	0.843	-	0.020	2.392	0	5
91	Dawki	Umngot	0.087	0.048	0.187	0.006	0.286	0	7
92	Delhi Rly Bridge	Yamuna	1.127	1.366	0.055	0.005	7.248	2	9
93	Deoprayag	Bhagirath	0.172	0.186	0.107	0.005	0.625	0	11
94	Derol Bridge	Sabarmati	0.076	0.067	0.114	0.010	0.187	0	11
95	Desangpani	Desang	0.138	0.158	0.049	0.030	0.773	0	11
96	Dhamkund	Chenab	0.180	0.192	0.107	0.004	0.767	0	7
97	Dharamtul	Kopili	0.534	0.630	0.104	0.007	5.074	1	10
98	Dheng Bridge	Bagmathi	0.111	0.091	0.199	0.010	0.348	0	11
99	Dholabazar	Lohit	0.195	0.226	0.058	0.003	1.314	0	11
100	Dholai	Rukni	0.166	0.132	0.267	0.010	0.638	0	8
101	Dholpur	Chambal	0.350	0.257	0.674	0.029	1.251	0	9
102	Dhubri	Brahmaputra	0.056	0.056	-	0.049	0.062	0	2
103	Dhulsar	Uri	0.044	0.002	0.086	0.002	0.086	0	2
104	Diana	Diana	0.044	0.044	-	0.044	0.044	0	1
105	Dibrugarh	Brahmaputra	0.132	0.141	0.093	0.005	0.846	0	11
106	Dillighat	Desang	0.146	0.097	0.368	0.020	0.629	0	11
107	Dimapara	Bugi	0.065	0.043	0.121	0.003	0.170	0	7
108	Dindori	Narmada	0.205	0.243	0.052	0.016	1.201	0	10
109	Domohani	Teesta	0.105	0.107	0.094	0.062	0.221	0	5
110	Duddhi	Kanhar	0.124	0.119	0.147	0.021	0.289	0	11
111	Dudhnai	Dudhnai	0.154	0.175	0.060	0.013	0.645	0	11
112	Durvesh	Vaitarna	5.896	7.834	0.082	0.011	33.809	2	6
113	Ekmighat	Bagmathi	0.156	0.157	0.153	0.003	0.504	0	11
114	Elginbridge	Ghagra	0.599	0.718	0.124	0.010	4.558	1	9
115	Elunuthimanagalam	Noyyal	5.161	5.161	-	0.397	15.946	1	3
116	English Bazar	Padma/Mahananda	0.170	0.194	0.059	0.008	0.768	0	11
117	Erinjipuzha	Payaswani	0.044	0.050	0.021	0.005	0.073	0	5
118	Etawah	Yamuna	0.301	0.363	0.084	0.079	0.926	0	9
119	Fakirabazar	Longai	0.057	0.030	0.124	0.003	0.175	0	7
120	Farakka	Ganga	0.173	0.197	0.067	0.010	0.723	0	11
121	Farakka/(HR)	Feeder Canal	0.150	0.175	0.050	0.004	0.794	0	10
122	Fatehgarh	Ganga	0.478	0.563	0.139	0.016	2.222	0	10
123	Fulertal	Barak	0.408	0.580	0.062	0.008	1.458	0	6
124	Gadarwara	Sakkar	0.135	0.163	0.050	0.008	0.726	0	8
125	Gadat	Ambika	0.143	0.173	0.052	0.002	0.663	0	8
126	Gajaldoba	Teesta	0.155	0.155	-	0.034	0.307	0	3
127	Galeta	Hindon	0.941	1.131	0.084	0.003	4.959	2	9

S. No.	Water Quality Site	River	Cadmium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 3 µg/L	Below 3 µg/L
128	Ganod	Bhadar	0.242	0.250	0.175	0.023	1.253	0	9
129	Garhamukteshwar	Ganga	0.503	0.535	0.374	0.021	2.415	0	10
130	Garrauli	Dhasan	0.197	0.243	0.128	0.038	0.487	0	5
131	Garudeshwar	Narmada	0.144	0.155	0.106	0.004	0.635	0	9
132	Gaya	Harohar/Phalgu	0.162	0.177	0.147	0.124	0.229	0	4
133	Gelabil	Doyang	0.071	0.062	0.090	0.010	0.116	0	6
134	Ghat	Sarju	0.407	0.474	0.141	0.038	2.533	0	10
135	Ghatora	Seonath	0.083	0.083	-	0.062	0.099	0	3
136	Ghatsila	Subarnarekha	0.254	0.282	0.061	0.009	1.017	0	8
137	Ghish	Ghish	0.081	0.081	-	0.031	0.167	0	3
138	Ghugumari	Torsa	0.092	0.079	0.143	0.049	0.143	0	5
139	Gokak	Ghataprabha	0.653	1.294	0.011	0.011	1.294	0	2
140	Golaghat	Sonkosh	0.210	0.233	0.104	0.003	0.913	0	11
141	Golakganj	Dhansiri	0.102	0.102	-	0.084	0.119	0	2
142	Gomlai	Brahmani	0.249	0.195	0.626	0.006	0.688	0	8
143	Gopalkheda	Purna	0.134	0.200	0.067	0.038	0.236	0	4
144	Gopurajapuram	Cauvery/Puravidaiyanar	0.023	0.023	-	0.023	0.023	0	1
145	Govindapur	Burhabalang	0.206	0.130	0.736	0.010	0.736	0	8
146	Gummanur	Ponnaiyar	0.178	0.213	0.038	0.015	1.157	0	10
147	Gumrabazar	Gumra	0.173	0.182	0.146	0.035	0.510	0	8
148	Gunupur	Vamsadhara	0.116	0.075	0.404	0.015	0.404	0	8
149	Haladi	Haladi	0.133	0.052	0.703	0.002	0.703	0	8
150	Halia	Halia	0.730	0.730	-	0.030	2.130	0	5
151	Hamirpur	Yamuna	0.400	0.490	0.084	0.035	2.534	0	9
152	Handia	Narmada	0.138	0.159	0.053	0.015	0.659	0	10
153	Hanskhali	Churni	0.097	0.106	0.055	0.004	0.317	0	11
154	Haridwar	Ganga	0.034	0.029	0.053	0.002	0.102	0	10
155	Harlahalli	Tungabhadra	0.107	0.074	0.274	0.036	0.274	0	6
156	Hasimara	Torsa	0.137	0.116	0.198	0.060	0.198	0	4
157	Hathidah	Ganga	0.093	0.099	0.066	0.004	0.480	0	11
158	Hayaghat	Bagmathi	0.223	0.182	0.411	0.002	1.147	0	11
159	Hivra	Wardha	0.212	0.201	0.262	0.017	0.482	0	11
160	Hogenakkal	Chinnar	0.205	0.205	-	0.205	0.205	0	1
161	Holehonnur	Bhadra	0.094	0.045	0.439	0.010	0.439	0	8
162	Honnali	Tungabhadra	0.123	0.090	0.354	0.003	0.457	0	8
163	Hoshangabad	Narmada	0.151	0.174	0.058	0.009	0.629	0	10
164	Huvin Hedgi	Krishna	0.860	1.007	0.272	0.010	2.708	0	5
165	Jagdalpur	Indravathi	0.257	0.039	0.475	0.039	0.475	0	2
166	Jagibhakatgaon	Kopili	0.092	0.081	0.140	0.003	0.248	0	11
167	Jai Nagar	Kamala-Balan	0.140	0.117	0.242	0.001	0.589	0	11
168	Jaldhaka NH-31	Jaldhaka	0.195	0.207	0.146	0.065	0.612	0	5
169	Jammu Tawi	Chenab/Tawi	0.071	0.050	0.200	0.001	0.200	0	7
170	Jamshedpur	Subarnarekha	0.419	0.321	1.107	0.004	1.533	0	8

S. No.	Water Quality Site	River	Cadmium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 3 µg/L	Below 3 µg/L
171	Jamsolghat	Subarnarekha	0.193	0.211	0.119	0.071	0.404	0	5
172	Japla	Sone	0.364	0.370	0.335	0.012	1.440	0	11
173	Jaraikela	Koel	0.293	0.327	0.051	0.002	1.536	0	8
174	Jenapur	Brahmani	0.330	0.292	0.592	0.026	0.658	0	8
175	Jhanjharpur	Kamala-Balan	0.077	0.063	0.142	0.010	0.176	0	11
176	Jiabharali NT Road Xing	Jiabharali	0.244	0.084	0.966	0.010	1.846	0	11
177	Jondhra	Seonath	0.008	0.008	-	0.008	0.008	0	1
178	K.M. Vadi	Lakshmantirtha	0.295	0.252	0.380	0.079	0.425	0	3
179	Kachlabridge	Ganga	0.410	0.458	0.216	0.040	2.304	0	10
180	Kalampur	Kaliyar	0.058	0.071	0.007	0.007	0.112	0	5
181	Kalanaur	Yamuna	0.198	0.217	0.112	0.006	1.126	0	11
182	Kallooppara	Manimala	0.042	0.049	0.014	0.014	0.078	0	5
183	Kalna (EBB)	Bhagirathi	0.083	0.096	0.056	0.022	0.200	0	6
184	Kalna (Flow)*	Bhagirathi	0.057	0.057	-	0.003	0.188	0	4
185	Kamalapuram	Papagni	0.103	-	0.103	0.083	0.123	0	2
186	Kamalpur	Banas	0.133	0.037	0.325	0.012	0.325	0	3
187	Kampur	Kopili	0.591	0.709	0.060	0.006	5.086	1	10
188	Kanpur	Ganga	0.429	0.498	0.151	0.076	1.901	0	10
189	Kantamal	Tel	0.174	0.174	-	0.056	0.457	0	4
190	Karad	Krishna	0.219	-	0.219	0.219	0.219	0	1
191	Karathodu	Kadalundi	0.051	0.056	0.032	0.029	0.078	0	5
192	Kashinagar	Vamsadhara	0.093	0.090	0.117	0.020	0.143	0	8
193	Katwa	Bhagirathi	0.082	0.089	0.053	0.005	0.233	0	11
194	Keesara	Munneru	1.013	1.245	0.314	0.041	2.904	0	4
195	Kellodu	Vedavathi	0.059	0.059	-	0.059	0.059	0	1
196	Keolari	Wainganga	0.191	0.203	0.140	0.049	0.541	0	11
197	Kesinga	Tel	0.283	0.283	-	0.035	0.972	0	4
198	Khanitar	Teesta	0.104	0.104	-	0.025	0.183	0	2
199	Khanpur	Mahi	0.174	0.179	0.154	0.006	1.047	0	11
200	Kharkhana	Surma/Myntdu	0.134	0.165	0.055	0.010	0.389	0	7
201	Khatoli	Parwati	0.143	0.190	0.028	0.026	0.544	0	7
202	Kheronighat	Kopili	0.144	0.144	0.145	0.007	0.633	0	11
203	Kidangoor	Meenachi	0.026	0.027	0.020	0.013	0.061	0	5
204	Kodumudi	Cauvery	0.203	0.226	0.064	0.011	1.108	0	7
205	Koelwar	Sone	0.466	0.386	0.825	0.026	2.522	0	11
206	Kogaon	Kundi	0.053	0.060	0.047	0.013	0.102	0	4
207	Kokrajhar	Gaurang	0.126	0.094	0.252	0.058	0.252	0	5
208	Kollegal	Cauvery	0.344	0.027	1.609	0.012	1.609	0	5
209	Konta	Sabari	0.188	0.099	0.634	0.015	0.634	0	6
210	Koperagaon	Godavari	0.526	-	0.526	0.526	0.526	0	1
211	Kora	Rind	0.277	0.305	0.206	0.053	0.877	0	7
212	Koteshwar	Bhagirath	0.077	0.052	0.164	0.005	0.241	0	9
213	Kudalaiyathur	Vellar	0.059	0.059	-	0.055	0.063	0	2

S. No.	Water Quality Site	River	Cadmium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 3 µg/L	Below 3 µg/L
214	Kudige	Cauvery	0.053	0.030	0.212	0.008	0.212	0	8
215	Kudlur	Palar	0.050	0.063	0.010	0.010	0.125	0	4
216	Kuldah Bridge	Sone	0.162	0.111	0.362	0.006	0.605	0	10
217	Kulsi	Kulsi	0.166	0.191	0.053	0.010	0.352	0	11
218	Kumbidi	Bharathapuzha	0.056	0.067	0.012	0.012	0.096	0	5
219	Kumhari	Wainganga	0.155	0.097	0.416	0.028	0.549	0	11
220	Kuniyil	Chaliyar	0.389	0.477	0.036	0.002	1.718	0	5
221	Kuppelur	Kumudavathi	0.081	0.081	-	0.081	0.081	0	1
222	Kurubhata	Mand	0.065	0.065	-	0.023	0.136	0	4
223	Kurundwad	Krishna	0.176	-	0.176	0.176	0.176	0	1
224	Kuttyadi	Kuttyadi	0.054	0.062	0.012	0.008	0.111	0	6
225	Kuzhithurai	Tambrapani	0.053	0.059	0.028	0.026	0.101	0	5
226	Labha	Mahananda	0.168	0.178	0.122	0.014	0.750	0	11
227	Lakhisarai	Kiul	0.109	0.117	0.075	0.002	0.525	0	10
228	Lalganj	Gandak	0.217	0.187	0.353	0.009	0.806	0	11
229	Lowara	Sheturni	6.112	7.275	0.878	0.019	28.047	3	8
230	Lucknow	Gomti	0.552	0.643	0.191	0.037	1.414	0	10
231	M.H. Halli	Hemavathi	0.030	0.030	-	0.005	0.053	0	4
232	Madhira	Wyra	0.744	0.744	-	0.010	1.666	0	4
233	Madla	Ken	0.140	0.102	0.274	0.039	0.462	0	9
234	Magaral	Cheyyar	0.068	0.068	-	0.068	0.068	0	1
235	Mahidpur	Sipra	0.154	0.397	0.033	0.010	0.397	0	3
236	Mahuwa	Purna	0.474	0.614	0.053	0.013	2.941	0	8
237	Maighat	Gomti	0.218	0.238	0.125	0.063	0.547	0	11
238	Majhitar	Rangit	0.028	0.028	-	0.028	0.028	0	1
239	Malakkara	Pampa	0.036	0.042	0.010	0.010	0.068	0	5
240	Malkhed	Kagna	0.363	0.266	0.654	0.059	0.654	0	4
241	Manas NH Crossing	Manas	0.134	0.082	0.290	0.068	0.290	0	4
242	Mancherial	Godavari	0.485	0.287	1.471	0.030	1.471	0	6
243	Mandleshwar	Narmada	0.115	0.129	0.062	0.002	0.666	0	10
244	Manendragarh	Hasdeo	0.084	0.084	-	0.063	0.105	0	2
245	Mangaon (Seasonal)	Kal	0.134	-	0.134	0.134	0.134	0	1
246	Mankara	Bharathapuzha	0.054	0.056	0.044	0.002	0.147	0	6
247	Manot	Narmada	0.196	0.222	0.094	0.033	0.901	0	10
248	Mantralayam	Tungabhadra	1.676	1.676	-	0.057	5.170	1	3
249	Marella	Gundlakamma	1.242	1.242	-	0.025	2.464	0	3
250	Margherita	Buridehing	0.287	0.322	0.128	0.012	1.461	0	11
251	Marol	Varada	0.030	0.047	0.012	0.012	0.047	0	2
252	Mataji	Mahi	0.174	0.165	0.211	0.012	0.522	0	11
253	Mathabhanga	Jaldhaka	0.496	0.623	0.112	0.055	1.738	0	4
254	Mathanguri	Beki	0.058	0.058	-	0.051	0.064	0	2
255	Mathura	Yamuna	1.226	1.485	0.058	0.003	9.166	2	9
256	Matigara	Balason	0.125	0.125	-	0.073	0.176	0	4

S. No.	Water Quality Site	River	Cadmium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 3 µg/L	Below 3 µg/L
257	Matijuri	Dhaleshwari	0.073	0.020	0.178	0.002	0.329	0	6
258	Matunga	Kalanadi	0.217	0.247	0.080	0.008	1.575	0	11
259	Mawi	Yamuna	0.110	0.113	0.098	0.010	0.287	0	11
260	Meja Road	Tons	0.275	0.140	0.814	0.020	1.520	0	10
261	Mekhliganj	Teesta	0.150	0.148	0.157	0.070	0.257	0	4
262	Menangudi	Cauvery/Noolar	0.046	0.046	-	0.046	0.046	0	1
263	Miao	Neo dihing	0.139	0.093	0.349	0.008	0.573	0	11
264	Mirzapur	Ganga	0.534	0.607	0.209	0.078	3.650	1	10
265	Mohana (Betwa)	Betwa	0.154	0.129	0.231	0.030	0.368	0	8
266	Mohana (Yamuna)	Yamuna	1.118	1.363	0.015	0.006	6.159	2	9
267	Mohgaoan	Burhner	0.170	0.197	0.065	0.003	0.910	0	10
268	Moradabad	Ramganga	0.400	0.444	0.227	0.125	1.726	0	10
269	Motinaroli	Kim	0.324	0.402	0.054	0.012	1.732	0	9
270	Murappanadu	Tambrapani	0.218	0.243	0.038	0.023	1.209	0	8
271	Muri	Subarnarekha	0.249	0.194	0.635	0.018	0.635	0	8
272	Murti	Murti	0.087	0.087	-	0.065	0.115	0	3
273	Musiri	Cauvery	0.272	0.272	-	0.011	1.287	0	7
274	Muthankera	Kabini	0.056	0.063	0.023	0.018	0.113	0	6
275	Nagalamadike	Pennar	0.023	0.023	-	0.023	0.023	0	1
276	Nagrakata	Jaldhaka	0.139	0.139	-	0.090	0.223	0	3
277	Naharkatia	Buridehing	0.133	0.087	0.337	0.008	0.569	0	11
278	Naidupet	Swarnamukhi	2.235	2.235	-	2.235	2.235	0	1
279	Nallammaranpatty	Amaravathi	0.306	0.403	0.017	0.017	0.890	0	4
280	Nallathur	Nandalar	0.364	0.364	-	0.009	1.367	0	4
281	Namsai	Neo dihing	0.082	0.086	0.067	0.003	0.230	0	11
282	Nandgaon	Wunna	0.386	0.368	0.442	0.089	0.947	0	8
283	Nandipalli	Sagaileru	0.149	0.241	0.058	0.026	0.407	0	4
284	Nanglamoraghat	Desang	0.142	0.146	0.125	0.009	0.556	0	11
285	Neamatighat	Brahmaputra	0.065	0.071	0.036	0.006	0.188	0	11
286	Neeleswaram	Periyar	0.061	0.073	0.003	0.003	0.172	0	6
287	Neemsar	Gomti	0.442	0.359	0.734	0.047	1.378	0	9
288	Nellithurai	Bhavani	0.260	0.260	-	0.006	0.994	0	4
289	Nellore	Pennar	0.144	0.144	-	0.007	0.280	0	2
290	Neora	Naora	0.133	0.133	-	0.076	0.200	0	3
291	Nowrangpur	Indravathi	0.107	0.117	0.058	0.020	0.393	0	6
292	Numaligarh	Dhansiri	0.134	0.144	0.094	0.010	0.505	0	10
293	P.G.Bridge	Penganga	0.273	0.317	0.119	0.070	1.199	0	9
294	Pachauli	Sind	0.181	0.187	0.174	0.174	0.187	0	2
295	Pachegaon	Pravara	0.613	-	0.613	0.613	0.613	0	1
296	Paderdibadi	Mahi	0.160	0.153	0.190	0.020	0.315	0	11
297	Pagladiya N.T.Road Crossing	Pagladiya	0.319	0.331	0.265	0.013	1.253	0	11
298	Paleru Bridge	Paleru	0.498	0.569	0.140	0.032	1.768	0	6
299	Paliakalan	Sharda	0.540	0.596	0.314	0.018	3.708	1	9

S. No.	Water Quality Site	River	Cadmium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 3 µg/L	Below 3 µg/L
300	Palla	Yamuna	0.285	0.333	0.066	0.005	2.154	0	11
301	Panbari	Burisuti	0.082	0.082	-	0.010	0.153	0	2
302	Pancharatna	Brahmaputra	0.303	0.354	0.076	0.008	1.314	0	11
303	Pandu	Brahmaputra	0.129	0.134	0.109	0.004	0.528	0	11
304	Panposh	Brahmani	0.246	0.266	0.112	0.016	0.533	0	8
305	Passighat	Siang	0.084	0.084	-	0.009	0.289	0	5
306	Patan	Hiran	0.144	0.173	0.041	0.006	0.864	0	9
307	Pathagudem	Indravathi	0.088	0.060	0.228	0.003	0.228	0	6
308	Pathardhi	Kharun	0.663	0.663	-	0.663	0.663	0	1
309	Pati	Goi	0.055	0.042	0.106	0.005	0.106	0	5
310	Patna	Ganga	0.098	0.105	0.066	0.002	0.334	0	11
311	Pattazhy	Kallada	0.109	0.123	0.034	0.010	0.476	0	6
312	Pauni	Wainganga	0.123	0.103	0.215	0.003	0.268	0	11
313	Peralam	Vanjiyar	0.193	0.193	-	0.053	0.332	0	2
314	Perumannu	Valapatnam	0.043	0.050	0.008	0.008	0.071	0	6
315	Perur	Godavari	0.046	0.030	0.128	0.009	0.128	0	6
316	Phulgaon (Seasonal)	Varna	0.147	-	0.147	0.147	0.147	0	1
317	Pingalwada	Dhadher	0.389	0.452	0.172	0.009	2.311	0	9
318	Poanta	Yamuna	0.019	0.019	-	0.008	0.030	0	2
319	Polavaram	Godavari	0.276	0.034	1.489	0.009	1.489	0	6
320	Pratapgarh	Sai	0.311	0.177	0.850	0.030	1.470	0	10
321	Pratapur	Yamuna	0.251	0.296	0.091	0.006	0.826	0	9
322	Prem Nagar	Chenab	0.079	0.072	0.116	0.002	0.223	0	7
323	Pudur	Kannadipuzha	0.061	0.074	0.006	0.006	0.185	0	5
324	Pulamanthole	Pulanthodu	0.020	0.023	0.004	0.001	0.056	0	6
325	Purna	Purna	0.040	0.040	-	0.040	0.040	0	1
326	Purushottampur	Rushikulya	0.099	0.105	0.060	0.023	0.203	0	8
327	Puthimari D.R.F.	Puthimari	0.419	0.452	0.271	0.017	2.980	0	11
328	Puthimari NH Road crossing	Puthimari	0.140	0.163	0.045	0.005	0.300	0	10
329	Raibareli	Sai	0.332	0.366	0.214	0.062	1.247	0	9
330	Rajapur	Yamuna	0.323	0.139	0.875	0.002	1.687	0	8
331	Rajegaon	Bagh	0.197	0.153	0.349	0.046	0.427	0	9
332	Rajghat	Betwa	0.136	0.159	0.078	0.018	0.332	0	7
333	Rajim	Mahanadi	0.101	0.101	-	0.101	0.101	0	1
334	Ram Munshi Bagh	Jhelum	0.059	0.051	0.099	0.010	0.117	0	6
335	Ramakona	Kanhan	0.116	0.113	0.128	0.022	0.241	0	9
336	Ramamangalam	Muvvattupuzha	0.109	0.126	0.024	0.005	0.551	0	6
337	Rampur	Jonk	0.125	0.125	-	0.075	0.192	0	3
338	Ranganadi NT-Road Xing	Ranganadi	0.056	0.046	0.100	0.003	0.189	0	11
339	Rangeli	Som	0.176	0.138	0.350	0.006	0.590	0	11
340	Rangpo	Rangpochu	0.196	0.196	-	0.041	0.433	0	3
341	Regauli	Rapti	0.575	0.616	0.409	0.009	3.130	1	9

S. No.	Water Quality Site	River	Cadmium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 3 µg/L	Below 3 µg/L
342	Rishikesh	Ganga	0.109	0.113	0.092	0.004	0.386	0	11
343	Rudraprayag	Alaknanda	0.042	0.039	0.056	0.002	0.124	0	10
344	Safapora	Jhelum	0.117	0.114	0.139	0.010	0.412	0	7
345	Sakleshpur	Hemavathi	0.049	0.043	0.093	0.008	0.093	0	8
346	Sakmur	Wardha	0.178	0.177	0.183	0.017	0.533	0	11
347	Salebhata	Ong	0.094	0.094	-	0.034	0.203	0	4
348	Samdoli	Varna	0.023	-	0.023	0.023	0.023	0	1
349	Sandia	Narmada	0.196	0.233	0.050	0.012	0.721	0	10
350	Sangam J	Jhelum	0.081	0.057	0.227	0.010	0.227	0	7
351	Sangam K	Kinnerasani	0.264	0.263	0.268	0.018	0.592	0	5
352	Sangod	Parwan	0.193	0.387	0.096	0.019	0.387	0	3
353	Sankalan	Teesta	0.111	0.111	-	0.014	0.193	0	3
354	Sankosh LRP	Sankosh	0.105	0.095	0.135	0.030	0.208	0	4
355	Santeguli	Aghanashini	0.086	0.085	0.091	0.015	0.184	0	8
356	Sarangkheda	Tapi	0.193	0.222	0.104	0.007	1.018	0	8
357	Satrapur	Kanhan	0.249	0.205	0.449	0.011	0.720	0	11
358	Savandapur	Bhavani	0.208	0.255	0.019	0.008	1.005	0	10
359	Seondha	Sind	0.227	0.255	0.087	0.033	0.633	0	6
360	Seppa	Kamang	0.615	0.716	0.165	0.003	5.158	1	10
361	Sevanur	Chittar	0.164	0.164	-	0.164	0.164	0	1
362	Sevoke	Teesta	0.067	0.067	-	0.011	0.113	0	3
363	Shahijina	Betwa	0.208	0.239	0.098	0.025	0.910	0	9
364	Shahzadpur	Ganga	0.599	0.719	0.118	0.022	3.936	1	9
365	Shimoga	Tunga	0.064	0.036	0.231	0.002	0.231	0	7
366	Sibbari	Dareng	0.574	0.657	0.368	0.002	3.253	1	6
367	Sikandarpur	Burhi Gandak	0.187	0.124	0.471	0.016	0.776	0	11
368	Simga	Seonath	0.164	0.164	-	0.035	0.367	0	3
369	Singla-Bazar	Rangit	0.109	0.109	-	0.050	0.181	0	3
370	Sivasagar	Dikhow	0.429	0.503	0.096	0.006	3.490	1	10
371	Sonapur	Digaru	0.203	0.216	0.128	0.008	0.659	0	7
372	Sonapurhat	Mahananda	0.147	0.147	-	0.067	0.193	0	3
373	Srikakulam	Nagavali	0.147	0.160	0.057	0.027	0.536	0	8
374	Srinagar	Alakananda	0.096	0.113	0.009	0.008	0.356	0	6
375	Sripalpur	Punpun	0.092	0.088	0.113	0.008	0.208	0	11
376	Suklai	Suklai	0.301	0.312	0.249	0.008	2.075	0	11
377	Sultanpur	Gomti	0.200	0.197	0.214	0.080	0.331	0	10
378	Sulurpet	Kalingi	0.013	0.013	-	0.013	0.013	0	1
379	Sundergarh	Ib	0.082	0.082	-	0.044	0.148	0	4
380	T. Bekuppe	Arkavathi	0.678	0.719	0.386	0.004	3.977	1	7
381	T. Narasipur	Kabini	0.174	0.180	0.147	0.008	0.643	0	5
382	T. Ramapuram	Hagari	3.492	3.492	-	0.359	7.888	1	2
383	T.K.Halli	Shimsha	0.790	0.790	-	0.031	2.831	0	4
384	Tal	Chambal	0.160	0.399	0.041	0.002	0.399	0	3

S. No.	Water Quality Site	River	Cadmium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 3 µg/L	Below 3 µg/L
385	Talcher	Brahmani	0.224	0.247	0.065	0.010	0.476	0	8
386	Tandi	Chenab/Bhaga	0.118	-	0.118	0.118	0.118	0	1
387	Teesta-Bazar	Teesta	0.090	0.080	0.135	0.039	0.141	0	6
388	Tehri	Bhagirath	0.186	0.186	-	0.100	0.272	0	2
389	Tekra	Pranhitha	0.214	0.152	0.494	0.039	0.798	0	11
390	Tezpur	Brahmaputra	0.132	0.149	0.053	0.002	0.759	0	11
391	Tezu	Lohit	0.146	0.143	0.156	0.005	0.727	0	10
392	Thengudi	Thirumalairajanar	0.296	0.296	-	0.022	0.841	0	3
393	Thengumarahada	Moyar	0.158	0.194	0.013	0.006	1.101	0	10
394	Theni	Suruliar	0.184	0.225	0.024	0.010	1.280	0	10
395	Therriaghat	Umsohrynkiew	0.150	0.193	0.045	0.001	0.611	0	7
396	Thevur	Sarabenga	0.807	0.807	-	0.807	0.807	0	1
397	Thimmanahalli	Yagachi	0.141	0.141	-	0.017	0.674	0	6
398	Thoppur	Thoppaiyar	0.081	-	0.081	0.081	0.081	0	1
399	Thumpamon	Achankovil	0.086	0.047	0.239	0.001	0.239	0	5
400	Tikarpara	Mahanadi	0.226	0.139	0.836	0.015	0.836	0	8
401	Tilga	Sankh	0.203	0.133	0.694	0.027	0.694	0	8
402	Tonk	Banas	0.088	0.163	0.012	0.012	0.163	0	2
403	Tribeni	Gandak	0.075	0.061	0.140	0.015	0.176	0	11
404	Tufanganj	Raidak-I	0.077	0.062	0.137	0.030	0.137	0	5
405	Tuini	Tuini	0.111	0.119	0.076	0.009	0.218	0	11
406	Turtipar	Ghagra	0.215	0.232	0.149	0.023	0.853	0	10
407	Udaipur (Chandra)	Chenab/Chandra	0.156	-	0.156	0.156	0.156	0	1
408	Udaipur (Tirap)	Tirap	0.400	0.468	0.095	0.010	3.428	1	10
409	Udi	Chambal	0.234	0.200	0.354	0.011	0.612	0	9
410	Ujjain	Sipra	0.085	0.153	0.017	0.017	0.153	0	2
411	Urachikottai	Cauvery	0.320	0.379	0.021	0.021	1.047	0	6
412	Uttarkashi	Bhagirath	0.107	0.120	0.048	0.003	0.613	0	11
413	Vandiperiyar	Periyar	0.049	0.055	0.024	0.013	0.094	0	5
414	Vapi	Damanganga	0.129	0.147	0.067	0.002	0.551	0	9
415	Varanasi	Ganga	0.293	0.302	0.256	0.068	0.902	0	11
416	Vautha	Sabarmati	7.808	9.456	0.397	0.045	70.518	2	9
417	Vazhavachanur	Ponnaiyar	1.329	1.329	-	0.035	3.826	1	3
418	Villupuram	Ponnaiyar	0.012	0.012	-	0.012	0.012	0	1
419	Wadenapally	Krishna	0.459	0.483	0.339	0.006	1.774	0	6
420	Wairagarh	Khobragarhi	0.097	0.042	0.235	0.021	0.353	0	7
421	Warunji	Koyna	0.013	-	0.013	0.013	0.013	0	1
422	Yadgir	Bhima	1.094	-	1.094	1.094	1.094	0	1
423	Yashwant nagar	Giri	0.162	0.187	0.052	0.005	0.429	0	11
424	Yennehole	Yennehole	0.099	0.062	0.250	0.016	0.250	0	5

CHROMIUM

S. No.	Water Quality Site	River	Chromium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 50 µg/L	Below 50 µg/L
1	A B Road Xing	Parwati	2.892	0.575	4.050	0.380	7.720	0	3
2	A.P. Puram	Chittar	4.672	4.672	-	1.030	14.330	0	5
3	A.P.Ghat	Barak	0.841	0.668	1.275	0.020	1.580	0	7
4	Aauriya	Yamuna	8.032	6.140	14.655	2.160	21.350	0	9
5	Abu Road	Banas	5.903	6.504	2.900	1.270	14.460	0	6
6	Addoor	Gurupur	21.705	22.150	21.260	21.260	22.150	0	2
7	Adityapur	Kharkai	2.556	1.694	8.590	0.530	8.590	0	8
8	Agra	Yamuna	9.346	9.283	9.565	1.410	36.370	0	9
9	Aie NH Crossing	Aie	4.007	4.007	-	0.320	8.610	0	3
10	Akabarpur	Chhoti Sarju	3.544	1.760	8.005	0.200	8.620	0	7
11	Akhnoor	Chenab	6.114	6.729	1.810	0.430	35.540	0	8
12	Akkihebbal	Hemavathi	2.774	1.796	10.600	0.210	10.600	0	9
13	Aklera	Parwan	5.289	8.288	0.790	0.345	16.340	0	5
14	Alladupalli	Kunderu	5.445	3.954	11.410	0.060	22.200	0	10
15	Allahabad	Ganga	4.604	3.951	7.540	0.180	14.940	0	11
16	Alutuma	Ramyala	3.470	2.044	10.600	0.350	10.600	0	6
17	Ambarampalayam	Aliyar	4.105	4.775	1.425	0.570	27.400	0	10
18	Ambasamudram	Vaigai	1.585	1.585	-	1.240	1.930	0	2
19	Anandpur	Ganga	5.800	5.586	7.300	0.210	15.350	0	8
20	Andhiyar Kore	Hamp	28.547	28.547	-	4.990	61.260	1	2
21	Ankinghat	Ganga	4.345	5.170	1.045	0.220	22.480	0	10
22	Annavasal	Nattar	8.180	8.180	-	8.180	8.180	0	1
23	Arangaly	Chalakudy	3.653	3.716	3.340	0.480	12.700	0	6
24	Arcot	Palar	8.015	5.890	10.140	5.890	10.140	0	2
25	Arjunwad	Krishna	8.200	-	8.200	8.200	8.200	0	1
26	Ashramam	Pazhayar	3.807	3.636	4.660	0.870	13.210	0	6
27	Ashti	Wainganga	2.637	1.827	6.285	0.560	9.550	0	11
28	Avarankuppam	Palar	2.480	2.480	-	2.480	2.480	0	1
29	Avershe	Sita	4.658	3.155	10.670	0.280	10.670	0	5
30	Ayilam	Vamanapuram	4.190	4.504	2.620	0.280	14.870	0	6
31	Ayodhya	Saryu	13.179	10.480	23.975	0.260	46.910	0	10
32	Azmabad	Ganga	4.005	4.507	1.745	0.400	16.630	0	11
33	B.P. Ghat	Barak	1.429	1.637	0.805	0.040	5.290	0	8
34	Badatighat	Subansiri	1.697	1.474	2.700	0.280	4.330	0	11
35	Badlapur	Ulhas	10.900	4.978	40.510	0.150	40.510	0	6
36	Balrampur	Rapti	37.883	33.620	54.935	0.360	141.110	3	7
37	Baltara	Kosi	5.237	5.240	5.225	0.550	24.920	0	11
38	Bamni (Banjar)	Banjar	2.333	2.201	2.795	0.170	6.310	0	9
39	Bamni (Wardha)	Wardha	4.940	4.171	8.400	0.530	19.300	0	11
40	Bamnidih	Hasdeo	7.053	7.053	-	1.480	11.670	0	3
41	Banda	Ken	3.879	4.071	3.205	0.740	13.020	0	9

S. No.	Water Quality Site	River	Chromium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 50 µg/L	Below 50 µg/L
42	Bansi	Rapti	72.452	90.024	10.950	0.320	224.330	3	6
43	Bantwal	Nethravathi	4.587	0.370	13.020	0.290	13.020	0	3
44	Baranwada	Banas	0.710	0.527	1.260	0.255	1.260	0	4
45	Bareilly	Ramganga	4.239	4.884	1.660	0.040	13.110	0	10
46	Barmanghat	Narmada	2.169	1.791	3.680	0.200	5.880	0	10
47	Barobisha	Raidak-II	3.128	3.808	0.410	0.410	8.540	0	5
48	Barod	Kali Sindh	1.833	2.203	0.720	0.310	6.200	0	8
49	Baronda	Pairi	3.900	3.900	-	3.900	3.900	0	1
50	Basantpur	Mahanadi	9.495	9.495	-	0.350	31.620	0	4
51	Basti	Kwano	6.945	8.255	1.705	0.730	43.010	0	10
52	Bawapuram	Tungabhadra	3.543	3.543	-	0.910	5.790	0	3
53	Behalpur	Champamati	8.615	8.615	-	0.910	16.320	0	2
54	Beki Mathanguri	Beki	3.375	3.375	-	0.820	5.930	0	2
55	Beki Road Bridge	Beki	2.366	2.878	0.320	0.190	9.300	0	5
56	Belkhedi	Sher	3.397	3.631	2.460	0.400	7.810	0	10
57	Belne Bridge	Gad	38.175	10.160	66.190	10.160	66.190	1	1
58	Bendrahalli	Suvarnavathi	2.030	2.030	-	2.030	2.030	0	1
59	Berhampore	Bhagirathi	2.083	1.497	4.720	0.090	7.140	0	11
60	Bhadrachalam	Godavari	4.487	5.147	0.530	0.120	21.510	0	7
61	Bhalukpong	Jiabharali	5.733	1.444	25.030	0.070	47.580	0	11
62	Bhatpalli	Peddavagu	4.287	3.277	8.835	0.220	11.860	0	11
63	Bhitaura	Ganga	19.149	23.550	1.545	0.470	164.250	1	9
64	Bhomoraguri	Brahmaputra	7.335	4.189	21.490	0.700	40.970	0	11
65	Bihubar	Dikhow	13.383	12.053	19.365	0.230	90.830	1	10
66	Biligundullu	Cauvery	4.191	3.269	11.570	0.050	15.720	0	9
67	Birdghat	Rapti	43.893	40.970	55.585	0.550	229.730	3	7
68	Bokajan	Dhansiri	5.001	2.153	17.815	0.040	25.870	0	11
69	Burhanpur	Tapi	5.779	5.623	6.245	1.160	11.950	0	8
70	Buxar	Ganga	7.988	9.590	0.780	0.540	45.990	0	11
71	Byaladahalli	Haridra	1.877	1.877	-	0.010	5.390	0	3
72	Champasari	Mahananda	3.995	3.995	-	0.500	13.790	0	4
73	Champua	Ganga	5.010	4.320	9.150	0.430	14.140	0	7
74	Chanwada	Orsang	5.012	4.103	8.195	0.290	15.930	0	9
75	Chapra	Jalangi	5.425	5.414	5.475	0.050	25.260	0	11
76	Chel	Chel	4.017	4.017	-	0.380	9.240	0	3
77	Chengalpet	Palar	2.030	2.383	0.970	0.970	4.110	0	4
78	Chenimari	Buridehing	2.196	2.017	3.005	0.300	5.710	0	11
79	Chennur	Pennar	5.030	3.053	12.940	0.180	20.240	0	10
80	Chepan	Raidak-I	3.300	3.805	1.280	0.170	11.900	0	5
81	Chhidgaon	Ganjal	4.272	3.705	6.540	0.280	18.600	0	10
82	Chitrasani	Balaram	3.626	4.419	0.850	0.410	9.560	0	9
83	Chittorgarh	Gambhiri	2.205	2.205	-	2.205	2.205	0	1
84	Cholachguda	Malaprabha	35.310	35.310	-	35.310	35.310	0	1

S. No.	Water Quality Site	River	Chromium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 50 µg/L	Below 50 µg/L
85	Chopan	Sone	4.047	2.886	9.275	0.360	16.650	0	11
86	Chouldhowaghat	Subansiri	5.666	1.782	23.145	0.400	42.370	0	11
87	Chuchankatte	Cauvery	6.403	2.765	13.680	0.270	13.680	0	3
88	Coronation	Teesta	6.307	6.307	-	0.280	16.540	0	3
89	Dabri	Ramganga	3.170	3.555	1.630	0.270	7.560	0	10
90	Damarcherla	Musi	2.518	2.518	-	0.120	7.490	0	5
91	Dawki	Umngot	0.763	0.832	0.590	0.030	1.770	0	7
92	Delhi Rly Bridge	Yamuna	2.845	2.849	2.825	0.010	11.350	0	11
93	Deoprayag	Bhagirath	5.318	4.121	10.705	0.100	20.490	0	11
94	Derol Bridge	Sabarmati	6.517	7.641	1.460	0.050	21.270	0	11
95	Desangpani	Desang	7.635	1.621	34.695	0.480	65.590	1	10
96	Dhamkund	Chenab	1.185	1.207	1.030	0.390	3.680	0	8
97	Dharamtul	Kopili	3.465	3.340	4.025	0.110	13.240	0	11
98	Dheng Bridge	Bagmathi	1.966	2.180	1.005	0.020	5.490	0	11
99	Dholabazar	Lohit	1.443	1.573	0.855	0.450	4.660	0	11
100	Dholai	Rukni	1.113	0.968	1.545	0.200	2.130	0	8
101	Dholpur	Chambal	5.108	5.053	5.300	0.680	12.290	0	9
102	Dhubri	Brahmaputra	10.975	10.975	-	1.850	20.100	0	2
103	Dhulsar	Uri	17.765	2.320	33.210	2.320	33.210	0	2
104	Diana	Diana	2.600	2.600	-	2.600	2.600	0	1
105	Dibrugarh	Brahmaputra	3.382	3.708	1.915	0.040	15.090	0	11
106	Dillighat	Desang	2.924	1.564	9.040	0.730	13.700	0	11
107	Dimapara	Bugi	3.693	4.868	0.755	0.030	11.400	0	7
108	Dindori	Narmada	3.430	3.630	2.630	0.270	9.170	0	10
109	Domohani	Teesta	12.364	12.928	10.110	0.070	36.240	0	5
110	Duddhi	Kanhar	4.216	2.716	10.970	0.190	18.960	0	11
111	Dudhnai	Dudhnai	4.255	4.560	2.885	0.900	15.730	0	11
112	Durvesh	Vaitarna	8.511	6.887	13.385	0.690	24.650	0	8
113	Ekmighat	Bagmathi	2.097	2.549	0.065	0.040	11.960	0	11
114	Elginbridge	Ghagra	45.233	33.450	92.365	0.720	183.010	2	8
115	Elunuthimanagalam	Noyyal	4.235	4.235	-	2.310	7.750	0	4
116	English Bazar	Padma/Mahananda	9.215	10.626	2.870	0.280	47.600	0	11
117	Erinjipuzha	Payaswani	2.702	2.772	2.350	0.510	5.270	0	6
118	Etawah	Yamuna	8.897	6.134	18.565	0.630	19.110	0	9
119	Fakirabazar	Longai	6.859	5.194	11.020	0.100	24.070	0	7
120	Farakka	Ganga	3.128	3.120	3.165	0.450	6.900	0	11
121	Farakka/(HR)	Feeder Canal	3.589	3.998	1.955	0.270	18.130	0	10
122	Fatehgarh	Ganga	20.322	24.503	3.600	0.430	175.240	1	9
123	Fulertal	Barak	3.957	4.120	3.630	0.750	11.900	0	6
124	Gadarwara	Sakkar	2.105	1.958	2.545	0.190	4.370	0	8
125	Gadat	Ambika	5.931	4.787	9.365	0.580	16.730	0	8
126	Gajaldoba	Teesta	7.100	7.100	-	0.090	13.840	0	3
127	Galeta	Hindon	4.315	4.306	4.360	0.015	15.920	0	11

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128	Ganod	Bhadar	6.711	6.084	11.730	1.420	13.360	0	9
129	Garhamukteshwar	Ganga	8.266	9.886	1.785	0.200	44.480	0	10
130	Garrauli	Dhasan	2.884	2.237	3.855	0.730	6.980	0	5
131	Garudeshwar	Narmada	7.870	6.319	13.300	0.540	25.020	0	9
132	Gaya	Harohar/Phalgu	2.088	1.400	2.775	1.300	3.740	0	4
133	Gelabil	Doyang	11.888	5.183	25.300	0.660	32.210	0	6
134	Ghat	Sarju	38.642	46.136	8.665	0.490	193.260	2	8
135	Ghatora	Seonath	9.077	9.077	-	2.130	17.870	0	3
136	Ghatsila	Subarnarekha	2.980	1.749	11.600	0.050	11.600	0	8
137	Ghish	Ghish	4.640	4.640	-	0.740	10.320	0	3
138	Ghugumari	Torsa	3.914	4.790	0.410	0.370	15.490	0	5
139	Gokak	Ghataprabha	15.570	7.430	23.710	7.430	23.710	0	2
140	Golaghat	Sonkosh	3.094	2.982	3.595	0.320	7.550	0	11
141	Golakganj	Dhansiri	5.355	5.355	-	0.540	10.170	0	2
142	Gomlai	Brahmani	4.309	3.429	10.470	0.130	11.760	0	8
143	Gopalkheda	Purna	16.713	13.110	20.315	3.820	36.810	0	4
144	Gopurajapuram	Cauvery/Puravidaiyanar	5.700	5.700	-	5.700	5.700	0	1
145	Govindapur	Burhabalang	4.325	3.781	8.130	0.330	18.940	0	8
146	Gummanur	Ponnaiyar	6.211	7.335	1.715	0.360	49.910	0	10
147	Gumrabazar	Gumra	3.520	0.880	11.440	0.310	21.800	0	8
148	Gunupur	Vamsadhara	4.464	3.753	9.440	0.250	11.540	0	8
149	Haladi	Haladi	3.932	2.874	12.400	0.020	12.400	0	9
150	Halia	Halia	2.650	2.650	-	0.170	10.640	0	6
151	Hamirpur	Yamuna	6.913	4.259	16.205	0.770	16.950	0	9
152	Handia	Narmada	4.496	1.596	16.095	0.370	26.660	0	10
153	Hanskhali	Churni	15.565	18.124	4.050	0.180	147.770	1	10
154	Haridwar	Ganga	3.409	1.644	10.470	0.180	18.240	0	10
155	Harlahalli	Tungabhadra	7.528	4.752	21.410	0.340	21.410	0	6
156	Hasimara	Torsa	4.760	5.833	1.540	0.880	14.070	0	4
157	Hathidah	Ganga	5.665	4.353	11.565	0.290	22.840	0	11
158	Hayaghat	Bagmathi	3.398	4.096	0.260	0.040	23.560	0	11
159	Hivra	Wardha	5.214	4.096	10.245	0.550	15.930	0	11
160	Hogenakkal	Chinnar	6.630	6.630	-	6.630	6.630	0	1
161	Holehonnur	Bhadra	6.589	1.740	45.380	0.030	45.380	0	9
162	Honnali	Tungabhadra	2.944	1.919	11.150	0.150	11.150	0	9
163	Hoshangabad	Narmada	3.727	3.063	6.385	0.140	12.440	0	10
164	Huvin Hedgi	Krishna	2.218	2.528	0.980	0.100	7.290	0	5
165	Jagdalpur	Indravathi	1.515	2.490	0.540	0.540	2.490	0	2
166	Jagibhakatgaon	Kopili	2.640	1.759	6.605	0.040	11.350	0	11
167	Jai Nagar	Kamala-Balan	2.649	3.160	0.350	0.070	12.710	0	11
168	Jaldhaka NH-31	Jaldhaka	4.744	4.228	6.810	0.850	11.710	0	5
169	Jammu Tawi	Chenab/Tawi	2.029	2.269	0.350	0.090	10.090	0	8
170	Jamshedpur	Subarnarekha	2.356	1.596	7.680	0.040	7.680	0	8

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171	Jamsolghat	Subarnarekha	2.950	1.678	8.040	0.440	8.040	0	5
172	Japla	Sone	5.103	5.400	3.765	0.320	29.490	0	11
173	Jaraikela	Koel	3.083	2.303	8.540	0.720	8.540	0	8
174	Jenapur	Brahmani	8.705	8.746	8.420	0.090	36.960	0	8
175	Jhanjharpur	Kamala-Balan	2.093	2.434	0.555	0.090	5.780	0	11
176	Jiabharali NT Road Xing	Jiabharali	14.955	5.683	56.675	0.030	111.430	1	10
177	Jondhra	Seonath	5.810	5.810	-	5.810	5.810	0	1
178	K.M. Vadi	Lakshmantirtha	4.847	1.870	10.800	0.760	10.800	0	3
179	Kachlabridge	Ganga	39.233	29.070	79.885	0.380	198.300	2	8
180	Kalampur	Kaliyar	2.810	2.606	3.830	0.290	11.270	0	6
181	Kalanaur	Yamuna	2.686	2.755	2.375	0.060	9.420	0	11
182	Kallooppara	Manimala	2.928	2.836	3.390	0.490	7.340	0	6
183	Kalna (EBB)	Bhagirathi	5.013	2.165	10.710	0.100	17.610	0	6
184	Kalna (Flow)*	Bhagirathi	1.233	1.233	-	0.110	2.560	0	4
185	Kamalapuram	Papagni	13.860	-	13.860	3.840	23.880	0	2
186	Kamalpur	Banas	5.480	5.620	5.200	3.070	8.170	0	3
187	Kampur	Kopili	3.942	2.433	10.730	0.100	16.660	0	11
188	Kanpur	Ganga	23.154	28.589	1.415	0.740	205.820	1	9
189	Kantamal	Tel	17.758	17.758	-	0.250	55.000	1	3
190	Karad	Krishna	98.350	-	98.350	98.350	98.350	1	0
191	Karathodu	Kadalundi	2.618	2.370	3.860	0.550	6.280	0	6
192	Kashinagar	Vamsadhara	3.303	2.146	11.400	0.310	11.400	0	8
193	Katwa	Bhagirathi	3.365	3.173	4.225	0.020	12.220	0	11
194	Keesara	Munneru	1.573	1.320	2.330	0.080	3.690	0	4
195	Kellodu	Vedavathi	0.850	0.850	-	0.850	0.850	0	1
196	Keolari	Wainganga	4.174	3.687	6.365	0.380	15.990	0	11
197	Kesinga	Tel	4.618	4.618	-	0.870	7.360	0	4
198	Khanitar	Teesta	16.525	16.525	-	0.670	32.380	0	2
199	Khanpur	Mahi	12.663	15.368	0.490	0.120	81.700	1	10
200	Kharkhana	Surma/Myntdu	10.133	1.696	31.225	0.210	62.240	1	6
201	Khatoli	Parwati	2.566	2.752	2.100	0.075	6.460	0	7
202	Kheronighat	Kopili	5.500	1.699	22.605	0.120	42.550	0	11
203	Kidangoor	Meenachi	5.897	6.406	3.350	0.270	16.980	0	6
204	Kodumudi	Cauvery	7.073	7.955	1.780	1.560	35.360	0	7
205	Koelwar	Sone	3.582	3.713	2.990	0.310	16.110	0	11
206	Kogaon	Kundi	8.560	2.030	15.090	1.160	23.130	0	4
207	Kokrajhar	Gaurang	3.640	4.488	0.250	0.080	12.740	0	5
208	Kollegal	Cauvery	3.910	2.258	10.520	0.360	10.520	0	5
209	Konta	Sabari	1.460	1.595	0.650	0.130	5.990	0	7
210	Koperagaon	Godavari	14.800	-	14.800	14.800	14.800	0	1
211	Kora	Rind	3.403	2.522	5.605	0.330	9.950	0	7
212	Koteshwar	Bhagirath	8.574	7.289	13.075	0.170	35.490	0	9
213	Kudalaiyathur	Vellar	2.870	2.870	-	0.210	5.530	0	2

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214	Kudige	Cauvery	3.067	2.053	11.180	0.150	11.180	0	9
215	Kudlur	Palar	2.723	2.837	2.380	2.380	3.100	0	4
216	Kuldah Bridge	Sone	2.691	1.916	5.790	0.240	11.230	0	10
217	Kulsi	Kulsi	5.115	5.088	5.240	0.280	23.360	0	11
218	Kumbidi	Bharathapuzha	2.003	1.864	2.700	0.400	6.820	0	6
219	Kumhari	Wainganga	3.395	2.717	6.445	0.580	12.710	0	11
220	Kuniyil	Chaliyar	2.017	1.982	2.190	0.580	7.000	0	6
221	Kuppelur	Kumudavathi	0.880	0.880	-	0.880	0.880	0	1
222	Kurubhata	Mand	4.158	4.158	-	0.670	6.470	0	4
223	Kurundwad	Krishna	22.450	-	22.450	22.450	22.450	0	1
224	Kuttyadi	Kuttyadi	10.913	11.875	5.140	0.160	43.330	0	7
225	Kuzhithurai	Tambrapani	4.313	3.718	7.290	0.100	10.070	0	6
226	Labha	Mahananda	6.305	6.606	4.950	0.030	50.770	1	10
227	Lakhisarai	Kiul	8.562	10.614	0.355	0.020	49.680	0	10
228	Lalganj	Gandak	7.813	9.459	0.405	0.100	44.670	0	11
229	Lowara	Sheturni	11.990	14.310	1.550	0.240	23.830	0	11
230	Lucknow	Gomti	9.765	12.021	0.740	0.400	44.380	0	10
231	M.H. Halli	Hemavathi	5.485	5.485	-	0.150	15.610	0	4
232	Madhira	Wyra	7.768	7.768	-	0.830	22.250	0	4
233	Madla	Ken	3.243	3.211	3.355	0.490	8.340	0	9
234	Magaral	Cheyyar	3.550	3.550	-	3.550	3.550	0	1
235	Mahidpur	Sipra	6.275	0.495	9.165	0.010	18.320	0	3
236	Mahuwa	Purna	21.108	5.192	68.855	0.980	135.570	1	7
237	Maighat	Gomti	3.663	3.137	6.030	0.030	16.910	0	11
238	Majhitar	Rangit	3.400	3.400	-	3.400	3.400	0	1
239	Malakkara	Pampa	2.348	2.180	3.190	0.390	6.210	0	6
240	Malkhed	Kagna	1.800	1.910	1.360	0.570	3.780	0	5
241	Manas NH Crossing	Manas	6.058	7.743	1.000	0.420	16.930	0	4
242	Mancherial	Godavari	3.861	2.582	11.540	0.090	11.540	0	7
243	Mandleshwar	Narmada	4.642	2.244	14.235	0.420	21.840	0	10
244	Manendragarh	Hasdeo	14.280	14.280	-	3.630	24.930	0	2
245	Mangaon (Seasonal)	Kal	133.490	-	133.490	133.490	133.490	1	0
246	Mankara	Bharathapuzha	9.290	10.225	3.680	0.670	25.590	0	7
247	Manot	Narmada	3.647	3.703	3.425	0.100	9.350	0	10
248	Mantralayam	Tungabhadra	3.325	3.325	-	0.520	8.160	0	4
249	Marella	Gundlakamma	2.430	2.430	-	0.080	5.630	0	3
250	Margherita	Buridehing	6.793	6.740	7.030	0.030	35.010	0	11
251	Marol	Varada	7.150	2.640	11.660	2.640	11.660	0	2
252	Mataji	Mahi	4.447	5.092	1.545	0.800	26.340	0	11
253	Mathabhanga	Jaldhaka	7.073	5.607	11.470	0.560	11.510	0	4
254	Mathanguri	Beki	1.865	1.865	-	1.080	2.650	0	2
255	Mathura	Yamuna	2.582	2.699	2.055	0.160	17.360	0	11
256	Matigara	Balason	5.830	5.830	-	0.240	16.760	0	4

S. No.	Water Quality Site	River	Chromium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 50 µg/L	Below 50 µg/L
257	Matijuri	Dhaleshwari	2.695	1.255	5.575	0.130	10.370	0	6
258	Matunga	Kalanadi	1.595	1.418	2.390	0.090	5.410	0	11
259	Mawi	Yamuna	4.659	5.392	1.360	0.090	28.660	0	11
260	Meja Road	Tons	3.855	3.063	7.025	0.350	13.110	0	10
261	Mekhliganj	Teesta	9.155	9.473	8.200	0.060	23.810	0	4
262	Menangudi	Cauvery/Noolar	5.030	5.030	-	5.030	5.030	0	1
263	Miao	Neo dihing	4.951	5.634	1.875	0.010	29.540	0	11
264	Mirzapur	Ganga	5.666	4.892	9.150	0.280	14.050	0	11
265	Mohana (Betwa)	Betwa	5.086	5.282	4.500	1.040	14.760	0	8
266	Mohana (Yamuna)	Yamuna	3.919	4.286	2.270	0.020	16.340	0	11
267	Mohgaoan	Burhner	2.341	2.354	2.290	0.170	5.330	0	10
268	Moradabad	Ramganga	29.140	35.988	1.750	1.230	230.900	1	9
269	Motinaroli	Kim	12.131	8.660	24.280	0.890	42.480	0	9
270	Murappanadu	Tambrapani	2.754	1.921	8.580	0.400	8.580	0	8
271	Muri	Subarnarekha	3.329	2.681	7.860	0.190	7.860	0	8
272	Murti	Murti	9.297	9.297	-	0.060	20.870	0	3
273	Musiri	Cauvery	6.039	6.039	-	0.790	19.800	0	7
274	Muthankera	Kabini	2.333	2.145	3.460	0.110	6.109	0	7
275	Nagalamadike	Pennar	3.470	3.470	-	3.470	3.470	0	1
276	Nagrakata	Jaldhaka	5.123	5.123	-	0.100	12.390	0	3
277	Naharkatia	Buridehing	3.506	3.078	5.435	0.660	13.010	0	11
278	Naidupet	Swarnamukhi	0.160	0.160	-	0.160	0.160	0	1
279	Nallammaranpatty	Amaravathi	11.228	14.470	1.500	1.170	34.260	0	4
280	Nallathur	Nandalar	6.663	6.663	-	0.940	18.270	0	4
281	Namsai	Neo dihing	3.125	2.526	5.825	0.050	11.600	0	11
282	Nandgaon	Wunna	3.986	2.548	8.300	0.700	10.320	0	8
283	Nandipalli	Sagaileru	10.238	7.850	12.625	0.590	21.860	0	4
284	Nanglamoraghat	Desang	4.189	4.219	4.055	0.130	22.300	0	11
285	Neamatighat	Brahmaputra	1.862	1.932	1.545	0.560	5.990	0	11
286	Neeleswaram	Periyar	2.360	1.872	5.290	0.110	5.950	0	7
287	Neemsar	Gomti	8.859	11.260	0.455	0.190	45.340	0	9
288	Nellithurai	Bhavani	11.115	11.115	-	4.810	18.760	0	4
289	Nellore	Pennar	1.010	1.010	-	1.010	1.010	0	2
290	Neora	Naora	8.297	8.297	-	0.040	14.230	0	3
291	Nowrangpur	Indravathi	2.226	2.375	1.330	0.270	6.450	0	7
292	Numaligarh	Dhansiri	2.688	2.608	3.010	0.010	9.270	0	10
293	P.G.Bridge	Penganga	3.526	2.181	8.230	0.590	9.530	0	9
294	Pachauli	Sind	5.700	3.290	8.110	3.290	8.110	0	2
295	Pachegaon	Pravara	19.770	-	19.770	19.770	19.770	0	1
296	Paderdibadi	Mahi	4.307	5.064	0.900	0.040	21.940	0	11
297	Pagladiya N.T.Road Crossing	Pagladiya	2.084	2.137	1.845	0.080	10.240	0	11
298	Paleru Bridge	Paleru	2.098	2.236	1.410	0.090	8.130	0	6
299	Paliakalan	Sharda	66.353	26.508	225.735	0.470	450.260	3	7

S. No.	Water Quality Site	River	Chromium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 50 µg/L	Below 50 µg/L
300	Palla	Yamuna	4.675	4.070	7.395	0.210	18.860	0	11
301	Panbari	Burisuti	8.850	8.850	-	2.880	14.820	0	2
302	Pancharatna	Brahmaputra	3.418	3.334	3.795	0.120	10.700	0	11
303	Pandu	Brahmaputra	4.137	4.684	1.675	0.370	17.300	0	11
304	Panposh	Brahmani	2.578	1.684	8.830	0.160	8.830	0	8
305	Passighat	Siang	1.062	1.062	-	0.340	2.000	0	5
306	Patan	Hiran	2.240	1.953	3.245	0.040	6.100	0	9
307	Pathagudem	Indravathi	2.179	2.508	0.200	0.040	9.910	0	7
308	Pathardhi	Kharun	4.800	4.800	-	4.800	4.800	0	1
309	Pati	Goi	6.464	1.475	26.420	0.770	26.420	0	5
310	Patna	Ganga	1.960	2.256	0.630	0.230	6.350	0	11
311	Pattazhy	Kallada	4.970	5.230	3.410	0.460	10.670	0	7
312	Pauni	Wainganga	3.050	1.871	8.355	0.110	10.990	0	11
313	Peralam	Vanjiyar	4.743	4.743	-	4.280	5.206	0	2
314	Perumannu	Valapatnam	1.596	1.360	3.010	0.340	5.800	0	7
315	Perur	Godavari	3.514	1.758	14.050	0.150	14.050	0	7
316	Phulgaon (Seasonal)	Varna	45.000	-	45.000	45.000	45.000	0	1
317	Pingalwada	Dhadher	9.330	7.424	16.000	1.230	29.860	0	9
318	Poanta	Yamuna	10.195	10.195	-	4.110	16.280	0	2
319	Polavaram	Godavari	1.669	1.945	0.010	0.010	6.270	0	7
320	Pratapgarh	Sai	3.823	3.091	6.750	0.110	12.780	0	10
321	Pratapur	Yamuna	9.714	6.874	19.655	2.210	20.950	0	9
322	Prem Nagar	Chenab	0.809	0.789	0.950	0.090	2.000	0	8
323	Pudur	Kannadipuzha	3.273	3.248	3.400	0.480	7.800	0	6
324	Pulamanthole	Pulanthodu	5.317	5.643	3.360	0.440	13.640	0	7
325	Purna	Purna	0.420	0.420	-	0.420	0.420	0	1
326	Purushottampur	Rushikulya	2.193	1.453	7.370	0.550	7.370	0	8
327	Puthimari D.R.F.	Puthimari	3.298	3.759	1.225	0.210	16.370	0	11
328	Puthimari NH Road crossing	Puthimari	2.706	2.899	1.935	0.290	11.630	0	10
329	Raibareli	Sai	11.016	13.873	1.015	0.520	54.770	1	8
330	Rajapur	Yamuna	5.025	3.442	9.775	0.180	11.780	0	8
331	Rajegaon	Bagh	3.342	2.247	7.175	0.160	10.790	0	9
332	Rajghat	Betwa	3.101	2.722	4.050	0.280	6.180	0	7
333	Rajim	Mahanadi	20.170	20.170	-	20.170	20.170	0	1
334	Ram Munshi Bagh	Jhelum	1.080	1.070	1.140	0.320	2.150	0	7
335	Ramakona	Kanhan	2.660	1.407	7.045	0.600	10.740	0	9
336	Ramamangalam	Muvvattupuzha	2.687	2.675	2.760	0.100	6.630	0	7
337	Rampur	Jonk	12.773	12.773	-	1.300	29.770	0	3
338	Ranganadi NT-Road Xing	Ranganadi	2.631	1.842	6.180	0.020	11.160	0	11
339	Rangeli	Som	4.002	4.694	0.885	0.040	22.430	0	11
340	Rangpo	Rangpochu	4.613	4.613	-	0.590	12.470	0	3
341	Regauli	Rapti	34.478	32.003	44.380	0.330	172.710	3	7

S. No.	Water Quality Site	River	Chromium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 50 µg/L	Below 50 µg/L
342	Rishikesh	Ganga	6.705	4.831	15.135	0.080	29.320	0	11
343	Rudraprayag	Alaknanda	5.706	5.284	7.395	0.060	29.450	0	10
344	Safapora	Jhelum	0.691	0.630	1.120	0.050	1.490	0	8
345	Sakleshpur	Hemavathi	10.013	8.854	19.290	0.330	40.610	0	9
346	Sakmur	Wardha	6.673	2.707	24.520	0.300	39.100	0	11
347	Salebhata	Ong	2.570	2.570	-	0.190	5.490	0	4
348	Samdoli	Varna	10.070	-	10.070	10.070	10.070	0	1
349	Sandia	Narmada	5.739	6.284	3.560	0.080	23.320	0	10
350	Sangam J	Jhelum	3.775	4.067	1.730	0.400	17.970	0	8
351	Sangam K	Kinnerasani	1.602	1.680	1.210	0.370	6.080	0	6
352	Sangod	Parwan	0.632	0.785	0.555	0.070	1.040	0	3
353	Sankalan	Teesta	3.823	3.823	-	0.050	10.600	0	3
354	Sankosh LRP	Sankosh	2.875	3.530	0.910	0.910	7.040	0	4
355	Santeguli	Aghanashini	22.041	23.348	11.590	0.720	169.950	1	8
356	Sarangkheda	Tapi	9.543	8.602	12.365	0.640	32.150	0	8
357	Satrapur	Kanhan	3.159	2.826	4.660	0.580	8.710	0	11
358	Savandapur	Bhavani	2.743	2.933	1.985	0.540	12.300	0	10
359	Seondha	Sind	2.902	3.308	0.870	0.490	13.110	0	6
360	Seppa	Kamang	12.698	13.331	9.850	1.210	42.990	0	11
361	Sevanur	Chittar	4.510	4.510	-	4.510	4.510	0	1
362	Sevoke	Teesta	3.187	3.187	-	0.340	8.120	0	3
363	Shahijina	Betwa	13.673	11.913	19.835	0.060	45.490	0	9
364	Shahzadpur	Ganga	9.817	10.133	8.555	1.410	28.370	0	10
365	Shimoga	Tunga	3.290	1.561	15.390	0.110	15.390	0	8
366	Sibbari	Dareng	1.473	1.522	1.350	0.130	3.120	0	7
367	Sikandarpur	Burhi Gandak	6.074	7.202	0.995	0.180	41.670	0	11
368	Simga	Seonath	6.507	6.507	-	2.510	9.130	0	3
369	Singla-Bazar	Rangit	5.153	5.153	-	3.990	6.630	0	3
370	Sivasagar	Dikhow	4.744	3.249	11.470	0.510	16.050	0	11
371	Sonapur	Digaru	3.451	2.755	7.630	0.640	10.720	0	7
372	Sonapurhat	Mahananda	7.290	7.290	-	0.630	16.950	0	3
373	Srikakulam	Nagavali	2.776	2.046	7.890	0.480	7.890	0	8
374	Srinagar	Alakananda	5.502	6.106	2.480	0.890	20.820	0	6
375	Sripalpur	Punpun	6.237	7.243	1.710	0.340	33.710	0	11
376	Suklai	Suklai	3.848	4.217	2.190	0.210	20.050	0	11
377	Sultanpur	Gomti	5.938	5.316	8.425	0.170	27.050	0	10
378	Sulurpet	Kalingi	1.120	1.120	-	1.120	1.120	0	1
379	Sundergarh	Ib	2.695	2.695	-	0.250	6.070	0	4
380	T. Bekuppe	Arkavathi	3.190	2.091	11.980	0.080	11.980	0	9
381	T. Narasipur	Kabini	5.074	2.490	15.410	0.320	15.410	0	5
382	T. Ramapuram	Hagari	3.513	3.513	-	2.240	4.680	0	3
383	T.K.Halli	Shimsha	3.878	3.878	-	0.370	8.980	0	4
384	Tal	Chambal	3.975	0.715	5.605	0.715	9.890	0	3

S. No.	Water Quality Site	River	Chromium (in µg/L)					BIS: 10500: 2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 50 µg/L	Below 50 µg/L
385	Talcher	Brahmani	3.869	3.437	6.890	0.140	14.630	0	8
386	Tandi	Chenab/Bhaga	2.030	-	2.030	2.030	2.030	0	1
387	Teesta-Bazar	Teesta	2.205	2.558	0.440	0.030	10.600	0	6
388	Tehri	Bhagirath	4.710	4.710	-	1.930	7.490	0	2
389	Tekra	Pranhitha	2.876	1.663	8.335	0.340	11.660	0	11
390	Tezpur	Brahmaputra	11.301	7.441	28.670	0.170	53.100	1	10
391	Tezu	Lohit	3.444	1.426	11.515	0.290	17.890	0	10
392	Thengudi	Thirumalairajanar	3.017	3.017	-	0.220	5.240	0	3
393	Thengumarahada	Moyar	3.101	3.525	1.405	1.110	10.630	0	10
394	Theni	Suruliar	3.068	3.069	3.065	0.740	8.820	0	10
395	Therriaghat	Umsohrynkiew	2.170	1.026	5.030	0.120	9.900	0	7
396	Thevur	Sarabenga	1.600	1.600	-	1.600	1.600	0	1
397	Thimmanahalli	Yagachi	1.967	1.967	-	0.530	4.910	0	6
398	Thoppur	Thoppaiyar	1.990	-	1.990	1.990	1.990	0	1
399	Thumpamon	Achankovil	2.902	2.882	3.000	0.270	5.460	0	6
400	Tikarpara	Mahanadi	3.461	2.787	8.180	0.260	8.180	0	8
401	Tilga	Sankh	6.020	5.710	8.190	0.420	11.870	0	8
402	Tonk	Banas	3.023	2.355	3.690	2.355	3.690	0	2
403	Tribeni	Gandak	11.351	13.780	0.420	0.200	49.580	0	11
404	Tufanganj	Raidak-I	2.586	3.110	0.490	0.280	9.840	0	5
405	Tuini	Tuini	3.233	3.806	0.655	0.002	14.340	0	11
406	Turtipar	Ghagra	41.524	12.175	158.920	0.170	316.840	1	9
407	Udaipur (Chandra)	Chenab/Chandra	4.330	-	4.330	4.330	4.330	0	1
408	Udaipur (Tirap)	Tirap	5.487	4.120	11.640	0.920	16.790	0	11
409	Udi	Chambal	4.850	4.909	4.645	0.930	8.540	0	9
410	Ujjain	Sipra	3.518	5.515	1.520	1.520	5.515	0	2
411	Urachikottai	Cauvery	3.600	3.178	5.710	0.730	9.530	0	6
412	Uttarkashi	Bhagirath	5.075	5.470	3.295	0.150	27.360	0	11
413	Vandiperiyar	Periyar	3.536	3.475	3.840	0.950	7.320	0	6
414	Vapi	Damanganga	5.869	4.193	11.735	0.420	19.570	0	9
415	Varanasi	Ganga	5.899	5.567	7.395	0.610	27.930	0	11
416	Vautha	Sabarmati	12.664	15.137	1.535	0.370	49.840	0	11
417	Vazhavachanur	Ponnaiyar	1.688	1.688	-	0.010	5.720	0	4
418	Villupuram	Ponnaiyar	3.520	3.520	-	3.520	3.520	0	1
419	Wadenapally	Krishna	3.610	3.973	1.430	0.050	8.760	0	7
420	Wairagarh	Khobragarhi	6.126	1.314	18.155	0.330	25.870	0	7
421	Warunji	Koyna	9.200	-	9.200	9.200	9.200	0	1
422	Yadgir	Bhima	1.240	-	1.240	1.240	1.240	0	1
423	Yashwant nagar	Giri	1.299	1.394	0.870	0.050	4.720	0	11
424	Yennehole	Yennehole	3.744	1.653	12.110	0.200	12.110	0	5

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S. No.	Water Quality Site	River	Copper (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 50 µg/L	Below 50 µg/L
1	A B Road Xing	Parwati	3.647	2.360	4.290	2.040	6.540	0	3
2	A.P. Puram	Chittar	3.686	3.686	-	0.270	7.160	0	5
3	A.P.Ghat	Barak	2.114	1.716	3.110	0.060	6.160	0	7
4	Aauriya	Yamuna	4.816	3.749	8.550	0.160	13.770	0	9
5	Abu Road	Banas	6.972	7.216	5.750	0.740	22.690	0	6
6	Addoor	Gurupur	5.180	6.350	4.010	4.010	6.350	0	2
7	Adityapur	Kharkai	3.996	3.816	5.260	0.740	9.270	0	8
8	Agra	Yamuna	7.254	4.453	17.060	0.040	30.640	0	9
9	Aie NH Crossing	Aie	5.863	5.863	-	4.110	9.200	0	3
10	Akabarpur	Chhoti Sarju	4.007	2.874	6.840	0.810	11.570	0	7
11	Akhnoor	Chenab	3.075	3.083	3.020	0.440	11.790	0	8
12	Akkihebbal	Hemavathi	1.728	1.704	1.920	0.120	5.030	0	9
13	Aklera	Parwan	1.910	1.410	2.660	1.250	2.820	0	5
14	Alladupalli	Kunderu	5.593	6.158	3.335	0.920	12.700	0	10
15	Allahabad	Ganga	5.788	7.056	0.085	0.070	11.260	0	11
16	Alutuma	Ramyala	5.762	6.898	0.080	0.080	24.740	0	6
17	Ambarampalayam	Aliyar	4.633	4.761	4.120	0.760	10.240	0	10
18	Ambasamudram	Vaigai	4.035	4.035	-	2.420	5.650	0	2
19	Anandpur	Ganga	3.555	3.416	4.530	0.510	11.250	0	8
20	Andhiyar Kore	Hamp	5.520	5.520	-	3.910	6.930	0	3
21	Ankinghat	Ganga	9.754	9.658	10.140	0.210	31.980	0	10
22	Annavasal	Nattar	3.530	3.530	-	3.530	3.530	0	1
23	Arangaly	Chalakudy	3.222	3.604	1.310	0.580	12.300	0	6
24	Arcot	Palar	3.705	2.950	4.460	2.950	4.460	0	2
25	Arjunwad	Krishna	6.730	-	6.730	6.730	6.730	0	1
26	Ashramam	Pazhayar	1.950	1.880	2.300	0.580	4.170	0	6
27	Ashti	Wainganga	3.362	2.907	5.410	0.580	7.370	0	11
28	Avarankuppam	Palar	6.020	6.020	-	6.020	6.020	0	1
29	Avershe	Sita	3.368	3.768	1.770	0.460	9.050	0	5
30	Ayilam	Vamanapuram	4.650	4.258	6.610	0.490	8.530	0	6
31	Ayodhya	Saryu	6.704	7.625	3.020	0.980	21.060	0	10
32	Azmabad	Ganga	6.165	6.663	3.920	0.740	23.570	0	11
33	B.P. Ghat	Barak	1.883	2.143	1.100	0.370	5.540	0	8
34	Badatighat	Subansiri	3.304	3.107	4.190	0.380	12.330	0	11
35	Badlapur	Ulhas	7.437	8.402	2.610	1.330	28.230	0	6
36	Balrampur	Rapti	8.439	8.480	8.275	2.320	21.430	0	10
37	Baltara	Kosi	6.294	5.433	10.165	0.410	14.900	0	11
38	Bamni (Banjar)	Banjar	6.001	4.506	11.235	1.370	12.350	0	9
39	Bamni (Wardha)	Wardha	5.966	5.388	8.570	1.800	13.170	0	11
40	Bamnidih	Hasdeo	14.183	14.183	-	3.460	28.260	0	3
41	Banda	Ken	3.078	3.403	1.940	0.490	7.750	0	9

S. No.	Water Quality Site	River	Copper (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 50 µg/L	Below 50 µg/L
42	Bansi	Rapti	4.486	4.900	3.035	0.200	12.320	0	9
43	Bantwal	Nethravathi	2.310	2.235	2.460	1.370	3.100	0	3
44	Baranwada	Banas	4.063	4.667	2.250	1.670	6.690	0	4
45	Bareilly	Ramganga	7.519	8.865	2.135	0.880	19.060	0	10
46	Barmanghat	Narmada	4.034	4.248	3.180	2.020	6.930	0	10
47	Barobisha	Raidak-II	6.114	7.303	1.360	0.670	16.910	0	5
48	Barod	Kali Sindh	2.913	3.252	1.895	0.230	6.370	0	8
49	Baronda	Pairi	41.940	41.940	-	41.940	41.940	0	1
50	Basantpur	Mahanadi	8.805	8.805	-	0.500	20.140	0	4
51	Basti	Kwano	6.669	7.469	3.470	1.100	17.190	0	10
52	Bawapuram	Tungabhadra	7.453	7.453	-	1.900	18.150	0	3
53	Behalpur	Champamati	7.365	7.365	-	1.140	13.590	0	2
54	Beki Mathanguri	Beki	14.265	14.265	-	3.300	25.230	0	2
55	Beki Road Bridge	Beki	4.288	4.738	2.490	0.640	9.090	0	5
56	Belkhedi	Sher	3.805	3.791	3.860	0.890	10.200	0	10
57	Belne Bridge	Gad	3.575	4.540	2.610	2.610	4.540	0	2
58	Bendrahalli	Suvarnavathi	7.050	7.050	-	7.050	7.050	0	1
59	Berhampore	Bhagirathi	2.994	2.918	3.335	0.590	6.170	0	11
60	Bhadrachalam	Godavari	2.166	2.152	2.250	1.040	3.250	0	7
61	Bhalukpong	Jiabharali	4.217	4.036	5.035	0.040	10.540	0	11
62	Bhatpalli	Peddavagu	4.661	4.170	6.870	0.430	11.700	0	11
63	Bhitaura	Ganga	9.334	10.519	4.595	3.430	20.930	0	10
64	Bhomoraguri	Brahmaputra	9.675	10.424	6.305	0.530	45.710	0	11
65	Bihubar	Dikhow	9.720	8.626	14.645	0.620	54.720	1	10
66	Biligundullu	Cauvery	4.006	4.160	2.770	0.570	12.490	0	9
67	Birdghat	Rapti	7.682	8.828	3.100	1.430	25.230	0	10
68	Bokajan	Dhansiri	5.459	4.327	10.555	1.570	16.370	0	11
69	Burhanpur	Tapi	10.426	8.840	15.185	0.030	24.900	0	8
70	Buxar	Ganga	7.619	7.077	10.060	1.130	19.020	0	11
71	Byaladahalli	Haridra	4.307	4.307	-	1.040	7.380	0	3
72	Champasari	Mahananda	2.588	2.588	-	1.370	4.080	0	4
73	Champua	Ganga	5.649	6.568	0.130	0.130	21.440	0	7
74	Chanwada	Orsang	3.608	3.836	2.810	0.340	5.820	0	9
75	Chapra	Jalangi	2.460	2.761	1.105	0.280	8.280	0	11
76	Chel	Chel	5.483	5.483	-	4.330	7.760	0	3
77	Chengalpet	Palar	4.213	4.510	3.320	3.320	6.350	0	4
78	Chenimari	Buridehing	4.227	3.374	8.065	0.610	8.840	0	11
79	Chennur	Pennar	4.158	4.718	1.920	1.510	9.110	0	10
80	Chepan	Raidak-I	6.306	7.550	1.330	1.330	12.410	0	5
81	Chhidgaon	Ganjal	4.096	4.530	2.360	0.530	18.360	0	10
82	Chitrasani	Balaram	5.148	5.270	4.720	0.790	13.220	0	9
83	Chittorgarh	Gambhiri	4.900	4.900	-	4.900	4.900	0	1
84	Cholachguda	Malaprabha	15.980	15.980	-	15.980	15.980	0	1

S. No.	Water Quality Site	River	Copper (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 50 µg/L	Below 50 µg/L
85	Chopan	Sone	4.188	3.392	7.770	2.100	12.500	0	11
86	Chouldhowaghat	Subansiri	3.717	3.881	2.980	0.260	10.820	0	11
87	Chuchankatte	Cauvery	1.980	1.345	3.250	1.240	3.250	0	3
88	Coronation	Teesta	4.503	4.503	-	1.150	8.010	0	3
89	Dabri	Ramganga	11.283	10.861	12.970	1.190	33.640	0	10
90	Damarcherla	Musi	1.964	1.964	-	1.040	2.720	0	5
91	Dawki	Umngot	5.306	6.662	1.915	0.170	17.460	0	7
92	Delhi Rly Bridge	Yamuna	2.805	2.917	2.300	0.370	8.810	0	11
93	Deoprayag	Bhagirath	9.825	11.660	1.570	0.470	44.200	0	11
94	Derol Bridge	Sabarmati	4.723	4.282	6.705	0.160	9.720	0	11
95	Desangpani	Desang	5.630	5.400	6.665	0.520	18.300	0	11
96	Dhamkund	Chenab	3.710	3.979	1.830	0.130	15.530	0	8
97	Dharamtul	Kopili	1.654	1.219	3.610	0.360	4.180	0	11
98	Dheng Bridge	Bagmathi	2.845	2.714	3.430	1.020	7.600	0	11
99	Dholabazar	Lohit	3.129	2.580	5.600	0.080	9.450	0	11
100	Dholai	Rukni	1.213	1.445	0.515	0.080	2.820	0	8
101	Dholpur	Chambal	3.486	3.204	4.475	0.480	8.330	0	9
102	Dhubri	Brahmaputra	3.345	3.345	-	3.100	3.590	0	2
103	Dhulsar	Uri	3.980	5.200	2.760	2.760	5.200	0	2
104	Diana	Diana	2.400	2.400	-	2.400	2.400	0	1
105	Dibrugarh	Brahmaputra	4.894	4.941	4.680	0.380	13.150	0	11
106	Dillighat	Desang	4.686	3.306	10.900	1.050	15.880	0	11
107	Dimapara	Bugi	3.316	0.904	9.345	0.080	18.610	0	7
108	Dindori	Narmada	4.799	4.791	4.830	2.610	6.920	0	10
109	Domohani	Teesta	12.820	15.288	2.950	2.430	47.720	0	5
110	Duddhi	Kanhar	5.586	3.714	14.010	1.250	24.810	0	11
111	Dudhnai	Dudhnai	4.565	5.092	2.190	0.220	22.150	0	11
112	Durvesh	Vaitarna	11.655	12.617	8.770	0.380	33.640	0	8
113	Ekmighat	Bagmathi	5.152	4.484	8.155	0.040	13.290	0	11
114	Elginbridge	Ghagra	6.584	7.163	4.270	1.260	18.860	0	10
115	Elunuthimanagalam	Noyyal	6.513	6.513	-	1.430	14.740	0	4
116	English Bazar	Padma/Mahananda	1.995	2.097	1.535	0.130	7.550	0	11
117	Erinjipuzha	Payaswani	3.593	3.176	5.680	0.470	6.710	0	6
118	Etawah	Yamuna	9.543	5.326	24.305	0.520	46.710	0	9
119	Fakirabazar	Longai	2.864	3.238	1.930	1.390	8.160	0	7
120	Farakka	Ganga	1.528	1.464	1.815	0.100	4.500	0	11
121	Farakka/(HR)	Feeder Canal	2.577	2.736	1.940	0.560	10.890	0	10
122	Fatehgarh	Ganga	7.472	8.344	3.985	0.820	18.300	0	10
123	Fulertal	Barak	1.335	1.558	0.890	0.130	2.920	0	6
124	Gadarwara	Sakkar	3.339	3.217	3.705	0.390	6.170	0	8
125	Gadat	Ambika	8.498	10.338	2.975	0.630	40.820	0	8
126	Gajaldoba	Teesta	4.123	4.123	-	2.560	5.000	0	3
127	Galeta	Hindon	3.930	4.229	2.585	0.240	9.060	0	11

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128	Ganod	Bhadar	8.624	7.889	14.510	0.030	15.800	0	9
129	Garhamukteshwar	Ganga	13.014	12.393	15.500	0.070	27.220	0	10
130	Garrauli	Dhasan	5.032	3.380	7.510	1.220	13.800	0	5
131	Garudeshwar	Narmada	8.793	9.821	5.195	1.170	42.870	0	9
132	Gaya	Harohar/Phalgu	2.483	1.940	3.025	0.940	3.650	0	4
133	Gelabil	Doyang	7.552	3.935	14.785	1.140	21.620	0	6
134	Ghat	Sarju	4.172	4.290	3.700	1.450	9.740	0	10
135	Ghatora	Seonath	5.353	5.353	-	3.430	7.710	0	3
136	Ghatsila	Subarnarekha	28.056	23.219	61.920	1.500	61.920	2	6
137	Ghish	Ghish	6.027	6.027	-	2.320	12.720	0	3
138	Ghugumari	Torsa	9.822	11.915	1.450	1.450	20.950	0	5
139	Gokak	Ghataprabha	5.735	5.210	6.260	5.210	6.260	0	2
140	Golaghat	Sonkosh	4.606	3.876	7.895	0.610	11.420	0	11
141	Golakganj	Dhansiri	2.430	2.430	-	1.830	3.030	0	2
142	Gomlai	Brahmani	6.929	7.299	4.340	2.230	21.690	0	8
143	Gopalkheda	Purna	8.348	12.080	4.615	2.600	14.410	0	4
144	Gopurajapuram	Cauvery/Puravidaiyanar	4.390	4.390	-	4.390	4.390	0	1
145	Govindapur	Burhabalang	5.538	6.317	0.080	0.080	27.850	0	8
146	Gummanur	Ponnaiyar	3.272	3.179	3.645	0.020	4.720	0	10
147	Gumrabazar	Gumra	2.231	1.825	3.450	0.050	6.850	0	8
148	Gunupur	Vamsadhara	4.201	4.793	0.060	0.060	14.880	0	8
149	Haladi	Haladi	2.190	2.119	2.760	0.110	11.840	0	9
150	Halia	Halia	2.025	2.025	-	0.540	5.550	0	6
151	Hamirpur	Yamuna	4.571	4.423	5.090	0.710	11.050	0	9
152	Handia	Narmada	3.439	3.381	3.670	0.580	10.230	0	10
153	Hanskhali	Churni	4.695	5.213	2.360	0.160	19.380	0	11
154	Haridwar	Ganga	2.084	1.484	4.485	0.130	6.380	0	10
155	Harlahalli	Tungabhadra	2.663	2.778	2.090	2.030	4.060	0	6
156	Hasimara	Torsa	5.745	5.667	5.980	0.690	13.720	0	4
157	Hathidah	Ganga	10.932	12.533	3.725	0.090	42.360	0	11
158	Hayaghat	Bagmathi	3.755	3.631	4.310	0.050	9.920	0	11
159	Hivra	Wardha	5.509	5.359	6.185	1.120	11.540	0	11
160	Hogenakkal	Chinnar	3.200	3.200	-	3.200	3.200	0	1
161	Holehonnur	Bhadra	3.232	3.151	3.880	0.280	13.700	0	9
162	Honnali	Tungabhadra	2.521	2.544	2.340	0.490	7.480	0	9
163	Hoshangabad	Narmada	3.736	3.784	3.545	1.540	7.650	0	10
164	Huvin Hedgi	Krishna	2.394	2.198	3.180	0.100	6.120	0	5
165	Jagdalpur	Indravathi	2.290	1.540	3.040	1.540	3.040	0	2
166	Jagibhakatgaon	Kopili	1.798	1.897	1.355	0.610	5.580	0	11
167	Jai Nagar	Kamala-Balan	3.889	3.538	5.470	1.100	8.480	0	11
168	Jaldhaka NH-31	Jaldhaka	4.260	4.863	1.850	1.370	9.280	0	5
169	Jammu Tawi	Chenab/Tawi	3.635	3.847	2.150	0.020	10.510	0	8
170	Jamshedpur	Subarnarekha	4.405	3.820	8.500	0.990	16.070	0	8

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171	Jamsolghat	Subarnarekha	22.044	8.660	75.580	4.050	75.580	1	4
172	Japla	Sone	6.486	6.296	7.345	0.890	20.570	0	11
173	Jaraikela	Koel	4.448	5.059	0.170	0.170	17.410	0	8
174	Jenapur	Brahmani	5.734	5.416	7.960	0.360	18.950	0	8
175	Jhanjharpur	Kamala-Balan	4.103	3.552	6.580	1.390	9.850	0	11
176	Jiabharali NT Road Xing	Jiabharali	5.854	4.047	13.985	0.450	21.380	0	11
177	Jondhra	Seonath	5.120	5.120	-	5.120	5.120	0	1
178	K.M. Vadi	Lakshmantirtha	5.833	7.445	2.610	2.610	8.450	0	3
179	Kachlabridge	Ganga	19.421	23.561	2.860	0.770	107.990	1	9
180	Kalampur	Kaliyar	2.012	2.108	1.530	0.590	4.110	0	6
181	Kalanaur	Yamuna	4.654	4.883	3.620	0.090	14.490	0	11
182	Kallooppara	Manimala	2.135	2.276	1.430	0.370	7.060	0	6
183	Kalna (EBB)	Bhagirathi	4.388	6.238	0.690	0.090	8.180	0	6
184	Kalna (Flow)*	Bhagirathi	4.563	4.563	-	1.050	9.690	0	4
185	Kamalapuram	Papagni	6.015	-	6.015	1.850	10.180	0	2
186	Kamalpur	Banas	4.143	4.040	4.350	0.970	7.110	0	3
187	Kampur	Kopili	1.966	1.744	2.965	0.080	3.870	0	11
188	Kanpur	Ganga	8.712	9.070	7.280	0.760	23.000	0	10
189	Kantamal	Tel	21.560	21.560	-	0.210	72.870	1	3
190	Karad	Krishna	4.380	-	4.380	4.380	4.380	0	1
191	Karathodu	Kadalundi	5.640	6.552	1.080	0.490	21.590	0	6
192	Kashinagar	Vamsadhara	3.229	3.671	0.130	0.050	10.170	0	8
193	Katwa	Bhagirathi	3.081	3.138	2.825	0.190	9.260	0	11
194	Keesara	Munneru	2.680	1.870	5.110	1.040	5.110	0	4
195	Kellodu	Vedavathi	3.640	3.640	-	3.640	3.640	0	1
196	Keolari	Wainganga	4.578	4.556	4.680	0.940	12.080	0	11
197	Kesinga	Tel	3.985	3.985	-	0.100	6.850	0	4
198	Khanitar	Teesta	3.485	3.485	-	1.780	5.190	0	2
199	Khanpur	Mahi	5.964	6.421	3.905	0.430	15.280	0	11
200	Kharkhana	Surma/Myntdu	2.381	1.680	4.135	0.640	4.960	0	7
201	Khatoli	Parwati	4.943	6.038	2.205	1.050	14.660	0	7
202	Kheronighat	Kopili	3.199	3.059	3.830	0.160	13.810	0	11
203	Kidangoor	Meenachi	3.027	3.016	3.080	0.650	6.680	0	6
204	Kodumudi	Cauvery	3.881	3.638	5.340	0.780	6.560	0	7
205	Koelwar	Sone	5.255	5.482	4.230	0.510	11.780	0	11
206	Kogaon	Kundi	3.608	3.865	3.350	2.580	5.150	0	4
207	Kokrajhar	Gaurang	6.044	6.965	2.360	0.880	19.270	0	5
208	Kollegal	Cauvery	2.594	2.520	2.890	0.600	4.200	0	5
209	Konta	Sabari	3.354	3.545	2.210	1.690	5.520	0	7
210	Koperagaon	Godavari	3.250	-	3.250	3.250	3.250	0	1
211	Kora	Rind	4.494	4.716	3.940	0.140	9.070	0	7
212	Koteshwar	Bhagirath	3.569	3.889	2.450	0.460	13.850	0	9
213	Kudalaiyathur	Vellar	3.535	3.535	-	1.490	5.580	0	2

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214	Kudige	Cauvery	5.929	6.378	2.340	0.420	22.140	0	9
215	Kudlur	Palar	3.303	3.290	3.340	1.620	4.910	0	4
216	Kuldah Bridge	Sone	5.531	4.441	9.890	1.950	15.290	0	10
217	Kulsi	Kulsi	1.880	2.069	1.030	0.070	4.410	0	11
218	Kumbidi	Bharathapuzha	3.540	3.940	1.540	0.690	10.070	0	6
219	Kumhari	Wainganga	6.048	5.964	6.425	0.480	18.660	0	11
220	Kuniyil	Chaliyar	5.052	5.724	1.690	0.250	21.050	0	6
221	Kuppelur	Kumudavathi	1.120	1.120	-	1.120	1.120	0	1
222	Kurubhata	Mand	4.225	4.225	-	0.660	7.030	0	4
223	Kurundwad	Krishna	3.220	-	3.220	3.220	3.220	0	1
224	Kuttyadi	Kuttyadi	7.714	8.423	3.460	1.000	27.430	0	7
225	Kuzhithurai	Tambrapani	7.877	9.048	2.020	0.310	22.540	0	6
226	Labha	Mahananda	3.303	3.664	1.675	0.270	16.290	0	11
227	Lakhisarai	Kiul	4.205	3.953	5.215	1.120	12.130	0	10
228	Lalganj	Gandak	3.545	4.124	0.935	0.070	9.610	0	11
229	Lowara	Sheturni	14.370	17.192	1.670	0.230	38.570	0	11
230	Lucknow	Gomti	6.473	6.054	8.150	1.020	15.320	0	10
231	M.H. Halli	Hemavathi	2.738	2.738	-	1.080	4.300	0	4
232	Madhira	Wyra	4.343	4.343	-	2.300	7.370	0	4
233	Madla	Ken	3.498	3.646	2.980	0.060	9.340	0	9
234	Magaral	Cheyyar	5.280	5.280	-	5.280	5.280	0	1
235	Mahidpur	Sipra	2.977	1.520	3.705	1.510	5.900	0	3
236	Mahuwa	Purna	6.521	5.585	9.330	1.460	11.630	0	8
237	Maighat	Gomti	7.275	6.082	12.645	0.030	25.260	0	11
238	Majhitar	Rangit	5.050	5.050	-	5.050	5.050	0	1
239	Malakkara	Pampa	2.653	2.942	1.210	0.480	8.370	0	6
240	Malkhed	Kagna	4.036	3.940	4.420	0.280	8.660	0	5
241	Manas NH Crossing	Manas	4.153	4.817	2.160	0.960	10.790	0	4
242	Mancherial	Godavari	3.650	3.723	3.210	0.080	13.070	0	7
243	Mandleshwar	Narmada	3.653	3.678	3.555	0.680	6.990	0	10
244	Manendragarh	Hasdeo	4.490	4.490	-	2.700	6.280	0	2
245	Mangaon (Seasonal)	Kal	2.960	-	2.960	2.960	2.960	0	1
246	Mankara	Bharathapuzha	3.649	4.048	1.250	0.280	11.720	0	7
247	Manot	Narmada	6.293	6.464	5.610	1.180	21.590	0	10
248	Mantralayam	Tungabhadra	4.833	4.833	-	1.550	12.350	0	4
249	Marella	Gundlakamma	3.513	3.513	-	2.110	6.240	0	3
250	Margherita	Buridehing	29.643	34.316	8.615	0.850	269.630	1	10
251	Marol	Varada	4.120	4.800	3.440	3.440	4.800	0	2
252	Mataji	Mahi	6.711	7.170	4.645	0.770	21.960	0	11
253	Mathabhanga	Jaldhaka	6.755	3.913	15.280	2.630	15.280	0	4
254	Mathanguri	Beki	4.120	4.120	-	2.410	5.830	0	2
255	Mathura	Yamuna	6.726	7.624	2.685	0.410	32.420	0	11
256	Matigara	Balason	6.108	6.108	-	0.500	12.560	0	4

S. No.	Water Quality Site	River	Copper (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 50 µg/L	Below 50 µg/L
257	Matijuri	Dhaleshwari	1.243	1.403	0.925	0.040	3.300	0	6
258	Matunga	Kalanadi	2.470	2.779	1.080	0.010	8.810	0	11
259	Mawi	Yamuna	2.052	2.063	2.000	0.070	5.210	0	11
260	Meja Road	Tons	5.484	4.456	9.595	1.890	16.260	0	10
261	Mekhliganj	Teesta	1.908	2.200	1.030	0.520	3.200	0	4
262	Menangudi	Cauvery/Noolar	2.180	2.180	-	2.180	2.180	0	1
263	Miao	Neo dihing	4.924	5.173	3.800	0.100	11.870	0	11
264	Mirzapur	Ganga	6.785	8.012	1.260	0.080	12.850	0	11
265	Mohana (Betwa)	Betwa	2.134	1.463	4.145	0.530	7.350	0	8
266	Mohana (Yamuna)	Yamuna	2.899	2.866	3.050	0.590	6.330	0	11
267	Mohgaoan	Burhner	6.741	7.078	5.395	1.360	20.610	0	10
268	Moradabad	Ramganga	16.060	18.673	5.610	2.890	48.680	0	10
269	Motinaroli	Kim	5.807	6.210	4.395	2.490	10.340	0	9
270	Murappanadu	Tambrapani	3.774	3.869	3.110	0.090	8.770	0	8
271	Muri	Subarnarekha	4.115	4.126	4.040	1.060	7.910	0	8
272	Murti	Murti	4.290	4.290	-	1.480	5.820	0	3
273	Musiri	Cauvery	3.290	3.290	-	1.060	6.670	0	7
274	Muthankera	Kabini	7.806	8.803	1.820	0.270	34.410	0	7
275	Nagalamadike	Pennar	6.150	6.150	-	6.150	6.150	0	1
276	Nagrakata	Jaldhaka	5.100	5.100	-	4.760	5.470	0	3
277	Naharkatia	Buridehing	6.231	6.760	3.850	1.260	13.420	0	11
278	Naidupet	Swarnamukhi	7.620	7.620	-	7.620	7.620	0	1
279	Nallammaranpatty	Amaravathi	9.103	10.057	6.240	0.520	23.310	0	4
280	Nallathur	Nandalar	6.623	6.623	-	1.880	14.330	0	4
281	Namsai	Neo dihing	6.686	6.039	9.600	1.250	11.660	0	11
282	Nandgaon	Wunna	4.351	3.997	5.415	0.860	8.480	0	8
283	Nandipalli	Sagaileru	4.918	7.220	2.615	1.960	10.650	0	4
284	Nanglamoraghat	Desang	9.363	9.852	7.160	1.180	37.580	0	11
285	Neamatighat	Brahmaputra	4.129	4.734	1.405	0.360	14.180	0	11
286	Neeleswaram	Periyar	5.950	6.582	2.160	0.880	28.870	0	7
287	Neemsar	Gomti	6.096	7.213	2.185	0.480	17.570	0	9
288	Nellithurai	Bhavani	2.591	2.591	-	0.003	6.540	0	4
289	Nellore	Pennar	3.285	3.285	-	3.180	3.390	0	2
290	Neora	Naora	3.037	3.037	-	0.020	7.310	0	3
291	Nowrangpur	Indravathi	2.459	2.505	2.180	1.460	5.310	0	7
292	Numaligarh	Dhansiri	4.151	3.901	5.150	0.650	8.070	0	10
293	P.G.Bridge	Penganga	6.729	5.203	12.070	0.600	20.990	0	9
294	Pachauli	Sind	1.990	3.930	0.050	0.050	3.930	0	2
295	Pachegaon	Pravara	5.420	-	5.420	5.420	5.420	0	1
296	Paderdibadi	Mahi	3.687	3.451	4.750	0.780	8.580	0	11
297	Pagladiya N.T.Road Crossing	Pagladiya	3.119	3.637	0.790	0.040	8.960	0	11
298	Paleru Bridge	Paleru	3.350	3.074	4.730	1.100	7.770	0	6
299	Paliakalan	Sharda	6.269	7.109	2.910	2.430	17.000	0	10

S. No.	Water Quality Site	River	Copper (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 50 µg/L	Below 50 µg/L
300	Palla	Yamuna	6.947	7.828	2.985	0.620	34.300	0	11
301	Panbari	Burisuti	2.265	2.265	-	1.680	2.850	0	2
302	Pancharatna	Brahmaputra	6.304	7.452	1.135	0.120	46.050	0	11
303	Pandu	Brahmaputra	4.626	5.336	1.435	0.020	11.740	0	11
304	Panposh	Brahmani	8.756	5.069	34.570	0.190	34.570	0	8
305	Passighat	Siang	4.030	4.030	-	0.370	9.390	0	5
306	Patan	Hiran	6.586	6.604	6.520	2.010	17.730	0	9
307	Pathagudem	Indravathi	2.431	2.195	3.850	0.740	3.850	0	7
308	Pathardhi	Kharun	2.940	2.940	-	2.940	2.940	0	1
309	Pati	Goi	2.302	2.638	0.960	0.780	4.540	0	5
310	Patna	Ganga	4.688	5.201	2.380	1.210	9.580	0	11
311	Pattazhy	Kallada	2.823	2.942	2.110	0.280	7.530	0	7
312	Pauni	Wainganga	4.772	3.686	9.660	0.680	15.040	0	11
313	Peralam	Vanjiyar	13.345	13.345	-	3.870	22.820	0	2
314	Perumannu	Valapatnam	5.290	5.432	4.440	0.670	13.280	0	7
315	Perur	Godavari	3.393	3.122	5.020	0.250	10.950	0	7
316	Phulgaon (Seasonal)	Varna	5.800	-	5.800	5.800	5.800	0	1
317	Pingalwada	Dhadher	39.830	49.446	6.175	0.270	314.930	1	8
318	Poanta	Yamuna	1.235	1.235	-	0.090	2.380	0	2
319	Polavaram	Godavari	2.260	2.035	3.610	0.370	4.740	0	7
320	Pratapgarh	Sai	5.594	4.835	8.630	2.460	12.490	0	10
321	Pratapur	Yamuna	4.703	4.577	5.145	1.140	9.800	0	9
322	Prem Nagar	Chenab	5.220	5.523	3.100	0.300	17.320	0	8
323	Pudur	Kannadipuzha	3.058	3.296	1.870	0.540	8.510	0	6
324	Pulamanthole	Pulanthodu	8.976	10.328	0.860	0.480	46.970	0	7
325	Purna	Purna	1.610	1.610	-	1.610	1.610	0	1
326	Purushottampur	Rushikulya	4.511	5.141	0.100	0.100	18.410	0	8
327	Puthimari D.R.F.	Puthimari	5.778	6.890	0.775	0.020	19.860	0	11
328	Puthimari NH Road crossing	Puthimari	6.507	7.901	0.930	0.030	44.670	0	10
329	Raibareli	Sai	7.260	8.887	1.565	0.560	19.600	0	9
330	Rajapur	Yamuna	4.370	4.002	5.475	1.520	8.770	0	8
331	Rajegaon	Bagh	5.356	5.291	5.580	0.590	12.150	0	9
332	Rajghat	Betwa	5.984	5.640	6.845	0.180	13.510	0	7
333	Rajim	Mahanadi	3.280	3.280	-	3.280	3.280	0	1
334	Ram Munshi Bagh	Jhelum	1.979	2.037	1.630	0.650	6.420	0	7
335	Ramakona	Kanhan	10.648	5.506	28.645	0.630	49.090	0	9
336	Ramamangalam	Muvvattupuzha	4.247	4.630	1.950	0.400	13.490	0	7
337	Rampur	Jonk	7.097	7.097	-	5.580	7.860	0	3
338	Ranganadi NT-Road Xing	Ranganadi	6.592	7.541	2.320	0.610	24.680	0	11
339	Rangeli	Som	6.129	6.342	5.170	0.840	15.590	0	11
340	Rangpo	Rangpochu	5.217	5.217	-	3.190	8.020	0	3
341	Regauli	Rapti	10.125	6.228	25.715	1.580	44.090	0	10
342	Rishikesh	Ganga	3.079	3.286	2.150	0.150	13.290	0	11

S. No.	Water Quality Site	River	Copper (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 50 µg/L	Below 50 µg/L
343	Rudraprayag	Alaknanda	3.981	2.971	8.020	0.620	11.880	0	10
344	Safapora	Jhelum	7.555	7.846	5.520	0.500	37.040	0	8
345	Sakleshpur	Hemavathi	2.169	1.938	4.020	0.410	4.280	0	9
346	Sakmur	Wardha	4.704	3.467	10.270	0.830	17.610	0	11
347	Salebhata	Ong	3.508	3.508	-	0.210	7.890	0	4
348	Samdoli	Varna	6.310	-	6.310	6.310	6.310	0	1
349	Sandia	Narmada	8.348	9.303	4.530	1.170	29.950	0	10
350	Sangam J	Jhelum	4.378	4.749	1.780	0.030	19.770	0	8
351	Sangam K	Kinnerasani	2.032	2.024	2.070	0.690	4.040	0	6
352	Sangod	Parwan	2.577	0.650	3.540	0.650	5.680	0	3
353	Sankalan	Teesta	4.920	4.920	-	3.280	6.560	0	3
354	Sankosh LRP	Sankosh	2.745	2.657	3.010	1.920	3.680	0	4
355	Santeguli	Aghanashini	3.547	3.590	3.200	0.410	11.670	0	9
356	Sarangkheda	Tapi	6.355	6.673	5.400	0.630	13.960	0	8
357	Satrapur	Kanhan	3.860	3.661	4.755	1.120	9.090	0	11
358	Savandapur	Bhavani	3.043	2.810	3.975	0.930	5.190	0	10
359	Seondha	Sind	6.912	8.000	1.470	0.880	26.440	0	6
360	Seppa	Kamang	7.269	6.991	8.520	0.120	33.040	0	11
361	Sevanur	Chittar	1.350	1.350	-	1.350	1.350	0	1
362	Sevoke	Teesta	8.263	8.263	-	3.330	15.160	0	3
363	Shahijina	Betwa	4.499	5.261	1.830	0.010	12.570	0	9
364	Shahzadpur	Ganga	6.762	7.174	5.115	0.060	22.550	0	10
365	Shimoga	Tunga	2.008	1.881	2.890	0.270	4.750	0	8
366	Sibbari	Dareng	0.849	0.982	0.515	0.020	2.860	0	7
367	Sikandarpur	Burhi Gandak	3.586	3.951	1.945	0.240	9.860	0	11
368	Simga	Seonath	4.550	4.550	-	4.310	4.870	0	3
369	Singla-Bazar	Rangit	5.007	5.007	-	3.440	7.020	0	3
370	Sivasagar	Dikhow	7.401	7.199	8.310	0.080	31.650	0	11
371	Sonapur	Digaru	4.787	5.578	0.040	0.040	17.060	0	7
372	Sonapurhat	Mahananda	2.980	2.980	-	0.230	6.680	0	3
373	Srikakulam	Nagavali	4.474	5.104	0.060	0.060	20.560	0	8
374	Srinagar	Alakananda	2.672	2.284	4.610	0.570	5.850	0	6
375	Sripalpur	Punpun	5.869	6.614	2.515	0.320	19.560	0	11
376	Suklai	Suklai	3.297	3.844	0.835	0.140	11.470	0	11
377	Sultanpur	Gomti	4.991	4.624	6.460	0.040	12.880	0	10
378	Sulurpet	Kalingi	2.150	2.150	-	2.150	2.150	0	1
379	Sundergarh	Ib	4.275	4.275	-	0.140	7.440	0	4
380	T. Bekuppe	Arkavathi	2.501	2.553	2.090	0.110	7.270	0	9
381	T. Narasipur	Kabini	3.072	3.425	1.660	0.330	6.850	0	5
382	T. Ramapuram	Hagari	6.153	6.153	-	1.700	14.870	0	3
383	T.K.Halli	Shimsha	3.518	3.518	-	1.310	5.040	0	4
384	Tal	Chambal	1.897	0.960	2.365	0.960	2.650	0	3
385	Talcher	Brahmani	3.033	2.653	5.690	0.590	9.950	0	8

S. No.	Water Quality Site	River	Copper (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 50 µg/L	Below 50 µg/L
386	Tandi	Chenab/Bhaga	2.800	-	2.800	2.800	2.800	0	1
387	Teesta-Bazar	Teesta	3.142	3.220	2.750	1.300	4.080	0	6
388	Tehri	Bhagirath	4.735	4.735	-	0.800	8.670	0	2
389	Tekra	Pranhitha	9.998	11.701	2.335	0.690	76.230	1	10
390	Tezpur	Brahmaputra	9.538	9.866	8.065	0.230	54.000	1	10
391	Tezu	Lohit	3.796	4.159	2.345	1.070	8.270	0	10
392	Thengudi	Thirumalairajanar	4.357	4.357	-	2.500	6.730	0	3
393	Thengumarahada	Moyar	5.655	6.466	2.410	0.500	22.270	0	10
394	Theni	Suruliar	3.665	3.574	4.030	1.070	6.850	0	10
395	Therriaghat	Umsohrynkiew	2.583	1.166	6.125	0.360	6.480	0	7
396	Thevur	Sarabenga	0.950	0.950	-	0.950	0.950	0	1
397	Thimmanahalli	Yagachi	1.883	1.883	-	0.280	4.480	0	6
398	Thoppur	Thoppaiyar	4.380	-	4.380	4.380	4.380	0	1
399	Thumpamon	Achankovil	4.938	5.620	1.530	0.390	20.390	0	6
400	Tikarpara	Mahanadi	2.693	2.283	5.560	1.070	7.150	0	8
401	Tilga	Sankh	7.403	5.269	22.340	0.410	22.340	0	8
402	Tonk	Banas	4.150	7.230	1.070	1.070	7.230	0	2
403	Tribeni	Gandak	4.642	5.400	1.230	0.060	10.660	0	11
404	Tufanganj	Raidak-I	6.166	7.233	1.900	1.900	13.840	0	5
405	Tuini	Tuini	3.540	3.977	1.575	0.800	9.240	0	11
406	Turtipar	Ghagra	7.672	8.938	2.610	1.000	26.650	0	10
407	Udaipur (Chandra)	Chenab/Chandra	2.930	-	2.930	2.930	2.930	0	1
408	Udaipur (Tirap)	Tirap	3.814	3.408	5.640	0.010	10.260	0	11
409	Udi	Chambal	4.459	5.180	1.935	0.200	10.680	0	9
410	Ujjain	Sipra	4.530	6.830	2.230	2.230	6.830	0	2
411	Urachikottai	Cauvery	4.447	3.806	7.650	0.440	10.020	0	6
412	Uttarkashi	Bhagirath	4.222	4.629	2.390	0.140	15.270	0	11
413	Vandiperiyar	Periyar	3.768	4.226	1.480	1.360	7.500	0	6
414	Vapi	Damanganga	10.922	13.370	2.355	0.320	61.550	1	8
415	Varanasi	Ganga	5.784	5.797	5.725	2.360	9.880	0	11
416	Vautha	Sabarmati	16.603	19.866	1.920	0.400	58.340	1	10
417	Vazhavachanur	Ponnaiyar	3.460	3.460	-	0.290	5.670	0	4
418	Villupuram	Ponnaiyar	2.900	2.900	-	2.900	2.900	0	1
419	Wadenapally	Krishna	4.564	4.663	3.970	0.780	11.780	0	7
420	Wairagarh	Khobragarhi	4.403	5.516	1.620	1.200	13.660	0	7
421	Warunji	Koyna	3.130	-	3.130	3.130	3.130	0	1
422	Yadgir	Bhima	2.820	-	2.820	2.820	2.820	0	1
423	Yashwant nagar	Giri	4.841	3.262	11.945	0.620	17.570	0	11
424	Yennehole	Yennehole	3.084	2.353	6.010	1.080	6.010	0	5

NICKEL

S. No.	Water Quality Site	River	Nickel (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 20 µg/L	Below 20 µg/L
1	A B Road Xing	Parwati	2.070	2.660	1.480	1.480	2.660	0	2
2	A.P. Puram	Chittar	6.098	6.098	-	1.870	10.480	0	5
3	A.P.Ghat	Barak	1.282	1.456	0.410	0.210	4.430	0	6
4	Aauriya	Yamuna	4.345	4.561	2.830	0.330	12.370	0	8
5	Abu Road	Banas	2.684	2.684	-	0.680	7.570	0	5
6	Addoor	Gurupur	3.410	3.410	-	3.410	3.410	0	1
7	Adityapur	Kharkai	6.507	6.507	-	0.130	17.580	0	7
8	Agra	Yamuna	5.275	5.593	3.050	0.470	9.900	0	8
9	Aie NH Crossing	Aie	1.847	1.847	-	0.910	2.870	0	3
10	Akabarpur	Chhoti Sarju	1.569	1.771	0.560	0.146	4.780	0	6
11	Akhnoor	Chenab	1.934	1.934	-	0.158	5.560	0	7
12	Akkihebbal	Hemavathi	2.579	2.579	-	0.170	9.290	0	7
13	Aklera	Parwan	2.815	3.723	0.090	0.090	6.110	0	4
14	Alladupalli	Kunderu	4.027	4.498	0.260	0.010	28.030	1	8
15	Allahabad	Ganga	3.413	3.732	0.540	0.237	9.950	0	10
16	Alutuma	Ramyala	1.158	1.158	-	0.131	2.410	0	5
17	Ambarampalayam	Aliyar	2.700	2.700	-	0.200	9.240	0	7
18	Ambasamudram	Vaigai	3.680	3.680	-	1.010	6.350	0	2
19	Anandpur	Ganga	3.372	3.372	-	0.116	11.970	0	7
20	Andhiyar Kore	Hamp	4.247	4.247	-	1.530	8.690	0	3
21	Ankinghat	Ganga	3.890	4.287	0.710	0.199	17.490	0	9
22	Annavasal	Nattar	0.360	0.360	-	0.360	0.360	0	1
23	Arangaly	Chalakudy	2.570	2.570	-	1.020	4.680	0	4
24	Arcot	Palar	0.620	0.780	0.460	0.460	0.780	0	2
25	Arjunwad	Krishna	-	-	-	0.000	0.000	0	0
26	Ashramam	Pazhayar	5.248	5.248	-	1.180	15.280	0	4
27	Ashti	Wainganga	2.099	2.247	0.770	0.064	8.230	0	10
28	Avarankuppam	Palar	7.170	7.170	-	7.170	7.170	0	1
29	Avershe	Sita	0.588	0.588	-	0.120	1.020	0	4
30	Ayilam	Vamanapuram	1.685	1.685	-	0.450	4.420	0	4
31	Ayodhya	Saryu	9.638	10.815	0.220	0.220	42.360	2	7
32	Azmabad	Ganga	2.094	2.270	0.510	0.150	10.110	0	10
33	B.P. Ghat	Barak	1.804	2.032	0.440	0.190	4.930	0	7
34	Badatighat	Subansiri	2.398	2.653	0.100	0.010	8.480	0	10
35	Badlapur	Ulhas	2.680	2.680	-	1.690	3.590	0	5
36	Balrampur	Rapti	3.753	3.988	1.880	0.240	9.220	0	9
37	Baltara	Kosi	3.240	3.468	1.190	0.150	14.460	0	10
38	Bamni (Banjar)	Banjar	2.471	2.823	0.010	0.010	13.420	0	8
39	Bamni (Wardha)	Wardha	5.475	6.040	0.390	0.102	15.640	0	10
40	Bamnidih	Hasdeo	9.363	9.363	-	0.980	24.120	1	2

S. No.	Water Quality Site	River	Nickel (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 20 µg/L	Below 20 µg/L
41	Banda	Ken	4.991	5.289	2.910	0.320	27.870	1	7
42	Bansi	Rapti	2.726	3.036	0.550	0.550	6.441	0	8
43	Bantwal	Nethravathi	4.455	4.455	-	1.520	7.390	0	2
44	Baranwada	Banas	4.787	4.787	-	2.100	9.490	0	3
45	Bareilly	Ramganga	3.598	4.029	0.150	0.150	14.190	0	9
46	Barmanghat	Narmada	17.587	19.759	0.210	0.010	85.940	2	7
47	Barobisha	Raidak-II	2.980	2.980	-	0.560	9.020	0	4
48	Barod	Kali Sindh	3.714	4.295	0.230	0.230	9.440	0	7
49	Baronda	Pairi	1.050	1.050	-	1.050	1.050	0	1
50	Basantpur	Mahanadi	18.255	18.255	-	1.020	59.210	1	3
51	Basti	Kwano	4.153	4.645	0.220	0.050	12.670	0	9
52	Bawapuram	Tungabhadra	17.717	17.717	-	5.660	30.300	1	2
53	Behalpur	Champamati	1.305	1.305	-	0.800	1.810	0	2
54	Beki Mathanguri	Beki	1.055	1.055	-	0.720	1.390	0	2
55	Beki Road Bridge	Beki	3.333	3.333	-	0.430	11.270	0	4
56	Belkhedi	Sher	2.668	2.936	0.530	0.095	12.770	0	9
57	Belne Bridge	Gad	0.480	0.480	-	0.480	0.480	0	1
58	Bendrahalli	Suvarnavathi	1.830	1.830	-	1.830	1.830	0	1
59	Berhampore	Bhagirathi	1.534	1.692	0.110	0.022	6.130	0	10
60	Bhadrachalam	Godavari	5.987	5.987	-	0.170	16.720	0	6
61	Bhalukpong	Jiabharali	11.542	12.562	2.360	0.310	83.830	1	9
62	Bhatpalli	Peddavagu	5.646	6.206	0.600	0.086	14.090	0	10
63	Bhitaura	Ganga	3.463	3.773	0.980	0.265	11.590	0	9
64	Bhomoraguri	Brahmaputra	2.208	2.116	3.040	0.410	6.900	0	10
65	Bihubar	Dikhow	6.421	7.108	0.240	0.170	16.540	0	10
66	Biligundullu	Cauvery	5.446	5.446	-	0.040	12.980	0	7
67	Birdghat	Rapti	2.909	3.194	0.630	0.280	11.150	0	9
68	Bokajan	Dhansiri	3.047	3.152	2.100	0.320	10.840	0	10
69	Burhanpur	Tapi	3.396	3.807	0.930	0.300	11.670	0	7
70	Buxar	Ganga	2.581	2.791	0.690	0.349	15.030	0	10
71	Byaladahalli	Haridra	2.623	2.623	-	0.010	6.590	0	3
72	Champasari	Mahananda	3.960	3.960	-	1.130	12.170	0	4
73	Champua	Ganga	1.379	1.379	-	0.122	4.320	0	6
74	Chanwada	Orsang	25.694	29.242	0.860	0.083	132.550	2	6
75	Chapra	Jalangi	1.026	1.123	0.150	0.005	2.144	0	10
76	Chel	Chel	3.173	3.173	-	0.470	5.490	0	3
77	Chengalpet	Palar	0.665	0.623	0.790	0.470	0.910	0	4
78	Chenimari	Buridehing	3.043	3.310	0.640	0.140	10.910	0	10
79	Chennur	Pennar	5.142	5.727	0.460	0.099	24.600	1	8
80	Chepan	Raidak-I	3.878	3.878	-	0.150	10.830	0	4
81	Chhidgaon	Ganjal	2.961	3.305	0.210	0.116	11.770	0	9
82	Chitrasani	Balaram	3.738	4.150	0.850	0.390	15.460	0	8
83	Chittorgarh	Gambhiri	6.950	6.950	-	6.950	6.950	0	1

S. No.	Water Quality Site	River	Nickel (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 20 µg/L	Below 20 µg/L
84	Cholachguda	Malaprabha	1.590	1.590	-	1.590	1.590	0	1
85	Chopan	Sone	3.562	3.816	1.270	0.135	11.070	0	10
86	Chouldhowaghat	Subansiri	2.083	2.139	1.580	0.214	7.200	0	10
87	Chuchankatte	Cauvery	1.785	1.785	-	0.870	2.700	0	2
88	Coronation	Teesta	2.673	2.673	-	1.120	3.880	0	3
89	Dabri	Ramganga	4.398	4.941	0.050	0.050	14.530	0	9
90	Damarcherla	Musi	8.512	8.512	-	1.220	17.860	0	5
91	Dawki	Umngot	2.080	2.440	0.280	0.040	5.580	0	6
92	Delhi Rly Bridge	Yamuna	12.506	13.616	2.520	1.640	48.810	1	9
93	Deoprayag	Bhagirath	2.726	3.017	0.110	0.110	7.930	0	10
94	Derol Bridge	Sabarmati	2.672	2.750	1.970	0.080	10.370	0	10
95	Desangpani	Desang	5.912	6.395	1.560	0.900	15.920	0	10
96	Dhamkund	Chenab	1.540	1.540	-	0.030	5.350	0	7
97	Dharamtul	Kopili	2.771	3.056	0.200	0.200	7.830	0	10
98	Dheng Bridge	Bagmathi	3.513	3.841	0.560	0.142	14.910	0	10
99	Dholabazar	Lohit	2.136	2.080	2.640	0.050	9.030	0	10
100	Dholai	Rukni	3.965	4.598	0.170	0.037	14.900	0	7
101	Dholpur	Chambal	4.070	4.159	3.450	0.290	12.680	0	8
102	Dhubri	Brahmaputra	3.125	3.125	-	1.530	4.720	0	2
103	Dhulsar	Uri	0.890	1.570	0.210	0.210	1.570	0	2
104	Diana	Diana	1.320	1.320	-	1.320	1.320	0	1
105	Dibrugarh	Brahmaputra	2.148	2.285	0.920	0.010	8.920	0	10
106	Dillighat	Desang	4.226	4.604	0.820	0.020	16.530	0	10
107	Dimapara	Bugi	1.314	1.463	0.570	0.075	4.060	0	6
108	Dindori	Narmada	3.309	3.697	0.210	0.090	17.240	0	9
109	Domohani	Teesta	2.691	2.691	-	0.320	6.895	0	4
110	Duddhi	Kanhar	2.104	2.262	0.680	0.149	7.890	0	10
111	Dudhnai	Dudhnai	2.377	2.639	0.010	0.010	8.780	0	10
112	Durvesh	Vaitarna	62.104	72.353	0.610	0.088	245.010	2	5
113	Ekmighat	Bagmathi	2.819	3.048	0.760	0.130	14.820	0	10
114	Elginbridge	Ghagra	3.415	3.815	0.210	0.210	10.390	0	9
115	Elunuthimanagalam	Noyyal	16.488	16.488	-	3.350	26.420	2	2
116	English Bazar	Padma/Mahananda	0.973	1.064	0.150	0.017	4.970	0	10
117	Erinjipuzha	Payaswani	1.738	1.738	-	0.250	4.240	0	4
118	Etawah	Yamuna	5.489	5.817	3.190	1.050	8.420	0	8
119	Fakirabazar	Longai	1.487	1.672	0.560	0.080	5.310	0	6
120	Farakka	Ganga	2.333	2.579	0.110	0.015	11.890	0	10
121	Farakka/(HR)	Feeder Canal	2.440	2.726	0.150	0.136	6.450	0	9
122	Fatehgarh	Ganga	2.458	2.754	0.090	0.070	12.220	0	9
123	Fulertal	Barak	1.898	2.243	0.520	0.032	6.940	0	5
124	Gadarwara	Sakkar	1.282	1.488	0.050	0.050	4.040	0	7
125	Gadat	Ambika	1.340	1.538	0.150	0.150	5.060	0	7
126	Gajaldoba	Teesta	0.707	0.707	-	0.150	1.670	0	3

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127	Galeta	Hindon	7.697	7.219	12.000	0.234	21.380	1	9
128	Ganod	Bhadar	4.314	4.314	-	0.220	16.380	0	8
129	Garhamukteshwar	Ganga	3.572	4.002	0.130	0.130	13.780	0	9
130	Garrauli	Dhasan	2.158	2.020	2.570	1.020	3.520	0	4
131	Garudeshwar	Narmada	1.535	1.638	0.810	0.087	8.020	0	8
132	Gaya	Harohar/Phalgu	0.687	0.950	0.160	0.160	1.570	0	3
133	Gelabil	Doyang	7.286	8.803	1.220	1.220	18.050	0	5
134	Ghat	Sarju	4.124	4.524	0.930	0.010	12.300	0	9
135	Ghatora	Seonath	10.317	10.317	-	0.970	28.990	1	2
136	Ghatsila	Subarnarekha	8.156	8.156	-	0.119	36.960	1	6
137	Ghish	Ghish	1.780	1.780	-	1.540	2.160	0	3
138	Ghugumari	Torsa	3.928	3.928	-	0.090	10.860	0	4
139	Gokak	Ghataprabha	1.520	1.520	-	1.520	1.520	0	1
140	Golaghat	Sonkosh	3.061	3.293	0.970	0.220	10.360	0	10
141	Golakganj	Dhansiri	1.025	1.025	-	0.490	1.560	0	2
142	Gomlai	Brahmani	2.949	2.949	-	0.116	11.820	0	7
143	Gopalkheda	Purna	14.227	20.845	0.990	0.990	39.850	1	2
144	Gopurajapuram	Cauvery/Puravidaiyanar	13.060	13.060	-	13.060	13.060	0	1
145	Govindapur	Burhabalang	2.509	2.509	-	0.121	8.050	0	7
146	Gummanur	Ponnaiyar	3.174	3.174	-	0.790	10.050	0	7
147	Gumrabazar	Gumra	3.477	3.967	0.540	0.049	15.890	0	7
148	Gunupur	Vamsadhara	2.352	2.352	-	0.133	6.560	0	7
149	Haladi	Haladi	2.669	2.669	-	0.010	8.110	0	7
150	Halia	Halia	7.005	7.005	-	2.350	13.190	0	6
151	Hamirpur	Yamuna	6.313	6.803	2.880	2.710	12.580	0	8
152	Handia	Narmada	2.549	2.844	0.190	0.130	12.490	0	9
153	Hanskhali	Churni	1.646	1.809	0.180	0.019	6.460	0	10
154	Haridwar	Ganga	2.020	2.100	1.380	0.030	10.310	0	9
155	Harlahalli	Tungabhadra	3.704	3.704	-	0.570	11.920	0	5
156	Hasimara	Torsa	2.053	2.053	-	0.670	4.250	0	3
157	Hathidah	Ganga	4.445	4.893	0.420	0.360	14.400	0	10
158	Hayaghat	Bagmathi	2.553	2.817	0.170	0.170	11.230	0	10
159	Hivra	Wardha	3.240	3.554	0.410	0.100	14.590	0	10
160	Hogenakkal	Chinnar	4.460	4.460	-	4.460	4.460	0	1
161	Holehonnur	Bhadra	2.164	2.164	-	0.080	9.140	0	7
162	Honnali	Tungabhadra	1.821	1.821	-	0.090	7.900	0	7
163	Hoshangabad	Narmada	2.371	2.660	0.060	0.060	13.410	0	9
164	Huvin Hedgi	Krishna	9.840	9.840	-	0.220	23.720	1	3
165	Jagdalpur	Indravathi	19.390	19.390	-	19.390	19.390	0	1
166	Jagibhakatgaon	Kopili	2.204	2.419	0.270	0.070	5.560	0	10
167	Jai Nagar	Kamala-Balan	2.488	2.735	0.260	0.157	12.430	0	10
168	Jaldhaka NH-31	Jaldhaka	5.138	5.138	-	0.290	16.360	0	4
169	Jammu Tawi	Chenab/Tawi	3.790	3.790	-	0.153	13.760	0	7

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170	Jamshedpur	Subarnarekha	6.331	6.331	-	0.106	20.270	1	6
171	Jamsolghat	Subarnarekha	4.880	4.880	-	0.109	12.030	0	4
172	Japla	Sone	2.675	2.956	0.140	0.140	12.800	0	10
173	Jaraikela	Koel	5.657	5.657	-	0.137	16.530	0	7
174	Jenapur	Brahmani	3.394	3.394	-	0.050	11.690	0	7
175	Jhanjharpur	Kamala-Balan	3.318	3.615	0.650	0.153	18.470	0	10
176	Jiabharali NT Road Xing	Jiabharali	3.447	2.651	10.610	0.170	10.610	0	10
177	Jondhra	Seonath	1.910	1.910	-	1.910	1.910	0	1
178	K.M. Vadi	Lakshmantirtha	2.550	2.550	-	1.210	3.890	0	2
179	Kachlabridge	Ganga	5.551	6.240	0.040	0.040	26.840	1	8
180	Kalampur	Kaliyar	1.458	1.458	-	0.190	2.330	0	4
181	Kalanaur	Yamuna	3.862	4.068	2.010	0.460	8.460	0	10
182	Kallooppara	Manimala	6.025	6.025	-	1.150	12.400	0	4
183	Kalna (EBB)	Bhagirathi	1.306	1.603	0.120	0.120	4.080	0	5
184	Kalna (Flow)*	Bhagirathi	0.750	0.750	-	0.008	2.350	0	4
185	Kamalapuram	Papagni	0.950	-	0.950	0.950	0.950	0	1
186	Kamalpur	Banas	0.480	0.480	-	0.230	0.730	0	2
187	Kampur	Kopili	3.421	3.744	0.510	0.250	10.670	0	10
188	Kanpur	Ganga	3.874	4.348	0.080	0.080	17.170	0	9
189	Kantamal	Tel	9.210	9.210	-	0.950	19.520	0	4
190	Karad	Krishna	-	-	-	0.000	0.000	0	0
191	Karathodu	Kadalundi	2.070	2.070	-	0.180	4.150	0	4
192	Kashinagar	Vamsadhara	1.479	1.479	-	0.125	4.840	0	7
193	Katwa	Bhagirathi	1.102	1.216	0.080	0.025	3.758	0	10
194	Keesara	Munneru	9.414	9.414	-	4.050	19.790	0	3
195	Kellodu	Vedavathi	1.180	1.180	-	1.180	1.180	0	1
196	Keolari	Wainganga	3.693	4.004	0.890	0.075	10.420	0	10
197	Kesinga	Tel	6.793	6.793	-	1.010	17.680	0	4
198	Khanitar	Teesta	2.455	2.455	-	1.270	3.640	0	2
199	Khanpur	Mahi	2.930	3.116	1.250	0.177	11.560	0	10
200	Kharkhana	Surma/Myntdu	2.634	3.090	0.350	0.062	7.170	0	6
201	Khatoli	Parwati	5.238	2.830	17.280	0.320	17.280	0	6
202	Kheronighat	Kopili	1.947	1.876	2.580	0.180	4.790	0	10
203	Kidangoor	Meenachi	3.860	3.860	-	0.900	12.000	0	4
204	Kodumudi	Cauvery	3.310	3.310	-	0.310	8.780	0	6
205	Koelwar	Sone	2.958	3.227	0.540	0.060	12.410	0	10
206	Kogaon	Kundi	0.612	0.773	0.290	0.290	0.946	0	3
207	Kokrajhar	Gaurang	5.973	5.973	-	1.050	15.940	0	4
208	Kollegal	Cauvery	1.483	1.483	-	0.990	2.170	0	4
209	Konta	Sabari	2.362	2.362	-	0.030	10.590	0	6
210	Koperagaon	Godavari	-	-	-	0.000	0.000	0	0
211	Kora	Rind	3.360	3.694	1.690	0.080	6.530	0	6
212	Koteshwar	Bhagirath	3.809	4.339	0.100	0.050	15.450	0	8

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213	Kudalaiyathur	Vellar	7.495	7.495	-	5.750	9.240	0	2
214	Kudige	Cauvery	2.771	2.771	-	0.550	11.320	0	7
215	Kudlur	Palar	6.525	6.525	-	4.890	8.160	0	2
216	Kuldah Bridge	Sone	4.285	4.508	2.500	0.131	12.780	0	9
217	Kulsi	Kulsi	1.783	1.955	0.240	0.070	7.330	0	10
218	Kumbidi	Bharathapuzha	4.553	4.553	-	1.230	13.410	0	4
219	Kumhari	Wainganga	2.130	2.245	1.100	0.073	10.000	0	10
220	Kuniyil	Chaliyar	2.063	2.063	-	0.300	5.770	0	4
221	Kuppelur	Kumudavathi	1.350	1.350	-	1.350	1.350	0	1
222	Kurubhata	Mand	11.425	11.425	-	0.730	27.570	1	3
223	Kurundwad	Krishna	-	-	-	0.000	0.000	0	0
224	Kuttyadi	Kuttyadi	4.796	4.796	-	1.000	8.190	0	5
225	Kuzhithurai	Tambrapani	3.778	3.778	-	1.060	10.350	0	4
226	Labha	Mahananda	1.748	1.923	0.170	0.027	8.420	0	10
227	Lakhisarai	Kiul	3.137	3.352	1.420	0.120	15.150	0	9
228	Lalganj	Gandak	2.713	2.798	1.950	0.220	12.020	0	10
229	Lowara	Sheturni	40.118	44.547	0.260	0.194	184.640	3	7
230	Lucknow	Gomti	3.705	3.972	1.570	0.253	11.150	0	9
231	M.H. Halli	Hemavathi	3.275	3.275	-	0.250	5.530	0	4
232	Madhira	Wyra	6.953	6.953	-	1.280	17.300	0	4
233	Madla	Ken	1.836	1.763	2.350	0.230	3.770	0	8
234	Magaral	Cheyyar	8.010	8.010	-	8.010	8.010	0	1
235	Mahidpur	Sipra	1.550	2.140	0.960	0.960	2.140	0	2
236	Mahuwa	Purna	4.844	5.609	0.250	0.245	19.330	0	7
237	Maighat	Gomti	3.551	3.874	0.650	0.122	11.080	0	10
238	Majhitar	Rangit	5.080	5.080	-	5.080	5.080	0	1
239	Malakkara	Pampa	3.620	3.620	-	0.480	10.420	0	4
240	Malkhed	Kagna	5.793	5.793	-	0.510	14.880	0	4
241	Manas NH Crossing	Manas	4.430	4.430	-	0.160	11.600	0	3
242	Mancherial	Godavari	5.525	5.525	-	0.180	14.340	0	6
243	Mandleshwar	Narmada	1.839	2.068	0.010	0.010	11.450	0	9
244	Manendragarh	Hasdeo	0.695	0.695	-	0.630	0.760	0	2
245	Mangaon (Seasonal)	Kal	-	-	-	0.000	0.000	0	0
246	Mankara	Bharathapuzha	4.148	4.148	-	1.200	6.150	0	5
247	Manot	Narmada	3.789	3.964	2.390	0.110	13.980	0	9
248	Mantralayam	Tungabhadra	12.130	12.130	-	0.620	31.390	1	3
249	Marella	Gundlakamma	10.533	10.533	-	5.070	16.150	0	3
250	Margherita	Buridehing	2.091	2.253	0.630	0.040	10.210	0	10
251	Marol	Varada	1.200	1.200	-	1.200	1.200	0	1
252	Mataji	Mahi	1.929	1.961	1.640	0.225	5.790	0	10
253	Mathabhanga	Jaldhaka	5.220	5.220	-	0.520	11.980	0	3
254	Mathanguri	Beki	6.530	6.530	-	0.250	12.810	0	2
255	Mathura	Yamuna	6.858	7.451	1.520	0.790	15.850	0	10

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256	Matigara	Balason	5.675	5.675	-	0.290	11.160	0	4
257	Matijuri	Dhaleshwari	1.770	2.173	0.160	0.160	4.660	0	5
258	Matunga	Kalanadi	2.779	3.062	0.230	0.157	12.550	0	10
259	Mawi	Yamuna	5.791	5.457	8.800	0.210	12.460	0	10
260	Meja Road	Tons	3.075	3.410	0.390	0.132	10.050	0	9
261	Mekhliganj	Teesta	1.187	1.187	-	0.230	2.080	0	3
262	Menangudi	Cauvery/Noolar	8.030	8.030	-	8.030	8.030	0	1
263	Miao	Neo dihing	4.747	4.762	4.610	0.060	16.730	0	10
264	Mirzapur	Ganga	3.704	4.096	0.170	0.170	11.660	0	10
265	Mohana (Betwa)	Betwa	3.117	3.307	1.980	0.150	9.340	0	7
266	Mohana (Yamuna)	Yamuna	5.027	5.267	2.870	0.270	11.840	0	10
267	Mohgaoan	Burhner	2.979	3.197	1.230	0.080	18.040	0	9
268	Moradabad	Ramganga	4.691	5.270	0.060	0.060	16.580	0	9
269	Motinaroli	Kim	3.512	3.976	0.260	0.103	9.460	0	8
270	Murappanadu	Tambrapani	4.111	4.111	-	0.020	11.520	0	7
271	Muri	Subarnarekha	3.257	3.257	-	0.117	13.620	0	7
272	Murti	Murti	1.217	1.217	-	0.100	2.660	0	3
273	Musiri	Cauvery	3.911	3.911	-	0.380	8.590	0	7
274	Muthankera	Kabini	5.516	5.516	-	0.970	15.260	0	5
275	Nagalamadike	Pennar	0.380	0.380	-	0.380	0.380	0	1
276	Nagrakata	Jaldhaka	2.400	2.400	-	1.270	3.720	0	3
277	Naharkatia	Buridehing	3.356	3.588	1.270	0.310	19.590	0	10
278	Naidupet	Swarnamukhi	0.050	0.050	-	0.050	0.050	0	1
279	Nallammaranpatty	Amaravathi	3.463	3.463	-	1.720	5.340	0	3
280	Nallathur	Nandalar	2.280	2.280	-	0.480	6.910	0	4
281	Namsai	Neo dihing	2.031	2.170	0.780	0.090	8.300	0	10
282	Nandgaon	Wunna	1.523	1.730	0.280	0.280	5.600	0	7
283	Nandipalli	Sagaileru	0.924	1.141	0.490	0.132	2.150	0	3
284	Nanglamoraghat	Desang	2.724	2.899	1.150	0.230	16.690	0	10
285	Neamatighat	Brahmaputra	1.817	1.977	0.370	0.030	10.400	0	10
286	Neeleswaram	Periyar	1.850	1.850	-	0.200	4.740	0	5
287	Neemsar	Gomti	3.287	3.663	0.650	0.172	11.870	0	8
288	Nellithurai	Bhavani	2.583	2.583	-	0.060	8.100	0	4
289	Nellore	Pennar	0.825	0.825	-	0.460	1.190	0	2
290	Neora	Naora	2.860	2.860	-	0.300	5.640	0	3
291	Nowrangpur	Indravathi	3.355	3.355	-	0.380	12.680	0	6
292	Numaligarh	Dhansiri	2.379	2.450	1.810	0.220	9.500	0	9
293	P.G.Bridge	Penganga	2.293	2.588	0.230	0.115	10.010	0	8
294	Pachauli	Sind	7.820	7.820	-	7.820	7.820	0	1
295	Pachegaon	Pravara	-	-	-	0.000	0.000	0	0
296	Paderdibadi	Mahi	2.036	2.143	1.070	0.220	5.580	0	10
297	Pagladiya N.T.Road Crossing	Pagladiya	2.624	2.881	0.310	0.010	12.955	0	10
298	Paleru Bridge	Paleru	5.596	5.596	-	1.150	10.610	0	5

S. No.	Water Quality Site	River	Nickel (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 20 µg/L	Below 20 µg/L
299	Paliakalan	Sharda	7.113	3.912	32.720	0.253	32.720	1	8
300	Palla	Yamuna	5.901	6.157	3.600	1.030	10.030	0	10
301	Panbari	Burisuti	1.745	1.745	-	1.710	1.780	0	2
302	Pancharatna	Brahmaputra	2.724	2.969	0.520	0.020	10.680	0	10
303	Pandu	Brahmaputra	1.566	1.732	0.070	0.050	10.210	0	10
304	Panposh	Brahmani	11.558	11.558	-	0.128	56.740	1	6
305	Passighat	Siang	5.056	5.056	-	0.130	21.180	1	4
306	Patan	Hiran	2.162	2.455	0.110	0.110	12.730	0	8
307	Pathagudem	Indravathi	3.552	3.552	-	0.290	15.040	0	6
308	Pathardhi	Kharun	1.190	1.190	-	1.190	1.190	0	1
309	Pati	Goi	0.600	0.728	0.090	0.090	1.240	0	5
310	Patna	Ganga	2.125	2.252	0.980	0.010	13.540	0	10
311	Pattazhy	Kallada	4.998	4.998	-	0.990	12.130	0	5
312	Pauni	Wainganga	1.215	1.242	0.970	0.040	6.530	0	10
313	Peralam	Vanjiyar	0.255	0.255	-	0.070	0.440	0	2
314	Perumannu	Valapatnam	4.298	4.298	-	0.920	10.640	0	5
315	Perur	Godavari	2.903	2.903	-	0.100	10.380	0	6
316	Phulgaon (Seasonal)	Varna	-	-	-	0.000	0.000	0	0
317	Pingalwada	Dhadher	5.566	6.324	0.260	0.260	19.550	0	8
318	Poanta	Yamuna	3.590	3.590	-	2.350	4.830	0	2
319	Polavaram	Godavari	2.208	2.208	-	0.180	10.000	0	6
320	Pratapgarh	Sai	1.772	1.883	0.880	0.134	6.230	0	9
321	Pratapur	Yamuna	2.835	3.036	1.430	0.040	6.500	0	8
322	Prem Nagar	Chenab	2.201	2.201	-	0.154	4.370	0	7
323	Pudur	Kannadipuzha	3.118	3.118	-	0.730	5.050	0	4
324	Pulamanthole	Pulanthodu	3.230	3.230	-	0.170	7.660	0	5
325	Purna	Purna	7.470	7.470	-	7.470	7.470	0	1
326	Purushottampur	Rushikulya	2.143	2.143	-	0.123	7.350	0	7
327	Puthimari D.R.F.	Puthimari	1.633	1.812	0.020	0.020	12.040	0	10
328	Puthimari NH Road crossing	Puthimari	1.966	2.210	0.010	0.010	10.290	0	9
329	Raibareli	Sai	4.320	4.864	0.510	0.510	10.470	0	8
330	Rajapur	Yamuna	3.880	4.070	2.740	1.060	10.810	0	7
331	Rajegaon	Bagh	3.421	3.813	0.680	0.119	17.320	0	8
332	Rajghat	Betwa	1.673	1.652	1.780	0.120	2.810	0	6
333	Rajim	Mahanadi	0.870	0.870	-	0.870	0.870	0	1
334	Ram Munshi Bagh	Jhelum	1.273	1.273	-	0.158	3.140	0	6
335	Ramakona	Kanhan	3.310	3.751	0.220	0.180	11.460	0	8
336	Ramamangalam	Muvvattupuzha	3.374	3.374	-	0.250	8.340	0	5
337	Rampur	Jonk	21.397	21.397	-	1.100	57.790	1	2
338	Ranganadi NT-Road Xing	Ranganadi	2.182	2.409	0.140	0.140	8.200	0	10
339	Rangeli	Som	2.254	2.471	0.300	0.090	5.580	0	10
340	Rangpo	Rangpochu	2.330	2.330	-	0.610	3.490	0	3
341	Regauli	Rapti	3.805	4.215	0.520	0.252	14.800	0	9

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			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 20 µg/L	Below 20 µg/L
342	Rishikesh	Ganga	2.939	3.256	0.080	0.080	10.760	0	10
343	Rudraprayag	Alaknanda	3.492	3.912	0.130	0.098	13.080	0	9
344	Safapora	Jhelum	3.088	3.088	-	0.090	7.040	0	6
345	Sakleshpur	Hemavathi	3.304	3.304	-	0.060	11.630	0	7
346	Sakmur	Wardha	4.423	4.862	0.470	0.076	16.770	0	10
347	Salebhata	Ong	19.003	19.003	-	1.030	50.070	2	2
348	Samdoli	Varna	-	-	-	0.000	0.000	0	0
349	Sandia	Narmada	2.620	2.936	0.090	0.090	12.550	0	9
350	Sangam J	Jhelum	2.214	2.214	-	0.149	5.990	0	7
351	Sangam K	Kinnerasani	5.126	5.126	-	0.210	18.120	0	5
352	Sangod	Parwan	6.305	3.840	8.770	3.840	8.770	0	2
353	Sankalan	Teesta	1.570	1.570	-	0.930	2.190	0	3
354	Sankosh LRP	Sankosh	1.023	1.023	-	0.190	1.710	0	3
355	Santeguli	Aghanashini	2.393	2.393	-	0.300	9.460	0	7
356	Sarangkheda	Tapi	2.287	2.470	1.190	0.060	10.040	0	7
357	Satrapur	Kanhan	0.902	0.951	0.460	0.070	1.980	0	10
358	Savandapur	Bhavani	2.474	2.474	-	0.040	8.070	0	7
359	Seondha	Sind	0.863	0.778	1.290	0.010	1.820	0	6
360	Seppa	Kamang	4.697	4.986	2.090	0.390	17.630	0	10
361	Sevanur	Chittar	2.240	2.240	-	2.240	2.240	0	1
362	Sevoke	Teesta	1.480	1.480	-	0.250	2.770	0	3
363	Shahijina	Betwa	2.873	2.930	2.470	0.060	8.580	0	8
364	Shahzadpur	Ganga	2.913	3.211	0.530	0.248	10.320	0	9
365	Shimoga	Tunga	2.620	2.620	-	0.040	11.390	0	6
366	Sibbari	Dareng	1.896	2.158	0.590	0.178	8.410	0	6
367	Sikandarpur	Burhi Gandak	3.822	4.213	0.300	0.190	16.110	0	10
368	Simga	Seonath	11.253	11.253	-	0.960	25.630	1	2
369	Singla-Bazar	Rangit	2.727	2.727	-	1.050	6.030	0	3
370	Sivasagar	Dikhow	3.068	3.103	2.750	0.290	8.810	0	10
371	Sonapur	Digaru	5.253	5.620	3.050	0.380	19.780	0	7
372	Sonapurhat	Mahananda	6.010	6.010	-	2.530	11.560	0	3
373	Srikakulam	Nagavali	3.765	3.765	-	0.112	13.320	0	7
374	Srinagar	Alakananda	2.868	2.868	-	0.100	8.320	0	5
375	Sripalpur	Punpun	3.968	4.252	1.410	0.140	16.820	0	10
376	Suklai	Suklai	1.368	1.516	0.040	0.040	7.860	0	10
377	Sultanpur	Gomti	4.127	4.520	0.980	0.132	12.480	0	9
378	Sulurpet	Kalingi	0.510	0.510	-	0.510	0.510	0	1
379	Sundergarh	Ib	17.613	17.613	-	8.670	37.320	1	3
380	T. Bekuppe	Arkavathi	10.593	10.593	-	0.440	44.460	1	6
381	T. Narasipur	Kabini	0.595	0.595	-	0.130	0.870	0	4
382	T. Ramapuram	Hagari	36.763	36.763	-	8.700	58.020	2	1
383	T.K.Halli	Shimsha	5.938	5.938	-	1.450	11.370	0	4
384	Tal	Chambal	1.615	1.800	1.430	1.430	1.800	0	2

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385	Talcher	Brahmani	5.049	5.049	-	0.090	8.910	0	7
386	Tandi	Chenab/Bhaga	-	-	-	0.000	0.000	0	0
387	Teesta-Bazar	Teesta	3.324	3.324	-	0.050	10.500	0	5
388	Tehri	Bhagirath	1.715	1.715	-	0.240	3.190	0	2
389	Tekra	Pranhitha	3.285	3.576	0.660	0.157	10.230	0	10
390	Tezpur	Brahmaputra	3.046	3.052	2.990	0.290	8.310	0	10
391	Tezu	Lohit	1.439	1.538	0.650	0.010	6.560	0	9
392	Thengudi	Thirumalairajanar	0.723	0.723	-	0.010	1.610	0	3
393	Thengumarahada	Moyar	2.157	2.157	-	0.300	6.810	0	7
394	Theni	Suruliar	2.789	2.789	-	0.040	10.270	0	7
395	Therriaghat	Umsohrynkiew	1.817	2.075	0.530	0.044	6.370	0	6
396	Thevur	Sarabenga	0.830	0.830	-	0.830	0.830	0	1
397	Thimmanahalli	Yagachi	2.123	2.123	-	0.280	9.230	0	6
398	Thoppur	Thoppaiyar	-	-	-	0.000	0.000	0	0
399	Thumpamon	Achankovil	1.218	1.218	-	0.210	2.390	0	4
400	Tikarpara	Mahanadi	2.736	2.736	-	0.123	11.930	0	7
401	Tilga	Sankh	3.197	3.197	-	0.127	10.190	0	7
402	Tonk	Banas	1.785	3.020	0.550	0.550	3.020	0	2
403	Tribeni	Gandak	4.531	4.894	1.270	0.330	18.440	0	10
404	Tufanganj	Raidak-I	3.315	3.315	-	0.320	10.910	0	4
405	Tuini	Tuini	1.938	1.891	2.360	0.380	4.270	0	10
406	Turtipar	Ghagra	5.493	6.129	0.410	0.250	14.290	0	9
407	Udaipur (Chandra)	Chenab/Chandra	-	-	-	0.000	0.000	0	0
408	Udaipur (Tirap)	Tirap	3.507	3.874	0.200	0.110	12.954	0	10
409	Udi	Chambal	2.894	3.037	1.890	0.350	12.200	0	8
410	Ujjain	Sipra	3.460	4.430	2.490	2.490	4.430	0	2
411	Urachikottai	Cauvery	3.192	3.192	-	0.170	8.950	0	5
412	Uttarkashi	Bhagirath	2.936	3.106	1.410	0.030	10.350	0	10
413	Vandiperiyar	Periyar	15.118	15.118	-	1.010	35.930	2	2
414	Vapi	Damanganga	2.126	2.357	0.510	0.110	4.850	0	8
415	Varanasi	Ganga	3.768	4.159	0.250	0.164	14.210	0	10
416	Vautha	Sabarmati	12.021	13.298	0.530	0.309	49.180	2	8
417	Vazhavachanur	Ponnaiyar	0.755	0.755	-	0.100	1.430	0	4
418	Villupuram	Ponnaiyar	0.540	0.540	-	0.540	0.540	0	1
419	Wadenapally	Krishna	4.007	4.007	-	0.730	8.500	0	6
420	Wairagarh	Khobragarhi	1.298	1.404	0.770	0.330	4.470	0	6
421	Warunji	Koyna	-	-	-	0.000	0.000	0	0
422	Yadgir	Bhima	-	-	-	0.000	0.000	0	0
423	Yashwant nagar	Giri	3.675	3.918	1.490	0.880	9.360	0	10
424	Yennehole	Yennehole	0.438	0.438	-	0.100	0.820	0	4

LEAD

S. No.	Water Quality Site	River	Lead (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
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1	A B Road Xing	Parwati	2.386	0.587	3.285	0.190	6.380	0	3
2	A.P. Puram	Chittar	1.062	1.062	-	0.060	2.430	0	5
3	A.P.Ghat	Barak	1.544	1.396	1.915	0.251	5.090	0	7
4	Aauriya	Yamuna	2.091	2.401	1.005	0.120	8.220	0	9
5	Abu Road	Banas	1.668	1.618	1.920	0.200	4.920	0	6
6	Addoor	Gurupur	0.680	0.180	1.180	0.180	1.180	0	2
7	Adityapur	Kharkai	3.281	3.154	4.170	0.020	13.800	1	7
8	Agra	Yamuna	4.293	5.117	1.410	0.420	22.670	1	8
9	Aie NH Crossing	Aie	2.131	2.131	-	0.160	4.940	0	3
10	Akabarpur	Chhoti Sarju	9.397	12.296	2.150	0.310	40.840	2	5
11	Akhnoor	Chenab	1.234	1.003	2.850	0.040	2.850	0	8
12	Akkihebbal	Hemavathi	1.227	1.200	1.440	0.010	2.620	0	9
13	Aklera	Parwan	1.604	0.663	3.015	0.180	5.850	0	5
14	Alladupalli	Kunderu	6.625	7.318	3.850	0.550	22.630	2	8
15	Allahabad	Ganga	2.168	1.873	3.495	0.380	5.390	0	11
16	Alutuma	Ramyala	0.932	0.760	1.790	0.130	2.070	0	6
17	Ambarampalayam	Aliyar	2.982	2.998	2.915	0.040	13.310	1	9
18	Ambasamudram	Vaigai	0.855	0.855	-	0.280	1.430	0	2
19	Anandpur	Ganga	2.481	2.700	0.950	0.150	9.861	0	8
20	Andhiyar Kore	Hamp	0.996	0.996	-	0.120	2.400	0	3
21	Ankinghat	Ganga	4.200	4.710	2.160	0.220	19.940	1	9
22	Annavasal	Nattar	0.150	0.150	-	0.150	0.150	0	1
23	Arangaly	Chalakudy	1.953	2.181	0.810	0.176	3.620	0	6
24	Arcot	Palar	26.415	1.310	51.520	1.310	51.520	1	1
25	Arjunwad	Krishna	4.920	-	4.920	4.920	4.920	0	1
26	Ashramam	Pazhayar	1.965	2.092	1.330	0.472	4.290	0	6
27	Ashti	Wainganga	1.466	1.408	1.725	0.330	4.530	0	11
28	Avarankuppam	Palar	1.960	1.960	-	1.960	1.960	0	1
29	Avershe	Sita	1.638	1.768	1.120	0.040	5.090	0	5
30	Ayilam	Vamanapuram	1.296	1.449	0.530	0.400	5.000	0	6
31	Ayodhya	Saryu	4.578	4.827	3.585	0.440	15.810	1	9
32	Azmabad	Ganga	3.253	3.749	1.025	0.020	22.860	1	10
33	B.P. Ghat	Barak	2.820	3.289	1.415	0.040	8.520	0	8
34	Badatighat	Subansiri	2.635	2.905	1.420	0.040	13.780	1	10
35	Badlapur	Ulhas	4.034	4.183	3.290	0.350	13.600	1	5
36	Balrampur	Rapti	3.791	4.062	2.705	0.550	13.000	1	9
37	Baltara	Kosi	2.043	2.180	1.430	0.180	6.310	0	11
38	Bamni (Banjar)	Banjar	2.083	2.487	0.670	0.230	7.040	0	9
39	Bamni (Wardha)	Wardha	2.615	2.927	1.210	0.146	8.120	0	11
40	Bamnidih	Hasdeo	3.657	3.657	-	0.040	9.690	0	3
41	Banda	Ken	1.987	2.113	1.545	0.570	7.910	0	9

S. No.	Water Quality Site	River	Lead (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
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42	Bansi	Rapti	3.739	4.627	0.630	0.030	17.430	1	8
43	Bantwal	Nethravathi	1.409	0.844	2.540	0.010	2.540	0	3
44	Baranwada	Banas	2.932	1.390	7.560	1.198	7.560	0	4
45	Bareilly	Ramganga	4.089	4.254	3.430	0.500	12.880	1	9
46	Barmanghat	Narmada	1.317	1.375	1.085	0.150	2.726	0	10
47	Barobisha	Raidak-II	2.634	2.108	4.740	0.270	4.740	0	5
48	Barod	Kali Sindh	2.498	2.237	3.280	0.250	7.726	0	8
49	Baronda	Pairi	0.010	0.010	-	0.010	0.010	0	1
50	Basantpur	Mahanadi	3.049	3.049	-	0.060	7.180	0	4
51	Basti	Kwano	5.345	5.590	4.365	0.140	28.410	1	9
52	Bawapuram	Tungabhadra	12.240	12.240	-	0.340	33.410	1	2
53	Behalpur	Champamati	1.967	1.967	-	0.470	3.464	0	2
54	Beki Mathanguri	Beki	2.570	2.570	-	0.330	4.810	0	2
55	Beki Road Bridge	Beki	3.425	2.006	9.100	0.290	9.100	0	5
56	Belkhedi	Sher	2.052	2.460	0.420	0.020	6.181	0	10
57	Belne Bridge	Gad	2.535	1.920	3.150	1.920	3.150	0	2
58	Bendrahalli	Suvarnavathi	0.040	0.040	-	0.040	0.040	0	1
59	Berhampore	Bhagirathi	0.814	0.752	1.095	0.070	2.120	0	11
60	Bhadrachalam	Godavari	1.637	1.539	2.230	0.042	4.520	0	7
61	Bhalukpong	Jiabharali	1.631	1.525	2.110	0.050	3.770	0	11
62	Bhatpalli	Peddavagu	2.345	2.416	2.025	0.040	7.860	0	11
63	Bhitaura	Ganga	8.056	8.642	5.710	0.070	34.040	2	8
64	Bhomoraguri	Brahmaputra	2.153	2.158	2.130	0.053	7.060	0	11
65	Bihubar	Dikhow	3.349	2.911	5.320	0.367	8.610	0	11
66	Biligundullu	Cauvery	2.829	2.930	2.020	0.520	6.740	0	9
67	Birdghat	Rapti	6.340	7.097	3.310	0.050	18.650	3	7
68	Bokajan	Dhansiri	1.324	1.593	0.115	0.019	3.560	0	11
69	Burhanpur	Tapi	3.505	4.280	1.180	0.750	7.960	0	8
70	Buxar	Ganga	3.530	4.213	0.460	0.020	16.380	1	10
71	Byaladahalli	Haridra	0.393	0.393	-	0.010	0.970	0	3
72	Champasari	Mahananda	5.059	5.059	-	1.020	13.600	1	3
73	Champua	Ganga	1.289	1.216	1.730	0.040	5.810	0	7
74	Chanwada	Orsang	8.923	8.444	10.600	0.750	39.800	2	7
75	Chapra	Jalangi	1.777	1.869	1.365	0.110	5.400	0	11
76	Chel	Chel	4.687	4.687	-	0.790	9.400	0	3
77	Chengalpet	Palar	1.683	2.237	0.020	0.020	5.580	0	4
78	Chenimari	Buridehing	3.149	1.323	11.365	0.377	20.550	1	10
79	Chennur	Pennar	6.402	7.419	2.335	0.580	38.500	1	9
80	Chepan	Raidak-I	4.831	4.906	4.530	0.880	9.880	0	5
81	Chhidgaon	Ganjal	1.385	1.515	0.865	0.200	3.590	0	10
82	Chitrasani	Balaram	1.737	1.841	1.370	0.260	5.280	0	9
83	Chittorgarh	Gambhiri	1.830	1.830	-	1.830	1.830	0	1
84	Cholachguda	Malaprabha	0.380	0.380	-	0.380	0.380	0	1

S. No.	Water Quality Site	River	Lead (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
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85	Chopan	Sone	2.805	2.432	4.485	0.090	9.900	0	11
86	Chouldhowaghat	Subansiri	1.786	1.762	1.895	0.010	4.330	0	11
87	Chuchankatte	Cauvery	0.913	0.575	1.590	0.090	1.590	0	3
88	Coronation	Teesta	3.196	3.196	-	1.280	4.507	0	3
89	Dabri	Ramganga	5.070	5.748	2.355	0.270	16.540	2	8
90	Damarcherla	Musi	2.564	2.564	-	0.160	8.630	0	5
91	Dawki	Umngot	2.037	2.202	1.625	0.020	5.130	0	7
92	Delhi Rly Bridge	Yamuna	2.877	3.001	2.320	0.010	12.652	1	10
93	Deoprayag	Bhagirath	1.772	2.060	0.475	0.190	5.510	0	11
94	Derol Bridge	Sabarmati	2.210	2.406	1.330	0.110	7.780	0	11
95	Desangpani	Desang	1.963	1.688	3.200	0.210	4.920	0	11
96	Dhamkund	Chenab	1.363	1.104	3.170	0.010	4.670	0	8
97	Dharamtul	Kopili	1.371	1.484	0.860	0.060	4.220	0	11
98	Dheng Bridge	Bagmathi	1.223	1.310	0.830	0.100	2.580	0	11
99	Dholabazar	Lohit	2.608	1.436	7.885	0.040	13.130	1	10
100	Dholai	Rukni	1.744	1.659	2.000	0.250	4.800	0	8
101	Dholpur	Chambal	1.327	1.589	0.410	0.050	4.550	0	9
102	Dhubri	Brahmaputra	1.727	1.727	-	1.380	2.073	0	2
103	Dhulsar	Uri	1.040	0.190	1.890	0.190	1.890	0	2
104	Diana	Diana	0.982	0.982	-	0.982	0.982	0	1
105	Dibrugarh	Brahmaputra	3.678	2.455	9.185	0.582	14.250	1	10
106	Dillighat	Desang	2.867	1.963	6.935	0.204	8.480	0	11
107	Dimapara	Bugi	4.410	3.174	7.500	0.050	13.090	2	5
108	Dindori	Narmada	2.304	2.717	0.650	0.410	7.850	0	10
109	Domohani	Teesta	3.159	3.376	2.290	1.090	5.250	0	5
110	Duddhi	Kanhar	2.800	2.777	2.900	0.066	9.010	0	11
111	Dudhnai	Dudhnai	2.875	2.173	6.035	0.140	10.920	1	10
112	Durvesh	Vaitarna	51.143	65.845	7.035	0.730	227.930	5	3
113	Ekmighat	Bagmathi	1.910	2.105	1.035	0.100	6.820	0	11
114	Elginbridge	Ghagra	4.395	4.486	4.030	0.440	10.850	1	9
115	Elunuthimanagalam	Noyyal	22.348	22.348	-	0.440	76.490	2	2
116	English Bazar	Padma/Mahananda	1.240	1.310	0.925	0.160	6.020	0	11
117	Erinjipuzha	Payaswani	1.370	0.528	5.580	0.068	5.580	0	6
118	Etawah	Yamuna	2.069	2.301	1.255	0.490	4.640	0	9
119	Fakirabazar	Longai	4.108	4.878	2.185	0.030	19.759	1	6
120	Farakka	Ganga	1.830	1.928	1.390	0.170	7.460	0	11
121	Farakka/(HR)	Feeder Canal	1.039	0.984	1.260	0.100	4.550	0	10
122	Fatehgarh	Ganga	3.856	4.650	0.680	0.030	14.610	1	9
123	Fulertal	Barak	7.030	9.613	1.865	0.020	32.680	1	5
124	Gadarwara	Sakkar	0.884	1.130	0.145	0.010	2.410	0	8
125	Gadat	Ambika	2.090	1.732	3.165	0.780	5.430	0	8
126	Gajaldoba	Teesta	2.678	2.678	-	1.020	4.300	0	3
127	Galeta	Hindon	3.942	4.029	3.550	0.200	18.520	1	10

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128	Ganod	Bhadar	3.011	3.225	1.300	0.046	7.790	0	9
129	Garhamukteshwar	Ganga	3.006	3.066	2.765	1.280	9.350	0	10
130	Garrauli	Dhasan	1.870	2.323	1.190	0.460	4.430	0	5
131	Garudeshwar	Narmada	4.072	4.901	1.170	0.540	21.930	1	8
132	Gaya	Harohar/Phalgu	2.270	2.865	1.675	0.450	5.020	0	4
133	Gelabil	Doyang	2.508	1.450	4.625	0.590	7.540	0	6
134	Ghat	Sarju	3.473	3.475	3.465	0.700	7.820	0	10
135	Ghatora	Seonath	1.489	1.489	-	0.570	3.290	0	3
136	Ghatsila	Subarnarekha	7.060	7.822	1.730	0.200	37.660	1	7
137	Ghish	Ghish	3.927	3.927	-	0.140	8.122	0	3
138	Ghugumari	Torsa	2.525	2.492	2.660	0.280	6.090	0	5
139	Gokak	Ghataprabha	2.315	0.430	4.200	0.430	4.200	0	2
140	Golaghat	Sonkosh	1.910	1.614	3.245	0.010	5.500	0	11
141	Golakganj	Dhansiri	2.530	2.530	-	0.270	4.790	0	2
142	Gomlai	Brahmani	10.493	11.839	1.070	0.030	77.420	1	7
143	Gopalkheda	Purna	18.945	18.015	19.875	1.260	37.620	2	2
144	Gopurajapuram	Cauvery/Puravidaiyanar	1.110	1.110	-	1.110	1.110	0	1
145	Govindapur	Burhabalang	1.801	1.910	1.040	0.050	4.970	0	8
146	Gummanur	Ponnaiyar	3.462	3.829	1.995	0.230	13.980	1	9
147	Gumrabazar	Gumra	2.541	2.941	1.340	0.340	5.170	0	8
148	Gunupur	Vamsadhara	0.775	0.793	0.650	0.230	2.030	0	8
149	Haladi	Haladi	2.098	2.196	1.320	0.080	12.180	1	8
150	Halia	Halia	2.229	2.229	-	0.110	9.500	0	6
151	Hamirpur	Yamuna	1.578	1.803	0.790	0.070	4.880	0	9
152	Handia	Narmada	1.580	1.819	0.625	0.290	4.530	0	10
153	Hanskhali	Churni	1.557	1.818	0.385	0.010	8.080	0	11
154	Haridwar	Ganga	1.062	1.179	0.595	0.110	4.020	0	10
155	Harlahalli	Tungabhadra	1.250	1.090	2.050	0.220	3.350	0	6
156	Hasimara	Torsa	5.579	6.528	2.730	1.690	9.120	0	4
157	Hathidah	Ganga	4.464	5.341	0.520	0.040	36.910	1	10
158	Hayaghat	Bagmathi	1.846	1.875	1.715	0.070	7.520	0	11
159	Hivra	Wardha	1.631	1.691	1.360	0.030	8.201	0	11
160	Hogenakkal	Chinnar	1.940	1.940	-	1.940	1.940	0	1
161	Holehonnur	Bhadra	1.182	1.088	1.940	0.450	2.360	0	9
162	Honnali	Tungabhadra	1.856	1.894	1.550	0.070	3.900	0	9
163	Hoshangabad	Narmada	1.491	1.706	0.630	0.210	6.440	0	10
164	Huvin Hedgi	Krishna	3.557	4.111	1.340	0.595	14.340	1	4
165	Jagdalpur	Indravathi	1.405	0.070	2.740	0.070	2.740	0	2
166	Jagibhakatgaon	Kopili	1.451	1.565	0.940	0.040	4.620	0	11
167	Jai Nagar	Kamala-Balan	1.318	1.393	0.980	0.100	4.140	0	11
168	Jaldhaka NH-31	Jaldhaka	6.756	7.900	2.180	1.470	21.960	1	4
169	Jammu Tawi	Chenab/Tawi	1.155	0.752	3.980	0.100	3.980	0	8
170	Jamshedpur	Subarnarekha	0.736	0.600	1.690	0.050	1.760	0	8

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171	Jamsolghat	Subarnarekha	1.656	1.815	1.020	0.130	5.690	0	5
172	Japla	Sone	1.966	2.043	1.620	0.010	7.440	0	11
173	Jaraikela	Koel	0.723	0.518	2.160	0.120	2.160	0	8
174	Jenapur	Brahmani	2.918	3.132	1.420	0.090	8.364	0	8
175	Jhanjharpur	Kamala-Balan	1.763	1.661	2.220	0.010	5.020	0	11
176	Jiabharali NT Road Xing	Jiabharali	4.369	4.412	4.175	0.070	29.260	1	10
177	Jondhra	Seonath	0.040	0.040	-	0.040	0.040	0	1
178	K.M. Vadi	Lakshmantirtha	1.977	1.985	1.960	0.040	3.930	0	3
179	Kachlabridge	Ganga	7.766	9.376	1.325	0.410	33.780	2	8
180	Kalampur	Kaliyar	0.956	1.043	0.520	0.044	3.490	0	6
181	Kalanaur	Yamuna	1.485	1.222	2.665	0.090	5.030	0	11
182	Kallooppara	Manimala	1.945	2.202	0.660	0.080	4.440	0	6
183	Kalna (EBB)	Bhagirathi	2.459	3.191	0.995	0.163	8.330	0	6
184	Kalna (Flow)*	Bhagirathi	0.605	0.605	-	0.160	1.240	0	4
185	Kamalapuram	Papagni	3.235	-	3.235	1.320	5.150	0	2
186	Kamalpur	Banas	0.660	0.420	1.140	0.050	1.140	0	3
187	Kampur	Kopili	1.466	1.627	0.740	0.130	5.470	0	11
188	Kanpur	Ganga	6.607	7.318	3.765	0.050	25.160	2	8
189	Kantamal	Tel	2.254	2.254	-	0.177	6.380	0	4
190	Karad	Krishna	4.810	-	4.810	4.810	4.810	0	1
191	Karathodu	Kadalundi	1.915	1.974	1.620	0.282	3.560	0	6
192	Kashinagar	Vamsadhara	0.951	0.931	1.090	0.110	2.500	0	8
193	Katwa	Bhagirathi	1.888	2.181	0.570	0.040	8.590	0	11
194	Keesara	Munneru	3.868	4.637	1.560	0.380	12.080	1	3
195	Kellodu	Vedavathi	0.070	0.070	-	0.070	0.070	0	1
196	Keolari	Wainganga	2.006	2.164	1.295	0.060	8.960	0	11
197	Kesinga	Tel	2.435	2.435	-	0.128	5.290	0	4
198	Khanitar	Teesta	2.284	2.284	-	0.490	4.077	0	2
199	Khanpur	Mahi	3.110	3.335	2.095	0.010	19.830	1	10
200	Kharkhana	Surma/Myntdu	3.546	4.290	1.685	0.040	9.120	0	7
201	Khatoli	Parwati	2.905	2.735	3.330	0.016	9.808	0	7
202	Kheronighat	Kopili	3.178	2.984	4.055	0.060	13.880	1	10
203	Kidangoor	Meenachi	1.685	1.696	1.630	0.279	4.860	0	6
204	Kodumudi	Cauvery	3.714	4.086	1.480	0.290	16.670	1	6
205	Koelwar	Sone	3.762	4.146	2.035	0.010	16.750	1	10
206	Kogaon	Kundi	0.958	1.310	0.605	0.390	2.230	0	4
207	Kokrajhar	Gaurang	2.729	2.656	3.020	0.360	4.410	0	5
208	Kollegal	Cauvery	2.314	2.570	1.290	0.180	6.750	0	5
209	Konta	Sabari	2.571	2.803	1.180	0.550	8.400	0	7
210	Koperagaon	Godavari	1.350	-	1.350	1.350	1.350	0	1
211	Kora	Rind	0.840	0.694	1.205	0.200	1.910	0	7
212	Koteshwar	Bhagirath	1.067	1.148	0.785	0.100	4.740	0	9
213	Kudalaiyathur	Vellar	1.806	1.806	-	0.520	3.091	0	2

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214	Kudige	Cauvery	1.436	1.473	1.140	0.010	5.450	0	9
215	Kudlur	Palar	0.940	1.183	0.210	0.070	3.270	0	4
216	Kuldah Bridge	Sone	3.309	2.324	7.250	0.200	11.740	1	9
217	Kulsi	Kulsi	2.385	1.650	5.690	0.350	7.290	0	11
218	Kumbidi	Bharathapuzha	1.864	1.864	1.860	0.010	5.950	0	6
219	Kumhari	Wainganga	1.455	1.406	1.680	0.240	6.740	0	11
220	Kuniyil	Chaliyar	0.812	0.908	0.330	0.189	2.890	0	6
221	Kuppelur	Kumudavathi	0.030	0.030	-	0.030	0.030	0	1
222	Kurubhata	Mand	1.744	1.744	-	0.067	5.260	0	4
223	Kurundwad	Krishna	4.960	-	4.960	4.960	4.960	0	1
224	Kuttyadi	Kuttyadi	1.773	1.877	1.150	0.322	3.550	0	7
225	Kuzhithurai	Tambrapani	1.554	1.843	0.110	0.050	6.790	0	6
226	Labha	Mahananda	0.976	0.928	1.190	0.280	2.100	0	11
227	Lakhisarai	Kiul	1.925	1.814	2.370	0.010	3.410	0	10
228	Lalganj	Gandak	1.882	1.832	2.105	0.250	7.590	0	11
229	Lowara	Sheturni	47.952	58.177	1.940	0.090	374.580	4	7
230	Lucknow	Gomti	6.219	7.465	1.235	0.310	21.670	2	8
231	M.H. Halli	Hemavathi	2.785	2.785	-	0.180	4.590	0	4
232	Madhira	Wyra	1.475	1.475	-	0.100	3.450	0	4
233	Madla	Ken	1.202	1.203	1.200	0.100	2.260	0	9
234	Magaral	Cheyyar	1.770	1.770	-	1.770	1.770	0	1
235	Mahidpur	Sipra	2.103	0.640	2.835	0.270	5.400	0	3
236	Mahuwa	Purna	2.833	3.315	1.385	0.700	6.890	0	8
237	Maighat	Gomti	2.233	2.183	2.455	0.200	5.850	0	11
238	Majhitar	Rangit	5.468	5.468	-	5.468	5.468	0	1
239	Malakkara	Pampa	2.876	2.795	3.280	0.304	7.970	0	6
240	Malkhed	Kagna	2.880	3.248	1.410	1.000	5.690	0	5
241	Manas NH Crossing	Manas	3.015	2.173	5.540	1.240	5.540	0	4
242	Mancherial	Godavari	1.560	1.663	0.940	0.300	3.080	0	7
243	Mandleshwar	Narmada	1.002	1.125	0.510	0.080	1.810	0	10
244	Manendragarh	Hasdeo	0.500	0.500	-	0.130	0.870	0	2
245	Mangaon (Seasonal)	Kal	4.970	-	4.970	4.970	4.970	0	1
246	Mankara	Bharathapuzha	1.244	1.271	1.080	0.178	1.900	0	7
247	Manot	Narmada	2.030	2.264	1.090	0.370	4.747	0	10
248	Mantralayam	Tungabhadra	8.606	8.606	-	0.060	32.290	1	3
249	Marella	Gundlakamma	2.983	2.983	-	0.579	7.450	0	3
250	Margherita	Buridehing	16.592	19.451	3.725	0.040	156.070	1	10
251	Marol	Varada	0.845	0.010	1.680	0.010	1.680	0	2
252	Mataji	Mahi	1.729	1.914	0.895	0.035	4.980	0	11
253	Mathabhanga	Jaldhaka	2.124	1.885	2.840	0.070	3.925	0	4
254	Mathanguri	Beki	2.628	2.628	-	2.370	2.886	0	2
255	Mathura	Yamuna	1.835	1.676	2.550	0.070	5.030	0	11
256	Matigara	Balason	2.988	2.988	-	0.900	5.350	0	4

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257	Matijuri	Dhaleshwari	1.351	1.372	1.310	0.010	4.946	0	6
258	Matunga	Kalanadi	1.863	1.794	2.175	0.510	6.130	0	11
259	Mawi	Yamuna	1.933	1.826	2.415	0.230	5.126	0	11
260	Meja Road	Tons	2.497	2.732	1.555	0.350	8.460	0	10
261	Mekhliganj	Teesta	2.015	1.789	2.690	0.160	3.450	0	4
262	Menangudi	Cauvery/Noolar	0.530	0.530	-	0.530	0.530	0	1
263	Miao	Neo dihing	4.587	4.937	3.015	0.160	19.300	2	9
264	Mirzapur	Ganga	2.000	1.567	3.950	0.180	5.410	0	11
265	Mohana (Betwa)	Betwa	1.741	2.158	0.490	0.160	4.460	0	8
266	Mohana (Yamuna)	Yamuna	5.581	5.889	4.195	0.280	20.044	2	9
267	Mohgaoan	Burhner	1.344	1.551	0.515	0.250	2.431	0	10
268	Moradabad	Ramganga	9.886	12.191	0.665	0.010	32.850	4	6
269	Motinaroli	Kim	2.908	2.940	2.795	0.910	5.420	0	9
270	Murappanadu	Tambrapani	2.349	2.391	2.050	0.010	4.740	0	8
271	Muri	Subarnarekha	0.819	0.777	1.110	0.200	1.330	0	8
272	Murti	Murti	3.490	3.490	-	0.180	7.650	0	3
273	Musiri	Cauvery	2.049	2.049	-	1.250	3.900	0	7
274	Muthankera	Kabini	1.323	1.391	0.910	0.158	3.510	0	7
275	Nagalamadike	Pennar	1.010	1.010	-	1.010	1.010	0	1
276	Nagrakata	Jaldhaka	1.269	1.269	-	0.180	2.460	0	3
277	Naharkatia	Buridehing	2.958	2.704	4.100	0.354	7.750	0	11
278	Naidupet	Swarnamukhi	38.860	38.860	-	38.860	38.860	1	0
279	Nallammaranpatty	Amaravathi	0.988	1.163	0.460	0.070	1.870	0	4
280	Nallathur	Nandalar	2.999	2.999	-	0.280	6.130	0	4
281	Namsai	Neo dihing	2.549	2.192	4.155	0.010	5.820	0	11
282	Nandgaon	Wunna	2.148	2.192	2.015	0.080	7.040	0	8
283	Nandipalli	Sagaileru	1.893	1.255	2.530	0.180	4.340	0	4
284	Nanglamoraghat	Desang	2.219	1.758	4.295	0.121	6.530	0	11
285	Neamatighat	Brahmaputra	1.780	1.768	1.835	0.060	4.130	0	11
286	Neeleswaram	Periyar	1.258	1.273	1.170	0.517	2.830	0	7
287	Neemsar	Gomti	7.565	9.500	0.795	0.140	23.440	3	6
288	Nellithurai	Bhavani	1.990	1.990	-	0.320	4.470	0	4
289	Nellore	Pennar	3.295	3.295	-	2.160	4.430	0	2
290	Neora	Naora	4.281	4.281	-	1.430	6.784	0	3
291	Nowrangpur	Indravathi	4.286	4.546	2.730	0.150	16.480	1	6
292	Numaligarh	Dhansiri	1.785	1.464	3.070	0.070	3.970	0	10
293	P.G.Bridge	Penganga	1.212	1.056	1.760	0.010	3.880	0	9
294	Pachauli	Sind	1.550	1.870	1.230	1.230	1.870	0	2
295	Pachegaon	Pravara	0.640	-	0.640	0.640	0.640	0	1
296	Paderdibadi	Mahi	1.661	1.571	2.065	0.200	3.720	0	11
297	Pagladiya N.T.Road Crossing	Pagladiya	3.075	1.648	9.495	0.200	18.700	1	10
298	Paleru Bridge	Paleru	2.285	2.268	2.370	0.250	6.920	0	6
299	Paliakalan	Sharda	3.635	3.882	2.645	0.120	9.930	0	10

S. No.	Water Quality Site	River	Lead (in µg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 10 µg/L	Below 10 µg/L
300	Palla	Yamuna	2.330	2.034	3.660	0.040	7.280	0	11
301	Panbari	Burisuti	1.604	1.604	-	0.390	2.817	0	2
302	Pancharatna	Brahmaputra	2.798	1.514	8.575	0.400	15.810	1	10
303	Pandu	Brahmaputra	3.418	1.325	12.840	0.020	21.480	1	10
304	Panposh	Brahmani	1.504	1.508	1.480	0.030	3.680	0	8
305	Passighat	Siang	1.175	1.175	-	0.076	3.090	0	5
306	Patan	Hiran	1.230	1.287	1.030	0.250	2.730	0	9
307	Pathagudem	Indravathi	2.313	2.464	1.410	0.630	7.490	0	7
308	Pathardhi	Kharun	1.300	1.300	-	1.300	1.300	0	1
309	Pati	Goi	1.694	1.405	2.850	0.160	3.450	0	5
310	Patna	Ganga	2.188	2.433	1.085	0.030	9.610	0	11
311	Pattazhy	Kallada	4.710	5.414	0.490	0.250	13.660	2	5
312	Pauni	Wainganga	1.235	1.106	1.815	0.110	2.480	0	11
313	Peralam	Vanjiyar	0.495	0.495	-	0.120	0.870	0	2
314	Perumannu	Valapatnam	1.129	1.106	1.270	0.130	2.680	0	7
315	Perur	Godavari	1.813	1.727	2.330	0.020	4.284	0	7
316	Phulgaon (Seasonal)	Varna	3.270	-	3.270	3.270	3.270	0	1
317	Pingalwada	Dhadher	5.204	5.873	2.860	1.360	17.650	1	8
318	Poanta	Yamuna	0.105	0.105	-	0.060	0.150	0	2
319	Polavaram	Godavari	4.404	4.891	1.480	0.060	22.870	1	6
320	Pratapgarh	Sai	2.627	2.680	2.415	0.190	8.850	0	10
321	Pratapur	Yamuna	1.678	2.004	0.535	0.060	7.180	0	9
322	Prem Nagar	Chenab	2.757	2.204	6.630	0.087	9.180	0	8
323	Pudur	Kannadipuzha	1.938	1.772	2.770	0.059	4.060	0	6
324	Pulamanthole	Pulanthodu	1.585	1.617	1.390	0.164	2.810	0	7
325	Purna	Purna	7.258	7.258	-	7.258	7.258	0	1
326	Purushottampur	Rushikulya	1.172	1.138	1.410	0.480	2.270	0	8
327	Puthimari D.R.F.	Puthimari	2.563	2.353	3.505	0.170	10.120	1	10
328	Puthimari NH Road crossing	Puthimari	1.599	1.589	1.640	0.150	3.540	0	10
329	Raibareli	Sai	7.770	9.765	0.785	0.290	26.240	2	7
330	Rajapur	Yamuna	1.303	1.575	0.485	0.160	3.520	0	8
331	Rajegaon	Bagh	1.367	1.218	1.885	0.060	5.170	0	9
332	Rajghat	Betwa	1.149	1.352	0.640	0.190	2.640	0	7
333	Rajim	Mahanadi	0.050	0.050	-	0.050	0.050	0	1
334	Ram Munshi Bagh	Jhelum	2.078	1.621	4.820	0.140	4.820	0	7
335	Ramakona	Kanhan	3.513	4.077	1.540	0.050	17.510	1	8
336	Ramamangalam	Muvvattupuzha	1.271	1.263	1.320	0.210	2.940	0	7
337	Rampur	Jonk	1.708	1.708	-	0.280	4.180	0	3
338	Ranganadi NT-Road Xing	Ranganadi	1.714	1.779	1.420	0.393	3.330	0	11
339	Rangeli	Som	1.702	1.703	1.700	0.249	4.990	0	11
340	Rangpo	Rangpochu	3.504	3.504	-	0.170	5.410	0	3
341	Regauli	Rapti	5.421	6.035	2.965	0.470	14.210	3	7
342	Rishikesh	Ganga	0.912	0.757	1.610	0.060	2.270	0	11

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343	Rudraprayag	Alaknanda	1.745	1.933	0.995	0.130	6.490	0	10
344	Safapora	Jhelum	2.111	1.766	4.520	0.010	4.520	0	8
345	Sakleshpur	Hemavathi	3.548	3.727	2.110	0.140	23.000	1	8
346	Sakmur	Wardha	1.576	1.462	2.090	0.190	4.110	0	11
347	Salebhata	Ong	2.588	2.588	-	0.150	7.030	0	4
348	Samdoli	Varna	4.240	-	4.240	4.240	4.240	0	1
349	Sandia	Narmada	1.305	1.539	0.370	0.240	2.560	0	10
350	Sangam J	Jhelum	1.383	0.811	5.390	0.020	5.390	0	8
351	Sangam K	Kinnerasani	1.515	1.490	1.640	0.052	5.840	0	6
352	Sangod	Parwan	2.920	0.590	4.085	0.220	7.950	0	3
353	Sankalan	Teesta	2.271	2.271	-	0.630	3.110	0	3
354	Sankosh LRP	Sankosh	5.571	6.281	3.440	1.080	14.730	1	3
355	Santeguli	Aghanashini	0.617	0.579	0.920	0.090	2.320	0	9
356	Sarangkheda	Tapi	9.485	11.740	2.720	0.610	62.120	1	7
357	Satrapur	Kanhan	1.244	1.118	1.810	0.020	4.150	0	11
358	Savandapur	Bhavani	1.619	1.521	2.010	0.230	3.420	0	10
359	Seondha	Sind	0.802	0.920	0.210	0.210	2.330	0	6
360	Seppa	Kamang	7.588	7.507	7.955	0.163	46.820	2	9
361	Sevanur	Chittar	0.110	0.110	-	0.110	0.110	0	1
362	Sevoke	Teesta	2.289	2.289	-	0.600	3.880	0	3
363	Shahijina	Betwa	1.437	1.683	0.575	0.150	3.480	0	9
364	Shahzadpur	Ganga	4.155	4.724	1.880	0.190	24.590	1	9
365	Shimoga	Tunga	1.164	1.037	2.050	0.110	3.480	0	8
366	Sibbari	Dareng	2.136	2.252	1.845	0.160	7.080	0	7
367	Sikandarpur	Burhi Gandak	1.435	1.580	0.780	0.060	4.330	0	11
368	Simga	Seonath	4.031	4.031	-	0.030	11.910	1	2
369	Singla-Bazar	Rangit	3.447	3.447	-	0.010	6.150	0	3
370	Sivasagar	Dikhow	3.564	1.885	11.115	0.059	20.630	1	10
371	Sonapur	Digaru	5.981	1.521	32.740	0.740	32.740	1	6
372	Sonapurhat	Mahananda	1.917	1.917	-	1.010	3.640	0	3
373	Srikakulam	Nagavali	0.996	1.004	0.940	0.130	2.090	0	8
374	Srinagar	Alakananda	1.350	1.178	2.210	0.050	2.690	0	6
375	Sripalpur	Punpun	2.566	2.655	2.165	0.140	8.740	0	11
376	Suklai	Suklai	1.532	1.588	1.280	0.220	5.066	0	11
377	Sultanpur	Gomti	2.050	1.848	2.860	0.170	5.510	0	10
378	Sulurpet	Kalingi	4.010	4.010	-	4.010	4.010	0	1
379	Sundergarh	Ib	1.644	1.644	-	0.446	4.680	0	4
380	T. Bekuppe	Arkavathi	6.473	6.806	3.810	0.550	26.290	2	7
381	T. Narasipur	Kabini	1.120	0.810	2.360	0.130	2.360	0	5
382	T. Ramapuram	Hagari	15.727	15.727	-	0.430	41.820	1	2
383	T.K.Halli	Shimsha	2.945	2.945	-	0.310	9.960	0	4
384	Tal	Chambal	1.983	0.650	2.650	0.230	5.070	0	3
385	Talcher	Brahmani	2.528	2.512	2.640	0.530	5.531	0	8

S. No.	Water Quality Site	River	Lead (in µg/L)					BIS:10500;2012	
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386	Tandi	Chenab/Bhaga	4.860	-	4.860	4.860	4.860	0	1
387	Teesta-Bazar	Teesta	3.404	3.079	5.030	0.110	7.900	0	6
388	Tehri	Bhagirath	2.084	2.084	-	0.787	3.380	0	2
389	Tekra	Pranhitha	1.960	1.813	2.620	0.230	3.790	0	11
390	Tezpur	Brahmaputra	2.362	2.188	3.145	0.210	8.630	0	11
391	Tezu	Lohit	2.285	2.183	2.695	0.150	3.820	0	10
392	Thengudi	Thirumalairajanar	3.477	3.477	-	0.260	9.390	0	3
393	Thengumarahada	Moyar	1.506	1.297	2.345	0.100	3.530	0	10
394	Theni	Suruliar	1.812	1.844	1.680	0.170	4.200	0	10
395	Therriaghat	Umsohrynkiew	4.359	2.498	9.010	0.030	16.810	1	6
396	Thevur	Sarabenga	0.070	0.070	-	0.070	0.070	0	1
397	Thimmanahalli	Yagachi	2.665	2.665	-	0.020	13.840	1	5
398	Thoppur	Thoppaiyar	0.570	-	0.570	0.570	0.570	0	1
399	Thumpamon	Achankovil	8.359	9.842	0.940	0.050	38.580	1	5
400	Tikarpara	Mahanadi	0.864	0.831	1.090	0.040	1.760	0	8
401	Tilga	Sankh	1.029	0.923	1.770	0.080	1.790	0	8
402	Tonk	Banas	1.562	2.734	0.390	0.390	2.734	0	2
403	Tribeni	Gandak	1.601	1.658	1.345	0.150	3.980	0	11
404	Tufanganj	Raidak-I	5.219	5.439	4.340	0.250	16.590	1	4
405	Tuini	Tuini	0.973	0.708	2.165	0.010	4.320	0	11
406	Turtipar	Ghagra	6.575	7.383	3.345	0.150	29.260	2	8
407	Udaipur (Chandra)	Chenab/Chandra	3.250	-	3.250	3.250	3.250	0	1
408	Udaipur (Tirap)	Tirap	1.977	1.254	5.230	0.010	7.500	0	11
409	Udi	Chambal	1.554	1.823	0.615	0.010	4.590	0	9
410	Ujjain	Sipra	0.516	0.831	0.200	0.200	0.831	0	2
411	Urachikottai	Cauvery	2.422	2.850	0.280	0.090	10.610	1	5
412	Uttarkashi	Bhagirath	1.454	1.483	1.325	0.100	4.850	0	11
413	Vandiperiyar	Periyar	3.590	3.810	2.490	0.111	5.930	0	6
414	Vapi	Damanganga	3.527	1.944	9.065	0.310	16.990	1	8
415	Varanasi	Ganga	2.082	1.818	3.270	0.160	5.170	0	11
416	Vautha	Sabarmati	5.962	7.040	1.110	0.077	17.570	3	8
417	Vazhavachanur	Ponnaiyar	1.843	1.843	-	0.440	4.150	0	4
418	Villupuram	Ponnaiyar	0.920	0.920	-	0.920	0.920	0	1
419	Wadenapally	Krishna	2.007	2.022	1.920	0.260	7.850	0	7
420	Wairagarh	Khobragarhi	1.371	0.906	2.535	0.020	2.680	0	7
421	Warunji	Koyna	3.240	-	3.240	3.240	3.240	0	1
422	Yadgir	Bhima	1.930	-	1.930	1.930	1.930	0	1
423	Yashwant nagar	Giri	1.054	0.710	2.600	0.003	4.920	0	11
424	Yennehole	Yennehole	2.634	2.438	3.420	0.010	9.190	0	5

ZINC

S. No.	Water Quality Site	River	Zinc (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 5 mg/L	Below 5 mg/L
1	A B Road Xing	Parwati	0.008	0.011	0.006	0.003	0.011	0	3
2	A.P. Puram	Chittar	0.008	0.008	-	0.005	0.015	0	5
3	A.P.Ghat	Barak	0.015	0.018	0.005	0.002	0.038	0	7
4	Aauriya	Yamuna	0.020	0.018	0.027	0.006	0.042	0	9
5	Abu Road	Banas	0.011	0.010	0.014	0.002	0.023	0	6
6	Addoor	Gurupur	0.008	0.011	0.004	0.004	0.011	0	2
7	Adityapur	Kharkai	0.011	0.012	0.005	0.001	0.025	0	8
8	Agra	Yamuna	0.108	0.023	0.406	0.008	0.800	0	9
9	Aie NH Crossing	Aie	0.226	0.226	-	0.010	0.648	0	3
10	Akabarpur	Chhoti Sarju	0.020	0.026	0.005	0.003	0.107	0	7
11	Akhnoor	Chenab	0.009	0.008	0.014	0.003	0.018	0	8
12	Akkihebbal	Hemavathi	0.009	0.009	0.008	0.000	0.027	0	9
13	Aklera	Parwan	0.008	0.011	0.003	0.003	0.016	0	5
14	Alladupalli	Kunderu	0.044	0.054	0.006	0.002	0.354	0	10
15	Allahabad	Ganga	0.019	0.023	0.006	0.001	0.159	0	11
16	Alutuma	Ramyala	0.009	0.011	0.002	0.002	0.026	0	6
17	Ambarampalayam	Aliyar	0.015	0.013	0.023	0.004	0.030	0	10
18	Ambasamudram	Vaigai	0.004	0.004	-	0.002	0.006	0	2
19	Anandpur	Ganga	0.011	0.012	0.004	0.002	0.025	0	8
20	Andhiyar Kore	Hamp	0.012	0.012	-	0.002	0.033	0	3
21	Ankinghat	Ganga	0.016	0.016	0.016	0.002	0.040	0	10
22	Annavasal	Nattar	0.004	0.004	-	0.004	0.004	0	1
23	Arangaly	Chalakudy	0.008	0.007	0.010	0.002	0.013	0	6
24	Arcot	Palar	0.007	0.010	0.005	0.005	0.010	0	2
25	Arjunwad	Krishna	0.007	-	0.007	0.007	0.007	0	1
26	Ashramam	Pazhayar	0.009	0.010	0.004	0.003	0.016	0	6
27	Ashti	Wainganga	0.006	0.006	0.005	0.001	0.010	0	11
28	Avarankuppam	Palar	0.004	0.004	-	0.004	0.004	0	1
29	Avershe	Sita	0.006	0.008	0.002	0.002	0.012	0	5
30	Ayilam	Vamanapuram	0.008	0.009	0.005	0.001	0.013	0	6
31	Ayodhya	Saryu	0.016	0.016	0.014	0.001	0.035	0	10
32	Azmabad	Ganga	0.016	0.014	0.025	0.001	0.046	0	11
33	B.P. Ghat	Barak	0.010	0.012	0.004	0.002	0.020	0	8
34	Badatighat	Subansiri	0.013	0.015	0.007	0.003	0.033	0	11
35	Badlapur	Ulhas	0.008	0.008	0.007	0.003	0.015	0	6
36	Balrampur	Rapti	0.015	0.016	0.009	0.003	0.025	0	10
37	Baltara	Kosi	0.010	0.010	0.011	0.005	0.025	0	11
38	Bamni (Banjar)	Banjar	0.022	0.018	0.038	0.003	0.066	0	9
39	Bamni (Wardha)	Wardha	0.007	0.007	0.005	0.002	0.012	0	11
40	Bamnidih	Hasdeo	0.011	0.011	-	0.001	0.022	0	3
41	Banda	Ken	0.020	0.021	0.014	0.009	0.040	0	9

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42	Bansi	Rapti	0.014	0.015	0.013	0.003	0.032	0	9
43	Bantwal	Nethravathi	0.008	0.010	0.004	0.004	0.013	0	3
44	Baranwada	Banas	0.010	0.012	0.003	0.003	0.018	0	4
45	Bareilly	Ramganga	0.015	0.017	0.010	0.001	0.029	0	10
46	Barmanghat	Narmada	0.014	0.015	0.009	0.002	0.032	0	10
47	Barobisha	Raidak-II	0.022	0.028	0.001	0.001	0.037	0	5
48	Barod	Kali Sindh	0.009	0.011	0.003	0.002	0.026	0	8
49	Baronda	Pairi	0.002	0.002	-	0.002	0.002	0	1
50	Basantpur	Mahanadi	0.027	0.027	-	0.002	0.079	0	4
51	Basti	Kwano	0.027	0.031	0.013	0.001	0.127	0	10
52	Bawapuram	Tungabhadra	0.014	0.014	-	0.003	0.028	0	3
53	Behalpur	Champamati	0.042	0.042	-	0.020	0.063	0	2
54	Beki Mathanguri	Beki	0.024	0.024	-	0.022	0.027	0	2
55	Beki Road Bridge	Beki	0.311	0.387	0.003	0.003	1.500	0	5
56	Belkhedi	Sher	0.013	0.014	0.011	0.002	0.024	0	10
57	Belne Bridge	Gad	0.009	0.009	0.009	0.009	0.009	0	2
58	Bendrahalli	Suvarnavathi	0.007	0.007	-	0.007	0.007	0	1
59	Berhampore	Bhagirathi	0.004	0.004	0.002	0.001	0.011	0	11
60	Bhadrachalam	Godavari	0.026	0.013	0.109	0.003	0.109	0	7
61	Bhalukpong	Jiabharali	0.024	0.023	0.029	0.005	0.092	0	11
62	Bhatpalli	Peddavagu	0.008	0.007	0.014	0.002	0.028	0	11
63	Bhitaura	Ganga	0.029	0.029	0.032	0.004	0.104	0	10
64	Bhomoraguri	Brahmaputra	0.025	0.026	0.024	0.006	0.099	0	11
65	Bihubar	Dikhow	0.034	0.031	0.050	0.001	0.114	0	11
66	Biligundullu	Cauvery	0.010	0.010	0.008	0.002	0.026	0	9
67	Birdghat	Rapti	0.021	0.024	0.010	0.003	0.079	0	10
68	Bokajan	Dhansiri	0.017	0.012	0.040	0.003	0.056	0	11
69	Burhanpur	Tapi	0.019	0.013	0.036	0.001	0.064	0	8
70	Buxar	Ganga	0.015	0.009	0.044	0.002	0.081	0	11
71	Byaladahalli	Haridra	0.004	0.004	-	0.002	0.009	0	3
72	Champasari	Mahananda	0.018	0.018	-	0.009	0.030	0	4
73	Champua	Ganga	0.008	0.009	0.002	0.002	0.014	0	7
74	Chanwada	Orsang	0.010	0.008	0.017	0.004	0.018	0	9
75	Chapra	Jalangi	0.004	0.004	0.003	0.001	0.011	0	11
76	Chel	Chel	0.028	0.028	-	0.020	0.037	0	3
77	Chengalpet	Palar	0.006	0.007	0.004	0.001	0.016	0	4
78	Chenimari	Buridehing	0.011	0.010	0.018	0.003	0.027	0	11
79	Chennur	Pennar	0.012	0.013	0.008	0.002	0.031	0	10
80	Chepan	Raidak-I	0.025	0.031	0.002	0.002	0.052	0	5
81	Chhidgaon	Ganjal	0.015	0.016	0.009	0.005	0.025	0	10
82	Chitrasani	Balaram	0.007	0.007	0.008	0.002	0.019	0	9
83	Chittorgarh	Gambhiri	0.008	0.008	-	0.008	0.008	0	1
84	Cholachguda	Malaprabha	0.010	0.010	-	0.010	0.010	0	1

S. No.	Water Quality Site	River	Zinc (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 5 mg/L	Below 5 mg/L
85	Chopan	Sone	0.010	0.010	0.007	0.001	0.032	0	11
86	Chouldhowaghat	Subansiri	0.012	0.011	0.019	0.002	0.025	0	11
87	Chuchankatte	Cauvery	0.007	0.006	0.007	0.004	0.009	0	3
88	Coronation	Teesta	0.033	0.033	-	0.024	0.046	0	3
89	Dabri	Ramganga	0.020	0.023	0.010	0.005	0.078	0	10
90	Damarcherla	Musi	0.009	0.009	-	0.001	0.023	0	5
91	Dawki	Umngot	0.011	0.014	0.004	0.002	0.042	0	7
92	Delhi Rly Bridge	Yamuna	0.012	0.014	0.002	0.001	0.047	0	11
93	Deoprayag	Bhagirath	0.023	0.026	0.008	0.005	0.052	0	11
94	Derol Bridge	Sabarmati	0.009	0.009	0.007	0.002	0.019	0	11
95	Desangpani	Desang	0.026	0.027	0.020	0.004	0.129	0	11
96	Dhamkund	Chenab	0.009	0.010	0.002	0.002	0.025	0	8
97	Dharamtul	Kopili	0.012	0.012	0.011	0.004	0.027	0	11
98	Dheng Bridge	Bagmathi	0.009	0.009	0.007	0.002	0.022	0	11
99	Dholabazar	Lohit	0.011	0.013	0.005	0.001	0.039	0	11
100	Dholai	Rukni	0.009	0.011	0.003	0.000	0.023	0	8
101	Dholpur	Chambal	0.073	0.078	0.053	0.006	0.444	0	9
102	Dhubri	Brahmaputra	0.036	0.036	-	0.016	0.055	0	2
103	Dhulsar	Uri	0.008	0.008	0.009	0.008	0.009	0	2
104	Diana	Diana	0.046	0.046	-	0.046	0.046	0	1
105	Dibrugarh	Brahmaputra	0.015	0.015	0.015	0.001	0.058	0	11
106	Dillighat	Desang	0.015	0.011	0.030	0.001	0.044	0	11
107	Dimapara	Bugi	0.006	0.007	0.003	0.002	0.019	0	7
108	Dindori	Narmada	0.066	0.078	0.015	0.007	0.253	0	10
109	Domohani	Teesta	0.022	0.027	0.002	0.002	0.038	0	5
110	Duddhi	Kanhar	0.016	0.017	0.010	0.002	0.114	0	11
111	Dudhnai	Dudhnai	0.038	0.044	0.015	0.003	0.243	0	11
112	Durvesh	Vaitarna	0.016	0.015	0.019	0.002	0.027	0	8
113	Ekmighat	Bagmathi	0.010	0.009	0.012	0.002	0.025	0	11
114	Elginbridge	Ghagra	0.031	0.033	0.021	0.004	0.153	0	10
115	Elunuthimanagalam	Noyyal	0.005	0.005	-	0.002	0.008	0	4
116	English Bazar	Padma/Mahananda	0.006	0.006	0.003	0.002	0.010	0	11
117	Erinjipuzha	Payaswani	0.007	0.008	0.005	0.002	0.014	0	6
118	Etawah	Yamuna	0.023	0.025	0.015	0.008	0.041	0	9
119	Fakirabazar	Longai	0.012	0.015	0.004	0.001	0.030	0	7
120	Farakka	Ganga	0.004	0.004	0.002	0.001	0.010	0	11
121	Farakka/(HR)	Feeder Canal	0.004	0.005	0.002	0.001	0.010	0	10
122	Fatehgarh	Ganga	0.040	0.047	0.014	0.003	0.124	0	10
123	Fulertal	Barak	0.016	0.021	0.005	0.001	0.057	0	6
124	Gadarwara	Sakkar	0.011	0.012	0.009	0.004	0.019	0	8
125	Gadat	Ambika	0.015	0.015	0.013	0.006	0.046	0	8
126	Gajaldoba	Teesta	0.019	0.019	-	0.017	0.022	0	3
127	Galeta	Hindon	0.031	0.034	0.018	0.004	0.156	0	11

S. No.	Water Quality Site	River	Zinc (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 5 mg/L	Below 5 mg/L
128	Ganod	Bhadar	0.021	0.013	0.089	0.002	0.089	0	9
129	Garhamukteshwar	Ganga	0.013	0.011	0.022	0.001	0.026	0	10
130	Garrauli	Dhasan	0.022	0.023	0.020	0.008	0.045	0	5
131	Garudeshwar	Narmada	0.012	0.011	0.014	0.002	0.027	0	9
132	Gaya	Harohar/Phalgu	0.005	0.005	0.006	0.004	0.007	0	4
133	Gelabil	Doyang	0.030	0.017	0.057	0.012	0.082	0	6
134	Ghat	Sarju	0.015	0.016	0.009	0.001	0.041	0	10
135	Ghatora	Seonath	0.014	0.014	-	0.006	0.025	0	3
136	Ghatsila	Subarnarekha	0.016	0.017	0.005	0.005	0.032	0	8
137	Ghish	Ghish	0.041	0.041	-	0.010	0.073	0	3
138	Ghugumari	Torsa	0.021	0.026	0.002	0.002	0.038	0	5
139	Gokak	Ghataprabha	0.008	0.010	0.006	0.006	0.010	0	2
140	Golaghat	Sonkosh	0.138	0.099	0.313	0.003	0.770	0	11
141	Golakganj	Dhansiri	0.030	0.030	-	0.029	0.031	0	2
142	Gomlai	Brahmani	0.011	0.012	0.003	0.003	0.021	0	8
143	Gopalkheda	Purna	0.011	0.009	0.013	0.006	0.018	0	4
144	Gopurajapuram	Cauvery/Puravidaiyanar	0.032	0.032	-	0.032	0.032	0	1
145	Govindapur	Burhabalang	0.009	0.011	0.001	0.001	0.017	0	8
146	Gummanur	Ponnaiyar	0.012	0.012	0.011	0.005	0.034	0	10
147	Gumrabazar	Gumra	0.039	0.049	0.008	0.004	0.130	0	8
148	Gunupur	Vamsadhara	0.017	0.019	0.006	0.002	0.068	0	8
149	Haladi	Haladi	0.011	0.012	0.005	0.000	0.029	0	9
150	Halia	Halia	0.008	0.008	-	0.001	0.024	0	6
151	Hamirpur	Yamuna	0.013	0.014	0.011	0.001	0.029	0	9
152	Handia	Narmada	0.015	0.016	0.011	0.001	0.025	0	10
153	Hanskhali	Churni	0.007	0.008	0.002	0.002	0.045	0	11
154	Haridwar	Ganga	0.021	0.025	0.006	0.003	0.083	0	10
155	Harlahalli	Tungabhadra	0.021	0.018	0.036	0.003	0.036	0	6
156	Hasimara	Torsa	0.025	0.032	0.002	0.002	0.042	0	4
157	Hathidah	Ganga	0.008	0.008	0.010	0.002	0.019	0	11
158	Hayaghat	Bagmathi	0.017	0.019	0.010	0.002	0.073	0	11
159	Hivra	Wardha	0.006	0.006	0.007	0.001	0.017	0	11
160	Hogenakkal	Chinnar	0.003	0.003	-	0.003	0.003	0	1
161	Holehonnur	Bhadra	0.012	0.012	0.011	0.001	0.021	0	9
162	Honnali	Tungabhadra	0.010	0.010	0.007	0.001	0.019	0	9
163	Hoshangabad	Narmada	0.014	0.015	0.010	0.004	0.025	0	10
164	Huvin Hedgi	Krishna	0.026	0.010	0.087	0.001	0.087	0	5
165	Jagdalpur	Indravathi	0.053	0.004	0.101	0.004	0.101	0	2
166	Jagibhakatgaon	Kopili	0.014	0.012	0.020	0.002	0.035	0	11
167	Jai Nagar	Kamala-Balan	0.008	0.008	0.009	0.000	0.017	0	11
168	Jaldhaka NH-31	Jaldhaka	0.015	0.018	0.003	0.003	0.036	0	5
169	Jammu Tawi	Chenab/Tawi	0.008	0.008	0.003	0.003	0.017	0	8
170	Jamshedpur	Subarnarekha	0.017	0.019	0.004	0.004	0.042	0	8

S. No.	Water Quality Site	River	Zinc (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 5 mg/L	Below 5 mg/L
171	Jamsolghat	Subarnarekha	0.008	0.009	0.005	0.003	0.020	0	5
172	Japla	Sone	0.010	0.010	0.007	0.003	0.022	0	11
173	Jaraikela	Koel	0.008	0.009	0.003	0.001	0.017	0	8
174	Jenapur	Brahmani	0.022	0.024	0.007	0.002	0.095	0	8
175	Jhanjharpur	Kamala-Balan	0.011	0.009	0.017	0.001	0.027	0	11
176	Jiabharali NT Road Xing	Jiabharali	0.017	0.013	0.037	0.004	0.063	0	11
177	Jondhra	Seonath	0.002	0.002	-	0.002	0.002	0	1
178	K.M. Vadi	Lakshmantirtha	0.015	0.010	0.025	0.009	0.025	0	3
179	Kachlabridge	Ganga	0.078	0.089	0.034	0.008	0.520	0	10
180	Kalampur	Kaliyar	0.007	0.008	0.003	0.001	0.016	0	6
181	Kalanaur	Yamuna	0.027	0.011	0.102	0.002	0.200	0	11
182	Kallooppara	Manimala	0.007	0.007	0.004	0.003	0.010	0	6
183	Kalna (EBB)	Bhagirathi	0.004	0.006	0.002	0.001	0.010	0	6
184	Kalna (Flow)*	Bhagirathi	0.006	0.006	-	0.001	0.010	0	4
185	Kamalapuram	Papagni	0.008	-	0.008	0.004	0.013	0	2
186	Kamalpur	Banas	0.008	0.006	0.013	0.002	0.013	0	3
187	Kampur	Kopili	0.017	0.014	0.030	0.001	0.042	0	11
188	Kanpur	Ganga	0.016	0.018	0.006	0.001	0.046	0	10
189	Kantamal	Tel	0.487	0.487	-	0.001	1.941	0	4
190	Karad	Krishna	0.026	-	0.026	0.026	0.026	0	1
191	Karathodu	Kadalundi	0.007	0.007	0.003	0.002	0.014	0	6
192	Kashinagar	Vamsadhara	0.012	0.013	0.007	0.002	0.027	0	8
193	Katwa	Bhagirathi	0.005	0.006	0.002	0.002	0.021	0	11
194	Keesara	Munneru	0.022	0.012	0.052	0.004	0.052	0	4
195	Kellodu	Vedavathi	0.008	0.008	-	0.008	0.008	0	1
196	Keolari	Wainganga	0.010	0.009	0.018	0.001	0.026	0	11
197	Kesinga	Tel	0.010	0.010	-	0.002	0.027	0	4
198	Khanitar	Teesta	0.033	0.033	-	0.013	0.053	0	2
199	Khanpur	Mahi	0.010	0.010	0.009	0.002	0.019	0	11
200	Kharkhana	Surma/Myntdu	0.059	0.080	0.006	0.001	0.256	0	7
201	Khatoli	Parwati	0.007	0.009	0.002	0.001	0.014	0	7
202	Kheronighat	Kopili	0.021	0.018	0.034	0.005	0.051	0	11
203	Kidangoor	Meenachi	0.018	0.021	0.003	0.002	0.080	0	6
204	Kodumudi	Cauvery	0.007	0.007	0.003	0.003	0.010	0	7
205	Koelwar	Sone	0.009	0.009	0.010	0.002	0.020	0	11
206	Kogaon	Kundi	0.011	0.013	0.009	0.008	0.015	0	4
207	Kokrajhar	Gaurang	0.029	0.036	0.002	0.002	0.074	0	5
208	Kollegal	Cauvery	0.015	0.017	0.009	0.002	0.045	0	5
209	Konta	Sabari	0.025	0.010	0.113	0.003	0.113	0	7
210	Koperagaon	Godavari	0.017	-	0.017	0.017	0.017	0	1
211	Kora	Rind	0.019	0.020	0.016	0.003	0.051	0	7
212	Koteshwar	Bhagirath	0.034	0.042	0.007	0.003	0.083	0	9
213	Kudalaiyathur	Vellar	0.012	0.012	-	0.011	0.013	0	2

S. No.	Water Quality Site	River	Zinc (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 5 mg/L	Below 5 mg/L
214	Kudige	Cauvery	0.009	0.010	0.003	0.002	0.033	0	9
215	Kudlur	Palar	0.013	0.010	0.024	0.002	0.024	0	4
216	Kuldah Bridge	Sone	0.011	0.010	0.014	0.001	0.036	0	10
217	Kulsi	Kulsi	0.034	0.040	0.008	0.002	0.201	0	11
218	Kumbidi	Bharathapuzha	0.009	0.010	0.004	0.004	0.014	0	6
219	Kumhari	Wainganga	0.009	0.010	0.006	0.003	0.022	0	11
220	Kuniyil	Chaliyar	0.047	0.052	0.021	0.007	0.165	0	6
221	Kuppelur	Kumudavathi	0.009	0.009	-	0.009	0.009	0	1
222	Kurubhata	Mand	0.008	0.008	-	0.002	0.023	0	4
223	Kurundwad	Krishna	0.004	-	0.004	0.004	0.004	0	1
224	Kuttyadi	Kuttyadi	0.011	0.012	0.004	0.002	0.024	0	7
225	Kuzhithurai	Tambrapani	0.011	0.013	0.004	0.001	0.028	0	6
226	Labha	Mahananda	0.004	0.005	0.003	0.001	0.010	0	11
227	Lakhisarai	Kiul	0.107	0.132	0.010	0.002	0.996	0	10
228	Lalganj	Gandak	0.096	0.115	0.012	0.002	0.978	0	11
229	Lowara	Sheturni	0.013	0.013	0.011	0.004	0.028	0	11
230	Lucknow	Gomti	0.018	0.019	0.012	0.005	0.046	0	10
231	M.H. Halli	Hemavathi	0.010	0.010	-	0.003	0.023	0	4
232	Madhira	Wyra	0.011	0.011	-	0.005	0.021	0	4
233	Madla	Ken	0.017	0.016	0.020	0.005	0.063	0	9
234	Magaral	Cheyyar	0.027	0.027	-	0.027	0.027	0	1
235	Mahidpur	Sipra	0.007	0.016	0.003	0.002	0.016	0	3
236	Mahuwa	Purna	0.025	0.029	0.011	0.001	0.132	0	8
237	Maighat	Gomti	0.013	0.016	0.003	0.001	0.109	0	11
238	Majhitar	Rangit	0.033	0.033	-	0.033	0.033	0	1
239	Malakkara	Pampa	0.005	0.006	0.003	0.001	0.010	0	6
240	Malkhed	Kagna	0.020	0.010	0.060	0.003	0.060	0	5
241	Manas NH Crossing	Manas	0.022	0.031	0.005	0.005	0.040	0	3
242	Mancherial	Godavari	0.022	0.010	0.091	0.004	0.091	0	7
243	Mandleshwar	Narmada	0.025	0.027	0.013	0.002	0.126	0	10
244	Manendragarh	Hasdeo	0.015	0.015	-	0.003	0.027	0	2
245	Mangaon (Seasonal)	Kal	0.014	-	0.014	0.014	0.014	0	1
246	Mankara	Bharathapuzha	0.010	0.010	0.009	0.003	0.024	0	7
247	Manot	Narmada	0.286	0.024	1.336	0.010	2.658	0	10
248	Mantralayam	Tungabhadra	0.009	0.009	-	0.002	0.017	0	4
249	Marella	Gundlakamma	0.006	0.006	-	0.003	0.009	0	3
250	Margherita	Buridehing	0.017	0.015	0.026	0.001	0.039	0	11
251	Marol	Varada	0.008	0.010	0.006	0.006	0.010	0	2
252	Mataji	Mahi	0.020	0.023	0.007	0.001	0.142	0	11
253	Mathabhanga	Jaldhaka	0.018	0.024	0.002	0.002	0.030	0	4
254	Mathanguri	Beki	0.030	0.030	-	0.013	0.048	0	2
255	Mathura	Yamuna	0.011	0.013	0.003	0.001	0.030	0	11
256	Matigara	Balason	0.044	0.044	-	0.011	0.119	0	4

S. No.	Water Quality Site	River	Zinc (in mg/L)					BIS:10500;2012	
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			Total	Non Monsoon	Monsoon			Above 5 mg/L	Below 5 mg/L
257	Matijuri	Dhaleshwari	0.025	0.036	0.004	0.000	0.112	0	6
258	Matunga	Kalanadi	0.036	0.042	0.010	0.002	0.264	0	11
259	Mawi	Yamuna	0.011	0.013	0.003	0.001	0.030	0	11
260	Meja Road	Tons	0.009	0.010	0.007	0.001	0.038	0	10
261	Mekhliganj	Teesta	0.019	0.025	0.002	0.002	0.034	0	4
262	Menangudi	Cauvery/Noolar	0.011	0.011	-	0.011	0.011	0	1
263	Miao	Neo dihing	0.018	0.018	0.014	0.008	0.052	0	11
264	Mirzapur	Ganga	0.011	0.013	0.005	0.003	0.053	0	11
265	Mohana (Betwa)	Betwa	0.013	0.015	0.009	0.006	0.028	0	8
266	Mohana (Yamuna)	Yamuna	0.013	0.015	0.005	0.003	0.029	0	11
267	Mohgaoan	Burhner	0.016	0.017	0.011	0.003	0.040	0	10
268	Moradabad	Ramganga	0.149	0.180	0.023	0.009	0.491	0	10
269	Motinaroli	Kim	0.011	0.009	0.017	0.001	0.022	0	9
270	Murappanadu	Tambrapani	0.010	0.010	0.012	0.003	0.031	0	8
271	Muri	Subarnarekha	0.011	0.012	0.004	0.002	0.028	0	8
272	Murti	Murti	0.031	0.031	-	0.023	0.046	0	3
273	Musiri	Cauvery	0.009	0.009	-	0.001	0.029	0	7
274	Muthankera	Kabini	0.146	0.169	0.007	0.001	0.928	0	7
275	Nagalamadike	Pennar	0.011	0.011	-	0.011	0.011	0	1
276	Nagrakata	Jaldhaka	0.024	0.024	-	0.011	0.034	0	3
277	Naharkatia	Buridehing	0.014	0.013	0.016	0.003	0.034	0	11
278	Naidupet	Swarnamukhi	0.011	0.011	-	0.011	0.011	0	1
279	Nallammaranpatty	Amaravathi	0.005	0.006	0.003	0.003	0.007	0	4
280	Nallathur	Nandalar	0.007	0.007	-	0.001	0.012	0	4
281	Namsai	Neo dihing	0.014	0.012	0.022	0.005	0.035	0	11
282	Nandgaon	Wunna	0.005	0.005	0.003	0.000	0.010	0	8
283	Nandipalli	Sagaileru	0.007	0.007	0.008	0.002	0.013	0	4
284	Nanglamoraghat	Desang	0.041	0.038	0.054	0.003	0.245	0	11
285	Neamatighat	Brahmaputra	0.018	0.018	0.023	0.005	0.062	0	11
286	Neeleswaram	Periyar	0.009	0.010	0.003	0.001	0.018	0	7
287	Neemsar	Gomti	0.015	0.015	0.013	0.004	0.028	0	9
288	Nellithurai	Bhavani	0.007	0.007	-	0.004	0.012	0	4
289	Nellore	Pennar	0.005	0.005	-	0.003	0.007	0	2
290	Neora	Naora	0.199	0.199	-	0.017	0.526	0	3
291	Nowrangpur	Indravathi	0.022	0.009	0.097	0.004	0.097	0	7
292	Numaligarh	Dhansiri	0.026	0.027	0.022	0.006	0.069	0	10
293	P.G.Bridge	Penganga	0.008	0.006	0.016	0.001	0.022	0	9
294	Pachauli	Sind	0.014	0.011	0.017	0.011	0.017	0	2
295	Pachegaon	Pravara	0.048	-	0.048	0.048	0.048	0	1
296	Paderdibadi	Mahi	0.009	0.010	0.005	0.001	0.024	0	11
297	Pagladiya N.T.Road Crossing	Pagladiya	0.032	0.038	0.004	0.002	0.262	0	11
298	Paleru Bridge	Paleru	0.025	0.009	0.104	0.001	0.104	0	6
299	Paliakalan	Sharda	0.014	0.016	0.006	0.003	0.027	0	10

S. No.	Water Quality Site	River	Zinc (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 5 mg/L	Below 5 mg/L
300	Palla	Yamuna	0.013	0.014	0.008	0.001	0.038	0	11
301	Panbari	Burisuti	0.042	0.042	-	0.036	0.047	0	2
302	Pancharatna	Brahmaputra	0.069	0.083	0.005	0.003	0.300	0	11
303	Pandu	Brahmaputra	0.036	0.041	0.009	0.001	0.278	0	11
304	Panposh	Brahmani	0.012	0.013	0.005	0.005	0.022	0	8
305	Passighat	Siang	0.011	0.011	-	0.003	0.018	0	5
306	Patan	Hiran	0.015	0.015	0.013	0.001	0.026	0	9
307	Pathagudem	Indravathi	0.025	0.010	0.109	0.003	0.109	0	7
308	Pathardhi	Kharun	0.007	0.007	-	0.007	0.007	0	1
309	Pati	Goi	0.016	0.018	0.009	0.002	0.038	0	5
310	Patna	Ganga	0.008	0.007	0.010	0.001	0.017	0	11
311	Pattazhy	Kallada	0.010	0.009	0.015	0.001	0.024	0	7
312	Pauni	Wainganga	0.007	0.006	0.008	0.000	0.017	0	11
313	Peralam	Vanjiyar	0.012	0.012	-	0.003	0.020	0	2
314	Perumannu	Valapatnam	0.009	0.009	0.009	0.001	0.024	0	7
315	Perur	Godavari	0.019	0.008	0.089	0.003	0.089	0	7
316	Phulgaon (Seasonal)	Varna	0.006	-	0.006	0.006	0.006	0	1
317	Pingalwada	Dhadher	0.164	0.187	0.084	0.010	1.079	0	9
318	Poanta	Yamuna	0.021	0.021	-	0.016	0.026	0	2
319	Polavaram	Godavari	0.021	0.007	0.102	0.004	0.102	0	7
320	Pratapgarh	Sai	0.007	0.006	0.012	0.001	0.019	0	10
321	Pratapur	Yamuna	0.016	0.014	0.022	0.002	0.036	0	9
322	Prem Nagar	Chenab	0.007	0.008	0.003	0.002	0.024	0	8
323	Pudur	Kannadipuzha	0.006	0.007	0.003	0.003	0.011	0	6
324	Pulamanthole	Pulanthodu	0.012	0.013	0.003	0.001	0.026	0	7
325	Purna	Purna	0.009	0.009	-	0.009	0.009	0	1
326	Purushottampur	Rushikulya	0.008	0.009	0.001	0.001	0.016	0	8
327	Puthimari D.R.F.	Puthimari	0.046	0.055	0.004	0.002	0.221	0	11
328	Puthimari NH Road crossing	Puthimari	0.038	0.045	0.007	0.002	0.271	0	10
329	Raibareli	Sai	0.022	0.025	0.010	0.009	0.034	0	9
330	Rajapur	Yamuna	0.012	0.013	0.010	0.004	0.027	0	8
331	Rajegaon	Bagh	0.008	0.008	0.009	0.003	0.018	0	9
332	Rajghat	Betwa	0.015	0.018	0.007	0.006	0.054	0	7
333	Rajim	Mahanadi	0.001	0.001	-	0.001	0.001	0	1
334	Ram Munshi Bagh	Jhelum	0.009	0.010	0.002	0.002	0.031	0	7
335	Ramakona	Kanhan	0.007	0.005	0.014	0.001	0.026	0	9
336	Ramamangalam	Muvvattupuzha	0.015	0.017	0.002	0.002	0.054	0	7
337	Rampur	Jonk	0.033	0.033	-	0.024	0.042	0	3
338	Ranganadi NT-Road Xing	Ranganadi	0.017	0.019	0.008	0.003	0.097	0	11
339	Rangeli	Som	0.013	0.015	0.006	0.002	0.048	0	11
340	Rangpo	Rangpochu	0.034	0.034	-	0.030	0.036	0	3
341	Regauli	Rapti	0.016	0.016	0.014	0.003	0.047	0	10
342	Rishikesh	Ganga	0.044	0.050	0.022	0.003	0.181	0	11

S. No.	Water Quality Site	River	Zinc (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 5 mg/L	Below 5 mg/L
343	Rudraprayag	Alaknanda	0.026	0.031	0.009	0.003	0.080	0	10
344	Safapora	Jhelum	0.008	0.008	0.005	0.002	0.022	0	8
345	Sakleshpur	Hemavathi	0.011	0.011	0.008	0.003	0.025	0	9
346	Sakmur	Wardha	0.025	0.009	0.098	0.002	0.195	0	11
347	Salebhata	Ong	0.011	0.011	-	0.002	0.025	0	4
348	Samdoli	Varna	0.016	-	0.016	0.016	0.016	0	1
349	Sandia	Narmada	0.016	0.017	0.010	0.008	0.031	0	10
350	Sangam J	Jhelum	0.008	0.008	0.002	0.002	0.026	0	8
351	Sangam K	Kinnerasani	0.015	0.008	0.049	0.003	0.049	0	6
352	Sangod	Parwan	0.307	0.017	0.452	0.004	0.900	0	3
353	Sankalan	Teesta	0.038	0.038	-	0.013	0.079	0	3
354	Sankosh LRP	Sankosh	0.016	0.020	0.002	0.002	0.027	0	4
355	Santeguli	Aghanashini	0.015	0.017	0.002	0.002	0.038	0	9
356	Sarangkheda	Tapi	0.012	0.010	0.019	0.004	0.022	0	8
357	Satrapur	Kanhan	0.006	0.006	0.008	0.001	0.012	0	11
358	Savandapur	Bhavani	0.018	0.015	0.030	0.003	0.056	0	10
359	Seondha	Sind	0.021	0.024	0.007	0.006	0.075	0	6
360	Seppa	Kamang	0.099	0.083	0.172	0.011	0.304	0	11
361	Sevanur	Chittar	0.007	0.007	-	0.007	0.007	0	1
362	Sevoke	Teesta	0.055	0.055	-	0.023	0.103	0	3
363	Shahijina	Betwa	0.018	0.019	0.014	0.006	0.039	0	9
364	Shahzadpur	Ganga	0.058	0.071	0.005	0.003	0.521	0	10
365	Shimoga	Tunga	0.011	0.011	0.007	0.004	0.020	0	8
366	Sibbari	Dareng	0.009	0.011	0.003	0.003	0.020	0	7
367	Sikandarpur	Burhi Gandak	0.008	0.009	0.006	0.002	0.028	0	11
368	Simga	Seonath	0.015	0.015	-	0.003	0.026	0	3
369	Singla-Bazar	Rangit	0.022	0.022	-	0.013	0.040	0	3
370	Sivasagar	Dikhow	0.075	0.081	0.049	0.005	0.602	0	11
371	Sonapur	Digaru	0.021	0.019	0.036	0.002	0.041	0	7
372	Sonapurhat	Mahananda	0.048	0.048	-	0.016	0.106	0	3
373	Srikakulam	Nagavali	0.010	0.010	0.010	0.002	0.018	0	8
374	Srinagar	Alakananda	0.021	0.023	0.008	0.008	0.055	0	6
375	Sripalpur	Punpun	0.100	0.120	0.007	0.002	1.021	0	11
376	Suklai	Suklai	0.020	0.024	0.004	0.002	0.061	0	11
377	Sultanpur	Gomti	0.017	0.020	0.006	0.001	0.136	0	10
378	Sulurpet	Kalingi	0.002	0.002	-	0.002	0.002	0	1
379	Sundergarh	Ib	0.013	0.013	-	0.003	0.032	0	4
380	T. Bekuppe	Arkavathi	0.012	0.012	0.008	0.001	0.034	0	9
381	T. Narasipur	Kabini	0.007	0.006	0.009	0.000	0.017	0	5
382	T. Ramapuram	Hagari	0.010	0.010	-	0.004	0.016	0	3
383	T.K.Halli	Shimsha	0.007	0.007	-	0.005	0.009	0	4
384	Tal	Chambal	0.008	0.015	0.005	0.002	0.015	0	3
385	Talcher	Brahmani	0.067	0.076	0.008	0.002	0.461	0	8

S. No.	Water Quality Site	River	Zinc (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 5 mg/L	Below 5 mg/L
386	Tandi	Chenab/Bhaga	0.004	-	0.004	0.004	0.004	0	1
387	Teesta-Bazar	Teesta	0.019	0.022	0.003	0.003	0.034	0	6
388	Tehri	Bhagirath	0.109	0.109	-	0.029	0.189	0	2
389	Tekra	Pranhitha	0.008	0.006	0.017	0.001	0.030	0	11
390	Tezpur	Brahmaputra	0.057	0.064	0.028	0.005	0.390	0	11
391	Tezu	Lohit	0.011	0.011	0.012	0.004	0.025	0	10
392	Thengudi	Thirumalairajanar	0.012	0.012	-	0.003	0.020	0	3
393	Thengumarahada	Moyar	0.009	0.009	0.007	0.004	0.031	0	10
394	Theni	Suruliar	0.012	0.012	0.016	0.005	0.028	0	10
395	Therriaghat	Umsohrynkiew	0.006	0.008	0.004	0.002	0.018	0	7
396	Thevur	Sarabenga	0.007	0.007	-	0.007	0.007	0	1
397	Thimmanahalli	Yagachi	0.012	0.012	-	0.000	0.032	0	6
398	Thoppur	Thoppaiyar	0.009	-	0.009	0.009	0.009	0	1
399	Thumpamon	Achankovil	0.007	0.008	0.003	0.003	0.010	0	6
400	Tikarpara	Mahanadi	0.011	0.011	0.004	0.003	0.024	0	8
401	Tilga	Sankh	0.010	0.011	0.002	0.002	0.020	0	8
402	Tonk	Banas	0.159	0.017	0.300	0.017	0.300	0	2
403	Tribeni	Gandak	0.010	0.011	0.008	0.004	0.031	0	11
404	Tufanganj	Raidak-I	0.022	0.028	0.002	0.002	0.044	0	5
405	Tuini	Tuini	0.091	0.011	0.452	0.002	0.900	0	11
406	Turtipar	Ghagra	0.018	0.020	0.011	0.004	0.053	0	10
407	Udaipur (Chandra)	Chenab/Chandra	0.004	-	0.004	0.004	0.004	0	1
408	Udaipur (Tirap)	Tirap	0.015	0.011	0.033	0.004	0.048	0	11
409	Udi	Chambal	0.045	0.043	0.052	0.005	0.202	0	9
410	Ujjain	Sipra	0.007	0.013	0.001	0.001	0.013	0	2
411	Urachikottai	Cauvery	0.005	0.005	0.004	0.004	0.008	0	6
412	Uttarkashi	Bhagirath	0.045	0.054	0.008	0.003	0.197	0	11
413	Vandiperiyar	Periyar	0.007	0.008	0.004	0.001	0.019	0	6
414	Vapi	Damanganga	0.045	0.049	0.035	0.000	0.269	0	9
415	Varanasi	Ganga	0.007	0.007	0.006	0.001	0.019	0	11
416	Vautha	Sabarmati	0.028	0.017	0.079	0.005	0.147	0	11
417	Vazhavachanur	Ponnaiyar	0.016	0.016	-	0.004	0.029	0	4
418	Villupuram	Ponnaiyar	0.014	0.014	-	0.014	0.014	0	1
419	Wadenapally	Krishna	0.021	0.008	0.100	0.001	0.100	0	7
420	Wairagarh	Khobragarhi	0.020	0.023	0.014	0.001	0.091	0	7
421	Warunji	Koyna	0.007	-	0.007	0.007	0.007	0	1
422	Yadgir	Bhima	0.093	-	0.093	0.093	0.093	0	1
423	Yashwant nagar	Giri	0.010	0.012	0.002	0.000	0.027	0	11
424	Yennehole	Yennehole	0.008	0.007	0.011	0.001	0.012	0	5

IRON

S. No.	Water Quality Site	River	Iron (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 0.3 mg/L	Below 0.3 mg/L
1	A B Road Xing	Parwati	0.048	0.074	0.035	0.020	0.074	0	3
2	A.P. Puram	Chittar	0.029	0.029	-	0.010	0.054	0	5
3	A.P.Ghat	Barak	0.060	0.034	0.126	0.002	0.203	0	7
4	Aauriya	Yamuna	0.098	0.094	0.112	0.003	0.252	0	9
5	Abu Road	Banas	0.082	0.068	0.150	0.018	0.150	0	6
6	Addoor	Gurupur	0.392	0.102	0.681	0.102	0.681	1	1
7	Adityapur	Kharkai	0.135	0.069	0.595	0.002	0.595	1	7
8	Agra	Yamuna	0.194	0.107	0.499	0.005	0.613	2	7
9	Aie NH Crossing	Aie	0.339	0.339	-	0.031	0.794	1	2
10	Akabarpur	Chhoti Sarju	0.162	0.104	0.309	0.021	0.492	1	6
11	Akhnoor	Chenab	0.078	0.050	0.280	0.002	0.280	0	8
12	Akkihebbal	Hemavathi	0.042	0.038	0.072	0.005	0.102	0	9
13	Aklera	Parwan	0.035	0.034	0.037	0.002	0.079	0	5
14	Alladupalli	Kunderu	0.061	0.047	0.116	0.005	0.181	0	10
15	Allahabad	Ganga	0.155	0.097	0.416	0.021	0.585	1	10
16	Alutuma	Ramyala	0.221	0.103	0.808	0.008	0.808	1	5
17	Ambarampalayam	Aliyar	0.109	0.088	0.190	0.010	0.223	0	10
18	Ambasamudram	Vaigai	0.023	0.023	-	0.009	0.037	0	2
19	Anandpur	Ganga	0.157	0.081	0.689	0.009	0.689	1	7
20	Andhiyar Kore	Hamp	0.026	0.026	-	0.010	0.047	0	3
21	Ankinghat	Ganga	0.283	0.298	0.224	0.015	1.126	3	7
22	Annavasal	Nattar	0.005	0.005	-	0.005	0.005	0	1
23	Arangaly	Chalakudy	0.051	0.049	0.062	0.003	0.105	0	6
24	Arcot	Palar	0.029	0.015	0.043	0.015	0.043	0	2
25	Arjunwad	Krishna	0.396	-	0.396	0.396	0.396	1	0
26	Ashramam	Pazhayar	0.170	0.172	0.162	0.028	0.436	1	5
27	Ashti	Wainganga	0.104	0.038	0.399	0.016	0.404	2	9
28	Avarankuppam	Palar	0.013	0.013	-	0.013	0.013	0	1
29	Avershe	Sita	0.091	0.021	0.373	0.005	0.373	1	4
30	Ayilam	Vamanapuram	0.133	0.151	0.041	0.029	0.412	1	5
31	Ayodhya	Saryu	0.330	0.344	0.274	0.005	1.457	4	6
32	Azmabad	Ganga	0.317	0.187	0.899	0.002	1.496	4	7
33	B.P. Ghat	Barak	0.128	0.059	0.337	0.003	0.626	1	7
34	Badatighat	Subansiri	0.291	0.272	0.374	0.028	0.586	4	7
35	Badlapur	Ulhas	0.048	0.029	0.143	0.004	0.143	0	6
36	Balrampur	Rapti	0.260	0.259	0.263	0.011	1.061	2	8
37	Baltara	Kosi	0.714	0.293	2.605	0.015	4.352	6	5
38	Bamni (Banjar)	Banjar	0.375	0.245	0.831	0.013	1.322	3	6
39	Bamni (Wardha)	Wardha	0.109	0.075	0.261	0.020	0.286	0	11
40	Bamnidih	Hasdeo	0.033	0.033	-	0.012	0.047	0	3
41	Banda	Ken	0.110	0.112	0.104	0.001	0.199	0	9

S. No.	Water Quality Site	River	Iron (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 0.3 mg/L	Below 0.3 mg/L
42	Bansi	Rapti	0.484	0.403	0.769	0.010	1.362	4	5
43	Bantwal	Nethravathi	0.263	0.059	0.673	0.047	0.673	1	2
44	Baranwada	Banas	0.070	0.076	0.052	0.052	0.077	0	4
45	Bareilly	Ramganga	0.239	0.162	0.549	0.009	0.573	3	7
46	Barmanghat	Narmada	0.374	0.316	0.608	0.012	1.100	3	7
47	Barobisha	Raidak-II	0.315	0.382	0.049	0.039	1.361	1	4
48	Barod	Kali Sindh	0.042	0.044	0.036	0.002	0.077	0	8
49	Baronda	Pairi	0.046	0.046	-	0.046	0.046	0	1
50	Basantpur	Mahanadi	0.038	0.038	-	0.009	0.070	0	4
51	Basti	Kwano	0.481	0.475	0.505	0.002	1.674	5	5
52	Bawapuram	Tungabhadra	0.044	0.044	-	0.018	0.092	0	3
53	Behalpur	Champamati	0.362	0.362	-	0.097	0.626	1	1
54	Beki Mathanguri	Beki	0.266	0.266	-	0.033	0.499	1	1
55	Beki Road Bridge	Beki	0.338	0.389	0.135	0.031	1.370	1	4
56	Belkhedi	Sher	0.116	0.068	0.310	0.008	0.489	1	9
57	Belne Bridge	Gad	0.121	0.037	0.205	0.037	0.205	0	2
58	Bendrahalli	Suvarnavathi	0.014	0.014	-	0.014	0.014	0	1
59	Berhampore	Bhagirathi	0.036	0.034	0.047	0.003	0.120	0	11
60	Bhadrachalam	Godavari	0.135	0.048	0.655	0.008	0.655	1	6
61	Bhalukpong	Jiabharali	1.277	0.162	6.297	0.007	8.518	4	7
62	Bhatpalli	Peddavagu	0.087	0.069	0.167	0.014	0.182	0	11
63	Bhitaura	Ganga	0.337	0.306	0.460	0.008	1.094	4	6
64	Bhomoraguri	Brahmaputra	1.583	1.184	3.376	0.008	6.147	7	4
65	Bihubar	Dikhow	1.818	0.984	5.571	0.028	8.980	7	4
66	Biligundullu	Cauvery	0.078	0.060	0.223	0.020	0.223	0	9
67	Birdghat	Rapti	0.333	0.361	0.218	0.006	1.244	3	7
68	Bokajan	Dhansiri	2.089	0.564	8.950	0.031	13.608	6	5
69	Burhanpur	Tapi	0.315	0.219	0.604	0.010	0.780	3	5
70	Buxar	Ganga	0.233	0.117	0.753	0.002	1.029	4	7
71	Byaladahalli	Haridra	0.027	0.027	-	0.018	0.043	0	3
72	Champasari	Mahananda	0.386	0.386	-	0.037	0.921	2	2
73	Champua	Ganga	0.143	0.065	0.611	0.012	0.611	1	6
74	Chanwada	Orsang	0.316	0.093	1.100	0.005	1.736	2	7
75	Chapra	Jalangi	0.030	0.028	0.043	0.002	0.062	0	11
76	Chel	Chel	0.626	0.626	-	0.032	1.119	2	1
77	Chengalpet	Palar	0.041	0.038	0.047	0.003	0.089	0	4
78	Chenimari	Buridehing	1.892	0.348	8.837	0.022	14.555	6	5
79	Chennur	Pennar	0.073	0.061	0.119	0.014	0.199	0	10
80	Chepan	Raidak-I	0.782	0.965	0.047	0.030	3.672	1	4
81	Chhidgaon	Ganjal	0.170	0.098	0.459	0.010	0.791	1	9
82	Chitrasani	Balaram	0.075	0.060	0.126	0.024	0.132	0	9
83	Chittorgarh	Gambhiri	0.064	0.064	-	0.064	0.064	0	1
84	Cholachguda	Malaprabha	0.017	0.017	-	0.017	0.017	0	1

S. No.	Water Quality Site	River	Iron (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 0.3 mg/L	Below 0.3 mg/L
85	Chopan	Sone	0.213	0.120	0.635	0.021	1.000	2	9
86	Chouldhowaghat	Subansiri	1.381	0.266	6.398	0.031	8.937	5	6
87	Chuchankatte	Cauvery	0.124	0.008	0.356	0.004	0.356	1	2
88	Coronation	Teesta	3.296	3.296	-	0.028	8.246	2	1
89	Dabri	Ramganga	0.350	0.292	0.581	0.009	1.109	5	5
90	Damarcherla	Musi	0.061	0.061	-	0.021	0.102	0	5
91	Dawki	Umngot	0.117	0.026	0.346	0.002	0.640	1	6
92	Delhi Rly Bridge	Yamuna	0.053	0.057	0.035	0.002	0.148	0	11
93	Deoprayag	Bhagirath	0.380	0.453	0.050	0.003	2.568	2	9
94	Derol Bridge	Sabarmati	0.251	0.105	0.912	0.012	1.677	1	10
95	Desangpani	Desang	1.763	0.597	7.010	0.030	10.279	6	5
96	Dhamkund	Chenab	0.055	0.053	0.070	0.007	0.143	0	8
97	Dharamtul	Kopili	0.876	0.823	1.111	0.027	2.868	7	4
98	Dheng Bridge	Bagmathi	0.136	0.084	0.367	0.002	0.564	1	10
99	Dholabazar	Lohit	0.289	0.219	0.605	0.023	0.779	5	6
100	Dholai	Rukni	0.046	0.043	0.056	0.002	0.120	0	8
101	Dholpur	Chambal	0.083	0.071	0.126	0.013	0.189	0	9
102	Dhubri	Brahmaputra	1.861	1.861	-	0.254	3.467	1	1
103	Dhulsar	Uri	0.057	0.054	0.060	0.054	0.060	0	2
104	Diana	Diana	0.137	0.137	-	0.137	0.137	0	1
105	Dibrugarh	Brahmaputra	1.365	0.623	4.702	0.020	5.801	5	6
106	Dillighat	Desang	1.321	0.260	6.097	0.023	8.684	4	7
107	Dimapara	Bugi	0.085	0.100	0.047	0.008	0.303	1	6
108	Dindori	Narmada	0.230	0.246	0.166	0.013	1.312	1	9
109	Domohani	Teesta	0.483	0.591	0.051	0.032	1.261	3	2
110	Duddhi	Kanhar	0.261	0.071	1.114	0.017	1.395	2	9
111	Dudhnai	Dudhnai	0.447	0.468	0.353	0.034	1.155	6	5
112	Durvesh	Vaitarna	0.280	0.087	0.860	0.011	0.970	2	6
113	Ekmighat	Bagmathi	0.783	0.390	2.552	0.009	4.414	5	6
114	Elginbridge	Ghagra	0.318	0.288	0.437	0.005	0.943	5	5
115	Elunuthimanagalam	Noyyal	0.025	0.025	-	0.008	0.056	0	4
116	English Bazar	Padma/Mahananda	0.031	0.027	0.049	0.002	0.057	0	11
117	Erinjipuzha	Payaswani	0.066	0.060	0.097	0.034	0.120	0	6
118	Etawah	Yamuna	0.107	0.103	0.122	0.002	0.239	0	9
119	Fakirabazar	Longai	0.050	0.047	0.057	0.002	0.133	0	7
120	Farakka	Ganga	0.031	0.028	0.047	0.002	0.088	0	11
121	Farakka/(HR)	Feeder Canal	0.042	0.041	0.045	0.002	0.136	0	10
122	Fatehgarh	Ganga	0.321	0.283	0.470	0.013	0.950	5	5
123	Fulertal	Barak	0.172	0.209	0.097	0.010	0.758	1	5
124	Gadarwara	Sakkar	0.113	0.093	0.176	0.012	0.249	0	8
125	Gadat	Ambika	0.348	0.133	0.994	0.012	1.023	2	6
126	Gajaldoba	Teesta	0.858	0.858	-	0.033	1.273	2	1
127	Galeta	Hindon	0.094	0.094	0.095	0.002	0.211	0	11

S. No.	Water Quality Site	River	Iron (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 0.3 mg/L	Below 0.3 mg/L
128	Ganod	Bhadar	0.339	0.321	0.488	0.005	1.185	3	6
129	Garhamukteshwar	Ganga	0.281	0.269	0.328	0.007	0.630	5	5
130	Garrauli	Dhasan	0.140	0.090	0.214	0.037	0.280	0	5
131	Garudeshwar	Narmada	0.121	0.073	0.289	0.009	0.429	1	8
132	Gaya	Harohar/Phalgu	0.373	0.095	0.652	0.076	1.145	1	3
133	Gelabil	Doyang	3.512	2.367	5.801	0.195	7.894	5	1
134	Ghat	Sarju	0.396	0.451	0.175	0.008	1.294	5	5
135	Ghatora	Seonath	0.018	0.018	-	0.010	0.027	0	3
136	Ghatsila	Subarnarekha	0.154	0.079	0.679	0.019	0.679	1	7
137	Ghish	Ghish	0.496	0.496	-	0.030	0.991	2	1
138	Ghugumari	Torsa	1.342	1.665	0.051	0.033	6.462	1	4
139	Gokak	Ghataprabha	0.093	0.008	0.178	0.008	0.178	0	2
140	Golaghat	Sonkosh	1.321	0.810	3.621	0.002	5.089	5	6
141	Golakganj	Dhansiri	0.273	0.273	-	0.027	0.518	1	1
142	Gomlai	Brahmani	0.206	0.093	0.997	0.031	0.997	1	7
143	Gopalkheda	Purna	0.990	0.193	1.788	0.010	2.319	3	1
144	Gopurajapuram	Cauvery/Puravidaiyanar	0.078	0.078	-	0.078	0.078	0	1
145	Govindapur	Burhabalang	0.138	0.067	0.630	0.020	0.630	1	7
146	Gummanur	Ponnaiyar	0.102	0.085	0.170	0.010	0.205	0	10
147	Gumrabazar	Gumra	0.065	0.062	0.076	0.008	0.193	0	8
148	Gunupur	Vamsadhara	0.242	0.226	0.347	0.031	0.796	3	5
149	Haladi	Haladi	0.093	0.050	0.436	0.016	0.436	1	8
150	Halia	Halia	0.032	0.032	-	0.004	0.066	0	6
151	Hamirpur	Yamuna	0.093	0.088	0.112	0.003	0.253	0	9
152	Handia	Narmada	0.168	0.175	0.141	0.011	0.506	1	9
153	Hanskhali	Churni	0.856	1.032	0.060	0.002	9.058	1	10
154	Haridwar	Ganga	0.156	0.184	0.041	0.002	1.203	1	9
155	Harlahalli	Tungabhadra	0.121	0.047	0.489	0.011	0.489	1	5
156	Hasimara	Torsa	1.564	2.069	0.048	0.039	6.097	1	3
157	Hathidah	Ganga	0.323	0.197	0.891	0.002	1.530	3	8
158	Hayaghat	Bagmathi	0.509	0.354	1.205	0.014	2.335	3	8
159	Hivra	Wardha	0.090	0.056	0.244	0.013	0.312	1	10
160	Hogenakkal	Chinnar	0.010	0.010	-	0.010	0.010	0	1
161	Holehonnur	Bhadra	0.112	0.061	0.515	0.012	0.515	1	8
162	Honnali	Tungabhadra	0.105	0.046	0.577	0.014	0.577	1	8
163	Hoshangabad	Narmada	0.265	0.170	0.647	0.009	1.009	2	8
164	Huvin Hedgi	Krishna	0.113	0.048	0.375	0.023	0.375	1	4
165	Jagdalpur	Indravathi	0.617	0.053	1.181	0.053	1.181	1	1
166	Jagibhakatgaon	Kopili	0.822	0.551	2.041	0.031	2.554	8	3
167	Jai Nagar	Kamala-Balan	0.272	0.130	0.910	0.007	1.580	2	9
168	Jaldhaka NH-31	Jaldhaka	0.233	0.279	0.049	0.032	0.557	2	3
169	Jammu Tawi	Chenab/Tawi	0.049	0.049	0.048	0.002	0.153	0	8
170	Jamshedpur	Subarnarekha	0.104	0.064	0.381	0.002	0.381	1	7

S. No.	Water Quality Site	River	Iron (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 0.3 mg/L	Below 0.3 mg/L
171	Jamsolghat	Subarnarekha	0.214	0.067	0.800	0.015	0.800	1	4
172	Japla	Sone	0.360	0.208	1.046	0.015	2.050	3	8
173	Jaraikela	Koel	0.183	0.069	0.980	0.008	0.980	1	7
174	Jenapur	Brahmani	0.183	0.105	0.732	0.008	0.732	2	6
175	Jhanjharpur	Kamala-Balan	0.320	0.150	1.087	0.002	1.877	3	8
176	Jiabharali NT Road Xing	Jiabharali	1.274	0.397	5.218	0.015	6.118	6	5
177	Jondhra	Seonath	0.035	0.035	-	0.035	0.035	0	1
178	K.M. Vadi	Lakshmantirtha	0.120	0.020	0.320	0.020	0.320	1	2
179	Kachlabridge	Ganga	0.337	0.308	0.454	0.019	1.379	5	5
180	Kalampur	Kaliyar	0.048	0.048	0.045	0.012	0.097	0	6
181	Kalanaur	Yamuna	0.052	0.056	0.036	0.001	0.155	0	11
182	Kallooppara	Manimala	0.050	0.048	0.058	0.028	0.103	0	6
183	Kalna (EBB)	Bhagirathi	0.029	0.019	0.049	0.003	0.052	0	6
184	Kalna (Flow)*	Bhagirathi	0.036	0.036	-	0.008	0.063	0	4
185	Kamalapuram	Papagni	0.806	-	0.806	0.046	1.565	1	1
186	Kamalpur	Banas	0.526	0.129	1.322	0.123	1.322	1	2
187	Kampur	Kopili	0.784	0.335	2.805	0.018	3.163	4	7
188	Kanpur	Ganga	0.435	0.431	0.448	0.008	1.339	5	5
189	Kantamal	Tel	0.059	0.059	-	0.030	0.102	0	4
190	Karad	Krishna	0.243	-	0.243	0.243	0.243	0	1
191	Karathodu	Kadalundi	0.054	0.056	0.041	0.027	0.123	0	6
192	Kashinagar	Vamsadhara	0.057	0.057	0.058	0.015	0.125	0	8
193	Katwa	Bhagirathi	0.233	0.274	0.046	0.002	2.221	1	10
194	Keesara	Munneru	0.048	0.041	0.069	0.023	0.069	0	4
195	Kellodu	Vedavathi	0.003	0.003	-	0.003	0.003	0	1
196	Keolari	Wainganga	0.115	0.070	0.314	0.016	0.436	1	10
197	Kesinga	Tel	0.056	0.056	-	0.010	0.154	0	4
198	Khanitar	Teesta	0.712	0.712	-	0.249	1.174	1	1
199	Khanpur	Mahi	0.240	0.213	0.359	0.002	0.978	3	8
200	Kharkhana	Surma/Myntdu	0.047	0.044	0.055	0.004	0.074	0	7
201	Khatoli	Parwati	0.052	0.060	0.035	0.002	0.098	0	7
202	Kheronighat	Kopili	0.676	0.223	2.712	0.010	3.588	5	6
203	Kidangoor	Meenachi	0.121	0.134	0.056	0.020	0.301	1	5
204	Kodumudi	Cauvery	0.041	0.039	0.055	0.011	0.067	0	7
205	Koelwar	Sone	0.388	0.280	0.875	0.002	1.431	4	7
206	Kogaon	Kundi	0.118	0.075	0.161	0.056	0.266	0	4
207	Kokrajhar	Gaurang	0.868	1.072	0.052	0.035	2.442	2	3
208	Kollegal	Cauvery	0.096	0.069	0.204	0.018	0.216	0	5
209	Konta	Sabari	0.185	0.069	0.881	0.009	0.881	1	6
210	Koperagaon	Godavari	0.453	-	0.453	0.453	0.453	1	0
211	Kora	Rind	0.092	0.071	0.143	0.005	0.240	0	7
212	Koteshwar	Bhagirath	0.164	0.197	0.048	0.002	1.087	1	8
213	Kudalaiyathur	Vellar	0.045	0.045	-	0.044	0.046	0	2

S. No.	Water Quality Site	River	Iron (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 0.3 mg/L	Below 0.3 mg/L
214	Kudige	Cauvery	0.107	0.069	0.416	0.013	0.416	2	7
215	Kudlur	Palar	0.110	0.076	0.212	0.003	0.212	0	4
216	Kuldah Bridge	Sone	0.225	0.068	0.854	0.016	0.993	2	8
217	Kulsi	Kulsi	0.319	0.298	0.413	0.004	0.763	5	6
218	Kumbidi	Bharathapuzha	0.037	0.032	0.065	0.006	0.070	0	6
219	Kumhari	Wainganga	0.179	0.068	0.679	0.012	0.740	2	9
220	Kuniyil	Chaliyar	0.043	0.042	0.044	0.024	0.082	0	6
221	Kuppelur	Kumudavathi	0.011	0.011	-	0.011	0.011	0	1
222	Kurubhata	Mand	0.034	0.034	-	0.011	0.071	0	4
223	Kurundwad	Krishna	0.203	-	0.203	0.203	0.203	0	1
224	Kuttyadi	Kuttyadi	0.304	0.348	0.040	0.024	1.256	2	5
225	Kuzhithurai	Tambrapani	0.036	0.034	0.046	0.002	0.058	0	6
226	Labha	Mahananda	0.048	0.049	0.044	0.002	0.230	0	11
227	Lakhisarai	Kiul	0.338	0.216	0.830	0.002	1.241	5	5
228	Lalganj	Gandak	0.283	0.188	0.708	0.003	0.949	4	7
229	Lowara	Sheturni	0.254	0.180	0.589	0.032	0.789	3	8
230	Lucknow	Gomti	0.228	0.230	0.220	0.010	0.782	2	8
231	M.H. Halli	Hemavathi	0.091	0.091	-	0.012	0.318	1	3
232	Madhira	Wyra	0.087	0.087	-	0.003	0.315	1	3
233	Madla	Ken	0.108	0.089	0.172	0.020	0.278	0	9
234	Magaral	Cheyyar	0.035	0.035	-	0.035	0.035	0	1
235	Mahidpur	Sipra	0.051	0.079	0.037	0.024	0.079	0	3
236	Mahuwa	Purna	0.538	0.230	1.462	0.009	1.966	3	5
237	Maighat	Gomti	0.121	0.057	0.409	0.017	0.578	1	10
238	Majhitar	Rangit	3.298	3.298	-	3.298	3.298	1	0
239	Malakkara	Pampa	0.082	0.090	0.045	0.012	0.238	0	6
240	Malkhed	Kagna	0.065	0.035	0.186	0.012	0.186	0	5
241	Manas NH Crossing	Manas	1.491	1.951	0.112	0.033	5.757	1	3
242	Mancherial	Godavari	0.065	0.064	0.069	0.024	0.177	0	7
243	Mandleshwar	Narmada	0.088	0.066	0.180	0.012	0.282	0	10
244	Manendragarh	Hasdeo	0.013	0.013	-	0.011	0.015	0	2
245	Mangaon (Seasonal)	Kal	0.152	-	0.152	0.152	0.152	0	1
246	Mankara	Bharathapuzha	0.061	0.063	0.048	0.004	0.121	0	7
247	Manot	Narmada	0.267	0.209	0.499	0.008	1.045	3	7
248	Mantralayam	Tungabhadra	0.056	0.056	-	0.024	0.111	0	4
249	Marella	Gundlakamma	0.053	0.053	-	0.022	0.082	0	3
250	Margherita	Buridehing	1.524	0.817	4.703	0.027	7.684	6	5
251	Marol	Varada	0.250	0.027	0.473	0.027	0.473	1	1
252	Mataji	Mahi	0.203	0.112	0.610	0.011	0.809	3	8
253	Mathabhanga	Jaldhaka	0.366	0.471	0.050	0.050	1.183	1	3
254	Mathanguri	Beki	0.389	0.389	-	0.080	0.697	1	1
255	Mathura	Yamuna	0.049	0.052	0.034	0.002	0.156	0	11
256	Matigara	Balason	1.539	1.539	-	0.030	5.340	2	2

S. No.	Water Quality Site	River	Iron (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 0.3 mg/L	Below 0.3 mg/L
257	Matijuri	Dhaleshwari	0.046	0.028	0.083	0.002	0.124	0	6
258	Matunga	Kalanadi	0.125	0.131	0.095	0.026	0.272	0	11
259	Mawi	Yamuna	0.051	0.054	0.036	0.002	0.144	0	11
260	Meja Road	Tons	0.147	0.065	0.473	0.013	0.667	1	9
261	Mekhliganj	Teesta	0.391	0.506	0.045	0.030	1.379	1	3
262	Menangudi	Cauvery/Noolar	0.032	0.032	-	0.032	0.032	0	1
263	Miao	Neo dihing	1.071	0.751	2.514	0.022	3.655	4	7
264	Mirzapur	Ganga	0.152	0.080	0.476	0.019	0.676	1	10
265	Mohana (Betwa)	Betwa	0.087	0.064	0.157	0.010	0.188	0	8
266	Mohana (Yamuna)	Yamuna	0.051	0.054	0.042	0.002	0.158	0	11
267	Mohgaoan	Burhner	0.179	0.073	0.600	0.012	0.655	2	8
268	Moradabad	Ramganga	0.317	0.316	0.321	0.008	1.160	4	6
269	Motinaroli	Kim	0.227	0.134	0.554	0.011	0.759	2	7
270	Murappanadu	Tambrapani	0.061	0.056	0.094	0.008	0.131	0	8
271	Muri	Subarnarekha	0.130	0.080	0.485	0.004	0.485	1	7
272	Murti	Murti	1.794	1.794	-	0.034	5.197	1	2
273	Musiri	Cauvery	0.091	0.091	-	0.005	0.289	0	7
274	Muthankera	Kabini	0.193	0.218	0.042	0.029	0.997	1	6
275	Nagalamadike	Pennar	0.010	0.010	-	0.010	0.010	0	1
276	Nagrakata	Jaldhaka	0.590	0.590	-	0.036	1.607	1	2
277	Naharkatia	Buridehing	2.078	0.939	7.208	0.021	11.270	8	3
278	Naidupet	Swarnamukhi	0.019	0.019	-	0.019	0.019	0	1
279	Nallammaranpatty	Amaravathi	0.028	0.010	0.081	0.003	0.081	0	4
280	Nallathur	Nandalar	0.051	0.051	-	0.004	0.111	0	4
281	Namsai	Neo dihing	0.776	0.368	2.614	0.031	4.289	6	5
282	Nandgaon	Wunna	0.090	0.064	0.168	0.011	0.275	0	8
283	Nandipalli	Sagaileru	0.146	0.070	0.223	0.008	0.391	1	3
284	Nanglamoraghat	Desang	0.975	0.386	3.627	0.006	4.086	6	5
285	Neamatighat	Brahmaputra	1.187	0.715	3.315	0.010	5.075	6	5
286	Neeleswaram	Periyar	0.080	0.087	0.039	0.003	0.195	0	7
287	Neemsar	Gomti	0.224	0.234	0.191	0.009	0.614	4	5
288	Nellithurai	Bhavani	0.150	0.150	-	0.010	0.434	1	3
289	Nellore	Pennar	0.049	0.049	-	0.043	0.054	0	2
290	Neora	Naora	0.593	0.593	-	0.032	1.457	1	2
291	Nowrangpur	Indravathi	0.580	0.382	1.767	0.012	1.923	2	5
292	Numaligarh	Dhansiri	1.616	0.621	5.595	0.013	7.894	6	4
293	P.G.Bridge	Penganga	0.096	0.046	0.269	0.021	0.329	1	8
294	Pachauli	Sind	0.144	0.035	0.252	0.035	0.252	0	2
295	Pachegaon	Pravara	0.339	-	0.339	0.339	0.339	1	0
296	Paderdibadi	Mahi	0.122	0.096	0.237	0.024	0.267	0	11
297	Pagladiya N.T.Road Crossing	Pagladiya	0.234	0.254	0.147	0.016	0.948	1	10
298	Paleru Bridge	Paleru	0.053	0.052	0.058	0.025	0.096	0	6
299	Paliakalan	Sharda	0.255	0.254	0.259	0.008	0.908	4	6

S. No.	Water Quality Site	River	Iron (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 0.3 mg/L	Below 0.3 mg/L
300	Palla	Yamuna	0.067	0.073	0.038	0.002	0.201	0	11
301	Panbari	Burisuti	0.773	0.773	-	0.138	1.408	1	1
302	Pancharatna	Brahmaputra	0.279	0.238	0.462	0.039	0.720	3	8
303	Pandu	Brahmaputra	0.352	0.375	0.246	0.020	1.649	4	7
304	Panposh	Brahmani	0.411	0.347	0.858	0.028	1.793	3	5
305	Passighat	Siang	0.088	0.088	-	0.008	0.251	0	5
306	Patan	Hiran	0.202	0.092	0.588	0.011	0.988	1	8
307	Pathagudem	Indravathi	0.177	0.045	0.969	0.008	0.969	1	6
308	Pathardhi	Kharun	0.027	0.027	-	0.027	0.027	0	1
309	Pati	Goi	0.073	0.064	0.110	0.010	0.181	0	5
310	Patna	Ganga	0.306	0.170	0.918	0.002	1.371	5	6
311	Pattazhy	Kallada	0.077	0.082	0.048	0.017	0.192	0	7
312	Pauni	Wainganga	0.105	0.042	0.389	0.005	0.435	2	9
313	Peralam	Vanjiyar	0.098	0.098	-	0.004	0.191	0	2
314	Perumannu	Valapatnam	0.362	0.382	0.246	0.010	1.142	2	5
315	Perur	Godavari	0.116	0.050	0.511	0.021	0.511	1	6
316	Phulgaon (Seasonal)	Varna	0.157	-	0.157	0.157	0.157	0	1
317	Pingalwada	Dhadher	0.962	0.942	1.033	0.010	3.500	4	5
318	Poanta	Yamuna	0.024	0.024	-	0.003	0.044	0	2
319	Polavaram	Godavari	0.136	0.047	0.670	0.009	0.670	1	6
320	Pratapgarh	Sai	0.195	0.060	0.734	0.011	1.007	2	8
321	Pratapur	Yamuna	0.106	0.098	0.136	0.006	0.195	0	9
322	Prem Nagar	Chenab	0.048	0.047	0.054	0.011	0.154	0	8
323	Pudur	Kannadipuzha	0.076	0.080	0.057	0.006	0.229	0	6
324	Pulamanthole	Pulanthodu	0.129	0.143	0.042	0.030	0.605	1	6
325	Purna	Purna	0.048	0.048	-	0.048	0.048	0	1
326	Purushottampur	Rushikulya	0.071	0.059	0.149	0.028	0.149	0	8
327	Puthimari D.R.F.	Puthimari	0.167	0.174	0.133	0.008	0.687	1	10
328	Puthimari NH Road crossing	Puthimari	0.161	0.166	0.139	0.017	0.677	1	9
329	Raibareli	Sai	0.522	0.526	0.511	0.011	2.724	3	6
330	Rajapur	Yamuna	0.096	0.082	0.139	0.008	0.191	0	8
331	Rajegaon	Bagh	0.196	0.078	0.608	0.022	0.646	2	7
332	Rajghat	Betwa	0.099	0.087	0.127	0.020	0.167	0	7
333	Rajim	Mahanadi	0.047	0.047	-	0.047	0.047	0	1
334	Ram Munshi Bagh	Jhelum	0.052	0.052	0.049	0.002	0.158	0	7
335	Ramakona	Kanhan	0.123	0.045	0.396	0.005	0.407	2	7
336	Ramamangalam	Muvvattupuzha	0.134	0.144	0.073	0.007	0.506	1	6
337	Rampur	Jonk	0.027	0.027	-	0.014	0.035	0	3
338	Ranganadi NT-Road Xing	Ranganadi	0.342	0.294	0.563	0.013	0.978	5	6
339	Rangeli	Som	0.148	0.117	0.286	0.012	0.507	2	9
340	Rangpo	Rangpochu	0.481	0.481	-	0.028	0.819	2	1
341	Regauli	Rapti	0.348	0.310	0.500	0.009	0.977	5	5
342	Rishikesh	Ganga	0.134	0.155	0.043	0.002	0.709	2	9

S. No.	Water Quality Site	River	Iron (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 0.3 mg/L	Below 0.3 mg/L
343	Rudraprayag	Alaknanda	0.218	0.263	0.038	0.013	0.892	3	7
344	Safapora	Jhelum	0.043	0.042	0.049	0.001	0.150	0	8
345	Sakleshpur	Hemavathi	0.145	0.084	0.635	0.015	0.635	1	8
346	Sakmur	Wardha	0.105	0.076	0.237	0.019	0.296	0	11
347	Salebhata	Ong	0.034	0.034	-	0.011	0.079	0	4
348	Samdoli	Varna	0.233	-	0.233	0.233	0.233	0	1
349	Sandia	Narmada	0.229	0.139	0.590	0.002	1.025	2	8
350	Sangam J	Jhelum	0.046	0.046	0.045	0.002	0.149	0	8
351	Sangam K	Kinnerasani	0.053	0.038	0.125	0.006	0.125	0	6
352	Sangod	Parwan	0.048	0.078	0.033	0.013	0.078	0	3
353	Sankalan	Teesta	0.591	0.591	-	0.034	1.052	2	1
354	Sankosh LRP	Sankosh	0.344	0.444	0.044	0.034	1.242	1	3
355	Santeguli	Aghanashini	0.206	0.187	0.353	0.001	0.831	3	6
356	Sarangkheda	Tapi	1.064	0.131	3.863	0.012	6.257	3	5
357	Satrapur	Kanhan	0.117	0.065	0.349	0.014	0.574	1	10
358	Savandapur	Bhavani	0.064	0.058	0.085	0.009	0.134	0	10
359	Seondha	Sind	0.111	0.120	0.066	0.048	0.171	0	6
360	Seppa	Kamang	2.204	1.477	5.477	0.013	9.174	7	4
361	Sevanur	Chittar	0.021	0.021	-	0.021	0.021	0	1
362	Sevoke	Teesta	0.881	0.881	-	0.032	2.299	2	1
363	Shahijina	Betwa	0.131	0.109	0.205	0.025	0.258	0	9
364	Shahzadpur	Ganga	0.183	0.119	0.440	0.018	0.626	1	9
365	Shimoga	Tunga	0.123	0.046	0.660	0.007	0.660	1	7
366	Sibbari	Dareng	0.087	0.079	0.107	0.013	0.178	0	7
367	Sikandarpur	Burhi Gandak	0.179	0.129	0.408	0.003	0.568	2	9
368	Simga	Seonath	0.027	0.027	-	0.010	0.042	0	3
369	Singla-Bazar	Rangit	1.262	1.262	-	0.031	3.282	2	1
370	Sivasagar	Dikhow	1.030	0.637	2.796	0.026	3.434	6	5
371	Sonapur	Digaru	0.480	0.550	0.062	0.062	1.171	4	3
372	Sonapurhat	Mahananda	0.395	0.395	-	0.062	0.763	2	1
373	Srikakulam	Nagavali	0.122	0.108	0.223	0.008	0.371	1	7
374	Srinagar	Alakananda	0.196	0.223	0.060	0.010	0.744	1	5
375	Sripalpur	Punpun	0.501	0.320	1.312	0.002	2.258	6	5
376	Suklai	Suklai	0.272	0.303	0.133	0.033	0.638	6	5
377	Sultanpur	Gomti	0.146	0.063	0.478	0.025	0.528	2	8
378	Sulurpet	Kalingi	0.107	0.107	-	0.107	0.107	0	1
379	Sundergarh	Ib	0.033	0.033	-	0.010	0.071	0	4
380	T. Bekuppe	Arkavathi	0.096	0.091	0.131	0.006	0.379	1	8
381	T. Narasipur	Kabini	0.087	0.043	0.264	0.010	0.264	0	5
382	T. Ramapuram	Hagari	0.060	0.060	-	0.025	0.109	0	3
383	T.K.Halli	Shimsha	0.027	0.027	-	0.010	0.053	0	4
384	Tal	Chambal	0.050	0.079	0.035	0.020	0.079	0	3
385	Talcher	Brahmani	0.168	0.096	0.676	0.009	0.676	1	7

S. No.	Water Quality Site	River	Iron (in mg/L)					BIS:10500;2012	
			Average			Min	Max	No. of Samples	
			Total	Non Monsoon	Monsoon			Above 0.3 mg/L	Below 0.3 mg/L
386	Tandi	Chenab/Bhaga	0.048	-	0.048	0.048	0.048	0	1
387	Teesta-Bazar	Teesta	0.346	0.404	0.053	0.029	1.204	2	4
388	Tehri	Bhagirath	0.825	0.825	-	0.238	1.412	1	1
389	Tekra	Pranhitha	0.089	0.056	0.238	0.011	0.427	1	10
390	Tezpur	Brahmaputra	2.347	1.306	7.031	0.027	9.872	7	4
391	Tezu	Lohit	0.487	0.104	2.022	0.003	3.052	3	7
392	Thengudi	Thirumalairajanar	0.012	0.012	-	0.005	0.017	0	3
393	Thengumarahada	Moyar	0.103	0.083	0.182	0.002	0.237	0	10
394	Theni	Suruliar	0.105	0.100	0.124	0.018	0.340	1	9
395	Therriaghat	Umsohrynkiew	0.036	0.033	0.044	0.002	0.059	0	7
396	Thevur	Sarabenga	0.007	0.007	-	0.007	0.007	0	1
397	Thimmanahalli	Yagachi	0.041	0.041	-	0.019	0.076	0	6
398	Thoppur	Thoppaiyar	0.146	-	0.146	0.146	0.146	0	1
399	Thumpamon	Achankovil	0.042	0.041	0.044	0.010	0.108	0	6
400	Tikarpara	Mahanadi	0.154	0.097	0.557	0.013	0.557	1	7
401	Tilga	Sankh	0.186	0.103	0.765	0.014	0.765	2	6
402	Tonk	Banas	0.065	0.075	0.054	0.054	0.075	0	2
403	Tribeni	Gandak	0.474	0.260	1.438	0.013	2.688	3	8
404	Tufanganj	Raidak-I	0.499	0.613	0.045	0.034	2.271	1	4
405	Tuini	Tuini	0.055	0.058	0.040	0.002	0.157	0	11
406	Turtipar	Ghagra	0.584	0.636	0.377	0.007	2.231	4	6
407	Udaipur (Chandra)	Chenab/Chandra	0.049	-	0.049	0.049	0.049	0	1
408	Udaipur (Tirap)	Tirap	1.318	0.816	3.575	0.019	4.132	7	4
409	Udi	Chambal	0.125	0.127	0.117	0.001	0.276	0	9
410	Ujjain	Sipra	0.050	0.075	0.025	0.025	0.075	0	2
411	Urachikottai	Cauvery	0.033	0.029	0.056	0.009	0.056	0	6
412	Uttarkashi	Bhagirath	0.180	0.206	0.060	0.002	1.107	2	9
413	Vandiperiyar	Periyar	0.573	0.678	0.047	0.027	3.115	1	5
414	Vapi	Damanganga	0.354	0.214	0.845	0.015	1.311	4	5
415	Varanasi	Ganga	0.167	0.088	0.527	0.022	0.873	1	10
416	Vautha	Sabarmati	0.349	0.302	0.562	0.032	0.780	6	5
417	Vazhavachanur	Ponnaiyar	0.034	0.034	-	0.016	0.069	0	4
418	Villupuram	Ponnaiyar	0.032	0.032	-	0.032	0.032	0	1
419	Wadenapally	Krishna	0.053	0.050	0.068	0.008	0.106	0	7
420	Wairagarh	Khobragarhi	0.160	0.057	0.419	0.028	0.559	1	6
421	Warunji	Koyna	0.191	-	0.191	0.191	0.191	0	1
422	Yadgir	Bhima	0.154	-	0.154	0.154	0.154	0	1
423	Yashwant nagar	Giri	0.056	0.061	0.032	0.001	0.162	0	11
424	Yennehole	Yennehole	0.208	0.034	0.905	0.013	0.905	1	4

River Data Compilation-2 Directorate

Central Water Commission

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